



**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PLANNING DIVISION
SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-0334**

Gerald F. Nicely
COMMISSIONER

Phil Bredesen
GOVERNOR

MEMORANDUM

TO: Paul Degges
Chief Engineer

Teresa Estes
Manager 2, Office of Local Programs

FROM: Steve Allen
Director, Project Planning Division

DATE: June 21, 2010

SUBJECT: Feasibility Study for GreenLea Blvd. EXT. from State Route 386 to State
Route 174 (Long Hollow Pike), Gallatin, Sumner County

Attached is a copy of the feasibility study performed for the above referenced document. This study fulfills a portion of the application for an Local Interstate Connector at GreenLea Blvd. in Gallatin.

This study is being provided for you to use in determining priorities, establishing future scheduling, and initiating further development of the project.

If you have any questions regarding the document, please contact me at (615) 741-2208 or email at Steve.Allen@tn.gov

SA/gjg

FEASIBILITY STUDY

**GREENLEA BOULEVARD EXTENSION
FROM STATE ROUTE 386
TO STATE ROUTE 174 (LONG HOLLOW PIKE)
SUMNER COUNTY**



*PREPARED BY
RPM TRANSPORTATION CONSULTANTS, LLC*

FOR THE

*TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION*

June 2010

PURPOSE OF THE FEASIBILITY STUDY

The purpose of this feasibility study is to investigate options for the alignment and operation of a proposed extension of GreenLea Boulevard in Gallatin, Sumner County. This proposed extension is the last segment of GreenLea Boulevard to be constructed, connecting State Route (SR) 6 and SR 174 (Long Hollow Pike). The portion of the proposed GreenLea Boulevard extension considered in this study is from the existing interchange at SR 386 to SR 174 (Long Hollow Pike), a distance of approximately 0.54 miles.

This extension was requested to be developed as a Local Interstate Connector route by Mayor Jo Ann Graves of Gallatin. This Feasibility Study is being conducted to investigate this proposed extension per the Department's "Guidelines for Construction of Local Interstate Connecting Routes".

BACKGROUND INFORMATION

The segment of GreenLea Boulevard under investigation is from SR 386 to SR 174 (Long Hollow Pike). A grade separated interchange currently exists on GreenLea Boulevard at SR 386. Project vicinity and location maps are given as Figures 1 and 2, respectively.

Gallatin's *General Development and Transportation Plan Update, Gallatin on the Move 2020 (Move 2020)* specifies that a direct connection is planned between the SR 386 interchange and SR 174. It states that this segment "will initially be constructed to a 3-lane section" but that "adequate right-of-way should be reserved between SR 386 and Long Hollow Pike (SR 174) for potential expansion to 5-lanes."

Other future projects planned by the City in *Move 2020* have been considered as part of this study. Namely,

- Construct a grade-separated interchange at the current intersection of SR 174 and SR 386
- Reconstruct the westbound ramps of the SR 386 interchange with GreenLea Boulevard to accommodate the future construction of the Bison Trail extension

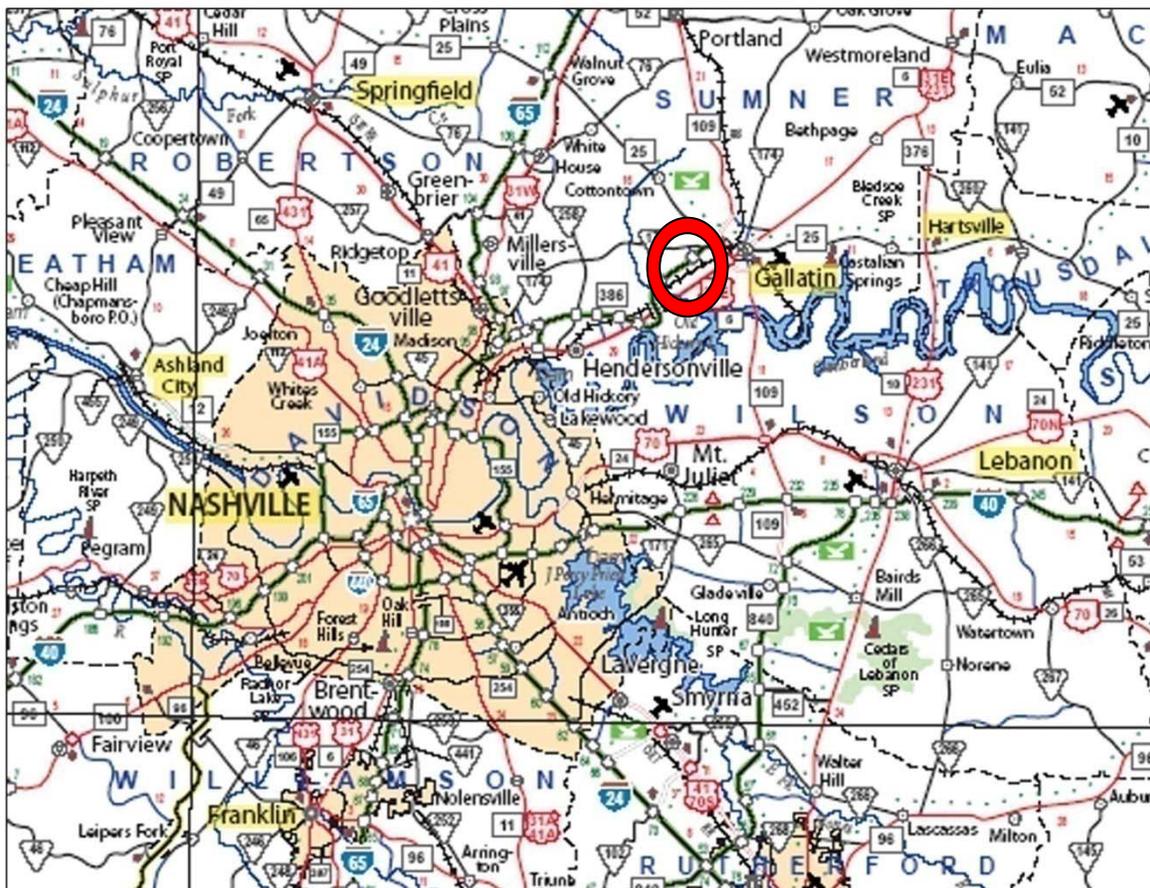
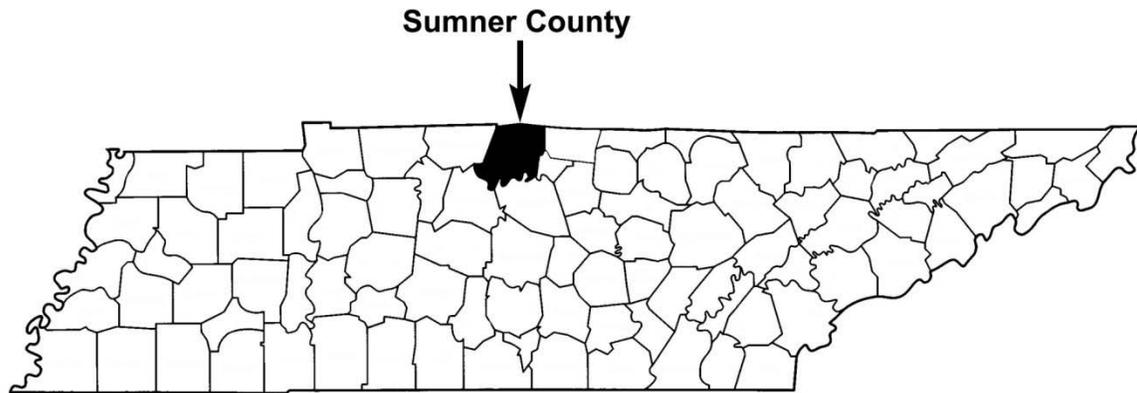
OPTIONS FOR IMPROVEMENT

In addition to the no build option, one option for improvement to meet the connectivity needs is presented as Option A. Traffic projections for this improvement option were developed by TDOT and were used to determine future roadway needs.

No Build

As shown in Figure 2, the connection between GreenLea Boulevard and SR 174 currently exists via Harris Lane. Harris Lane is a rural two (2) lane road with nine (9) foot travel lanes and no shoulders. A 90 degree horizontal curve exists. The no build option leaves Harris Lane to make the connection between GreenLea Boulevard and SR 174 and does not meet minimum safety or capacity requirements for a local interstate connector route.

Extension of GreenLea Boulevard, Sumner County
Feasibility Study



Project Vicinity Map
Not to Scale

Figure 1.



Project Location Map
Not to Scale

Figure 2.

Option A

Option A describes the layout as generally proposed by the City in *Move 2020*. This option would extend GreenLea Boulevard directly north from the SR 386 interchange, cross Liberty Creek, and continue on new alignment to intersect SR 174 at the Stratford Park residential subdivision. The existing portion of Harris Lane south of SR 174 would extend to an intersection with the proposed GreenLea Boulevard extension and would maintain access to the properties south of SR 174 and west of the GreenLea Boulevard extension.

A slight modification to the *Move 2020* plan of constructing a three (3) lane road later to be widened to five (5) lanes is recommended. The GreenLea Boulevard extension would be constructed with a full width cross-section having shoulders and curb and gutter drainage to match the existing five (5) lane section south of the SR 386 interchange. However, the center portion of the roadway would be constructed as a raised grass median. This would result in two (2) through lanes (one in each direction) separated by a 36 foot wide grass median. This way, as additional capacity is needed, the median can be replaced with an additional lane in each direction and a two-way center turn lane without removal of the curb and gutter drainage system. The cross-section will also include 10 foot wide shoulders and 12 foot wide utility strips where sidewalks will be constructed as part of City plans in the future.

Construction should include the acquisition of right-of-way to a total width of 108 feet, enough to accommodate the proposed cross-section. The intersection of the GreenLea Boulevard extension and SR 174 would align with Stratford Park Boulevard to create a four legged signalized intersection.

Other improvements required as part of Option A include:

- Adding a 150 foot left turn lane on the westbound SR 386 off ramp approach at GreenLea Boulevard
- Adding a 100 foot left turn lane on the eastbound SR 386 off ramp approach at GreenLea Boulevard
- Signalization of the following intersections: SR 174 and GreenLea Boulevard extension, westbound SR 386 ramps and GreenLea Boulevard, and eastbound SR 386 ramps and GreenLea Boulevard
- Adding a 50 foot left turn lane on the southbound Stratford Park Boulevard approach at SR 174

Local plans are to extend Bison Trail eastward to intersect GreenLea Boulevard north of Freedom Church Road (see Figure 3). Currently, the intersection of GreenLea Boulevard and Freedom Church Road is located approximately 230 feet north of the intersection of the nearest SR 386 ramps, This distance is less than desirable and, with increasing traffic volumes, will potentially result in making the westbound SR 386 off-ramp to Freedom Church Road movement problematic due to limited weaving distance. To avoid this problem, or any SR 386 ramp reconstruction that may be required to maintain the intersection of GreenLea Boulevard and Freedom Church Road, it is proposed as part of this study to modify the future alignment of

the Bison Trail extension further north. Ideally, this future corridor would intersect GreenLea Boulevard approximately mid-way between Harris Lane and Freedom Church Road. Future access needs in this area could then be met by the Bison Trail corridor instead of Freedom Church Road.

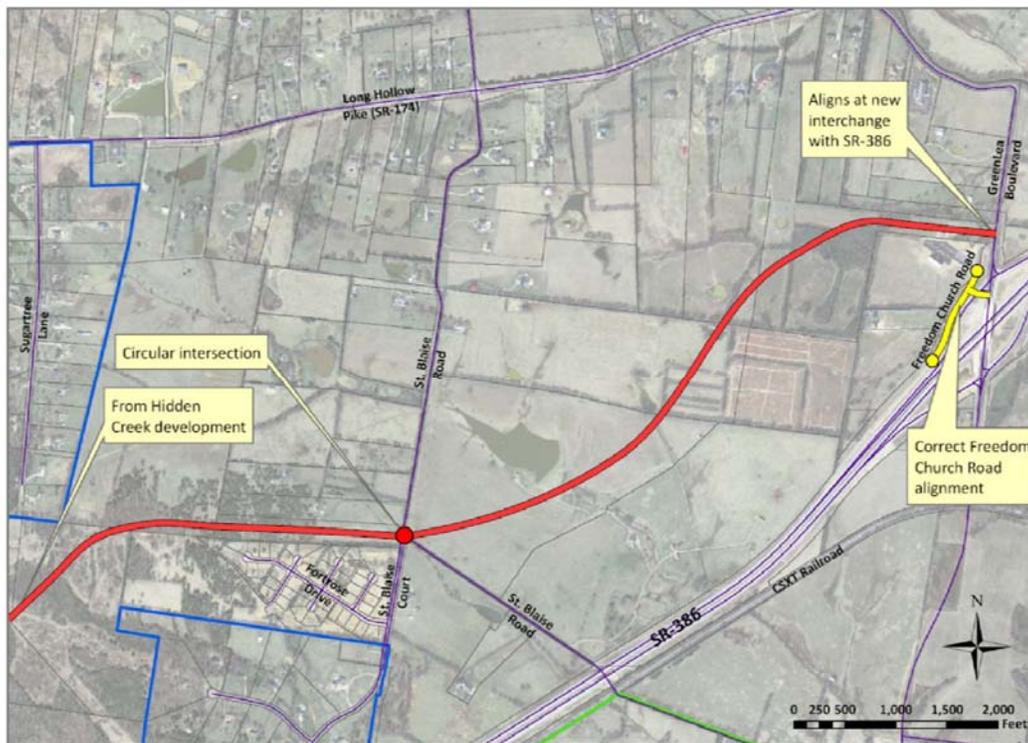


Figure 3. Proposed Bison Trail Extension (Source: Gallatin on the Move 2020, City of Gallatin)

The traffic projections for the key intersections of Option A are given in Figure 4 for the base year 2014 and in Figure 5 for the future year 2034. Traffic analyses have been developed for these intersections (assuming construction of the above improvements) and a summary of these analyses is given as Table 1. As shown in Table 1, with the improvements outlined above, all of the key intersections, with the exception of the intersection of SR 174 and SR 386, will operate with an acceptable level of service through the design year.

The existing intersection of SR 174 and SR 386 presents some problem under the base and design year scenarios given the high volumes of traffic projected along SR 386. By the design year 2034, it is projected that SR 386 will have an ADT of over 90,000 vehicles per day. For a roadway carrying this much volume, an at-grade intersection cannot be designed within reasonable size and operational constraints.

Given the increases in traffic expected over the next 25 years, the role and function of SR 386 west of Gallatin should be studied on a wider scale than is presented in this report. It may be that the long-term mobility needs for this corridor impact the alignment of the proposed GreenLea Boulevard extension.

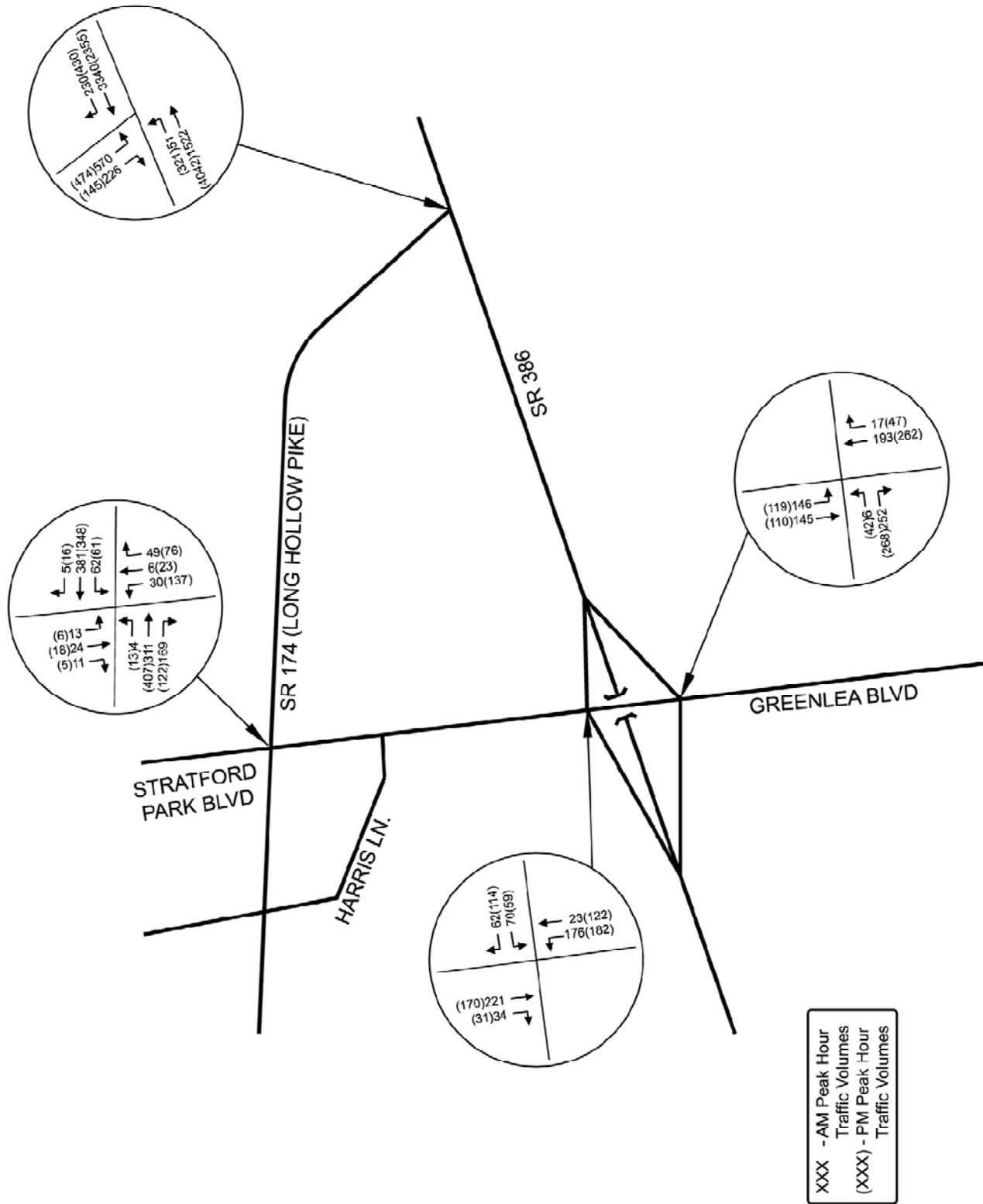


Figure 4.

Peak Hour Turning Movement Volumes, Option A (Year 2014)

(Not to Scale)



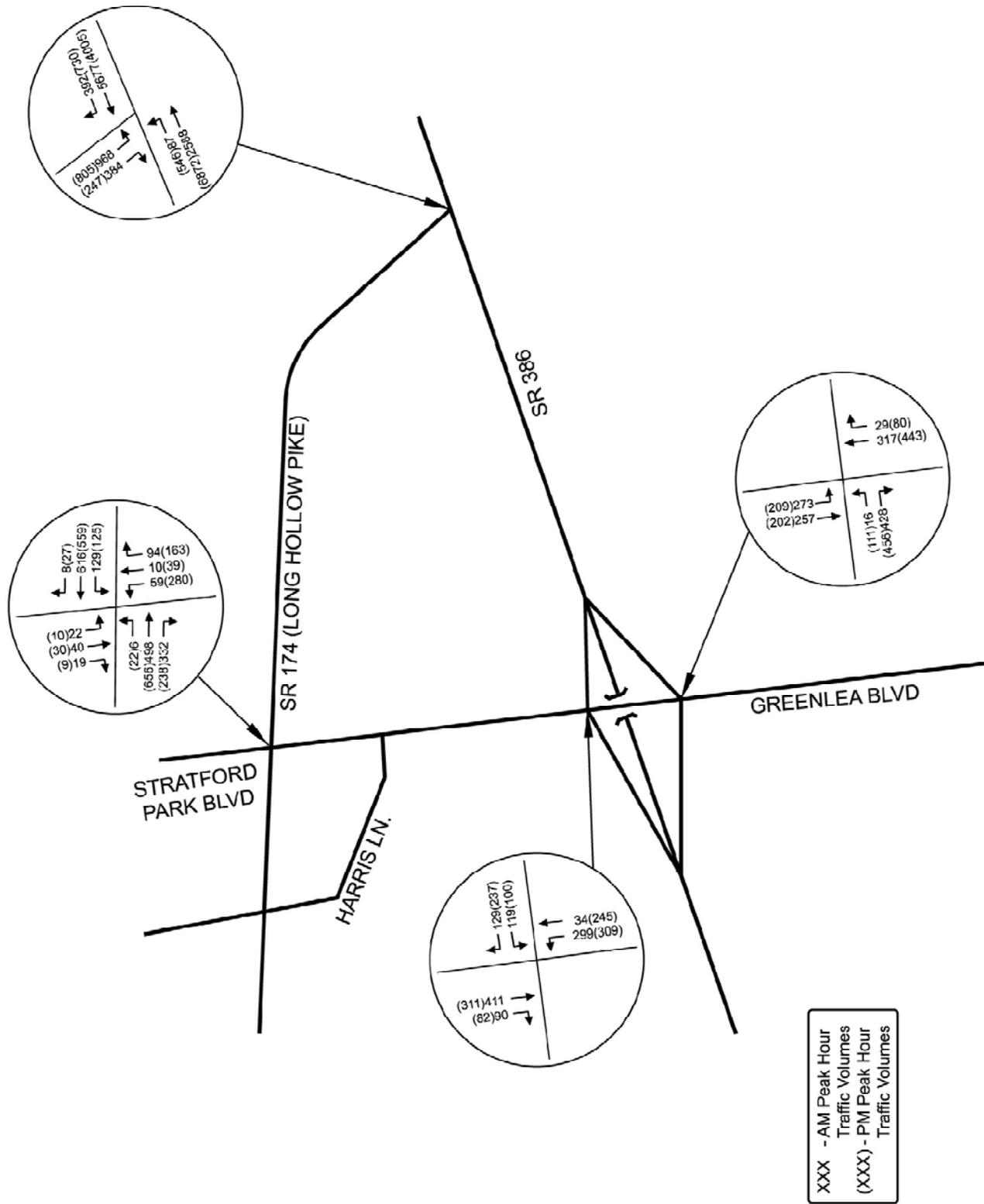


Figure 5.

Peak Hour Turning Movement Volumes, Option A (Year 2034)

(Not to Scale)

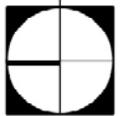


Table 1. Summary Traffic Analysis of Key Intersections, Option A

Intersection	Analysis Year	AM Peak Hour		PM Peak Hour	
		Level of Service	Delay (sec/veh)	Level of Service	Delay (sec/veh)
SR 174 and Proposed GreenLea Blvd Extension/ Stratford Park Dr	2014	C	21.6	C	22.3
	2034	C	30.0	C	32.5
GreenLea Blvd and WB SR 386 ramps	2014	B	16.9	B	15.6
	2034	B	19.0	B	17.0
GreenLea Blvd and EB SR 386 ramps	2014	B	16.6	B	17.6
	2034	B	19.3	B	19.8
SR 174 and SR 386	2014	F	188.6	F	226.7
	2034	Projected volumes exceed the capacity of an at-grade intersection. Further study of access options is required.			
NOTE: All intersections are proposed to be signalized, therefore an overall LOS and delay is presented for each intersection.					

Construction of Option A is estimated to cost \$4,082,000. This includes a construction cost of \$2,430,000, a right-of-way cost of \$1,051,000, a utility relocation cost of \$270,000, and a preliminary engineering cost of \$331,000.

Modification to State Route System

No changes to the state routing system are currently proposed as part of Option A. The SR 174 designation would follow Long Hollow Pike to SR 386 and would follow the SR 386 alignment into Gallatin. However, future modification to the state route system could occur under Option A. Specifically, SR 174 could follow Long Hollow Pike west of the study area, then turn southerly to follow the proposed GreenLea Boulevard extension. At the GreenLea Boulevard interchange with SR 386, the SR 174 designation would turn again to follow the SR 386 alignment into Gallatin.

Table 3 summarizes the potential changes in length of the SR 174 routing as a result of this project. As shown in Table 3, modifying the state route system under the potential Option A scenario would add 0.84 miles to the State Route system as SR 174.

Table 3. Modification to State Route System

Segment of State Route 174	Scenario	Length of State Route 174 (miles)	Addition to State Route System (miles)
Harris Lane to SR 386	Existing	0.84	N/A
Harris Lane to SR 386	Option A (proposed)	0.84	0
Harris Lane to SR 386 Interchange	Option A (potential)	0.92	0.08
SR 386 Interchange to Long Hollow Pike	Existing	N/A	N/A
SR 386 Interchange to Long Hollow Pike	Option A (proposed)	N/A	N/A
SR 386 Interchange to Long Hollow Pike	Option A (potential)	0.76	0.76
Total Addition to State Route System (miles) – Existing System			0
Total Addition to State Route System (miles) – Option A (proposed)			0
Total Addition to State Route System (miles) – Option A (potential)			0.84
Note: No changes to the routing of SR 386 are proposed under the improvement option. Only 0.08 miles are actually new miles on the State Highway System since the 0.76 miles identified as SR 174 from SR 386 Interchange to Long Hollow Pike already carry the SR 386 designation.			

Environmental Impact

An Early Environmental Screening (EES) was performed by TDOT for this project. The EES found that the project is likely to result in substantial impact to a large wetland area. Evidence of the wetland area was noted in the pasture located in between SR 174 and Liberty Creek within the area of the proposed GreenLea Boulevard extension alignments. Option A would cross a portion of the wetland area. Compensatory mitigation of this wetland area may be required as part of this proposed alignment.

Option A requires one crossing of Liberty Creek. Liberty Creek is identified by the USGS as a blue-line stream and appropriate permitting will be required before crossing this creek.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

SUMNER COUNTY

GREENLEA BOULEVARD
EXTENSION
FROM S.R. 386 TO
S.R. 174 (LONG HOLLOW PIKE)

STATE HIGHWAY NO. N/A F.A.H.S. NO. N/A

TENN.	YEAR	SHEET NO.
	2010	1
FED. AID PROJ. NO.		
STATE PROJ. NO.		

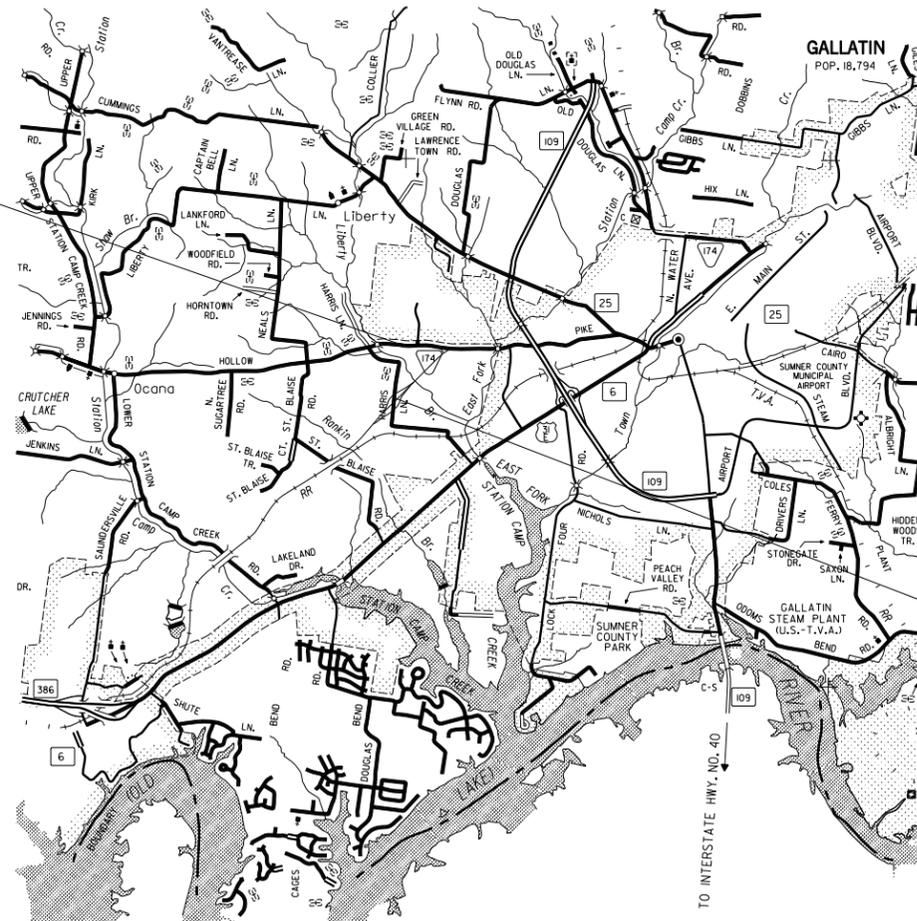
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL SECTIONS
3-4	PROPOSED LAYOUTS (OPTION "A")



PROJECT LOCATION
SUMNER COUNTY



END
PROJECT LOCATION



BEGIN
PROJECT LOCATION

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED MARCH 1, 2006 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

TDOT C.E. MANAGER 1 _____
DESIGNED BY RPM Transportation Consultants, LLC
DESIGNER _____ CHECKED BY _____
P.E. NO. _____
PIN NO. _____

SCALE: 1" = 5280'

APPROVED: _____
CHIEF ENGINEER

DATE: _____

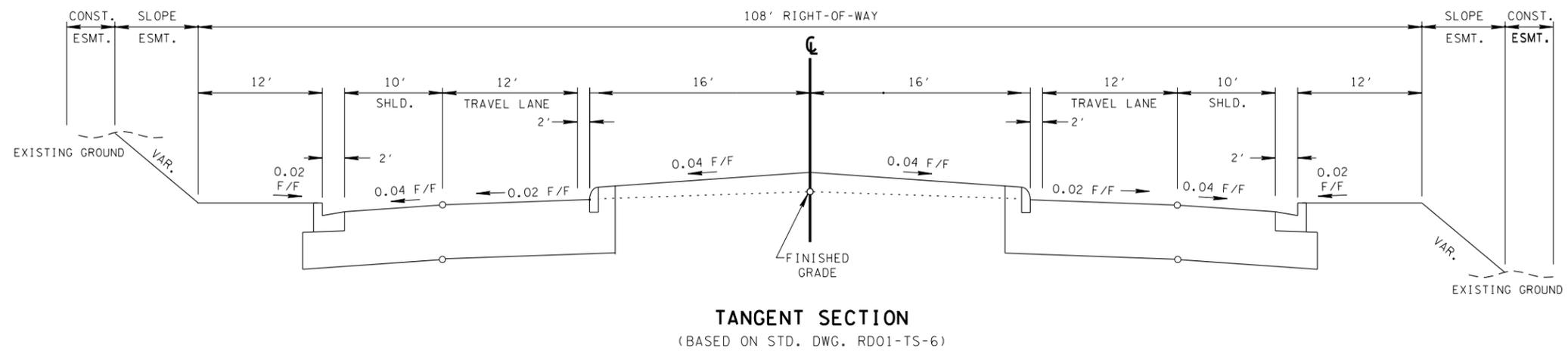
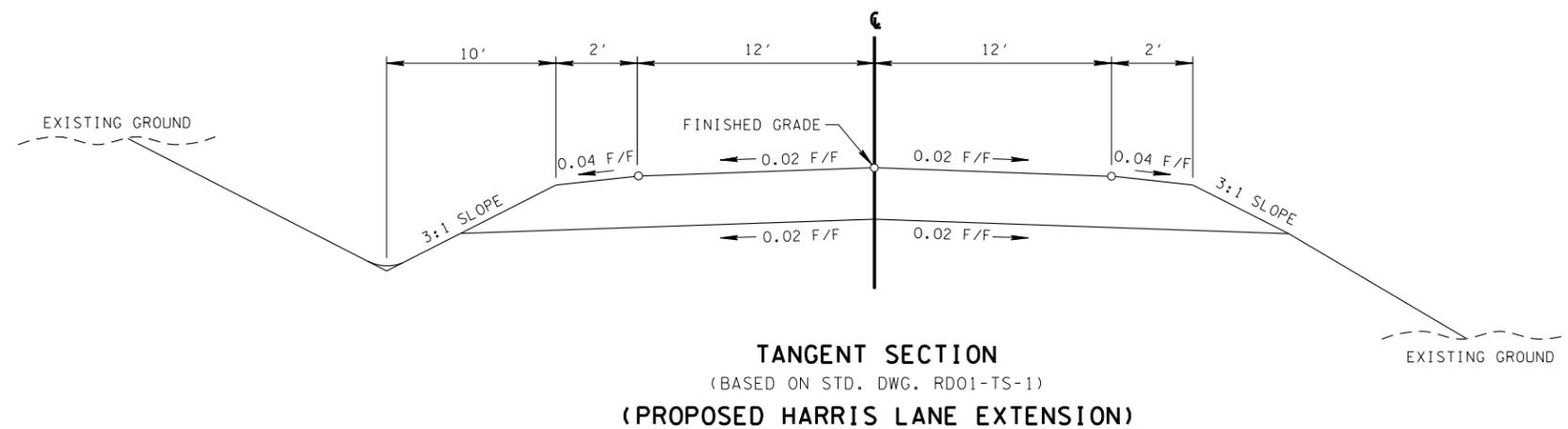
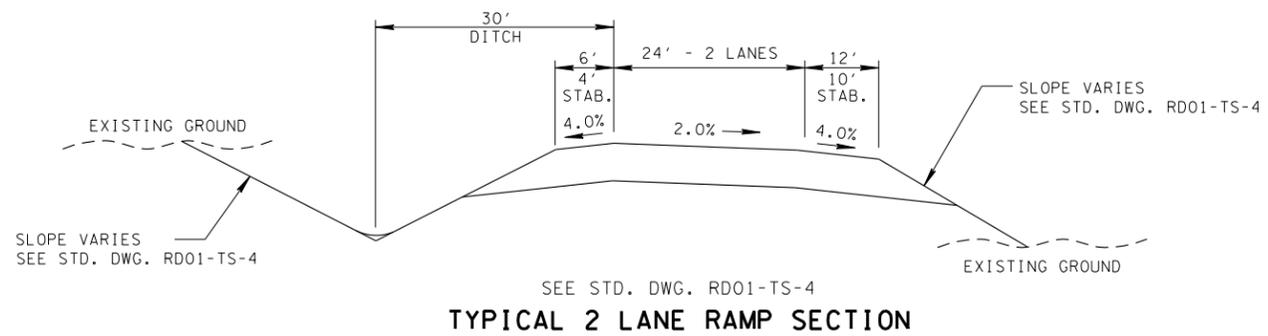
APPROVED: _____
COMMISSIONER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

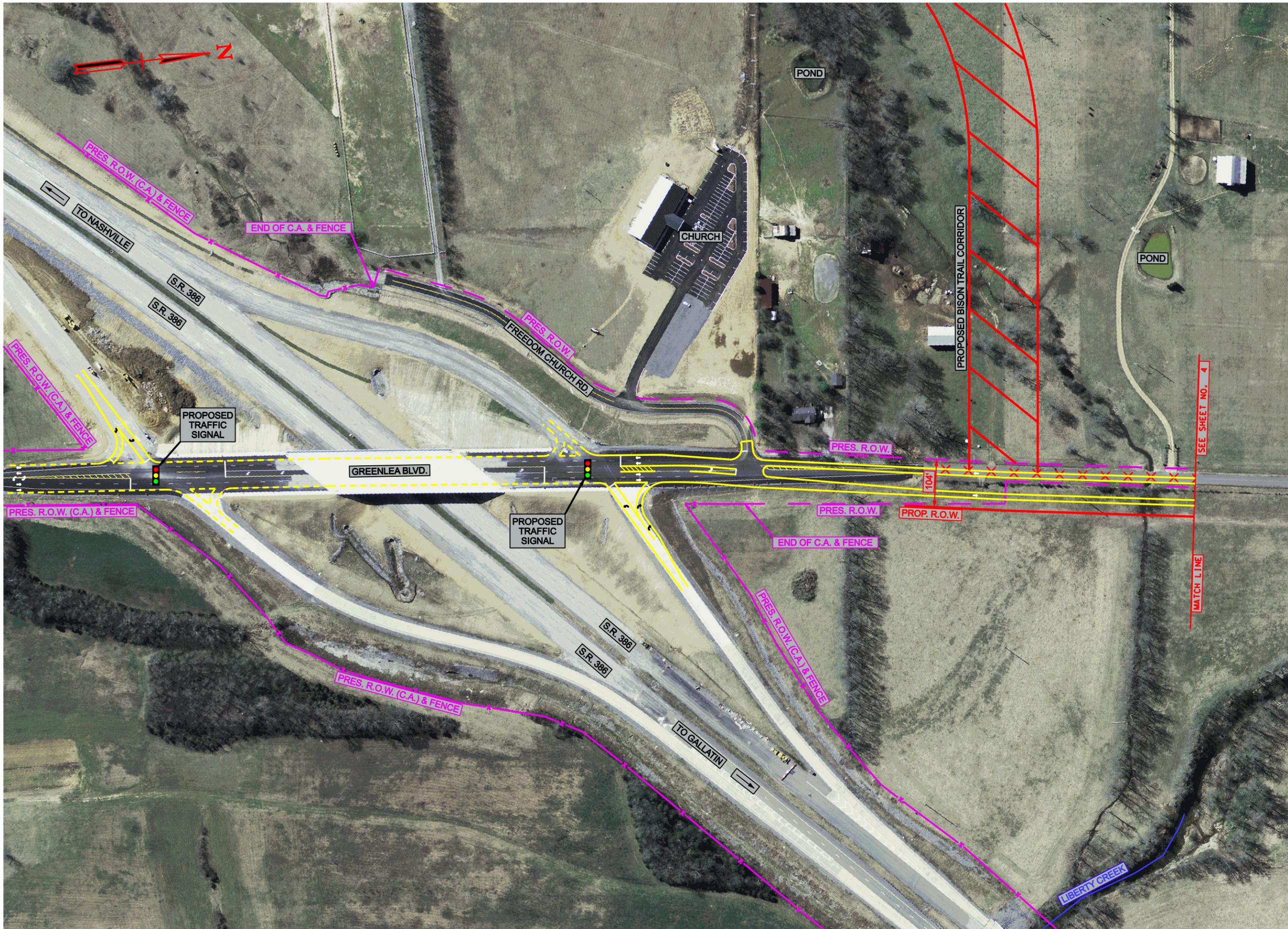
APPROVED: _____
DIVISION ADMINISTRATOR

DATE: _____

TYPE	YEAR	COUNTY	SHEET NO.
FEAS.	2010	SUMNER	2



TYPE	YEAR	COUNTY	SHEET NO.
FEAS.	2010	SUMNER	3

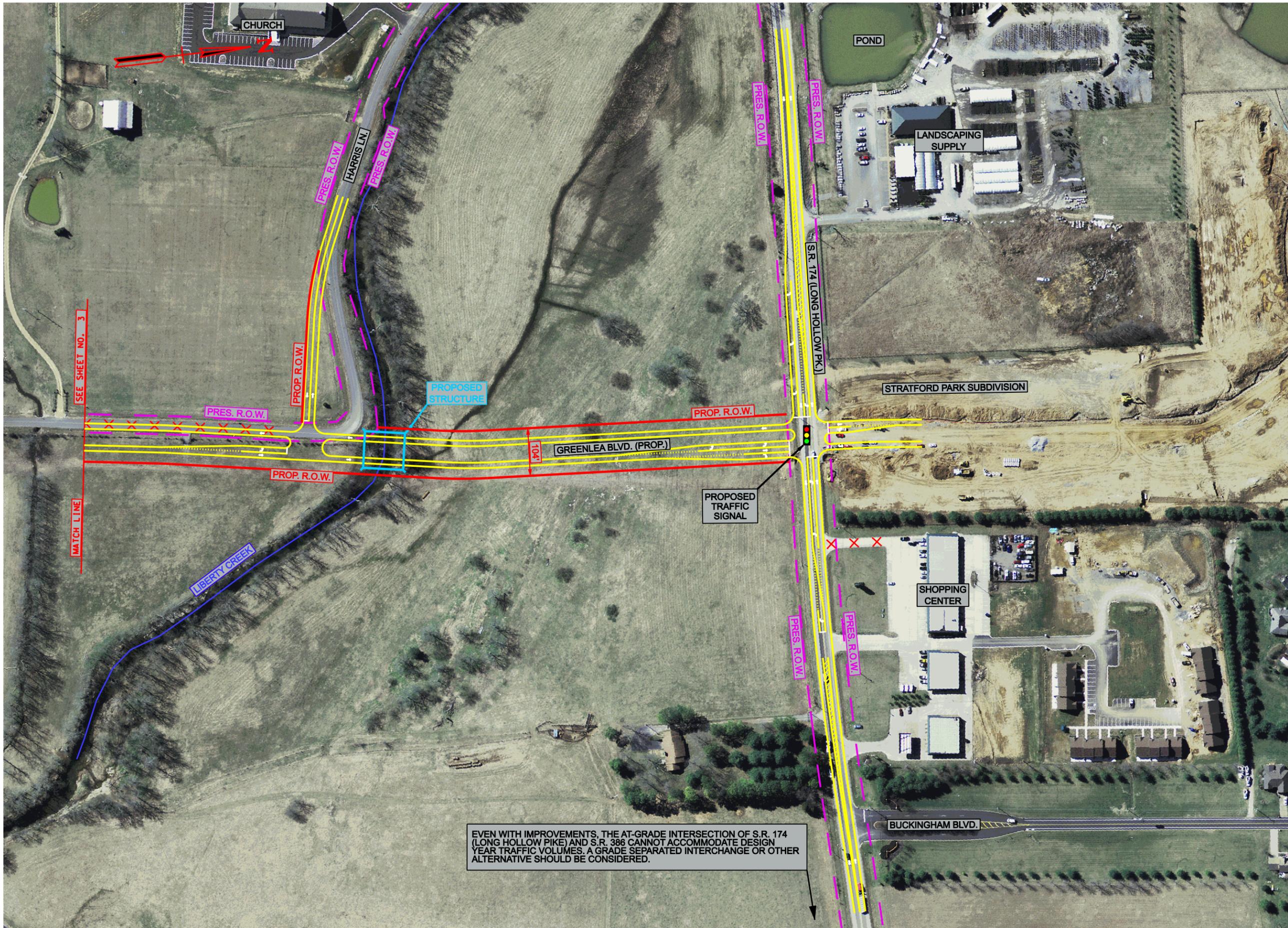


STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

GREENLEA
BOULEVARD
EXTENSION
SUMNER COUNTY

OPTION "A"

TYPE	YEAR	COUNTY	SHEET NO.
FEAS.	2010	SUMNER	4



EVEN WITH IMPROVEMENTS, THE AT-GRADE INTERSECTION OF S.R. 174 (LONG HOLLOW PIKE) AND S.R. 386 CANNOT ACCOMMODATE DESIGN YEAR TRAFFIC VOLUMES. A GRADE SEPARATED INTERCHANGE OR OTHER ALTERNATIVE SHOULD BE CONSIDERED.



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

GREENLEA
BOULEVARD
EXTENSION
SUMNER COUNTY

OPTION "A"