APPENDIX J – 2012 DRAFT ENVIRONMENTAL IMPACT STATEMENT (INCLUDING ATTACHMENTS AND APPENDICES)

SR 126 (MEMORIAL BOULEVARD) CORRIDOR IMPROVEMENT PROJECT

From East Center Street to Interstate 81 in Sullivan County, Kingsport, Tennessee

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to the National Environmental Policy Act of 1969
42 U.S.C. 4332(2)(c) and 49 U.S.C. 303

U.S. Department of Transportation
Federal Highway Administration,
Tennessee Department of Transportation
Environmental Division

Cooperating Agencies:
U.S. Army Corp of Engineers
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The State Route 126 (Memorial Boulevard) improvement project is a joint effort between the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA). The limits of the 8.4 mile long project extend from East Center Street, within the City of Kingsport's City Limits, east to Interstate 81 (I-81) in Sullivan County, Tennessee. Two Build Alternatives and the No-Build Alternative are currently under consideration for this project.

1/5/2012
Date

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Summary

SUMMARY

S.1 GENERAL PROJECT DESCRIPTION

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), is proposing to improve State Route (SR) 126. The limits of the 8.4 mile long project extend from East Center Street, within the City of Kingsport's City Limits, east to Interstate 81 (I-81) in Sullivan County, Tennessee. SR 126 is also known as Memorial Boulevard within the study limits.

SR 126 (Memorial Boulevard) is primarily a two-travel lane facility (one travel lane in each direction) throughout the study corridor. Each travel lane is approximately eleven feet wide. The existing right-of-way varies from approximately sixty feet to three hundred feet wide. The speed limit varies from thirty-five to fifty miles per hour. Many sharp curves and steep grades along the route are signed with supplemental speed plaques advising lower safe travel speeds than the posted speed limit. Many roadside hazards are located in close proximity to the travel lanes. Narrow shoulders are present along the majority of the route. Sidewalks are present along approximately 0.1 mile (1%) of the 8.4 mile long corridor. Curbs are located sporadically along the route, with the majority of the corridor having roadside ditches.

Two Build Alternatives and the No-Build Alternative are currently under consideration for this project. The Build Alternatives improve SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas.

S.2 PURPOSE AND NEED OF THE PROPOSED ACTION

The purpose of the project is to provide a safe, efficient route for local traffic between the City of Kingsport and I-81. Improvements should be sensitive to the context of the different land uses along the corridor. Specifically, the improvements along the western half of the project, which is more commercial and residential, should provide improved access to adjacent businesses and homes and improved pedestrian and bicycle connectivity. The improvements along the eastern half of the project should complement the rural nature of the area.

The needs of the project can be summarized as follows:

- The safety of the route needs to be improved. The crash rates observed along the entire SR 126 (Memorial Boulevard) study corridor exceeded the statewide average crash rates for similar roadway segments.
- The width of the roadway generally needs to be improved. Most of the existing roadway includes 11-foot wide lanes with narrow shoulders.
- The width of the shoulders needs to be improved. The shoulders along the route are typically no wider than 2 feet and often not paved. The narrow shoulders, along with other existing geometric deficiencies, contribute to the high crash rates and create a less than desirable route for pedestrians and bicyclists.
- The geometry of the roadway needs to be improved. Numerous horizontal and vertical curves along the route are inadequate for the posted speed limit.
- Improved access management is needed along the commercial areas of the route. The public cited access onto SR 126 (Memorial Boulevard) as a major problem. Difficulty entering or exiting business parking lots was identified as a significant problem because of uncontrolled access to businesses along the roadway. Many of the access points are located near or within substandard curves or hills that limit sight distance for drivers attempting to turn into or out of the businesses.
- Improved response time for emergency vehicles is needed. With improvements, emergency vehicles would be able to respond more efficiently to emergencies within and near the project corridor. Wider shoulders would enable motorists to pull over and allow the emergency vehicles to pass through to their intended destinations. Current conditions along SR 126 (Memorial Boulevard) do not feature many areas for vehicles to pull over.
- Improved access for mail delivery is needed. Current geometric conditions along SR 126 (Memorial Boulevard) create bottlenecks during mail delivery. Wider shoulders would enable delivery vehicles to depart the travel lane and motorists pass more safely.
- Improved access for school busses is needed. Current geometric conditions along SR 126 (Memorial Boulevard) make it difficult for school busses to make turns. Wider paved roadway widths would improve accessibility for the school busses along the corridor.
- Improved traffic operations are needed along the route.

S.3 ALTERNATIVES

In selecting reasonable alternatives to meet the purpose and need of the project, TDOT consulted with local, state and federal officials and agencies, identified environmentally sensitive areas and held several public involvement meetings in the project corridor. The SR 126 (Memorial Boulevard) project was the initial Context Sensitive Solutions (CSS) Project for

Tennessee. The CSS Process included a Community Resource Team (CRT) that assisted with the development of alternatives. The No-Build and two Build Alternatives are currently under consideration for this project. The final selection of the preferred alternative will not be made until after the impacts of the No-Build and Build Alternatives, comments on the Draft EIS, and the comments from the NEPA Public Hearing have been fully evaluated.

Both of the Build Alternatives were recommended by the Citizens Resource Team (CRT).

S.3.1 No-Build

The No-Build Alternative would leave SR 126 (Memorial Boulevard) between East Center Street and I-81 in its current configuration with no improvements to the roadway other than routine maintenance.

S.3.2 Build Alternative A

Several different typical cross sections are proposed along the SR 126 (Memorial Boulevard) corridor. Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to 54% of the corridor within the commercial and residential areas. The wider shoulders and additional sidewalks will promote bicycle and pedestrian usage of the facility. Deficient horizontal and vertical curves will be improved. Additional right-of-way will be required along the entire corridor to accommodate the proposed improvements. **Chapter 2** describes the proposed roadway cross-sections in detail.

The proposed alignment of Alternative A generally follows the existing alignment. The proposed alignment shifts from side to side to minimize impacts, reduce earthwork volumes, simplify constructability, and improve the curvature of the roadway. Despite the effort to minimize impacts, considerable additional right-of-way will be required and many residences and businesses will need to be relocated. Numerous gravesites will also need to be relocated.

In addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved. Many of these minor connections intersect SR 126 (Memorial Boulevard) at skewed angles. Realigning side road approaches to intersect to as close to 90 degrees as possible has proven visibility and safety benefits.

Additionally, several intersections are proposed to be closed along SR 126 (Memorial Boulevard). These minor connections to SR 126 (Memorial Boulevard) will be rerouted to connect via improved intersections on neighboring roads. Closing these intersections will improve access control and safety along the route due to the reduction of conflict points.

S.3.3 Build Alternative B

Alternative B is a refinement of Alternative A. Alternative B utilizes the same proposed typical roadway cross sections as Alternative A, but the length of the four-travel lane section is reduced by approximately ½ of a mile. As with Alternative A, improved shoulders will be provided along the entire corridor. Sidewalks will be extended to 59% of the corridor within the commercial and

residential areas. The wider shoulders and additional sidewalks will promote bicycle and pedestrian usage of the facility. Deficient horizontal and vertical curves will be improved. Retaining walls will be utilized with Alternative B in the vicinity of historic Yancey's Tavern and East Lawn Memorial Gardens Cemetery. These modifications were made to minimize impacts to Yancey's Tavern and the East Lawn Memorial Gardens Cemetery located on opposing sides of SR 126 (Memorial Boulevard). It should be noted that numerous gravesites will still need to be relocated with Alternative B. Additional changes incorporated into Alternative B include minor modifications of the proposed centerline to minimize excavation and fill impacts and improve maintenance of traffic during construction. Alternative B subsequently requires less additional right-of-way and impacts fewer residences and businesses than Alternative A. **Chapter 2** describes the proposed roadway cross-sections in detail.

As with Alternative A, in addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved or closed. These side road modifications improve the safety and access control along SR 126 (Memorial Boulevard). The side road approaches modified in Alternative B are the same as those in Alternative A. Both of the Build Alternatives were recommended by the Citizens Resource Team (CRT).

S.4 ENVIRONMENTAL IMPACTS

S.4.1 Land Use Impacts

Land use will change as land currently in agricultural, residential, commercial, open farmland, or other uses, is converted to highway right-of-way. Secondary development resulting from the proposed project is likely to occur in the surrounding neighborhoods. Numerous gravesites will be impacted by the Build Alternatives.

The indirect and cumulative impacts to land use involves the conversion of land from agricultural use and open space to residential, and commercial uses, as well as converting commercial uses to residential uses. This conversion is already occurring at various locations in the project area. Based on a review of land use plans prepared by the surrounding communities, as the population rate increases and job opportunities increase, it is likely that the need for more residential and commercial development will continue for decades. These land use changes will result in the loss of wildlife habitat, wetlands, forested areas, farmland, as well as impact the floodplains of the surrounding rivers and streams. The number of acres of potential loss cannot be accurately determined at this time.

S.4.2 Relocation Impacts

Alternative A will result in an estimated two hundred and forty-one (241) residential relocations, forty-three (43) business displacements, and one (1) non-profit displacement. Alternative B will result in one hundred and sixty-two (162) residential relocations, thirty (30) business displacements, and one (1) non-profit displacement.

A study of the real estate market in the project area indicates a market not capable of supporting the one hundred and sixty-two (162) to two hundred and forty-one (241) residential displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number of relocations, but not easily. It

will be difficult to adequately address the varying needs of all those displaced by this project. Numerous, substantial Last Resort Housing Payments could be expected.

A study of the real estate market in the project area reveals that it is unlikely that the thirty (30) to forty-three (43) business displacees can relocate in the immediate project area. Successful relocation will require many of the businesses to expand their search area beyond the immediate project area.

This project is expected to cause one (1) non-profit displacement (a Kingsport volunteer fire department station) with either alternate. Due to the nature of the non-profit displacement, it will need to relocate in close proximity to its current location. Based on a study of the local real estate market, it is believed that suitable replacement sites do exist, but not in great numbers. This is complicated by the large number of businesses displaced by the project.

S.4.3 Economic Impacts

There will be long-term adverse economic impacts due to the construction of Alternative A or B. Permanent loss of tax revenue would result if a business closes or moves out of the project area due to the thirty (30) (Alternative B) or forty-three (43) (Alternative A) business displacements. The associated residential displacements of one hundred sixty-two (162) for Alternative B and two hundred forty-one (241) for Alternative A will also impact tax revenues.

S.4.4 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, February 11, 1994, requires that the evaluation of federal actions identify and address disproportionately high and adverse human health and environmental impacts on low income and minority populations. The evaluation of the Build Alternatives has revealed no concentration of low-income or minority populations along the corridor. The Build Alternatives will not change the basic social arrangement or character of the project area and would not create a barrier to social interaction.

S.4.5 Hazardous Materials

A number of potential hazardous material sites have been identified within the proposed right-of-way. Additional studies are recommended at three (3) sites within the proposed right-of-way to determine the contents and extent of materials and the specific impacts they may possess to the surrounding community. In the event that hazardous substances or wastes are encountered within the proposed right-of-way of the Build Alternatives, their disposition shall be subject to the applicable sections of the Federal Resources Conservation and Recovery Act (RCRA), as amended, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, and the Tennessee Hazardous Waste Management Act of 1983.

The Build Alternatives will involve the removal of buildings and has the potential for encountering friable asbestos. Pursuant to the TDOT Standard Specifications for Road and Bridge Construction (March 2006), the construction contractor must notify the Tennessee Department of Environment and Conservation (TDEC) prior to the demolition of any building in accordance with TDEC policy and regulations. All structures containing friable asbestos must be demolished in accordance with these regulations and policies.

S.4.6 Protected Species

The proposed project is not likely to affect any federally listed, threatened, or endangered species or critical habitat. Although the Indiana Bat is not known to occur in the project area, at the request of the United States Fish and Wildlife Service (USFWS), a bat survey was conducted. Mist nets and field reviews were conducted in the project impact area. No Indiana Bats were located. A copy of the *Indiana Bat (Myotis sodalis) Mist Net Survey*, dated October 2011, is on file at the TDOT Environmental Division Office in Nashville, TN. Based on the best information available at this time, the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Correspondence with the USFWS can be found in **Appendix C**.

S.4.7 Historic Impacts

> The goal of **Section 106** is to identify historic properties potentially affected by a Federal undertaking, assess the undertakings effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

Two properties protected under Section 106 of the National Historic Preservation Act of 1966 are located in the project area. The Shipley-Jarvis House is eligible for listing in the National Register of Historic Places (NRHP). The house is located on the south side of SR 126 (Memorial Boulevard) near the beginning of the project. No land will be acquired from this site. The second site, Yancey's Tavern, is listed in the NRHP. It is located on the north side of SR 126 (Memorial Boulevard) on Chestnut Ridge Road. SR 126 (Memorial Boulevard) is proposed to be widened to the south side of the roadway. However, it has been determined that widening the roadway will have an "Adverse Visual Effect" on this property. In compliance with 36 CFR 800, a Memorandum of Agreement (MOA) between the SHPO and FHWA to address the adverse effect finding to Yancey's Tavern will be executed prior to approval of the Final Environmental Impact Statement. A more detailed explanation can be found in **Chapter 4**, Historical Impacts.

S.4.8 Archaeological Impacts

A Phase I Cultural Resource Survey identified four archaeological sites in the project area (40SL412, 40SL413, 40SL419, and 40SL421). The proposed Build Alternatives have been modified to avoid impacting these sites. It was determined based on the field survey that no historic archaeological properties would therefore be impacted by the project and no further investigations were needed. The SHPO has concurred in this finding. The SHPO letter can be found in **Appendix B**.

If archaeological materials are uncovered during construction, all construction work in the area of the find will cease. The Tennessee Division of Archaeology (615-741-1588) and the recognized Native American Tribes previously coordinated with will be immediately contacted so a representative of their office may have the opportunity to examine and evaluate the materials.

S.4.9 Section 4(f) Evaluation

As described in **Section S.4.7**, there are two historic properties, one listed and one eligible for listing in the National Register of Historic Places located along the project corridor. The widening of SR 126 (Memorial Boulevard) will not require taking land from these two historic properties. There are no parks, recreation areas, waterfowls or wildlife refuges in the project impact area. No properties protected under Section 4 (f) of the US Department of Transportation Act of 1966 will be impacted in the project area.

> The purpose of **Section 4(f)** is to preserve publicly owned land from a public park, recreation area, wildlife or waterfowl refuge, or significant historic site from being used for a transportation project. It requires consideration of avoidance or mitigation of damages.

S.4.10 Executive Order 11990 Wetland Impacts

There are no State or Federal jurisdictional wetlands in the project impact area.

S.5 PERMITS NEEDED

The Build Alternatives will require both State and Federal Water Quality Permits for stream crossings. Section 404 permits from the USACE, National Pollutant Discharge Elimination System (NPDES) permits, and Tennessee Water Quality Permits will be needed. A Section 26a permit or letter of no objection from the Tennessee Valley Authority is also required. TDOT will coordinate any mitigation efforts with Federal and State regulatory agencies before preparing final mitigation plans and submitting permit applications. It is during the permitting process phase that the appropriate compensatory mitigation for the unavoidable impacts of this project will be determined.

S.6 AREAS OF CONTROVERSY AND UNRESOLVED ISSUES

The primary areas of concern related to the Build Alternatives include:

- The displacement of ninety (90) to three hundred and fifty (350) graves, dependent upon which Build Alternative is selected.
- The displacement of one hundred and sixty two (162) to two hundred and forty one (241) residential relocations, dependent upon which Build Alternative is selected.
- The displacement of thirty (30) to forty-three (43) business displacements, dependent upon which Build Alternative is selected.

S.7 STATUTE OF LIMITATIONS ON FILING CLAIMS

The Federal Highway Administration (FHWA) may publish a notice in the Federal Register, pursuant to 23 USC § 139 (I), indicating that one or more Federal agencies have taken final action on permits, licenses, or approvals for this project. If such notice is published, claims seeking judicial review of those Federal agency actions will be barred unless such claims are filed within 180 days after the date of publication of the notice, or written such that a shorter time period as is specified in the Federal laws pursuant to which judicial review of the Federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the Federal laws governing such claims will apply.

S.8 OTHER MAJOR FEDERAL ACTIONS

There are no other major transportation improvement actions proposed by TDOT, FHWA, or other government agencies near the project study area.

TABLE A: SUMMARY OF PROJECT DATA & ESTIMATED IMPACTS

Summary of Project Data & Estimated Impacts for SR 126 (Memorial Boulevard)				
Item		No-Build	Build Alternative A	Build Alternative B
Functional Classification		Minor Arterial	Minor Arterial	Minor Arterial
Length (Miles)		8.4	8.4	8.4
Cross Sections (feet)[1]				
From:	To:			
East Center St.	Hillcrest Drive	60	160	160
Hillcrest Drive	SR 93	100	160	160
SR 93	SR 93	160	160	160
SR 93	Heather Lane	120	160	160
Heather Lane	Old Stage Road	120	160	160
Old Stage Road	Lemay Drive	120	200	200
Lemay Drive	Cooks Valley Road	120	200	120
Cooks Valley Road	Harr Town Road	120	120	120
Harr Town Road	Cochise Trail	120	160	160
Cochise Trail	Carolina Pottery Drive	60	160	160
Carolina Pottery Drive	I-81	160	300	300
I-81	I-81	300	300	300
Year 2013 AADT		8,450 - 25,800	8,450 - 25,800	8,450 - 25,800
Year 2033 AADT		13, 520 - 33,540	13, 520 - 33,540	13, 520 - 33,540
Percent Trucks		6%	6%	6%
Estimated Right-of-Way Acquisition (Acres)		0	239	121
Residential Displacements		0	241	162
Business Displacements		0	43	30
Non-Profit Displacements (Volunteer Fire Sta.)		0	1	1
Air Quality/Noise Impacts Requiring Mitigation		0	0	0
Archaelogical Sites Impacted		0	0	0
Historic Sites Impacted[2]		0	1	1
Section 4(f) Properties Impacted		0	0	0
Gravesites Impacted		0	350	90
Wetlands Impacted (Acres)		0	0	0
Stream Crossings (Linear Feet)		0	4863	3107
Floodplains Impacts (Acres)		0	4	3.2
Forest Land Acquired (Acres)[3]		0	75	54.8
Threatened/Endangered Species Impacts		0	0	0
Hazardous Material Sites Impacted (Parcels)		0	2	3
Farmland Impacted (Acres)		0	15	5
Estimated Right-of-Way Cost		$ -	$ 60,000,000	$ 48,000,000
Estimated Utility Cost		$ -	$ 5,316,000	$ 4,565,000
Estimated Construction Cost		$ -	$ 55,000,000	$ 47,000,000
Total Estimated Project Cost		$ -	$ 120,316,000	$ 99,565,000

1. The estimated ROW width is reported and based upon the typical width needed for each typical section. Actual proposed ROW widths will vary throughout the project based upon the use of slope easements, total versus partial property acquisitions, uneconomicremnants, etc.
2. Adverse visual impact
3. Includes all forest land impacted within the estimated construction limits, which may be within slope easements and outside of the ROW limits

S.9 ENVIRONMENTAL COMMITMENTS

Throughout this Environmental Impact Statement (EIS), measures are detailed to avoid, minimize, or mitigate the impacts of the proposed project on the human and natural environments. Unique commitments, outside of the normal or standard requirements of a federally funded project, including Federal and State laws, regulations, policy, best practice, and TDOT's Standard Specifications, are summarized as follows:

S.9.1 Hazardous Materials

The following three (3) sites will be evaluated as potential hazardous waste sites prior to submittal of the Final EIS.

- English Cabinets (5236 Memorial Boulevard, Kingsport, TN)
- People's Food Store (3104 Memorial Boulevard, Kingsport, TN)
- Richard Chadbourne Property (5340 Memorial Boulevard, Kingsport, TN)

A Phase II Environmental Site Investigation will be performed on the following three (3) parcels identified in the Phase I Hazardous Materials Survey Report.

- Fuel and Convenience Store (4001 Memorial Boulevard, Kingsport, TN)
- Dry Cleaning Service (3200 Memorial Boulevard, Kingsport, TN)
- Fuel and Convenience Store (5121 Memorial Boulevard)

S.9.2 Protected Species

The United States Fish and Wildlife Service (USFWS) has concurred with a "not likely to adversely affect" finding concerning the federally endangered Indiana Bat (Myotis sodalis). However, to further minimize potential for harm to the Indiana Bat, trees with a diameter at breast height of five inches or greater will not be removed from October 15 through March 31.

S.9.3 Historical

The State Historic Preservation Office (SHPO) has reviewed the project and in a letter dated November 3, 2008 stated that an adverse visual effect to Yancey's Tavern would occur if either Build Alternative was selected. Supporting documentation along with the final Memorandum of Agreement (MOA), developed in consultation with the SHPO, and any other consulting parties, must be filed with the Advisory Council on Historic Preservation (ACHP) in accordance with 36 CFR 800.6(b)(1)(iv) and Section 106 of the National Historic Preservation Act. The MOA will be prepared and signed prior to approval of the Final Environmental Impact Statement.

S.9.4 Archaeological

Four archaeological sites are located in the project area (40SL412, 40SL413, 40SL419, and 40SL421). The proposed Build Alternatives have been modified to avoid impacting these sites. However, if archaeological materials are uncovered during construction, all construction work in the area of the find will cease. The Tennessee Division of Archaeology (615-741-1588) and the recognized Native American Tribes previously coordinated with will be immediately contacted so a representative of their office may have the opportunity to examine and evaluate the materials. Any sites identified during construction of the proposed project will be monitored during construction activities to ensure that the areas are avoided and not utilized as equipment staging areas or otherwise impacted by the construction of the project.

Since the initial consultation with the Native American Tribes, two (2) additional tribes have been recognized, The Cherokee Nation and the Shawnee Tribe. Consultation with these additional Native American Tribes will be completed prior to submittal of the FEIS.

S9.5 Miscellaneous

TDOT will comply with the Tennessee State Burial Law: TCA 46-4-101-104 (Termination of land use as cemetery) for the relocation of any grave sites.

A volunteer fire department station (Number Four) will be acquired and relocated with either Build Alternative A or B. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents.
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ACRONYMS

ADA	Americans with Disabilities Act
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
AADT	Average Annual Daily Traffic
APE	Area of Potential Effect
APR	Advanced Planning Report
ARAP	Aquatic Resources Alterations Permit
BMPs	Best Management Practices
C&G	Curb and Gutter
CAAA	Clean Air Act Amendment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CRT	Community Resource Team
CSS	Context Sensitive Solutions
db	Decibels
dBA	A-weighted sound levels in decibels
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ETW	Exceptional Tennessee Waters
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
Ft.	Foot
GPS	Global Positioning System
HC	Hydrocarbons
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
I	Interstate
KATS	Kingsport Area Transit Service
Leq	Equivalent continuous sound level
L.M.	Log Mile
LOS	Level of Service
LUST	Leaking Underground Storage Tank
LRTP	Long Range Transportation Plan
MOE	Measures of Effectiveness
MPO	Metropolitan Planning Organization
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHS	National Highway System
NO	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

NWI	National Wetland Inventory
O3	Ozone
ONRW	Outstanding Natural Resource Waters
PE	Preliminary Engineering or Professional Engineer
pH	Level of acidity of water
PIN	Project Identification Number
PM	Particulate matter
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
RSAR	Road Safety Audit Report
SHPO	State Historic Preservation Office
Sox	Sulfur Oxides
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TCA	Tennessee Codes Annotated
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Program
TPR	Transportation Planning Report
TSM	Transportation Systems Management
TVA	Tennessee Valley Authority
TWLTL	Two Way Left Turn Lane
TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Services
US	United States
USC	United States Codes
UST	Underground Storage Tank
v/c	Volume to Capacity Ratio
VOC	Volatile Organic Compound

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Appendix E Context Sensitive Solutions Conceptual Alternatives

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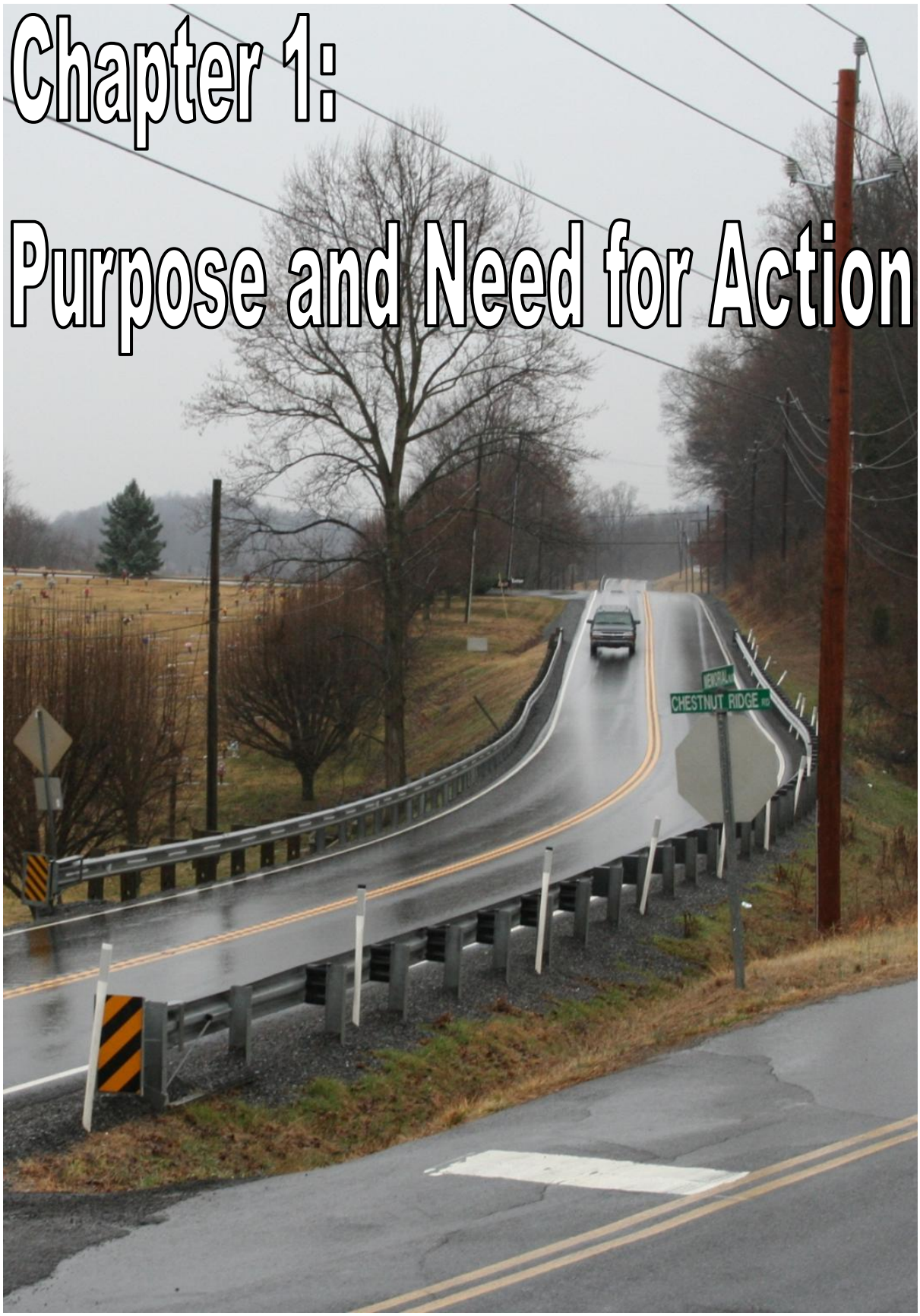
Chapter 1: Purpose and Need for Action



1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The State Route (SR) 126 improvement project is a joint effort between the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA). The limits of the 8.4 mile long project extend from East Center Street, within the City of Kingsport's City Limits, east to Interstate 81 (I-81) in Sullivan County, Tennessee. SR 126 is also known as Memorial Boulevard within the study limits.

SR 126 (Memorial Boulevard) is primarily a two-travel lane facility (one travel lane in each direction) throughout the study corridor. Two Build Alternatives and the No-Build Alternative are currently under consideration for this project. The Build Alternatives improve SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas. The existing roadway conditions and the Build Alternatives are discussed in more detail in **Section 1.2** and **Chapter 2** of this document, respectively. Conceptual Layouts of the Build Alternatives are provided in **Appendix D**.

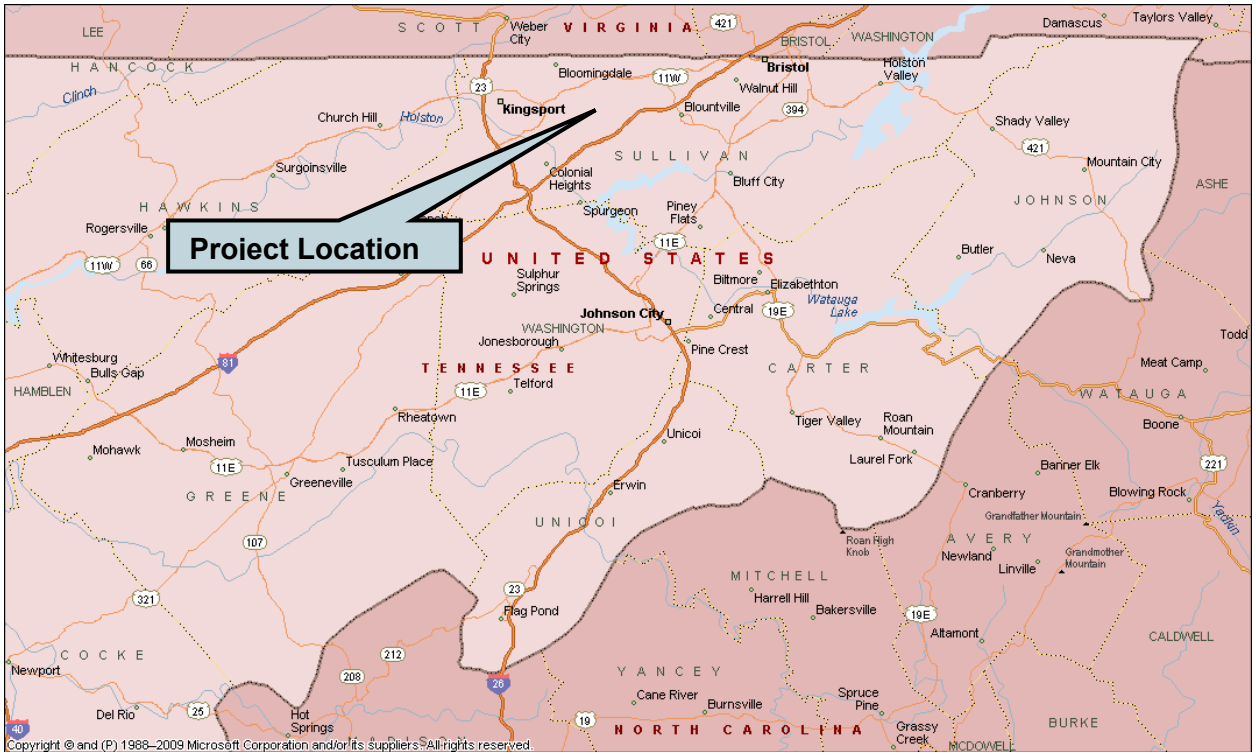


FIGURE 1.1.1: PROJECT OVERVIEW MAP

The proposed SR 126 (Memorial Boulevard) improvement project is located within the Kingsport Area Metropolitan Planning Organization's (MPO) jurisdiction. In 1977 the Kingsport Area MPO was created by federal legislation and organized by the Tennessee Department of Transportation (TDOT) and the Virginia Department of Transportation (VDOT) to develop efficient and safe street and highway networks and other transportation modes. Of utmost

importance was to approach transportation problems in highly populated areas without dividing the planning area up according to jurisdiction; the idea being that transportation systems cross jurisdictional lines. The Kingsport MPO is comprised of the following jurisdictional members; in Tennessee – TDOT, City of Kingsport, Town of Mount Carmel, Town of Church Hill, Hawkins County, and Sullivan County; representatives in Virginia include the Virginia Department of Transportation, Weber City, Gate City, and Scott County. Additional members who are in an advisory role include the Federal Transit Administration, Federal Highway Administration, First Tennessee Development District, the Tennessee Office of Local Planning (representing Church Hill and Mount Carmel), and the LENOWSICO Virginia Planning District Commission (representing Gate City and Weber City). Improvements along SR 126 (Memorial Boulevard) are included in the *Kingsport Metropolitan Area 2030 Transportation Plan*, dated June 14, 2007 and amended January 10, 2008. The plan addresses the future transportation needs within the MPO boundary.

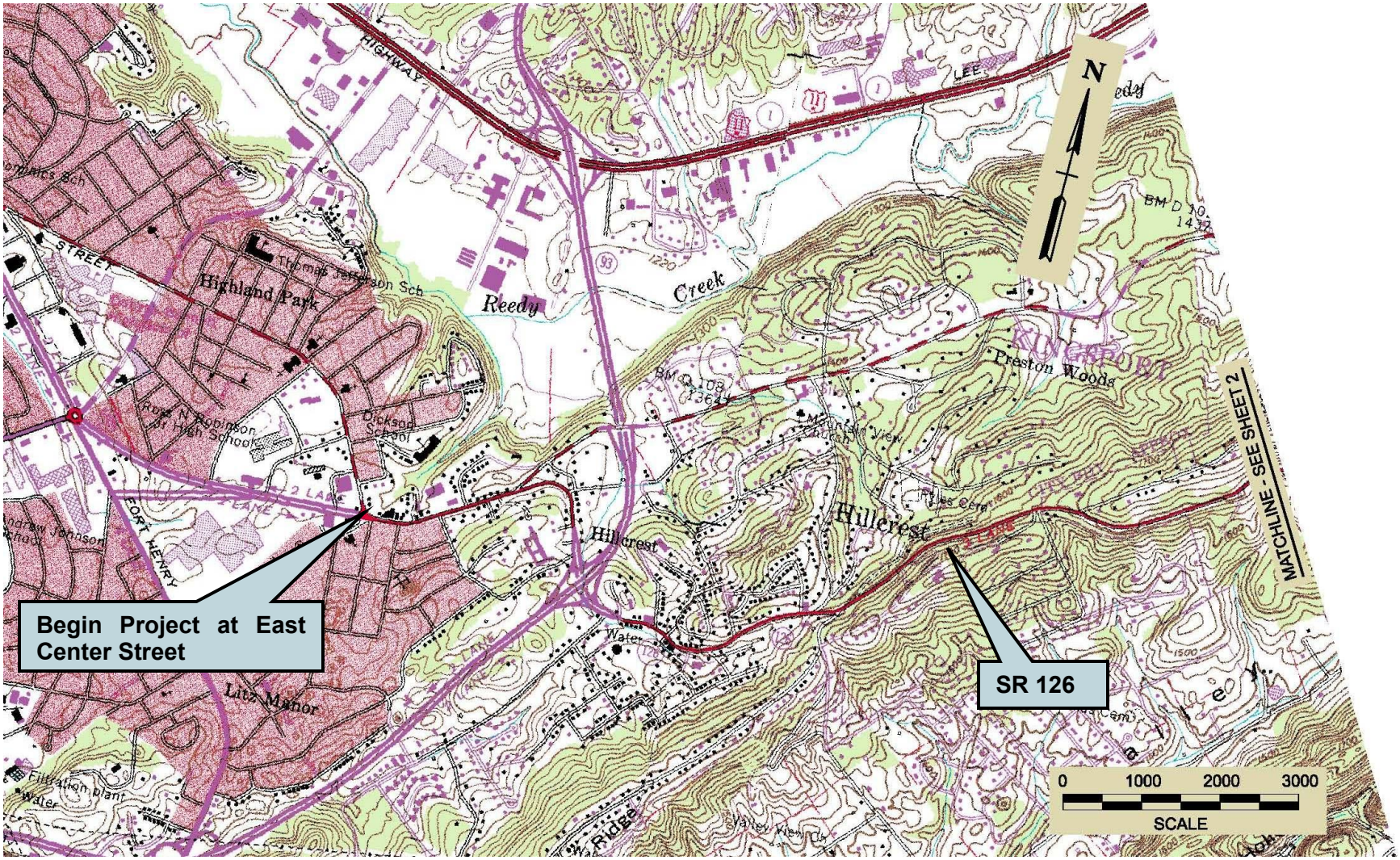


FIGURE 1.1.2: PROJECT LOCATION MAP (1 OF 3)
USGS Indian Springs and Kingsport Quad Maps

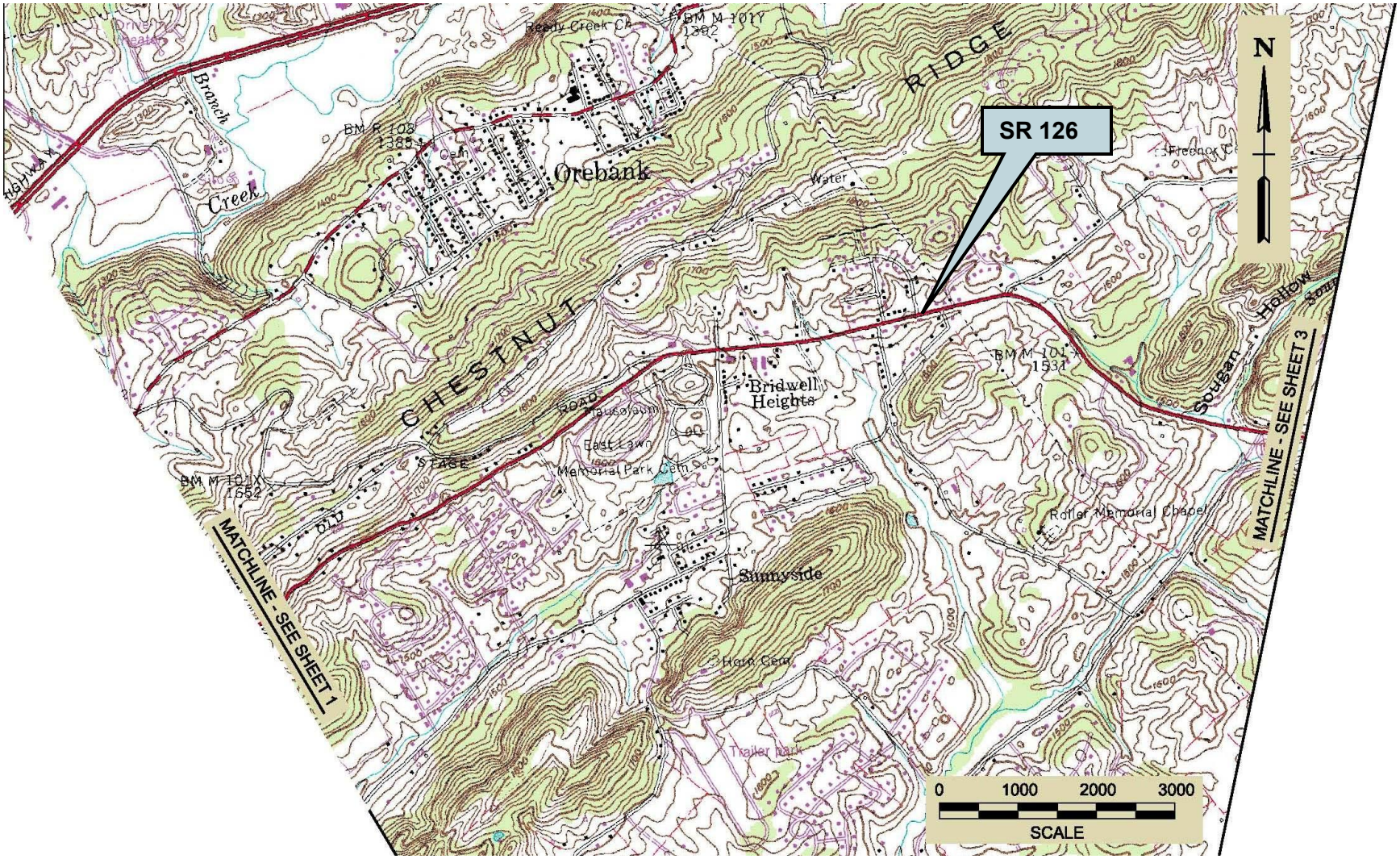


FIGURE 1.1.2: PROJECT LOCATION MAP (2 OF 3)
USGS Indian Springs and Kingsport Quad Maps

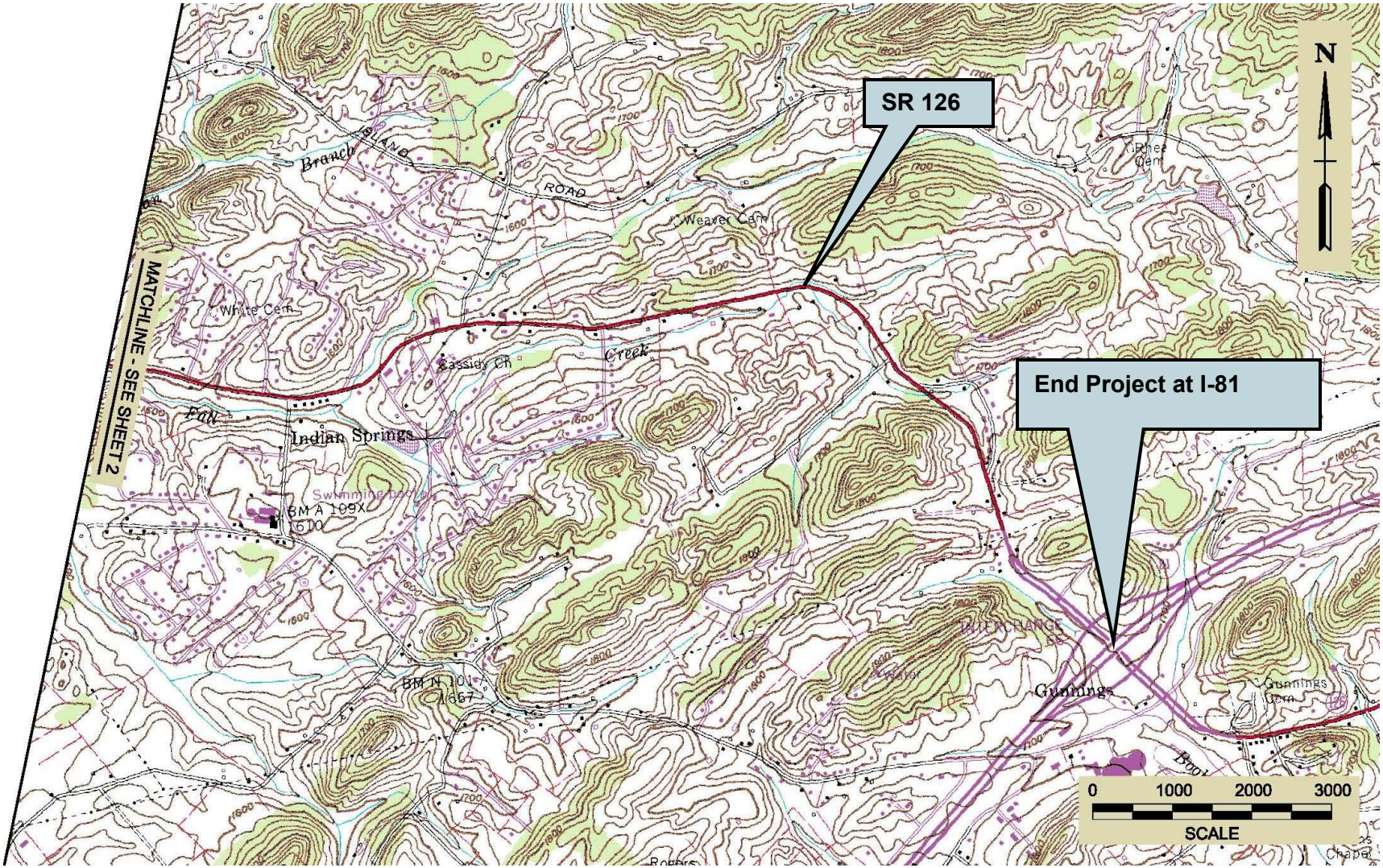


FIGURE 1.1.2: PROJECT LOCATION MAP (3 OF 3)
USGS Indian Springs and Kingsport Quad Maps

FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (1 OF 4)
(Log Mile 3.72 to Log Mile 5.7)

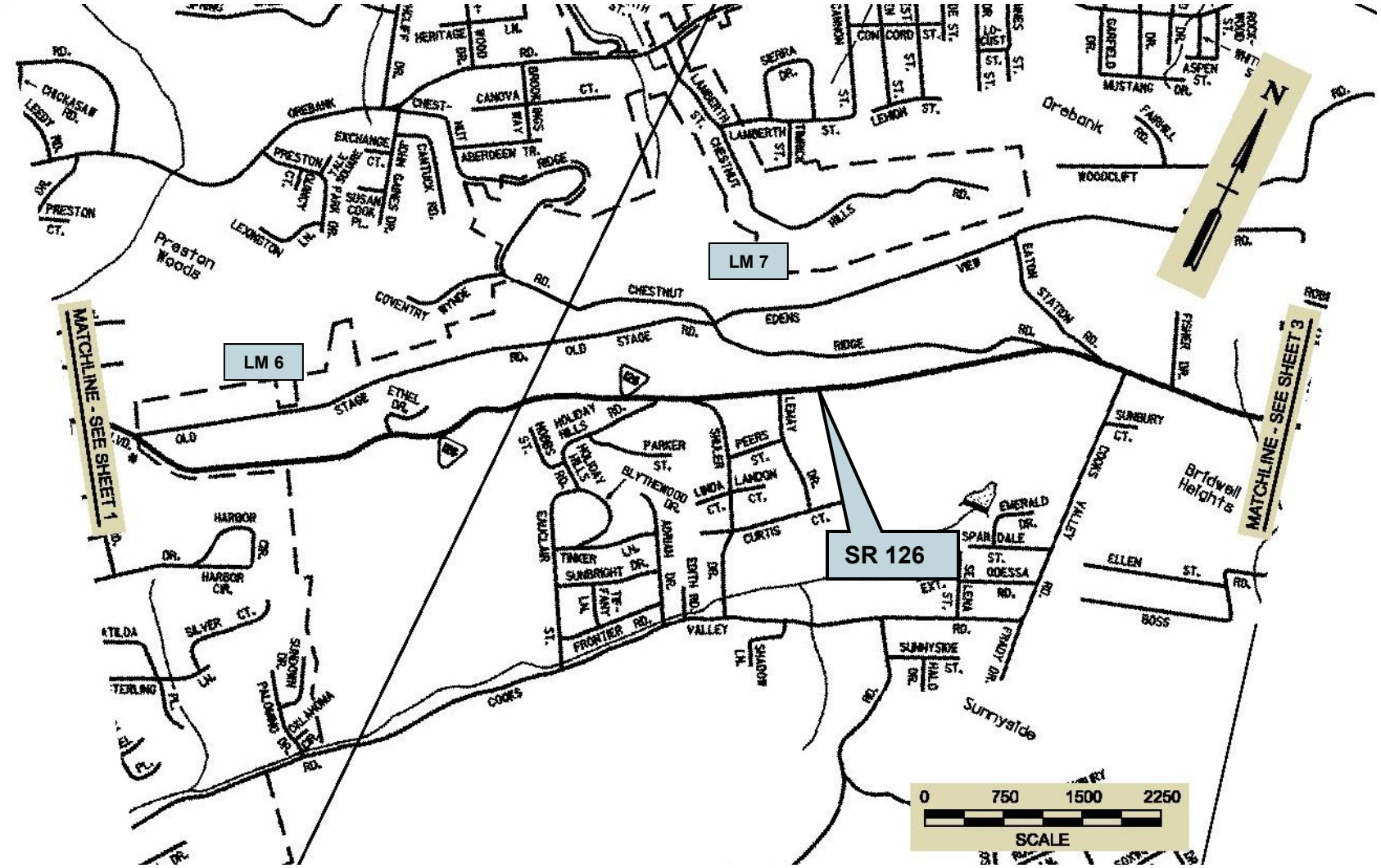


FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (2 OF 4)
(Log Mile 5.7 to Log Mile 7.99)

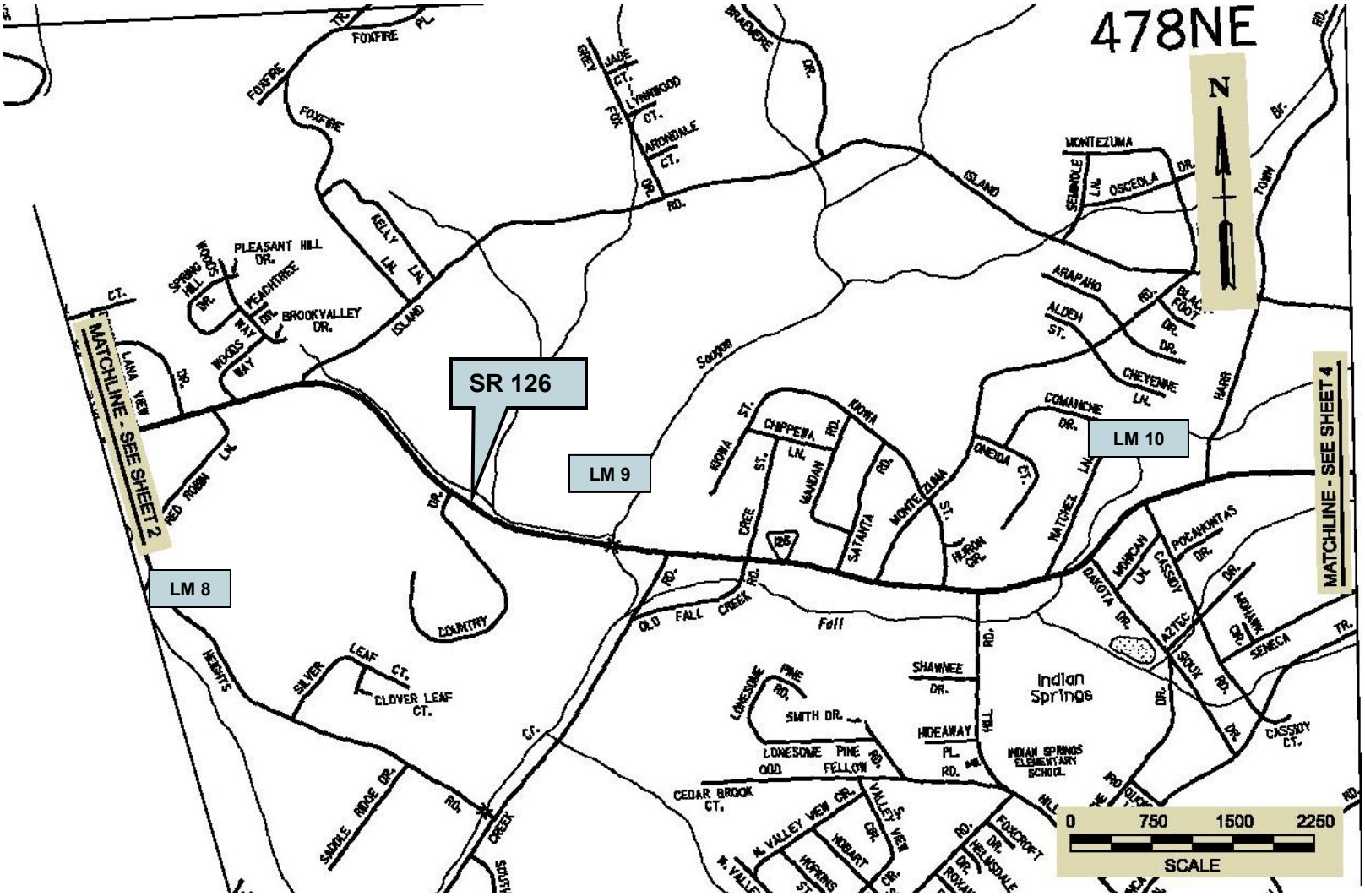


FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (3 OF 4)
(Log Mile 7.99 to Log Mile 10.37)

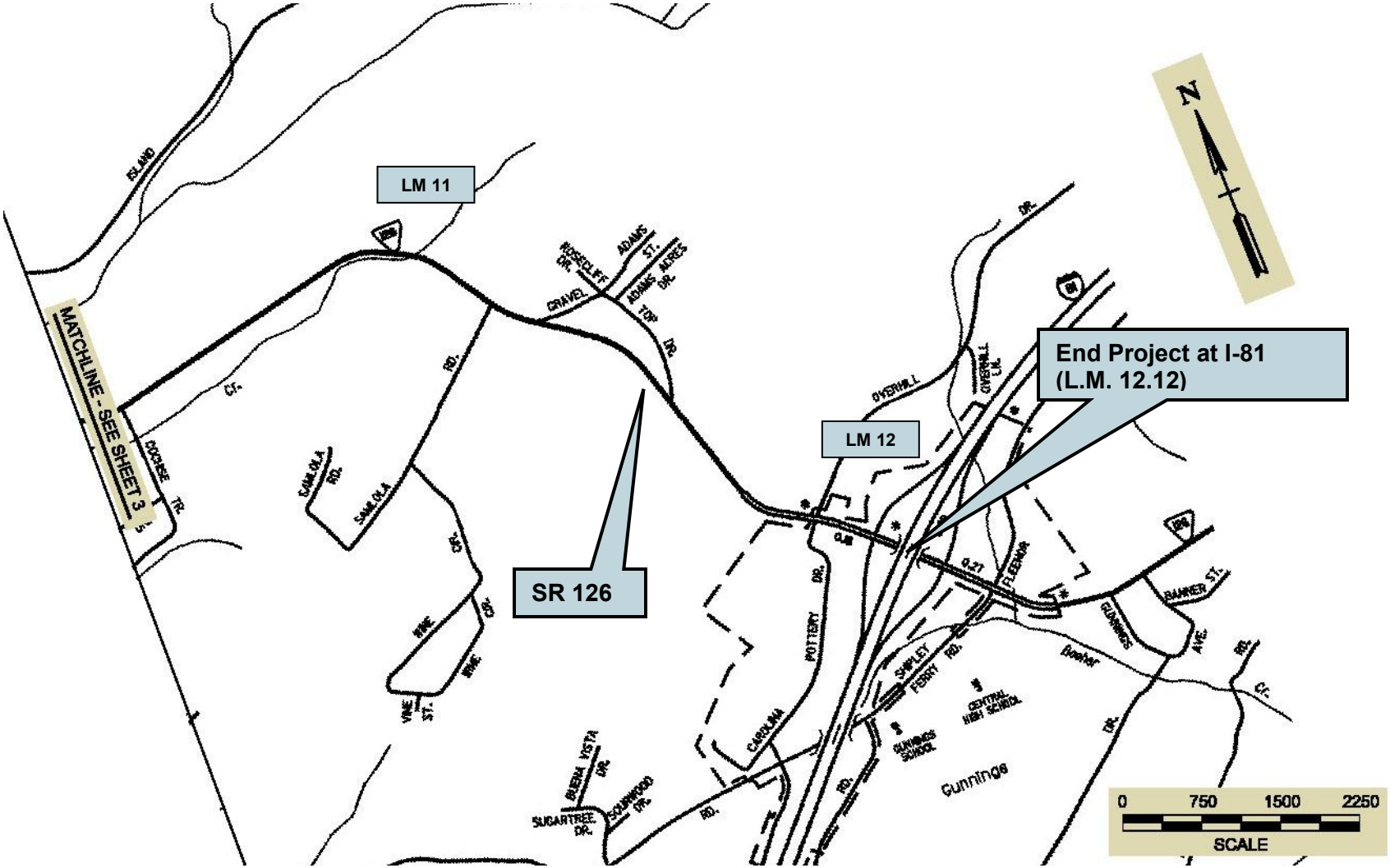


FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (4 OF 4)
(Log Mile 10.37 to Log Mile 12.12)

1.2 DESCRIPTION OF THE STUDY CORRIDOR

1.2.1 Description of the Adjacent Community

The terrain is rolling within the 8.4 mile long study limits between East Center Street and I-81. Due to the terrain, many side roads intersect SR 126 (Memorial Boulevard) at skewed angles. Steep side-slopes and guardrail are prevalent along many segments of the corridor. The corridor contains a mixture of land uses, including commercial, residential, and rural or agricultural. Poor access control is prevalent in the commercial areas, with many businesses having their entire frontage paved adjacent to the roadway. A few community resources, including those of historic significance, are located adjacent to the roadway. These resources include the Shipley-Jarvis House, which is deemed eligible for listing on the National Register of Historic Places (NRHP), Yancey's Tavern, which is listed on the NRHP, and the East Lawn Memorial Gardens Cemetery.

A mixture of residential and commercial land use is present from the corridor's western terminus at East Center Street (Log Mile 3.72) east to Beverly Hill Street (Log Mile 4.91). Within this approximately 1.19 mile long segment, the commercial land uses are generally small privately owned stores, restaurants, car lots, gas stations, and other service businesses. The residential land use is generally single family housing. The Shipley-Jarvis House is located adjacent to the northbound lanes near Woodside Drive at Log Mile (L.M.) 3.97 in this segment.

The land use is generally single family residential for the next 1.13 miles, from Beverly Hill Street (L.M. 4.91) to near Ethel Drive (L.M. 6.04).

The land use is primarily rural for the final 6.08 miles of the corridor, from near Ethel Drive (L.M. 6.04) to I-81 (L.M. 12.12). There are some areas of commercial development within this segment. The commercial land uses are generally small privately owned stores, restaurants, car lots, gas stations, and other service businesses. Yancey's Tavern and the East Lawn Memorial Gardens Cemetery are located on either side of SR 126 (Memorial Boulevard) near Chestnut Ridge Road at L.M. 7.55 in this segment.

FIGURE 1.2.1: PAVED FRONTAGE EXAMPLE 1

FIGURE 1.2.3: SHIPLEY-JARVIS HOUSE

FIGURE 1.2.2: PAVED FRONTAGE EXAMPLE 2

FIGURE 1.2.4: CEMETERY (LT), YANCEY'S TAVERN (RT.)

1.2.2 Description of the Existing Roadway

Within the 8.4 mile long study limits between East Center Street and I-81, SR 126 (Memorial Boulevard) is functionally classified as a minor arterial on the State Highway System. The roadway primarily has two travel lanes (one in each direction). Each travel lane is approximately eleven feet wide. The existing right-of-way varies from approximately sixty feet to three hundred feet wide. The speed limit varies from thirty-five to fifty miles per hour. Many sharp curves and steep grades along the route are signed with supplemental speed plaques advising lower safe travel speeds than the posted speed limit. Many roadside hazards are located in close proximity to the travel lanes. Narrow shoulders are present along the majority of the route. Sidewalks are present along approximately 0.1 mile of the 8.4 mile long corridor. Curbs are located sporadically along the route, with the majority of the corridor having roadside ditches. Four traffic signals are present, all of which are located within the first 1.5 miles of the corridor. The average daily traffic (ADT) in 2013 is estimated to range between 8,450 and 25,800 vehicles per day along the corridor. In the year 2033, the design year of the project, the traffic is projected to increase to between 13,520 and 33,540 vehicles per day.

Several different typical cross sections are utilized along the existing SR 126 (Memorial Boulevard) corridor. The following describes the existing roadway cross-sections. The existing roadway characteristics are also summarized in **Figure 1.2.5** and **Tables 1.2.1** through **1.2.3**.

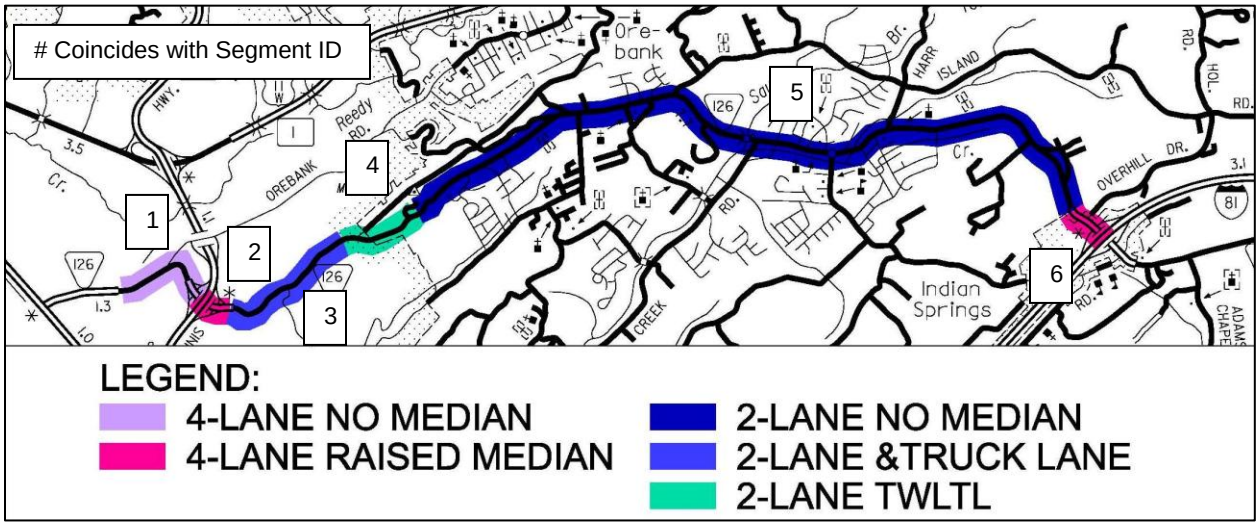


FIGURE 1.2.5: EXISTING ROADWAY CROSS SECTION LEGEND

1. East Center Street (L.M. 3.72) to west of Hillcrest Drive (L.M. 4.33)

SR 126 (Memorial Boulevard) has four travel lanes (two in each direction) along this 0.61 mile long segment. No median is present. The shoulders are two feet or less in width. The posted speed limit is thirty-five miles per hour. The existing right-of-way varies from approximately sixty to ninety feet wide. Ditches are generally located adjacent to the roadway, but curb and gutter with sidewalks are present for approximately one-tenth of a mile in the Orebank Road/Edens Ridge Road area. A traffic signal is located at East Center Street. **Figure 1.2.6**, taken at Log Mile (L.M.) 4.15, provides a photograph of the typical roadway characteristics of this first segment of the study corridor.

FIGURE 1.2.6: SEGMENT 1 PHOTOGRAPH

2. West of Hillcrest Drive (L.M. 4.33) to between Stratford Road and Heather Lane (L.M. 4.60)

SR 126 (Memorial Boulevard) has four travel lanes (two in each direction) along this 0.27 mile long segment. Unlike the first segment, a median is present that ranges in width from approximately twenty to twenty-eight feet wide. The median is generally a raised grass median. In some areas the median is depressed and within the SR 93 (John B. Dennis Highway) Interchange, the median is flush with a concrete barrier separating the opposing travel lanes. The shoulders range from five to sixteen feet in width and are generally gravel. The posted speed limit is thirty-five miles per hour. The existing right-of-way varies from approximately one hundred to one hundred and sixty feet wide. Ditches are generally located adjacent to the roadway, but curb and gutter is present for approximately one-tenth of a mile in the SR 93/Stratford Road/Heather Lane area. No sidewalks are present. Two traffic signals are located within the SR 93 (John B. Dennis Highway) Interchange. **Figure 1.2.7**, taken at Log Mile (L.M.) 4.34, provides a photograph of the typical roadway characteristics of this second segment of the study corridor.

FIGURE 1.2.7: SEGMENT 2 PHOTOGRAPH

3. Between Stratford Road and Heather Lane (L.M. 4.60) to between Trinity Lane and Tanglewood Road (L.M. 5.50)

SR 126 (Memorial Boulevard) has one westbound travel lane and two eastbound travel lanes (one of which is a truck climbing lane) along this 0.90 mile long segment. No median is present. The shoulders are approximately one-foot wide. The posted speed limit is forty-five miles per hour. The existing right-of-way is approximately sixty feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks. One traffic signal is located at Harbor Chapel Road. **Figure 1.2.8**, taken at Log Mile (L.M.) 4.90, provides a photograph of the typical roadway characteristics of this third segment of the study corridor.

FIGURE 1.2.8: SEGMENT 3 PHOTOGRAPH

4. Between Trinity Lane and Tanglewood Road (L.M. 5.50) to between Old Stage Road and Ethel Drive (L.M. 6.00)

SR 126 (Memorial Boulevard) has two travel lanes (one in each direction) along this 0.50 mile long segment. A center two-way left turn lane (TWLTL) is present. The shoulders are approximately two feet wide. The posted speed limit is forty-five miles per hour. The existing right-of-way is approximately sixty feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks. No traffic signals are present in this segment. **Figure 1.2.9**, taken at Log Mile (L.M.) 5.76, provides a photograph of the typical roadway characteristics of this fourth segment of the study corridor.

FIGURE 1.2.9: SEGMENT 4 PHOTOGRAPH

5. Between Old Stage Road and Ethel Drive (L.M. 6.00) and west of Carolina Pottery Drive (L.M. 11.90)

SR 126 (Memorial Boulevard) has two travel lanes (one in each direction) along this 5.90 mile long segment. In general, no median is present and the shoulders are two feet in width. There is a 0.16 mile long segment near Kiowa Street and Natchez Lane that has a two way left turn lane and six-foot wide shoulders. The posted speed limit is fifty miles per hour. The existing right-of-way is approximately sixty feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks present. No traffic signals are located in this segment. **Figure 1.2.10**, taken at Log Mile (L.M.) 6.65, provides a photograph of the typical roadway characteristics of this fifth segment of the study corridor.

FIGURE 1.2.10: SEGMENT 5 PHOTOGRAPH

6. West of Carolina Pottery Drive (L.M. 11.90) to I-81 (L.M. 12.12)

SR 126 (Memorial Boulevard) has four travel lanes (two in each direction) along this 0.22 mile long segment. A twenty-nine foot wide raised grass median is present. The shoulders are paved and generally twelve feet in width. The posted speed limit is forty miles per hour. The existing right-of-way is approximately three hundred feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks present. No traffic signals are located in this segment. **Figure 1.2.11**, taken at Log Mile (L.M.) 12.01, provides a photograph of the typical roadway characteristics of this sixth and final segment of the study corridor.

FIGURE 1.2.11: SEGMENT 6 PHOTOGRAPH

1.2.3 Existing Roadway Cross Section Summary

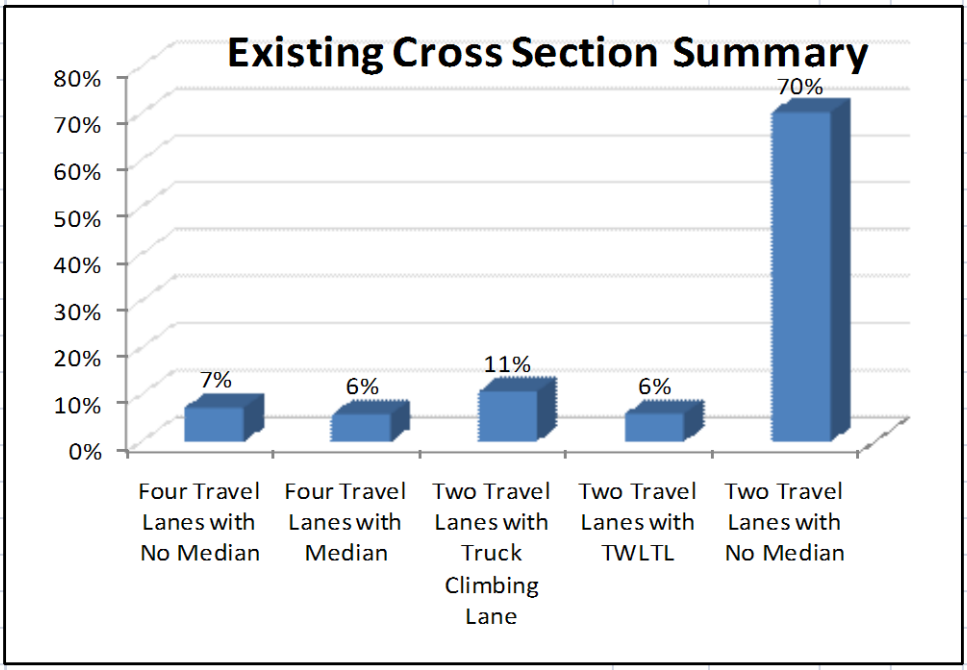
Four travel lanes are present along 13% of the corridor at the eastern and western termini. The middle 87% of the corridor has two travel lanes (including where a 0.90 mile long truck climbing lane is provided). Sidewalks are present along 1% of the corridor. A shoulder width equal to or greater than four feet, which is generally regarded as the minimum safe width for bicyclists, is present along 8% of the corridor.

TABLE 1.2.1: EXISTING SIDEWALK AND SHOULDER SUMMARY

Cross Section Description	Existing Roadway Description		
	Seg. ID	Length (Miles)	%
Sidewalks Present	1	0.1	1%
Sidewalks Not Present	1, 2, 3, 4, 5, 6	8.3	99%
Total		8.4	
Shoulders less than Four Feet Wide	1, 3, 4, 5	7.8	92%
Shoulders equal to or greater than Four Feet Wide	2, 5, 6	0.7	8%
Total		8.4	

TABLE 1.2.2: EXISTING ROADWAY SUMMARY

Cross Section Description	Existing Roadway Description			
	Seg. ID	Length (Miles)	%	
Four Travel Lanes with No Median	1	0.6	7%	13%
Four Travel Lanes with Median	2, 6	0.5	6%	
Two Travel Lanes with Truck Climbing Lane	3	0.9	11%	87%
Two Travel Lanes with TWLTL	4	0.5	6%	
Two Travel Lanes with No Median	5	5.9	70%	
Total		8.4		



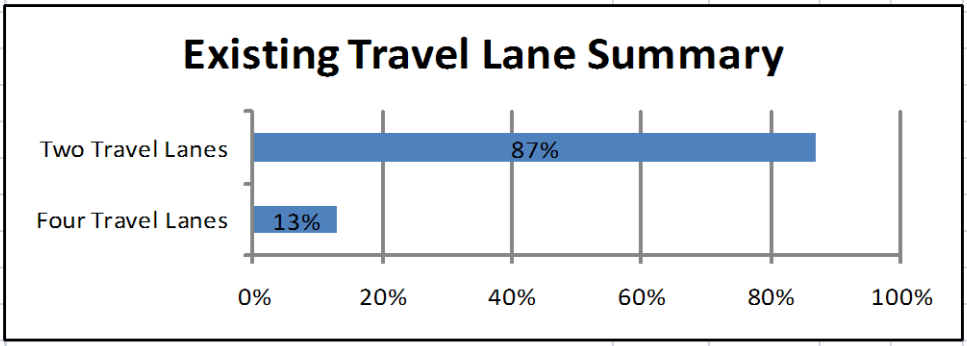


TABLE 1.2.3: EXISTING ROADWAY DESCRIPTION

SR 126 (Memorial Boulevard) Existing Roadway Description													
Segment		Posted Speed Limit	From		To		Length	Travel Lanes		Median Desc.	Shld.	Ditch/ C&G ?	Side-walk?
ID	Dist.		LM	Description	LM	Description	(Miles)	No.	Width				
1	0.61	35	3.72	Center Street	3.78	between Center and Central Streets	0.06	4	11	Left Turn Lane	2 Ft. Paved	Ditch	No
			3.78	between Center and Central Streets	4.16	between Orebank and Edens Ridge Roads	0.38	4	11	None	1 Ft. Paved	Ditch	No
			4.16	between Orebank and Edens Ridge Roads	4.22	Edens Ridge Road	0.06	4	11.5	None	None	C&G	Yes
			4.22	Edens Ridge Road	4.25	east of Edens Ridge Road	0.03	4	11.25	None	1 Ft. Gravel/ None	Ditch/ C&G	Yes
			4.25	east of Edens Ridge Road	4.33	west of Hillcrest Drive	0.08	4	11	None	1 Ft. Gravel	Ditch	No
2	0.27	35	4.33	west of Hillcrest Drive	4.42	within the SR 93 Interchange	0.09	4	11	20 Ft. Raised Grass	5 Ft. Gravel/ 8 Ft.	Ditch	No
			4.42	within the SR 93 Interchange	4.51	within the SR 93 Interchange	0.09	4	12	28 Ft. with Barrier at Bridge	8 Ft. Gravel	Ditch	No
			4.51	within the SR 93 Interchange	4.55	Stratford Road	0.04	4	12	23 Ft. Depressed Grass	8 Ft. Gravel/ 18 Ft.	Ditch/ Curb	No
			4.55	Stratford Road	4.60	between Stratford Road and Heather Lane	0.05	4	12	22 Ft. Raised Grass	8 Ft. Gravel/ 16 Ft.	Ditch/ Curb	No

SR 126 (Memorial Boulevard) Existing Roadway Description (Continued)													
Segment		Speed Limit	From		To		Length	Travel Lanes		Median Desc.	Shld.	Ditch/ C&G ?	Side-walk?
ID	Dist.		LM	Description	LM	Description	(Miles)	No.	Width				
3	**0.90**	**45**	4.60	between Stratford Road and Heather Lane	5.50	between Trinity Lane and Tanglewood Road	0.90	3	11	None	1 Ft. Paved	Ditch	No
4	**0.50**	**45**	5.50	between Trinity Lane and Tanglewood Road	5.72	Briarwood Road	0.22	2	11	11 Ft. TWLTL	2 Ft. Paved	Ditch	No
			5.72	Briarwood Road	5.80	Old Stage Road	0.08	2	11	11 Ft. TWLTL	2 Ft. Soil	Ditch	No
			5.80	Old Stage Road	6.00	between Old Stage Road and Ethel Drive	0.20	2	11	10 Ft. TWLTL	2 Ft. Gravel	Ditch	No
5	**5.90**	**50**	6.00	between Old Stage Road and Ethel Drive	9.56	west of Kiowa Street	3.56	2	12	None	2 Ft. Gravel	Ditch	No
			9.56	west of Kiowa Street	9.72	west of Natchez Lane	0.16	2	12	12 Ft. TWLTL	6 Ft. Paved	Ditch	No
			9.72	west of Natchez Lane	11.82	west of Carolina Pottery Drive	2.10	2	12	None	2 Ft. Soil	Ditch	No
			11.82	west of Carolina Pottery Drive	11.90	west of Carolina Pottery Drive	0.08	Transition					No
6	**0.22**	**40**	11.90	west of Carolina Pottery Drive	12.12	I-81 Overpass	0.22	4	12	29 Ft. Raised Grass	12 Ft. Paved	Ditch	No
		42.5	**= Weighted Average**			**Σ =**	**8.40**						

1.3 PROJECT BACKGROUND AND STATUS

SR 126 (Memorial Boulevard) was initially constructed in 1926. The roadway was originally eighteen feet wide and constructed of concrete. The roadway was widened in 1950 to twenty-two feet wide and overlaid with asphalt. Existing SR 126 (Memorial Boulevard) follows the original 1926 alignment.

Since the early 1990s, improvements for SR 126 (Memorial Boulevard) have been discussed that would facilitate improved traffic and safety conditions for the route. The Executive Board and Executive Staff of the Kingsport Metropolitan Planning Organization (MPO) passed a resolution requesting the preparation of an Advanced Planning Report for SR 126 (Memorial Boulevard) in March 2003. In April 2003, a copy of this resolution was sent by the Mayor of Kingsport to TDOT. A response from TDOT was provided May 2003 acknowledging Kingsport's efforts and needs. The response was forwarded to the TDOT Planning Division with instructions to initiate a new Advance Planning Report, and in September 2003, TDOT responded by naming the SR 126 (Memorial Boulevard) project the initial Context Sensitive Solutions (CSS) Project for Tennessee.

The purpose of the CSS Project was to study and prepare a concept plan recommendation for improving SR 126 (Memorial Boulevard). A Community Resource Team (CRT) was assembled for the SR 126 (Memorial Boulevard) CSS project. The CRT met thirteen times for meetings, training, and workshops and conducted three series of Public Involvement Sessions between October 2003 and May 2005. Public opinion was surveyed at each Public Involvement Session and the results of those surveys were reviewed and discussed by the CRT. The final *Context Sensitive Solutions Report for State Route 126 (Memorial Boulevard)* is on file at the TDOT Environmental Division Office in Nashville, TN.

The CSS Project determined several "common ground" recommendations, for which there was unanimous support among the CRT members. Following is a list of items that the CRT unanimously agreed were important considerations for the SR 126 (Memorial Boulevard) project.

<u>CSS Common Ground Recommendation: Safety</u>

- Safety is the number one priority on this project
- Wide shoulders are desirable
- Improve sight distance and address geometric deficiencies at all intersections of side streets
- Provide left turn lanes at major intersections
- Provide right turn lanes at major intersections
- Consider using center line and shoulder rumble strips and reflective thermal markings where appropriate
- Special attention should be given to intersection improvements at the intersection of Carolina Pottery and Overhill Road to improve safety
- Plan development needs to be mindful of pedestrian safety and connectivity, providing a safe and separate walkway for pedestrians where feasible.

Specific areas where sidewalks are desired include East Center Street to Old Stage Road (within the City limits) and within the Indian Springs Community.

- Use side facing mailbox placement along SR 126 to improve safety for residents
- The CRT would like to avoid a "one size fits all" solution for SR 126

CSS Common Ground Recommendation: Points of Interest to the Community

The CRT wants to minimize impacts to and protect the integrity of community treasures in the SR 126 study area. Sites that are considered community treasures include:

- Cherry Point Animal Hospital
- White House at the corner of Satana Road and SR 126
- East Lawn Cemetery
- Old Indian Springs Post Office
- Chestnut Ridge view shed
- Anything within the historic boundary of Yancey's Tavern, including the tavern, barn, and trace of Old Island Road
- Shipley Mansion (near East Center Street)

CSS Common Ground Recommendation: Enhancements

The CRT supports the incorporation of the following enhancement features in the design plans for SR 126:

- Use of natural elements for retaining and buffering walls
- Landscaping to a human scale with native plant species
- Decorative guardrail where appropriate
- Use of decorative lighting where appropriate with sensitivity to residential areas
- Underground utilities instead of overhead
- Use of mast arms rather than span wire where traffic signals are installed
- Use of Texas rail instead of Jersey barrier type railing on bridges
- Bridge design needs to be an enhancement and fit within the context of the community
- Include irrigation with major landscaping
- Landscape design that is appropriate to the speed limit
- Inclusion of a roundabout at the intersection of SR 126 and East Center Street if adequate capacity can be provided for forecasted traffic volumes

CSS Common Ground Recommendation: Other Issues

- Where roadway widening is undertaken, use as much of the existing roadway as possible
- ·Where the roadway is widened from two to four lanes, consider leaving the existing road in place and constructing the new lanes to one side (asymmetrical widening)
- ·The CRT identified two major benefits of asymmetrical widening: improved traffic flow during construction, and enhanced constructability
- ·Asymmetrical widening should not preclude making improvements to horizontal and vertical alignment deficiencies

Concept plans for three distinct proposals and one blended proposal were prepared by the CSS Project's consultant team, with input from the CRT. The concepts were originally presented to the public at the November 2004 Public Involvement Session. Revised concepts were presented to the public for review and comment at the May 2005 Public Involvement Session. The majority of the CRT members supported a blend of roadway cross sections along the corridor. Proposed Build Alternative A in this document represents the majority decision of the CRT.

Additionally, the CSS document includes three minority objection statements that were prepared for specific sections of the project study area by members of the CRT. Proposed Alternative B of this document was developed to address the minority objection statement to minimize impacts to Yancey's Tavern and the East Lawn Memorial Gardens, which are located on opposite sides of SR 126 (Memorial Boulevard) near Cooks Valley Road.

In March of 2006 TDOT issued a Road Safety Audit Review (RSAR) recommending safety improvements at the intersection of Carolina Pottery Drive/Overhill Drive with SR 126 (Memorial Boulevard). This intersection is located near the I-81 Interchange. The safety improvements were warranted due to the crash rate of this intersection being over four times the critical crash rate for similar intersections. The improvements recommended in the RSAR have been constructed. The improvements included realigning the left turn lanes along SR 126 (Memorial Boulevard) to improve sight distance, improving signing and striping at the intersection, and cutting vegetation to improve sight distance.

In December of 2008 The City of Kingsport Planning MPO Office developed the *Draft State Route 126/Memorial Boulevard (Sullivan County) Safety Improvements Project* report. The report notes recommended major and minor improvements to be constructed. It notes that many of the proposed safety improvements such as intersection improvements and upgrading the S-curves on Chestnut Ridge will become an integral part of the future final upgrade of the highway. The report was issued "due to the excessive length of time to complete the highway upgrade and the urgent need to provide immediate safety enhancements."

In June of 2009 another RSAR was issued by TDOT, this time recommending safety improvements along the entire study corridor from East Center Street to I-81. This RSAR utilized input from the CSS Project and the City of Kingsport's safety study. The RSAR notes that the crash rate along the entire corridor is higher than the statewide average crash rates for similar roadway segments. The RSAR identified short-term safety solutions that would correct critical areas of concern. Example improvements include signing and striping improvements,

the implementation of rumble strips/stripes, and minor shoulder improvements. The recommendations in the RSAR were completed in 2010.

Each of these safety studies demonstrates a documented need for safety improvements along the study corridor. These past efforts to improve the safety of the roadway have involved relatively inexpensive improvements for spot locations along the route. These efforts attempt to mitigate locations with high crash rates. A corridor-wide improvement is needed to improve the roadway characteristics of SR 126 (Memorial Drive).

1.4 PURPOSE AND NEED OF THE PROPOSED ACTION

1.4.1 Purpose of the Proposed Action

The purpose of the project is to provide a safe, efficient route for local traffic between the City of Kingsport and I-81. Improvements should be sensitive to the context of the different land uses along the corridor. Specifically, the improvements along the western half of the project, which is more commercial and residential, should provide improved access to adjacent businesses and homes and improved pedestrian and bicycle connectivity. The improvements along the eastern half of the project should complement the rural nature of the area.

1.4.2 Need of the Proposed Action

The needs of the project can be summarized as follows:

- The safety of the route needs to be improved. The crash rates observed along the entire SR 126 (Memorial Boulevard) study corridor exceeded the statewide average crash rates for similar roadway segments.
- The width of the roadway generally needs to be improved. Most of the existing roadway includes 11 foot wide lanes with narrow shoulders.
- The width of the shoulders needs to be improved. The shoulders along the route are typically no wider than 2 feet and often not paved. The narrow shoulders, along with other existing geometric deficiencies, contribute to the high crash rates and create a less than desirable route for pedestrians and bicyclists.
- The geometry of the roadway needs to be improved. Numerous horizontal and vertical curves along the route are inadequate for the posted speed limit.
- Improved access management is needed along the commercial areas of the route. The public cited access onto SR 126 (Memorial Boulevard) as a major problem. Difficulty entering or exiting business parking lots was identified as a significant problem because of uncontrolled access to businesses along the roadway. Many of the access points are located near or within substandard curves or hills that limit sight distance for drivers attempting to turn into or out of the businesses.
- Improved response time for emergency vehicles is needed. With improvements, emergency vehicles would be able to respond more efficiently to emergencies within and near the project corridor. Wider shoulders would enable motorists to pull over and allow the emergency vehicles to pass through to their intended destinations. Current conditions along SR 126 (Memorial Boulevard) do not feature many areas for vehicles to pull over.

- Improved access for mail delivery is needed. Current geometric conditions along SR 126 (Memorial Boulevard) create bottlenecks during mail delivery. Wider shoulders would enable delivery vehicles to depart the travel lane and motorists pass more safely.
- Improved access for school busses is needed. Current geometric conditions along SR 126 (Memorial Boulevard) make it difficult for school busses to make turns. Wider paved roadway widths would improve accessibility for the school busses along the corridor.
- Improved traffic operations are needed along the route.

1.5 DISCUSSION OF NEEDS OF THE PROPOSED ACTION

1.5.1 System Linkage

Kingsport is served by two United States (US) Highways, US 23 and US 11W; two Interstates, I-26 and I-81; and four State Routes, SR 93, SR 92A, SR 126, and SR 136. SR 126 (Memorial Boulevard) provides a direct link between the City of Kingsport and I-81 and continues east to Bristol. SR 126 (Memorial Boulevard) is generally parallel to US 11W and I-81 within the study limits. SR 126 (Memorial Boulevard) primarily services local traffic and provides access to these higher type facilities that are utilized for longer distance travel. It is also a popular commuter route between adjacent communities and the City of Kingsport.

The termini for this project meet the requirements of being logical and displaying independent utility. This longstanding route has connected Kingsport to communities, including Indian Hills and Bridwell Heights, for decades (this route was the original US 11W, constructed in 1926); and to I-81 since the 1970s. Improvements and reconstruction of portions of the roadway will allow this route to remain open in a safer, more efficient manner.

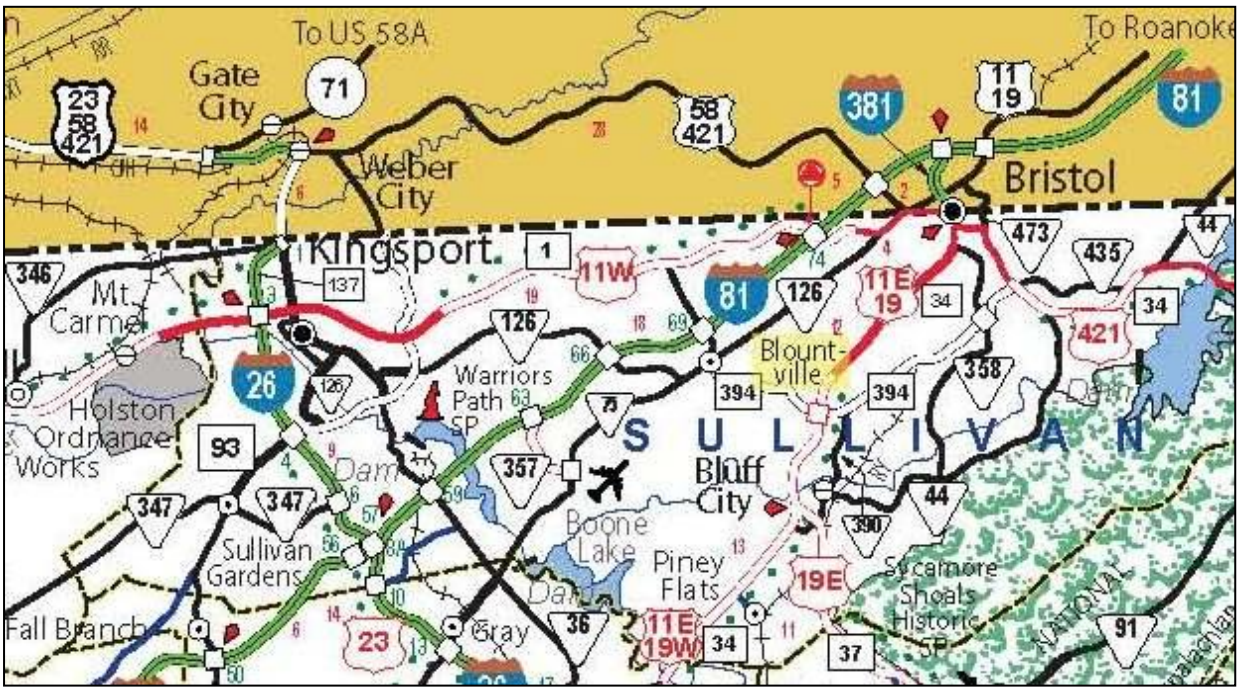


FIGURE 1.5.1: KINGSPORT HIGHWAY MAP

1.5.2 Existing Roadway Deficiencies

The existing roadway features inadequate lane widths, a lack of shoulders, and an unforgiving roadside with steep side slopes and roadside hazards. Additionally, substandard horizontal and vertical curves were identified by the public and by the Community Resource Team as a major concern on SR 126 (Memorial Boulevard). These concerns were validated by engineering field studies. Following is a summary of the identified deficiencies for horizontal and vertical curves within the study area.

Horizontal Curve Evaluation

Horizontal alignment is comprised of the straight lines and curves that make up the side to side elements of a roadway. A horizontal curve is what most people refer to as a curve or bend in the roadway. The speed at which a reasonable and prudent driver traverses a curve should be consistent with the amount of sight distance provided in the curve to allow for the driver to respond to the roadway conditions ahead. The design speed of horizontal curves should be consistent with the overall design speed of the roadway, and where it is not consistent, advisory or warning speed limits should be posted.

Along the study section of SR 126 (Memorial Boulevard), approximately 41% (20 out of 49) of the horizontal curves are substandard for the posted speed limit. **Table 1.5.1** identifies the location and severity of each deficient curve. The table also notes whether or not an advisory speed warning is posted in advance of the curve.

TABLE 1.5.1: HORIZONTAL CURVES WITH SUBSTANDARD DESIGN SPEEDS

Location	Curve Design Speed	Posted Speed Limit	Advisory Speed Warning
East of Orebank Road	25 mph	35 mph	
At Kite Street	30 mph	35 mph	
East side of Kent Street	30 mph	35 mph	
At Harbor Chapel Road	35 mph	45 mph	
East of Old Stage Road	30 mph	45 mph	30 mph
On Chestnut Ridge	35 mph	50 mph	35 mph
On Chestnut Ridge	40 mph	50 mph	35 mph
On Chestnut Ridge	40 mph	50 mph	35 mph
On Chestnut Ridge	25 mph	50 mph	35 mph
On Chestnut Ridge	30 mph	50 mph	35 mph
On Chestnut Ridge	45 mph	50 mph	35 mph
At Chestnut Ridge Road	45 mph	50 mph	
East side of Island Road	45 mph	50 mph	
At Shadowtown Road	45 mph	50 mph	
Between Natchez Lane & Dakota Drive	35 mph	50 mph	
West side of Cassidy Drive	45 mph	50 mph	
West side of Cochise Trail	45 mph	50 mph	
West of Samlola Road	40 mph	50 mph	
West of Samlola Road	45 mph	50 mph	
West of Overhill Drive	40 mph	50 mph	35 mph

Vertical Curve Evaluation

Vertical alignment is comprised of the straight lines and curves that make up the up and down elements of a roadway. A vertical curve is what most people refer to as a hill or valley. The design speed of a vertical curve is intended to prevent the driver's travel speed from exceeding his or her line of sight, thus allowing the driver ample time to respond to the roadway conditions ahead. A flatter curve allows the driver to see a greater distance, allowing a higher speed limit.

Data from a controlled aerial survey was used to develop a centerline profile for the project area of SR 126 (Memorial Boulevard). The curvature of the profile was examined to identify vertical curves that are substandard for the posted speed limit. **Table 1.5.2** lists 42 vertical curves by location that have a design speed less than the posted speed limit.

TABLE 1.5.2: VERTICAL CURVES WITH SUBSTANDARD DESIGN SPEEDS

Location	Type of Curve	Design Speed	Posted Speed	Curve Length
East of Trinity Lane	sag	35 mph	45 mph	183’
East of Trinity Lane	crest	40 mph	45 mph	214’
Between Trinity Lane & Tanglewood Road	crest	40 mph	45 mph	241’
Between Trinity Lane & Tanglewood Road	sag	40 mph	45 mph	257’
East of Old Stage Road	crest	40 mph	45 mph	273’
East of Old Stage Road	crest	40 mph	50 mph	176’
On Chestnut Ridge	sag	20 mph	50 mph	178’
On Chestnut Ridge	crest	45 mph	50 mph	379’
On Chestnut Ridge	sag	40 mph	50 mph	192’
On Chestnut Ridge	sag	45 mph	50 mph	168’
On Chestnut Ridge	crest	45 mph	50 mph	103’
On Chestnut Ridge	sag	35 mph	50 mph	164’
On Chestnut Ridge	crest	40 mph	50 mph	316’
East of Shuler Road	crest	35 mph	50 mph	346’
At Lemay Drive	crest	40 mph	50 mph	410’
East of Lemay Drive	crest	40 mph	50 mph	483’
East of Lemay Drive	sag	20 mph	50 mph	207’
West of Chestnut Ridge Road	crest	40 mph	50 mph	294’
West of Chestnut Ridge Road	sag	35 mph	50 mph	240’
East of Chestnut Ridge Road	crest	40 mph	50 mph	310’
Between Cooks Valley Road & Fisher Drive	sag	35 mph	50 mph	271’
East of Fisher Drive	crest	40 mph	50 mph	175’
Between Fisher Drive & Bridwell Heights	sag	30 mph	50 mph	271’
Between Bridwell Heights & Lana View Road	crest	40 mph	50 mph	316’
Between Lana View Road & Wembeck Drive	sag	35 mph	50 mph	295’
At Island Road	crest	40 mph	50 mph	271’
At Country Drive	crest	45 mph	50 mph	204’
West of Fall Creek Road	sag	35 mph	50 mph	219’
At Fall Creek Road	crest	40 mph	50 mph	340’
West of Cree Street	sag	35 mph	50 mph	387’
Between Cree Street & Santanta Road	crest	40 mph	50 mph	264’
At Montezuma Road	sag	40 mph	50 mph	318’
East of Natchez Lane	sag	45 mph	50 mph	600’
West of Cochise Trail	sag	35 mph	50 mph	429’
East of Cochise Trail	crest	40 mph	50 mph	291’
East of Cochise Trail	sag	45 mph	50 mph	324’
East of Cochise Trail	crest	45 mph	50 mph	350’
Between Cochise Trail & Samlola Road	crest	45 mph	50 mph	186’
Between Samlola Road & Gravel Top Road (west)	crest	45 mph	50 mph	525’
East of Gravel Top Road (east)	crest	40 mph	50 mph	390’
West of I-81 westbound ramp	sag	45 mph	50 mph	240’
West of I-81 westbound ramp	sag	40 mph	50 mph	296’

1.5.3 Modal Interrelationships

There are currently few modal interrelationships along the SR 126 (Memorial Boulevard) corridor. Narrow shoulders and lane widths, along with other existing geometric deficiencies, create a less than desirable route for pedestrians and bicyclists. Only approximately 1% of the corridor has sidewalks, limiting the facility's usage by pedestrians. Transit service is available along the far western segment of the corridor, and does not access the vast majority of the project study area east of Stratford Road.

1.5.4 Safety

A safety analysis was conducted for the project. Crash data from 1999 through 2007 was utilized in the safety analysis. The analysis demonstrates that the actual crash rates observed along the entire SR 126 (Memorial Boulevard) study corridor exceeded the statewide average crash rates for similar roadway segments (see **Table 1.5.3**).

TABLE 1.5.3: CRASH RATE SUMMARY FOR SR 126

Section Limits or Intersection Description	Typical Section	Total Crashes	Injury Crashes	Fatal Crashes	Actual Crash Rate	Statewide Average Rate
E. Center Street to Sun Bridge Rehab	4-lane undivided	130	37	0	4.014	3.3920
Sun Bridge Rehab to east of Stratford Rd.	4-lane divided	150	33	0	11.487	2.0112
East of Stratford Rd. to east of Old Stage Rd.	2-lane + climb	208	58	2	4.818	2.4188
East of Old Stage Rd. to west of Overhill Rd.	2-lane	436	137	13	2.906	1.6565
SR 126 intersection with Carolina Pottery Drive / Overhill Road	N/A	51	26	1	1.91	0.2193

Several intersections along SR 126 (Memorial Boulevard) were also identified as having high numbers of crashes. Those intersections include (with the number of crashes in parentheses):

- Overhill Road/Carolina Pottery Drive (74)
- Stratford Road (49)
- SR 93 (John B. Dennis Highway) Southbound Ramps (35)
- Harbor Chapel Road (26)
- Fall Creek Road (34)
- Amy Avenue (31)
- East Center Street (25)

Sixteen fatal crashes were reported between 1999 and 2007. Their location, date, time, and type of crash are listed in **Table 1.5.4**. As can be seen in the table, the majority of the fatal crashes were either lane departure crashes or head on crashes. These types of crashes are generally associated with high travel speeds, poor roadside design/lack of shoulders, and narrow lanes.

Table 1.5.5 lists the fatal crash rates along the SR 126 (Memorial Boulevard) Study Corridor. As can be seen in the table, the actual fatal crash rate along SR 126 (Memorial Boulevard) from Stratford Road to Overhill Road is between two to eight times higher than the statewide fatal crash rate for similar roadway segments. The area between Stratford Road and Overhill Road is 7.4 miles long and accounts for 88% of the 8.4 mile long study corridor.

TABLE 1.5.4: FATALITY CRASH LOCATIONS

Location Description	Date	Time	Type of Crash
Culvert between East Lawn Cemetery and Chestnut Ridge Road	3/27/99	21:25	The vehicle ran off the road and overturned.
Overhill Road / Carolina Pottery	6/5/00	15:13	Angle collision between two vehicles
East of Cochise Trail	6/7/00	6:18	Head-on collision between two vehicles
Between Chestnut Ridge Road and Old Stage Road	5/20/02	18:35	The vehicle ran off the road and hit a fixed object.
Between Trinity Lane and Tanglewood Road	8/26/02	14:58	The vehicle ran off the road and overturned.
Between Island Road and Country Acres Drive	7/16/03	1:40	The vehicle ran off the road and hit a fixed object.
Between Old Stage Road and Cooks Valley Road	7/18/03	16:15	Head-on collision between two vehicles
Between Chestnut Ridge Road and Old Stage Road	1/13/03	6:25	Angle collision between two vehicles
Between Trinity Lane and Tanglewood Road	1/16/04	18:25	Vehicle was sideswiped by an on-coming vehicle
Between LeMay Drive and Chestnut Ridge Road	8/9/04	5:00	Single car crash; vehicle encountered an animal
Between Cree Street and Satanta Road	3/25/04	23:55	The vehicle ran off the road and hit a fixed object.
At the SR 126 intersection with Satanta Road	9/28/04	17:45	The vehicle ran off the road and hit a fixed object.
Near the SR 126 intersection with Cochise Trail	11/24/04	12:00	Vehicle collided with a utility pole
Between Old Stage Road and Holliday Hills Road	12/20/05	10:58	Head-on collision between two vehicles
Between Old Stage Road and Holliday Hills Road	12/12/06	14:00	Angle collision between two vehicles
Between Old Stage Road and Holliday Hills Road	10/6/06	20:35	Vehicle ran off the road to avoid colliding with another vehicle

TABLE 1.5.5: FATAL CRASH RATE SUMMARY FOR SR 126

Section Description	Fatal Crash Rates	
	SR 126	TN Average
East Center Street to Sun Bridge Rehab	0.0000	0.02
Sun Bridge Rehab to east of Stratford Road	0.0000	0.01
East of Stratford Road to east of Old Stage Road	0.0463	0.02
East of Old Stage Road to west of Overhill Rd.	0.0867	0.01

1.6 LEVEL OF SERVICE ANALYSIS

1.6.1 Traffic

Traffic projections were created by TDOT during the Context Sensitive Solutions Process to assist with determining the needed improvements. The traffic volumes are summarized in **Table 1.5.6: SR 126 Traffic Volumes**. Annual Average Daily Traffic (AADT) mainline volumes are reported for the Build and Design Years of 2013 and 2033.

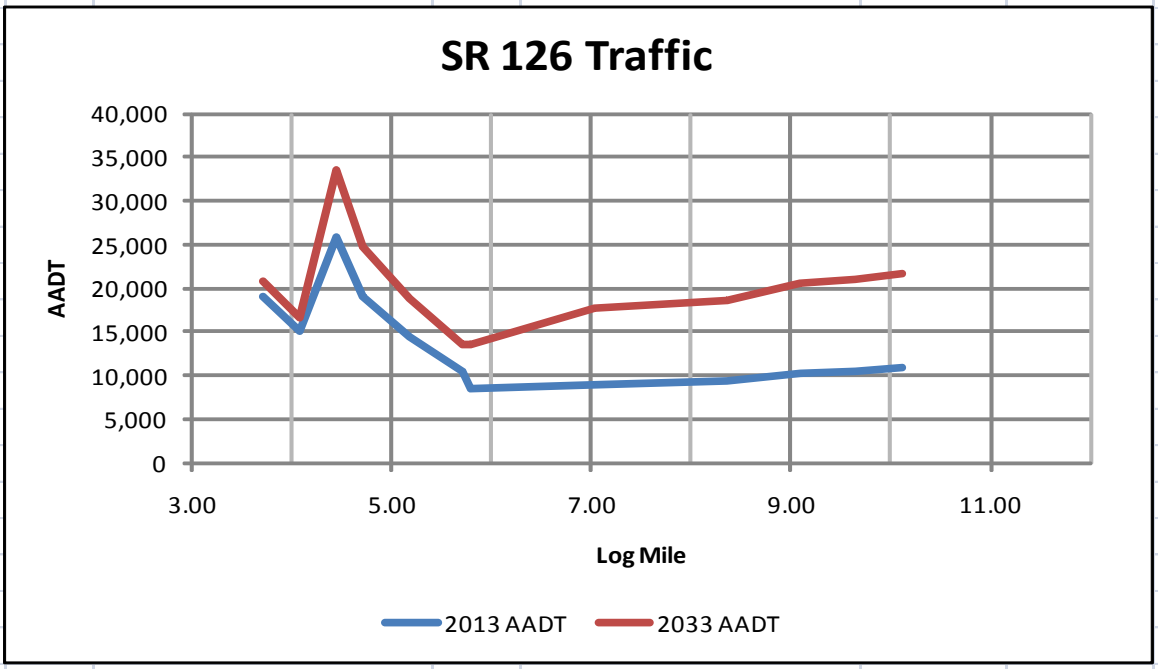
The Build Year Traffic (2013) utilized four TDOT count stations within the study corridor, historical data within the study corridor, and calibrated turning movement counts. The Design Year Traffic (2033) was calculated utilizing four zones segmented by the TDOT count stations, with respect to variance in growth rates provided from the Kingsport MPO model. The growth rates were as follows:

- 0.5% per year between East Center Street and SR 93 (John B. Dennis Highway)
- 1.5% per year between SR 93 (John B. Dennis Highway) and Old Stage Road
- 3.0% per year between Old Stage Road and Shuler Drive
- 5.0% per year between Shuler Drive and I-81 and Shuler Drive

As can be seen in **Table 1.5.6**, the traffic is heaviest at the western terminus of the study corridor, peaking in the SR 93 (John B. Dennis Highway) Interchange area. The land use in this area is mixed commercial and residential. The traffic then gradually decreases until it reaches Lemay Drive. Lemay Drive is located near Kingsport's City Limits in a residential area. The land use east from Lemay Drive changes from residential to rural. East from Lemay Drive, the traffic volumes are lighter, but increase gradually until reaching the study corridor's eastern terminus at I-81.

TABLE 1.5.6: SR 126 TRAFFIC VOLUMES

SR 126 Existing and Future Traffic Volumes					
From		To		2013	2033
L.M.	Cross Road	L.M.	Cross Road	AADT	AADT
3.72	East Center Street	4.09	Orebank Road	18,960	20,860
4.09	Orebank Road	4.44	SR 93	15,100	16,700
4.44	SR 93	4.71	Hawthorne Street	25,800	33,540
4.71	Hawthorne Street	5.18	Harbor Chapel Road	19,080	24,800
5.18	Harbor Chapel Road	5.72	Briarwood Road	14,500	18,850
5.72	Briarwood Road	5.80	Old Stage Road	10,430	13,560
5.80	Old Stage Road	7.04	Lemay Road	8,450	13,520
7.04	Lemay Road	8.37	Island Road	8,920	17,840
8.37	Island Road	9.10	Fall Creek Road	9,360	18,720
9.10	Fall Creek Road	9.65	Hill Road	10,260	20,520
9.65	Hill Road	10.11	Harr Town Road	10,550	21,100
10.11	Harr Town Road	12.12	I-81	10,830	21,660



1.6.2 Capacity Analysis Results

Several measures of effectiveness (MOE) are utilized in this document to assess the operational conditions of SR 126 (Memorial Boulevard) for the No-Build and two Build Alternatives. These measures of effectiveness are level of service, volume to capacity ratio, and average travel speed. A definition of these measures is provided in the following text. A detailed discussion of the No-Build Alternative and two Build Alternative's MOE are also provided. A summary of the No-Build and Build Alternative's Design Year (2033) MOE are provided in **Figure 1.6.1: SR 126 Design Year (2033) LOS**, **Figure 1.6.2: SR 126 Alternative Design Year (2033) MOE Comparison**, and **Figure 1.6.3: SR 126 Alternative Design Year (2033) Travel Speed Comparison**. The Level of Service calculations can be found on file at the TDOT Environmental Division Office in Nashville, TN.

Without improvements (No-Build), the corridor will experience LOS ranging from C to F in the design year and a corresponding average travel speed of 24 mph.

With improvements (Build Alternatives), the LOS will be improved to a range of B to F with an average travel speed of up to 34 mph.

Level of Service

Level of Service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS range from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of those conditions. Please refer to **Table 1.6.1: LOS Table** for a description of each LOS.

The quality of service was assessed utilizing the methodology outlined in the *Highway Capacity Manual 2000* (HCM) *Two-Lane Highways* and *Multilane Highways* Chapters. The Level of Service (LOS) Calculations were performed with the Highway Capacity Software (HCS+T7F Version 5.3). HCS+ is developed and maintained as an implementation of the HCM procedures. HCS+ calculations assign a LOS along route segments with similar geometric and traffic characteristics.

Volume to Capacity Ratio & Congestion Reduction

Unlike LOS, which is a qualitative measure, the volume to capacity ratio (v/c) is a quantitative measure. The v/c ratio is reported to demonstrate the magnitude of congestion for the options included in this document. The v/c ratio demonstrates how much reserve capacity along a roadway segment is available, or how much the segment is overcapacity. A v/c ratio near or above "1" indicates a roadway experiences congestion.

Average Travel Speed

Average travel speed is calculated in the LOS analysis. Speed is an important measure of congestion and the quality of the traffic service provided to the motorist.

TABLE 1.6.1: LOS TABLE

LOS	Traffic Flow Conditions	Representative Photo
A	Free flow operations. Vehicles are almost completely unimpeded in their ability to maneuver with the traffic stream. The general level of physical and psychological comfort provided to the driver is high.	
B	Reasonable free flow operations. The ability to maneuver within the traffic stream is only slightly restricted and the general level of physical and psychological comfort provided to the driver is still high.	
C	Flow with speeds at or near free flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes require more vigilance on the part of the driver. The driver notices an increase in tension.	
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is more noticeably limited. The driver experiences reduced physical and psychological comfort levels.	
E	At lower boundary, the facility is at capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.	
F	Breakdowns in traffic flow. The number of vehicles entering the highway section exceed the capacity or ability of the highway to accommodate that number of vehicles. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.	

No-Build Alternative

The No-Build Alternative makes no improvements to SR 126 (Memorial Boulevard) other than scheduled maintenance activities. The existing roadway characteristics of the No-Build Alternative are discussed in **Section 1.2.2**.

For the No-Build Alternative, the Highway Capacity Software (HCS) analysis calculates Levels of Service (LOS) ranging from C to F along SR 126 (Memorial Boulevard) through the year 2033 during peak hour conditions. Eighty-seven percent (87%) of the route is calculated to operate with a deficient LOS of E or F by 2033. A summary of the LOS calculations for the No-Build Alternative is provided in **Table 1.6.2**. The LOS are reported for the years 2013 and 2033.

For the No-Build Alternative in the year 2013, the volume to capacity ratio (v/c) of SR 126 (Memorial Boulevard) is calculated to range from 0.27 to 0.76, with a weighted average of 0.47. In 2033, the v/c ranges from 0.54 to 0.99 with a weighted average of 0.81. The average was weighted based upon the length of each segment analyzed. A v/c ratio near or above "1" indicates a roadway experiences congestion. A summary of the v/c calculations for the No-Build Alternative is provided in **Table 1.6.2**. The v/c are reported for the years 2013 and 2033.

The speed limit ranges from 35 to 50 mph along SR 126 (Memorial Boulevard). For the No-Build Alternative in the year 2013, travel speeds along the corridor are calculated by the HCS to range from 21 mph to 42 mph, with a weighted average of 32 mph. In 2033, the travel speed ranges from 15 mph to 42 mph with a weighted average of 24 mph. The average was weighted based upon the length of each segment analyzed. The weighted average of the speed limit along the route is 47 mph. The calculated average route speed is 68% and 51% of the posted speed limit in the years 2013 and 2033, respectively. A summary of the travel speed calculations for the No-Build Alternative is provided in **Table 1.6.2**. The travel speeds are reported for the years 2013 and 2033.

The existing SR 126 (Memorial Boulevard) Corridor (No-Build Alternative) between East Center Street to the west and I-81 to the east is 8.4 miles in length. For the No-Build Alternative in the year 2013, the travel time along the corridor is calculated to be 16 minutes. In 2035, the travel time is calculated to be 21 minutes.

Build Alternative A

Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas. Build Alternative A is discussed in more detail in **Chapter 2**.

For Build Alternative A, the Highway Capacity Software (HCS) analysis calculates Levels of Service (LOS) ranging from B to F along SR 126 (Memorial Boulevard) through the year 2033 during peak hour conditions. Fifty-four percent (54%) of the route is calculated to operate with a deficient LOS of E or F by 2033. A summary of the LOS calculations for Build Alternative A is provided in **Table 1.6.3**. The LOS are reported for the years 2013 and 2033.

For Build Alternative A in the year 2013, the volume to capacity ratio (v/c) of SR 126 (Memorial Boulevard) is calculated to range from 0.24 to 0.70, with a weighted average of 0.38. In 2033, the v/c ranges from 0.31 to 0.91 with a weighted average of 0.64. The average was weighted

based upon the length of each segment analyzed. A v/c ratio near or above "1" indicates a roadway experiences congestion. A summary of the v/c calculations for Build Alternative A is provided in **Table 1.6.3**. The v/c are reported for the years 2013 and 2033.

The speed limit of Alternative A will likely range from 35 to 50 mph along SR 126 (Memorial Boulevard). For Build Alternative A in the year 2013, travel speeds along the corridor are calculated by the HCS to range from 31 mph to 43 mph, with a weighted average of 38 mph. In 2033, the travel speed also ranges from 31 mph to 43 mph, but the weighted average decreases to 34 mph. The average was weighted based upon the length of each segment analyzed. The weighted average of the proposed speed limit along the route is 44 mph. The calculated average route speed is 86% and 77% of the posted speed limit in the years 2013 and 2033, respectively. A summary of the travel speed calculations for Build Alternative A is provided in **Table 1.6.3**. The travel speeds are reported for the years 2013 and 2033.

The existing SR 126 (Memorial Boulevard) Corridor (No-Build Alternative) between East Center Street to the west and I-81 to the east is 8.4 miles in length. The length of Build Alternative A will be similar. For Build Alternative A in the year 2013 the travel time along the corridor is calculated to be 13 minutes. In 2033, the travel time is calculated to be 15 minutes.

<u>Build Alternative B</u>

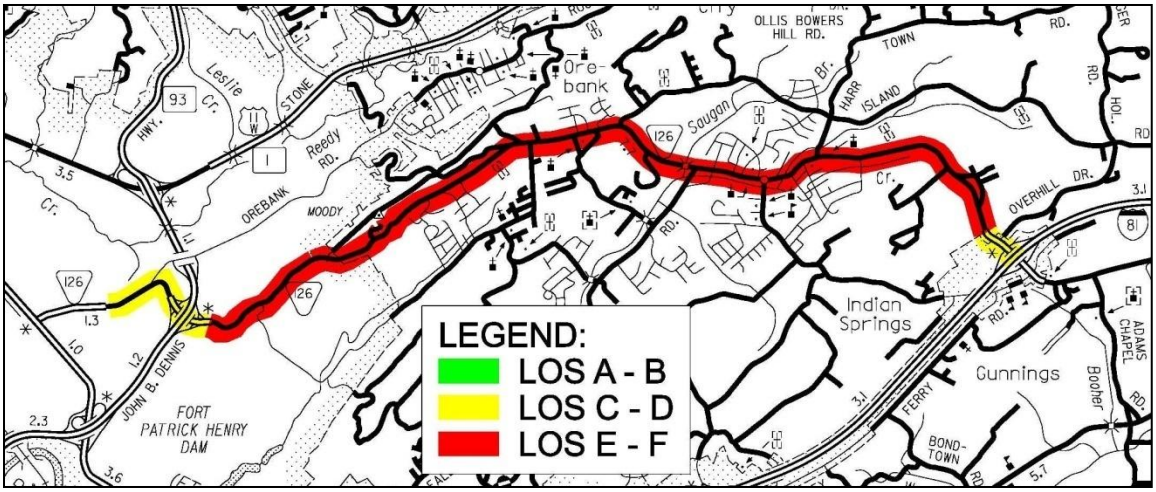
Build Alternative B is similar to Build Alternative A. The length of the four-lane improvement is reduced by approximately 0.46 mile in Build Alternative B to reduce impacts to East Lawn Memorial Gardens while avoiding impacts to Yancey's Tavern. These environmentally sensitive properties are located on either side of SR 126 (Memorial Boulevard) near Eaton Station Road. Build Alternative B is discussed in more detail in **Chapter 2**.

For Build Alternative B, the Highway Capacity Software (HCS) analysis calculates Levels of Service (LOS) ranging from B to F along SR 126 (Memorial Boulevard) through the year 2033 during peak hour conditions. Fifty-nine percent (59%) of the route is calculated to operate with a deficient LOS of E or F by 2033. A summary of the LOS calculations for Build Alternative B is provided in **Table 1.6.4**. The LOS are reported for the years 2013 and 2033.

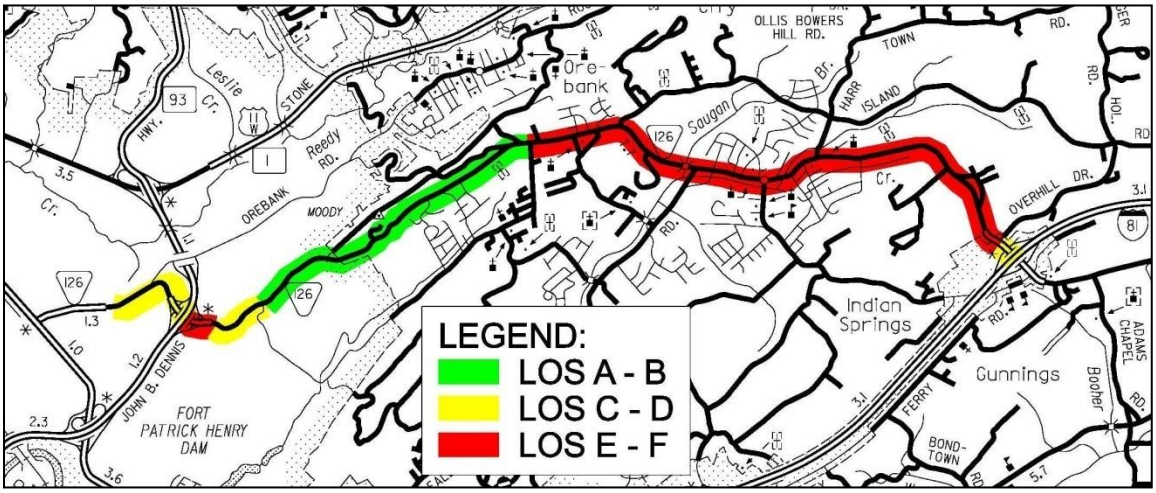
For Build Alternative B in the year 2013, the volume to capacity ratio (v/c) of SR 126 (Memorial Boulevard) is calculated to range from 0.24 to 0.70, with a weighted average of 0.39. In 2033, the v/c ranges from 0.31 to 0.91 with a weighted average of 0.67. The average was weighted based upon the length of each segment analyzed. A v/c ratio near or above "1" indicates a roadway experiences congestion. A summary of the v/c calculations for Build Alternative B is provided in **Table 1.6.4**. The v/c are reported for the years 2013 and 2033.

The speed limit of Alternative B will likely range from 35 to 50 mph along SR 126 (Memorial Boulevard). For Build Alternative B in the year 2013, travel speeds along the corridor are calculated by the HCS to range from 31 mph to 43 mph, with a weighted average of 38 mph. In 2033, the travel speed also ranges from 31 mph to 43 mph, but the weighted average decreases to 33 mph. The average was weighted based upon the length of each segment analyzed. The weighted average of the proposed speed limit along the route is 44 mph. The calculated average route speed is 86% and 75% of the posted speed limit in the years 2013 and 2033, respectively. A summary of the travel speed calculations for Build Alternative B is provided in **Table 1.6.4**. The travel speeds are reported for the years 2013 and 2033.

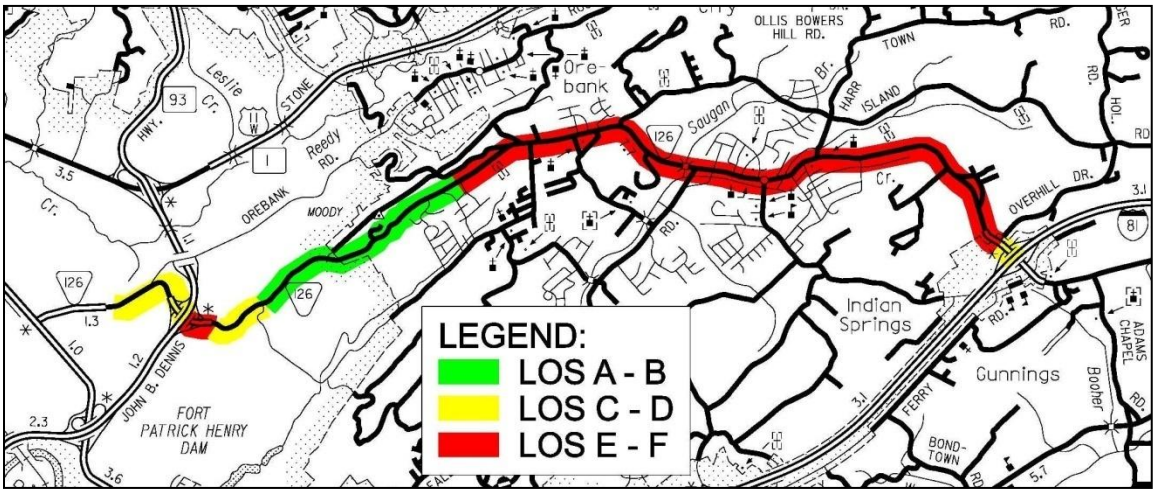
The existing SR 126 (Memorial Boulevard) Corridor (No-Build Alternative) between East Center Street to the west and I-81 to the east is 8.4 miles in length. The length of Build Alternative B will be similar. For Build Alternative B in the year 2013 the travel time along the corridor is calculated to be 13 minutes. In 2033, the travel time is calculated to be 15 minutes.



No-Build



Build Alternative A



Build Alternative B

FIGURE 1.6.1: SR 126 DESIGN YEAR (2033) LOS

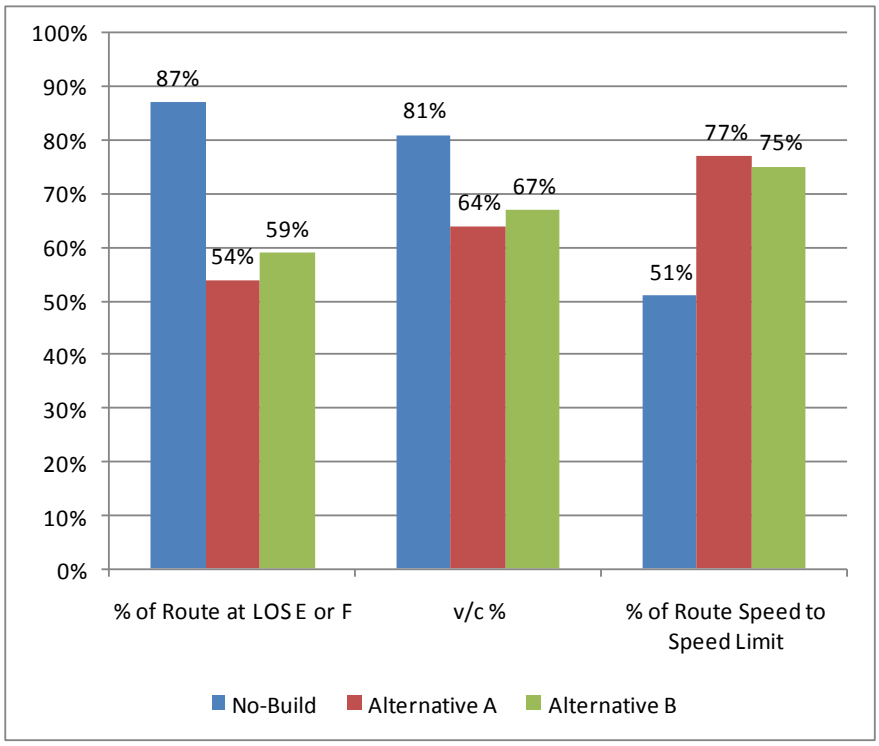


FIGURE 1.6.2: SR 126 ALTERNATIVE DESIGN YEAR (2033) MOE COMPARISON

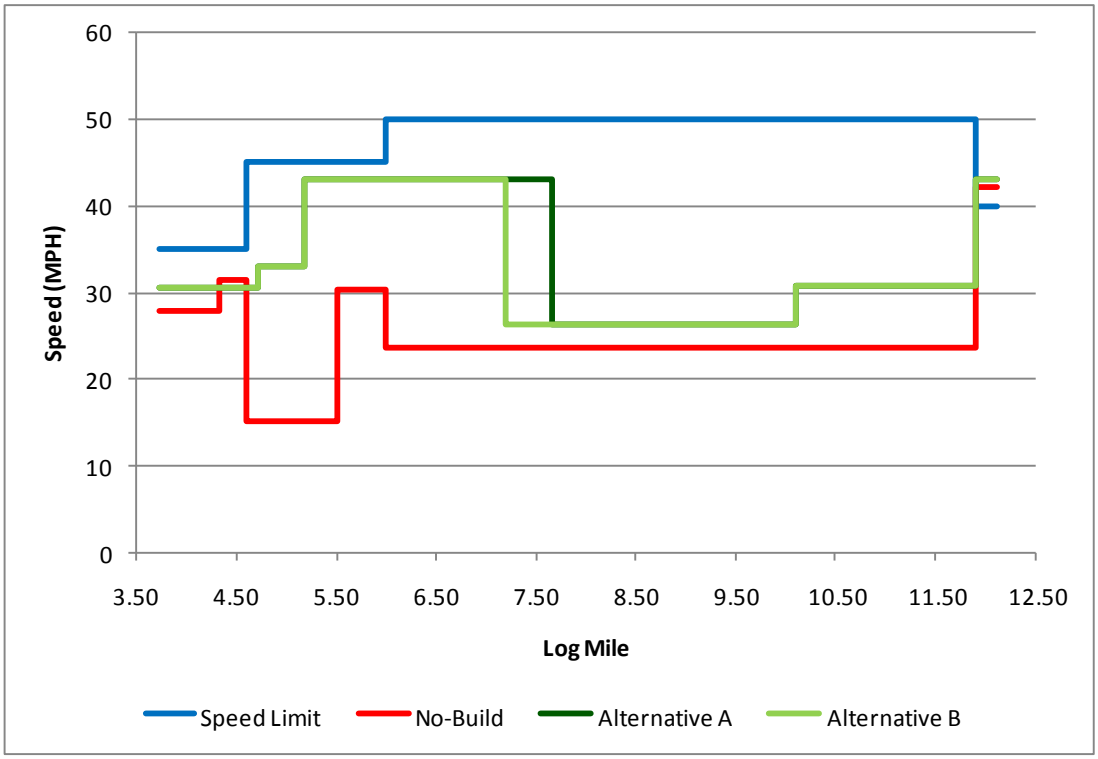


FIGURE 1.6.3: SR 126 ALTERNATIVE DESIGN YEAR (2033) TRAVEL SPEED COMPARISON

TABLE 1.6.2: NO-BUILD ALTERNATIVE LOS

ID	From		To		Dist.	Cross Section	Speed	2013				2033			
	L.M.	Desc.	L.M.	Desc.			Limit	AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1	3.72	Center St.	4.33	Hillcrest Dr.	0.61	4-Lanes with No Median and Narrow Shoulders	35	18,960	C	28	0.51	20,860	C	28	0.56
2	4.33	Hillcrest Dr.	4.60	Heather Ln.	0.27	4-Lanes with a Raised Grass Median and Wide Shoulders	35	25,800	D	32	0.70	33,540	D	32	0.91
3	4.60	Heather Ln.	5.50	Tangle-wood Rd.	0.9	2-Lanes Eastbound, 1-Lane Westbound with No Median and Narrow Shoulders	45	19,080	E	21	0.76	24,800	F	15	0.99
4	5.50	Tangle-wood Rd.	6.00	Ethel Dr.	0.5	2-Lanes with TWLTL and Narrow Shoulders	45	10,430	E	33	0.42	13,560	E	30	0.54
5	6.00	Ethel Dr.	11.90	Carolina Pottery Dr.	5.9	2-Lanes with No Median and Narrow Shoulders	50	10,550	E	33	0.42	21,100	F	24	0.84
6	11.90	Carolina Pottery Dr.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and Wide Shoulders	40	10,830	B	42	0.27	21,660	C	42	0.55
				Σ =	**8.4**	**Weighted Average =**	**47**			**32**	**0.47**			**24**	**0.81**

TABLE 1.6.3: BUILD ALTERNATIVE A LOS

ID	From		To		Dist.	Cross Section	Speed	2013				2033			
	L.M.	Desc.	L.M.	Desc.			Limit	AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	18,960	C	31	0.51	20,860	C	31	0.56
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	25,800	D	31	0.70	33,540	E	31	0.91
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	19,080	C	33	0.52	24,800	D	33	0.67
3	5.18	Harbor Chapel Rd.	7.66	Cooks Valley Rd.	2.48	4-Lanes with a Raised Grass Median and 4-8 Ft. Shoulders	45	10,430	A	43	0.24	13,560	B	43	0.31
4	7.66	Cooks Valley Rd.	10.11	Harr Town Rd.	2.45	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	10,260	E	36	0.41	20,520	E	26	0.82
5	10.11	Harr Town Rd.	11.90	Carolina Pottery Rd.	1.79	2-Lanes with No Median and 10 Ft. Shoulders	50	10,830	D	41	0.43	21,660	F	31	0.86
6	11.90	Carolina Pottery Rd.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	40	10,830	B	43	0.27	21,660	C	43	0.55
				Σ =	**8.4**	**Weighted Average =**	**44**			**38**	**0.38**			**34**	**0.64**

TABLE 1.6.4: BUILD ALTERNATIVE B LOS

ID	From		To		Dist.	Cross Section	Speed	2013				2033			
	L.M.	Desc.	L.M.	Desc.			Limit	AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	18,960	C	31	0.51	20,860	C	31	0.56
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	25,800	D	31	0.70	33,540	E	31	0.91
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	19,080	C	33	0.52	24,800	D	33	0.67
3	5.18	Harbor Chapel Rd.	7.20	Lemay Dr.	2.02	4-Lanes with a Raised Grass Median and 4-8 Ft. Shoulders	45	10,430	A	43	0.24	13,560	B	43	0.31
4	7.20	Lemay Dr.	10.11	Harr Town Rd.	2.91	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	10,260	E	36	0.41	20,520	E	26	0.82
5	10.11	Harr Town Rd.	11.90	Carolina Pottery Rd.	1.79	2-Lanes with No Median and 10 Ft. Shoulders	50	10,830	D	41	0.43	21,660	F	31	0.86
6	11.90	Carolina Pottery Rd.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	40	10,830	B	43	0.27	21,660	C	43	0.55
				Σ =	**8.4**	**Weighted Average =**	**44**			**38**	**0.39**			**33**	**0.67**

1.7 CONSISTENCY WITH EXISTING TRANSPORTATION PLANS

The project is included in the Kingsport Metropolitan Planning Organization's (MPO) *Transportation Improvement Program, Fiscal Years 2011 through 2014*, adopted October 20th, 2010. The project is listed in *Section A, Previous Projects*. The projects in Section A are major projects carried over from the previous (2008-2011) Transportation Improvement Program (TIP). The project is listed on page 12 of the 2011-2014 TIP. The project description is provided in **Table 1.7.1: TIP Listing**.

This project is also included in the *Kingsport Metropolitan Area 2030 Transportation Plan*, dated June 14, 2007 and amended January 10, 2008. The plan addresses the future transportation needs within the MPO boundary. The project is listed on pages 119 and 120 of the amended plan. The project description is provided in **Table 1.7.2: Transportation Plan Listing**.

TABLE 1.7.1: TIP LISTING

ID	Project Location	Description	Status
TN-5 PIN 105467.00	SR 126 from Center St. to I-81	Reconstructing/widening improvements	Currently in PE Phase

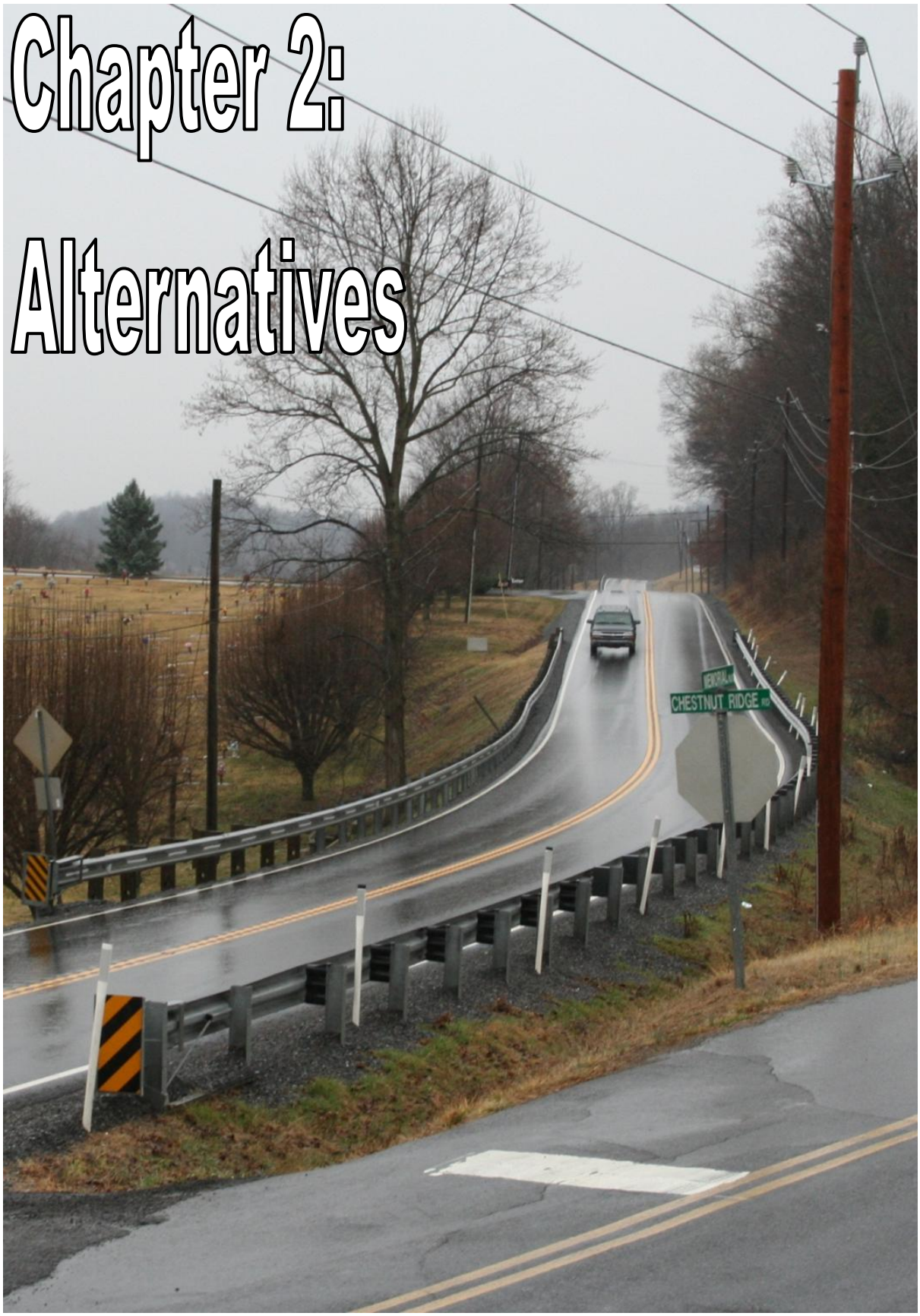
TABLE 1.7.2: TRANSPORTATION PLAN LISTING

Project No.	Jurisdiction	Project Name (not Prioritized)	Location (To and From)	Functional Classification	Project Purpose	Type Project	General Improvements	Additional Information	Estimated Cost
MNA-20a	Kingsport Sullivan County	Memorial Blvd./State Route 126	Center Street to Cook's Valley Road	Minor Arterial	Safety and Related Congestion Relief	Major Reconstruction	Reconstruct to 4 lanes with grass median	Apply context sensitive solutions concepts	$22,867,800
MNA-20b	Kingsport Sullivan County	Memorial Blvd./State Route 126	Cook's Valley Road to I-81	Minor Arterial	Safety and Related Congestion Relief	Major Reconstruction	Reconstruct to 3 lanes and wide shoulder/clear zones, soften curbs	3 lanes/2 lanes/widen shoulders	$17,150,850

1.8 SUMMARY

Based on the above discussion, it has been determined that there is a need for the proposed project. SR 126 (Memorial Boulevard) provides a direct link between the City of Kingsport and I-81. SR 126 (Memorial Boulevard) is generally parallel to US 11W and I-81 within the study limits. SR 126 (Memorial Boulevard) primarily services local traffic and provides access to these higher type facilities that are utilized for longer distance travel. It is also a popular commuter route between adjacent communities and the City of Kingsport. SR 126 (Memorial Boulevard) has documented safety and geometric deficiencies that need to be improved. The existing roadway allows no safe modal choice except for automobiles due to the narrow shoulders and lack of sidewalks. The project has logical termini, is of sufficient length to address environmental matters on a broad scope, has independent utility, and will not restrict consideration of alternatives for other foreseeable transportation improvements.

Chapter 2: Alternatives



2.0 ALTERNATIVES

This chapter of the Draft Environmental Impact Statement (DEIS) describes the alternatives under consideration for the 8.4 mile-long SR 126 (Memorial Boulevard) Corridor improvement project. In selecting reasonable alternatives to meet the purpose and need of the project, TDOT consulted with local, state and federal officials and agencies, identified environmentally sensitive areas and held several public involvement meetings in the project corridor. The No-Build and two Build Alternatives are currently under consideration for this project. Background concerning how these alternatives were determined is provided in **Section 2.1**. The geometric features of the existing roadway, which are consistent with the No-Build Alternative, were discussed in detail in **Chapter 1, Section 1.2**. The two Build Alternatives (Build Alternative A and Build Alternative B) are described in detail in **Sections 2.3** and **2.4.** The No-Build and two Build Alternatives are compared in **Section 2.5**, along with how each alternative addresses the purpose and need of the project. Conceptual Layouts of Alternatives A and B are provided in **Appendix D**. The alternatives that were considered but eliminated from further study are described and the reason for their elimination are summarized in **Section 2.6**. The final selection of the preferred alternative will not be made until after the impacts of the No-Build and Build Alternatives, comments on the Draft EIS, and the comments from the NEPA Public Hearing have been fully evaluated.

2.1 BACKGROUND IN DETERMINING REASONABLE ALTERNATIVES TO INCLUDE IN THE DEIS

The SR 126 (Memorial Boulevard) project was the initial Context Sensitive Solutions (CSS) Project for Tennessee. A Community Resource Team (CRT) was assembled for the SR 126 (Memorial Boulevard) CSS project. The CRT met thirteen times for meetings, training, and workshops and conducted three series of Public Involvement Sessions between October 2003 and May 2005.

A continuous four-travel lane alternative with a divided median was considered and discussed beginning in the planning stages of the project and through the CSS phase. Although some support was noted for this alternative, there was considerable opposition, in part, due to the increased right-of-way requirements, which would require a higher number of family and business relocations, adverse impacts to the historic Yancey's Tavern property, and additional grave relocations within the East Lawn Memorial Gardens Cemetery located directly across the roadway from the tavern. The continuous four-travel lane alternative would also require higher areas of encroachment into floodplains, greater lengths of channel changes to streams, and potentially additional hazardous material impacts. The public expressed concerns about potential diminished visual and rural aesthetics, accelerated development and increased traffic speed in the corridor if a continuous four-lane alignment was constructed.

In the CSS Process, the public expressed preferences for the blending of four-, three-, and two-lane sections of the roadway. They also expressed a preference for maintaining fewer travel lanes and lower speed limits in portions of the project area to minimize potential increases in land use changes adjacent to the project area.

Concept plans were presented at the public involvement meetings associated with the CSS Process. The concept plans were not fully developed alternatives. They were presented as tables with options (i.e., landscaped median or center turn lane), and presented to the public for discussion. Three main concepts, A, B, and C, were presented during the Public Involvement

Session that occurred at Sunnyside Baptist Church on May 26, 2005. The Summary of Cross Section Elements for these conceptual alternatives is included in **Appendix E**.

A detailed preference survey was included at the end of handout material distributed during the May 2005 Public Involvement Session. In the survey, citizens were asked to express a preference for Concept A, B, C, or the "No-Build" Alternative along various segments of the study corridor. The public comments favored Concept C by 1102 of the 2424 responses collected. Concept C incorporates the public's expressed preference for the blending of four-, three-, and two-lane sections of the roadway along the corridor. Concepts A and B were dismissed by the CRT and TDOT based on public lack of support for a four-lane section in the portion of the project between Cooks Valley Road and I-81. Concept C was carried forward for further consideration in the design process. Concept C has been renamed Build Alternative A in this document. Build Alternative B in this document is a refinement of Build Alternative A. Build Alternative B incorporates the public's desire to minimize adverse impacts to the historic Yancey's Tavern property and additional grave relocations within the East Lawn Memorial Gardens Cemetery, located directly across the roadway from the tavern.

2.2 NO-BUILD ALTERNATIVE

The No-Build, or No Action, Alternative makes no improvements to SR 126 (Memorial Boulevard) other than scheduled maintenance activities. There are several advantages to the No-Build Alternative. One is that present travel patterns would not be temporarily disrupted by the construction of this project. Noise and construction impacts would not occur. There would be no impacts to wildlife, cultural resources, or farmland. There would be no family or business relocations. The No-Build Alternative would have no direct impacts on the environment.

There are, however, several disadvantages to the No-Build Alternative. It would not improve vehicular, pedestrian, or bicyclist mobility. It would not correct existing geometric deficiencies along the route. It would not improve safety. It does not meet the Purpose and Need of the project.

2.3 BUILD ALTERNATIVE A

Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Either a raised median or two way left turn lane (TWLTL) will be provided along the majority of the route. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas.

Several different typical cross sections are proposed along the SR 126 (Memorial Boulevard) corridor. Additional right-of-way will be required along the entire corridor to accommodate the proposed improvements. **Section 2.3.1** describes the proposed roadway cross-sections in detail. The proposed roadway characteristics are also summarized in **Figures 2.3.1** through **2.3.20** and **Table 2.3.1**. Additionally, Conceptual Layouts of Build Alternative A are provided in **Appendix D**.

The proposed alignment of Alternative A generally follows the existing alignment. The proposed alignment shifts from side to side to minimize impacts, reduce earthwork volumes, simplify constructability, and improve the curvature of the roadway. Despite the effort to minimize

impacts, considerable additional right-of-way will be required and many residences and businesses will need to be relocated. Numerous gravesites will also need to be relocated.

In addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved. Many of these minor connections intersect SR 126 (Memorial Boulevard) at skewed angles. Realigning side road approaches to intersect to as close to 90 degrees as possible has proven visibility and safety benefits. Conceptual Layouts of Build Alternative A, which include the proposed side road approach realignments, are provided in **Appendix D**. Side Road approaches to SR 126 (Memorial Boulevard) to be realigned include:

- Warpath Drive
- Miller Street
- Orebank Road
- John B. Dennis Exit Ramp
- Heather Lane
- Old Stage Road
- Eaton Station Road
- Woods Way
- Island Road
- Natchez Lane
- Harr Town Road
- Adams Street

Several intersections are proposed to be closed along SR 126 (Memorial Boulevard). These minor connections to SR 126 (Memorial Boulevard) will be rerouted to connect via improved intersections on neighboring roads. Closing these intersections will improve access control and safety along the route due to the reduction of conflict points. Conceptual Layouts of Build Alternative A, which include the proposed intersection closings, are provided in **Appendix D**. Intersections to be closed along SR 126 (Memorial Boulevard) include:

- Edens Ridge Road
- Hawthorne Street
- Kent Street
- Amy Avenue
- Trinity Lane
- Tanglewood Road
- Holiday Road
- Shuler Drive
- Chestnut Ridge Road
- Red Robin Lane
- Gravel Top Road

2.3.1 Build Alternative A Typical Proposed Roadway Cross Sections

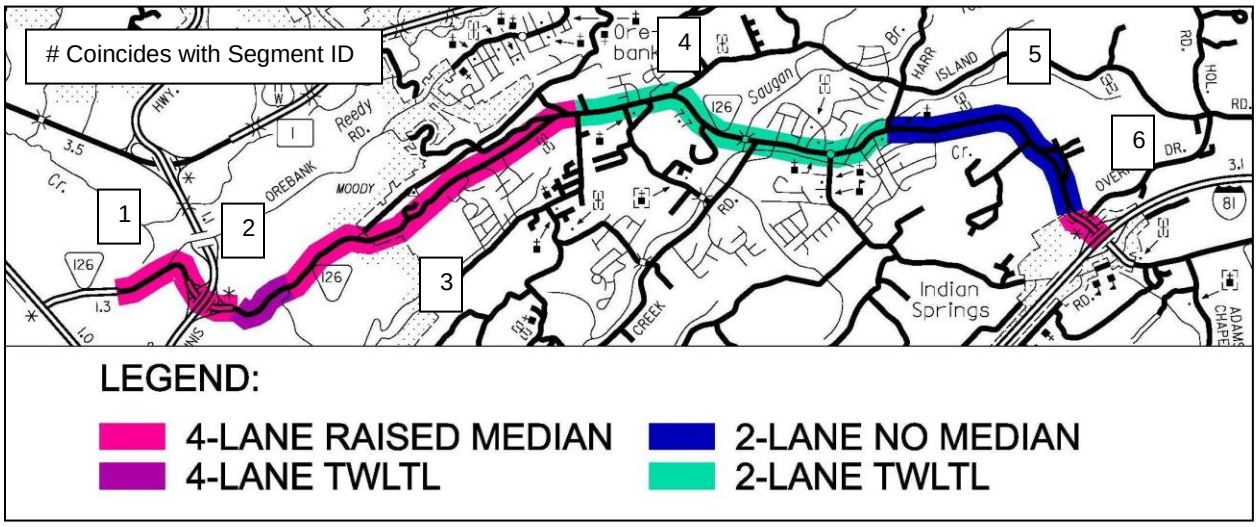


FIGURE 2.3.1: BUILD ALTERNATIVE A CROSS SECTION LEGEND

1. East Center Street (L.M. 3.72) to west of Hawthorne Street (L.M. 4.71)

On the first 1.0 mile long segment from East Center Street to west of Hawthorne Street, the proposed cross section includes four travel lanes (two in each direction), a raised grass median, four-foot wide paved shoulders, and curb and gutter. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 35 miles per hour. Please refer to **Figure 2.3.2** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.3** and **2.3.4**.

A roundabout is proposed at the five legged intersection of SR 126 (Memorial Boulevard), East Center Street, Warpath Drive, and Miller Street located at the corridor's western terminus. A roundabout is a type of circular road intersection where traffic enters a one-way stream around a central island. Statistically, roundabouts are safer than traditional intersections. While a roundabout is the preferred improvement option at this intersection, a second option, which would maintain the existing traffic signal, is still under consideration.

Additional features in this section include realigning the Orebank Road Intersection to connect to SR 126 (Memorial Boulevard) at an improved skew, closing the Edens Ridge Road Intersection, and reducing the skew and improving the channelization of the northbound John B. Dennis exit ramp to eastbound SR 126 (Memorial Boulevard). These features will improve the safety and access control along SR 126 (Memorial Boulevard).

The Shipley-Jarvis House is located adjacent to the northbound lanes near Woodside Drive in this segment. The Shipley-Jarvis House is deemed eligible for listing on the National Register of Historic Places (NRHP). The improvements will be constructed along the southbound lanes to avoid impacting the Shipley-Jarvis House.

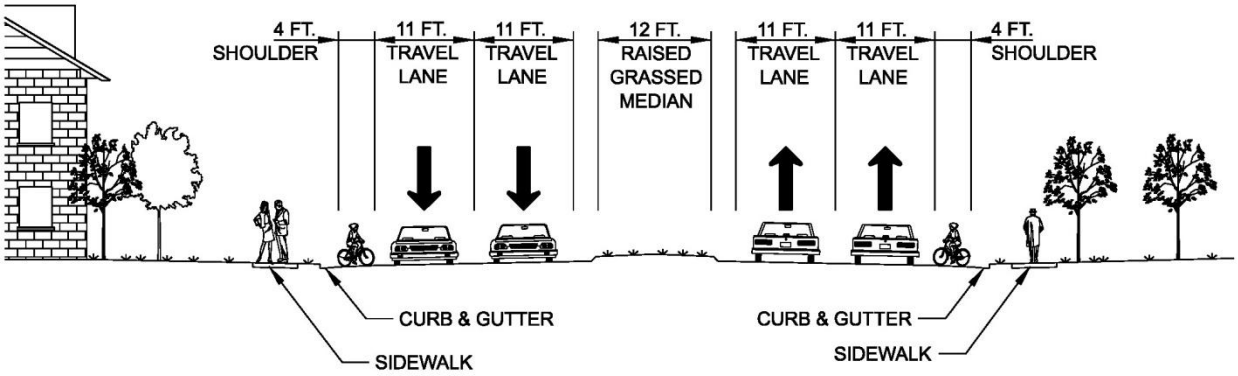


FIGURE 2.3.2: SEGMENT 1 PROPOSED TYPICAL SECTION

FIGURE 2.3.3: SEGMENT 1 EXISTING TYPICAL SECTION

FIGURE 2.3.4: SEGMENT 1 PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Curb & Gutter, & Sidewalks

2. West of Hawthorne Street (L.M. 4.71) to Harbor Chapel Road (L.M. 5.18)

The proposed cross section of this 0.5 mile long segment of SR 126 (Memorial Boulevard) from west of Hawthorne Street to Harbor Chapel Road includes four travel lanes (two in each direction), four-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane, instead of the raised grass median proposed in Segment 1. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 35 miles per hour. Please refer to **Figure 2.3.5** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.6** and **2.3.7**.

Additional features in this section include intersection realignments and closings. Hawthorne Street's intersection with the south side of SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Kite Street. In addition, the Kent Street intersection with SR 126 (Memorial Boulevard) will be closed, with access to SR 126 (Memorial Boulevard) also being provided via Kite Street. The Amy Avenue/Woodridge Avenue intersection with SR 126 (Memorial Boulevard) will be closed and realigned to intersect with Glenwood Street. Heather Lane's approach to SR 126 (Memorial Parkway) will be realigned to improve the skew of the intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

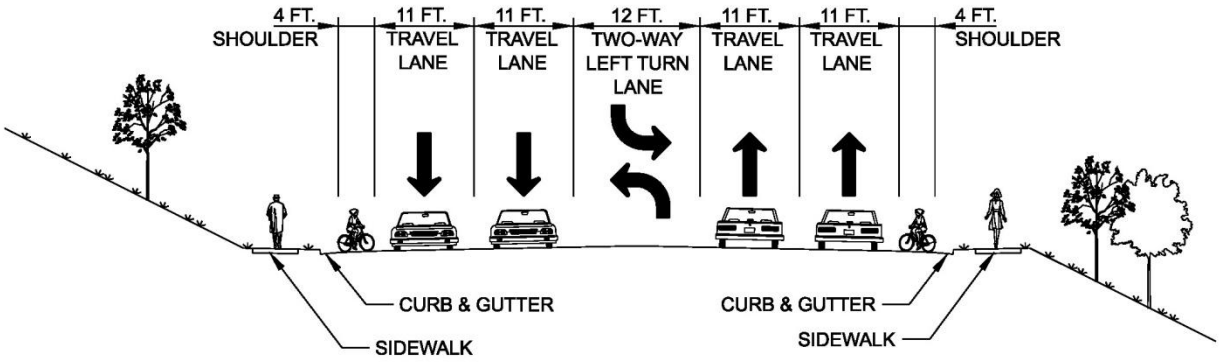


FIGURE 2.3.5: SEGMENT 2 PROPOSED TYPICAL SECTION

FIGURE 2.3.6: SEGMENT 2 EXISTING TYPICAL SECTION

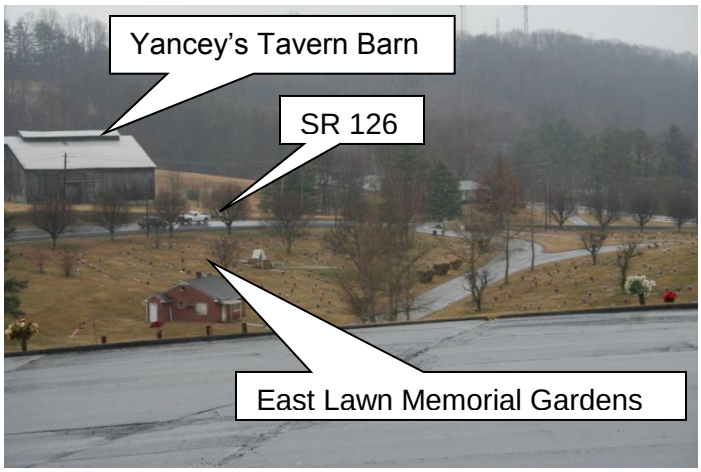
FIGURE 2.3.7: SEGMENT 2 PROPOSED TYPICAL SECTION
4-Lane, TWLTL, Shoulders, Curb & Gutter, & Sidewalks

3. Harbor Chapel Road (L.M. 5.18) to Cooks Valley Road (L.M. 7.66)

The proposed cross section of this 2.5 mile long segment of SR 126 (Memorial Boulevard) from Harbor Chapel Road to Cooks Valley Road includes four travel lanes (two in each direction), and a raised grass median. The first 0.6 mile of this segment from Harbor Chapel Road to east of Old Stage Road includes four-foot wide paved shoulders, curb and gutter, and sidewalks on both sides of the roadway. The next 1.9 miles of this segment from east of Old Stage Road to Cooks Valley Road will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be eight feet wide, six feet of which will be paved. No sidewalks will be provided along this 1.9 mile segment between Old Stage Road and Cooks Valley Road due to the lack of properties fronting SR 126 (Memorial Boulevard). The travel lanes throughout the entire 2.5 mile long segment will be eleven feet wide. The four to six-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figures 2.3.8** and **2.3.9** for a depiction of the proposed typical sections of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.10** through **2.3.12**.

Additional features in this section include intersection realignments and closings. Trinity Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Amy Avenue and Glenwood Street. Tanglewood's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Briarwood Road. Old Stage Road's approach to SR 126 (Memorial Boulevard) will be realigned to improve the skew of the intersection. Holiday Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection between Parker Street and Old Parker Drive. The new connection will provide access to Peers Street and Lemay Drive. Shuler Drive's Intersection with SR 126 (Memorial Boulevard) will also be closed. Access to SR 126 (Memorial Drive) will be provided via Peers Street and Lemay Drive. Chestnut Ridge Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Old Stage Road and Eaton Station Road. Eaton Station Road's approach to SR 126 (Memorial Parkway) will be realigned to improve the skew of the intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

Two community resources are located on either side of SR 126 (Memorial Boulevard) in this segment: Yancey's Tavern and the East Lawn Memorial Gardens Cemetery. Yancey's Tavern is listed on the National Register of Historic Places. To avoid direct impacts to the Yancey's Tavern property, it is proposed to widen SR 126 (Memorial Boulevard) to the south. The roadway improvements will impact the East Lawn Memorial Gardens Cemetery. Yancey's Tavern and East Lawn Memorial Gardens are discussed in more detail in **Chapters 3** and **4**.



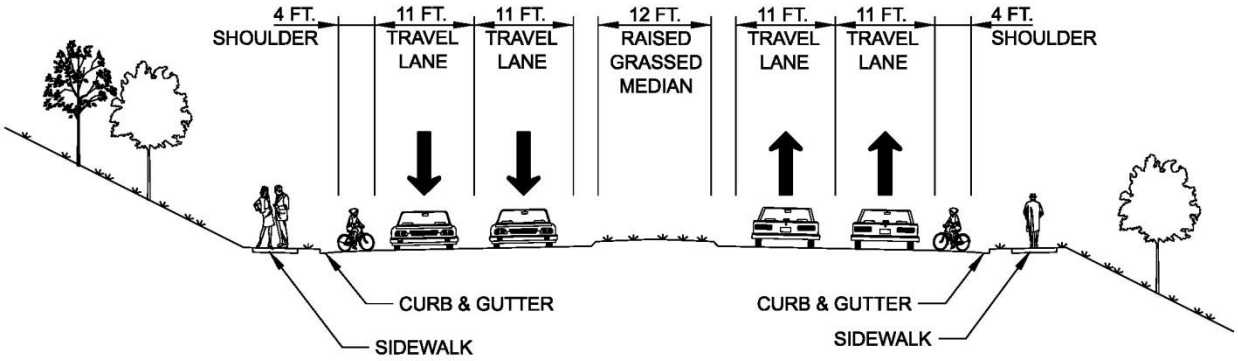


FIGURE 2.3.8: SEGMENT 3A PROPOSED TYPICAL SECTION

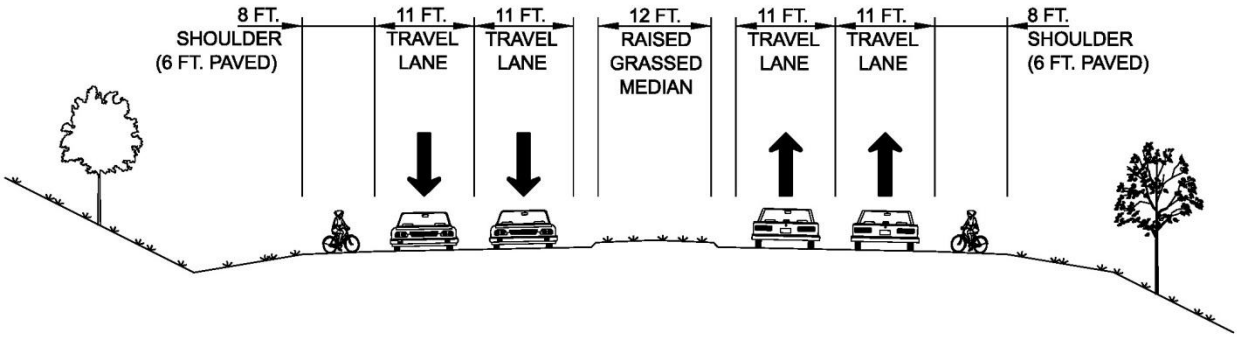


FIGURE 2.3.9: SEGMENT 3B PROPOSED TYPICAL SECTION

FIGURE 2.3.10: SEGMENT 3 EXISTING TYPICAL SECTION

FIGURE 2.3.11: SEGMENT 3A PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Curb & Gutter, & Sidewalks

FIGURE 2.3.12: SEGMENT 3B PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Roadside Ditches

4. Cooks Valley Road (L.M. 7.66) to Harr Town Road (L.M. 10.11)

The proposed cross section of this 2.5 mile long segment of SR 126 (Memorial Boulevard) from Cooks Valley Road to Harr Town Road includes two travel lanes (one in each direction), six-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The six-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.3.13** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.14** and **2.3.15**.

Additional features in this section include intersection realignments and closings. Red Robin Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Bridwell Heights Road. The side road approaches of Woods Way, Island Road, Natchez Lane, and Harr Town Road to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

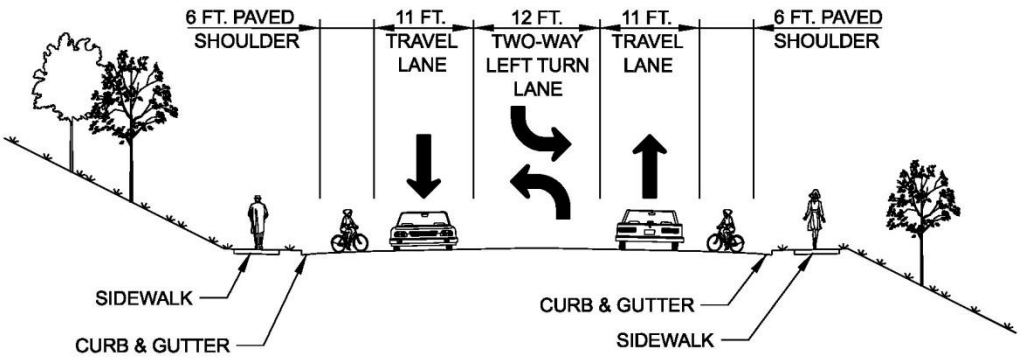


FIGURE 2.3.13: SEGMENT 4 PROPOSED TYPICAL SECTION

FIGURE 2.3.14: SEGMENT 4 EXISTING TYPICAL SECTION

FIGURE 2.3.15: SEGMENT 4 PROPOSED TYPICAL SECTION
2-Lane, TWLTL, Shoulders, Curb & Gutter, & Sidewalks

5. Harr Town Road (L.M. 10.11) to west of Carolina Pottery Drive (L.M. 11.90)

The proposed cross section of this 1.8 mile long segment of SR 126 (Memorial Boulevard) from Harr Town Road to west of Carolina Pottery Drive includes two travel lanes (one in each direction) with no median. This section will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be ten feet wide, eight feet of which will be paved. No sidewalks will be provided due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. Rumble strips will be provided along the centerline of the roadway to deter drivers from crossing into the opposing lane. Rumble strips will also be provided along the shoulders. The shoulder rumble strips will include ten-foot gaps between thirty-foot rumble strip segments to accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.3.16** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.16** and **2.3.17**.

Additional features in this section include intersection realignments and closings. The side road approache of Adams Street to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. Gravel Top Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via the improved Adams Street Intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

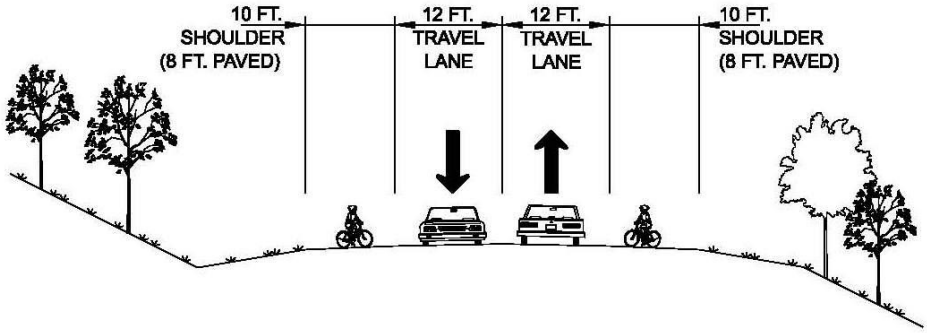


FIGURE 2.3.16: SEGMENT 5 PROPOSED TYPICAL SECTION

FIGURE 2.3.16: SEGMENT 5 EXISTING TYPICAL SECTION

FIGURE 2.3.17: SEGMENT 5 PROPOSED TYPICAL SECTION
2-Lane, No Median, Shoulders, Roadside Ditches

6. West of Carolina Pottery Drive (L.M. 11.90) to I-81 (L.M. 12.12)

The proposed cross section of this 0.2 mile long segment of SR 126 (Memorial Boulevard) from west of Carolina Pottery Drive to I-81 includes four travel lanes (two in each direction), and a raised grass median. This segment will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be twelve feet wide and paved. No sidewalks will be provided along this segment due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. The twelve-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.3.18** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.19** and **2.3.20**.

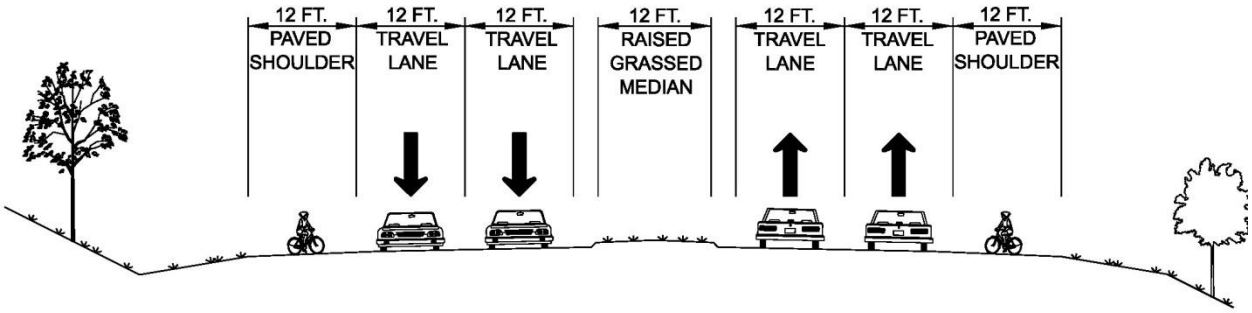


FIGURE 2.3.18: SEGMENT 6 PROPOSED TYPICAL SECTION

FIGURE 2.3.19: SEGMENT 6 EXISTING TYPICAL SECTION

FIGURE 2.3.20: SEGMENT 6 PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Roadside Ditches

TABLE 2.3.1: BUILD ALTERNATIVE A DESCRIPTION

SR 126 (Memorial Boulevard) Alternative A Roadway Description												
Segment		Design Speed	From		To		Travel Lanes		Median Desc. (Typical)	Shld.	Ditch/ C&G ?	Side-walk?
ID	Dist.		LM	Description	LM	Description	No.	Width				
1	1.0	35	3.72	Center Street	4.71	west of Hawthorne Street	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
2	0.47	35	4.71	west of Hawthorne Street	5.18	Harbor Chapel Road	4	11	12 Ft. Paved TWLTL	4 Ft. Paved	C&G	Yes
3	2.48	45	5.18	Harbor Chapel Road	5.80	east of Old Stage Road	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
			5.80	east of Old Stage Road	7.66	Cooks Valley Road	4	11	12 Ft. Raised Grass	6 Ft. Paved/ 8 Ft. Total	Ditch	No
4	2.45	45	7.66	Cooks Valley Road	10.11	Harr Town Road	2	11	12 Ft. Paved TWLTL	6 Ft. Paved	C&G	Yes
5	1.79	45	10.11	Harr Town Road	11.90	west of Carolina Pottery Drive	2	12	None w/ Rumble Strip	8 Ft. Paved/10 Ft. Total	Ditch	No
6	0.22	45	11.90	west of Carolina Pottery Drive	12.12	I-81	4	12	12 Ft. Raised Grass	12 Ft. Paved	Ditch	No
Σ =	8.40	43.3	= Weighted Average									

2.4 BUILD ALTERNATIVE B

Alternative B is a refinement of Alternative A. Alternative B utilizes the same proposed typical roadway cross sections as Alternative A, but the length of the four-travel lane section of Segment 3 is reduced. As a result, the two-travel lane section of Segment 4 begins further west, near Lemay Drive, and is longer than in Alternative A. Retaining walls will also be utilized in the vicinity of historic Yancey's Tavern and East Lawn Memorial Gardens Cemetery. These modifications were made to minimize impacts to Yancey's Tavern and the East Lawn Memorial Gardens Cemetery located on opposing sides of SR 126 (Memorial Boulevard) in Segment 4. It should be noted that numerous gravesites will still need to be relocated with Alternative B. Additional changes incorporated into Alternative B include minor modifications of the proposed centerline to minimize excavation and fill impacts and improve maintenance of traffic during construction. Alternative B subsequently requires less additional right-of-way and impacts fewer residences and businesses than Alternative A.

Section 2.4.1 describes the proposed SR 126 (Memorial Boulevard) roadway cross-sections, along with side road improvements, in detail. The proposed roadway characteristics are also summarized in **Figures 2.4.1** through **2.4.8** and **Table 2.4.1**. Additionally, Conceptual Layouts of Build Alternative B are provided in **Appendix D**.

In addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved or closed. These side road modifications improve the safety and access control along SR 126 (Memorial Boulevard). The side road approaches modified in Alternative B are the same as those in Alternative A. For a list of the affected side roads, please refer to **Section 2.3**.

2.4.1 Build Alternative B Typical Proposed Roadway Cross Sections

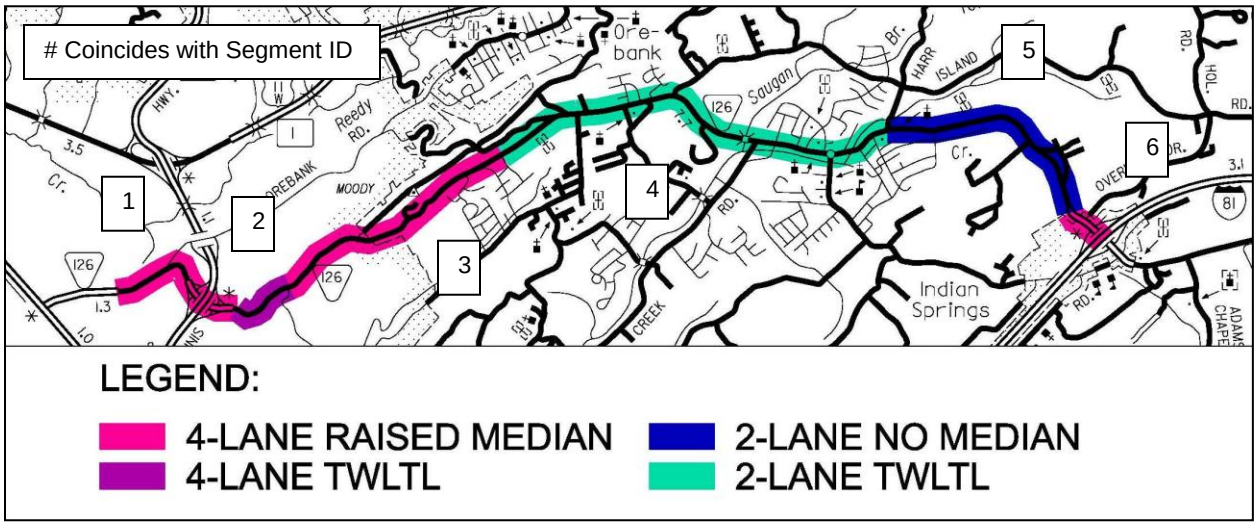


FIGURE 2.4.1: BUILD ALTERNATIVE B CROSS SECTION LEGEND

1. East Center Street (L.M. 3.72) to west of Hawthorne Street (L.M. 4.71)

On the first 1.0 mile long segment from East Center Street to west of Hawthorne Street, the proposed cross section includes four travel lanes (two in each direction), a raised grass median, four-foot wide paved shoulders, and curb and gutter. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 35 miles per hour. Please refer to **Figure 2.4.2** for a depiction of the proposed typical section of this segment.

A roundabout is proposed at the five legged intersection of SR 126 (Memorial Boulevard), East Center Street, Warpath Drive, and Miller Street located at the corridor's western terminus. A roundabout is a type of circular road intersection where traffic enters a one-way stream around a central island. Statistically, roundabouts are safer than traditional intersections. While a roundabout is the preferred improvement option at this intersection, a second option, which would maintain the existing traffic signal, is still under consideration.

Additional features in this section include realigning the Orebank Road Intersection to connect to SR 126 (Memorial Boulevard) at an improved skew, closing the Edens Ridge Road Intersection, and reducing the skew and improving the channelization of the northbound John B. Dennis exit ramp to eastbound SR 126 (Memorial Boulevard). These features will improve the safety and access control along SR 126 (Memorial Boulevard).

The Shipley-Jarvis House is located adjacent to the northbound lanes near Woodside Drive in this segment. The Shipley-Jarvis House is deemed eligible for listing on the National Register of Historic Places (NRHP). The improvements will be constructed along the southbound lanes to avoid impacting the Shipley-Jarvis House.

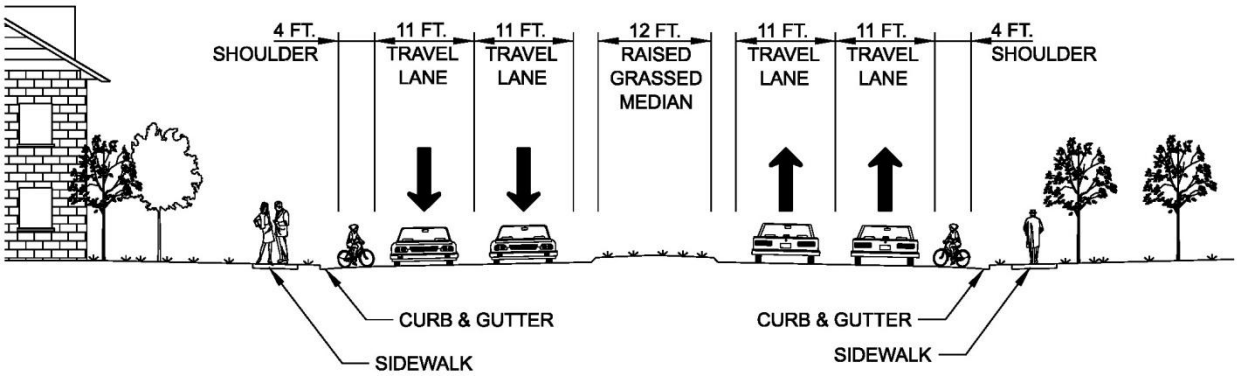


FIGURE 2.4.2: SEGMENT 1 PROPOSED TYPICAL SECTION

2. West of Hawthorne Street (L.M. 4.71) to Harbor Chapel Road (L.M. 5.18)

The proposed cross section of this 0.5 mile long segment of SR 126 (Memorial Boulevard) from west of Hawthorne Street to Harbor Chapel Road includes four travel lanes (two in each direction), four-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane, instead of the raised grass median proposed in Segment 1. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this

segment is 35 miles per hour. Please refer to **Figure 2.4.3** for a depiction of the proposed typical section of this segment.

Additional features in this section include intersection realignments and closings. Hawthorne Street's intersection with the south side of SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Kite Street. In addition, the Kent Street intersection with SR 126 (Memorial Boulevard) will be closed, with access to SR 126 (Memorial Boulevard) also being provided via Kite Street. The Amy Avenue/Woodridge Avenue intersection with SR 126 (Memorial Boulevard) will be closed and realigned to intersect with Glenwood Street. Heather Lane's approach to SR 126 (Memorial Parkway) will be realigned to improve the skew of the intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

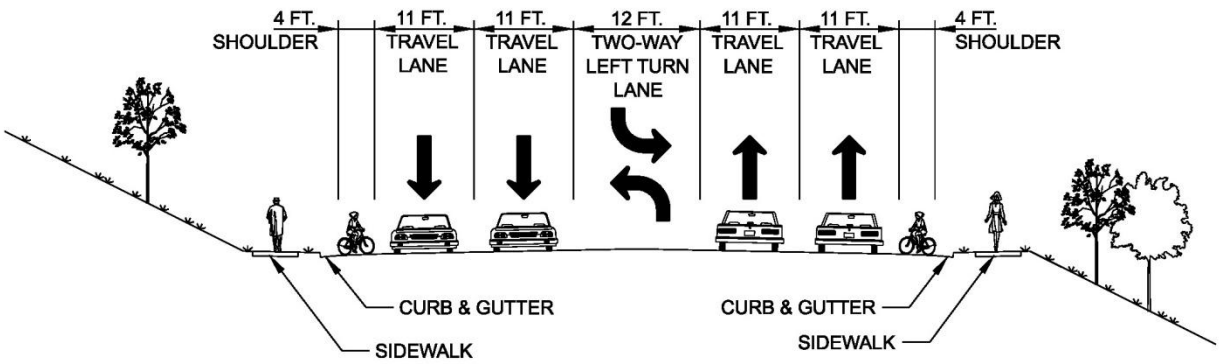


FIGURE 2.4.3: SEGMENT 2 PROPOSED TYPICAL SECTION

3. Harbor Chapel Road (L.M. 5.18) to east of Lemay Drive (L.M. 7.20)

The proposed cross section of this 2.0 mile long segment of SR 126 (Memorial Boulevard) from Harbor Chapel Road to Cooks Valley Road includes four travel lanes (two in each direction), and a raised grass median. This section is 0.5 miles shorter than in Alternative A. The first 0.6 mile of this segment from Harbor Chapel Road to east of Old Stage Road includes four-foot wide paved shoulders, curb and gutter, and sidewalks on both sides of the roadway. The next 1.4 miles of this segment from east of Old Stage Road to Cooks Valley Road will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be eight feet wide, six feet of which will be paved. No sidewalks will be provided along this 1.4 mile segment between Old Stage Road and Cooks Valley Road due to the lack of properties fronting SR 126 (Memorial Boulevard). The travel lanes throughout the entire 2.5 mile long segment will be eleven feet wide. The four to six-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figures 2.4.4** and **2.4.5** for a depiction of the proposed typical sections of this segment.

Additional features in this section include intersection realignments and closings. Trinity Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Amy Avenue and Glenwood Street. Tanglewood's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Briarwood Road. Old Stage Road's approach to SR 126 (Memorial Boulevard) will be realigned to improve the skew of the intersection. Holiday Road's intersection with SR 126 (Memorial Boulevard) will be closed.

Access to SR 126 (Memorial Boulevard) will be provided via a new connection between Parker Street and Old Parker Drive. The new connection will provide access to Peers Street and Lemay Drive. Shuler Drive's Intersection with SR 126 (Memorial Boulevard) will also be closed. Access to SR 126 (Memorial Drive) will be provided via Peers Street and Lemay Drive. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

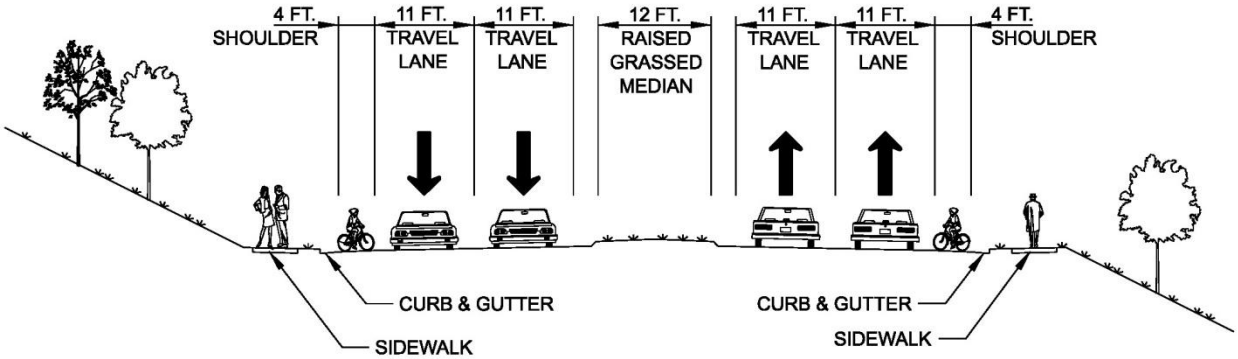


FIGURE 2.4.4: SEGMENT 3A PROPOSED TYPICAL SECTION

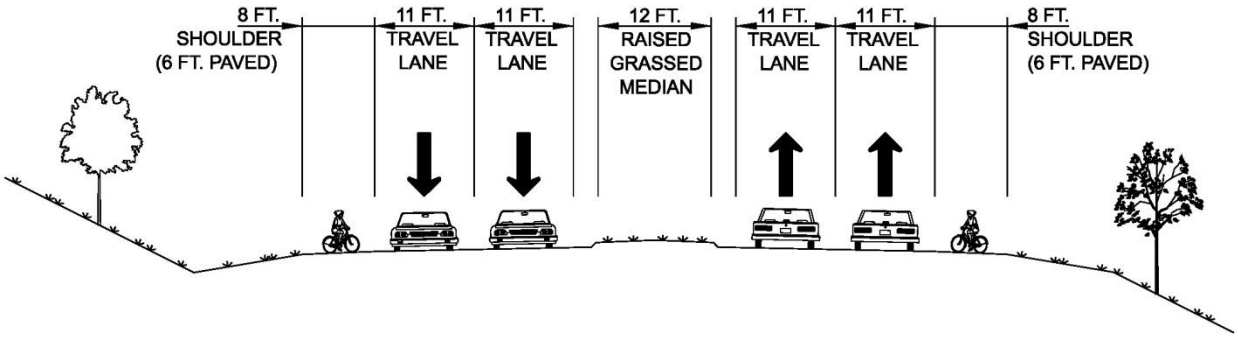


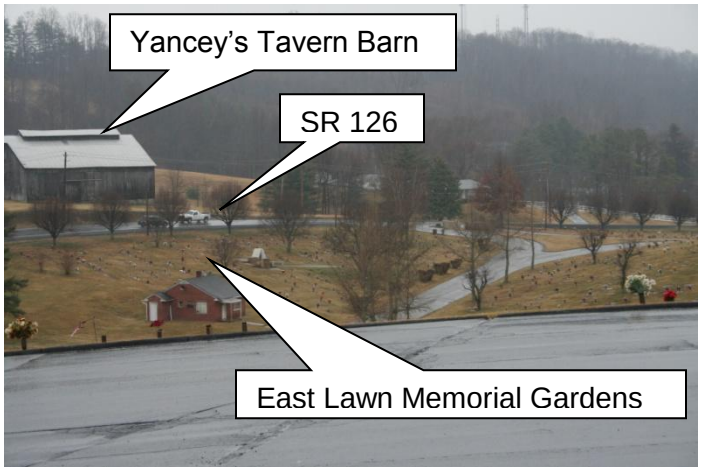
FIGURE 2.4.5: SEGMENT 3B PROPOSED TYPICAL SECTION

4. East of Lemay Drive (L.M. 7.20) to Harr Town Road (L.M. 10.11)

The proposed cross section of this 2.9 mile long segment of SR 126 (Memorial Boulevard) from east of Lemay Drive to Harr Town Road includes two travel lanes (one in each direction), six-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The six-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. This section is 0.5 miles longer than in Alternative A. Please refer to **Figure 2.4.6** for a depiction of the proposed typical section of this segment.

Additional features in this section include intersection realignments and closings. Chestnut Ridge Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Old Stage Road and Eaton Station Road. Red Robin

Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Bridwell Heights Road. The side road approaches of Eaton Station Road, Woods Way, Island Road, Natchez Lane, and Harr Town Road to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. These features will improve the safety and access control along SR 126 (Memorial Boulevard).



Two community resources are located on either side of SR 126 (Memorial Boulevard) in this segment: Yancey's Tavern and the East Lawn Memorial Gardens Cemetery. Yancey's Tavern is listed on the National Register of Historic Places. To avoid direct impacts to the Yancey's Tavern property, it is proposed to widen SR 126 (Memorial Boulevard) to the south. The roadway improvements will impact the East Lawn Memorial Gardens Cemetery. In order to minimize the impacts, the roadway cross section is reduced to two travel lanes in this section of Alternative B, compared to four travel lanes in Alternative A. This will minimize the visual impacts to Yancey's Tavern and reduce the number of gravesites which must be relocated in the East Lawn Memorial Gardens Cemetery. Retaining walls will also be utilized in this area to further reduce impacts to the cemetery. Yancey's Tavern and East Lawn Memorial Gardens are discussed in more detail in **Chapters 3** and **4**.

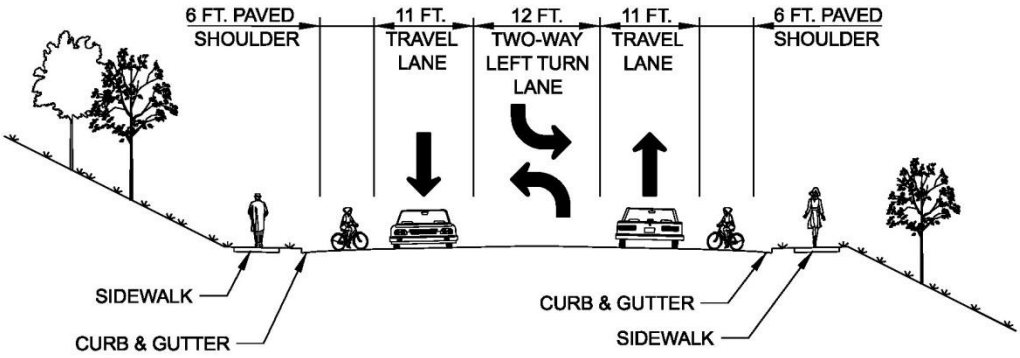


FIGURE 2.4.6: SEGMENT 4 PROPOSED TYPICAL SECTION

5. Harr Town Road (L.M. 10.11) to west of Carolina Pottery Drive (L.M. 11.90)

The proposed cross section of this 1.8 mile long segment of SR 126 (Memorial Boulevard) from Harr Town Road to west of Carolina Pottery Drive includes two travel lanes (one in each direction) with no median. This section will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be ten feet wide, eight feet of which will be paved. No sidewalks will be provided due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. Rumble strips will be provided along the centerline of the roadway to deter drivers from crossing into the opposing lane. Rumble strips will also be provided along the shoulders. The shoulder rumble strips will include ten-foot gaps between thirty-foot rumble strip segments to accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.4.7** for a depiction of the proposed typical section of this segment.

Additional features in this section include intersection realignments and closings. The side road approache of Adams Street to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. Gravel Top Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via the improved Adams Street Intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

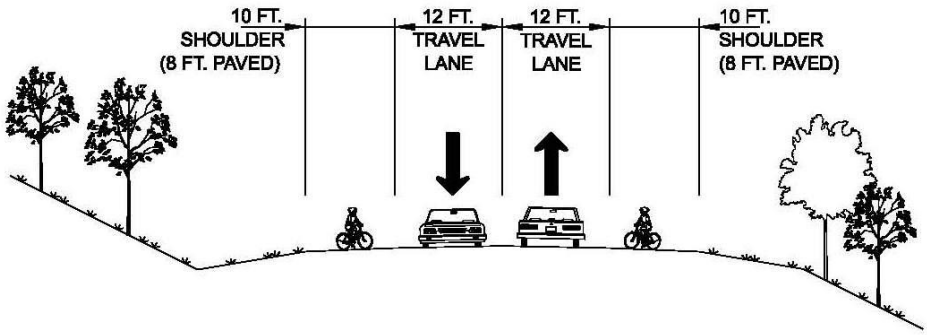


FIGURE 2.4.7: SEGMENT 5 PROPOSED TYPICAL SECTION

6. West of Carolina Pottery Drive (L.M. 11.90) to I-81 (L.M. 12.12)

The proposed cross section of this 0.2 mile long segment of SR 126 (Memorial Boulevard) from west of Carolina Pottery Drive to I-81 includes four travel lanes (two in each direction), and a raised grass median. This segment will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be twelve feet wide and paved. No sidewalks will be provided along this segment due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. The twelve-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.4.8** for a depiction of the proposed typical section of this segment.

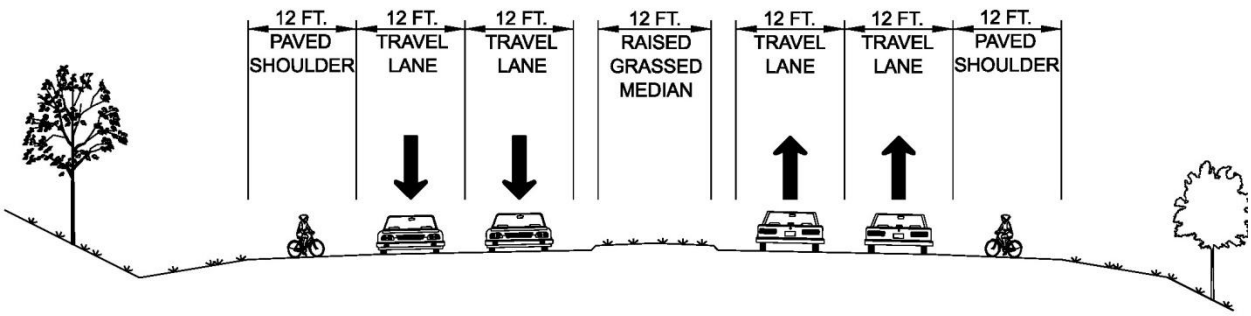


FIGURE 2.4.8: SEGMENT 6 PROPOSED TYPICAL SECTION

TABLE 2.4.1: BUILD ALTERNATIVE B DESCRIPTION

SR 126 (Memorial Boulevard) Alternative B Roadway Description												
Segment		Design Speed	From		To		Travel Lanes		Median Desc. (Typical)	Shld.	Ditch/ C&G ?	Side-walk?
ID	Dist.		LM	Description	LM	Description	No.	Width				
1	1.0	35	3.72	Center Street	4.71	west of Hawthorne Street	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
2	0.47	35	4.71	west of Hawthorne Street	5.18	Harbor Chapel Road	4	11	12 Ft. Paved TWLTL	4 Ft. Paved	C&G	Yes
3	2.02	45	5.18	Harbor Chapel Road	5.80	east of Old Stage Road	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
			5.80	east of Old Stage Road	7.20	East of Lemay Drive	4	11	12 Ft. Raised Grass	6 Ft. Paved/ 8 Ft. Total	Ditch	No
4	2.91	45	7.20	East of Lemay Drive	10.11	Harr Town Road	2	11	12 Ft. Paved TWLTL	6 Ft. Paved	C&G	Yes
5	1.79	45	10.11	Harr Town Road	11.90	west of Carolina Pottery Drive	2	12	None w/ Rumble Strip	8 Ft. Paved/10 Ft. Total	Ditch	No
6	0.22	45	11.90	west of Carolina Pottery Drive	12.12	I-81	4	12	12 Ft. Raised Grass	12 Ft. Paved	Ditch	No
Σ =	8.40	43.3	= Weighted Average									

2.5 ALTERNATIVES COMPARISON

The No-Build and two Build Alternatives are currently under consideration for this project. The No-Build, or No Action, Alternative makes no improvements to SR 126 (Memorial Boulevard) other than scheduled maintenance activities. Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas. Alternative B is a refinement of Alternative A. Alternative B utilizes the same proposed typical roadway cross sections as Alternative A, but the length of the four-travel lane section is reduced to minimize environmental impacts.

As can be seen in **Table 2.5.1**, the project corridor is 8.4 miles long. The No-Build Alternative will have no impacts to wildlife, cultural resources, or farmland and there would be no residential or business relocations. The No-Build Alternative would not impact any gravesites and has no construction costs. Alternative A has considerable residential and business relocations and will impact a large number of gravesites. While Alternative B reduces the impacts associated with Alternative A, the number of residential, business, and gravesite relocations are still considerable. The alternatives' affected environment and environmental consequences are discussed in **Chapters 3** and **4.**

Figure 2.5.1 and **Tables 2.5.2** and **2.5.3** summarizes the different roadway cross sections utilized in each alternative. The No-Build Alternative utilizes a four-travel lane cross section along 13% of the study corridor. Build Alternative A utilizes a four-travel lane cross section along 50% of the corridor. Alternative B utilizes a four-travel lane cross section along 44% of the corridor. The remainder of the corridor for all three alternatives will be two travel lanes.

Figure 2.5.2 and **Table 2.5.4** summarizes the location of sidewalks along each alternative. The No-Build Alternative has sidewalks along 1% of the study corridor. Alternative A extends sidewalks to 54% of the study corridor, while Alternative B extends sidewalks to 59% of the study corridor. The sidewalks in Alternatives A and B are located in residential and commercial areas, and not provided along the more rural areas.

The No-Build Alternative has shoulders equal to or greater than four feet in width along 8% of the study corridor. Build Alternatives A and B have shoulders equal to or greater than four feet in width along the entire study corridor.

2.5.1 Do the Alternatives Meet the Project's Purpose and Need?

The No-Build Alternative does not meet the purpose and need of the project. The No-Build Alternative does not create a safer, more efficient route for local traffic between the City of Kingsport and I-81. The existing narrow lane and shoulder widths would not be improved. The numerous deficient horizontal and vertical curves would not be improved. These existing geometric deficiencies lead to the observed high crash rate along the route. The narrow shoulders and lack of sidewalks limit bicycle and pedestrian usage of the facility. The No-Build Alternative does not improve access management along the route. The existing poor access management contributes to poor traffic operations and higher crash rates. The No-Build Alternative does not improve traffic operations or travel times for commuters or emergency response vehicles.

Build Alternatives A and B both meet the purpose and need of the project. Both Build Alternatives create a safer, more efficient route between the City of Kingsport and I-81. Lane widths and shoulder widths will be improved along the corridor. Deficient horizontal and vertical curves will be improved. These geometric improvements will create a safer, more efficient route. The addition of wider shoulders along the entire corridor and sidewalks along commercial and residential areas will promote bicycle and pedestrian usage of the facility. Access management will be improved along the commercial areas of the corridor through the use of raised grass medians and curb and gutter. Throughout the entire study corridor access management will be improved by closing or realigning many side road intersections with SR 126 (Memorial Boulevard). Improved access management will improve the safety and efficiency of the route. Both Build Alternatives improve traffic operations and travel times for both commuters and emergency response vehicles. Both Build Alternatives A and B provide these improvements in a context sensitive design, preserving the rural nature of the eastern half of the study corridor.

TABLE 2.5.1: SUMMARY OF PROJECT DATA & ESTIMATED IMPACTS

Summary of Project Data & Estimated Impacts for SR 126 (Memorial Boulevard)				
Item		No-Build	Build Alternative A	Build Alternative B
Functional Classification		Minor Arterial	Minor Arterial	Minor Arterial
Length (Miles)		8.4	8.4	8.4
Cross Sections (feet)[1]				
From:	To:			
East Center St.	Hillcrest Drive	60	160	160
Hillcrest Drive	SR 93	100	160	160
SR 93	SR 93	160	160	160
SR 93	Heather Lane	120	160	160
Heather Lane	Old Stage Road	120	160	160
Old Stage Road	Lemay Drive	120	200	200
Lemay Drive	Cooks Valley Road	120	200	120
Cooks Valley Road	Harr Town Road	120	120	120
Harr Town Road	Cochise Trail	120	160	160
Cochise Trail	Carolina Pottery Drive	60	160	160
Carolina Pottery Drive	I-81	160	300	300
I-81	I-81	300	300	300
Year 2013 AADT		8,450 - 25,800	8,450 - 25,800	8,450 - 25,800
Year 2033 AADT		13, 520 - 33,540	13, 520 - 33,540	13, 520 - 33,540
Percent Trucks		6%	6%	6%
Estimated Right-of-Way Acquisition (Acres)		0	239	121
Residential Displacements		0	241	162
Business Displacements		0	43	30
Non-Profit Displacements (Volunteer Fire Sta.)		0	1	1
Air Quality/Noise Impacts Requiring Mitigation		0	0	0
Archaelogical Sites Impacted		0	0	0
Historic Sites Impacted[2]		0	1	1
Section 4(f) Properties Impacted		0	0	0
Gravesites Impacted		0	350	90
Wetlands Impacted (Acres)		0	0	0
Stream Crossings (Linear Feet)		0	4863	3107
Floodplains Impacts (Acres)		0	4	3.2
Forest Land Acquired (Acres)[3]		0	75	54.8
Threatened/Endangered Species Impacts		0	0	0
Hazardous Material Sites Impacted (Parcels)		0	2	3
Farmland Impacted (Acres)		0	15	5
Estimated Right-of-Way Cost		$ -	$ 60,000,000	$ 48,000,000
Estimated Utility Cost		$ -	$ 5,316,000	$ 4,565,000
Estimated Construction Cost		$ -	$ 55,000,000	$ 47,000,000
Total Estimated Project Cost		$ -	$ 120,316,000	$ 99,565,000

1. The estimated ROW width is reported and based upon the typical width needed for each typical section. Actual proposed ROW widths will vary throughout the project based upon the use of slope easements, total versus partial property acquisitions, uneconomicremnants, etc.
2. Adverse visual impact
3. Includes all forest land impacted within the estimated construction limits, which may be within slope easements and outside of the ROW limits

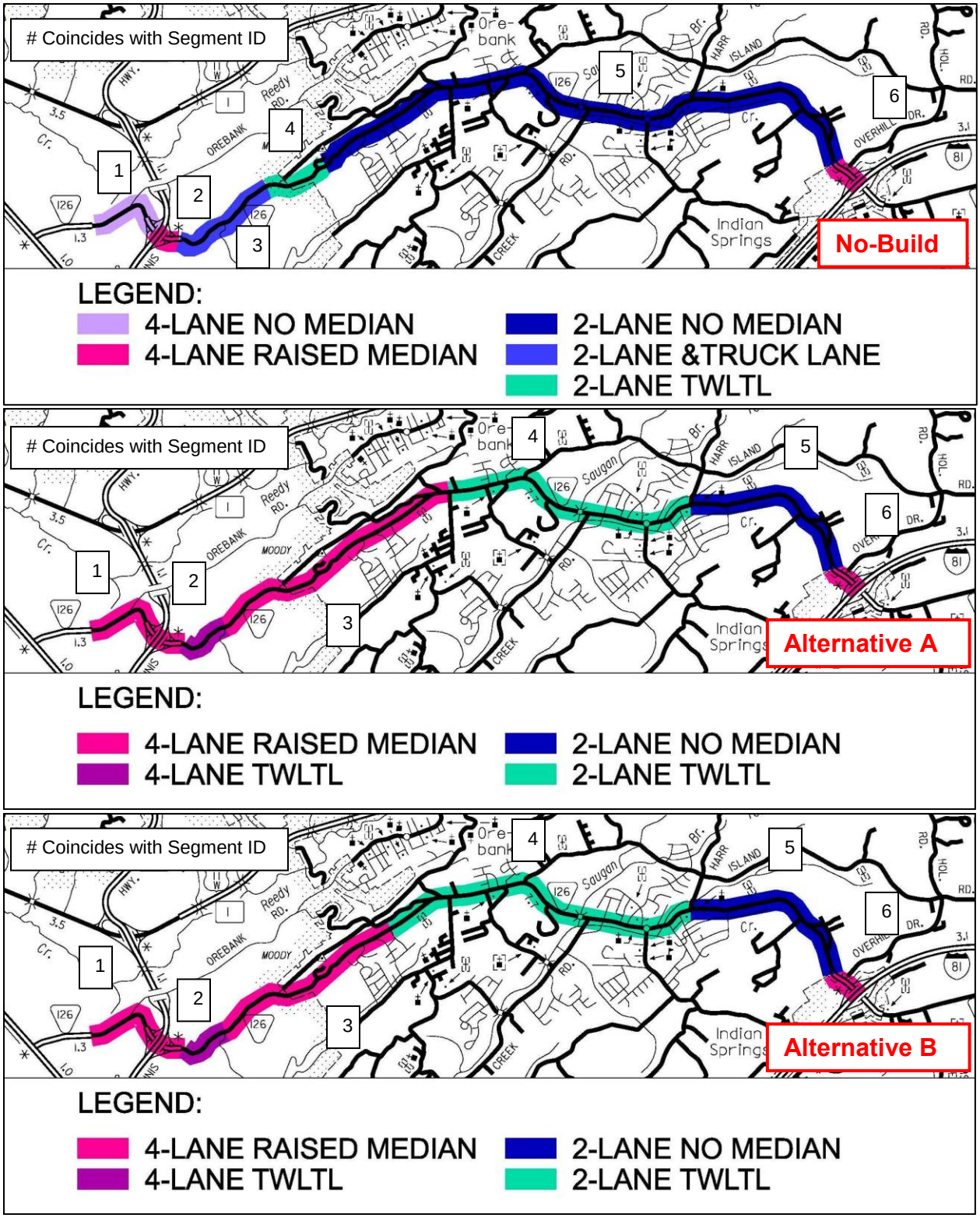
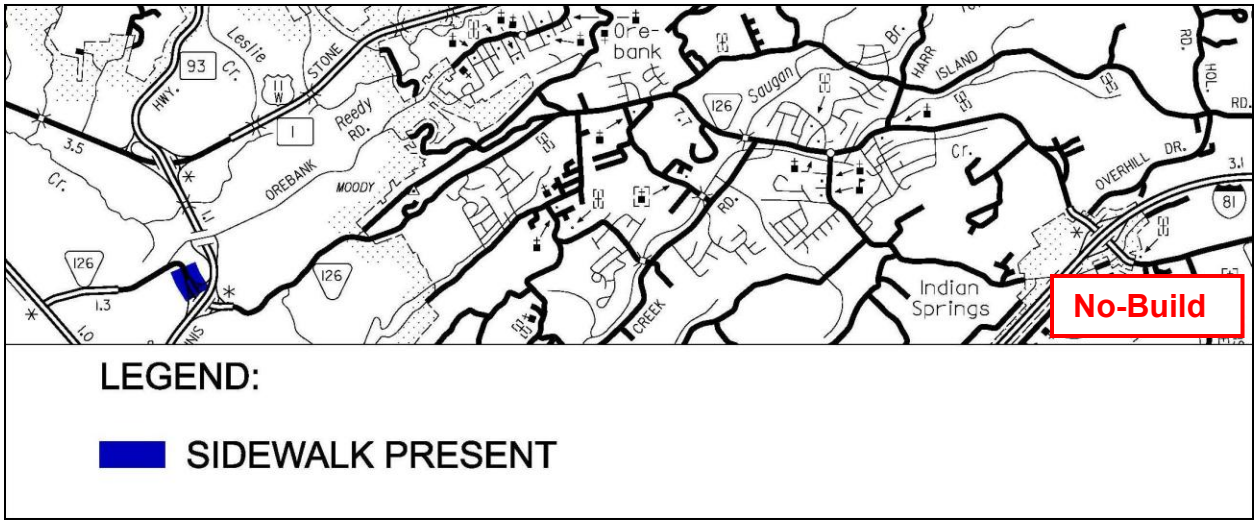
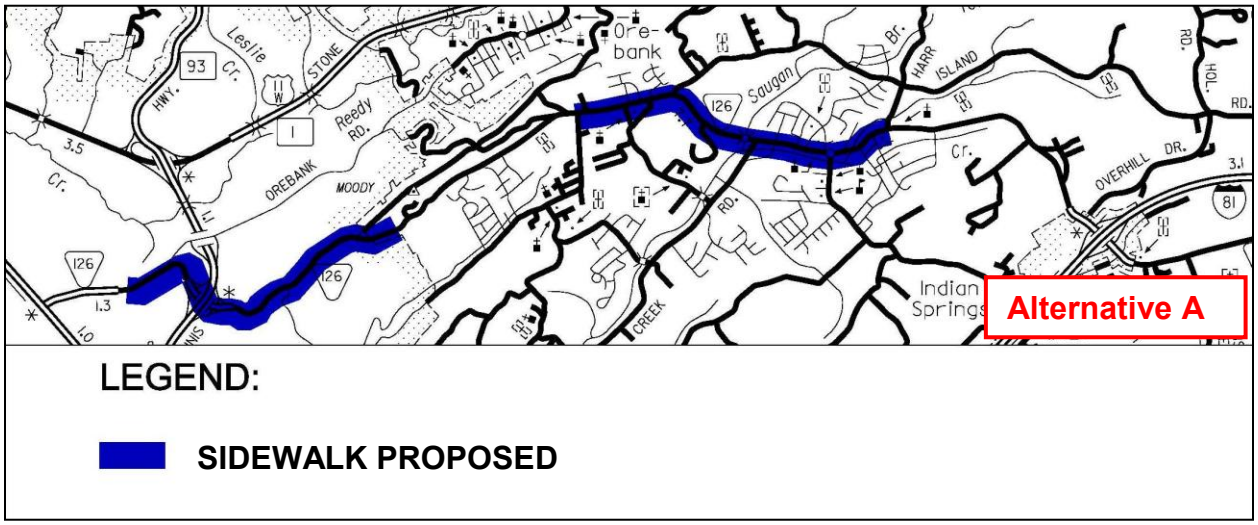


FIGURE 2.5.1: CROSS SECTION COMPARISON





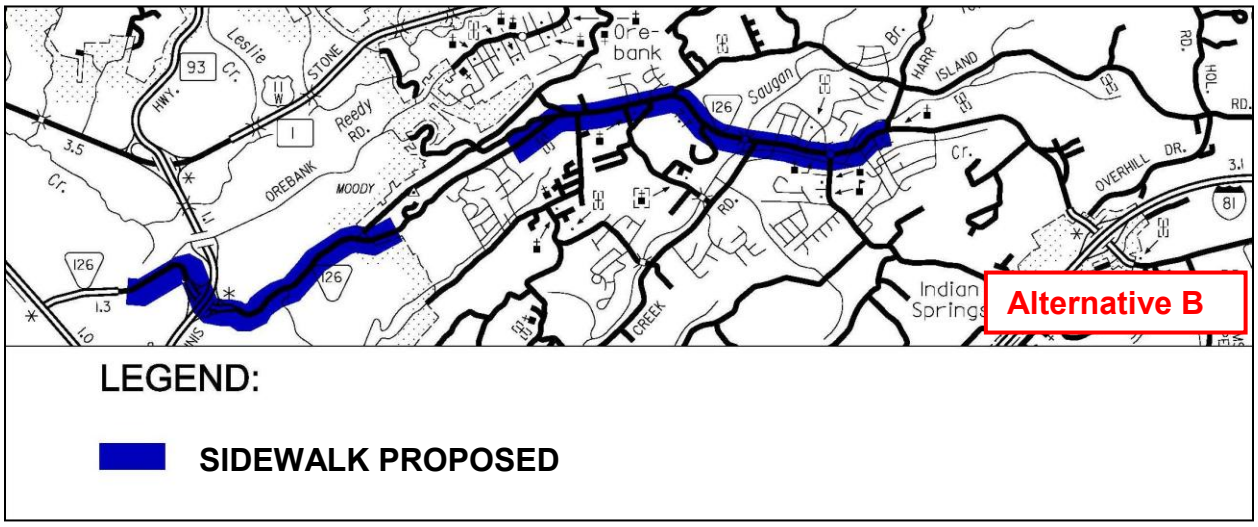


FIGURE 2.5.2: SIDEWALK COMPARISON

TABLE 2.5.2: TRAVEL LANE COMPARISON

Travel Lane Summary			
	No-Build	Alternative A	Alternative B
Four Travel Lanes	13%	50%	44%
Two Travel Lanes	87%	50%	56%

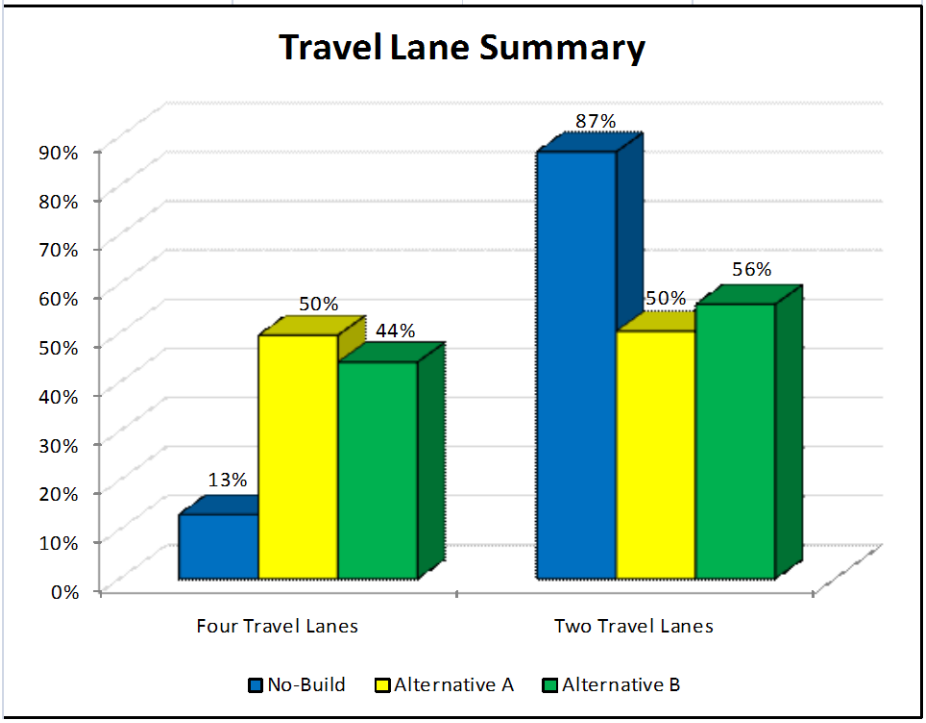


TABLE 2.5.3: CROSS SECTION COMPARISON

Cross Section Description	Alternative											
	No-Build				Alternative A				Alternative B			
	Seg. ID	Length (Miles)	%		Seg. ID	Length (Miles)	%		Seg. ID	Length (Miles)	%	
Four Travel Lanes with No Median	1	0.6	7%		n/a	0.0	0%		n/a	0.0	0%	
Four Travel Lanes with Median	2, 6	0.5	6%	13%	1, 3, 6	3.7	44%	50%	1, 3, 6	3.2	39%	44%
Four Travel Lanes with TWLTL	n/a	0.0	0%		2	0.5	6%		2	0.5	6%	
Two Travel Lanes with Truck Climbing Lane	3	0.9	11%		n/a	0.0	0%		n/a	0.0	0%	
Two Travel Lanes with TWLTL	4	0.5	6%	87%	4	2.5	29%	50%	4	2.9	35%	56%
Two Travel Lanes with No Median	5	5.9	70%		5	1.8	21%		5	1.8	21%	
Total		8.4				8.4				8.4		

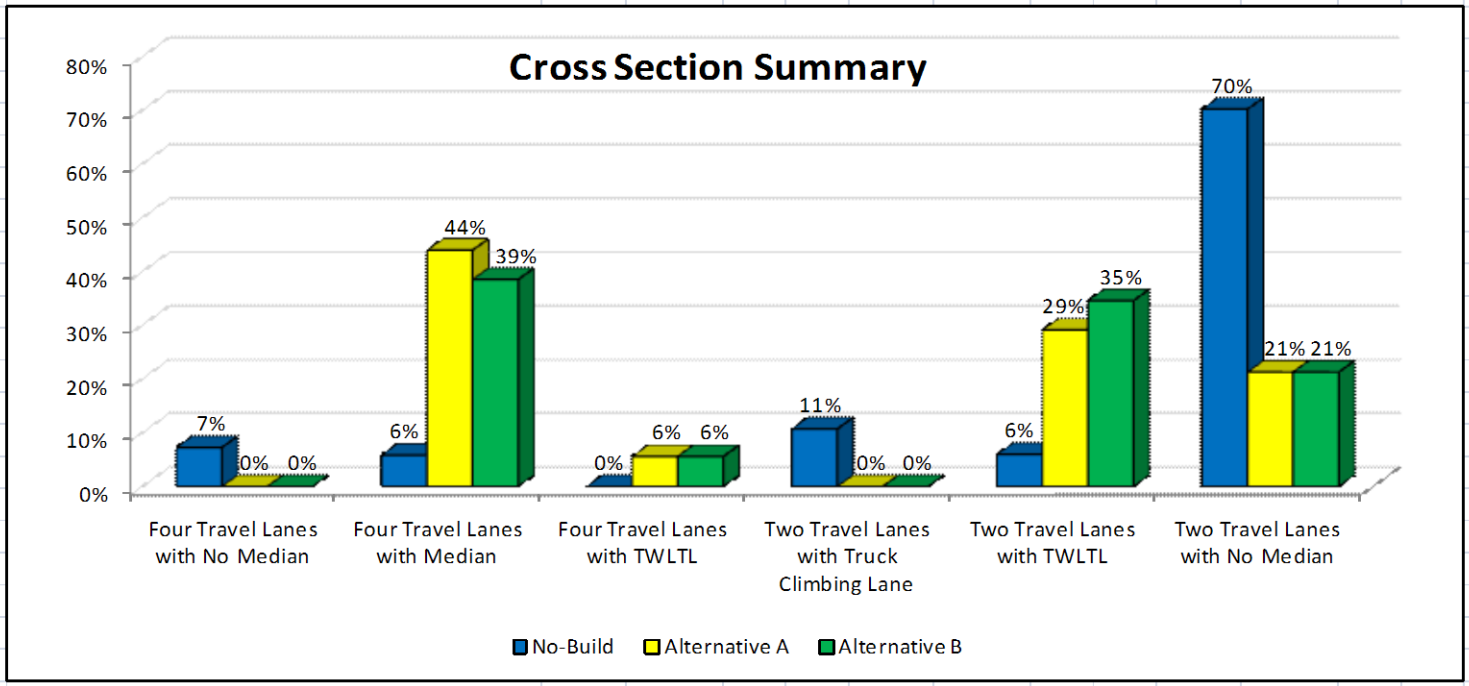


TABLE 2.5.4: SIDEWALK AND SHOULDER COMPARISON

Cross Section Description	Alternative								
	No-Build			Alternative A			Alternative B		
	Seg. ID	Length (Miles)	%	Seg. ID	Length (Miles)	%	Seg. ID	Length (Miles)	%
Sidewalks Present	1	0.1	1%	1, 2, 3, 4	4.5	54%	1, 2, 3, 4	5.0	59%
Sidewalks Not Present	1, 2, 3, 4, 5, 6	8.3	99%	3, 5, 6	3.9	46%	3, 5, 6	3.4	40%
Total		8.4			8.4			8.4	
Shoulders less than Four Feet Wide	1, 3, 4, 5	7.8	92%	-	0.0	0%	-	0.0	0%
Shoulders equal to or greater than Four Feet Wide	2, 5, 6	0.7	8%	1, 2, 3, 4, 5, 6	8.4	100%	1, 2, 3, 4, 5, 6	8.4	100%
Total		8.4			8.4			8.4	

2.6 ALTERNATIVES PREVIOUSLY CONSIDERED BUT ELIMINATED

In addition to the Build Alternatives, other transportation policy alternatives were considered for this project. The alternatives included a Four-Travel Lane Option, a Transportation Systems Management Alternative and a Mass Transit Alternative. The Four-Travel Lane Option was eliminated in the public involvement/Context Sensitive Solution process discussed in **Section 2.1**. Neither The TSM nor Mass Transit Alternatives alone can serve the purpose and need for this project, and were therefore not carried forward in this document. However, elements of each of these transportation policy alternatives are provided in the Build Alternatives.

2.6.1 Four-Travel Lane Option

As discussed in **Section 2.1**, a continuous four-travel lane alternative with a divided median was considered and discussed beginning in the planning stages of the project and through the CSS phase. Although some support was noted for this alternative, there was considerable opposition, in part, due to the increased right-of-way requirements, which would require a higher number of relocations, adverse impacts to the historic Yancey's Tavern property, and additional relocations within the East Lawn Memorial Gardens Cemetery located directly across the roadway from the tavern. The continuous four-travel lane alternative would also require higher areas of encroachment into floodplains, greater lengths of channel changes to streams, and potential hazardous materials impacts would also have been required. The public expressed concerns about potential diminished visual and rural aesthetics, accelerated development and increased traffic speed in the corridor if a continuous four-lane alignment was constructed. Due to the lack of public support, a continuous four-travel lane option was not carried forward in this document.

2.6.1 TSM Alternative

Transportation Systems Management (TSM) is an integrated approach to optimize the performance of the existing transportation infrastructure through the implementation of systems, services, and projects designed to preserve capacity and improve security, safety, and reliability. The goal of TSM is to improve the efficiency of existing transportation facilities while minimizing the need for major construction/reconstruction projects.

TSM strategies alone cannot serve the purpose and need for this project, which includes correcting existing roadway deficiencies and improving access management. Therefore TSM alternatives as the only improvements were not carried forward in this document. Common TSM strategies, along with their effects to this project, are listed in **Table 2.6.1**.

TABLE 2.6.1: TSM STRATEGIES

TSM Strategy #1: Ridesharing	
Tools:	Carpooling, vanpooling, alternative work hours, guaranteed ride home, telecommuting, paratransit services, park and ride facilities
Effect on the Study Area:	The effects of ridesharing strategies are regional in nature, and not corridor specific. The effect of ridesharing strategies in the mostly rural setting of the project corridor would be expected to be minimal. Advances in technology have enabled many to work from home. However, the potential impact of telecommuting on the transportation system is difficult to ascertain, and should be considered minimal. Paratransit services are presently handled as a demand-response service in Kingsport's City Limits. Paratransit services are a benefit to those unable to drive, but generally have minimal impact on traffic. Park and ride facilities are provided for motorists to park and transfer to public transit, carpool or vanpool. No park and ride facilities are located in the project study area and public transit is only offered in the far eastern area of the study area. Additional park and ride facilities may compliment roadway improvements, but without expanded transit availability would not significantly improve congestion in the area or meet the purpose and need of the project.
TSM Strategy #2: Roadway Improvements	
Tools:	Intersection improvements, channelization, traffic surveillance and control systems, traffic control centers, computerized signal systems
Effect on the Study Area:	Intersection improvements and improved channelization are included in the Build Alternatives. Only Four traffic signals are present along the 8.4 mile long study corridor, all of which are located within the first 1.5 miles. While improving traffic surveillance and control systems would be beneficial, it would not impact the majority of the project.
TSM Strategy #3: Dedicated Laneage	
Tools:	HOV lanes, HOV and bus bypass lanes, bus bypass ramps
Effect on the Study Area:	These tools are generally applied to freeway facilities and are not applicable to the study corridor.

TSM Strategy #4: Bicycle and Pedestrian Facilities	
Tools:	Provide bicycle and pedestrian facilities.
Effect on the Study Area:	The Build Alternative will provide shoulders wide enough to accommodate bicyclists and will provide sidewalks along most residential and commercial segments of the corridor. These facilities will compliment the roadway improvements. Bicycle and pedestrian facilities alone would not meet the purpose and need of the project or noticeably reduce congestion along the corridor. Furthermore, constructing bicycle and pedestrian facilities would incur high costs due to the narrow existing right-of-way, surrounding terrain, and adjacent development.
TSM Strategy #5: Transit Improvements	
Tools:	Transit service enhancement or expansion, transit traffic signal preemption, transit information services, exclusive transit ROW, and mode change facilities
Effect on the Study Area:	Transit improvements are discussed in **Section 2.6.2 Mass Transit Alternative**.
TSM Strategy #6: Intelligent Transportation Systems	
Tools:	Intelligent transportation systems and advanced public transportation system technology, incident management, and motorist information systems
Effect on the Study Area:	These systems are primarily applied to freeway facilities. Many non freeway ITS strategies, including dynamic message signs and improved personal GPS systems that provide congestion alerts, provide value. However, quantitative estimates of their benefits are not yet available since many of these strategies are relatively new. ITS improvements alone would not be expected to significantly improve traffic operations along the corridor and would not meet the purpose and need of the project.

TSM Strategy #7: General Purpose Lanes	
Tools:	Add additional general purpose lanes
Effect on the Study Area:	The addition of general purpose lanes is included in the Build Alternatives. This strategy has the potential to have the most impact on congestion relief. It also will likely have the highest cost and will tend to negatively impact vehicle miles traveled and, in some cases, emissions. Therefore, the addition of general purpose lanes was considered only after all of the other strategies had been evaluated and found to be ineffective.

2.6.2 Mass Transit Alternative

Fixed route mass transit service is offered within the City of Kingsport through the Kingsport Area Transit Service (KATS). KATS operates from 7:30 am until 5:30 pm, Monday through Friday, excluding holidays. Five routes are currently offered by KATS (see **Figure 2.6.1**). The cost to ride a KATS bus is $1.

Paratransit is also available within Kingsport's City Limits. KATS Paratransit is a curb-to-curb, origin-to-destination next day transportation service that is available to those individuals who reside in the City of Kingsport, and because of their disability or health-related condition, cannot independently board, ride and/or disembark from an accessible fixed-route transit bus or cannot get to/from a boarding or disembarking location. All KATS Paratransit eligible customers must be Americans with Disabilities Act (ADA) certified by the transit agency before scheduling a ride.

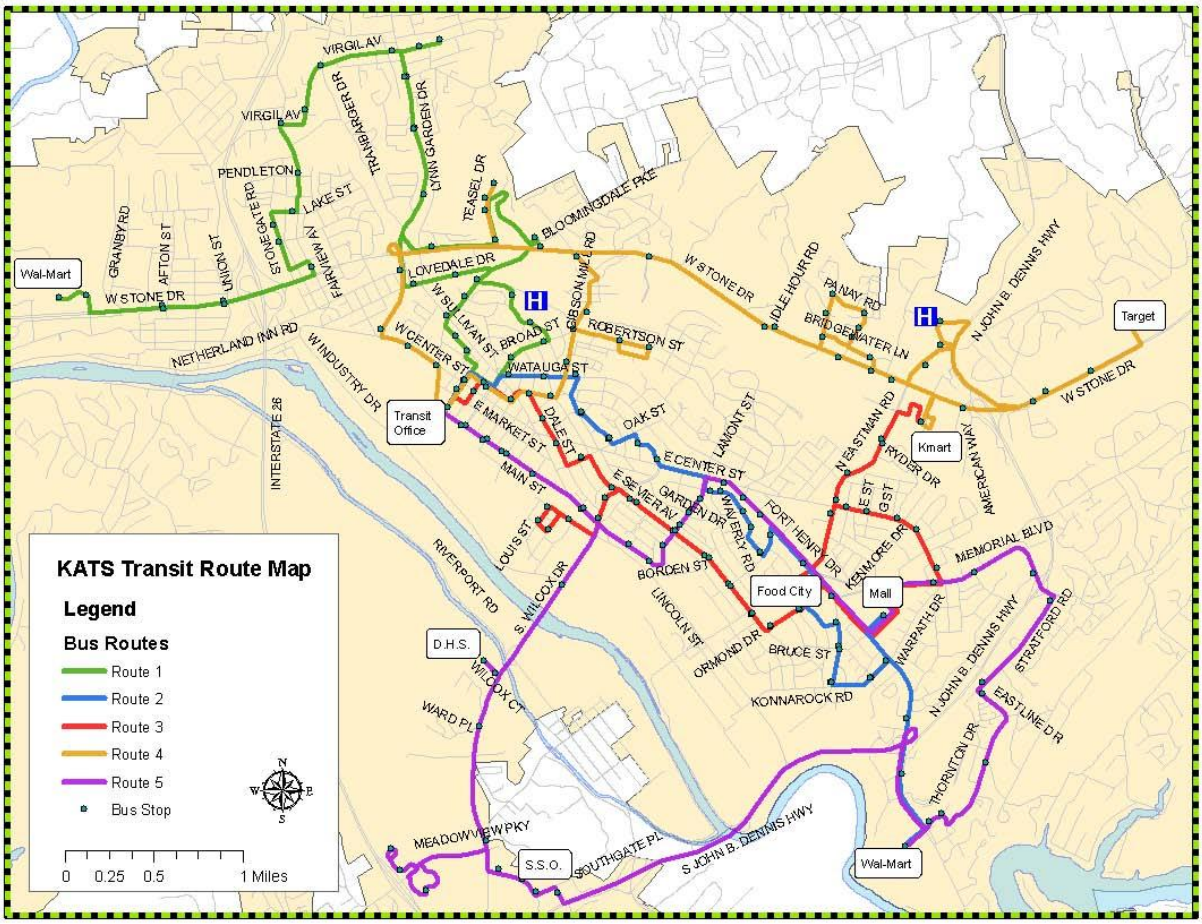


FIGURE 2.6.1: KATS TRANSIT ROUTES

Fixed route transit service is currently offered within the first 0.8 mile, or 10%, of the study corridor, between East Center Street and Stratford Road. Paratransit is offered within the Kingsport City Limits, which accounts for 2.1 miles, or 25%, of the study corridor. There are no known plans to extend transit service beyond these limits. The majority of the study corridor is rural in nature with low population densities, which is unfavorable for transit ridership. Furthermore, improvements to the mass transit system alone do not serve the purpose and need for this project, which includes improving the safety of the route and relieving congestion. Therefore, a Mass Transit Alternative was not carried forward in this document.

It should be noted that if expanding transit service along the study corridor is ever warranted, the improvements in the Build Alternatives would be beneficial to the expansion. SR 126 (Memorial Boulevard) is primarily a two-lane roadway with limited capacity for future traffic growth. The majority of the route has a rural cross section with no shoulders or sidewalks. The narrow cross section width, lack of shoulders, and lack of sidewalks makes many segments of the corridor unfavorable for bus/transit service. There are few safe locations to locate bus stops, with poor pedestrian connectivity between potential stops and adjacent developments. The proposed improvements will correct these deficiencies along the route and provide a facility that is more acceptable for transit service.

Chapter 3: Affected Environment

3.0 AFFECTED ENVIRONMENT

This chapter provides an inventory of the natural and human environment within the project corridor. This includes existing neighborhoods, the income level of residents, racial populations, cultural and historic resources, aquatic and terrestrial species, streams, wetlands, and types of land uses.

3.1 LAND USE

3.1.1 Existing Land Use

Land use in the initial portion of the project area, from East Center Street in downtown Kingsport to the John B. Dennis Highway, is primarily commercial, but does include some residential land use. Commercial uses are a mix of services, including exercise facilities, a dry cleaning business, an auto repair business, a music store, and several convenience stores. The residential land use is mainly conventional framed-structure housing (40 years of age or older).

The land use transitions to mainly residential with very few commercial enterprises as SR 126 (Memorial Boulevard) crosses underneath the John B. Dennis Highway. Between the John B. Dennis Highway and Old Stage Road the land use is an urban residential composition that includes a mixture of older single family residential houses, apartments, and multiplex dwellings, with some businesses. The homes in this area are limited to road proximity by the slopes of the hill. They are either in a valley beneath SR 126 (Memorial Boulevard) or above the roadway on a ridge.

East of Old Stage Road, SR 126 (Memorial Boulevard) crests a ridge and begins to level off. The areas to the north and south of Memorial Boulevard become less severe in their slopes. In this area, the land use remains residential, although agricultural land use becomes more evident. The area between Stagecoach Road and Cook Valley Road also includes the East Lawn Memorial Park, a cemetery with numerous gravesites adjacent to the existing roadway, and Yancey's Tavern, a National Register of Historic Places listed property.

From the cemetery to Samlola Road, the land use on either side of Memorial Boulevard is a blend of residential and agricultural, with some commercial land use scattered lightly through the area. Within this segment, residences are more densely populated around Fall Creek Road, Lonesome Pine Road, Cochise Trail, and Chippewa Lane. Conversations with local officials indicated that residential development of over one hundred homes is ongoing adjacent to Island Road. The areas of commercial land use are concentrated around smaller communities. The Indian Hills area features a shopping center with a national chain discount store. In addition, a veterinary clinic and several small businesses exist in this area that includes the junction of SR 126 (Memorial Boulevard) and Island Road.

From Samlola Road to Overhill Drive, the area is less developed. Some homes exist, but farmland is more prevalent. The Overhill Drive area, Shadowtown Road, and Carolina Pottery Drive are all located in the vicinity around the SR 126 (Memorial Boulevard) Interchange with I-81, the eastern terminus of the project. This area is primarily highway commercial with some residential land use.

3.1.2 Land Use Plans and Regulatory Controls

Kingsport's City Limits include the western terminus of the study corridor at East Center Street and extend eastward to approximately the western terminus of Old Stagecoach Road. The area from Old Stagecoach Road eastward to the I-81 interchange is not within the Kingsport City Limits. Kingsport's City Limits also include the area around I-81 as a linear corridor. The Interchange of SR 126 (Memorial Boulevard) and I-81 is included in this linear corridor and is therefore within the city limits.

Reviews of the project area and zoning maps indicate that approximately half of the existing and planned development in the corridor within Kingsport's City Limits consists of residential land use. The predominant residential land use zoning is single family units, with some multi-unit dwellings (duplexes and apartments). These areas are shaded in yellow in **Figure 3.1.1**. Commercial land use zoning is predominantly at the western and eastern termini of the corridor. These areas are shaded in blue, pink, orange and red in **Figure 3.1.1**.

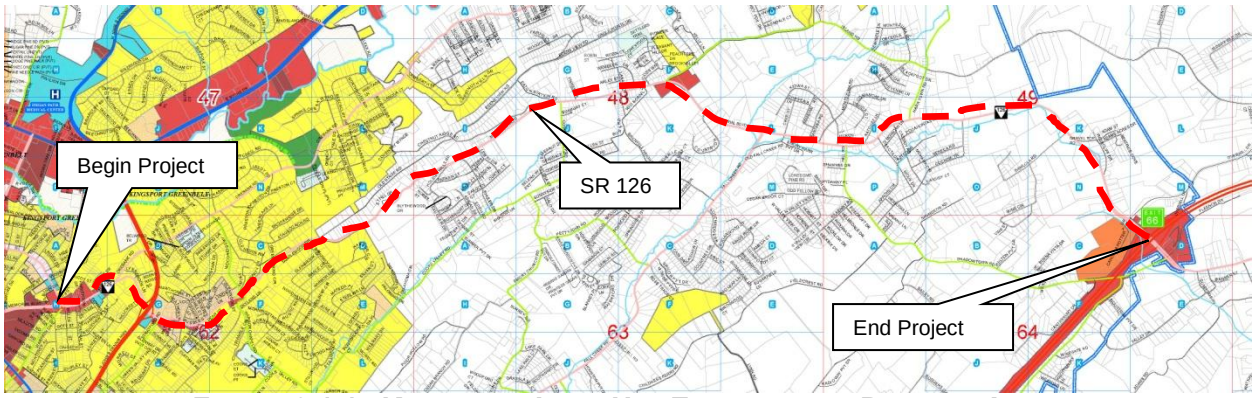


FIGURE 3.1.1: KINGSPORT LAND USE ZONING IN THE PROJECT AREA

Outside of Kingsport's City Limits, Sullivan County Planning regulates development. Reviews of the project area and zoning maps indicate that most of the existing and planned development in the corridor outside of Kingsport's City Limits consists of residential land use, mainly single family units, with some multi-unit dwellings (duplexes and apartments). These areas are shaded in yellow in **Figure 3.1.2**. Commercial land use zoning is scattered along the corridor. These areas are shaded in blue pink, orange and red in **Figure 3.1.2**. Agriculturally zoned areas exist along the study corridor and are shaded in green. Based on site observations, many residentially zoned areas are also utilized for agricultural use.

The *Sullivan County Regional Plan: A Guide for Future Land Use and Transportation Development, Planning Period 2006 – 2026* notes that like many counties in northeast Tennessee, the pattern of land use or development in Sullivan County has been significantly affected by natural factors, including extreme slopes and soil suitability. Slopes in Sullivan County, and within the SR 126 (Memorial Boulevard) Study Corridor, range from below 5 percent to nearly 50 percent. In areas greater than 20 percent slope, limitations to development are severe. Based on soils analysis, there is very little of Sullivan County that is considered suitable for urban development utilizing subsurface sewage disposal systems (septic tanks). Areas not serviced by sewer lines therefore have limited high density development potential.

Approximately half of the SR 126 (Memorial Boulevard) Corridor outside of Kingsport's City Limits, from Harr Town Road to I-81, is not serviced by sewer lines.

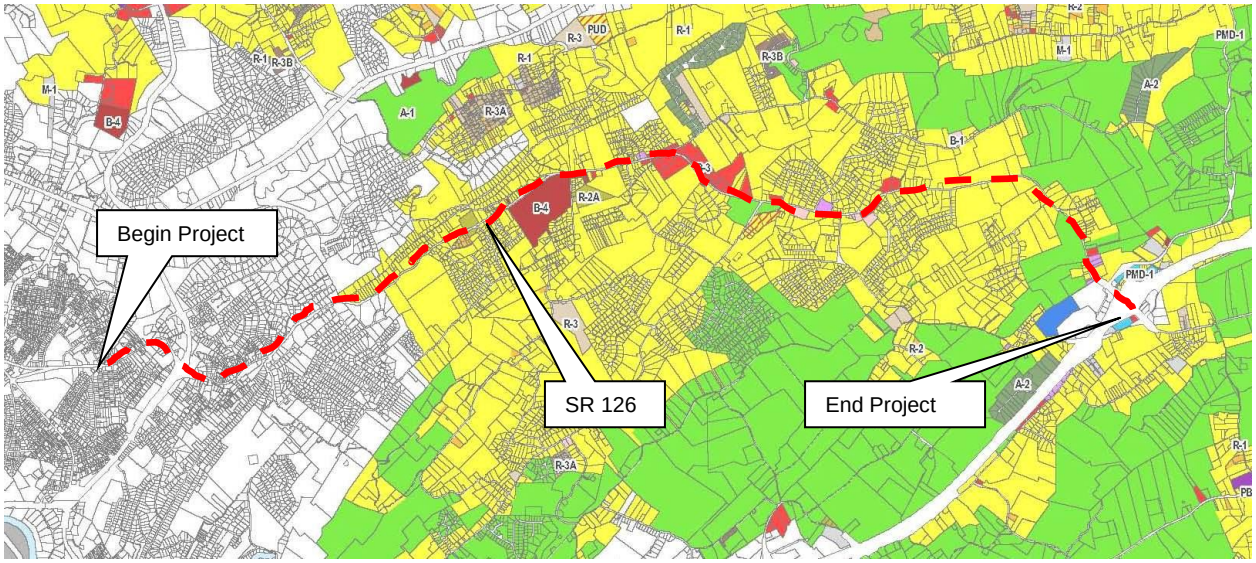


FIGURE 3.1.2: SULLIVAN COUNTY LAND USE ZONING IN THE PROJECT AREA

3.2 COMMUNITY SERVICES

3.2.1 Schools

The Sullivan County Department of Education serves over 13,000 students. The county currently has 25 schools which are distributed into 4 zones; North, South, East and Central. Each zone consists of a high school and several elementary and middle schools. In total there are four comprehensive high schools, seven middle schools, one intermediate school and 12 elementary schools. One school, Mary Hughes, combines grades Kindergarten through Eighth Grade. Indian Springs Elementary School is located approximately 300 yards south of SR 126 (Memorial Boulevard). Central High School is located just outside the eastern terminus of the study corridor, east of I-81. Sullivan County Schools are listed in **Table 3.2.1**. Schools that serve the project area with bus routes are represented in gray shading.

TABLE 3.2.1: SULLIVAN COUNTY SCHOOLS*

Bluff City Elementary	Kingsley Elementary	
Bluff City Middle	Mary Hughes Elementary & Middle Schools	Blountville Elementary
Brookside Elementary	Miller Perry Elementary	Blountville Middle
Cedar Grove Elementary	North High School	Central Heights Elementary
Colonial Heights Middle	Rock Springs Elementary	Central High School
East High School	South High School	Holston Valley Middle
Emmett Elementary	Sullivan Elementary	
	Sullivan Middle	
Holston Elementary		
Indian Springs Elementary	Weaver Elementary	
Ketron Intermediate		

* Source: Sullivan County School Board website (http://www.scde.k12.tn.us/metadot/index.pl?id=2167&isa=Category&op=show)

3.2.2 Fire, Medical Emergency, and Police Protection

The proposed project area includes one volunteer fire station, Kingsport Fire Department Station #4, which is located near the western terminus of the study area near Heather Lane. No other emergency service facilities are located within the project impact area.

3.2.3 Hospitals

Sullivan County has several hospitals, and three are located in Kingsport. They are described below. None are located within close proximity to the project corridor.

HealthSouth Rehabilitation Hospital of Kingsport is an acute inpatient rehabilitation hospital treating more than 1,000 patients annually from Southwest Virginia, Northeast Tennessee, Southeast Kentucky and Northwest North Carolina. The hospital offers care by physician specialists in physical medicine and rehabilitation, pulmonary care, neurology, gastroenterology, internal medicine, and family practice.

Indian Path Medical Center is a full range outpatient service acute care hospital with 261 beds. It is located in Kingsport off the John B. Dennis Highway. Services include an emergency department, a family-centered birthing center, and skilled nursing beds.

Holston Valley Medical Center is one of Tennessee's six Level I trauma centers, equipped to care for the most critically injured patients. This facility houses a Level III neonatal intensive care unit which cares for the region's most critically ill babies.

3.2.4 Utilities

Both Build Alternatives under consideration would be located adjacent to, and would replace portions of, the existing roadway. Conversations with local officials have indicated that the City of Kingsport has existing sewer lines and water lines within sections of the project area. Some lines will have to be moved, replaced, and/or repaired.

Coordination with the City's Public Works was done to determine possible future impacts on utilities and it was determined that there are no plans to add new water or sewer lines along SR 126 (Memorial Boulevard). Any additional sewer lines would be added along area creeks, and

additional water lines would be added along area roadways, but not SR 126 (Memorial Boulevard).

3.2.5 Multi-modal Transportation

Airports
The area is served by the Tri-Cities Regional Airport. This facility is owned by Johnson City, Kingsport and Bristol, TN, and Bristol, VA. It is centrally located to facilitate the needs of the Tri-City area, and is not located near the project area.

Rail
Rail freight is very light in Sullivan County, and according to the Kingsport Area MPO's 2030 Long Range Transportation Plan and the Sullivan County Regional Plan 2006-2026, future plans do not include increased usage of this form of transportation. Norfolk Southern serves the Industrial Park in Piney Flats, Bluff City and Bristol. None of these areas are within or adjacent to the project corridor. There are proposed plans by Kingsport to increase rail activities by CSX at its intermodal facility off Lincoln Street, which primarily accommodates the needs of the Eastman Chemical plant. No existing railways and no proposed railways are identified within the project corridor.

Bicycle Trails
SR 126 (Memorial Boulevard) is not listed as a Tennessee Bicycle Route. However, it is TDOT's Policy (Bicycle and Pedestrian Policy #530-01) that provisions for bicycles and pedestrians be integrated into new construction and reconstruction of roadway projects through design features appropriate for the context and function of the transportation facility.

3.3 SOCIAL AND ECONOMIC CHARACTERISTICS

Sullivan County is defined by 413.0 square miles of land area and a population density of 374.2 people per square mile. The average household size is 2.22 persons compared to a national average family size of 2.60 persons. The County population in 2010 was estimated to be 162,197. Owner-occupied homes totaled 47,531, while 17,430 residents occupied rented homes in Sullivan County.

Manufacturing was the largest of 20 major employment sectors in 2008, providing an average annual income of $68,124. Sullivan County's per capita income grew by 8.6% between 1996 and 2006 (adjusted for inflation).

TABLE 3.3.1: SUMMARY OF DEMOGRAPHICS, SULLIVAN COUNTY, TN

People & Income Overview (By Place of Residence)	**Value**	**Industry Overview (2008)** (By Place of Work)	**Value**
Population (2010)	162,197	**Covered Employment**	72,164
Growth (%) since 1990	6.9%	Manufacturing - % all jobs in County	23.2%
Households (2010)	64,961		
Labor Force (persons) (2009)	71,629	Transportation & Warehousing - % all jobs in County	3.1%
Unemployment Rate (2007)	10.9%		

3.3.1 Social Characteristics

Population Trends and Forecasts

The University of Tennessee (UT) Center for Business and Economic Research performs population projections for the state of Tennessee, including state, county, and city populations. County populations are based on data to determine the annual change in population (the change in population equals births minus deaths plus net migration).

Population Characteristics - TN & Sullivan County

Population projections for Tennessee and Sullivan County are shown in **Table 3.3.2**. Population growth for Sullivan County in the decades of, 2000, 2010, 2020, 2030, and 2040 are less than the population growth for the state. Sullivan County shows a growth rate (2.47%) between 2000 and 2010 that is 9.0 % below the projected growth rate for the state (11.5%). Projected growth rates for Sullivan County indicate a net growth in population through 2040 of 9.5% higher than the 2000 figure. The State of Tennessee is predicted to realize an increase in population of 42.5% between 2000 and 2040.

TABLE 3.3.2: POPULATION AND FORECAST GROWTH 2000-2040, TENNESSEE AND SULLIVAN COUNTY

Geographic Area	**Population**					
	2000	**2010**	**2020**	**2030**	**2040**	**2000-2040 Change**
Tennessee	5,689,283	6,346,105	6,841,868	7,489,809	8,106,583	2,417,300
Change	-	+11.5%	+7.8%	+9.5%	+8.2%	+42.5%
Sullivan County	153,048	156,823	159,551	163,795	167,599	14,551
Change	-	+2.5%	+1.7%	+2.7%	+2.3%	9.5%

Source: *UT Center for Business and Economic Research, 2010 and U.S. Census Bureau, 2010*

Population Characteristics - City of Kingsport

As shown in **Table 3.3.3**, the population totals for the City of Kingsport have remained steady when comparing estimates from 2005 through 2009. Between 2009 and 2010, the population increased by 7.7% due to a series of annexations. Projections and estimates for populations in Kingsport are not conducted by the U.T. Center for Business and Economic Research. The estimations below were provided by the U.S. Census Bureau. No projections into 2040 exist for the City of Kingsport.

TABLE 3.3.3: KINGSPORT COMPARATIVE POPULATIONS, 2005 - 2010

Kingsport Population by Year		Rate of Change in Percentages
2005	44,238	---
2006	44,259	+0.05%
2007	44,548	+0.65%
2008	44,610	+0.14%
2009	44,758	+0.33%
2010	48,205	+7.70%

Population Characteristics - Study Corridor

The project study corridor bisects seven U.S. Census tracts. However, many of these seven census tracts include large portions that are located outside of the immediate project area. Most of the SR 126 (Memorial Boulevard) project is situated within Census Tract 423. Lesser portions of the project are located within Census Tracts 408, 409, 410, 411, 422 and 424. These adjacent Census Tracts are provided in **Figure 3.3.1**.

The 2010 population within the immediate study corridor was 26,683. Census tracts 423 (6,780 persons), 410 (4,052 persons), and 408 (3,633 persons) had the largest populations. Senior adults, those 65 years of age and older, comprise a majority of the population in all tracts considered.. **Table 3.3.4** provides specific data for each of the Census Tracts in the study corridor.

TABLE 3.3.4: POPULATION AGE CHARACTERISTICS, CENSUS TRACTS FOR SULLIVAN COUNTY, 2010

Subject	Sullivan County Census Tracts							Total
Census Tracts	**408**	**409**	**410**	**411**	**422**	**423**	**424**	
TOTAL POPULATION	3,633	3,229	4,052	2,375	3,199	6,780	3,415	26,683
Under 5	208	203	204	106	152	335	173	1,381
5 – 14	420	418	564	270	393	850	375	3,290
15 – 24	399	380	363	230	384	680	415	2,851
25 – 34	408	322	385	243	281	615	343	2,597
35 – 44	436	388	551	297	453	964	493	3,582
45 – 54	461	431	654	335	525	1062	536	4,004
55 – 64	433	421	571	343	429	1064	485	3,746
65 and over	868	666	760	551	582	1210	595	5,232
Median age	43.9	42.6	44.3	46.5	43.8	44.3	43.4	

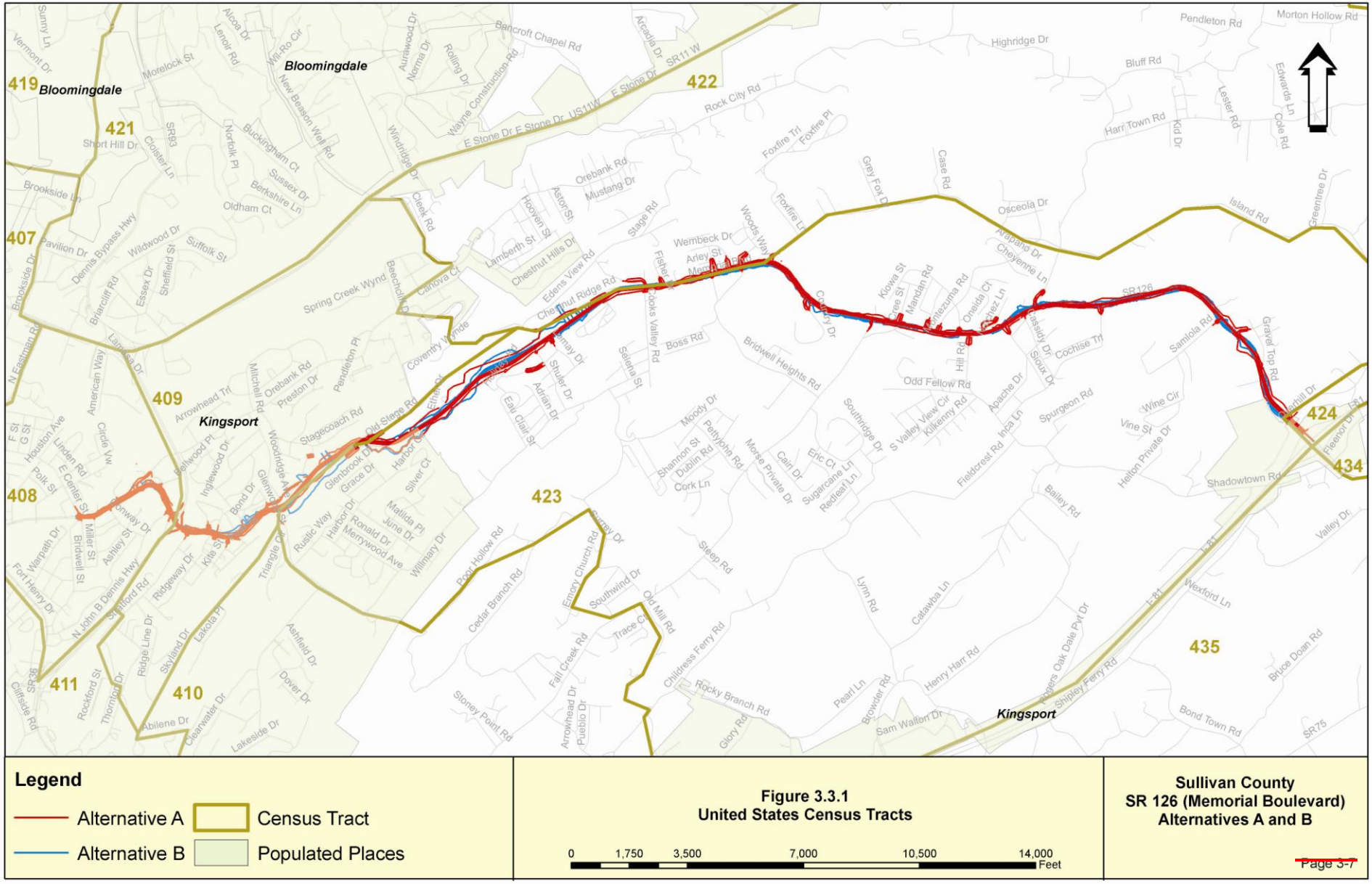


FIGURE 3.3.1: U.S. CENSUS TRACTS IN PROJECT CORRIDOR

Social Groups - Sullivan County & Study Corridor

The majority of Sullivan County's population is white. As seen in **Table 3.3.5**, the Census Tracts for the study corridor also reflect a majority white population. The largest minority group in Sullivan County is comprised of African American citizens. African-Americans account for 92.3% of the minority population in Sullivan County.

TABLE 3.3.5: RACIAL CHARACTERISTICS BY CENSUS TRACTS, SULLIVAN COUNTY, 2010*

Subject	Sullivan County Census Tracts							Total
	408	409	410	411	422	423	424	
RACE								
Total Population	3,633	3,229	4,052	2,375	3,199	6,780	3,415	26,683
One Race*	3,573	3,152	4,020	2,325	3,161	6,711	3,385	26,327
White	3,371	3,008	3,936	2,204	3,105	6,593	3,325	25,542
African-American	123	82	25	62	13	36	20	361
American Indian/Alaskan	19	5	7	12	7	14	5	69
Asian	12	40	39	21	12	42	13	179
Native Hawaiian	1	1	1	0	0	4	1	8
Some other race	47	16	12	26	24	22	21	168
Two or more races*	60	77	32	50	38	69	30	356
Hispanic/Latino (of any race)	94	40	40	50	45	60	39	368

*Beginning in 2000, the U.S. Census Bureau allowed individuals to identify one or more races to indicate their racial identity.

Educational Characteristics - TN, Sullivan County

Sullivan County has a lower percentage of residents who are high school graduates or equivalent (85.1%) than the State of Tennessee (88.3%). Sullivan County also has a lower percentage of residents who have attained a Bachelor's Degree or higher (18.5%) than the State of Tennessee (26.7%).

TABLE 3.3.6: EDUCATIONAL ATTAINMENT PERCENTAGES, TENNESSEE AND SULLIVAN COUNTY, 2010

AREA	Percentage of Population High School Graduate or Higher	Percentage of Population Bachelor's Degree or Higher
Tennessee	88.3%	26.7%
Sullivan County	85.1%	18.5%

Urban/Rural Population Distribution - Sullivan County

The urban and rural distribution of residents within Sullivan County indicates that most residents live within the populated areas of Kingsport and Bristol. The study corridor is located primarily within a rural area. A small portion of the project within the city limits is urban. The U.S. Census 2000 figures estimate that 73.5% of the county's residents are classified as living in urban areas, and the remaining 26.5% reside in rural areas. The 2010 data for urban/rural distribution of residents is currently unavailable. Table **3.3.7** provides total population counts and percentages for these categories in Sullivan County.

TABLE 3.3.7: URBAN/RURAL REPRESENTATION OF SULLIVAN COUNTY

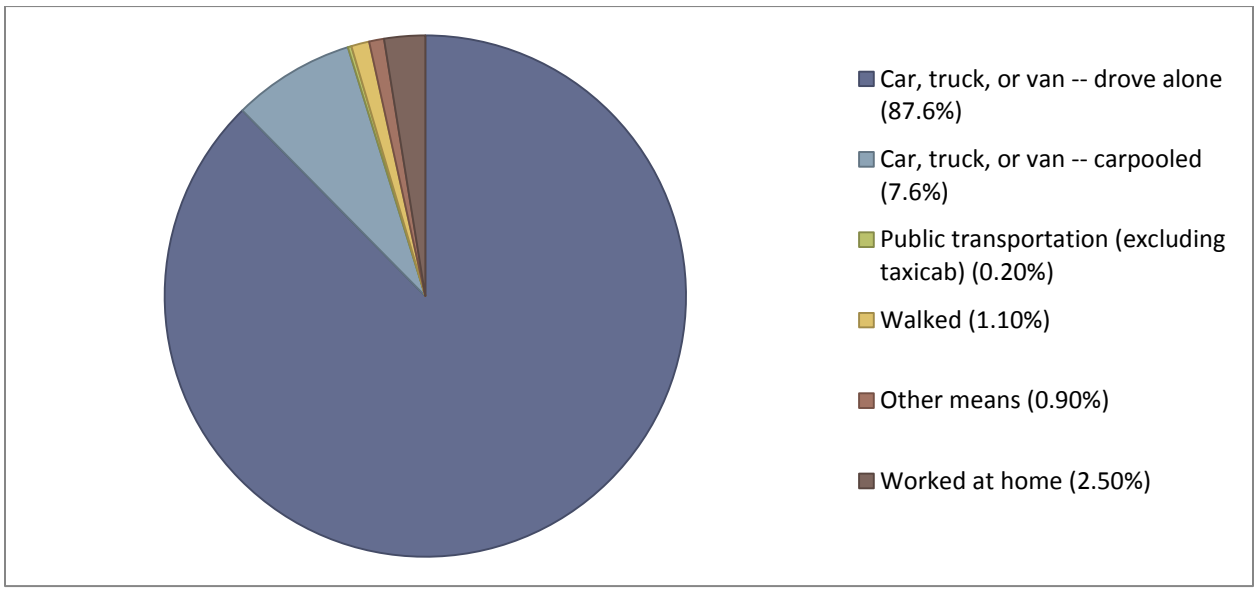
Classification Type	Population Total	Percentage of Population within Classification
2000 Total Urban Population inside urbanized areas.	112,474	73.5%
2000 Total Rural	40,574	26.5%

*The 2010 Census Data for Urban/Rural representation is not currently available

Commuting Patterns - Sullivan County

Commuting patterns are important in establishing modes of transportation and length of time commuting to and from work. These statistics can indicate the level of alternative means of transportation that are utilized. A great majority of the residents in Sullivan County choose the most common method of driving to and from work; driving by car (87.6% with a single occupant). Carpooling is the second choice (7.6% with two or more vehicle occupants). Very few residents utilize buses, taxis, bicycles or walking when commuting to work. **Table 3.3.8** includes a graphic which represents the means of transportation to work based on figures from the 2010 U.S. Census.

TABLE 3.3.8: COMMUTING PATTERNS



Housing – TN, Sullivan County, & Study Corridor

Interviews were conducted with local officials at the Kingsport MPO and with a local real estate agent, and the Multiple Listing database was reviewed for Kingsport and Sullivan County. The discussions and research indicate that the area has not experienced drastic declines in activities during the economic downturn between 2008 and 2009. Sales prices and home sales volumes showed that home values remained steady between 2006 and 2009 for Kingsport and the Tri-City region of Kingsport, Bristol and Johnson City. Annual sales volumes for the same years declined, but activities in 2010 are indicating an increase will be realized by the end of the year.

Tables 3.3.9A and 3.3.9B provides U.S. Census 2010 information on the number of tenants and the type of homes they occupy. As seen in the table, 8,595 of the 11,091 housing units in the study corridor (77.5 percent) were owner-occupied, with the remaining 22.5% of housing units being occupied by renters. Census Tracts 408 (42.1 percent) and 409 (29.4 percent) had the highest percentages of renter-occupied housing units, while Census Tract 410 (11.3 percent) and Census Tract 422 (16.0 percent) had the lowest percentages.

TABLE 3.3.9A: COMPARATIVE HOUSING DATA FOR SULLIVAN COUNTY AND TENNESSEE, 2010 CENSUS

	Total Project Area*	Sullivan County	Tennessee
Total:	11,091	73,825	2,815,087
Owner Occupied	8,595	47,531	1,662,768
Percentage	77.5%	73.2%	68.1%
Renter Occupied	2,496	17,430	777,895
Percentage	22.5%	26.8%	31.9%

TABLE 3.3.9B: COMPARATIVE HOUSING DATA FOR PROJECT AREA CENSUS TRACTS, 2010 CENSUS

	Census Tract 408, Sullivan County, Tennessee	Census Tract 409, Sullivan County, Tennessee	Census Tract 410, Sullivan County, Tennessee	Census Tract 411, Sullivan County, Tennessee	Census Tract 422, Sullivan County, Tennessee	Census Tract 423, Sullivan County, Tennessee	Census Tract 424, Sullivan County, Tennessee
Total:	1,569	1,388	1,599	1,103	1,284	2,725	1,423
Owner occupied	908	980	1,418	803	1,078	2,284	1,124
Percentage	57.9	70.6	88.7	72.8	84	83.8	79
Renter occupied	661	408	181	300	206	441	299
Percentage	42.1	29.4	11.3	27.2	16	16.2	21

***** These figures resulted from totaling the values of the seven Census Tract Areas

Poverty – TN, Sullivan County, City of Kingsport, & Study Corridor

This project is located mainly within rural areas that are transitioning to suburban land use. The initial portion of the project is within the city limits of Kingsport in an urban setting. An additional portion of the project, along the I-81 corridor near and at the eastern terminus, is also within the city limits. The U.S. Census Bureau reported in its 2007 estimations that Kingsport had a higher poverty level than Sullivan County or the State of Tennessee. This concentration of low income residents is consistent with most towns and cities.

A total of 7.4 percent of Kingsport's residents were estimated in 2007 to be living below the poverty level, which is almost one percent higher than the State of Tennessee's total. The area along the project corridor does not feature concentrations of socially interdependent family clusters. The area consists primarily of subdivisions and larger tracts of land with homes. Some apartments and multiplex buildings exist within or adjacent to the project limits, but these rental structures are not occupied by a largely minority or low-income groups. **Table 3.3.10** compares poverty levels on statewide, county, and city levels. **Table 3.3.11** compares poverty levels within the project's Census Tracts. Updated poverty levels estimates are not available for the adjacent Census Tracts.

TABLE 3.3.10: RESIDENTS WITH INCOME BELOW THE POVERTY LEVEL IN 2007*

Kingsport	20.2%
Sullivan County	15.0%
Tennessee	15.9%

* U.S. Census Bureau, Quickfacts2007

TABLE 3.3.11: U.S. CENSUS TRACT HOUSEHOLD INCOME, 2000

Subject	Sullivan County Census Tracts							Total
	408	409	410	411	422	423	424	
INCOME IN 1999								
Households	1,636	1,274	1,379	1,137	1,185	2,592	1,326	10,529
Median household income ($)	25,522	36,757	43,651	33,512	39,694	45,889	27,833	
Families	965	917	1,082	732	918	2,032	1,006	7,652
Median family income ($)	31,715	49,712	50,833	41,279	44,844	52,132	33,393	
Below poverty families	144	90	29	93	59	74	127	616
Percent of all families below poverty*	14.9	9.8	2.7	12.7	6.4	3.6	12.6	8.1
Below poverty individuals	652	402	167	342	260	297	527	2,647

* U.S. Census Bureau, 2000 (2010 Dataset is not available)

Personal Income – TN & Sullivan County

The Tennessee Advisory Commission on Intergovernmental Relations (TACIR) provides selected statistical information for Counties and compares them to State data. In 2007 the per capita personal income of Sullivan County was $32,141. This is less than the State's per capita personal income of $33,395 and ranks 11th out of Tennessee's 95 counties.

In 2008 the median household income of Sullivan County was $41,115. This is less than the State's median household income of $43,610 and ranks 27th out of Tennessee's 95 counties.

3.3.2 Economic Characteristics

Table **3.3.12** provides labor force characteristics for Sullivan County and the State of Tennessee. Sullivan County had a lower unemployment rate (10.9%) compared to Tennessee's statewide rate of 11.3%.

TABLE 3.3.12: LABOR FORCE CHARACTERISTICS FOR SULLIVAN COUNTY, 2010*

AREA	Total Labor Force(2010)		Total/Percentage of Unemployment Rate(2010)
	Labor Force	Employment	Unemployment
Tennessee	3,081,522	2,733,310	348,212 / 11.3%
Sullivan County	71,269	63,500	7,769 / 10.9%

*2010 Labor Force Data were not available for Kingsport or the Adjacent Census Tracts.

The highest numbers of employees throughout the study corridor's census tracts, and in total, are located in the sectors of manufacturing, educational, health and social services, and in retail trade (See **Table 3.3.13**). The immediate project area features mainly retail, agricultural, and other service industries. The majority of the retail located within the project area is in the East Center Street area, and also at the interchange with I-81.

TABLE 3.3.13: ECONOMIC CHARACTERISTICS, SULLIVAN COUNTY CENSUS TRACTS, 2000*

Subject Industry Employees	Sullivan County Census Tracts							Total
	408	409	410	411	422	423	424	
Agriculture, forest, fishing and hunting, and mining	6	0	11	0	6	18	22	63
Construction	149	70	94	63	144	197	202	919
Manufacturing	218	245	388	188	238	636	349	2,262
Wholesale trade	52	93	49	49	31	133	65	472
Retail trade	216	135	171	163	282	483	120	1,570
Transportation and warehousing, and utilities	29	20	84	17	71	96	68	385
Information	16	25	54	21	12	113	18	259
Finance, insurance, real estate, and rental and leasing	48	92	84	38	70	162	27	521
Educational, health and social services	217	217	373	200	257	734	181	2,179
Professional, scientific, management, administrative, and waste management services	63	41	130	74	116	178	88	690
Arts, entertainment, recreation, accommodation and food services	112	138	103	74	80	218	169	894
Other services (except public administration)	104	63	83	62	45	126	151	634
Public administration	33	24	39	37	46	110	5	294

*2010 Data not available

3.3.3 Summary of Socioeconomic Characteristics

The City of Kingsport has remained somewhat steady in its population for the past few years as more residents move into the county than the city. In part, the topography limits development within many areas of the city limits. Many residents of the City of Kingsport and Sullivan County are senior adults that retired from the Eastman Kodak plant and have remained in the area. The vast majority of residents in the county and city are white, middle class, and own their own homes.

The unemployment rate of the area, reflective of those across the nation, increased in the latter part of 2008 and through 2009 due to the national economic recession. Sullivan County has a lower percentage of residents who are high school graduates or equivalent (85.1%) than the State of Tennessee (88.3%). Sullivan County also has a lower percentage of residents who

have attained a Bachelor's Degree or higher (18.5%) than the State of Tennessee (26.7%). The poverty rate of Sullivan County (15.0%) is comparable to the poverty rate for Tennessee (15.9%). Higher poverty rates are present within Kingsport's City Limits (20.2%).

3.4 NATURAL ENVIRONMENT

3.4.1 Geology

Topography and Geology

The project is located in Sullivan County, along the eastern limits of the City of Kingsport to its interchange with I-81. This area of Sullivan County features undulating to rolling valleys with rounded hills. The project area is situated within the Valley and Ridge physiographic region. In Tennessee, the Valley and Ridge is sometimes referred to as the Valley of East Tennessee, a rolling lowland formed on highly folded limestone, dolomite, and shale. Fertile valleys separated by wooded ridges make up this area. The eastern escarpment of the Cumberland Plateau and the Blue Ridge subdivision mark the boundaries of this region.

The Valley and Ridge is an area comprised of Ordovician and Ordovician-Cambrian age limestone, dolomite, shale, chert, siltstone, sandstone, and clay. Numerous elongated ridges and intervening valleys, all trending in a northeast-southwest direction, characterize this physiographic region. As a general rule the major ridges are formed by prominent quartzitic sandstone. Subordinate ridges consist of Lower Devonian sandstone and various sandstones of the Upper Devonian. The valleys and lower flanks of major ridges are underlain by shale and limestone. Valley floors contain rolling hills. Hills formed of shale are generally well rounded and smooth; those formed of limestone are somewhat irregular. Streams generally follow the narrow valley floors or cut across the strike of the ridges. The Tennessee River flows southwest through the region. Principal feeders from the north are the Clinch, French Broad, and Holston Rivers. Major tributaries from the east are the Hiwassee and Little Tennessee Rivers.

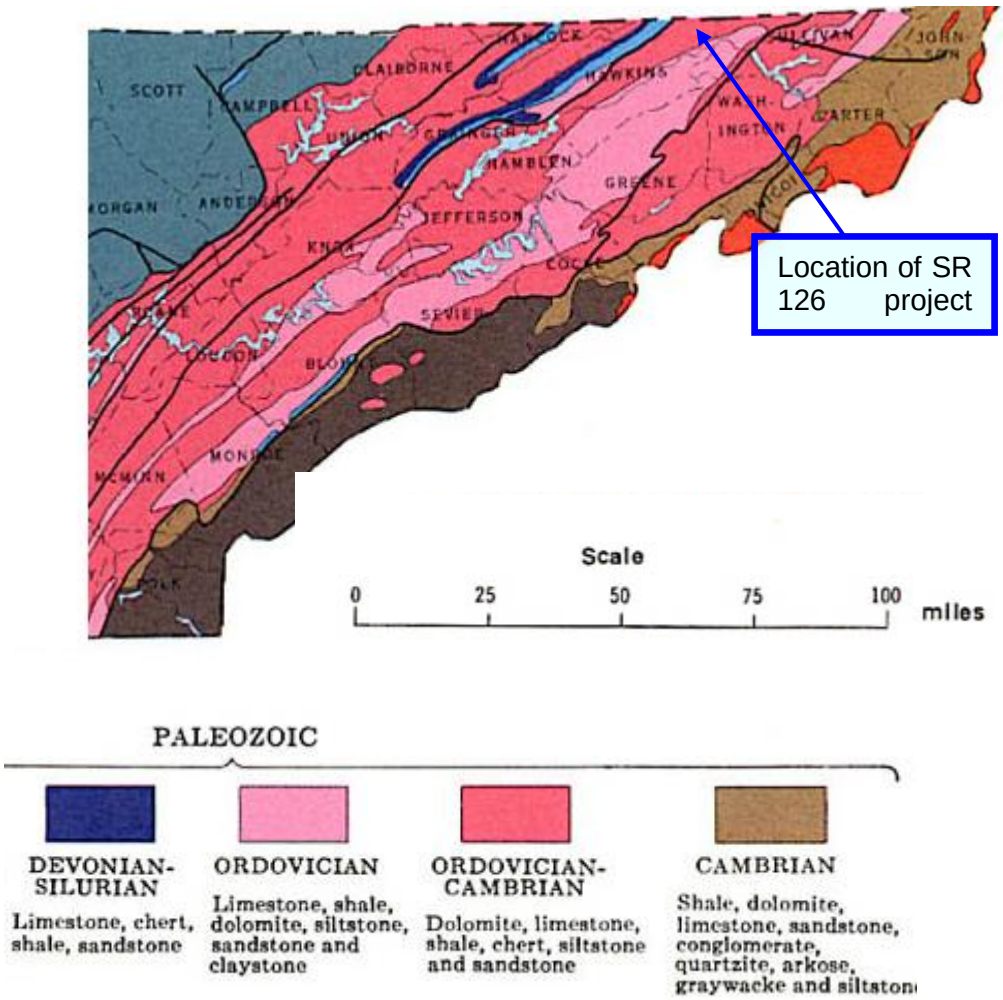


FIGURE 3.4.1: GENERALIZED GEOLOGIC MAP OF EAST TENNESSEE

Karst Features

Although karst topography is present within the project area, very few sinkholes have been mapped in the greater project region, and no significant sinkholes, if any, are being indicated within the project limits. Field trips also did not result in the identification of sinkholes within or adjacent to the project limits. The underlying geologic formations, particularly the Knox Group and the Honaker Dolomite group, are susceptible to sinkhole development due to their carbonate (limestone and dolostone) composition. Sinkhole development or discovery of developing sinkholes could occur at any time, but were not evident in areas where recent development has occurred in the areas surrounding SR 126 (Memorial Boulevard).

> Karst is an area of irregular limestone in which erosion has produced fissures (cracks), sinkholes, underground streams, and caverns.

Other Geological Issues

TDOT conducted a preliminary geologic investigation that was submitted on June 29, 2009. The varying topography ranges throughout the project from nearly level areas to steeply rolling terrain. A copy of the Preliminary Geologic Report is on file at the TDOT Environmental Division Office in Nashville, TN.

Pyritic material is not expected to be encountered on the proposed project, and there does not appear to be any significant geological issues that cannot be addressed during the design or construction phase.

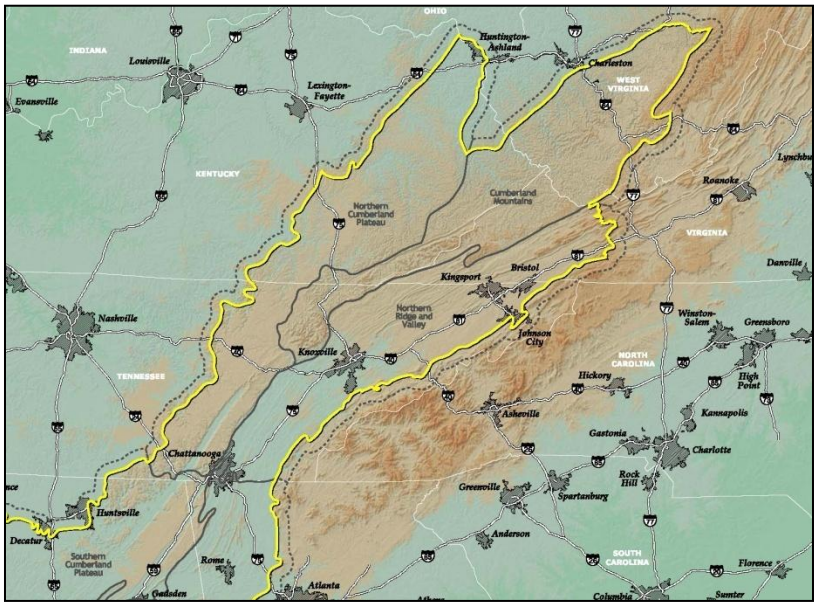
A possible old borrow site was observed just west of Holiday Hills Road adjacent to the westbound lane of existing SR 126 (Memorial Boulevard). The surrounding ground and backslope appeared stable, with no curvature being noted in the large diameter trees at the top of the slope. No geotechnical concerns were noted with regard to this area.

The observations made during the field trip and reviews of topographic mapping anticipate the majority of roadway improvements would require shifting into the existing hill slopes. This would result in a greater number of constructed cut slopes than embankment fills. The greatest cuts are expected in areas with steeper terrain such as the Sougan Hollow vicinity and the southern flank of Chestnut Ridge. Moderate to steep cuts could occur throughout the project, with less steep cuts being anticipated in areas of more gentle topography. Other areas along creek bottoms or in areas where the roadway is not shifted into the hill slopes could encounter minor to moderate fills.

3.5 NATURAL RESOURCES

3.5.1 Terrestrial Habitat

The project area is within the EPA Level III ecoregion termed the “Ridge and Valley Ecoregion.” This northeast-southwest trending, relatively low-lying, but diverse ecoregion is sandwiched between generally higher, more rugged mountainous regions with greater forest cover. **Figure 3.5.1** provides a location of the project in relation to the Ridge and Valley Ecoregion.



The Ridge & Valley Ecoregion (yellow outline in the figure above) includes the project area.

FIGURE 3.5.1: RIDGE AND VALLEY ECOREGION

Springs and caves are relatively numerous. Present-day forests cover about 50% of the region. The ecoregion has a diversity of aquatic habitats and species of fish. Natural plant communities in this area of the ecoregion are Appalachian oak forest (mixed oaks, hickory, pine, poplar, birch, maple); bottomland oak and mesophytic forests; and cedar barrens.

Field studies and records reviews indicate that two main types of forests, mixed mesophytic and upper hardwood, exist in the project area. The mixed mesophytic habitat is found in the more sheltered ravines of the lower elevations and is dominated by woody species of White Basswood (*Tilia heterophylla*), American Beech (*Fagus grandifolia*), Yellow Buckeye (*Aesculus octandra*), Sugar Maple (*Acer saccharum*), Red Oak (*Quercus rubra*), Fraser Magnolia (*Magnolia fraseri*), conifers such as White Pine (*Pinus strobus),* Eastern Hemlock (*Tsuga canadensis*), and White Ash (*Fraxinus americana*). The under-story vegetation includes successional species such as Flowering Dogwood (*Cornus florida*), Eastern Redbud (*Cercis canadensis*), Eastern Red Cedar (*Juniperus virginiana*) and Sassafras (*Sassafras albidum*). Rhododendron (*Rhododendron maximum*) and Mountain Laurel (*Kalmia latifolia*) dominate the slopes and stream sides. The upper hardwood habitat is found mainly at the higher elevations. The tree species are often stunted or broken due to exposure to strong winds. Species include Red Oak, American Beech, Sugar Maple, American Elm, and Virginia Pine.

Some open land does exist in the project area. Areas such as cemeteries, abandoned farmland, hay fields, utility right-of-ways, etc., exhibit early-successional, grass-shrub habitat with the dominant plants being cool-season grasses (fescue, timothy, and orchard grass), and a vast assortment of forbs (a broad-leaf herb other than a grass, growing in a field or meadow), and shrubs such as blackberry and honeysuckle. Reviews of aerial photographs of the project corridor over the past sixty years indicate that the amount of trees in the area has increased. This can be attributed to the loss of small farmland, which has reverted to fallow fields. **Figure**

3.5.2 shows the extensive forest fragmentation in the project area due to urban, residential, and agricultural land usage.

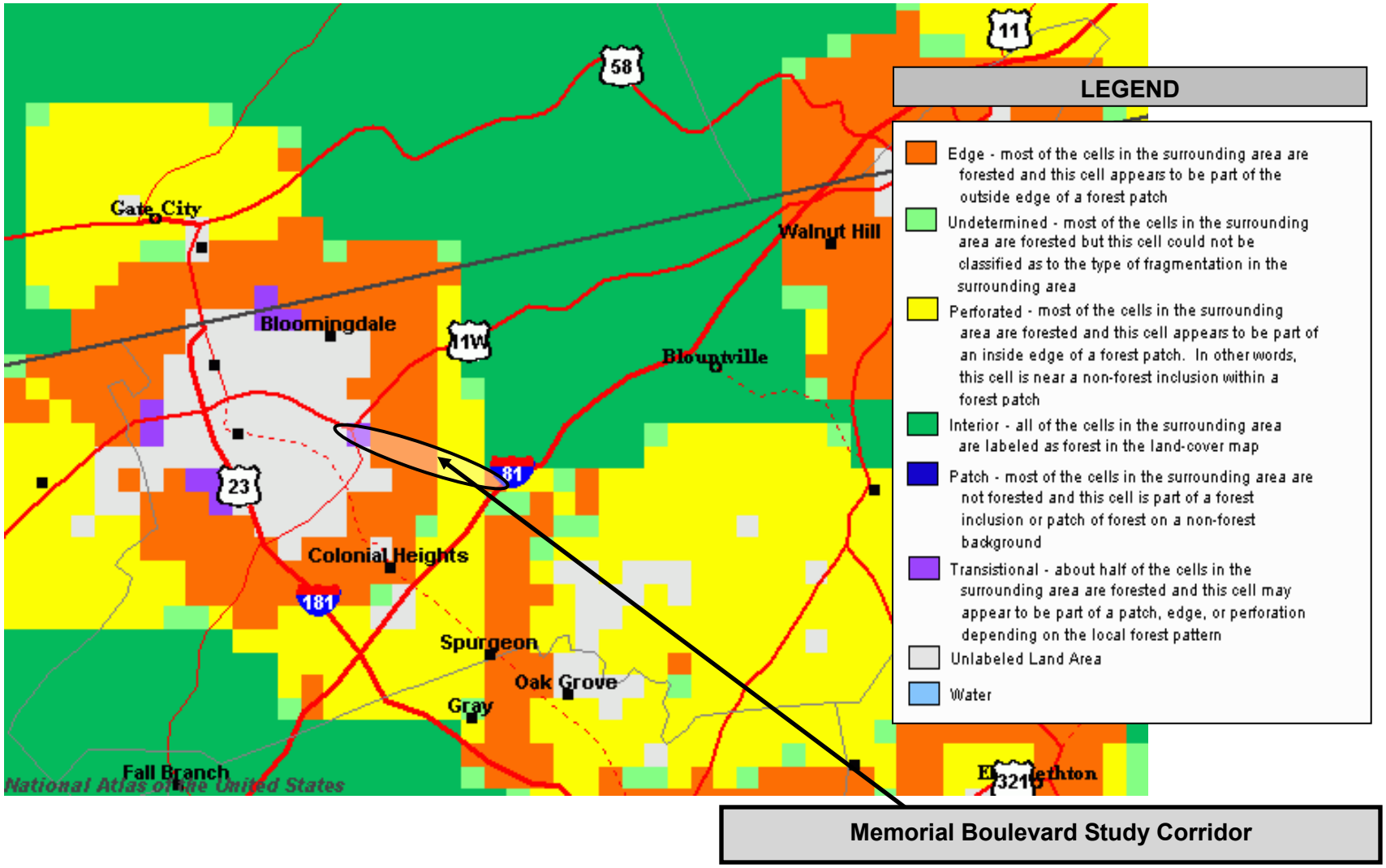


FIGURE 3.5.2: FOREST FRAGMENTATION OF THE STUDY CORRIDOR AND SULLIVAN COUNTY

3.5.2 Aquatic Resources

Surface Waters

Five streams are identified within the project corridor. Three are perennial streams: Sougans Branch, Fall Creek, and an unnamed tributary of Sougans Branch. Two streams are intermittent streams: An unnamed tributary of Fall Creek and an unnamed tributary of Reedy Creek. None of the five streams are listed as Tennessee Exceptional Waters within the project impact area, and none are impaired to the degree that they have been placed upon the Tennessee 303(d) list of impaired streams published by the Tennessee Department of Conservation's (TDEC) Division of Water Quality Control. Habitat quality of each of the streams was investigated, and all five streams scored in the below-average range. Stream impacts are discussed in **Chapter 4**.

Floodplains

Reviews of Federal Emergency Management Agency (FEMA) maps that show the historic 100-year floodplains indicated that floodplains are evident within and near the SR 126 (Memorial Boulevard) project corridor. The floodplains are associated with two streams, the Fall Creek and Sougans Branch of Fall Creek, which are currently crossed by the existing SR 126 (Memorial Boulevard). Floodplain impacts are discussed in **Chapter 4**.

Jurisdictional Wetlands

Surveys were conducted within the project impact area of the project. In addition, National Wetland Inventory maps, topographical maps, and coordination with state and federal agencies were conducted to locate the presence of these resources. No wetlands were located within the corridor. No impacts are anticipated to these resources.

Conservation Areas and Targeted Conservation Sites

The Nature Conservancy published a report (The Nature Conservancy, 2003) that evaluated the significant ecological features within the ecological region that coincides with the project area. These areas within the region are designated as "Conservation Areas" (**See Figure 3.5.3**). The Conservation Areas are noted as brown horizontally striped areas for terrestrial sites, and blue vertically striped areas for aquatic sites. No Conservation Areas coincide with the project.

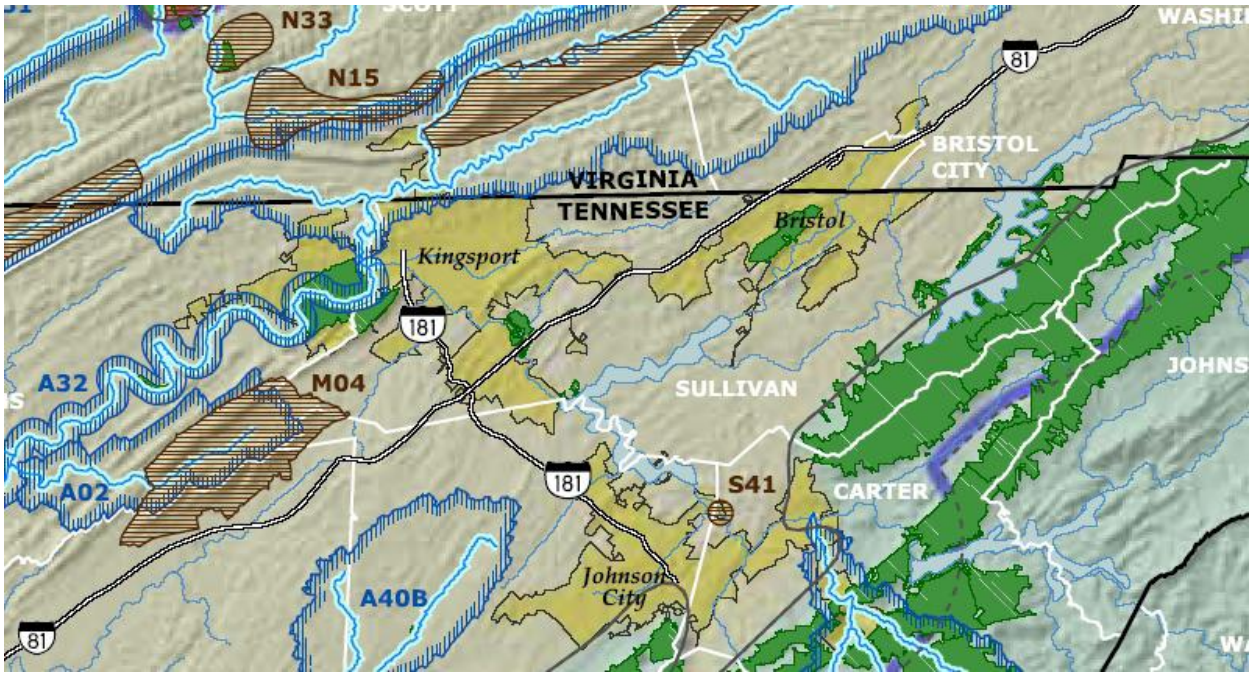


FIGURE 3.5.3: CONSERVATION AREAS

3.5.3 Federally Listed and Proposed Threatened and Endangered Species

There are eleven (11) species federally listed as threatened or endangered in Sullivan County, Tennessee. The threatened species are; Spotfin chub (*Erimonax monachus*), and American Hart's tongue fern (*Phyllitis scolopendrium var Americana*). The endangered species include; Gray bat (*Myotis grisescens*), Tubercled-blossom pearlymussel (*Epioblasma torulosa torulosa*), Shiny pigtoe (*Fusconaia edgariana*), Fine-rayed pigtoe pearlymussel (*Fusconaia cuneolus*), Tan riffle shell (*Epioblasma walkeri*), Cumberland monkeyface pearlymussel (*Quadrula intermedia*), Green-blossom pearlymussel (*Epioblasma torulosa gubernaculum*), Littlewing pearlymussel (*Pegias fabula*), and the Duskytail darter (*Etheostoma percnurum*). An ecological survey was conducted for the project area and the results are discussed in **Chapter 4**.

Although the Indiana Bat is not known to occur in the project area, at the request of the United States Fish and Wildlife Service (USFWS), a bat survey for this federally listed endangered species was conducted. Mist nets and field reviews were conducted in the project impact area. No Indiana Bats were located. A copy of the *Indiana Bat (Myotis sodalis) Mist Net Survey*, dated October 2011, is on file at the TDOT Environmental Division Office in Nashville, TN.

3.5.4 State Listed Species

A review of the TDEC Threatened and Endangered Species File was conducted in July 2009. The identified species have been compiled into lists of plants and animals. The identified state listed species in Sullivan County are listed in **Tables 3.5.1 (Plants)** and **3.5.2 (Animals)**.

Field studies and records research have been conducted to identify Federal and State-listed species or habitat in the project impact area. None were evident in this area of Sullivan County.

No known populations of Federal and State-listed species were identified within the project area.

3.5.5 Invasive Species

Invasive species pose perhaps the biggest threat to native ecosystems. Exotic invasive species are those that have evolved within one ecosystem and were introduced, either intentionally or accidentally, to another ecosystem. Because exotic species evolved elsewhere, they encounter few or no natural control mechanisms in their new location allowing them to spread easily and quickly. Exotic plants exhibit a particularly dangerous hazard due to their capacity to reproduce rapidly. As they broaden their range, invasive plants disrupt available nutrients, occupy space, and out-compete native plants. Some exotic species introduce pathogens or insect pests that can suddenly devastate an ecosystem, while the exotic species remains relatively immune to its effects. Exotic plants are often used in an ornamental setting but cross-over into an uncontrollable habitat. Some exotic plants, such as leafy spurge (*Euphorbia esula*) may be poisonous to wildlife and livestock. Others, like Chinese chestnut (*Castanea mollisima*), don't offer quite the nutritional value of their native counterparts (*Castanea dentata*). All of these alterations negatively affect the ecosystem, often dramatically. Revegetating disturbed areas with woody native vegetation can minimize the potential impacts. Ecological impacts are further discussed in **Chapter 4**.

TABLE 3.5.1: PLANTS IDENTIFIED WITHIN SULLIVAN COUNTY BY TDEC (1 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Allium burdickii	Narrow-leaf Ramps	Threatened and Commercially Exploited – This plant is found in rich woods.
Berberis canadensis	American Barberry	Special Concern – This perennial shrub is found on rocky woods and river bars. According to the Nature Conservancy, American barberry was formerly found in fire-maintained habitats which kept the canopy open, *i.e*., it was an inhabitant of savannas and open woodlands, and fire suppression has significantly restricted its habitat to sites with shallow soil (such as glades and cliffs) or areas with mowing or other canopy-clearing activities (such as powerline corridors, railroad/road rights-of-way and riverbanks).
Botrychium matricariifolium	Chamomile Grapefern	Special Concern - This fern is found in mountain woods and thickets.
Buckleya distichophylla	Piratebush	Threatened - A large shrub which is found in rocky mountain woods. The plants can be found scattered among host trees within openings of hemlock forests, but habitats also include south-facing slopes and chestnut oak forests. It was thought that *B. distichophylla* was host specific to hemlocks, but subsequent investigations have shown otherwise.
Cimicifuga rubifolia	Appalachian Bugbane	Threatened - Occupied habitat in Tennessee includes rich soil on river bluffs, north-facing hillsides and talus slopes, moist dolomite ledges in ravines, as well as rocky and shady woods below limestone bluffs.
Cymophyllus fraserianus	Fraser's Sedge	Special Concern - This herbaceous plant is found in mixed mesophytic forests.
Cypripedium acaule	Pink Lady's-slipper	Special Concern and Commercially Exploited - This herbaceous plant is found in piney woods.
Draba ramosissima	Branching Whitlow-grass	Special Concern - This herbaceous plant is found on dry, calcareous rocky cliffs.
Dryopteris cristata	Crested Shield-fern	Threatened - This herbaceous plant is found in bogs.
Gentiana austromontana	Appalachian Gentian	Special Concern - This herbaceous plant is found in high elevation open woods.
Goodyera repens	Dwarf Rattlesnake-plantain	Special Concern - This herbaceous plant is found in cool, moist, mountainous forest usually in proximity to conifers.
Hexastylis virginica	Virginia Heartleaf	Special Concern - This herbaceous plant is found in sandy or rocky woods.
Hydrastis Canadensis	Goldenseal	Special Concern and Commercially Exploited - This herbaceous plant grows best in rich, mesic hardwood forest, especially those underlain by limestone or alkaline soils.
Hydrophyllum virginianum	Appalachian Waterleaf	Threatened - This herbaceous plant grows in rich moist woods.
Juglans cinerea	Butternut	Threatened - This tree is found in rich woods and hollows.
Lonicera dioica	Mountain Honeysuckle	Special Concern - This herbaceous plant grows in moist mountain woods and thickets.
Magnolia virginiana	Sweetbay Magnolia	Threatened - This tree is found in forested acidic wetlands

TABLE 3.5.1: PLANTS IDENTIFIED WITHIN SULLIVAN COUNTY BY TDEC (2 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Maianthemum stellatum	Starflower False Solomon's-seal	Endangered - This herbaceous plant is found on moist streambanks, floodplains, and sandy woods.
Meehania cordata	Heartleaf Meehania	Threatened - This herbaceous plant is found on wooded mountain slopes.
Panax quinquefolius	American Ginseng	Special Concern and Commercially Exploited – This plant occurs primarily in rich, cool, moist hardwood-dominated or mixed woods, under a closed canopy, especially on slopes or ravines and often over a limestone or marble parent material on soil with a good humus component.
Platanthera flava var. herbiola	Tubercled Rein-orchid	Threatened - This plant occurs in swamps and floodplains.
Platanthera grandiflora	Large Purple Fringed Orchid	Endangered - This plant occurs in wet meadows and along streams.
Platanthera orbiculata	Large Round-leaved Orchid	Threatened - This plant is found in mid-elevation mesic forests.
Pyrola Americana	American Wintergreen	Endangered - This plant occurs in moist woods and bogs.
Scutellaria saxatilis	Rock Skullcap	Threatened - This plant occurs in rocky woods and moist cliffs.
Silene caroliniana ssp. Pensylvanica	Carolina Pink	Threatened - This plant is found in sandy, dry and open woodlands and rocky bluffs.
Streptopus amplexifolius	White Mandarin	Threatened - This plant occurs in wet cliffs and mesophytic mountain woods.
Symplocarpus foetidus	Skunk-cabbage	Endangered - This plant occurs in swamps and bogs.
Thuja occidentalis	Northern White Cedar	Special Concern - This tree is found on calcareous rocky seeps and cliffs.
Trientalis borealis	Northern Starflower	Threatened - This plant occurs in mountain mesophytic hardwood forests.
Tsuga caroliniana	Carolina Hemlock	Threatened - This plant is found on dry ridges.
Vitis rupestris	- Sand Grape	Endangered - This plant occurs on sandy, rocky riverbanks.
Woodsia scopulina ssp. Appalachiana	Alleghany Cliff-fern	Special Concern - This fern occurs on mountain cliffs.

TABLE 3.5.2: ANIMALS IDENTIFIED WITHIN SULLIVAN COUNTY BY TWRA AND TDEC (1 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Allocapnia brooksi	Stonefly	Endangered – This aquatic invertebrate occurs in streams.
Gomphus consanguis	Cherokee Clubtail Dragonfly	Special Concern - Larvae of this aquatic invertebrate are usually found in small first- and second-order streams with silty pool bottoms; occupied streams are often spring-fed. Adults utilize these same habitats during the breeding season, but are also found in nearby fields and other areas of open habitat.
Nesticus paynei	A Cave Spider	Special Concern - S
Speyeria Diana	Diana Fritillary	Special Concern – This species occurs in woodlands.
Helicodiscus notius specus	Land Snail	Special Concern – This snail is found in caves.
Io fluvialis	Spiny Riversnail	Special Concern – This snail occurs in medium to large rocky streams with sandy substrate.
Percina aurantiaca	Tangerine Darter	Wildlife-In-Need-Of-Management – This fish occurs in medium sized streams to moderate rivers, with adults typically occupying the deeper, smooth-surfaced areas with moderately swift currents adjacent to shallow riffles. Smaller individuals are usually found along the shoreline of pools.
Percina burtoni	Blotchside Darter	Wildlife-In-Need-Of-Management
Percina macrocephala	Longhead Darter	Threatened
Phoxinus tennesseensis	Tennessee Dace	Wildlife-In-Need-Of-Management
Haliaeetus leucocephalus	Bald Eagle	Wildlife-In-Need-Of-Management – This species requires miles of shoreline along unpolluted water with high perching and lookout points, and tall, often dead, trees for nests.
Limnothlypis swainsonii	Swainson's Warbler	Wildlife-In-Need-Of-Management – In the mountains of east Tennessee, this bird occurs in rhododendron or mountain laurel tangles, generally in ravines in hardwood or mixed forests.
Corvus corax	Common Raven	Threatened – This bird prefers mountainous (elevation usually above 3000 feet), hilly areas with open and spottily wooded lowlands. It is usually found far from humans.
Tyto alba	Common Barn Owl	Wildlife-In-Need-Of-Management – Owls prefer areas of idle or lightly grazed grassland. Reduction in number of buildings and silos that can still be accessed for nesting, but remain out of reach of increasing raccoon populations, is a major contributing factor to the decrease in the population of barn owls.
Rallus limicola	Virginia Rail	Special Concern – This is a bird of marshes and wetlands.
Parascalops breweri	Hairy-tailed Mole	Wildlife-In-Need-Of-Management – This species is not restricted to any one habitat type, and is found in secondary hardwood forest, open fields, old pastures, cultivated fields, and along roadsides.

TABLE 3.5.2: ANIMALS IDENTIFIED WITHIN SULLIVAN COUNTY BY TWRA AND TDEC(1 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Sorex fumeus	Smoky Shrew	Wildlife-In-Need-Of-Management – This species is apparently confined to mountains, and the preferred habitat is damp deciduous-coniferous forest around stumps, under mossy logs and rocks and near streams.
Sorex longirostris	Southeastern Shrew	Wildlife-In-Need-Of-Management – This species is most common in moist to wet areas usually bordering swamps, marshes or rivers. It is also found in old fields, dry upland hardwoods, and planted pine plots. In all habitats, this species is associated with heavy ground cover of grasses, sedges, rushes, blackberry, Japanese honeysuckle, and/or thick mats of decaying leaves.
Synaptomys cooperi	Southern Bog Lemming	Wildlife-In-Need-Of-Management – This small mammal appears to have a broad range of habitats, ranging from moist meadows, marsh borders, dry field thickets, eastern red cedar woodland, and moist woodlands.
Zapus hudsonius	Meadow Jumping Mouse	Wildlife-In-Need-Of-Management – They are found in grasslands, orchards, meadow and old fields. It prefers areas with numerous shrubs, and areas with herbaceous ground cover. They are sometimes taken in wooded areas when herbaceous cover is adequate. Impatiens (touch-me-not) is apparently a good habitat indicator.

3.6 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by the Council and referred to as "Protection of Historic Properties" (36 CFR Part 800).

Surveys of potential historic/archaeological sites were performed in accordance with Section 106 guidelines outlined in 36 CFR 800. The purpose of these studies was to determine the presence of resources listed, or eligible for listing, in the National Register of Historic Places (NRHP) within the Area of Potential Effect (APE). The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.

The NRHP criteria of eligibility outlined in 36 CFR 60.4 were applied to all surveyed resources. Those criteria are as follows:

- Criterion A – Sites that are associated with events that have made an important contribution to the broad patterns of our history; or
- Criterion B - Sites associated with the lives of persons of considerable importance in our past; or
- Criterion C – Sites that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a noteworthy and distinguishable entity whose components may lack individual distinction; or

- Criterion D – Sites that have yielded, or may be likely to yield, information important in history or prehistory.

3.6.1 Architectural/Historic Resources

The APE was established as being 1,500 feet in distance from either side of the existing SR 126 (Memorial Boulevard) centerline. TDOT identified two properties within the APE that are eligible for, or listed on, the National Register of Historic Places (NRHP). The properties are the Shipley-Jarvis House, located at 3309 Memorial Boulevard (SR 126), and Yancey's Tavern, located on SR 126 (Memorial Boulevard) at its intersection with Chestnut Ridge Road. The properties are described below, and their status on the NRHP is included. See **Figure 3.6.1** for a map of the APE.

Shipley-Jarvis House

This site, located on the south side of SR 126 (Memorial Boulevard) in a residential and commercial section of East Kingsport, exemplifies the adaptation of nineteenth century dwellings to conform to twentieth century architectural tastes. Its architectural features continue to illustrate both mid-nineteenth century building methods and twentieth-century stylistic changes. TDOT deemed this site eligible for listing in the NRHP under Criterion C for its architectural style. The Shipley-Jarvis House is located on a 1.6 acre tract near the project's East Center Street terminus. See **Figure 3.6.2A** for a map of the site.

Yancey's Tavern

This property was listed in the NRHP in 1972 under Criterion A for its significance in the early settlement of Sullivan County. According to the NRHP listing, the tavern was constructed in 1782 as a double log house with a dogtrot. Underneath the present façade remain the logs used to construct the house. Hand fired brick replaced the original chimneys which were constructed of stone. Bricks have also replaced some of the original stone foundation. Brick was used in recent years to completely enclose the cellar, but the framing of the door and window openings leading into the cellar are from a much earlier time period. Front and back porches were later additions to the structure. The back wing of the house includes a fireplace with simple mantel suggesting an early date, though it is not part of the original structure. The location of a back chimney suggests that this area was once a small distance of open area between the kitchen and the main structure. Openings for windows and doors pre-date the 20th century, but are not original materials. See **Figure 3.6.2B** for a map of the site.

The interior of Yancey's Tavern is simple with three plain, well-executed mantels on the first floor. The two second-story rooms are accessed by separate stairways. The construction of the dogtrot is visible on the second floor because this portion of the house has not been finished for use.

The Yancey's Tavern property includes various outbuildings such as a barn, a wash house, spring house, chicken house, and a corn crib, which all are associated with the late 19th/early 20th centuries. The frame granary which features a shingled roof and stone foundation is considerably earlier according to the NRHP narrative.

The NRHP also states that Yancey's Tavern was a crucial stopping point along Island Road, which was a major artery in East Tennessee. This allowed the tavern to figure prominently in the development of the area, and attracted notable visitors, including John Sevier and William Blount. The tavern also served as headquarters for local businesses including meetings of the Sullivan County court. Island Road predates the tavern, being completed in September 1761, and is the first road constructed in Tennessee, and also to the southwest. Island Road connected Chillhowie, Virginia, to the Long Island of the Holston River. Part of Island Road later was renamed the "Great Stage Road." The Tennessee section of Island Road supported connection between three forts, including Eaton's Fort which in the early 1770s was a portion of Amos Eaton's 'corn rights' land. Eaton sold a portion of his land near the fort in 1779 to James Hollis, who ultimately sold 900 acres to John Yancey, Sr. in 1782. It cannot be determined if the structure now known as Yancey's Tavern was constructed prior to the sale of the land to Yancey, but the tavern became operable shortly after the real estate transaction was completed. The Yancey heirs maintained the property until the last half of the 19th century. The property changed ownership several times until it was purchased in 1889 by John R. Spahr, whose descendants owned the property into the 20th century. The property was purchased by the current owner, Rann L. Vaulx, at auction.

The project impact to these two NRHP resources is discussed in **Chapter 4**.

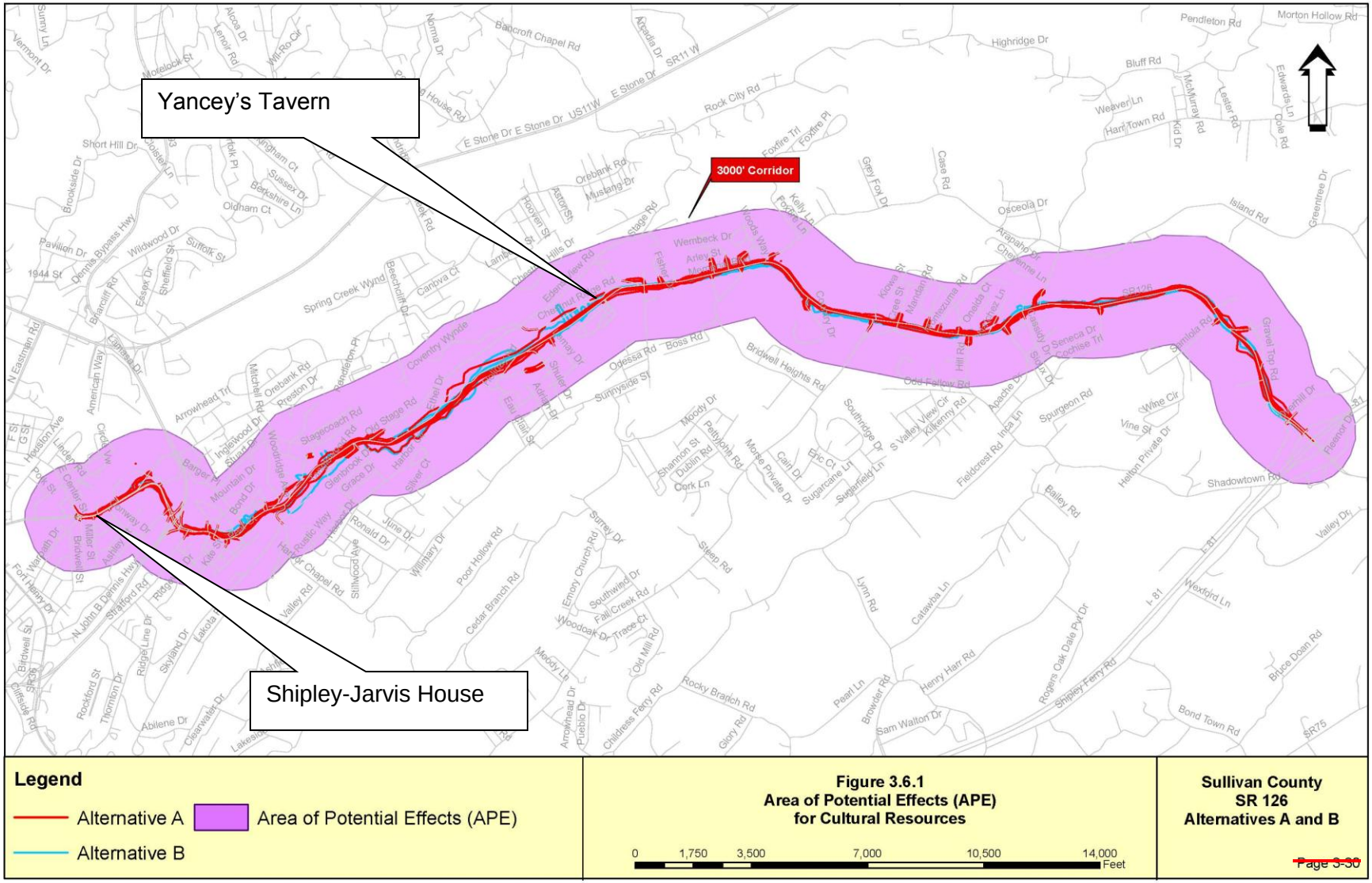


FIGURE 3.6.1: APE FOR CULTURAL RESOURCES

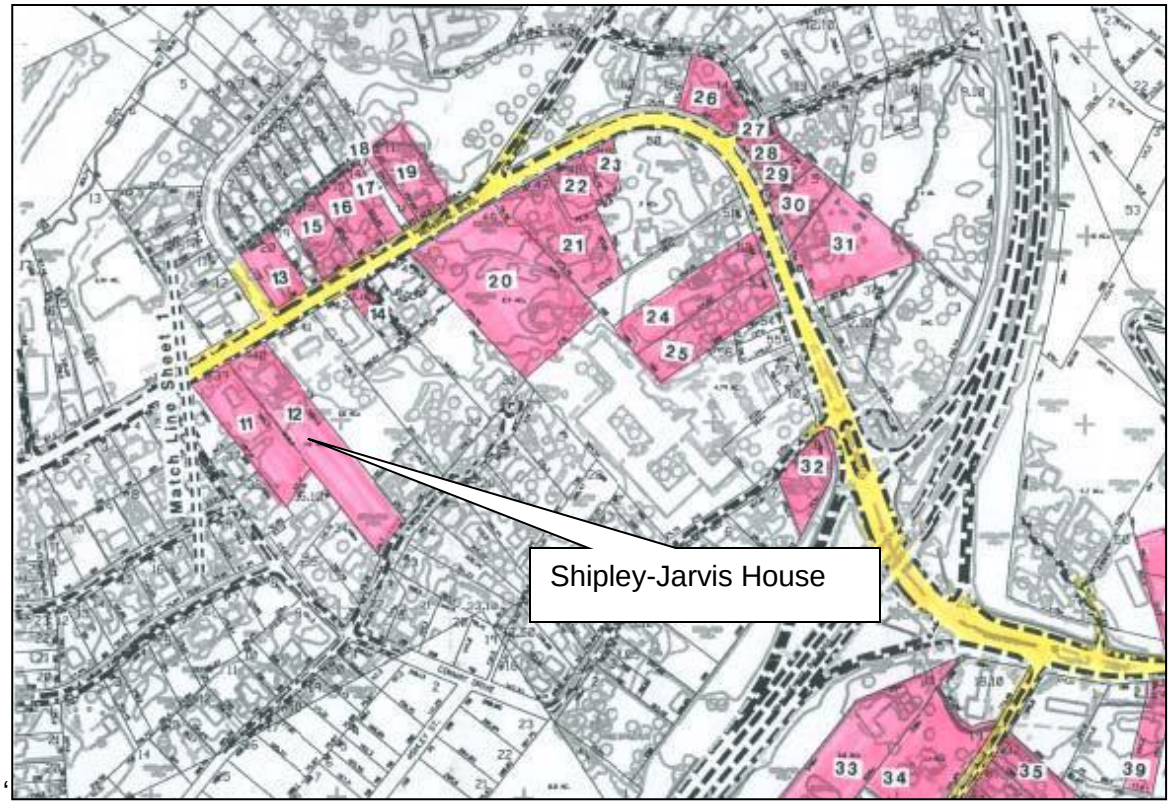


FIGURE 3.6.2A: SHIPLEY-JARVIS HOUSE

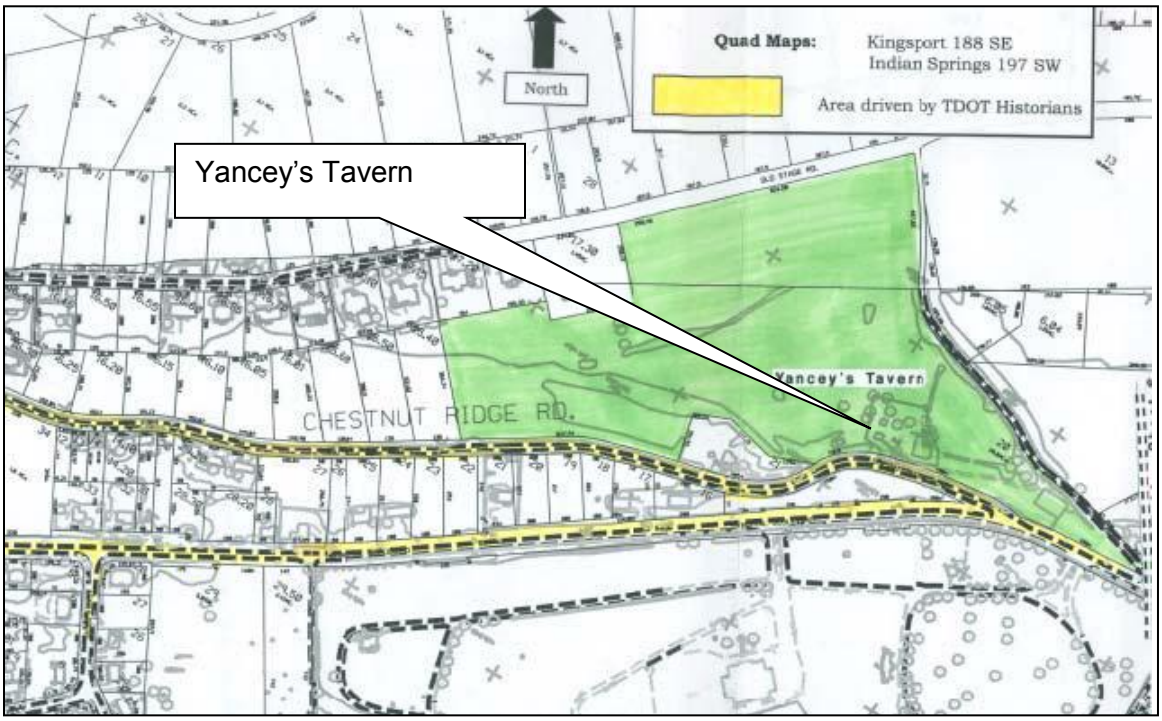


FIGURE 3.6.2B: YANCEY'S TAVERN

3.6.2 Archaeological Resources

Beginning in October 2001, investigations were conducted to provide information on the distribution of important archaeological properties within the project area. This information was used to make informed management decisions relating to the design, improvements, and construction of SR 126 (Memorial Boulevard).

These investigations were conducted in two phases. Phase 1a consisted of a literature and records search for the areas surrounding the proposed alternatives. This phase of the investigation addressed three objectives; (1) to identify all previously recorded archaeological and historical properties within the study area, (2) to develop an environmental, cultural and historical context for the study area, and, (3) to develop a model to predict site locations within the various topographic regions included within the study area.

Phase 1b, the second phase of the investigation, consisted of a systematic pedestrian survey of high-probability areas resulting from the predictive model for archaeological resources within the proposed alternatives. Goals and methods employed during the pedestrian survey were based upon criteria outlined in the *Scope of Work for TDOT Phase 1 Archaeological Assessments* (Kline 1999). The objective of the survey was to identify and record all cultural resources within or adjacent to the proposed highway corridor that are listed, eligible for listing, or potentially eligible for listing on the NRHP pursuant to criteria set forth in 36 CFR 60.4. The archaeological assessment is discussed in **Chapter 4**.

3.7 RECREATIONAL RESOURCES

The project corridor was visited, maps of the area were reviewed, and conversations were conducted with local officials to determine if resources, including public and private parks, wildlife refuge areas, and other forms of recreation might exist. No recreational resources were identified within or near the project corridor.

3.8 VISUAL RESOURCES

The project begins in an urbanized segment of Kingsport, and as it moves eastward, climbs a hill, and transitions into an agricultural/scattered residential area. The urban area is in a relatively flat area with numerous houses and businesses densely situated along the existing roadway and surrounding areas. As the project climbs out of the urbanized area, homes become less densely aggregated. Most of the homes are along the existing SR 126 (Memorial Boulevard) or along feeder roads. Farmland becomes more evident as the project area moves eastward. Reviews of land use maps on file at the TDOT Environmental Division Office in Nashville, TN, which span a fifty-year period, show that many areas now have more trees within the area in relation to the initial photographs from the 1950s. Most of the areas with trees are in the rural area, and indicate the loss of smaller farms as lack of agricultural activity allows for re-growth. Some additional wooded areas are located in neighborhoods that have been established for several decades.

In addition to becoming more rural in nature, the project terrain becomes more mountainous and rolling. Vegetation is predominately a mix of agricultural lands and scattered forests in the eastern two-thirds of the project. The western third of the project contains mainly manicured lawns or is covered by impermeable surfaces in the urban section of the project. Local and

commuter traffic generally use the existing SR 126 (Memorial Boulevard) on a daily basis, and view the surrounding landscape from their vehicles.

Viewers of the road are comprised of residents and businesses occupying the areas, and vary in frequency based upon whether they are located in an urban or rural setting. These numbers range from high in Kingsport to low in the middle portion of the project. The view of SR 126 (Memorial Boulevard) within town includes heavier traffic scenarios, especially in peak commute hours, while those areas along the agricultural sections experience lower numbers of vehicles traveling at higher speeds. A variance exists along the intersection of SR 126 (Memorial Boulevard) at I-81. A higher number of vehicles are experienced in this area and consist of commuters, some local traffic, and long-range travelers using the interchange for rests, fueling, and overnight stays.

Throughout the Context Sensitive Solutions process, the Community Resource Team expressed concerns on behalf of the public regarding any action that would diminish the scenic attributes of the hillsides that comprise a great portion of the project. The hills and rural nature of the greater portion of the project are important to residents of the immediate area, and to residents of Kingsport and Sullivan County.

Chapter 4: Environmental Consequences

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the direct environmental impacts of the No-Build and Build Alternatives, as well as the indirect and cumulative impacts of the proposed project. The following resource categories were determined to be appropriate for this study and are consistent with the general guidelines set forth by the FHWA.

1. Land Use Impacts
2. Farmland Impacts
3. Social Impacts
4. Relocation Impacts
5. Environmental Justice
6. Economic Impacts
7. Pedestrians and Bicyclists Impacts
8. Soils and Geologic Impacts
9. Ecological Impacts
10. Air Quality Impacts
11. Noise Impacts
12. Historical Impacts
13. Archaeological Impacts
14. Section 4(f) Evaluation
15. Section 6(f) Evaluation
16. Hazardous Material Impacts
17. Visual Impacts
18. Wild & Scenic Rivers and Tennessee Scenic Rivers
19. Energy Impacts
20. Construction Impacts
21. Short Term Impacts vs. Long Term Benefits
22. Irreversible and Irretrievable Commitments of Resources
23. Indirect and Cumulative Impacts

Table 4.1 provides a summary of the primary environmental impacts of the Build Alternatives. All known environmental impacts of the project are discussed in detail in **Sections 4.1** through **4.23** of this document.

TABLE 4.1 ENVIRONMENTAL IMPACTS MATRIX

Alternative	Residential Relocations	Business/Non-Profit Relocations	Employees Affected	Gravesites Impacted	Wetlands Impacts (Acres)	Floodplains Impacts (Acres)	Forest Land Acquired (Acres)	Stream Crossings	Stream Impacts (Linear Ft)	Hazardous Materials Sites	Adverse Visual Impacts to Historical Sites	Impacts to Archaeological Sites	Farmland Impacts (Acres)	Farms Segmented or Totally Acquired	Threatened and Endangered Species	Section 4(f)/ Section 6(f) Impacts	Air Quality/Noise Impacts Requiring Mitigation
A	241	43/1	125 to 175	350	0	4.0	75.0	5	4,863	2	1	0	15	0	0	0/0	0/0
B	162	30/1	75 to 125	90	0	3.2	54.8	5	3,107	3	1	0	5	0	0	0/0	0/0

4.1 LAND USE IMPACTS

The land use along the project corridor is a mixture of residential, commercial, and agricultural. The widening of the roadway will result in the conversion of these land uses (121-239 acres) to roadway right-of-way. Indirect and cumulative impacts are expected to occur with the project study corridor and are discussed further in **Section 4.23 Indirect and Cumulative Impacts**.

4.1.1 East Lawn Memorial Gardens

A large cemetery, East Lawn Memorial Gardens, is located on the south side of State Route 126 and abuts the existing right-of-way. There are several thousand grave sites in this cemetery. It is estimated that 350 currently occupied gravesites would be impacted by Alternative A. It is estimated Alternative B would impact 90 currently occupied gravesites. The proposed Alternative B cross-section reduces the number of travel lanes through this area to reduce the impact to the cemetery. A review of the cemetery plat indicated that there are numerous sites available for relocation of the affected grave sites. TDOT will comply with the Tennessee State Burial Law: TCA 46-4-101-104 (Termination of land use as cemetery) for the relocation of any grave sites.

For both Alternatives A and B, the proposed alignment was shifted to the south side of the roadway to avoid impacting the National Register of Historic Places listed Yancey's Tavern property. The taking of land from the Yancey's Tavern tract would have resulted in an Adverse Affect under Section 106 of the National Historic Preservation Act of 1966. The use of the land would have also resulted in a Section 4(f) finding under the provisions of Section 4(f) of the National Transportation Act of 1966.

4.2 FARMLAND IMPACTS

The Federal Farmland Protection Act was passed in 1981. The purpose of the Act is to prevent the conversion of farmlands to non-agricultural uses by minimizing the impacts that federal programs have on farmlands. Before farmland can be used for a project utilizing federal funds, an assessment must be completed to determine if prime, unique or statewide or locally important farmlands would be converted to non-agricultural uses.

The Natural Resource Conservation Service (NRCS) characterizes eligible farmlands as prime, unique, or of statewide or local significance. The designations are based on NRCS soil type and are protected by federal legislation.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, or oil-seed and other agricultural crops with minimum input of fuel, fertilizer, pesticides, and labor without intolerable soil erosion. Prime farmland includes land that possesses the above characteristics and may include land currently used as cropland, pastureland, rangeland or forestland. Prime farmland does not include land already in or committed to urban development or water storage.

Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing

season and moisture supply needed to economically produce high quality or high yields of specific crops when treated and managed according to acceptable farming methods.

Statewide or locally important farmland is land that has been designated of state or local importance for the production of food, feed, fiber, forage or oil-seed crops but is not of national significance.

The impacts of the proposed project on farmland were determined through coordination with NRCS, which included an evaluation using the US Department of Agriculture's (USDA) Farmland Conversion Impact Rating Form (see coordination letter from NRCS in **Appendix A**). The form was completed in accordance with 7 CFR, Part 658 of the *National Farmland Protection Policy Act.* The site assessment criteria (part VI on the form) are designed to assess important factors other than the agricultural value of the land. The ten assessment criteria used for transportation and other corridor-like studies consider not only the land currently being farmed, but also the land use around the project area and whether or not that land use is urban, non-urban or in transition. The criteria also determine the following:

- Whether the conversion of the proposed agricultural site would eventually cause the conversion of neighboring farmland;
- Whether there are adequate support facilities, activities and industry to keep the farms in business;
- The extent to which local and state government and private programs have made efforts to protect farmland from conversion;
- Relative amount of on-farm investment; and
- Whether there are agriculturally related activities, businesses or jobs dependent on the site staying in agricultural production

Each factor is assigned a score relative to its importance. Sites that receive a total site assessment score of 160 points or less are given a minimal level of consideration for protection. Sites with a total site assessment score of 161 points or more would require the consideration of alternative project alignments that would serve the proposed purpose but convert either fewer acres of farmland or other farmland that has a relatively lower value.

The site assessment score for the alternatives under consideration was 82 points, indicating that consideration of alternative project alignments that would serve the proposed purpose but convert either fewer acres of farmland or other farmland that has a relatively lower value is not necessary. The completed USDA Farmland Conversion Impact Rating form is included in **Appendix A**.

TABLE 4.2.1: FARMLAND CONVERSION TOTALS

Alternative	Total Acres in 2000-foot Study Corridor	Total Acres Prime & Unique Farmland Required by Alternative	Total Acres of Land to be Converted to Roadway ROW	Total Farmland Impact Rating Score
A	2,100	15	239	82
B	2,100	5	121	82

The No-Build Alternative would have no effect on farming operations since existing conditions would remain unchanged.

Construction of the Build Alternatives will result in the direct conversion of between 5 and 15 acres of farmland to a transportation facility.

4.3 SOCIAL IMPACTS

4.3.1 Schools

Construction of the proposed project will not directly impact any school property. Accessibility to and from area schools will be enhanced by improvements to SR 126 (Memorial Boulevard). SR 126 (Memorial Boulevard) is the main route for students traveling to schools from areas east of Kingsport. Indian Springs Elementary serves students in the immediate project area. Several Sullivan County bus routes use portions of SR 126 (Memorial Boulevard) or its connecting roads to distribute students between home and school. The improved roadway will provide shoulders and sidewalks that will create a safer environment for bus riders.

4.3.2 Fire and Police

A volunteer fire department station (Number Four) will be acquired and relocated with either Build Alternative A or B. The volunteer fire department is a non-profit organization and is located along SR 126 (Memorial Boulevard) at the intersection with Heather Lane. It is not occupied full time, but is used during emergencies and includes a garage and a small office/organization area. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents. No other police, fire, or emergency services facilities will be displaced.

The proposed improvements will improve emergency response time for police and emergency service. The additional lanes and shoulders will provide safer travel conditions for emergency vehicles and the general public.

4.3.3 Hospitals

The project will improve traffic flow on SR 126 (Memorial Boulevard) to four immediate area hospitals. None of the services provided by these facilities will be impaired by the proposed alternative.

4.3.4 Utilities

Relocation of utilities will be required, however; no long-term utility impacts are anticipated. Temporary service disruptions could result during project construction. Utility relocation will require coordination with local service providers, which will minimize, if not avoid, disruptions.

4.4 RELOCATION IMPACTS

Displacements are a potential adverse environmental effect associated with any proposed project. A Conceptual State Relocation Plan (CSRP) has been prepared to assess the effects of displacements and to determine the probability of successful relocation. On April 8, 2010, a

CSRP was completed for this project. A copy of the CSRP is on file in the TDOT Environmental Division Office in Nashville, TN. Alternative A will result in an estimated 241 residential relocations, 43 business displacements, and 1 non-profit displacement. Alternative B will result in 162 residential relocations, 30 business displacements, and 1 non-profit displacement. A summary of relocation impacts is provided in the **Table 4.4.1**.

TABLE 4.4.1: RELOCATION IMPACTS FOR BUILD ALTERNATIVES

	Alternative A	Alternative B
Single Family Homes	102	90
Multi-Family Units	135	69
Mobile Homes	4	3
Annual Income Range of Affected Households	$25,000 to >$100,000	$25,000 to >$100,000
Homes occupied by low-income residents	Less than 5	Less than 5
Homes with Minority Occupants	None evident	None evident
Homes with Elderly Occupants	50 to 60	40 to 50
Households with 5 or more residents	15 to 20	10 to 15
Homes with disabled residents	20 to 25	20 to 25
Family or Social Clusters	0	0
Businesses	43	30
Number of Employees Affected	125 to 175	75 to 125
Non-Profit Organizations	1	1
Community Institutions	0	0

4.4.1 Specific Information for each Build Alternative

Alternative A

Alternative A will result in an estimated relocation of 102 occupied conventional single family residences and 135 multiple family units. It is estimated that 75% of the conventional houses have 2 to 3 bedrooms, 20% have 1 to 2 bedrooms, and 5% have 3 to 4 bedrooms. The estimated price range for the affected houses is from $60,000 to over $400,000. Most of the homes (approximately 70%) are in good condition, 10% of the homes are in very good condition, 15% of the homes are in fair condition, and the remaining 5% are estimated to be in poor condition. Ages of the conventional homes range from new to over 100 years old, with most being between 25 and 49 years of age. A total of 4 mobile/pre-constructed homes will be relocated. The mobile homes appear to be between 10 and 35 years in age. The homes are in fair to good condition. Each appears to have 2 to 3 bedrooms. The value of the mobile homes ranges between $25,000 and $40,000. No neighborhoods will be bisected, and no divisive or disruptive impacts to minority or ethnic neighborhoods are anticipated.

Forty-three (43) businesses and one (1) non-profit organization will be relocated by Alternative A. The non-profit organization, a volunteer fire department station, would be acquired and moved. It is not occupied full time, but is used during emergencies and includes a garage and a small office/organization area. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents.

The Conceptual Stage Relocation Plan found that no schools or churches will be partially or totally acquired by Alternative A.

Although no neighborhoods will be split or bisected, traffic patterns will change for some residences with the closing of some streets that currently have direct access to SR 126 (Memorial Boulevard). The street closings are proposed to improve access control along SR 126 (Memorial Boulevard) and to improve safety. Access will be available to SR 126 (Memorial Boulevard) via other nearby streets.

Alternative B

Alternative B will require the relocation of 90 occupied conventional single family residences and 69 multiple family units. It is estimated that 20% of the houses have 1 to 2 bedrooms, 75% of the houses have 2 to 3 bedrooms, and 5% have 3 or more bedrooms. The estimated price range for the affected houses is from $60,000 to over $400,000. Most of the homes (approximately 70%) are in good condition, 10% of the homes are in very good condition, 25% of the homes are in fair condition, and the remaining 5% are estimated to be in poor condition. Ages of the conventional homes range from new to over 100 years old, with most being between 25 and 49 years of age. A total of three mobile/pre-constructed homes would be required to be relocated. It is estimated that the mobile homes have 2 or 3 bedrooms. The mobile homes are in fair to good condition. The mobile homes are between 10 and 25 years of age. It is believed the mobile homes are occupied by their owners. No neighborhoods will be bisected, and no divisive or disruptive impacts to minority or ethnic neighborhoods are anticipated for Alternative B.

Thirty (30) businesses and one (1) non-profit organization will be relocated by Alternative B. The non-profit organization, a volunteer fire department station, would be acquired and moved. It is not occupied full time, but is used during emergencies and includes a garage and a small office/organization area. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents.

The Conceptual Stage Relocation Plan found that no schools or churches will be partially or totally acquired by Alternative B.

Although no neighborhoods will be split or bisected, traffic patterns will change for some residences with the closing of some streets that currently have direct access to SR 126 (Memorial Boulevard). The street closings are proposed to improve access control along SR 126 (Memorial Boulevard) and to improve safety. Access will be available to SR 126 (Memorial Boulevard) via other nearby streets.

4.4.2 Relocation Assistance

The Tennessee Department of Transportation will make relocation assistance available to all eligible persons impacted by this project, including residences, businesses, farm operations, non-profit organizations, and those requiring special services or assistance in accordance with provisions in Title VI of the Civil Rights Act of 1964. Title VI prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance. The Regional Relocation Staff will administer the relocation program under the rules, policies, and procedures set forth in the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Uniform Relocation Assistance Act of 1972, implementing federal regulations, TCA 13-11-101 through 119, The State of Tennessee

Relocation Assistance Brochure and Chapter Nine of the State of Tennessee, Department of Transportation, Right-of-Way Manual.

Relocation resources are available to all the displaced without discrimination. Relocation impacts to the displaced would include possible loss of neighbors, adjustment to new surroundings, and moving inconveniences. Although the impacts associated with project displacements are adverse, they would be short-term in duration. The provisions of suitable and acceptable replacement housing, combined with adequate relocation payments, can be expected to minimize relocation impacts. If any situation should exist where decent, safe, and sanitary housing within the financial means of the displacees is not available, such housing will be made available under the replacement housing of last resort provisions.

At least one relocation agent is assigned to each highway project to carry out the relocation assistance payments program. A relocation agent will contact each person to be relocated to determine individual needs and desires, to provide information, answer questions, and aid in finding replacement property.

The Department provides advance notification of impending right-of-way acquisition and before acquiring right-of-way has all properties appraised on the basis of comparable sales and land values in the area. Owners of property to be acquired will be offered fair market value for their property. Relocation services and payment are provided without regard to race, color, religion, sex, or national origin.

Brochures that describe in detail the right-of-way acquisition program and relocation assistance and payments program are distributed at all public hearings and are made available upon request to any interested person.

Implementation of the proposed project will not substantially change the basic social arrangement or character of the project area. The proposed project will not split neighborhoods or separate residence from community facilities. Although no neighborhoods will be split or bisected, traffic patterns will change for some residences with the closing of some streets that currently have direct access to SR 126 (Memorial Boulevard). The street closings are proposed to improve access control along SR 126 (Memorial Boulevard) and to improve safety. Access will be available to SR 126 (Memorial Boulevard) via other nearby streets.

Residential Relocation Information

A study of the real estate market in the project area indicates a market not capable of supporting the one hundred and sixty two (162) to two hundred and forty one (241) residential displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number of relocations, but not easily. It will be difficult to adequately address the varying needs of all those displaced by this project. Numerous, substantial Last Resort Housing Payments could be expected.

Last Resort Housing is used when there is no comparable housing available for sale or rent within TDOT's current limitations. Should Last Resort Housing become necessary, supplemental payments or other housing options, as determined by TDOT, can be implemented through procedures provided for in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The displacees will be interviewed on an individual basis during the acquisition phase and more specific solutions will be made at the time all the facts are gathered.

No person lawfully occupying real property will be required to move without at least 90 days written notice of the intended vacating date, and no occupant of a residential property will be required to move until decent, safe, and sanitary replacement housing is made available. "Made available" means that either the affected person has by themselves obtained and has the right of possession of replacement housing or the Department has offered the relocatee decent, safe, and sanitary housing that is within their financial means and available for immediate occupancy.

Business Relocation Information

A study of the real estate market in the project area reveals that it is unlikely that the thirty (30) to forty-three (43) business displacees can relocate in the immediate project area. Successful relocation will require many of the businesses to expand their search area beyond the immediate project area.

Non-Profit Relocation Information

This project is expected to cause one (1) non-profit displacement (a Kingsport volunteer fire department station) with either alternate. Due to the nature of their "business", they will need to relocate in close proximity to their current location. Based on a study of the local real estate market, it is believed that suitable replacement sites do exist, but not in great numbers. This is complicated by the large number of businesses displaced by the project.

4.5 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* requires that the evaluation of Federal actions identify and address disproportionately high and adverse human health and environmental impacts on low income and minority populations. The majority of the residents in the project area based on 2010 census data are non-minority.

The Build Alternatives are not anticipated to have any disproportionate or adverse effects to minority or low-income populations and no neighborhoods or communities would be bisected.

The Kingsport MPO conducted a study to identify Environmental Justice areas or neighborhoods within its boundaries. The efforts are documented in the MPO's 2030 Long Range Transportation Plan (amended January 10, 2008) study. A copy of a map which details these areas is provided in **Figure 4.5.1**. Although areas have been identified in the region, the areas surrounding the proposed project were not identified as containing areas of concern.

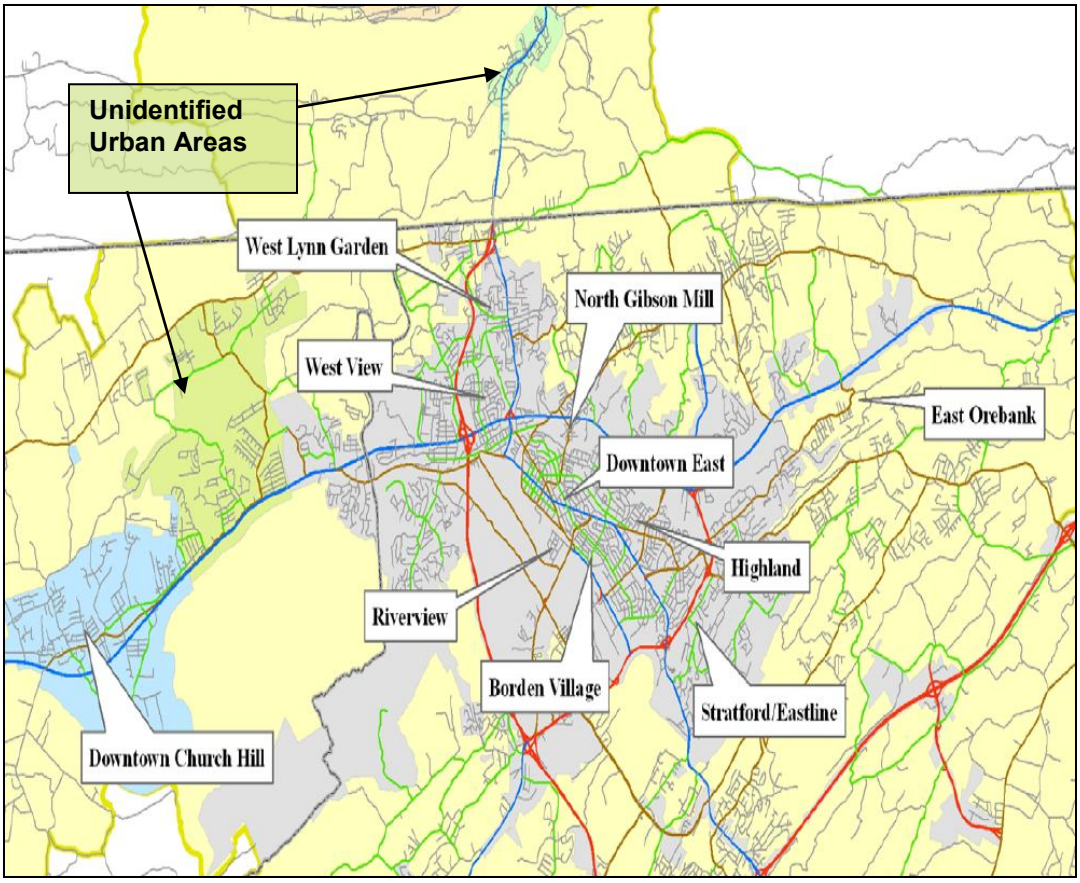


FIGURE 4.5.1: IDENTIFIED ENVIRONMENTAL JUSTICE AREAS, KINGSPORT MPO

Note: The yellow shaded portions of the map denote the Kingsport MPO area. The gray shaded area indicates the City Limits of Kingsport. The light blue area is common to Downtown Church Hill. Two other populated areas are noted in green and an aqua color, but do not bear names. The project area has been highlighted in blue. The various flags indicating names such as "North Gibson Mill" or "Stratford/Eastline" are areas that have been identified by the MPO study as areas of Environmental Justice concern.

The proposed project will not have an adverse or disproportionately high impact for minority populations and low income populations. All people in the area, including special interest groups, will share equally in the benefits of the proposed project.

4.6 ECONOMIC IMPACTS

There will be long-term adverse economic effects due to the construction of Alternative A or B. With Alternative A, there will be 241 residential relocations and 43 business relocations involved. With Alternative B there will be 162 residential relocations and 30 business relocations involved. The results of the Conceptual Stage Relocation Plan indicate a market not capable of supporting the large number of anticipated residential or business displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number of relocations, but not easily. Some of the businesses may choose to go out of business or move out of the project area, causing a loss of

tax revenues. Also, the buying of additional right-of-way by the government will decrease the area property tax base. Due in part to both Build Alternatives not adding travel lanes to approximately half of the study corridor, implementation of the improved facility would likely not result in an increase in land use development pace, nor would it be likely to induce a change in the types of land uses (i.e. shifting to industrial development from residential development and light commercial development). No industrial sites are located within or adjacent to the proposed project's limits. No impacts would be imposed upon these resources by the project.

4.7 PEDESTRIANS AND BICYCLISTS IMPACTS

The lack of sufficient shoulders or sidewalks creates an unsafe environment for bicycles and pedestrians along SR 126 (Memorial Blvd.). The proposed Build Alternatives will provide shoulders along the entire route, sidewalks where appropriate, and improve sight distances. Although the shoulders will not be marked for bicycles and pedestrians, the paved shoulders will be wide enough to accommodate bicycles and pedestrians. (See Cross-Section schematics **Chapter 2**)

4.8 SOILS AND GEOLOGIC IMPACTS

The varied topography encountered throughout the project area will require a range of minor to possibly considerable cuts and fills. A subsurface investigation program with core drilling will be conducted prior to construction.

The potential for slope stability problems within both soil and rock areas will require a detailed evaluation of the actual slope conditions, particularly within the cut slopes of steep and rocky terrain. This evaluation will be conducted to determine the actual stability and slope geometry. Any slope stability problems that might be determined will be addressed in either the design or construction phase of the project.

Karst topography, though present in the area, was not identified within or adjacent to the project limits. The underlying geologic formations are susceptible to the formation of sinkholes, and early development of these features could occur during construction. If sinkholes are discovered, the appropriate permits and mitigation treatments would be implemented before completion of the construction phase.

A copy of the *Geologic Report* for SR 126 (Memorial Boulevard) is on file in the TDOT Environmental Division Office in Nashville, TN.

4.9 ECOLOGICAL IMPACTS

An ecological study was conducted in December 2008 to characterize the existing terrestrial and aquatic habitat within the proposed Build Alternatives and to identify jurisdictional water resources including wetlands, streams, springs, sinkholes, etc. as well as the potential for the presence of any threatened and/or endangered species and their critical habitat. The ecological study also reviewed water quality impacts, floodplain benefit impacts, and geology within the proposed Build Alternative corridor and evaluated potential environmental impacts to these resources. The complete Ecology Report is on file in the TDOT Environmental Division Office in Nashville, TN.

4.9.1 Terrestrial Ecology

The improvements to SR 126 (Memorial Boulevard) will result in minimal impacts to local wildlife and plant communities in the area. The existing roadway will be widened, requiring additional land beyond the current right-of-way.

Roads and highways affect wildlife in many ways; both directly as roadkill, and indirectly through the degradation, fragmentation, and loss of habitat. Construction of the proposed project will result in the loss of habitat for small mammals and birds. Forested habitat is minimal in the project area, and the area within the corridor is comprised mainly of existing roadway, housing and commercial land use within the city limits, and scattered housing and agricultural use with a small amount of commercial land use in the rural section of the project. Most of the land has been converted to agricultural and residential/commercial use over the past century. The proposed project will result in minimal loss of wildlife habitat and local wildlife populations.

Construction of the proposed project in previously undisturbed areas will also impact native vegetation. Mitigation measures for the disturbances of the floral community will include revegetating the areas with native plants as soon as possible. Leaving soil exposed to the elements for a prolonged period of time will increase the likelihood of invasion of the area by invasive/exotic plant species and could potentially cause erosion and sedimentation problems in nearby area streams. Plants chosen for the site will be compatible with the hydrology, geology, and land use of the surrounding landscape. Due to the fact the proposed project is along an existing facility, the majority of any removal of native vegetation will occur along the shoulders and will remain minimal.

Various successional vegetative stages will be considered when replacing native species to prevent the landscape from converting into a monoculture state, thereby decreasing floral diversity. Since the proposed project is along an existing facility, absent of extensive forested areas, the impacts to terrestrial plants and animals will be minimal and extensive mitigation measures are not necessary.

Direct impacts to the terrestrial environment are anticipated to be minimal. Alternative A will result in 75 acres of scattered forested habitat to be converted to right-of-way, and Alternative B will require 54.8 acres of scattered forested habitat.

4.9.2 Aquatic Ecology

Five (5) streams were identified within the project corridor. Three (3) are perennial streams: Sougans Branch, Fall Creek, and an unnamed tributary of Sougans Branch. Two (2) streams are intermittent streams: An unnamed tributary of Fall Creek and an unnamed tributary of Reedy Creek. Habitat quality of each of the streams was investigated, and all five (5) streams scored in the below-average range. **Figure 4.9.1** identifies the location of these streams.

A **perennial stream** has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

An **intermittent stream** has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Source: www.nap.usace.army.mil/cenap-op/regulatory/definitions.html

Impacts to a stream during road construction activities are primarily destruction of habitat and sedimentation. Habitat destruction will directly impact portions of the stream located within the project's right-of-way limits. Sedimentation is associated with construction activities. Sedimentation impacts are usually temporary and can impact a stream for hundreds of feet downstream. These impacts include reduced levels of oxygen in the stream, and interference with the ability of fish, aquatic insects, mussels and other aquatic organisms to utilize oxygen from the water. Temperature patterns and water flow patterns can be altered. Siltation increases turbidity (cloudiness from dust and other disturbed particles) which can slow photosynthesis, clog gills in fish and other aquatic life, and covers macroinvertebrates and fish egg-laying substrates (streambed layers). This can result in long term negative impacts to streams. Siltation can redistribute itself to increase flooding events, loss of storage capacity in reservoirs, and potential economic impacts associated with increased water treatment costs. Organic chemicals and metals can be reintroduced into the water columns that were previously contaminated.

Nonpoint source pollution in the project area is related primarily to agricultural practices. In addition, urban runoff, sewage and construction activities contribute to nonpoint source pollution. These pollutants include deicing compounds, weed, rodent, and insect control products, surface runoff of pollutants coming from vehicular operations (oil, grease, asbestos and rubber), toxic chemical spills by trucks into a water supply system, and contamination of surface and groundwater supplies by polluted fill materials. Deicing and herbicide/pesticide uses are seasonal, and typically result in short term increases in area waters. Surface runoffs associated with vehicles are unavoidable, but the quantities of these pollutants are typically small which would result in negligible impacts. Accidental spills are not predictable, but emergency procedures are in place that report, contain, and clean up hazardous materials. The impacts to area streams will be minimized by strict adherence to the Standard Specification for soil erosion and sediment control.

FIGURE 4.9.1: IMPACTED STREAMS

Alternative A Stream Impacts

Five (5) streams will be impacted by Alternative A; three (3) are perennial and two (2) are intermittent streams. None of the five (5) have been listed as Tennessee Exceptional Waters within the project impact area, and none were impaired to the degree that they have been placed upon the Tennessee 303(d) list of impaired streams published by TDEC Division of Water Pollution Control. Habitat quality of each of the streams was investigated, and all five streams scored in the below-average range. The total amount of stream channel impacted will be determined after final project plans become available (i.e., alternative selected), but impacts have been estimated based upon preliminary plans for Alternative A. No bridges will be required; all stream crossings will consist of culverts or pipes. Alternative A would require a total of 1,278 feet of culverts to be constructed. A total of 3,585 feet of stream would be relocated within the project's proposed right-of-way. Table **4.9.1** and Table **4.9.2** illustrates stream impacts anticipated in association with Alternative A. TDOT considered shifting the alignment to avoid these resources, but this would not have been feasible. The shifts would result in additional relocations of residents and greater impacts to floodplains.

Alternative B Stream Impacts

The same five (5) streams as previously mentioned will be impacted by Alternative B. The total amount of stream channel impacted will be determined after final project plans become available (i.e., alternative selected), but impacts have been estimated based upon preliminary plans. No bridges will be required; all stream crossings will consist of culverts or pipes. Alternative B would require a total of 846 feet of culverts to be constructed. A total of 2,261 feet of stream would be relocated within the project's proposed right-of-way. **Table 4.9.1** and Table **4.9.2** illustrates stream impacts anticipated in association with Alternative B. TDOT considered shifting the alignment to avoid these resources, but this would not have been feasible. The shifts would result in additional relocations of residents and greater impacts to floodplains.

TABLE 4.9.1: LINEAR FEET OF STREAM IMPACT BY IMPACT TYPE, SR 126, SULLIVAN COUNTY, TENNESSEE FOR SELECTED ALTERNATIVES A AND B

Item	Total Linear Feet Impacted	Culverts/Pipes (ft)	Crossing / Bridge (ft)	Relocation (ft)
Alternative A	4,863	1,278	NA	3,585
Alternative B	3,107	846	NA	2,261

TABLE 4.9.2: COMPARISONS OF STREAM IMPACTS IN LINEAR FEET FOR ALTERNATIVE A AND ALTERNATIVE B

Streams Impacted	Drainage Area (acres)	Flow Regime	Alternative A: Linear Feet Impacted	Alternative B: Linear Feet Impacted
U.T Reedy Creek	113	Intermittent	428	174
U.T. Fall Creek	53	Intermittent	192	92
U.T. Sougan Branch	439	Perennial	2,506	1,868
Sougan Branch	1,574	Perennial	93	99
Fall Creek	2,032	Perennial	1,644	874
			Total: 4,863	**Total: 3,107**

Mitigation Measures for Impacted Streams

To protect water quality and aquatic species it is necessary that stream crossings be designed perpendicular to the direction of flow. The construction of culverts should be staged during the drier times of the year when stream flows have been reduced. The culverts will not be constructed immediately following rain events. Locations of these structures will be determined during final design and prior to submission of federal and state permit applications.

Where culverts penetrate the existing embankment, they will be lengthened so that the existing drainage function would be preserved. Therefore, there will be no additional flooding upstream of the existing berm. Additional culvert improvements would be made during final design, if necessary, based on a hydraulic capacity analysis. Culverts will also be wide enough to pass high flows and should be placed so as not to restrict the movement of aquatic vertebrates within the streams.

Mitigation is required for all stream impacts which do not meet requirements for general TDEC Division of Water Aquatic Resources Alterations permits (ARAP) and for certain Nationwide Section 404 permits (U.S. Army Corps of Engineers; TDOT 2004).

Coordination with TDEC Division of Water Pollution Control for a potential Water Quality Certification (401) prior to disturbance of streams is required. A 401 Water Certification states that a discharge into surface waters must comply with the aquatic protection requirements of the State of Tennessee. The *Status of Water Quality in Tennessee Year 2000 305 (b) Report* states “As a general rule, the Division prefers bridging of streams or even relocation of streams as an alternative to culverting.” Furthermore, large projects where culverting is unavoidable may require an in lieu fee for compensatory mitigation. Aquatic life cannot be maintained in a culverted body of water. Altered stream flow consists of layers of water that do not mix. Hence, there is limited mixing of nutrients and dissolved oxygen. Additionally, the smooth bottom of the culvert eliminates refuge, feeding and egg-laying sites for aquatic organisms associated with natural stream substrates.

A Section 404 Dredge and Fill Permit will be required from the USACE prior to any construction work on the proposed project. Permittees must meet all conditions, restrictions, and notification procedures required prior to work under any said permit.

Unavoidable impacts to waters of the U.S. could still occur after all appropriate avoidance and minimization measures have been taken. Compensatory mitigation is likely to be required to offset any unavoidable impacts to waters of the U.S. TDOT will implement the current sanctioned stream mitigation compensation, as necessary, at the time of attaining permits.

TDOT Standard Specifications, Section 6-290.00, Sediment Control and Erosion Prevention, would be followed to minimize impacts to the five streams. To minimize potential run-off impacts to streams (and subsequent wildlife that utilize those streams) during and after construction, all appropriate BMP’s in accordance with the FHWA will be implemented to control sedimentation and debris within contributing drainages.

Minimization of Stream Impacts

The Build Alternatives will be designed to avoid major impacts to waters of the State/U.S. to the extents practicable. Efforts to further minimize impacts will continue throughout the design,

permitting, and construction processes. Unavoidable impacts will be mitigated as required by applicable laws and regulations. In an effort to minimize sedimentation impacts, erosion prevention and sediment control plans will be included in the project construction plans. TDOT will also implement its *Standard Specifications for Road and Bridge Construction* and the *Statewide Storm Water Management Plan (SSWMP)*, which includes erosion prevention and sediment control standards for use during construction. The State of Tennessee sets water quality criteria for waters of the state; these standards must be met during construction of the project.

Erosion control devices should limit any adverse effects to area streams. Such devices include filter rings and siltation traps. Maintaining the vegetated buffer zone between the roadway and the streams will minimize the impact of non-point source pollution to the streams. Also, drainage ditches should direct runoff into appropriate areas to allow the non-point source pollutants to filter out of the drainage. To minimize potential runoff impacts to the project streams, all appropriate Best Management Practices will be implemented to ensure water quality in the project area is not adversely impacted during construction. Exact measures will be developed and coordinated with the appropriate permit agencies later in the design phase.

Along streams it is important to leave mature canopy when possible and allow establishment of a dense herbaceous layer of native species. Re-vegetating disturbed areas as soon as possible with native floral species should diminish erosion impacts. Using native species will improve habitats by adding diversity and discouraging invasive species growth. Riparian zones will provide habitat for existing species and attract the lower food chain organisms that may draw fish and invertebrates indigenous to the area.

Heavy equipment will not be allowed directly in the stream. Where possible, diversion channels will be constructed to keep surface flow away from the construction site or to direct flow from the construction site into appropriate sediment control services. Seeding with temporary vegetation to help control sediment runoff will be considered. Construction will not take place immediately following rain storm events.

If these mitigation measures are utilized, there should be no cumulative impacts to streams as a result of the construction of this project.

<u>Water Quality Impacts/Minimization</u>

Potential environmental impacts other than direct alteration of the streams consists of sediment laden stormwater run-off due to construction of the project. In order to minimize the impacts to water quality as a result of construction activities, erosion prevention and sediment control (EPSC) “Best Management Practices” (BMPs) will be utilized. Some of the BMPs that should be utilized include the following:

- Preservation of roadside vegetation beyond the limits of construction where possible
- Early re-vegetation of disturbed areas to hold soil movement to a minimum
- The use of detention/retention structures, surface, subsurface, and cross drains designed to protect the water quality of both groundwater and surface waters
- Inclusion of BMPs in the construction plans, specifications, and contract pay items as specified in TDOT *Standard Specification for Road and Bridge Construction as well as the Drainage Manual*

- Prohibiting the release of chemicals, fuels, lubricants, bitumens, raw sewage, or harmful waste into or alongside of streams or impoundments, or into natural or manmade channels that lead to same

Wetland Impacts

No wetlands under the provisions of Executive Order 11990 were identified in the project impact area. The build alternative will have no direct impact on State or Federal jurisdictional wetlands.

Floodplain Impacts

Executive Order 11988, Floodplain Management, addresses concerns associated with encroachment upon floodplains. Federal agencies must avoid significant impacts to floodplains if a practical alternative exists. Longitudinal encroachments will be minimized on this project. One longitudinal crossing would occur with both Build Alternatives. There are no practical alternatives that would avoid longitudinal crossings of floodplains, and total avoidance was not possible. The selection or location of other build alternatives in other areas of the corridor would cause greater impacts by encroachment and greater right-of-way acquisition associated with wider typical sections and new construction.

Reviews of Floodplain Insurance Rate Maps supplied by FEMA indicate that Alternative A and Alternative B each cross two floodplains within the project area. The floodplains are associated with Fall Creek and the Sougans Branch of Fall Creek. Table **4.9.3** shows the floodplain acreage impacted by each Alternative. These floodplains are located adjacent to SR 126 (Memorial Boulevard) in the eastern sections of the project as identified in **Figure 4.9.2**. The total number of acres impacted is less than five acres. Encroachments upon the floodplains have been minimized by remaining as close to the existing roadway as possible.

TABLE 4.9.3: FLOODPLAIN IMPACTS

Area	Alternative A	Alternative B
Total Area of land within the 2,000-foot Corridor	2100 acres	2100 acres
Impacted Floodplains within the Corridor	4.0 acres	3.2 acres

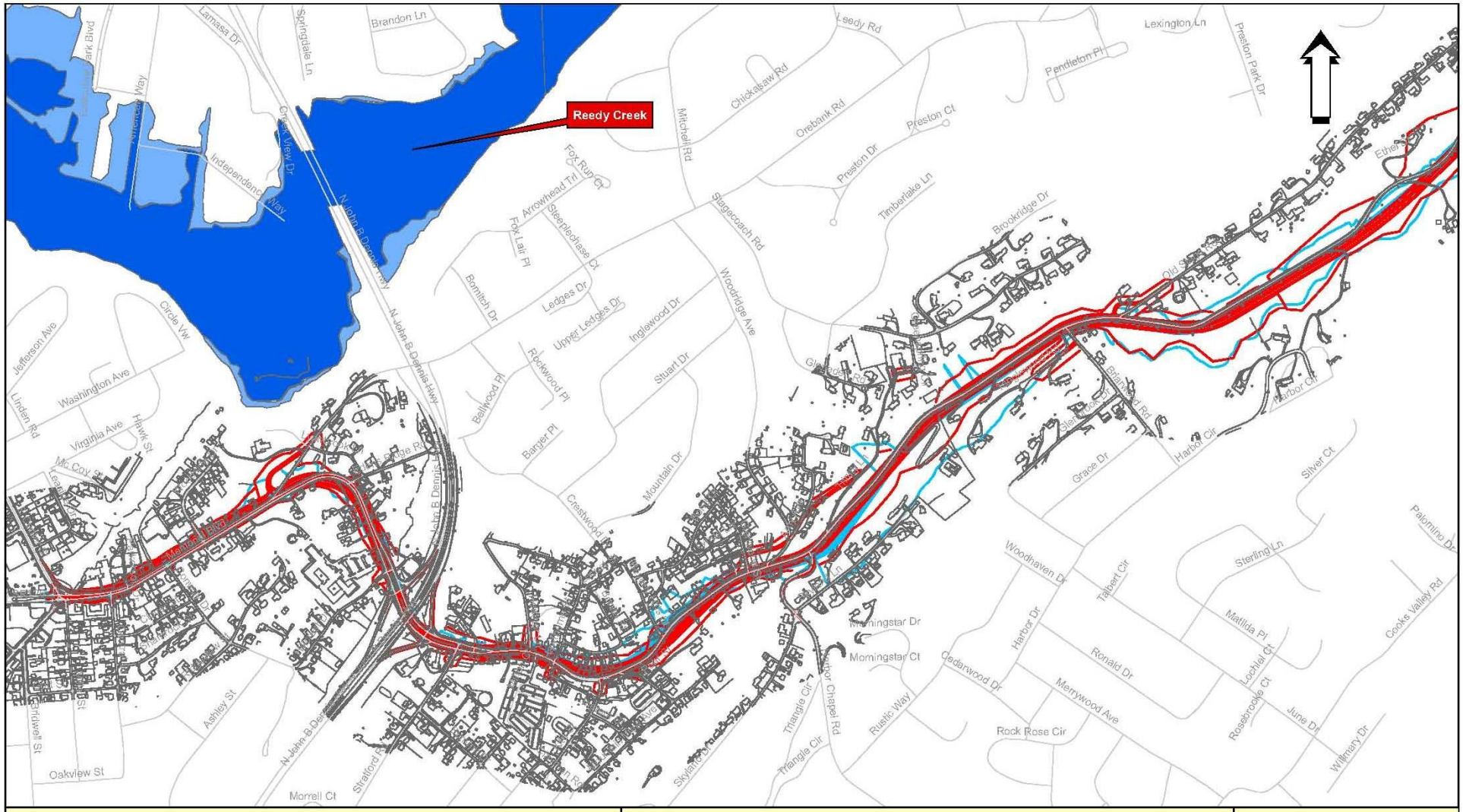
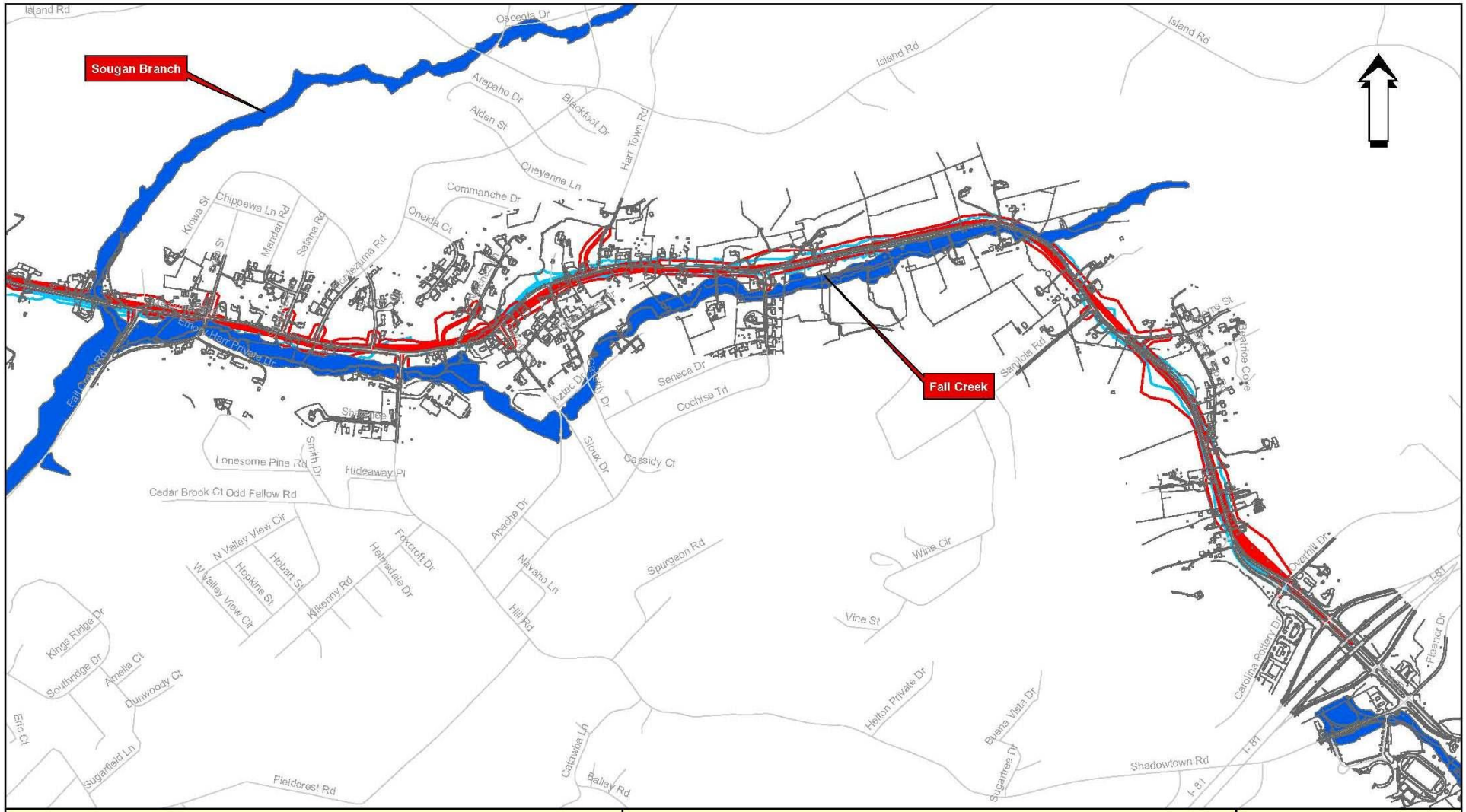


FIGURE 4.9.2: FEMA FLOODPLAINS (1 OF 2)



Legend

Alternative A — 100 Year Floodplain

Alternative B — 500 Year Floodplain

~~Figure 4.5.2~~
FEMA Floodplain Impacts
100 Year and 500 Year Floodplains

0 700 1,400 2,800 4,200 5,600 Feet

Sullivan County
SR 126
Alternatives A and B

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FIGURE 4.9.2: FEMA FLOODPLAINS (2 OF 2)

Minimization of Floodplain Impacts

The project will be designed to minimize floodplain impacts as required by the Federal Highways Administration procedures in 23 CFR 650A. Impacts will be minimized through the use of a perpendicular roadway design aimed at reducing fill and/or structures within the floodplain. The floodplain crossing will be designed so that the following criteria are met:

- There is no potential for interruption or termination of the transportation facility that is needed for emergency vehicles or provides the communities' only evacuation route due to the construction of the project
- The water crossings will convey floodwaters so there will be no increase in flooding due to the encroachment in the floodplain
- The Build Alternatives will have no substantial adverse impacts on the natural and beneficial floodplain values

The proposed project will not have a substantial impact on the 100 year floodplain.

Water Quality Permits

Alteration Permitting:

Entities that propose to construct projects that alter a stream, river, or lake must first obtain a water quality permit. Physical alterations to properties of waters of the State require an Aquatic Resource Alteration Permit (ARAP) or a Section 401 Water Quality Certification. Alterations to waters of the U.S. require either a Section 404 Nationwide or Individual Permit from the U.S. Army Corps of Engineers (USACE) and, where applicable, a 26a permit or letter of no objection from the Tennessee Valley Authority (TVA).

State Permits Required for Stream Impacts:

A *General NPDES Permit for Discharges of Stormwater Associated with Construction Activities* will be required for the proposed project. This permit is issued by the Tennessee Department of Environment & Conservation (TDEC), Division of Water Pollution Control pursuant to the federally-promulgated National Pollutant Discharge Elimination System (NPDES) program. The permit requires a Stormwater Pollution Prevention Plan (SWPPP) detailing the erosion prevention and sediment control practices designed to minimize sediment-laden stormwater run-off during precipitation events. One or more Aquatic Resource Alteration Permits (ARAP) under Section 401 of the Clean Water Act will be required for the proposed project. The stream crossings will require either a General Permit or Individual Permit under the ARAP program administered by TDEC. The type of permit issued will be determined after the significance of the impacts to the streams is reviewed by TDEC.

Federal Permits Required for Stream Impacts:

One or more permits under Section 404 of the Clean Water Act will be required for the proposed project. The crossing of streams will require either a Nationwide Permit or Individual Permit under the federal permit program administered by the U.S. Army Corps of Engineers (USACE). The type of permit issued will be determined after the significance of the impacts to the streams is reviewed by the USACE. A Tennessee Valley Authority Section 26a Permit will be required for the proposed stream crossing in Sullivan County

4.9.3 Impacts to Threatened and Endangered Species

Reviews of records, surveys, and responses received from federal and state agencies that monitor the status of threatened and endangered species have indicated that no such species would be impacted by the proposed project.

Although the Indiana Bat is not known to occur in the project area, at the request of the United States Fish and Wildlife Service (USFWS), a bat survey was conducted for this federally listed endangered species. Mist nets and field reviews were conducted in the project impact area. No Indiana Bats were located. A copy of the *Indiana Bat (Myotis sodalis) Mist Net Survey*, dated October 2011, is on file at the TDOT Environmental Division Office in Nashville, TN. The USFWS has concurred with a "not likely to adversely affect" finding concerning the Indiana Bat. However, to further minimize potential for harm to the Indiana Bat, trees with a diameter at breast height of five inches or greater will not be removed from October 15 through March 31.

Based on the best information available at this time, the requirements of Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. The USFWS response letters are contained in **Appendix C**.

Additional Protective Acts for Migratory Birds:

During the research of potential threatened and endangered species for the project corridor, bald eagles were cited as a species known to exist in Sullivan County. Field surveys did not identify either bald eagles or nests. If this species was to locate within the project APE at any time, including the construction phase, they would be protected under the US Migratory Bird Treaty Act (MBTA) and the US Bald and Golden Eagle Protection Act.

The MBTA (1918) was implemented for the protection of birds migrating between the U.S. and Canada. Under the Act, it is illegal for people to "take" migratory birds, their eggs, feathers or nests. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. "Take" is defined in the MBTA "to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof."

The US Bald and Golden Eagle Protection Act offers additional protection to all bald and golden eagles. Bald eagles may not be taken for any purpose unless the Secretary of the Interior issues a permit prior to the taking. At this time, no mitigation measures are required. A copy of the Ecological Study prepared for this project is on file at TDOT's Environmental Division Office in Nashville, TN.

Impacts to State-Listed Species:

Reviews of records, field trips and responses from state agencies that monitor the status of state-listed species of plants and animals indicate that no impacts are anticipated for listed species in Sullivan County. The species list is contained in **Chapter 3**. The species of concern have been identified historically in Sullivan County, but no recent identifications are evident in the project area.

Invasive Species Impacts:

Executive Order 13112 was enacted to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.

The potential for introducing additional exotic or invasive species to the natural and farmed plant communities in the project area is remote. Habitat fragmentation has already resulted in the establishment of these organisms in the region. Additional fragmentation of habitat and soil disturbance could create more favorable conditions for the existing non-native species. These impacts will be minimized by planting native vegetation on cut and fill slopes and in the medians of the selected Build Alternatives.

4.10 AIR QUALITY IMPACTS

SR 126 (Memorial Boulevard) in Sullivan County is in an attainment area according to EPA for mobile source air pollutants. The project is included in Section A of the Kingsport Metropolitan Planning Organization's (MPO) 2011-2014 Transportation Improvement Program (TIP), as adopted October 2010. The project was previously included in the conforming 2008-2011 TIP.

According to the Tennessee Department of Environment and Conservation, Division of Air Pollution Control, this project is in an area designated as attainment/unclassified for the National Ambient Air Quality Standards (NAAQS), therefore, a transportation conformity determination is not required.

Based upon the analysis of highway projects with similar meteorological conditions and traffic volumes, the carbon monoxide (CO) levels of the subject project will be well below the National Ambient Air Quality Standard (35ppm one-hour and 9ppm eight-hour). Since the project will have levels below this standard and is located in a region of air quality conformity, it was determined that there will be no CO impact on the air quality of the area from the proposed project. This project qualifies as a "project with low potential MSAT effects" in accordance with FHWA's guidance.

A copy of the *Highway Traffic Noise and Air Quality Analysis* Report, as updated in October of 2011, is on file in the TDOT Environmental Division Office in Nashville, TN.

4.10.1 Mobile Source Air Toxics (MSAT)

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents.*"[1] This guidance was superseded on September 30, 2009 by FHWA's "*Interim Guidance Update on Air Toxic Analysis in NEPA Documents.*"[2] The purpose FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSATs) in the NEPA

[1] *Interim Guidance on Air Toxic Analysis in NEPA Documents*, FHWA, February 3, 2006.
http://www.fhwa.dot.gov/environment/airtoxic/020306guidmem.htm

[2] *Interim Guidance Update on Air Toxic Analysis in NEPA Documents*, FHWA, September 30, 2009.
http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm

process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

The qualitative analysis presented below provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The assessment is derived in part from a study conducted by the FHWA entitled *"A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives."*[3] Additional information regarding MSATs is provided at the end of this section.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and,
- Projects with Higher Potential MSAT Effects.

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersegment on a surface street or where design year traffic projections are less than 140,000 to 150,000 AADT.

The Build Alternatives include the widening of SR 126 (Memorial Boulevard). The highest projected design year 2033 AADT on SR 126 is 33,540 and substantially lower than the FHWA criterion. Therefore, the project meets the criteria for a "Project with Low Potential MSAT Effects."

For both the No-Build and Build Alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The estimated VMT for the Build Alternatives are essentially the same as the VMT for the No-Build Alternative. Therefore, it is expected that there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

Additionally, travel speeds for the Build Alternatives are expected to be higher than for the No-Build Alternative. According to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

[3] Claggett, M., et. al., "*A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives,"* Federal Highway Administration, Resource Center.

The additional travel lanes contemplated for the Build Alternatives will have the effect of moving some traffic closer to nearby residences and other sensitive uses; therefore, under the Build Alternatives there may be localized areas where ambient concentrations of MSATs could be higher than under the No-Build Alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts.

In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternatives could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Substantial construction-related MSAT emissions are not anticipated for this project as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the project area.

MSATs Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in **Figure 4.10.1**.

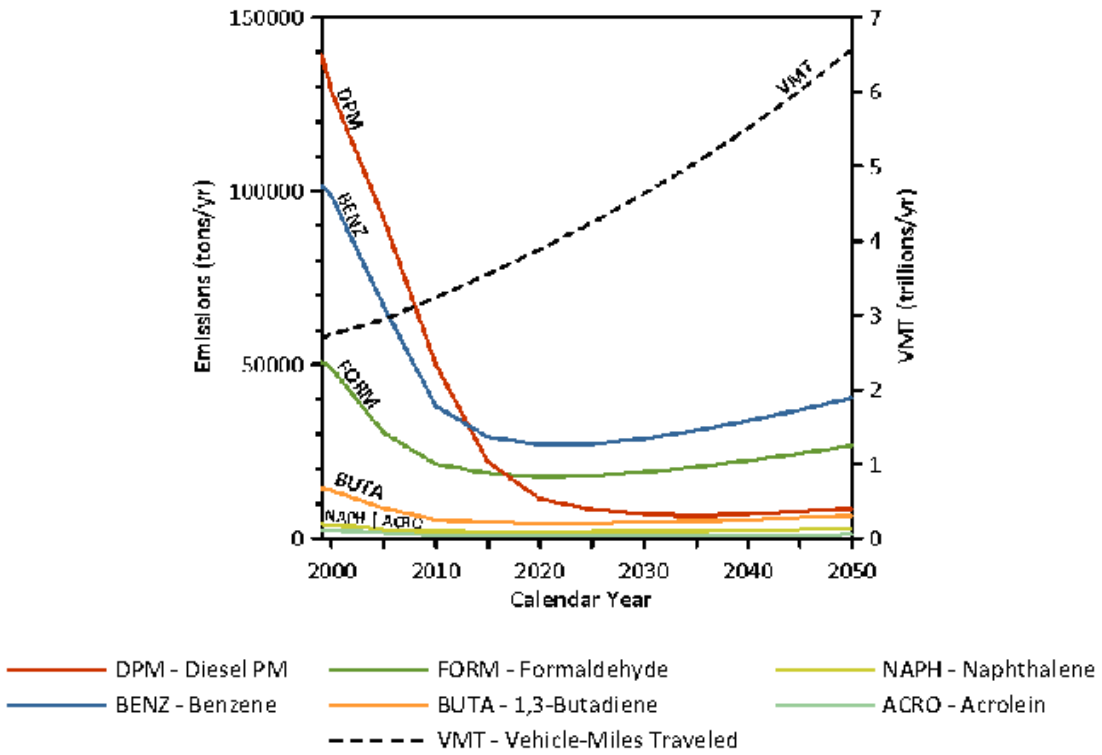


FIGURE 4.10.1: NATIONAL MSAT EMISSION TRENDS 1999 – 2050
FOR VEHICLES OPERATING ON ROADWAYSUSING EPA's MOBILE6.2 MODEL

Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors
Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

Unavailable Information for Project Specific MSAT Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any

genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT

exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

4.10.2 Climate Change

Climate change, also referred to as global warming, is an increase in the overall average atmospheric temperature of the earth due to the trapping of heat in the atmosphere by greenhouse gases. The primary greenhouse gas emitted by human activities in the US is carbon dioxide (CO_2), which represents approximately 85 percent of total greenhouse gas emissions.

Transportation sources contribute to global warming through the burning of petroleum-based fuel. According to the FHWA, transportation sources are responsible for approximately one-quarter of the greenhouse gas emissions in the US. Automobiles and light-duty trucks account for almost two-thirds of emissions from the transportation sector and emissions have steadily grown since 1990.

Emissions from transportation sources depend on the number of trips or miles traveled by each type of vehicle per year, which are, in turn, influenced by larger economic trends and consumer behavior. Over the long term, changes in vehicle fuel efficiency, driving behavior, and fuel type will influence the level of emissions.

Under the Clean Air Act, the EPA has the authority to establish motor vehicle emissions standards for CO_2 and other greenhouse gases although such standards have not yet been established.

FHWA is actively involved in efforts to initiate, contact, and disseminate climate-change-related research and to provide technical assistance to stakeholders. The FHWA is also involved in climate change initiatives with the USDOT Center for Climate Change and Environmental Forecasting.

Climate change and related effects are complex and global in nature. As a result, the impacts of any single transportation project cannot be effectively estimated in terms of global warming effect. However, the emissions changes due to individual projects are very small compared to global emissions.

Once standards are established and guidance for assessing the potential greenhouse gas effects of transportation projects becomes available, a more in-depth assessment rate may be possible.

4.11 NOISE IMPACTS

The noise evaluation for this project was conducted in accordance with Federal guidance for handling noise impacts and abatement contained in 23 Code of Federal Regulations (CFR) Part 772, “Procedures for Abatement of Highway Traffic Noise and Construction Noise” and the Tennessee Department of Transportation’s Policy on Highway Traffic Noise Abatement, effective July 13, 2011. A copy of the *Highway Traffic Noise and Air Quality Analysis Report* (updated October 2011) for SR 126 (Memorial Boulevard) is on file in the TDOT Environmental Division Office in Nashville, TN.

4.11.1 Fundamentals of Sound and Noise

The intensity or loudness of sound is measured in units called decibels (dB). However, because the human ear does not hear sound waves of different frequencies at the same subjective loudness, an adjustment or weighting of the high-pitched and low-pitched sounds is made to approximate how an average person hears sounds. When such adjustments to the sound levels are made, they are called “A-weighted levels” and are labeled “dBA.” **Figure 4.11.1** shows some common indoor and outdoor sound levels.

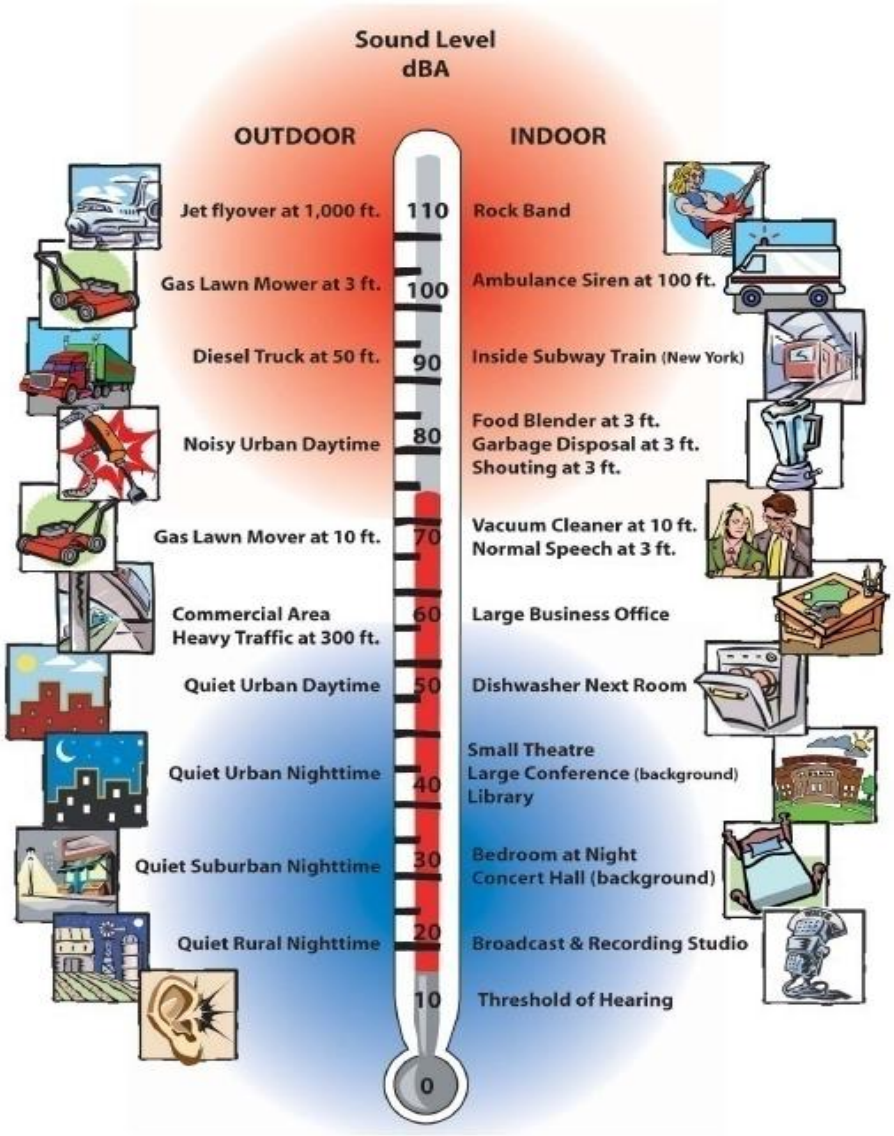


FIGURE 4.11.1: COMMON INDOOR AND OUTDOOR NOISE LEVELS

Noise is defined as unwanted sound. Since highway traffic sound is normally unwanted, it is usually called highway traffic noise. The level of highway traffic noise is never constant; therefore, it is necessary to use a statistical descriptor to describe the varying traffic noise levels. The equivalent continuous sound level (L_{eq}) is the statistical descriptor used in a noise impact analysis. The L_{eq} sound level is the steady A-weighted sound level, which would produce the same A-weighted sound energy over a stated period of time.

4.11.2 Criteria for Determining Impacts

FHWA regulations establish Noise Abatement Criteria (NAC) that must be used by states to determine if noise-sensitive land uses will be impacted by a project.

The regulations state that noise mitigation should be evaluated for any receptor or group of receptors where predicted traffic noise levels, using future traffic volumes and roadway conditions, approach or exceed the NAC shown in **Table 4.11.1.**

Traffic noise is considered to "approach" a criterion at a level of 1 dBA less than the criterion (e.g., 66 dBA for Category B receptors).

The FHWA regulations and TDOT's noise policy also define impacts to occur if there is a substantial increase in design year sound levels over existing sound levels. **Table 4.11.2** presents TDOT's criteria to define substantial noise increase.

4.11.3 Determination of Existing Sound Levels

Noise measurements were conducted at several noise-sensitive land uses in the project area to characterize the existing noise environment. Existing peak hour sound levels at the measurement locations range from 44 to 66 dBA.

4.11.4 Determination of Future Sound Levels

Sound levels for the No-Build Alternative are predicted to be 1 to 3 dB higher than existing sound levels depending on location.

Noise modeling of Build Alternatives A and B was completed using the FHWA Traffic Noise Model (TNM 2.5) computer program. The program calculated design year 2033 sound levels at the noise-sensitive land uses in the project area.

4.11.5 Noise Impact Evaluation

As noted previously, a location is impacted if 1) the predicted worst hour noise level approaches or exceeds the NAC or 2) there is a substantial increase in design year noise levels above existing noise levels.

TABLE 4.11.1. FHWA NOISE ABATEMENT CRITERIA IN 23 CFR 772

Activity Category	L_{Aeq} (1h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(1)	67	Exterior	Residential.
C(1)	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structure, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structure, radio studios, recording studios, schools, and television studios.
E(1)	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D, or F.
F	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	---	Undeveloped lands that are not permitted.

(1) Includes undeveloped lands permitted for this activity category.

TABLE 4.11.2: SUBSTANTIAL NOISE LEVEL INCREASE

Existing Noise Level (dBA) (1)	Subjective Descriptor
42 or less	15 or more
43	14 or more
44	13 or more
45	12 or more
46	11 or more
47 or more	10 or more

Design year sound levels for the Build Alternative are predicted to be 1 dB to 8 dB higher than existing sound levels. These increases are not substantial in accordance with TDOT's Noise Policy. Therefore, none of the land uses are predicted to be impacted by a substantial increase in sound level.

Design year sound levels at most receivers are predicted to be less than the NAC for both Alternatives A and B. However, 35 residences are predicted to be impacted under Alternative A with design year sound levels of 66 dBA or higher. Similarly, 45 residences are predicted to be impacted under Alternative B.

The increased number of impacts under Alternative B is primarily the results of fewer takes under Alternative B due to a narrower right-of-way. The taking of fewer properties leaves some residences in close proximity to SR 126 (Memorial Boulevard).

A copy of the *Highway Traffic Noise and Air Quality Analysis Report* (updated October 2011) for SR 126 (Memorial Boulevard) is on file in the TDOT Environmental Division Office in Nashville, TN.

4.11.6 Noise Abatement Evaluation

Abatement is generally evaluated when impacts are predicted to occur. Noise barriers were evaluated to reduce sound levels for impacted land uses. In order for noise barriers to be included in a project, they must be determined to be both feasible and reasonable in accordance with TDOT's Noise Policy.

Feasibility means that the construction of a barrier would not be anticipated to pose any major design, construction, maintenance, or safety problems that the barrier would reduce traffic noise levels for the majority of the impacted first-row receptors.

SR 126 (Memorial Boulevard) is not a limited access facility. In fact, of the 35 impacted residences under Alternative A, 29 have direct driveway access to SR 126 (Memorial Boulevard). Similarly, of the 45 impacted residences under Alternative B, 40 have direct driveway access to SR 126 (Memorial Boulevard). Noise barriers are not feasible to mitigate impacts at these residences because a noise barrier would limit access from these properties and adjacent properties.

The remaining impacted residences under both Alternatives are isolated from other impacted residences. Noise barriers for these residences would not be reasonable since the required area per benefited residence will greatly exceed the allowable area for benefited residence.

As a result, noise barriers were determined not to be feasible or reasonable for this project.

4.11.7 Information for Local Officials

There are tracts of undeveloped land adjacent to SR 126 (Memorial Boulevard). TDOT encourages the local governments with jurisdiction over these lands, as well as potential developers of these lands to practice noise compatibility planning in order to avoid future noise impacts. The following language is included in TDOT's noise policy:

> *"Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized."*

Two guidance documents on noise compatible land use planning are available from FHWA and can be found at: http://www.fhwa.dot.gov/environment/audible/index.htm and http://www.fhwa.dot.gov/environment/noise/quietzon.

Table 4.11.3 presents design year sound levels for areas along SR 126 where vacant and possibly developable lands exist. Noise predictions were made at distances between 100 and 400 feet from the centerline of the closest travel lane for the design year. As indicated, sound levels within approximately 100 feet of the centerline of the closest travel lane of SR 126 will approach or exceed the NAC of 66 dBA. Noise-sensitive land uses should generally not be constructed in these areas unless noise mitigation measures are provided.

TABLE 4.11.3: DESIGN YEAR 2033 SOUND LEVELS FOR UNDEVELOPED LANDS

Distance from SR 126 (1)	L_{eq} (1h) (dBA)(2)
100 feet	66
200 feet	62
300 feet	57
400 feet	53

(1) Perpendicular distance to the center of near lane. (2) At-grade scenario.

These values do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels will vary with changes in terrain and will be affected by the shielding of objects such as buildings. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels.

Finally, TDOT currently has an active Type II Noise Barrier Program to facilitate the construction of "retrofit" noise barriers along existing highways. To be eligible for a Type II noise barrier, an area must meet the following criteria:

- The neighborhood must be located along a limited-access roadway;
- The neighborhood must be primarily residential;
- The majority (more than 50%) of residences in the neighborhood near the highway pre-dated the initial highway construction;
- A noise barrier for the neighborhood must not have been previously determined to be not reasonable or not feasible as part of a new highway construction or through-lane widening study (Type I project);
- Existing noise levels measured in the neighborhood must be above the Noise Abatement Criteria (NAC) of 66 dBA;
- A barrier must be feasible to construct and will provide substantial noise reduction; and,

- A barrier must be reasonable (barrier cost per benefitted residence) in accordance with TDOT's noise policy. A residence is considered "benefitted" if the noise barrier will reduce the traffic noise by at least 5 dB.

4.11.8 Construction Noise

It is expected that TDOT's construction specifications will apply to this project. As a result, construction procedures shall be governed by the *Standard Specifications for Road and Bridge Construction* as issued by TDOT and as amended by the most recent applicable supplements. The contractor will be bound by Section 107.01 of the Standard Specifications to observe any noise ordinance in effect within the project limits. Detoured traffic shall be routed during construction so as to cause the least practicable noise impact on noise-sensitive areas.

4.12 HISTORIC IMPACTS

In compliance with the requirements of Section 106 of the National Historic Preservation Act of 1966 and the implementing regulations 36 CFR 800, the Cultural Resource survey conducted for the project identified one National Register of Historic Places (NRHP) listed property and one NRHP eligible property within the established Area of Potential Effect (APE).

Yancey's Tavern is located on the northern side of State Route 126 (Memorial Boulevard) on Chestnut Ridge Road (See **Figure 4.12.1**). Yancey's Tavern was listed in the NRHP in 1972 under Criterion A for its significance in the early settlement of Sullivan County. It was an important stop along the Island Road, the major artery in upper East Tennessee. A five acre boundary surrounding the Tavern was established in 1972.

The current alignment of State Route 126 (Memorial Boulevard) is located south of Yancey's Tavern and is separated from the main roadway by land and Chestnut Ridge Road. With Alternative A, the proposed widening from two lanes to four lanes with a median, curbs and gutters, and sidewalks will not take any land from the Yancey's Tavern property. However, the widening will introduce a roadway that is out of scale with the historic setting and will introduce an adverse visual impact to the historic property. Alternative B also does not take any land from the Yancey's Tavern Property. Alternative B includes retaining walls and a narrower roadway cross section with fewer lanes in this area in an effort to minimize impacts to Yancey's Tavern and East Lawn Memorial Gardens Cemetery, which is located across SR 126 (Memorial Boulevard) from the tavern. The State Historic Preservation Office (SHPO) has reviewed the project and in a letter dated November 3, 2008 stated that an adverse visual effect to Yancey's Tavern would occur if either Build Alternative was selected (SHPO letter is contained in **Appendix B**). On February 26, 2010 the SHPO advised that, under 36 CFR 800, the Advisory Council on Historic Preservation (ACHP) should be consulted regarding this adverse effect.

Upon receiving written notification and information regarding the adverse affect to Yancy's Tavern, the ACHP responded that there is no need for their participation to resolve the adverse effect. The ACHP correspondence, dated February 18, 2011, also noted that supporting documentation along with the final Memorandum of Agreement (MOA), developed in consultation with the SHPO, and any other consulting parties, must be filed with the ACHP in accordance with 36 CFR 800.6(b)(1)(iv) and Section 106 of the National Historic Preservation Act. The MOA will be prepared and signed prior to approval of the Final Environmental Impact Statement. The ACHP correspondence is located in **Appendix B**.

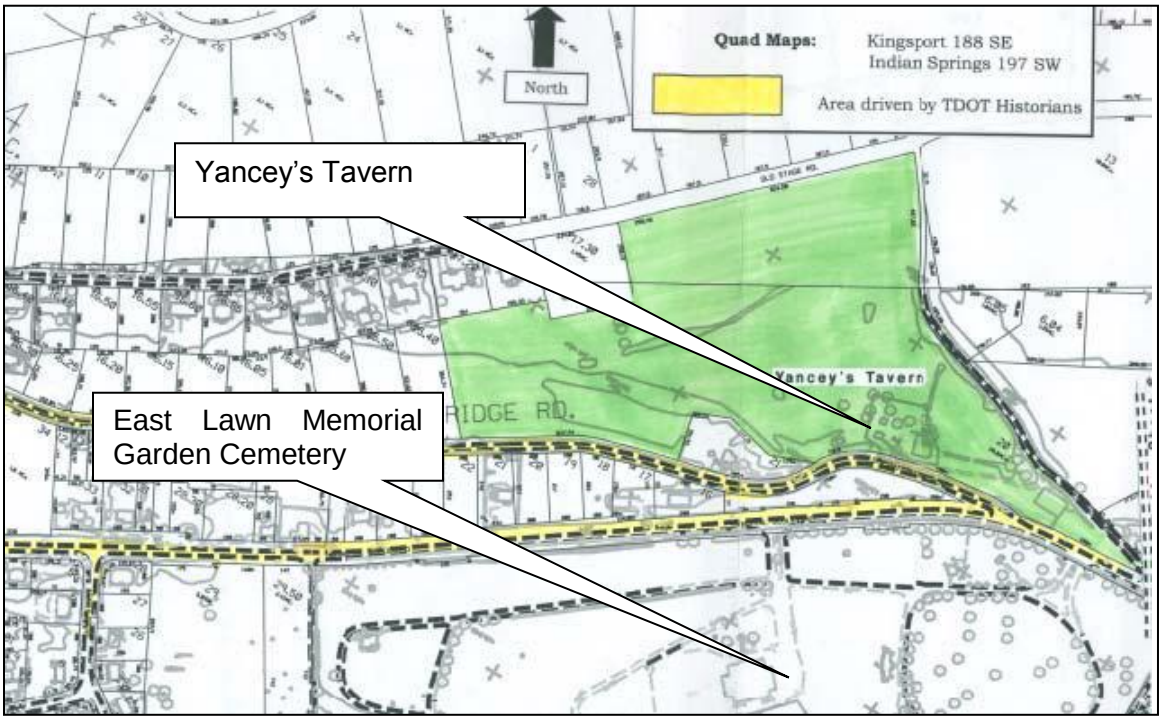


FIGURE 4.12.1: YANCEY'S TAVERN

A second historic property, the Shipley-Jarvis House, is located on the south side of SR 126 (Memorial Boulevard) near the beginning of the project in a residential and commercial sector of Kingsport. The Shipley-Jarvis House has been determined to be eligible for listing in the National Register of Historic Places.

The Shipley-Jarvis House exemplifies the adaptation of nineteenth century dwellings to conform to twentieth century architectural tastes. The house is in excellent condition and is a good example of Colonial Revival Architecture. The Colonial Revival style was popularized in the 1880's and became the dominant style for domestic building for the first half of the twentieth century.

The Shipley-Jarvis House is a good example of the evolution of architectural styles that blends early styles with modern feature. Its architectural features continue to illustrate both ninetieth century building methods and twentieth century stylistic changes. The Shipley-Jarvis House was determined eligible for listing in the NRHP under Criterion C for its architectural style.

The proposed widening of the roadway in front of the Shipley-Jarvis House will not acquire any right-of-way from the property. It has been determined that the proposed project will have an effect that is not adverse to this property. No mitigation is required. The SHPO concurred in this finding in a letter dated November 3, 2008 (SHPO letter is contained in **Appendix B**.)

To learn more about these listed or eligible National Register properties, facts about Section 106 of the National Historic Preservation Act, and National Register Criteria, copies of the Historical and Architectural Survey and Documentation for Effect Under 36 CFR 800 Evaluation reports are available for viewing in TDOT's Environmental Division Office in Nashville.

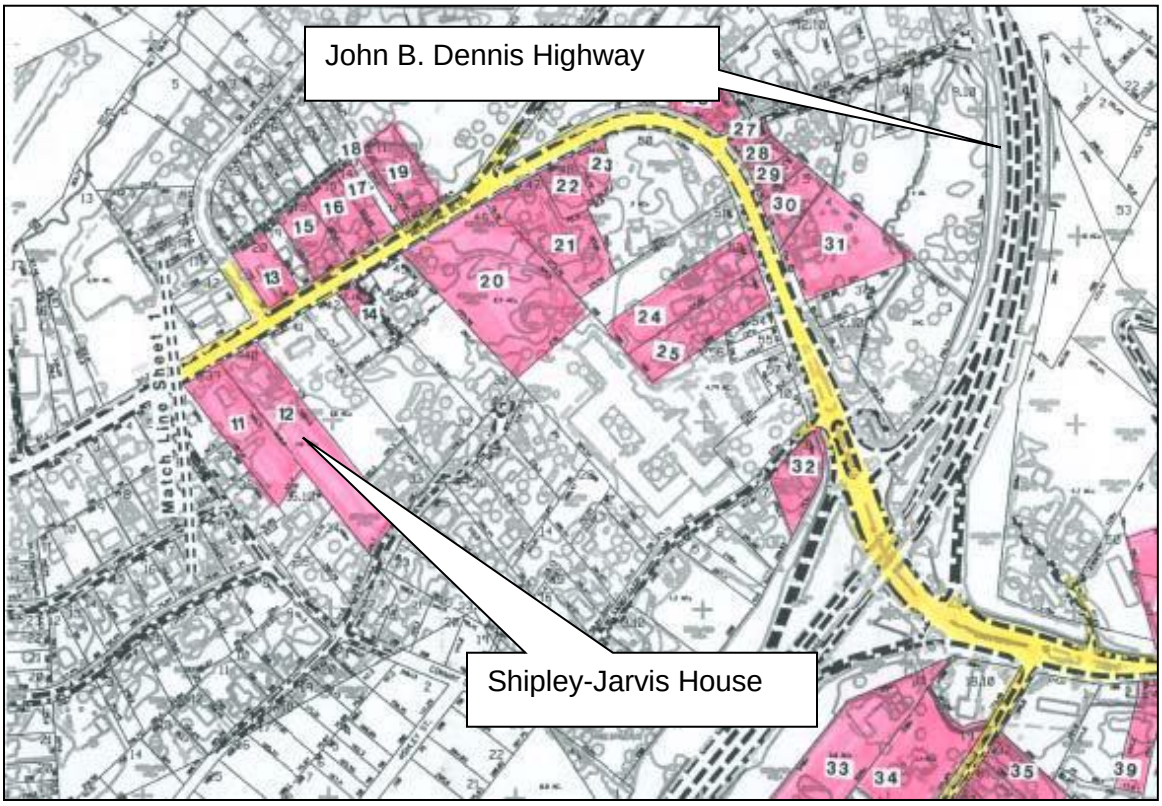


FIGURE 4.11.2: SHIPLEY-JARVIS HOUSE

4.13 ARCHAEOLOGICAL ASSESSMENT

A Phase I Cultural Resources Survey for the proposed improvements to SR 126 (Memorial Boulevard) has been completed. The purpose of the archaeological survey was: to identify and evaluate any archaeological resources (excluding standing structures) located within the area of potential effect that were listed or potentially eligible for listing on the National Register of Historic Places (NRHP) pursuant to the criteria set forth in 36 CFR 60.4; to assess the effects of the proposed construction on such resources; and to provide recommendations for further archaeological resource management decisions in compliance with Section 106 of the National Historic Preservation Act.

The results of the archaeological surveys identified four sites within or adjacent to the proposed build alternatives.

40SL412 is a late 19th-early 20th century farmstead site with a small prehistoric component. The site contains information that could be important to understanding life in rural Sullivan County in the late 19th-early 20th centuries.

40SL413 is a prehistoric lithic scatter that has a high potential for intact deposits below the plowzone. Since there are not many prehistoric sites along the corridor, the SHPO agreed this one is potentially eligible.

40SL419 is the archaeological component of the already NR-listed Yancey's Tavern property, including both historic and prehistoric components. The historic component was determined eligible and the prehistoric component was determined potentially eligible. The prehistoric component lies inside the area of the barn, Eaton Station Road, and SR 126 (Memorial Boulevard).

40SL421 is a small historic house site with a surviving stone-lined cellar and a brick-lined cistern, both situated on a rocky rise between the current SR 126 (Memorial Boulevard) and one of its earlier roadbeds. Probable dates for the structure range from between 1854 and 1939.

The proposed Build Alternatives have been modified to avoid impacting these sites. The SHPO has reviewed the revised project area, and in a letter dated July 14, 2010 stated the project as presently proposed contains no archaeological resources eligible for listing in the National Register of Historic Places. (SHPO letter is included in **Appendix B**)

Native American Consultation

A Section 106 consultation notice was sent to the following federally recognized tribes for Sullivan County. An asterisk indicates a response was returned. No culturally sensitive or sacred sites were identified. Each responding tribe requested to be notified in the event of an inadvertent find.

- Eastern Shawnee Tribe of Oklahoma*
- Muscogee (Creek) Nation*
- Eastern Band of Cherokee Indians*
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Seminole Nation of Oklahoma
- United Keetowah Band of Cherokees
- Quapaw Tribe of Oklahoma
- Thlopthlocco Tribal Town, Oklahoma

Since the initial consultation with the Native American Tribes, two (2) additional tribes have been recognized, The Cherokee Nation and the Shawnee Tribe. Consultation with these additional Native American Tribes will be completed prior to submittal of the FEIS.

If archeological material is uncovered during construction, all construction will cease in that area and the Tennessee Division of Archaeology and the recognized Native American Tribes will be contacted so a representative can have the opportunity to examine and evaluate the material. A copy of the Archaeological Survey is on file at TDOT Environmental Division office in Nashville.

4.14 SECTION 4(F) EVALUATION

4.14.1 Section 4(f) Finding

Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966 Section 6009, requires federal aid projects to include special efforts to preserve the natural beauty of the countryside, public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Approval of projects that have the potential to impact any of these resources can be made only if the following conditions are met:

1. There is no feasible or prudent alternative to the use of land from the property; and
2. The action includes all possible planning to minimize harm to the property resulting from use.

> The purpose of **Section 4(f)** is to preserve publicly owned land from a public park, recreation area, wildlife or waterfowl refuge, or significant historic site from being used for a transportation project. It requires consideration of avoidance or mitigation of damages.

There are two historic sites within the project study corridor. The Build Alternatives as presently proposed will not take property from either site. There are no public parks, recreation lands, wildlife or waterfowl refuges in the project impact area. No Section 4(f) resources will be impacted by the proposed Build Alternatives.

4.15 SECTION 6(F) LAND AND WATER CONSERVATION ACT

No Section 6(f) funds have been appropriated in the project impact area.

4.16 HAZARDOUS MATERIAL IMPACTS

Hazardous materials are substances that have, or will have when combined with other materials, a harmful effect on the human and natural environment. Hazardous materials are primarily regulated under the Federal Resource Conservation and Recovery Act (RCRA) of 1976, as amended, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980; and the Superfund Amendments and Reauthorization Act (SARA) of 1986.

A broad hazardous materials study was conducted for this project in 2007/2008. The results of the study were based on visual inspection and documentation of state and federal agencies. Agencies whose records were reviewed included the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation, Division of Underground Storage Tanks (DUST) and Division of Solid and Hazardous Waste Management.

The National Priorities List (NPL) is a federal list of sites subject to cleanup directed by the EPA. These sites are part of the national Superfund program. The NPL revealed no NPL in the proposed project impact area.

The Comprehensive Environmental Response and Liability Act Information System (CERCLIS) is also part of the national Superfund program. Inclusion in CERCLIS is the first step in the ranking of potentially hazardous sites to determine whether they meet the criteria for inclusion in the NPL. There are no active CERCLIS sites within the project area.

Superfund also has an archive designation. The "archive status" means that assessment at a site has been completed and the EPA has determined no steps will be taken to designate the site as a priority by listing it on the NPL. There are no super fund sites in the project impact area.

4.16.1 Hazardous Materials

A Phase I Environmental Site Assessment (ESA) was conducted in accordance with the scope and limiting conditions set forth in the American Society for Testing and Materials (ASTM) practice 1527. Recognized Environmental Conditions (RECs) were identified for properties within, or adjacent to, the proposed right-of-way limits of the Build Alternatives under consideration in this document.

The goal of this Assessment was to determine the potential presence of aboveground and/or underground storage tanks, hazardous wastes or materials, solid and special wastes and areas of potential hazardous waste concerns which may pose a threat to human health and/or the environment. The results of the Phase I ESA were utilized to determine the need for Phase II Site Assessments.

The project team worked within a two thousand (2,000) foot wide corridor, one thousand (1,000) feet from either side of the existing centerline of SR 126 (Memorial Boulevard). A total of one hundred and eleven (111) sites were investigated in this Phase I ESA. Records searches and field inspections were combined to determine the existence of underground storage tanks (USTs), above ground storage tanks (ASTs) and other known and unknown sources of potentially hazardous materials.

In the Phase I ESA, a state and federal database search was conducted in March, 2008 and identified a total of nine (9) potentially Recognized Environmental Conditions (pRECs) located in the two thousand (2,000) foot wide study corridor of the proposed project. After a thorough review of the files, an on-site field reconnaissance, literature search, and conversations with officials from TDEC in Nashville and Johnson City, it was determined that three (3) sites were of sufficient concern to warrant a recommendation for Phase II testing.

4.16.2 Properties with Potentially Recognized Environmental Concerns

<u>1. Station 5-0111; 3717 Memorial Boulevard, Kingsport, TN 37663</u>

This site, just north of John B. Dennis Parkway, is currently not a hazardous waste concern. It was reported in 1991 to have had a leaking underground storage tank (LUST). The site is currently active, but past concerns appear to have been mitigated. No further environmental concerns appear to exist.

FIGURE 4.16.1: GAS STATION NEAR THE JOHN B. DENNIS HIGHWAY

2. Fuel and Convenience Store; 4001 Memorial Boulevard, Kingsport, TN 37664

This UST site is an active gasoline/convenience mart. A total of five gasoline tanks are located at this site. Two are in use and three are permanently out of use. The three inactive tanks showed no signs of leakage via stains, oil sheens or odors during field visits. The database records search indicates that no tank or pipe leakages have been reported.

The site's two active 12,000 gallon fuel tanks feature composite construction of steel with FRP. No leakages were evident during the visual walkthrough and none were reported in the database records search. An automotive tank gauge is used for inventory control and piping is flexible plastic.

Although the field visit and the search results indicate that no environmental concerns were evident, it is recommended that a detailed Environmental Site Assessment be conducted. This will ensure that no leakages of the out of service tanks are occurring or will occur prior to construction of the project.

FIGURE 4.16.2: GAS STATION AT 4001 MEMORIAL BOULEVARD

3. Pool and Spa Supplies Store; 3933 Memorial Boulevard, Kingsport, TN 37664

This UST-reported site is currently occupied by a retail Pool and Spa store. An interview was conducted with the owner in November 2007 during the field trips. The project construction limits do not require a total acquisition of this site. The search indicated that a 1000 gallon UST for gasoline was once located on this site. Tank leak detection was listed in the report. Conversations with the owner indicate that the tank was removed approximately 20 years ago. Paperwork documenting the removal is located at this site. No vent pipes or other signs associated with gasoline USTs were evident at this site.

4. Gas Station; 5001 Memorial Boulevard, Kingsport, TN

This inactive UST site is located adjacent to SR 126 (Memorial Boulevard). The search indicated that three USTs are located on the site. Tank leak detection is listed for all three of the tanks. However an interview with the current owner indicated that the tanks were removed.

The current business occupying the site is an upholstery and fabric store. An interview with the Director of the Sullivan County Emergency Management Agency, confirmed that the tanks have been removed. According to the current occupant the tanks were removed approximately 25 years ago.

Although the site does not appear to present an environmental concern in relation to the project, a vent pipe was detected in the front, right corner of the building. If a Build Alternative requires partial or full acquisition of this property, it is recommended that further investigations be conducted to ensure that proper removal has been completed at the site.

FIGURE 4.16.3: FORMER GAS STATION AT 5001 MEMORIAL BOULEVARD – EVIDENCE OF TANK REMOVAL

5. Dry Cleaning Service; 3200 Memorial Boulevard, Kingsport, TN 37660

This site was identified as a Resource Conservation and Recovery Act (RCRA), and FINDS (Facility Index System) site. Drycleaners produce ignitable waste. The Tennessee Department of Environment and Conservation (TDEC) records database indicated that there are no concerns associated with this site.

Any substances used for dry cleaning are contained within the building. The walking inspection of the site indicated no leakages or stains, and no odors were evident. This site is located near the western terminus of the project in an urban setting. The removal of the dry cleaning facility could pose a minor environmental concern due to ignitable waste and warrants further evaluation.

6. Pipe & Muffler Repair Service; 3310 Memorial Boulevard, Kingsport, TN 37664

This automobile repair facility is a former full service gasoline station. Conversations with the owner indicate that the gasoline tanks have been removed. At this time, the site does not appear to present environmental concerns for the project. The field visit did not indicate the presence of ASTs, USTs, hazardous waste, stains or signs of leakage on the premises. No environmental concerns appear to exist for this site.

7. Market and Deli; 5121 Memorial Boulevard, Kingsport, TN 37664

This is an active site. Database reports and field visits indicate that two gasoline tanks are located on this site and both are currently in use. Each tank is a fiber reinforced plastic tank, asphalt coated and the interiors are lined. The pipe materials also consist of nonpressurized fiberglass reinforced plastic material. No leaks have been detected and no environmental concerns have been reported in relation to this site.

An inactive kerosene tank was reported as leaking in the past. A fourth tank, a 2000 gallon diesel tank, was identified, but no tank leaks were reported or evident. The field trip did not reveal any stains, oil slicks or other visual signs of contamination associated with leaks. The site is located east of any anticipated construction activities. Further investigation is recommended if future alignments shift to the east to ensure that the kerosene leak has either been mitigated or is avoided.

FIGURE 4.16.4: MARKET AND DELI AT 5121 MEMORIAL BOULEVARD

8. Unnamed Construction Site; SR 126 (Memorial Boulevard adjacent to 5234 Memorial Blvd.), Kingsport, TN 37664

This is an unreported site. Reviews of the project plans indicate that only a portion of the property near the front would be affected by the project. This area does not appear to be included in the area where debris was noticed.

Field visits revealed that tires, vehicles, and junk are scattered throughout most of the site, but not the front area. Trucks and construction equipment are visible, and conversations with area residents indicated that a potential landfill exists. The materials in the fill could include tires and potential automotive fluids including fuel, oil and other materials associated with vehicles. The site was chained and inspections were limited to views from a property on the eastern perimeter of the property and from the roadway.

If alignment changes are made and the proposed new roadway is shifted to the north, minor environmental concerns for the project might occur. Information pertaining to the owner is available and was provided for TDOT in the Hazardous Materials/Underground Storage Tank technical study; however, the speculative nature of the materials at the site means that photographs that would identify the site and specific information will not be published in this document.

9. Auto Repair; 5637 Memorial Boulevard, Blountville, TN 37617

This is a former gasoline station that has re-opened since the field study was conducted. It currently provides automobile service, but does not supply automobile fuel. Current plans indicate that a partial acquisition of the property would avoid all areas associated with hazardous materials. If the plans change or a total acquisition is required, this site might present environmental concerns, and a Phase II ESA investigation could be necessary.

The field visit and walking inspection of the site revealed three rusting 55 gallon drums labeled "used antifreeze" in the side lot on the west side of the building. The drums were sealed, almost filled, and no leakage was evident in the gravel underneath the drums or on the surfaces of the drums themselves. An above ground storage tank (AST) was detected on the back side of the building. The partially filled AST is connected to the structure via a PVC pipe. This AST stored used motor oil. Some spillage was evident on the tank and immediately underneath the tank. A kerosene AST is located on the east side of the building and appeared to still contain some of the kerosene. No leakage was evident.

The garage area has two hydraulic lifts which show evidence of some leakage of hydraulic fluids on the lift posts and the floor area immediately surrounding the posts. It appears that two UST tanks could remain in the ground in the area between the front of the building and SR 126 (Memorial Boulevard), and a vent pipe was detected at the entrance to the facility. In the area just west of the three drums, a small crater was noticed. Next to the small crater was a broken vent pipe. Although no stains were evident, it is likely that an UST could have been removed from this area.

It is likely that one or two USTs are located between the canopies and the area of the property adjacent to the existing state right-of-way limits along SR 126 (Memorial Boulevard). Further investigations were recommended for Build Alternatives A and B. The Johnson City TDEC Environmental Field Offices Petroleum Underground Storage Tank Facilities Division conducted a follow-up investigation in the spring of 2010. The three drums containing antifreeze liquid were removed, and no fuel tanks remain in the ground. The site was cleared of concerns in relation to the proposed project by TDEC.

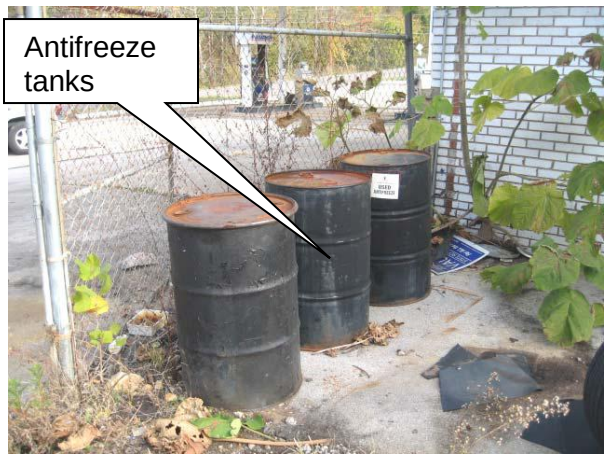


FIGURE 4.16.5: AUTO REPAIR; 5637 MEMORIAL BOULEVARD

4.16.3 Sites Recommended for Phase II Investigations

Site 2 – Fuel and Convenience Store (4001 Memorial Boulevard, Kingsport, TN)

This site is an active store that sells gasoline. A total of five fuel tanks are located at this site. Two are in use and three are permanently out of use. None of the tanks have been reported to leak, and no visual signs of leakage are evident (stains, oil sheens or odors). Both Alternative A and Alternative B would require acquisition of the property requiring removal of the tanks. If a Build Alternative is selected, a scope of work will be written by TDOT and bid packages will be assembled for removal of the A&B, the USTs, product lines, and vent pipes prior to site demolition. The UST removal will be conducted under TDEC Division of Underground Storage Tanks (DUST) rules, but without seeking DUST fund reimbursement. An access agreement, if necessary, will be sought with the site owner prior to removal activities. The UST removal project will be conducted by TDOT.

Site 5 – Dry Cleaning Service (3200 Memorial Boulevard, Kingsport, TN)

Site 5 will be impacted by both Build Alternative A and B. All substances are contained within the building. Site investigations did not indicate leakages or stains and no odors were evident. Since this business contains ignitable substances, further evaluation is needed prior to removing the structure. The disposition of any chemicals will comply with both Federal and State rules and regulations.

Site 7 – Fuel and Convenience Store (5121 Memorial Boulevard)

This active site indicated that two gasoline fuel tanks are located and currently in use. Each tank is a fiber reinforced plastic tank, asphalt coated, and the interiors are lined. No leaks have been detected, and field trips confirmed this site during a visual inspection of the grounds. An inactive kerosene tank was reported as leaking in the past, but appears to be corrected. A fourth tank, a 2000 gallon diesel tank, was identified, but no leaks have been reported or were evident during the site visit. Alternative A would avoid the site, but Alternative B would impact the site requiring removal of all tanks. If Alternative B is selected, a scope of work will be written by TDOT and bid packages will be assembled for removal of the A&B, the USTs, product lines, and vent pipes prior to site demolition. The UST removal will be conducted under TDEC

Division of Underground Storage Tanks (DUST) rules, but without seeking DUST fund reimbursement. An access agreement, if necessary, will be sought with the site owner prior to removal activities. The UST removal project will be conducted by TDOT.

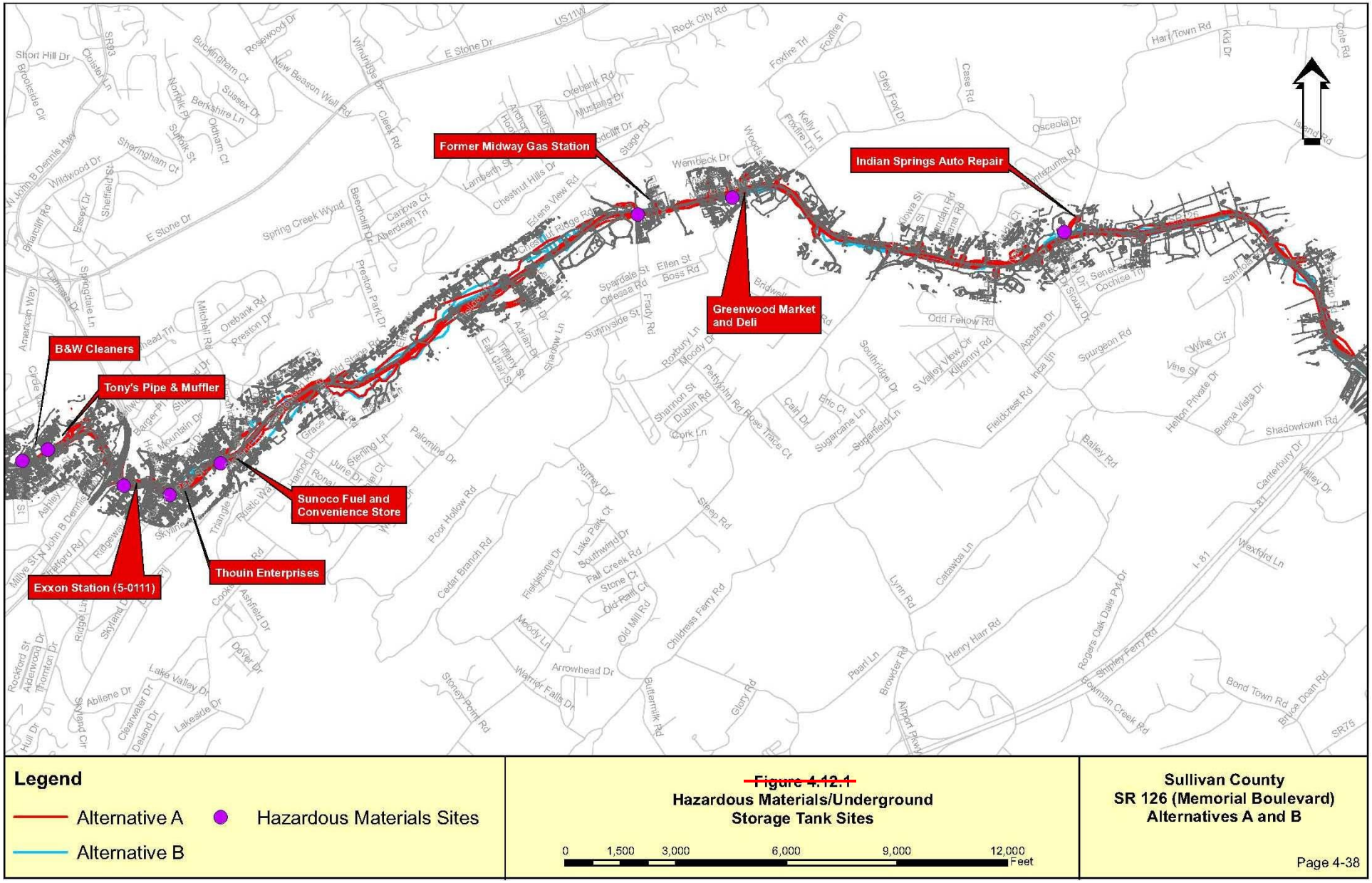
TABLE 4.16.4: SUMMARY OF UST AND HAZARDOUS MATERIALS IMPACTS

Alternative	Site	Site	Site	Total Sites
A	#2	#5	NA	**2**
B	#2	#5	#7	**3**

Site 2 and 5 would be impacted by Alternative A, while Sites 2, 5, and 7 would be impacted by Alternative B. **Figure 4.16.5** provides a comprehensive map of identified hazardous materials sites.

The majority of the properties associated with the proposed Build Alternatives have low or no potential for environmental impact. Three (3) sites have the potential to contain hazardous material. A Phase II Environmental Site Investigation will be performed on these parcels prior to commencement of construction activities. A Phase II Environmental Site Investigation consists of soil and/or groundwater sampling to determine the extent of potential or know contamination.

In the event hazardous substances/wastes are encountered within the proposed right-of-way prior to or during construction activities, the appropriate authorities will be notified, permits will be secured, and cleanup activities will take place. Their disposition shall be subject to the applicable sections of the Federal Resource Conservation and Recovery Act (RCRA), as amended; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended; and the Tennessee Hazardous Waste Management Act of 1983. A copy of the Phase I Preliminary Site Investigation is on file in the TDOT Environmental Division Office in Nashville.



~~Figure 4.12.1~~
Hazardous Materials/Underground Storage Tank Sites

FIGURE 4.16.5 HAZARDOUS MATERIALS/UST SITES

4.17 VISUAL IMPACTS

A visual impact assessment was conducted to evaluate the affects of the project on the area's visual resources. The SR 126 (Memorial Boulevard) project was the initial Context Sensitive Solutions (CSS) Project for Tennessee. A Community Resource Team (CRT) was assembled for the SR 126 (Memorial Boulevard) CSS project. During the CSS Project, the public expressed concerns about diminished visual and rural aesthetics in the corridor if a continuous four-lane roadway was constructed. As a result, the CRT expressed preferences for blending four-, three-, and two-lane sections of the roadway. The Build Alternatives incorporate these preferences.

Visual impacts can be defined as changes to the visual landscape. Visual impacts can be categorized as minimal, moderate or high. Minimal impacts generally occur when existing transportation facilities are already part of the viewshed, the view has few or no visually sensitive resources and the proposed project would introduce few, if any noticeable changes to the viewshed. Moderate visual impacts occur when changes to the existing viewshed would be noticeable, but not substantial and/or there are visually sensitive resources that would undergo a noticeable change in view. High visual impact occurs when substantial changes are made to the existing viewshed that would result in a greatly changed view and/or there are visually sensitive resources that would undergo a substantial change in view.

Viewer groups in the project area fall into two categories; persons with a view of the surrounding area from the existing roadway and person with a view of the existing roadway from the surrounding area. The proposed project passes through commercial, residential, and agricultural areas. The western portion of the Build Alternatives, extending from East Center Street to SR 93 (John B. Dennis Highway), follows existing SR 126 (Memorial Boulevard). The dominant visual elements in this area are buildings. The development is typical of built up areas found around cities and does not indicate visual sensitivity or unique visual importance. Few changes other than widening shoulders and providing some additional sidewalk will occur in this area; therefore, no adverse visual impact is anticipated.

Beginning at SR 93 (John B. Dennis Highway) and extending to east of Old Stage Road, the proposed project will widen existing SR 126 (Memorial Boulevard) from two to four lanes. The widening of the roadway through this area will cause a minimal impact to moderate impact since there is an existing facility in place. The dominant visual element through this area is predominantly commercial developments with scattered residential developments.

In the last segment of the Build Alternatives, from near Old Stage Road to the end of the project, the dominant visual element through this segment is predominantly residential with some commercial and agricultural property and the local cemetery. The widening of the existing roadway will cause a minimum to moderate impact on the visual environment since an existing facility is in place. The viewshed will change with the adding of additional lanes, shoulders and sidewalks. The visual effect would generally not be adverse. However, The State Historic Preservation Office has reviewed the project and in a letter dated November 3, 2008 stated that an adverse visual effect to the historic Yancey's Tavern would occur if either Build Alternative was selected (See **Appendix B** from SHPO letter). Please refer to **Section 4.12 Historic Impacts** for a more detailed discussion of the impacts to Yancey's Tavern.

4.18 WILD & SCENIC RIVERS

4.18.1 Wild & Scenic River Legislation

The Wild & Scenic Rivers Act established a National Wild & Scenic Rivers System in 1968 for the protection of certain selected rivers of the Nation which, with their immediate environments, possess "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values." These rivers are to be preserved in free-flowing condition and their immediate environments are to be protected for the benefit and enjoyment of present and future generations.

The Obed River and its two main tributaries, Clear Creek and Daddys Creek, located in Cumberland County and Morgan County, is the only federally designated Wild & Scenic River in the State of Tennessee.

4.18.2 Impacts to Wild & Scenic Rivers

There are no rivers or streams in the project impact area designated as Wild or Scenic Rivers. No impacts to federally-designated Wild & Scenic Rivers will occur as a result of the proposed project.

4.19 ENERGY IMPACTS

Construction of the Build Alternatives will involve the commitment of energy resources both during the short-term construction period and throughout the long-term operation of the facility. The energy requirements of the Build Alternatives are greater than the energy requirements of the No-Build Alternative.

The energy used by the Build Alternatives can be characterized as follows:

Construction: Energy would be used for the manufacturing and transport of the construction components and by the heavy equipment utilized for roadway and bridge construction.

Maintenance: The project would require routine maintenance that could result in energy use for the maintenance actives. Traffic delays could accompany the maintenance activities and could result in temporary increases in energy use.

Motor Vehicle Use: Improved traffic flow and reduced travel time could result in a decrease from existing energy use.

In summary, the amount of energy required to construct a roadway project of this type is substantial, but temporary in nature, and generally leads to reduced operating cost once the project is completed. A reduction in cost and energy use could come from improved access, reduced travel time and increased safety (i.e. less accidents on local roads that hold up traffic and require emergency services).

4.20 CONSTRUCTION IMPACTS

A major construction project, public or private, will likely inconvenience or disturb residents, businesses and business customers. In the case of improvements to an existing highway,

inconvenience to highway users also occurs. The maintenance of traffic and access to properties adjoining the road and utility relocations are particular construction-related impact issues that must be addressed with this project.

Without proper planning and implementation of controls, traffic disruption, loss of access and utility relocation could adversely affect the comfort and daily life of residents and disrupt the flow of customers, employees and material/supplies to and from businesses. Construction impact controls would be integrated into the project's contract specifications and traffic control plans. The Build Alternative would have physical construction-related impacts, but with implementation of appropriate controls, no cumulative or secondary impacts are foreseeable. The following construction issues are addressed below:

- Maintenance of Traffic and access
- Economic benefits
- Waste disposal
- Utility relocation
- Discovery of unknown archaeological sites
- Erosion control
- Air quality
- Noise

Maintenance of Traffic and Access: Traffic will be maintained on existing roadways during construction or detours will be developed. Access to all properties will be maintained during construction.

Economic: The construction activities may result in short-term economic benefits to the local area that would include increased revenue to local businesses through the sale of construction supplies and material and retail/service purchases by construction personnel. Construction jobs also could be available for persons residing in the area. These short-term revenues and jobs are not expected to be significant locally or regionally.

Construction could result in adverse economic impacts to the local businesses along the corridor that are not relocated as a result of the project due to some motorists avoiding the corridor during construction, thus lessening the potential number of customers for some businesses. The construction related adverse impacts would be minimal and short-term.

Waste Disposal: Solid waste will be generated by project construction (i.e. through removal of structures that cannot be relocated). The quantity of disposed waste would represent a negligible proportion of the total load directed toward local landfills.

Any toxic and hazardous materials would be handled and used in accordance with package labels and manufacturer's directions. Wastes would be segregated, labeled and stored in a manner that would prevent their release into the environment from an accident or spill. The contractor would dispose of these materials and their containers in accordance with applicable state and federal regulations.

Disposal of excess material would be the responsibility of the contractor, who will be contractually required to handle and dispose of the material in accordance with the TDOT *Standard Specification for Road and Bridge Construction.* These specifications require that the contractor comply with open burning regulations and be supervised by a competent watchman; that material is disposed of in accordance with all applicable laws and ordinance and that material disposed on private property have a signed agreement with the property owner.

Utility Relocation: The relocation of utilities will be included in final design plans. As appropriate, TDOT and the City of Kingsport will coordinate with the appropriate officials to avoid or minimize damage or disruption of existing service.

Discovery of Unknown Archaeological Sites: If archaeological materials are uncovered during construction, all construction work in the area of the find will cease. The Tennessee Division of Archaeology (615-741-1588) and the recognized Native American Tribes previously coordinated with will be immediately contacted so a representative of their office may have the opportunity to examine and evaluate the materials.

Borrow Pits: Should earth fill be required for this project, the applicable TDOT borrow provisions will be followed.

Erosion Control: The Build Alternatives will disturb land that has a tendency to erode when disturbed. The contractor will be required to employ FHWA Best Management Practices for Erosion and Sediment Control (1995) to minimize the impacts of point and non-point source pollution resulting from increased siltation and highway runoff. A sediment control plan will be formulated in accordance with the TDOT *Standard Specifications for Road and Bridge Construction* and will include the following measures:

- Temporary erosion control devices, such as silt fences, straw bales, burlap, jute matting, grading, seeding and sodding will be used to minimize erosion and sedimentation.
- Removal of vegetation will be minimized.
- Fill slopes should be constructed and stabilized during the growing season through the establishment of non-invasive vegetation.
- The planting of native woody and herbaceous vegetation should be encouraged.

Air Quality: Even though the National Ambient Air Quality Standards (NAAQS) are not exceeded in the design year, all phases of construction operations could temporarily contribute to air pollution. Particulates would increase slightly along the project as dust from construction activities collects in the air surrounding the project. The construction equipment would temporarily produce slight amounts of exhaust emissions. The emission of air pollutants would be reduced by the use of properly maintained equipment and the use of tarp covers on trucks transporting refuse and construction waste products.

Any burning of wastes and control of dust will be the responsibility of the construction contractor. The contractor must meet the burning and dust control requirements of TDOT's *Standard Specifications for Road and Bridge Construction* and is required to comply with applicable state and local laws, ordinances and regulations regarding these emissions.

Construction Noise Abatement: Temporary noise impacts will occur within the immediate vicinity of the construction activities. The exact noise levels cannot be predicted because the specific types of construction equipment, methods and schedule are unknown at this time.

The following noise abatement measures will be incorporated into the contract plans and specifications in order to prevent adverse construction noise impact in the vicinity of the proposed project:

- The contractor shall comply with all state and local sound control and noise level rules, regulations and ordinances that apply to any work performed pursuant to the contract.
- Each internal combustion engine used for any purpose on work related to the project shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such muffler.

4.21 SHORT-TERM IMPACTS VERSUS LONG-TERM BENEFITS

Short-term impacts related to highway improvements will occur during construction operations. Some interruption to vehicular traffic flow is inevitable; however, appropriate maintenance of traffic phasing will be employed to minimize inconvenience. Traffic control plans will be developed to minimize congestion and delays during construction.

Temporary air impacts from dust and exhaust fumes, and noise associated with construction operations cannot be avoided. Every effort will be made to minimize these effects by using best management practices.

Many long-term benefits are anticipated to result from the proposed project, such as a decrease in travel time and traffic congestion and an improved level of service. Accidents along segments of existing highways may also decrease over the long term. Elimination of congestion is expected to result in more efficient use of energy. In the long term, the construction of the roadway through the area will provide a better modal connection and could provide an economic benefit through establishment of new businesses along the corridor.

4.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irretrievable resources necessary to build the proposed roadway include energy (fossil fuel), concrete, aggregate and steel. None of these materials are in short supply. Implementation of the proposed project involves a commitment of a range of natural, physical, human and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if the highway facility is no longer needed, the land can be converted to another use.

Considerable amounts of fossil fuels, labor and roadway construction materials such as cement, aggregate and bituminous materials will be expended. Additionally, large amounts of labor and natural resources will be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use will not have an adverse effect upon continued availability of these resources. Construction will require a one-time expenditure of both state and federal funds, which are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, state and region will benefit by the improved quality of the transportation system. These benefits will consist of improved accessibility and safety, savings in time and greater availability of quality services that are anticipated to outweigh the commitment of these resources.

4.23 INDIRECT AND CUMULATIVE IMPACTS

The purpose of an Indirect and Cumulative Impacts Assessment is to present an evaluation of the reasonably foreseeable potential indirect and cumulative impacts expected as a result of this project. By United States Code of Federal Regulations (CFR) definition, *direct effects (or*

impacts) are caused by the action and occur at the same time and place (40 CFR § 1508.8). *Indirect effects (or impacts)*, are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.8). *Cumulative effects (or impacts)* are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

Indirect and Cumulative Impacts for the Human and Natural Environments associated with the SR 126 (Memorial Boulevard) project include:

- Land Use
- Farmland Conversion
- Terrestrial Habitat
- Aquatic Habitat
- Historic Resources
- Archaeological Resources.

Reviews of project area mapping were conducted using aerial photographs from the 1950s through 2006. The maps have been combined with field visits, and with conversations in the company of local officials to determine the types of growth that have been experienced in East Kingsport and Sullivan County. The area of potential effect was defined as the area circumscribed by US 11, SR 126 at East Center Street, Falls Creek Road and the intersection of SR 126 with I-81. This area has experienced steady residential growth throughout a fifty-year period. Additionally, residential development is ongoing throughout the area. Neighborhoods between SR 126 (Memorial Boulevard) and Falls Creek Road are currently adding an estimated 100 to 125 new homes in the area. Local officials indicate that this rate of growth and type of development will continue whether the improvements to SR 126 (Memorial Boulevard) are implemented using either Build Alternative, or if the No-Build Alternative is selected.

Due in part to both Build Alternatives not adding travel lanes to approximately half of the study corridor, implementation of the improved facility would likely not result in an increase in land use development pace, nor would it be likely to induce a change in the types of land uses (i.e. shifting to industrial development from residential development and light commercial development).

When reviewing the historic aerial maps and combining the lack of measurable growth around the I-81 Interchange, it is evident that development activities in the eastern portions of this project are minimal and not expected to substantially increase in the next 20 to 25 years. Overall the area is either already saturated with business and residential land use or is converting at a steady and sustained rate. The implementation of an improved SR 126 (Memorial Boulevard) with additional lanes and new shoulders will not measurably increase or decrease the current patterns.

It can be safely concluded by the age of the structures, and by reviewing the historic aerial maps on file at the TDOT Environmental Division Office in Nashville, TN, that the residential growth that has occurred in the area began several decades ago. This growth has been continual over the fifty-year period. Conversations with the local officials indicate that the improvements to SR 126 (Memorial Boulevard) are in response to the increased traffic

throughout the project area. Most of the surrounding neighborhoods, communities, and scattered farm residences between US 11W and Falls Creek Road use SR 126 (Memorial Boulevard) as their main roadway for accessing shopping, work and government service needs in Kingsport, and to I-81. As residential development continues in this area, traffic is anticipated to continue to increase causing additional burdens on the existing facility. The established land use changes from agricultural to residential applications and improvements to the existing SR 126 (Memorial Boulevard) facility indicate that very little indirect or cumulative impacts are anticipated for the human or natural environments within the area served by the project area. The roadway itself is not, nor would be, a major influence of land use patterns, but is more of a solution to changing conditions of the land uses. It would not result in a measurable change of impacts for either of the two Build Alternatives, A or B.

The residential and agricultural activities in the area have already displaced forested areas, natural habitat areas and farmland. These rates will not appreciably change, whether the new road is constructed or the No-Build Alternative is selected. Therefore additional pressures to animals, plants, wetlands and streams are not expected to substantially increase. Impacts to the human environment will improve due to reduced accidents and more efficient facility for transportation within the corridor. However, no substantial increase to the current rate of land use transition from agricultural to residential applications is anticipated. Commercial applications in the rural sections of the corridor are very lightly represented; many occupy older structures, such as an upholstery shop that has occupied a former gas/market company. Other older structures also are occupied by gas/food marts. Those sites not relocated by the project will be better served with the increased efficiency and improved safety conditions of a new roadway.

Many of the sites are geographically dependent. This means that they provide a variety of services, including convenience/gasoline businesses, groceries, veterinary services, clothing, and auto repairs to the smaller communities that are situated within the Area of Potential Effect. These sites will continue these services with some interruption from the construction of the improved facility, and they will experience some business losses from the improvements to SR 126 (Memorial Boulevard) or due to land use changes associated with an improved roadway in this area of Sullivan County.

It is believed that land use changes will continue even if the No-Build Alternative is selected. The difference of impact on land use change would likely be immeasurable. If a Build Alternative is selected, losses of floral and faunal habitat, degradation of water quality in streams, conversion of farmland, and potential impacts to historic and archaeological resources in the area are not anticipated to experience additional cumulative or indirect pressures from proposed action.

In general roadway projects most commonly result in indirect impacts to land use, farmland, community and economic resources, water quality, wetland and terrestrial ecology. Future construction activities along the corridor may result in a decline in the local wildlife populations due to the removal of habitat. Increased noise levels may also affect wildlife populations in the vicinity.

The cumulative impacts to land use in the study area as a result of past and future transportation and infrastructure projects has been anticipated by local governments for many years. Local land use plans have identified areas for future growth and local services. The Build Alternatives, as previously discussed in this document, are located mostly along the existing roadway. Future land use changes in the project impact area would be influenced by

other factors in addition to the proposed project. Changes in the local economy, changes in land use by local jurisdictions and other infrastructure changes can all affect how, when, and to what degree land is developed and redeveloped. A positive cumulative effect in transportation service to the surrounding area will occur with the proposed improvements to SR 126 (Memorial Boulevard). The project will provide a safer, less congested roadway for local travelers. As well as a safer environment for pedestrians and bicyclist.

Chapter 5: Public Input and Agency Coordination

5.0 PUBLIC INPUT AND AGENCY COORDINATION

This section describes the agency coordination process and public involvement activities that were conducted for this project. In addition, the key issues that have been identified through those efforts are included in this section of the DEIS.

5.1 AGENCY COORDINATION

5.1.1 Initial Coordination

The initial coordination for the SR 126 (Memorial Boulevard) project was initiated with a package describing the project area, and sent to approximately 45 federal, state, and local agencies in December 2008. The initial package included a description of the proposed improvements to SR 126 (Memorial Boulevard) and goals of the project. A project data summary was attached along with an overview map of the area showing the project location that is under study, a data summary (which provided a description of the project and a list of potential environmental, economic and social concerns associated with the construction of the project), and a Coordination Plan. The agencies were invited to cooperate, participate or provide comments relative to the project and their appropriate levels of participations. The package included a letter requesting the recipient's review and comments on the project.

The following is a list of those agencies, officials, and organizations receiving the initial coordination package. An asterisk indicates a response was returned to TDOT. Local government representatives were also asked to contact any local, social or civic groups that might be concerned with the project. **Section 5.2** provides summaries of each response received during the initial coordination process, and the Letters of Response are provided in **Appendix A**, Initial Coordination.

5.1.2 Federal Agencies

Appalachian Regional Commission
Environmental Protection Agency
Federal Emergency Management Agency
Federal Energy Regulatory Commission
Federal Railroad Administration, Office of Economic Analysis
Federal Aviation Administration*
Tennessee Valley Authority, Environmental Services and Programs*
U.S. Army Corps of Engineers, Nashville District*
U.S. Department of Agriculture;
- Natural Resources Conservation Service*
- Wetland Reserve Program,

U.S. Department of the Interior;
- National Parks Service
- Office of Surface Mining*
- U.S. Fish and Wildlife Service*
- Water Resources Division, District Chief, Nashville, TN

U.S. Geological Survey, National Center, Reston, VA

5.1.3 State of Tennessee Agencies

Tennessee Department of Agriculture
Tennessee Department of Economic and Community Development
Tennessee Department of Education*
Tennessee Historical Commission, State Historic Preservation Office*
Tennessee Wildlife Resources Agency*
Tennessee Department of Environment and Conservation;
- Division of Air Pollution Control
- Division of Natural Heritage
- Division of Groundwater Protection
- Division of Solid/Hazardous Waste Management
- Division of Water Pollution Control
- Division of Water Supply

Tennessee Housing Development Agency

5.1.4 Local Agencies

City of Kingsport;
Mayor Dennis Phillips, City of Kingsport

Kingsport MPO*;
William Albright and Chris Campbell

Sullivan County*;
County Mayor Steve Godsey, Sullivan County, TN
Ambre Torbett, Director of Planning

Local and Regional Organizations:
First Tennessee Development District
Sullivan County Industrial Board
Sierra Club, Knoxville
The Nature Conservancy

5.2 SUMMARIES AND DISPOSITION OF COMMENTS

5.2.1 Federal Agencies

Federal Aviation Administration

Comment: *We have reviewed the proposed study area and found no issue or concerns that could affect the nearest airport (Tri-Cities Regional Airport) in that area. We feel, from your proposal, that this project will have no environmental impact for future airport development nor is this project located within Airport Clear Zones. We would like to be notified if changes should occur from the original studies.*

Response: None required.

Tennessee Valley Authority

Comment: *TVA is pleased to participate as a cooperating agency in the development of the Environmental Impact Statement for this road project. Depending on the final alignment, the proposed highway improvements may require a TVA Section 26a permit.*

As a cooperating agency under SAFETEA-LU and the Tennessee Environmental Streamlining Agreement, we would be pleased to work with you on defining the purpose and need, range of alternatives, and environmental analysis needs. We are not aware of unusual or unique environmental resources in the project area that should be addressed in the environmental review.

Response: TDOT will continue to coordinate with TVA throughout the project development process.

U.S. Army Corps of Engineers, Nashville District

Comment: *Based on the information provided and a brief explanation of the Kingsport, TN and Indian Springs, TN/VA USGS quadrangle maps, we anticipate that Sougan Branch, Fall Creek and other unnamed tributaries to the South Fork Holston River (SFHR) would be impacted by the construction of the Build Alternative. Impacts could result from culvert extensions and/or new road crossings.*

The regulatory authorities and responsibilities of the Corps of Engineers (Corps) are based mainly on two laws: Section 404 of the Clean Water Act (33 USC 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403). Section 404 requires a Corps permit for any discharge of dredged or fill material into waters of the United States. Section 10 prohibits the obstruction or alteration of navigable waters of the United States without a Corps permit. Sougan Branch, Fall Creek, and other unnamed tributaries to the SFHR are considered navigable waters of the US. No navigable waters of the US exist within the project study area. We do not have enough information at this time to estimate whether jurisdictional wetlands are present and would be affected by this proposal.

Our specific permitting requirements for construction of road crossings over jurisdictional waters would depend on the specific installation methods and associated impacts. Road crossings that would not involve substantial aquatic habitat alternation may qualify for authorization under our Nationwide Permit (NWP) program (33 CFR 330). Activities that do not qualify for NWP authorization would require approval under a Standard Department of the Army (DA) permit.

Finally, our permit review would include application of the Section 404(b) (1) Guidelines (40 CFR 230). The Guidelines require that no discharge of dredged or fill material may be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

Response: All applicable State and Federal permits will be acquired prior to project construction. No wetlands were identified within the project corridor during field surveys or reviews of NWI maps. No navigable waters are located in the project impact area.

U.S. Department of Agriculture, Natural Resources Conservation Service, Knoxville.

Comment: *This information was compiled using a corridor of 1,000 ft. on either side of existing SR 126 as specified in the information you sent. This project will result in the conversion of 132 acres of Prime Farmland as defined in the Farmland Protection Policy Act. Form AD-1006 is attached to this letter to document this determination. Prime farmland is land that has the best combination of physical and chemical characteristics, growing season, and moisture supply for producing agricultural crops. Generally, land may be pasture, forestland, or cropland but may not be urban built-up land or waterways. Additionally, construction within an existing right-of-way purchased on or before August 4, 1984, is not subject to the Farmland Protection Policy Act.*

Concerning Hydric Soils, there are 54 map units of Bloomingdale silty clay loam, 0 to 2 percent slopes, occasionally flooded within the corridor. These 4 map units occupy about 47 acres of the total 2,100 acres. Hydric soil criteria is only one of the 3 factors used in determining a wetland. Areas of hydric soils may or may not meet all of the requirements of a wetland.

Response: The farmland impacts will be included in the Draft DEIS.

U.S. Department of the Interior, Office of Surface Mining

Comment: *As a coal regulatory agency, our area of interest is generally limited to the coalfields of East Tennessee and this project lies well outside the coalfield area. This in combination with the fact that mineable coal is not known to exist in the Sullivan County area, and the fact that Federal regulations at 30 CFR Section 707 provide for a broadly based exemption from complying with Federal mining regulations for coal extraction incident to government financed highway construction, make it unlikely that our agency would have any jurisdiction or authority with respect to this proposed project. As such, we must decline your invitation to participate.*

Response: None required.

U.S. Department of the Interior, Fish and Wildlife Service

Comment: *We have reviewed the project summary and the possible role that our agency would have in the development of the State Route 126 improvement project. We accept the invitation to be a participating agency in the development of this project. We have also reviewed our existing database for any records of federally listed species near the proposed project. Our collection of records does (sic) not indicate that federally listed or proposed endangered or threatened species occur within the proposed study area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.*

Response: An ecology study has been completed and is on file at TDOT's Environmental Division Office in Nashville, TN. No threatened or endangered species have been identified in the project impact area.

5.2.2 State of Tennessee Agencies

The Tennessee Department of Education

Comment: *The Department of Education does not intend to submit comments on the project pertaining to the, from East Center Street in Kingsport, to Interstate 81 in Sullivan County, TN. P.I.N. 105467.00.*

Response: None Required.

Tennessee Historical Commission (State Historic Preservation Office)

Comment: *Considering available information, we find, after applying the Criteria of Adverse Effect codified at 36 CFR Part 800, that the project as currently proposed will ADVERSELY AFFECT YANCEY'S TAVERN, A PROPERTY THAT IS ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES. You should now, through FHWA, inform the Advisory Council on Historic Preservation of this adverse effect determination and begin immediate consultation with our office. Please enclose a copy of this determination in your notification to the Council as delineated at 36 CFR Part 800. Until you have received a final comment on this project from this office and the Council, you have not completed the Section 106 review process. Please direct questions and comments to Joe Garrison, (615) 532-1550-103. We appreciate your cooperation.*

Response: TDOT initiated and is continuing the Section 106 process as communicated by the TN SHPO. The adverse visual impacts have been included in **Chapter 4**. An MOA between FHWA and the SHPO will be prepared prior to approval of the FEIS. Letters received from the SHPO are included in the Cultural **Appendix B** at the end of the DEIS.

Tennessee Wildlife Resources Agency

Comment: *The Tennessee Wildlife Resources Agency had received and reviewed the information your office provided to us regarding the invitation to be a participating agency for State Route 126 (Memorial Boulevard) from East Center Street, in Kingsport (sic), to Interstate 81 in Sullivan County, Tennessee. Our current concerns are potential environmental impacts associated with potential stream and wetland impacts due to the construction of this project. We accept the invitation to participate in this process and encourage continued consultation with our agency in future phases of this project to further reduce impacts to fish and wildlife resources.*

Response: TDOT will continue to coordinate with TWRA throughout the project development process.

5.2.3 Local Agencies

Kingsport Metropolitan Planning Organization

Comment: *We are in receipt of your letter to us concerning the initiation of an Environmental Impact Statement of the CSS-based State Route 126 project within the City of Kingsport and Sullivan County. Please note the City of Kingsport, in cooperation with the Kingsport MPO, enthusiastically agrees to, and accept, your invitation to become a participating agency in this process and will work to provide staff time and/or any input you may need from our resources to complete the review. This includes, but is not limited to, providing early input in determining the range of alternatives for improvements to SR 126, and participation in coordination meetings and joint field reviews.*

As we look forward to working with your agency on this phase, we also want to express our appreciation for your willingness to advance one of the MPO's priority projects. In addition, if you need further information or have additional questions concerning this matter, please feel free to call our offices.

Response: TDOT will continue to coordinate with the Kingsport MPO throughout the project development process.

Sullivan County Offices of Land Use, Department of Planning, Zoning & GIS

Comment: *As a previous member of the Local Resource Team on the SR 126/Memorial Blvd. study, representing Sullivan County, I would like to continue my service on this project. I am the county's Director of Planning, and would be happy to continue to serve on this city-county-state planning project.*

Response: TDOT will continue to coordinate with the Sullivan County Department of Planning throughout the project development process.

5.3 TENNESSEE ENVIRONMENTAL STREAMLINING AGREEMENT, CONCURRENCE POINTS 1 AND 2

The Tennessee Department of Transportation (TDOT) has implemented the *Tennessee Environmental Streamlining Agreement* (TESA) to facilitate understanding and interagency participation throughout the NEPA process. TESA is a four-step process that allows the participating and coordinating agencies on federal, state and local levels to review and participate in the decision making process. The four steps of TESA review process are:

1. Project Purpose and Need;
2. Evaluation of Alternatives;
3. Preliminary Draft Environmental Impact Statement;
4. Preferred Alternative and Preliminary Mitigation.

The TESA Process for SR 126 (Memorial Boulevard) was initiated by combining Steps 1 and 2, Project Purpose and Need and Evaluation of Alternatives. These steps were combined

because the project and its public involvement/stakeholders involvement participation was begun prior to the implementation of TESA process.

A field trip was conducted in June 2009 and a package summarizing the conditions, the surrounding environment, and options for alternatives were reviewed and discussed. Results of these efforts supported the decision to include two Build Alternatives, A and B, for review and comparison in the DEIS.

The TESA package for Concurrence Steps 1 and 2 was mailed in February 2009, to all agencies who requested to participate in or coordinate on this project asking for their comments and their concurrences with the project's purpose and need, and for alternatives to be evaluated.

The TESA package for Concurrence Step 3 was sent electronically in August 2011 to all agencies who requested to participate in or coordinate on this project asking for their comments and their concurrences with the Preliminary DEIS. Comments were received from the participating agencies and responses were sent to the agencies in October 2011.

Concurrence Step 4 will be completed prior to completion of the FEIS.

5.4 SECTION 106 COORDINATION

Section 106 of the National Historic Preservation Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office (SHPO) before they carry out their proposed undertakings. Consultation letters with the Tennessee Historical Commission's SHPO are provided in **Appendix B, Cultural Resources**.

Pursuant to Section 106, a letter and project data summary were sent to Native American Groups and local officials inviting these parties to be a Section 106 consulting party for the project. The letter was sent on November 19, 2003. The following is a list of those Native American Groups receiving the Section 106 coordination package. An asterisk indicates a response was returned to TDOT. **Section 5.4.1** provides summaries of each response received during the Section 106 Coordination, and the Letters of Response are provided in **Appendix B, Cultural Resources**.

The following parties were invited to be Section 106 consulting parties for the project:

- Eastern Shawnee Tribe of Oklahoma*
- Muscogee (Creek) Nation*
- Eastern Band of Cherokee Indians*
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Seminole Nation of Oklahoma
- United Keetowah Band of Cherokees
- Quapaw Tribe of Oklahoma
- Thlopthlocco tribal town of east-central Oklahoma

On March 16, 2008, TDOT mailed a copy of the Architectural Assessment to each of the owners of surveyed properties and local groups with historic interests. Listed below are the property owners of sites that are listed in or eligible for the National Register. TDOT mailed a copy of the

Documentation of Effect Report to the two property owners whose sites are either listed in or eligible for the National Register.

Jack and Shirley Jarvis
NRE Shipley-Jarvis House
3309 Memorial Boulevard
Kingsport, TN 37664

Rann Vaulx
NRL Yancey's Tavern
405 Wine Circle
Blountville, TN 37617

The Environmental Division of TDOT prepared a list by counties of historic groups and similar organizations that might be interested in the proposed project. This list was compiled using the following sources:

- The State Historic Preservation Office's list of current county historians;
- The State Historic Preservation Office's list of Historic Sites and Museums;
- The State Historic Preservation Office's list of Historical Societies;
- The National Trust for Historic Preservation's list of member organizations in Tennessee, the American Association for State and Local History *Directory of Historical Societies and Agencies in the United States and Canada* (Twelfth Edition, 1982);
- Interested State Review Board Members;
- A questionnaire mailed to each of Tennessee's 95 County Executives

<u>County Executives</u>

- Steve M. Godsey, County Mayor, Sullivan County, TN

<u>Mayor</u>

- Dennis Phillips, Mayor, Kingsport

The following parties with identified historic preservation interests were also sent a letter and information package asking for their comments on the proposed project's potential effects to cultural resources:

- Mr. Sam Stuffle, Sullivan County Historical Society
- Mr. Ken Weems, CLG/Historic Commission, City of Kingsport
- Dr. Tom Maher, Tennessee Valley Authority, Cultural Resources
- Dr. Dale Royalty, East Tennessee State University, Department of History
- Ms. Claudia Moody, Northeast Heritage Tourism Area
- Ms. Deborah Montanti, The Heritage Alliance of Northeast TN & Southeast VA.
- Ms. Shelia Hunt, Sullivan County Historian, Department of Archives & History

5.4.1 Section 106 Responses

Section 106 Consultation letters are provided in **Appendix B, Cultural Resources**.

Advisory Council on Historic Preservation (ACHP)

Comment: *Based upon the information you provided, we have concluded that Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed.*

Response: None required.

Eastern Shawnee Tribe of Oklahoma

Comment: *Consult only if there is an inadvertent find.*

Response: None required.

Muscogee (Creek) Nation

Comment: *Consult only if there is an inadvertent find.*

Response: None required.

Eastern Band of Cherokee Indians

Comment: *Consult only if there is an inadvertent find.*

Response: None required.

Since the initial consultation with the Native American Tribes, two (2) additional tribes have been recognized, The Cherokee Nation and the Shawnee Tribe. Consultation with these additional Native American Tribes will be completed prior to submittal of the FEIS.

5.5 PUBLIC INVOLVEMENT, CONTEXT SENSITIVE SOLUTIONS PROCESS

This section documents and provides information on public, FHWA, TDOT, and local official efforts which led to the development of a concept for SR 126 (Memorial Boulevard) based on concerns, conditions, and early information. This synopsis is based on the culmination of a 21-month effort composed of meetings, field trips, and discussions between the various agencies and the public.

The Context Sensitive Solutions (CSS) Process

In September 2003, data collection such as gathering of mapping, traffic data, geometric features, and traffic accident reports initiated the CSS process. While the technical data gathered for the project provided an important piece of the information needed, it was not

completed until context was received by the local community. The CSS process requires that additional considerations be given to non-technical information and viewpoints. TDOT asked the City and County Mayors to appoint a community resource team to assist the project management team, people who reside in the local community, in gathering and understanding local concerns. This resulted in the assembly of a team of individuals from the community who provided insights and assistance throughout the project as a Community Resource Team (CRT).

The CRT was comprised of elected officials, City and County staff, and citizens who live in the study area. Since they were assembled specifically for this project and had not worked together previously as a team, it was necessary to begin with education. TDOT provided a two-day team building workshop facilitated by a professional team building consultant. This resulted in the definition of the study area boundary for the SR 126 (Memorial Boulevard) project.

Throughout the project, the CRT assisted the project managers with collection of information relative to citizen characteristics, concerns, and values. These subjective data were obtained through a combination of public involvement techniques. These techniques included surveys, one-on-one conversations, workshops, a focus group, and public involvement sessions. The community resource team served a valuable purpose by voicing local concerns for consideration by the project team.

Throughout the project, the basic process for gathering and evaluating data included a feedback loop. The project management team reviewed information, identified problems or issues, checked the validity of those conclusions by engaging the local team or community, revisited understandings, developed proposals, presented those proposals to the local team or community, and made modifications as necessary prior to final presentation.

CSS Process Overview

The process followed by TDOT and the project management team for this project was based on open communication, inclusion, and flexibility. This allowed the project management team freedom to try new things and develop a workable procedure.

The SR 126 (Memorial Boulevard) project was led by a project management team, which was assisted throughout the project by the CRT which provided local knowledge and guidance to the project management team. The CRT was consulted before any major project decisions were made.

Throughout the project the public was given information through a variety of outreach techniques that included: a project newsletter, website, postcards, local media, and three series of public involvement sessions. The public was encouraged to provide input to the project management and Community Resource Team through surveys, a toll free phone line, email, question and answer sessions, and face-to-face discussions.

The primary objectives of the Context Sensitive Solutions process that was followed for SR 126 (Memorial Boulevard) were:

- Provide multiple opportunities and methods for gathering community input
- Work closely with leaders and citizens from the local community
- Gather information to identify community values and concerns
- Build trust through listening and responding with integrity
- Maintain open, two-way communication
- Facilitate the Community Resource Team's ability to prepare a recommendation for improving SR 126 (Memorial Boulevard)

Summary of Community Resource Team (CRT) Recommendations

During the 21-month study process there was unanimous support among the members of the CRT for a large number of "Common Ground" recommendations. Majority decisions were made regarding design elements and roadway cross sections. Public opinion was surveyed at each Public Involvement Session, and the results of those surveys were reviewed and discussed by the CRT and used to guide their decision making.

This process resulted in the development of "Alternative A," which is one of the two Build Alternatives being evaluated and compared in the Environmental Impact Statement. It was developed by TDOT and its consultants during the Context Sensitive Solutions phase of the project based on the public input and concerns. Alternative B is a refinement of Alternative A, and was developed to further minimize impacts, and to provide a more feasible maintenance of traffic plan while remaining respective to the public's concerns in the project corridor.

CRT recommended:

The CRT provided ten (10) safety improvements, seven (7) points of interest to the community, eleven (11) enhancement features in the design plan, as well as four (4) other special issues. A summary of the considerations is provided below.

Safety Improvements:

1. Safety is the number one priority on this project.
2. Wide Shoulders are desirable
3. Improve sight distance and address geometric deficiencies at all intersections of side streets
4. Provide left turn lanes at major intersections:
   a. Orebank Road
   b. Harbor Chapel Road
   c. Stratford Road
   d. Old Stage Road
   e. Amy Avenue /Glenwood Street
   f. Cooks Valley Road
   g. Island Road
   h. Fall Creek Road
   i. Hill Road
5. Provide right turn lanes at major intersections:
   a. Cooks Valley Road
   b. Fall Creek Road
   c. Hill Road

6. Consider using center line and shoulder rumble strips and reflective thermal markings where appropriate
7. Special attention should be given to intersection improvements at the intersection of Carolina Pottery and Overhill Road to improve safety
8. Plan development needs to be mindful of pedestrian safety and connectivity, providing a safe and separate walkway for pedestrians where feasible. Specific areas where sidewalks are desired include East Center Street to Old Stage Road (within the City limits) and within the Indian Springs community
9. Use side facing mailbox placement along SR 126 (Memorial Boulevard) to improve safety for residents
10. The CRT would like to avoid a "one size fits all" solution for SR 126 (Memorial Boulevard)

Points of Interest to the Community

The CRT wants to minimize impacts to and protect the integrity of community treasures in the SR 126 study area. Sites that are considered treasures include:

1. Cherry Point Animal Hospital
2. White House at the corner of Santana Road and SR 126 (Memorial Boulevard)
3. East Lawn Cemetery
4. Old Indian Springs Post Office
5. Chestnut Ridge view shed
6. Anything within the historic boundary of Yancey's Tavern, including the tavern, barn, and trace of Old Island Road
7. Shipley Mansion (near East Center Street)

Enhancements

The CRT support the incorporation of the following enhancement features in the design plans for SR 126

1. Use of natural elements for retaining and buffering walls
2. Landscaping to a human scale with native plant species
3. Decorative guardrail where appropriate
4. Use of decorative lighting where appropriate with sensitivity to residential areas
5. Underground utilities instead of overhead
6. Use of mast arms rather than span wire where traffic signals are installed
7. Use of Texas rail instead of Jersey barrier type of railing on bridges
8. Bridge design needs to be an enhancement and fit within the context of the community
9. Include irrigation with major landscaping
10. Landscape design that is appropriate to the speed limit
11. Inclusion of a roundabout at the intersection of SR 126 and East Center Street if adequate capacity can be provided for forecasted traffic volumes.

Other Issues

1. Where roadway widening is undertaken, use as much of the existing roadway as possible.
2. Where the roadway is widened from two to four lanes, consider leaving the existing road in place and constructing the new lanes to one side (asymmetrical widening)
3. The CRT identified two major benefits of asymmetrical widening: improved traffic flow during construction, and enhanced constructability.

4. Asymmetrical widening should not preclude making improvements to horizontal and vertical alignment deficiencies.

Working together, the CRT developed recommendations for roadway cross sections. The recommendations are divided into eight sections, identified by intersecting cross streets.

- For five of the eight sections, the CRT developed consensus design recommendations.
- For three of the eight sections, the CRT developed design recommendations that were supported by a majority of team members.

Consensus design recommendations include:

- Improve these segments to a four-lane median divided facility with curb, gutter and sidewalks
  - Segment 1 West – East Center Street to Orebank Road
  - Segment 1 East – Orebank Road to West of Hawthorne Street
  - Segment 3 West – Harbor Chapel Road to east of Old Stage Road
- Improve this section to four travel lanes and a center turn lane with curb and gutter and sidewalks
  - Segment 2 – West of Hawthorne Street to Harbor Chapel Road
- Provide an improved two-lane roadway with paved shoulders, wide centerline, and rumble strips
  - Segment 4 East – Harrtown Road to Cochise Trail

Majority design recommendations with minority objection statements include:
- Improve this segment to a four-lane median divided facility with shoulders
  - Segment 3 East – East of Old Stage Road to Cooks Valley Road
- Improve this segment to provide two travel lanes and a center turn lane with curb, gutter and sidewalks
  - Segment 4 West – Cooks Valley Road to Harrtown Road
- Provide an upgraded two-lane roadway with paved shoulders, wide centerline, and rumble strips
  - Segment 5 – Cochise Trail to I-81

Community Character & Values
A sampling of residents highly value the following:
- The scenic quality
- Quiet neighborhoods
- A feeling of safety and security within the neighborhoods
- Historic aspects
- Nearby family recreation and sports opportunities

A sampling of residents highly value the following visual characteristics:
- The rural setting (pastures, woodlands)
- Trees, shrubs and landscaping
- Historic houses, barns and other structures

Road Safety

- Accident rates exceed statewide averages for similar roads
- The public ranked the following safety concerns in order of importance
  - Limited sight distance
  - Dangerous curves
  - Speeding traffic
  - Difficulty turning left
  - Unsafe for bicycles and pedestrians
- The following problems and roadway deficiencies were identified:
  - Varied travel speeds that increase conflict between vehicles
  - Travel speeds that exceed the posted speed limits and/or design speed
  - Substandard horizontal and vertical curves (inadequate sight distance)
  - Lack of turn lanes at major intersections
  - Skewed intersection angles
  - Substandard superelevation in sharp curves
- Local resource team members identified additional problems such as:
  - Very narrow shoulder widths.

Access Management

- The public also ranked access onto SR 126 (Memorial Boulevard) as a major concern.
- Difficulty entering or exiting business parking lots was identified as a significant problem, i.e., uncontrolled access to businesses along the roadway.
- School busses have difficulty maneuvering and turning onto side streets while on SR 126 (Memorial Boulevard), and turning onto SR 126 (Memorial Boulevard) from side streets.

Modal Interrelationship

- Need for safe pedestrian mobility and bikeways

CSS Process Chronology

Table 5.5.1 provides a summary of major tasks and meetings that were conducted during the CSS phase of the project. After the table, more detailed information is provided concerning milestone events.

TABLE 5.5.1: CHRONOLOGICAL SUMMARY OF THE CSS PROJECT (1 OF 2)

Date	Task
September 2003	Project Kickoff Meeting - Presentation of Consultants to Kingsport / Sullivan County
	Identification of Local Resource Team members by Mayors Blazier and Venable
October 2003	First Team Meeting (TDOT/Local Resource Teams)
	Complete Stakeholder Identification
	Establish a mailing list for households in the project area
	Issued Team Roles & Responsibilities document for review
	Define methods of communication and protocols
October/November 2003	Collect & review information of record
November 2003	Stakeholder Kick-off Meeting • Introduce CSS process • Dialogue about the community & desires for Memorial Boulevard
	Team Building in Kingsport Defined study area boundary
	CSS Training at TDOT
December 2003	Collect speed data on SR 126 Analyze traffic accident data from TRIMS
January 2004	Analyze horizontal and vertical curve data
	Requested information of record from environmental specialists
	CSS Training in Kingsport Consultant conducted field review and meetings with utility providers
	Team Meeting
February 2004	Consultant investigated local contacts with low income and minority population groups
February & March 2004	Preparation of traffic forecasts Capacity analyses Tabulation of additional traffic accident data
February 2004 through February 2005	Weekly Telephone Conference Calls (held on most Fridays)
February 20, 2005	Requested controlled aerial survey
March 2004	Team Meeting (TDOT/Local Resource Teams)
	Team Meeting
April 2004	Letter to Elected Officials
	Issued Press Release
May 2004	Project Website activated
	Postcard announcement of First Public Involvement Session mailed
	First Public Involvement Sessions

TABLE 5.5.1: CHRONOLOGICAL SUMMARY OF THE CSS PROJECT (2 OF 2)

Date	Task
June 2004	Postcard thank you mailed with summary of First Public Involvement Session
July 23, 2004	Team Meeting (TDOT/Local Resource Teams)
October 2004	Team Meeting – Design Charette (TDOT/Local Teams)
	Newsletter #2
November 2004	Second Public Involvement Sessions
December 2004	Team Meeting (TDOT/Local Teams)
January 2005	Team Meeting (Local Team)
February 2005	Team Meeting (Local Team)
March 2005	Team Meeting – Plan Review Workshop (TDOT/Local)
April 2005	Focus Group
May 2005	Third Public Involvement Sessions
June 2005	Team Meeting – Team Recommendation Workshop
August 2005	Website updated with Team Recommendation
	Road Safety Audit training course in Kingsport
	Draft Context Sensitive Solutions Report submitted to TDOT for review
October 2005	TDOT Comments on Draft Report sent to consultant
	Demonstration of digital video & radar speed enforcement equipment on SR 126
	Announcement by Governor Bredesen & Commissioner Nicely accepting the Community Resource Team Recommendation
	Website Updated with interim improvements list, project timeline, Public Involvement Session summary from May 2005, and press release
February 2006	Final Context Sensitive Solutions Report submitted to TDOT

Community & Technical Resource Teams (September 2003)
Appointment of the Community Resource Team was made by the Mayors of Kingsport and Sullivan County. Appointed members included various members of the local governments and citizens. Additional team members included TDOT and consultant project managers.

In addition to the Community Resource team, TDOT assembled a Technical Resource Team to provide expertise and assistance.

Project Website (activated April 2004)
A project website was prepared and hosted on TDOT's main website. Content for the website was prepared by the project management team with input from the Community Resource Team.

Team Recommendation Meeting (June 21 and 22, 2005)
A two-day meeting was held for the Community Resource Team at the Renaissance Center in Kingsport to facilitate the development of a team recommendation.

- Public input and survey results from the May 2005 Public Involvement Sessions were reviewed and discussed.
- Team members turned in individual scoring of an evaluation matrix for compilation.

- Composite team scores from the evaluation matrix were reviewed and discussed. It was determined that the scoring did not provide enough variation between the different concept plans to be useful to the team.
- Team members discussed and agreed upon a list of "common ground" recommendations that were supported by all team members.
- The consultant facilitated the team's discussion of each roadway segment and development of either a consensus or majority recommendation for each segment.
- Team members who opposed a majority recommendation were given the opportunity to write a minority opinion statement.
- Group decisions and minority reports were reviewed, and all team members were asked to sign a statement of support for the team recommendation with objections noted by the minority reports.

Concepts A, B, and C were presented to the public at the November 2004 Public Involvement Session. Citizens were asked to express a preference for one concept or "no build" in each of the five segments. Concepts A, B, and C are a combination of various cross section options along the corridor. Concepts A, B, and C are listed in **Appendix E CSS Alternatives**.

Concepts A, B, and C were revised after the November 2004 public involvement session based on comments from the public and the Community Resource Team. These revisions were presented to the team at a design review workshop in March 2004, and were later refined again to incorporate the team's comments. The plans were shaded and color coded to make them more easily understood by the public. The revised and reformatted plans were presented to the public at the May 2005 Public Involvement Sessions. Visualizations of existing and future conditions with each concept plan were provided for four locations: Orebank Road, Harbor Chapel Road, Old Stage Road, and Island Road. Typical cross sections, reformatted to a consistent scale and color coded to match the concept plans, were also presented. The public was asked to complete a preference survey to indicate which of the concept plans they preferred in each of the eight segments of the corridor.

<u>Public Preferences for the Concept Plans</u>
At the May 2005 Public Involvement Sessions, a detailed preference survey was included at the end of the handout material. Each person who signed the attendance roster upon entering the sessions was asked to view the concept plans, review the handout material, listen to a formal presentation, and then complete the preference survey.

The preference survey began by asking questions concerning the adequacy of information provided at the Public Involvement Sessions and the level of comfort that citizens felt in expressing a preference. Citizens were then asked to express a preference for one of the concept plans (A, B, or C) or the No-Build alternative in each of eight project sections. The concept plans A, B, and C retained the same center-line. The plans varied in cross-section design. The cross sections for each concept plan The preferences are included in **Table 5.5.2**.

During the question and answer session of the Public Involvement Session that occurred at Sunnyside Baptist Church on May 26, 2005, a petition was presented by a citizen from the study area to the project management team. The petition was accepted and entered into the official transcript. It included a total of 1,167 signatures, of which 43 were duplicates. The total number of unique signatures on the petition was 1,124. The petition included the following statement:

"We, as citizens who live on and/or use SR-126, do not want the 2-lane section of the highway to become a 4-lane highway. We firmly believe a 4-lane highway would increase the number

and severity of accidents. It would destroy the community with the loss of most of the houses, apartments, and businesses along the highway. We support improvements to make the highway safer. We offer our signatures as a vote to support keeping the 2-lane section."

TABLE 5.5.2: PREFERENCE MATRIX
Preference Survey Results from Public Involvement Sessions, May 2005

SEGMENT	Concept A	Concept B	Concept C	No-Build	No Response	Other	Total Comments
Section 1 West **E Center to Orebank**	40	71	157	23	12		303
Section 1 East **Orebank to west of Hawthorne**	42	63	159	24	15		303
Section 2 **Hawthorne to Harbor Chapel**	48	35	181	21	16	2	303
Section 3 West **Harbor Chapel to Old Stage Rd**	59	50	161	20	13		303
Section 3 East **Old Stage to Cooks Valley Rd**	92	60	126	15	9	1	303
Section 4 West **Cooks Valley to Harr Town**	87	76	111	17	10	2	303
Section 4 East **Harr Town to Cochise Trail**	109	65	101	15	13		303
Section 5 **Cochise Trail to I-81**	118	48	106	16	15		303
TOTALS	**595**	**468**	**1102**	**151**	**103**	**5**	**2424**

Announcement of a Recommended Alternative for SR 126 (Memorial Boulevard)

On October 27, 2005, TDOT announced the CSS defined "Concept C" as the Recommended Alternative for the SR 126 project. Concept C has been renamed "Alternative A" for the NEPA documentation process. As mentioned throughout the DEIS, Alternative B is a refinement of Alternative A. Alternative B has been developed to minimize impacts associated with Alternative A, and with regard for the CSS recommendations. These recommendations include community concerns and comments for both an improved facility and the least amount of impact associated with a Build Alternative, preservation to the greatest extent possible of the viewshed, and improved safety and travel efficiency.

Chapter 6: References

6.0 REFERENCES

Haworth, Meyer and Boleyn (HMB) Professional Engineers, Inc.

2008 Phase I Site Assessment of Underground Storage Tanks and Hazardous Material Sites. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. March 2008.

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2008 Air Quality Analysis. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. October 2008.

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2009 Traffic Analysis Report Addendum. SR 126 (Memorial Boulevard), Sullivan County, Tennessee.

Sain & Associates/PBS&J

2006 Context Sensitive Solutions Report for State Route 126 (Memorial Boulevard), in the City of Kingsport/Sullivan County.

Tennessee Department of Transportation

2010 Phase 1a and 1b Archaeological Survey of the Proposed SR 126 (Memorial Boulevard), Sullivan County, Tennessee. March 2010.

2008 Historical and Architectural Survey and documentation for effect under 36 CFR 800 evaluation. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. October 2008

2010 Conceptual Relocation Plan for SR 126 (Memorial Boulevard), Sullivan County, Tennessee, March 2010.

2008 TDOT Design Division Roadway Design Guidelines, Design Division, August 2008.

Kingsport/Sullivan County

2006 Sullivan County Regional Plan: A Guide for Future Land Use and Transportation Development, Planning Period 2006 – 2026.

2008 Kingsport Metropolitan Area 2030 Transportation Plan (Amended January 10, 2008), Kingsport MPO

2008 Kingsport Area Transportation Improvement Program, Fiscal Years 2008 through 2011, January 2008.

2010 Kingsport Area Transportation Improvement Program, Fiscal Years 2011 through 2014, October 2010.

American Association of State Highway and Transportation Officials

2001 A Policy on Geometric Design of Highways and Streets, Fourth Edition

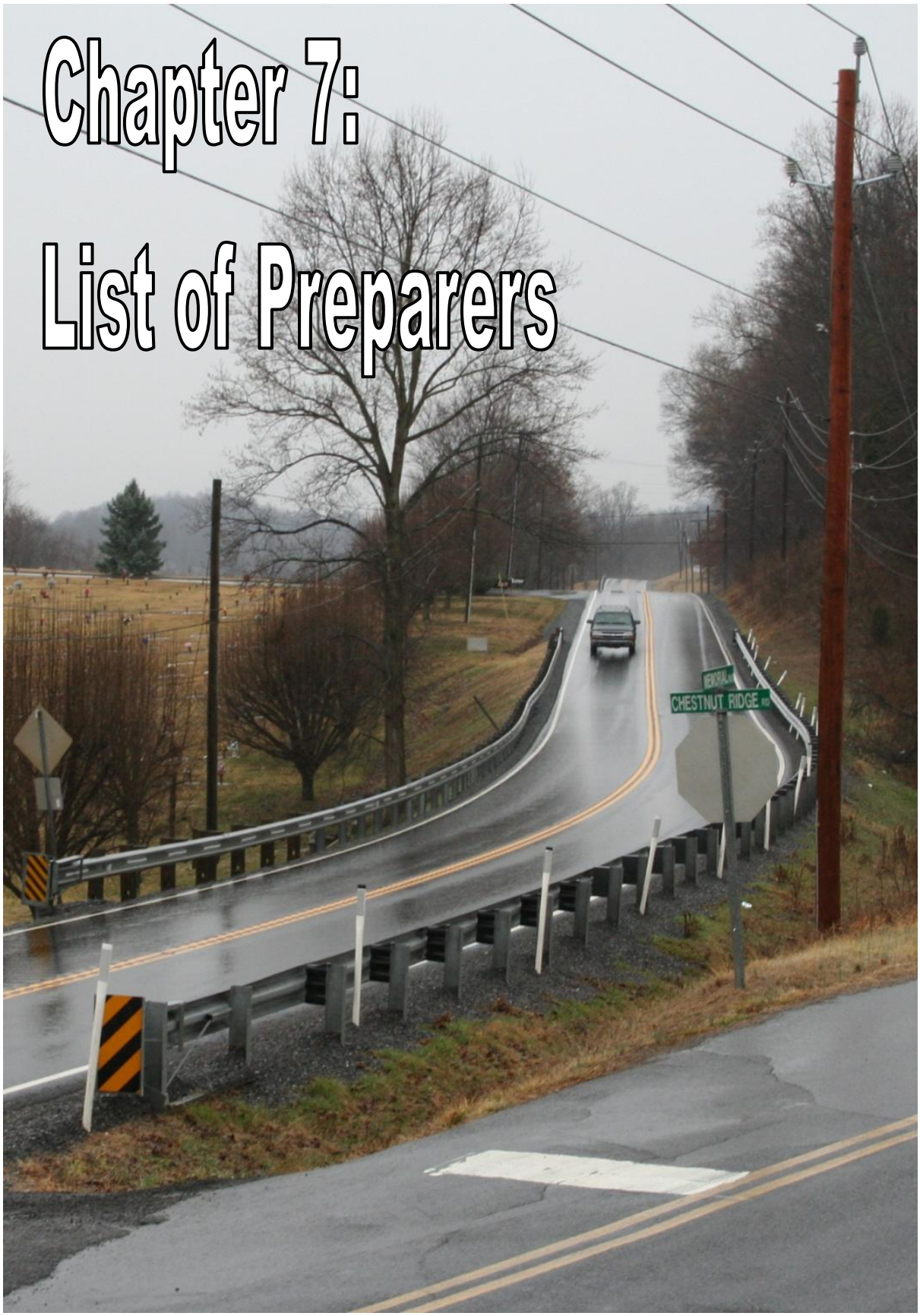
Transportation Research Board

2000 Highway Capacity Manual

United States Bureau of Census

2010 Profiles for Census Tracts 408, 409, 410, 411, 422, 423, 424

Chapter 7: List of Preparers



7.0 LIST OF PREPARERS

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APPENDIX A INITIAL CORRESPONDENCE LETTERS

U.S. Department
of Transportation
**Federal Aviation
Administration**

Memphis Airports District Office
2862 Business Park Dr, Bldg G
Memphis, TN 38118-1555

Phone: 901-322-8180

January 22, 2009

Mr. Tom Love
Transportation Manager
State of Tennessee Department of Transportation
Suite 900, James K. Polk Bld.
505 Deaderick Street
Nashville, TN 37243-0334

Re: Coordination Package and Invitation to be a Participating Agency for State Route 126 (Memorial Boulevard) for State Route 126 (Memorial Boulevard) from East Center Street, in Kingsport, to Interstate 81, Sullivan County, Tennessee

Dear Mr. Love:

We have reviewed the proposed study and found no issue or concerns that could affect the nearest airport (Tri-Cities Regional Airport) in that area. We feel, from your proposal, that this project will have no environmental impact for future airport development nor is this project located within Airport Clear Zones. We would like to be notified if any changes should occur from the original studies.

Thank you for considering our opinion in your study and if you have any question feel free to call our office.

Sincerely,

James H. Williams
Program Manager

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1401

January 13, 2009

Mr. Tom Love
Tennessee Department of Transportation
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Dear Mr. Love:

SUBJECT: COORDINATION PACKAGE AND INVITATION TO BE A COOPERATING AND PARTICIPATING AGENCY FOR STATE ROUTE 126 (MEMORIAL BOULEVARD) FROM EAST CENTER STREET, IN KINGSPORT, TO INTERSTATE 81, SULLIVAN COUNTY, TENNESSEE

In response to your letter of December 15, 2008, TVA is pleased to participate as a cooperating agency in the development of the Environmental Impact Statement for this road project. Depending on the final alignment, the proposed highway improvements may require a TVA Section 26a permit.

As a cooperating agency under SAFETEA-LU and the Tennessee Environmental Streamlining Agreement, we would be pleased to work with you on defining the purpose and need, range of alternatives, and environmental analysis needs. We are not aware of unusual or unique environmental resources in the project area that should be addressed in the environmental review.

Sincerely,

Charles P. Nicholson
Program Manager
NEPA Resources
Environmental Services and Programs

Printed on recycled paper

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
Regulatory Branch
3701 Bell RD
Nashville, TN 37214

January 13, 2009

Regulatory Branch

SUBJECT: File No. 200900048; Proposed Improvements to State Route (SR) 126 (Memorial Boulevard) from East Center Street, in Kingsport, to Interstate 81, in Sullivan County, Tennessee

Mr. Tom Love
Transportation Manager
Tennessee Department of Transportation
Environmental Division
Suite 900, James K. Polk Building
Nashville, Tennessee 37243-0334

Dear Mr. Love:

We gladly accept the Participating Agency role with TDOT and FHWA in the development of the EIS for the subject project. Our participating agency responsibilities are explained in Section 6002 of SAFETEA-LU. In addition, we agree to be a Cooperating Agency in the preparation of the EIS in accordance with our CEQ responsibilities for implementing NEPA.

The Project Data Summary, EIS Coordination Plan for Agency and Public Involvement, maps, and other information submitted indicate that TDOT plans to improve an approximate eight-mile segment of SR-126 east of Kingsport, in Sullivan County, Tennessee. The project has logical termini at existing East Center Street and I-81. The current road would be improved and/or widened to segments of two to four lanes of traffic throughout the proposed planning length. The submittal states that the proposal would improve pedestrian/vehicle safety, emergency response times, and connectivity with eastern Sullivan county areas. In addition, the work would reduce travel delays for through traffic and complement regional and local economic development efforts.

Residential, undeveloped (woodlands, open fields, and active farmlands), and pockets of commercial and industrial land uses exist along the project study area. Alternatives being considered for evaluation include No Build, Transportation System Management, Mass Transit System, and a Build alternative developed through the Context Sensitive Solutions process. The Build alternative consists of improvements to the existing roadway following the existing alignment.

Based on the information provided and a brief examination of the Kingsport-TN and Indian Springs-TN/VA USGS quadrangle maps, we anticipate that Sougan Branch, Fall Creek, and other unnamed

tributaries to the South Fork Holston River (SFHR) would be impacted by the construction of the Build alternative. Impacts could result from culvert extensions and/or new road crossings.

The regulatory authorities and responsibilities of the Corps of Engineers (Corps) are based mainly on two laws: Section 404 of the Clean Water Act (33 USC 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403). Section 404 requires a Corps permit for any discharge of dredged or fill material into waters of the United States (WUS). Section 10 prohibits the obstruction or alteration of navigable waters of the United States (NWUS) without a Corps permit. Sougan Branch, Fall Creek, and other unnamed tributaries to the SFHR are considered WUS. No NWUS exist within the project study area. We do not have enough information at this time to estimate whether jurisdictional wetlands are present and would be affected by this proposal.

Our specific permitting requirements for construction of road crossings over jurisdictional waters would depend on the specific installation methods and associated impacts. Road crossings that would not involve substantial aquatic habitat alteration may qualify for authorization under our Nationwide Permit (NWP) program (33 CFR 330). Activities that do not qualify for NWP authorization would require approval under a standard Department of the Army (DA) permit.

Finally, our permit review would include application of the Section 404(b)(1) Guidelines (40 CFR 230). The Guidelines require that no discharge of dredged or fill material may be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

If you have any questions or wish to discuss DA permit requirements for the project in more detail, please contact me at 615/369-7519 or jose.r.hernandez@usace.army.mil.

Sincerely,

J. Ruben Hernandez

J. Ruben Hernandez
Project Manager
Operations Division

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
675 U.S. Courthouse
801 Broadway
Nashville, Tennessee 37203

December 22, 2008

Mr. Tom Love
Tennessee Department of Transportation
Suite 900, James K. Polk Bldg.
505 Deaderick Street
Nashville, TN 37243-0334

Dear Mr. Love:

We received your request for Environmental assessment and FPPA information for the State Route 126 highway project from East Center Street in Kingsport to Interstate 81, Sullivan County, TN

Your request for information related to environmental impacts is being forwarded to the Tennessee NRCS National Environmental Policy Act (NEPA) Coordinator to review and coordinate with other NRCS specialists for any comments or recommendations they may have pertaining to this project.

The following NRCS specialist will supply a Farmland Conversion Impact Rating based upon information you submitted on Form CPA-106 and accompanying documents:
Livingston, Richard L, RESOURCE SOIL SCI
KNOXVILLE SERVICE CENTER
9737 COGDILL RD
KNOXVILLE, TN 37918
(865) 671-3830 x 3

Some other items in your request are outside of the authority of our agency or we do not have the expertise to provide that type of information for your organization.

Our soil survey information can also be found online at http://websoilsurvey.nrcs.usda.gov. This website will provide you with all of our most current soil survey data and interpretations including prime farmland and hydric soils.

The Natural Resources Conservation Service provides leadership in a partnership effort to help people
to conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

Please feel free to call me at (615) 277-2550, or e-mail me at doug.slabaugh@tn.usda.gov, if you have questions about this request, or if you need assistance with accessing our soils information on the web and any other needs that may arise for Tennessee Soil Survey products or information.

Sincerely,

J. DOUGLAS SLABAUGH
State Soil Scientist

Cc: (w/enclosures)
Rick Livingston, NRCS Resource Soil Scientist, Knoxville, TN
Carol Chandler, NRCS NEPA Coordinator, Nashville, TN

NRCS:SS:JD Slabaugh::12/22/08

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
9737 Cogdill Road, Suite 152C
Knoxville, TN 37932
Phone 865-671-3830 x. 112

January 12, 2009

Mr. Tom Love
Tennessee Department of Transportation
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, TN 37243-0334

Project: State Route 126 (Memorial Blvd.) from East Center St. in Kingsport to I-81 Sullivan County, TN

Dear Mr. Love,

The request for soils information that was sent to Mr. Kevin Brown forwarded to me. I will be addressing the portion of the request concerning the Farmland Protection Policy and hydric soils

This information was compiled using a corridor of 1,000 ft. on either side of existing S.R. 126 as specified in the information you sent. This project will result in the conversion of 132 acres of Prime Farmland as defined in the Farmland Protection Policy Act. Form AD-1006 is attached to this letter to document this determination. Prime farmland is land that has the best combination of physical and chemical characteristics, growing season, and moisture supply for producing agricultural crops. Generally, land may be pasture, forestland, or cropland but may not be urban built-up land or waterways. Additionally, construction within an existing right-of-way purchased on or before August 4, 1984 is not subject to the Farmland Protection Policy Act.

Concerning Hydric Soils, there are 54 map units of Bloomingdale silty clay loam, 0 to 2 percent slopes, occasionally flooded within the corridor. These 4 map units occupy about 47 acres of the total 2,100 acres. Hydric soil criteria is only one of the 3 factors used in determining a wetland. Areas of hydric soils may or may not meet all of the requirements of a wetland.

Much of our soils information is available on-line at http://websoilsurvey.nrcs.usda.gov/app/
Additional information on Prime Farmland may be obtained at our websites
www.tn.nrcs.usda.gov/technical/soils/fppa.html or www.nrcs.usda.gov/programs/fppa/ .

Feel free to contact me if I may be of further assistance.
Sincerely,

Richard Livingston
Resource Soil Scientist

Enclosure

U.S. DEPARTMENT OF AGRICULTURE

Form AD-1006

FARMLAND CONVERSION IMPACT RATING

PART 1 ***(To be completed by Federal Agency)***	1. Date of Land Evaluation Request **December 12, 2008**	2. Sheet 1 of 1
3. Name of Project **SR 126, Memorial Boulevard**	4. Federal Agency Involved **US Department of Transportation, Federal Highway Administration**	
5. Proposed Land Use **Improved Highway Corridor**	6. County and State **Sullivan County, TN**	7. Type of Project: Corridor **X** Other ☐
PART II ***(To be completed by NRCS)***	1. Date Request Received by NRCS	2. Person Completing the NRCS parts of this form

3. Does the site or corridor contain prime, unique ,statewide or local important farmland? Yes X No ☐ (If no, the FPPA does not apply - Do not complete additional parts of this form)		4. Acres Irrigated **NA**	5. Average Farm Size **120 acres**
6. Major Crop(s) **Corn**	7. Farmable Land in Government Jurisdiction Acres: **97,375** **35%**	8. Amount of Farmland As Defined in FPPA Acres: **16,623** **6 %**	
9. Name of Land Evaluation System Used LESA	10. Name of Local Site Assessment System None	11. Date Land Evaluation Returned by NRCS January 12, 2009	

PART III ***(To be completed by Federal Agency)***		**Alternative Site Rating**			
		Alternate A	**Alternate B**		
A. Total Acres To Be Converted Directly		**239 acres**	**121 acres**		
B. Total Acres To Be Converted Indirectly, Or To Receive Services					
C. Total Acres in Site		**239 acres**	**121 acres**		
PART IV ***(To be completed by NRCS) Land Evaluation Information***					
A. Total Acres Prime and Unique Farmland		**132.0**	**132.0**		
B. Total Acres Statewide and Local Important Farmland		**15**	**5**		
C. Percentage of Farmland in County or Local Govt. Unit to be Converted		**0.01**	**0.01**		
D. Percentage of Farmland in Govt. Jurisdiction with Same or Higher Relative Value		**80%**	**80%**		
PART V ***(To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland to be Serviced or Converted (Scale of 0 - 100 Points)***		**18**	**18**		
PART VI ***(To be completed by Federal Agency) Corridor or Site Assessment Criteria (These criteria are explained in*** **7 CFR 658.5(b & c))**	**Max. Points Corridor**				
1. Area in Nonurban Use	15	9	9		
2. Perimeter in Nonurban Use	10	7	7		
3. Percent of Site Being Farmed	20	12	12		
4. Protection Provided by State and Local Government	20	5	5		
5. Distance from Urban Built-up area	0	NA	NA		
6. Distance to Urban Support Services	0	NA	NA		
7. Size of Present Farm Unit Compared to Average	10	8	8		
8. Creation of Non-Farmable Farmland	25	1	1		
9. Availability of Farm Support Services	5	5	5		
10. On-Farm Investments	20	10	10		
11. Effects of Conversion on Farm Support Services	25	2	2		
12. Compatibility with Existing Agricultural Use	10	5	5		
TOTAL CORRIDOR OR SITE ASSESSMENT POINTS	160	64	64		
PART VII ***(To be completed by Federal Agency)***					
Relative Value of Farmland (from Part V above)	100	18	18		
Total Corridor or Site Assessment (From Part VI above or a local site assessment)	160	64	64		
TOTAL POINTS ***(Total of above 2 lines)***	260	82	82		

PART VIII ***(To be completed by Federal Agency after final alternative is chosen)***

1. Corridor or Site Selected: Improvements to SR 126, Memorial Blvd. from East Center Street to Interstate 81 in Kingsport, TN.	2. Date of Selection: NA	3. Was A Local Site Assessment Used? Yes X No ☐

4. Reason For Selection:

Selection has not been made – This is a comparison of the two proposed Build Alternatives.

Signature of person completing the Federal Agency parts of this form:

Sullivan County
State Route 126
Memorial Boulevard
LESA Site Assessment

United States Department of the Interior

OFFICE OF SURFACE MINING
Reclamation and Enforcement
710 Locust Street, Second Floor
Knoxville, TN 37902

January 9, 2009

Mr. Tom Love
Tennessee Department of Transportation
Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Subject: Invitation to be a Participating Agency in Development of an Environmental Impact Statement for Proposed Improvements to State Route 126 (Memorial Boulevard) from East Center Street in Kingsport to Interstate 81, Sullivan County, Tennessee

Dear Mr. Love:

Thank you for your correspondence of December 12, 2008, concerning development of an environmental impact statement (EIS) for the above proposed improvement. The Office of Surface Mining Reclamation and Enforcement's Knoxville Field Office appreciates your invitation to be a participating agency in the development of the EIS. As a coal regulatory agency, our area of interest is generally limited to the coalfields of East Tennessee and this project lies well outside the coalfield area. This in combination with the fact that mineable coal is not known to exist in the Sullivan County area, and the fact that Federal regulations at 30 CFR Section 707 provide for a broadly based exemption from complying with Federal mining regulations for coal extraction incident to government financed highway construction, make it unlikely that our agency would have any jurisdiction or authority with respect to this proposed project. As such, we must decline your invitation to participate. Again thank you for providing this opportunity and we look forward to working with you on future projects.

Sincerely,

Earl Bandy, Director
Knoxville Field Office

TAKE PRIDE IN AMERICA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

January 30, 2009

Mr. Tom Love
Tennessee Department of Transportation
Environmental Planning and Permits Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Re: Initial Coordination for State Route 126 Improvements from East Center Street to Interstate 81, Sullivan County, Tennessee

Dear Mr. Love:

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), is initiating an Environmental Impact Statement (EIS) for proposed improvements to State Route 126 in Sullivan County, Tennessee. The proposed project is considered necessary to improve and complete system linkages; enhance regional and local mobility for the general public, as well as, emergency vehicles; improve traffic capacity and safety conditions; and enhance regional and local economic development opportunities.

TDOT and the FHWA have requested that the U.S. Fish and Wildlife Service (Service) be a participating agency with the development of the EIS. Acceptance of this request does not imply that the Service supports the proposal or has any special expertise with respect to the evaluation of the project.

We have reviewed the project summary and the possible role that our agency would have in the development of the State Route 126 improvement project. We accept the invitation to be a participating agency in the development of this project. We have also reviewed our existing database for any records of federally listed species near the proposed project. Our collection records do not indicate that federally listed or proposed endangered or threatened species occur within the proposed study area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

If you have any questions regarding the information which we have provided, please contact Robbie Sykes of my staff at 931/528-6481, extension 209.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

RECEIVED
JAN 02 2009
TDOT-Environmental Division

December 30, 2008

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

Mr. Charles Bush
Tennessee Dept. of Transportation
Suite 700/J. K. Polk Bldg.
Nashville, Tennessee, 37243-0349

RE: FHWA, SR-126/E. CENTER ST. TO I-81, KINGSPORT, SULLIVAN COUNTY

Dear Mr. Bush:

In response to your request, received on Monday, December 22, 2008, we have reviewed the documents you submitted regarding your proposed 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 applicant for federal assistance to consult with t he a ppropriate S tate H istoric P reservation O ffice bef ore t hey c arry o ut their p roposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process. You may also find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at http://www.tennessee.gov/environment/hist/federal/sect106.shtml

Considering available information, we find, after applying the Criteria of Adverse Effect codified at 36 CFR Part 800, that the project as currently proposed will ADVERSELY AFFECT YANCEY'S TAVERN, A PROPERTY THAT IS ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES. You should now, through FHWA, inform the Advisory Council on Historic Preservation of this adverse effect determination and begin immediate consultation with our office. Please enclose a copy of this determination in your notification to the Council as delineated at 36 CFR Part 800. Until you have received a final comment on this project from this office and the Council, you have not completed the Section 106 review process. Please direct questions and comments to Joe Garrison (615) 532-1550-103. We appreciate your cooperation.

Sincerely,

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

EPM/jyg

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

January 20, 2009

RECEIVED
JAN 26 2009
TDOT-Environmental Division

Charles Bush
State of Tennessee
Department of Transportation
Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, TN 37243-0334

Re: Invitation to be a Participating Agency for State Route 126 (Memorial Boulevard) from East Center Street, in Kingston, to Interstate 81 in Sullivan County, Tennessee

Dear Mr. Bush:

The Tennessee Wildlife Resource Agency has received and reviewed the information your office provided to us regarding the invitation to be a participating agency for State Route 126 (Memorial Boulevard) from East Center Street, in Kingston, to Interstate 81 in Sullivan County, Tennessee. Our current concerns are potential environmental impacts associated with potential stream and wetland impacts due to the construction of this project. We accept the invitation to participate in this process and encourage continued consultation with our agency in future phases of this project to further reduce impacts to fish and wildlife resources.

We thank you for the opportunity to comment during the initial coordination process and look forward to working with TDOT personnel in the future to reduce potential impacts to fish and wildlife resources associated with this project.

Sincerely,

Robert M. Todd

Robert M. Todd
Fish and Wildlife Environmentalist

cc: Rob Lindbom, Region IV Habitat Biologist
Bob Nichols, Region IV Manager

KINGSPORT METROPOLITAN PLANNING ORGANIZATION

TENNESSEE: KINGSPORT, SULLIVAN COUNTY, HAWKINS COUNTY, MOUNT CARMEL, CHURCH HILL
VIRGINIA: SCOTT COUNTY, WEBER CITY, GATE CITY

January 16, 2009

Tom Love
Transportation Manager I
TDOT- Environment Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, TN 37243

Dear Tom:

We are in receipt of your letter to us concerning the initiation of an Environmental Impact Statement on the CSS-based State Route 126 project within the City of Kingsport and Sullivan County. Please note the City of Kingsport, in cooperation with the Kingsport MPO, enthusiastically agrees to, and accepts, your invitation to become a participating agency in this process and will work to provide staff time and/or any input you may need from our resources to complete the review. This includes, but is not limited to, providing early input in determining the range of alternatives for improvements to SR 126, and participation in coordination meetings and joint field reviews.

As we look forward to working with your agency on this phase, we also want to express our appreciation for your willingness to advance one of the MPO's priority projects. In addition, if you need further information or have additional questions concerning this matter, please feel free to call our offices at (423) 224-2677 or (423) 229-9400.

Sincerely,

William A. Albright,
Transportation Planning Manager – Kingsport MPO

CC: John Campbell, City of Kingsport
Jeff Fleming, City of Kingsport
Ray Hensen, TDOT
Steve Allen, TDOT

225 West Center Street – Kingsport, Tennessee 37660-4237 – Phone (423) 229-9400 Fax (423) 224-2590
www.ci.kingsport.tn.us

SULLIVAN COUNTY

Offices of Land Use

Department of Planning, Zoning & GIS

3411 Hwy. 126, Suite 30
Blountville, TN 37617
Telephone (423) 323-6440
Fax (423) 279-2886

Building Commission
Planning and Zoning
Solid Waste
G. I. S.
Health and Safety

RECEIVED
JAN 09 2009
TDOT-Environmental Division

January 7, 2009

Charles E. Bush, Transportation Manager 2
TDOT – Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, TN 37243-0334

RE: Participation in the SR126/Memorial Blvd. Planning Committee

Dear Mr. Bush,
As a previous member of the Local Resource Team on the SR126/Memorial Blvd. study, representing Sullivan County, I would like to continue my service on this project. Lucian Lawson, Director of Land Use for Sullivan County, received the package of material from you dated December 15, 2008 instructing him to confirm in writing his participation in this transportation planning project. Please note, Mr. Lawson was not previously involved with the Local Resource Committee. His title can be misleading to some, as he serves as director of sanitation, solid waste, sewer expansions and the recycling programs for Sullivan County. I am the county's Director of Planning and would be happy to continue to serve on this city-county-state planning project.

Please accept this confirmation for my participation on behalf of Sullivan County. Thank you for your continued interest and service with Sullivan County's transportation needs.

Warm regards,

Ambre M. Torbett, AICP
director

copy: Mayor, Steve Godsey
Lucian Lawson, Sanitation Director
Bill Albright, Kingsport MPO

APPENDIX B CULTURAL RESOURCES

Preserving America's Heritage

February 18, 2011

Ms. Leigh Ann Tribble
Environmental Program Engineer
FHWA – Tennessee Division
404 BNA Drive, Suite 508
Nashville, TN 37217

Ref: *Proposed Improvements to SR-126 (Memorial Boulevard) from East Center Street to I-81 Kingsport, Sullivan County, Tennessee*

Dear Ms. Tribble:

On February 7, 2011, the Advisory Council on Historic Preservation (ACHP) received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information you provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Tennessee State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require further assistance, please contact Ms. Najah Duvall-Gabriel at 202-606-8585 or at ngabriel@achp.gov.

Sincerely,

LaShavio Johnson

LaShavio Johnson
Historic Preservation Technician
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone:202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

March 22, 2005

Ms. Martha Carver
Tennessee Department of Transportation
505 Deaderick St/900
Nashville, Tennessee, 37243-0349

RE: FHWA, ARCHITECTURAL SURVEY REPORT, SR-126/E, CENTER ST. TO I-81, KINGSPORT, SULLIVAN COUNTY

Dear Ms. Carver:

In response to your request, received on Thursday, March 17, 2005, we have reviewed the documents you submitted regarding your proposed 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 applicant 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. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process.

Considering the information provided, we find that the area of potential effect contains one architectural resources eligible for listing in the National Register of Historic Places that may be affected by this undertaking, the Shipley-Jarvis House. We further find that the area of potential effect contains one architectural resources listed in the National Register of Historic Places that may be affected by this undertaking, Yancey's Tavern. You should notify interested persons and make the documentation associated with this finding available to the public.

All borrow areas outside proposed rights-of-way will require separate certification as specified under Section 107.06-Federal Aid Provisions. If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, please contact us to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act.

This office appreciates your cooperation.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jyg

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

November 3, 2008

Ms. Martha Carver
Tennessee Department of Transportation
505 Deaderick St/900
Nashville, Tennessee, 37243-0349

RE: FHWA, DOCUMENTATION OF EFFECT, SR-126 IMPVTS./E. CENTER ST. TO I-81, KINGSPORT, SULLIVAN COUNTY

Dear Ms. Carver:

In response to your request, received on Wednesday, October 22, 2008, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. Based on the information provided, we concur with your agency's determination that the area of potential effects contains the Yancey's Tavern that is eligible for listing in the National Register of Historic Places.

This office further concurs with TDOT's finding of project adverse impact on the Yancey's Tavern. You should notify interested persons and make the documentation associated with this finding available to the public as defined at 36 CFR 800 and seek the comments of the Advisory Council on Historic Preservation.

If project plans are changed or archaeological remains are discovered during 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. Your cooperation is appreciated.

Sincerely,

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

EPM/jyg

February 26, 2010

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

Mr. Tom Love
TDOT Environmental Division
505 Deadrick Ave./900
Nashville, Tennessee, 37243-0334

RE: FHWA, SR-126/E. CENTER ST. TO I-81, UNINCORPORATED, SULLIVAN COUNTY

Dear Mr. Love:

In response to your request, received on Tuesday, February 16, 2010, we have reviewed the documents you submitted regarding your proposed 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 applicant for federal assistance to consult with t he a ppropriate S tate H istoric P reservation O ffice bef ore t hey c arry o ut their p roposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process. You may also find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at http://www.tennessee.gov/environment/hist/federal/sect106.shtml

Considering available information, we find, after applying the Criteria of Adverse Effect codified at 36 CFR Part 800, that the project as currently proposed will ADVERSELY AFFECT PROPERTIES THAT ARE ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES. You should now, through FHWA, inform the Advisory Council on Historic Preservation of this adverse effect determination and begin immediate consultation with our office. Please enclose a copy of this determination in your notification to the Council as delineated at 36 CFR Part 800. Until you have received a final comment on this project from this office and the Council, you have not completed the Section 106 review process. Please direct questions and comments to Joe Garrison (615) 532-1550-103. We appreciate your cooperation.

Sincerely,

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

EPM/jyg

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

July 14, 2010

Mr. Gerald Kline
Tennessee Department of Transportation
Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: FHWA, ARCHAEOLOGICAL AVOIDANCE PLAN, SR-126/NORTH CENTER ST. TO I-81, UNINCORPORATED, SULLIVAN COUNTY, TN

Dear Mr. Kline:

At your request, our office has reviewed the above-referenced archaeological avoidance plan in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we find that the revised project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

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

EPM/jmb

EASTERN SHAWNEE TRIBE
OF OKLAHOMA

P.O. Box 350 · Seneca, MO 64865 · (918) 666-2435 · FAX (918) 666-3325

November 24, 2003

Department of Transportation
Environmental Planning & Permitting Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Re: See Attached

To Whom It May Concern:

Thank you for notice of the referenced project(s). The Eastern Shawnee Tribe of Oklahoma is currently unaware of any documentation directly linking Indian Religious Sites to the proposed construction. In the event any items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered during construction, the Eastern Shawnee Tribe request notification and further consultation.

The Eastern Shawnee Tribe has no objection to the proposed construction. However, if any human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, the construction should stop immediately, and the appropriate persons, including state and tribal NAGPRA representatives contacted.

Sincerely,

Charles Enyart

Charles Enyart, Chief
Eastern Shawnee Tribe of Oklahoma

1. ? Site 1: Culvert Improvements over westbound ramp of I-40 at Log Mile 12.23
   Site 2: Bridge repair at the I-40 bridge over State Route 58 at Log Mile 12.34

2. Section 106 initial coordination for proposed improvements to State Route 126 (Memorial Blvd.) from E. Center St. in Kingsport to I-81, Sullivan County, Tennessee 2003190

3. Section 106 initial coordination for proposed bridge improvements to Yarnell Road (E516) over Little Dismal Creek, LM 0.96, Anderson County, Tennessee 2003194

4. Section 106 initial coordination for proposed bridge improvements to Ella West Road (A092) over East Fork Lynn Creek, LM 2.42, Giles County, Tennessee 2003192

5. Section 106 initial coordination for proposed bridge improvements to Earl Townsend Road (A372) over West Fork Shoal Creek, LM 0.07, Giles County Tennessee 2003191

6. Section 106 initial coordination for proposed bridge improvements to Martin Luther King Drive (A584) over Branch, LM 0.08, Madison County, Tennessee 2003193

7. Section 106 initial coordination for proposed bridge improvements to Binkley Acres Road (E488) over Brushy Fork Creek, LM 0.06, Anderson County, Tennessee 2003195

8. Section 106 initial coordination for proposed bridge improvements to Beech Road (A045) over Morgan's Creek, LM 2.79, Overton County, Tennessee 2003197

9. Section 106 initial coordination for proposed bridge improvements to Beech Road (A045) over Bryan's Fork Creek, LM 0.93, Overton County, Tennessee 2003196

10. Section 106 initial coordination for proposed bridge improvements to Trentham Hollow Road over Clear Creek, LM 2.95, Cocke County, Tennessee 2001126

Creek Nation of Oklahoma

Cultural and Historic Preservation

December 11, 2003

Gerald Kline
State of Tennessee-Department of Transportation
Environmental Planning and Permits Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Subjects: SEE ATTACHED

Dear Mr. Kline:

In keeping with a government-to-government relationship and in compliance with 36CFR800, the Muscogee (Creek) Nation appreciates the invitation to participate as a consulting party.

At this time, we are unaware of any cultural or archaeological sites in the above project area that would be eligible for inclusion in the National Register.

In the event that human remains or culturally significant artifacts are inadvertently discovered during construction, please contact me at (918) 732-7732.

Respectfully,

Tim Thompson
Research Specialist
Muscogee Creek Nation

jj

Creek Nation Tribal Complex · Highway 75 & Loop 56 · P.O. Box 580 · Okmulgee, Oklahoma 74447 · 918/756-8700 · Fax 918/756-291

SUBJECTS:

Section 106 Initial Coordination for Proposed Bridge Improvements to Ella West Road (A092) over East Fork Lynn Creek, LM 2.42, Giles County, Tennessee 2003192

Section 106 Initial Coordination for Proposed Bridge Improvements to Earl Townsend Road (A372) over West Fork Shoal Creek, LM 0.07, Giles County, Tennessee 2003191

Section 106 Initial Coordination for Proposed Bridge Improvements to Martin Luther King Drive (A584) over Branch, LM 0.08, Madison County, Tennessee 2003193

Section 106 Initial Coordination for Proposed Bridge Improvements to Binkley Acres Road (E488) over Brushy Fork Creek, LM 0.06, Anderson County, Tennessee 2003195

Section 106 Initial Coordination for Proposed Bridge Improvements to Beach Road (A045) over Morgan's Creek, LM 2.79, Overton County, Tennessee 2003197

Section 106 Initial Coordination for Proposed Bridge Improvements to Beech Road (A045) over Bryan's Fork Creek, LM 0.93, Overton County, Tennessee 2003196

Section 106 Initial Coordination for Proposed Bridge Improvements to Trentham Hollow Road over Clear Creek, LM 2.95, Cocke County, Tennessee 2001124

X Section 106 Initial Coordination for Proposed Bridge Improvements to State Route 126 (Memorial Blvd) from E. Center St. in Kingsport to I-81, Sullivan County, Tennessee 2003190

Section 106 Initial Coordination for Proposed Bridge Improvements to Yarnell Road (E516) over Little Dismal Creek, LM 0.96, Anderson County, Tennessee 2003194

Section 106 Initial Coordination for Proposed Bridge Improvements to State Route 70 over Nolichuncky River, LM 8.51, Green County, Tennessee 980059

The Eastern Band of Cherokee Indians
Tribal Historic Preservation Office
P.O. Box 455, Cherokee, NC 28719
(828) 488-0237 / Fax (828) 497-1590

3/19/04

RE: PFH-306(7)-Polk Co
Petty Lane (A571) over Carter Creek, LM 2.32, Maury Co 2003207
Fitzgerald Rd (A088) over Snow Creek, LM 2.98, Maury Co 2005205
Cane Creek Church Rd (A130) over Cane Creek, LM 0.06, Perry Co 2003221
State Route 141 (N) at State Route 10/25, Trousdale Co 2003207
State Route 245 (Campbellsville Pike) and Indian Camp Springs Rd, Maury Co 2003
Roaring Fork Creek (A845) over Roaring Fork Creek, LM 0.01, Sevier Co 2001
Bridge Improvements to SR 56 over Piney Creek, LM 20.56, Grundy Co 2002
Bridge Improvements to SR 56 over Barren Fork, LM .77, Warren Co 2001
" " " SR 286 " " " LM 2.54, " " 2001
Bridge Improvements to Trentham Hollow Rd over Clear Creek LM 2.95, Cock

The Eastern Band of Cherokee Indians appreciates the invitation to participate as a consulting party in compliance with 36CFR800 on the above referenced project(s). According to the information you provided, the EBCI THPO is unaware of any known cultural resources or archaeological sites in the project area significant to our Tribe. However, should any cultural resources or human remains be encountered during the proposed project's activities, work should cease and this office should be contacted immediately.

As a consulting party we request that you send all information pertaining to cultural resources within the above-referenced project(s) area of potential effect (APE) for our review and comment. If you have any questions, please direct them to me at (828) 488-0237.

Sincerely,

Mi h

Michelle Hamilton
Tribal Historic Preservation Specialist
Eastern Band of Cherokee Indians
(828) 488-0237
michhami@nc-cherokee.com

PS: Sorry for the delay - working through a backlog

- Bridge Improvements to East Townsend Rd (A372) over West Fork Shoal Creek, LM 0.07, Giles Co 2003191

- Bridge Improvements to MLK Dr. (A584) over Branch LM 0.08, Madison Co 2003190

- Bridge Improvements to Binkley Acres Rd (E488) over Brushy Fork Creek LM 0.06 2003190 Anderson Co

- Bridge Imp. to Beech Rd (A045) over Morgan's Creek LM 2.79, Overton Co 2003189

- Bridge Imp. to Beech Rd (A045) over Bryan's Fork Creek, LM 0.93, Overton Co 2003190

- Bridge Imp. to Ella West Rd (A042) over East Fork Lynn Creek LM 2.42, Giles 2003194

- Bridge Imp. to Yarnell Rd (E516) over Little Dismal Creek, LM 0.96, Anderson Co 98059

- Bridge Imp. to SR 70 over Nolichucky R, LM 8.51, Greene Co 2003195

- Imp. to SR 126 (Memorial Blvd) from E. Center St in Kingsport to I-81, Sull, 2003204

- Imp in Rane Co 1) Culvert Imp over westbound ramp of I-40 @ LM 12.23, 2) Bridge repair at I-40 Bridge over SR 58 @ LM 12.34 2003203

- Imp in Marion Co 1) Rehab drainage on SR 2 @ LM 26.93, 2) Rehab drainage on SR 2 @ LM 27.78, 3) Replace drainage on SR 283 @ LM 5.40

- Imp SR 96 (Murfreesboro Rd) and Royal Oaks Blvd, Williamson Co 2003202

- Imp SR 96 (Murfreesboro Rd) and Royal Oaks Blvd, Williamson Co 2003187

- Bridge Imp to West 9th St Bridge over CSX Railroad LM 0.01, Maury Co 2003201

- Bridge Imp to Kennys Bend Rd (A230) over Lost Creek LM 1.23, Smith Co 2003191

- Bridge Imp to Harris Hollow Rd (A047) over Defeated Creek, LM 0.14, Smith Co 2000120

- Bridge Imp to SR 247 over Carters Creek LM 15.78, Maury Co 2000

- Bridge Imp to SR 1 (Kingston Pike) over Norfolk Southern Railroad, LM 15.17, Knox

- Bridge Imp to SR 33 (E. Broadway) over Brown Creek, LM 12.51, Blount Co 2003318

- Bridge Imp to Rock Branch Rd over Hanging Rock Creek, LM 0.78, Macon Co 2003179

- Bridge Imp to Carr Branch Rd over Carr Creek LM 0.89, Macon Co 2003178

- Bridge Imp to W. Wixtown Rd over West Fork Long Creek, LM 1.00, Macon Co 2003

- Bridge Imp to Trammel Creek Rd over Big Trammel Creek, LM 0.81, Macon Co 2003

- Bridge Imp to SR 117, McNairy Co > NOT IN TERRITORY! 200318

- Imp to SR 15 (US 64) at SR 117, Bedford Co 2001071

- Bridge Imp to SR 269 over Knob Creek, LM 11.10, Sevier Co 2003164

- Imp to SR 416-A, Two segments of Birds Creek Rd, Sevier Co 2003168

- Imp to Bay-Pass Rd from SR 16 to Georgia Crossing Rd, Georgia Crossing Rd from Bay-pass Road to East of Greenview Dr in Franklin Co 2003168

- Bridge Imp to SR 127 over I-24, LM 3.74, Coffee Co 2002015
- Imp at SR 336 and Blackhawk Rd, Blount Co 2003185
- Imp to SR 400 Bridge over Brush Creek @ LM 4.99, Washington Co 200201
- Imp to SR 1 over Southern Railroad @ LM 19.47, Knox Co 2002009
- Bridge Imp to SR 2 over Duck River, LM 12.72, Coffee Co 2002016
- Bridge Imp to Hawkins Rd over Big Trammel Creek, LM 0.82, Macon Co 2001156
- Bridge Imp to SR 107 over Indian Creek, LM 8.69, Unicoi Co 2000154
- Bridge Imp to SR 37 (US 19E) over Doe River, LM 6.65, Carter Co 2002008
- Bridge Imp to Sycamore Rd over Sycamore Creek, LM 7.32, Cannon Co 2001
- Imp to SR 30 (White St) to near Davidson Rd, McMinn Co 2004005
- Bridge Imp to I-24 over Elk River @ LM 1.25 and over Pelton Creek @ LM 1.57, Grundy Co 2003200

APPENDIX C ECOLOGY

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

November 17, 2011

Ms. Leigh Ann Tribble
Federal Highway Administration
Tennessee Division Office
404 BNA Drive, Suite 508
Nashville, Tennessee 37217

Subject: FWS #12-CPA-0072. Proposed construction to State Route 126 (Memorial Boulevard) from Center Street to Interstate 81; PIN# 105467.00, P.E. 82085-1225-14, Sullivan County, Tennessee.

Dear Ms. Tribble:

Thank you for your letter dated October 26, 2011, transmitting acoustic and mist netting survey results for the proposed construction to State Route 126 from Center Street to Interstate 81 in Sullivan County, Tennessee. At the request of our office, surveys were conducted along the proposed corridor to determine if the area is being utilized as summer roosting habitat by the federally endangered Indiana bat (*Myotis sodalis*). Personnel of the U.S. Fish and Wildlife Service have reviewed the information provided and offer the following comments.

Joint mist netting and acoustical studies were performed from August 3 through August 10, 2011, at six sites determined to contain suitable habitat for the Indiana bat. The acoustical study resulted in the recording of 883 bat calls, of which none were identified as Indiana bats. The mist netting efforts resulted in the capture of 26 bats, of which two individuals were federally endangered gray bats *(Myotis grisescens)*. The Tennessee Division Office agrees with the determination made by the Tennessee Department of Transportation (TDOT) that the project is "not likely to adversely affect" the Indiana bat because none were observed during surveys.

Due to negative Indiana bat surveys, we concur with TDOT's finding of "not likely to adversely affect" for the Indiana bat. Although it is likely that this project would have an insignificant effect on the Indiana bat, we would appreciate consideration given to the removal of trees with a DBH (diameter at breast height) of five inches or greater from October 15 through March 31 to further minimize potential for harm to the Indiana bat. Based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under the Act must be reconsidered if (1) new information reveals impacts

of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

The capture of two gray bats during survey efforts would indicate that this species utilizes the area streams as travel/feeding corridors. Our database indicates that the nearest gray bat cave is Morrell Cave, approximately 10 miles east of the project. We are unaware of any caves that would be impacted by the project and are concerned mainly for water quality along travel/feeding corridors. Best management practices, to include stringent erosion and sediment control measures, should be implemented throughout the project to minimize potential for harm to the gray bat.

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,

Mary E. Jennings
Field Supervisor

PROFESSIONAL ENGINEERS, INC

3 HMB Circle
U.S. 460
Frankfort, KY 40601
Office: (502) 695-9800
Fax: (502) 695-9810

FA-0168

RECEIVED
NOV 14 2007
By

November 8, 2007

Lee Barclay, Field Supervisor
U.S. Fish and Wildlife Service
Cookeville Field Office
446 Neal Street
Cookeville, TN 38501

Subject: Aquatic and Terrestrial Technical Study
Project: State Route 126 (Memorial Boulevard)
Sullivan County, Tennessee

Dear Mr. Barclay:

The Tennessee Department of Transportation has contracted with HMB Professional Engineers, Inc. to conduct a technical study for the proposed improvement of State Route 126 in Sullivan County, TN. The study will provide an assessment of the aquatic and terrestrial environment from Hermitage Drive in Kingsport, to Interstate 81 near Overhill Drive. The study corridor would include 1000 feet to either side of the existing SR 126.

HMB Professional Engineers, Inc. and the Tennessee Department of Transportation are requesting information concerning possible stream and wetland impacts, and potential impacts to threatened and endangered species that may occur within the area of this project.

Please review the enclosed information and provide any comments and concerns that might be associated with the proposed action. The USGS 7.5 minute quadrangle mapping which applies to the project has been included, and a copy of the project corridor has been included.

Thank you for your prompt attention to this request. If you have any questions or need further information, please contact John W. Brown, HMB Environmental Project Manager, or myself at (502) 695-9800 or at either of the following email addresses: srice@hmbpe.com or jwbrown@hmbpe.com.

No significant adverse impacts to wetlands or federally listed endangered or threatened species are anticipated from this proposal.

Lee A Barclay 12/7/07
Field Supervisor Date
U. S. Fish and Wildlife Service
Cookeville, TN 38501

Highway Engineering
Structural Engineering
Water & Wastewater
Site Development
Master Planning
Environmental Planning
Surveying
Project Management
Cost Estimation
Construction Inspection
Aviation Services
Environmental Remediation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

March 25, 2010

Mr. Tom Love
Tennessee Department of Transportation
Environmental Planning and Permits Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Subject: Concurrence points I and II. Proposed construction to State Route 126 (Memorial Boulevard), Sullivan County, Tennessee.

Dear Mr. Love:

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), is initiating National Environmental Policy Act (NEPA) documentation and analysis for the proposed construction to approximately 8.4 miles of State Route 126 between East Center Street and Interstate 81 (I-81) in Sullivan County, Tennessee. The purpose of this project is to improve the existing two-lane roadway, reduce the crash rates, and enhance travel and emergency response times from East Center Street in Kingsport to I-81. TDOT, the City of Kingsport, and local citizens conducted a Context Sensitive Solutions process which documents the majority decisions made by a Community Resource Team regarding design elements, roadway cross sections, and components of the project's purpose and need.

The *Purpose and Need and Study Area/ Alternatives to be Evaluated Package* was developed by TDOT to justify this project and outline the preferred build alternatives and their potential impacts in accordance with the National Environmental Policy Act and the Tennessee Environmental Streamlining Agreement (TESA). In accordance with TESA, TDOT has requested that the U.S. Fish and Wildlife Service review and provide concurrence (or non concurrence) on concurrence points 1 and 2, *Purpose and Need and Study Area/ Alternatives to be Evaluated Package*.

We have reviewed the *Purpose and Need and Study Area/ Alternatives to be Evaluated Package* and **concur** that it is adequate and that TDOT should proceed to Concurrence Point 3, *Draft Environmental Assessment*. Endangered species collection records available to the Service do not indicate that federally listed or proposed endangered or threatened species occur within the impact area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by

various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. However, based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action. The signed TESA concurrence points 1 and 2 package for this project is attached.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/528-6481 (ext. 228) or by email at john_griffith@fws.gov.

Sincerely,

Mary E. Jennings

Mary E. Jennings
Field Supervisor

Enclosure

APPENDIX D BUILD ALTERNATIVES CONCEPTUAL LAYOUTS

Legend

Alternative A

Alternative A on Aerial Photography

0 125 250 500 750 1,000 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.1

Woodside Dr
Orebank Rd
Matchline
Lynnbrook Ln
Edens Ridge Rd
N John B Dennis Hwy
Barger Pl
Inglewood Dr
Memorial Blvd
Right-of-Way
Matchline
Mountain Dr
Crestwood Dr
Hawthorne St
Locust St
Beverly Hills St
Bond Ln
Basbee St
Bonita St
Right-of-Way
Heather Ln
Matchline
Busbee St
Hillcrest Dr
N John B Dennis Hwy
N John B Dennis Hwy
Ridgeview St
Conway Dr
Ashley St
Stratford Rd
Milton Ct
Kent St

Legend

Alternative A

Alternative A on Aerial Photography

0 170 340 680 1,020 1,360 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.2

Legend

Alternative A

Alternative A on Aerial Photography

0 130 260 520 780 1,040 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.3

Legend

Alternative A

Alternative A on Aerial Photography

0 190 380 760 1,140 1,520 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.4

Legend

Alternative A

Alternative A on Aerial Photography

0 125 250 500 750 1,000 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.5

Legend

Alternative A

Alternative A on Aerial Photography

0 175 350 700 1,050 1,400 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.6

Legend

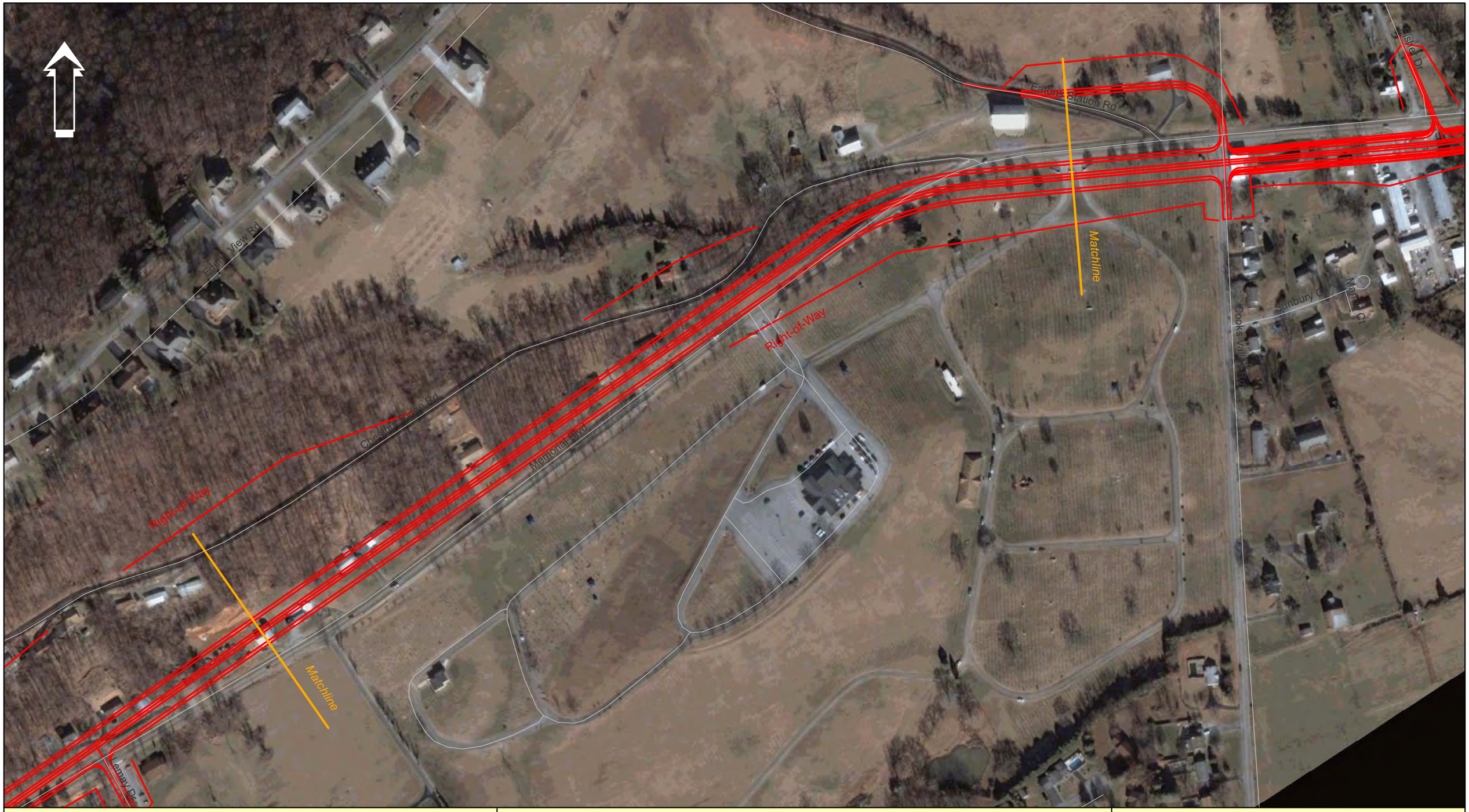
Alternative A

Alternative A on Aerial Photography

0 175 350 700 1,050 1,400 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.7



Legend

Alternative A

Alternative A on Aerial Photography

0 175 350 700 1,050 1,400 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.8

Legend

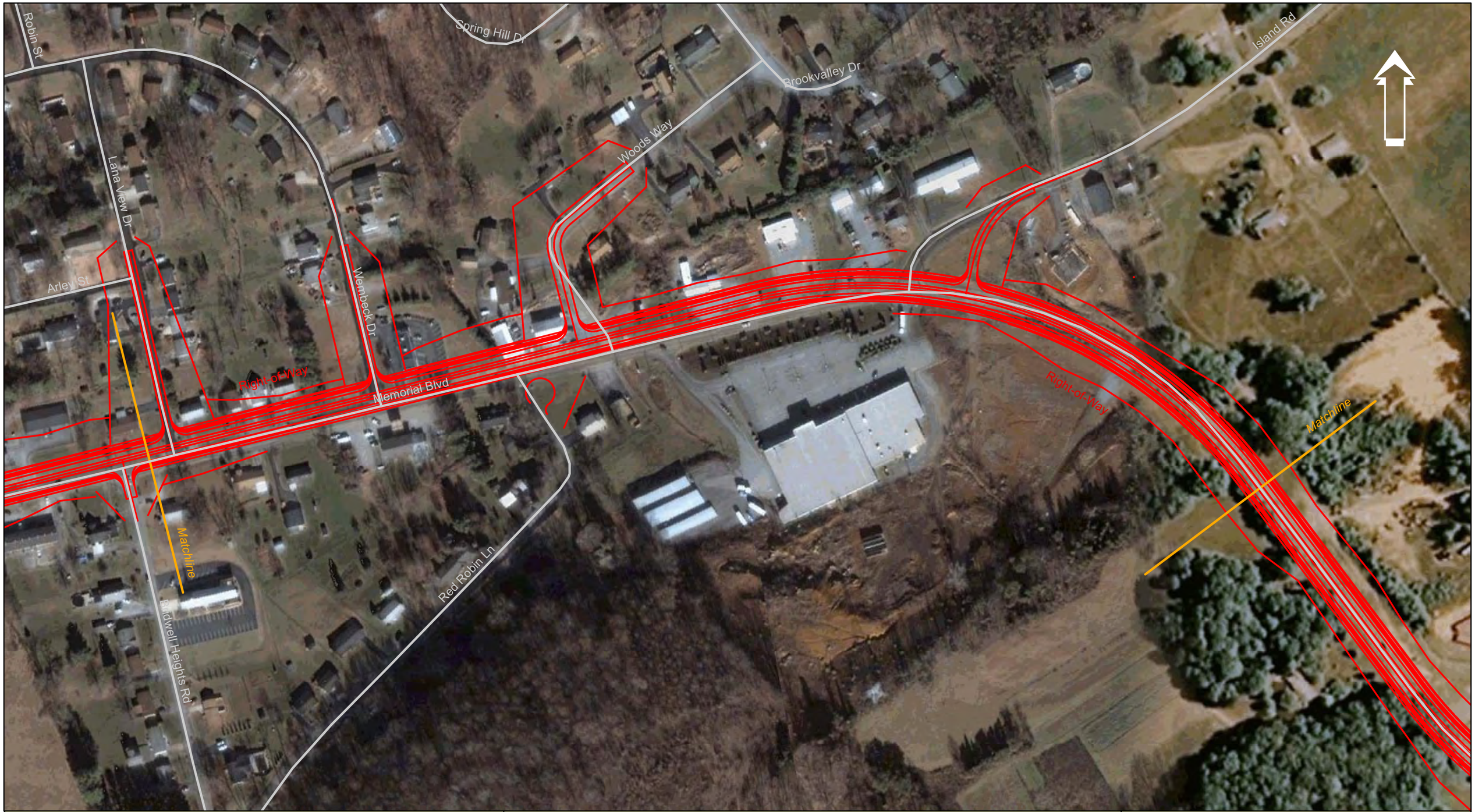
Alternative A

Alternative A on Aerial Photography

0 145 290 580 870 1,160 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.9



Legend

Alternative A

Alternative A on Aerial Photography

0 137.5 275 550 825 1,100 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.10

Legend

Alternative A

Alternative A on Aerial Photography

0 145 290 580 870 1,160 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.11

Legend

Alternative A

Alternative A on Aerial Photography

0 145 290 580 870 1,160 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

Satana Rd
Montezuma Rd
Oneida Ct
Natchez Ln
Huron Cir
Right-of-Way
Cassidy Dr
Matchline
Kiowa St
Mohican Ln
Memorial Blvd
Right-of-Way
Matchline
Hill Rd
Dakota Dr
Aztec Dr

Legend

Alternative A

Alternative A on Aerial Photography

0 145 290 580 870 1,160 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

Legend

Alternative A

Alternative A on Aerial Photography

0 145 290 580 870 1,160 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

Legend

Alternative A

Alternative A on Aerial Photography

0 145 290 580 870 1,160 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

A.15

Legend

Alternative A

Alternative A on Aerial Photography

0 190 380 760 1,140 1,520 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

Legend

Alternative A

Alternative A on Aerial Photography

0 260 520 1,040 1,560 2,080 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

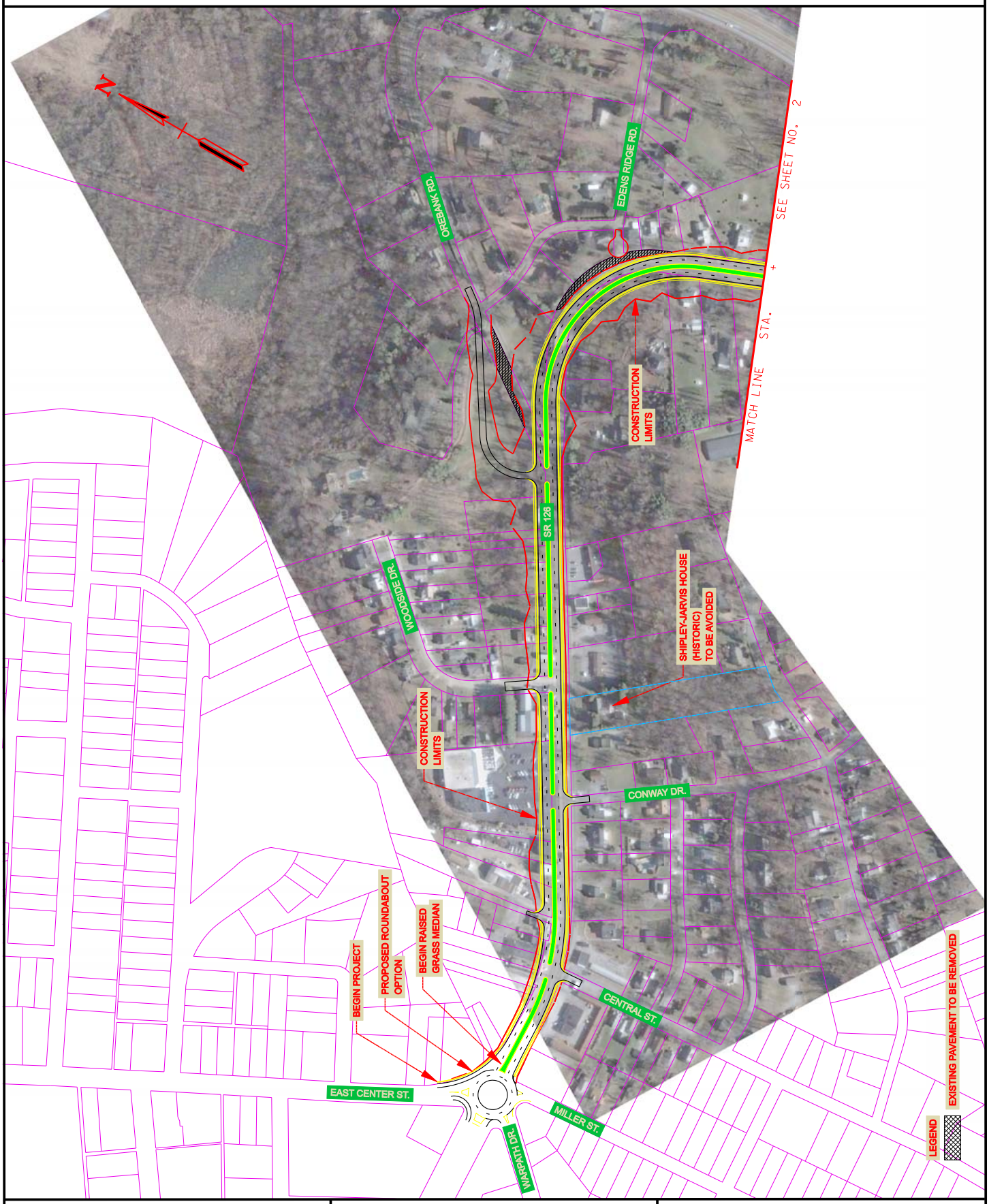
Legend

Alternative A

Alternative A on Aerial Photography

0 250 500 1,000 1,500 2,000 Feet

Sullivan County
SR 126 (Memorial Boulevard)
Alternative A

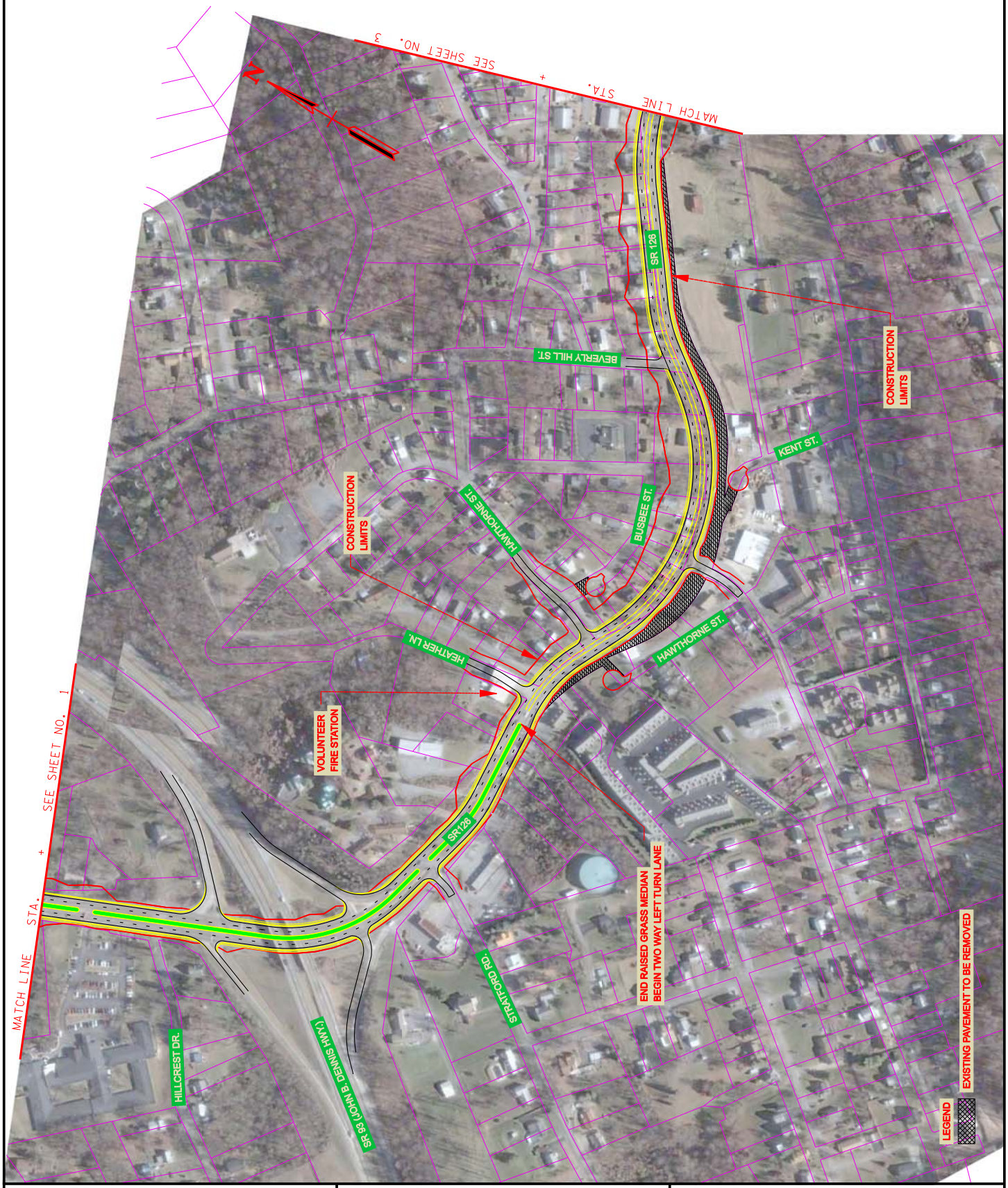


0 150 300 450

SCALE: 1 IN. = 400 FT.

SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 1



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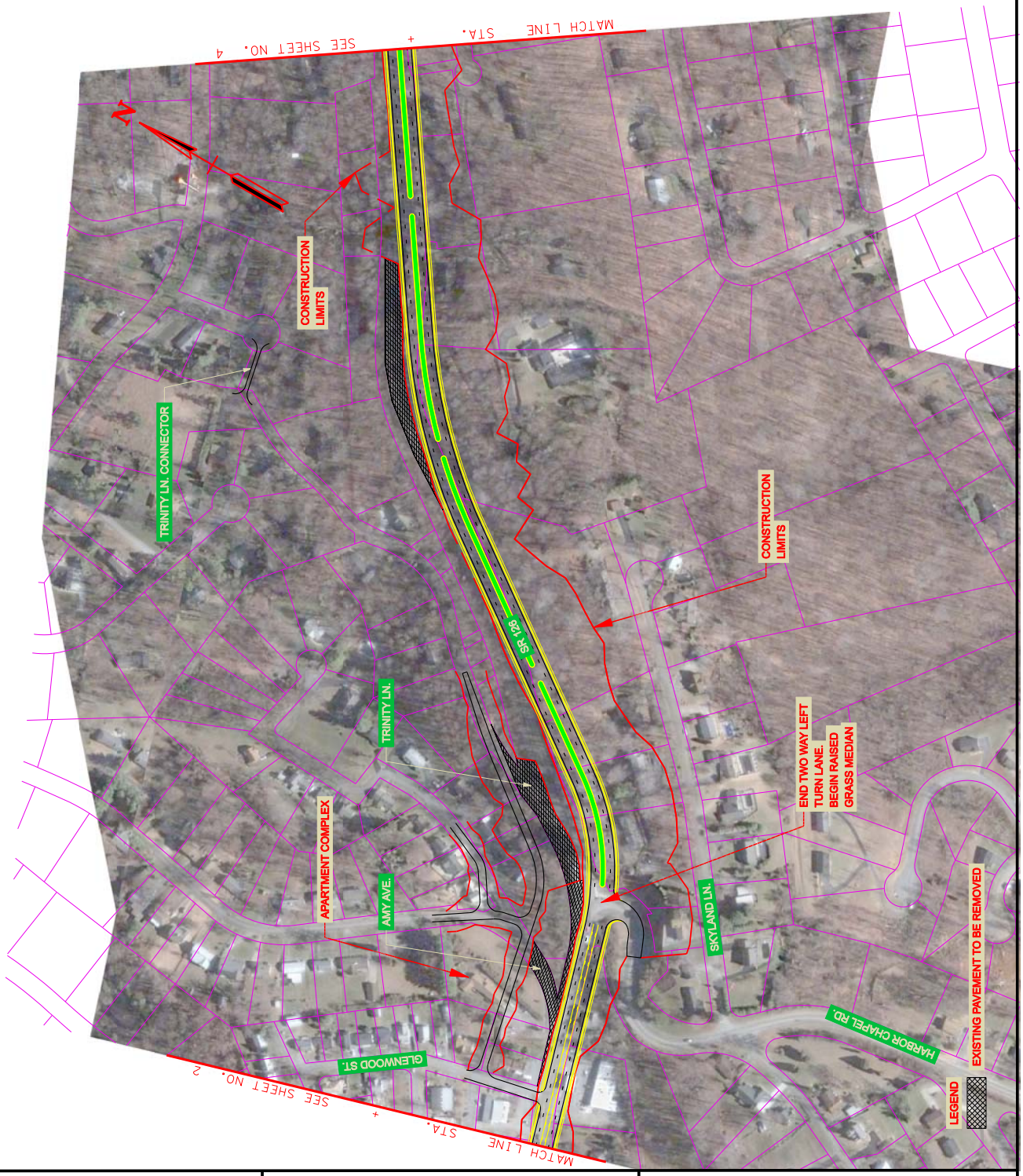
SCALE: 1 IN. = 400 FT.

SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 2



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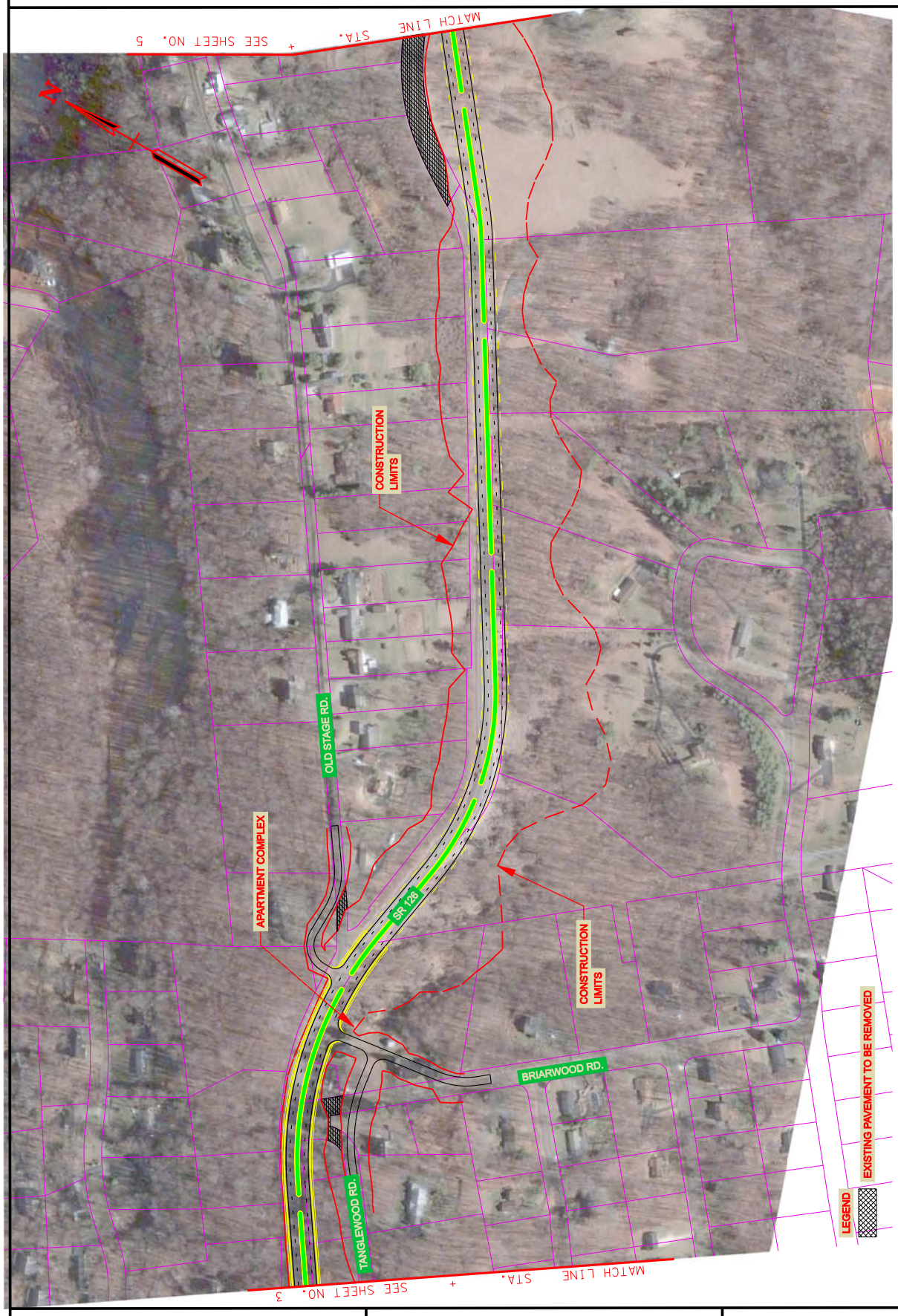
SCALE: 1 IN. = 400 FT.

SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 3

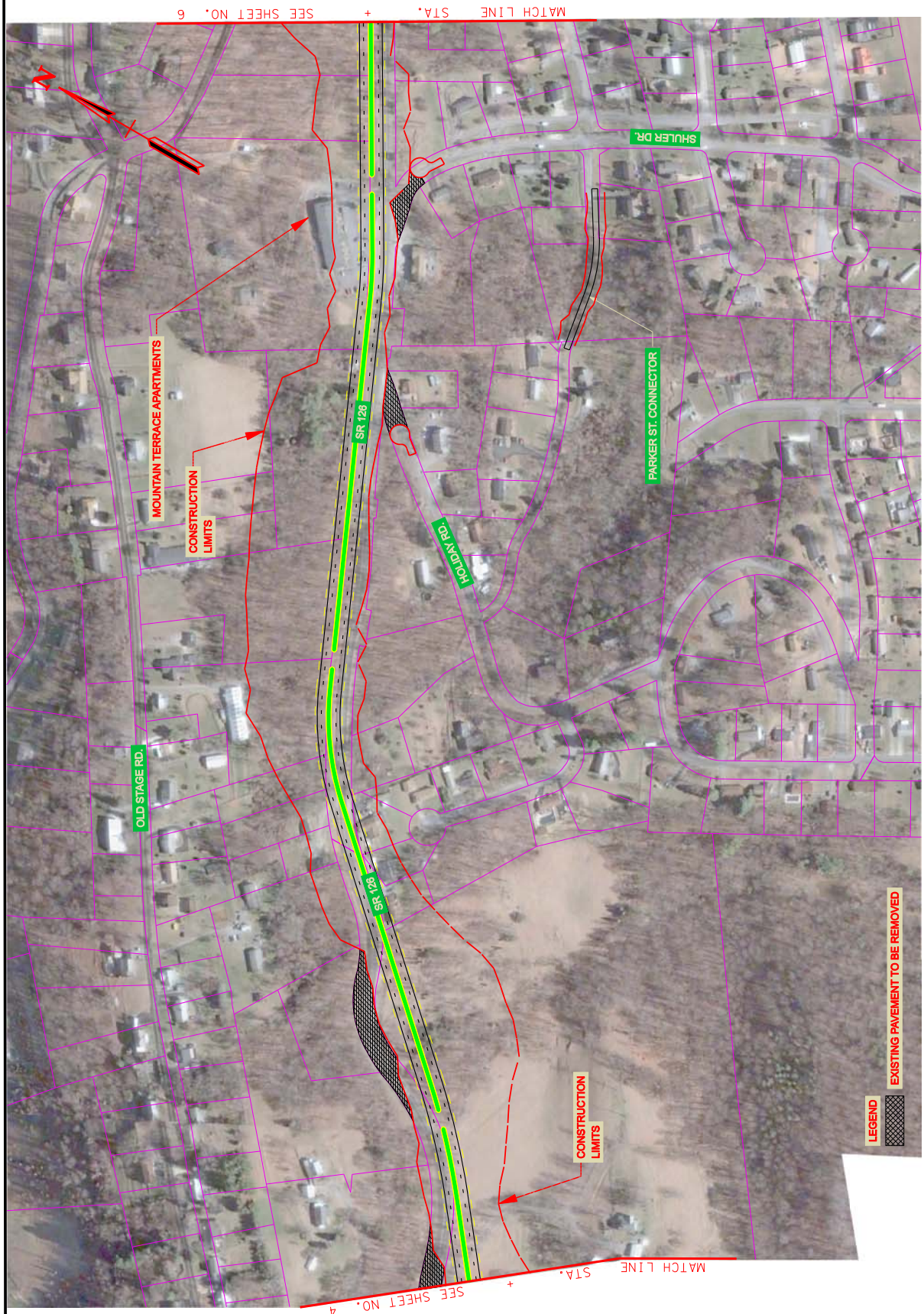


0 150 300 450

SCALE: 1 IN. = 400 FT.

SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 4

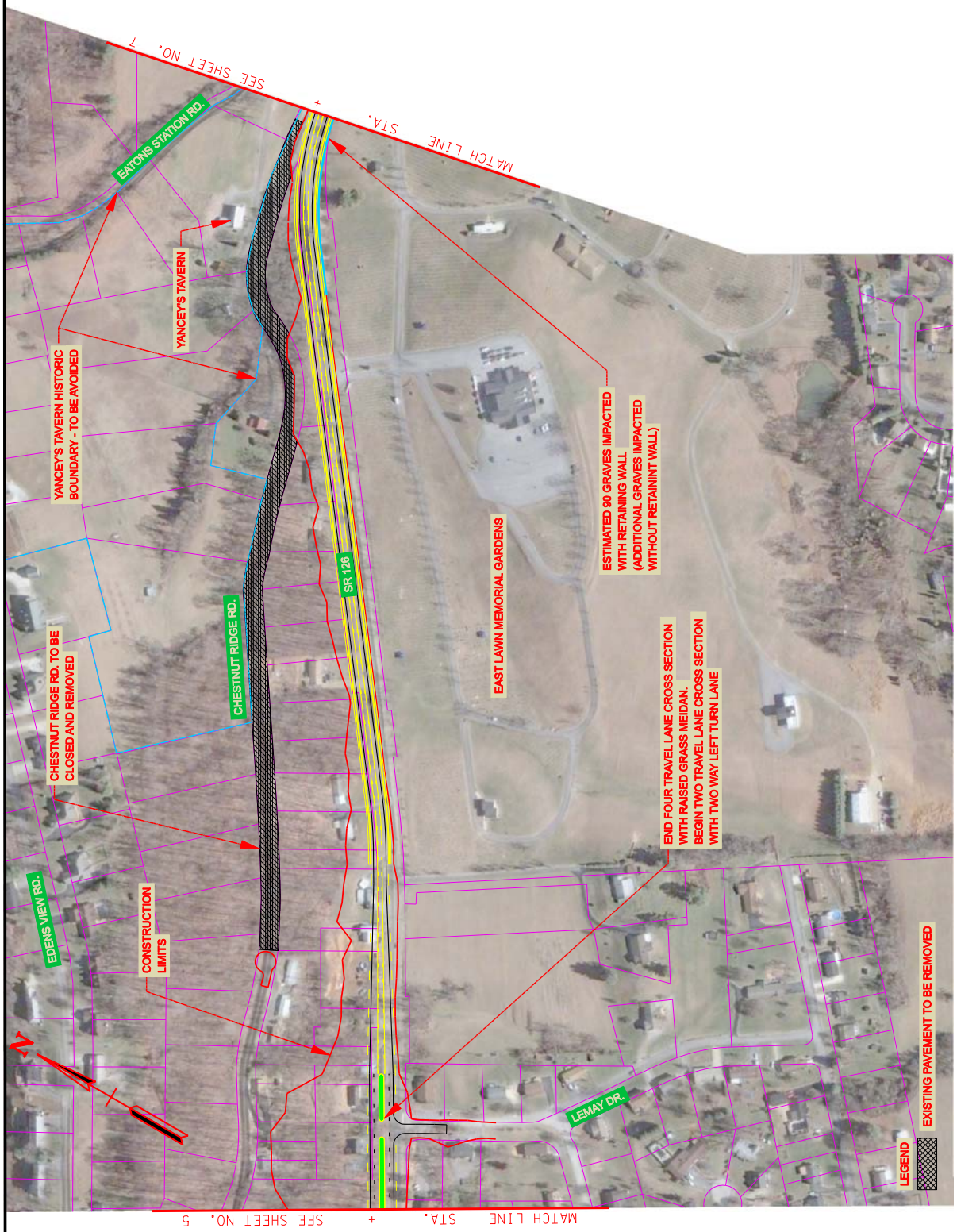


0 150 300 450

SCALE: 1 IN. = 400 FT.

SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 5



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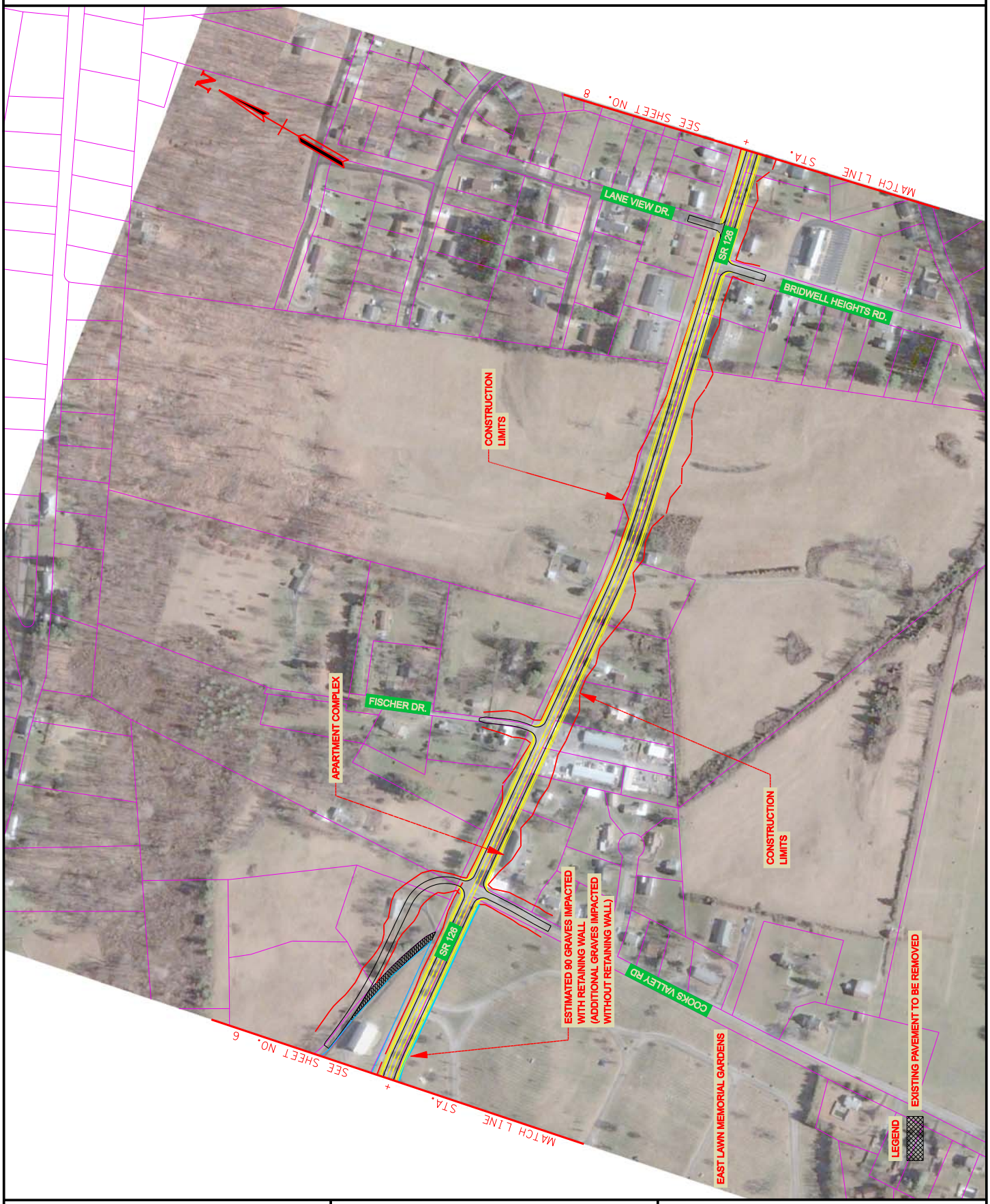
SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 6



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SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 7

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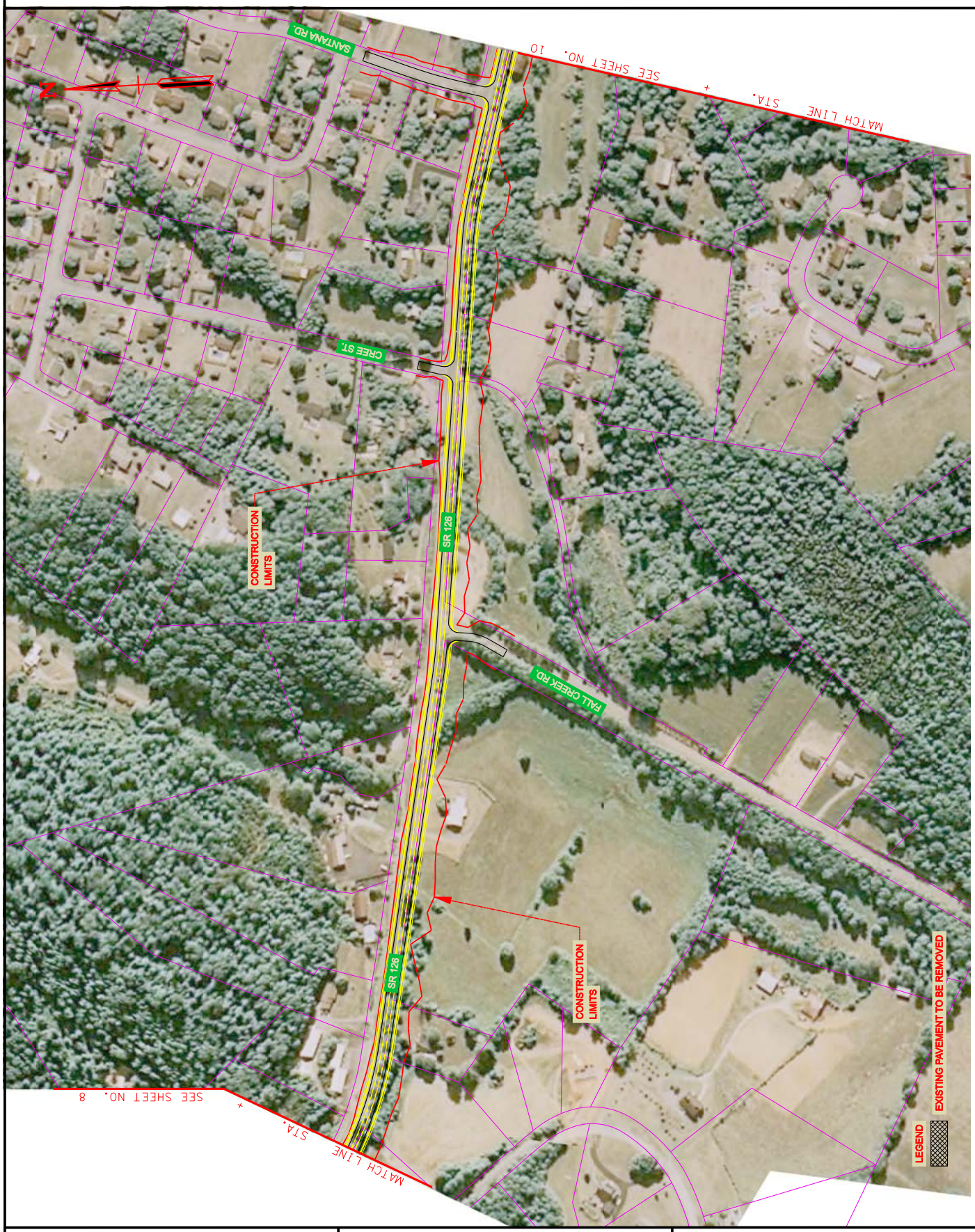
SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 8



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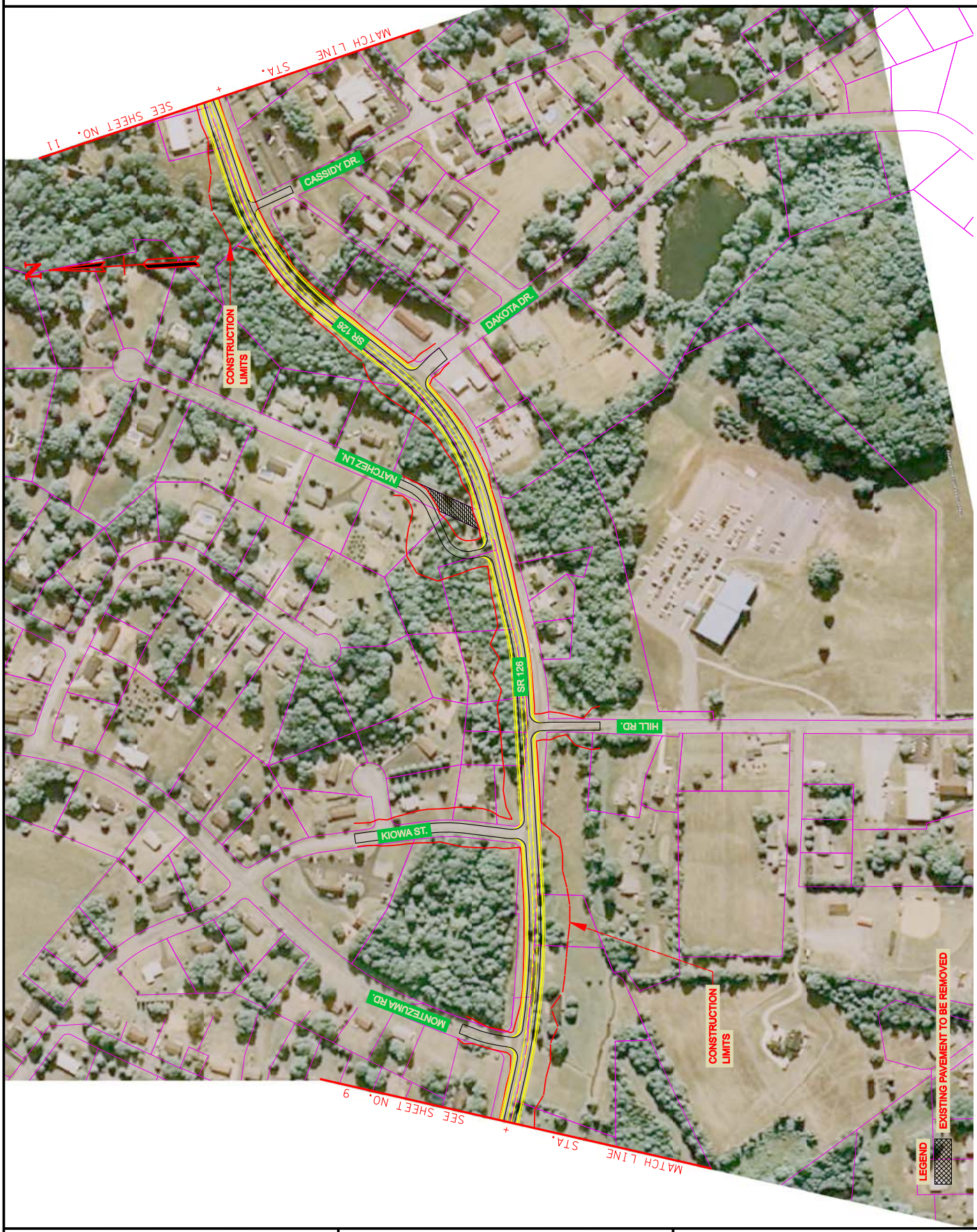
SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 9



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SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
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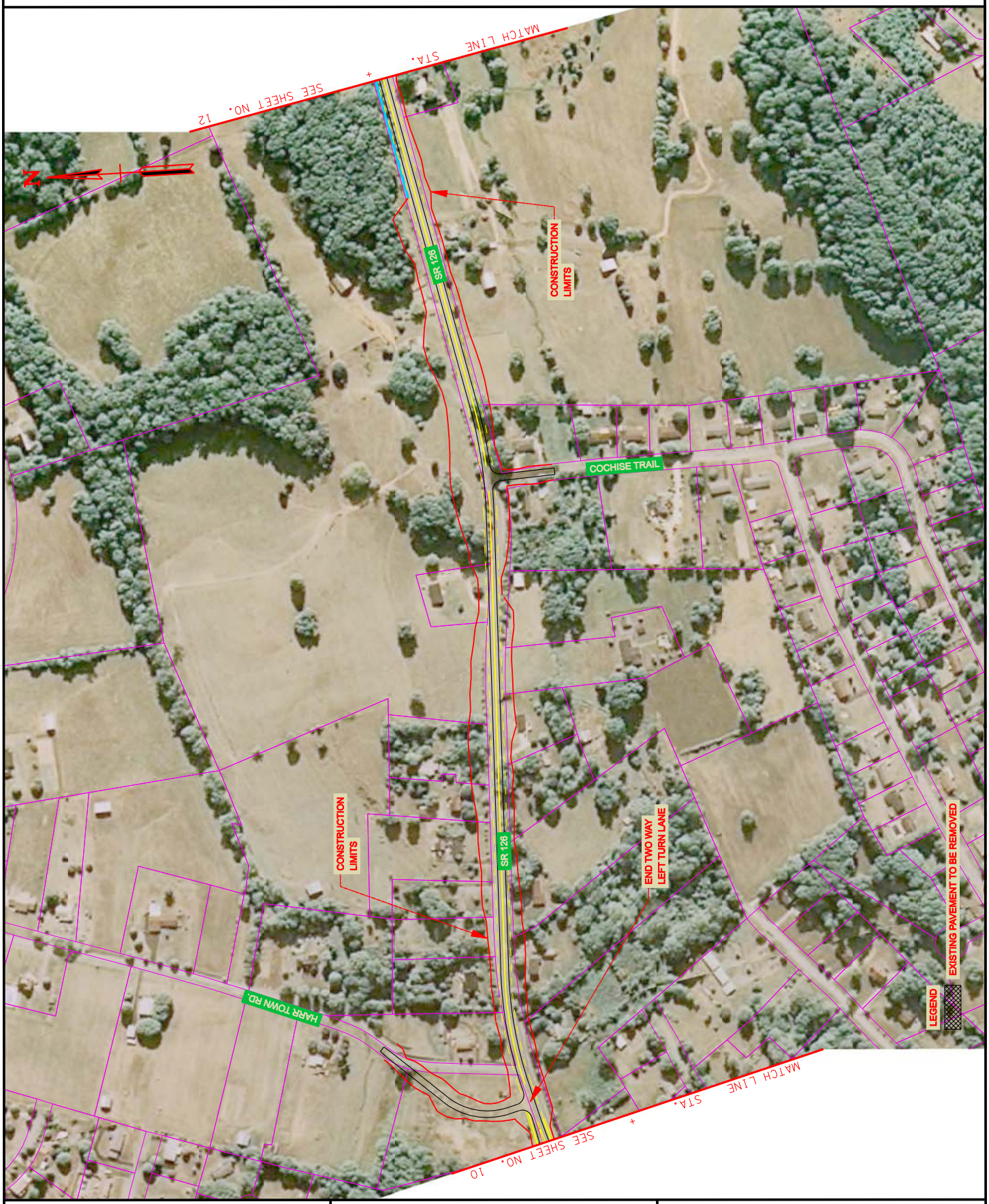

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SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 11

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SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 12

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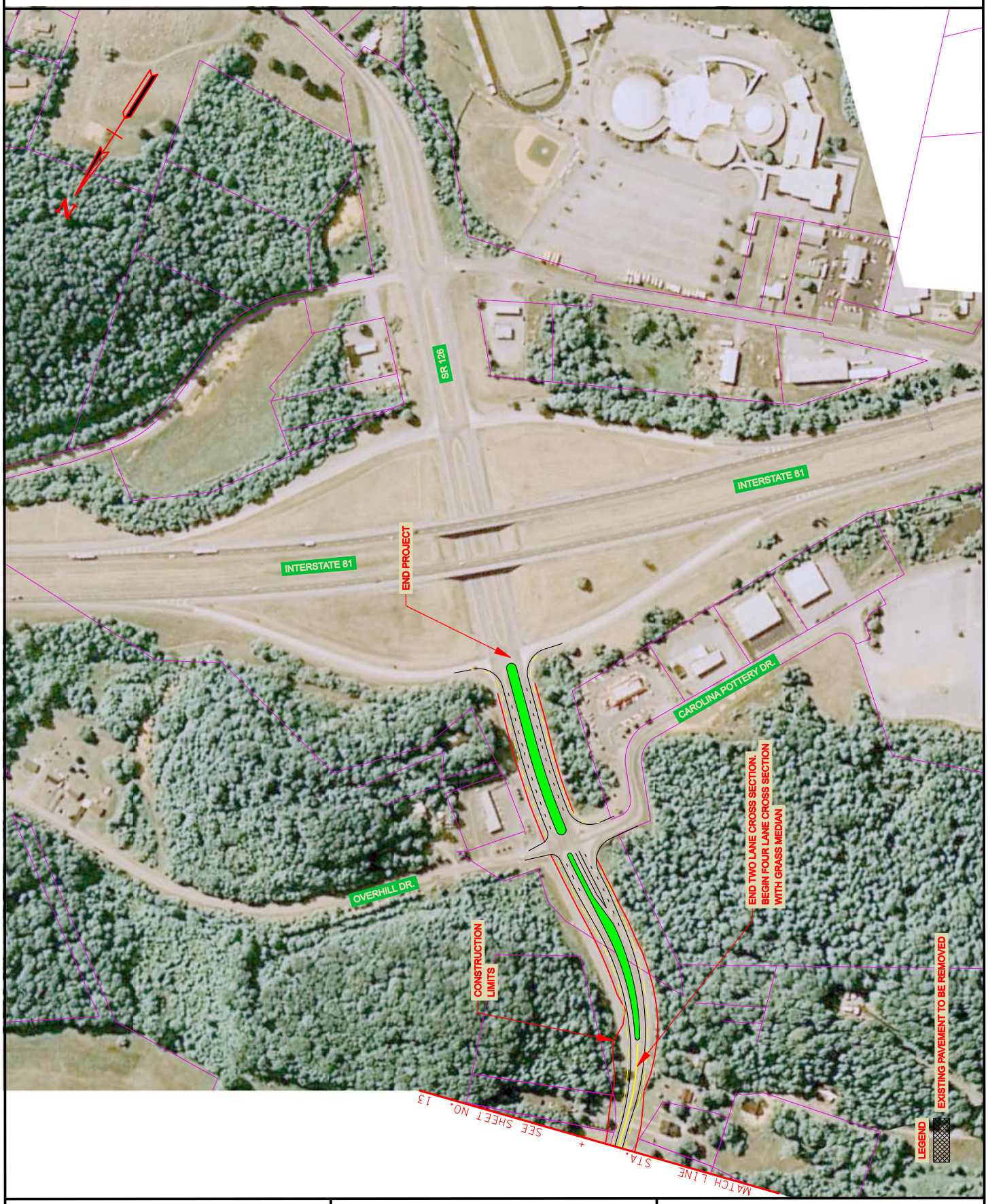
SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 13



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SR 126 Improvement Project
From East Center Street to I-81
Sullivan County, Tennessee

PROJECT LOCATION MAP
ALTERNATIVE B
SHEET 14

APPENDIX E CONTEXT SENSITIVE SOLUTIONS CONCEPTUAL ALTERNATIVES

Summary of Cross Section Elements from Concepts A, B, & C

Section 1 West -- East Center Street to Orebank Road

	Concept A	Concept B	Concept C
Design speed	35	35	35
Travel lanes	1 eastbound and 1 westbound (14' each)	2 eastbound and 2 westbound (11' each)	2 eastbound and 2 westbound (11' each)
Median	Raised landscaped	Center turn lane	Raised landscaped
Bikeways	Share travel lane	4' shoulder	4' shoulder
Sidewalks	Yes	Yes	Yes
Curb and Gutter	Yes	Yes	Yes
Special features	One-lane roundabout at East Center Street		Roundabout with flared right turns at East Center Street (alternate option is signalized intersection)
Access Notes	Median openings and turn lanes at Central Street, Conway Drive, Woodside Drive, and Orebank Road	No access restrictions	Median openings and turn lanes at Central Street, Conway Drive, Woodside Drive, and Orebank Road

Section 1 East -- Orebank Road to West of Hawthorne Street

	Concept A	Concept B	Concept C
Design speed	35	35	35
Travel lanes	2 eastbound and 2 westbound	2 eastbound and 2 westbound	2 eastbound and 2 westbound
Median	Raised landscaped	Center turn lane	Raised landscaped
Bikeways	4' shoulder	4' shoulder	4' shoulder
Sidewalks	Yes	Yes	Yes
Curb and Gutter	Yes	Yes	Yes
Special Features	None	none	none
Access Notes	Median opening at eastern driveway for Sun Bridge Hillside Care and Rehab	No access restrictions	Median opening at eastern driveway for Sun Bridge Hillside Care and Rehab

Section 2 -- West of Hawthorne Street to Harbor Chapel Road

	Concept A	Concept B	Concept C
Design speed	35	35	35
Travel lanes	2 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	No	Center turn lane	Center turn lane
Bikeways	4' shoulder	4' shoulder	4' shoulder
Sidewalks	Yes	Yes	Yes
Curb and Gutter	Yes	Yes	Yes
Special Features	None	none	none
Access Notes	None	none	none

Section 3 West -- Harbor Chapel Road to East of Old Stage Road

	Concept A	Concept B	Concept C
Design speed	35	45	45
Travel lanes	2 eastbound and 1 westbound, west of Briarwood Road; 1 eastbound and 1 westbound, east of Briarwood Road	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	None west of Briarwood Road; a center turn lane east of Briarwood	Center turn lane	Raised landscaped
Bikeways	4' shoulder on both sides	4' shoulder on north side 10' stabilized (8' paved) shoulder on south side	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Yes	Yes on north side only	Pedestrians use shoulder
Curb and Gutter	Yes	Yes on north side only	No
Special Features	None	none	none
Access Notes	None	none	none

Section 3 East -- East of Old Stage Road to Cooks Valley Road

	Concept A	Concept B	Concept C
Design speed	45	45	45
Travel lanes	1 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	Centerline rumble strip	Center turn lane or raised barrier	Raised landscaped
Bikeways	8' stabilized (6'paved) shoulder on both sides	4' shoulder on north side 10' stabilized (8' paved) shoulder on south side	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Pedestrians use shoulder	Yes on north side only	Pedestrians use shoulder
Curb and Gutter	No	Yes on north side only	No
Special Features	None	none	none
Access Notes	None	none	none

Section 4 -- Cooks Valley Road to Cochise Trail

	Concept A	Concept B	Concept C
Design speed	45	45	45
Travel lanes	1 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	Centerline rumble strip	Center turn lane	Raised landscaped
Bikeways	8' stabilized (6'paved) shoulder on both sides	6' shoulder on both sides	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Pedestrians use shoulder	Yes	Pedestrians use shoulder
Curb and Gutter	No	Yes	No
Special Features	None	none	none
Access Notes	None	none	none

Section 5 -- Cochise Trail to Interstate 81

	Concept A	Concept B	Concept C
Design speed	45	45	45
Travel lanes	1 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	Centerline rumble strip	Center turn lane	Raised landscaped
Bikeways	8' stabilized (6'paved) shoulder on both sides	10' stabilized (8' paved) shoulder on both sides	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Pedestrians use shoulder	Pedestrians use shoulder	Pedestrians use shoulder
Curb and gutter	No	No	No
Special Features	Modify the two to four-lane transition area near Overhill Drive to provide longer tapers and better advance warning and sight distance	Modify the two to four-lane transition area near Overhill Drive to provide longer tapers and better advance warning and sight distance	Correct deficient curve west of Overhill Road and narrow existing median width at Overhill Road / Carolina Pottery intersection to improve safety
Access Notes	None	none	none

Context Sensitive Solutions Report

for

State Route 126 (Memorial Boulevard)

Memorial Boulevard

Developing a Context Sensitive Solution

in the

City of Kingsport / Sullivan County

Prepared by

Sain Associates, Inc.

&

PBS&J

Prepared for the

Tennessee Department of Transportation

Planning Division

VOLUME 1

sain associates

TDOT Go.

PBSJ

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PREFACE

This report presents a detailed chronology of the process followed, data collected, analyses conducted, and recommendations developed during the planning phase of the State Route 126 (Memorial Boulevard) project in Kingsport and Sullivan County, Tennessee. This was Tennessee's first Context Sensitive Solutions project to begin with the planning phase. In addition to recording the results of this project, this document is intended to serve as a reference tool for future CSS projects by detailing the process that was used. Questions specifically addressed in this report include:

- Why was the project initiated?
- What conditions of concern exist on SR 126?
- What is the purpose and need for the project?
- How was the project team selected?
- How did the team do their work?
- What struggles did the team encounter, and how were they resolved?
- How was public input gathered and considered?
- How were the principles of CSS used during the planning stage of this project?
- What improvements are recommended for SR 126?

This report is divided into seven major sections:

- Executive Summary
- SR 126 History and Background Information
- Process
- Project Data
- Solutions Development
- Team Recommendations
- Support Documentation

The State Route 126 study area is depicted on Figure 1. The project limits extend from the intersection of State Route 126 and East Center Street in the City of Kingsport to the interchange of SR 126 and Interstate 81 in Sullivan County.

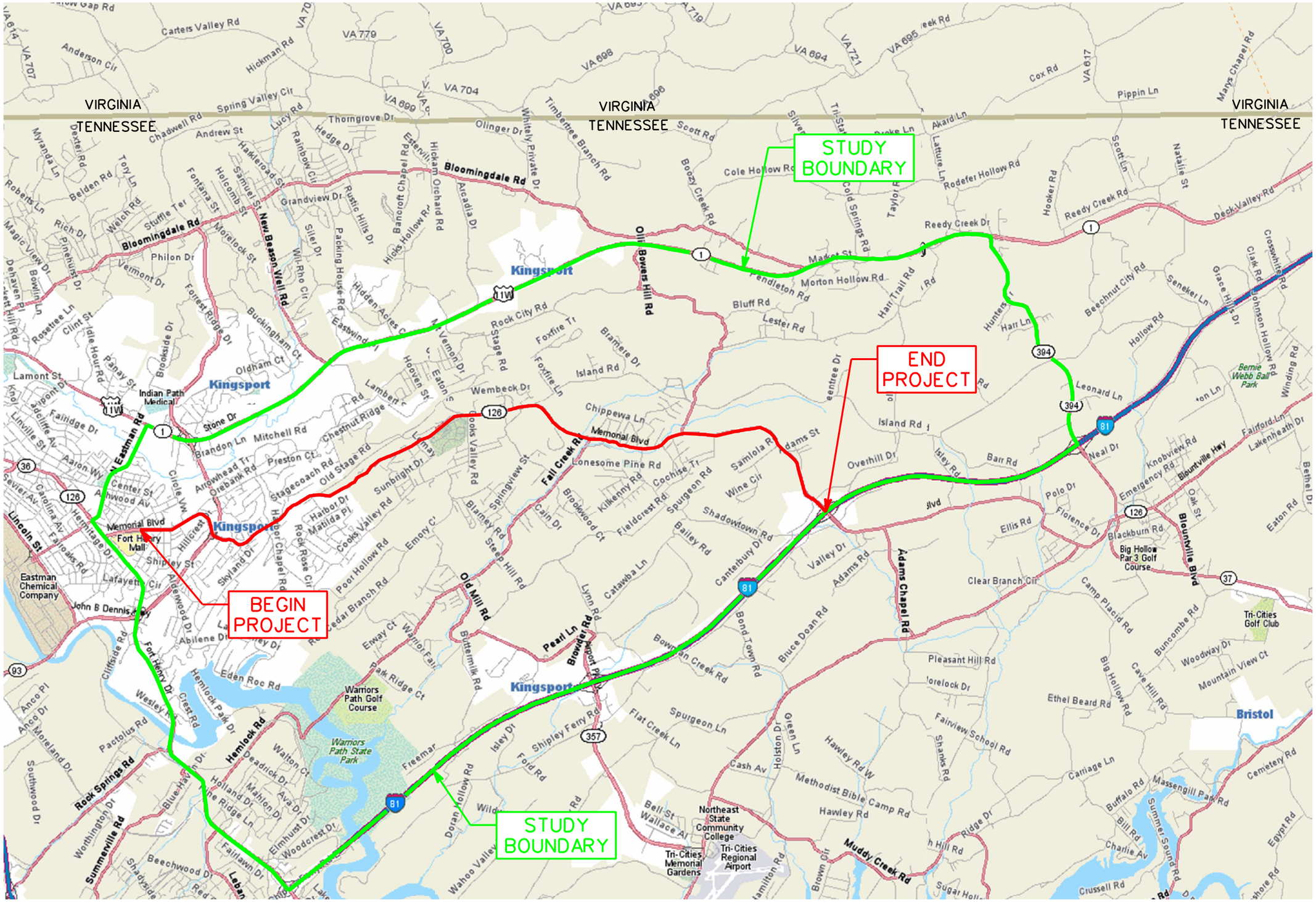


FIGURE 1
PROJECT STUDY AREA

EXECUTIVE SUMMARY

Summary of Community Resource Team (CRT) Recomendations

During the 21-month study process there was unanimous support among the CRT members for a large number of "Common Ground" recommendations. Majority decisions were made regarding design elements and roadway cross sections. Public opinion was surveyed at each Public Involvement Session, and the results of those surveys were reviewed and discussed by the CRT and used to guide their decision making.

- CRT unanimously agreed upon:
    - 11 Enhancement Features in the Design Plan
    - 10 Safety Improvements, with safety stated as the number one priority for SR 126
    - 7 Points of Interest to the Community
    - 4 Other Special Issues

Working together, the CRT developed recommendations for roadway cross sections. The recommendations are divided into eight sections, identified by intersecting cross streets.

- For five of the eight sections, the CRT developed consensus design recommendations.
- For three of the eight sections, the CRT developed design recommendations that were supported by a majority of team members.
- Figure 2 shows a graphic depiction of the CRT's recommendation for number of travel lanes on SR 126.

Consensus design recommendations include:

- Improve these segments to a four-lane median divided facility with curb, gutter and sidewalks
    - Segment 1 West – East Center Street to Orebank Road
    - Segment 1 East – Orebank Road to West of Hawthorne Sreet
    - Segment 3 West – Harbor Chapel Road to east of Old Stage Road
- Improve this section to four travel lanes and a center turn lane with curb and gutter and sidewalks
    - Segment 2 – West of Hawthorne Street to Harbor Chapel Road
- Provide an improved two-lane roadway with paved shoulders, wide centerline, and rumble strips
    - Segment 4 East – Harrtown Road to Cochise Trail

Majority design recommendations with minority objection statements include:

- Improve this segment to a four-lane median divided facility with shoulders
    - Segment 3 East – East of Old Stage Road to Cooks Valley Road
- Improve this segment to provide two travel lanes and a center turn lane with curb, gutter and sidewalks
    - Segment 4 West – Cooks Valley Road to Harrtown Road
- Provide an upgraded two-lane roadway with paved shoulders, wide centerline, and rumble strips
    - Segment 5 – Cochise Trail to Interstate 81

HWY 126 PROJECT LOCATION MAP

4 lane cross section with landscaped raised median
4 lane cross section with center turn lane
2 lane cross section with center turn lane
2 lane cross section

Figure 2
Community Resource Team Recommendation for SR 126

Purpose & Need Statement

Historical Perspective

The Memorial Boulevard (S.R. 126) corridor literally evolved over time from an animal and wagon trail to eventually become U.S. Highway 11-W in 1926. It was built as an 18-foot wide concrete highway and currently follows the original alignment. It was widened to 22 feet overall around 1950 and topped with asphalt.

Although the roadway was "piecemealed" through the years, it proved to be a futile attempt to accommodate highway traffic. Eventually the decision was made to construct an entirely new by-pass for U.S. 11-W (known locally as Stone Drive).

When the new four-lane divided U.S. 11-W was opened in the 1960's the old route became a County road for a few years. It was then adopted by the State of Tennessee and designated as State Route 126 that extends from Kingsport through the county seat of Blountville, and on to Bristol, Tennessee-Virginia.

Presently, the remnants of the old highway remain virtually unchanged since it lost its designation as a U.S. highway in the 1960's. As the roadway's purpose changed from a U.S. highway to a State route, the roadway's new role needs to be evaluated in a comprehensive, context sensitive fashion.

Project Status

The need for improvement of Memorial Boulevard (S.R. 126) was identified by the City of Kingsport in the 1990s, and an application for a study of the facility was made in the City's 1992 annual state legislative funding request.

In 2003 the Kingsport MPO requested an Advance Planning Report for Memorial Boulevard (S.R.126) as the result of the primary recommendation of the East Kingsport Comprehensive Land Use and Transportation Study. The 8-mile project, which runs east-west from East Center Street within the City of Kingsport to Interstate 81 in Sullivan County, was chosen to be the state's first Context Sensitive Solutions project.

The roadway is an urban minor arterial route linking downtown Kingsport with residential communities to the east including Hillcrest, Cooks Valley, Bridwell Heights, Indian Springs and Gunnings. Residential development in the Memorial Boulevard (S.R. 126) corridor has steadily grown at about 1% per year over the past four decades.

On the western edge of the study area, Memorial Boulevard (S.R. 126) is a 4-lane undivided roadway (with no turn lanes) for a half-mile between Center Street to a point just west of John B. Dennis Highway (S.R. 93). It widens briefly to a 4-lane divided facility for a quarter-mile where it passes through two (2) signalized intersections at the ramps to John B. Dennis Highway (S.R. 93). It then changes to 3-lanes with an outbound climbing lane (presumably leftover from

its previous life as U.S. 11-W where slow-moving trucks needed to climb over the ridge) for one and one-third miles. After passing over Chestnut Ridge and leaving the city limits, it narrows back to a 2-lane facility for a distance of five and three-quarter miles. It then widens again to a 4-lane divided facility for less than a fifth-mile at its intersection with I-81 (which is the eastern terminus of the study area) in order to provide access to the interstate and interstate-related commercial establishments.

Although two-thirds of the route is currently in the County, it has been identified as an urban route because it lies within the Kingsport Urban Growth Boundary.

Existing (2003 / 2004) traffic volumes on Memorial Boulevard (S.R. 126) ranged from 18,060 vehicles immediately east of East Center Street to a high of 22,440 vehicles near the John B. Dennis Highway (S.R. 93) interchange to a low of 6,700 vehicles between Shadowtown Road and Harr Town Road. The projected 2028 traffic volumes for these same locations are estimated to be 18,060 (no growth is projected for Memorial Boulevard (S.R. 126) west of John B. Dennis Highway), an increase of 1.048% per year to 28,570 east of John B. Dennis Highway, and an increase of 1.048% per year to 8,440 between Shadowtown Road and Harr Town Road.

Outdated design on difficult terrain with many intersecting accesses dictates that the primary need on Memorial Boulevard (S.R. 126) is for improved safety and correction of roadway deficiencies.

Corridor Description

Terrain

The terrain is typical of the ridge & valley system that is common throughout East Tennessee. Kingsport is located in a basin framed by Bays Mountain (2,400') and Chestnut Ridge (1,940'). The study area is located in the "heights" above the city, 110'-735' higher than Downtown. The study area itself varies greatly in terrain. Beginning at Center Street, the roadway rises 380' to its crossing of Chestnut Ridge before descending 95' to its intersection with Cooks Valley Road and again rising 100' to I-81.

1,205 Broad at Center (in Downtown Kingsport)
1,315' Memorial (S.R.126) at Center Street (western terminus of study area)
1,695' Memorial (S.R. 126) at Old Stage (crossing Chestnut Ridge)
1,940' Highest point on Chestnut Ridge
1,600' Memorial (S.R. 126) at Cook's Valley Road
1,700' Memorial (S.R. 126) at I-81
2,400' Highest point in Kingsport (Bays Mountain Fire Tower)

Land Use

The west end consists of higher density single and multi-family residential. There are several small businesses along the west end that have very shallow setbacks and zero-lot line side yards. The middle section consists of low-density suburban-style single family residential with an elementary school, churches and neighborhood retail uses. 77% of the housing units are single family detached. Farmland and woodlands are focused along the steeper slopes, creek bottoms and adjacent valleys. A shopping center and high school are located at the intersection of I-81. There are numerous churches and historic sites along the corridor.

Economic Development
Roadway improvements are not intended to introduce additional commercial or industrial development to the non-City corridor, rather it is intended to support a sustainable business climate by improving access from developing residential areas to existing commercial areas.

Community Character & Values

Residents assign the highest values to:

- The scenic quality
- Quiet neighborhoods
- A feeling of safety and security within the neighborhoods
- Historic aspects
- Nearby family recreation and sports opportunities

Residents highly value the following visual characteristics:

- The rural setting (pastures, woodlands)
- Trees, shrubs and landscaping
- Historic houses, barns and other structures

Problems to be Solved

Road Safety

- Accident rates exceed statewide averages for similar roads
- The public ranked the following safety concerns in order of importance
    - Limited sight distance
    - Dangerous curves
    - Speeding traffic
    - Difficulty turning left
    - Unsafe for bicycles and pedestrians
- The consultants identified the following problem conditions and roadway deficiencies
    - Varied travel speeds that increase conflict between vehicles
    - Travel speeds that exceed the posted speed limits and/or design speed
    - Substandard horizontal and vertical curves (inadequate sight distance)
    - Lack of turn lanes at major intersections
    - Skewed intersection angles
    - Substandard superelevation in sharp curves
- Local resource team members identified additional problems such as:
    - Very narrow shoulder widths

Access Management

- The public also ranked access onto Memorial Boulevard (S.R. 126) as a major problem
- Difficulty entering or exiting business parking lots was identified as a significant problem, i.e. uncontrolled access to businesses along the roadway

Modal Interrelationship

- Need for safe pedestrian mobility and bikeways

Process Overview

The process followed by TDOT and the project management team for this project was one based upon open communication, inclusion, and flexibility. The process was not prescriptive, because this was TDOT's first attempt at using a Context Sensitive Solutions model for a planning study. The project management team was given a great deal of freedom to try new things and develop a workable procedure. The risk of being the first project team in Tennessee to implement a CSS process was that mistakes would inevitably be made along the way. TDOT recognized and accepted this risk, giving the SR 126 team its full support.

The SR 126 project was led by a project management team consisting of two TDOT staff members and three consultants. Among the consultant staffers, one served as the overall project manager with responsibility for schedules, budgets, leading meetings, managing team communications, and project documentation. The second consultant led the design efforts for the project and was responsible for overseeing all plan preparation. The third consultant staffer was responsible for leading all public involvement efforts.

The project management team was assisted throughout the project by a Community Resource Team that was appointed by the local City and County Mayors. The Community Resource Team provided local knowledge and guidance to the project management team and was consulted before any major project decisions were made.

Throughout the project the public was given information through a variety of outreach techniques that included: a project newsletter, website, postcards, local media, and three series of public involvement sessions. The public was encouraged to provide input to the project management and Community Resource Team through surveys, a toll free phone line, email, question and answer sessions, and face-to-face discussions.

The primary objectives of the Context Sensitive Solutions process that was followed for SR 126 were:

- To provide multiple opportunities and methods for gathering community input
- Work closely with leaders and citizens from the local community
- Gather information to identify community values and concerns
- Build trust through listening and responding with integrity
- Maintain open, two-way communication
- Facilitate the Community Resource Team's ability to prepare a recommendation for improving SR 126.

SR 126 HISTORY AND BACKGROUND INFORMATION

Attempts to improve SR 126 (Memorial Boulevard) have been under discussion since the early 1990s. In 1992, the Tennessee Department of Transportation (TDOT) completed an Advance Planning Report (APR). At the same time, the City of Kingsport included SR 126 (Memorial Boulevard) on its transportation priority list as part of its annual state legislative funding request process.

Several years later the APR was updated and the corridor was divided into three phases in an attempt to increase funding opportunities. Phase 1 extended from Center Street to Shuler Drive, Phase 2 extended from Shuler Drive to Hill Road, and Phase 3 extended from Hill Road to I-81. The city of Kingsport and the Kingsport Urban Area Metropolitan Planning Organization (MPO) again requested that TDOT develop an APR using this three-phase approach.

In March 2003, the Executive Board and Executive Staff of the Kingsport MPO passed a resolution requesting an APR for SR 126 (Memorial Boulevard). In April 2003, a copy of the resolution was included in a letter from Kingsport Mayor Jeanette Blazier to TDOT Commissioner Gerald Nicely. The letter detailed the history of the city's efforts to improve SR 126 (Memorial Boulevard). In May 2003, Commissioner Nicely responded, acknowledging Kingsport's efforts and directed TDOT's Planning Division to initiate a new APR. By September 2003, TDOT had committed to make SR 126 (Memorial Boulevard) the State's pilot Context Sensitive Solutions project.

TDOT selected a consultant and in September 2003 a Context Sensitive Solution presentation was made in Kingsport to an invited audience. This audience included the Mayors of Kingsport and Sullivan County, local state representatives, city and county staffs, citizens, and TDOT staff.

Principles of Context Sensitive Solutions

The SR 126 (Memorial Boulevard) project was designed to incorporate the principles of Context Sensitive Solutions. This is a process endorsed by the Federal Highway Administration, and is defined by it as "a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility." A stakeholder is defined as a person or group affected by and/or with an interest in the outcome of the project. Stakeholders in the SR 126 (Memorial Boulevard) project include:

- Citizens who live, work and/or travel along SR 126 (Memorial Boulevard) within the project area;
- City, County and state government elected and appointed officials;
- Groups with environmental, economic, or other concerns; and,
- The Tennessee Department of Transportation.

The Context Sensitive Solutions process has 15 guiding principles that have been divided into two groups and are documented on the Federal Highway Administration's website (http://www.fhwa.dot.gov/csd/qualities.htm). The first seven guiding principles deal with qualities of excellence in transportation design:

1. The project satisfies the purpose and needs as agreed to by a full range of stakeholders. This agreement is forged in the earliest phase of the project and amended, as warranted, as the project develops.
2. The project is a safe facility for both the user and the community.
3. The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area, i.e. exhibits context sensitive design.
4. The project exceeds the expectations of both designers and stakeholders and achieves a level of excellence in people's minds.
5. The project involves efficient and effective use of the resources (time, budget, community) of all involved parties.
6. The project is designed and built with minimal disruption to the community.
7. The project is seen as having added lasting value to the community.

The next eight guiding principles deal with process characteristics that contribute to excellence:

8. Communication with all stakeholders is open, early, and continuous.
9. A multidisciplinary team is established early, with disciplines based on the needs of the specific project, and with the inclusion of the public.
10. A full range of stakeholders is involved with transportation officials in the scoping phase. The purposes of the project are clearly defined, and consensus on the scope is forged before proceeding.
11. The highway development process is tailored to meet the circumstances. This process should examine multiple alternatives that will result in a consensus of approach methods.
12. A commitment to the process from top agency officials and local leaders is secured.
13. The public involvement process, which includes informal meetings, is tailored to the project.
14. The landscape, the community, and valued resources are understood before engineering design is started.
15. A full range of tools for communication about project alternatives is used (e.g. visualization).

PROCESS

Beginning in September 2003, data collection such as gathering of mapping, traffic data, geometric features, and traffic accident reports began. The primary source for this data was TDOT, with the local Metropolitan Planning Organization providing additional support material.

While the technical data gathered for the project provided a significant piece of the information needed, it was not complete without the context that is provided by the local community. The CSS process demands that additional considerations be given to non-technical information and viewpoints. In order for the project management team --- people who do not reside in the local community --- to gather and understand local concerns, it was necessary to assemble a team of individuals from the community for assistance throughout the project. Recognizing the need for this, TDOT asked the City and County Mayors to appoint a community resource team.

The community resource team was comprised of elected officials, City and County staff, and citizens who live in the study area. Because the team members were unfamiliar with the CSS process and roadway planning, and since they were assembled specifically for this project and had not worked together previously as a team, it was necessary to begin with education. TDOT provided a two-day team building workshop that was facilitated by a professional team building consultant. One of the items that was accomplished during the team building sessions was the definition of the study area boundary. Following the team building, a one-day training session in the principles of Context Sensitive Solutions was conducted for the team by the Kentucky Transportation Center.

Throughout the project, the community resource team assisted the project managers with collection of information relative to citizen characteristics, concerns, and values. These subjective data were obtained through a combination of public involvement techniques. These techniques included surveys, one-on-one conversations, workshops, a focus group, and public involvement sessions. The community resource team served a valuable purpose by voicing local concerns for consideration by the project team.

Throughout the project, the basic process for gathering and evaluating data included a feedback loop. The project management team reviewed information, identified problems or issues, checked the validity of those conclusions by engaging the local team or community, revisited understandings, developed proposals, presented those proposals to the local team or community, and made modifications as necessary prior to final presentation.

Data Collection Methods

The following paragraphs present a summary of the information collected from TDOT and the community, individually and through the community resource team.

Mapping & Roadway Data

- At the project outset, TDOT provided the consultant team with two dimensional aerial photography. These aerial photos were useful for evaluating the horizontal curvature of SR 126 and for identifying structures and other features along the project route. The aerials were

also useful for mapping traffic accident data, design speed data for horizontal curves, and for visual presentations to the public.

- Mapping was obtained from the local Metropolitan Planning Organization's geographic information system which proved to be of limited use to the team.
- Data from TDOT's Traffic and Roadway Information Management System (TRIMS), was utilized to inventory geometric features and traffic control, view photographs of the roadway and roadside development, identify areas with sight distance deficiencies, establish base photos of existing conditions for future visualizations of concept recommendations, and evaluation of vertical curvature. After completion of the vertical curve analysis from TRIMS data, it was determined from a field review that the data was inaccurate and not suitable for curve analysis.
- After consideration of the tremendous planning challenges presented by the mountainous topography in the study area, the project team requested that TDOT provide controlled aerial survey with digital terrain model information. The controlled aerial surveys were completed during the summer of 2004, approximately nine months after the project began. The aerial survey allowed the consultants to prepare concept plans with sufficient detail to estimate construction impacts for cut and fill areas, produce an accurate centerline profile, identify deficient vertical curves, and establish centerline files in GEOPAK, and engineering design software, that can be utilized for roadway design in a subsequent phase of the project.

Traffic Volume Data

- TDOT provided traffic forecasts (ADT and DHV) for 2008 and 2028, that included volumes for thirteen segments on SR 126 throughout the project study area and turning movement volumes for four intersections: SR 126 and East Center Street, SR 126 and the two ramp terminal intersections of John B. Dennis Highway, as well as SR 126 and Harbor Chapel Road.
- A planning level analysis of capacity was conducted with the traffic forecast data to evaluate level of service for existing and future conditions.
- Objections were raised by members of the team concerning the methodology used by TDOT to produce the future traffic forecasts. TDOT had used a single growth rate for the entire project corridor based on historic traffic data from selected traffic count stations that were believed to have reliable data. Count stations with data showing zero or negative growth had been eliminated from the sample. Team members who objected to the TDOT projections argued that the complete set of data points should be used and that Kingsport had, in fact, seen a reduction in traffic volumes over the past ten years. A compromise was reached in which TDOT agreed to revise the traffic forecasts, using the complete set of data with two different growth rates. A zero growth rate was agreed to for traffic west of John B. Dennis Highway, and a growth rate of 1.048% per year was used for the rest of SR 126 east of John B. Dennis Highway. (See traffic forecast report dated August 26, 2004 and memo from Steve Allen dated August 19, 2004 in the appendix.) This early concession to members of the resource team remained a point of contention among TDOT staff and later with some members of the community. The compromise deviated from standard TDOT traffic forecasting practices.

Traffic Accident Data

- TDOT provided traffic accident data from TRIMS for the years 1999 through 2001, the most recent years available at the time of project initiation (July 2003).
- The consultant team prepared maps on aerial photos showing the location of every traffic accident within the TRIMS database. (TRIMS includes all accidents reported to TDOT except for property damage only with a value of less than $400 or accidents occurring on private property. This was not understood by the consultant team at the time.) The maps were presented to the resource team in January 2004 at a team meeting for their review and comment. The community resource team requested that the database be expanded to include data from 2002 and 2003 because of recent fatalities. Local team members offered to coordinate assembly of accident reports from City, County, and State law enforcement. After receiving accident reports from these local agencies, the consultant team created a new traffic accident database. The new database revealed that the data set from TRIMS for 1999 through 2001 was incomplete in that it did not include all traffic accident reports that had been on file at the local law enforcement agencies. The resource team was made aware of the discrepancies and the project management team made a decision to move forward with the expanded database for 1999 through 2003.
- Using the expanded database of traffic accident data, the consultant team revised the aerial photo mapping to show traffic accident locations for 1999 through 2003.
- Aerial photo maps of the traffic accident locations were presented at the Public Involvement Sessions in May 2004. Citizens were asked for comments on the accident data. Specifically, the project management team asked for local perspectives on the cause of accidents at the Carolina Pottery / Overhill Road intersection for which no obvious cause could be identified.
- Consultants calculated accident rates based upon the expanded traffic accident data set. After review of the accident rate calculations, TDOT requested that the rates be revised to eliminate accidents with property damage only less than $400 as well as any accident that occurred on private property. This change in the data set was required in order to keep the rate calculation process consistent with standard TDOT procedures.

Speed Data

- During an initial field review the consultant team noted locations of regulatory and advisory speed limits along SR 126. These were compared with the design speeds that were determined from the horizontal curve analysis conducted with the aerial photography. A comparison revealed that there are several horizontal curves along the project route where the existing design speed is inconsistent with regulatory and/or advisory speed signage. These discrepancies were noted on aerial mapping that was displayed at the January 2004 Resource Team Meeting and the May 2004 Public Involvement Sessions.
- To supplement the design speed and signage data, the project management team requested supplemental speed data be collected by TDOT to identify existing travel speeds at specific locations where there are horizontal curves. The speed data was summarized and presented at the January 2004 Resource Team Meeting and the May 2004 Public Involvement Sessions. The speed data validated a concern that had been expressed by local citizens that travel speeds on SR 126 exceed posted speed limits.

Historic and Archaeological Areas of Potential Concern

- As part of the project, TDOT initiated a historical survey of the SR 126 corridor to identify any historic properties that might be affected by the project. At the January 2004 team meeting, the team was told that one property, Yancey's Tavern, was listed on the National Register of Historic Places in 1972. Yancey's Tavern is located on Old Stage Road across SR 126 from East Lawn Cemetery.
- A complete historic survey of the study area was prepared by TDOT in draft form prior to the Design Review Workshop on March 30 and 31, 2005. Based on that draft report, the consultant added to the project concept plans a boundary identification for Shipley mansion, a National Register eligible property located near East Center Street.
- The TDOT Archeologist assigned to the technical resource team identified an area of potential concern in the vicinity of Eaton's Fort near Bridwell Heights Road. This information was presented at the Resource Team meeting in January 2004.
- The TDOT Ecologist assigned to the technical resource team reported in January 2004 that numerous streams would be of concern to the U.S. Army Corps of Engineers.

Meeting Location and Day of Week / Time of Day Preferences

- Meeting times and location preferences were surveyed on a postcard that was sent with the first newsletter in March 2004.
- Public Involvement Sessions were scheduled based upon the information gleaned from the postcard survey. Each time that Public Involvement was scheduled, two identical sessions were provided: a Wednesday mid-day session and an evening session that was held either on Tuesday or on Thursday. The Wednesday session was always held in downtown Kingsport at the Civic Auditorium in order to be convenient to those who work downtown and could attend a meeting during their lunch hour, those who work evening shift, and to retirees and others who prefer daytime meetings. The Tuesday or Thursday session was always held in the residential portion of Sullivan County at Sunnyside Baptist Church in order to be convenient to the majority of residents, including those in low income neighborhoods, and those who are unable to attend a meeting during the work day.

Areas of Concern and Qualities Valued on SR 126

- The postcard that was sent with the first newsletter in March 2004 also asked citizens to provide information about problem areas along SR 126.
- The postcard responses were summarized and presented at the first Public Involvement Sessions in May 2004. Over 700 postcard responses were received.
- At the May 2004 Public Involvement Sessions, a written survey was used to gather more detailed information about public perceptions of SR 126. Citizens were asked to rank in order of importance several types of travel or safety concerns. Nine questions were asked in the survey:
    1. Do you drive in the Memorial Boulevard / SR 126 study area (east of Center Street, south of 11W/Stone Drive, and north of Interstate 81)?
    2. How many round trips per week do you make using Memorial Boulevard / SR 126 between Interstate 81 and East Center Street?
    3. What is the average length (in miles), one-way, that you take on Memorial Boulevard / SR 126 between Interstate 81 and East Center Street?
    4. Do you have any travel problems or safety concerns along this route? If yes, rank those that apply in order of importance from 1 to 5, with 5 being the most important and 1 being the least important.

5. What intersections on Memorial Boulevard / SR 126 create problems for you? (circle all that apply)
6. If you live along or near the Memorial Boulevard / SR 126 corridor, what qualities do you value about your community and the surroundings? (circle all that apply)
7. What visual characteristics of the Memorial Boulevard / SR 126 corridor do you value? (circle all that apply)
8. What buildings, areas, or views along the corridor do you consider to be significant and worthy of protection?
9. Do you have any other comments regarding transportation problems and/or community values along the Memorial Boulevard / SR 126 corridor?

- A summary of the survey results was included in the second newsletter and was presented at the second series of Public Involvement Sessions in November 2004. A tabulation of the results is included in the background data section of this report.

Process Chronology

Table 1 presents a summary of major tasks and meetings that were conducted during the SR 126 project. After the table, more detailed information is provided about the project milestone events.

Table 1
Chronological Summary of the Project

Date	Task
September 18, 2003	Project Kickoff Meeting - Presentation of Consultants to Kingsport / Sullivan County
September 2003	Identification of Local Resource Team members by Mayors Blazier and Venable
October 1, 2003	First Team Meeting (TDOT/Local Resource Teams)
October 10, 2003	Complete Stakeholder Identification
October 15, 2003	Establish a mailing list for households in the project area
October 21, 2003	Issued Team Roles & Responsibilities document for review
October 31, 2003	Define methods of communication and protocols
October & November 2003	Collect & review information of record
Early November 2003	Stakeholder Kick-off Meeting • Introduce CSS process • Dialogue about the community & desires for Memorial Boulevard
November 5 & 6, 2003	Team Building in Kingsport Defined study area boundary
November 19 & 20, 2003	CSS Training at TDOT
December 2003	Collect speed data on SR 126 Analyze traffic accident data from TRIMS
January 2004	Analyze horizontal and vertical curve data
January 14, 2004	Requested information of record from environmental specialists
January 22, 2004	CSS Training in Kingsport Consultant conducted field review and meetings with utility providers
January 23, 2004	Team Meeting
February 2004	Consultant investigated local contacts with low income and minority population groups

February & March 2004	Preparation of traffic forecasts Capacity analyses Tabulation of additional traffic accident data
February 2004 through February 2005	Weekly Telephone Conference Calls (held on most Fridays)
February 20, 2005	Requested controlled aerial survey
March 2, 2004	Team Meeting (TDOT/Local Resource Teams)
March 25, 2004	Team Meeting
March 31, 2004	Letter to Elected Officials
April 2, 2004	Issued Press Release
April 8, 2004	Project Website activated
March 2003	Newsletter #1
May 7, 2004	Team Meeting (TDOT/Local Resource Teams)
May 2004	Postcard announcement of First Public Involvement Session mailed
May 24 & 25, 2004	First Public Involvement Sessions
June 2004	Postcard thank you mailed with summary of First Public Involvement Session
July 23, 2004	Team Meeting (TDOT/Local Resource Teams)
October 6 & 7, 2004	Team Meeting – Design Charette (TDOT/Local Teams)
October 2004	Newsletter #2
November 3 & 4, 2004	Second Public Involvement Sessions
December 3, 2004	Team Meeting (TDOT/Local Teams)
January 21, 2005	Team Meeting (Local Team)
February 7, 2005	Team Meeting (Local Team)
February 24 & 25, 2005	Team Meeting (Local Team)
March 30 & 31, 2005	Team Meeting – Plan Review Workshop (TDOT/Local)
April 18, 2005	Focus Group
May 2005	Newsletter #3
May 25 & 26, 2005	Third Public Involvement Sessions
June 21 & 22, 2005	Team Meeting – Team Recommendation Workshop
August 9, 2005	Website updated with Team Recommendation
August 10 & 11, 2005	Road Safety Audit training course in Kingsport
August 2005	Draft Context Sensitive Solutions Report submitted to TDOT for review
October 2005	TDOT Comments on Draft Report sent to consultant
October 21, 2005	Demonstration of digital video & radar speed enforcement equipment on SR 126
October 27, 2005	Announcement by Governor Bredesen & Commissioner Nicely accepting the Community Resource Team Recommendation
October 28, 2005	Website Updated with interim improvements list, project timeline, Public Involvement Session summary from May 2005, and press release
February 2006	Final Context Sensitive Solutions Report submitted to TDOT
February 2006	Newsletter #4

Additional information about some of the activities noted in the process chronology is provided below.

Project Kickoff Meeting (September 18, 2003)

- Consultant team presented an overview of Context Sensitive Solutions.
- Consultant team and TDOT project management staff were introduced to attendees.
- The meeting included City of Kingsport and Sullivan County elected officials and staff, local business owners, residents and citizen interest groups, Tennessee General Assembly members, TDOT staff, and consultants.

Community & Technical Resource Teams (September 2003)

Appointment of the Community Resource Team was made by Mayor Jeanette Blazier (Kingsport) and Mayor Richard Venable (Sullivan County). Appointed members included:

- Bill Albright, Kingsport Sullivan County MPO
- Allan Andrews*, Citizen Representative
- Jeanette Blazier, Mayor of Kingsport
- Tom Carroll, Citizen Representative
- Dan Cheek, Citizen Representative
- Humberto Collazo****, Citizen Representative and Spanish language provider
- Jeff Fleming, Kingsport Assistant City Manager
- Ray Griffin, Kingsport City Manager
- Larry Hall, Sullivan County Commissioner
- Forrest Koder***, City of Kingsport Landscape Architect
- Ken Marsh, Kingsport Alderman
- Judy Murray, Citizen Representative
- Wallace Putnam**, Citizen Representative
- Edwin Quinn*, Citizen Representative
- Dave Ruller, Kingsport City Engineer
- Roy Settle, Citizen Representative
- Diane Somers**, Citizen Representative
- Michael Surgenor*, Sullivan County Commissioner
- Ambre Torbett, Sullivan County Planner
- Nathan Vaughn, Tennessee State Representative
- Richard Venable, Sullivan County Mayor

  *Original member who resigned
  **Replacement member
  ***Member added for professional expertise in landscape architecture
  ****Member added for Spanish language skills and cultural sensitivity

- Additional team members included TDOT and consultant project managers: Elizabeth Smith, Jerry Moorhead, Becky White, and Anne Morris

TDOT assembled a Technical Resource Team to provide expertise and assistance to the Community Resource Team. The Technical Resource Team included:

- Michael Agnew, design
- Tammy Allison, historian
- Keven Brown, ecologist
- Ed Cole, environmental planning and permits
- Brandon Darks, traffic

- Doug Delaney, environmental planning and permits
- Charles Graves, design
- Bill Hart, planning
- Jeff Jones, design
- Lori Kirby, civil rights
- Paul Lane, planning
- Alan Longmire, archaeology
- Tom Love, environmental planning and permits
- Mike Phillips, right-of-way
- Nancy Sartor, research
- Judy Steele, community relations
- Derrick Tibbs, public involvement
- Leigh Ann Tribble (Federal Highway Administration), environmental
- Cammie Woodle, civil rights
- Jerry Yuknavage, environmental planning and permits

Team Building Workshop (November 5 and 6, 2003)
A team building workshop was conducted by a professional team trainer retained by TDOT. The workshop was held in Kingsport at the Meadowview Marriott Hotel and Convention Center. All local resource team members were invited to participate. Items accomplished at the workshop included:

- Team members became acquainted with one another through group exercises.
- Personality typing gave insight into individual values, concerns, and preferences.
- The team worked together to define the study area for the SR 126 project.

Context Sensitive Solutions Training (January 22, 2004)
A one-day workshop was held in Kingsport for Community Resource Team members at the Meadowview Marriott Hotel and Convention Center. The workshop was led by staff from the Kentucky Transportation Center. A Community Resource Team meeting was held the following day at the Renaissance Center in Kingsport..

Telephone Conference Calls (February 2004 through February 2005)

- Conference calls were held on Fridays as needed to discuss project management issues, schedules, and deliverables.
- During the first month, calls included only the project management staff (TDOT & consultants).
- During the second month, a representative of the local resource team was added to the conference.
- By April 2004, the call was opened up to local team members to join at their discretion.
- When concerns arose about whether team decisions were being made in the conference calls without a team quorum, the Friday conference calls were discontinued.

Newsletter #1 and Postcard (March 2004)

- Approximately 5,000 newsletters were bulk mailed to residences and businesses in the study area. Mailing labels were addressed to specific occupants.
- Enclosed with the newsletter was a postcard asking for preferences regarding day of week and time of day for meetings and problems encountered on SR 126. These postcards were

addressed for return to the public involvement consultant and included a first class stamp. Over 700 postcards were returned.

- The mailing list was provided by the City of Kingsport based upon records from the property tax assessor. Some problems were encountered with the mailing list. These are documented in the Lessons Learned report.
- Approximately 400 additional copies of the newsletter were provided to the City of Kingsport for distribution at City Hall, libraries, and locations in the study area that accepted food stamps. Members of the Community Resource Team also distributed newsletters to local service clubs and churches.
- A Spanish translation was provided and distributed via The Latino Club and Saint Dominic's Catholic Church.

Project Website (activated April 2004)

A project website was prepared and hosted on TDOT's main website. Content for the website was prepared by the project management team with input from the Community Resource Team. The website address (www.tennessee.gov/tdot/sr126) was referenced in all project newsletters. When initially activated, the project website contained a project overview, information on context sensitive solutions planning, a project location map, project photos, a list of resource team members, a project timeline, and answers to frequently asked questions. Throughout the project, the website was updated with copies of the project newsletters, announcements of upcoming meetings, and summaries of comments from the public involvement sessions. In response to comments from a few citizens, a project library was added to the website in early 2005 with copies of the project's public involvement plan, team member roles, and focus group information.

Postcard Announcement of Public Involvement Sessions (May 2004)

- A postcard was mailed in mid-May, prior to the first Public Involvement Sessions, to announce the date, time, and location of each session.
- Postcards were printed on green card stock to make them more visible in mailboxes.
- Approximately 5,000 postcards were mailed.

First Public Involvement Sessions

- Tuesday, May 25, 2004 from 7:00-9:00 p.m. at Sunnyside Baptist Church
- Wednesday, May 26, 2004 from 11:00-1:00 p.m. at Kingsport Civic Auditorium
- Citizens were asked to indicate where they lived by affixing a dot to a map of the study area.
- Handouts provided at each session included:
    - Agenda
    - Description of Context Sensitive Solutions
    - Project map
    - Preference survey questionnaire of features valued and problems with SR 126
- Displays shown at each session included:
    - Traffic accidents from 1999 through 2003 by location and type shown on aerial photography
    - Existing 2003 average daily traffic (ADT) volume data on a map of the study area
    - Aerial photographs that showed posted speed limits, design speed for all horizontal curves, and deficient horizontal curves
- Techniques used to gather citizen input included:
    - Public was given sticky notes and encouraged to write comments on the maps.

- A formal presentation was given.
- Open microphone question and answer session followed the formal presentation.
- Notes were taken on a flipchart during the question and answer session to record comments from citizens.
- Court recorder was available throughout the session to take individual comments, providing privacy for those who felt uncomfortable speaking before a group.
- Spanish interpreter was provided, but no interpretations were requested.
- Citizens were asked to complete a preference survey and return it at the end of the session or return it by mail.
- Resource team members wore bright green T-shirts to make them more visible and identifiable to citizens.

Third Postcard Mailout (June 2004)

- Approximately 5,200 postcards were mailed after the first Public Involvement Sessions.
- The purpose was to thank those who had returned the first postcard and those who had attended the Public Involvement Session.
- The postcard explained what would be done with the public input that had been collected and listed the next steps in the project.
- Safety was identified as the common theme expressed in most public comments.

Design Charette (October 6 and 7, 2004)

A design charette (workshop) was hosted by the project management team to facilitate development of improvement ideas from the Community Resource Team. The purpose of the charette was to review public input from May 2004 and develop concepts for improving SR 126.

- Information obtained from the first Public Involvement Sessions was summarized and displayed to focus attention on community concerns during concept development.
- A roadway profile drawing of the study corridor was displayed for reference.
- The consultant team provided the Community Resource Team members with educational information concerning basic roadway design principles, such as functional classification, design speed, clear zones, and minimum performance standards.
- Community Resource Team members were divided into 4 small groups to develop their improvement concept ideas. (The four concepts were later synthesized into three by the consultant team due to similarities and common features.)
- TDOT and consultant engineers were available throughout the charette to provide guidance regarding design issues.
- A photo log from TRIMS was displayed with a computer projector so that team members could refresh their memories of the project route.
- Consultant engineers set up a computer workstation with Microstation and GEOPAK. The consultants used a computer projector to show design images that the team could view as a group. The engineers had already created centerline files for SR 126 and were able to show team members how different cross section widths might impact the area and how differing design speeds influenced curve radii.
- At the end of the second day's session, each group presented their concept ideas to the whole team. Notes were taken by the consultant team to carefully document the features of each group's concept plan.
- The charette was open to the public to attend as observers.

Newsletter #2 (October 2004)

- Approximately 5,200 newsletters were bulk mailed to residences and businesses in the study area. Mailing labels were addressed to specific occupants or to "current resident" if sent to an apartment or mobile home.
- Approximately 400 additional copies of the newsletter were provided to the City of Kingsport for distribution at City Hall, libraries, and locations in the study area that accepted food stamps. Members of the Community Resource Team also distributed newsletters to local service clubs and churches.
- The newsletter provided summaries of the post card survey and the Public Involvement Session questionnaire from May 2004. It also described the Community Resource Team's design charette.
- It announced the dates, times and locations for the second series of Public Involvement Sessions.

Second Public Involvement Sessions

- Wednesday, November 3, 2004 from 11:00-1:00 p.m. at Kingsport Civic Auditorium
- Thursday, November 4, 2004 from 7:00-9:00 p.m. at Sunnyside Baptist Church
- Handouts provided at each session included:
    - Agenda
    - Comment Sheet
    - Worksheet for taking notes
- Displays shown at each session included:
    - Three concept plans (A, B, and C) for the study area, each divided into five segments
    - Typical Cross Sections for each concept and segment (not at the same scale throughout)
    - Located to the right of each concept segment was a paper on which citizens could affix a sticker to indicate their concept preference.
- Techniques used to gather citizen input included:
    - A formal presentation was given.
    - An open microphone question and answer session followed the formal presentation.
    - A court recorder prepared a transcript of the question and answer session.
    - After the question and answer period, each member of the public was given five dots numbered 1 through 5 and asked to return to the aerial photographs to express their preference for one concept in each segment. Concepts included A, B, C, and No Build.
    - Citizens were give one triangle and were asked to place it on the aerial photographs at a location where they would like to see before and after visualizations.
    - The public was given sticky notes and encouraged to write comments on the maps.
    - A court recorder was available throughout the session to take individual comments, providing privacy for those who felt uncomfortable speaking before a group.
    - Resource team members wore bright green T-shirts to make them more visible and identifiable to citizens.

Plan Review Workshop (March 30 and 31, 2005)

A workshop was held for the Community Resource Team in order to facilitate refinement of the concept plans in preparation for public involvement. The consultants and TDOT project managers facilitated the meeting with support from TDOT design engineers.

- The Team reviewed concept plans that had been revised by the consultant team based upon team and citizen input since November 2004.
- The Team took a bus tour of the project route to look at specific areas of concern.
- Suggestions were given for further refinement of the three concept plans.
- The Team created Concept D, a plan that mixed features and cross sections from the three root concepts (A, B, and C). The rationale for Concept D was to provide an example to the public that would demonstrate how the roadway cross section could vary throughout the project limits, as opposed to a "one size fits all" cross section. The team chose to use diminishing traffic volumes as the guiding factor for narrowing the cross section of Concept D as SR 126 moves eastward to Interstate 81.
- A revised "Accident Analysis Summary" was distributed to the team.
- Safety issues on SR 126 were discussed and a representative of the Governor's Highway Safety Office spoke to the team.
- The Team requested that the next public involvement sessions be longer than the previously held sessions in order to provide more time for the public to view mapping and allow for a longer comment period.
- The Plan review workshop was open to the public to attend as observers. At the end of each day's session, a 30-minute public comment period was provided.

Focus Group (April 18, 2005)

A Focus Group was held with citizens from the project study area at the Renaissance Center in Kingsport. The purpose of the Focus Group was to provide a small group setting for interviewing citizens and preparing a progress report card on the project and the team's performance. Need for the Focus Group was prompted by process concerns that had been raised by several citizens.

- Twelve (12) citizens were invited to participate. They were chosen randomly from a list of those who had attended both of the two previous Public Involvement Sessions.
- Thirteen (13) citizens participated in the Focus Group because one citizen showed up uninvited and asked to participate.
- Among others, the participating citizens included:
    - Four (4) who live on or own a business on SR 126
    - Four (4) who live on streets that directly intersect SR 126
- The meeting was held at the Renaissance Center from 6:30-8:30 p.m. on April 18.
- Dinner was provided through a local caterer.
- Two TDOT representatives from the project management team were present to observe, provide background information, and answer questions.
- A neutral, professional facilitator was retained to lead the Focus Group and provide a summary of the discussion.
- Feedback from the Focus Group included the following items (a complete report is included in the appendix):
    - Create a large print version of the newsletter
    - Citizens appreciated the opportunities to provide feedback at each Public Involvement Sessions and through the Focus Group
    - Need for more information and explanation of maps, plans, process, and impacts
    - Publicity for the project and meetings was good
    - Maps of the concept plans needed to be revised to be more easily understood
    - Property owners needed more information about right-of-way acquisition
    - Citizens would like another opportunity to express concept preferences

    - Overall, the project process was good
- At the request of the Focus Group, a summary of the discussion was provided to the public at the third Public Involvement Sessions and was included on the project website.

Newsletter #3 (May 2005)

- Approximately 5,300 newsletters were first class mailed to residences and businesses in the study area. All mailing labels were addressed to "current resident".
- Approximately 400 additional copies of the newsletter were provided to the City of Kingsport for distribution at City Hall, libraries, and locations in the study area that accepted food stamps. Members of the Community Resource Team also distributed newsletters to local service clubs and churches.
- The newsletter provided a summary of the second Public Involvement Session, the team's Plan Review Workshop, and the Focus Group.
- It provided a detailed summary of revised concept plans (A, B, and C) and an explanation of Concept D.
- It announced the dates, times and locations for the third series of Public Involvement Sessions with an explanation of extended hours that would be provided.

Third Public Involvement Sessions

- Wednesday, May 25, 2005 from 10:00 a.m. -2:00 p.m. at Kingsport Civic Auditorium
- Thursday, May 26, 2005 from 5:00-9:30 p.m. at Sunnyside Baptist Church
- Handouts provided at each session included:
    - Agenda
    - Detailed summary of concept plans with tradeoffs (11 pages)
    - Summary of Focus Group
    - Preference Survey
    - Large print edition of the newsletter
- Displays shown at each session included:
    - Maps depicting existing 2003 and Future 2028 average daily traffic (ADT) volumes
    - Four concept plans (A, B, C, and D), each divided into eight segments
    - Typical Cross Sections for each Concept and segment (all at same scale and color coded to match concept plan colors)
    - Before & After Visualizations
- Techniques used to gather citizen input included:
    - A formal presentation was given.
    - Judy Walton, from Region 3 Right-of-Way, made a presentation and provided pamphlets on the TDOT process used for right-of-way acquisition.
    - An open microphone question and answer session followed the formal presentation.
    - A court recorder prepared a transcript of the question and answer session.
    - A court recorder was available throughout the session to take individual comments, providing privacy for those who felt uncomfortable speaking before a group.
    - Citizens were asked to complete a preference survey and return it prior to leaving the session.
    - Resource team members wore bright green T-shirts to make them more visible and identifiable to citizens.

Team Recommendation Meeting (June 21 and 22, 2005)
A two-day meeting was held for the Community Resource Team at the Renaissance Center in Kingsport to facilitate the development of a team recommendation.

- Public input and survey results from the May 2005 Public Involvement Sessions was reviewed and discussed.
- Team members turned in individual scoring of an evaluation matrix for compilation.
- Composite team scores from the evaluation matrix were reviewed and discussed. It was determined that the scoring did not provide enough variation between the different concept plans to be useful to the team.
- Team members discussed and agreed upon a list of "common ground" recommendations that were supported by all team members.
- The consultant facilitated the team's discussion of each roadway segment and development of either a consensus or majority recommendation for each segment.
- Team members who opposed a majority recommendation were given the opportunity to write a minority opinion statement.
- Group decisions and minority reports were reviewed, and all team members were asked to sign a statement of support for the team recommendation with objections noted by the minority reports.

Road Safety Audit Training Course (August 2005)
Federal Highway Administration's Leigh Ann Tribble, a member of the Community Resource Team, arranged for FHWA to fund two sessions of the National Highway Institute's Road Safety Audit training course. The course was conducted on August 10 and 11, 2005 at East Tennessee State University in Kingsport and CRT members Bill Albright and Mike Thompson of the City of Kingsport participated. A second session was conducted on August 16 and 17, 2005 at FHWA's office in Nashville, and CRT member Liz Smith of TDOT attended.

Demonstration of Digital Video and Radar Technology (October 2005)
Sullivan County law enforcement personnel and others attended the national Governors' Highway Safety Life Savers conference in October 2005. As a result of their attendance, Sullivan County was selected to participate in a 30-day trial of new digital video and radar technology for speed enforcement. On October 21, 2005 the technology was demonstrated on SR 126.

Announcement by Governor Bredesen and Commissioner Nicely (October 27, 2005)
In a press release, the Governor and Commissioner publicly announced their support for the Community Resource Team's Recommendation for SR 126

Newsletter #4 (Anticipated in August 2005)

- Approximately 5,300 newsletters were first class mailed to residences and businesses in the study area. All mailing labels were addressed to "current resident".
- The newsletter provided a summary of activities that had occurred since May 2005 and a comparison of the Community Resource Team Recommendation and the concept preference survey results from the May 2005 public involvement sessions.
- The newsletter also gave a status update on a centerline rumble strip safety improvement project and a summary of the next steps for the SR 126 CSS project.

Demographic Survey

A demographic analysis was conducted for the SR 126 project area to determine the characteristics of the study area's population. This was initiated in order to design a public involvement plan that would address the abilities and constraints of all populations to participate. Environmental Justice populations (African American, Hispanic, Asian/Pacific Islanders, Native American/Alaskan Natives, and low income), the elderly, disabled, transportation dependent (occupied units having no vehicles), and those with limited English proficiency (those speaking a non-English language at home) were included in this analysis.

Information relative to the demographic analysis was obtained from the following 2000 Census tables:

- General Demographic Characteristics (SF1, DP-1);
- General Housing Characteristics (SF1, QT-H1);
- Profile of Selected Economic Characteristics (SF3, DP-3);
- Profile of Selected Social Characteristics (SF3, DP-2); and,
- Profile of Selected Housing Characteristics (SF3, DP-4).

In the 2000 Census, the study area, shown in Figure 3, included all or parts of seven census tracts – 408, 409, 410, 411, 422, 423, and 424. It should be pointed out that the census tract boundaries did not match exactly the study area boundary. In most cases, the census tracts included areas outside the study area boundaries. Therefore, the information provided below addresses an area larger than the actual study area. The majority of SR 126 was located in census tract 423, with smaller portions within census tracts 407 and 409.

Tables 2, 3, 4, 5 and 6 provide detailed information extracted from the 2000 Census for tracts 408, 409, 410, 411, 422, 423, and 424. This information was provided to the Community Resource Team in January 2004. Following is a summary of general findings that were verbally communicated to the team.

Population Characteristics

The population within the study area was 25,417. Census tracts 423 (6,505 persons), 408 (3,615 persons), and 410 (3,540 persons) had the largest populations.

Age Characteristics

Those 65 years old and over accounted for 16.6 percent (4,229 persons) of the study area's population. Census tracts with the highest number of elderly were 408 (1,028 persons), 423 (729 persons), and 409 (614 persons). The median age of the study area ranged from 37.5 years in census tract 424 to 45.9 years in census tract 408. In general, the older populations tended to be located within the City of Kingsport at the western end of the project study area.

Racial and Ethnic Characteristics

Whites accounted for 98.0 percent (24,720 persons) of the study area's population, while African Americans composed 1.1 percent (281 persons). African Americans were located predominantly in census tracts 408 (75 persons), 409 (65 persons) and 411 (67 persons). Hispanics accounted for 0.9 percent (230 persons) of the study area population, and were located predominantly in census tracts 423 and 411 (43 persons each), 410 (38 persons), and 408 (35 persons).

Housing Characteristics

Of the 11,359 housing units in the study area, 92.5 percent (10,512 units) were occupied. Of the 10,512 occupied units, 78.6 percent (8,258 units) were owner-occupied and 21.4 percent (2,254 units) were renter-occupied. Census tracts 408 (35.5 percent), 409 (27.3 percent), and 411 (26.6 percent) had the highest percents of renter-occupied housing units, while census tract 410 (13.2 percent) had the lowest percent. The race of 97.7 percent of the householders in occupied units was White. Of those who occupied housing units, 25.8 percent were 65 years old and older.

Between 1990 and March 2000, 1,835 units (16.2 percent) were constructed in the study area. This number is consistent with construction between 1980 and 1989 (1,620 units), between 1970 and 1979 (2,005 units), and between 1960 and 1969 (1,780 units). Most of the construction between 1990 and March 2000 occurred in census tracts 423 (587 units), 424 (317 units), and 410 (311 units).

Of the 10,512 occupied units, 56.8 percent (5,971 units) of the householders had moved into their units between 1990 and March 2000. This is a substantially greater percent than between 1980 and 1989 (15.9 percent), and between 1970 and 1979 (12.4 percent).

Single-family detached units accounted for 76.9 percent (8,735 units) of all structures within the study area. Census tracts 423 (2,191 units), 408 (1,425 units), and 410 (1,277 units) had the most single-family detached units. Mobile homes accounted for 9.9 percent (1,130 units) of all structures. The majority of mobile homes were found in census tracts 424 (582 units), 422 (224 units), and 423 (200 units). In addition, there were 755 structures with five or more units in them. Census tracts 409 (250 structures), 423 (171 structures), and 408 (135 structures) had the most structures with five or more units within them.

Within the study area, 576 occupied units (5.5 percent) had no vehicle.

Economic Characteristics

Unemployment, as a percent of the civilian labor force, was 3.4 percent in the study area. It ranged from 1.9 percent in census tract 424 to 7.8 percent in census tract 408. Census tract 408 (7.8 percent), 409 (5.1 percent) and 411 (3.0 percent) had the highest unemployment in the study area. Of those 16 years old and older, 42.8 percent were not in the labor force. Census tracts 408 (54.7 percent), 409 (48.2 percent), and 411 (49.2 percent) had the highest percents of those not in the labor force.

Within the study area, 88.4 percent of those who commuted to work drove alone and 8.4 percent carpooled. The mean travel time to work ranged from 15.4 minutes (census tract 409) to 26.1 minutes (census tract 424). Those living closest to Kingsport had shorter commutes and those living further from Kingsport had longer commutes.

Median household incomes within the study area ranged from $45,889 (census tract 423) to $25,522 (census tract 408). Those families living below poverty accounted for 8.1 percent of all families in the study area. The percent of all families living below poverty ranged from 14.9 percent (census tract 408) to 2.7 percent (census tract 410).

Social Characteristics

Of those 25 years old and older in the study area, 20.2 percent (3,663 persons) did not complete high school, 30.9 percent (5,614 persons) completed high school, and 48.9 percent (8,865 persons) completed more than high school. Of special concern were the 8.3 percent (1,497 persons) who did not finish the 9th grade.

Disability status among civilians is divided into three age groups. Of those 5 – 20 years old 8.7 percent were disabled (425 persons); of those 21-64 years old 20.9 percent were disabled (3,075 persons), and of those 65 years old and older 45.5 percent were disabled (1,830 persons). Census tracts 408 (455 persons), 423 (335 persons), and 411 (277 persons) had the highest number of those 65 years old and older that were disabled. Census tracts 423 (782 persons), 424 (520 persons), and 408 (480 persons) had the highest number of those between 21 and 64 years old that were disabled.

Within the study area, 1.8 percent (421 persons) of those 5 years old and older spoke a language other than English at home. Census tracts 423 (106 persons), 409 (102 persons), and 408 (73 persons) had the highest numbers of those that spoke a language other than English at home.

Summary Conclusions

- The number of elderly located within the City of Kingsport suggested that a meeting location in Kingsport would be appropriate to meet the convenience needs of those elderly citizens. The much smaller number of elderly persons in the area outside of Kingsport suggested that a second meeting in a location here would also be appropriate. If two meetings were provided, they could be held at different times. One meeting should be during daylight hours to accommodate the elderly. Large print information may be appropriate.
- The limited number of Hispanics in the study area, and the small number of those who speak a language other than English suggested that materials should not be translated into Spanish. Instead, a minister at a church that provides Spanish services, or a member of an Hispanic group in the area could be retained to provide translated information to this small group, and interpretation services at public involvement meetings.
- Those living in mobile homes and large apartment complexes could be difficult to reach. It was determined that the tax assessor information should be checked to see if there is an owner of the mobile home park and apartments, or whether each unit has a distinct address.
- The census information on commute time indicated that very few of the residents have employment outside of the greater Kingsport area and would be available to attend meetings during the day and in the evening. It was noted that information should be obtained from Eastman Chemical about shift times for their employees.
- The majority of those living in occupied units have vehicles and would be able to access a meeting.
- Low literacy does not appear to be a problem.
- The number of disabled would require that any meeting place adhere to the standards set forth in the Americans with Disabilities Act.

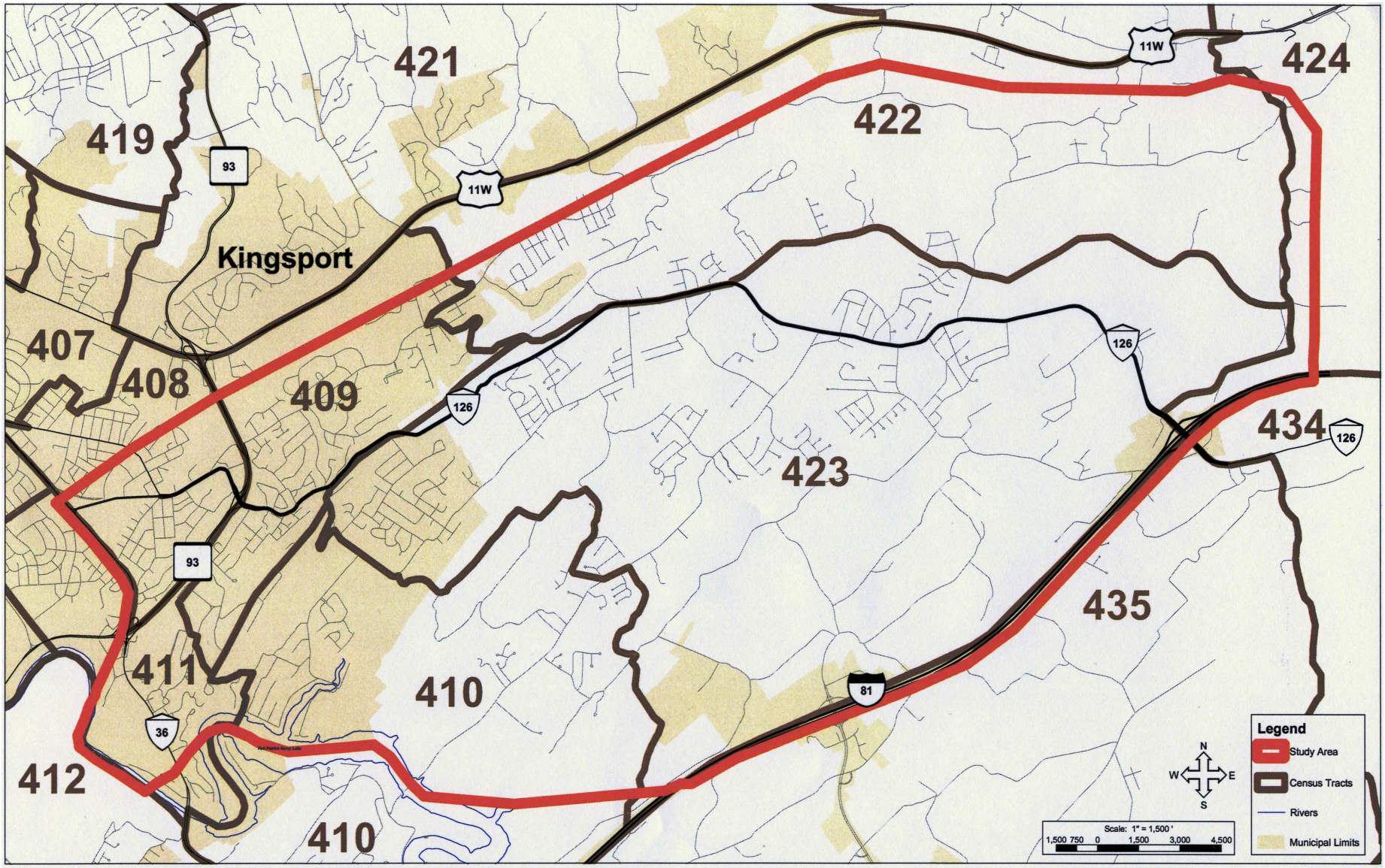


Figure 3
Census Tracts in Study Area Boundary

Table 2
General Demographic Characteristics (SF1, DP-1) 2000 Census

Subject	Census Tracts							Total
	408	409	410	411	422	423	424	
TOTAL POPULATION	3,615	2,987	3,540	2,448	3,031	6,505	3,291	25,417
Under 5	155	205	234	141	196	375	224	1,530
5 – 14	380	367	475	278	428	830	449	3,207
15 – 24	355	307	325	237	303	706	358	2,591
25 – 34	420	318	435	262	416	815	486	3,152
35 – 44	460	407	619	340	482	1,048	552	3,908
45 – 54	428	439	524	339	452	1,108	464	3,754
55 – 64	389	330	371	280	400	894	382	3,046
65 and over	1,028	614	557	571	354	729	376	4,229
Median age	45.9	42.8	40.1	44.2	38.8	40.4	37.5	
RACE								
One Race	3,584	2,959	3,522	2,426	3,007	6,458	3,277	25,233
White	3,478	2,853	3,470	2,321	2,976	6,379	3,243	24,720
African-American	75	65	20	67	16	28	10	281
American Indian/Alak	1	19	3	7	5	6	10	51
Asian	12	14	19	14	5	25	9	98
Native Hawaiian	0	1	0	5	0	0	0	6
Some other race	18	7	10	12	5	20	5	77
Two or more races	31	28	18	22	24	47	14	184
HISPANIC OR LATINO								
Hispanic/Latino (of any race)	35	26	38	43	17	43	28	230
Not Hispanic or Latino	3,580	2,961	3,502	2,405	3,014	6,462	3,263	25,187
White alone	3,468	2,835	3,445	2,290	2,964	6,357	3,220	24,579
HOUSEHOLDS BY TYPE								
Total Households	1,615	1,298	1,376	1,126	1,186	2,588	1,323	10,512
Family Households	942	929	1,081	725	908	2,029	995	7,609
Nonfamily Households	673	369	295	401	278	559	328	2,903
Householder living alone	608	326	271	367	250	507	283	2,612
65 years old and older	369	141	114	192	92	156	110	1,174
RELATIONSHIP								
In Households	3,395	2,974	3,503	2,448	3,031	6,505	3,291	25,147
In Group Quarters	220	13	37	0	0	0	0	270
Institutionalized	177	0	37	0	0	0	0	214
Noninstitutionalized	43	13	0	0	0	0	0	56

Table 3
General Housing Characteristics (SF1, QT-H1) 2000 Census

Subject	Census Tracts							Total
	408	409	410	411	422	423	424	
OCCUPANCY STATUS								
Total housing units	1,792	1,416	1,439	1,269	1,262	2,743	1,438	11,359
Occupied housing units	1,615	1,298	1,376	1,126	1,186	2,588	1,323	10,512
Vacant housing units	177	118	63	143	76	155	115	847
TENURE								
Occupied housing units	1,615	1,298	1,376	1,126	1,186	2,588	1,323	10,512
Owner-occupied	1,042	943	1,195	826	1,000	2,164	1,088	8,258
Renter-occupied	573	355	181	300	186	424	235	2,254
RACE OF HOUSEHOLDER								
Occupied housing units	1,615	1,298	1,376	1,126	1,186	2,588	1,323	10,512
One race	1,603	1,293	1,368	1,119	1,179	2,573	1,315	10,450
White	1,566	1,252	1,353	1,082	1,167	2,551	1,303	10,274
African-American	27	26	7	28	7	12	4	111
American Indian/Alak	1	7	2	1	1	1	2	15
Asian	4	4	4	7	2	5	5	31
Native Hawaiian	0	1	0	1	0	0	0	2
Some other race	5	3	2	0	2	4	1	17
Two or more races	12	5	8	7	7	15	8	62
HISPANIC OR LATINO HOUSEHOLDER								
Hispanic/Latino (of any race)	10	8	8	7	3	11	10	57
Not Hispanic or Latino	1,605	1,290	1,368	1,119	1,183	2,577	1,313	10,455
White alone	1,563	1,248	1,346	1,076	1,166	2,545	1,293	10,237
AGE OF HOUSEHOLDER								
Occupied housing units	1,615	1,298	1,376	1,126	1,186	2,588	1,323	10,512
15 - 24	60	70	23	36	26	79	55	349
25 - 34	196	169	194	122	186	380	230	1,477
35 - 44	259	225	322	188	250	542	300	2,086
45 - 54	237	245	291	209	250	609	260	2,101
55 - 64	225	200	216	179	233	514	217	1,784
65 and over	638	389	330	392	241	464	261	2,715
65 - 74	275	206	178	170	151	266	148	1,394
75 - 84	271	161	122	190	69	158	84	1,055
85 and over	92	22	30	32	21	40	29	266

Table 4
Profile of Selected Social Characteristics (SF3, DP-2) 2000 Census

Subject	Census Tracts							Total
	408	409	410	411	422	423	424	
EDUCATIONAL ATTAINMENT								
Population 25 years old and older	2,733	2,103	2,534	1,827	2,114	4,569	2,262	18,142
Less than 9th grade	466	115	135	139	207	131	304	1,497
9th to 12th grade, no diploma	494	209	93	280	318	319	453	2,166
High School graduate	879	497	792	537	710	1,466	733	5,614
Some college, no degree	442	407	494	371	424	984	539	3,661
Associate degree	96	122	163	99	114	378	113	1,085
Bachelor's degree	246	545	577	267	198	898	85	2,816
Graduate or professional degree	110	208	280	134	143	393	35	1,303
DISABILITY STATUS CIVILIANS								
Population less than 5 years old	115	205	234	141	196	375	224	1,490
Populations 5 - 20 years	616	598	686	436	608	1,348	668	4,960
With a disability	64	92	62	27	47	90	43	425
Population 21 - 64 years	1,810	1,576	2,048	1,291	1,870	4,069	2,018	14,682
With a disability	490	328	276	271	408	782	520	3,075
Populations 65 years and older	846	620	516	576	353	731	376	4,018
With a disability	455	216	184	277	161	335	202	1,830
RESIDENCE IN 1995								
Population 5 years old and older	3,460	2,802	3,311	2,307	2,831	6,148	3,068	23,927
Same house in 1995	2,057	1,713	1,927	1,215	1,890	3,759	2,058	14,619
Different house in the US in 1995	1,392	1,086	1,353	1,080	941	2,376	1,010	9,238
Same county	1,056	729	790	655	625	1,402	697	5,954
Different county	336	357	563	425	316	974	313	3,284
Same state	141	114	182	219	166	386	57	1,265
Different state	195	243	381	206	150	588	256	2,019
Elsewhere in 1995	11	3	31	12	0	13	0	70
LANGUAGE SPOKEN AT HOME								
Population 5 years old and older	3,460	2,802	3,311	2,307	2,831	6,148	3,068	23,927
English only	3,387	2,700	3,253	2,295	2,795	6,042	3,034	23,506
Language other than English	73	102	58	12	36	106	34	421

Table 5
Profile of Selected Economic Characteristics (SF3, DP-3) 2000 Census

Subject	Census Tracts							Total
	408	409	410	411	422	423	424	
EMPLOYMENT STATUS								
16 years and over	3,023	2,381	2,793	2,007	2,383	5,252	2,595	20,434
In labor force	1,370	1,233	1,726	1,020	1,433	3,301	1,602	11,685
Civilian labor force	1,370	1,225	1,702	1,016	1,433	3,301	1,596	11,643
employed	1,263	1,163	1,663	986	1,398	3,204	1,565	11,242
unemployed	107	62	39	30	35	97	31	401
% of civilian labor force	7.8	5.1	2.3	3.0	2.4	2.9	1.9	3.4
Armed Forces	0	8	24	4	0	0	6	42
Not in labor force	1,653	1,148	1,067	987	950	1,951	993	8,749
COMMUTING TO WORK								
Workers 16 years old and older	1,251	1,158	1,658	985	1,384	3,141	1,555	11,132
Drove alone	1,042	1,006	1,471	878	1,212	2,847	1,383	9,839
Carpooled	146	131	109	67	159	221	110	943
Public transport	5	0	0	0	0	0	0	5
Walked	19	6	4	20	7	27	21	104
Other means	8	7	0	0	0	0	4	19
Worked at home	31	8	74	20	6	46	37	222
Mean travel time to work (min)	17.1	15.4	19.5	20.9	24.4	18.7	26.1	
OCCUPATION								
Employed civilian population 16 years and over	1,251	1,163	1,663	986	1,398	3,204	1,565	11,230
Management, professional, and related occupations	347	435	768	263	402	1,368	288	3,871
Service occupations	216	169	127	113	146	282	264	1,317
Sales and office occupations	369	315	433	347	409	835	336	3,044
Farming, fishing, and forestry occupations	0	11	7	0	0	0	8	26
Construction, extraction, and maintenance occupations	119	76	151	98	204	332	276	1,256
Production, transportation, and material moving occupations	212	157	177	165	237	387	393	1,728

Table 5 continued
Profile of Selected Economic Characteristics (SF3, DP-3) 2000 Census

Subject	Census Tracts							Total
	408	409	410	411	422	423	424	
INDUSTRY								
Agriculture, forest, fishing and hunting, and mining	6	0	11	0	6	18	22	63
Construction	149	70	94	63	144	197	202	919
Manufacturing	218	245	388	188	238	636	349	2,262
Wholesale trade	52	93	49	49	31	133	65	472
Retail trade	216	135	171	163	282	483	120	1,570
Transportation and warehousing, and utilities	29	20	84	17	71	96	68	385
Information	16	25	54	21	12	113	18	259
Finance, insurance, real estate, and rental and leasing	48	92	84	38	70	162	27	521
Educational, health and social services	217	217	373	200	257	734	181	2,179
Professional, scientific, management, administrative, and waste management services	63	41	130	74	116	178	88	690
Arts, entertainment, recreation, accommodation and food services	112	138	103	74	80	218	169	894
Other services (except) public administration)	104	63	83	62	45	126	151	634
Public Administration	33	24	39	37	46	110	5	294
INCOME IN 1999								
Households	1,636	1,274	1,379	1,137	1,185	2,592	1,326	10,529
Median household income ($)	25,522	36,757	43,651	33,512	39,694	45,889	27,833	
Families	965	917	1,082	732	918	2,032	1,006	7,652
Median family income ($)	31,715	49,712	50,833	41,279	44,844	52,132	33,393	
Below poverty families	144	90	29	93	59	74	127	616
Percent of all families	14.9	9.8	2.7	12.7	6.4	3.6	12.6	8.1
Below poverty individuals	652	402	167	342	260	297	527	2,647

Table 6
Profile of Selected Housing Characteristics (SF3, DP-4) 2000 Census

Subject	Census Tracts							Total
	408	409	410	411	422	423	424	
UNITS IN STRUCTURE								
Total housing units	1,792	1,416	1,439	1,269	1,262	2,743	1,438	11,359
1-unit, detached	1,425	1,059	1,277	977	997	2,191	809	8,735
1-unit, attached	73	61	33	76	12	33	6	294
2 units	49	5	19	36	0	8	6	123
3 or 4 units	74	27	0	60	0	140	12	313
5 to 9 units	42	196	31	41	20	62	17	409
10 to 19 units	6	5	15	39	0	73	0	138
20 or more	87	49	0	30	0	36	6	208
Mobile home	36	14	64	10	224	200	582	1,130
Boat, RV, van, etc.	0	0	0	0	9	0	0	9
YEAR STRUCTURE BUILT								
1999 - March 2000	7	8	10	40	15	115	40	235
1995 - 1998	12	82	183	65	94	311	166	913
1990 - 1994	23	124	118	40	110	161	111	687
1980 - 1989	156	118	146	94	191	538	377	1,620
1970 - 1979	112	266	213	84	260	757	313	2,005
1960 - 1969	137	302	276	188	185	551	141	1,780
1940 - 1959	1,003	445	457	675	309	187	184	3,260
1939 or earlier	342	71	36	83	98	123	106	859
YEAR HOUSEHOLDER MOVED INTO UNIT								
Total occupied units	1,615	1,298	1,376	1,126	1,186	2,588	1,323	10,512
1999 - March 2000	271	223	201	146	142	439	197	1,619
1995 - 1998	344	282	373	381	291	722	310	2,703
1990 - 1994	279	260	216	128	194	320	252	1,649
1980 - 1989	209	179	151	168	199	536	232	1,674
1970 - 1979	167	154	209	115	193	320	146	1,304
1969 or earlier	345	200	226	188	167	251	186	1,563
VEHICLES AVAILABLE								
None	210	85	10	79	46	63	83	576
1	672	404	269	469	292	545	391	3,042
2	498	586	750	366	484	1,096	502	4,282
3 or more	235	223	347	212	364	884	347	2,612

Roadway Characteristics

The SR 126 project area is approximately 8.4 miles in length, beginning at East Center Street in Kingsport and ending at Interstate 81 in unincorporated Sullivan County. Within the project area, the number of travel lanes and other roadway feature varies from four lanes with and without a center median to two lanes. Following is a detailed discussion of the various cross sections along project route, beginning at the western termini and moving eastward to Interstate 81.

East Center Street to just west of SR 93 (John B. Dennis Highway)
The western section of SR 126 begins at East Center Street and extends for 0.62 miles to just west of SR 93 (Log Mile 3.72 to Log Mile 4.34). This section contains four travel lanes with no left turn lanes or median. The posted speed limit is 35 miles per hour. There is an existing traffic signal at the intersection of SR 126 and East Center Street. The average daily traffic (ADT) volume on this section of SR 126 was 18,060 west of Orebank Road and 14,460 east of Orebank Road in 2003. The percent of trucks as a portion of the ADT varied in 2003 from 3% west of Orebank Road to 4% east of Orebank Road. Development in this section of the project is mainly commercial and single family residential.

West of SR 93 (John B. Dennis Highway) to Stratford Drive
This section of SR 126 extends for a distance of 0.26 mile (Log Mile 4.34 to Log Mile 4.6) through a grade separated interchange with SR 93. In this section there are four travel lanes with a concrete median that separates opposing traffic. Both of the SR 93 ramp terminal intersections with SR 126 are signalized. The posted speed limit is 35 miles per hour. The 2003 ADT for SR 126 on the east side of SR 93 was 22,440 with 2% trucks. Land uses surrounding the interchange are primarily commercial, with an assisted living / rehabilitation center located on the southwest quadrant of the interchange.

Stratford Drive to just east of Old Stage Road
Immediately east of Stratford Drive the center median on SR 126 ends and the roadway transitions to provide two eastbound travel lanes and one westbound travel lane with no center turn lane or median. This section extends for a distance of 1.44 miles up Chestnut Ridge and through the curve just east of Old Stage Road (Log Mile 4.6 to Log Mile 6.04). The second eastbound travel lane functions as a climbing lane to allow faster drivers to bypass slower moving vehicles as they travel uphill onto the ridge. The posted speed limit is 35 miles per hour for most of the section, but increases to 45 miles per hour on top of the ridge west of Old Stage Road.

Within this section there are numerous intersections that provide access to residential areas off of SR 126. There is a major intersection with Harbor Chapel Road that had historically been very congested and which was signalized during December 2004. The 2003 ADT in this section of SR 126 varied from 16,800 west of Harbor Chapel Road to 10,870 at Old Stage Road. The percent of trucks as a portion of the ADT was 2% at all count stations. This area contains both residential and commercial land uses.

East of Old Stage Road to West of Overhill Drive / Carolina Pottery

This two-lane section of SR 126 extends from just east of Old Stage Road, where the eastbound climbing lane terminates, to a point west of Overhill Drive near Interstate 81. This section is approximately 5.78 miles long (Log Mile 6.04 to Log Mile 11.82). This portion of SR126 contains two travel lanes with no center medians. Left turn lanes are provided at only a few intersections. The speed limit along this section of SR 126 is posted at 50 miles per hour, however there are advisory speeds posted at several curves as low as 30 miles per hour. The ADT counts in this section are listed below along with the year that the data was collected.

- 8,360 with 1% trucks east of Old Stage Road (2003)
- 8,950 with 1 % trucks between Cooks Valley Road and Island Road (2004)
- 9,270 with 2% trucks between Island Road and Fall Creek Road (2003)
- 8,900 with 2% trucks between Fall Creek Road and Shadowtown Road (2004)
- 6,700 with 2% trucks between Shadowtown Road and Harr Town Road (2004)

Land uses in this section of SR 126 vary from multi-family and single family residential to commercial, institutional, and agricultural. Most of the commercial land uses are concentrated in an area around Island Road.

West of Overhill Drive to I-81 Interchange

The final section of SR 126 examined in this project is a short 0.25-mile section beginning just west of Overhill Drive and continuing through the interchange at Interstate 81 (Log Mile 11.82 to 12.07). This area contains 4 travel lanes with a center grassed median separating opposing lanes of traffic. The posted speed limit is 50 miles per hour. The Overhill Drive intersection is a four-way, side street stop controlled intersection that provides access, on one side, to a shopping center and a McDonald's restaurant. The Interstate 81 ramp terminal intersections on SR 126 are also stop sign controlled. The 2003 ADT in this section was 7,220 with 2% trucks. There is some commercial roadside development as well as large tracts of undeveloped property.

Geometric Deficiencies

Substandard horizontal and vertical curves were identified by the public and by the Community Resource Team as a major concern on SR 126. These concerns were validated by engineering field studies conducted by the project consultants. Following is a summary of the identified deficiencies for horizontal and vertical curves within the study area.

Horizontal Curve Evaluation

Horizontal alignment is comprised of the straight lines and curves that make up the side to side elements of a roadway. A horizontal curve is what most people refer to as a curve or bend in the roadway. The speed at which a reasonable and prudent driver traverses a curve should be consistent with the amount of sight distance provided in the curve to allow for the driver to respond to the roadway conditions ahead. The design speed of horizontal curves should be consistent with the overall design speed of the roadway, and where it is not consistent then advisory or warning speeds limits should be posted.

Along the study section of SR 126 approximately 41% (20 out of 49) of the horizontal curves are substandard for the posted speed limit. Table 7 identifies the location and severity of each deficient curve. The table also notes whether or not an advisory speed warning is posted in

advance of the curve. The appendix to this report includes maps that diagram the location of each horizontal curve and all speed signage along SR 126. These maps were presented to the public at the May 2004 Public Involvement Sessions and were also used by the Community Resource Team at the October 2004 Design Charette.

Table 7
Horizontal Curves with Substandard Design Speeds

Location	Curve Design Speed	Posted Speed Limit	Advisory Speed Warning
East of Orebank Road	25 mph	35 mph	
At Kite Street	30 mph	35 mph	
East side of Kent Street	30 mph	35 mph	
At Harbor Chapel Road	35 mph	45 mph	
East of Old Stage Road	30 mph	45 mph	30 mph
On Chestnut Ridge	35 mph	50 mph	35 mph
On Chestnut Ridge	40 mph	50 mph	35 mph
On Chestnut Ridge	40 mph	50 mph	35 mph
On Chestnut Ridge	25 mph	50 mph	35 mph
On Chestnut Ridge	30 mph	50 mph	35 mph
On Chestnut Ridge	45 mph	50 mph	35 mph
At Chestnut Ridge Road	45 mph	50 mph	
East side of Island Road	45 mph	50 mph	
At Shadowtown Road	45 mph	50 mph	
Between Natchez Lane & Dakota Drive	35 mph	50 mph	
West side of Cassidy Drive	45 mph	50 mph	
West side of Cochise Trail	45 mph	50 mph	
West of Samlola Road	40 mph	50 mph	
West of Samlola Road	45 mph	50 mph	
West of Overhill Drive	40 mph	50 mph	35 mph

Vertical Curve Evaluation

Vertical alignment is comprised of the straight lines and curves that make up the up and down elements of a roadway. A vertical curve is what most people refer to as a hill or valley. The design speed of a vertical curve is intended to prevent the driver's travel speed from exceeding his or her line of sight, thus allowing the driver ample time to respond to the roadway conditions ahead. A flatter curve allows the driver to see a greater distance, allowing a higher speed limit.

Data from the controlled aerial survey was used to develop a centerline profile for the project area of SR 126. The curvature of the profile was examined to identify vertical curves that are substandard for the posted speed limit. Table 8 lists 42 vertical curves by location that have a design speed less than the posted speed limit and a curve length of greater than 150'. Deficient curves that are shorter than 150' were not included in the list since they are not generally discernable to the driver.

Table 8
Vertical Curves with Substandard Design Speeds

Location	Type of Curve	Design Speed	Posted Speed	Curve Length
East of Trinity Lane	sag	35 mph	45 mph	183’
East of Trinity Lane	crest	40 mph	45 mph	214’
Between Trinity Lane & Tanglewood Road	crest	40 mph	45 mph	241’
Between Trinity Lane & Tanglewood Road	sag	40 mph	45 mph	257’
East of Old Stage Road	crest	40 mph	45 mph	273’
East of Old Stage Road	crest	40 mph	50 mph	176’
On Chestnut Ridge	sag	20 mph	50 mph	178’
On Chestnut Ridge	crest	45 mph	50 mph	379’
On Chestnut Ridge	sag	40 mph	50 mph	192’
On Chestnut Ridge	sag	45 mph	50 mph	168’
On Chestnut Ridge	crest	45 mph	50 mph	103’
On Chestnut Ridge	sag	35 mph	50 mph	164’
On Chestnut Ridge	crest	40 mph	50 mph	316’
East of Shuler Road	crest	35 mph	50 mph	346’
At Lemay Drive	crest	40 mph	50 mph	410’
East of Lemay Drive	crest	40 mph	50 mph	483’
East of Lemay Drive	sag	20 mph	50 mph	207’
West of Chestnut Ridge Road	crest	40 mph	50 mph	294’
West of Chestnut Ridge Road	sag	35 mph	50 mph	240’
East of Chestnut Ridge Road	crest	40 mph	50 mph	310’
Between Cooks Valley Road & Fisher Drive	sag	35 mph	50 mph	271’
East of Fisher Drive	crest	40 mph	50 mph	175’
Between Fisher Drive & Bridwell Heights	sag	30 mph	50 mph	271’
Between Bridwell Heights & Lana View Road	crest	40 mph	50 mph	316’
Between Lana View Road & Wembeck Drive	sag	35 mph	50 mph	295’
At Island Road	crest	40 mph	50 mph	271’
At Country Drive	crest	45 mph	50 mph	204’
West of Fall Creek Road	sag	35 mph	50 mph	219’
At Fall Creek Road	crest	40 mph	50 mph	340’
West of Cree Street	sag	35 mph	50 mph	387’
Between Cree Street & Santanta Road	crest	40 mph	50 mph	264’
At Montezuma Road	sag	40 mph	50 mph	318’
East of Natchez Lane	sag	45 mph	50 mph	600’
West of Cochise Trail	sag	35 mph	50 mph	429’
East of Cochise Trail	crest	40 mph	50 mph	291’
East of Cochise Trail	sag	45 mph	50 mph	324’
East of Cochise Trail	crest	45 mph	50 mph	350’
Between Cochise Trail & Samlola Road	crest	45 mph	50 mph	186’
Between Samlola Road & Gravel Top Road (west)	crest	45 mph	50 mph	525’
East of Gravel Top Road (east)	crest	40 mph	50 mph	390’
West of I-81 westbound ramp	sag	45 mph	50 mph	240’
West of I-81 westbound ramp	sag	40 mph	50 mph	296’

Speed Data

Travel speed (too fast and too slow) on SR 126 was noted as a concern on many of the surveys completed by the public for this project. In addition to this local concern about travel speeds, the consultant team noted in their field investigations that there are a number of horizontal curves where the design speed of the curve is as much as 20 miles per hour less than the posted speed limit. Some of these curves have advisory speed warnings and some do not. Concern for travel speeds on the corridor, particularly in curvy areas, prompted TDOT to gather speed data along the route. Five locations were chosen based on their proximity to horizontal curves. Speed data was collected for a 24-hour period in each direction at each location. The following table summarizes the speed data that was collected at each location.

Table 9
Travel Speed Data on SR 126

Station #	# of Lanes	Travel Direction	Posted Speed Limit	Advisory Speed Warning	Average Speed	85th Percentile Speed*
1 – near Orebank Road	2	Eastbound	35 mph	None	39.4, 43.4	44.7, 50.0
	2	Westbound	35 mph	None	40.6, 40.1	46.7, 46.4
2 – between Beverly Hill St. and Glenwood St.	2	Eastbound	45 mph	None	40.6, 41.1	45.2, 46.6
	1	Westbound	35 mph	None	39.2	43.9
3 – between Old Stage Rd. and Holiday Rd.	1	Eastbound	50 mph	35 mph	44.8	51.9
	1	Westbound	50 mph	35 mph	46.3	52.9
4 – west of Island Rd. near shopping center	1	Eastbound	50 mph	None	42.8	49.6
	1	Westbound	50 mph	None	42.0	48.7
5 – west of Samlola Rd.	1	Eastbound	50 mph	None	49.3	54.5
	1	Westbound	50 mph	None	52.3	58.5

*85th percentile travel speed is the speed at or below which 85% of the vehicles traveled. Average and 85th percentile speed is noted for each travel lane.

The 85th percentile travel speeds at most of the surveyed locations were within 5 miles per hour of the posted speed limit. The notable exceptions were at station #1, near Orebank Road, and at station #5, west of Samlola Road. The design speed for the curve at station #1 is 25 miles per hour and the posted speed limit is 35 miles per hour. The curve at station #5 is a compound curve made up of two curves with a straight section in between. The design speed of the two individual curves at station # 5 are 40 miles per hour and 45 miles per hour with a posted speed limit of 50 miles per hour.

The collected speed data verifies comments made by the public that travel speeds are higher than desirable in certain areas of SR 126. Particularly noteworthy is the confirmed concern that travel speeds are higher in curved areas than is prudent for the existing curve design speeds. The geometric and speed data evaluations confirmed in the minds of the Project Management Team and Community Resource Team that whatever improvements are ultimately recommended for SR 126, it is imperative that the vertical and horizontal curvature be corrected to match a consistent and logical design speed.

Accident Data

As noted in a previous section of this report, traffic accident data for SR 126 was gathered from several sources: TDOT's Traffic and Roadway Information Management System (TRIMS), the City of Kingsport, Sullivan County, and the Tennessee Highway Patrol. Data was collected for the years from 1999 through 2003. Per standard TDOT practice, the database was filtered to remove any traffic accidents that occurred on private property or involved only property damage with a value less than $400. Maps were prepared to graphically show the locations and type of traffic accidents that had occurred on SR 126. These maps, included in the appendix of this report, were presented at the Public Involvement Sessions in May 2004.

In addition to preparing a graphic summary of the traffic accident data, the consultants calculated accident rates for SR 126 using a standard TDOT methodology. Accident rates were calculated for various sections of SR 126 based upon the existing roadway cross sections. The resultant rates for SR 126 and a comparison with statewide average rates are shown in Table 10.

The traffic accident rate summary table includes information on the total number of traffic accidents, number of accidents that produced an injury, and the number of accidents that resulted in a fatality. Also noted are statewide average accident rates for similar facilities in Tennessee and calculated accident rates for various sections of SR 126. The actual traffic accident rate noted in the table is determined by dividing the number of accidents that occur at a given location in a specified time period by the amount of vehicular exposure at that location. Exposure is measured in number of vehicle-miles of travel or in number of entering vehicles. Statewide averages for accident rates on comparable roadway segments are provided in the table for comparison. The critical accident rate reflects a statistical control that provides a means of evaluating actual accident rates. If an actual accident rate is higher than the critical accident rate, one can conclude that the accident pattern is most likely not due to chance but to some unfavorable characteristic of the local conditions. The severity index is an expression of the ratio of fatal and injury accidents to the total number of accidents at a given location. The higher the severity index, the more hazardous the location.

In addition to the accident rate summary table, the following pages include tables that summarize locations with 20 or more accidents from 1999 through 2003, locations of accidents that resulted in a fatality and the type of collision, and fatal accident rates for various sections of SR 126 compared to statewide averages for similar roadways in Tennessee.

Table 10
Accident Rate Summary for SR 126 - 1999 through 2003

Section	Type	Total Accidents	Injury Accidents	Fatal Accidents	Statewide Average Rate	Actual Accident Rate	Critical Accident Rate	Severity Index
E. Center Street to Sun Bridge Rehab	4-lane undivided	71	26	0	3.72	6.49	5.12	0.37
Sun Bridge Rehab to east of Stratford Road	4-lane divided	87	18	0	2.33	8.71	3.5	0.21
East of Stratford Road to east of Old Stage Road	3-lane (climbing lane)	128	33	1	3.72	2.87	4.4	0.26
East of Old Stage Road to west of Overhill Road	2-lane	253	94	6	2.89	2.68	3.3	0.52

Intersection	Type	Total Accidents	Injury Accidents	Fatal Accidents	Statewide Average Rate	Actual Accident Rate	Critical Accident Rate	Severity Index
SR 126 @ Overhill Road / Carolina Pottery	4-lane divided urban	51	27	1	0.29	2.21	0.57	0.55

Table 11
Locations with 20 or More Accidents - 1999 through 2003

Location	Log Mile	Total Accidents	Injury Accidents	Fatal Accidents
at Overhill Road / Carolina Pottery	11.96	45	25	1
at Stratford Road	4.55	27	3	0
at SR 93 southbound ramps	4.41	26	7	0
at Harbor Chapel Road	5.18	20	7	0
at Fall Creek Road	9.1	20	7	0
at Amy Avenue	5.11	16	5	0
at East Center Street	3.72	15	5	0

Table 12
Fatality Locations - 1999 through 2003

Location	Log Mile	Date	Time	Type of Accident
Culvert between East Lawn Cemetery & Chestnut Ridge Road	7.5	3/27/1999	21:25	Vehicle ran off road & overturned
Overhill Road / Carolina Pottery	11.96	6/5/2000	15:13	Angle collision between 2 vehicles
east of Cochise Trail	10.96	6/7/2000	6:18	Head on collision between 2 vehicles
between Chestnut Ridge Road and Old Stage Road	7.56	5/20/2002	18:35	Vehicle ran off road & hit fixed object
between Trinity Lane and Tanglewood Road	5.46	8/26/2002	14:58	Vehicle ran off road & overturned
between Island Road and Country Acres Drive	8.5	7/16/2003	1:40	Vehicle ran off road & hit fixed object
between Old Stage Road and Cooks Valley Road	7.64	7/18/2003	16:15	Head on collision between 2 vehicles
between Chestnut Ridge Road and Old Stage Road	7.58	1/13/2003	6:25	Angle collision between 2 vehicles

Table 13
Fatal Accident Rate Comparison - 1999 through 2003

Section	Total Accident Rates		Fatal Accident Rates	
	SR 126	TN Average	SR 126	TN Average
E. Center Street to Sun Bridge Rehab	6.49	3.72	0.00	0.02
Sun Bridge Rehab to east of Stratford Road	8.71	2.33	0.00	0.01
East of Stratford Road to east of Old Stage Road	2.87	2.87	0.02	0.02
East of Old Stage Road to west of Overhill Road	2.68	2.89	0.06	0.01

Intersection	Total Accident Rates		Fatal Accident Rates	
	SR 126	TN Average	SR 126	TN Average
SR 126 @ Overhill Road / Carolina Pottery	2.21	0.29	0.04	0.00

Field Review of Accident Locations

After examining the traffic accident data, the consultants conducted a field review of the project route to identify any observable deficiencies that might contribute to the frequency of traffic accidents along SR 126. The following list summarizes items noted in the field review:

- In the commercial area of SR 126 between East Center Street and Orebank Road, the lack of turn lanes and poor access control at driveways is likely a contributing factor to rear-end and angle collisions.
- The intersection of Orebank Road and SR 126 has an acute angle and no main street turn lanes which contribute to the preponderance of rear-end collisions.
- On westbound SR 126 there is limited sight distance of the traffic signal at the intersection of SR 126 and the southbound ramps of John B. Dennis Highway (SR 93). Restricted sight distance at this intersection could be contributing to the number of rear-end and angle collisions.
- Poor access control creates too many conflict points in the area surrounding the Stratford Drive intersection. This area has multiple angle collisions.
- All of the intersections, except Kent Street, along SR 126 between Hawthorne Street and Amy Avenue have a sight distance restriction in at least one direction that is caused by the vertical or horizontal curvature of the roadway. These sight distance restrictions contribute to both angle and rear-end collisions.
- The acute angle of Amy Avenue at its intersection with SR 126 appears to contribute to the occurrence of westbound rear-end collisions.
- There is a sight distance deficiency at the intersection of Briarwood Road that may contribute to angle and rear-end collisions.
- In the vicinity of Lemay Drive, there are vertical curves that restrict sight distance.
- There is a sight distance restriction looking west from Cooks Valley Road.
- Sight distance is limited in both directions for drivers exiting Island Road onto SR 126. This intersection is located in a sharp horizontal curve. The traffic accidents at this location are predominantly angle collisions with some rear-end collisions.
- The intersection of Fall Creek Road is located at the crest of a vertical curve that restricts sight distance for drivers on SR 126. Accidents at this intersection include a both rear-end and angle collisions.
- There is a sight distance restriction looking east from Old Fall Creek Road.
- Sight distance is limited in both directions for drivers exiting Montezuma Road. This location has mostly rear-end collisions.
- There is a severe sight distance restriction looking to the west along SR 126 from the Cassidy Drive intersection.
- At the Harr Town Road intersection, sight distance is limited looking to the east from Harr Town Road and looking east from SR 126. The poor sight distance contributes to rear-end and angle collisions.
- The compound horizontal curve west of Samlola Road needs improved super elevation. This curve has been the site of several run off the road accidents.
- Sight distance is limited looking west from the western end of Gravel Top Road (west). At the eastern end of Gravel Top Road, sight distance is limited looking to the east.
- In the horizontal curve west of Overhill Drive, the transition from a normal crown to super elevation needs correction.

- There is a preponderance of right angle collisions at the intersection of Overhill Drive / Carolina Pottery and SR 126. These collisions occur mostly between drivers traveling in the southbound and eastbound directions. It appears that the wide median may be a factor in angle collisions at this intersection causing drivers to misjudge the amount of time needed to cross over SR 126 from the side street. Since this intersection had the highest number of traffic accidents within the study area limits and due to its proximity to Sullivan County High School, the Community Resource Team and public expressed a great deal of concern for the safety of this intersection. Many postulated that the high accident rate is due, at least in part, to a disproportionately high number of young and inexperienced drivers traveling through it on a daily basis. According to the accident records tabulated for this study, approximately half of the 'at fault' drivers were age 21 or younger.

Driver Contributing Factors Evaluation

In response to questions raised by the Community Resource Team concerning the impacts and frequency of driver error or influence of alcohol on traffic accidents along SR 126, the consultants conducted a review of contributing factors listed on the collision reports for one of the sample years, 2003. Following is a table that presents data from the 2003 collision reports concerning driver condition and contributing factors. This table was provided to the Community Resource Team for review along with some general conclusions suggested by the data:

- In 2003 there were two fatalities, one of which involved alcohol. This is consistent with national data from the National Highway Traffic Safety Administration (NHTSA) that shows a 40% alcohol involvement rate in highway fatalities nationwide in 2003.
- The most frequent driver errors or contributing factors listed in the collision reports were failure to yield right of way (marked in 42% of **total** accidents for 2003), curve (26%), failure to keep in the proper lane or run off road (14%), and following too closely (12%). For comparison: The NHTSA statistics for nationwide **fatal** accidents in 2003 lists failure to keep in the proper lane or run off road as the most frequently occurring driver factor (32%) in fatal accidents. Speed was the second most frequently occurring factor in the NHTSA data (21%). Failure to yield was listed at 8% in the NHTSA fatal accident statistics. This is a general comparison because the NHTSA data is only for fatal accidents whereas the SR 126 summary is for total accidents.
- It appears that the frequency of driver error or contributing factors on SR 126 is consistent with other roadways. What makes SR 126 dangerous is its unforgiving nature --- inadequate clear zones, no shoulders, lack of turn lanes, etc. While engineering improvements to SR 126 cannot eliminate driver error they can create a more forgiving roadway in which the total number of accidents could be reduced.

Table 14
Contributing Factors Evaluation - 2003 Traffic Accident Data

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Accident Total	**11**	**13**	**6**	**11**	**10**	**10**	**7**	**7**	**17**	**12**	**15**	**13**	**132**
Injury Accidents	3	6	3	4	5	1	2	2	6	4	5	4	45
People Injured	3	11	7	7	5	1	2	2	9	5	9	7	68
Fatalities	-	-	-	1*	-	-	1**	-					2
Driver Condition													
Alcohol				1*									0
Drugs													0
Illegal Drugs/Alcohol	1***												0
Unknown (see footnote)	2	1		1			1**	1	2	2	1	1	11
Illness		1											1
Reaction to Drugs or Meds				1									1
Fatigue									1				1
Driver Actions or Contributing Factors													
Speeding	1			1			1	1	1	1			6
Curve	4	3	2	4	3	2		2	5	2	5	3	35
Failure to keep in proper lane or Run Off Road	3	2		3	1		2	1	4		1	1	18
Inattentive	1		1							1	2	1	6
Driving Left of Center	2				1	1		1					5
Failure to Yield Right of Way	4	6	3	4	5	5	2	4	8	4	4	6	55
Improper Turn			1		1								2
Following too Closely	1	2	1	1	1	2	2			3		3	16
Telephone		1											1
Overcorrecting		1		1					1				3
Vision Obstructed		1			1								2
Failure to Obey Traffic Controls		1								1			2
Failure to use Lights				1									1
Improperly Towing Vehicle				1									1
Careless or Erratic Driving					1	1		1					3
Failure to Signal Intentions					1								1
Driver Inexperience						1							1
Failure to Comply with License Restrictions						1							1
Reckless or Negligent						2		1					3
Improper Lane Change									1				1

*This fatality involved alcohol and a failure to keep in proper lane in a curve. It resulted in a head-on collision and three injured persons.

**This fatality did not involve alcohol or drugs. It was a one car collision. The driver was 17.

***This alcohol related accident resulted in one injury and was caused by driving left of the center line in a curve.

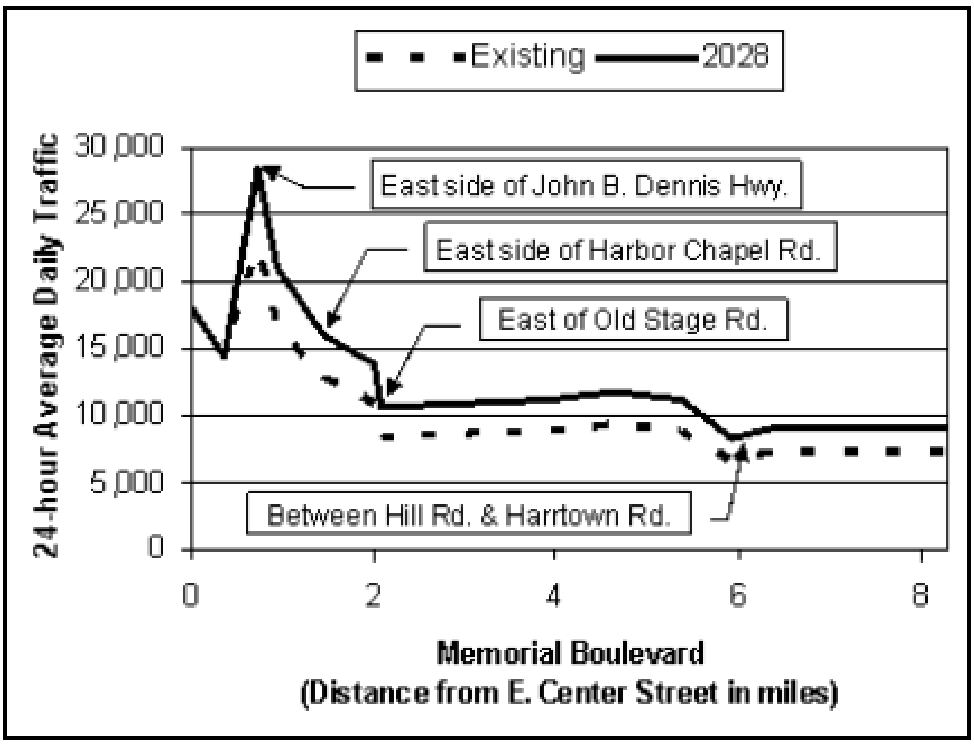
Driver Condition unknown…this was marked on the accident report in hit-and run accidents, reports taken over the phone, instances where alcohol and/or drug tests were administered but the results were not known at the time the report was written, and in a few instances when no test was administered.

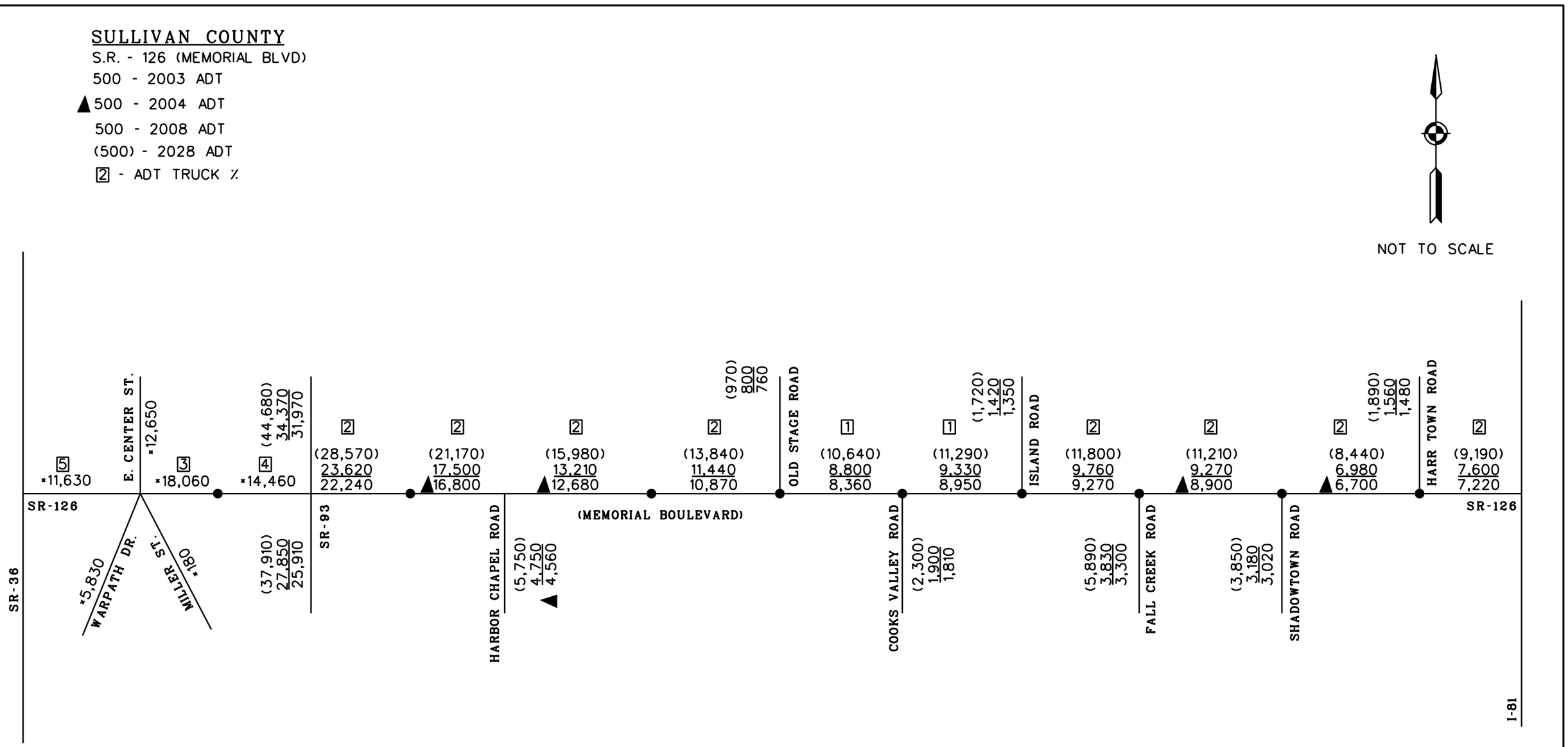
Traffic Volumes and Capacity

Traffic volume forecasts for this project were developed by TDOT for base year 2008 and future year 2028. Average daily traffic (ADT) and design hour volumes (DHV) were prepared for the thirteen segments on SR 126 throughout the project study area. Figures 5 and 6 illustrate the ADT and DHV volume estimates for the study area. Intersection turning movement volumes were projected for four intersections: SR 126 and East Center Street, SR 126 and the two ramp terminal intersections of John B. Dennis Highway, and SR 126 and Harbor Chapel Road. (see appendix for intersection volumes).

Based upon input from the Community Resource Team, the forecasted traffic volumes for SR 126 include a zero growth rate for traffic west of John B. Dennis Highway, and a growth rate of 1.048% per year for traffic east of John B. Dennis Highway. (See traffic forecast report dated August 26, 2004 and memo from Steve Allen dated August 19, 2004 in the appendix.) The highest traffic volumes within the corridor occur immediately east of John B. Dennis Highway (SR 93). The following graph, which was included in the handout material from the third set of Public Involvement Sessions, shows how forecasted 2028 traffic volumes vary along the SR 126 corridor.

Figure 4
Average Daily Traffic Volumes Graph





* ZERO GROWTH (WEST OF SR-93) REPRESENTS 2003-2008 ADT.

1.048% PER YEAR GROWTH (EAST OF SR-93)

FIGURE 5

AVERAGE DAILY TRAFFIC VOLUMES ON SR 126

SULLIVAN COUNTY

S.R. - 126 (MEMORIAL BLVD)

*DHV 2008 - 2028

2008 DHV - 000

2028 DHV - (000)

11% - DHV

NOT TO SCALE

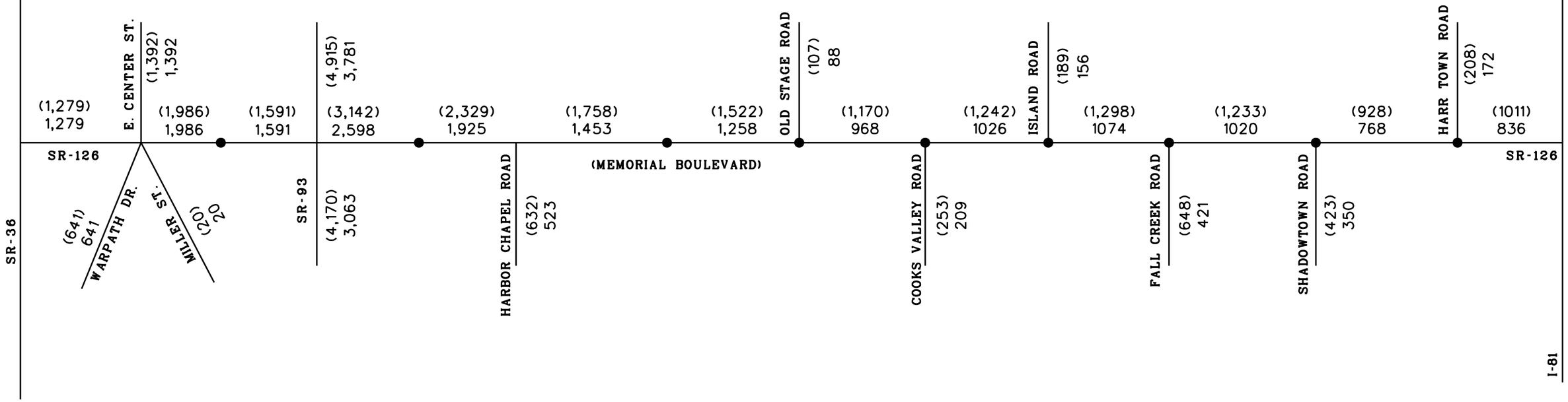


FIGURE 6

DESIGN HOUR VOLUMES ON SR 126

The traffic volume data was used to identify areas along SR 126 that have existing capacity deficiencies or constraints, as well as areas with the potential for future capacity concerns. Capacity is defined in terms of "level of service" which is rated in descending order from "A" to "F". Typically for roadway planners, a level of service "C" is considered the desirable minimum performance standard. Often, however, a level of service "D" is considered acceptable for urban areas where motorists are more willing to tolerate some peak hour congestion. In the case of SR 126, the Community Resource Team set a minimum performance standard of "D" for all sections of SR 126.

Capacity analyses for SR 126 were performed in stages throughout the project development process. Initially, the consultants prepared level of service estimates for the base year and future traffic volumes with the existing roadway section. This was, at first, a planning level analysis based solely upon traffic volumes and the number of travel lanes provided. That analysis was later refined to account for various geometric features such as lane and shoulder widths. The results of the capacity analysis of existing geometry is summarized in the table entitled "Capacity Analysis Results with Existing Geometry".

After the concept plans A, B, and C were fully developed, capacity analyses of each concept plan were prepared for year 2028 traffic volumes. Levels of service were estimated for each concept plan. The results of the concept plan capacity analyses were shared with the Community Resource Team in June 2005, in preparation for the team recommendation meeting. The level of service results for Concepts A, B, and C are shown on tables after the levels of service for existing geometry.

Table 15
Capacity Analysis Results with Existing Geometry

Arterial with Free Flow Speed < or = 45 mph

Analysis is for segments between signalized intersections. LOS is governed by intersection operations.

			2008 AM			2028 AM	
Road Segment	**Existing Cross Section**		**Direction**	**LOS**		**Direction**	**LOS**
Between E. Center Street & SR 93 Southbound Ramps	4-lane undivided		Eastbound	C		Eastbound	C
			Westbound	C		Westbound	D
Between SR 93 Southbound Ramps & SR 93 Northbound Ramps	4-lane divided		Eastbound	D		Eastbound	D
			Westbound	D		Westbound	D

			2008 PM			2028 PM	
Road Segment	**Existing Cross Section**		**Direction**	**LOS**		**Direction**	**LOS**
Between E. Center Street & SR 93 Southbound Ramps	4-lane undivided		Eastbound	C		Eastbound	C
			Westbound	F		Westbound	F
Between SR 93 Southbound Ramps & SR 93 Northbound Ramps	4-lane divided		Eastbound	C		Eastbound	C
			Westbound	D		Westbound	E

Signalized Intersections

		2008			2028	
Intersection		**AM**	**PM**		**AM**	**PM**
SR 126 @ E. Center Street / Warpath Sr.		D	F		D	F
SR 126 @ SR 93 Southbound Ramps		D	F		F	F
SR 126 @ SR 93 Northbound Ramps		B	F		C	F
SR 126 @ Harbor Chapel		D	B		F*	E*

* With modified signal timing, LOS improves to D for AM & C for PM.

Note: With improvement to intersection operations, the above arterial levels of service would improve.

Table 15 continued
Capacity Analysis Results with Existing Geometry

Segment Capacity Analysis for 2-Lane Highway

		2008 DHV		2028 DHV	
Road Segment	**Existing Cross Section**	**Volume**	**LOS**	**Volume**	**LOS***
Stratford Drive to Harbor Chapel (Eastbound)	2 lanes eastbound	1,925	C	2,329	C
Stratford Drive to Harbor Chapel (Westbound)	1 lane westbound	1,925	E	2,329	E
Harbor Chapel to Briarwood Road (Eastbound)	2 lanes eastbound	1,453	C	1,758	C
Harbor Chapel to Briarwood Road (Westbound	1 lane westbound	1,453	D	1,758	E
Briarwood Road to Old Stage Road (Eastbound)	2 lanes eastbound	1,258	C	1,522	C
Briarwood Road to Old Stage Road (Westbound)	1 lane westbound	1,258	D	1,522	D
Old Stage Road to Cooks Valley Road	2-lane undivided	968	D	1,170	D
Cooks Valley Road to Island Road	2-lane undivided	1,026	D	1,242	D
Island Road to Fall Creek Road	2-lane undivided	1,074	D	1,298	D
Fall Creek Road to Shadowtown Road	2-lane undivided	1,020	D	1,233	D
Shadowtown Road to Harr Town Road	2-lane undivided	768	C	928	D
Harr Town Road to I-81	2-lane undivided	836	D	1,011	D
Harr Town Road to I-81	4-lane divided	836	A	1,101	A

LOS stands for Level of Service, a measure of the amount of delay and congestion on a roadway. LOS ranges from A to F with A representing free-flow conditions and F representing severe congestion.

The LOS results reported in these tables were derived with the Highway Capacity Software 2000 and from Synchro6.

Table 16
Capacity Analysis Results for Concept A

Urban Arterial

Road Segment	Cross Section	Based on 2028 ADT Direction	LOS*
Between E. Center Street & Orebank Road	2-lane divided	Eastbound	E
		Westbound	E
Between Orebank & Stratford Dr.	4-lane divided	Eastbound	B
		Westbound	B

Segment Capacity Analysis for 2-Lane Highway

Road Segment	Cross Section	2028 DHV Volume	LOS*
Stratford Dr. to Harbor Chapel (Eastbound)	2 lanes eastbound	2,329	C
Stratford Dr. to Harbor Chapel (Westbound)	1 lane westbound	2,329	E
Harbor Chapel to Briarwood Rd. (Eastbound)	2 lanes eastbound	1,758	C
Harbor Chapel to Briarwood Rd. (Westbound)	1 lane westbound	1,758	E
Briarwood Rd. to Old Stage Road	2-lane with center turn lane	1,522	D
Old Stage Rd to Cooks Valley Rd	2-lane undivided	1,170	D
Cooks Valley Rd to Island Rd	2-lane undivided	1,242	D
Island Rd to Fall Creek Rd	2-lane undivided	1,298	D
Fall Creek Rd to Shadowtown Rd	2-lane undivided	1,233	D
Shadowtown Rd to Harr Town Rd	2-lane undivided	928	D
Harr Town Rd to west of Overhill Road	2-lane undivided	1,011	D
west of Overhill Road to I-81	4-lane divided	1,011	A

LOS stands for Level of Service, a measure of the amount of delay and congestion on a roadway. LOS ranges from A to F with A representing free-flow conditions and F representing severe congestion.

The LOS results reported in these tables were derived with the Highway Capacity Software 2000 and from TDOT's . generalized table "Daily Service Volumes Related to Level of Service".

Table 17
Capacity Analysis Results for Concept B

Urban Arterial

Road Segment	Cross Section	Based on 2028 ADT Direction	LOS*
Between E. Center Street & Orebank Road	4-lane + center turn lane	Eastbound	C
		Westbound	C
Between Orebank & Stratford Dr.	4-lane + center turn lane	Eastbound	B
		Westbound	B

Segment Capacity Analysis for 2-Lane Highway + center turn lane

Road Segment	Cross Section	2028 DHV Volume	LOS*
Stratford Dr. to Harbor Chapel	2-lane with center turn lane	2,329	E
Harbor Chapel to Briarwood Rd.	2-lane with center turn lane	1,758	D
Briarwood Rd. to Old Stage Road	2-lane with center turn lane	1,522	C
Old Stage Rd to Cooks Valley Rd	2-lane with center turn lane	1,170	B
Cooks Valley Rd to Island Rd	2-lane with center turn lane	1,242	B
Island Rd to Fall Creek Rd	2-lane with center turn lane	1,298	C
Fall Creek Rd to Shadowtown Rd	2-lane with center turn lane	1,233	B
Shadowtown Rd to Harr Town Rd	2-lane with center turn lane	928	B
Harr Town Rd to west of Overhill Road	2-lane with center turn lane	1,011	B
west of Overhill Rd to I-81	4-lane divided	1,011	A

LOS stands for Level of Service, a measure of the amount of delay and congestion on a roadway. LOS ranges from A to F with A representing free-flow conditions and F representing severe congestion.

The LOS results reported in these tables were derived with the Highway Capacity Software 2000 and from TDOT's generalized table "Daily Service Volumes Related to Level of Service".

Table 18
Capacity Analysis Results for Concept C

Urban Arterial

Road Segment	Cross Section	Based on 2028 ADT Direction	LOS*
Between E. Center Street & Orebank Road	4-lane + median	Eastbound	C
		Westbound	C
Between Orebank & Stratford Dr.	4-lane + median	Eastbound	B
		Westbound	B

Segment Capacity Analysis for 4-Lane Highway + median

Road Segment	Cross Section	2028 DHV Volume	LOS*
Stratford Dr. to Harbor Chapel	4-lane divided	2,329	C
Harbor Chapel to Briarwood Rd.	4-lane divided	1,758	B
Briarwood Rd. to Old Stage Road	4-lane divided	1,522	B
Old Stage Rd to Cooks Valley Rd	4-lane divided	1,170	A
Cooks Valley Rd to Island Rd	4-lane divided	1,242	A
Island Rd to Fall Creek Rd	4-lane divided	1,298	A
Fall Creek Rd to Shadowtown Rd	4-lane divided	1,233	A
Shadowtown Rd to Harr Town Rd	4-lane divided	928	A
Harr Town Rd to I-81	4-lane divided	1,011	A

LOS stands for Level of Service, a measure of the amount of delay and congestion on a roadway. LOS ranges from A to F with A representing free-flow conditions and F representing severe congestion.

The LOS results reported in these tables were derived with the Highway Capacity Software 2000 and from TDOT's generalized table "Daily Service Volumes Related to Level of Service".

Historic, Archaeological, & Ecological Areas of Concern

With the exception of a historic survey, detailed environmental studies were not conducted as a part of this Context Sensitive Solutions planning study. The project resource team did, however, include representatives from the environmental planning section of TDOT to provide general guidance to the team. Team members included a historian, an ecologist, an archaeological specialist, and environmental permit specialists. The following is a summary of information provided to the Community Resource Team by these technical specialists. Detailed reports and correspondence pertaining to these environmental concerns are included in the Appendix to this report.

Historic Properties

As part of the project, TDOT initiated a historical survey of the SR 126 corridor to identify any historic properties that might be affected by the project. Preliminary information from the survey was provided to the Community Resource Team in January 2004 and results from the completed survey were shared with the team meeting in March 2005. Significant findings from the historic survey include:

- Yancey's Tavern
  A property located on Old Stage Road, across SR 126 from East Lawn Cemetery, is listed on the National Register of Historic Places (listed in 1972) for its significance in the early settlement of Sullivan County. The National Register boundary for Yancey's Tavern was described as five acres including the tavern and associated outbuildings.
- Shipley Mansion
  The historical survey identified a residence known as Shipley Mansion, located on the south side of SR 126 east of East Center Street, as a National Register eligible property.

Archaeological Concerns

Archaeological surveys have not been conducted to determine the presence or absence of archaeological sites within the SR 126 project limits. In September 2004, the archaeological specialist noted that there were a couple of previously recorded sites in the Cooks Valley area at Yancey's tavern and Eaton's Station that would likely be of significance to the project. The location of Yancey's Tavern is noted above in the historic survey discussion. Eton's Station is located near Bridwell Heights Road. Detailed archaeological surveys will be required once a preferred alignment corridor is defined.

Ecological Concerns

The TDOT Ecologist assigned to the technical resource team reported in January 2004 that numerous streams would be of concern to the U.S. Army Corps of Engineers.

Sites of Local Significance and Value

In addition to the properties identified in the historic survey, the Community Resource Team identified several sites that they considered to be of local significance and thus worthy of protection under the guidelines of Context Sensitive Solutions planning. The noted sites are:

- Cherry Point Animal Hospital
  Locally known as the Barger House, this structure contains a veterinary clinic. It is located at the intersection of Island Road and SR 126. A letter describing the local

significance of the Barger House and photographs are included in the Appendix to this report.

- White House at the corner of Satanta Road and SR 126
  Although not historic, this house is considered a treasure by the community for its architecture and age. Photographs of the house are included in the Appendix.

- East Lawn Cemetery
  East Lawn is a large cemetery located on the south side of SR 126 adjacent to Cooks Valley Road. Protection of the cemetery was noted as a concern by many citizens during the public involvement process.

- Old Indian Springs Post Office
  This structure is currently barely visible from the shoulder of SR 126. It is located on the south side of the roadway, east of Hill Road. Photographs are included in the Appendix to this report.

- Chestnut Ridge view shed
  Throughout the public involvement process, citizens stated that the view of and view from Chestnut Ridge was a valuable asset to the community that should be preserved.

Community Values and Safety Concerns

The public was formally surveyed on two occasions to gather input regarding safety concerns on SR 126 and community values. These surveys were conducted by the first postcard that was mailed with the first newsletter and in a detailed preference survey that was conducted at the first Public Involvement Sessions.

Responses to the first postcard indicated concerns with such things as overall safety, problem intersections, the need for traffic signals, poor sight distance, drivers going too fast or too slow, and traffic volumes. The problem intersection mentioned most frequently was the intersection of Harbor Chapel Road. Other intersections of concern included Island Road, Chestnut Ridge and Fall Creek Road.

The detailed preference survey conducted at the first Public Involvement Sessions asked specific questions about access to SR 126, problem intersections, and community values. On the following page is a tabulation of those survey results.

In the first Public Involvement Sessions, citizens were invited to write comments on the aerial maps or attach a sticky note to the maps with questions or comments. In the second Public Involvement Sessions, citizens were invited to use sticky notes for comments about the concept plans. After each public session, these handwritten comments and notes were assembled and typed for the project record and for consideration by the Community Resource Team. The appendix includes full reports of these public comments.

TENNESSEE DEPARTMENT OF TRANSPORTATION

MEMORIAL BOULEVARD/SR 126 PROJECT

FIRST PUBLIC INVOLVEMENT SERIES

QUESTIONNAIRE

Please complete this questionnaire and either place it in the questionnaire box at the sign-in table, or return it by mail.

Do you live in the Memorial Boulevard/SR 126 study area (east of Center Street, south of 11W/Stone Drive, and north of Interstate 81)? **232 Yes** 17 No

Number responding shown in parenthesis.

How many round trips per week do you make using Memorial Boulevard/SR 126 between Interstate 81 and East Center Street? (circle one answer)

A. 1-2 **(15)**
B. 3-5 **(23)**
C. 5-10 **(61)**
D. 10-20 **(69)**
E. More than 20 **(83)**
F. Do not travel on Memorial Boulevard **(0)**

What is the average length (in miles), one-way, that you take on Memorial Boulevard/SR 126 between Interstate 81 and East Center Street? (circle one answer)

A. 1-2 miles **(34)**
B. 3-5 miles **(93)**
C. 6-8 miles **(122)**
D. Do not travel on Memorial Boulevard **(1)**

Do you have any travel problems or safety concerns along this route? **(252)** Yes ___ No

If Yes, rank those that apply in order of importance from 1 to 5, with 5 being the most important and 1 being the least important.

___ A. Difficulty in getting onto Memorial Boulevard/SR 126

1(Least) – 17
2---------- 15
3---------- 28
4----------24
5(Most)---96
Total------180

___ B. Difficulty turning left when getting off Memorial Boulevard/SR 126

1(Least) – 23
2---------- 19
3---------- 17
4----------32
5(Most)----58
Total-------149

___ C. Difficulty entering or exiting business parking lots

1(Least) – 17
2---------- 22
3---------- 24
4----------29
5(Most)----38
Total-------130

Travel Problems Cont.

___ D. Limited ability to see on-coming traffic
1(Least) – 10
2---------- 16
3---------- 36
4----------39
5(Most)----79
Total------180

___ E. Speeding traffic
1(Least) – 16
2---------- 15
3---------- 31
4----------33
5(Most)---74
Total------169

___ F. Slow traffic
1(Least) – 23
2---------- 18
3---------- 15
4----------14
5(Most)----24
Total-------94

___ G. Dangerous curves
1(Least) – 24
2---------- 15
3---------- 24
4----------28
5(Most)---82
Total------173

___ H. Unsafe for bicycles and pedestrians
1(Least) – 21
2---------- 12
3---------- 11
4----------8
5(Most)---70
Total------122

___ I. Other___School Bus Safety_____
1(Least) – -0
2---------- 1
3---------- 1
4----------0
5(Most)----2
Total------4

Travel Problems Cont.

___ J. Other___Narrow Roads_____
1(Least) – 1
2---------- 0
3---------- 0
4----------1
5(Most)---4
Total------6

___ K. Other____Dangerous Lane Merges__
1(Least) – 0
2---------- 1
3---------- 0
4----------2
5(Most)---1
Total------4

What intersections on Memorial Boulevard/SR 126 create problems for you? (circle all that apply)

A. Orebank Road **(65)**
B. John B. Dennis **(36)**
C. Stratford Road **(20)**
D. Center Street **(18)**
E. Harbor Chapel Road **(123)**
F. Briarwood Road **(23)**
G. Old Stage Road **(58)**
H. Island Road **(67)**
I. Cooks Valley Road **(58)**
J. Fall Creek Road **(64)**

K-Z. (Others) -
Hawthorne **(6)**
Eaton Station **(2)**
Garden Center **(2)**
Conway **(3)**
Harrtown **(11)**
Shuler **(4)**
Chestnut Ridge **(8)**
Holiday **(3)**
Dakota **(3)**
Hill Road **(4)**
Cree **(4)**
Cochise **(3)**
Cassidy **(3)**
Amy **(6)**
Trinity **(3)**
Milton Court **(6)**

If you live along or near the Memorial Boulevard/SR 126 corridor, what qualities do you value about your community and the surroundings? (circle all that apply)

A. Scenic quality **(174)**
B. Historic aspects **(85)**
C. Quiet neighborhoods **(166)**
D. Sense of community with nearby churches, schools, special events **(121)**
E. Feeling of safety and security **(152)**

Qualities Valued cont.

F. Nearby State Park, family recreation and sports opportunities **(78)**
G. Nearby golf course **(19)**
H. Other__Personal property **(2)**_
I. Other_ Location **(3)**

What visual characteristics of the Memorial Boulevard/SR 126 corridor do you value? (circle all that apply)
A. Rural setting (pastures, woodlands) **(161)**
B. The way the road winds through Sullivan County **(62)**
C. Trees, shrubs and other landscaping **(122)**
D. Historic houses, barns and other structures **(107)**
E. Views of the adjacent neighborhoods **(50)** F. Other_View From The Road **(3)**_____
G. Other_Local Cemetery **(2)**_____ H. Other_____

What buildings, areas or views along the corridor do you consider to be significant and worthy of protection?
A. The "S" Curves **(5)**
B. Chestnut Ridge view **(19)**
C. Cooks Valley view **(13)**
D. East Lawn Cemetery **(20)**
E. Yancy Tavern **(10)**
F. Greenwood Market **(5)**
G. Family/personal property **(5)**
H. Eaton's Fort **(2)**
I. Exchange Place **(3)**
J. White Inn **(3)**
K. Cherry Point **(4)**
L. Model City Motel **(3)**

Do you have any other comments regarding transportation problems and/or community values along the Memorial Boulevard/SR 126 corridor?
A. Not enough turn lanes **(10)**
B. Want wider shoulders **(4)**
C. Traffic control / more stop lights **(27)**
D. Want to lower the speed limit **(5)**
E. Law enforcement / speed control **(16)**
F. Bike Lane **(19)**
G. In favor of widening the road **(24)**
H. Sidewalks **(4)**
I. Straightening and leveling **(25)**
J. Litter problem **(2)**
K. Concerned about thru traffic **(5)**
L. Want the road to remain the same **(12)**
M. Inadequate traffic flow **(4)**
N. Community integrity / property value **(10)**
O. Drainage needed **(4)**
P. Tree Trimming **(2)**

SOLUTIONS DEVELOPMENT

Immediate Safety Improvements

As a result of public input, TDOT recognized that there were opportunities to make some immediate safety improvements within the project corridor. These safety improvements included the following:

- Installing a traffic signal at Harbor Chapel Road
- Removal of roadside vegetation that obstructs sight distance
- Replacement of damaged guardrail at selected locations
- Addition of gravel to stabilize shoulders in selected areas
- Installation of reflectors in selected areas to improve nighttime visibility of the roadway edge, and
- Increased speed limit enforcement.

The traffic signal installation for Harbor Chapel Road had been under consideration by the City of Kingsport for some time because of citizen complaints about traffic access to SR 126 from Harbor Chapel Road. Installation had been delayed because of uncertainties pertaining to a previous Advance Planning Report that had been conducted by TDOT that, if implemented, would have significantly altered SR 126 near the Harbor Chapel Road intersection. In addition, Kingsport had been without a City Traffic Engineer until the summer of 2004. Based upon the overwhelming identification of Harbor Chapel Road as the number one concern of citizens who responded to the postcard and preference survey, TDOT pledged to support and expedite a permit for construction of a traffic signal at the intersection of SR 126 and Harbor Chapel Road. The new City Traffic Engineer prepared a design plan for the traffic signal and the permit was approved by November 2004. The signal was installed during December 2004.

Maintenance issues were raised many times at the May 2004 Public Involvement Sessions. As a result, the TDOT project managers contacted the TDOT Region office's maintenance staff, providing them with a list of maintenance issues reported by the public and asked for help in addressing them. Similarly, requests for increased speed limit enforcement were relayed to both City police and the Tennessee Highway Patrol. Both law enforcement agencies increased patrols and radar enforcement.

In an effort to address other safety concerns, TDOT convened a meeting of personnel from the Region office in Knoxville, local maintenance staff, the City of Kingsport Traffic Engineer, a representative from the Kingsport Metropolitan Planning Organization, and representatives from the Governor's Highway Safety Office to discuss problem areas and explore solutions. It was decided that the City of Kingsport and Sullivan County could request optional safety funds from TDOT to implement some innovative techniques to address the safety concerns. The funding request was assembled and approved to cover items such as:

- Centerline rumble strips
- Additional reflectors and raised pavement markers, and
- High visibility pavement markings.

Long-Range Improvements

After gathering input from the community concerning the problems they perceived on SR 126 and the characteristics they valued, the process of long term solutions development began. In order to be true to the ideals of Context Sensitive Solutions it was important that improvement ideas come from the community itself. The process of developing criteria and ideas for improvement of the roadway was initiated at the Design Charette held in October 2004 and attended by the Community Resource Team with support from TDOT technical staff and the project management team.

The Design Charette was hosted and facilitated by the project management team for the purpose of assisting the Community Resource Team with creating their interpretations of an improved SR 126. The charette began with a review of information obtained from the public. The project engineers and management team led a discussion of the principles of CSS and good roadway design. The team then worked together to establish minimum and optimal design criteria as well as performance standards for level of service. Team members were then divided into four groups and asked to interpret the aforementioned standards and criteria into a concept vision for the corridor. Tools supplied to the groups included the following:

- Aerial photos
- Markers and drafting equipment
- Tracing paper
- Typical roadway widths in plan view drawn to the same scale as the aerial photos and reproduced on clear plastic
- Reference books
- TRIMS photo log of the project corridor, and
- Engineering expertise and appropriate software.

At the conclusion of the charette, each of the four groups presented their concept vision to the whole team. Notes were made to document the specifics of each concept so that the details of each vision could be translated by the project engineers into workable concept plans. After examining the four concept visions, it became clear that for every segment there were commonalities in two of the groups visions. This made it possible to combine the four groups visions into a total of three concept plans.

Three concept plans (A, B, and C) were prepared for the corridor using aerial topographic photography with digital terrain information. The topographic data allowed the engineers to prepare plans with GEOPAK, so that a zone of construction impact could be estimated and shown on the concept drawings. The construction impact information helped the Community Resource Team understand the impact implications of various cross sections. In all concepts, the same centerline was used so that the variations shown were due solely to differences in cross section. The disadvantage of maintaining consistent centerlines was that the plans did not show an optimal choice for widening of the roadway based upon the particular cross section. The advantage of maintaining a consistent centerline is that comparison of the impacts of each concept's cross section was simplified and plan production was expedited. Given that this was the planning phase, and no environmental technical studies had been authorized other than the historic survey, it was not prudent to incorporate centerline variations between concepts.

Concepts A, B, and C were presented to the public at the November 2004 Public Involvement Session. Citizens were asked to express a preference for one concept or "no build" in each of the five segments. (A summary of the preferences from November 2004 is provided in the appendix.)

After the November 2004 sessions, Concepts A, B, and C were revised based on public comments and additional comments from the Community Resource Team. These revisions were presented to the team at a design review workshop in March 2004 and were later refined again to incorporate the team's comments. At the design review workshop, the Community Resource Team created a fourth concept (Concept D) which combined elements of Concepts A, B, and C and reflected a philosophy of narrowing the roadway cross section as traffic volumes decrease on the corridor. Concept D was developed solely to serve as an example in order to show the public how various cross sections could be combined within the study corridor.

The following the design review workshop, plans were prepared for Concept D and the previously drawn plans for Concepts A, B, and C were revised. All plans were shaded and color coded to make them more easily understood by the public. The revised and reformatted plans were presented to the public at the May 2005 Public Involvement Sessions. Visualizations of existing and future conditions with each concept plan were provided for four locations: Orebank Road, Harbor Chapel Road, Old Stage Road, and Island Road. Typical cross sections, reformatted to a consistent scale and color coded to match the concept plans, were also presented. The public was asked to complete a preference survey to indicate which of the concept plans they preferred in each of the eight segments of the corridor.

A table is included on the following pages that provides a comparative description by segment of the concept plans that were presented to the public in May 2005. When the concept plans were presented in May 2005, a handout was provided to each person that included detailed information about the tradeoffs of each concept plan and the differences and similarities in the concept plans. A copy of the handout material that was provided to the public at the May 2005 sessions is included in the appendix.

Table 19
Summary of Cross Section Elements from Concepts A, B, & C

Section 1 West -- East Center Street to Orebank Road

	Concept A	Concept B	Concept C
Design speed	35	35	35
Travel lanes	1 eastbound and 1 westbound (14' each)	2 eastbound and 2 westbound (11' each)	2 eastbound and 2 westbound (11' each)
Median	Raised landscaped	Center turn lane	Raised landscaped
Bikeways	Share travel lane	4' shoulder	4' shoulder
Sidewalks	Yes	Yes	Yes
Curb and Gutter	Yes	Yes	Yes
Special features	One-lane roundabout at East Center Street		Roundabout with flared right turns at East Center Street (alternate option is signalized intersection)
Access Notes	Median openings and turn lanes at Central Street, Conway Drive, Woodside Drive, and Orebank Road	No access restrictions	Median openings and turn lanes at Central Street, Conway Drive, Woodside Drive, and Orebank Road

Section 1 East -- Orebank Road to West of Hawthorne Street

	Concept A	Concept B	Concept C
Design speed	35	35	35
Travel lanes	2 eastbound and 2 westbound	2 eastbound and 2 westbound	2 eastbound and 2 westbound
Median	Raised landscaped	Center turn lane	Raised landscaped
Bikeways	4' shoulder	4' shoulder	4' shoulder
Sidewalks	Yes	Yes	Yes
Curb and Gutter	Yes	Yes	Yes
Special Features	None	none	none
Access Notes	Median opening at eastern driveway for Sun Bridge Hillside Care and Rehab	No access restrictions	Median opening at eastern driveway for Sun Bridge Hillside Care and Rehab

Section 2 -- West of Hawthorne Street to Harbor Chapel Road

	Concept A	Concept B	Concept C
Design speed	35	35	35
Travel lanes	2 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	No	Center turn lane	Center turn lane
Bikeways	4' shoulder	4' shoulder	4' shoulder
Sidewalks	Yes	Yes	Yes
Curb and Gutter	Yes	Yes	Yes
Special Features	None	none	none
Access Notes	None	none	none

Section 3 West -- Harbor Chapel Road to East of Old Stage Road

	Concept A	Concept B	Concept C
Design speed	35	45	45
Travel lanes	2 eastbound and 1 westbound, west of Briarwood Road; 1 eastbound and 1 westbound, east of Briarwood Road	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	None west of Briarwood Road; a center turn lane east of Briarwood	Center turn lane	Raised landscaped
Bikeways	4' shoulder on both sides	4' shoulder on north side 10' stabilized (8' paved) shoulder on south side	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Yes	Yes on north side only	Pedestrians use shoulder
Curb and Gutter	Yes	Yes on north side only	No
Special Features	None	none	none
Access Notes	None	none	none

Section 3 East -- East of Old Stage Road to Cooks Valley Road

	Concept A	Concept B	Concept C
Design speed	45	45	45
Travel lanes	1 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	Centerline rumble strip	Center turn lane or raised barrier	Raised landscaped
Bikeways	8' stabilized (6'paved) shoulder on both sides	4' shoulder on north side 10' stabilized (8' paved) shoulder on south side	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Pedestrians use shoulder	Yes on north side only	Pedestrians use shoulder
Curb and Gutter	No	Yes on north side only	No
Special Features	None	none	none
Access Notes	None	none	none

Section 4 -- Cooks Valley Road to Cochise Trail

	Concept A	Concept B	Concept C
Design speed	45	45	45
Travel lanes	1 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	Centerline rumble strip	Center turn lane	Raised landscaped
Bikeways	8' stabilized (6'paved) shoulder on both sides	6' shoulder on both sides	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Pedestrians use shoulder	Yes	Pedestrians use shoulder
Curb and Gutter	No	Yes	No
Special Features	None	none	none
Access Notes	None	none	none

Section 5 -- Cochise Trail to Interstate 81

	Concept A	Concept B	Concept C
Design speed	45	45	45
Travel lanes	1 eastbound and 1 westbound	1 eastbound and 1 westbound	2 eastbound and 2 westbound
Median	Centerline rumble strip	Center turn lane	Raised landscaped
Bikeways	8' stabilized (6'paved) shoulder on both sides	10' stabilized (8' paved) shoulder on both sides	8' stabilized (6' paved) shoulder on both sides
Sidewalks	Pedestrians use shoulder	Pedestrians use shoulder	Pedestrians use shoulder
Curb and gutter	No	No	No
Special Features	Modify the two to four-lane transition area near Overhill Drive to provide longer tapers and better advance warning and sight distance	Modify the two to four-lane transition area near Overhill Drive to provide longer tapers and better advance warning and sight distance	Correct deficient curve west of Overhill Road and narrow existing median width at Overhill Road / Carolina Pottery intersection to improve safety
Access Notes	None	none	none

Table 20
Summary of Cross Section Elements of Concept D

Section	Root Concept
1 West E. Center Street to Orebank Road	Same as C 2 lane each direction with raised landscaped median
1 East Orebank Rd. to west of Hawthorne St.	Same as C 2 lanes each direction with raised landscaped median
2 west of Hawthorne St. to Harbor Chapel	Same as C 2 lanes each direction plus center turn lane
3 West Harbor Chapel Rd. to west of cemetery	Same as C 2 lanes each direction with raised landscaped median
3 East west of cemetery to Cooks Valley Rd.	Same as B 1 lane each direction with center turn lane
4 West Cooks Valley Rd. to Harrtown Rd.	Same as B 1 lane each direction plus center turn lane Add auxiliary passing lanes in each direction for straight section west of Fall Creek Road
4 East Harrtown Rd. to Cochise Trail	Same as A 1 lane in each direction, but with shoulders widened to 10'
5 Cochise Trail to I-81	Same as A 1 lane in each direction, but with shoulders widened to 10'

Public Preferences for the Concept Plans

At the May 2005 Public Involvement Sessions, a detailed preference survey was included at the end of the handout material. Each person who signed the attendance roster upon entering the sessions was asked to view the concept plans, review the handout material, listen to a formal presentation, and then complete the preference survey. A copy of the survey is included in the Appendix to this report.

The preference survey began by asking questions concerning the adequacy of information provided at the Public Involvement Sessions and the level of comfort that citizens felt in expressing a preference. The following questions were asked in the survey:

Q1 Do you understand that you are not limited to one concept throughout the entire project, but can choose a different concept for each segment?
Q2 Is the information provided in the handout understandable?
Q3 Do you feel that you were provided with the information necessary for you to register a preference?

Following is a summary of the answers given to the above questions on the survey:

Table 21
Survey Responses to Questions of Information Adequacy

	Q1	Q2	Q3
Yes	285	270	262
No		8	16
No Response	18	23	23
"Mostly/Fair/etc."		2	2
TOTALS	303	303	303

After addressing the adequacy of information questions, citizens were asked to express a preference for one of the concept plans (A, B, or C) or the "no build" alternative in each of eight project sections. Table 22 provides a summary of the concept preferences expressed by those who attended the May 2005 Public Involvement Sessions.

During the question and answer session of the Public Involvement Session that occurred at Sunnyside Baptist Church on May 26, 2005, a petition was presented by a citizen from the study area to the project management team. The petition was accepted and entered into the official transcript. It included a total of 1,167 signatures, of which 43 were duplicates. The total number of unique signatures on the petition was 1,124. The petition included the following statement:

> "We, as citizens who live on and/or use SR-126, do not want the 2-lane section of the highway to become a 4-lane highway. We firmly believe a 4-lane highway would increase the number and severity of accidents. It would destroy the community with the loss of most of the houses, apartments, and businesses along the highway. We support improvements to make the highway safer. We offer our signatures as a vote to support keeping the 2-lane section."

Table 22
Preference Survey Results from Public Involvement Sessions - May 2005

PREFERENCE MATRIX							
SEGMENT	CONCEPT A	CONCEPT B	CONCEPT C	NO BUILD	NO RESPONSE	OTHER *	
Section 1 West **E Center to Orebank**	40	71	157	23	12		303
Section 1 East **Orebank to west of Hawthorne**	42	63	159	24	15		303
Section 2 **Hawthorne to Harbor Chapel**	48	35	181	21	16	2	303
Section 3 West **Harbor Chapel to Old Stage Rd**	59	50	161	20	13		303
Section 3 East **Old Stage to Cooks Valley Rd**	92	60	126	15	9	1	303
Section 4 West **Cooks Valley to Harr Town**	87	76	111	17	10	2	303
Section 4 East **Harr Town to Cochise Trail**	109	65	101	15	13		303
Section 5 **Cochise Trail to I-81**	118	48	106	16	15		303
TOTALS	**595**	**468**	**1102**	**151**	**103**	**5**	**2424**

OTHER*		
Section #2 - liked A and B	Section #3 East - Concept A or No Build	
Section #2 - liked A or "No Build"	Section #4 West - A or B only	Section #4 West - C to A

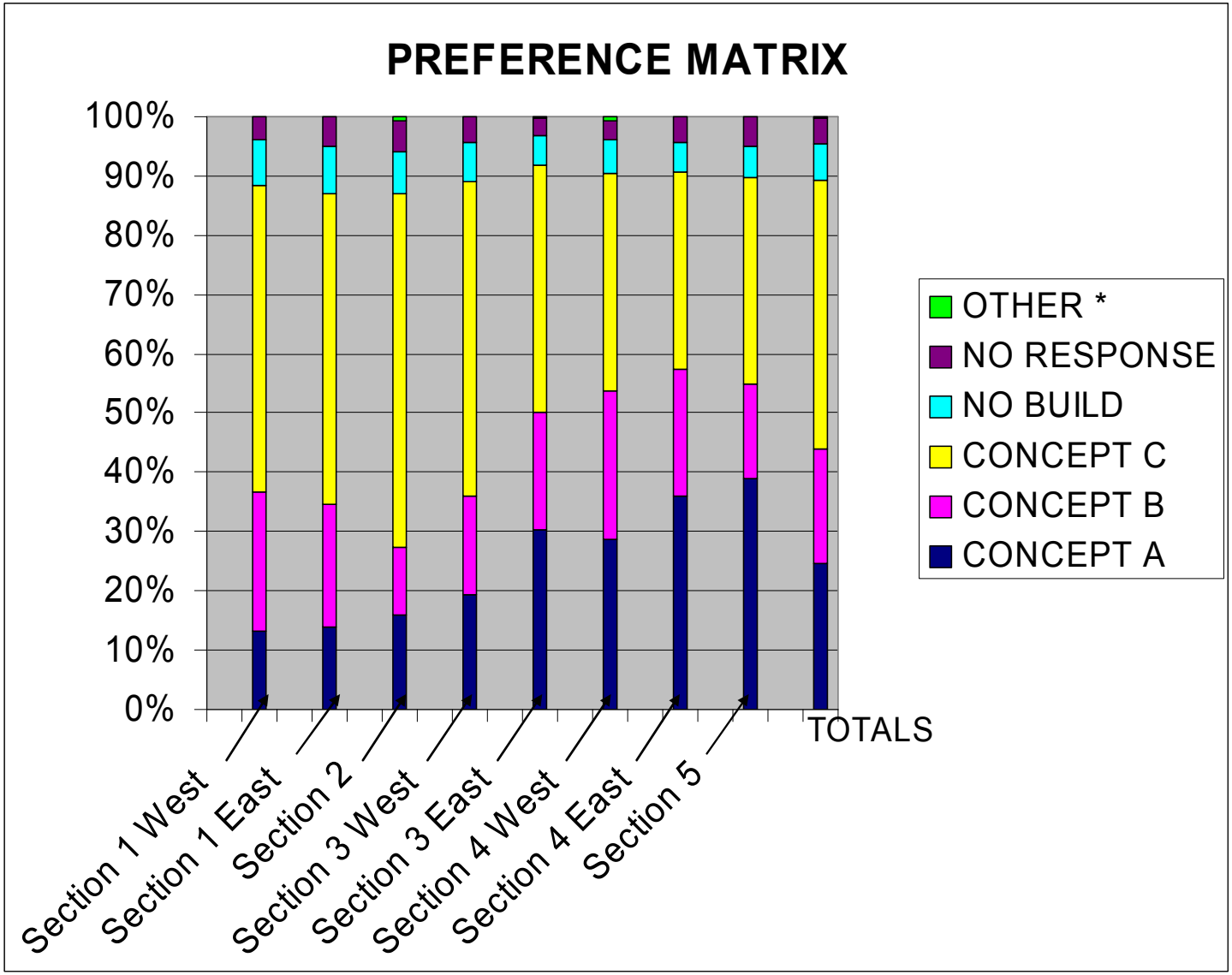


Figure 7
Graph of Preference Survey Results

Development of a Team Recommendation

On June 21 and 22, 2005, the Community Resource Team met with the project management team to discuss the public responses to the surveys conducted at the third Public Involvement Sessions in May and to formulate recommendations for TDOT. The group began with an exercise to evaluate each concept plan based upon a set of criteria that had been previously established by the team. An Evaluation Matrix was completed by team members and the results tabulated and averaged to produce a group score. A copy of the scored evaluation matrix is included in the Team Workshops section of the Appendix. After review of the team's composite scores, it was decided that the evaluation matrix had limited benefit for helping the team develop a recommendation because the scores for the various concept plans did not have enough variation. The matrix had been helpful in the sense that it compelled team members to consider all of the evaluative criteria that influence roadway decision making, rather than focusing only on the issues that are of personal concern.

After discussing the limitations of the evaluation matrix, the Community Resource Team proceeded with a facilitated discussion of the merits of each concept plan in light of the public preferences and concerns that had been heard at the Public Involvement Sessions. The facilitated discussion began with a dialogue concerning common ground issues, or items that everyone on the team could agree to support. After completing a list of common ground recommendations, the group worked through a process of discussing and developing consensus or majority agreements concerning concept recommendations for each section of SR 126.

During the process of group discussion and compromise, the team agreed to make minor modifications to the cross sections for three of the roadway segments. These modifications included extending a curb and gutter section with sidewalks from Harbor Chapel Road to Old Stage Road in place of stabilized shoulders, and widening the travel lanes and shoulders and adding special pavement markings in the sections from Harr Town Road to Cochise Trail and from Cochise Trail to Interstate 81. The curb and gutter extension to Old Stage Road was agreed upon in order to provide a consistent pedestrian accommodation in the form of sidewalks throughout the portion of SR 126 that falls within the City limits of Kingsport. The modifications in lane and shoulder width and pavement markings from Harr Town Road to I-81 were agreed upon in order to make the recommended two-lane sections safer for motorists by allowing more width for evasive maneuvers in the case of emergency. The final team recommendation is documented in the next section of this report.

TEAM RECOMMENDATIONS

The recommendations of the Community Resource Team were developed at a team workshop held in Kingsport on June 21 and 22, 2005. After that work session, the project managers compiled the team's recommendations into a formal document that was then submitted to TDOT's senior management for review and consideration. The team recommendation was presented to TDOT Commissioner Gerald Nicely on August 9, 2005. After careful consideration and discussion, Mr. Nicely agreed to support the team's recommendation and provide funding for the next stage of the project which is the preparation of an environmental assessment.

The following pages of this report are the formal team recommendation document that was reviewed and approved by TDOT.

Memorial Boulevard
State Route 126

Community Resource Team Recommendation
June 22, 2005

The Community Resource Team (CRT) for the State Route 126 (Memorial Boulevard) CSS project has worked together since October 2003 to study and prepare a concept plan recommendation for improving SR 126 in Kingsport and Sullivan County. The project study area extends from East Center Street to Interstate 81, a distance of approximately 8 miles. During the 21-month study process, the CRT met together thirteen times for meetings, training, and workshops and conducted three series of Public Involvement Sessions in Kingsport. Public opinion was surveyed at each Public Involvement Session and the results of those surveys were reviewed and discussed by the CRT. Concept plans for three distinct proposals (Concepts A, B, and C) and one blended proposal (Concept D) were prepared by the project's consultant team. Concepts A, B, and C were originally presented to the public at the November 2004 Public Involvement Session. Revised Concepts A, B, and C, along with Concept D, were presented to the public for review and comment at the May 2005 Public Involvement Session.

This document summarizes the collective recommendations of the SR 126 CRT. Included first are "common ground" recommendations, for which there was unanimous support among the CRT members. Following the common ground issues, is a summary of the team's recommendations concerning roadway cross sectional elements. These cross section recommendations are supported by a majority of CRT members. Finally, this document includes three minority objection statements that were prepared for specific sections of the project study area by members of the CRT. The minority objections clarify the diversity of opinion within the team.

Following is a list of items that the CRT unanimously agreed were important considerations for the SR 126 project.

Safety

- Safety is the number one priority on this project.
- Wide shoulders are desirable
- Improve sight distance and address geometric deficiencies at all intersections of side streets
- Provide left turn lanes at major intersections (even with two-lane Concept A):
  - Orebank Road
  - Harbor Chapel Road
  - Stratford Road
  - Old Stage Road
  - Amy Avenue /Glenwood Street
  - Cooks Valley Road
  - Island Road
  - Fall Creek Road
  - Hill Road
- Provide right turn lanes at major intersections (even with two-lane Concept A):
  - Cooks Valley Road
  - Fall Creek Road
  - Hill Road
- Consider using center line and shoulder rumble strips and reflective thermal markings where appropriate
- Special attention should be given to intersection improvements at the intersection of Carolina Pottery and Overhill Road to improve safety
- Plan development needs to be mindful of pedestrian safety and connectivity, providing a safe and separate walkway for pedestrians where feasible. Specific areas where sidewalks are desired include East Center Street to Old Stage Road (withing the City limits) and within the Indian Springs community
- Use side facing mailbox placement along SR 126 to improve safety for residents
- The CRT would like to avoid a “one size fits all” solution for SR 126

Points of Interest to the Community

The CRT wants to minimize impacts to and protect the integrity of community treasures in the SR 126 study area. Sites that are considered community treasures include:

- Cherry Point Animal Hospital
- White House at the corner of Satana Road and SR 126
- East Lawn Cemetery
- Old Indian Springs Post Office
- Chestnut Ridge view shed
- Anything within the historic boundary of Yancey’s Tavern, including the tavern, barn, and trace of Old Island Road
- Shipley Mansion (near East Center Street)

Enhancements

The CRT supports the incorporation of the following enhancement features in the design plans for SR 126:

- Use of natural elements for retaining and buffering walls
- Landscaping to a human scale with native plant species
- Decorative guardrail where appropriate
- Use of decorative lighting where appropriate with sensitivity to residential areas
- Underground utilities instead of overhead
- Use of mast arms rather than span wire where traffic signals are installed
- Use of Texas rail instead of Jersey barrier type railing on bridges
- Bridge design needs to be an enhancement and fit within the context of the community
- Include irrigation with major landscaping
- Landscape design that is appropriate to the speed limit
- Inclusion of a roundabout at the intersection of SR 126 and East Center Street if adequate capacity can be provided for forecasted traffic volumes

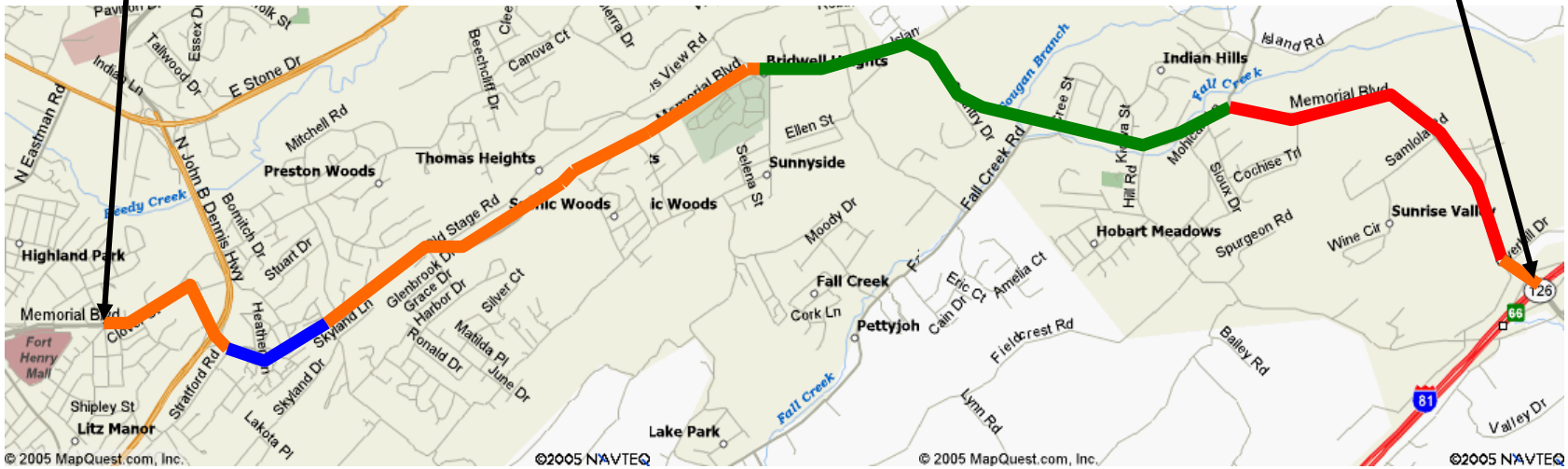
Other Issues

- Where roadway widening is undertaken, use as much of the existing roadway as possible.
- Where the roadway is widened from two to four lanes, consider leaving the existing road in place and constructing the new lanes to one side (asymmetrical widening).
- The CRT identified two major benefits of asymmetrical widening: improved traffic flow during construction, and enhanced constructability.
- Asymmetrical widening should not preclude making improvements to horizontal and vertical alignment deficiencies.

HWY 126 PROJECT LOCATION

Begin Project

End Project



- 4 lane cross section with landscaped raised median
- 4 lane cross section with center turn lane
- 2 lane cross section with center turn lane
- 2 lane cross section

Following is a summary of recommendations for roadway cross sections agreed upon by a majority of the CRT. The recommendations are divided into eight sections, identified by intersecting cross streets. For three of the eight sections, minority objections were documented within the CRT. The sections with minority objections are noted in the cross section descriptions and a detailed description of each minority opinion is included at the end of this report.

Section 1 West – East Center Street to Orebank Road

Preferred Concept - Concept C
Design speed - 35
Travel lanes - 2 eastbound and 2 westbound (11' each)
Median - Raised landscaped
Bikeways - 4' shoulder
Sidewalks – Yes, on both sides
Curb and Gutter - Yes
Special features:
Roundabout with flared right turns at East Center Street. (An alternate option is to maintain the existing traffic signal, but a roundabout is preferred.)
Access Notes:
Median openings and turn lanes at Central Street, Conway Drive, Woodside Drive, and Orebank Road
Intersection and Geometric Improvements:

- Realign Orebank Road to 90 degree angle plus turn lanes

Section 1 East – Orebank Rd to West of Hawthorne St.

Preferred Concept - Concept C
Design speed - 35
Travel lanes - 2 eastbound and 2 westbound (11' each)
Median - Raised landscaped
Bikeways - 4' shoulder
Sidewalks – Yes, on both sides
Curb and Gutter - Yes
Access Notes:
Median opening at eastern driveway for Sun Bridge Hillside Care and Rehab
Intersection and Geometric Improvements:

- Improve curve at Orebank Road / Edens Ridge Road
- Close Edens Ridge Road intersections (access to Memorial Boulevard via Orebank Road)
- Improve northbound entrance ramp to John B. Dennis Highway
- Remove right turn yield condition from northbound John B. Dennis exit ramp to eastbound SR 126 in order to reduce vehicle conflicts; make right turns use the traffic signal

Section 2 – West of Hawthorne St to Harbor Chapel Road

Preferred Concept - Concept C
Design speed - 35
Travel lanes - 2 eastbound and 2 westbound (11' each)
Median – Center Turn Lane
Bikeways - 4' shoulder
Sidewalks – Yes, on both sides
Curb and Gutter - Yes
Intersection and Geometric Improvements:

- Close Milton Court (condominium access) intersection to SR 126 and provide alternate access via Stratford and Kite Street
- Close Hawthorne Street intersection on the south side of SR 126
- Close Kent Street intersection with SR 126 (access SR 126 via Kite Street)
- Improve side road sight distance at Hawthorne Street and Beverly Hills Street
- Correct deficient curves at Kite Street and Beverly Hills Street
- Close Amy Avenue / Woodridge Avenue intersection and tie Amy / Woodridge into Glenwood Street
- Close Trinity Lane and provide alternate access via a new connection near the cemetery (access to SR 126 via Orebank Road)

Section 3 West – Harbor Chapel Rd to east of Old Stage Rd

Preferred Concept - Concept C Modified to include curb & gutter and sidewalks
Design speed - 45
Travel lanes - 2 eastbound and 2 westbound (11' each)
Median – Raised Landscape
Bikeways – 4' shoulder
Sidewalks – Yes, on both sides
Curb and Gutter - Yes
Intersection and Geometric Improvements:

- Close off intersection of Tanglewood Road and tie Tanglewood into Briarwood Road
- Realign Old Stage Road to create a 90 degree intersection and decrease steepness of Old Stage Road

Section 3 East – East of Old Stage Rd to Cooks Valley Rd

Preferred Concept - Concept C
Design speed - 45
Travel lanes - 2 eastbound and 2 westbound (11' each)
Median – Raised Landscape
Bikeways – 8' stabilized (6' paved shoulder on both sides)
Sidewalks – Pedestrians use shoulder
Curb and Gutter - No
Intersection and Geometric Improvements:

- Correct deficient "S" curves on Chestnut Ridge
- Connect Holiday Hills Road to Shuler Drive via Parker Street

Section 3 East continued

- Close Shuler Drive intersection with SR 126 and redirect traffic to Lemay Drive
- Realign Chestnut Ridge Road to the west
- Realign Eaton Station Road to tie in opposite Cooks Valley Road
- Provide a left turn lane onto Cooks Valley Road and Eaton Station Road

*NOTE: A minority objection statement is documented for this section.

Section 4 West – Cooks Valley Rd to Harrtown Rd

Preferred Concept - Concept B
Design speed - 45
Travel lanes - 1 eastbound and 1 westbound (11' each)
Median – Center Turn Lane
Bikeways – 6' stabilized shoulder (does not include gutter pan) on both sides
Sidewalks – Yes, on both sides
Curb and Gutter - Yes
Intersection and Geometric Improvements:

- Close Red Robin Lane intersection (access to SR 126 via Bridwell Heights Road)
- Realign Woodsway Drive to a 90 degree intersection
- Realign Island Road and improve sight distance
- Realign Natchez Lane intersection
- Relocate Harrtown Road intersection further west to reduce steepness
- Correct deficient curves between Hill Road and Harrtown Road

*NOTE: A minority objection statement is documented for this section.

Section 4 East - Harrtown Rd to Cochise Trail

Preferred Concept - Concept A Modified
Design speed - 45
Travel lanes - 1 eastbound and 1 westbound (12' each)
Median – None
Bikeways – 8' paved and 2' stabilized shoulder on both sides
Sidewalks – No
Curb and Gutter - No
Special features:

- Use an 18" center line crossover deterrent consisting of a rumble strip with appropriate striping. The travel lane width shall be reduced to accommodate the deterrent.
- Include rumble strips between the travel lane and the shoulder

Access Notes:

- Require turn lane construction by future developers

Section 5 - Cochise Trail to Interstate 81

Preferred Concept - Concept A Modified
Design speed - 45
Travel lanes - 1 eastbound and 1 westbound (12' each)
Median – None
Bikeways – 8' paved and 2' stabilized shoulder on both sides
Sidewalks – No
Curb and Gutter - No
Special features:

- Use an 18" center line crossover deterrent consisting of a rumble strip with appropriate striping. The travel lane width shall be reduced to accommodate the deterrent.
- Include rumble strips between the travel lane and the shoulder
- Design passing zones by correcting vertical curves and improving sight distance
- Design better transition area from 4 lanes at I-81

Access Notes:

- Require turn lane construction by future developers

Intersection and geometric improvements:

- Correct deficient curves west and east of Samlola Road
- Realign Gravel Top Road (west) intersection
- Close Gravel Top Road (east) intersection

*NOTE: A minority objection statement is documented for this section.

Minority Report for Section 3 East
Of State Route 126 in Sullivan County

Basic concept for this segment:

Old Stage Road to Cooks Valley Road: Concept A with a right turn lane onto Lemay Drive.

Statement of Purpose:

We find ourselves in fundamental opposition to the exhumation of human remains or the destruction of an historical treasure (Yancey's Tavern property) while a viable alternative is available that fulfills the agreed upon requirements for the project. Further, with respect to the preservation of Chestnut Ridge, we also are unable to accept a solution or concept that is more destructive with respect to the original contours and appearance of the ridge than is required, while a viable alternative exists that, again, fulfills the agreed upon requirements for the project.

Rationale:

- Safety
  - Has eight foot shoulders, guard rails, improved sight distances, and improved horizontal and vertical curves.
  - Has centerline & shoulder rumble strips to minimize lane departure (as recommended in State of Tennessee Strategic Highway Safety Plan, p. 8, 11/17/04)
  - Designated right turn lane into Lemay Drive provides greater safety for new traffic generated by adjacent road closures. Also allows eastbound traffic to continue while vehicles make right turn.
- Community Impacts
  - Concept A has the least impact to Chestnut Ridge both environmentally and visually.
  - Concept A has the smallest number of impacts to residences.
  - Best preserves the community wishes of maintaining the scenic beauty of Chestnut Ridge.
- Cost Justification
  - B & C are not justified by actual and projected traffic counts through 2028.
  - B & C are not justified by turning needs (few driveways & minimal left turns to side roads since most traffic is westbound in the morning and eastbound in the evening)

- There is a lack of consideration of cost in this section in light of the lack of potential benefits that might be realized by the community.

- Public Response
  - 58% of those surveyed in Public Session III chose an option other than a 4-lane, i.e. Concept C, in the section.
  - Additionally, a petition with 1100+ names expressed a preference for a two lane road in this section.
  - Eleven foot travel lanes minimize the road footprint.
  - Concept A impacts East Lawn Cemetery the least of all concepts.
  - Concept A protects the historic Yancey tavern and barn, as well as remnants of Old Island Road and the surrounding site. The history of this area predates the American Revolution.

- Mobility
  - Right turn lane increases capacity in Concept A.
  - Traffic counts have drastically fallen east of Old Stage Road.

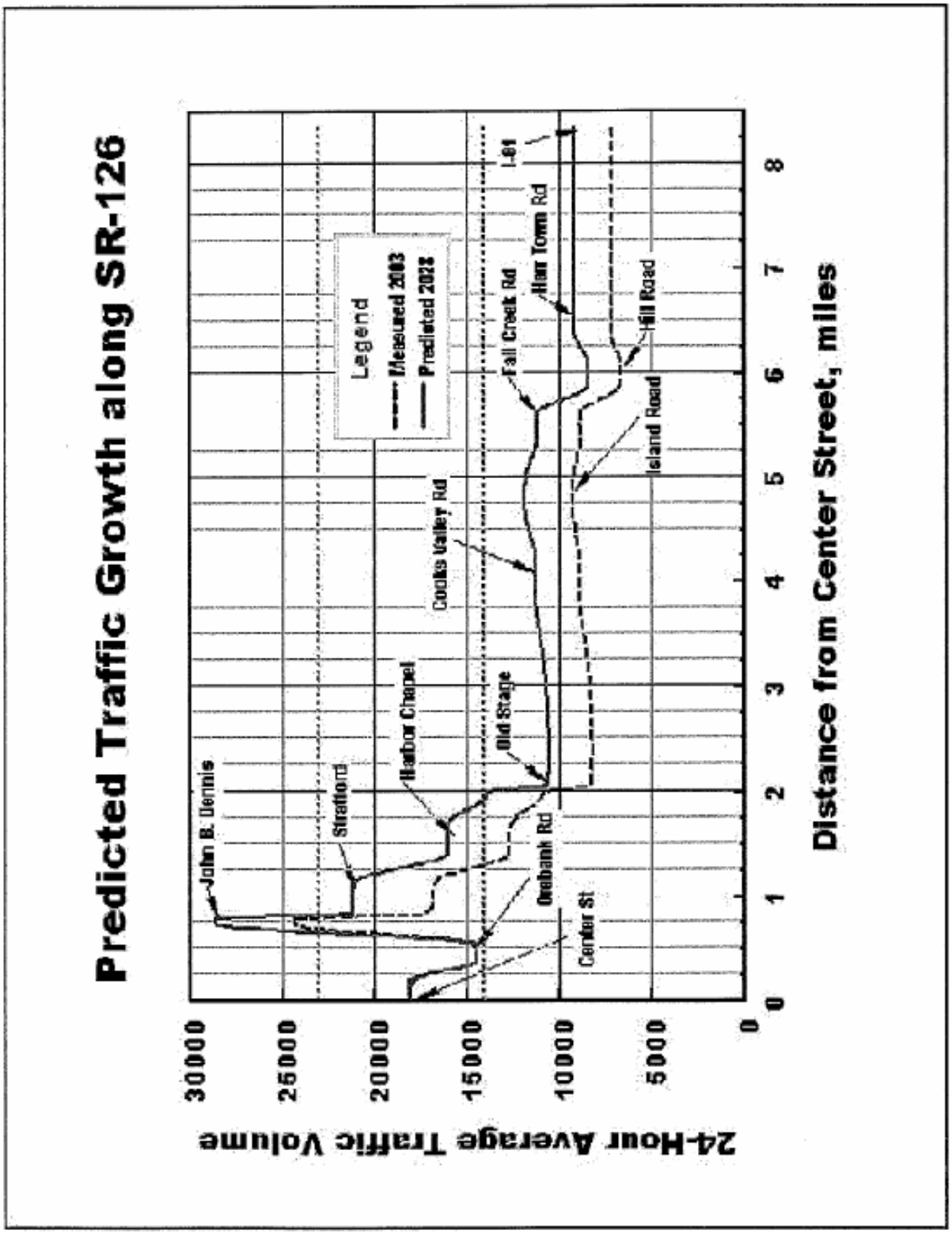
June 22, 2005

State Representative Nathan Vaughn

Larry Hall, Member of the Sullivan County Board of Commissioners, District 6

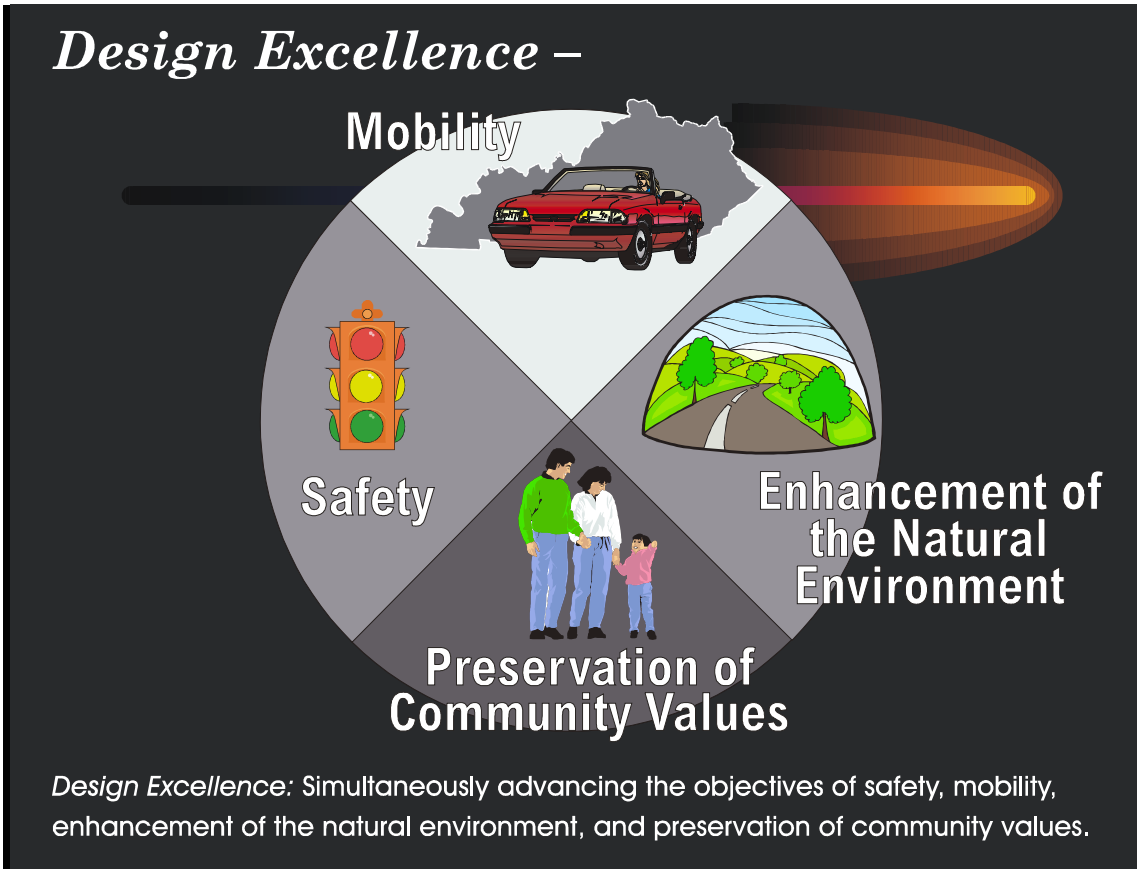
Judith Murray, Citizen Representative

Dan Cheek, Citizen Representative


Predicted Traffic Growth along SR-126
24-Hour Average Traffic Volume
30000
25000
20000
15000
10000
5000
0
Distance from Center Street, miles
0
1
2
3
4
5
6
7
8
Legend
Measured 2003
Predicted 2023
John B. Dennis
Stratford
Harbor Chapel
Cooks Valley Rd
Old Stage
Owlbank Rd
Center St
Fall Creek Rd
Harr Town Rd
I-81
Hill Road
Island Road

What is Context-Sensitive Design?

- Addresses purpose and need
- Addresses equally:
  - Safety
  - Mobility
  - Preservation of scenic, esthetic, historic, environmental, and community values



Minority Objection

for

Section 4 West – Cooks Valley Road to Harrtown Road

Tennessee State Route 126

June 22, 2005

We, whose names are listed below, strongly believe that Concept B is an inappropriate and unjustified recommendation for improving Section 4 West, Cooks Valley Road to Harrtown Road, a portion of the Tennessee State Route 126 project. The following statements describe our concerns:

Public Preference

- **Concept B (three-lane)** goes against the public's preference for **Concept C (four-lane divided)** as expressed in the two separate votes of November 2004 (98 vs. 22) and May 2005 (111 vs.76).
- Of the three concept choices, Concept B received the least number of favorable responses from the May 2005 public meetings.

Every member of the community has had equal opportunity to have their preference reflected in the hard numbers obtained from these two public input sessions. We believe these responses most accurately measures the public's desire.

Growth

- Concept B does not address the strong potential for growth along the 126 corridor.
- As of June 22, 2005, 344 family residential units are under development east of Cooks Valley Road that will feed traffic directly onto SR 126 and increase traffic west into Kingsport. (These are: Yancey's Tavern – 18 sites; Sugarwood – 74 units; near Old Island Rd – 100 apartment units; Rose Mary Villas – 13 units with more planned at Crockett Ridge Golf Course; Pectol property – 19 sites; Shadowtown Rd. – 120 units.) All but one of these developments are located within Section 4 West.
- In addition, Crockett Ridge Golf Course/Old Island residential development is under new ownership. Owners recently completed a new clubhouse and have received approval for rezoning of their development for condominiums, patio homes, and single home dwellings. This alone will significantly increase traffic volumes entering SR 126 from Island Road and Harrtown Road both of which are east of Cooks Valley Road and within Section 4 West.
- Concept B ignores additional strong growth potential in the areas as sewers are extended in 2005-2006 to the greater Indian Springs area.
- The Cooks Valley Road station for 2003-04 ADT is 8,950 with a projected 2028 ADT of 11,290 indicates expected growth of 2,340 ADT. The 344 family units listed above, in themselves, with an average of two autos per unit making one round trip daily to Kingsport **significantly** exceeds the 2008 projected ADT.
- ***We believe the projected traffic volumes furnished to the SR 126 Resource Team were inappropriately reduced from TDOT's original projections and do not accurately reflect future traffic volumes.***

- Concept B provides for a very limited increase over current traffic capacity and will not adequately address future capacity needs.
- One lane in each direction does not provide adequate mobility as requested by the public.

We recommend that Concept C be extended east from Section 3 East (Old Stage Road) to Hill Road rather than to Harrtown Road. This will adequately accommodate the large volume of traffic to and from Indian Springs School, most of which originates west of Hill Road.

Safety

- Concept B does not provide for safe passing opportunities as the public requested.
- Concept B promotes driver conflicts due to the inability to pass slow drivers.
- Concept B will encourage unsafe passing with the use of the center turn lane being used for that purpose.

Impact

- The physical impact of Concept C is essentially equal to that of Concept B.
- Issues concerning the cemetery and Yancey's Tavern/barn should be "fully" addressed during this project to accommodate future needs and not postponed, thus making it necessary to revisit the problem again in the near future. A proper solution should be implemented before future development has taken place thereby further complicating the issue.

In summary, TDOT has invested much time and money into the CSS process in providing information to the public and then asking the public for their preference. The public has responded, and the desires of the greater population should be honored. In addition, we strongly feel that Concept B is an ill-advised and extremely shortsighted plan for improving Section 4 West of SR 126 and will result in an immediate need for an additional upgrade.

Tom Carroll, Citizen Representative
Diane Somers, Citizen Representative
Wallace Putnam, Citizen Representative
Ray Griffin, Kingsport City Manager
Ken Marsh, Kingsport Alderman and Kingsport Planning Commission

Minority Objection Statement
for
Section 5 - Cochise Trail to Interstate 81

The preference of the Resource Team, after several votes promulgated by "modifications" to each concept, was Alternate A Modified. Alternate A Modified provides 2 lanes originally with no separation, was later adjusted to include centerline striping and/or skips that establish an 18 inch center space. An 18 inch median or space simply does not provide adequate separation for 2-way "unseparated" traffic. With safety an utmost priority, inadequate separation will continue to create potential for ongoing safety incidences (head-ons, close calls) or motorists crossing the center line causing more accidents. Additionally, and of utmost important, left turn conflicts will continue to exist, causing rear-end collisions, other accidents, and other close calls. Left turn inhibitions will also create additional traffic flow problems, with two way traffic passing "opportunities" becoming passing "hazards". With a grass median or center turn lane, passing in Section 5 will be prohibited; a much better scenario than affording a dangerous passing environment. A wide median with two lanes reduces vehicular conflicts, provides for greater visibility for motorists to see the road and see each other, and offers a chance for motorists to recover from either their mistakes or avoid the mistake of others – it is much more "forgiving" of driver error.

Section 5 has much more open/undeveloped properties alongside the existing roadway. In this section, because widening to 3 lanes (or grass median) can be flexible, the ability to move the centerline lessens the impact on homes and properties. Consequently, adding a median and turn lanes can be accommodated much easier with much less impact. Additionally, with the impacts being similar with all 3 concepts, why would TDOT and/or the local community want to put back a roadway that could potentially continue to entice head-on collisions and/or other incidences caused by 2-way traffic, when we could do and get a better quality roadway ??

Bill Albright
Tom Carroll
Diane Somers

We, the State Route 126 Resource Team, request that the Tennessee Department of Transportation accept and carry forward the improvements described in this document for State Route 126 from East Center Street to Interstate 81. Included in this document are objection statements for ~~two~~ three sections of the roadway that clarify diversity in opinion within this resource team. We appreciate the opportunity provided by TDOT to participate in this CSS process and we further recommend that the department continue to involve local participation in this project as it moves forward through subsequent stages.

Mayor Jeanette Blazier

Dan Cheek

Mayor Richard Venable

Forrest Koder

Representative Nathan Vaughn

Anne Morris, Consultant

Alderman Ken Marsh

Judy Murray

Commissioner Larry Hall

Wallace Putnam

Ray Griffin, City Manager

Elizabeth Smith, TDOT

Jeff Fleming, Assistant City Manager

Diane Somers

Bill Albright

Ambre Torbett

Tom Carroll

Becky White, Consultant

The following team members were unavailable to participate in preparation of the team recommendations: Humberto Collazo, David Ruller, Roy Settle.

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COST ESTIMATE

A preliminary cost estimate was prepared for the recommended plan in order to provide TDOT with a general estimate of construction costs that could be expected if the recommendation is implemented as envisioned by the Community Resource Team. It is important to note that this cost estimate was prepared only for the purposes of this report. At no time during the planning stages of the SR 126 project were construction costs estimated for the various concepts under consideration. No cost estimates were shared with the public or with the Community Resource Team. The decision to postpone cost estimating was made due to sensitivity to perceptions that the public might have concerning accuracy of cost figures. At this stage of project planning, it is very difficult to correctly estimate construction costs since environmental studies and detailed engineering design have not been undertaken.

Based on the information available to date, the following are preliminary construction cost estimates for the recommended plan:

Section 1- East Center Street to west of Hawthorne Street	$ 9,045,000
Section 2 – west of Hawthorne Street to Harbor Chapel Road	$ 6,535,000
Section 3 – Harbor Chapel Road to Cooks Valley Road	$38,150,000
Section 4 – Cooks Valley Road to Cochise Trail	$16,200,000
Section 5 – Cochise Trail to Interstate 81	$15,225,000
Project Total	**$85,155,000**

APPENDIX: SUPPORT DOCUMENTATION

Correspondence
- Letters
- Conversation Logs
- Disc with Team and Citizen emails

Agendas & Minutes
- Meeting Minutes
- Slides from January 23, 2004 Team Meeting
- Photographs from Team Meetings

Team Workshops
- Photographs from Team Building Workshop
- Agenda for CSS Workshop
- Photographs from CSS Workshop
- Agenda from Plan Review Workshop
- Notes from Plan Review Workshop
- Photographs from Plan Review Workshop
- Agenda from the Team Recommendation Workshop
- Evaluation Matrix with Team Average Scores
- Photographs from Team Recommendation Workshop

Design Charette
- Design 101 document from Charette
- Summary of Team Concepts
- Consensus Decisions
- Slides from Design Charette
- Photographs

Public Involvement
- Public Involvement Plan
- Newsletters
- Samples of all surveys, postcards, handouts, etc.
- Copies of slides from PIS presentations
- Transcripts from PIS
- Typed reports of the sticky note and handwritten comments on maps
- Photographs from PIS
- Letters from Citizens
- Focus Group report

Roadway Data
- Photographs from Field Reviews
- Horizontal & Vertical curve analysis
- Maps of horizontal curve locations

Traffic Accidents

- Maps of traffic accident locations
- Accident rate calculation worksheets

Traffic Forecasts

- Traffic Forecast Report
- August 19, 2004 traffic methodology memo from Steve Allen

Environmental

- Historic Survey
- Other correspondence regarding environmental issues
- Documentation from public concerning sites of local significance
- Photographs from sites of local significance

Concept Plans

- Concept plans

Recommended Plan

- Concept plans

Cost Estimate

- Backup data for cost estimates

TRAFFIC ANALYSIS

LOS Summary Tables
2013 No Build Alternative – HCS Calculation Data and Reports
2033 No Build Alternative – HCS Calculation Data and Reports
2013 Build Alternative A & B – HCS Calculation Data and Reports
2033 Build Alternative A & B – HCS Calculation Data and Reports

LOS Summary Tables

No Build LOS

ID	From		To		Dist.	Cross Section	Speed Limit	2013				2033			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1	3.72	Center St.	4.33	Hillcrest Dr.	0.61	4-Lanes with No Median and Narrow Shoulders	35	18,960	C	28	0.51	20,860	C	28	0.56
2	4.33	Hillcrest Dr.	4.60	Heather Ln.	0.27	4-Lanes with a Raised Grass Median and Wide Shoulders	35	25,800	D	32	0.70	33,540	D	32	0.91
3	4.60	Heather Ln.	5.50	Tangle-wood Rd.	0.9	2-Lanes Eastbound, 1-Lane Westbound with No Median and Narrow Shoulders	45	19,080	E	21	0.76	24,800	F	15	0.99
4	5.50	Tangle-wood Rd.	6.00	Ethel Dr.	0.5	2-Lanes with TWLTL and Narrow Shoulders	45	10,430	E	33	0.42	13,560	E	30	0.54
5	6.00	Ethel Dr.	11.90	Carolina Pottery Dr.	5.9	2-Lanes with No Median and Narrow Shoulders	50	10,550	E	33	0.42	21,100	F	24	0.84
6	11.90	Carolina Pottery Dr.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and Wide Shoulders	40	10,830	B	42	0.27	21,660	C	42	0.55
				Σ =	**8.4**	**Weighted Average =**	**47**			**32**	**0.47**			**24**	**0.81**

Build Alternative A LOS

ID	From		To		Dist.	Cross Section	Speed Limit	2013				2033			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	18,960	C	31	0.51	20,860	C	31	0.56
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	25,800	D	31	0.70	33,540	E	31	0.91
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	19,080	C	33	0.52	24,800	D	33	0.67
3	5.18	Harbor Chapel Rd.	7.66	Cooks Valley Rd.	2.48	4-Lanes with a Raised Grass Median and 4-8 Ft. Shoulders	45	10,430	A	43	0.24	13,560	B	43	0.31
4	7.66	Cooks Valley Rd.	10.11	Harr Town Rd.	2.45	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	10,260	E	36	0.41	20,520	E	26	0.82
5	10.11	Harr Town Rd.	11.90	Carolina Pottery Rd.	1.79	2-Lanes with No Median and 10 Ft. Shoulders	50	10,830	D	41	0.43	21,660	F	31	0.86
6	11.90	Carolina Pottery Rd.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	40	10,830	B	43	0.27	21,660	C	43	0.55
				Σ =	**8.4**	**Weighted Average =**	**44**			**38**	**0.38**			**34**	**0.64**

Build Alternative B LOS

ID	From		To		Dist.	Cross Section	Speed Limit	2013				2033			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	18,960	C	31	0.51	20,860	C	31	0.56
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	25,800	D	31	0.70	33,540	E	31	0.91
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	19,080	C	33	0.52	24,800	D	33	0.67
3	5.18	Harbor Chapel Rd.	7.20	Lemay Dr.	2.02	4-Lanes with a Raised Grass Median and 4-8 Ft. Shoulders	45	10,430	A	43	0.24	13,560	B	43	0.31
4	7.20	Lemay Dr.	10.11	Harr Town Rd.	2.91	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	10,260	E	36	0.41	20,520	E	26	0.82
5	10.11	Harr Town Rd.	11.90	Carolina Pottery Rd.	1.79	2-Lanes with No Median and 10 Ft. Shoulders	50	10,830	D	41	0.43	21,660	F	31	0.86
6	11.90	Carolina Pottery Rd.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	40	10,830	B	43	0.27	21,660	C	43	0.55
				Σ =	**8.4**	**Weighted Average =**	**44**			**38**	**0.39**			**33**	**0.67**

Multilane Highways Capacity Analysis Tables

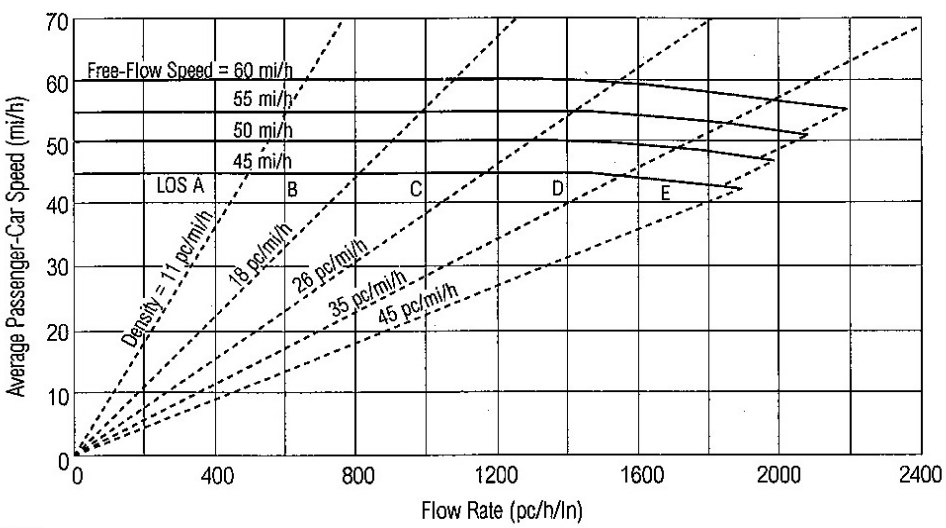
Tables 21-2 and 21-3 from the HCM were utilized to extrapolate LOS

EXHIBIT 21-2. LOS CRITERIA FOR MULTILANE HIGHWAYS

		LOS				
Free-Flow Speed	Criteria	A	B	C	D	E
60 mi/h	Maximum density (pc/mi/ln)	11	18	26	35	40
	Average speed (mi/h)	60.0	60.0	59.4	56.7	55.0
	Maximum volume to capacity ratio (v/c)	0.30	0.49	0.70	0.90	1.00
	Maximum service flow rate (pc/h/ln)	660	1080	1550	1980	2200
55 mi/h	Maximum density (pc/mi/ln)	11	18	26	35	41
	Average speed (mi/h)	55.0	55.0	54.9	52.9	51.2
	Maximum v/c	0.29	0.47	0.68	0.88	1.00
	Maximum service flow rate (pc/h/ln)	600	990	1430	1850	2100
50 mi/h	Maximum density (pc/mi/ln)	11	18	26	35	43
	Average speed (mi/h)	50.0	50.0	50.0	48.9	47.5
	Maximum v/c	0.28	0.45	0.65	0.86	1.00
	Maximum service flow rate (pc/h/ln)	550	900	1300	1710	2000
45 mi/h	Maximum density (pc/mi/ln)	11	18	26	35	45
	Average speed (mi/h)	45.0	45.0	45.0	44.4	42.2
	Maximum v/c	0.26	0.43	0.62	0.82	1.00
	Maximum service flow rate (pc/h/ln)	490	810	1170	1550	1900

Note:
The exact mathematical relationship between density and volume to capacity ratio (v/c) has not always been maintained at LOS boundaries because of the use of rounded values. Density is the primary determinant of LOS. LOS F is characterized by highly unstable and variable traffic flow. Prediction of accurate flow rate, density, and speed at LOS F is difficult.

EXHIBIT 21-3. SPEED-FLOW CURVES WITH LOS CRITERIA



Note:
Maximum densities for LOS E occur at a v/c ratio of 1.0. They are 40, 41, 43, and 45 pc/mi/ln at FFS of 60, 55, 50, and 45 mi/h, respectively. Capacity varies by FFS. Capacity is 2,200, 2,100, 2,000, and 1,900 pc/h/ln at FFS of 60, 55, 50, and 45 mi/h, respectively.
For flow rate (v_p), v_p > 1400 and

2013 No Build Alternative – HCS Calculation Data and Reports

2013 No Build LOS Calculation Data

										For Multi-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Flow Rate (Capacity)	Flow Rate (Calc)	v/c	Diff. Speed
1	18960	0.11	0.65	2090	1360	6%	1	n/a	30	1600	823	0.51	12.1
2	25800	0.11	0.65	2840	1850	6%	8	n/a	30	1600	1120	0.7	8.4
3	19080	0.11	0.65	2100	1370	6%	1	90	20	1900	n/a	n/a	n/a
4	10430	0.11	0.65	1150	750	6%	2	90	8	1900	n/a	n/a	n/a
5	10550	0.11	0.65	1160	750	6%	2	90	8	2000	n/a	n/a	n/a
6	10830	0.11	0.65	1190	770	6%	12	n/a	8	1700	466	0.27	2.9

Notes:
Access Points from HCM Exhbit 12-4 (Default Values)
Flow Rate (Capacity) extrapolated from Exhibit 21-3
Multilane analysis in HCS not designed for free flow speeds under 45 mph. The calculations rely on concepts in the HCM & Exhibit 21-2
Primarily, the v/c ratio.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/18/2011
Analysis Period:	2013
Highway:	SR 126
From/To:	Center St to Hillcrest
Jurisdiction:	
Analysis Year:	
Project ID:	Segment 1

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	1.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	7.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Undivided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	1.1	mph	0.0	mph
Median type adjustment, FM	1.6	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	47.9	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1360	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	378		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	823	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	823	pcphpl	0	pcphpl
Free-flow speed, FFS	47.9	mph	60.0	mph
Avg. passenger-car travel speed, S	47.9	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	17.2	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/18/2011
Analysis Period:	2013
Highway:	SR 126
From/To:	Hillcrest to Heather
Jurisdiction:	
Analysis Year:	
Project ID:	Segment 2

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	2.0	ft	6.0	ft
Total lateral clearance	8.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.9	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	51.6	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1850	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	514		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	1120	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1120	pcphpl	0	pcphpl
Free-flow speed, FFS	51.6	mph	60.0	mph
Avg. passenger-car travel speed, S	51.6	mph	60.0	mph
Level of service, LOS	C		A	
Density, D	21.7	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	jhs
Agency/Co.	F&H
Date Performed	2/21/2011
Analysis Time Period	2013
Highway	SR 126
From/To	Heather Ln to Tanglewood
Jurisdiction	
Analysis Year	
Description	Segment 3

Input Data

Highway class	Class 1				
Shoulder width	1.0	ft	Peak-hour factor, PHF	0.90	
Lane width	11.0	ft	% Trucks and buses	6	%
Segment length	0.9	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	20	/mi
Up/down		%			

Two-way hourly volume, V 2100 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	2428	pc/h
Highest directional split proportion (note-2)	1578	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	4.7	mi/h
Adj. for access points, fA	5.0	mi/h
Free-flow speed, FFS	40.3	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATS	20.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2333	pc/h
Highest directional split proportion (note-2)	1516	
Base percent time-spent-following, BPTSF	87.1	%
Adj.for directional distribution and no-passing zones, fd/np	3.5	
Percent time-spent-following, PTSF	90.7	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.76	
Peak 15-min vehicle-miles of travel, VMT15	525	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1890	veh-mi
Peak 15-min total travel time, TT15	25.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	jhs
Agency/Co.	F&H
Date Performed	2/21/2011
Analysis Time Period	2013
Highway	SR 126
From/To	Tanglewood to Ethel
Jurisdiction	
Analysis Year	
Description Segment 4	

Input Data

Highway class Class 1					
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.90	
Lane width	11.0	ft	% Trucks and buses	6	%
Segment length	0.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 1150 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	1329	pc/h
Highest directional split proportion (note-2)	864	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	45.0	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATS	33.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1278	pc/h
Highest directional split proportion (note-2)	831	
Base percent time-spent-following, BPTSF	67.5	%
Adj.for directional distribution and no-passing zones, fd/np	9.2	
Percent time-spent-following, PTSF	76.7	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	160	veh-mi
Peak-hour vehicle-miles of travel, VMT60	575	veh-mi
Peak 15-min total travel time, TT15	4.9	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	jhs
Agency/Co.	F&H
Date Performed	2/21/2011
Analysis Time Period	2013
Highway	SR 126
From/To	Ethel to Carolina Pottery
Jurisdiction	
Analysis Year	
Description	Segment 5

Input Data

Highway class	Class 1				
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	6	%
Segment length	0.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 1160 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	1341	pc/h
Highest directional split proportion (note-2)	872	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	45.4	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATS	33.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1289	pc/h
Highest directional split proportion (note-2)	838	
Base percent time-spent-following, BPTSF	67.8	%
Adj.for directional distribution and no-passing zones, fd/np	9.1	
Percent time-spent-following, PTSF	76.9	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	161	veh-mi
Peak-hour vehicle-miles of travel, VMT60	580	veh-mi
Peak 15-min total travel time, TT15	4.8	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/18/2011
Analysis Period:	2013
Highway:	SR 126
From/To:	Carolina Pottery to I-81
Jurisdiction:	
Analysis Year:	
Project ID:	Segment 6

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	2.0	ft	6.0	ft
Total lateral clearance	8.0	ft	12.0	ft
Access points per mile	8		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.9	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	2.0	mph	0.0	mph
Free-flow speed	57.1	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	770	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	214		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	466	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	466	pcphpl	0	pcphpl
Free-flow speed, FFS	57.1	mph	60.0	mph
Avg. passenger-car travel speed, S	57.1	mph	60.0	mph
Level of service, LOS	A		A	
Density, D	8.2	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

2033 No Build Alternative – HCS Calculation Data and Reports

2033 No Build LOS Calculation Data

										For Multi-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Flow Rate (Capacity)	Flow Rate (Calc)	v/c	Diff. Speed
1	20,860	0.11	0.65	2290	1490	6%	1	n/a	30	1600	902	0.56	12.1
2	33,540	0.11	0.65	3690	2400	6%	8	n/a	30	1600	1453	0.91	8.5
3	24,800	0.11	0.65	2730	1770	6%	1	90	20	1900	n/a	n/a	n/a
4	13,560	0.11	0.65	1490	970	6%	2	90	8	1900	n/a	n/a	n/a
5	21,100	0.11	0.65	2320	1510	6%	2	90	8	2000	n/a	n/a	n/a
6	21,660	0.11	0.65	2380	1550	6%	12	n/a	8	1700	938	0.55	2.9

Notes:
Access Points from HCM Exhbit 12-4 (Default Values)
Flow Rate (Capacity) extrapolated from Exhibit 21-3
Multilane analysis in HCS not designed for free flow speeds under 45 mph. The calculations rely on concepts in the HCM & Exhibit 21-2
Primarily, the v/c ratio.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/18/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Center to Hillcrest
Jurisdiction:	
Analysis Year:	
Project ID:	Segment 1

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	1.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	7.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Undivided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	1.1	mph	0.0	mph
Median type adjustment, FM	1.6	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	47.9	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1490	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	414		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	902	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	902	pcphpl	0	pcphpl
Free-flow speed, FFS	47.9	mph	60.0	mph
Avg. passenger-car travel speed, S	47.9	mph	60.0	mph
Level of service, LOS	C		A	
Density, D	18.8	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/18/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Hillcrest to Heather
Jurisdiction:	
Analysis Year:	
Project ID:	Segment 2

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	2.0	ft	6.0	ft
Total lateral clearance	8.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.9	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	51.6	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	2400	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	667		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	1453	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1453	pcphpl	0	pcphpl
Free-flow speed, FFS	51.6	mph	60.0	mph
Avg. passenger-car travel speed, S	51.5	mph	60.0	mph
Level of service, LOS	D		A	
Density, D	28.2	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	jhs
Agency/Co.	F&H
Date Performed	2/21/2011
Analysis Time Period	2033
Highway	SR 126
From/To	Heather Ln to Tanglewood
Jurisdiction	
Analysis Year	
Description Segment 3	

Input Data

Highway class Class 1					
Shoulder width	1.0	ft	Peak-hour factor, PHF	0.90	
Lane width	11.0	ft	% Trucks and buses	6	%
Segment length	0.9	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	20	/mi
Up/down		%			

Two-way hourly volume, V 2730 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	3156	pc/h
Highest directional split proportion (note-2)	2051	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	4.7	mi/h
Adj. for access points, fA	5.0	mi/h
Free-flow speed, FFS	40.3	mi/h
Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATS	15.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	3033	pc/h
Highest directional split proportion (note-2)	1971	
Base percent time-spent-following, BPTSF	93.0	%
Adj.for directional distribution and no-passing zones, fd/np	3.1	
Percent time-spent-following, PTSF	96.1	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.99	
Peak 15-min vehicle-miles of travel, VMT15	683	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2457	veh-mi
Peak 15-min total travel time, TT15	45.1	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	jhs
Agency/Co.	F&H
Date Performed	2/21/2011
Analysis Time Period	2033
Highway	SR 126
From/To	Tanglewood to Ethel
Jurisdiction	
Analysis Year	
Description Segment 4	

Input Data

Highway class Class 1					
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.90	
Lane width	11.0	ft	% Trucks and buses	6	%
Segment length	0.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 1490 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	1722	pc/h
Highest directional split proportion (note-2)	1119	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	45.0	mi/h
Adjustment for no-passing zones, fnp	1.3	mi/h
Average travel speed, ATS	30.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1656	pc/h
Highest directional split proportion (note-2)	1076	
Base percent time-spent-following, BPTSF	76.7	%
Adj.for directional distribution and no-passing zones, fd/np	6.3	
Percent time-spent-following, PTSF	83.0	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.54	
Peak 15-min vehicle-miles of travel, VMT15	207	veh-mi
Peak-hour vehicle-miles of travel, VMT60	745	veh-mi
Peak 15-min total travel time, TT15	6.8	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	jhs
Agency/Co.	F&H
Date Performed	2/21/2011
Analysis Time Period	2033
Highway	SR 126
From/To	Ethel to Carolina Pottery
Jurisdiction	
Analysis Year	
Description Segment 5	

Input Data

Highway class Class 1					
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	6	%
Segment length	0.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 2320 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	2682	pc/h
Highest directional split proportion (note-2)	1743	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	45.4	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATS	23.7	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2578	pc/h
Highest directional split proportion (note-2)	1676	
Base percent time-spent-following, BPTSF	89.6	%
Adj.for directional distribution and no-passing zones, fd/np	3.1	
Percent time-spent-following, PTSF	92.8	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.84	
Peak 15-min vehicle-miles of travel, VMT15	322	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1160	veh-mi
Peak 15-min total travel time, TT15	13.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/18/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Carolina Pottery to I-81
Jurisdiction:	
Analysis Year:	
Project ID:	Segment 6

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	2.0	ft	6.0	ft
Total lateral clearance	8.0	ft	12.0	ft
Access points per mile	8		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.9	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	2.0	mph	0.0	mph
Free-flow speed	57.1	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1550	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	431		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	938	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	938	pcphpl	0	pcphpl
Free-flow speed, FFS	57.1	mph	60.0	mph
Avg. passenger-car travel speed, S	57.1	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	16.4	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

2013 Build Alternative A & B– HCS Calculation Data and Reports

Note: The HCS reports apply to both Build Alternative A & B. For each segment, the same roadway cross section and traffic volumes used is applicable to both alternatives. Only the length of the segments varied between Build Alternative A and Build Alternative B.

2013 Build Alternative A LOS Calculation Data

										For Multi-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Flow Rate (Capacity)	Flow Rate (Calc)	v/c	Diff. Speed
1a	18960	0.11	0.65	2090	1360	6%	4	n/a	30	1600	823	0.51	9.4
1b	25800	0.11	0.65	2840	1850	6%	4	n/a	30	1600	1120	0.7	9.4
2	19080	0.11	0.65	2100	1370	6%	4	n/a	20	1600	829	0.52	6.9
3	10430	0.11	0.65	1150	750	6%	8	n/a	20	1900	454	0.24	6.9
4	10260	0.11	0.65	1130	730	6%	6	90	8	1900	n/a	n/a	n/a
5	10830	0.11	0.65	1190	770	6%	10	90	8	2000	n/a	n/a	n/a
6	10830	0.11	0.65	1190	770	6%	12	n/a	8	1700	466	0.27	2

Notes:
Access Points from HCM Exhbit 12-4 (Default Values)
Flow Rate (Capacity) extrapolated from Exhibit 21-3
Multilane analysis in HCS not designed for free flow speeds under 45 mph. The calculations rely on concepts in the HCM & Exhibit 21-2
Primarily, the v/c ratio.

2013 Build Alternative B LOS Calculation Data

										For Multi-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Flow Rate (Capacity)	Flow Rate (Calc)	v/c	Diff. Speed
1a	18960	0.11	0.65	2090	1360	6%	4	n/a	30	1600	823	0.51	9.4
1b	25800	0.11	0.65	2840	1850	6%	4	n/a	30	1600	1120	0.7	9.4
2	19080	0.11	0.65	2100	1370	6%	4	n/a	20	1600	829	0.52	6.9
3	10430	0.11	0.65	1150	750	6%	8	n/a	20	1900	454	0.24	6.9
4	10260	0.11	0.65	1130	730	6%	6	90	8	1900	n/a	n/a	n/a
5	10830	0.11	0.65	1190	770	6%	10	90	8	2000	n/a	n/a	n/a
6	10830	0.11	0.65	1190	770	6%	12	n/a	8	1700	466	0.27	2

Notes:
Access Points from HCM Exhbit 12-4 (Default Values)
Flow Rate (Capacity) extrapolated from Exhibit 21-3
Multilane analysis in HCS not designed for free flow speeds under 45 mph. The calculations rely on concepts in the HCM & Exhibit 21-2
Primarily, the v/c ratio.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst: JHS
Agency/Co: F&H
Date: 2/22/2011
Analysis Period: 2013
Highway: SR 126
From/To: Center to SR 93
Jurisdiction:
Analysis Year:
Project ID: Build Alternatives - Seg 1a

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	50.6	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1360	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	378		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	823	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	823	pcphpl	0	pcphpl
Free-flow speed, FFS	50.6	mph	60.0	mph
Avg. passenger-car travel speed, S	50.6	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	16.3	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2013
Highway:	SR 126
From/To:	SR 93 to Hawthorne
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 1b

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	50.6	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1850	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	514		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	1120	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1120	pcphpl	0	pcphpl
Free-flow speed, FFS	50.6	mph	60.0	mph
Avg. passenger-car travel speed, S	50.6	mph	60.0	mph
Level of service, LOS	C		A	
Density, D	22.1	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

Florence & Hutcheson
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Phone: (615) 399-9090 Fax: (615) 399-9049

OPERATIONAL ANALYSIS

Analyst: JHS
Agency/Co: F&H
Date: 2/22/2011
Analysis Period: 2013
Highway: SR 126
From/To: Hawthorne to Harbor Chapel
Jurisdiction:
Analysis Year:
Project ID: Build Alternatives - Seg 2

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	0.0	mph
Free-flow speed	53.1	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1370	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	381		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	829	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	829	pcphpl	0	pcphpl
Free-flow speed, FFS	53.1	mph	60.0	mph
Avg. passenger-car travel speed, S	53.1	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	15.6	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2013
Highway:	SR 126
From/To:	Harbor Chapel to Cooks Valley
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 3

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	0.0	mph
Free-flow speed	53.1	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	750	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	208		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	454	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	454	pcphpl	0	pcphpl
Free-flow speed, FFS	53.1	mph	60.0	mph
Avg. passenger-car travel speed, S	53.1	mph	60.0	mph
Level of service, LOS	A		A	
Density, D	8.5	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	JHS
Agency/Co.	F&H
Date Performed	2/22/2011
Analysis Time Period	2013
Highway	SR 126
From/To	Cooks Valley to Harr Town
Jurisdiction	
Analysis Year	
Description	Build Alternative Segment 4

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.90	
Lane width	11.0	ft	% Trucks and buses	6	%
Segment length	2.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 1130 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	1306	pc/h
Highest directional split proportion (note-2)	849	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.4	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	47.6	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATS	35.7	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1256	pc/h
Highest directional split proportion (note-2)	816	
Base percent time-spent-following, BPTSF	66.8	%
Adj.for directional distribution and no-passing zones, fd/np	9.5	
Percent time-spent-following, PTSF	76.3	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.41	
Peak 15-min vehicle-miles of travel, VMT15	785	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2825	veh-mi
Peak 15-min total travel time, TT15	22.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.5

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Two-Way Two-Lane Highway Segment Analysis

Analyst	JHS
Agency/Co.	F&H
Date Performed	2/22/2011
Analysis Time Period	2013
Highway	SR 126
From/To	Harr Town to Carolina Pottery
Jurisdiction	
Analysis Year	
Description	Build Alternative Segment 5

Input Data

Highway class	Class 1				
Shoulder width	10.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	6	%
Segment length	2.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 1190 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	1376	pc/h
Highest directional split proportion (note-2)	894	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	55.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	53.0	mi/h
Adjustment for no-passing zones, fnp	1.6	mi/h
Average travel speed, ATS	40.7	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1322	pc/h
Highest directional split proportion (note-2)	859	
Base percent time-spent-following, BPTSF	68.7	%
Adj.for directional distribution and no-passing zones, fd/np	8.8	
Percent time-spent-following, PTSF	77.5	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.43	
Peak 15-min vehicle-miles of travel, VMT15	826	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2975	veh-mi
Peak 15-min total travel time, TT15	20.3	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2013
Highway:	SR 126
From/To:	Carolina Pottery to I-81
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 3

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	8		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	2.0	mph	0.0	mph
Free-flow speed	58.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	770	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	214		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	466	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	466	pcphpl	0	pcphpl
Free-flow speed, FFS	58.0	mph	60.0	mph
Avg. passenger-car travel speed, S	58.0	mph	60.0	mph
Level of service, LOS	A		A	
Density, D	8.0	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

2033 Build Alternative A & B– HCS Calculation Data and Reports

Note: The HCS reports apply to both Build Alternative A & B. For each segment, the same roadway cross section and traffic volumes used is applicable to both alternatives. Only the length of the segments varied between Build Alternative A and Build Alternative B.

2033 Build Alternative A LOS Calculation Data

										For Multi-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Flow Rate (Capacity)	Flow Rate (Calc)	v/c	Diff. Speed
1a	20,860	0.11	0.65	2290	1490	6%	4	n/a	30	1600	902	0.56	9.4
1b	33,540	0.11	0.65	3690	2400	6%	4	n/a	30	1600	1453	0.91	9.5
2	24,800	0.11	0.65	2730	1770	6%	4	n/a	20	1600	1071	0.67	6.9
3	13,560	0.11	0.65	1490	970	6%	8	n/a	20	1900	587	0.31	6.9
4	20,520	0.11	0.65	2260	1470	6%	6	90	8	1900	n/a	n/a	n/a
5	21,660	0.11	0.65	2380	1550	6%	10	90	8	2000	n/a	n/a	n/a
6	21,660	0.11	0.65	2380	1550	6%	12	n/a	8	1700	938	0.55	2

Notes:
Access Points from HCM Exhbit 12-4 (Default Values)
Flow Rate (Capacity) extrapolated from Exhibit 21-3
Multilane analysis in HCS not designed for free flow speeds under 45 mph. The calculations rely on concepts in the HCM & Exhibit 21-2
Primarily, the v/c ratio.

2033 Build Alternative B LOS Calculation Data

										For Multi-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Flow Rate (Capacity)	Flow Rate (Calc)	v/c	Diff. Speed
1a	20,860	0.11	0.65	2290	1490	6%	4	n/a	30	1600	902	0.56	9.4
1b	33,540	0.11	0.65	3690	2400	6%	4	n/a	30	1600	1453	0.91	9.5
2	24,800	0.11	0.65	2730	1770	6%	4	n/a	20	1600	1071	0.67	6.9
3	13,560	0.11	0.65	1490	970	6%	8	n/a	20	1900	587	0.31	6.9
4	20,520	0.11	0.65	2260	1470	6%	6	90	8	1900	n/a	n/a	n/a
5	21,660	0.11	0.65	2380	1550	6%	10	90	8	2000	n/a	n/a	n/a
6	21,660	0.11	0.65	2380	1550	6%	12	n/a	8	1700	938	0.55	2

Notes:
Access Points from HCM Exhbit 12-4 (Default Values)
Flow Rate (Capacity) extrapolated from Exhibit 21-3
Multilane analysis in HCS not designed for free flow speeds under 45 mph. The calculations rely on concepts in the HCM & Exhibit 21-2
Primarily, the v/c ratio.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Center to SR 93
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 1a

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	50.6	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1490	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	414		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	902	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	902	pcphpl	0	pcphpl
Free-flow speed, FFS	50.6	mph	60.0	mph
Avg. passenger-car travel speed, S	50.6	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	17.8	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst: JHS
Agency/Co: F&H
Date: 2/22/2011
Analysis Period: 2033
Highway: SR 126
From/To: SR 93 to Hawthorne
Jurisdiction:
Analysis Year:
Project ID: Build Alternatives - Seg 1b

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	30		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	7.5	mph	0.0	mph
Free-flow speed	50.6	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	2400	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	667		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	1453	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1453	pcphpl	0	pcphpl
Free-flow speed, FFS	50.6	mph	60.0	mph
Avg. passenger-car travel speed, S	50.5	mph	60.0	mph
Level of service, LOS	D		A	
Density, D	28.8	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Hawthorne to Harbor Chapel
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 2

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	0.0	mph
Free-flow speed	53.1	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1770	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	492		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	1071	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1071	pcphpl	0	pcphpl
Free-flow speed, FFS	53.1	mph	60.0	mph
Avg. passenger-car travel speed, S	53.1	mph	60.0	mph
Level of service, LOS	C		A	
Density, D	20.2	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.5

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OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Harbor Chapel to Cooks Valley
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 3

FREE-FLOW SPEED

Direction	1		2	
Lane width	11.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	1.9	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	0.0	mph
Free-flow speed	53.1	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	970	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	269		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	587	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	587	pcphpl	0	pcphpl
Free-flow speed, FFS	53.1	mph	60.0	mph
Avg. passenger-car travel speed, S	53.1	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	11.1	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Two-Lane Highways Release 5.5

Florence & Hutcheson
1321 Murfreesboro Road
Suite 325
Nashville, TN 37217
Phone: (615) 399-9090 Fax: (615) 399-9049

Two-Way Two-Lane Highway Segment Analysis

Analyst	JHS
Agency/Co.	F&H
Date Performed	2/22/2011
Analysis Time Period	2033
Highway	SR 126
From/To	Cooks Valley to Harr Town
Jurisdiction	
Analysis Year	
Description	Build Alternative Segment 4

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.90	
Lane width	11.0	ft	% Trucks and buses	6	%
Segment length	2.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 2260 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	2613	pc/h
Highest directional split proportion (note-2)	1698	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	0.4	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	47.6	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATS	26.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2511	pc/h
Highest directional split proportion (note-2)	1632	
Base percent time-spent-following, BPTSF	89.0	%
Adj.for directional distribution and no-passing zones, fd/np	3.2	
Percent time-spent-following, PTSF	92.2	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.82	
Peak 15-min vehicle-miles of travel, VMT15	1569	veh-mi
Peak-hour vehicle-miles of travel, VMT60	5650	veh-mi
Peak 15-min total travel time, TT15	59.5	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.5

Florence & Hutcheson
1321 Murfreesboro Road
Suite 325
Nashville, TN 37217
Phone: (615) 399-9090 Fax: (615) 399-9049

Two-Way Two-Lane Highway Segment Analysis

Analyst	JHS
Agency/Co.	F&H
Date Performed	2/22/2011
Analysis Time Period	2033
Highway	SR 126
From/To	Harr Town to Carolina Pottery
Jurisdiction	
Analysis Year	
Description	Build Alternative Segment 5

Input Data

Highway class	Class 1				
Shoulder width	10.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	6	%
Segment length	2.5	mi	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	90	%
Grade: Length		mi	Access points/mi	8	/mi
Up/down		%			

Two-way hourly volume, V 2380 veh/h
Directional split 65 / 35 %

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.971	
Two-way flow rate,(note-1) vp	2751	pc/h
Highest directional split proportion (note-2)	1788	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	55.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.0	mi/h
Free-flow speed, FFS	53.0	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATS	30.8	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2644	pc/h
Highest directional split proportion (note-2)	1719	
Base percent time-spent-following, BPTSF	90.2	%
Adj.for directional distribution and no-passing zones, fd/np	3.1	
Percent time-spent-following, PTSF	93.3	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.86	
Peak 15-min vehicle-miles of travel, VMT15	1653	veh-mi
Peak-hour vehicle-miles of travel, VMT60	5950	veh-mi
Peak 15-min total travel time, TT15	53.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Multilane Highways Release 5.5

Florence & Hutcheson
1321 Murfreesboro Road
Suite 325
Nashville, TN 37217
Phone: (615) 399-9090 Fax: (615) 399-9049

OPERATIONAL ANALYSIS

Analyst:	JHS
Agency/Co:	F&H
Date:	2/22/2011
Analysis Period:	2033
Highway:	SR 126
From/To:	Carolina Pottery to I-81
Jurisdiction:	
Analysis Year:	
Project ID:	Build Alternatives - Seg 3

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	8		0	
Median type	Divided			
Free-flow speed:	Base		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	2.0	mph	0.0	mph
Free-flow speed	58.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	1550	vph	0	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	431		0	
Trucks and buses	6	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		1.5	
Recreational vehicles PCE, ER	2.0		1.2	
Heavy vehicle adjustment, fHV	0.917		1.000	
Flow rate, vp	938	pcphpl	0	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	938	pcphpl	0	pcphpl
Free-flow speed, FFS	58.0	mph	60.0	mph
Avg. passenger-car travel speed, S	58.0	mph	60.0	mph
Level of service, LOS	B		A	
Density, D	16.2	pc/mi/ln	0.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

SECTION A

Previous Projects
Listed below are major projects from the previous TIP

ID	Project Location	Description	Status
TN-1	Fordtown Rd	Realignment	PE and ROW completed
TN-2	I-26 Welcome Center	Welcome Center and interchange	PE and ROW underway
TN-3 PIN# 103725	Intersection of US 11W/Indian Trail Dr	Install new signal and add median work at approaches	Construction complete, awaiting final voucher
TN-4 PIN# 101552.00	Netherland Inn Bridge	Bridge replacement	Construction complete
TN-5 PIN# 105467.00	SR 126 from Center St to I-81	Reconstruction/widening improvements	Currently in PE Phase
TN-7 PIN# 105528.00	SR 126 from Center St to I-81	Safety improvements along SR 126 using Optional Safety funds	Complete
TN-8 PIN #109896.00 & 109896.01	Intersection of SR 93 and Pavilion Dr	Install new signal and geometric improvements	Construction in Summer of 2010, awaiting final voucher
TN-9	Watauga Roundabout	Construct roundabout at 5 legged intersection with local funds	Complete
TN-10	Eastman Rd/Ryder Dr	Signalization with local funds	Complete
TN-11	Gibson Mill / W Ravine Rd	Realignment and relocation project funded by local/private partnership	W Ravine Rd extension complete; Gibson Mill realignment construction underway
TN-12 PIN# 030627.00	Adjacent to Netherland Inn	Construct Historic Transportation Museum using Enhancement funds	Construction complete, awaiting final voucher
TN-13	Warriors Path State Park	Park amenities	Construction complete, awaiting final voucher
TN-14 PIN# 030629.01	Sections of the Greenbelt	Construct multi-modal pathway	Section from Sullivan St to Center St Completed, section

Table 26: Recommended Street and Highway Improvement Projects

Project No.	Jurisdiction	Project Name (not prioritized)	Location (To and From)	Functional Classification	Project Purpose	Type Project	General Improvements	Additional Information	Estimated Cost
MNA-12	Hawkins County	Hammond Avenue (Mt. Carmel)	Main Street to Valley Crest	Minor Arterial	Congestion Relief Access/Travel Time	Major Reconstruction	Reconstruct railroad overpass near Main Street, reconstruct to 3 lanes with wide shoulder	Center turn lane through railroad overpass to Valley Crest	$4,001,865
MNA-13	Sullivan County	Hemlock Road	SR 36 (Fort Henry Dr.) to Warriors Park	Minor Arterial	Safety and Related Economic Development	Minor Reconstruction	Widen shoulders and add bike lanes- selected locations	To serve Warriors Path State Park, at Fort Henry Dr. extend left turn lane, correct geometry at selected locations	$343,017
MNA-14	Hawkins County	Independence Avenue (Mount Carmel)	Intersections with Walnut, Tranbarger and Redwood	Minor Arterial	Safety and Related	Minor Reconstruction	Add left turn lanes at designated intersections	Widen shoulders at selected locations	$171,508
MNA-15	Kingsport	Industry Drive	Lincoln Street to Cherokee Street	Minor Arterial	Access/Travel Time	Minor Reconstruction	Improve transitions to Lincoln Street	Coordinate connections to Cherokee Street	$571,695
MNA-16	Sullivan County	Lebanon Road	Intersection of SR 36 (Fort Henry Dr.)	Minor Arterial	Congestion Relief	Minor Reconstruction	Extend left turn lane	Left turn lane length determined by queuing study	$114,339
MNA-17	Hawkins County	Main Street (Church Hill)	North Goshen Valley Road	Minor Arterial	Access/Travel Time Safety and Related	Major Reconstruction	Reconstruct railroad overpass	Replace antiquated railroad structure	$2,286,780
MNA-18	Hawkins County	Main Street (Mount Carmel)	Intersections with Laurel, Independence, Hammond, Englewood, Dover, Belmont	Minor Arterial	Safety and Related Congestion Relief	Intersection Improvements	Restrict turning movements with islands and pavement markings	Coordinate a traffic flow from U.S. 11W	$85,754
MNA-19	Sullivan County	McKellar Drive/State Route 75	State Route 36 to State Route 357	Minor Arterial	Congestion Relief Economic Development	Major Reconstruction	Reconstruct to 4 lanes with separated median	In current TDOT planning process	$28,584,749
MNA-20a	Kingsport Sullivan County	Memorial Blvd./State Route 126	Center Street to Cook's Valley Road	Minor Arterial	Safety and Related Congestion Relief	Major Reconstruction	Reconstruct to 4 lanes with grass median	Apply context sensitive solutions concepts	$22,867,800

Table 26: Recommended Street and Highway Improvement Projects

Project No.	Jurisdiction	Project Name (not prioritized)	Location (To and From)	Functional Classification	Project Purpose	Type Project	General Improvements	Additional Information	Estimated Cost
MNA-20b	Kingsport Sullivan County	Memorial Blvd./State Route 126	Cooks Valley Road to I-81	Minor Arterial	Safety and Related Congestion Relief	Major Reconstruction	Reconstruct to 3 lanes and wide shoulder/clear zones, soften curbs	3 lanes/2 lanes/widen shoulders	$17,150,850
MNA-21	Kingsport	Moreland Drive	SR 93 (John B. Dennis Highway) and Jarrod Drive	Minor Arterial	Safety and Related	Minor Reconstruction	Improve and reconstruct approaches to John B. Dennis	Interchange improvements previously completed on ramps	$343,017
MNA-22	Kingsport	Netherland Inn Road	SR 36 (Center St.) to Ridgefields Road	Minor Arterial	Congestion Relief Economic Development	Major Reconstruction	Reconstruct to install 3rd/center turning lane	Coordinate with proposed roundabout	$1,143,390
MNA-23	Sullivan County	Orebank Road	Intersections with Woodbridge and Chestnut Ridge	Minor Arterial	Safety and Related	Minor Reconstruction	Add turning lanes to selected intersections	Widen shoulders at specified locations	$114,339
MNA-24	Kingsport	Ravine Road	Holston Valley Drive to Cassell Drive	Minor Arterial	Access/Travel Time	Major Reconstruction	Reconstruct transition area to new Stone Drive / Hospital Connector	Part of redevelopment corridors proposal for improved access to Holston Valley Drive	$343,017
MNA-25	Kingsport	Reservoir Road (Meadowview Parkway)	I-26 to Saratoga Rd	Minor Arterial	Economic Development	Major Reconstruction	Reconstruct to 3 lanes	Includes center turning lane and widened shoulders	$343,017
MNA-26a	Kingsport	Riverport Road	Holston River Sluice bridge to SR 126 (Wilcox Drive)	Minor Arterial	Safety and Related	Minor Reconstruction	Widen shoulders and clear zones	Include bike lane (part of bikeway system)	$571,695
MNA-26b	Kingsport	Riverport Road	Ridgefields Road to Holston River Sluice Bridge	Minor Arterial	Safety and Related	Major Reconstruction	Reconstruct to 3 lanes (center turning lane)	Coordinate with potential bikeway route	$571,695
MNA-27	Kingsport Sullivan County	Rock Springs Road / State Route 347	SR 36 (Ft Henry) to Moreland Dr I-26 to Snapps Ferry Road	Minor Arterial	Safety and Related Congestion Relief Access / Travel Time	Major Reconstruction	Widen Shoulders and improve clear zones Widen to 3 lanes and widen shoulders	Potential Phase I of further improvements to corridor leading to Exit 56 of I-81	$3,430,170
MNA-28	Kingsport	Sullivan Street, West	Charlemont to SR 36 (Lynn Garden Drive)	Minor Arterial	Congestion Relief Economic Development	Major Reconstruction	Reconstruct to 3 lanes (continuous turning lane)	Consider adding separated bike lane	$2,286,780

HISTORICAL LAND USE MAPS OF SULLIVAN COUNTY; 1953, 1976, AND 2006

Note: The initial map is a “reference mosaic” of the entire project area. SR 126 is outlined in red.

Six panels that include the project area are represented for the years 1953, 1976, and 2006 to provide a visual reference of land density changes in the project area.

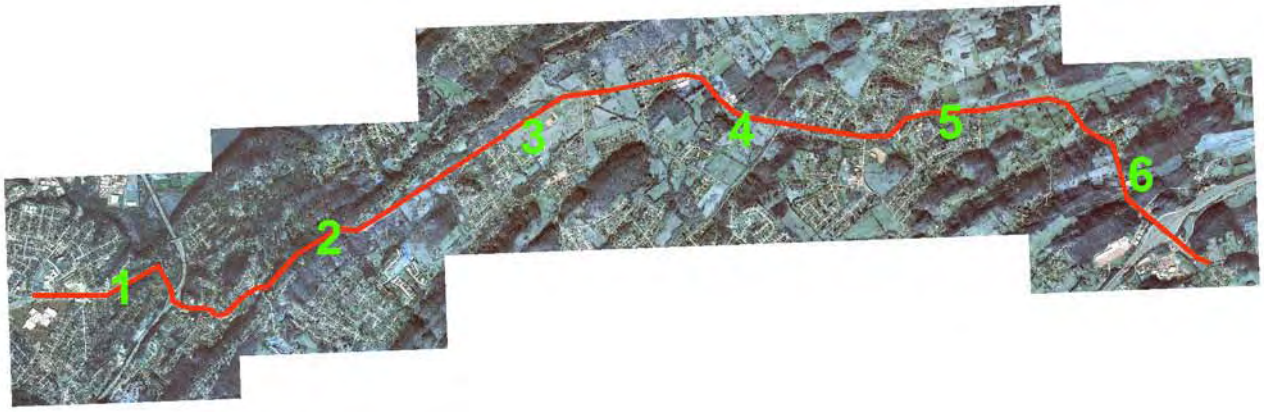
These maps have been placed in historic sequence by the six panels from E. Center St. to the area at Interstate 81. This allows the reader to view changes within the immediate area.

Environmental FirstSearch

Historical Aerial

2006 - Reference Mosaic

SR 126 , KINGSPORT TN 37664



Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - Reference Mosaic

Approximate Scale: 1 inch equals 6,667 feet

Legend

Target Area

1-6 Index Numbers

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Environmental FirstSearch

Historical Aerial

1953 - 1

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1953 - 1

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

1976 - 1

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1976 - 1

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

2006 - 1

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - 1

Approximate Scale: 1 inch equals 1,108 feet

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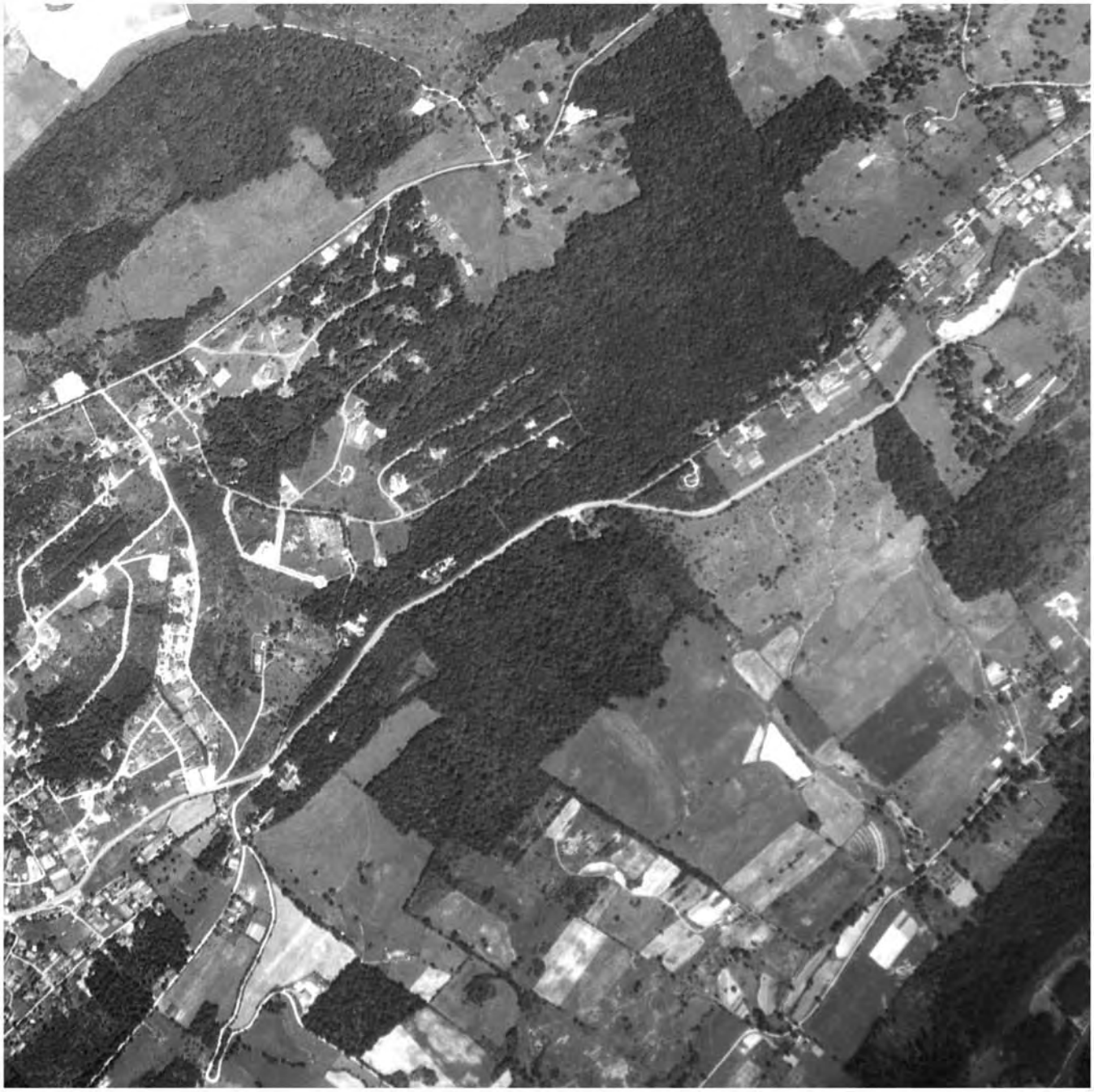
Environmental FirstSearch

Historical Aerial

1953 - 2

SR 126 , KINGSPORT TN 37664



Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1953 - 2

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

1976 - 2

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1976 - 2

Approximate Scale: 1 inch equals 1,125 feet

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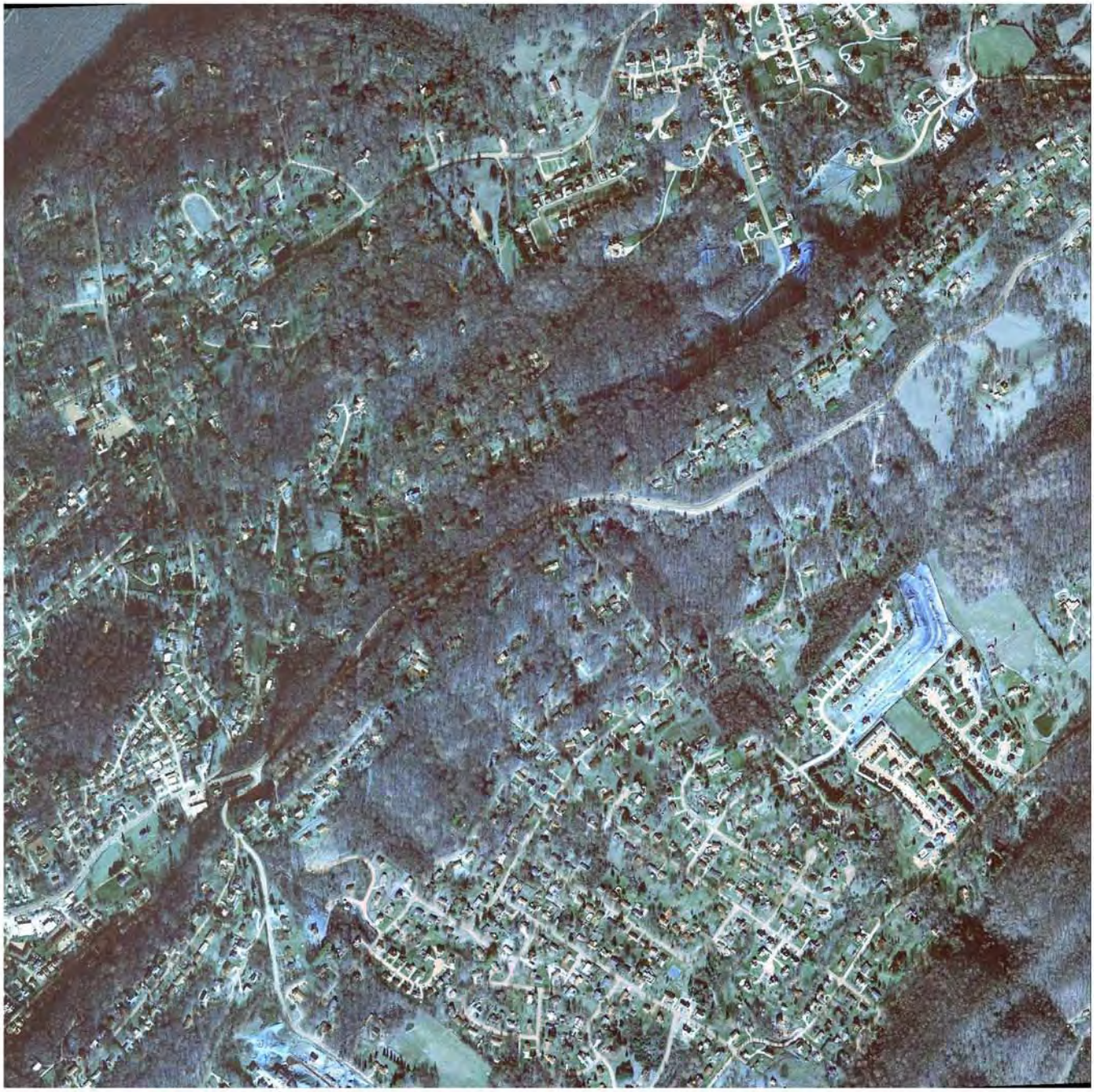
Historical Aerial

2006 - 2

SR 126 , KINGSPORT TN 37664



Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - 2

Approximate Scale: 1 inch equals 1,108 feet

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Historical Aerial

1953 - 3

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1953 - 3

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

1976 - 3

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1976 - 3

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

2006 - 3

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - 3

Approximate Scale: 1 inch equals 1,108 feet

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Historical Aerial

1953 - 4

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1953 - 4

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

1976 - 4

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1976 - 4

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

2006 - 4

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - 4

Approximate Scale: 1 inch equals 1,108 feet

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Historical Aerial

1953 - 5

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1953 - 5

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

1976 - 5

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1976 - 5

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

2006 - 5

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - 5

Approximate Scale: 1 inch equals 1,108 feet

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Historical Aerial

1953 - 6

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1953 - 6

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

1976 - 6

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 1976 - 6

Approximate Scale: 1 inch equals 1,125 feet

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Historical Aerial

2006 - 6

SR 126 , KINGSPORT TN 37664

Source:
Target Site (Latitude: 36.539471 Longitude: -82.454432)
Quad Name: Indian Springs
Date: 2006 - 6

Approximate Scale: 1 inch equals 1,108 feet

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY DIVISION
SUITE 600, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0337

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

CONCEPTUAL STAGE RELOCATION PLAN

Sullivan Co.
Project No. 82085-1225-14; STP-126(10)
PIN NO. 105467.00

State Route 126 from East Center Street to I-81

GENERAL AREA AND PROJECT INFORMATION

The Tennessee Department of Transportation is proposing to improve State Route 126 from East Center Street in Kingsport to Interstate 81. The project proposes to improve the existing two (2) lane roadway which currently suffers from substandard geometry and sight distance issues.

Sullivan County is located in northeast Tennessee and has a population of 153,048 (2000 census data). Kingsport, where the project begins, has a population of 44,905 (2000 census data).

DISPLACEMENTS

RELOCATIONS	A	B
SINGLE-FAMILY UNITS	102	90
MULTI-FAMILY UNITS	135	69
MOBILE HOMES	4	3
BUSINESSES	43	30
NON PROFIT	1	1

DISPLACEMENT EFFECTS AND ANALYSIS

RESIDENTIAL:

This project is expected to cause either one hundred and sixty two (162) or two hundred forty one (241) residential displacements depending on the alternate chosen. The displacements are as follows:

Alternate A is expected to cause two hundred forty one (241) residential displacements consisting of one hundred two (102) single family residences, one hundred thirty five (135) units in multi-family housing, and four (4) mobile homes. A majority of the single family residences and mobile homes are believed to be owner occupied. All multi-family units are believed to be tenant occupied.

Alternate B is expected to cause one hundred sixty two (162) residential displacements consisting of ninety (90) single family residences, sixty nine (69) units in multi-family housing, and three (3) mobile homes. A majority of the single family residences and mobile homes are believed to be owner occupied. All multi-family units are believed to be tenant occupied.

A study of the real estate market in the project area indicates a market not capable of supporting the one hundred and sixty two (162) to two hundred forty one (241) residential displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number or relocations, but not easily. It will be difficult to adequately address the varying needs of all those displaced by this project. Numerous, substantial last resort housing payments could be expected.

BUSINESS:

This project is expected to cause either forty three (43) or thirty (30) non-residential displacements depending on the alternate chosen. The displacements are as follows:

Alternate A is expected to cause forty three (43) non-residential displacements.

Alternate B is expected to cause thirty (30) non-residential displacements.

The displaced businesses represent a variety of service and retail operations, including service stations, a lawn & garden center, restaurants, a health/fitness club, a dry cleaner, and retail sales. The above counts also include numerous apartment buildings that will likely be categorized as displaced businesses, as well as, a few vacant buildings that could be occupied prior to offers being made. All displaced businesses are believed to employ fifteen (15) or fewer.

A study of the real estate market in the project area reveals that it is unlikely that such a large number of business displacees can relocate in the immediate project area. Successful relocation will require many of the businesses to expand their search area beyond the immediate project area.

NON-PROFIT:

This project is expected to cause one (1) non-profit displacement on either alternate, Kingsport Fire Department, Station #3. The station employs fewer than ten (10) with three (3) per shift. Some difficulty is anticipated in relocating this station. Due to the nature of their "business", they will need to relocate in close proximity to their current location. Based on a study of the local real estate market, it believed that suitable replacement sites do exist but not in great numbers. This is complicated by the large number of businesses displaced by the project.

FARM:

This project is not expected to cause any farm displacements.

ASSURANCES

The Tennessee Department of Transportation will make relocation assistance available to all eligible persons impacted by this project, including residences, businesses, farm operations, non-profit organizations, and those requiring special services or assistance. The Regional Relocation Staff will administer the relocation program under the rules, policies, and procedures set forth in the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Uniform Relocation Assistance Act of 1972, implementing federal regulations, TCA 13-11-101 through 119, The State of Tennessee Relocation Assistance Brochure and Chapter Nine of the State of Tennessee, Department of Transportation, Right-of-Way Manual. TDOT's relocation program is practical and will allow for the efficient relocation of all eligible displaced persons in accordance with State and Federal guidelines.

Prepared By:

Gale Wagner – Transportation Manager 1 Date: 4/8/10

Approved By:

Joe Shaw – Transportation Manager 2 Date: 4/8/10

STATE OF TENNESSEE
TENNESSEE DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING SECTION
6601 CENTENNIAL BOULEVARD
NASHVILLE, TENNESSEE 37243-0360

June 29, 2009

Mr. Thomas Love, Trans. Mgr. 1
Environmental Planning Office
9th Floor - James K. Polk Building
505 Deaderick Street
Nashville, TN 37243

RE: Project No. 82085-1225-14
PIN No. 105467.00
Preliminary Site Location Study State Route 126 (Memorial Boulevard) Improvements from East Center Street to I-81
Sullivan County

Dear Mr. Love:

Enclosed is the Geotechnical Report on the above project.

If additional information is needed, please advise.

Sincerely,

M. Leonard Oliver, P.E.
Civil Engineering Manager 2

MLO:CJW
Enclosure

GES File No. 8212608

GEOTECHNICAL ENGINEERING

DIVISION OF MATERIALS AND TESTS

TDOT

GEOLOGIC REPORT

PRELIMINARY SITE LOCATION STUDY
STATE ROUTE 126 (MEMORIAL BOULEVARD)
IMPROVEMENTS
FROM EAST CENTER STREET TO I-81
STATE PROJECT NO. 82085-1225-14
PIN NO. 105467.00
SULLIVAN COUNTY

N

FILE NO 8212608

PRELIMINARY GEOLOGIC REPORT
SR 126 (MEMORIAL BOULEVARD)
FROM EAST CENTER STREET TO I-81
SULLIVAN COUNTY

PROJECT NO. 82085-1225-14
GES FILE NO. 8212608
PIN 105467.00

EXECUTIVE SUMMARY

A Preliminary Geologic Report has been prepared to address the proposed State Route 126 Memorial Boulevard improvement project in Sullivan County. The improvements will affect the boulevard, which connects East Center Street with Interstate 81. Limited field inspections of the Boulevard Route were conducted by driving reconnaissance in April and May 2009. Functional plans and various maps were also referenced during the desktop phase of the study.

Topography varies considerably throughout the project site, ranging from nearly level to steeply rolling terrain, and will require the implementation of cut slopes and fill embankments where appropriate in order to construct the proposed roadway. The cuts and fills will require specific consideration upon selection of the final alignment. They are assumed to be generally minor to moderate in height and thickness, respectively, although more substantial and possibly considerable cuts are expected in the steepest terrain.

Based on the results of the preliminary geologic study, pyritic material is not expected to be encountered on the proposed project. There do not appear to be any significant geotechnical issues that can not be addressed during the design or construction phases of the proposed project.

PRELIMINARY GEOLOGIC REPORT
SR 126 (MEMORIAL BOULEVARD)
FROM EAST CENTER STREET TO I-81
SULLIVAN COUNTY

PROJECT NO. 82085-1225-14
GES FILE NO. 8212608
PIN 105467.00

INTRODUCTION AND BACKGROUND

Pursuant to a request received by the Geotechnical Engineering Section from the Environmental Planning Office, the Preliminary Geologic Report presented herein has been prepared to address the proposed State Route 126 Memorial Boulevard improvement project. Limited field inspections of the proposed roadway improvement were conducted by driving reconnaissance in April and May 2009. Functional plans and geologic and topographic maps were utilized as sources of information. The existing route of SR 126 appears to follow that of old US 11W. A figure illustrating the improvement route is provided as an attachment.

Topography varies considerably throughout the project site, ranging from nearly level to hilly terrain, and will require the implementation of cut slopes and fill embankments where appropriate in order to construct the proposed improvements. The cuts and fills will require specific consideration upon selection of the final alignment. They are assumed to be generally minor to moderate in height and thickness, respectively, although more substantial and possibly considerable cuts are expected in the steepest terrain.

Numerous roadways and entrances intersect the proposed roadway improvement, and the roadway crosses several minor streams. A figure illustrating the proposed route of improvement, as provided to our office, is included as an attachment.

GEOLOGY AND SITE CONDITIONS

The proposed project site is located within the varied topography of the Valley and Ridge Physiographic Province, in the northwestern portion of Sullivan County. The regional topography is dominated by alternating linear valleys and ridges that trend generally northeast to southwest. Topography along the project area ranges from relatively flat to rolling to hilly terrain, and from nearly level to steep slopes. Varying degrees of residential and commercial development are present throughout the project.

Geologic data were derived from the site investigation and from review of available geologic maps. Geologic mapping indicates that the proposed project vicinity geology is relatively complex and varies across the project. The site vicinity is generally underlain by variable limestone, dolostone, and calcareous shale to clastic shale bedrock units of three primary geologic formations: Knox Group, Honaker Dolomite, and Conasauga Group, respectively. The geologic structure is largely controlled by gently to steeply dipping thrust faults that trend similarly to the valleys and ridges, and which result in the repetition of the aforementioned geologic formations at the ground surface.

Although karst topography is present within the project area, very few sinkholes have been mapped in the greater project region, with no significant sinkholes (if any) being indicated within the project limits. However, the underlying geologic formations, particularly the Knox Group and Honaker Dolomite, are susceptible to sinkhole development due to their carbonate (limestone and dolostone) composition, and sinkhole development or discovery of incipient sinkholes could occur at any time.

Based on observations made during the driving reconnaissance and from review of geologic mapping, pyritic material is not expected to be encountered on the proposed project.

Residual soils developed from weathering of the underlying geologic parent materials range in thickness from a thin mantle cover to a relatively thick layer of several feet or more. The typical residual soil, especially within the Knox Group and Honaker Dolomite formations, appears generally to be silty clay with variable amounts of chert and carbonate rock fragments. The residual soil derived from the Conasauga Group in the project region appears to contain much greater amounts of weathered shale fragments than the other formations, resulting in generally clayey silt soils.

A possible old borrow area was observed just west of Holiday Hills Road, adjacent to the westbound traffic lane. The surrounding ground and backslope appeared stable, with no curvature being noted in the large diameter trees at the top of the slope. No geotechnical concerns were noted with regard to this limited area.

Vegetation along the alignment ranges from grass cover to densely wooded areas. Several small streams are located along the alignment, with generally shallow to moderately steep banks and ranging from lightly to moderately vegetated to rock covered banks.

Based on observations made during the driving reconnaissance and from review of topographic mapping, it is anticipated that the majority of roadway improvements will require shifting into existing hillslopes, resulting in a greater number of constructed cut slopes than embankment fills. The greatest cuts are expected in areas with steeper terrain (for example, Sougan Hollow vicinity and the southern flank of Chestnut Ridge). Moderate to steep cuts may be encountered throughout the project, with less steep cuts being anticipated in areas of more gentle topography. Minor to moderate fills are also to be expected throughout the project, with deeper fill embankments being necessary along creek bottoms or in areas where the roadway is not shifted into the hillslopes.

Selected photographs conveying typical existing slope and soil conditions are provided in an attachment to this report.

RECOMMENDATIONS

The topography encountered along the alignment is varied, and a range of minor to possibly considerable cuts and fills are anticipated. A subsurface investigation program with auger drilling and potential core drilling should be conducted once the project is finalized.

Although no specific areas of unstable ground were observed, there is always the potential for slope stability problems to exist throughout the project, both within soil and within rock. Detailed evaluation of the actual slope conditions, particularly within cut slopes in steep or rocky terrain, will be necessary prior to determination of actual stability analyses and slope geometry. However, it appears that any slope stability problems, should they exist, may be addressed either during the design phase or the construction phase of the finalized project. Cut slopes in soil and rock that are anticipated to be higher than about 30 feet should be considered as candidate slopes for benching.

As mentioned, karst topography is present within the project area. However, very few sinkholes have been mapped in the greater project region, with no significant sinkholes (if any) being indicated within the project limits. The underlying geologic formations are susceptible to sinkhole development due to their composition, and sinkhole development or discovery of incipient sinkholes could occur during construction activities or at any other time.

Several small streams were observed throughout the alignment and will require consideration during the design and construction phases of the project. The impact from the streams will be greatest in areas of embankment fill along low-lying areas.

If further information is needed regarding the soil and geologic conditions along the roadway alignment, please contact the Region I Geotechnical Engineering Office.

George E. Sutton, Jr., PG
Geologist 3

Harry Moore, PG
Transportation Manager 1

M. Leonard Oliver, PE
Civil Engineering Manager 2

GS:kw
June 3, 2009
Attachment

ATTACHMENT

FIGURES

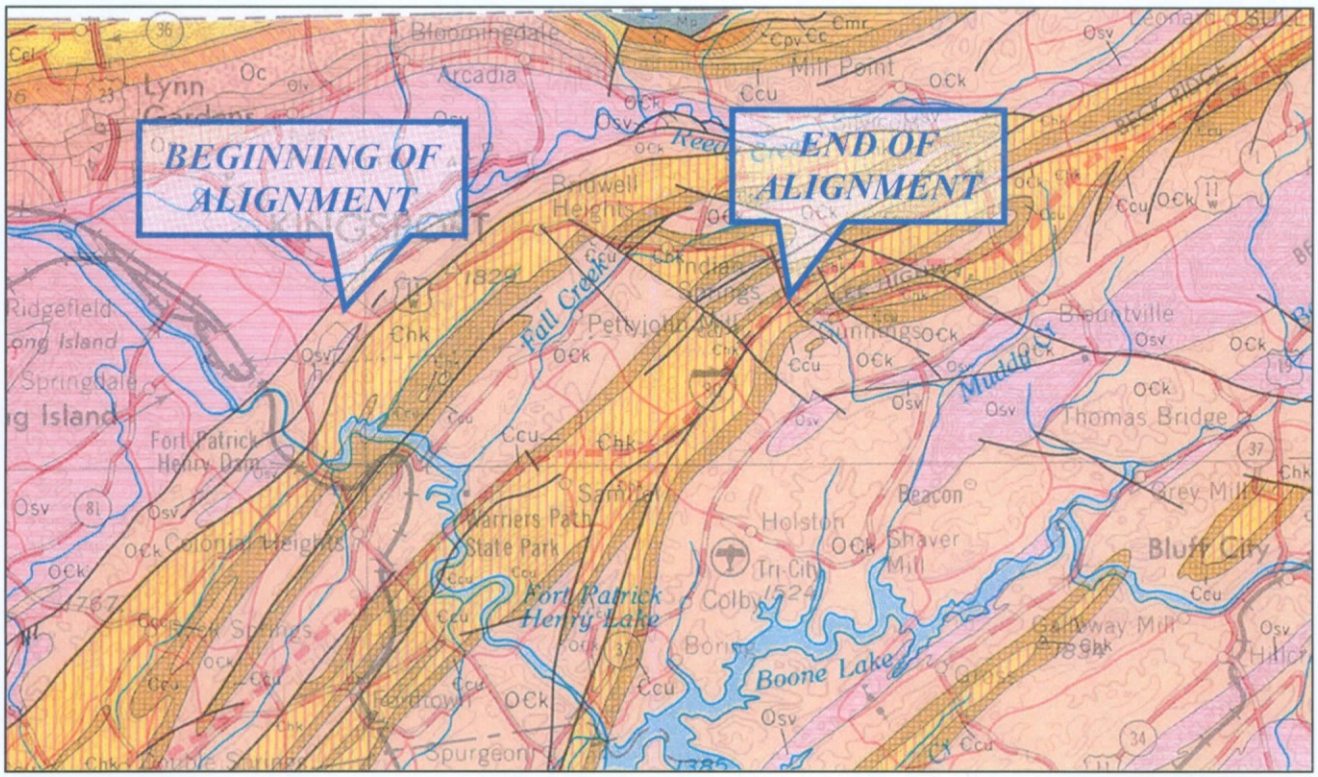

Figure 2: Geology Overview of the greater Project vicinity.

FIGURES

Figure 3: Viewing westbound from I-81.

Figure 4: Weathered cut slope at I-81.

FIGURES

Figure 5: Close-up of weathered cut slope material.

Figure 6: Close-up of weathered cut slope material.

FIGURES

Figure 7: Cut slope near beginning of project.

Figure 8: Typical topography with cut and fill areas.

FIGURES

Figure 9: Typical cut slope.

Figure 10: Typical sidehill cut section.

Aquatic and Terrestrial Ecology Technical Report

State Route 126

Memorial Boulevard from Center Street to I-81

Kingsport, TN

December 2008

Prepared for: TDOT Go.

Prepared by: HMB PROFESSIONAL ENGINEERS, INC

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- **Exhibit 1-** Stream Crossings displayed on a Topographic Map
- **Exhibit 2-** Stream Crossings displayed on Aerial Photographs

1.0 Purpose and Need

The purpose and need of the proposed action to Memorial Blvd. (SR 126) seeks to improve road safety, provide better access to existing businesses, offer areas for safe non-motorized travel, and facilitate growth.

The improvements to Memorial Boulevard (SR 126) will include two-lane and four-lane segments as noted in Figure 1.0. The project distance is approximately 8.8 miles. The Tennessee Department of Transportation (TDOT) is administering the project. The Federal Highways Administration (FHWA) is designated as the lead federal agency.

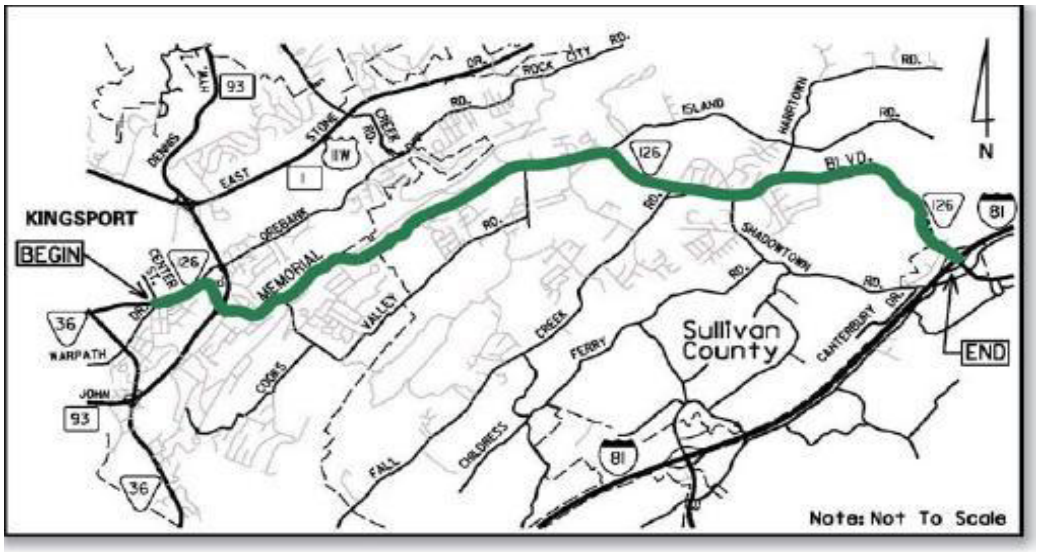


Figure 1.0 – State Route 126 (Memorial Boulevard) Project Corridor

1.1 Existing Facility

The Memorial Boulevard is an urban minor arterial roadway linking downtown Kingsport, TN with residential communities to the east including Hillcrest, Cooks Valley, Bridwell Heights, Indian Springs and Gunnings. On the western edge of the project area, Memorial Blvd. is a 4 lane undivided roadway (without turn lanes) for a half-mile between Center St to a point just west of John B. Dennis Highway (SR 93) It briefly widens to a 4-lane divided road for a quarter mile where it passes through two signalized intersections at the ramp of SR 93. It then changes to 3-lanes with an outbound climbing lane (for slow moving trucks ascending the hill). After passing over Chestnut Ridge, and leaving the city limits, it narrows back to a 2-lane facility for a distance of 5 and three-quarter miles. It then widens again to a 4 lane divided facility for less than a fifth-mile at its intersection with I-81 (the eastern terminus of the project area) in order to provide access to the interstate and interstate related commercial establishments. Although two-thirds of the route is currently in the County, it has been identified as an urban route because it lies within the Kingsport Urban Growth Boundary.

The terrain within the project area is typical of the ridge and valley system that is common throughout East Tennessee. Kingsport is located in a basin framed by Bays

Mountain (2,400 ft) and Chestnut Ridge (1,940 ft). Most of the project area is located in the "heights" above the city, 110-375 ft higher than downtown.

2.0 Environmental Setting

These sections present the physical and environmental characteristics of the project area in reference to topography, geology, agricultural soil associations, and hydrogeology. This data has been collected from available literature and observations made during field investigations.

2.1 Topography, Soils, and Geology

Through coordination with the USDA (National Resources Conservation Service) soil survey data for Sullivan County, Tennessee was obtained and utilized to assess the soils in the area. The project area is situated in East Tennessee within the Ridge and Valley physiographic region. The area is comprised of Ordovician and Ordovician-Cambrian age limestone, dolomite, shale, chert, siltstone, sandstone and clay.

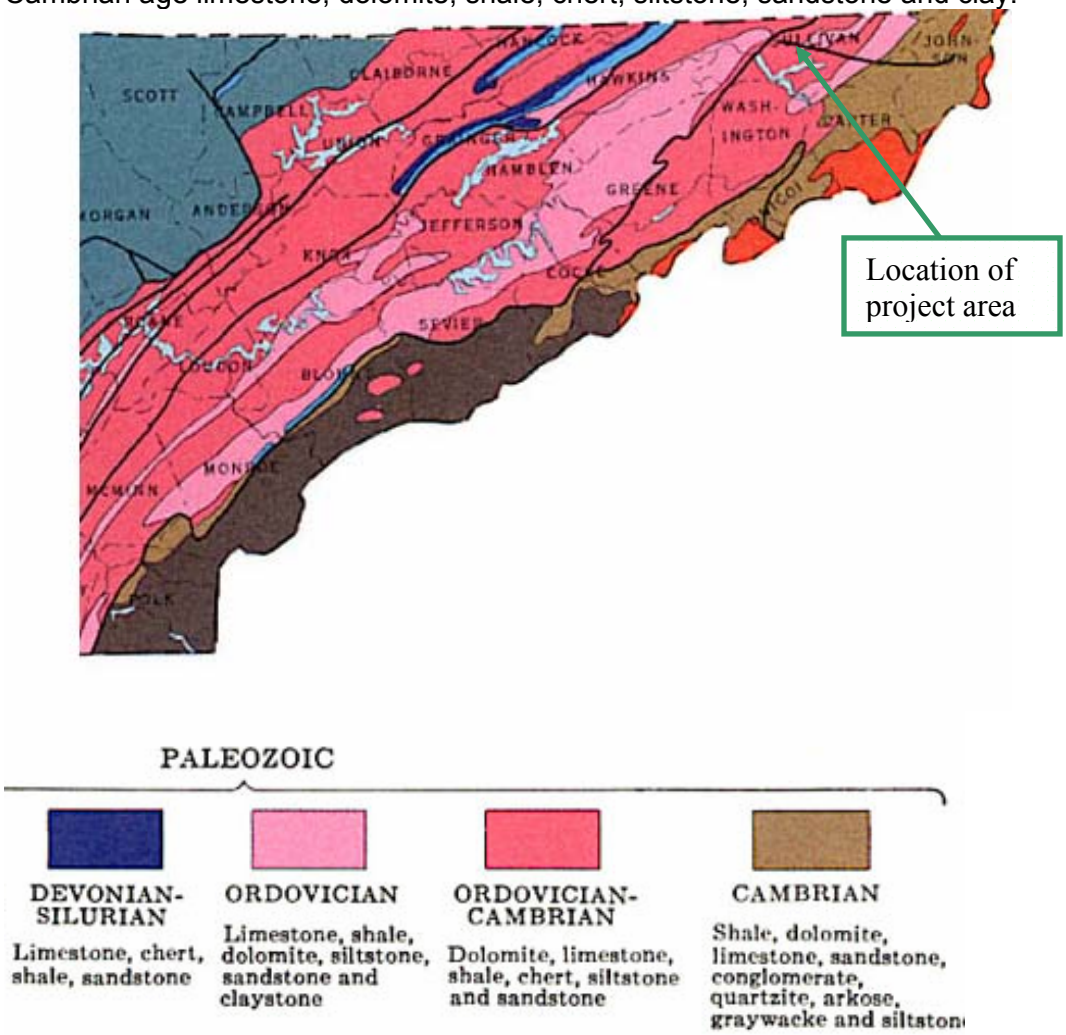


Figure 2.0 - Generalized Geologic Map of East Tennessee

Sullivan County is located in the northeastern portion of Tennessee. It is bordered on the north by Virginia, the south by Washington and Carter Counties, on the west by Hawkins County and on the east by Carter and Johnson Counties. Sullivan County is divided from east to west by the Holston River and the South Holston, Boone, and Fort Patrick Henry Reservoirs. The county is in two major land resource areas, the Southern Appalachian Ridges and Valleys and the Blue Ridge.

The project is located in west and central Sullivan County between the eastern limits of Kingsport and Interstate 81. This area of Sullivan County features rolling upland topography. Soils in the region include the Holston-Bellamy, Talbott-Bradyville, Collegedale-Etowah, and the Montevallo-Collegedale associations. Following are descriptions of the soil associations located within the project area.

Holston Bellamy
This soils association features moderately steep, well drained and moderately well drained areas that have loamy subsoil. The soils are located on high and low terraces in the Southern Appalachian Ridges and Valleys area. The slope and hazard of erosion are the major management concerns. Slopes range from 2 to 20 percent.

Talbott-Bradyville
This soils association feature moderately steep and steep, well drained soils that have clayey subsoil. They are intermingled with outcrops of limestone bedrock, and are located on limestone hills and uplands in the Southern Appalachian Ridges and Valleys area. The hazard of erosion, and the rock outcrops are the major management concerns. Slopes range from 12 to 35 percent and are typically smooth and convex.

Collegedale-Etowah
This soils association features moderately sloping to steep, well drained soils that have clayey and lumpy subsoil. They are situated on uplands and high terraces in the Southern Appalachian Ridges and Valleys area of Tennessee. Most of this association has been cleared and is used for pasture or hay land. Some row crops, such as corn, are evident. The slope and hazard of erosion are major management concerns in this association. Slopes range from 5 to 35 percent.

Montevallo-Collegedale
This soils association features moderately steep to extremely steep and well drained soils that have loamy, clayey subsoil. They are located on shale ridges and the adjacent limestone uplands in the Southern Appalachian Ridges and Valleys area. A few areas on the lower side slopes have been cleared and are used as pasture land. Much of the area of land within this association is wooded. The slope, the depth to bedrock, and the hazard of erosion are major management concerns. Slopes range from 12 to 80 percent.

2.2 Land Use

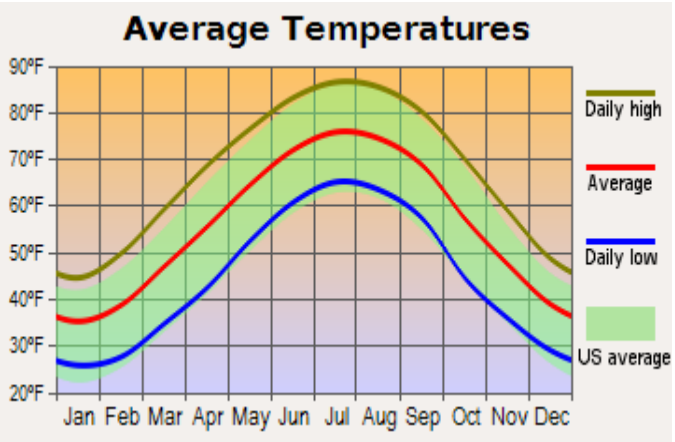
Land use in the east end of Sullivan County is transitioning from agricultural and scattered residential to higher density single and multi-family residential uses. Several areas feature low-density, suburban style family residences, an elementary school, churches and neighborhood retail uses.

The western portion of the project is located in an urban area that is heavily developed. The initial section from Center Street to the area just east of the John B. Dennis Highway near Stratford Road, is a blend of residential and commercial land use. From Stratford Road, residential development is located on both sides of SR 126 with scattered farmland until the Indian Hills area near Fall Creek. From Indian Hills to Overhill Drive, scattered residential land use exists with occasional commercial land uses. The area between Overhill Drive and the intersection of SR 126 with I-81 is a mix of commercial and residential land use. As the project moves east, and away from Kingsport, farm areas and the sizes of farms increase. The steeper slopes along the corridor are dominated by woodlands and farmland in the valleys. A shopping center and high school are located at the intersection of I-81. There are numerous churches and historic sites along the corridor.

Over the last 50 years Kingsport has experienced growth indicative of many rural communities in East Tennessee. Some land has been converted to residential, some to agriculture and some has been left to revert back to open-land and forest. A series of aerial photographs from 1953, 1976 and 2006 are in Appendix—3, and they provide an accurate depiction of the land use changes that have occurred over the last five decades.

2.3 Climate

Kingsport, TN climate is warm during summer when temperatures tend to be in the 70's and very cold during winter when temperatures tend to be in the 30's. The warmest month of the year is July with an average maximum temperature of 86.90 degrees Fahrenheit, while the coldest month of the year is January with an average minimum temperature of 26.20 degrees Fahrenheit. Temperature variations between night and day tend to be moderate during summer with a difference that can reach 22 degrees Fahrenheit, and moderate during winter with an average difference of 20 degrees Fahrenheit. The annual average precipitation at Kingsport is 44.44 inches. Rainfall in East Tennessee is fairly evenly distributed throughout the year. The wettest month of the year is July with an average rainfall of 4.64 inches.



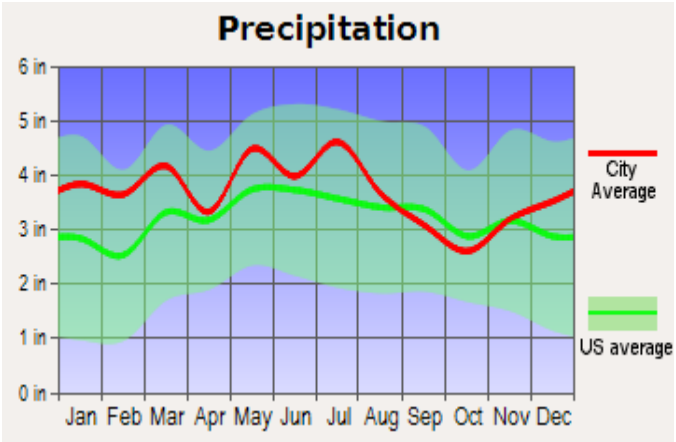


Fig 3.0- Average Temperature and Average Precipitation for Kingsport, TN

2.4 Watershed

The Holston River Watershed is located in East Tennessee and includes parts of Grainger, Hamblen, Hawkins, Jefferson, Knox, Sevier, Sullivan, and Union Counties (Figure 4.0).

Figure 4.0- General Location of the Holston River Watershed

The Holston River Watershed, designated 06010104 by the USGS, is approximately 999 square miles and drains to the Tennessee River. There are 16 dams inventoried by TDEC Division of Water Supply in the Holston River Watershed. As part of the Tennessee River drainage basin, the watershed includes 1,175.6 stream miles and 6,499 lake acres. Two designated state natural areas, two state parks, and three wildlife management areas are located in the watershed. Fifty-six rare plant and animal species have been documented in the watershed, including eight rare fish species, eleven rare mussel species, and one rare snail species. A portion of one stream in the Holston River Watershed is listed in the National Rivers Inventory as having one or more outstanding natural or cultural values. The three major forks of the Holston (its North, Middle, and South Forks) rise in southwestern Virginia and have their confluence near Kingsport, TN. From there the river flows roughly southwestward until it reaches its confluence with the French Broad River just east of downtown Knoxville, TN. This confluence is considered to be the headwaters of the Tennessee River.

2.5 Floral Community

The two main types of forests that exist in the project area are mixed mesophytic and upper hardwood. The mixed mesophytic habitat is found in the more sheltered ravines of the lower elevations and is dominated by woody species of White Basswood (*Tilia heterophylla*), American Beech (*Fagus grandifolia*), Yellow Buckeye (*Aesculus octandra*), Sugar Maple (*Acer saccharum*), Red Oak (*Quercus rubra*), Fraser Magnolia (*Magnolia fraseri*), conifers such as White Pine (*Pinus strobus*) and Eastern Hemlock (*Tsuga canadensis*), and White Ash (*Fraxinus americana*). The under-story vegetation includes successional species such as Flowering Dogwood (*Cornus florida*), Eastern Redbud (*Cercis canadensis*), Eastern Red Cedar (*Juniperus virginiana*) and Sassafras (*Sassafras albidum*). Rhododendron (*Rhododendron maximum*) and Mountain Laurel (*Kalmia latifolia*) dominate the slopes and stream sides. The upper hardwood habitat is found mainly at the higher elevations. The tree species are often stunted or broken due to exposure to strong winds. Species include Red Oak, American Beech (*Fagus grandifolia*), Sugar Maple (*Acer saccharum*), American Elm (*Ulmus americana*), and Virginia Pine (*Pinus virginiana*).

Some open land does exist in the project area. Areas such as cemeteries, abandoned farmland, hay fields, utility right-of-ways, etc. exhibit early-successional, grass-shrub habitat with the dominant plants being cool-season grasses (fescue, timothy, and orchard grass), a vast assortment of forbs, and shrubs such as blackberry and honeysuckle.

3.0 Alternatives

The Memorial Boulevard project was guided by a Community Resource Team (CRT) in the early planning and study process. The CRT conducted several meetings throughout a 21-month process. Through this early public involvement process, the CRT identified a number of common-ground recommendations for the project and majority decisions were made concerning the design elements and roadway cross sections. At each public involvement session, public opinion was surveyed. The results of the survey were reviewed, discussed and incorporated into the CRT's decision making process.

The preferred alternative includes several lane configurations through the project corridor. The alternative as recommended by the CRT in the Context Sensitive Solutions (CSS) Report includes eight sections. Three of the eight sections met with minority objections, which are noted in the CSS report. The first section originates at the western terminus, East Center Street and proceeds to a point at Orebank Road. It includes four travel lanes, and each is 11' in width. A raised, landscaped median and a 4' shoulder for bicycles are included. Sidewalks will be featured on both sides of the new Memorial Boulevard. A curb and gutter will be included, and a roundabout with flared right turns at Central Street is preferred. A second option, which would maintain the existing traffic signal, is still under consideration, but the roundabout is the preferred option. This four-lane, raised median section would continue to the Orebank Road area of the project. The design speed is 35 miles per hour for this section.

From Orebank Road to West of Hawthorne Street, the project would continue as four 11-foot lanes with a raised, landscaped median. The 4-foot shoulder for bikes would remain, as would sidewalks on both sides. Curb and gutter features would continue. A median opening would be included for the Sun Bridge Hillside Care and Rehabilitation Facility. Additional features in this section include closing Edens Ridge Road intersections, improving northbound John B. Dennis exit ramp to eastbound SR 126 to reduce vehicle conflicts. Right turns would use a traffic signal. This configuration would continue to a point west of Hawthorne Street. The design speed remains at 35 mph for this section.

Between a point west of Hawthorne Street to Harbor Chapel Road, the four 11' foot lanes would continue, but the median will change to a center turn lane in place of the raised, landscaped median. The 4' bikeway shoulder, sidewalks on both sides, and the urban curb and gutter would remain on this section of the proposed improvements to SR 126. The design speed would remain at 35 mph. This section proposes to close the intersection of Milton Court and SR 126, providing alternate access via Stratford and Kite Streets. Hawthorne Street's intersection with the south side of SR 126 would be closed. In addition the Kent Street intersection with SR 126 would be closed with access being provided via Kite Street. The Amy Avenue/Woodridge Avenue intersection would be closed and tied in to Glenwood Street. Trinity Lane would be closed and alternate access would be provided via a new connection near the cemetery (access to SR 126 via Orebank Road). The design speed would remain at 35 mph for this section.

From Harbor Chapel Road to a point east of Old Stage Road, the project would continue as four 11' lanes, featuring a raised landscaped median, 4' shoulder for bikeways, two sidewalks and a curb and gutter. The design speed in this section increases to 45 mph. The intersection of Tanglewood with existing SR 126 would be closed with Tanglewood now tying into Briarwood Road. Old Stage Road would be realigned to create a 90 degree intersection, effectively decreasing the steepness of the existing Old State Road.

The project would continue from the point east of Old Stage Road to Cooks Valley Road as four 11' lanes with a raised, landscaped median, two 8' stabilized shoulders (6' of paved shoulder on each side), no sidewalks, curbs or gutters and a design speed of 45 mph. Pedestrians and bicyclists would be allowed to use the 6' shoulders. This section would connect Holiday Hills Road to Shuler Drive via Parker Street, close the Shuler Drive intersection with existing SR 126, and redirect the traffic to Lemay Drive. In addition Chestnut Ridge Road and Eaton Station Road would be realigned, and left turn lanes onto Cooks Valley Road and Eaton Station Road would be provided.*

From Cooks Valley Road to Harrtown Road, the proposed project would continue as two 11' travel lanes with a center turn lane. The design speed would remain at 45 mph. The 6' stabilized shoulders on both sides would remain, but would not include gutter pans. Bicyclists would still use the 6' shoulders, but pedestrians would be provided with sidewalks on both sides of the proposed improvement. A curb and gutter would also be featured in this section. Red Robin Lane would be closed with access being provided via Bridwell Heights Road. Woodsway Drive, Island Road and Natchez Lane would be realigned.*

From Harrtown Road to Cochise Trail, the project would continue as two lanes, but each lane would be expanded to 12' wide. No median would be included in this section. The shoulders would be expanded to 10' (8' paved and 2' stabilized) in width allowing

pedestrians and bicyclists access. No sidewalks, curbs or gutters are included in this section. An 18" center line crossover deterrent using a rumble strip and striping would be incorporated with a reduced travel lane to accommodate the deterrent. Rumble strips will also be included between the travel lane and the shoulder. The design speed would remain at 45 mph for this section.

From Cochise Trail to Interstate 81, the project would include two 12' travel lanes, but no median, sidewalks, curbs or gutters. The center line crossover deterrent would continue, and an improved transition area from the four-lane SR 126 area at Interstate 81 will be featured. The 10' shoulders (8' paved/2' stabilized) would continue through this section allowing pedestrians and bicyclists access. The design speed would remain at 45 mph for this section. The project would require turn lane construction by future developers throughout this section. Gravel Top Road would be realigned on the western intersection with SR 126 while it would be closed east of the intersection.*

*A minority objection statement was included for three sections. The objections are included in the CSS Report and will also be included in the Environmental Impact Statement.

4.0 Methodology

The following section will outline the methods used while conducting the aquatic and terrestrial surveys for Sullivan County, Tennessee for the proposed action to Memorial Boulevard (SR 126).

4.1 Streams and Wetlands

Prior to conducting field surveys qualified biologists reviewed aerial and topographic maps of the project area to assess the potential impacts proposed activities would have on the streams and wetlands located within the "disturbed limits" of the project corridor. These limits were determined by adding 1000 feet to either side of the proposed centerline (total of 2000 ft corridor). NWI (National Wetland Inventory) maps were reviewed to locate potential wetlands in the area.

Field surveys of streams and wetlands were conducted in March and May of 2008. Six streams will be impacted by the proposed actions to Memorial Boulevard (SR 126). Four of the streams are classified as perennial (water flows in the stream at least 90 percent of the time in a well defined channel) and the other two are classified as intermittent (flow generally occurs only during the wet season or approximately 50 percent of the time). In addition to classifying the streams as either intermittent or perennial the streams were also rated for their quality using a Habitat Assessment Field Data Sheet for High Gradient Streams. Streams were assigned numerical scores based on several parameters (epifaunal substrate, embeddedness, velocity/depth regime, etc.) Pictures of the streams and their accompanying stream forms can be found in Appendix 1.

Several potential wetlands were located on NWI maps within the disturbed limits and biologists surveyed the area to ground-truth their existence.

4.2 Endangered and Threatened Species

There are 12 species federally listed as threatened or endangered in Sullivan County, Tennessee. The threatened species are; Bald Eagle (*Haliaeetus leucocephalus*), Spotfin chub (*Erimonax monachus*), and American Hart's tongue fern (*Phyllitis scolopendrium var Americana*). The endangered species include; Gray bat (*Myotis grisescens*), Tubercled-blossom pearlymussel (*Epioblasma torulosa torulosa*), Shiny pigtoe (*Fusconaia edgariana*), Fine-rayed pigtoe pearlymussel (*Fusconaia cuneolus*), Tan riffle shell (*Epioblasma walkeri*), Cumberland monkeyface pearlymussel (*Quadrula intermedia*), Green-blossom pearlymussel (*Epioblasma torulosa gubernaculum*), Littlewing pearlymussel (*Pegias fabula*), and the Duskytail darter (*Etheostoma percnurum*).

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle (*Haliaeetus leucocephalus*) was first placed under Federal protection in 1940 under what would be later named the Bald and Golden Eagle Protection Act. The eagle continued to be protected when the Endangered Species Act of 1973 was enacted (Palmer-Ball 1996). Bald eagles are found over most of North America, from Alaska and Canada to northern Mexico. About half of the world's 70,000 bald eagles live in Alaska (USFWS 2007). There are two subspecies of bald eagles. The "southern" bald eagle, *Haliaeetus leucocephalus leucocephalus,* is found in the gulf states from Texas and Baja California across to South Carolina and Florida, south of 40 degrees north latitude. The "northern" bald eagle, *Haliaeetus leucocephalus alascanus,* is found north of 40 degrees north latitude across the entire continent.

Distinguished by a white head and white tail feathers, bald eagles are powerful birds that may weigh up to 14 pounds and have a maximum wingspan of 8 feet. Bald eagles live near rivers, lakes, and marshes where they can find fish, their staple food. Bald eagles will also feed on waterfowl, turtles, rabbits, snakes, and other small animals and carrion. Bald eagles require an ample food base, perching areas and nesting sites in order to form a breeding population. Eagles mate for life, choosing the tops of tall trees to build nests, which they typically use and enlarge each year. Breeding bald eagles typically lay 1-3 eggs once a year, and they hatch after about 35 days. The young eagles fly within three months and are on their own after four months.

The first major decline of bald eagles probably began in the mid to late 1800's coinciding with the decline of waterfowl, shorebirds and other prey. Eagles, like most predators, were shot because it was thought they posed a threat to small livestock and other wildlife. Congress placed them under federal protection in 1940 and banned killing,

selling or possessing the species. Shortly after World War II, DDT was hailed as a new pesticide to control mosquitoes and other insects. However, DDT and its residues washed into nearby waterways, where aquatic plants and fish absorbed them. Bald eagles, in turn, were poisoned with DDT when they ate the contaminated fish. The chemicals interfered with the bird's ability to produce strong, thick, eggshells, sometimes causing them to break during incubation. In addition to DDT some eagles died as a result of lead poisoning, after feeding on waterfowl containing lead shot. By 1963, with only 417 nesting pairs of bald eagles remaining, the species was flirting with extinction (USFWS 2007).

The first step taken on the road to recovery for the bald eagle was the banning of DDT in 1972. Until 1995, the bald eagle had been listed as endangered under the Endangered Species Act in 43 of the 48 lower states, and listed as threatened in Wisconsin, Minnesota, Michigan, Washington and Oregon. Also aiding bald eagle recovery was a 5- year program implemented in 1991 by the U.S. Fish and Wildlife Service to phase out the use of lead shot for waterfowl hunting. In July of 1995, the US Fish and Wildlife Service upgraded the status of bald eagles in the lower 48 states to "threatened." On June 28, 2007 the Interior Department took the American bald eagle off the Endangered Species List. The bald eagle will still be protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Based on the recent population figures, the USFWS estimates that there are more than 9700 nesting pairs in the United States (USFWS 2007).

Spotfin Chub (*Cyprinella monacha)*

The spotfin chub was formerly referred to the genus *Hybopis* because of its barbel. It is readily distinguished from other *Cyprinella* species not only by its barbell but also by its' more than 50 lateral line scales (most other species in the genus have around 40 lateral line scales). The body form of *Cyprinella monacha* is elongate, and somewhat triangular in cross section. The head is triangular and small in side view, with a distinctly inferior mouth. Breeding males have a brilliant turquoise-royal blue color along the back, side of the head, and upper part of the sides. During peak nuptial activity, the fins are tipped with milky white. Adults reach sizes varying from 2.2 to 3.3 inches (55 to 85 mm).

The spotfin chub prefers clear, medium-sized upland rivers with moderate or swift current over boulder substrates. Adults are found in swift current, while juveniles are often found in slow current over gravel (Jenkins and Burkhead, 1984). The species feeds primarily on immature aquatic insects (such as midges, blackflies, mayflies, and caddisflies) and lives for more than three years. The spotfin chub reportedly reproduces from late May to August and is a fractional crevice spawner on rocks, logs, and other similar cover.

This species is endemic to the Tennessee River drainage in upland habitats of Alabama, Tennessee, Georgia, North Carolina, and Virginia, but it has not been found for some time in Alabama and Georgia. In any case, its occurrence is rare throughout its range. In Alabama it has been collected at only two locations: in Little Bear Creek near Tuscumbia, Colbert County (one specimen), and in Shoal Creek near Florence, Lauderdale County (three specimens). The Little Bear Creek collection was made in 1937, the Shoal Creek collection in 1884 – in both cases before the Tennessee Valley Authority impounded the Tennessee River.

American Hart's Tongue Fern (*Phyllitis scolopendrium var. Americana)*

This fern has glossy leaves that are 20-40 cm in length. It can be found in well shaded and moist area of deciduous forests, or on rocks with high magnesium content, such as moist Silurian limestone. This fern has been listed as threatened by federal government since 1993. It is threatened by trampling, habitat alteration, timber removal, quarrying, and residential development. It is found only in Tennessee, Georgia, New York, Michigan, and Maryland.

Gray Bat (Myotis grisescens)

The Gray Bat was listed as endangered on April 28, 1976. The Gray bat is a year-around resident of caves, but may migrate seasonally between hibernacula and maternity caves. Caves selected by gray bats must meet certain temperature and environmental criteria; thus all caves are not suitable habitat. The bats are extremely loyal to particular home territories. Maternity caves are typically located within a kilometer of streams or reservoirs. Summer colonies may occupy a traditional area with several roosting caves. Adult pregnant female gray bats give birth to a single young in late May to early June. During this time the lactating females and their young amass in one specific traditional maternity cave. Males and non-reproductive females cluster in other caves within the colony home range. The primary population centers for the Gray bat are the southern Appalachian and the Ozark areas. Gray bats occur nearly statewide in Kentucky.

Because gray bats are year-round residents of caves and often inhabit particular caves in large numbers, they are highly vulnerable to human disturbance. Major disturbance events at one major hibernacula or maternity colony could potentially impact a substantial percentage of the total population. The major cause of decline of gray bats appears to be disturbance of caves (both hibernacula and maternity sites) by humans. Accumulation of toxins ingested through feeding and drinking (particularly insecticides) has been shown to cause mortality in gray bats. (Tuttle 1986). Other probable negative impacts to gray bat populations are siltation and other pollution of streams, which affect a major food component (insects with aquatic larva), and destruction of foraging habitat.

Recovery efforts for the gray bat have been fairly successful. The protection of caves through the use of appropriately designed cave gates as well as reduction in cave disturbance through signs and education is largely credited with the recent increases in the gray bat population. (Tuttle 1986).

Tubercled-blossom pearlymussel (*Epioblasma torulosa torulosa)*

The tubercled blossom pearlymussel (Epioblasma torulosa torulosa) is a medium-sized freshwater mussel, reaching about 3.6 in (9.1 cm) in shell length. The shell is irregularly egg shaped or elliptical, slightly sculptured, and corrugated with distinct growth lines. The outer surface is smooth and shiny; tawny, yellowish-green, or straw colored; and usually has numerous green rays. The inner shell surface is white to salmon-red. Females are generally larger than males and display a large, rounded marsupial swelling, which is often a darker green than the rest of the shell. The male and female are different in shape, but both are yellowish-brown with green rays. It was granted protection on June 14, 1967.

This mussel can be found in large rivers, in shallow sand and gravel shoals with rapid current.

Reproduction requires a stable, undisturbed habitat and a sufficient population of host fish to complete the mussel's larval development. When the male discharges sperm into the current, females downstream siphon in the sperm in order to fertilize their eggs, which they store in their gill pouches until the larvae hatch. The females then expel the larvae. Those larvae that manage to attach themselves to the gills of a host fish grow into juveniles with shells of their own. At that point they detach from the host fish and settle into the streambed, ready for a long (possibly up to 50 years) life as an adult mussel.

This mussel was once quite abundant throughout all the major rivers of the eastern U.S. and southern Ontario. It was particularly numerous in the Ohio River Valley. Increased turbidity and siltation caused by deforestation, and the spread of intensive agriculture were major factors in the decline of this species. The last individual collected was a freshly dead one found below Kanawha Falls, West Virginia in 1969.

There have been no known sightings since. The species may well be extinct. Other factors that probably helped in the expiration of this mussel include the building of dams and reservoirs and pollution from agricultural and industrial runoff (USFWS, 2008)

Shiny pigtoe (*Fusconaia edgariana*)

The shiny pigtoe is a medium-sized species distinguished by very smooth and shiny periostracum with prominent dark green to blackish rays on a yellow to brown background. Shiny pigtoes are known to live as long as 25 years. Shiny pigtoes from the North Fork Holston River ranged from 12.8 mm in length (3 years) to 59.8 mm in length (20+ years). Individuals aged between 7 to 20 years dominated the majority of the population, with very few specimens less than 6 years of age. The shiny pigtoe is typically a riffle species, found along riffles, fords, and shoals of clear, moderate to fast-flowing streams and rivers with a stable substrate (USFWS, 1984). It does not inhabit deep pools, impounded waters, or other lentic habitats. The species is usually observed well buried in the sand and gravel substrate during most of the year, and is more readily visible in early summer (USFWS, 1984). Although this species occurs only in riverine habitats, it can be affected (through run-off) by land uses and treatments on surrounding areas and is therefore "associated" with other habitats within the upper Tennessee River basin. Fish of the family Cyprinidae have been found to be host fish. Species found naturally encysted with shiny pigtoe glochidia in the North Fork Holston River were *Notropis galacturus* (whitetail shiner), *N. cornutus* (common shiner), *N. coccigenus* (warpaint shiner), and *N. telescopus* (telescope shiner). The most severe limiting factor to the species continues to be habitat degradation, primarily from siltation due to poor mining practices and other land uses. Predation, especially from muskrats, may also be a significant limiting factor. At a site on the North Fork Holston River, researchers observed the loss of 25% of the mussel population to predation by muskrats - during only a 2 year period.

Fine-rayed pigtoe pearlymussel (*Fusconaia cuneolus)*

The fine-rayed pigtoe pearlymussel, is of medium size, up to 2.5 in (6.4 cm) in length. This Cumberlandian species is distinguished by the many fine green rays that radiate over the yellowish green to light brown background of its ovoid shell. The hinged end of the shell is rounded, while the front margin is straight. The shell surface has a smooth, satiny appearance and is

indistinctly patterned with growth lines. The inner shell surface is white.

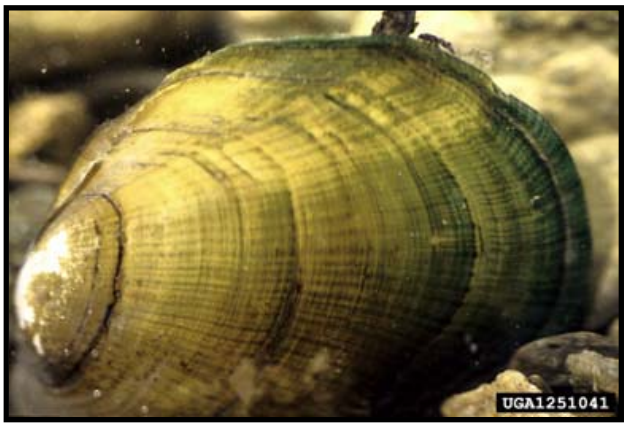
The fine-rayed pigtoe occupies shallow riffles and shoals of freshwater streams and rivers. It buries itself in the stream bottom in gravel or compacted sand but is rarely found in pools. It displays a higher tolerance for muddy bottoms than most other freshwater mussels.

Although this species was thought to have disappeared from its original collection site in the Holston River, four freshly dead specimens were collected along the river in 1982 at Cloud Ford, Tennessee. Industrial and chemical pollution from upstream at Saltville, Virginia, has severely degraded the water quality there. Live specimens have yet to be found but may indeed exist. Recent surveys in other upper Tennessee River tributaries, such as the Nolichucky, French Broad, Flint, and Buffalo Rivers, failed to locate specimens.

Construction of dams and multi-purpose reservoirs across the former range of the fine-rayed pigtoe has altered the free-flowing character of these rivers. Such impoundments produce siltation, fluctuating water temperatures, changes in water acidity, and lowered oxygen content. Impoundments also fragment the range of the species into isolated populations, which are then unable to interbreed.

Tan Riffleshell (*Epioblasma walkeri*)

The tan riffle shell is a medium sized mussel, seldom exceeding 60 mm in length. The shell is elliptical in shape with dull brownish or yellowish-green periostracum and numerous faint green rays evenly distributed over the valve surface. The tan riffle shell appears to occur in riffle or shoal areas of small to moderate-sized rivers with swift regular current and stable substrate of gravel and sand. It was collected in the Middle Fork Holston River in riffle habitat below a rock outcropping.



Destruction and alteration of habitat, and water quality degradation in the Tennessee and Cumberland River drainages are responsible for the decline and present status of the tan riffle shell. Dam construction appears to have had major impacts on populations of the tan riffle shell throughout its range. Cold water discharges have been, and continue to be, detrimental to mussel populations below dams. Dams on the Middle and South Forks of the Holston River have impounded those rivers in Sullivan Co., TN and Washington Co., VA, and eliminated habitat within its historic range. Closure of Wolf Creek Dam impounded the Cumberland River and the lower reaches of its major tributaries, including habitat of the tan riffle shell in Beaver Creek.

Cumberland monkeyface pearlymussel (*Quadrula intermedia*)

The Cumberland monkeyface pearlymussel is a medium-size bivalve with a greenish-yellow to yellowish-green shell that darkens with age. This species was listed as federally endangered in the U.S. in 1976 and a recovery plan created.

The cumberland monkeyface inhabits shallow riffle and shoal areas of headwater streams and bigger rivers. It prefers clean, fast-flowing water in shoal conditions, and has never been found in the deeper, pool-like, stretches of rivers, nor is it known from small streams. It has been found living in a sand and gravel substrate in 6 inches to 2 feet of water (Bogan and Parmalee, 1983).

Historically, this species was widespread in the upper Tennessee River system (Tennessee, Elk, Duck, Holston, north and south fork Holston, Nolichucky, French Broad, Tellico, Clinch, Powell Rivers) in Tennessee, Alabama, and Virginia, and possibly in the Cumberland River system (Cumberland, Big South Fork Cumberland, Caney Fork) where its former occurrence remains uncertain because the closely related *Quadrula tuberosa* was also reported there (USFWS, 1984). It was recently found alive in the Duck River in Tennessee. It appears to be extirpated from Alabama, although reintroduction efforts are underway (Mirarchi et al., 2004).

Green-blossom pearlymussel (*Epioblasma torulosa gubernaculum)*

The green-blossom pearlymussel (*Epioblasma torulosa gubernaculums*) is a compressed headwaters form of the tubercled-blossom pearlymussel (*E. torulosa torulosa*). It is a medium-sized Cumberlandian mussel with an irregularly elliptical shell, which is smooth and shiny, tawny or straw-colored, and patterned with numerous fine green rays. The shell surface is marked with distinct growth lines. The nacre (inner shell) color varies from white to salmon-red. The female's shell is generally larger than the male's and the posterior margin is more broadly rounded.

Green-blossom pearlymussels inhabit riffle and shoal areas in medium-sized (3-6 order) streams. Habitat is typically sand and gravel substrates with moderate to fast current (USFWS, 1983). This species does not occur in the impounded sections of rivers. It is apparently quite sedentary, appears to be intolerant of silt and pollution, and requires ample water flow and stable substrate for survival. The reproductive cycle of E. t. gubernaculum is presumed to be similar to other Epioblasma spp. The green-blossom pearlymussel is probably a long-term breeder (USFWS, 1983), spawning in late summer, retaining glochidia through fall and winter, and releasing glochidia the following spring/summer. The fish host(s) are unknown.

Coal waste from mining activities in southwestern Virginia has probably contributed to the decline of this species. Water pollution is another major factor that has apparently contributed to the decline of this species and other Epioblasma spp. Acid mine drainage in headwater tributaries of the Cumberland River has nearly eliminated the most diverse group of Epioblasma (USFWS, 1983). Numerous streams in the upper Tennessee drainage were polluted already by early twentieth century, and the mussel fauna was in a decline at that time (USFWS, 1983). The historic population in the Clinch River was likely affected by chemical spills in 1967 and 1970 at the APCO plant in Carbo, VA (Bates, 1978). All of the factors mentioned above (impoundments, siltation, coal mining, and water pollution) are still considered potential threats to the remaining population of E. t. gubernaculum. Other factors that may also be affecting this species include collecting by conchologists, invasion of the Asiatic clam (*Corbicula fluminea*), and the small gene pool which may be below minimum population size needed for sufficient genetic variation to respond to environmental changes.

Little-Wing Pearlymussel (*Pegias fabula*)

The little-wing pearlymussel was federally listed as endangered on November 14, 1988. This small freshwater mussel species has historically been reported to inhabit 27 river reaches in five states. The little-wing pearlymussel inhabits small to medium streams, having low turbidity, cool-water, and high to moderate gradient. It would typically be found near riffles on sand and gravel substrates or in sand pockets between rocks, cobbles, and boulders. The specific food habits of this species are unknown. The little-wing pearlymussel is a long-term brooder, holding glochidia from midsummer until the following spring. At least two fish species have been identified as glochidial hosts, greenside darter (*Etheostoma blennioides*) and emerald darter (*Etheostoma baileyi*). Two other fish species which are known to live in the habitat and range of the little-wing pearlymussel, and are suspected as glochidial hosts, are the sculpin (*Cottus carolinae*) and redline darter (*Etheostoma rufilineatum*).

Only a few small populations are known to survive in; Horse Lick Creek (Jackson and Rockcastle Counties, KY), Big South Fork Cumberland River (McCreary and Wayne Counties, KY), Little South Fork Cumberland River (McCreary and Wayne Counties, KY), and Cane Creek (Van Buren County, TN).

Duskytail Darter (*Etheostoma percnurum*)

The duskytail darter was listed as endangered on April 27, 1993. This small freshwater fish was once widespread throughout the middle reaches of the Cumberland River and the upper reaches of

the Tennessee River. The duskytail darter inhabits edges of gently flowing, shallow pools, eddy areas, and slow runs in clear waters of large creeks and medium sized rivers. Populations of the duskytail darter are believed to have greatly diminished such that only one known site on the Big South Fork of the Cumberland River has evidence of its inhabitance. Duskytail darter adults are 2.5 inches in length, typically dull in color, and classified as insectivores. Spawning season runs from April through May where the female will lay one cluster of 23- 200 eggs on the underside of a rock. The male duskytail darter protects and cares for the incubating eggs by cleaning them regularly. Population declines of the duskytail darter are due to poor water quality as a result of siltation and other pollutants.

4.3 Agency Coordination

Coordination with several federal and state agencies concerning the listed species, wetlands and streams, and critical habitats took place prior to any field surveys being conducted. HMB biologists sent coordination letters, maps and project descriptions to the following agencies; US Fish and Wildlife Service (Cookeville office), The Nature Conservancy (Nashville office), Tennessee Wildlife Resources Agency (Region 4 office), and Tennessee Dept. of Environment and Conservation (Johnson City Field Office) to determine if any direct or indirect impacts to endangered or threatened species could be foreseen by the proposed project. Information on the soils in the area of the proposed project was provided by the USDA-NRCS (Soil Survey of Sullivan County, TN CD-ROM). No correspondence with the United States Forest Service (USFS) or the National Park Service (NPS) was necessary, as the project area does not fall within the scope of either agency's purview. Please refer to Appendix 2 for federal and state agency coordination letters.

4.3.1 Agency Determinations

Correspondence with TWRA, USFWS, and TNC indicated no foreseen impacts to federally listed threatened or endangered species, and no wildlife management areas or critical habitats exist within the proposed project's corridor. In addition, no exemplary natural communities monitored by TDEC are within the project corridor. Additionally, TDEC listed no wild rivers, exceptional waters, special use waters, or wellhead protection areas that occur within the project's proposed corridor. No additional unique features were identified during fieldwork or during literature searches.

4.4 Invasive Species

Aside from habitat loss, invasive species pose perhaps the biggest threat to native ecosystems. Exotic invasive species are those that have evolved within one ecosystem and were introduced, either intentionally or accidentally, to another ecosystem. Because exotic species evolved elsewhere, they encounter few or no natural control mechanisms in their new location allowing them to spread easily and quickly. Exotic plants exhibit a particular dangerous hazard due to their capacity to reproduce rapidly. As they broaden their range, invasive plants disrupt available nutrients, occupy space, and out-compete native plants. Some exotic species introduce e pathogens or insect pests that can suddenly devastate an ecosystem, while the exotic species remains relatively immune to its effects. Oftentimes exotic plants are used in an ornamental setting but cross-over into an uncontrollable habitat. Some exotic plants, such as leafy spurge (*Euphorbia esula*)

may be poisonous to wildlife and livestock. Others, like Chinese chestnut (*Castanea mollisima*), don't offer quite the nutritional value of their native counterparts (*Castanea dentata*). All of these alterations negatively affect the ecosystem, often dramatically.

5.0 Results and Potential Impacts

5.1 Stream and Wetland Survey Results and Impacts

Qualified biologists surveyed the project area for perennial, intermittent and ephemeral streams that would be impacted by the proposed action to Memorial Boulevard (SR 126). The results of the survey were that six streams existed within the disturbed limits (1000 feet to either side of the proposed centerline) of the proposed action to Memorial Blvd. Two streams were classified as intermittent and four streams were classified as perennial. None of the streams surveyed received a Habitat Parameter score above 137, thus all were classified as "Poor" (RBP score ranging from 0-137) in quality.
It its likely that the impacts to these streams will be minimal. Culverts are already in place in areas where the streams cross SR 126. Extension of those culverts during construction is probable and will likely be the only measurable impacts. The proposed project does not impact any streams that are not already impacted by the existing facility. Conceptual construction limits will be included in the draft EIS for each build alternative. Impacts to the area streams and the appropriate levels of mitigation measures will be addressed, as appropriate in this final document.

Some cumulative and indirect impacts will likely result where the proposed corridor crosses the above-mentioned six tributaries. There will be a temporary loss of vegetation and increase in sedimentation from the exposed soil. In the areas of impact and, possibly, downstream, there may be increases in turbidity and a decrease in dissolved oxygen levels due to the loss of the stream's tree canopy. Construction activities within the stream channel could cause the temporary loss of in-stream habitat for aquatic flora and fauna. Changes to the stream channel can result in bank instability if the scouring process leads to degradation, or excessive sediment deposition results in aggradations (Rosgen 1996). Construction of this project will increase the potential traffic load of the road and the amount of pavement being maintained by TDOT. As such, streams could experience an increase in the amounts of chemical contaminants from maintenance activities such as de-icing agents and vehicle emissions. Petroleum byproducts, road salts, and heavy metals can detrimentally affect stream water quality. Maintaining a native vegetative buffer zone between the roadway and the streams or drainage ditches will alleviate some of the impacts to water resources in the area.

Indirect impacts as a result of this project could include an increase in downstream turbidity and a migration of aquatic species intolerant of major habitat alterations may occur.

Wetland surveys conducted in May 2008 yielded no jurisdictional wetlands within the disturbed limits of the proposed action to Memorial Blvd (SR 126). If further site visits are required based on alternatives presented in the draft EIS which reveal potential impacts to area wetlands, biologists will reassess their condition and proper mitigation will be taken to avoid any lasting adverse impacts.

5.2 Endangered and Threatened Species Survey Results and Impacts

Through coordination with several state and federal agencies it was concluded that no endangered or threatened species occur within the disturbed limits of the proposed action to Memorial Boulevard (SR 126) in Kingsport, TN and no foreseen impacts will occur to those species and their ecological communities (see Appendix 2 for coordination letters). Therefore, no extensive field surveys were required.

If during further field visits new or updated information is obtained concerning impacts to endangered and threatened species in the area, the proper agencies will be contacted and the project will be reassessed. If mitigation measures become necessary they will be included in the draft EIS.

Cumulative impacts to other wildlife in the area of the proposed action are present, but limited due to the fact that the majority of the proposed action occurs along an existing roadway. Mortality of wildlife may occur both during construction and highway operation, although roadway mortality is generally not believed to significantly affect wildlife populations under normal conditions (TDOT, 2004). Also increased noise could affect the utilization of habitats by wildlife (TDOT, 2004). Disruption of plant communities that occur along the proposed project's corridor could negatively impact local species by limiting available habitat for nesting and foraging. However, the majority of habitat loss usually occurs through the conversion of forested or open land to roadway, which in this case is very minimal since the proposed action is along an existing facility.

5.3 Invasive Species Results and Impacts

While conducting stream and wetland surveys and taking noise measurements along the corridor biologists took note of any invasive/exotic species that were present in the project area.

Invasive plants that have been identified in this project area include; Japanese honeysuckle (*Lonicera japonica*), mimosa/silk tree (*Albizia julibrissin*), kudzu (*Puereria montana*), Chinese privet (*Ligustrum sinense*), common privet (*Ligustrum vulgare*), multiflora rose (*Rosa multiflora*), tree of heaven (*Ailanthus altissima*), Queen Anne's lace/wild carrot (*Daucus carota*), paper mulberry (*Broussonetia papyifera*), cocklebur (*Xanthium strumarium*), bull-thistle (*Crisium vulgare*), Canada thistle (*Cirsium arvense*), ox-eye daisy (*Chrysanthemum leucathemum*), and fescue (*Festuca arundinacea*). Other exotic plant species are also likely to occur within the project area.

Field observations also noted the occurrence of several exotic animal species. Included in these were the Asian clam (*Corbicula fluminea*) and European Starlings (*Sturnus vulgaris*). Other exotic organisms are likely to be present within the project area, however, field surveys did not reveal their presence.

The potential of further damage to the existing natural community through the introduction of exotic or invasive species, beyond what is already present, is remote. Habitat fragmentation has already resulted in the establishment of these species in the

project area and surrounding region. Any potential impacts, by invasive species, can be minimized through the utilization of native, woody vegetation on cut and fill slopes. Additionally native, herbaceous forbs and grasses should be planted in the medians and along the shoulders of the Build Alternative that has been selected for construction.

5.4 Land Use Impacts

Aerial maps were reviewed between the 1950s and 2006 for the entire project area. The growth patterns and land use trends within the project corridor reflect a traditional outgrowth from a city. The densest growth remains close to the city and gradually lessens as distance increases along major roadways. Deviations to this trend are also traditional. In the case of the SR 126/Memorial Boulevard project, the one noticeable deviation is the limited commercial growth that has occurred at the interchange of SR 126 and I-81. A small area surrounding the interchange has transitioned from agricultural to highway-commercial and limited light industrial land use exists as well.

Land use in the initial 25 to 30 percent of the project corridor is located in the city of Kingsport and suburban areas on the perimeters of the city limits. This area is primarily urban in nature. No additional indirect or cumulative impacts are anticipated to measurably alter land uses in ways that would further impact aquatic and terrestrial species.

The remaining 70 to 75 percent of the project area has been slowly changing over from agricultural/rural land uses to primarily residential land use with a small percentage of commercial development. One concentrated area of commercial land use is located within the last 0.3 miles of the project within the area of the existing interchange of SR 126 with Interstate 81. Aerial maps were reviewed between the 1950s and 2006 to verify these land use trends. The John B. Dennis Highway was added in the 1970s in Kingsport. The aerial photographs also indicate that tree canopies have surprisingly increased in certain areas. When reviewing this situation it was concluded that farms within the area that were traditional, small family farms which have followed the national trend of failing to provide an adequate living for their occupants. As these agricultural fields have become fallow over the past fifty years, early-succesional tree species have reclaimed some of their previous areas. In addition, many of the neighborhoods that have arisen in the past have apparently chosen to keep as many trees as possible from being removed.

It is unlikely over the next 25 years that the project will accelerate development measurably beyond the current rate of changes due to efforts to keep the improved roadway within its existing alignment. These efforts, and the lack of direct impacts to threatened and endangered species and their habitats, indicate that indirect and cumulative impacts to the area are minimal.

6.0 Conclusions & Mitigation Measures

6.1 Aquatic Conclusions & Mitigation Measures

To protect water quality and aquatic species it is necessary stream crossings should be made perpendicular to the direction of flow, and culverts should be constructed wide enough to pass high flows and should be placed so as not to restrict the movement of

aquatic vertebrates within the stream. Mitigation will be required for all stream impacts which do not meet requirements for general TDEC-Division of Water Aquatic Resources Alternations permits (ARAP) and for certain Nationwide Section 404 permits (TDOT, 2004).

Coordination with TDEC Division of Water for a potential Water Quality Certification (401) prior to disturbance of streams is required. A 401 Water Certification states that any discharge into surface waters will comply with the aquatic protection requirements of the State.

A Section 404 Dredge and Fill permit will be required from the U.S. Army Corps of Engineers prior to any construction work on the proposed project. Permittees must meet all conditions, restrictions, and notification procedures required prior to any work on the proposed project.

Erosion control devices should limit any adverse effects to area streams. Maintaining the vegetated buffer zone between the roadway and the streams will minimize the impact of non-point source pollution to the streams. Also, drainage ditches should direct road-runoff into appropriate areas to allow the non-point source pollutants to filter out of the drainage. To minimize potential runoff impacts to the project streams, all appropriate Best Management Practices in accordance with the FHWA erosion control guidelines will be implemented to ensure that water quality in the project area is not adversely impacted during construction. Along stream corridors it is important to leave mature canopy when possible and allow establishment of a dense herbaceous layer of native species. Revegetating disturbed areas as soon as possible with native species should help contain erosion impacts as well as add diversity to the floral community and discourage invasive/exotic species growth.

If these mitigation measures are utilized, there should be no cumulative impacts to the aquatic communities in the project area as a result of the construction of this proposed project.

6.2 Terrestrial Conclusions & Mitigation Measures

6.2.1 Flora

Mitigation for the disturbances of the floral community should include revegetating the areas with native plants as soon as possible. Leaving soil exposed to the elements for a prolonged period of time will increase the likelihood of invasion of the area by invasive/exotic plant species and could potentially cause erosion and sedimentation problems in nearby area streams. Plants chosen for the site should be compatible with the hydrology, geology, and land use of the surrounding landscape. Due to the fact that the proposed project is along an existing facility the majority of any removal of native vegetation will occur along the shoulders and in the medians, and will remain minimal.

6.2.2 Wildlife

As habitats are encroached upon most wildlife will adjust to changes in their environment. Displaced wildlife species will move to habitats in nearby areas for refuge, therefore circumventing any adverse impacts to their habits and behavior. Although some measures can be taken to ensure wildlife aren't adversely affected.

Various successional vegetative stages should be considered when replacing native species to prevent the landscape from slipping into a monoculture state, thereby decreasing floral diversity. Since the proposed project is along an existing facility, absent of extensive forested areas, the impacts to wildlife will be minimal and extensive mitigation measures are not necessary.

Vegetative removal during fall and early winter months will prevent displacement of many species during their respective nesting seasons.

To minimize potential run-off impacts to streams (and subsequent wildlife that utilize those streams) during and after construction, all appropriate BMP's in accordance with the FHWA should be implemented to control sedimentation and debris within contributing drainages.

6.2.3 Threatened & Endangered Species

No threatened and endangered species were determined to exist within the project area and therefore none will be impacted by the proposed project. As a result no mitigation measures are required. If any threatened or endangered flora or fauna are located during future site visits or during construction immediate consultation with USFWS, TWRA and TDOT biologists will occur and protection of the species and their habitats will take place.

6.3 No Build Alternative

The No-build alternative would result in no adverse ecological impacts thereby eliminating any mitigation from taking place.

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Appendix 1- Stream Photos, Stream Data Forms

S01i

S02p

S03p

S04p

S05p

Spring flowing into S05p

S06i

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)
MODIFIED FOR USE WITH COE EASTERN KENTUCKY STREAM ASSESSMENT PROTOCOL

STREAM NAME S01i	LOCATION Sullivan Co. TN
HWY STA #_____ SITE #_____	STREAM CLASS Int.
LAT 36.5457 _____ LONG 82.4350 _____	RIVER BASIN
PICTURE #	AGENCY
INVESTIGATORS of HMB MTM, AL	
FORM COMPLETED BY MTM	DATE 3/21/08 TIME 9:15 AM PM / SPECIFIC CONDUCTIVITY 576
DOMINANT TREE SPECIES N/A	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 X 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 X 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 X	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 X 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 X	10 9 8 7 6	5 4 3 2 1 0

COMMENTS: Flows along side existing SR126. Flows into S02p.□
Width-- 2' Depth--6-12".

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✘ 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	✘ 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 ✘ 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 ✘ 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✘	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✘	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 ✘
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 ✘

Total Score 88

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)
MODIFIED FOR USE WITH COE EASTERN KENTUCKY STREAM ASSESSMENT PROTOCOL

STREAM NAME S02p	LOCATION Sullivan Co. TN
HWY STA # ca ??+?? SITE #	STREAM CLASS Per.
LAT 36.5454 LONG 82.4334	RIVER BASIN
PICTURE #	AGENCY
INVESTIGATORS of HMB MTM, AL	
FORM COMPLETED BY MTM	DATE 3/20/08 TIME 2:10 AM PM / SPECIFIC CONDUCTIVITY 567
DOMINANT TREE SPECIES Sycamore	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 ✗ 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 ✗ 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✗ 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	✗ 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 ✗ 12 11	10 9 8 7 6	5 4 3 2 1 0

COMMENTS: Part of channel is rip rap. Width 4' depth 1'.

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	~~10~~ 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	~~15~~ 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 ~~7~~ 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 ~~7~~ 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ~~6~~	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ~~6~~	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 ~~1~~ 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 ~~1~~ 0

Total Score 88