

TRANSPORTATION PLANNING REPORT

**STATE ROUTE 257
FROM US-41 (STATE ROUTE 11) TO GIDEON ROAD AT BETHEL ROAD
RIDGETOP, ROBERTSON COUNTY
PIN# 104906.00**



**PREPARED BY
Florence & Hutcheson
FOR THE
TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**

Approved by:	Signature	DATE
CHIEF OF ENVIRONMENT AND PLANNING		8/30/06
TRANSPORTATION DIRECTOR PROJECT PLANNING DIVISION		8-18-06
TRANSPORTATION MANAGER 2 PROJECT PLANNING DIVISION		8/4/06

This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.

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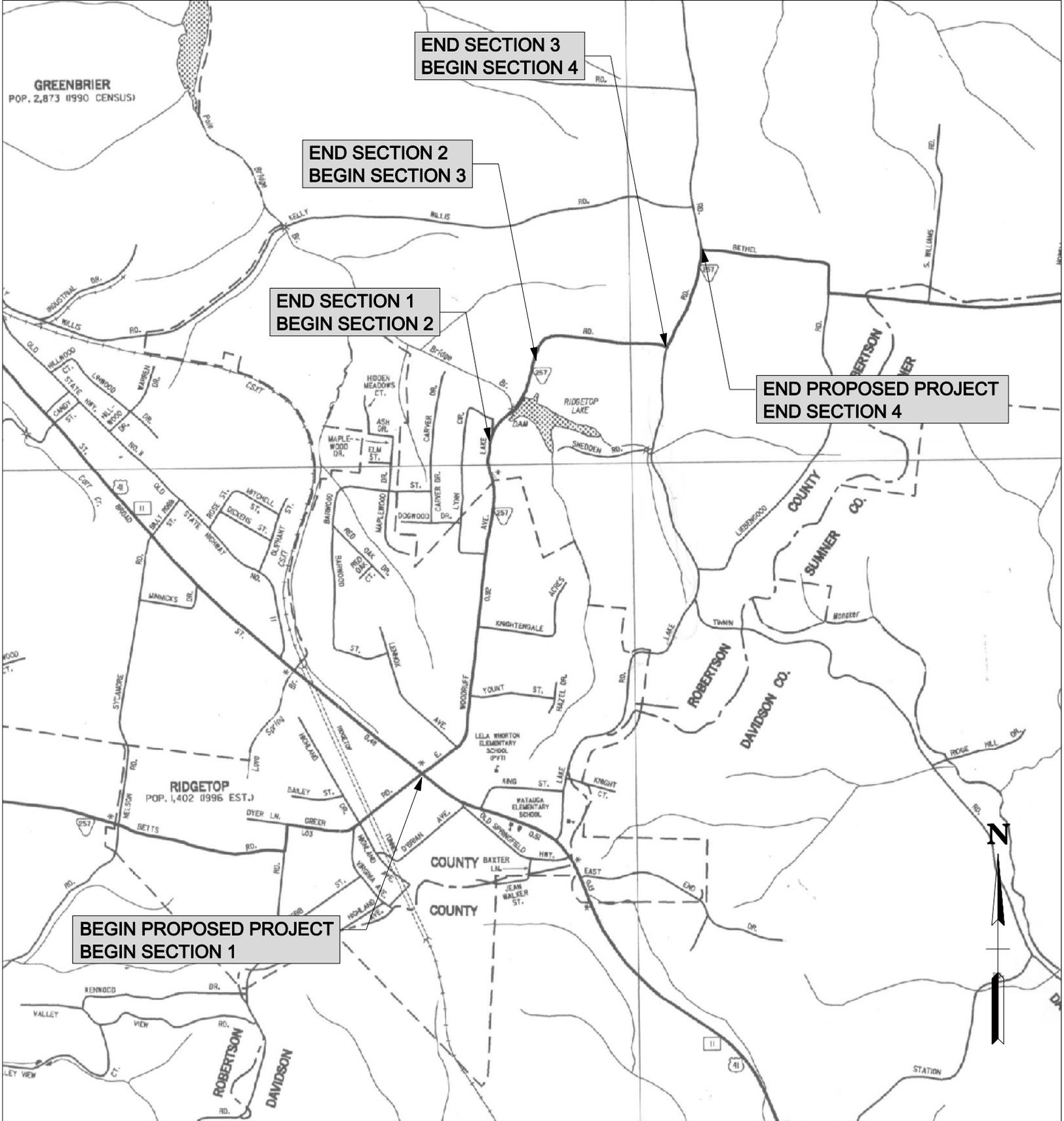
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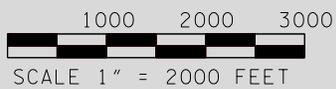
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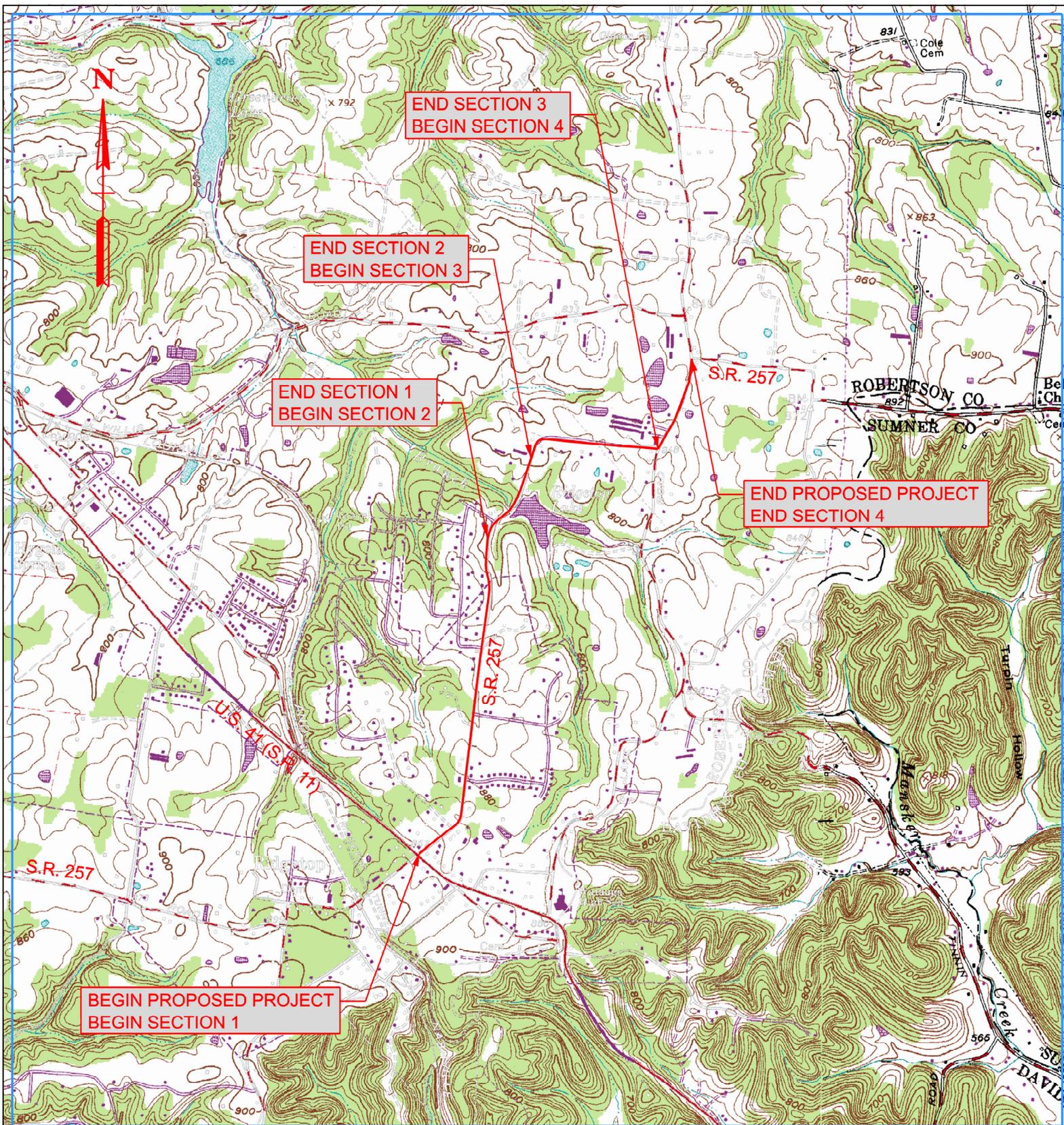
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**AREA VICINITY MAP
S.R. 257 - FROM U.S. 41 (S.R. 11) TO
GIDEON ROAD AND BETHEL ROAD
RIDGETOP, ROBERTSON COUNTY, TN**



PROJECT LOCATION MAP
S.R. 257 - FROM U.S. 41 (S.R. 11) TO
GIDEON RD. AT BETHEL RD.
USGS "GREENBRIER" QUAD
RIDGETOP, ROBERTSON COUNTY, TN

Data Table

State Route 257 (Woodruff Avenue/Lake Road/Gideon Road)
Robertson County

Section: 1
From: US-41
To: just before Lynn Circle

<u>Item</u>	<u>Existing</u>	<u>Proposed</u>
Functional Class	Urban Minor Arterial	Urban Minor Arterial
System Class	STP	STP
Length – Miles	1.03	1.03
Cross Section		
Feet	18/20/30-40	32/60
Base Year ADT (2009)	1,610	1,610
Design Year ADT (2029)	2,320	2,320
Design Year DHV 2029 (12%)	278	278
Percent Trucks (DHV)	5	5
Estimated Right-of-Way Acquisition (Acres)	N/A	3.90
Estimated Right-of-Way Tracts Affected	N/A	47
Estimated Family Displacements	N/A	1
Estimated Business Displacements	N/A	0
Estimated Right-of-Way Cost	N/A	\$477,000
Estimated Utility Cost Reimbursable	N/A	\$0
Estimated Utility Cost Non-Reimbursable	N/A	\$390,000
Estimated Construction Cost	N/A	\$1,716,000
Estimated Preliminary Engineering Cost	N/A	\$172,000
Total Estimated Cost	N/A	\$2,755,000

Data Table

State Route 257 (Woodruff Avenue/Lake Road/Gideon Road)
Robertson County

Section: 2
From: just before Lynn Circle
To: after Ridgetop Lake

<u>Item</u>	<u>Existing</u>	<u>Proposed</u>
Functional Class	Urban Minor Arterial	Urban Minor Arterial
System Class	STP	STP
Length – Miles	0.25	0.25
Cross Section		
Feet	18/20/30-40	32/60
Base Year ADT (2009)	1,610	1,610
Design Year ADT (2029)	2,320	2,320
Design Year DHV 2029 (12%)	278	278
Percent Trucks (DHV)	5	5
Estimated Right-of-Way Acquisition (Acres)	N/A	2.05
Estimated Right-of-Way Tracts Affected	N/A	5
Estimated Family Displacements	N/A	2
Estimated Business Displacements	N/A	0
Estimated Right-of-Way Cost	N/A	\$623,000
Estimated Utility Cost Reimbursable	N/A	\$0
Estimated Utility Cost Non-Reimbursable	N/A	\$79,000
Estimated Construction Cost	N/A	\$2,536,000
Estimated Preliminary Engineering Cost	N/A	\$254,000
Total Estimated Cost	N/A	\$3,492,000

Data Table

State Route 257 (Woodruff Avenue/Lake Road/Gideon Road)
Robertson County

Section: 3
From: after Ridgetop Lake
To: 1-way stop at Lake/Gideon Rd.

<u>Item</u>	<u>Existing</u>	<u>Proposed</u>
Functional Class	Rural Major Collector	Rural Major Collector
System Class	STP	STP
Length – Miles	0.44	0.44
Cross Section		
Feet	18/20/30-40	32/60
Base Year ADT (2009)	1,610	1,610
Design Year ADT (2029)	2,320	2,320
Design Year DHV 2029 (12%)	278	278
Percent Trucks (DHV)	5	5
Estimated Right-of-Way Acquisition (Acres)	N/A	2.20
Estimated Right-of-Way Tracts Affected	N/A	14
Estimated Family Displacements	N/A	1
Estimated Business Displacements	N/A	0
Estimated Right-of-Way Cost	N/A	\$341,000
Estimated Utility Cost Reimbursable	N/A	\$0
Estimated Utility Cost Non-Reimbursable	N/A	\$139,000
Estimated Construction Cost	N/A	\$769,000
Estimated Preliminary Engineering Cost	N/A	\$77,000
Total Estimated Cost	N/A	\$1,326,000

Data Table

State Route 257 (Woodruff Avenue/Lake Road/Gideon Road)
Robertson County

Section: 4
From: 1-way stop at Lake/Gideon Rd.
To: 3-2ay stop at Gideon/Bethel Roads

<u>Item</u>	<u>Existing</u>	<u>Proposed</u>
Functional Class	Rural Major Collector	Rural Major Collector
System Class	STP	STP
Length – Miles	0.33	0.33
Cross Section		
Feet	22/26/50	32/60
Base Year ADT (2009)	2,220	2,200
Design Year ADT (2029)	3,340	3,340
Design Year DHV 2029 (12%)	401	401
Percent Trucks (DHV)	5	5
Estimated Right-of-Way Acquisition (Acres)	N/A	1.96
Estimated Right-of-Way Tracts Affected	N/A	8
Estimated Family Displacements	N/A	0
Estimated Business Displacements	N/A	0
Estimated Right-of-Way Cost	N/A	\$81,000
Estimated Utility Cost Reimbursable	N/A	\$0
Estimated Utility Cost Non-Reimbursable	N/A	\$90,000
Estimated Construction Cost	N/A	\$634,000
Estimated Preliminary Engineering Cost	N/A	\$63,000
Total Estimated Cost	N/A	\$868,000

Data Table

State Route 257 (Woodruff Avenue/Lake Road/Gideon Road)
Robertson County

Section: Total Project
From: US-41
To: Gideon/Bethel Roads

<u>Item</u>	<u>Existing</u>	<u>Proposed</u>
	Urban Minor Arterial/ Rural Major Collector	Urban Minor Arterial/ Rural Major Collector
Functional Class		
System Class	STP	STP
Length – Miles	2.05	2.05
Cross Section	18/20/30-40	
Feet	22/26/50	32/60
Base Year ADT (2009)	1,610-2,220	1,610-2,200
Design Year ADT (2029)	2,320-3,340	2,320-3,340
Design Year DHV 2029 (12%)	278-401	278-401
Percent Trucks (DHV)	5	5
Estimated Right-of-Way Acquisition (Acres)	N/A	10.08
Estimated Right-of-Way Tracts Affected	N/A	74
Estimated Family Displacements	N/A	4
Estimated Business Displacements	N/A	0
Estimated Right-of-Way Cost	N/A	\$1,522,000
Estimated Utility Cost Reimbursable	N/A	\$0
Estimated Utility Cost Non-Reimbursable	N/A	\$698,000
Estimated Construction Cost	N/A	\$5,655,000
Estimated Preliminary Engineering Cost	N/A	\$566,000
Total Estimated Cost	N/A	\$8,441,000

SR-257 Robertson County TPR

1.0 PURPOSE OF STUDY

The purpose of this study is to investigate geometric deficiencies along SR-257 from the signalized intersection at SR-11 (US-41) to the three-way stop at Gideon Road and Bethel Road. The street names of this 2.05-mile section of SR-257 are Woodruff Avenue, Lake Road, and Gideon Road. This route is within the Ridgetop City Limits in Robertson County.

This study was initiated in response to a request from State Senator Jo Ann Graves in a letter dated October 7, 2004. The primary focus of the letter is the narrow roadway width and lack of shoulders along SR-257. A copy of the letter is included in the Appendix as Exhibit A-1.

This project is not referenced in the Nashville Area Metropolitan Planning Organization (MPO) Long Range Plan (LRP) 2005-2030 or the Transportation Improvement Plan (TIP) 2006-2008. The MPO was contacted concerning this study to coordinate any proposed improvements. Copies of the correspondence with the MPO are included in the Appendix as Exhibit A-2.

Reports utilized in this study were the *Land Use and Transportation Policy Plan for Ridgetop, Tennessee 2002 – 2020* and *Community Facilities Plan Ridgetop, Tennessee 2002 – 2020*.

2.0 DEFICIENCIES AND EXISTING CONDITIONS

Please refer to the *Area Vicinity Map*, *Project Location Map*, or *Conceptual Plans* included in this report for visual representations of the locations described in the text.

2.1. LAND USE

The existing land use along the study area varies. The land use is retail at the southern termini of the study area at the intersection with US-41. Two small automobile repair shops are located on either side of SR-257. Near the northern termini of the study area, at the intersection with Lake Road, the land use is industrial. Two small manufacturing plants are located there. One creates shelves for Wal-Mart and the other creates disposable plastic medical equipment. Between these areas, the land use is primarily single-family residential, with some agricultural areas.

Land Use and Transportation Policy Plan for Ridgetop, Tennessee 2002 – 2020 describes Ridgetop as being a bedroom community of Nashville. The plan outlines the land use adjacent to SR-257 within the study area as becoming entirely residential between US-41 and the intersection with Lake Road. Electric lines, city sewer lines, gas lines and city water lines currently service the area, making population growth and increased density in the area likely.

A 25-acre, 50-lot subdivision is planned between Yount Street and Knightengale Acres Road. The subdivision plats are nearly complete and construction will begin soon.

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TDOT Historians and the Tennessee State Historic Preservation Office (SHPO) have deemed a property adjacent to SR-257 eligible for the National Register of Historic Places. This property, known as the Wilson House, contains an 1890 Folk Victorian vacation house with Colonial Revival updates. This property is located across from Knightengale Acres Road. A 25-acre city park is planned on this site, with the house being used as a city museum. This park will contain hiking trails and a playground. A copy of the Preliminary Historic Survey is located in the Appendix as Exhibit A-3.

Please refer to Exhibits 2.1.1 through 2.1.6 for photos of the land uses present within the study area.

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Exhibit 2.1.1
SR-257 at US-41
Commercial Land Use



Exhibit 2.1.2
SR-257 at US-41
Commercial Land Use



Exhibit 2.1.3
SR-257 at Lenox Road
Residential Land Use



Exhibit 2.1.4
SR-257 across from Knightengale Acres
Agricultural Land Use
(Location of Proposed Park)



Exhibit 2.1.5
SR-257 at Lake Road Intersection
Industrial Land Use



Exhibit 2.1.6
SR-257 at Lake Road Intersection
Industrial Land Use



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2.2. VEHICULAR VOLUMES

The traffic projections and data were provided by TDOT. The study base year (2009) average daily traffic (ADT) along SR-257 from US-41 to the one-way stop at Lake Road is 1,610 vehicles per day (vpd). The ADT from the on-way stop at Lake Road to the three-way stop at Gideon Road and Bethel Road is 2,220 vpd. Please refer to the *Traffic Schematic* included in this report for all traffic data, including ADT turning movements.

The design year (2029) ADT along SR-257 from US-41 to the one-way stop at Lake Road is 2,320 vpd. The ADT from the one-way stop at Lake Road to the three-way stop at Gideon Road and Bethel Road is 3,340 vpd.

The design year design hourly volume (DHV) is 12% of the ADT. The DHV from US-41 to the one-way stop at Lake Road is 278 vph. The directional distribution of the traffic is 65% in the peak direction and 35% in the opposite direction. Therefore, the peak direction DHV from US-41 to the one-way stop at Lake Road is 181 vph. The DHV from the one-way stop at Lake Road to the three-way stop at Gideon and Bethel Road is 401 vph. The peak direction DHV from the one-way stop at Lake Road to the three-way stop at Gideon Road and Bethel Road is 261 vph. Turning movement peak hour DHV's can be calculated in a similar manner from the information provided in the *Traffic Schematic* included in this report.

The volume of truck traffic along this route is 5% of the DHV or 8% of the ADT. It was noted by Ridgetop officials that approximately 2-3 times a month heavy truck traffic is found along this route. This occurs when I-65 experiences heavy congestion due to the ongoing construction along I-65 or a crash.

2.3. CROSS-SECTION

SR-257 is classified by TDOT's Tennessee Roadway Information Management System (TRIMS) database as a two lane Urban Minor Arterial or a Rural Major Collector throughout the 2.05-mile study area. The posted speed limit is 35 mph. From US-41 to the one-way stop at Lake Road (1.75 miles), the travel lanes are 9' wide and the paved shoulders are 1' wide. From the one-way stop at Lake Road to the three-way stop at Gideon Road (0.30 miles), the travel lanes are 11' wide and the paved shoulders are 2' wide.

According to Ridgetop officials, the state has put 1' wide gravel shoulders along the route in the past. These 1' wide gravel shoulders were in addition to the existing paved shoulders. The additional width of gravel shoulder quickly washed away. The gravel shoulders were not stable and deep ruts quickly formed where vehicles left the paved surface.

No existing design plans could be located for this route. Based on field inspection of the location of the utility poles along the route, the field review team estimated the existing minimum R.O.W. to vary from 30 to 50 feet. A copy of the field review notes are included in the Appendix as Exhibit A-4.

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Inadequate roadside design is present throughout the study area. Steep shoulder drop-offs, inadequate ditch grading, and utility poles and/or trees are located adjacent to the roadway. Furthermore, the narrow existing R.O.W. does not allow for an adequate clearzone to be developed.

The narrow cross section of SR-257 is the primary deficiency of the route. As noted previously, the lane widths vary from 9 to 11' with 1-2' shoulders. As seen in Exhibits 2.3.1 and 2.3.2, in many areas there are steep 3-4' drop-offs from the edge of the shoulder to the adjacent ground. There are currently no accommodations for pedestrians or bicyclists along this route.

Exhibit 2.3.1

Pavement Drop-Off



Exhibit 2.3.2

Pavement Drop-Off



2.4 HORIZONTAL AND VERTICAL GEOMETRY

No existing design plans could be located for this route. The existing geometric features of this route were measured from aerial photography, USGS quad sheets, and field observations.

For the 35 mph posted speed limit within the study area, there are three deficient horizontal curves located along the corridor. These curves are listed in Exhibit 2.4.1 below. Their respective design speeds are listed in the table. The curves are listed in order from south to north along the route. As noted in the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (commonly referred to as the *Greenbook*, 2004 Edition, pg 68), "It is desirable that the running speed of a large proportion of drivers be lower than the design speed." Therefore, a 40 mph design speed was determined appropriate for this facility to safely maintain the posted 35 mph speed limit.

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Exhibit 2.4.1

SR-257 Existing Deficient Horizontal Curves

Horiz. Curve ID	Location	Curve Radius	Design Speed (Based on 4% Maximum S.E.)
1	Between Lenox Ave. and Yount St.	20° 00'	25 mph
2	At the north end of Lynne Circle (Reverse Curve)	12° 00'	30 mph
3	North of Lynn Circle – 90° curve towards Lake Ave.	40° 00'	20 mph

The terrain along this route consists of rolling hills. The existing vertical alignment follows this natural terrain. Three vertical curves appear deficient along SR-257. These vertical curves appear to have poor sight distance for a 35 mph roadway. The first deficient vertical curve on SR-257 is located south of Yount Street. The second deficient vertical curve is located between Yount Street and Knightengale Acres Road. The final deficient vertical curve is on SR-257 at the southern intersection with Lynn Circle. The sight distance is limited for vehicles departing Lynn Circle due to the deficient vertical curve along SR-257. Please refer to Exhibits 2.4.2 and 2.4.3 for photographs of two of the vertical curves discussed above. The locations of these vertical curves are noted in the *Conceptual Plans* included in this report.

Exhibit 2.4.2

Deficient Vertical Curve
Between Yount St. & Knightengale Acres



Exhibit 2.4.3

Deficient Vertical Curve
At Lynne Circle



2.5. CRASH DATA

Twenty crashes were reported along SR-257 within the study area between 2001 and 2003. Five of these crashes, or 25%, were injury crashes. No fatality crashes occurred within the study area between 2001 and 2003. The crashes are distributed relatively evenly across the study area. There is a higher volume of crashes at the southern termini near the intersection with US-41, however. This is not surprising due to a higher volume of vehicles being present at this intersection. The crash rate for this 2.05-mile, 1,610 vehicle per day, segment of SR-257 is calculated to be 5.52 crashes per million

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vehicle-miles. The statewide average for similar roads is 2.51 crashes per million vehicle-miles. The critical crash rate is calculated to be 4.59 crashes per million-vehicle miles. Please refer to Exhibits 2.5.1 and 2.5.2 for a tabulation and diagram of the crash data.

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Exhibit 2.5.1

SR-257 Crash Data Tabulation 2001-2003

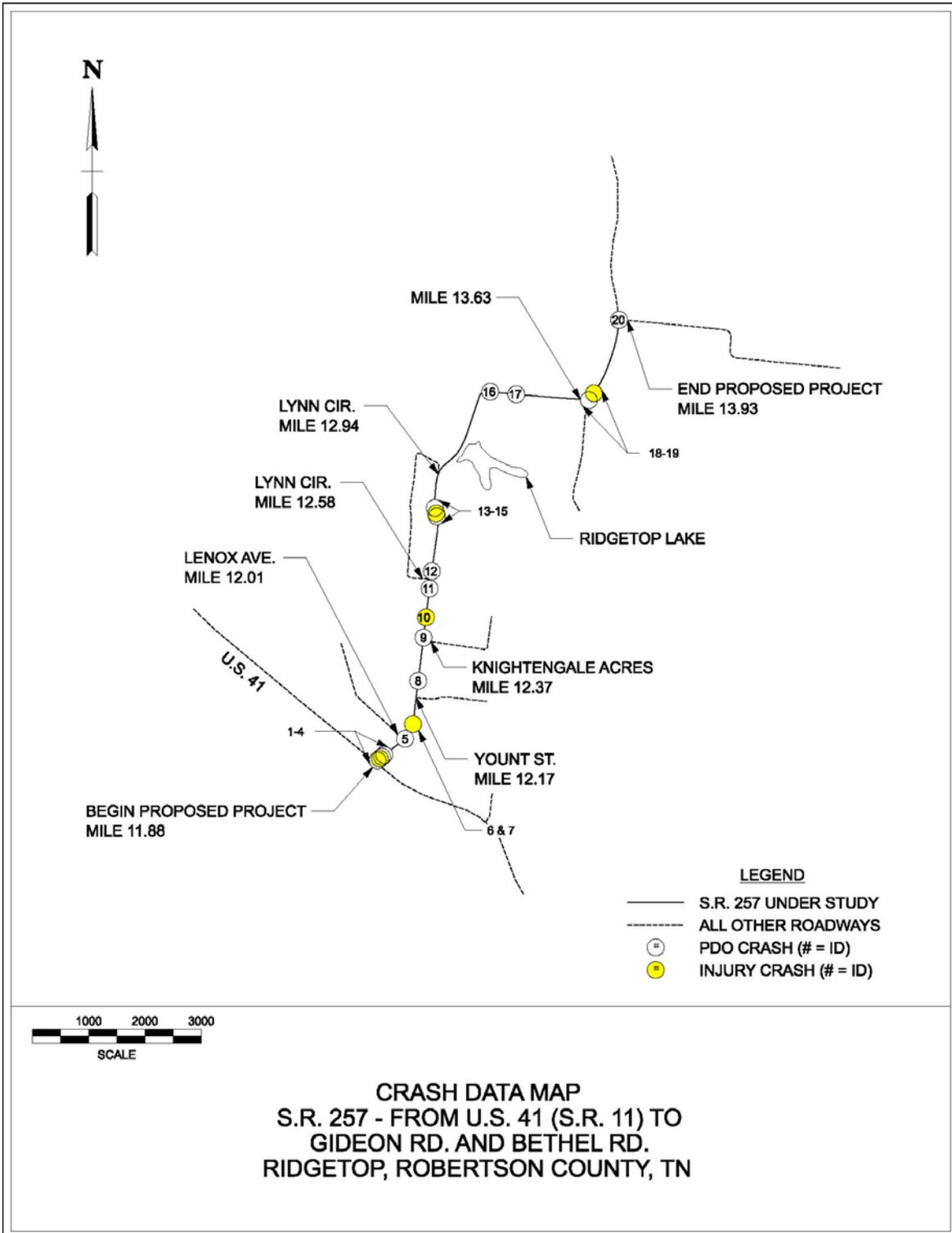
ID	Log Mile	Type of Crash	Location	Crash Type/Object Struck	Total Injured	Total Vehicles	Date of Crash
1	11.89	PDO	Mainline	Sign Post		1	7/5/01
2	11.90	INJ	Mainline	Tree	1	1	10/11/02
3	11.91	PDO	Mainline	Sideswipe, Opp. Dir.		2	3/27/02
4	11.92	PDO	Mainline	Utility Pole		1	7/27/02
5	12.01	PDO	Intersection	Angle		2	5/9/01
6	12.07	PDO	Mainline	Tree		1	9/30/03
7	12.07	INJ	Mainline	Tree	1	1	6/19/03
8	12.22	PDO	Mainline	Animal		1	2/20/02
9	12.37	PDO	Intersection	Ditch		1	6/25/02
10	12.44	INJ	Mainline	Ditch	1	1	10/7/03
11	12.54	PDO	Mainline	Sideswipe, Opp. Dir.		2	6/13/03
12	12.60	PDO	Mainline	Angle		2	1/11/02
13	12.79	PDO	Intersection	Sideswipe, Same Dir.		2	6/23/03
14	12.80	INJ	Mainline	Utility Pole	1	1	3/31/03
15	12.82	PDO	Mainline	Fixed Obj.		1	12/13/01
16	13.29	PDO	Mainline	Tree		1	7/11/03
17	13.38	PDO	Mainline	Sideswipe, Opp. Dir.		2	5/3/03
18	13.63	PDO	Intersection	Rear-End		2	5/17/01
19	13.66	INJ	Mainline	Ditch	1	1	1/16/03
20	13.93	PDO	Intersection	Rear-End		1	5/19/02

	No.	%
1. Property Damage Only (PDO) Crashes	15	75%
2. Injury (INJ) Crashes	5	25%
3. Fatality Crashes	0	0%
4. Single vehicle/run-off the road crashes	13	65%
5. Sideswipe, opposite direction crashes	3	15%
6. Collisions potentially related to narrow road/ poor roadside design (=4+5)	16	80%

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Exhibit 2.5.2

SR-257 Crash Data Map



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Many of the crashes reported indicate the existing narrow roadway width contributed to the incidents. Thirteen (65%) of the crashes were single vehicle and/or run-off the road incidents. Three (15%) of the crashes were sideswipe crashes between vehicles traveling in opposite directions. Together, these two crash types are sixteen (16) of the twenty (20) crashes along this route, or 80% of the crashes. These two crash types support the position that the narrow cross section of the roadway is a contributing factor.

2.6. LEVEL OF SERVICE

The Level of Service (LOS) for this corridor was analyzed using the Urban Streets process within the Highway Capacity Software (HCS+ Version 5.2). The urban streets procedure was chosen due to the residential nature of this corridor and the low operating speeds. The mainline LOS are calculated to be "B" for both the 2009 and 2029 peak hours of traffic. The improvements recommended in this report do not affect the LOS calculations. A summary table of the LOS calculations is provided in Exhibit 2.1.6 below. The HCS+ output is provided in the Appendix as Exhibit A-5.

Exhibit 2.6 LOS Analysis

Analysis Time Period	Peak Hour Directional Flow Rate (VPH)	Capacity (VPH)	v/c Ratio	LOS
2009	258	575	0.45	B
2029	392	575	0.68	B

3.0 PROPOSED IMPROVEMENTS

SR-257 within the limits of this study is located in a primarily residential area. Local officials noted there is little desire to alter the character of the road or increase speeds along the route. The primary focus of the study is therefore to provide adequate lane widths with shoulders, spot improvements of deficient locations, and study the need for turn lanes at a few locations. The City of Ridgetop officials do not desire realignment of the route to a new location. Pedestrian and bicycle needs should be considered with all improvements due to the residential nature of the area and the proposed 25-acre park being constructed across from Knightengale Acres Road.

Proposed improvements are based on the projected 2029 traffic provided by TDOT. This will provide improvements with a 20-year design life. A 40 mph design speed with a 0.04 ft/ft maximum superelevation rate was decided upon for this corridor. This will safely accommodate the 35 mph posted speed limit in this urban environment.

No existing design plans could be located for this route. The existing geometric features of this route were measured from aerial photography, USGS quad sheets, and field observations.

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3.1 CROSS-SECTION

To meet current TDOT design standards for a minor urban arterial, it is proposed to increase the lane widths of SR-257 to 12 feet. At the field review, it was determined the best cross-section for use along the corridor will consist of curb, gutter, and an enclosed drainage network. This will be visually appealing in this residential corridor, and reduce the amount of R.O.W. needed by eliminating ditches designed to AASHTO Roadside Design Guide standards. The recommended four-foot shoulders will accommodate bicyclists.

3.1.1 Sidewalk

It is proposed to construct a sidewalk along the northbound lane of SR-257 the entire length of the study corridor from US-41 to Bethel Road. The 2.05-mile sidewalk will provide pedestrian connectivity within this primarily residential corridor. The new subdivision and city park being constructed demonstrate the need for pedestrian access along this residential route.

3.1.2 Proposed R.O.W.

As discussed in Section 2.3 of this report, the minimum existing R.O.W. is estimated to vary from 30' to 50'. A minimum of 60' will be needed for the proposed cross-section. This 60' R.O.W. will accommodate the 12' lanes, 4' shoulders, curb and gutter, sidewalk with grass strip at the curb, and a 4' utility strip. Slopes to tie to the existing ground will be in a slope easement and are not included within the proposed R.O.W. It is estimated that 74 property tracts will be affected by the additional R.O.W. needed.

3.1.3 Dam Crossing

SR-257 crosses a dam located adjacent to Ridgetop Lake within the study corridor. The existing crossing is narrow with the lake to the right and a steep 25' drop-off to a stream on the left. The lane widths are 9' with limited shoulders and guardrail. This cross-section is deficient for the Urban Minor Arterial standard chosen. TDOT Structures Division recommends no impact be made to this dam. TDOT does not currently own the dam. Any improvements made on the dam would require TDOT to take ownership and assume all maintenance and liability for the dam. Therefore, it is not recommended to improve the roadway cross section across the top of the dam. The roadway should be relocated to a new location in the vicinity of the dam so that the recommended cross section can be maintained for the entire corridor. The roadway relocation in the vicinity of the dam is discussed further in Section 3.2.3 of this report. A copy of the letter from TDOT's Division of Structures recommending no impact to the dam is included in the Appendix as Exhibit A-6.

3.2 HORIZONTAL ALIGNMENT

It is recommended to improve two horizontal curves along the route. Their radii need to be increased to match the desired 40 mph design speed. In addition to the improved radii of these curves, two horizontal alignment shifts are necessary to avoid environmentally sensitive areas. The locations of these horizontal alignment adjustments are noted in the *Conceptual Plans* included in this report.

SR-257 Robertson County TPR

3.2.1 Deficient Curves to be Improved

The first curve to be improved is located between US-41 and Yount Street. The curve is deficient with a 286' radius (20° curve). Utilizing a superelevation of 4%, this existing radius is equivalent to a 25 mph design speed curve. Four percent superelevation is the desirable amount recommended for an urban roadway based on TDOT Standard Drawing RD-SE-2. It is recommended to improve this curve to a 40 mph design speed, or 573' radius (10° 00' curve). The impact to adjacent property with this improvement is minor.

The second curve is located north of Ridgdetop Lake and west of Lake Road. The curve is deficient with a 143' radius (40° curve). Utilizing a superelevation of 4%, this existing radius is equivalent to a 20 mph design speed curve. It is recommended to improve this curve to a 40 mph design speed, or 573' radius (10° 00' curve). This improvement will require one residence to be relocated.

A third deficient curve is noted in Section 2.4 of this report. That deficient curve will be corrected by the alignment shift necessary to avoid the dam at Ridgdetop Lake (discussed in Section 3.2.3 below).

3.2.2 Alignment Shift to Avoid Historic Property

The horizontal alignment should be shifted in the vicinity of the historic property discussed in Section 2.1 of this report. This property is known as the Wilson house and is located adjacent to the southbound lane of SR-257 across from Knightengale Acres. The alignment shift should be adequate to maintain the existing southbound R.O.W. line adjacent to the property. No R.O.W or easements should be taken from the historic property.

3.2.3 Alignment Shift to Avoid Dam

The horizontal alignment of SR-257 should also be shifted in the vicinity of the dam discussed in Section 3.1 of this report. It is recommended by the TDOT Structural Division to avoid any impact to the dam. The alignment shift will locate SR-257 to the west of the existing location. The realigned section will cross a large valley and blue line stream with a bridge. The required bridge spans will total 550 feet and will be approximately 50 feet above the valley floor below. The cost estimate of the proposed improvements in this report is broken into sections because of the high expense associated with this structure, compared to the other relatively minor improvements recommended elsewhere along this route. The realignment of SR-257 at this location will require two residences to be relocated.

3.2.4 Side Roads

The northern intersection of Lynn Circle with SR-257 should be improved. Lynn Circle intersects SR-257 at a considerable skew. Therefore, it is recommended to realign this side road to intersect SR-257 at a 90-degree angle. This realignment will also be necessary due to the recommended realignment of SR-257 to avoid the dam adjacent to Ridgdetop Lake.

SR-257 Robertson County TPR

3.3 VERTICAL ALIGNMENT

It is proposed to grade three vertical curves to improve sight distance along SR-257. The sight distance of these curves appears deficient from field inspection. The horizontal alignment shift proposed to avoid impacting the dam will also require the vertical alignment to be improved.

3.3.1 Deficient Curves to be Improved

The first vertical curve to be improved is located between US-41 and Yount Street. It is estimated a depth of 6' should be graded at the peak of the vertical curve. The length of roadway affected is estimated to be 440 feet. This estimation is based on an assumed grade difference of 10% and a minimum crest "K" value of 44 for the desired 40 mph design speed. The impact to adjacent property with this improvement is expected to be minor.

The second vertical curve is located between Yount Street and Knightengale Acres Road. It is estimated a depth of 6' should be graded at the peak of the vertical curve. The length of roadway affected is estimated to be 440 feet. This estimation is based on an assumed grade difference of 10% and a minimum crest "K" value of 44 for the desired 40 mph design speed. This improvement will likely require one residence to be relocated.

The third vertical curve is located at the southern intersection of Lynn Circle with SR-257. This vertical curve has limited sight distance for vehicles departing from Lynn Circle. It is also estimated a depth of 6' should be graded at the peak of the vertical curve. The length of roadway affected is estimated to be 440 feet. This estimation is based on an assumed grade difference of 10% and a minimum crest "K" value of 44 for the desired 40 mph design speed. The impact to adjacent property with this improvement is expected to be minor.

3.3.2 Alignment Shift to Avoid Dam

The horizontal alignment shift to avoid the dam will require a large shift in the vertical alignment. No survey of this site was performed. However, based on USGS quad sheet contours, a 550-foot bridge span will be required 50' above the valley floor below. It does not appear possible to follow the existing vertical alignment due to the maximum 8% vertical grade and minimum sag vertical curve requirements to meet the recommended 40 mph design speed. The proposed vertical alignment will eliminate the steep grades approaching Ridgetop Lake. The finished grade will be approximately 30 feet above the existing grade at the dam. The horizontal and vertical alignment shifts to avoid the dam will require two residences to be relocated.

3.4 TURN LANES

The need for turn lanes was studied. It is recommended to install turn lanes on SR-257 at US-41, on SR-257 at the one-way stop at Lake Road and Gideon Road, and at all approaches to the three-way stop at Gideon Road and Bethel Road. Left turn lanes were analyzed, but not recommended at the new city park and new subdivision along SR-257. The projected traffic at both of these sites does not meet the standards

SR-257 Robertson County TPR

outlined in TDOT's Roadway Design Guidelines to warrant left turn lanes. R.O.W. restrictions due to the historic property would also be problematic at this location.

3.4.1 Left Turn Lane at US-41

The intersection of SR-257 with US-41 is signalized. From the 2029 traffic data provided by TDOT, 128 vph are projected to make left turns from SR-257 to southbound US-41. Based on Exhibit 10-13 of the Highway Capacity Manual, left turn signal phasing should be considered for left turn volumes above 100 vph. Left turn phases should generally not be installed without a left turn bay. Therefore, it is recommended to install a left turn lane at this location.

The minimum recommended bay length is 75 feet. This bay will accommodate three passenger cars. The approach taper should be 320' and the bay taper should be 160'. The tapers are based on TDOT Design Guideline recommendations for a 40 mph design speed. The traffic signal hardware will need to be modified to accommodate the new turn lane. Signal poles will need to be moved along with some signal heads replaced.

3.4.2 Left Turn Lane at One-Way Stop at Lake Road and Gideon Road

The intersection of SR-257 at Lake Road and Gideon Road is unsignalized. From the 2029 traffic data provided by TDOT, 170 vph are projected to make left turns from SR-257 to northbound Gideon Road.

For the traffic projected, the minimum recommended bay length is 125' based on TDOT Design Guideline Figure 2-9. The approach taper should be 320' and the bay taper should be 160'. The tapers are based on TDOT Design Guideline recommendations for a 40 mph design speed.

3.4.3 Turn Lanes at the Intersection of Bethel Road and Gideon Road

It was recommended at the field review to add turn lanes to all approaches to this intersection. Therefore, a right turn lane should be added to Gideon Road northbound, and left turn lanes should be added to Bethel Road westbound and Gideon Road southbound. The approach tapers should be 320' and the bay tapers should be 160'. The tapers are based on TDOT Design Guideline recommendations for a 40 mph design speed. The minimum bay lengths should be 75 feet. This bay length will accommodate three passenger cars.

3.4.4 Left Turn Lane at Proposed City Park

From the Institute of Traffic Engineers's (ITE) Trip Generation, 7th Edition manual (page 640), it can be estimated that 34 vph will enter the 25-acre park. Assuming the entering vehicles are distributed evenly from the north and south directions, 17 vph are expected to enter the city park via left turns. Utilizing TDOT Design Guideline Figure 2-10b *Warrant for Left Turn Storage Lanes on Two-Lane Highways*, a left turn lane is not warranted at this location for the projected traffic.

3.4.5 Left Turn Lane at Proposed 50-Tract Subdivision

From the Institute of Traffic Engineers's (ITE) Trip Generation, 7th Edition manual (page 271), it can be estimated that 36 vph will enter the 50-tract subdivision. Assuming the entering vehicles are distributed evenly from the north and south directions, 18 vph are expected to enter the subdivision park via left turns. Utilizing TDOT Design Guideline Figure 2-10b *Warrant for Left Turn Storage Lanes on Two-Lane Highways*, a left turn lane is not warranted at this location for the projected traffic.

4.0 PEDESTRIANS AND BICYCLES

The proposed improvements will accommodate pedestrian and bicycle needs in this residential area. A sidewalk is proposed for the entire 2.05-mile corridor. Four foot wide shoulders are recommended. This, in conjunction with the wider 12' travel lanes, will accommodate bicyclists. The recommendations proposed to the horizontal and vertical alignment of the route are primarily spot improvements, and should not increase vehicular speeds above the existing 35 mph speed limit. Maintaining the low speed of the route, along with providing sidewalks and paved shoulders, will enhance the accessibility for pedestrians and bicyclists along SR-257.

5.0 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

SR-257 within the study area is primarily a local route located within a residential area. Therefore, no ITS recommendations are made in correlation with this proposed project.

6.0 DISPOSITION OF EXISTING ROUTE

The recommendations within this study primarily improve the existing route. Where any minor realignment occurs, i.e. realigning a horizontal curve, the existing roadway should be scarified and obliterated. The realignment necessary to avoid the dam will leave the existing roadbed on the dam. Potential uses could include a greenway. The dam is not TDOT property and therefore The City of Ridgetop and/or the adjacent neighborhood association should determine the most appropriate use for the abandoned roadbed. It is recommended to eliminate access by motorized vehicles to the dam, however.

7.0 NATURAL IMPACTS

The recommendations in this report avoid impacts to the two known environmentally sensitive locations along this route: The Wilson House (located on the future park property across from Knightengale Acres) and the dam at Ridgetop Lake.

8.0 IMPACT TO AIR AND NOISE QUALITY

The recommendations in this report should have negligible impact on the air and noise quality of this route.

9.0 FIELD INVESTIGATION

Two field investigations were held for this project. Summaries of those meetings are included in the Appendix as Exhibit A-4.

SR-257 Robertson County TPR

An initial field investigation was held on 12/14/05 at 8:30 AM. Those in attendance included:

<u>Name</u>	<u>Company/Agency</u>	<u>E-Mail/Phone No.</u>
Mark Johnson	City of Ridgetop Mayor of Ridgetop	xme@mindspring.com (615) 859-0596
Tony Reisner	City of Ridgetop Fire Chief	(615) 851-4570
Jon Storey, P.E.	Florence & Hutcheson	istorey@flohut.com (615) 399-9090

A field review was held on 2/10/06 at 10:00 AM. Those in attendance included:

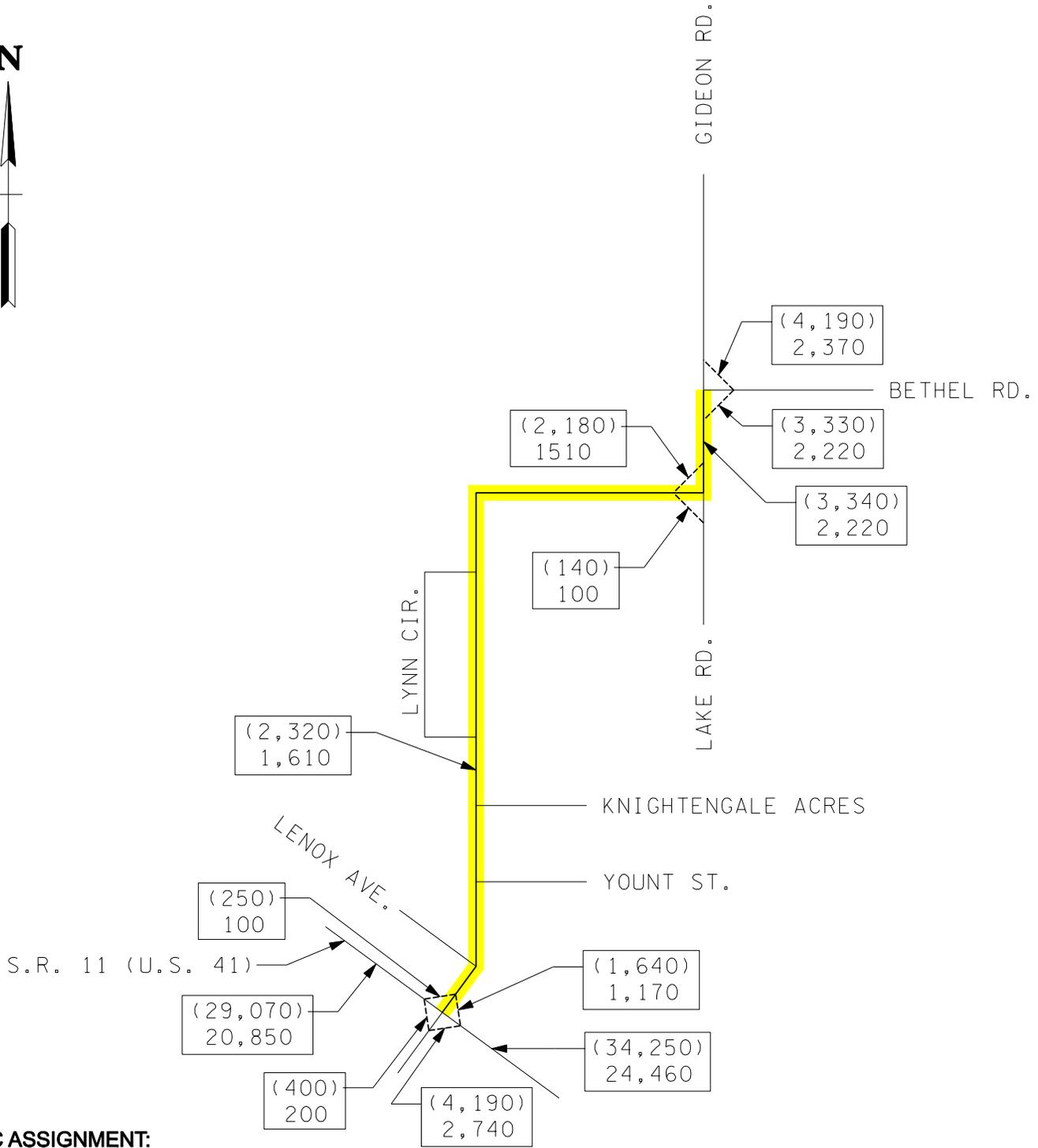
<u>Name</u>	<u>Company/Agency</u>	<u>E-Mail/Phone No.</u>
Mark Johnson	City of Ridgetop Mayor of Ridgetop	xme@mindspring.com (615) 859-0596
Tony Reisner	City of Ridgetop Fire Chief	(615) 851-4570
Bob Allen	TDOT Environmental	Bob.allen@state.tn.us (615) 532-2468
David H. Thompson	TDOT Environmental	David.h.thompson@state.tn.us (615) 532-2471
Charles Bush	TDOT Environmental	Charles.bush@state.tn.us (615) 741-3653
Carl Brown	TDOT Environmental	(615) 253-2459
Charles Graves	TDOT Planning	Charles.graves@state.tn.us (615) 741-6410
Gary Webber	TDOT Planning	Gary.webber@state.tn.us (615) 741-5372
John Moore	TDOT Region III Design	John.w.moore@state.tn.us (615) 350-4250
Jon Storey	Florence & Hutcheson	istorey@flohut.com (615) 399-9090

Checklist of Determinants for Location Study

Location: S.R. 257 from Ridgetop (U.S. 41) east to Gideon Rd. and Bethel Rd.

If preliminary field reviews indicate the presence of any of the following facilities or ESE categories, place an "X" in the blank opposite the item. Where more than one alternate is to be considered, place its letter designation in the blank.

1. Agricultural land usage.....X
2. Airport (existing or proposed).....
3. Commercial area, shopping center..... X
4. Floodplains.....
5. Forested Land.....X
6. Historical, archaeological, cultural, or natural landmark
or cemeteries.....X
7. Industrial park, factory.....X
8. Institutional usage's
 - a. School or other educational institution.....
 - b. Church or other religious institution.....
 - c. Hospital or other medical facility.....
 - d. Public building, e.g., fire station.....
 - e. Defense Installation.....
9. Recreational Usage's
 - a. Park or recreational area, State Natural Area..... **PROPOSED**
 - b. Wildlife refuge or wildlife management area.....
10. Residential Establishment..... X
11. Urban area, town, city or community..... X
Title 6, low income/minority community.....
12. Waterway, lake, pond, river, stream, spring, wetland..... X
Permit required: Coast Guard.....
Section 404..... X
Section 10.....
TVA Section 26a review.....
NPDES..... X
Aquatic Resource Alteration Permit..... X
Class V Injection Wells.....
13. Location coordinated with local officials..... X
14. Railroad Crossings.....
15. Hazardous Material Site.....
Underground Storage Tanks – U.S.T.).....
16. Other.....



TRAFFIC ASSIGNMENT:

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS	
ADT	YEAR	ADT	DHV	%	YEAR	DIR.DIST.	DHV	ADT
2220	2009	3340	401	12	2029	65-35	5	8

LEGEND

	S.R. 257 UNDER STUDY
###	2009 ADT
(###)	2029 ADT

**TRAFFIC SCHEMATIC
S.R. 257 - FROM U.S. 41 (S.R. 11) TO
GIDEON RD. AND BETHEL RD.
RIDGETOP, ROBERTSON COUNTY, TN**

**Tennessee Department of Transportation
Design Criteria for Location and Design Phase**

Route:	SR-257, E. Woodruff Ave., Lake Rd. and Gideon Rd.	Alternate:	N/A
Section:	N/A	Region:	III
County:	Robertson	Project #	104906.00

Location

From:	U.S. 41 (SR-11), Log Mile 11.88
To:	The three-way stop at Gideon Road, Log Mile 13.93

Parameter	Criteria
2009 ADT	2,220
2029 ADT	3,340
Percent Trucks (DHV)	5%
DHV (12% ADT 2029)	401
Functional Classification	Urban Minor Arterial/Rural Major Collector
Minimum Design Speed	40 MPH
Access Control	N/A
Maximum Curve	Radius = 573 ' = 10°00' (S.E. = 0.04 '/')
Maximum Grade	8%
Minimum Stopping Sight Distance	305'
Surface Width	2 @ 12'
Number of Lanes	2
Usable Shoulder Width	2 @ 6' ^A (Includes Curb & Gutter)
Median Width	N/A
Minimum R.O.W. (Curb & Gutter)	60'
Signalization	Modify Signal at U.S. 41 to accommodate proposed left turn lane on S.R. 257

^A Shoulder will accommodate cyclists

Cost Data Sheet

State Route 257

Section: 1, from US-41 to just before Lynn Circle

Length: 1.03 Miles

Right-of-Way

Land	3.9 acres	\$ 336,000
Incidentals	47 tracts	\$ 118,000
Relocation Payments	1 residences business & farm non-profits	\$ 22,500

Total Right-of-Way Cost \$ 477,000

Utility Relocation

Reimbursable	\$ -
Non-reimbursable	\$ 390,000

Total Utility Cost \$ 390,000

Construction

Clear and Grubbing	\$ 5,000
Earthwork	\$ 64,000
Pavement Removal	\$ 10,000
Drainage	\$ 404,000
Structures	\$ -
Railroad Crossing or Separation	\$ -
Paving	\$ 647,000
Retaining Walls	\$ -
Maintenance of Traffic	\$ 100,000
Topsoil	\$ 7,000
Seeding	\$ 3,000
Sodding	\$ 15,000
Signing	\$ 5,000
Lighting	\$ -
Signalization	\$ 75,000
Fence	\$ -
Guardrail	\$ -
Rip Rap or Slope Protection	\$ -
Construction Item Subtotal	\$ 1,335,000
Other Construction Items (8.5%)	\$ 113,000
Erosion Control (3.5%)	\$ 47,000
Mobilization	\$ 65,000

Construction Cost \$ 1,560,000

10% Engineering & Cont. \$ 156,000

Total Construction Cost \$ 1,716,000

Preliminary Engineering (10%) \$ 172,000

Total Cost \$ 2,755,000

Cost Data Sheet

State Route 257

Section: 2, from just before Lynn Circle to after Ridgetop Lake and dam (Bridge)

Length: 0.25 Miles

Right-of-Way

Land	2.05 acres	\$ 565,000
Incidentals	5 tracts	\$ 13,000
Relocation Payments	2 residences	\$ 45,000
	business & farm	
	non-profits	

Total Right-of-Way Cost \$ 623,000

Utility Relocation

Reimbursable	\$ -
Non-reimbursable	\$ 79,000

Total Utility Cost \$ 79,000

Construction

Clear and Grubbing	\$ 5,000
Earthwork	\$ 114,000
Pavement Removal	\$ 2,000
Drainage	\$ 54,000
Structures	\$ 1,579,000
Railroad Crossing or Separation	\$ -
Paving	\$ 96,000
Retaining Walls	\$ -
Maintenance of Traffic	\$ 63,000
Topsoil	\$ -
Seeding	\$ -
Sodding	\$ 5,000
Signing	\$ 5,000
Lighting	\$ -
Signalization	\$ -
Fence	\$ -
Guardrail	\$ -
Rip Rap or Slope Protection	\$ 51,000
Construction Item Subtotal	\$ 1,974,000
Other Construction Items (8.5%)	\$ 168,000
Erosion Control (3.5%)	\$ 69,000
Mobilization	\$ 94,000

Construction Cost \$ 2,305,000

10% Engineering & Cont. \$ 231,000

Total Construction Cost \$ 2,536,000

Preliminary Engineering (10%) \$ 254,000

Total Cost \$ 3,492,000

Cost Data Sheet

State Route 257

Section: 3, from after Ridgetop Lake and dam to the 1-way stop at Lake/Gideon Roads

Length: 0.44 Miles

Right-of-Way

Land	2.2 acres	\$ 283,000
Incidentals	14 tracts	\$ 35,000
Relocation Payments	1 residences business & farm non-profits	\$ 22,500

Total Right-of-Way Cost **\$ 341,000**

Utility Relocation

Reimbursable	\$ -
Non-reimbursable	\$ 139,000

Total Utility Cost **\$ 139,000**

Construction

Clear and Grubbing	\$ 5,000
Earthwork	\$ 50,000
Pavement Removal	\$ 10,000
Drainage	\$ 172,000
Structures	\$ -
Railroad Crossing or Separation	\$ -
Paving	\$ 280,000
Retaining Walls	\$ -
Maintenance of Traffic	\$ 63,000
Topsoil	\$ -
Seeding	\$ -
Sodding	\$ 10,000
Signing	\$ 5,000
Lighting	\$ -
Signalization	\$ -
Fence	\$ -
Guardrail	\$ -
Rip Rap or Slope Protection	\$ -
Construction Item Subtotal	\$595,000
Other Construction Items (8.5%)	\$ 51,000
Erosion Control (3.5%)	\$ 21,000
Mobilization	\$ 32,000

Construction Cost \$ 699,000

10% Engineering & Cont. \$ 70,000

Total Construction Cost **\$ 769,000**

Preliminary Engineering (10%) **\$ 77,000**

Total Cost **\$ 1,326,000**

Cost Data Sheet

State Route 257

Section: 4, from the 1-way stop at Lake/Gideon Roads to Gideon/Bethel Roads

Length: 0.33 Miles

Right-of-Way

Land	1.96 acres	\$	61,000
Incidentals	8 tracts	\$	20,000
Relocation Payments	0 residences	\$	-
	business & farm		
	non-profits		

Total Right-of-Way Cost \$ 81,000

Utility Relocation

Reimbursable	\$	-
Non-reimbursable	\$	90,000

Total Utility Cost \$ 90,000

Construction

Clear and Grubbing	\$	5,000
Earthwork	\$	25,000
Pavement Removal	\$	5,000
Drainage	\$	112,000
Structures	\$	-
Railroad Crossing or Separation	\$	-
Paving	\$	265,000
Retaining Walls	\$	-
Maintenance of Traffic	\$	63,000
Topsoil	\$	3,000
Seeding	\$	2,000
Sodding	\$	5,000
Signing	\$	5,000
Lighting	\$	-
Signalization	\$	-
Fence	\$	-
Guardrail	\$	-
Rip Rap or Slope Protection	\$	-
Construction Item Subtotal	\$	490,000
Other Construction Items (8.5%)	\$	42,000
Erosion Control (3.5%)	\$	17,000
Mobilization	\$	27,000

Construction Cost \$ 576,000

10% Engineering & Cont. \$ 58,000

Total Construction Cost \$ 634,000

Preliminary Engineering (10%) \$ 63,000

Total Cost \$ 868,000

Cost Data Sheet

State Route 257

Section: Total of all 4 Sections

Length: 2.05 Miles

Right-of-Way

Land	10.11 acres	\$ 1,245,000
Incidentals	74	\$ 186,000
Relocation Payments	4 residences business & farm non-profits	\$ 90,000

Total Right-of-Way Cost **\$ 1,522,000**

Utility Relocation

Reimbursable	\$ -
Non-reimbursable	\$ 698,000

Total Utility Cost **\$ 698,000**

Construction

Clear and Grubbing	\$ 20,000
Earthwork	\$ 253,000
Pavement Removal	\$ 27,000
Drainage	\$ 742,000
Structures	\$ 1,579,000
Railroad Crossing or Separation	\$ -
Paving	\$ 1,288,000
Retaining Walls	\$ -
Maintenance of Traffic	\$ 289,000
Topsoil	\$ 10,000
Seeding	\$ 5,000
Sodding	\$ 35,000
Signing	\$ 20,000
Lighting	\$ -
Signalization	\$ 75,000
Fence	\$ -
Guardrail	\$ -
Rip Rap or Slope Protection	\$ 51,000
Construction Item Subtotal	\$ 4,394,000
Other Construction Items (8.5%)	\$ 373,000
Erosion Control (3.5%)	\$ 154,000
Mobilization	\$ 203,000

Construction Cost \$ 5,140,000

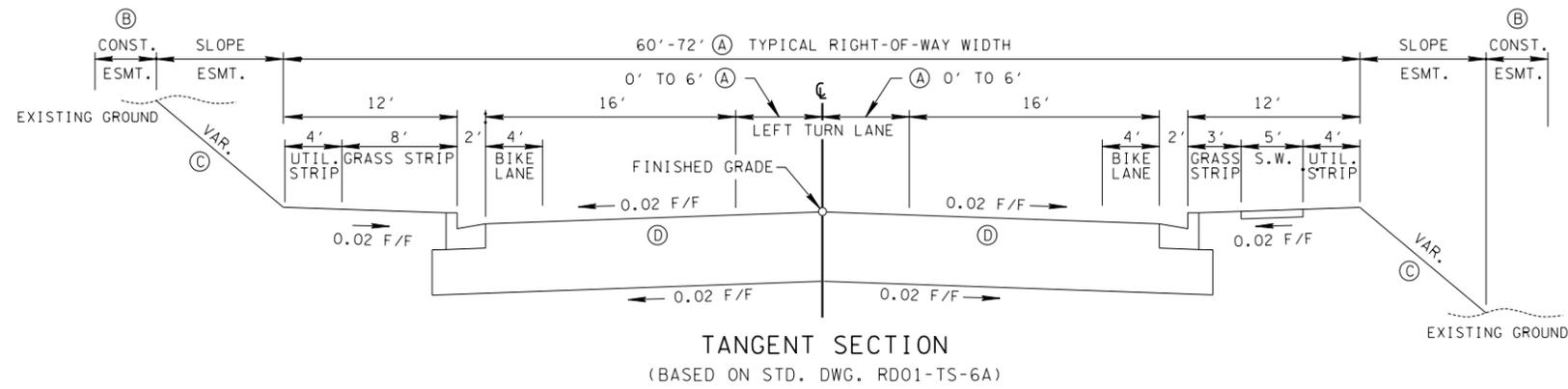
10% Engineering & Cont. \$ 515,000

Total Construction Cost **\$ 5,655,000**

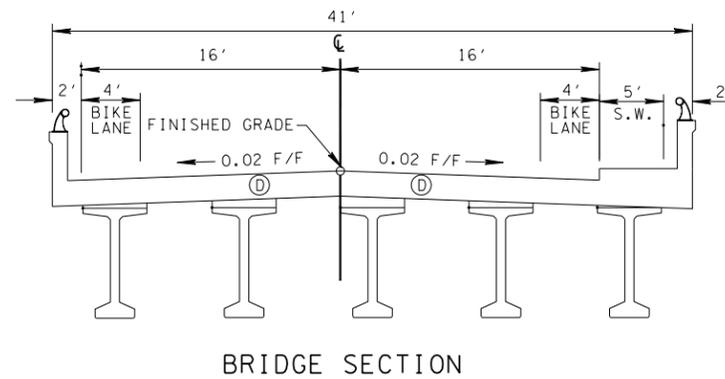
Preliminary Engineering (10%) **\$ 566,000**

Total Cost **\$ 8,441,000**

TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2006	104906.00	2



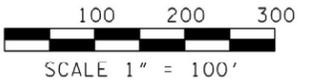
- (A) SEE CONCEPTUAL PLAN SHEETS FOR LEFT TURN LANE LOCATIONS
- (B) 10 FEET MINIMUM DESIRABLE
- (C) 3:1 SLOPES OR FLATTER ARE DESIRABLE AND 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE
- (D) MAXIMUM SUPERELEVATION = 0.04 ' / '. SEE STANDARD DRAWING RD01-SE-2 FOR SUPERELEVATION DETAILS



TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2006	104906.00	3



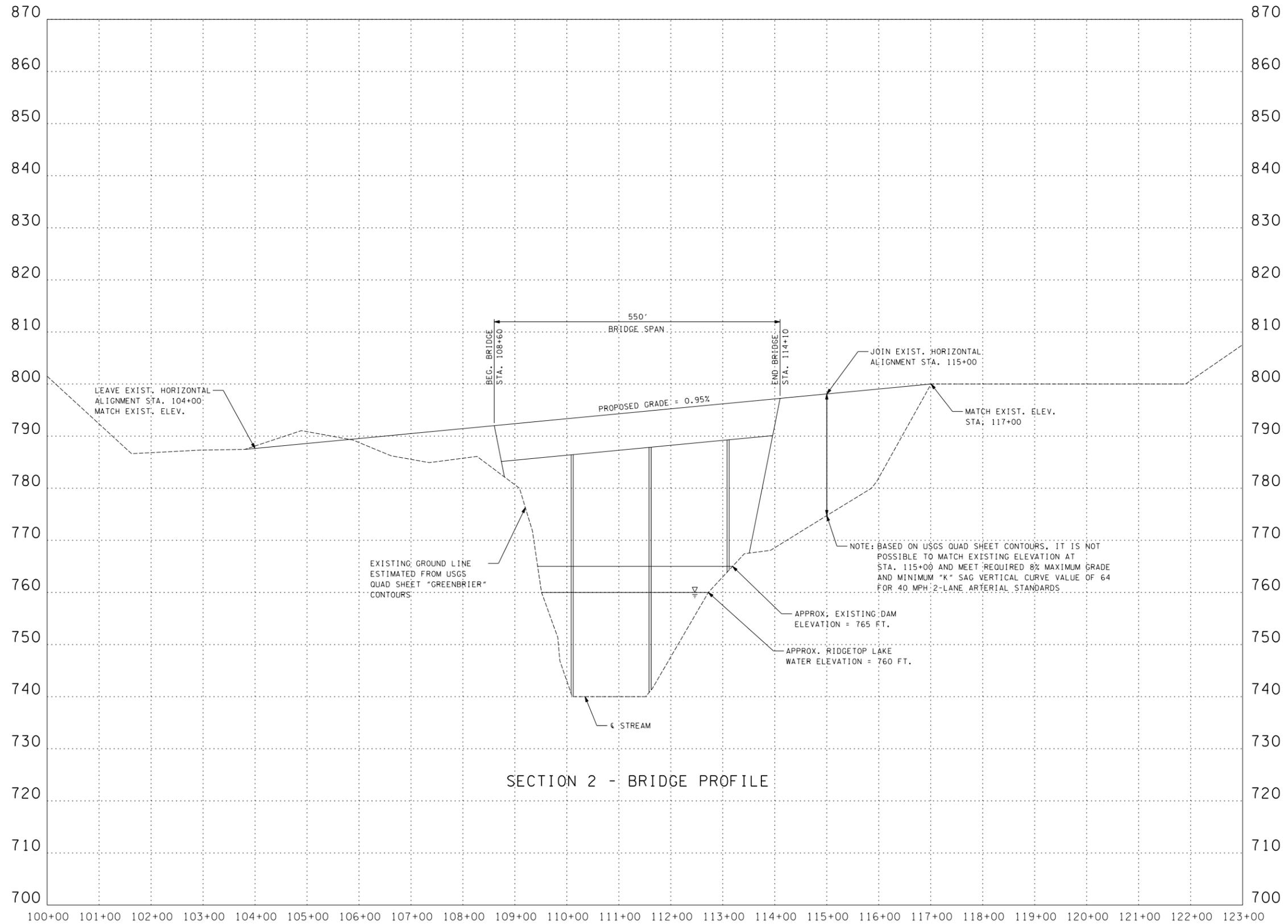
SEE SHEET NO. 4
 MATCH LINE



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 STATE ROUTE 257
 ROBERTSON CO.

*****TIME*****
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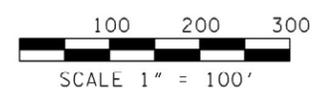
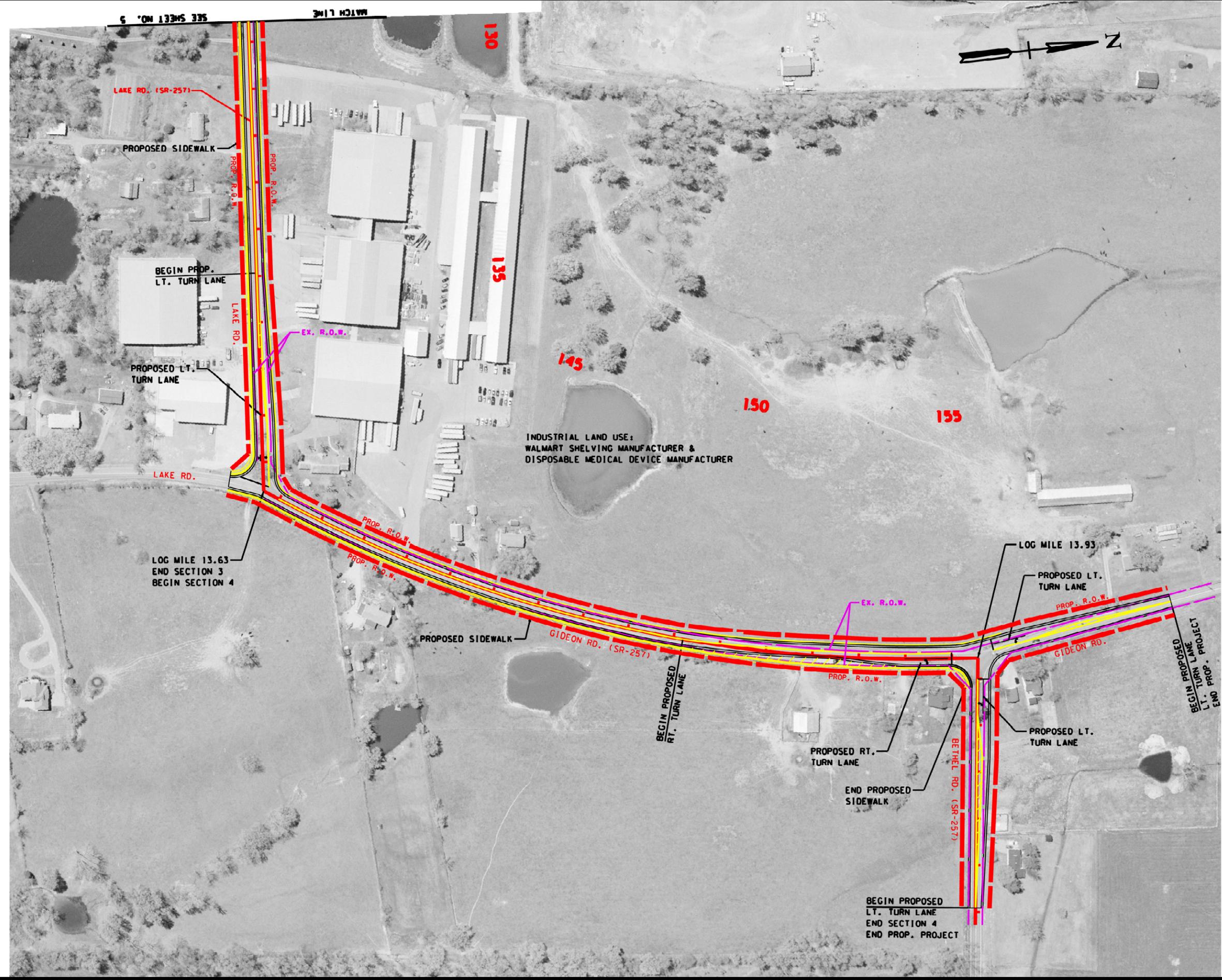
TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2006	104906.00	6



\$\$\$\$SYTIME\$\$\$\$
\$\$\$\$DONSPEC\$\$\$\$

TENNESSEE D. O. T.
 DESIGN DIVISION
 FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2006	99106-1084-04	7



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 STATE ROUTE 257
 ROBERTSON CO.

*****TIME*****
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