



**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**

**SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-0344**

Gerald F. Nicely
Commissioner

Phil Bredesen
Governor

MEMORANDUM

To: Mr. Paul Degges, Chief Engineer

From:  Mr. Steve Allen, Director
Project Planning Division

Date: August 17, 2009

**SUBJECT: RSAR SR 13 (L.M. 26.81)
MONTGOMERY COUNTY**

The Road Safety Audit Review for the intersection of State Route 13 at Alfred Thun Road / Cracker Barrel Road at log mile 26.81, Montgomery County, has been completed and the report is attached. This location appears on the **Highway Safety Improvement Program (HSIP)** list and qualifies for Hazard Elimination Safety Program (HESP) funds because the crash ratio is 4.26, which is greater than 3.5 (the minimum threshold).

The following guidance was provided:

• **Figure 1 (L.M. 26.81)**

1. Install a traffic signal at the intersection of SR 13 at Alfred Thun Road/Cracker Barrel Road. The signal shall consist of four steel strain poles/span wire and associated equipment, including, but not limited to, LED signal heads, inductive loop vehicle detection, traffic signal cabinet and controller.
2. The signal installed at the intersection of SR 13 at Alfred Thun Road/Cracker Barrel Road shall be interconnected with the existing signal at the I-24 WB ramps via aerial fiber optic cable attached to existing utility poles.
3. Remove existing stop signs on the Alfred Thun Road and Cracker Barrel Road approaches.
4. Remove and replace all existing pavement markings with new thermoplastic pavement markings and install thermoplastic stop bar pavement markings on SR 13.
5. The existing radius on the southeast corner of the intersection was analyzed and deemed sufficient, however, due to shoulder pavement deterioration it is recommended to replace the shoulder pavement on the southeast corner to full-depth pavement standards.

6. Move "Signal Ahead" sign to new location.

The estimated cost of the proposed improvements is \$153,654. A contract will be let to implement the recommended improvements.

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

Attachment

cc: Ed Cole, Jim Moore, Mike Tugwell, Winston Gaffron, Phil Trammel, Stanley Sumner, Diane Gusky, Jeanne Stevens, Ken Anderson, Bill Hart, Elizabeth Smith

ROAD SAFETY AUDIT REPORT

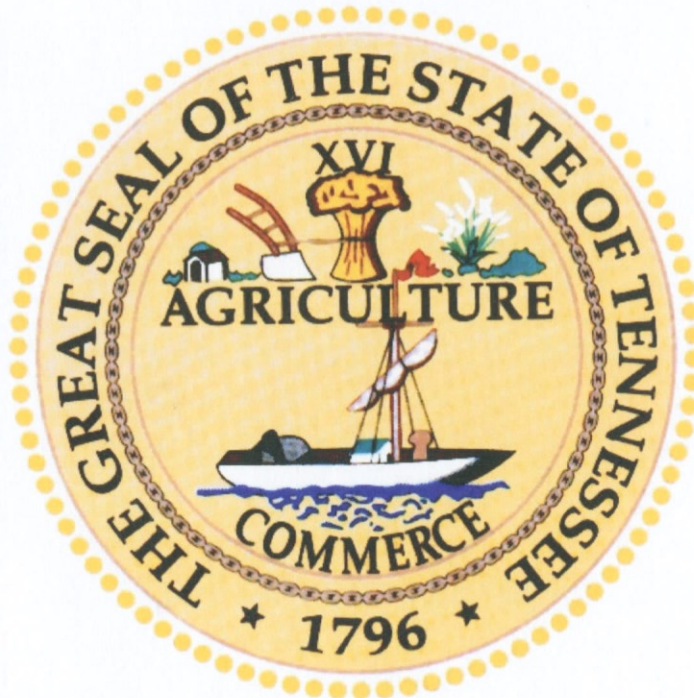
State Route 13

Intersection at Alfred Thun Road / Cracker Barrel Road

Log Mile 26.81

Montgomery County

PIN # 112826.00



PREPARED BY

GRESHAM, SMITH AND PARTNERS

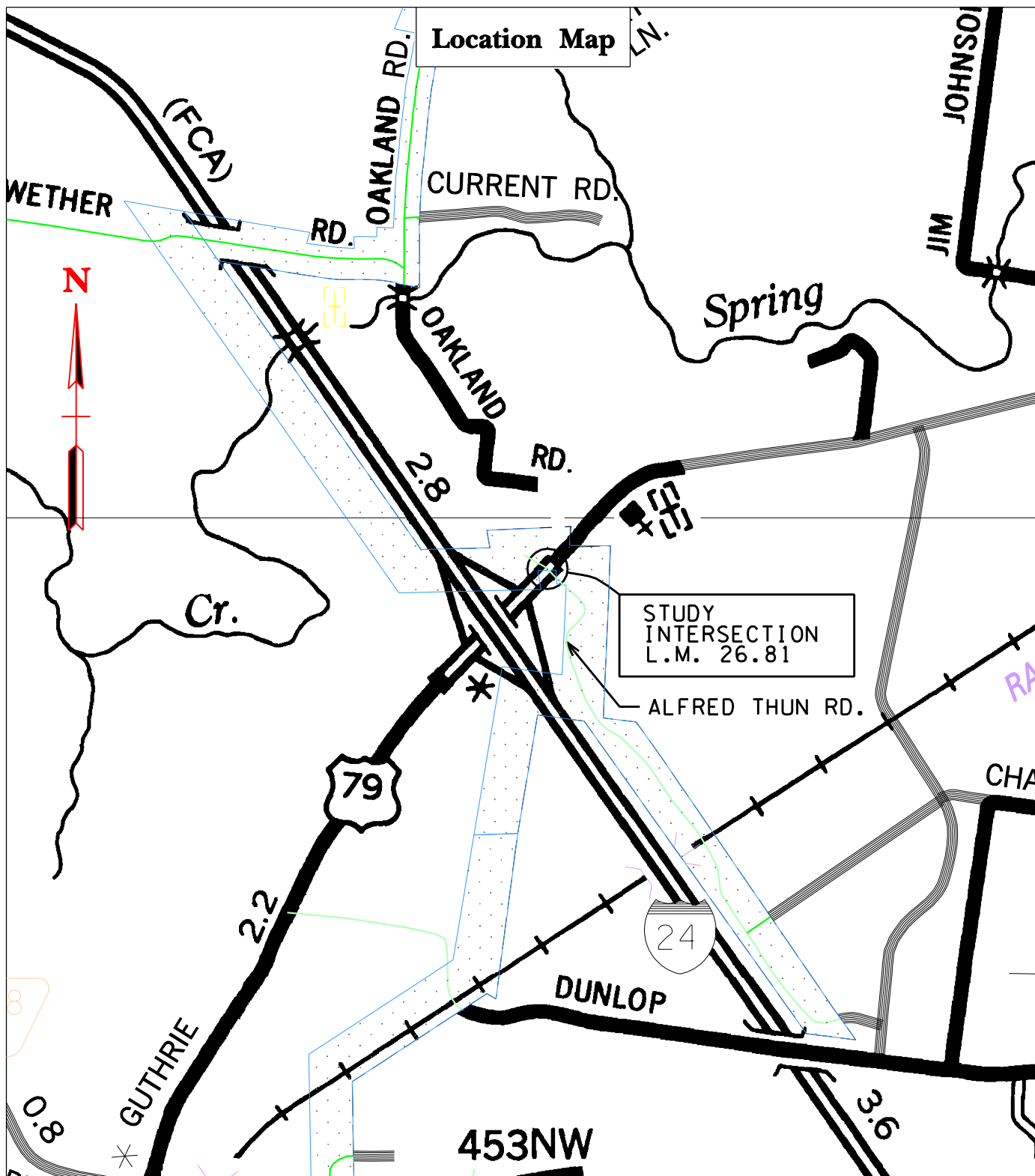
FOR

THE TENNESSEE DEPARTMENT OF TRANSPORTATION

PROJECT PLANNING DIVISION

Approved by:	Signature	Date
DIRECTOR Project Planning Division		8-18-09

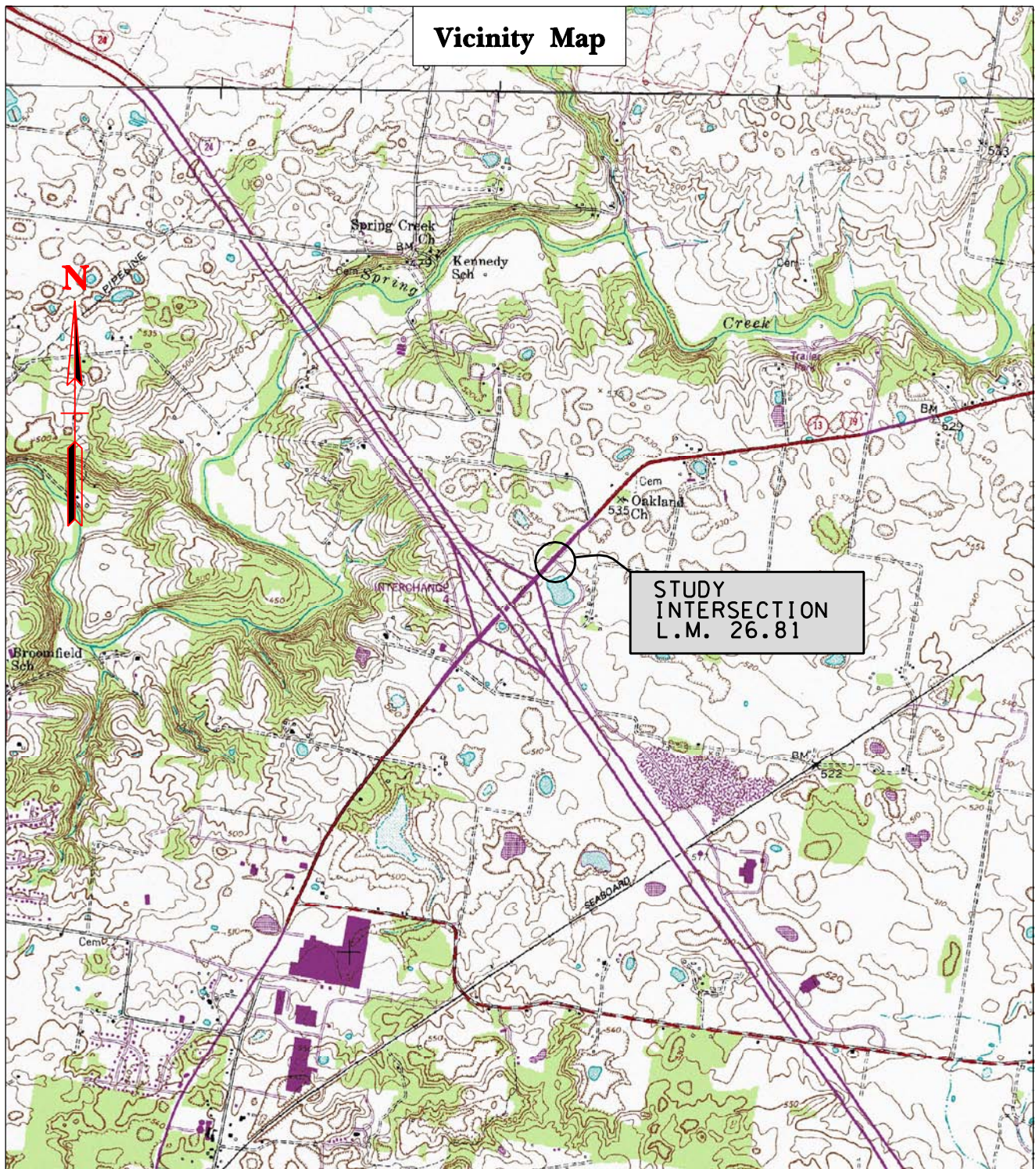
This document is covered by 23 USC § 409 and its production pursuant to fulfilling public Planning requirements does not waive the provision of § 409.



ROAD SAFETY AUDIT REPORT
SR 13 AT INTERSECTION OF
ALFRED THUN RD. AND
CRACKER BARREL RD.
MONTGOMERY COUNTY, TN

DATE: 06/16/09





STUDY LOCATION

ROAD SAFETY AUDIT REPORT
 SR 13 AT INTERSECTION OF
 ALFRED THUN RD. AND
 CRACKER BARREL RD.
 MONTGOMERY COUNTY, TN

DATE: 06/16/09



ROAD SAFETY AUDIT REVIEW

Montgomery County

State Route 13

Intersection at Alfred Thun Road / Cracker Barrel Road (LM 26.81)

Date of Review: May 21, 2009

PROJECT DESCRIPTION AND BACKGROUND

This project was identified through the TDOT safety needs planning process. The intersection of State Route 13 at Alfred Thun Road / Cracker Barrel Road at log mile 26.81 is eligible for **Hazard Elimination Safety Program (HESP)** funds because the crash ratio is 4.26, which is greater than 3.5 (the minimum threshold).

Consequently, a TDOT Road Safety Audit Review (RSAR) team was asked to evaluate this intersection and determine the appropriate safety improvements.

RSAR TEAM MEMBERS

Name	Organization	Title	Phone	Email
Scott Johnson	TDOT Region 3 Design	Roadway Specialist 2	615-350-4263	scott.johnson@tn.gov
Terry Arnold	TDOT Region 3 Design	Roadway Specialist Supervisor 1	615-350-4274	terry.arnold@tn.gov
Will F. Oliver	TDOT District 33	Highway Maintenance Supervisor 2	615-648-5570	w.oliver@tn.gov
Stanley Sumner	TDOT Region 3 Traffic	Operations Specialist 2	615-350-4046	stanley.sumner@tn.gov
Michelle Powell	TDOT Traffic Headquarters	Operations Specialist 2	615-741-0894	michelle.powell@tn.gov
Glenda Tyus	TDOT Project Planning	Transportation Planner 3	615-741-1816	glenda.tyus@tn.gov
Paul Lane	TDOT Project Planning	Transportation Manager 1	615-253-2432	paul.lane@tn.gov
Jill Hall	Clarksville MPO	Transportation Planner	931-645-7448	jhall@cityofclarksville.com
Chris Cowan	Clarksville Street Department	Traffic Engineer	931-645-7464	chris.cowan@cityofclarksville.com
Jonathan Haycraft	Gresham, Smith and Partners	Project Engineer – Roadway	615-770-8322	jonathan_haycraft@gspnet.com
Dowell Squier	Gresham, Smith and Partners	Project Engineer – Traffic	615-770-8385	dowell_hoskins@gspnet.com
Mark Holloran	Gresham, Smith and Partners	Project Manager	615-770-8461	mark_holloran@gspnet.com

INFORMATION USED IN REVIEW

- Crash Map
- Crash Report
- Onsite Field Review
- TRIMS Crash Data (2005-2007)
- TRIMS Geometric Report
- TRIMS Road Segment Report
- TRIMS Traffic Report (2008)
- Traffic Count for intersection of SR 13/Alfred Thun Rd/Cracker Barrel Rd (2007)
- Traffic Count for intersection of SR 13/I-24 EB Ramps (counted on June 16, 2009)

PRE-BRIEF SUMMARY

A Pre-brief meeting was held at TDOT Headquarters at 9:00AM on May 19th, 2009. A summary of the topics and information provided at the meeting is provided below:

1. This project was identified through the TDOT safety needs planning process. The intersection of State Route 13 at Alfred Thun Road / Cracker Barrel Road at log mile 26.81 is eligible for **Hazard Elimination Safety Program (HESP)** funds because the crash ratio is 4.26, which is greater than 3.5 (the minimum threshold).
2. There are a total of twenty-one (21) crashes, including nine (9) injuries between 2005 and 2007. It was noted that right-angle crashes were the most prevalent type of the crash at the subject intersection, with eighteen (18) crashes being of this type.
3. Stanley Sumner stated that a traffic study was conducted in 2007 at the subject intersection and that a traffic signal was warranted based on volumes and crashes. Chris Cowan expressed concern over the subject location's proximity to the existing signal at the I-24 interchange.
4. It was stated that current traffic counts at the SR13/I-24 ramps are not available but that 2007 counts for the subject intersection were available and would be forwarded to Cynthia Allen who would then forward them to Gresham, Smith and Partners.
5. Chris Cowan suggested using Synchro/SimTraffic to analyze the interaction between the existing signalized intersection at SR13/I-24 and the proposed signal at Alfred Thun Rd/Cracker Barrel Rd.
6. Cynthia Allen stated that this project qualifies for HESP funding under the HSIP program.
7. Further details were provided regarding the format of the report.

OBSERVATIONS

At 9:30AM on May 21, 2009, Gresham, Smith and Partners (GS&P) met with TDOT and City of Clarksville representatives for an onsite field review at the intersection of SR 13 with Alfred Thun Road and Cracker Barrel Road just north of the I-24 interchange.

The following is a summary of comments/observations that were made at the field review:

1. There is a large amount of military personnel making the left turn from SR 13 to I-24 WB in the morning rush hour.
2. The existing traffic signals on each side of the interchange are in a coordinated system. A new signal at Alfred Thun Road would need to be coordinated with these signals.
3. The permit for the proposed development next to the Cracker Barrel will be reviewed by the City of Clarksville and the TDOT Region 3 Traffic Office. The City/TDOT are considering restricting direct access to SR 13 and forcing development traffic to use Cracker Barrel Road to access SR 13. However, the permit process has not been completed. Once the City of Clarksville agrees in concept to the developer's proposal, the permit will then be reviewed/issued by the TDOT Region 3 Traffic office. The observations/recommendations from the RSAR will be reviewed during the evaluation of the permit application once a permit application is submitted to the Region 3 Traffic Office by the developer.
4. A right-in/right out at Sam's was discussed as a possibility to improve safety near the intersection. The Sam's complex has another entrance off of Alfred Thun Road. However, it was agreed to not change the existing entrance.
5. There are major utility boxes in the ROW on the corner next to the BP station.
6. A double left may be needed from Alfred Thun Road. A double left can only be installed in conjunction with a traffic signal. A double left cannot be used at an un-signalized intersection. The traffic volumes at the intersection will be evaluated to determine if a double left is needed.
7. The existing raised median forms the exclusive turn lane for NB SR 13 traffic turning left into Cracker Barrel Road. This configuration hampers the left turn movement from Alfred Thun Road as those vehicles have to cross the 2 through lanes and the turn lane to get around the raised median into SB SR 13.
8. There is considerable truck traffic related to the nearby industrial park.
9. Use thermoplastic for new striping.
10. The radii of the existing intersection may need to be improved to provide a better radius for turning vehicles and trucks.
11. The TDOT Region 3 Traffic Office and the City of Clarksville agree that a traffic signal is warranted at Alfred Thun Road based on traffic volumes and crashes. However, there is concern about the close proximity of Alfred Thun Road to the interstate ramp traffic signal, which is located 500' from Alfred Thun Road. The City of Clarksville and the TDOT Region 3 Traffic Office recommend using traffic signal modeling to analyze how the two intersections would work together if Alfred Thun was signalized.

12. A right turn lane was discussed for vehicles on SR13 Northbound turning right onto Alfred Thun Road if roadway geometry/utilities allow for installation. Vehicles are currently using the shoulder for a right turn lane and wearing down the shoulder pavement.
13. The Hemlock Plant construction entrance is located about a mile past Alfred Thun Rd and is expected to generate a significant amount of traffic.

GUIDANCE

- **Figure 1 (LM 26.81)**
 1. Install a traffic signal at the intersection of SR 13 at Alfred Thun Road/Cracker Barrel Road. The signal shall consist of four steel strain poles/span wire and associated equipment, including, but not limited to, LED signal heads, inductive loop vehicle detection, traffic signal cabinet and controller.
 2. The signal installed at the intersection of SR 13 at Alfred Thun Road/Cracker Barrel Road shall be interconnected with the existing signal at the I-24 WB ramps via aerial fiber optic cable attached to existing utility poles.
 3. Remove existing stop signs on the Alfred Thun Road and Cracker Barrel Road approaches.
 4. Remove and replace all existing pavement markings with new thermoplastic pavement markings and install thermoplastic stop bar pavement markings on SR 13.
 5. The existing radius on the southeast corner of the intersection was analyzed and deemed sufficient, however, due to shoulder pavement deterioration it is recommended to replace the shoulder pavement on the southeast corner to full-depth pavement standards.
 6. Move “Signal Ahead” sign to new location.

TRAFFIC ANALYSIS

The following is a summary and results of the traffic analysis that was performed to determine whether additional turn lanes are warranted and how a new traffic signal at the intersection of SR 13 / Alfred Thun Road/Cracker Barrel Road will impact adjacent signals.

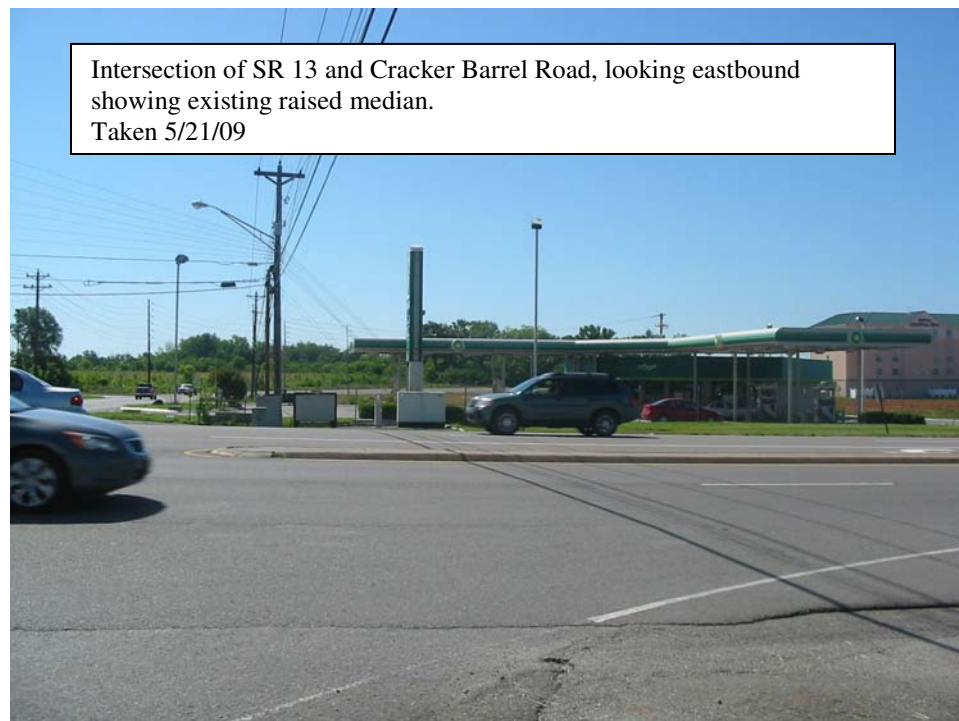
1. A double-left on Alfred Thun is not warranted based on the traffic volumes.
2. The intersections of SR 13 and Alfred Thun Road/Cracker Barrel Road, the I-24 Ramps, and Holiday Road were analyzed for the AM and PM peak hours using Synchro7/SimTraffic simulation software. Existing timings were obtained from the City of Clarksville for the existing signals at the I-24 Ramps and Holiday Road and were used in the Synchro software. Synchro was allowed to optimize the timing and offset for the proposed signal at Alfred Thun Road/Cracker Barrel Road. The EPAC timing data obtained from the City as well as the Synchro reports are included in the Appendix.
3. Based on the Synchro analysis, using the existing timing at the two existing intersections, there is no indication that the northbound thru queue on SR 13 at Alfred Thun Rd / Cracker Barrel Rd will cause traffic to back up on the I-24 ramp (the 95th percentile queue length for the NB thru movement is 124 ft during the PM peak period). However, the southbound thru queue on SR 13 at the I-24 ramps may cause traffic to back up through the intersection of Alfred Thun Rd /

Cracker Barrel Rd with the existing signal timing (the 95th percentile queue length for the SB thru movement may exceed 606 ft during the PM peak period). Allowing Synchro to optimize the network cycle length and offsets mitigates the problem of the southbound thru queue (the 95th percentile thru queue for the SB thru movement was reduced from 606 ft to 333 ft during the PM peak period with the optimal signal timing).

4. Once the traffic signal is installed at the intersection of SR 13 at Alfred Thun Rd / Cracker Barrel Rd, the signal timing should be modified at the two adjacent intersections to mitigate any back-ups.

The estimated cost of the improvements is \$153,654. A contract will be let to implement the recommended improvements.

PHOTOGRAPHS OF THE STUDY AREA

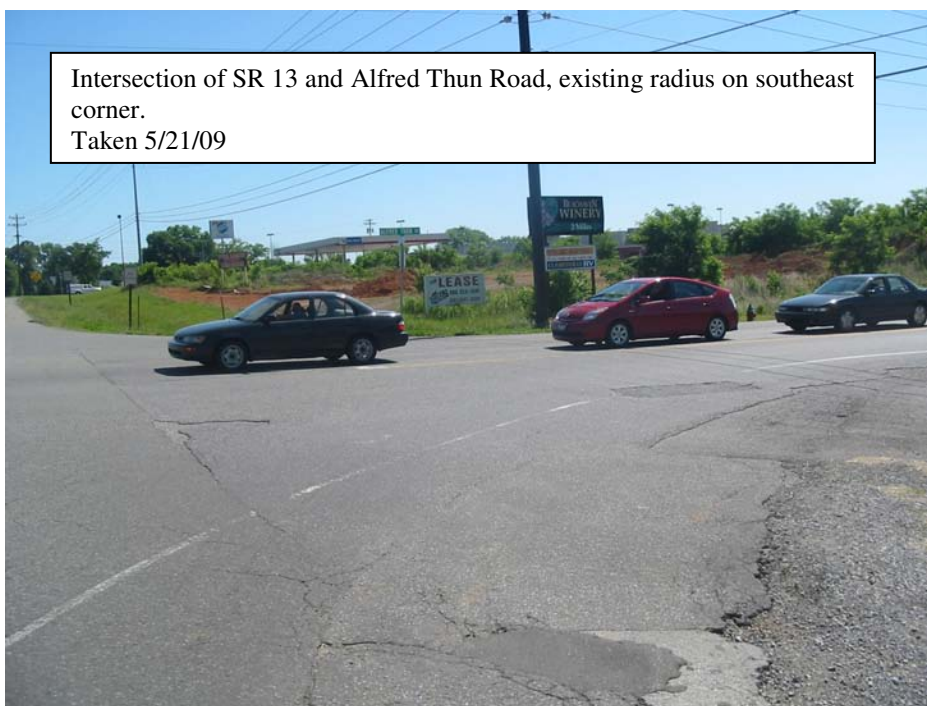
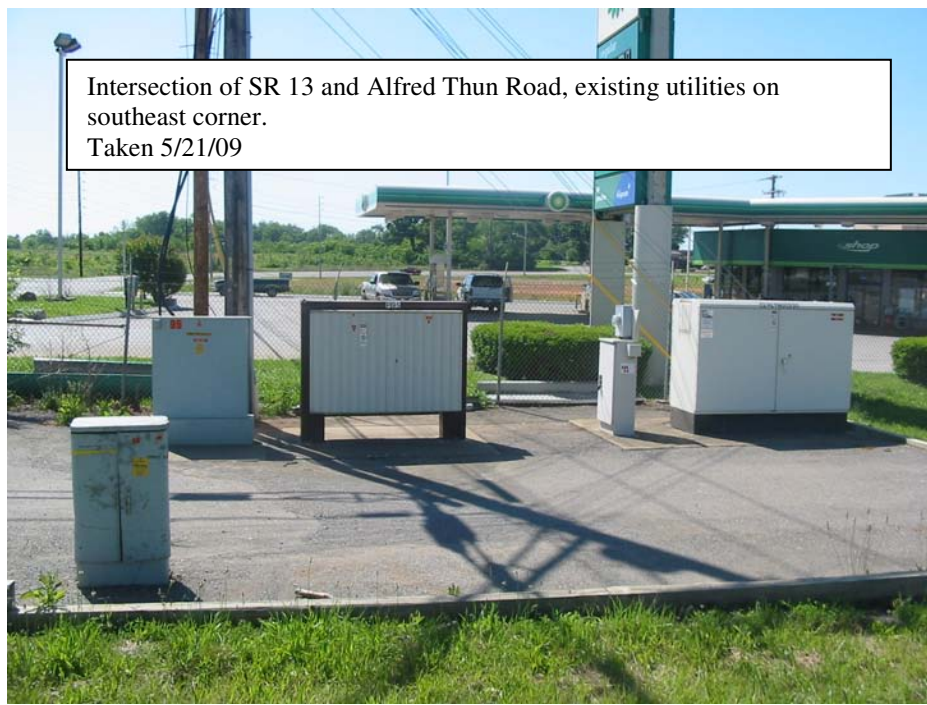


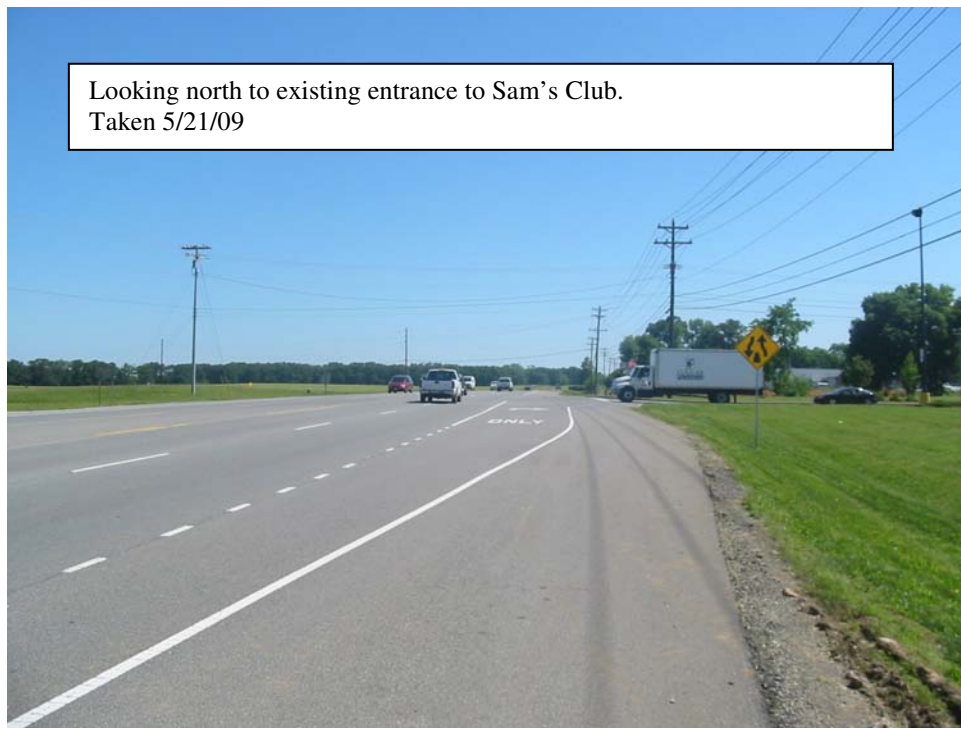
Intersection of SR 13 and Alfred Thun Road / Cracker Barrel Road,
looking southbound.
Taken 5/21/09



Intersection of SR 13 and Alfred Thun Road / Cracker Barrel Road,
looking northbound.
Taken 5/21/09







COST DATA SHEET
100% Federally Funded Items

PROJECT: SR 13 - Intersection with Alfred Thun Road / Cracker Barrel Road
LOCATION: Montgomery County
LOG MILE: 26.81

RIGHT OF WAY

Land Improvement & Damages	(# Acres)	\$0
Incidentals	(# Tracts)	\$0
Relocation Payment	Residences	\$0
	Businesses	\$0
	Non-Profits	\$0
TOTAL RIGHT OF WAY COST		\$0

UTILITY RELOCATION

Reimbursable	\$0	
Non-Reimbursable	\$0	
TOTAL UTILITY ADJUSTMENT COST		\$0

CONSTRUCTION

Clear and Grubbing	\$0
Earthwork	\$0
Pavement Removal	\$3,000
Drainage (Erosion Control = \$0)	\$0
Structures (Preservation and Demolition)	\$0
Paving	\$4,500
Retaining Walls	\$0
Maintenance of Traffic	\$10,500
Topsoil	\$0
Seeding	\$0
Sodding	\$0
Striping	\$2,000
Signing (w/ Delineators)	\$0
Remove and Relocate Signs	\$100
Gaurdrail	\$0
Signalization	\$78,000
Fence	\$0
Rip-rap or Slope Protection	\$0
Other Construction Items (8.5%)	\$8,339
Mobilization (5% of Construction)	\$4,905
15% Contingencies	\$16,702
TOTAL CONSTRUCTION COST	
\$128,045	
ENGINEERING COST (20% OF CONSTRUCTION)	
\$25,609	

ESTIMATED TOTAL COST **\$153,654**