




STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-2208

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

MEMORANDUM

TO: Paul Degges, Deputy Commissioner and Chief Engineer

FROM:  Steve Allen, Director
Strategic Transportation Investments Division

DATE: September 21, 2016

SUBJECT: **Road Safety Audit Review (RSAR)**
State Route 76 from West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
Robertson County
PIN 120290.00

A study of State Route 76 was initiated by the City of White House as a candidate safety project. The section of State Route 76 from log mile 15.60 to log mile 16.20 is a two (2) lane urban roadway, with travel lane widths ranging from eleven (11) feet to twelve (12) feet and shoulder widths ranging from two (2) feet to twelve (12) feet. State Route 76 was added to the Highway Safety Improvement Program (HSIP) list because State Route 76 has a severe crash rate of 0.122, which exceeds the statewide average severe crash rate of 0.077 for an Urban Collector.

The total estimated cost of improvements listed in the report is \$1,453,800. No right-of-way acquisition is anticipated. A signal maintenance agreement will be required with the City of White House. The City of White House has committed to budget funds for: engineering design services; 10% of the construction cost; and, potential future improvements along SR 76. These improvements will be let to contract.

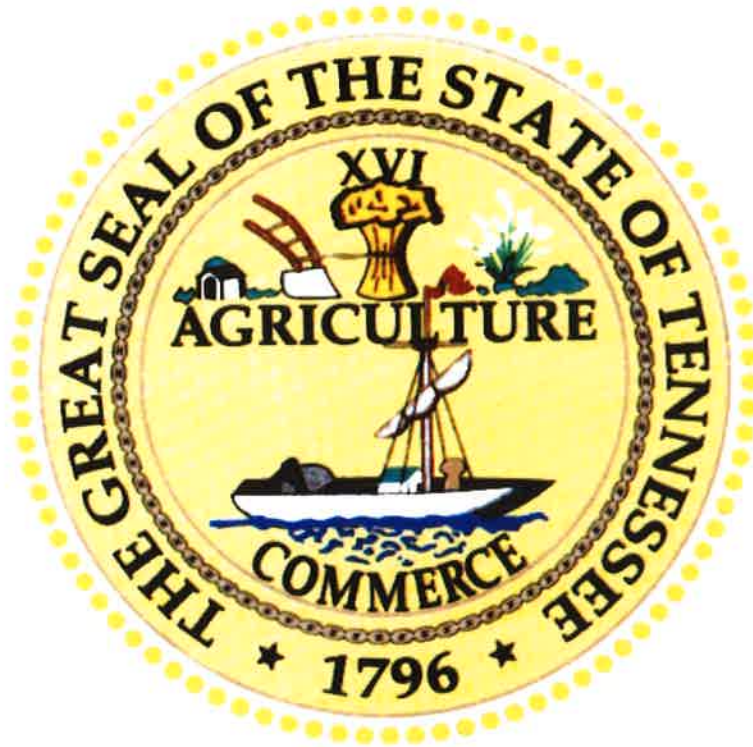
If you should need any further information, please contact me at (615) 741-2208 or e-mail me at Steve.Allen@tn.gov.

SA/JB

Attachment

CC: Jeff Jones, David Layhew, Jim Waters, Jerry Hatcher, Brad Freeze, Joe Deering, Phil Trammel, Scott Johnson, Stanley Sumner, Kelley Garrett, Shaun Armstrong, Brandon Darks, Shane Hester, Chuck Graves, Michelle Lacewell (Nashville Metropolitan Planning Organization, Mike Arnold (Mayor, City of White House), File

TENNESSEE
DEPARTMENT OF TRANSPORTATION



ROAD SAFETY AUDIT REPORT

STATE ROUTE 76


From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

Robertson County

PIN 120290.00

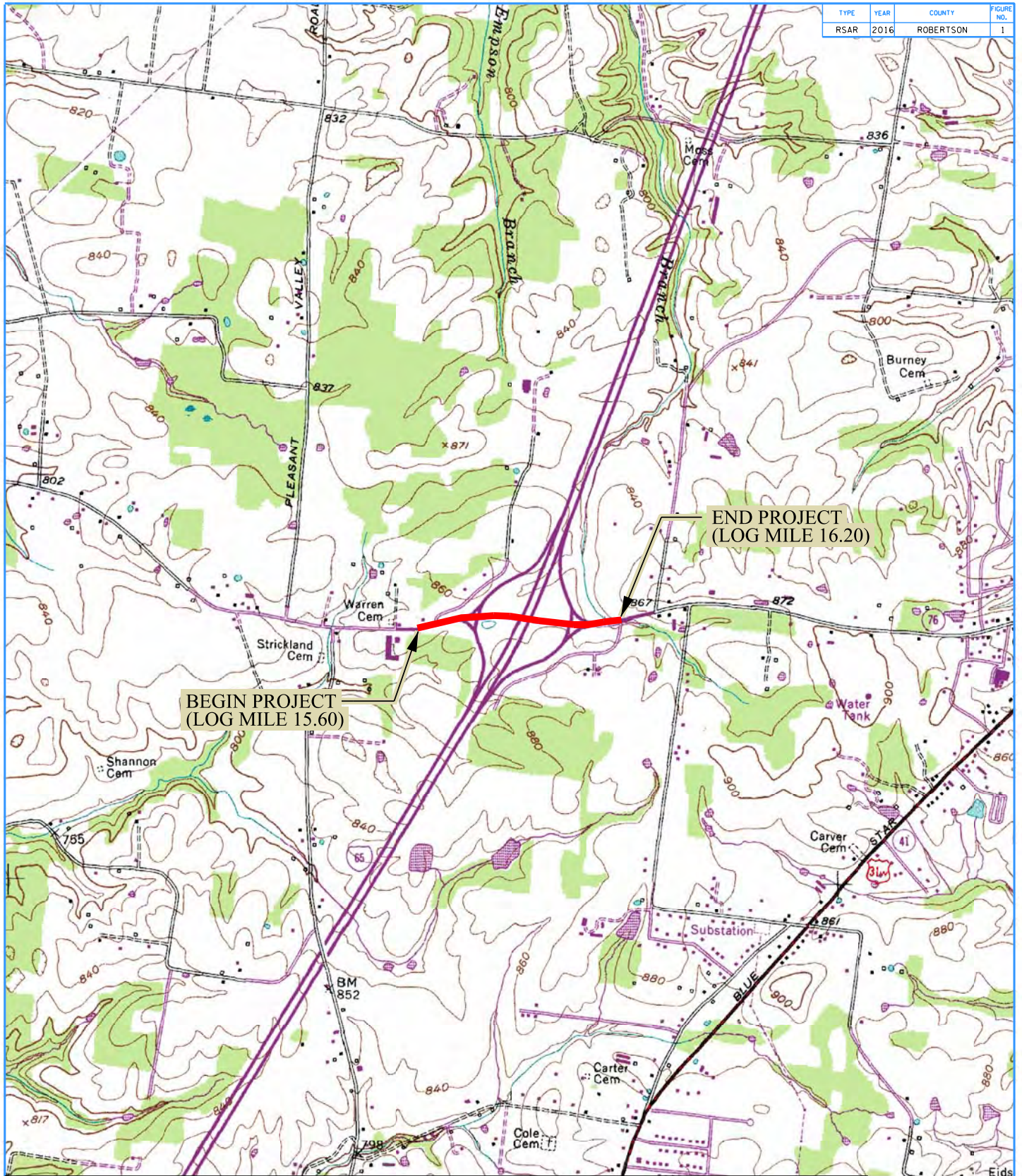
***Prepared by The Corradino Group
for the***

Strategic Transportation Investments Division

Recommended by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		9.22.16

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

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2016	ROBERTSON	1



BEGIN PROJECT
(LOG MILE 15.60)

END PROJECT
(LOG MILE 16.20)



0 1000' 2000'
SCALE 1 IN. = 2000 FT.

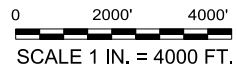
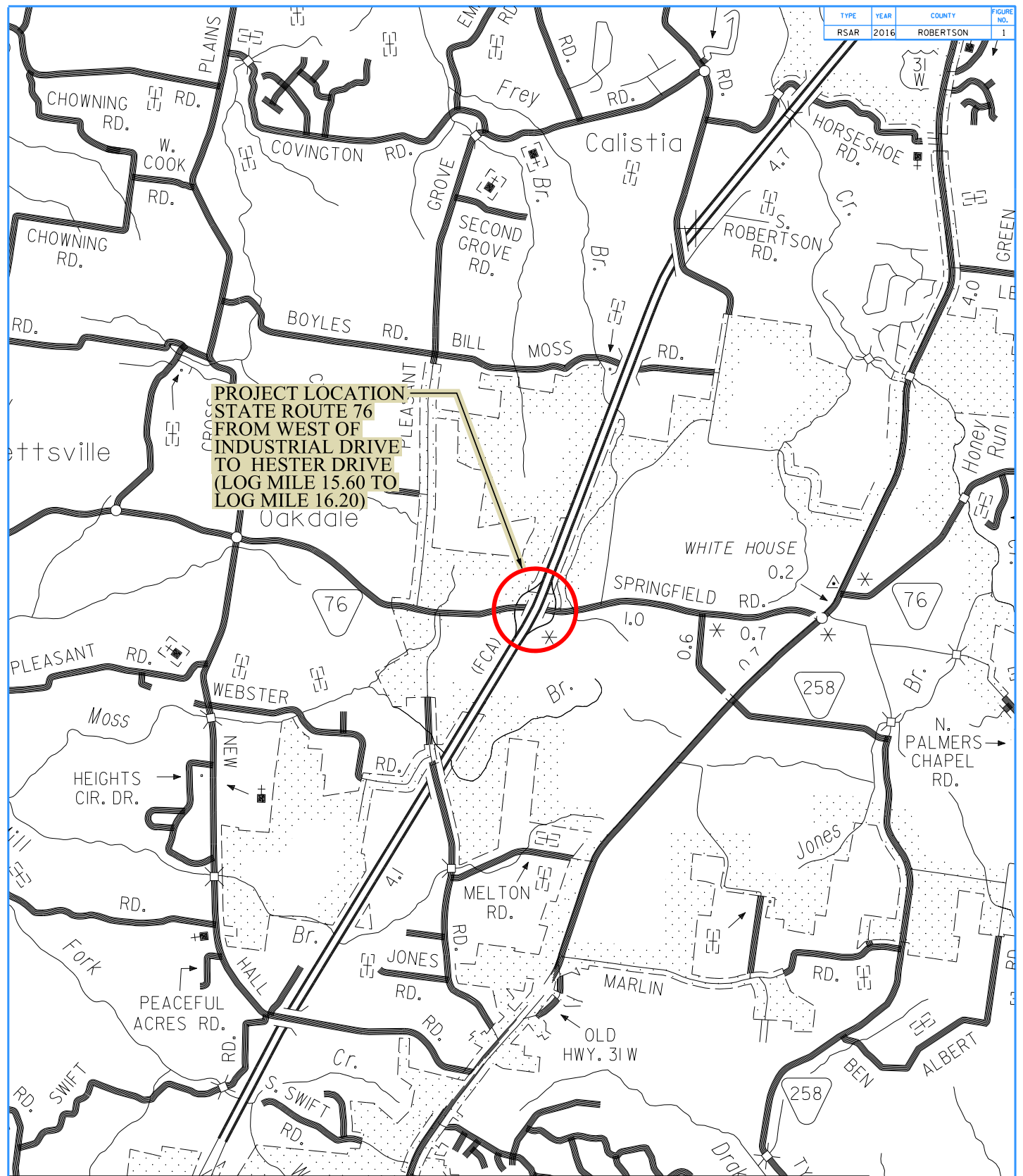
ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

VICINITY
MAP

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2016	ROBERTSON	1

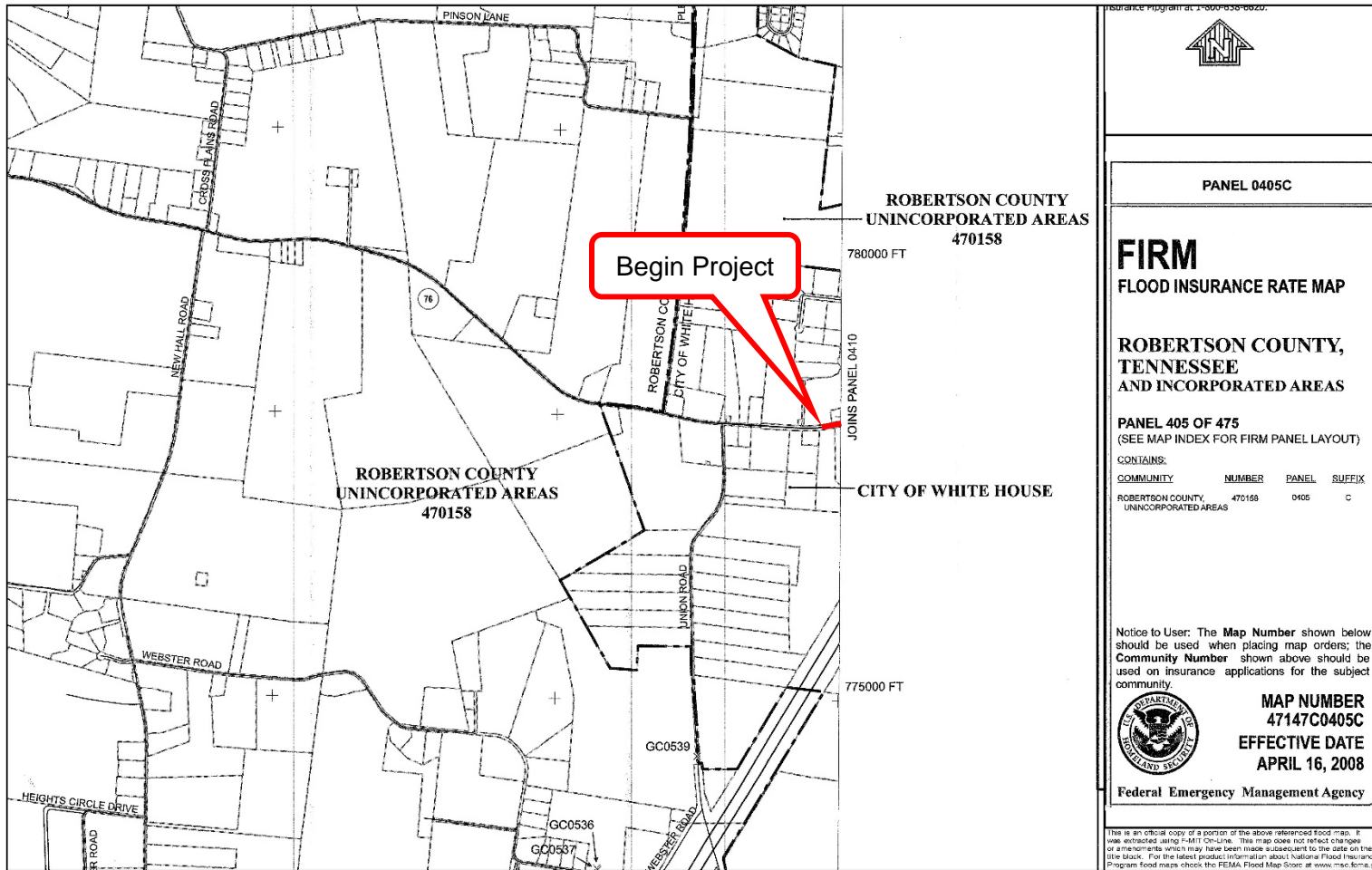


ROAD SAFETY AUDIT REVIEW

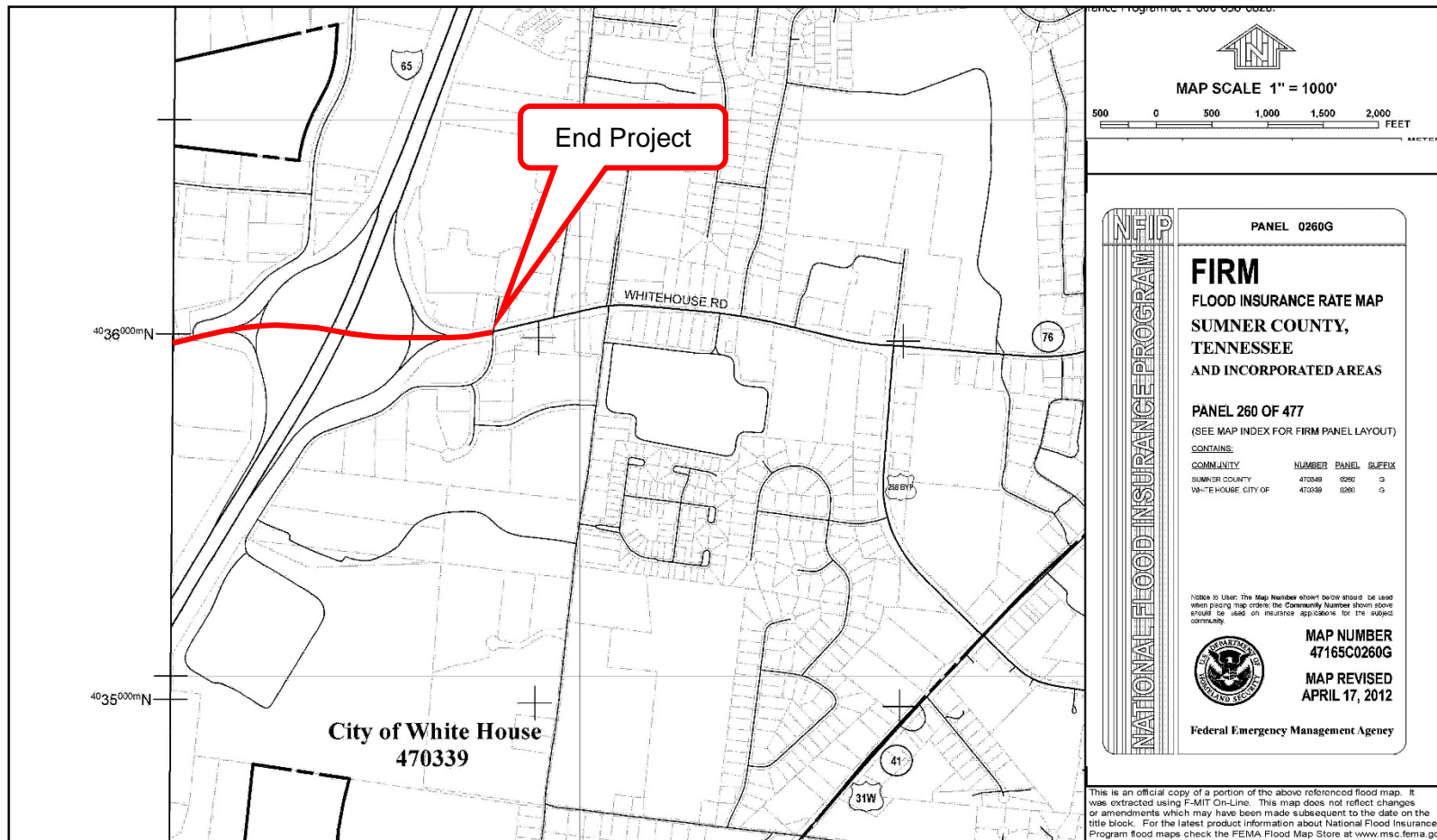
STATE ROUTE 76
 L.M. 15.60 TO L.M. 16.20
 ROBERTSON COUNTY

STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 STRATEGIC TRANSPORTATION
 INVESTMENTS DIVISION

LOCATION
 MAP



Source: FEMA Map No. 47147C0405C, Not to Scale
FLOOD MAP (1 OF 2)



Source: FEMA Map No. 47165C0260G, Not to Scale
FLOOD MAP (2 OF 2)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00

ROAD SAFETY AUDIT REVIEW

PROJECT DESCRIPTION AND BACKGROUND

A study of State Route 76 was initiated by the City of White House as a candidate safety project. The section of State Route 76 from log mile 15.60 to log mile 16.20 is a two (2) lane urban roadway, with travel lane widths ranging from eleven (11) feet to twelve (12) feet and shoulder widths ranging from two (2) feet to twelve (12) feet. State Route 76 was added to the Highway Safety Improvement Program (HSIP) list because State Route 76 has a severe crash rate of 0.122, which exceeds the statewide average severe crash rate of 0.077 for an Urban Collector.

Utilizing engineering judgment to include the Hester Drive intersection, this project has been extended from log mile 16.15 to log mile 16.20.

RSAR TEAM MEMBERS

Name	Organization	Phone	E-mail
Brian Hurst	TDOT Strategic Transportation Investments Division	615-253-2433	Brian.Hurst@tn.gov
Brandon Darks	TDOT Strategic Transportation Investments Division	615-253-3999	Brandon.Darks@tn.gov
Michelle Powell	TDOT HQ Traffic	615-741-0894	Michelle.Powell@tn.gov
Phil Trammel	TDOT Region 3 Traffic	615-350-4332	Phil.Trammel@tn.gov
Scott Johnson	TDOT Region 3 Design	615-350-4263	Scott.Johnson@tn.gov
Nathan Bartlett	TDOT Region 3 Design	615-350-4261	Nathan.Bartlett@tn.gov
Joe Willis	TDOT Region 3 Construction	731-624-7708	Joey.Willis@tn.gov
Edwin Dykes	TDOT Region 3 Construction	256-612-1973	Edwin.Dykes@tn.gov
Mike Arnold	City of White House Mayor	615-781-5788	MichaelLeeArnold@comcast.net
Reed Hillen	City of White House Planning	615-426-9786	RHillen@cityofwhitehouse.com
Joe Moss	City of White House	615-672-3654	JMoss@cityofwhitehouse.com
Gerald Herman	City of White House	615-829-0057	GHerman@cityofwhitehouse.com
Jason Reynolds	CSR Engineering	615-347-4331	Jason.Reynolds@csrengineers.com
Steve Bryan	The Corradino Group	615-982-6204	SBryan@corradino.com
Richard Sullivan	The Corradino Group	615-982-6202	RSullivan@corradino.com

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

INFORMATION USED IN THE REVIEW

- County Highway Map
- United States Geological Survey (USGS) Map
- Aerial Photographs (provided by TDOT)
- FEMA Flood Maps
- TRIMS Geometric Report
- TRIMS Route Feature Report
- TRIMS Crash Rate Report (2009 to 2011, plus an additional crash in 2013)
- TRIMS Crash Data
- Crash Rate Summary
- Crash Reports
- Photographs (from Onsite Field Review)
- Video Logs (from Onsite Field Review)

PRE-BRIEF SUMMARY

A pre-brief meeting was held at 9:00 AM CT on Wednesday, August 27, 2014 at TDOT Headquarters in Nashville.

A Road Safety Audit (RSA) team was assembled to evaluate and determine appropriate safety measures for the segment of State Route 76 from West of Industrial Drive to Hester Drive (L.M. 15.60 to L.M. 16.20) in Robertson County, Tennessee. This RSA project is 0.60 miles in length. The posted speed limit on State Route 76 is forty (40) miles per hour (mph) and the existing right-of-way width ranges from sixty (60) feet to 120 feet outside the influence of the interstate. Within the interstate area, the right-of-way along State Route 76 expands to 250 feet.

From 2009 to 2011 plus an additional crash in 2013, a total of 78 crashes occurred along this section of State Route 76, with fifty-five (55) property damage crashes, twenty-one (21) non-incapacitating injury crashes, two (2) incapacitating injury crashes involving three (3) incapacitating injuries, and zero (0) fatal crashes.

The following observations were made when evaluating the crash data:

- No fatal crashes occurred in this analysis section.
- 29% of crashes (23) resulted in an injury.
- 42% of crashes (33) were rear end crashes.
- 32% of crashes (25) were angle crashes.
- 14% of crashes (11) were single vehicle crashes.

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

- 14% of crashes (11) were lane departure crashes.
- The first incapacitating injury crash occurred on 6/30/2011 at Hester Drive (L.M. 16.18). This crash involved a vehicle travelling westbound on State Route 76 swerving and colliding with an eastbound vehicle waiting in the left turn lane at the intersection causing the head-on crash. The driver of the westbound vehicle swerving was apparently driving under the influence with the test results pending. This crash involved two (2) incapacitating injuries and the crash information noted clear weather and dark (unknown lighting) conditions.
- The second incapacitating injury crash occurred on 6/30/2013 just west of Industrial Drive (L.M. 15.61). This crash was a single vehicle, lane departure crash that involved a vehicle traveling westbound on State Route 76 leaving the left side of the roadway and crashing into the lobby of the Days Inn. The crash information noted cloudy weather and daylight conditions.

OBSERVATIONS

An onsite field review was held at 9:00 AM CT on Friday, August 29, 2014. The following discussions/observations are provided concerning the location:

- A Love's Truck Stop is being developed along the south side of State Route 76 just west of the Interstate 65 interchange. State Route 76 is being widened along the front of this development. The improvements contained in the RSA project shall tie into the proposed Love's Truck Stop development project (near L.M. 15.71).
- A Traffic Impact Study (TIS) for the Love's Truck Stop warranted and recommended a traffic signal at the State Route 76/Interstate 65 Northbound Ramps. The RSA Team determined the existing free-flow condition of traffic heading east needs to be brought under traffic-signal control and two (2) eastbound thru travel lanes are needed on State Route 76. Traffic analyses of the intersection demonstrated that one (1) left turn lane and two (2) right turn lanes on the exit ramp will be required under traffic signal control.
- Based on State Route 76 traffic patterns within the Interstate 65 interchange, the RSA Team decided the two (2) westbound travel lanes should be provided with the left-most travel lane functioning as a lane drop for traffic heading southbound on Interstate 65 and the right-most travel lane for traffic heading westbound on State Route 76.
- Vertical clearances of the Interstate 65 bridges are a major concern along State Route 76. Field measurements were collected along State Route 76 under the interstate bridges and contained in the appendix. These field measurements indicated that the lowest vertical clearance height over a travel lane was the west side of the Interstate 65 southbound bridge, which measured fourteen feet – two inches (14'-2").
- There are two (2) fourteen feet-zero inch (14'-0") vertical clearance warning signs on State Route 76 approaching the Interstate 65 bridges (one (1) in each direction).
- The underside of the Interstate 65 southbound bridge has visible signs of trucks and/or other vehicles scraping the concrete surface.

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

- The State Route 76 intersection at the Interstate 65 southbound ramps is currently signalized. The signal heads contain LED's, but the backplates do not have retro-reflective yellow strips around the edges.
- The State Route 76 intersection at Hester Drive is currently signalized. The signal heads contain LED's, but the backplates do not have retro-reflective yellow strips around the edges. The pedestrian signal heads do not contain the countdown feature. The pedestrian pushbuttons are not ADA-compliant.
- The RSA Team decided to develop three (3) concepts along State Route 76 to improve the safety concerns identified during the site visit. The three (3) concepts are contained in the appendix and the following is a summary of these concepts:
 - **State Route 76 Concept 1:**
 - One (1) eastbound travel lane and two (2) westbound travel lanes along State Route 76. This concept maintains the existing westbound edge line of the roadway within the interchange area.
 - **State Route 76 Concept 2:**
 - One (1) eastbound travel lane and two (2) westbound travel lanes along State Route 76. This concept maintains the existing centerline of the roadway within the interchange area.
 - **State Route 76 Concept 3:**
 - As a comparison to Concepts 1 and 2, the RSA Team decided to evaluate two (2) eastbound travel lanes and two (2) westbound travel lanes along State Route 76. This concept maintains the existing westbound edge line of the roadway within the interchange area.

After a careful review of these three (3) concepts, a modified version of Concept 3 was selected as the most feasible concept to move forward with in the RSA report.

In a letter dated January 21, 2016, the City of White House, TN committed to budget funds for: engineering design services; 10% of the construction cost; and, potential future improvements along SR 76, if needed to mitigate queues from reaching the I-65 mainline. The city's letter is provided in the **Appendix**.

The total estimated cost of improvements listed in the report is \$1,453,800. No right-of-way acquisition is anticipated. A signal maintenance agreement will be required with the City of White House. These improvements will be let to contract.

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00

SITE PHOTOS (8/29/14)



STATE ROUTE 76 AT INDUSTRIAL DRIVE – EASTBOUND APPROACH (L.M. 15.66)



STATE ROUTE 76 AT INDUSTRIAL DRIVE – WESTBOUND APPROACH (L.M. 15.66)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 AT INDUSTRIAL DRIVE – SOUTHBOUND APPROACH (L.M. 15.66)



STATE ROUTE 76 AT INDUSTRIAL DRIVE – LOOKING NORTH ACROSS INTERSECTION (L.M. 15.66)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 AT THE I-65 SOUTHBOUND RAMPS – EASTBOUND APPROACH (L.M. 15.78)



STATE ROUTE 76 AT THE I-65 SOUTHBOUND RAMPS – WESTBOUND APPROACH (L.M. 15.78)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 AT THE I-65 SOUTHBOUND RAMPS – SOUTHBOUND APPROACH (L.M. 15.78)



STATE ROUTE 76 LOOKING SOUTH AT THE INTERSTATE 65 SOUTHBOUND ON-RAMP (L.M. 15.78)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 LOOKING EAST NEAR THE INTERSTATE 65 UNDERPASS BRIDGES (L.M. 15.86)



STATE ROUTE 76 LOOKING WEST NEAR THE INTERSTATE 65 UNDERPASS BRIDGES (L.M. 15.95)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 AT THE I-65 NORTHBOUND RAMPS – EASTBOUND APPROACH (L.M. 16.03)



STATE ROUTE 76 AT THE I-65 NORTHBOUND RAMPS – WESTBOUND APPROACH (L.M. 16.03)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 AT THE I-65 NORTHBOUND RAMPS – NORTHBOUND APPROACH (L.M. 16.03)



STATE ROUTE 76 LOOKING NORTH AT THE I-65 NORTHBOUND ON-RAMP (L.M. 16.03)

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00



STATE ROUTE 76 AT HESTER DRIVE/CHARLES DRIVE – EASTBOUND APPROACH (L.M. 16.18)



STATE ROUTE 76 AT HESTER DRIVE/CHARLES DRIVE – WESTBOUND APPROACH (L.M. 16.18)

**Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00**



STATE ROUTE 76 AT HESTER DRIVE/CHARLES DRIVE – NORTHBOUND APPROACH (L.M. 16.18)



STATE ROUTE 76 AT HESTER DRIVE/CHARLES DRIVE – SOUTHBOUND APPROACH (L.M. 16.18)

Route:	State Route 76
Description:	West of Industrial Road to Hester Drive. Log Mile 15.60 to Log Mile 16.20
County:	Robertson
Length:	0.60 miles
Date:	August 2, 2016

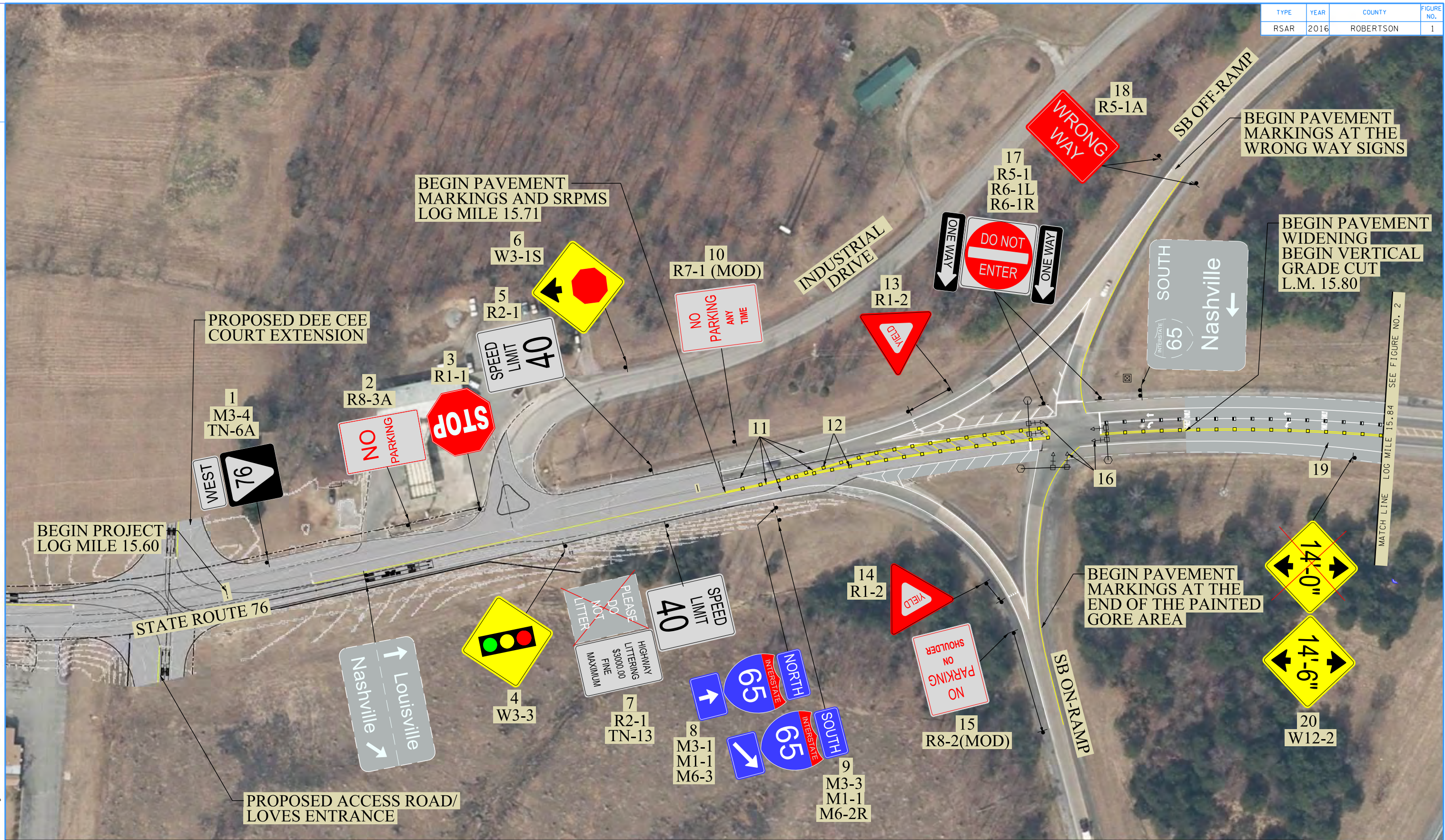
<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ -	\$ -	\$ -
Clearing and Grubbing	\$ -	\$ 300	\$ 2,700	\$ 3,000
Earthwork	\$ 5,800	\$ -	\$ 52,300	\$ 58,100
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ -	\$ -	\$ -
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ -	\$ -	\$ -	\$ -
Pavement Removal	\$ 6,000	\$ -	\$ 54,300	\$ 60,300
Paving	\$ 73,000	\$ -	\$ 656,900	\$ 729,900
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ 500	\$ -	\$ 4,770	\$ 5,300
Seeding	\$ 200	\$ -	\$ 2,000	\$ 2,200
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ -	\$ -	\$ -
Fencing	\$ -	\$ -	\$ -	\$ -
Signing ¹			\$ 11,200	\$ 11,200
Pavement Markings ¹			\$ 54,300	\$ 54,300
Lighting ¹			\$ -	\$ -
Signalization ¹			\$ 15,000	\$ 15,000
Guardrail ¹			\$ 10,800	\$ 10,800
Pay Item Quantity Adjustment (15%) ²	\$ 12,800	\$ -	\$ 129,600	\$ 142,500
Maintenance of Traffic (5%)	\$ 4,900	\$ -	\$ 49,700	\$ 54,600
Mobilization (5%)	\$ 4,900	\$ -	\$ 49,700	\$ 54,600
CONSTRUCTION COST (rounded)	\$ 108,100	\$ 300	\$ 1,093,300	\$ 1,201,700
Engineering and Contingency (10%)	\$ 10,800	\$ -	\$ 109,300	\$ 120,100
TOTAL CONSTRUCTION COST (rounded)	\$ 118,900	\$ 300	\$ 1,202,600	\$ 1,321,800
Preliminary Engineering 10% (By the City)	\$ 132,000	\$ -	\$ -	\$ -
PROJECT COST ³(rounded)	\$ 250,900	\$ 300	\$ 1,202,600	\$ 1,453,800

¹ This safety item is 100% eligible and does not require a 10% funding match by the local agency.

² For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

³ For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2016	ROBERTSON	1



ROAD SAFETY AUDIT REVIEW
STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION
FIGURE 1
S.R. 76
L.M. 15.60 to
L.M. 15.84

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GUIDANCE

1. Remove and replace one (1) West sign (M3-4) (24"x12") and one (1) State Route 76 sign (TN-6A) (24"x24") on westbound State Route 76.
 2. Remove and replace one (1) No Parking sign (R8-3A) (24"x30") on westbound State Route 76.
 3. Remove and replace one (1) Stop sign (R1-1) (36"x36") on southbound Industrial Drive approaching State Route 76, and install a 2-inch minimum width red retro-reflective strip on the sign post. (See Details Page)
 4. Remove and replace one (1) Signal Ahead sign (W3-3) (36"x36") on eastbound State Route 76.
 5. Install one (1) Speed Limit sign (R2-1, 40 MPH) (30"x36") on westbound State Route 76 approximately 150 feet east of Industrial Drive.
 6. Remove and replace one (1) Stop Ahead sign (W3-3) (36"x36") on southbound Industrial Drive.
 7. Remove and replace one (1) Speed Limit sign (R2-1, 40 MPH) (30"x36") and one (1) Highway Littering sign (TN-13) (24"x30") on eastbound State Route 76.
 8. Remove and replace one (1) North sign (M3-1) (24"x12"), one (1) Interstate 65 sign (M1-1) (24"x24"), and one (1) Directional Arrow sign (M6-3) (21"x15") on eastbound State Route 76.
 9. Remove and replace one (1) South sign (M3-3) (24"x12"), one (1) Interstate 65 sign (M1-1) (24"x24"), and one (1) Directional Arrow sign (M6-2R) (21"x15") on eastbound State Route 76.
 10. Remove and replace one (1) No Parking Any Time sign (R7-1 (MOD)) (24"x30") on westbound State Route 76.
 11. Install enhanced flatline and thermoplastic pavement markings as shown on State Route 76 from L.M. 15.71 to L.M. 15.84 including the southbound Interstate 65 ramps. Match existing pavement markings.
 12. Install sixty-five (65) yellow bi-directional snowplowable reflective pavement markers (SRPM) and thirty-two (32) white mono-directional SRPM's as shown on State Route 76 from L.M. 15.71 to L.M. 15.84.
 13. Remove one (1) Yield sign (R1-2) (36"x36"x36") on the southbound Interstate 65 off-ramp approaching State Route 76. Install one (1) Yield sign (R1-2) (36"x36"x36") on the southbound Interstate 65 off-ramp approximately thirty (30) feet from the painted gore. Install a 2-inch minimum width red retro-reflective strip on the sign post. (See Details Page)
 14. Remove one (1) Yield sign (R1-2) (36"x36"x36") on the southbound Interstate 65 on-ramp approaching the painted gore area. Install one (1) Yield sign (R1-2) (36"x36"x36") on the southbound Interstate 65 on-ramp approximately thirty (30) feet from the painted gore. Install a 2-inch minimum width red retro-reflective strip on the sign post. (See Details Page)
 15. Remove one (1) No Parking On Shoulder sign (R8-2 (MOD)) (24"x30") on the southbound Interstate 65 on-ramp. Install one (1) No Parking On Shoulder sign (R8-2 (MOD)) (24"x30") on the southbound Interstate 65 on-ramp approximately 120 feet from the painted gore.
 16. Remove and replace the backplate around six (6) traffic signal heads on State Route 76 at the southbound Interstate 65 ramps, and install a yellow retro-reflective strip around the edge of each backplate (See Details Page)
 17. Remove and replace two (2) Do Not Enter signs (R5-1) (36"x36") and four (4) One Way signs (R6-1) (36"x12") [two (2) R6-1L and two (2) R6-1R] on the southbound Interstate 65 off-ramp at the intersection with State Route 76, and install a 2-inch minimum width red retro-reflective strip on each sign post. (See Details Page)
 18. Remove and replace two (2) Wrong Way signs (R5-1A) (36"x24") on the southbound Interstate 65 off-ramp, and install a 2-inch minimum width red retro-reflective strip on each sign post. (See Details Page)
 19. Widen pavement and lower pavement grade [1,525 SY] along State Route 76 from L.M. 15.80 to L.M. 15.84. Maintain the existing westbound travel lane edge line. Match existing horizontal pavement section and vertical pavement grade at L.M. 15.80.
 20. Remove one (1) Low Clearance With Arrows sign (W12-2, 14'-0") and install one (1) Low Clearance With Arrows sign (W12-2, 14'-6") (36"x36") on eastbound State Route 76 approximately 300 feet east of the southbound Interstate 65 ramps.
- * All warning signs shall be on fluorescent yellow sheeting material.
** All interstate signs shall be on blue sheeting material.

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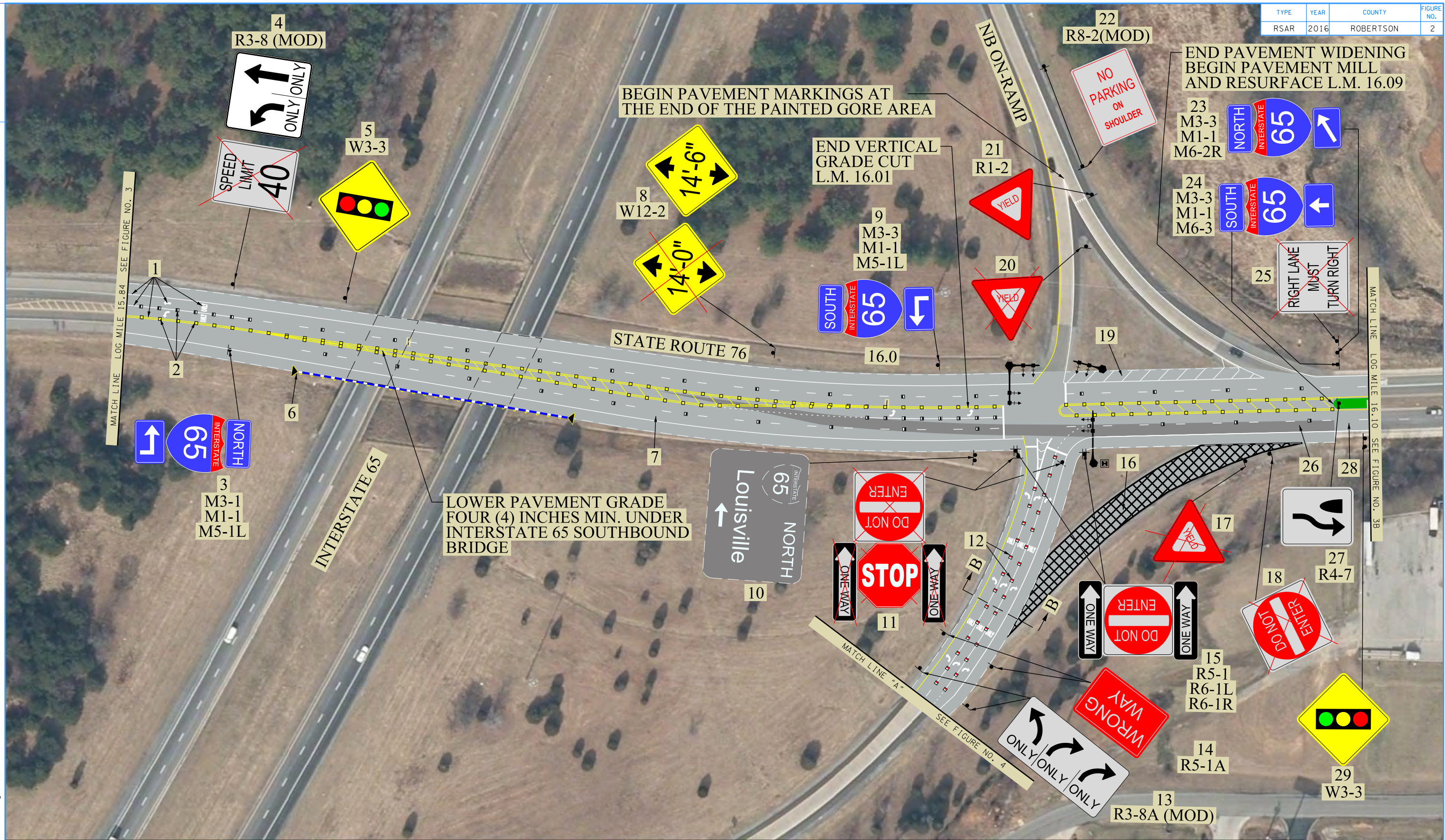
ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1A
S.R. 76
L.M. 15.60 to
L.M. 15.84

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2016	ROBERTSON	2



ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION
FIGURE 2
S.R. 76
L.M. 15.84 to
L.M. 16.10

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GUIDANCE

1. Install enhanced flatline and thermoplastic pavement markings as shown on State Route 76 from L.M. 15.84 to L.M. 16.10.
 2. Install eighty (80) yellow bi-directional snowplowable reflective pavement markers (SRPM) and forty-one (41) white mono-directional SRPM's as shown on State Route 76 from L.M. 15.84 to L.M. 16.10.
 3. Remove and replace one (1) North sign (M3-1) (24"x12"), one (1) Interstate 65 sign (M1-1) (24"x24"), and one (1) Advance Turn Arrow sign (M6-1L) (21"x15") on eastbound State Route 76.
 4. Remove one (1) Speed Limit sign (R2-1, 40 MPH) and install one (1) Advanced Intersection Lane Control sign (R3-8 (MOD)) (30"x30") on westbound State Route 76 approximately 450 feet east of the southbound Interstate 65 ramps.
 5. Remove and replace one (1) Signal Ahead sign (W3-3) (36"x36") on westbound State Route 76.
 6. Install 200 feet of guardrail and two (2) Type 38 guardrail end treatments along the south side of State Route 76 beginning 520 feet east of the southbound Interstate 65 ramps. Install white continuous delineation enhancement on 300 feet of new guardrail.
 7. Widen pavement and lower pavement grade [5,420 SY] along State Route 76 from L.M. 15.84 to L.M. 16.01. Maintain the existing westbound travel lane edge line. Match existing vertical pavement grade at L.M. 16.01.
 8. Remove one (1) Low Clearance With Arrows sign (W12-2, 14'-0") and install one (1) Low Clearance With Arrows sign (W12-2, 14'-6") (36"x36") on westbound State Route 76 approximately 300 feet west of the northbound Interstate 65 ramps.
 9. Remove and replace one (1) South sign (M3-3) (24"x12"), one (1) Interstate 65 sign (M1-1) (24"x24"), and one (1) Advance Turn Arrow sign (M5-1L) (21"x15") on eastbound State Route 76.
 10. Relocate one (1) I-65 North Louisville Guide Sign twelve (12) feet south away from State Route 76.
 11. Remove two (2) Stop signs (R1-1), two (2) Do Not Enter signs (R5-1), and four (4) One Way signs (R6-1L and R6-1R) on the northbound Interstate 65 off-ramp.
 12. Install thirty-two (32) white/red bi-directional snowplowable reflective pavement markers (SRPM) as shown on the northbound Interstate 65 off-ramp from 880 feet northeast of the interstate gore to State Route 76.
 13. Install two (2) Lane Control signs (R3-8A (MOD)) (36"x30") on the northbound Interstate 65 off-ramp at the beginning of the third lane section.
 14. Remove and replace two (2) Wrong Way signs (R5-1A) (36"x24") on the northbound Interstate 65 off-ramp, and install a 2-inch minimum width red retro-reflective strip on each sign post. (See Details Page)
 15. Install two (2) Do Not Enter signs (R5-1) (36"x36") and four (4) One Way signs (R6-1) (36"x12") [two (2) R6-1L and two (2) R6-1R] on the northbound Interstate 65 off-ramp at the intersection with State Route 76, and install a 2-inch minimum width red retro-reflective strip on each sign post. (See Details Page)
 16. Scarify existing pavement [1,700 SY] on the northbound Interstate 65 off-ramp as shown in hatched area and replace with topsoil, seeding, and watering.
 17. Remove one (1) Yield sign (R1-2) on the northbound Interstate 65 off-ramp.
 18. Remove one (1) Do Not Enter sign (R5-1) on the northbound Interstate 65 off-ramp.
 19. Notch and widen pavement [970 SY] along westbound State Route 76 from L.M. 16.01 to L.M. 16.09. Maintain the existing westbound travel lane edge line. Match existing pavement section at L.M. 16.09.
 20. Remove one (1) Yield sign (R1-2) on the northbound Interstate 65 on-ramp.
 21. Install one (1) Yield sign (R1-2) (36"x36"x36") on the northbound Interstate 65 off-ramp approximately thirty (30) feet from the painted gore. Install a 2-inch minimum width red retro-reflective strip on the sign post. (See Details Page)
 22. Remove one (1) No Parking On Shoulder sign (R8-2 (MOD)) (24"x30") on the northbound Interstate 65 on-ramp. Install one (1) No Parking On Shoulder sign (R8-2 (MOD)) (24"x30") on the northbound Interstate 65 on-ramp approximately 120 feet from the painted gore.
 23. Remove and replace one (1) North sign (M3-1) (24"x12"), one (1) Interstate 65 sign (M1-1) (24"x24"), and one (1) Directional Arrow sign (M6-2R) (21"x15") on westbound State Route 76.
 24. Remove and replace one (1) South sign (M3-3) (24"x12"), one (1) Interstate 65 sign (M1-1) (24"x24"), and one (1) Directional Arrow sign (M6-3) (21"x15") on westbound State Route 76.
 25. Remove one (1) Right Lane Must Turn Right sign (R3-7R) on westbound State Route 76.
 26. Remove the existing State Route 76 eastbound shoulder and construct full-depth pavement from L.M. 15.95 to L.M. 16.09 [Dark Shade Area]. Construct shoulder-depth pavement along State Route 76 from L.M. 15.95 to L.M. 16.09 adjacent to the new full-depth pavement construction.
 27. Remove and replace one (1) Keep Right sign (R4-7) (24"x30") within the grassed median area on eastbound State Route 76.
 28. Mill and resurface 1.25" of asphalt pavement [160 SY] as shown on State Route 76 from L.M. 16.09 to L.M. 16.10. Match existing pavement grade.
 29. Remove and replace one (1) Signal Ahead sign (W3-3) (36"x36") on eastbound State Route 76.
- * All warning signs shall be on fluorescent yellow sheeting material.
** All interstate signs shall be on blue sheeting material.

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ROAD SAFETY AUDIT REVIEW
STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY



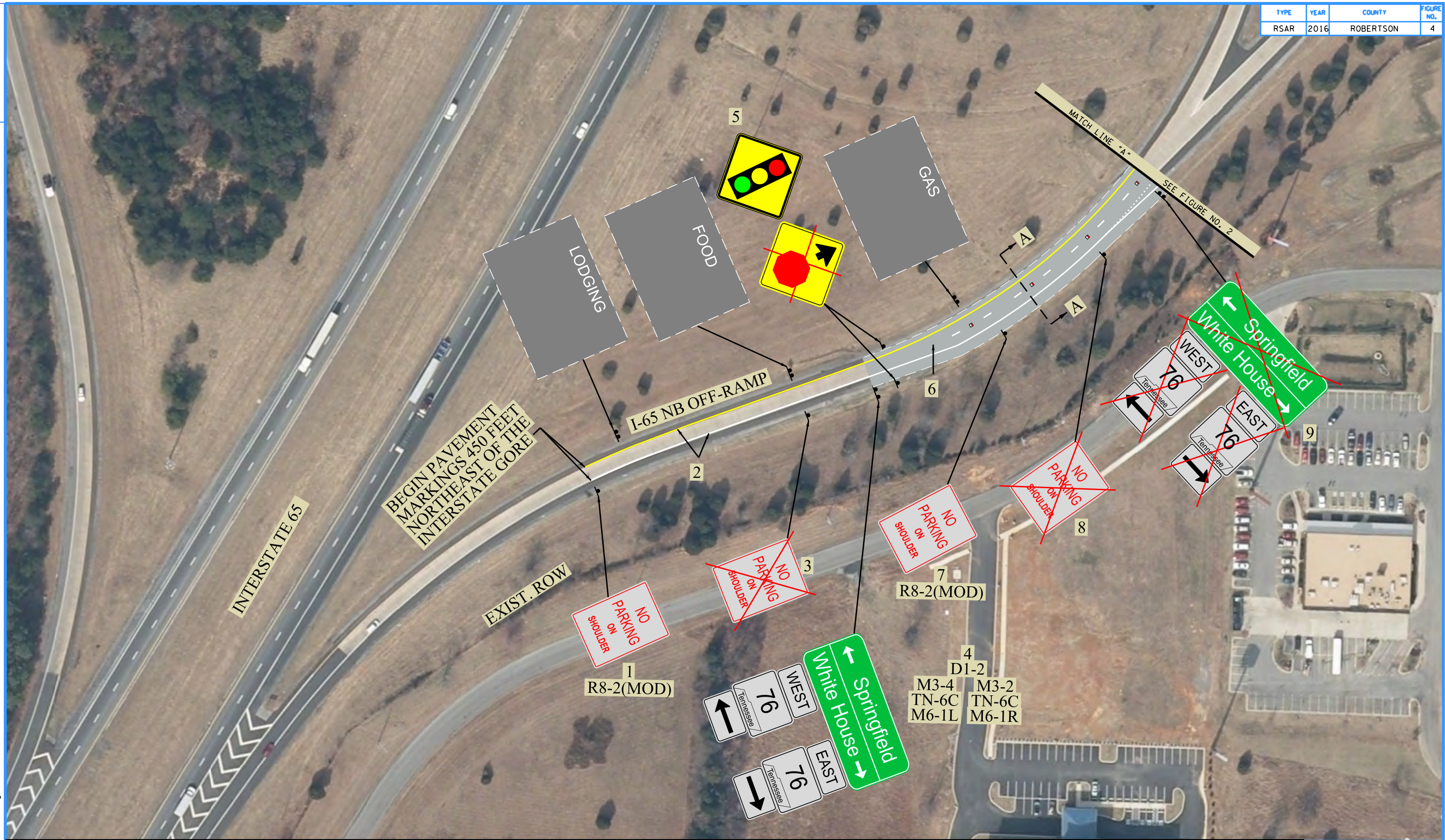
GUIDANCE

1. Mill and resurface 1.25" of asphalt pavement [910 SY] as shown on State Route 76 from L.M. 16.10 to L.M. 16.13. Match existing pavement grade.
2. Install enhanced flatline and thermoplastic pavement markings as shown on State Route 76 from L.M. 16.10 to L.M. 16.20 including the side roads for Charles Drive and Hester Drive. Unless otherwise noted on this drawing, the pavement markings on all side roads shall begin fifty (50) feet from the stop line in advance of the intersection with State Route 76. Match existing pavement markings.
3. Remove and replace one (1) Keep Right sign (R4-7) (24"x30") within the grassed median area on westbound State Route 76.
4. Install eighteen (18) yellow bi-directional snowplowable reflective pavement markers (SRPM) and fourteen (14) white mono-directional SRPM's as shown on State Route 76 from L.M. 16.10 to L.M. 16.20.
5. Remove one (1) Right Lane Must Turn Right sign (R3-7R) on westbound State Route 76.
6. Remove one (1) Right Lane Must Turn Right sign (R3-7R) on westbound State Route 76.
7. Remove and replace one (1) Speed Limit sign (R2-1, 40 MPH) (24"x30") on eastbound State Route 76.
8. Remove and replace the backplate around eight (8) traffic signal heads on State Route 76 at Charles Drive/Hester Drive, and install a yellow retro-reflective strip around the edge of each backplate. (See Details Page)
9. Remove eight (8) pedestrian signal heads and install eight (8) LED countdown pedestrian signal heads on State Route 76 at Charles Drive/Hester Drive. Remove and replace eight (8) pedestrian ADA-compliant pushbuttons with countdown signs. (See Details Page)

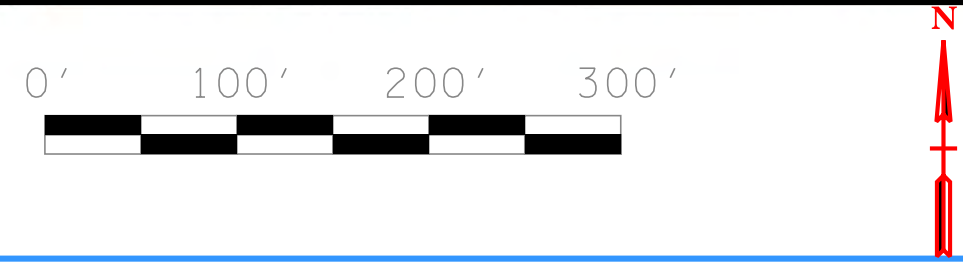


ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY



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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 4
S.R. 76
L.M. 15.84 to
L.M. 16.10

GUIDANCE

1. Remove and replace one (1) No Parking On Shoulder sign (R8-2 (MOD)) (24"x30") on the northbound Interstate 65 off-ramp.
 2. Install enhanced flatline and thermoplastic pavement markings as shown on the northbound Interstate 65 off-ramp from approximately 450 feet northeast of the interstate gore to State Route 76. Tie to existing pavement markings.
 3. Remove one (1) No Parking On Shoulder sign (R8-2 (MOD)) on the northbound Interstate 65 off-ramp.
 4. Install one (1) Springfield/White House Destination sign (D1-2) (96"x30"), one (1) East sign (M3-2) (24"x12"), one (1) West sign (M3-4) (24"x12"), two (2) State Route 76 signs (TN-6C) (30"x24"), one (1) Directional Arrow sign (M6-1L) (21"x15"), and one (1) Directional Arrow sign (M6-1R) (21"x15") on the northbound Interstate 65 off-ramp at the beginning of the ramp widening taper.
 5. Remove two (2) Stop Ahead signs (W3-1) and install two (2) Traffic Signal Ahead signs (W3-3) (48"x48") on the northbound Interstate 65 off-ramp.
 6. Widen the northbound Interstate 65 off-ramp as shown from approximately 780 feet northeast of the interstate gore to State Route 76. (See Figure 3 for Layout Plan and Typical Sections)
 7. Install one (1) No Parking On Shoulder sign (R8-2 (MOD)) (24"x30") on the northbound Interstate 65 off-ramp approximately 920 feet northeast of the interstate gore.
 8. Remove one (1) No Parking On Shoulder sign (R8-2 (MOD)) on the northbound Interstate 65 off-ramp.
 9. Remove one (1) Springfield/White House Destination sign (D1-2), one (1) East sign (M3-2), one (1) West sign (M3-4), two (2) State Route 76 signs (TN-6C), one (1) Directional Arrow sign (M6-1L), and one (1) Directional Arrow sign (M6-1R) on the northbound Interstate 65 off-ramp.
- * All warning signs shall be on fluorescent yellow sheeting material.

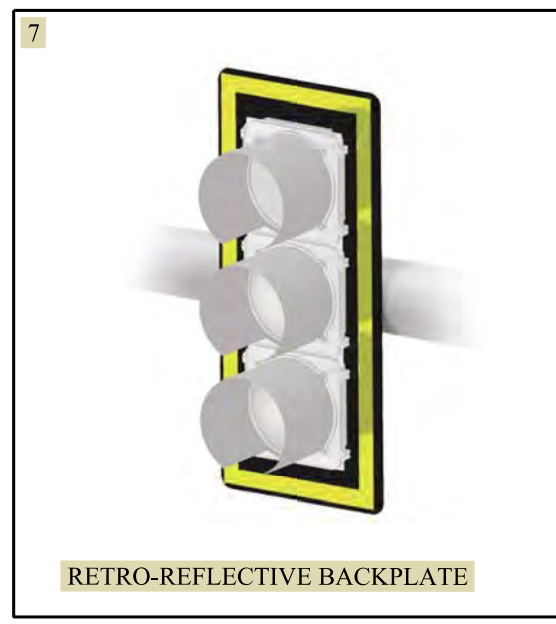
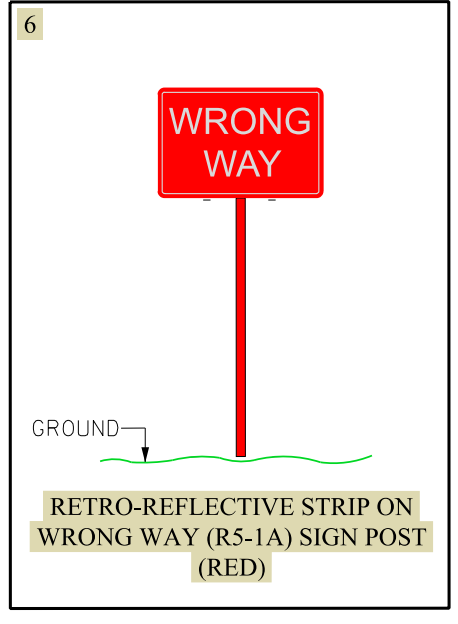
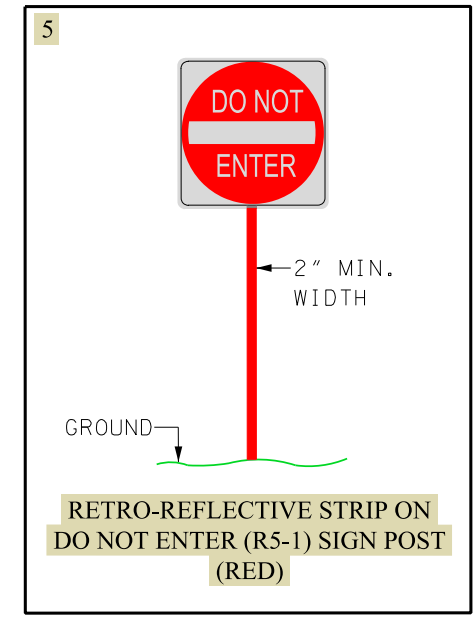
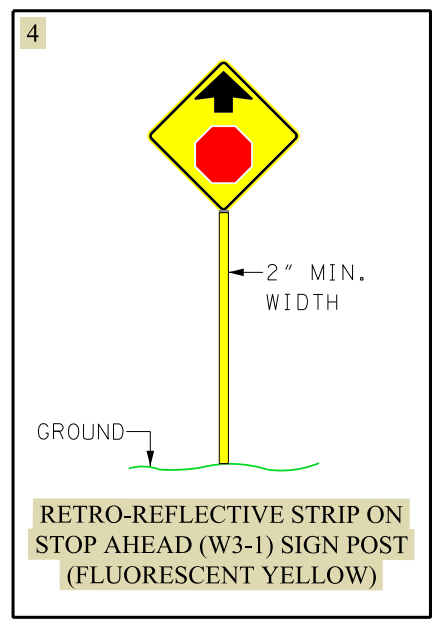
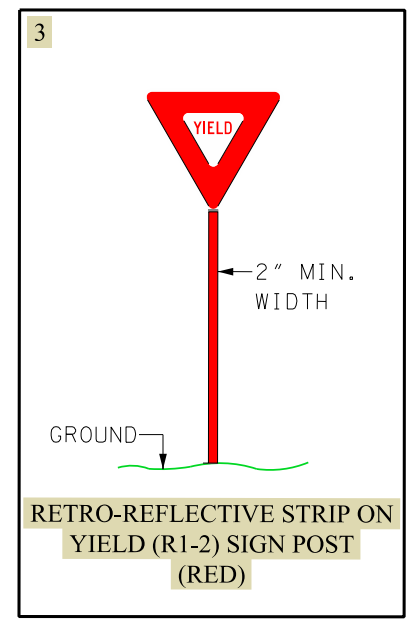
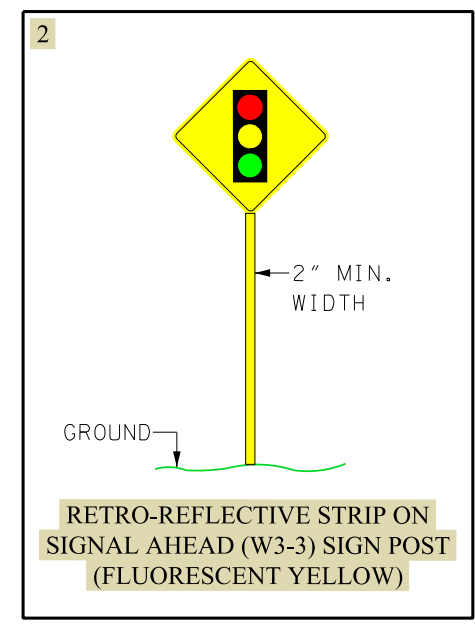
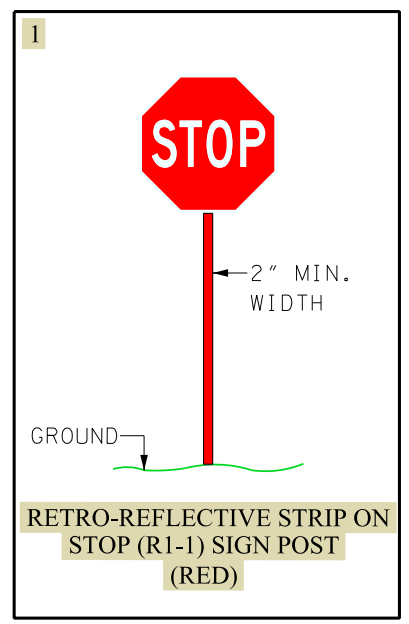
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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

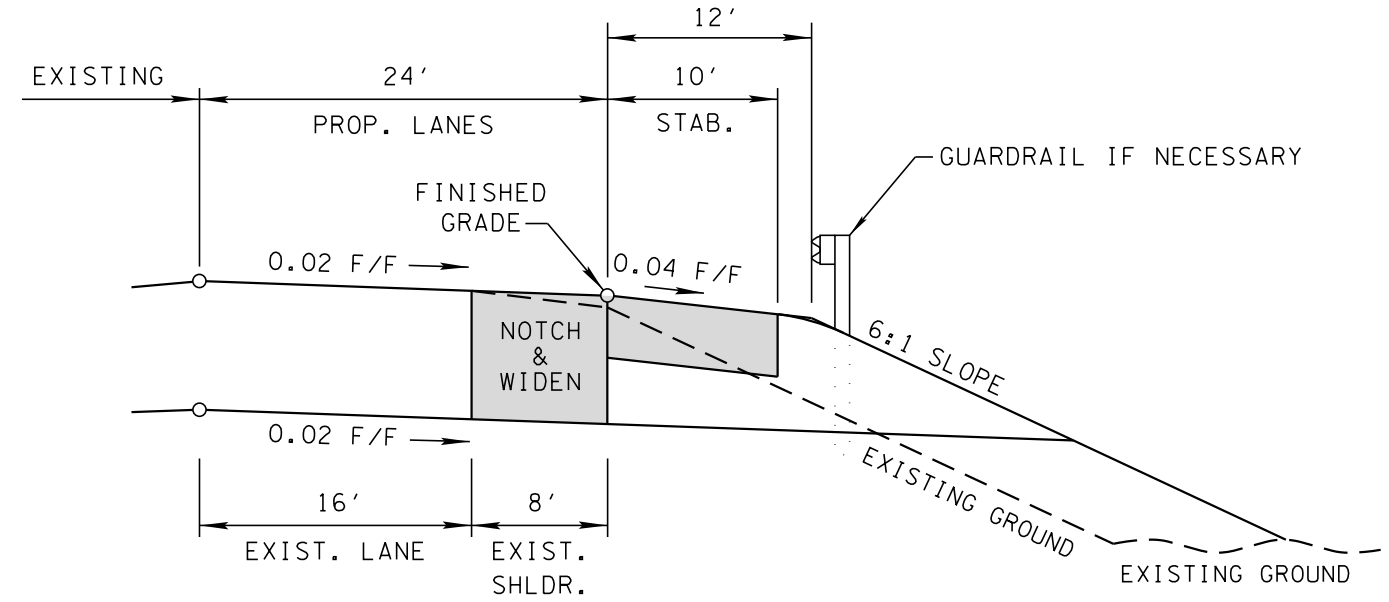
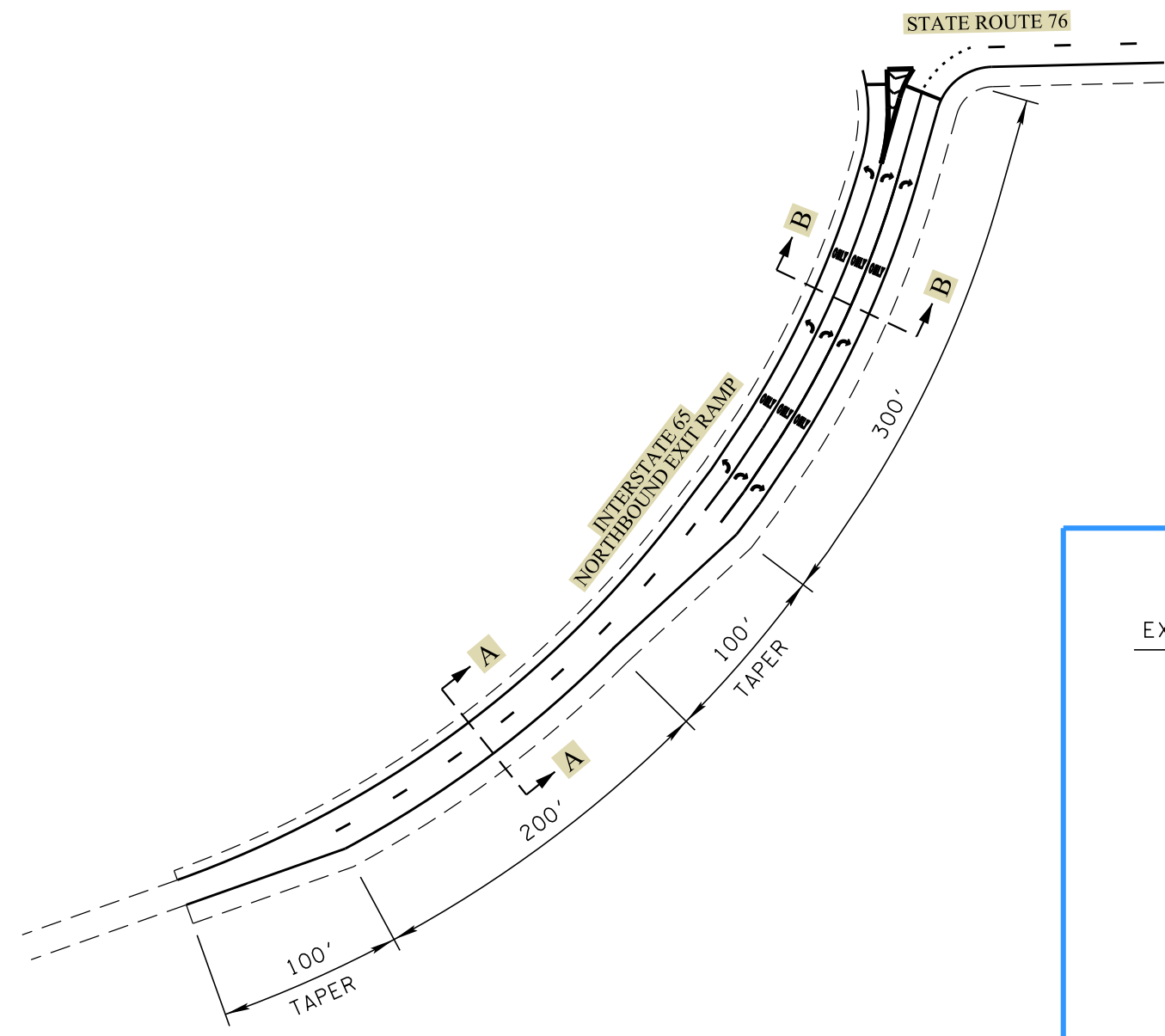
FIGURE 4A
S.R. 76
L.M. 15.84 to
L.M. 16.10



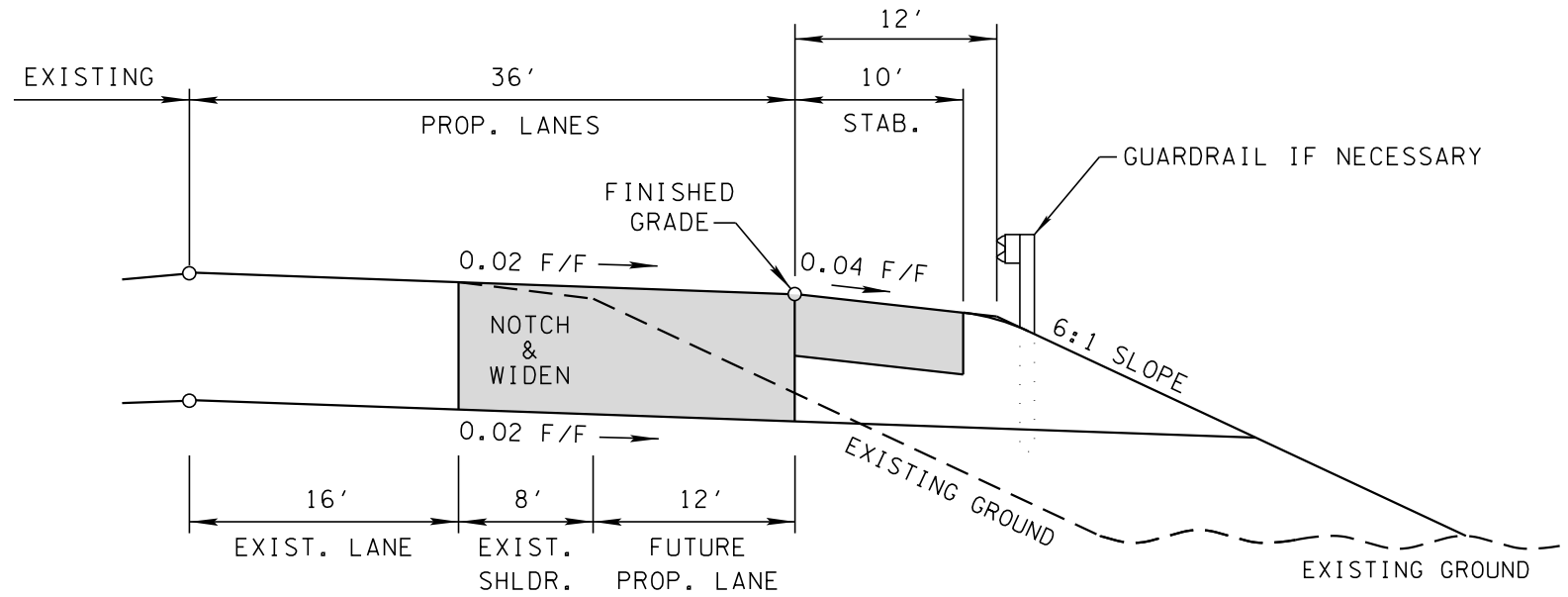
ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO 16.20
ROBERTSON COUNTY

**EXIT RAMP LAYOUT PLAN VIEW
AND TYPICAL SECTIONS**

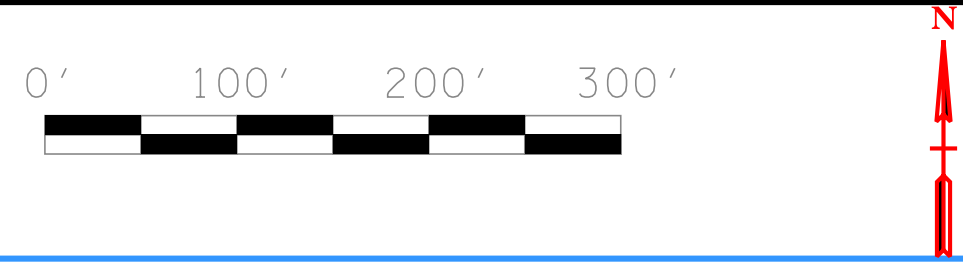


I-65 NORTHBOUND EXIT RAMP SECTION A-A
(BASED ON STD. DWG. RD01-TS-4)



I-65 NORTHBOUND EXIT RAMP SECTION B-B
(BASED ON STD. DWG. RD01-TS-4)

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ROAD SAFETY AUDIT REVIEW

**STATE ROUTE 76
L.M. 15.95 TO L.M. 16.10
ROBERTSON COUNTY**

Robertson County
State Route 76
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)
PIN 120290.00

APPENDIX

CITY OF WHITE HOUSE COMMITMENT LETTER

COST ESTIMATES

INTERSTATE 65 BRIDGE VERTICAL CLEARANCE FIELD MEASUREMENTS

STATE ROUTE 76 CONCEPTS

PRE-BRIEF SUMMARY WITH CRASH DATA

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

CITY OF WHITE HOUSE COMMITMENT LETTER



City of White House, Tennessee

105 College Street • White House, TN 37188
www.cityofwhitehouse.com/planning
Phone (615) 672-4350 • Fax (615) 672-2939
"Valuing our Future while Protecting our Heritage"

January 21, 2016

Mr. Steve Allen
Strategic Transportation Investments Division
TN Department of Transportation
James K. Polk Building, Suite 1000
505 Deaderick Street
Nashville, TN 37243-0344

REF: Letter of Commitment for the City of White House concerning RSAR PIN 120290.00

Mr. Allen:

As Mayor of the City of White House, I completely support my administration's hard work to improve the safety for our traveling public within our jurisdiction. I also appreciate the efforts TDOT personnel have continually contributed to safety in our City which includes both completed projects and planning for future improvements. More specifically, we are committed to teaming with TDOT and the Federal government concerning the necessary safety improvements along SR76 as defined in your recent RSAR and related studies.

The intent of this letter is to convey our City's commitment to these safety efforts in accordance with recent coordination details between TDOT and City staff. To summarize the key background information, engineers have studied this area of SR 76 and the I-65 interchange and developed the following documents: RSAR Draft (PIN 120290.00 – 11/11/14), Charles Drive Access Study (Draft 11/10/15), and RSAR Draft (PIN120290.01 – 11/28/15). The City desires to move forward with the recommended safety improvements of the Full RSAR (Draft) PIN 120290.00 and as further studied in the Charles Drive Access Study. Included in the Charles Drive Access Study Conclusion on page 37 and the focal point of this commitment letter is the paragraph below.

As with any study in which forecasting is required, some inaccuracy in assumptions will occur. In this case, the analysis shows that some room for error exists before heavy delays are expected within the corridor. If congestion and delays do increase significantly more than expected, the City may be required to take steps to, foremost, prevent congestion from affecting the I-65 ramps such that queues extend to the mainline interstate lanes. In this case, mitigation efforts may include:

- *Increase signal green time along SR 76 to clear queues. This would result in higher side street delays, but would serve major approaches of SR 76 better.*
- *Install an adaptive signal system which can adjust timing based on current conditions. This could allow a targeted approach to mitigating interstate ramp queues, if they were to occur.*
- *A measure that would have a significant impact on existing, developed properties would be to add capacity along SR 76, including additional lanes at intersections. Dual left turn lanes at Charles Drive, right turn lanes at Charles Drive or Wilkinson Lane, and/or additional lanes to allow removal of split phase signal operation at Wilkinson Lane are all possibilities. Most of these improvements would result in significant right-of-way impacts.*

As described above, should the situation along I-65 at the Exit 108 Interchange be affected by the conditions along SR76 and the intersection of Charles Drive and its connection to the Wal-

Mart development, the City is committed to taking action to rectify the situation. The solutions bulletized above will be analyzed at that time; and the measures most appropriate for mitigation of the issue will be developed and constructed. If at that time, the City does not have the funding available to construct the appropriate measure, short term closure of the Charles Drive connection to Wal-Mart would be initiated until such funds become available to continue with the necessary improvements that resolve the issues at hand and allow reopening of the subject connection. We make this commitment as a part of the Strategic Transportation Investment Division's coordination and requirement in order to progress the necessary RSAR PIN 120290.00 from its Draft to Final disposition and consequently move forward with development.


As a further commitment of the City of White House, we are prepared to budget funds during the City's FY16-17 year to cover the Engineering necessary to progress the project through design and have it "shovel ready." We understand that the Federal match of 90% is currently not appropriated for this project due to other State priorities. In accordance with your previous discussion points, with the project shovel ready, eventually this project will be of enough priority to receive matching funds. At that time, the City is also prepared to provide 10% of the construction costs to complete this project.

As previously stated, we appreciate the continued efforts of you, your staff and the rest of TDOT in continuing to strive for improved safety in our City and across Tennessee. If you have questions, concerns or comments that require further discussion, please contact me anytime.

Sincerely,



Michael L. Arnold
Mayor
City of White House



Gerald O. Herman
City Administrator
City of White House

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

COST ESTIMATES

Route:	State Route 76
Description:	West of Industrial Road to Hester Drive. Log Mile 15.60 to Log Mile 16.20
County:	Robertson
Length:	0.60 miles
Date:	August 2, 2016

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ -	\$ -	\$ -
Clearing and Grubbing	\$ -	\$ 300	\$ 2,700	\$ 3,000
Earthwork	\$ 5,800	\$ -	\$ 52,300	\$ 58,100
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ -	\$ -	\$ -
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ -	\$ -	\$ -	\$ -
Pavement Removal	\$ 6,000	\$ -	\$ 54,300	\$ 60,300
Paving	\$ 73,000	\$ -	\$ 656,900	\$ 729,900
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ 500	\$ -	\$ 4,770	\$ 5,300
Seeding	\$ 200	\$ -	\$ 2,000	\$ 2,200
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ -	\$ -	\$ -
Fencing	\$ -	\$ -	\$ -	\$ -
Signing ¹			\$ 11,200	\$ 11,200
Pavement Markings ¹			\$ 54,300	\$ 54,300
Lighting ¹			\$ -	\$ -
Signalization ¹			\$ 15,000	\$ 15,000
Guardrail ¹			\$ 10,800	\$ 10,800
Pay Item Quantity Adjustment (15%) ²	\$ 12,800	\$ -	\$ 129,600	\$ 142,500
Maintenance of Traffic (5%)	\$ 4,900	\$ -	\$ 49,700	\$ 54,600
Mobilization (5%)	\$ 4,900	\$ -	\$ 49,700	\$ 54,600
CONSTRUCTION COST (rounded)	\$ 108,100	\$ 300	\$ 1,093,300	\$ 1,201,700
Engineering and Contingency (10%)	\$ 10,800	\$ -	\$ 109,300	\$ 120,100
TOTAL CONSTRUCTION COST (rounded)	\$ 118,900	\$ 300	\$ 1,202,600	\$ 1,321,800
Preliminary Engineering 10% (By the City)	\$ 132,000	\$ -	\$ -	\$ -
PROJECT COST ³(rounded)	\$ 250,900	\$ 300	\$ 1,202,600	\$ 1,453,800

¹ This safety item is 100% eligible and does not require a 10% funding match by the local agency.

² For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

³ For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

Route: State Route 76
County: Robertson
Section: Log Mile 15.60 to Log Mile 16.20
Length: 0.60 Miles

Item	Quantity	Unit	2014 Unit Cost	Sub-Total	Total Cost	Rounded Cost	Description/Quantity Calculation
Clear and Grubbing							
201-01	1.03	Acres	\$ 2,500.00		\$ 2,575	\$ 3,000	Area along widening
Earthwork							
203-01	8686	CY	\$ 6.68	\$ 58,023			Road & Drainage Excavation (Unclassified) (Cut)
		Total			\$ 58,023	\$ 58,100	
Paving							
	9484	SF	\$ 10.91	\$ 103,494			Concrete Ramp Widening
	68477	SF	\$ 6.05	\$ 414,075			Arterial Mainline (SR 76)
	48559	SF	\$ 3.78	\$ 183,589			Asphalt Shoulders (Ramp and SR 76)
	34613	SF	\$ 0.67	\$ 23,199			1.25" Resurfacing
415-01.02	3845	SY	\$ 1.42	\$ 5,460			Cold planing (milling) asphalt pavement (SR 76)
		Total			\$ 729,815	\$ 729,900	
Pavement Removal							
202-03	680	SY	\$ 8.65	\$ 377			Removal of Rigid Pavement, Sidewalk, etc. (Ramp Radius)
202-03.01	9520	SY	\$ 6.04	\$ 57,502			Asphalt Removal (SR 76)
407-20.05	1150	LF	\$ 2.07	\$ 2,381			Saw Cut Asphalt Pavement
					\$ 60,260	\$ 60,300	
Topsoil							
203-07	969	CY	\$ 5.45		\$ 5,282	\$ 5,300	
Seeding							
801-01	52268	SF	\$ 24.20	\$ 1,581			sq. ft to be seeded/1000 x 1.25 = units. Unit price in units
801-03	48	MG	\$ 11.51	\$ 552			Water (Seeding & Sodding)
					\$ 2,134	\$ 2,200	
Signing							
713-13.02	179	SF	\$ 12.55	\$ 2,246.45			0.08" Sheeting
713-13.03	174	SF	\$ 13.97	\$ 2,430.78			0.10" Sheeting
713-11.01	231	LB	\$ 3.27	\$ 755.37			"U" Post
713-11.02	1101	LB	\$ 3.62	\$ 3,985.62			"P" Post
713-02.21	96	LF	\$ 5.80	\$ 556.80			Sign post delineation enhancement
713-15.36	41	Each	\$ 29.16	\$ 1,195.56			Remove Sign, Support, & Footing
					\$ 11,171	\$ 11,200	
Pavement Marking							
716-01.21	225	Each	\$ 29.52	\$ 6,642.00			Snowplowable Markers (bi-direction 1 color)
716-01.22	100	Each	\$ 30.70	\$ 3,070.00			Snowplowable Markers (mono-direction)
716-01.23	32	Each	\$ 28.08	\$ 898.56			Snowplowable Markers (bi-direction 2 color)
716-02.04	378	SY	\$ 17.78	\$ 6,720.84			Plastic Pavement Marking (Channelization Striping)
716-02.05	336	LF	\$ 12.19	\$ 4,095.84			Stop Lines
716-02.06	22	Each	\$ 149.38	\$ 3,286.36			Turn Lane Arrow
716-04.05	1	Each	\$ 130.52	\$ 130.52			Straight Arrow
716-04.01	2	LF	\$ 197.38	\$ 394.76			Straight-Turn Arrow
716-02.09	314	LF	\$ 29.70	\$ 9,325.80			Plastic Pavement Marking (Longitudinal Cross-Walk)
716-03.01	12	Each	\$ 191.35	\$ 2,296.20			Plastic Pavement Marking (Only)
716-04.04	394	LF	\$ 5.64	\$ 2,222.16			Plastic Pavement Marking (Transverse Shoulder)
716-04.12	45	SF	\$ 12.87	\$ 579.15			Plastic Pavement Marking (Yield Line)
716-12.01	3.131	L.M.	\$ 3,201.12	\$ 10,022.71			Edgelines & Centerlines, Enhanced Flatline Thermo (4")
716-12.02	0.866	L.M.	\$ 4,707.34	\$ 4,076.56			Enhanced Flatline Thermo (6")
716-12.04	161	LF	\$ 1.98	\$ 318.78			4" Dotted Line (Enhanced Flatline Thermo)
716-12.05	100	LF	\$ 1.56	\$ 156.00			Enhanced Flatline Thermo (6" Dotted)
					\$ 54,236	\$ 54,300	
Signalization							
730-01	1	Lump Sum	\$ 15,000.00	\$ 15,000			Signalized intersection improvements at Charles Drive and to modify I-65 NB signal when SR 76 is widened
					\$ 15,000	\$ 15,000	
Guardrail							
705-02.02	300	LF	\$ 15.67	\$ 4,701			Guardrail (End Terminals Not Included in Price)
705-04.07	2	Each	\$ 2,025.56	\$ 4,051			Guardrail Terminal (Type 38)
705-04.09	2	Each	\$ 997.20	\$ 1,994			Type 38 Earth Pad
		Total			\$ 10,747	\$ 10,800	
Total:						\$ 950,100	

Paving Cost by Cross Section
JHS

City Street Mainline:

Item No.	Description	Units	2015 Unit Cost	Thickness (Inches)	Cost per S.F.	Based On
411-01.10	Surface AC (PG64-22) GR "D"	Ton	\$ 91.05	1.25	\$ 0.67	Design Guidelines 4-411.00
307-01.08	Binder AC (PG64-22) GR "B-M2"	Ton	\$ 81.76	2	\$ 1.03	Design Guidelines 4-307.00
307-01.01	Black Base AC (PG64-22) GR "A"	Ton	\$ 78.76	3	\$ 1.51	Design Guidelines 4-307.00
303-01	Mineral Agg Base GRA "D"	Ton	\$ 19.25	8	\$ 0.96	Design Guidelines 4-303.00
Total:				14.25	\$ 4.17	

Arterial (Asphalt) Mainline:

Item No.	Description	Units	2015 Unit Cost	Thickness (Inches)	Cost per S.F.	Based On
411-02.10	Bituminous Surface	Tons	\$ 90.31	1.25	\$ 0.66	Design Guidelines 4-411.00
403-01	Tack Coat	Tons	\$ 626.63	0.00	\$ 0.01	Design Guidelines 4-403.00
307-02.08	Bituminous Binder	Tons	\$ 79.82	2.25	\$ 1.13	Design Guidelines 4-307.00
307-02.01	Bituminous Base	Tons	\$ 70.92	6.50	\$ 2.95	Design Guidelines 4-307.00
402-01	Prime Coat	Tons	\$ 560.05	0.00	\$ 0.08	Design Guidelines 4-402.00
402-02		Tons	\$ 37.32		\$ 0.02	Design Guidelines 4-402.00
303-01	Mineral Aggregate Base	Tons	\$ 19.25	10.00	\$ 1.21	Design Guidelines 4-303.00
Total:				20	\$ 6.05	

City Street Overlay (Assume Double Layer of Surface AC):

Item No.	Description	Units	2015 Unit Cost	Thickness (Inches)	Cost per S.F.	Based On
411-01.10	Surface AC (PG64-22) GR "D"	Ton	\$ 91.05	1.25	\$ 0.67	Design Guidelines 4-411.00
Total:				1.25	\$ 0.67	

Ramp (Concrete) Mainline:


Item No.	Description	Units	2015 Unit Cost	Thickness (Inches)	Cost per S.F.	Based On
501-01.03	Portland Cement Concrete PVMT (Plain)	S.Y.	\$ 76.31	10.00	\$ 8.48	
313-03	Treated Permeable Base	S.Y.	\$ 17.56	4.00	\$ 1.95	
303-01	Mineral Aggregate Base	Tons	\$ 19.25	4.00	\$ 0.48	Design Guidelines 4-303.00
Total:				18	\$ 10.91	

City Street Shoulder:

Item No.	Description	Units	2015 Unit Cost	Thickness (Inches)	Cost per S.F.	Based On
411-01.07	Surface AC (PG64-22) GR "E"	Ton	\$ 92.37	1.5	\$ 0.79	Design Guidelines 4-411.00
303-01	Mineral Agg Base GRA "D"	Ton	\$ 19.25	12.75	\$ 1.54	Design Guidelines 4-303.00
Total:				14.25	\$ 2.33	

Arterial and Ramp (Asphalt) Shoulder:

Item No.	Description	Units	2015 Unit Cost	Thickness (Inches)	Cost per S.F.	Based On
411-01.07	Bituminous Surface	Tons	\$ 92.37	1.25	\$ 0.66	Design Guidelines 4-411.00
403-01	Tack Coat	Tons	\$ 626.63	0.00	\$ 0.01	Design Guidelines 4-403.00
307-01.08	Bituminous Binder	Tons	\$ 81.76	2.00	\$ 1.03	Design Guidelines 4-307.00
402-01	Prime Coat	Tons	\$ 560.05	0.00	\$ 0.08	Design Guidelines 4-402.00
402-02		Tons	\$ 37.32		\$ 0.02	Design Guidelines 4-402.00
303-01	Mineral Aggregate Base	Tons	\$ 19.25	16.50	\$ 1.99	Design Guidelines 4-303.00
Total:				19.75	\$ 3.78	

 = referenced from previous input price

Route: 76
 County: Robertson
 Termini: Log Mile 15.6 to Log Mile 16.2
 PIN: 120788.00

Figure	MUTCD Sign Code	Description	Size	Sheet Thickness (Inches)	Area 0.08" (s.f.)	Area 0.10" (s.f.)	Post Type	Post Weight (lbs/ft)	Estimated Length	Post Quantity (lbs)	Red Delineation	Yellow Delineation	Note
101	M3-4	West Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
101	TN-6a	Secondary State Route (2 Digits)	24"x24"	0.08	4								
102	R8-3A	No Parking (Words)	24"x30"	0.08	5		P8	2.164	14	30.296			
103	R1-1	Stop	36"x36" (Octagon)	0.1		7	P8	2.164	14	30.296	6		
104	W3-3	Signal Ahead	36"x36" (Diamond)	0.1		9	P8	2.164	14	30.296		6	
105	R2-1	Speed Limit (xx)	30"x36"	0.1		7.5	U3	2.5	14	35			40 MPH
107	R2-1	Speed Limit (xx)	30"x36"	0.1		7.5	U3	2.5	14	35			40 MPH
107	TN-13	Highway Littering Sign	24"x30"	0.08	5								
106	W3-1	Stop Ahead	30"x30"	0.08	6.25		P2	2.06	14	28.84		6	
108	M3-1	North Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
108	M1-1	Interstate Route (2 Digit)	24"x24"	0.08	4								65
108	M6-3	Straight Arrow Auxiliary	21"x15"	0.08	2.1875								
109	M3-3	South Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
109	M1-1	Interstate Route (2 Digit)	24"x24"	0.08	4								65
109	M6-2R	(Right) Diagonal Arrow Auxiliary	21"x15"	0.08	2.1875								
110	R7-1 (MOD)	No Parking Any Time	24"x30"	0.08	5		P2	2.06	14	28.84			
113	R1-2	Yield	36"x36" (Triangle)	0.1		4.5	U6	3	14	42	6		
114	R1-2	Yield	36"x36" (Triangle)	0.1		4.5	U6	3	14	42	6		
115	R8-2 (MOD)	No Parking on Shoulder	24"x30"	0.08	5		P2	2.06	14	28.84			
117	R5-1	Do Not Enter	36"x36" (Square)	0.1		9	P8	2.164	14	30.296	6		
117	R6-1L	One Way (Left)	36"x12"	0.08	3								
117	R6-1R	One Way (Right)	36"x12"	0.08	3								
117	R5-1	Do Not Enter	36"x36" (Square)	0.1		9	P8	2.164	14	30.296	6		
117	R6-1L	One Way (Left)	36"x12"	0.08	3								
117	R6-1R	One Way (Right)	36"x12"	0.08	3								
118	R5-1a	Wrong Way	36"x24"	0.08	6		P8	2.164	14	30.296	6		
118	R5-1a	Wrong Way	36"x24"	0.08	6		P8	2.164	14	30.296	6		
120	W12-2	Low Clearance Sign	36"x36" (Diamond)	0.1		9	P8	2.164	14	30.296			14' - 6"
203	M3-1	North Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
203	M1-1	Interstate Route (2 Digit)	24"x24"	0.08	4								65
203	M5-1L	Advance Left Turn Arrow Auxiliary	21"x15"	0.08	2.1875								
204	R3-8 (MOD)	Advance Intersection Lane Control	30"x30"	0.08	6.25		P8	2.164	14	30.296			
205	W3-3	Signal Ahead	36"x36" (Diamond)	0.1		9	P8	2.164	14	30.296		6	
208	W12-2	Low Clearance Sign	36"x36" (Diamond)	0.1		9	P8	2.164	14	30.296			
209	M3-3	South Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
209	M1-1	Interstate Route (2 Digit)	24"x24"	0.08	4								65
209	M5-1L	Advance Left Turn Arrow Auxiliary	21"x15"	0.08	2.1875								
213	R3-8A	Lane Control (Three)	36"x60"	0.1		15	P8	2.164	14	30.296			
213	R3-8A	Lane Control (Three)	36"x60"	0.1		15	P8	2.164	14	30.296			
214	R5-1a	Wrong Way	36"x24"	0.08	6		P2	2.06	14	28.84	6		
214	R5-1a	Wrong Way	36"x24"	0.08	6		P2	2.06	14	28.84	6		
215	R5-1	Do Not Enter	36"x36" (Square)	0.1		9	P5	3.141	14	43.974	6		
215	R6-1L	One Way (Left)	36"x12"	0.08	3				14	0			
215	R6-1R	One Way (Right)	36"x12"	0.08	3				14	0			
215	R5-1	Do Not Enter	36"x36" (Square)	0.1		9	P5	3.141	14	43.974	6		
215	R6-1L	One Way (Left)	36"x12"	0.08	3				14	0			
215	R6-1R	One Way (Right)	36"x12"	0.08	3				14	0			
221	R1-2	Yield	36"x36" (Triangle)	0.1		4.5	U6	3	14	42	6		
222	R8-2 (MOD)	No Parking on Shoulder	24"x30"	0.08	5		P2	2.06	14	28.84			
223	M3-1	North Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
223	M1-1	Interstate Route (2 Digit)	24"x24"	0.08	4								65
223	M6-2R	(Right) Diagonal Arrow Auxiliary	21"x15"	0.08	2.1875								
224	M3-3	South Directional Auxiliary	24"x12"	0.08	2		P8	2.164	14	30.296			
224	M1-1	Interstate Route (2 Digit)	24"x24"	0.08	4								65
224	M6-3	Straight Arrow Auxiliary	21"x15"	0.08	2.1875								
227	R4-7	Keep Right	24"x30"	0.08	5		P2	2.06	14	28.84			
229	W3-3	Signal Ahead	36"x36" (Diamond)	0.1		9	P8	2.164	14	30.296		6	
303	R4-7	Keep Right	24"x30"	0.08	5		P2	2.06	14	28.84			
307	R2-1	Speed Limit (xx)	30"x36"	0.1		7.5	U3	2.5	14	35			40 MPH
401	R8-2 (MOD)	No Parking On Shoulder	24"x30"	0.08	5		P2	2.06	14	28.84			
404	D1-2	Destination 2 Line	96"x30"	0.1		20	P5	3.141	28	87.948			
404	M3-4	West Directional Auxiliary	24"x12"	0.08	2				14	0			
404	TN-6C	State Route (2 Digits)	30"x24"	0.08	5				14	0			
404	M6-1L	(Left) Arrow Auxiliary	15"x21"	0.08	2.1875				14	0			
404	M3-2	East Directional Auxiliary	24"x12"	0.08	2				14	0			
404	TN-6C	State Route (2 Digits)	30"x24"	0.08	5				14	0			
404	M6-1R	(Right) Arrow Auxiliary	15"x21"	0.08	2.1875				14	0			
407	R8-2 (MOD)	No Parking On Shoulder	24"x30"	0.08	5		P2	2.06	14	28.84			

Totals:

179 174

1331.512

72

24

U3 = 105
 U6 = 126 231
 P2 = 288.4
 P5 = 175.896
 P8 = 636.216 1100.512

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

INTERSTATE 65 BRIDGE VERTICAL CLEARANCE FIELD MEASUREMENTS

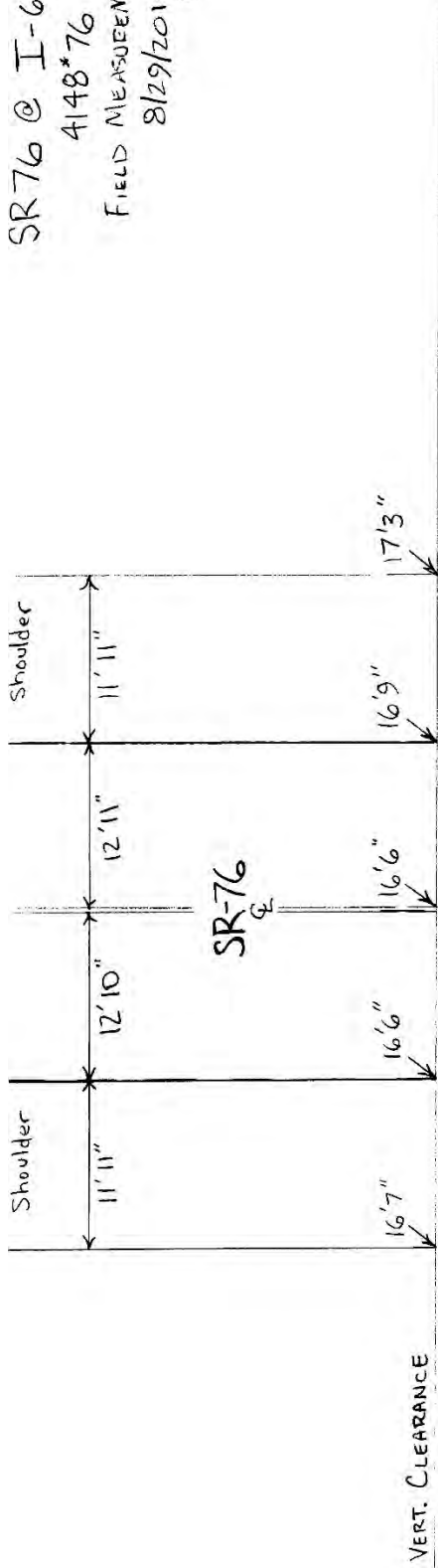
SR76 @ I-65

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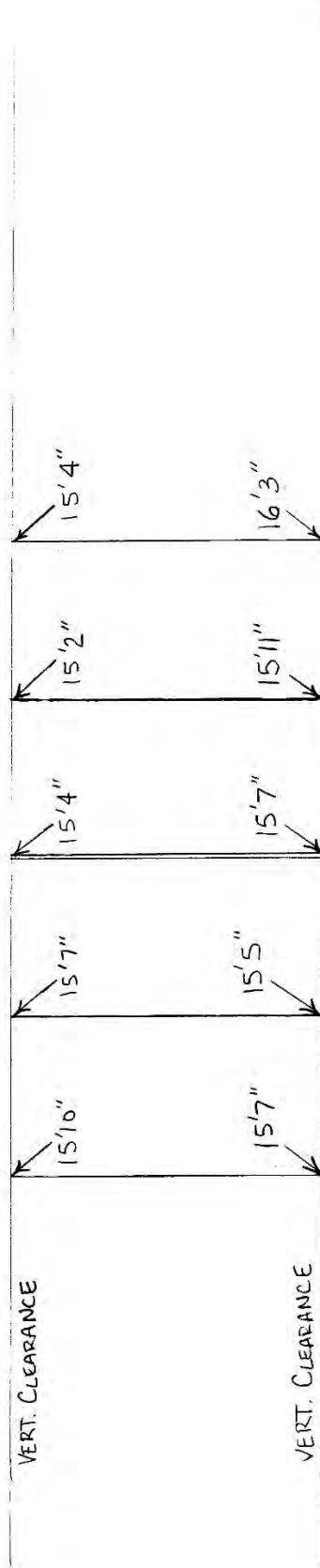
FIELD MEASUREMENTS

8/29/2014

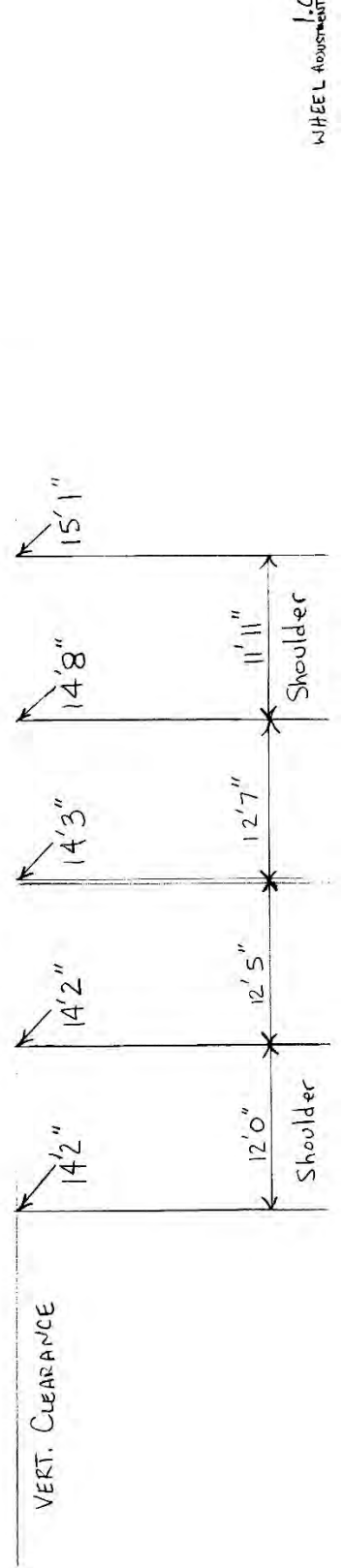
RHS



I-65 N



I-65 S



Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

STATE ROUTE 76 CONCEPTS

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

COMPARISON OF STATE ROUTE 76 CONCEPTS

Three (3) State Route 76 concepts have been developed for review based on discussions during the site visit on August 29, 2014. The following is a summary of these three (3) concepts:

State Route 76 Concept 1: One (1) eastbound travel lane and two (2) westbound travel lanes along State Route 76. This concept maintains the existing westbound edge line of the roadway within the interchange area.

State Route 76 Concept 2: One (1) eastbound travel lane and two (2) westbound travel lanes along State Route 76. This concept maintains the existing centerline of the roadway within the interchange area.

State Route 76 Concept 3: As a comparison to Concepts 1 and 2, the RSA Team decided to evaluate two (2) eastbound travel lanes and two (2) westbound travel lanes along State Route 76. This concept maintains the existing westbound edge line of the roadway within the interchange area.

The following is a comparison of these concepts along with the existing conditions.

Description	Existing Conditions	Concept 1	Concept 2	Concept 3
No. of Eastbound Travel Lanes (Under the Interstate 65 Bridges)	1	1	1	2
No. of Westbound Travel Lanes (Under the Interstate 65 Bridges)	1	2	2	2
Traffic Control for the Interstate 65 Northbound Ramp to State Route 76 Eastbound	Free-Flow	Free-Flow	Free-Flow	Yield
Proposed Minimum Vertical Clearance at the Interstate 65 Southbound Bridge	14'-2"	14'-6"	14'-6"	14'-6"
State Route 76 Vertical Cut to achieve the above Minimum Vertical Clearance (Estimated)	-	4 Inches	7 Inches ⁽¹⁾	4 Inches
Construction Cost Estimate	-	\$936,800	\$972,300	\$1,129,800

⁽¹⁾Proposed State Route 76 westbound travel lanes will encroach onto the existing westbound shoulder area and in turn, their existing roadway cross slopes will need to be modified an additional three (3) inches.

Robertson County

State Route 76

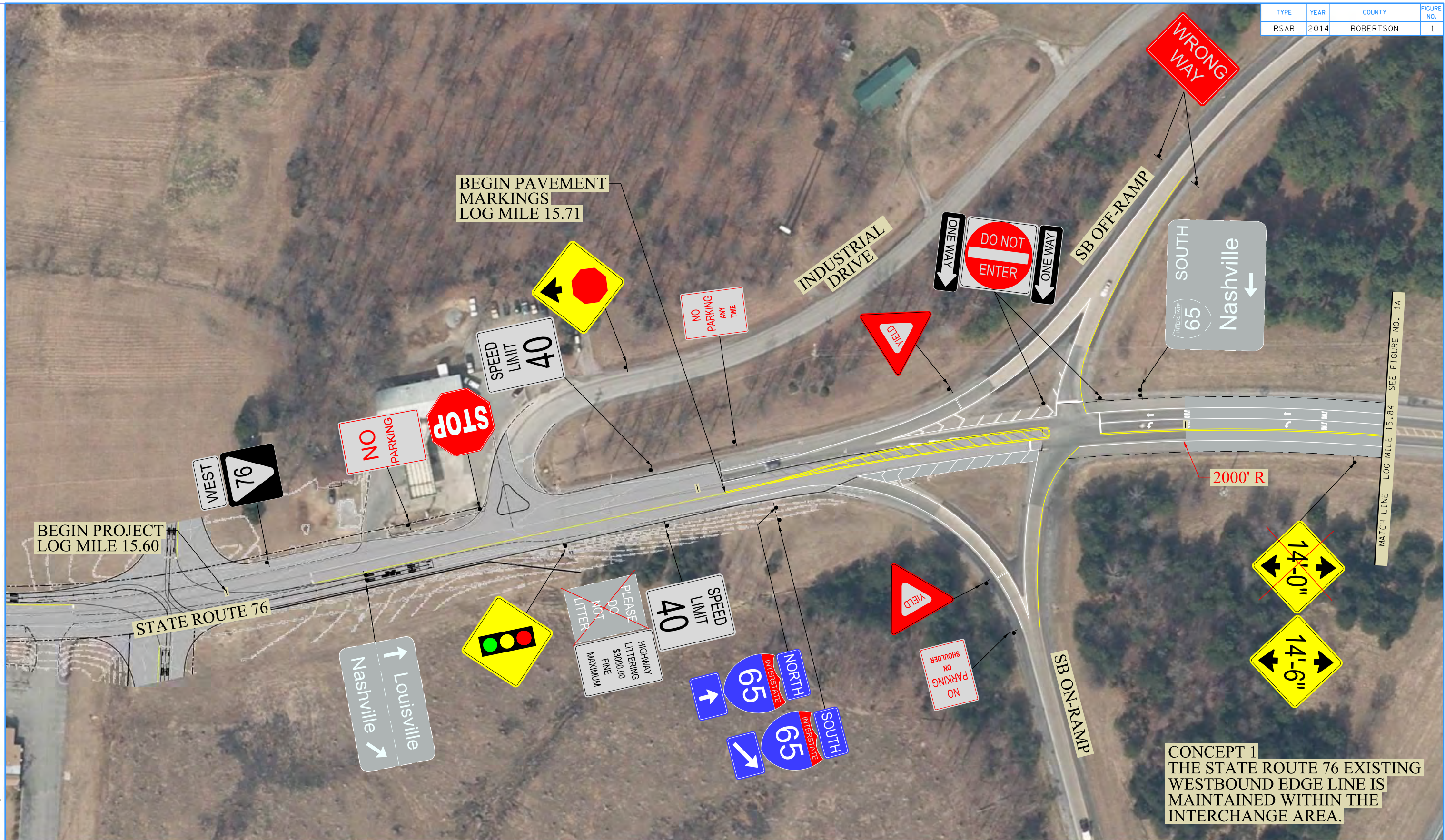
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

STATE ROUTE 76 – CONCEPT 1 SUMMARY

FIGURES AND COST ESTIMATES

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	1



ROAD SAFETY AUDIT REVIEW

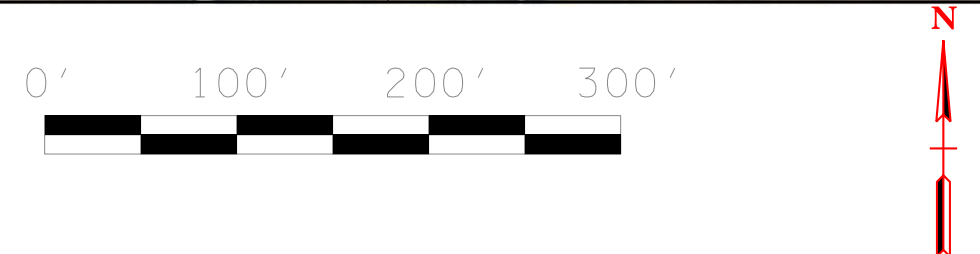
STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1
S.R. 76
L.M. 15.60 to
L.M. 15.84



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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	1B



CONCEPT 1
THE STATE ROUTE 76 EXISTING WESTBOUND EDGE LINE IS MAINTAINED WITHIN THE INTERCHANGE AREA.

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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1B
S.R. 76
L.M. 16.10 to
L.M. 16.20

Route:	State Route 76
Description:	Log Mile 15.60 to Log Mile 16.20
County:	Robertson
Length:	0.6 mile
Date:	October 10, 2014

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ -	\$ -	\$ -
Clearing and Grubbing	\$ -	\$ -	\$ -	\$ -
Earthwork	\$ -	\$ 3,200	\$ 28,800	\$ 32,000
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ 3,000	\$ 27,000	\$ 30,000
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ -	\$ -	\$ -	\$ -
Pavement Removal	\$ -	\$ -	\$ -	\$ -
Paving	\$ -	\$ 47,600	\$ 428,400	\$ 476,000
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ -	\$ 500	\$ 4,500	\$ 5,000
Seeding	\$ -	\$ 100	\$ 900	\$ 1,000
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ -	\$ -	\$ -
Fencing	\$ -	\$ -	\$ -	\$ -
Signing ¹			\$ 14,000	\$ 14,000
Pavement Markings ¹			\$ 44,000	\$ 44,000
Lighting ¹			\$ -	\$ -
Signalization ¹			\$ 10,000	\$ 10,000
Guardrail ¹			\$ -	\$ -
Pay Item Quantity Adjustment (15%) ²	\$ -	\$ 8,200	\$ 83,600	\$ 91,800
Maintenance of Traffic (5%)		\$ 3,100	\$ 32,100	\$ 35,200
Mobilization (5%)		\$ 3,100	\$ 32,100	\$ 35,200
CONSTRUCTION COST (rounded)		\$ 68,800	\$ 705,400	\$ 774,200
Engineering and Contingency (10%)		\$ 6,900	\$ 70,500	\$ 77,400
TOTAL CONSTRUCTION COST (rounded)		\$ 75,700	\$ 775,900	\$ 851,600
Preliminary Engineering (10%)		\$ 7,600	\$ 77,600	\$ 85,200
PROJECT COST ³(rounded)	\$ -	\$ 83,300	\$ 853,500	\$ 936,800

¹ This safety item is 100% eligible and does not require a 10% funding match by the local agency.

² For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

³ For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

Concept 1

Route: State Route 76
County: Robertson
Section: L.M. 15.60 to L.M. 16.20
Length: 0.6 Miles

Item	Quantity	Unit	2013 Unit Cost	Sub-Total	Total Cost	Rounded Cost	Description/Quantity Calculation
Earthwork							
203-01	5944	CY	\$ 5.27	\$ 31,325			Road & Drainage Excavation (Unclassified) (Cut)
		Total			\$ 31,325	\$ 32,000	
Drainage							
		Total			\$ 30,000	\$ 30,000	Misc. drainage improvements
Paving							
	54704	SF	\$ 6.02	\$ 329,318			arterial street asphalt paving - see separate calcs
	33818	SF	\$ 3.89	\$ 131,552			arterial and ramp asphalt shoulder - see separate calcs
	6123	SY	\$ 0.78	\$ 4,776			1.25" Resurfacing - see separate calcs
415-01.02	6123	SY	\$ 1.62	\$ 9,919			Cold planing (milling) asphalt pavement
		Total			\$ 475,565	\$ 476,000	
Topsoil							
203-07	412	CY	\$ 11.02		\$ 4,540	\$ 5,000	
Seeding							
801-01	22176	SF	\$ 30.11		\$ 835	\$ 1,000	sq. ft to be seeded/1000 x 1.25 = units. Unit price in units
Signing							
713-13.02	121	SF	\$ 14.19	\$ 1,716.99			0.08" Sheeting
713-13.03	193	SF	\$ 16.62	\$ 3,207.66			0.10" Sheeting
713-11.01	243	LB	\$ 3.03	\$ 736.29			"U" Post
713-11.02	1037	LB	\$ 4.41	\$ 4,573.17			"P" Post
713-02.21	114	LF	\$ 6.41	\$ 730.74			Sign post delineation enhancement
713-15.36	39	Each	\$ 64.89	\$ 2,530.71			Remove Sign, Support, & Footing
					\$ 13,496	\$ 14,000	

Concept 1

Route: State Route 76
County: Robertson
Section: L.M. 15.60 to L.M. 16.20
Length: 0.6 Miles

Pavement Marking							
716-01.21	196	Each	\$ 30.76	\$ 6,028.96			Snowplowable Markers (bi-direction 1 color)
716-01.22	72	Each	\$ 32.12	\$ 2,312.64			Snowplowable Markers (mono-direction)
716-02.04	400	SY	\$ 17.54	\$ 7,016.00			Plastic Pavement Marking (Channelization Striping)
716-02.05	224	LF	\$ 12.23	\$ 2,739.52			Stop Lines
716-02.06	12	Each	\$ 152.13	\$ 1,825.56			Turn Lane Arrow
716-02.09	316	LF	\$ 27.66	\$ 8,740.56			Plastic Pavement Marking (Longitudinal Cross-Walk)
716-03.01	6	Each	\$ 187.79	\$ 1,126.74			Plastic Pavement Marking (Only)
716-04.12	48	SF	\$ 13.12	\$ 629.76			Plastic Pavement Marking (Yield Line)
716-12.01	2.782	L.M.	\$ 3,404.04	\$ 9,470.04			Edgelines & Centerlines, Enhanced Flatline Thermo (4")
716-12.02	0.56	L.M.	\$ 5,683.99	\$ 3,183.03			Enhanced Flatline Thermo (6")
716-12.04	268	LF	\$ 1.67	\$ 447.56			4" Dotted Line (Enhanced Flatline Thermo)
					\$ 43,520	\$ 44,000	
Signalization							
730-01	1	Lump Sum	\$ 10,000.00	\$ 10,000			Signalized intersection improvements
					\$ 10,000	\$ 10,000	
Total:						\$ 612,000	

Robertson County

State Route 76

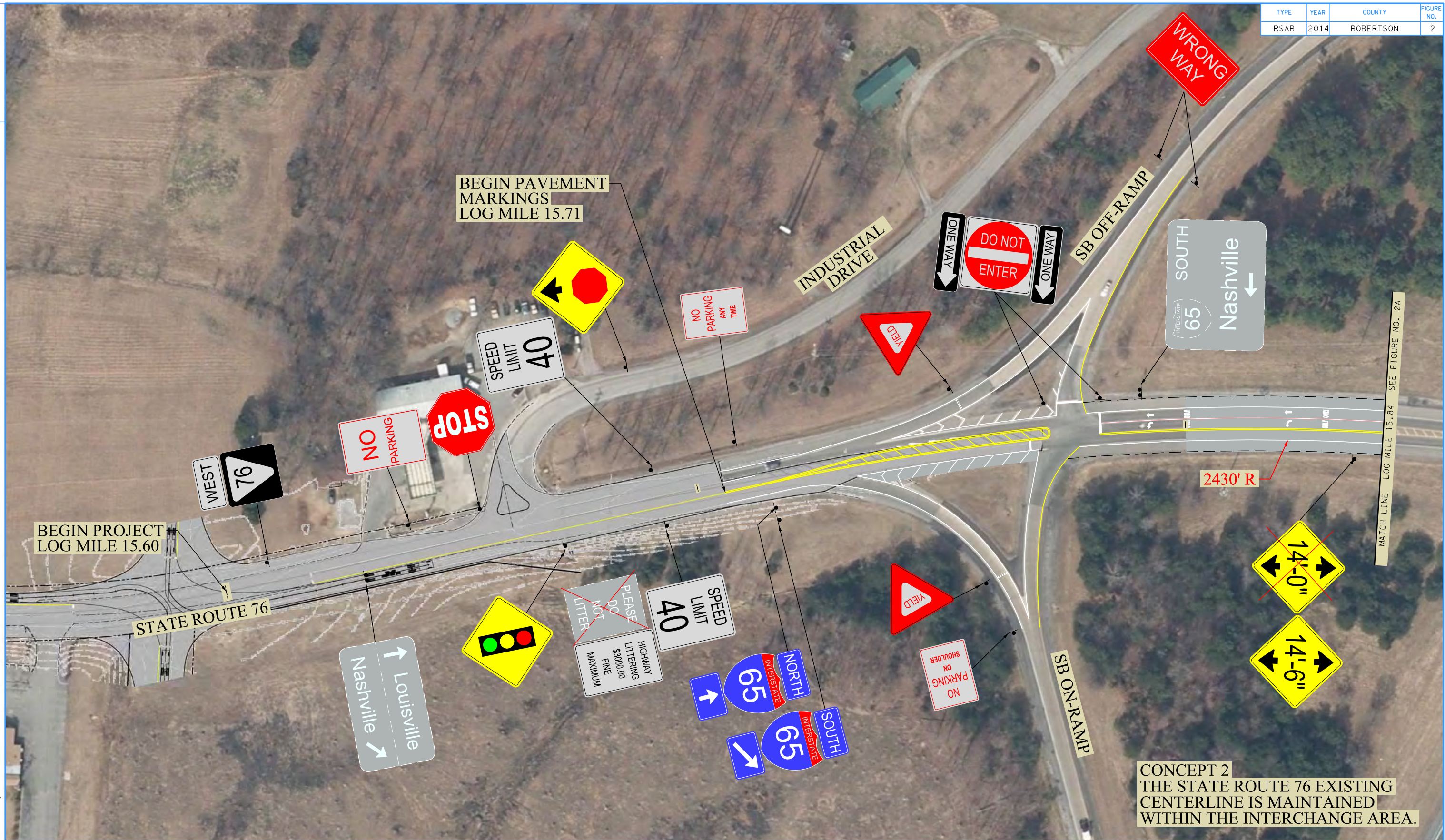
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

STATE ROUTE 76 – CONCEPT 2 SUMMARY

FIGURES AND COST ESTIMATES

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	2



BEGIN PROJECT
LOG MILE 15.60

BEGIN PAVEMENT
MARKINGS
LOG MILE 15.71

2430' R

MATCH LINE LOG MILE 15.84 SEE FIGURE NO. 2A

CONCEPT 2
THE STATE ROUTE 76 EXISTING
CENTERLINE IS MAINTAINED
WITHIN THE INTERCHANGE AREA.

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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 2
S.R. 76
L.M. 15.60 to
L.M. 15.84



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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	2B



CONCEPT 2
THE STATE ROUTE 76 EXISTING
CENTERLINE IS MAINTAINED
WITHIN THE INTERCHANGE AREA.

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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 2B
S.R. 76
L.M. 16.10 to
L.M. 16.20

Route:	State Route 76
Description:	Log Mile 15.60 to Log Mile 16.20
County:	Robertson
Length:	0.6 mile
Date:	October 10, 2014

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ -	\$ -	\$ -
Clearing and Grubbing	\$ -	\$ -	\$ -	\$ -
Earthwork	\$ -	\$ 3,500	\$ 31,500	\$ 35,000
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ 5,000	\$ 45,000	\$ 50,000
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ -	\$ -	\$ -	\$ -
Pavement Removal	\$ -	\$ -	\$ -	\$ -
Paving	\$ -	\$ 47,600	\$ 428,400	\$ 476,000
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ -	\$ 500	\$ 4,500	\$ 5,000
Seeding	\$ -	\$ 100	\$ 900	\$ 1,000
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ -	\$ -	\$ -
Fencing	\$ -	\$ -	\$ -	\$ -
Signing ¹			\$ 14,000	\$ 14,000
Pavement Markings ¹			\$ 44,000	\$ 44,000
Lighting ¹			\$ -	\$ -
Signalization ¹			\$ 10,000	\$ 10,000
Guardrail ¹			\$ -	\$ -
Pay Item Quantity Adjustment (15%) ²	\$ -	\$ 8,500	\$ 86,800	\$ 95,300
Maintenance of Traffic (5%)		\$ 3,300	\$ 33,300	\$ 36,600
Mobilization (5%)		\$ 3,300	\$ 33,300	\$ 36,600
CONSTRUCTION COST (rounded)		\$ 71,800	\$ 731,700	\$ 803,500
Engineering and Contingency (10%)		\$ 7,200	\$ 73,200	\$ 80,400
TOTAL CONSTRUCTION COST (rounded)		\$ 79,000	\$ 804,900	\$ 883,900
Preliminary Engineering (10%)		\$ 7,900	\$ 80,500	\$ 88,400
PROJECT COST ³(rounded)	\$ -	\$ 86,900	\$ 885,400	\$ 972,300

¹ This safety item is 100% eligible and does not require a 10% funding match by the local agency.

² For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

³ For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

Concept 2

Route: State Route 76
County: Robertson
Section: L.M. 15.60 to L.M. 16.20
Length: 0.6 Miles

Item	Quantity	Unit	2013 Unit Cost	Sub-Total	Total Cost	Rounded Cost	Description/Quantity Calculation
Earthwork							
203-01	6502	CY	\$ 5.27	\$ 34,266			Road & Drainage Excavation (Unclassified) (Cut)
		Total			\$ 34,266	\$ 35,000	
Drainage							
		Total			\$ 50,000	\$ 50,000	Misc. drainage improvements
Paving							
	54704	SF	\$ 6.02	\$ 329,318			arterial street asphalt paving - see separate calcs
	33818	SF	\$ 3.89	\$ 131,552			arterial and ramp asphalt shoulder - see separate calcs
	6123	SY	\$ 0.78	\$ 4,776			1.25" Resurfacing - see separate calcs
415-01.02	6123	SY	\$ 1.62	\$ 9,919			Cold planing (milling) asphalt pavement
		Total			\$ 475,565	\$ 476,000	
Topsoil							
203-07	412	CY	\$ 11.02		\$ 4,540	\$ 5,000	
Seeding							
801-01	22176	SF	\$ 30.11		\$ 835	\$ 1,000	sq. ft to be seeded/1000 x 1.25 = units. Unit price in units
Signing							
713-13.02	121	SF	\$ 14.19	\$ 1,716.99			0.08" Sheeting
713-13.03	193	SF	\$ 16.62	\$ 3,207.66			0.10" Sheeting
713-11.01	243	LB	\$ 3.03	\$ 736.29			"U" Post
713-11.02	1037	LB	\$ 4.41	\$ 4,573.17			"P" Post
713-02.21	114	LF	\$ 6.41	\$ 730.74			Sign post delineation enhancement
713-15.36	39	Each	\$ 64.89	\$ 2,530.71			Remove Sign, Support, & Footing
					\$ 13,496	\$ 14,000	

Concept 2

Route: State Route 76
County: Robertson
Section: L.M. 15.60 to L.M. 16.20
Length: 0.6 Miles

Pavement Marking							
716-01.21	196	Each	\$ 30.76	\$ 6,028.96			Snowplowable Markers (bi-direction 1 color)
716-01.22	72	Each	\$ 32.12	\$ 2,312.64			Snowplowable Markers (mono-direction)
716-02.04	400	SY	\$ 17.54	\$ 7,016.00			Plastic Pavement Marking (Channelization Striping)
716-02.05	224	LF	\$ 12.23	\$ 2,739.52			Stop Lines
716-02.06	12	Each	\$ 152.13	\$ 1,825.56			Turn Lane Arrow
716-02.09	316	LF	\$ 27.66	\$ 8,740.56			Plastic Pavement Marking (Longitudinal Cross-Walk)
716-03.01	6	Each	\$ 187.79	\$ 1,126.74			Plastic Pavement Marking (Only)
716-04.12	48	SF	\$ 13.12	\$ 629.76			Plastic Pavement Marking (Yield Line)
716-12.01	2.782	L.M.	\$ 3,404.04	\$ 9,470.04			Edgelines & Centerlines, Enhanced Flatline Thermo (4")
716-12.02	0.56	L.M.	\$ 5,683.99	\$ 3,183.03			Enhanced Flatline Thermo (6")
716-12.04	268	LF	\$ 1.67	\$ 447.56			4" Dotted Line (Enhanced Flatline Thermo)
					\$ 43,520	\$ 44,000	
Signalization							
730-01	1	Lump Sum	\$ 10,000.00	\$ 10,000			Signalized intersection improvements
					\$ 10,000	\$ 10,000	
Total:				\$ 635,000			

Robertson County

State Route 76

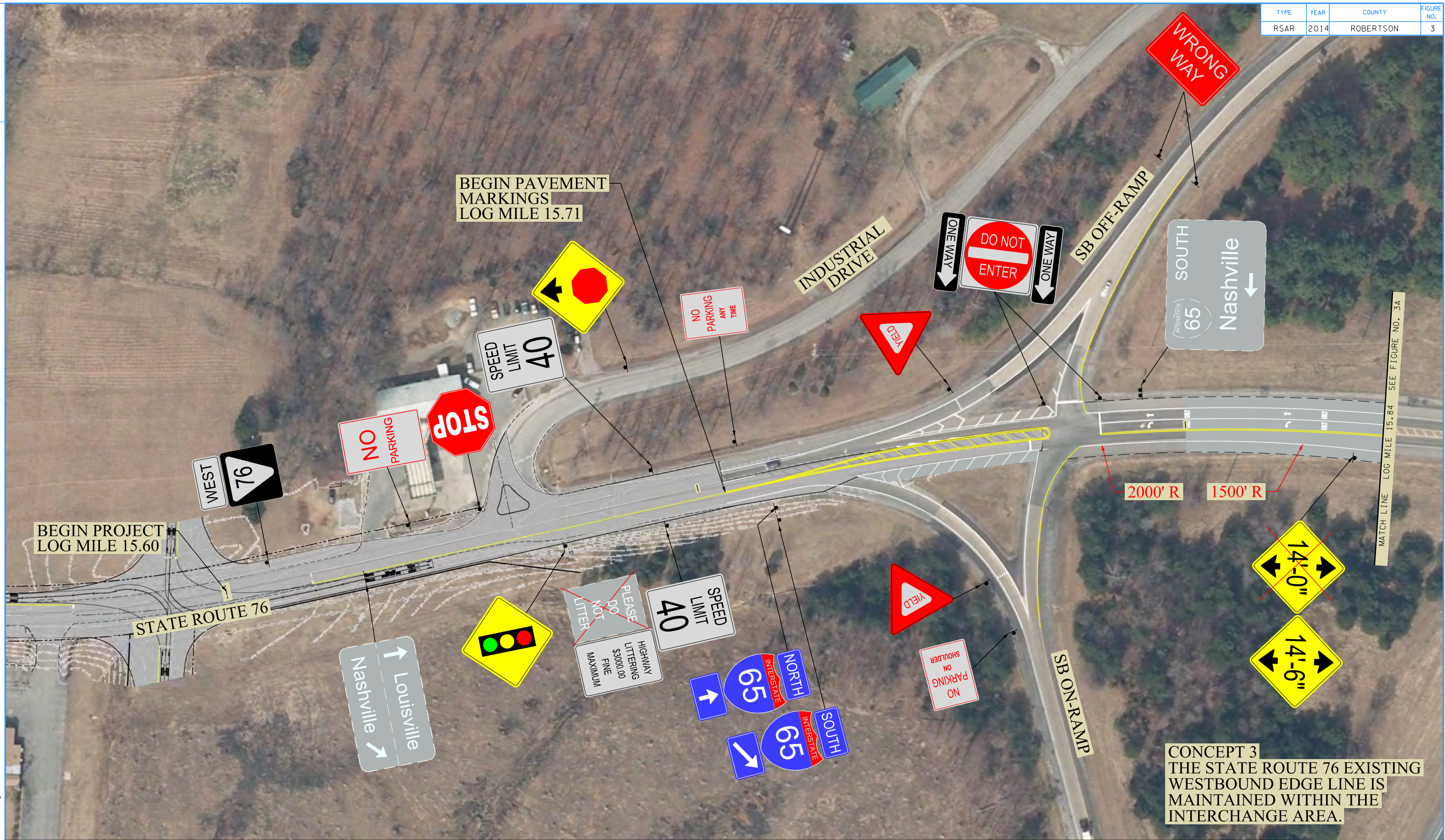
From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

STATE ROUTE 76 – CONCEPT 3 SUMMARY

FIGURES AND COST ESTIMATES

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	3



ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

CONCEPT 3
THE STATE ROUTE 76 EXISTING
WESTBOUND EDGE LINE IS
MAINTAINED WITHIN THE
INTERCHANGE AREA.

FILE NO.



LOWER PAVEMENT GRADE
BY FOUR (4) INCHES UNDER
INTERSTATE 65 BRIDGES

CONCEPT 3
THE STATE ROUTE 76 EXISTING
WESTBOUND EDGE LINE IS
MAINTAINED WITHIN THE
INTERCHANGE AREA.

ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 3A
S.R. 76
L.M. 15.84 to
L.M. 16.10

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TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	3B



CONCEPT 3
THE STATE ROUTE 76 EXISTING WESTBOUND EDGE LINE IS MAINTAINED WITHIN THE INTERCHANGE AREA.

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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 3B
S.R. 76
L.M. 16.10 to
L.M. 16.20

Route:	State Route 76
Description:	Log Mile 15.60 to Log Mile 16.20
	Concept 3
County:	Robertson
Length:	0.6 mile
Date:	October 10, 2014

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ -	\$ -	\$ -
Clearing and Grubbing	\$ -	\$ -	\$ -	\$ -
Earthwork	\$ -	\$ 3,800	\$ 34,200	\$ 38,000
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ 3,000	\$ 27,000	\$ 30,000
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ -	\$ -	\$ -	\$ -
Pavement Removal	\$ -	\$ -	\$ -	\$ -
Paving	\$ -	\$ 58,100	\$ 522,900	\$ 581,000
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ -	\$ 500	\$ 4,500	\$ 5,000
Seeding	\$ -	\$ 100	\$ 900	\$ 1,000
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ -	\$ -	\$ -
Fencing	\$ -	\$ -	\$ -	\$ -
Signing ¹			\$ 14,000	\$ 14,000
Pavement Markings ¹			\$ 45,000	\$ 45,000
Lighting ¹			\$ -	\$ -
Signalization ¹			\$ 10,000	\$ 10,000
Guardrail ¹			\$ 14,000	\$ 14,000
Pay Item Quantity Adjustment (15%) ²	\$ -	\$ 9,800	\$ 100,900	\$ 110,700
Maintenance of Traffic (5%)		\$ 3,800	\$ 38,700	\$ 42,500
Mobilization (5%)		\$ 3,800	\$ 38,700	\$ 42,500
CONSTRUCTION COST (rounded)		\$ 82,900	\$ 850,800	\$ 933,700
Engineering and Contingency (10%)		\$ 8,300	\$ 85,100	\$ 93,400
TOTAL CONSTRUCTION COST (rounded)		\$ 91,200	\$ 935,900	\$ 1,027,100
Preliminary Engineering (10%)		\$ 9,100	\$ 93,600	\$ 102,700
PROJECT COST ³(rounded)	\$ -	\$ 100,300	\$ 1,029,500	\$ 1,129,800

¹ This safety item is 100% eligible and does not require a 10% funding match by the local agency.

² For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

³ For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

Concept 3

Route: State Route 76
County: Robertson
Section: L.M. 15.60 to L.M. 16.20
Length: 0.6 Miles

Item	Quantity	Unit	2013 Unit Cost	Sub-Total	Total Cost	Rounded Cost	Description/Quantity Calculation
Earthwork							
203-01	7177	CY	\$ 5.27	\$ 37,823			Road & Drainage Excavation (Unclassified) (Cut)
		Total			\$ 37,823	\$ 38,000	
Drainage							
		Total			\$ 30,000	\$ 30,000	Misc. drainage improvements
Paving							
	70864	SF	\$ 6.02	\$ 426,601			arterial street asphalt paving - see separate calcs
	35803	SF	\$ 3.89	\$ 139,274			arterial and ramp asphalt shoulder - see separate calcs
	6123	SY	\$ 0.78	\$ 4,776			1.25" Resurfacing - see separate calcs
415-01.02	6123	SY	\$ 1.62	\$ 9,919			Cold planing (milling) asphalt pavement
		Total			\$ 580,570	\$ 581,000	
Topsoil							
203-07	412	CY	\$ 11.02		\$ 4,540	\$ 5,000	
Seeding							
801-01	22176	SF	\$ 30.11		\$ 835	\$ 1,000	sq. ft to be seeded/1000 x 1.25 = units. Unit price in units
Signing							
713-13.02	121	SF	\$ 14.19	\$ 1,716.99			0.08" Sheeting
713-13.03	197	SF	\$ 16.62	\$ 3,274.14			0.10" Sheeting
713-11.01	287	LB	\$ 3.03	\$ 869.61			"U" Post
713-11.02	1037	LB	\$ 4.41	\$ 4,573.17			"P" Post
713-02.21	120	LF	\$ 6.41	\$ 769.20			Sign post delineation enhancement
713-15.36	39	Each	\$ 64.89	\$ 2,530.71			Remove Sign, Support, & Footing
					\$ 13,734	\$ 14,000	

Concept 3

Route: State Route 76
County: Robertson
Section: L.M. 15.60 to L.M. 16.20
Length: 0.6 Miles

Pavement Marking							
716-01.21	196	Each	\$ 30.76	\$ 6,028.96			Snowplowable Markers (bi-direction 1 color)
716-01.22	72	Each	\$ 32.12	\$ 2,312.64			Snowplowable Markers (mono-direction)
716-02.04	381	SY	\$ 17.54	\$ 6,682.74			Plastic Pavement Marking (Channelization Striping)
716-02.05	224	LF	\$ 12.23	\$ 2,739.52			Stop Lines
716-02.06	12	Each	\$ 152.13	\$ 1,825.56			Turn Lane Arrow
716-02.09	316	LF	\$ 27.66	\$ 8,740.56			Plastic Pavement Marking (Longitudinal Cross-Walk)
716-03.01	6	Each	\$ 187.79	\$ 1,126.74			Plastic Pavement Marking (Only)
716-04.12	63	SF	\$ 13.12	\$ 826.56			Plastic Pavement Marking (Yield Line)
716-12.01	3.149	L.M.	\$ 3,404.04	\$ 10,719.32			Edgelines & Centerlines, Enhanced Flatline Thermo (4")
716-12.02	0.56	L.M.	\$ 5,683.99	\$ 3,183.03			Enhanced Flatline Thermo (6")
716-12.04	268	LF	\$ 1.67	\$ 447.56			4" Dotted Line (Enhanced Flatline Thermo)
					\$ 44,633	\$ 45,000	
Signalization							
730-01	1	Lump Sum	\$ 10,000.00	\$ 10,000			Signalized intersection improvements
					\$ 10,000	\$ 10,000	
Guardrail							
705-02.02	300	LF	\$ 18.94	\$ 5,682			Guardrail (End Terminals Not Included in Price)
705-04.07	2	Each	\$ 2,529.32	\$ 5,059			Guardrail Terminal (Type 38)
705-04.09	2	Each	\$ 1,244.70	\$ 2,489			Type 38 Earth Pad
		Total			\$ 13,230	\$ 14,000	
Total:				\$ 738,000			

Robertson County

State Route 76

From West of Industrial Road to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

PRE-BRIEF SUMMARY WITH CRASH DATA

Road Safety Audit Pre-Brief Information

Robertson County

State Route 76

From West of Industrial Drive to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

ROAD SAFETY AUDIT PRE-BRIEF INFORMATION

PROJECT LOCATION:

Project No.:	74013-0231-94	PIN:	120290.00
Federal No.:	PHSIP-76(91)	Region:	3
County:	Robertson	City:	White House
Route:	State Route 76	AADT:	8,080 (West of I-65) 16,800 (East of I-65)
Beginning L.M.:	15.60	End L.M.:	16.20
Length:	0.60 Miles		
Location on Route:	From West of Industrial Drive to Hester Drive		

SUMMARY:

A pre-brief meeting is scheduled for 9:00 AM CT on Wednesday, August 27, 2014 at TDOT Headquarters in Nashville.

A Road Safety Audit (RSA) team is being assembled to evaluate and determine appropriate safety measures for the segment of State Route 76 from West of Industrial Drive to Hester Drive (L.M. 15.60 to L.M. 16.20) in Robertson County, Tennessee. This RSA project is 0.60 miles in length. The posted speed limit on State Route 76 is forty (40) miles per hour (mph) and the existing right-of-way width ranges from sixty (60) feet to 120 feet outside the influence of the interstate. Within the interstate area, the right-of-way along State Route 76 expands to 250 feet.

The following observations were made when evaluating the crash data:

- No fatal crashes occurred in this analysis section.
- 29% of crashes (23) resulted in an injury.
- 42% of crashes (33) were rear end crashes.
- 32% of crashes (25) were angle crashes.
- 14% of crashes (11) were single vehicle crashes.
- 14% of crashes (11) were lane departure crashes.
- The first incapacitating injury crash occurred on 6/30/2011 at Hester Drive (L.M. 16.18). This crash involved a vehicle travelling westbound on State Route 76 swerving and colliding with an eastbound vehicle waiting in the left turn lane at the intersection causing the head-on crash. The driver of the westbound vehicle swerving was apparently driving under the influence with the test results pending. This crash involved two (2) incapacitating injuries and the crash information noted clear weather and dark (unknown lighting) conditions.

Road Safety Audit Pre-Brief Information

Robertson County

State Route 76

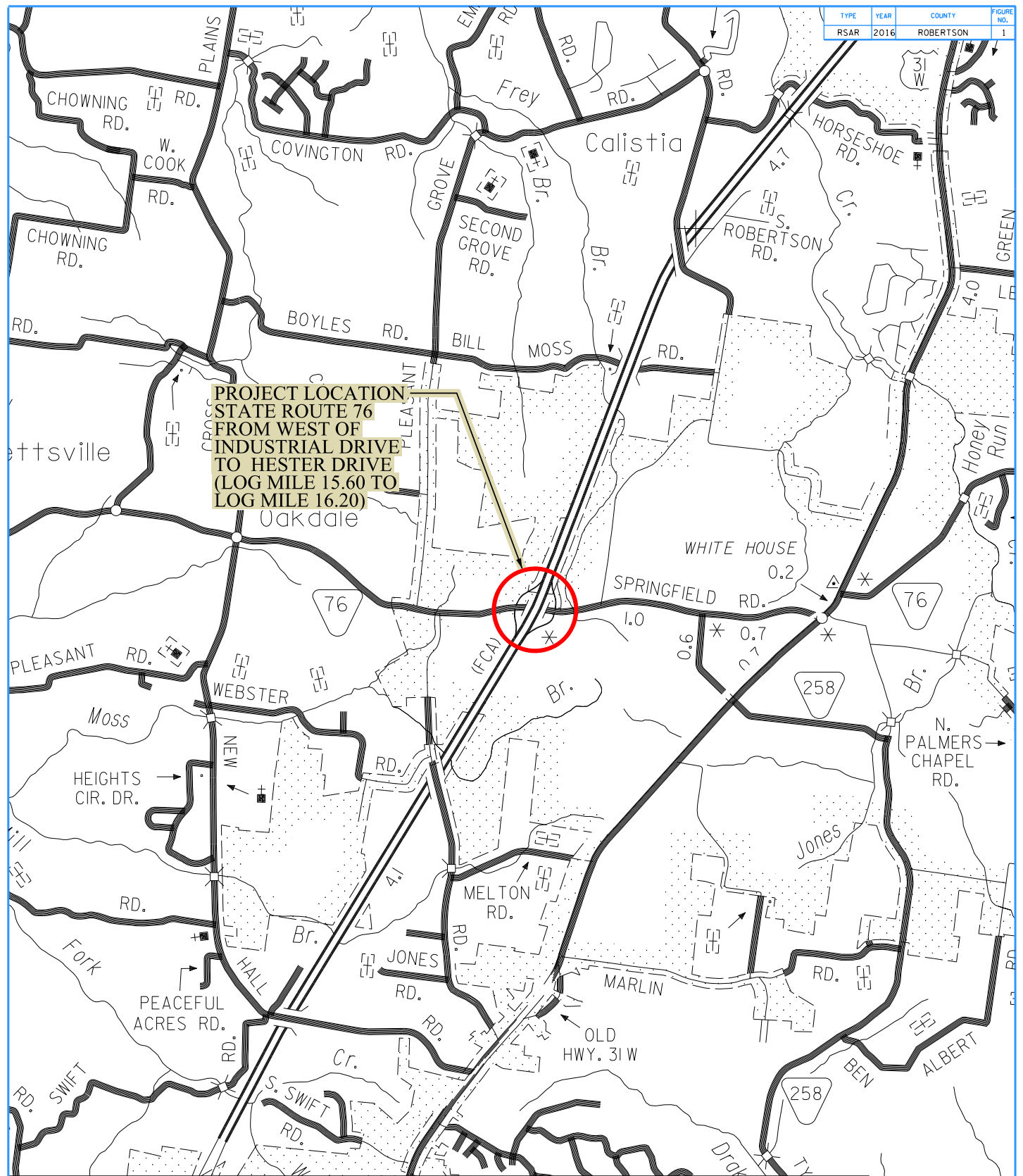
From West of Industrial Drive to Hester Drive (L.M. 15.60 to L.M. 16.20)

PIN 120290.00

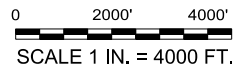
- The second incapacitating injury crash occurred on 6/30/2013 just west of Industrial Drive (L.M. 15.61). This crash was a single vehicle, lane departure crash that involved a vehicle traveling westbound on State Route 76 leaving the left side of the roadway and crashing into the lobby of the Days Inn. The crash information noted cloudy weather and daylight conditions.

From 2009 to 2011 plus an additional crash in 2013, a total of 78 crashes occurred along this section of State Route 76, with fifty-five (55) property damage crashes, twenty-one (21) non-incapacitating injury crashes, two (2) incapacitating injury crashes involving three (3) incapacitating injuries, and zero (0) fatal crashes.

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2016	ROBERTSON	1



PROJECT LOCATION
STATE ROUTE 76
FROM WEST OF
INDUSTRIAL DRIVE
TO HESTER DRIVE
(LOG MILE 15.60 TO
LOG MILE 16.20)



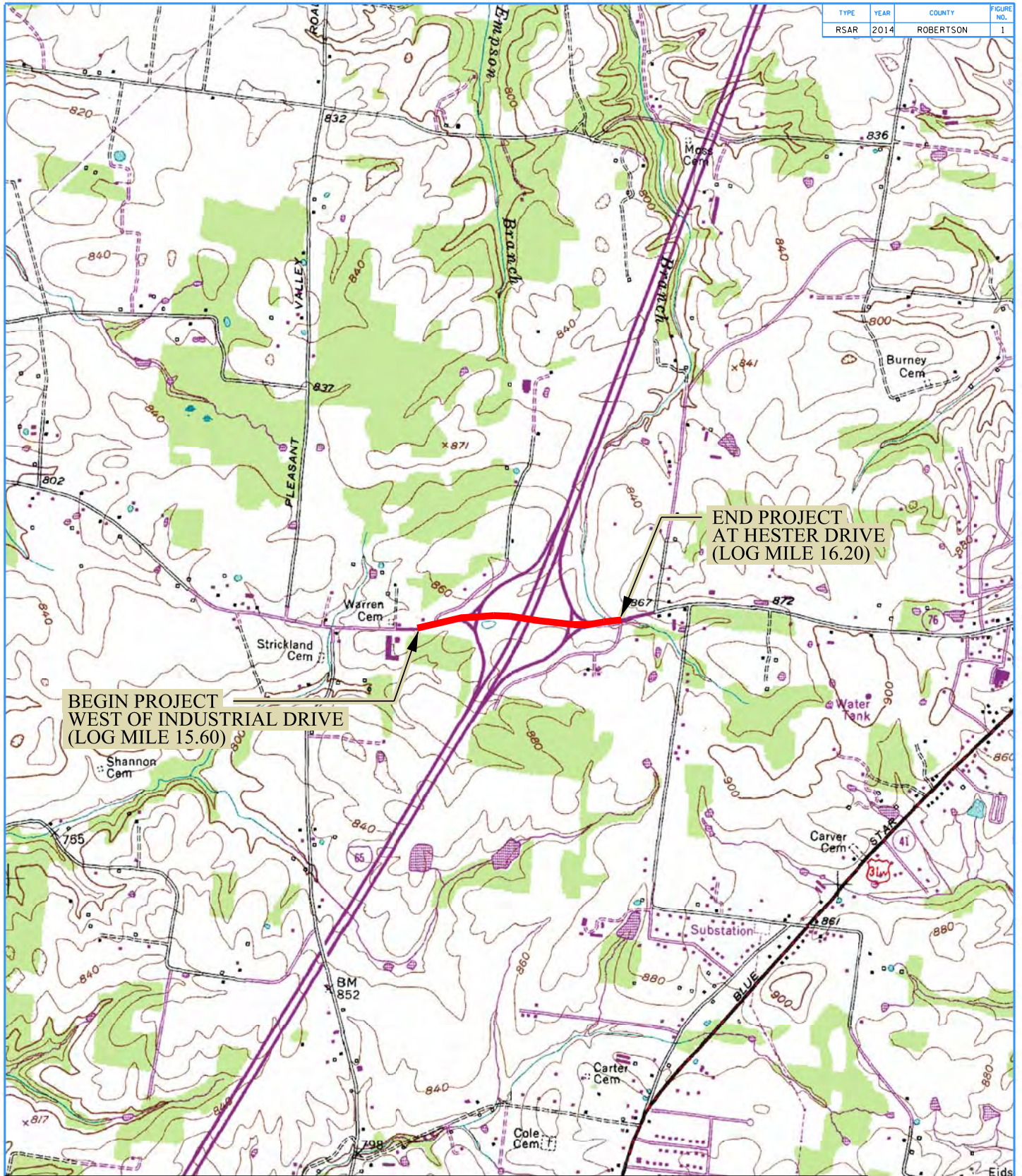
ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
 STRATEGIC TRANSPORTATION
 INVESTMENTS DIVISION

LOCATION
MAP

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	1



BEGIN PROJECT
WEST OF INDUSTRIAL DRIVE
(LOG MILE 15.60)

END PROJECT
AT HESTER DRIVE
(LOG MILE 16.20)



0 1000' 2000'
SCALE 1 IN. = 2000 FT.

ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

VICINITY
MAP

COUNTY = ROBERTSON Date: 8/29/2014
 Route = State Route 76
 Location = From West of Industrial Drive to Hester Drive
 L.M. 15.60 to L.M. 16.20
 Highway Type = Two Lanes with Center Turn Lane
 FUNCTIONAL CLASS= Urban Collector
 DATA YEARS = 1/1/2009-12/31/2011
 ADT YEARS USED= 2013 ADAM TRAFFIC DATA
 COMMENTS = Section has Two (2) Incapacitating Injury Crashes
 ANALYZED BY = SKB

SECTION = MORE THAN 0.10 MILE / SPOT = LESS THAN 0.10 MILE

BLM	ELM	Length	Average AADT	VMT
15.60	15.90	0.30	8,080	2,424
15.90	16.20	0.30	16,800	5,040
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0

0.60 12,440 7,464

INTERSECTION
 Log Mile =
 Leg Traffic AADT
 North =
 East =
 South =
 West =

Entering AADT = 0

2013 Adam Traffic Data

Two Lanes With Center Turn Lane
 1/1/2009-12/31/2011

	Total	Fatal	Incap. Injury	*Severe Crashes	Other Injury
No. of Crashes =	14	0	1	1	3
No. of Years =	3.00				
SW avg. rate =	2.142	0.011	0.066	0.077	0.543
08-10 S/W Rates					
Exposure (E) =	8.1731				
Crash Rate (A) =	1.713	0.000	0.122	0.122	0.367
Critical Rate (C) =	3.394				
Severity Index (SI) =	0.3571				
Actual Rate/SW Average =	0.80	0.00	1.85	1.59	0.68
Ratio of A/C =	0.50				

* Severe Crashes are the sum of fatal and incapacitating injury crashes

Revised 4/3/2007

TYPE	YEAR	COUNTY	FIGURE NO.
RSAR	2014	ROBERTSON	1

NOTE: ONLY CRASHES FROM HIGHEST YEAR (2011) WERE PLOTTED/DIAGRAMMED

CONDITION CODES LEGEND

X - X - X

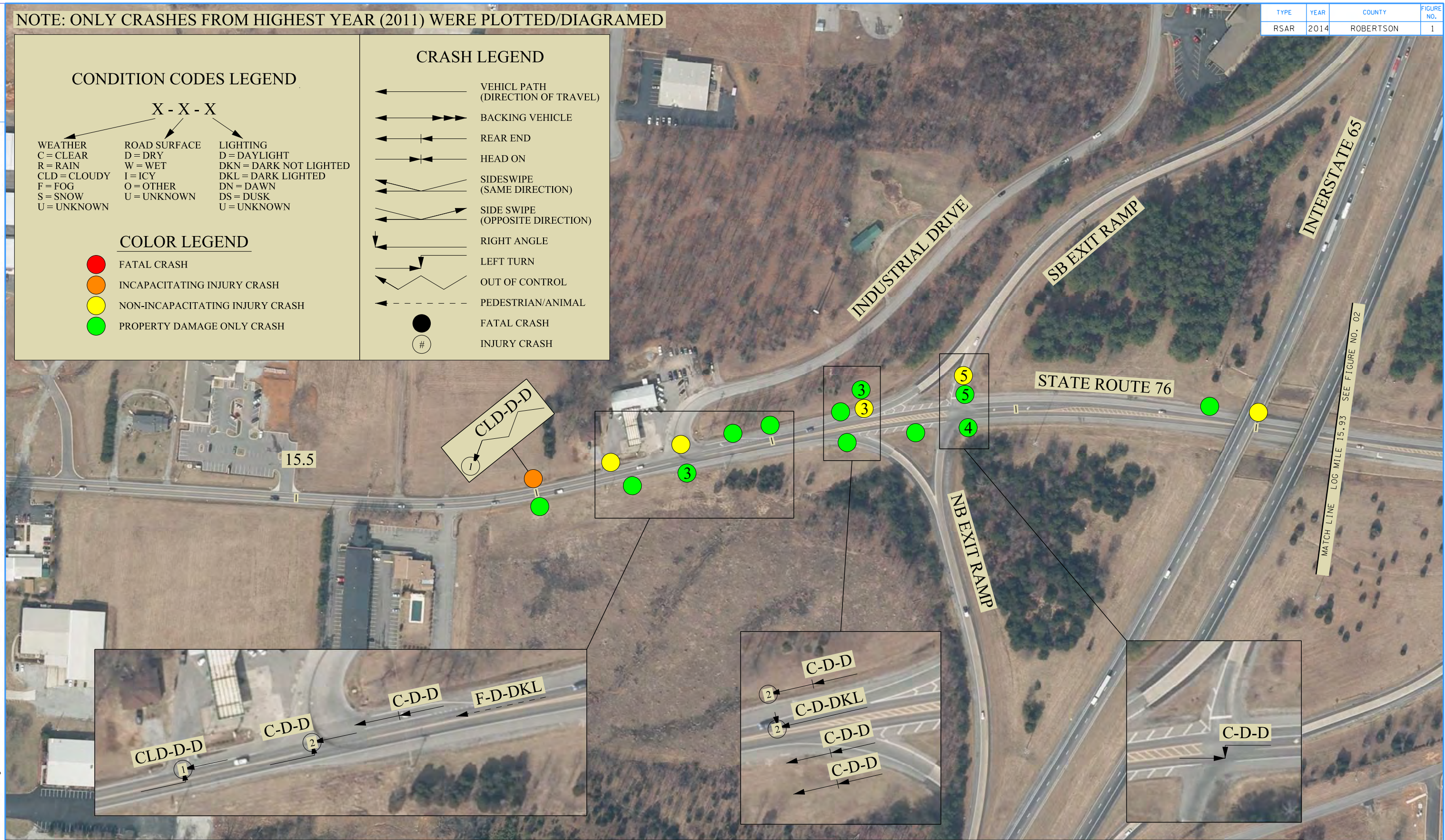
WEATHER C = CLEAR R = RAIN CLD = CLOUDY F = FOG S = SNOW U = UNKNOWN	ROAD SURFACE D = DRY W = WET I = ICY O = OTHER U = UNKNOWN	LIGHTING D = DAYLIGHT DKN = DARK NOT LIGHTED DKL = DARK LIGHTED DN = DAWN DS = DUSK U = UNKNOWN
--	---	---

COLOR LEGEND

- FATAL CRASH
- INCAPACITATING INJURY CRASH
- NON-INCAPACITATING INJURY CRASH
- PROPERTY DAMAGE ONLY CRASH

CRASH LEGEND

- ← VEHICL PATH (DIRECTION OF TRAVEL)
- ← → BACKING VEHICLE
- ← | → REAR END
- ← | | → HEAD ON
- ← / → SIDESWIPE (SAME DIRECTION)
- ← \ → SIDE SWIPE (OPPOSITE DIRECTION)
- ⊥ RIGHT ANGLE
- ↪ LEFT TURN
- ↪ OUT OF CONTROL
- - - PEDESTRIAN/ANIMAL
- FATAL CRASH
- # INJURY CRASH



MATCH LINE LOG MILE 15.93 SEE FIGURE NO. 02

ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 01
S.R. 76
L.M. 15.60 to
L.M. 15.93

NOTE: ONLY CRASHES FROM HIGHEST YEAR (2011) WERE PLOTTED/DIAGRAMMED

CONDITION CODES LEGEND

X - X - X

WEATHER C = CLEAR R = RAIN CLD = CLOUDY F = FOG S = SNOW U = UNKNOWN	ROAD SURFACE D = DRY W = WET I = ICY O = OTHER U = UNKNOWN	LIGHTING D = DAYLIGHT DKN = DARK NOT LIGHTED DKL = DARK LIGHTED DN = DAWN DS = DUSK U = UNKNOWN
--	---	---

COLOR LEGEND

- FATAL CRASH
- INCAPACITATING INJURY CRASH
- NON-INCAPACITATING INJURY CRASH
- PROPERTY DAMAGE ONLY CRASH

CRASH LEGEND

- VEHICL PATH (DIRECTION OF TRAVEL)
- BACKING VEHICLE
- REAR END
- HEAD ON
- SIDESWIPE (SAME DIRECTION)
- SIDE SWIPE (OPPOSITE DIRECTION)
- RIGHT ANGLE
- LEFT TURN
- OUT OF CONTROL
- PEDESTRIAN/BICYCLE
- FATAL CRASH
- # INJURY CRASH



ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

NOTE: ONLY CRASHES FROM HIGHEST YEAR (2011) WERE PLOTTED/DIAGRAMED

CONDITION CODES LEGEND

X - X - X

WEATHER C = CLEAR R = RAIN CLD = CLOUDY F = FOG S = SNOW U = UNKNOWN	ROAD SURFACE D = DRY W = WET I = ICY O = OTHER U = UNKNOWN	LIGHTING D = DAYLIGHT DKN = DARK NOT LIGHTED DKL = DARK LIGHTED DN = DAWN DS = DUSK U = UNKNOWN
---	--	--

COLOR LEGEND

- FATAL CRASH
- INCAPACITATING INJURY CRASH
- NON-INCAPACITATING INJURY CRASH
- PROPERTY DAMAGE ONLY CRASH

CRASH LEGEND

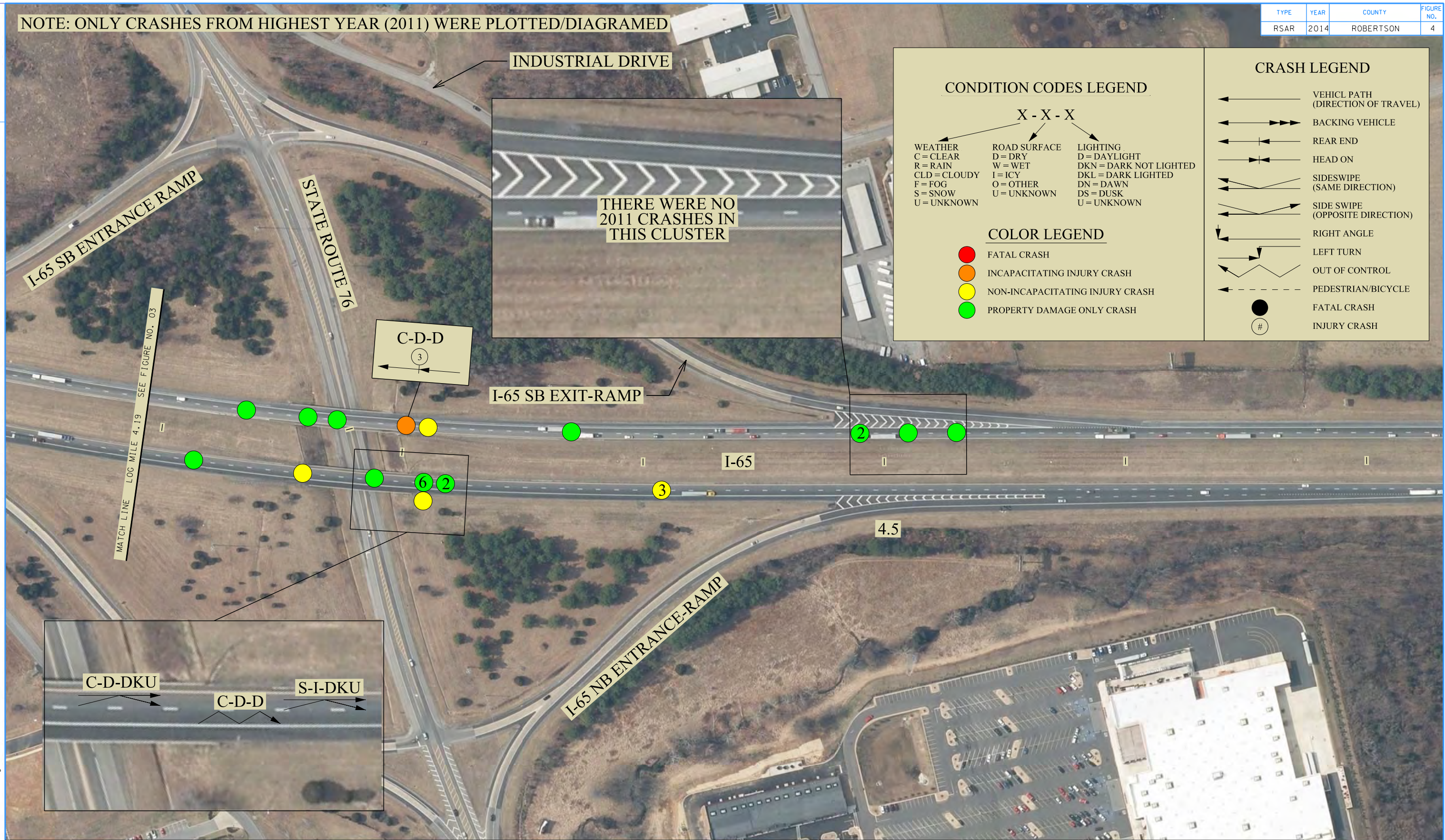
- VEHICLE PATH (DIRECTION OF TRAVEL)
- BACKING VEHICLE
- REAR END
- HEAD ON
- SIDESWIPE (SAME DIRECTION)
- SIDE SWIPE (OPPOSITE DIRECTION)
- RIGHT ANGLE
- LEFT TURN
- OUT OF CONTROL
- PEDESTRIAN/BICYCLE
- FATAL CRASH
- # INJURY CRASH



ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY

NOTE: ONLY CRASHES FROM HIGHEST YEAR (2011) WERE PLOTTED/DIAGRAMMED



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ROAD SAFETY AUDIT REVIEW

STATE ROUTE 76
L.M. 15.60 TO L.M. 16.20
ROBERTSON COUNTY