

## **EXECUTIVE SUMMARY**

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This Transportation Planning Report examines a portion of State Route 156 (SR 156) in Marion County. The study area extends from State Route 27 (SR 27/US 72) near the Tennessee River Bridge on the west to State Route 377 (SR 377) on the east and from the Tennessee River on the north to the Alabama state line on the south. The study area includes the City of New Hope. The purpose of the study is to evaluate existing and future conditions on SR 156 and identify options for improving transportation accommodation on the highway that would provide enhanced access to the Nickajack Port Industrial Park (NPIP). The NPIP is situated on approximately 1,200 acres of land adjacent to SR 156 and the Tennessee River. Of the 1,200 acres, 95 acres are publicly owned and administered by the Nickajack Port Authority. The remaining acres are controlled by seventeen private owners.

SR 156 is functionally classified as a rural major collector on the Surface Transportation Program system. It contains two travel lanes and extends in a west/east orientation across Marion County, providing access to Alternate US 41 on the west side and Interstate 24 on the east side. Existing land uses in the study area are predominantly residential, agricultural, and industrial. The roadside contextual setting is small town rural.

This Transportation Planning Report was conducted in response to a request by the Mayor of Marion County, Howell Moss, to Governor Phil Bredesen. Mayor Moss' request noted that the Nickajack Port Authority, Marion County, and Tennessee Department of Economic and Community Development have for many years unsuccessfully attempted to attract industrial development to the NPIP. Access to the NPIP has been cited as an outstanding concern by many prospects. Persons involved in recruiting industry for the NPIP see improvement of SR 156 as a critical element in being able to gain commitments from prospective tenants.

SR 156 is not currently funded nor is it in the Tennessee Department of Transportation Long Range Plan or the Statewide Transportation Improvement Program. On January 17, 2008 the Southeast Tennessee Regional Planning Organization placed SR 156 on their "under development" list.

### **Purpose and Need**

The primary purpose and need for improvement to SR 156 is to provide improved vehicular access to the Nickajack Port Industrial Park (NPIP) and mitigate the impact of increased traffic on the adjacent community. For several years, the leaders of Marion County have actively sought to attract new industry and employment opportunities in order to positively impact the economic development of the cities, towns and unincorporated areas of the county. As part of that strategy, the county has provided support towards development of the Nickajack Port Industrial Park (NPIP). There are three private industries currently active within the NPIP. Over the past twelve years, numerous industries have looked at the prospect of locating a facility in the NPIP but chose other sites outside of Marion County.

SR 156 is a rural major collector with two 11' travel lanes and 2' shoulders. Numerous deficient horizontal and vertical curves along the corridor limit its carrying capacity and safe travel speed. The route bisects the community of New Hope where roadside development includes single family residences, small commercial buildings, churches, the New Hope City Hall, and a city park. While there is a significant amount of undeveloped property near SR

156 that could take advantage of rail and river access for industrial development, the limitations of SR 156 itself have hindered the NPIP's ability to attract tenants.

Not only is improved transportation accommodation necessary to support development at the NPIP, it is also needed to minimize the negative impacts of increased roadway traffic on SR 156 in the surrounding community. Options for providing the needed transportation improvement include:

- construction of a bypass to relocate existing SR 156 and keep traffic associated with industrial development away from the New Hope community
- improve existing SR 156 with spot improvements where the existing horizontal and/or vertical alignment is inadequate to serve increased traffic

### **Options Analyzed**

This TPR reviews existing operational, geometric, and safety conditions on SR 156 and evaluates options for improving transportation accommodation in the study area. The following options are analyzed:

- No Build – Make no physical changes to the existing roadway.
- Build Option A – Construct a bypass of SR 156 on new location to the north of the existing route from the Tennessee River Bridge to SR 377.
- Build Option B – Construct a bypass of SR 156 on new location to the south of the existing route from the Tennessee River Bridge to SR 377.
- Build Option C – Make spot improvements to horizontal and/or vertical curves as necessary to improve safety and sight distance.

Each option was evaluated for operational performance, potential safety enhancement, cost, environmental and cultural impacts, and ability to satisfy purpose and need. Following is a summary of the performance or issues associated with each option:

#### No Build:

- Does not require additional right-of-way
- Does not meet the purpose and need for improved access to the NPIP
- Does not reduce projected truck traffic in the New Hope community along SR 156
- Would likely result in an increase in traffic crashes as traffic volumes increase along SR 156 with no improvement in horizontal and vertical curvature
- Creates no additional environmental impacts
- Results in deficient traffic operations by the year 2032 (LOS E)
- Does not add approximately 4.0 miles to approximately 4.7 miles of roadway maintenance to local highway department

#### Option A:

- Improves access for trucks traveling between I-24 and the NPIP
- Reduces truck traffic along the existing SR 156 in the New Hope community
- Yields acceptable traffic operations through 2032 on both the new bypass (LOS D) and existing SR 156 (LOS C)
- Does not improve roadway conditions (curvature, shoulders, etc) on existing SR 156, but does minimize growth in traffic which would otherwise contribute to an increase in crashes
- Requires a significant amount of right-of-way
- Has a higher potential for environmental impacts than No Build and Option C

- Adds approximately 4.0 miles of roadway maintenance to local highway department

Option B:

- Improves access for trucks traveling between I-24 and the NPIP
- Reduces truck traffic along the existing SR 156 in the New Hope community
- Yields acceptable traffic operations through 2032 on both the new bypass (LOS D) and existing SR 156 (LOS C)
- Does not improve roadway conditions (curvature, shoulders, etc) on existing SR 156, but does minimize growth in traffic which would otherwise contribute to an increase in crashes
- Requires a significant amount of right-of-way
- Has a higher potential for environmental impacts than No Build and Option C
- Adds approximately 4.7 miles of roadway maintenance to local highway department

Option C:

- Provides slightly improved access for trucks traveling between I-24 and the NPIP through spot improvements on SR 156
- Improves roadway safety, maneuverability, and driver comfort for all motorists traveling SR 156, but may not yield any improvement in crash rate due to increases in traffic volumes
- Requires minimal amount of additional right-of-way
- Does not reduce future increased truck traffic in the New Hope community along SR 156
- Has a lower potential for environmental impacts than Option A and Option B
- Results in deficient traffic operations by the year 2032 (LOS E)
- Likely improves travel speeds on SR 156 as horizontal and vertical curves are improved
- Consideration until occupancy of the industrial park warrants improved traffic operations

Options A and B provide the most potential for operational and safety benefit to the study area. Both of the options, however, appear to have a greater potential for environmental impacts. Additional studies are needed to quantify the level of potential impact and possible mitigation measures. Option C is a lower cost option than A or B and could improve the attractiveness of the industrial development area, but would not provide any additional traffic capacity to the study area.

# TRANSPORTATION PLANNING REPORT

## State Route 156

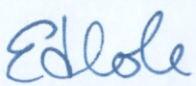
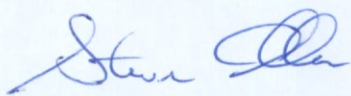
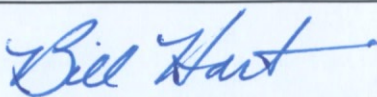
FROM STATE ROUTE 27 (US 72) TO STATE ROUTE 377

MARION COUNTY

PIN# 109907.00



PREPARED BY  
SAIN ASSOCIATES, INC.  
FOR THE  
TENNESSEE DEPARTMENT OF TRANSPORTATION  
PROJECT PLANNING DIVISION

| Recommended by:                                    | Signature  | DATE    |
|--|--|---------|
| CHIEF OF ENVIRONMENT AND PLANNING                  |   | 7/30/08 |
| TRANSPORTATION DIRECTOR PROJECT PLANNING DIVISION  |   | 7-28-08 |
| TRANSPORTATION MANAGER 2 PROJECT PLANNING DIVISION |  | 7/24/08 |

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

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## **1.0 PURPOSE OF THE TRANSPORTATION PLANNING REPORT**

This Transportation Planning Report documents analyses undertaken to evaluate options for improving transportation on State Route 156 (SR 156) that would also provide enhanced access to the Nickajack Port Industrial Park (NPIP) in New Hope, Marion County, Tennessee. The NPIP is situated on approximately 1,200 acres of land adjacent to SR 156 and the Tennessee River. Of the 1,200 acres, 95 acres are publicly owned and administered by the Nickajack Port Authority. The remaining acres are controlled by seventeen private owners.

SR 156 is functionally classified as a rural major collector. It provides two travel lanes and extends in a west/east orientation across Marion County, providing access to Alternate US 41 on the west side and Interstate 24 on the east side. The study area for this TPR extends from the intersection of SR 156 and State Route 27 (SR 27/US 72) on the west side to the intersection of SR 156 and State Route 377 (SR 377) on the east side. The study area is characterized by undulating topography and a rural community setting.

This study is intended to identify existing and future deficiencies or needs along SR 156 within the study area. Located within the study area is the City of New Hope (population 1,043, 2000 census). In addition to identifying the existing needs of SR 156, this study evaluates one no build option and three improvement options and identifies potential impacts to the adjacent community and environment.



## 2.0 HISTORY & BACKGROUND

In August of 2007, the Mayor of Marion County sent a letter to Governor Phil Bredesen requesting support for upgrading or bypassing SR 156 for improved access to the Nickajack Port Industrial Park (NPIP) in Marion County. The NPIP is located adjacent to SR 156 and the Tennessee River in Marion County. Mayor Moss' request was forwarded to TDOT Commissioner Gerald Nicely, who initiated the preparation of a Transportation Planning Report (TPR) to identify improvement options for SR 156 and to evaluate the performance, impacts, and cost of those options.

In his request for assistance, Mayor Moss noted that the Nickajack Port Authority, Marion County, and Tennessee Department of Economic and Community Development have for many years attempted to attract industrial development to the NPIP. Previous prospects have included Mercedes Benz, US Gypsum, CME Merchant Energy, National Steel Car (Project Tiger), and ThyssenKrupp (Project Compass). Current prospects include CBI and a biofuels company. Access to the NPIP has been cited as an outstanding concern by many prospects. Persons involved in recruiting industry for the NPIP see improvement of SR 156 as a critical element in being able to gain commitments from prospective tenants.

The NPIP is situated on approximately 1,200 acres, of which 95 acres are publicly owned and administered by the Nickajack Port Authority. The remaining acres are controlled by seventeen private owners. There are three private industries currently active within the NPIP. Parker Towing Company controls a port facility and operates the loading and unloading of river barges. In 2007, the port handled 7,324 tons of cargo, but in previous years the accommodated cargo has reached 150,000 tons. The port's capacity is approximately 375,000 tons of cargo. Progress Rail operates a scrap metal operation at the Port that also loads and unloads cargo to trucks. Colonial Chemical, Inc. also located within the NPIP, is a chemical manufacturer of personal care products, household and industrial products, and lubricants.

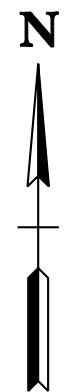
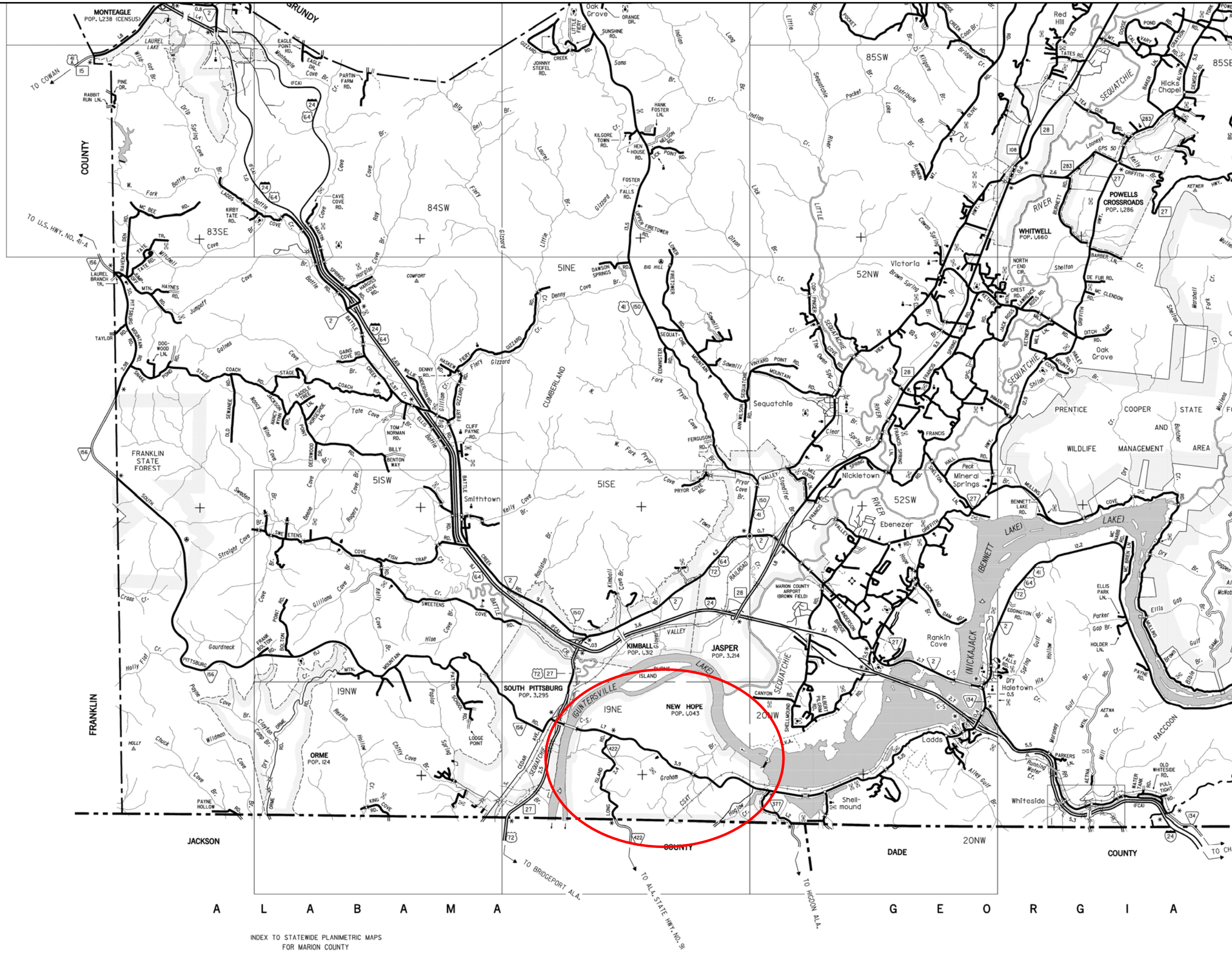
During the past fifteen years, there have been several studies undertaken by TDOT to evaluate transportation accommodation in the SR 156 study area. Following is a brief summary of those prior studies:

- In 1993, the City of New Hope and TDOT prepared preliminary environmental, architectural, archaeological, and land use plans for "New Hope Bypass".
- In 1996, County Mayor Howell Moss sent a letter to Commissioner J. Bruce Saltsman regarding access to Nickajack Port from an improved SR 156 for U.S. Gypsum. This request prompted the preparation of an Advance Planning Report (APR) by TDOT. The APR examined options for improvement of SR 156 between the Tennessee River Bridge and the CSX Railroad near New Hope. The study included a new bridge over the Tennessee River with four travel lanes.
- In 1998, TDOT prepared an APR for extension of State Route 28 (SR 28) from east of the Tennessee River Bridge at South Pittsburg to south of Interstate 24 at its interchange with SR 28. This option realigned SR 156 to the north and included a new bridge connecting SR 156 with SR 28 and Interstate 24.

SR 156 is not currently funded nor is it in the Tennessee Department of Transportation Long Range Plan or the Statewide Transportation Improvement Program. On January 17, 2008 the Southeast Tennessee Regional Planning Organization placed SR 156 on their "under development" list.

FILE NO.

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 3         |



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STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

**LOCATION  
MAP  
FIGURE 1**  
SCALE: 1" = 2 MILES

INDEX TO STATEWIDE PLANIMETRIC MAPS FOR MARION COUNTY

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P:\2007\070463\Structure\corres\FIG.01.Location\_Map.DGN

### 3.0 EXISTING CONDITIONS

#### 3.1 Description of the Study Area

This Transportation Planning Report examines a portion of SR 156 located between SR 27 (US 72), near the Tennessee River Bridge, and SR 377. The study area includes the City of New Hope. Figure 2 shows the study area for this evaluation. The study focuses on three specific areas: 1) the existing SR 156 corridor extending approximately 5.2 miles from the intersection of SR 156 and SR 27 (US 72) to the intersection of SR 156 and SR 377, 2) a corridor to the north of the existing SR 156 extending approximately 4.0 miles from just east of the Tennessee River Bridge to SR 377, and 3) a corridor to the south of the existing SR 156 extending approximately 4.6 miles from just east of the Tennessee River Bridge to SR 377.

SR 156 is functionally classified as a rural major collector on the Surface Transportation Program system. It contains two travel lanes and extends in a west/east orientation across Marion County, providing access to Alternate US 41 on the west side and Interstate 24 on the east side. Existing land uses in the study area are predominantly residential, agricultural, and industrial. The roadside contextual setting is small town rural.

Marion County was established in 1817. Jasper is the county seat, with South Pittsburg and Kimball being two of the larger towns in the county. Marion County is situated twenty-five (25) miles west of Chattanooga and is served by Interstate 24. The county topography is varied according to its location in the Appalachian foothills. The City of New Hope, located within the study area, is surrounded by a bend in the Tennessee River with the SR 156 Tennessee River Bridge providing access from the west and the Nickajack Dam providing access to the east.

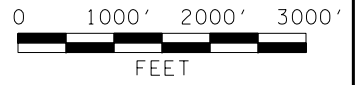
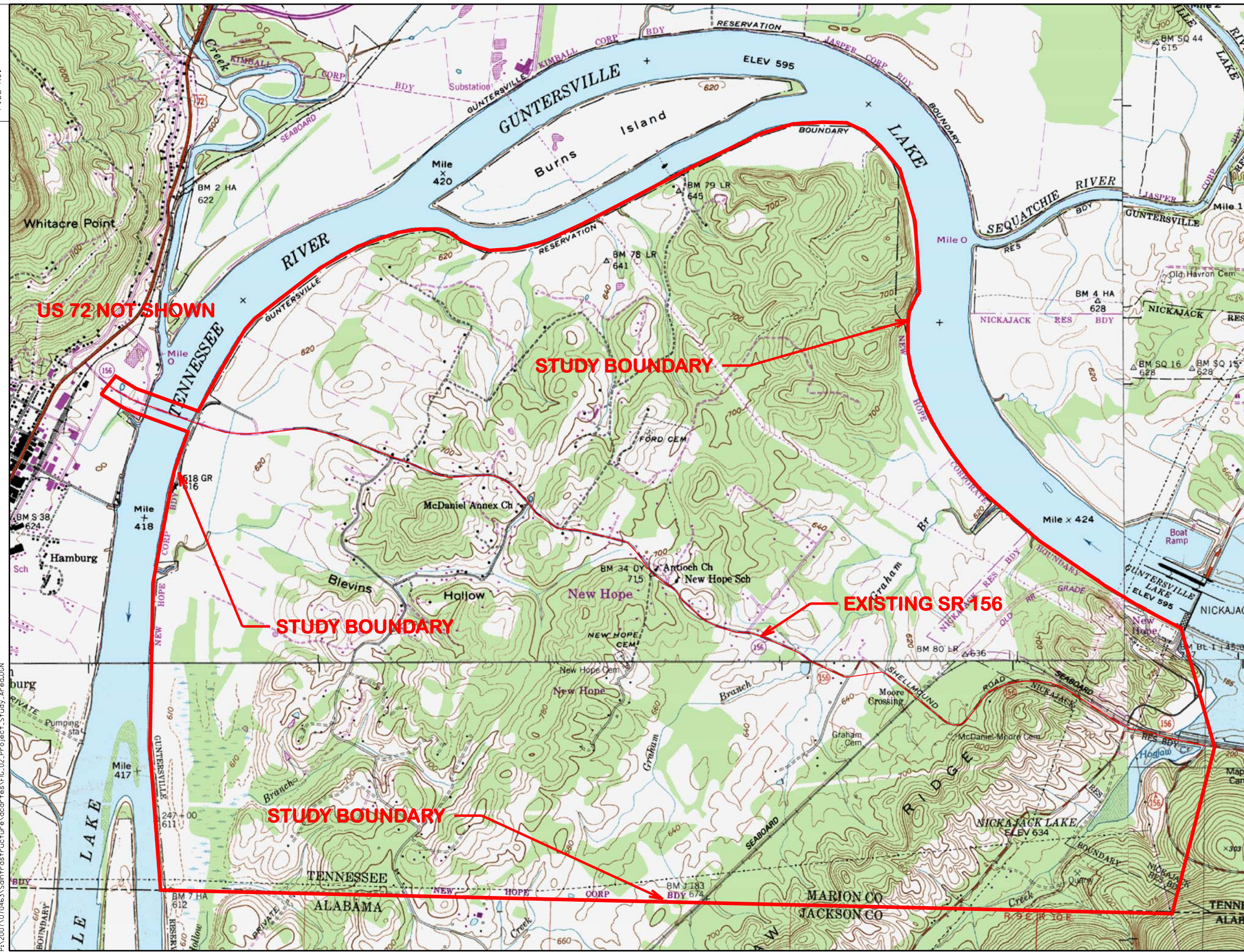
Table 1 summarizes general population data for Marion County, the City of New Hope, and the state of Tennessee. Population density and housing density in Marion County and the City of New Hope are less than the statewide averages for Tennessee. The percent of total population living below the poverty level ranges from 14%-15% in the study area, compared with 13% statewide. Census data indicates that the percentage of persons speaking a language other than English in the home within Marion County and New Hope is only 1%-2% compared to 5.5% statewide.

**Table 1  
Population Data by Geographic Area (Year 2000)**

|  | Marion County | City of New Hope | Tennessee |
|--|---------------|------------------|-----------|
| Land Area (square miles)                           | 498.36        | 10.3             | 41,217.12 |
| Population Density (persons per square mile)       | 55.7          | 101.3            | 138.0     |
| Housing Density (units per square mile)            | 24.3          | 42.0             | 59.2      |
| Percent of Population below poverty level          | 14.1%         | 14.8%            | 13.1%     |
| English not spoken at home (% of total population) | 2.1%          | 1.7%             | 5.5%      |

FILE NO.

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 5         |
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AND ARE DATUM ADJUSTED BY THE  
FACTOR 1.00 & TIED TO THE TRN.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

**STUDY AREA**  
**FIGURE 2**  
SCALE: 1" = 2000'

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P:\2007\070463\SanitFstructure\corres\FIG.02\_Project\_Study\_Area.DGN

The population of Marion County in the last decennial census (year 2000) was 27,776 of which 1,043 lived in New Hope. As shown in Table 2, population in Marion County and New Hope increased by 11.7% and 22.1%, respectively, between 1990 and 2000. That change yields an average annual growth rate of 1-2%. Since 2000, population growth in the county and city has leveled off. Comparatively, population growth in the state of Tennessee has continued at an average annual rate of approximately 1.2%.

**Table 2  
Population Trends**

| Year      | City of New Hope |          |                         | Marion County |          |                         | Tennessee |          |                         |
|-----------|------------------|----------|-------------------------|---------------|----------|-------------------------|-----------|----------|-------------------------|
|           | Pop.             | % Change | Avg. Annual Growth Rate | Pop.          | % Change | Avg. Annual Growth Rate | Pop.      | % Change | Avg. Annual Growth Rate |
| 1990      | 854              |          |                         | 24,860        |          |                         | 4.88 Mil. |          |                         |
| 2000      | 1,043            | 22.1%    | 2.2%                    | 27,776        | 11.7%    | 1.2%                    | 5.69 Mil. | 16.6%    | 1.7%                    |
| 2007 Est. | 1,027*           | -1.5%    | -0.2%                   | 28,138        | 1.3%     | 0.2%                    | 6.16 Mil. | 8.2%     | 1.2%                    |

\*Population cited for New Hope is for 2006.

Marion County has approximately 30 manufacturing industries as well as more than 50,000 acres of farm land. The primary farming commodities in Marion County include livestock, poultry, corn, wheat, soybeans, and hay.

According to statistics for February 2008 compiled by the Tennessee Department of Labor and Workforce Development, the labor force in Marion County has an unemployment rate of 6.2%. This unemployment rate is 0.4% higher than the Tennessee statewide average of 5.8% for the same month.

### 3.2 Crash History

The Safety Planning Section of TDOT's Project Planning Division conducted an analysis of traffic crashes on SR 156 from the Tennessee River Bridge to Interstate 24. A traffic crash rate was calculated from data for the years 2003, 2004, and 2005. Table 3 summarizes the crash rate compared to the statewide average.

**Table 3  
Traffic Crash Rate for 2003-2005**

| Location                                   | Statewide Average | Actual Crash Rate |
|--|-------------------|-------------------|
| SR 156 from Tennessee River Bridge to I-24 | 2.152             | 1.301             |

Within the studied period, there were a total of 26 crashes on SR 156, of which 3 resulted in an incapacitating injury and 1 resulted in a fatality. Following is a summary of the crash locations for each incapacitating injury and fatal crash. Each of these crashes occurred within the vicinity of a horizontal curve.

**Table 4  
Summary of Incapacitating Injury and Fatal Crashes**

| Crash Date | Time  | Log Mile | Location                               | Killed | Injured | Vehicles Involved | Crash Type   |
|------------|-------|----------|--|--------|---------|-------------------|--------------|
| 2/6/2003   | 6:00  | 17.924   | Between Campbell & Griffin Rd          | 1      | 0       | 1                 | Run Off Road |
| 8/8/2003   | 9:50  | 18.705   | Curve west of railroad track           | 0      | 3       | 2                 | Right angle  |
| 6/28/2004  | 10:45 | 23.10    | Curve east of Nickajack Landing Road** | 0      | 2       | 1                 | Run Off Road |
| 10/23/2005 | 6:32  | 17.627   | Curve near Campbell Road               | 0      | 1       | 1                 | Run Off Road |

\*\* This location is just outside the study area boundary to the east.

### 3.3 Geometrics

SR 156 is a two-lane rural major collector administered by the Tennessee Department of Transportation under the Surface Transportation Program (STP) system. SR 156 provides east/west connectivity between communities that lie on the southeast bank of the Tennessee River: New Hope, Ladds, and Vulcan. SR 156 also provides access to the Nickajack Port Industrial Park, located east of New Hope. West of New Hope and State Route 422 (SR 422), SR 156 crosses the Tennessee River and connects with SR 27/US Highway 72 in the city of South Pittsburg.

Within the study area, SR 156 has a cross section that generally consists of two 11' travel lanes with 2' shoulders. The right-of-way width is 150 feet from log mile 15.06 (the beginning of the study area) to log mile 16.07 (between the east end of the Tennessee River Bridge and SR 422). From log mile 16.07 to the end of the study area at log mile 20.13, the right-of-way is 50 feet. The posted speed limit on SR 156 is 45 miles per hour. The intersections of SR 422 at SR 156 and SR 377 at SR 156 are controlled by stop signs on the side street approaches.

There are numerous deficient horizontal and vertical curves on the studied section of SR 156. There are also many residential driveways, small commercial driveways, and local street intersections with no turn lanes along the highway. In several locations, these physical characteristics result in insufficient sight distance. Following is a summary of substandard geometric or safety features:

- Intersection of SR 156 and SR 422 (log mile 16.28) – intersection sight distance is limited for vehicles turning westbound from SR 422.
- Vertical curve at log mile 16.68 – curve does not meet current design standards and limits stopping sight distance in the vicinity of several private driveways.
- Intersection of SR 156 and Mail Loop Road East (log mile 17.09) – intersection sight distance looking west from Mail Loop Road is deficient, and the horizontal and vertical curves do not meet current design standards.
- Intersection of SR 156 and Crystal Lane (log mile 17.17) – intersection sight distance is limited in both directions.

- Horizontal curve at log mile 17.33 – curve does not meet current design standards and limits stopping sight distance in the vicinity of the New Hope Volunteer Fire Department.
- Section of SR 156 between termini of Campbell Road west and Campbell Road east – vertical and horizontal curves are substandard and limit sight distance at the adjacent intersections.
- Vertical curve at log mile 17.98 near Griffin Lane – curve does not meet current design standards and limits stopping and intersection sight distance at the Griffin Lane intersection and at several private driveways.
- Intersection of SR 156 and Colonial Drive (log mile 18.57) – intersection sight distance to the east from Colonial Drive is restricted by vegetation.
- CSX Railroad Crossing – the vertical geometry is deficient at the railroad grade crossing
- Horizontal and vertical curves at log mile 18.95 – curves do not meet current design standards and limit stopping sight distance and travel speed.
- Intersection of SR 156 and TVA Powerhouse Road (log mile 19.79) – intersection sight distance to the east from Powerhouse Road is restricted by vegetation.

### **3.4 Level of Service Analyses**

Existing (2007) annual average daily traffic (AADT) volumes on SR 156 range from 3,930 near the Tennessee River Bridge to 1,730 between SR 422 and SR 377. These low traffic volumes are consistent with the adjacent rural setting. Although SR 156 roughly parallels Interstate 24, there appears to be very little cut-through traffic on the highway. Existing truck traffic on SR 156 accounts for approximately 120 trucks per day. As a percentage of overall traffic, truck traffic is approximately 3% of the total 3,930 vehicles near the Tennessee River and approximately 7% of the total 1,730 vehicles between SR 422 and SR 377.

Traffic forecasts for the horizon years 2012 and 2032 were prepared using historic traffic data and projections for traffic generation that would typically occur with new industrial development. The traffic forecasts included some key assumptions:

By 2012:

- 156 acres of additional general light industrial development is in operation at the NPIP.

By 2032:

- 300 more acres (for a total of 456) of general light industrial development is in operation at the NPIP.

Figure 6, located in the Appendix to this report, illustrates the forecasted average annual daily traffic (AADT) volumes for the existing SR 156 system for horizon years 2012 and 2032. These traffic volumes were analyzed to evaluate the Level of Service that can be expected during each horizon year. Level of Service is a term used to describe operational conditions within a stream of traffic based upon qualitative measures, such as speed, travel time, maneuverability, flow interruptions, driver comfort, and convenience. For two-lane rural highways, such as SR 156, service quality is based on the percent of time that a driver is likely to spend following another vehicle. Level of Service (LOS) measures are stated in a sequence of letter grades from A to F, with LOS A used to describe the highest quality of traffic flow and LOS F used to describe the worst conditions. Table 5 describes the qualities of each Level of Service category, and Table 6 summarizes the computed Level of Service for each segment of existing SR 156 with the forecasted traffic volumes for 2012 and 2032.

**Table 5  
Level of Service (LOS) Description**

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

Source: Highway Capacity Manual 2000

**Table 6  
Future Level of Service with Existing System**

| <b>Segment of SR 156</b>           | <b>Year 2012</b> | <b>Year 2032</b> |
|------------------------------------|------------------|------------------|
| Between Tennessee River and SR 422 | D                | E                |
| Between SR 422 and the NPIP        | D                | E                |
| Between the NPIP and SR 377        | C                | D                |

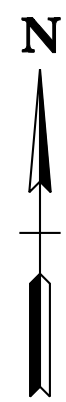
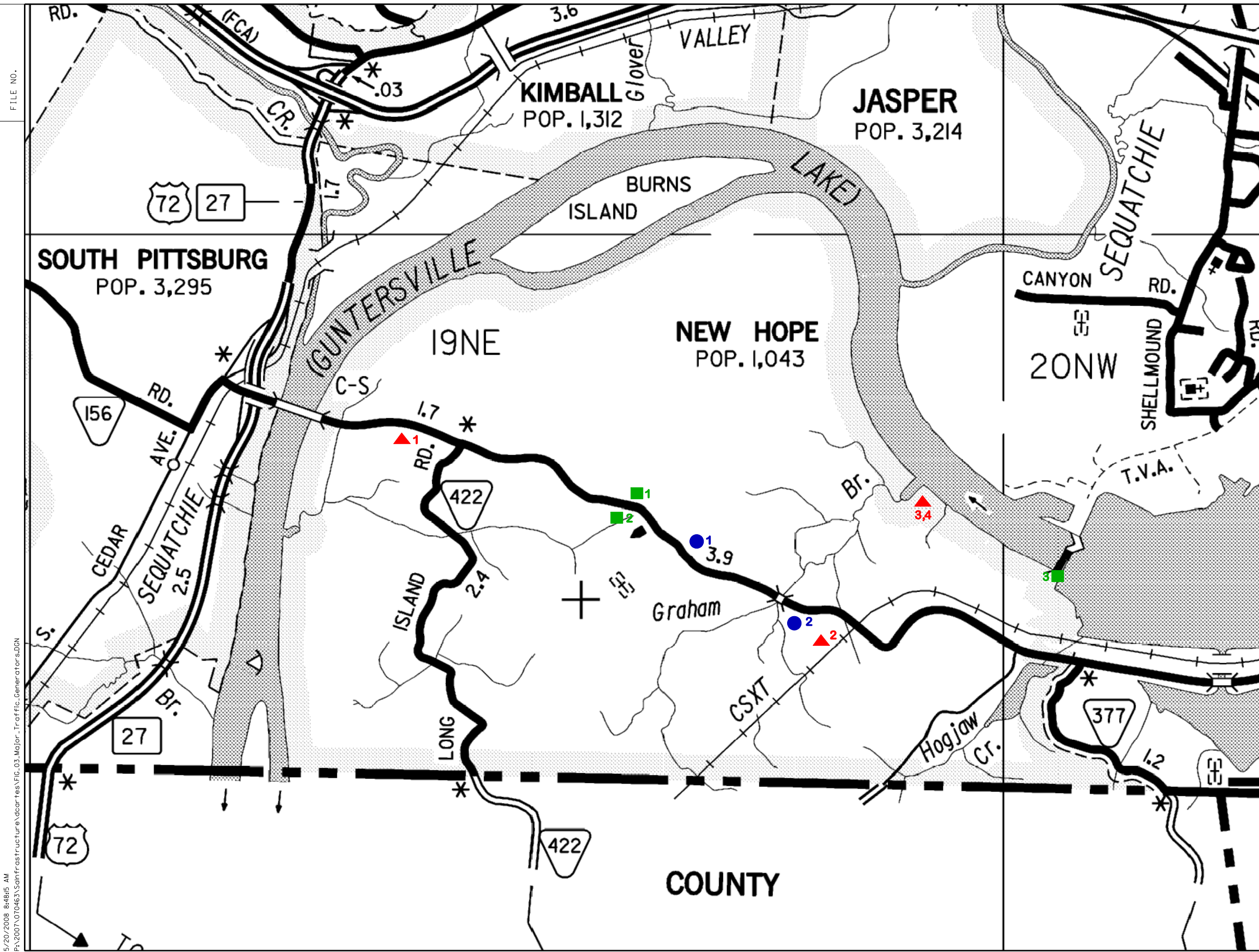
The Level of Service analysis indicates traffic operations on existing SR 156 will be acceptable in the year 2012 with 156 acres of additional development in the NPIP. By 2032, however, the segments of SR 156 between the Tennessee River Bridge and the NPIP will drop to LOS E, an unacceptable level. East of the NPIP, the computed 2032 LOS is D.

### **3.5 Land Uses / Traffic Generators**

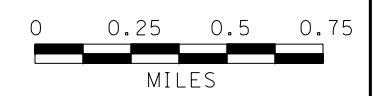
Figure 3 shows a map of the study area with symbols to identify many of the traffic generators located in the New Hope area. The traffic generators are separated into three land use categories: 1) industrial or manufacturing, 2) retail, and 3) public facility. Table 7 lists the name of each identified site.



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- ▲ INDUSTRIAL/ MANUFACTURING
- RETAIL
- PUBLIC FACILITY



COORDINATE VALUES ARE NAD/83(1995)  
AND ARE DATUM ADJUSTED BY THE  
FACTOR 1.00 & TIED TO THE TGRN.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

**TRAFFIC GENERATORS**




**FIGURE 3**

SCALE: 1" = 1/2 MILE

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**Table 7  
Traffic Generators in the Study Area**

| <b>Map Symbol</b>   | <b>Traffic Generators</b>                             |
|---|---|
|  | <b>Industrial or Manufacturing Business</b>           |
| 1   | Tree Brand Packaging                                  |
| 2   | Colonial Chemical                                     |
| 3   | Port of Nickajack (operated by Parker Towing Company) |
| 4   | Progress Rail   |
|  | <b>Retail</b>   |
| 1   | H&P Meats   |
| 2   | Nick and Jack Gas Station                             |
|  | <b>Public Facility</b>                                |
| 1   | New Hope City Park                                    |
| 2   | New Hope City Hall & Volunteer Fire Department        |
| 3   | Nickajack Dam   |

### **3.6 Major Structures**

On the west end of the study area, SR 156 crosses the Tennessee River via a steel and concrete bridge with one main span and five approach spans. The bridge was constructed in 1981 and provides one travel lane in each direction. Another major structure, Nickajack Dam, is located on the northeast edge of the study area. Nickajack is one of six TVA reservoirs along the Tennessee River. The Nickajack Dam is 81 feet high, stretches 3,767 feet across the Tennessee River, and contains a 110-foot by 600-foot lock. Neither of these structures would be modified in any way as a result of the study options.

### **3.7 Topography**

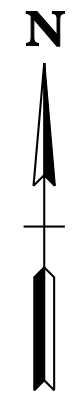
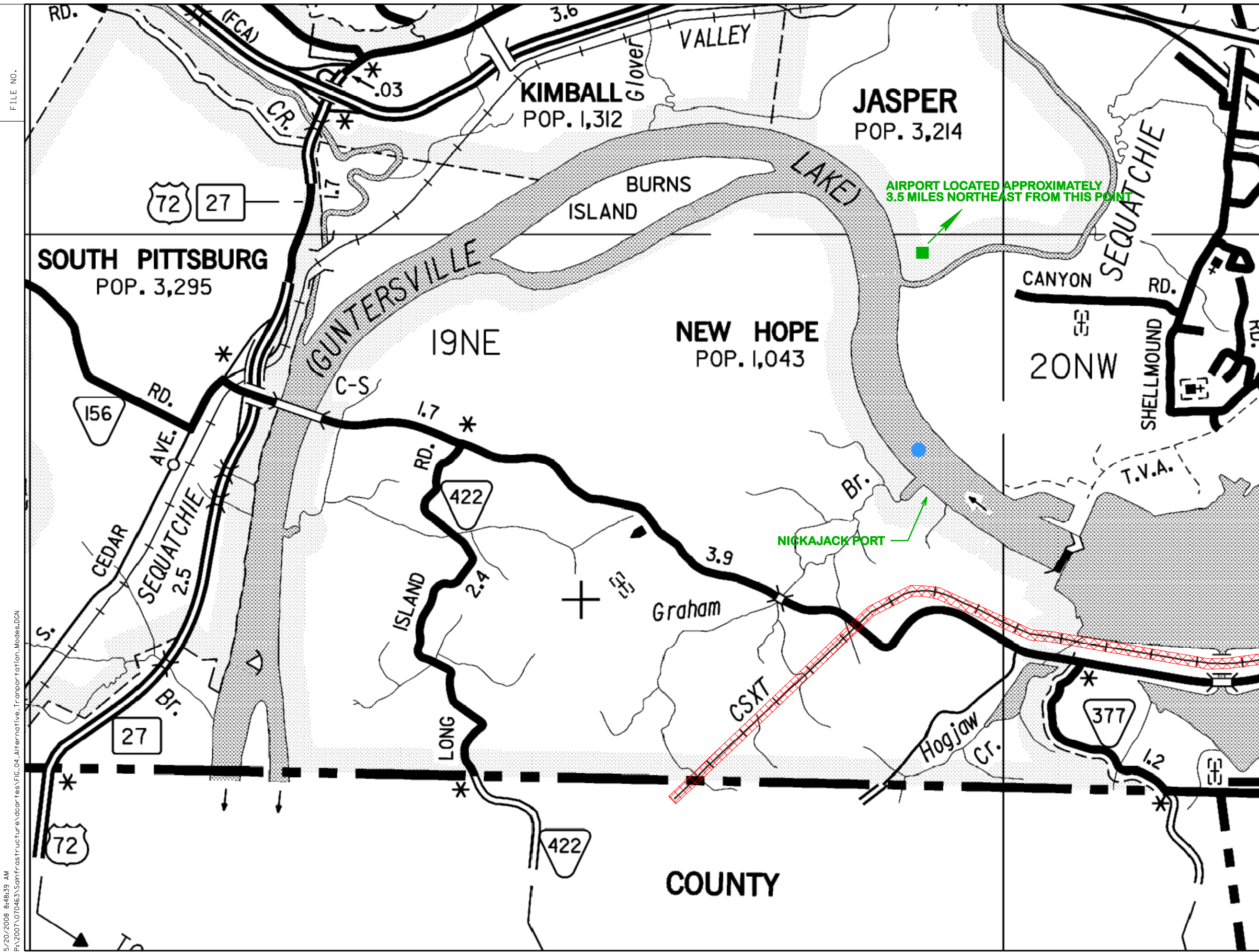
Topography within the study area consists of gently rolling hills. Consistent with the terrain, SR 156 has numerous horizontal and vertical curves but no severe grade changes.

### **3.8 Multi-modal Facilities**

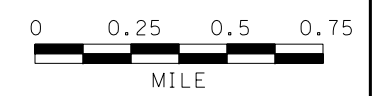
Within the study area, alternative modes of transportation are very limited. There are no dedicated pedestrian, bicycle, or transit facilities in the study area. Figure 4 shows the location of an air transportation facility, a rail line, highways and a navigable waterway. The Marion County Airport in Jasper provides general aviation, taxi, and rental car service. A rail line operated by CSX Transportation (CSXT) that connects Chattanooga to Nashville intersects SR 156 in the study area at log mile 18.75. This CSXT rail line accommodates 19 freight trains per day traveling at 45 - 50 mph. No rail passenger service is provided. The Tennessee River is a navigable waterway, and there is river access in the study area provided by the Port of Nickajack. The facility provides docking, mooring cells, crane service, knuckle boom loader and front-end loader service for general freight transfer.

In addition to these alternative transportation modes in the study area, Marion County has access to two larger airports via I-24. Nashville International Airport is located approximately 100 miles to the northwest and provides non-stop service to 14 major airline hubs. Chattanooga Metropolitan Airport is located approximately 40 miles to the east and provides non-stop service to 12 major airline hubs.

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
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- NAVIGABLE WATERWAY
- AIRPORT
- RAILROAD



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FACTOR 1.00 & TIED TO THE TGRN.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
**ALTERNATIVE  
TRANSPORTATION  
MODES**  
**FIGURE 4**  
SCALE: 1" = 1/2 MILE

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## 4.0 FIELD REVIEW

On January 30, 2008 a field review meeting of stakeholders was conducted in South Pittsburg and along the study corridor to identify concerns and opportunities related to SR 156. A list of meeting attendees and minutes from the field review are included in the Appendix of this report. Key elements of the discussion included:

- elimination of the existing at-grade railroad crossing with any proposed route
- location of existing utilities
- concern for residents along SR 156 with regard to traffic impacts of additional industrial development
- potential tenant for the industrial park, and
- documentation of known environmental features and the environmental approval process.

Further field reviews were conducted by Sain Associates on November 20, 2007 and April 18, 2008 to better define the existing conditions of SR 156 and to better identify possible corridors and spot improvements.

## 5.0 PURPOSE AND NEED FOR IMPROVEMENTS

The primary purpose and need for improvement to SR 156 is to provide improved vehicular access to the Nickajack Port Industrial Park (NPIP) and mitigate the impact of future increased truck traffic on the adjacent community. For several years, the leaders of Marion County have actively sought to attract new industry and employment opportunities in order to positively impact the economic development of the cities, towns and unincorporated areas of the county. As part of that strategy, the county has provided support towards development of the NPIP which is located along SR 156, east of New Hope. The NPIP is situated on approximately 1,200 acres, of which 95 acres are publicly owned and administered by the Nickajack Port Authority. The remaining acres are controlled by seventeen private owners. The port has two mooring cells to accommodate barge traffic along the Tennessee River and a CSXT mainline railroad runs parallel to the property. There are three private industries currently active within the NPIP. Parker Towing Company operates the port facility, Progress Rail runs a scrap metal operation that also loads and unloads cargo to and from trucks, and Colonial Chemical, Inc. manufactures various personal care products, household and industrial products, and lubricants. Over the past twelve years, numerous industries have looked at the prospect of locating a facility in the NPIP but chose other sites outside of Marion County. Persons involved in recruiting industry for the NPIP have cited inadequate roadway access as a key consideration for industries that chose to locate elsewhere. With only three active industries, the NPIP remains sparsely developed.

SR 156 is functionally classified as a rural major collector with two 11' travel lanes and 2' shoulders. Numerous deficient horizontal and vertical curves along the corridor limit its carrying capacity and safe travel speed. The route bisects the community of New Hope where roadside development includes single family residences, small commercial buildings, churches, the New Hope City Hall, and a city park. While there is a significant amount of undeveloped property near SR 156 that could take advantage of rail and river access for industrial development, the limitations of SR 156 itself have hindered the NPIP's ability to attract tenants.

The Nickajack Port Industrial Park currently has two prospects. Development of industrial sites at the NPIP would increase car and truck traffic on SR 156, resulting in noticeable impacts to the community of New Hope. Not only is improved transportation accommodation necessary to support development at the NPIP, it is also needed to minimize the negative impacts of increased roadway traffic on SR 156 in the surrounding community. Options for providing the needed transportation improvement include:

- construction of a bypass to relocate existing SR 156 and keep traffic associated with industrial development away from the New Hope community
- improve existing SR 156 with spot improvements where the existing horizontal and/or vertical alignment is inadequate to serve increased traffic

Improving the entire SR 156 within the study area to current standards would not be prudent due to the significant impact to the New Hope community, but spot improvements in critical locations would improve transportation conditions.

### 5.1 Safety

There are numerous deficient horizontal and vertical curves on the studied section of SR 156. In addition, there are many residential driveways, small commercial driveways, and local street intersections with no turn lanes along the highway. In several locations, these

physical characteristics result in insufficient sight distance and inadequate geometric features to assist drivers in safely traversing the highway.

According to an analysis by the Safety Planning Section of TDOT's Project Planning Division, the traffic crash rate on SR 156 for the years 2003 through 2005 was 1.301 compared to a statewide average of 2.152. Within that three-year period, there were a total of 26 crashes on SR 156, of which 3 resulted in an incapacitating injury and 1 resulted in a fatality. Each of the incapacitating injury and fatal crashes occurred within the vicinity of a horizontal curve.

## **5.2 System Linkage**

SR 156 is a two-lane rural major collector administered by the Tennessee Department of Transportation under the Surface Transportation Program (STP) system. The highway provides east/west connectivity for communities that lie on the southeast bank of the Tennessee River. This study examines options for improving existing SR 156 or adding a bypass around the community of New Hope that would tie into the existing alignment of SR 156 on the east and west ends of the study area. No new transportation system links are proposed.

## **5.3 Capacity**

A Level of Service analysis indicates that traffic operations on existing SR 156 will be acceptable in the year 2012, but by 2032 the segments of SR 156 between the Tennessee River Bridge and the NPIP will drop to LOS E, an unacceptable level. East of the NPIP, the computed 2032 LOS is D. A Level of Service D or better is desired on all segments of SR 156.

## **5.4 Transportation Demand**

There are no plans for improvement of SR 156 in the State Transportation Improvement Plan (STIP) or Long-Range Transportation Plan. Traffic forecasts were developed for this study using a historical growth rate for SR 156 plus an estimate of traffic that could be generated by additional industrial development at the NPIP. For the purposes of this study, the traffic forecasts projected an additional 456 acres of general light industrial development at the NPIP by the horizon year 2032.

## **5.5 Legislation**

While there is no federal, state, or local government mandate for improvement of SR 156, the local government did request a Transportation Planning Report be conducted by TDOT.

## **5.6 Social Demands or Economic Development**

Persons involved in recruiting industry in Marion County have noted that inadequate roadway access via SR 156 has been a stumbling block to attracting prospects to the NPIP. With only three active industries, the NPIP remains sparsely developed. According to statistics for February 2008, the unemployment rate in Marion County is 0.4% higher than the statewide average in Tennessee. Marion County leaders are actively pursuing industrial development in the county to create new jobs. If new industry is added to the NPIP, the additional traffic it attracts will stress the capacity of existing SR 156 to provide acceptable traffic operations.

## **5.7 Modal inter-relationships**

Improvement of SR 156 would provide better access to an existing, underutilized port facility at the NPIP.

## **5.8 Roadway Deficiencies**

The options considered in this study would provide correction or mitigation of existing deficiencies either by bypassing the existing substandard facility with a new facility or by making spot improvements to the existing route. The bypass options provide the benefit of a new roadway designed to meet current standards that could accommodate higher speed traffic. With these options, existing SR 156 would be transferred from the State Highway System to the local highway department to serve as a local road to accommodate slower speed traffic and provide direct access to residences and businesses. The spot improvements option would correct deficiencies which would lead to improved safety, maneuverability and driver comfort. Also the spot improvements option would likely improve travel speeds along the existing route but not provide additional capacity.

## 6.0 OPTIONS FOR IMPROVEMENT

Several options were considered and evaluated as a means of addressing the transportation needs within the study area. The options, illustrated on Figure 5, include the following:

- No Build – Make no physical changes to the existing roadway.
- Build Option A – Construct a bypass of SR 156 on new location to the north of the existing route from the Tennessee River Bridge to SR 377.
- Build Option B – Construct a bypass of SR 156 on new location to the south of the existing route from the Tennessee River Bridge to SR 377.
- Build Option C – Make spot improvements to horizontal and/or vertical curves as necessary to improve safety and sight distance.

The following sections of this report summarize the concept, typical section, identified environmental and cultural resource concerns, structural impacts, and preliminary cost (based upon a per mile estimate) of each considered option. For each option, an operational performance assessment was conducted to provide an objective measure of the benefits and/or shortcomings of each option. The operational performance assessment is based upon future peak hour volumes estimated by multiplying the annual average daily traffic (AADT) projections with a peak hour factor. Traffic projections for SR 156 were developed for two horizon years (2012 and 2032) by applying a historical growth rate to existing traffic counts then adding traffic volumes that would likely be generated by development at the NPIP. The following assumptions were made in the traffic forecasts:

- By horizon year 2012, 156 acres of property is developed in and adjacent to the NPIP with light industrial tenants
- By horizon year 2032, an additional 300 acres of property adjacent to the NPIP is developed with light industrial tenants.

Future annual average daily traffic volumes for each option are summarized in Table 8. Traffic volume maps are included in the detailed description of each option.

**Table 8  
Future Average Annual Daily Traffic Volumes - 2012**

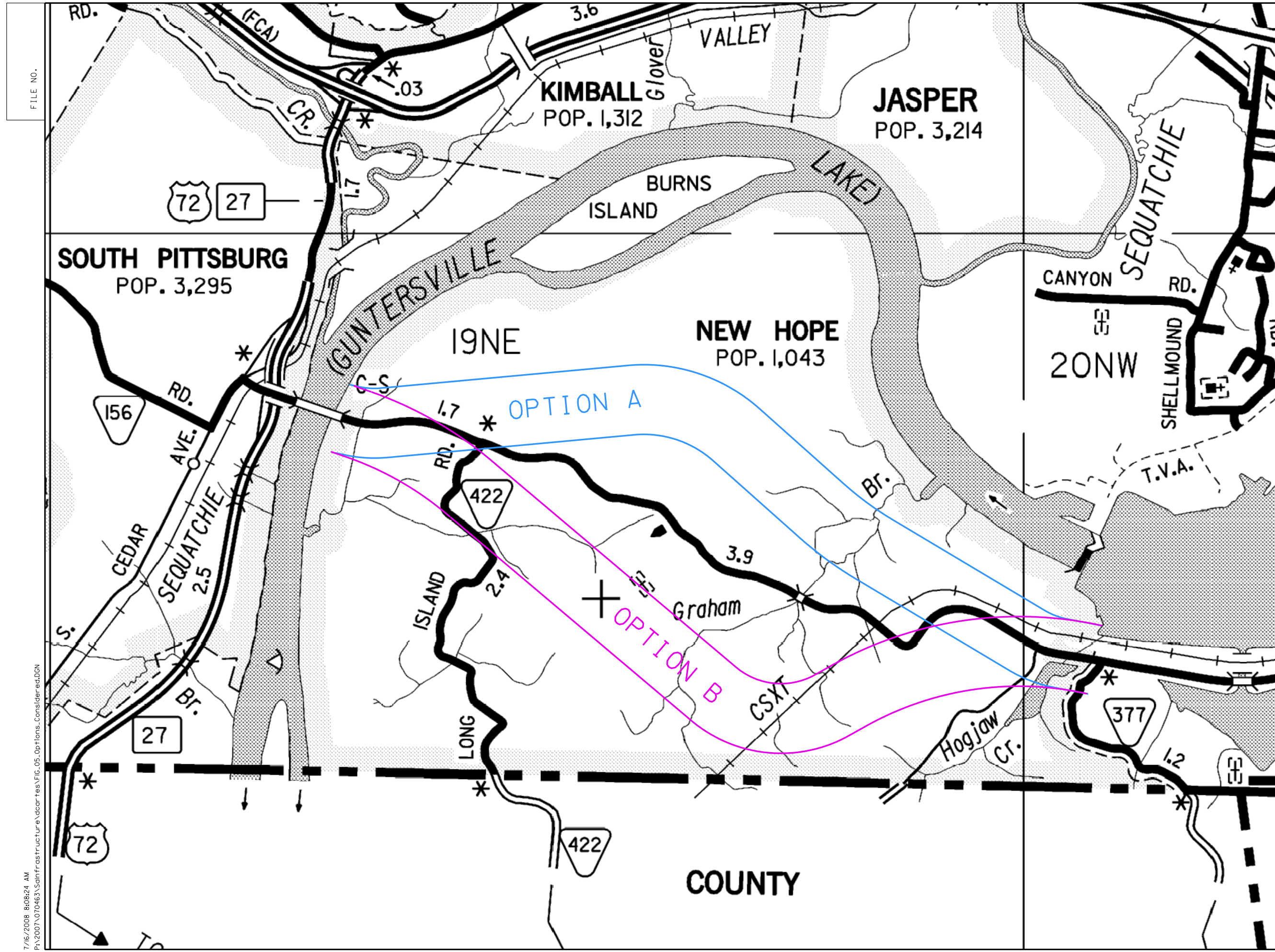
| Road Segment                          | No Build    | Option A    | Option B    | Option C    |
|---------------------------------------|-------------|-------------|-------------|-------------|
| SR 156 from Tennessee River to SR 422 | 8,490       | 8,490       | 8,490       | 8,490       |
| Bypass from SR 422 to NPIP            | -           | 5,680       | 5,680       | -           |
| Existing SR 156 from SR 422 to NPIP   | 7,210-9,040 | 1,530-3,360 | 1,530-3,360 | 7,210-9,040 |
| SR 156 from NPIP to SR 377            | 4,200       | 4,200       | 4,200       | 4,200       |

**Future Average Annual Daily Traffic Volumes - 2032**

| Road Segment                          | No Build      | Option A    | Option B    | Option C      |
|---------------------------------------|---------------|-------------|-------------|---------------|
| SR 156 from Tennessee River to SR 422 | 17,310        | 17,310      | 17,310      | 17,310        |
| Bypass from SR 422 to NPIP            | -             | 15,050      | 15,050      | -             |
| Existing SR 156 from SR 422 to NPIP   | 17,100-19,530 | 2,050-4,480 | 2,050-4,480 | 17,100-19,530 |
| SR 156 from NPIP to SR 377            | 8,510         | 8,510       | 8,510       | 8,510         |

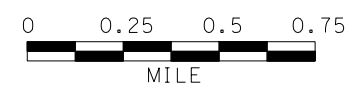
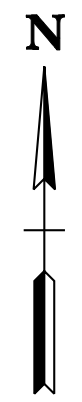


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STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION

**OPTIONS  
 CONSIDERED**  
**FIGURE 5**

SCALE: 1" = 1/2 MILE

**COUNTY**

The forecasted peak hour volumes for each option were analyzed using the Highway Capacity Software. Table 10, located in the Summary (Section 8) of this report, includes a comparison of several performance measures for each option. These performance measures are referred to in the subsequent discussion of each option.

## **6.1 Corridor Improvements**

### No Build Option

*Concept:*

Make no physical changes to the existing roadway network.

*Typical Section:*

All roadway sections would remain as they are currently configured.

*Operational Performance:*

Figure 6 in the Appendix illustrates the annual average daily traffic volumes on the existing roadway network in 2012 and 2032. SR 156 volumes are projected to reach 19,530 vehicles per day by the year 2032, causing traffic operations on the roadway to decline to an unacceptable level of service E for segments located between the Tennessee River and the NPIP. In the near-term horizon (2012), the volume of traffic on SR 156 is anticipated to reach approximately 9,000 vehicles per day, a volume that can be accommodated at an acceptable level of service D or better for all segments.

With the increase in traffic associated with development at the NPIP, there will be more trucks using SR 156. As a percent of total traffic, truck traffic is forecasted to range from 6-7%. Existing truck traffic on SR 156 ranges from 3-7% of the total volume in 2007. While these percentages seem to be fairly consistent from existing to future conditions, the total volume of traffic is significantly increased and so will the number of trucks. This increase in number of trucks on SR 156 would impact quality of life in the New Hope community and could have impacts to safety on the highway as higher volumes of traffic and a greater mix of heavy vehicles use the facility.

As noted previously, the traffic crash rate on SR 156 for 2003-2005 is below the statewide average; however there have been 3 incapacitating injury crashes and 1 fatal crash within that period of time. All of the incapacitating injury and fatal crashes occurred in the vicinity of a horizontal curve (see Table 4). As traffic volumes increase on the facility with no geometric improvements, the crash rate is likely to increase.

### Build Option A

*Concept:*

Construct a new two lane roadway north of the existing SR 156 from a point east of the Tennessee River Bridge to a point west of SR 377. Figures 10 through 14 in the Appendix illustrate the corridor for Option A on U.S.G.S. quadrangle maps and aerial photography. The corridor is designated as 2000' wide, an area large enough to allow design flexibility within the natural topographic constraints for the area. The concept plan is for Option A to be constructed as a two-lane facility with access management and at-grade intersections at the local roadway crossings. Turn lanes are to be included at major intersections. The crossing of the rail line shall be grade separated.

*Typical Section (proposed):* See Figure 15 in the Appendix

- Option A
  - Two travel lanes with access management and turn lanes at major intersections
  - 120 - 140' of right-of-way
- All other roadways would maintain existing typical section.

*Operational Performance:*

Figure 7 in the Appendix illustrates the anticipated annual average daily traffic volumes on the bypass alignment and existing roadway network in 2012 and 2032. Future traffic will be divided between the bypass highway and existing SR 156. By 2032, traffic on the bypass is forecasted to be approximately 15,000 vehicles per day with another 4,500 forecasted on the existing section of SR 156. Because the future traffic demand is divided between these two facilities, traffic operations with Option A are better than with the No Build option. The volume of traffic on these two facilities can each be accommodated with adequate levels of service (LOS "D" on the bypass and LOS "C" on the existing section of SR 156).

As noted previously, any future industrial development at the NPIP will produce additional truck traffic. With Option A, trucks will be provided with a better travel route to and from the NPIP as opposed to using existing SR 156. New truck traffic associated with development of the NPIP is expected to utilize the bypass. Truck traffic on the bypass is forecasted to reach approximately 8% of total traffic, while truck traffic on existing SR 156 will not exceed 3-4% of total traffic. Keeping the industrial related truck traffic away from the heart of New Hope will help to minimize community impacts. It would also provide a better quality of roadway and safer driving conditions for truck drivers.

The traffic crash rate on SR 156 for 2003-2005 is below the statewide average. However, there have been 3 incapacitating injury crashes and 1 fatal crash within that period of time. The incapacitating injury crashes as well as the fatal crash occurred in the vicinity of a horizontal curve. With Option A, traffic volumes on the existing SR 156 would grow at a much lower rate (anticipated 2032 AADT is approximately 4,500) than with the No Build option or Option C (2032 AADT of 19,500). With only modest increases in traffic on existing SR 156, the crash rate would likely remain stable or increase only slightly. Fewer crashes are anticipated for the new bypass alignment because it would be constructed with modern design standards that yield better safety performance than is typically seen on older roadways like existing SR 156.

*Disposition of Existing Route*

Approximately 2.9 miles of this option would be on new location. Any portions of the existing SR 156 not utilized in the completion of this project would be removed from the State Highway System and would become the responsibility of local county and/or city government.

**Build Option B**

*Concept:*

Construct a new two lane roadway south of the existing SR 156 from a point east of the Tennessee River Bridge to a point west of SR 377. Figures 10 through 14 in the Appendix illustrate the corridor for Option B on U.S.G.S. quadrangle maps and aerial photography. The corridor is designated as 2000' wide, an area large enough to allow design flexibility within the natural topographic constraints for the area. The concept plan is for Option B to be constructed as a two-lane facility with access management and at-grade intersections at

the major roadway crossings. Turn lanes are to be included at major intersections. The crossing of the rail line will be grade separated.

*Typical Section (proposed):* See Figure 15 in the Appendix

- Option B
  - Two travel lanes with access management and turn lanes at major intersections
  - 120-140' of right-of-way
- All other roadways would maintain existing typical section.

*Operational Performance:*

Projected operational performance for Option B is the same as for Option A. Figure 8 in the Appendix illustrates the annual average daily traffic volumes on the bypass alignment and existing roadway network in 2012 and 2032. Future traffic will be divided between the bypass highway and existing SR 156. By 2032, traffic on the bypass is forecasted to be approximately 15,000 vehicles per day with another 4,500 forecasted on the existing section of SR 156. Because the future traffic demand is divided between these two facilities, traffic operations with Option B are better than with the No Build option. The volume of traffic on these two facilities can each be accommodated with adequate levels of service (LOS "D" on the bypass and LOS "C" on the existing section of SR 156).

As noted previously, any future industrial development at the NPIP will produce additional truck traffic. With Option B, trucks will be provided with a better travel route to and from the NPIP as opposed to using existing SR 156. New truck traffic associated with development of the NPIP is expected to utilize the bypass. It is anticipated that truck traffic on the bypass will reach approximately 8% of total traffic, while truck traffic on existing SR 156 will not exceed 3-4% of total traffic. Keeping the industrial related truck traffic away from the heart of New Hope will help to minimize community impacts. It would also provide a better quality of roadway and safer driving conditions for truck drivers.

The traffic crash rate on SR 156 for 2003-2005 is below the statewide average; however there have been 3 incapacitating injury crashes and 1 fatal crash within that period of time. The incapacitating injury crashes as well as the fatal crash occurred in the vicinity of a horizontal curve. With Option B, traffic volumes on the existing SR 156 would grow at a much lower rate (anticipated 2032 AADT is approximately 4,500) than with the No Build option or Option C (2032 AADT of 19,500). With only modest increases in traffic on existing SR 156, the crash rate would likely remain stable or increase only slightly. Fewer crashes are anticipated for the new bypass alignment because it would be constructed with modern design standards that yield better safety performance than is typically seen on older roadways like existing SR 156.

*Disposition of Existing Route*

Approximately 4.2 miles of this option would be on new location. Any portions of the existing SR 156 not utilized in the completion of this project would be removed from the State Highway System and would become the responsibility of local county and/or city government.

## 6.2 Spot Improvements

### Build Option C

*Concept:*

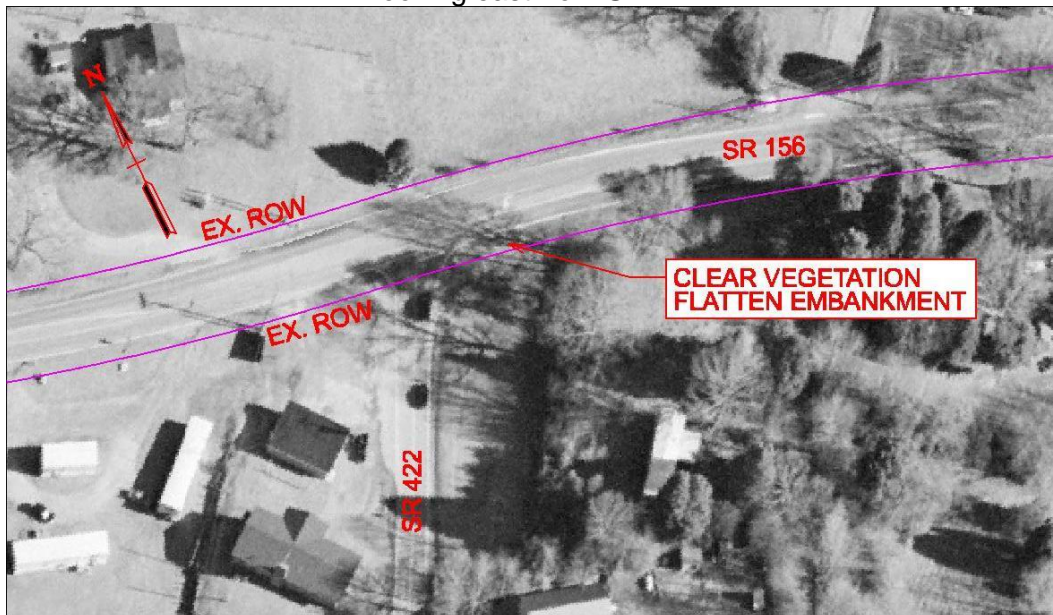
Construct spot improvements to the existing SR 156 from east of the Tennessee River Bridge to west of SR 377. Spot improvements are described by location in the following paragraphs.

#### Intersection of SR 156 and SR 422 (log mile 16.28)

The sight distance at the intersection of SR 156 and SR 422 is limited for vehicles turning westbound. Intersection advanced warning signs should be placed along SR 156 westbound. Clearing of the vegetation and flattening of the adjacent southern roadway embankment in the right-of-way is recommended.



Looking east from SR 422



Recommendation for intersection of SR 156 and SR 422

Vertical Curve at Log Mile 16.68

The vertical curve in this area is deficient. While there are no side road intersections in this area, there are several driveways on either side of the vertical curve. Sight distance to and from these driveways is restricted by the deficient curve. Flattening of the vertical curve is recommended, with advanced warning signs, such as "Hill Blocks View," placed on either side of the curve until the curve can be corrected. Right-of-way would be required from the adjacent properties with a possible impact to an existing structure. If existing septic systems are located within the proposed right-of-way without an option for relocating to another portion of the affected property, right-of-way costs may significantly increase. Sewer, water, gas, and electric utilities would be impacted as well.



Log Mile 16.68, looking east



Log Mile 16.68, looking west

Intersection of SR 156 and Mail Loop Road East (Log Mile 17.09)

Intersection sight distance looking to the west from Mail Loop Road East is severely impaired by the vegetation and northern embankment of the adjacent yard. In addition, the horizontal and vertical curves at this location are deficient. Realignment to the north for a distance of approximately 600 feet would improve the sight distance and allow this area to conform to design standards. Right-of-way would be required from the properties to the north with possible impact to an existing structure. If existing septic systems are located within the proposed right-of-way without an option for relocating to another portion of the affected property, right-of-way costs may significantly increase. Sewer and electric utilities would be impacted as well.



Looking west from Mail Loop Road East



Horizontal curve at Mail Loop Road East, looking west



Horizontal curve at Mail Loop Road East, looking east

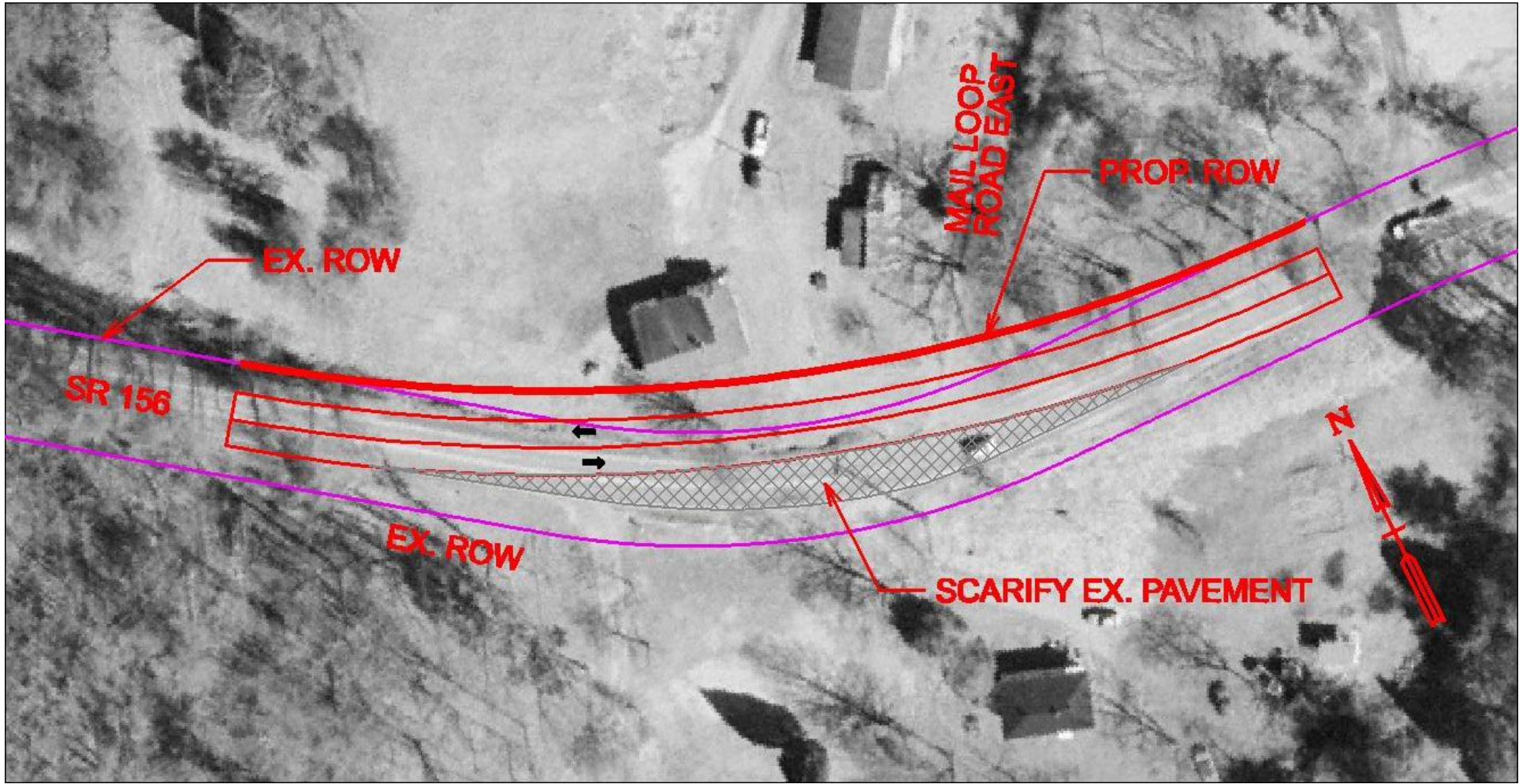


Vertical curve at Mail Loop Road East, looking west





Vertical curve at Mail Loop Road East, looking east



Recommendation for intersection of SR 156 and Mail Loop Road East

Intersection of SR 156 and Crystal Lane (Log Mile 17.17)

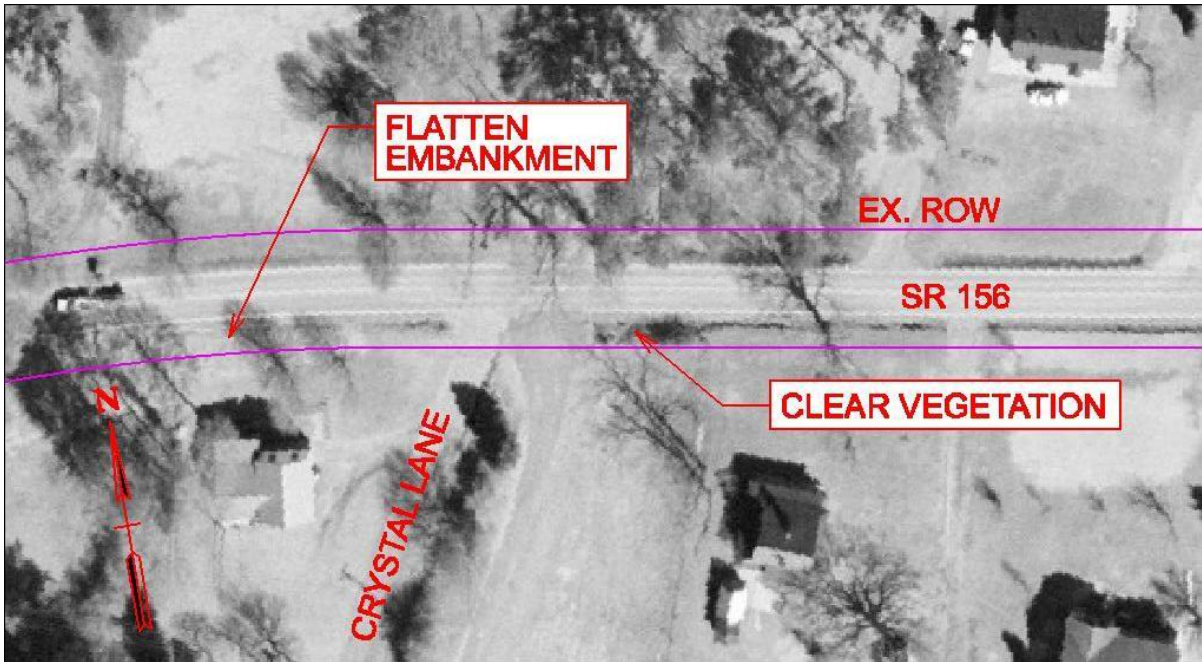
The intersection of Crystal Lane and SR 156 has limited sight distance in both directions. The southern embankment of the adjacent yard blocks the view to the west. To the east, there is vegetation obstructing the view. Clearing of the vegetation and flattening of the adjacent embankment in the ROW is recommended.



Looking west from Crystal Lane



Looking east from Crystal Lane



Recommendation for intersection of SR 156 and Crystal Lane

Horizontal Curve at Log Mile 17.33

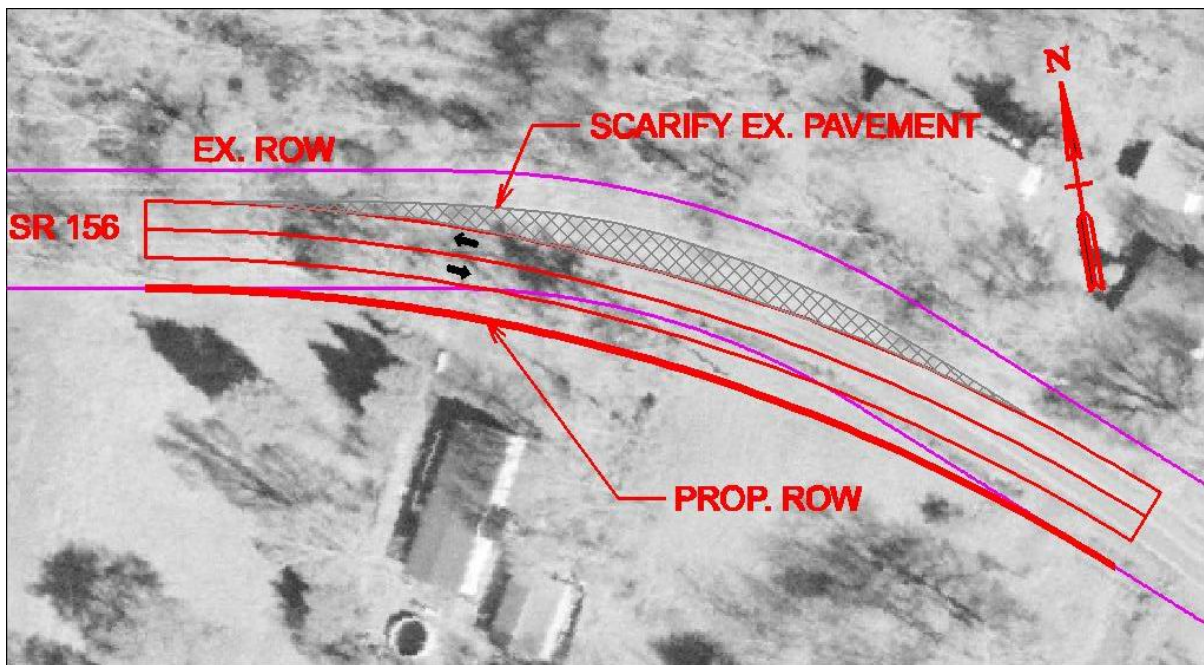
The horizontal curve is deficient in this area. The New Hope Volunteer Fire Department is just east of the curve's point of tangency. The curve results in a stopping sight distance deficiency for cars traveling eastbound on SR 156 who may encounter traffic entering or exiting the Fire Department driveway. Realignment to the south for a distance of approximately 600 feet would improve the curve to design standards and provide adequate sight distance in either direction. Right-of-way would be required of the properties to the south and if existing septic systems are located within the proposed right-of-way without an option for relocating to another portion of the affected property, right-of-way costs may significantly increase. Water and gas utilities would be impacted as well.



Horizontal curve at Log Mile 17.33, looking east



Horizontal curve at Log Mile 17.33, looking west



Recommendation for Horizontal Curve at Log Mile 17.33

Intersections of SR 156 and Campbell Road West and Campbell Road East (Log Mile 17.48 – 17.60) and Curves at Log Mile 17.62 – 17.68

Intersection sight distance looking to the east from Campbell Road West is severely impaired. Campbell Road West is not maintained by Marion County and serves as additional access to Antioch Church. The sight distance for Campbell Road East is also impaired looking to the west. The geometry in this area is deficient vertically and horizontally. The horizontal curves at Log Mile 17.62 and Log Mile 17.68 are deficient.

The recommendation for this location is a realigned two lane section constructed to the south which removes the substandard curves. Roadway geometrics will improve for SR 156 and sight distance will improve for Campbell Road. Pine Grove Road should be realigned for improved sight distance.

Extensive right-of-way would be required of the properties to the south with possible impacts to an existing structure. If existing septic systems are located within the proposed right-of-way without an option for relocating to another portion of the affected property, right-of-way costs may increase significantly. Water, gas, and electric utilities would be impacted as well.



Looking east from Campbell Road West



Looking west from Campbell Road East

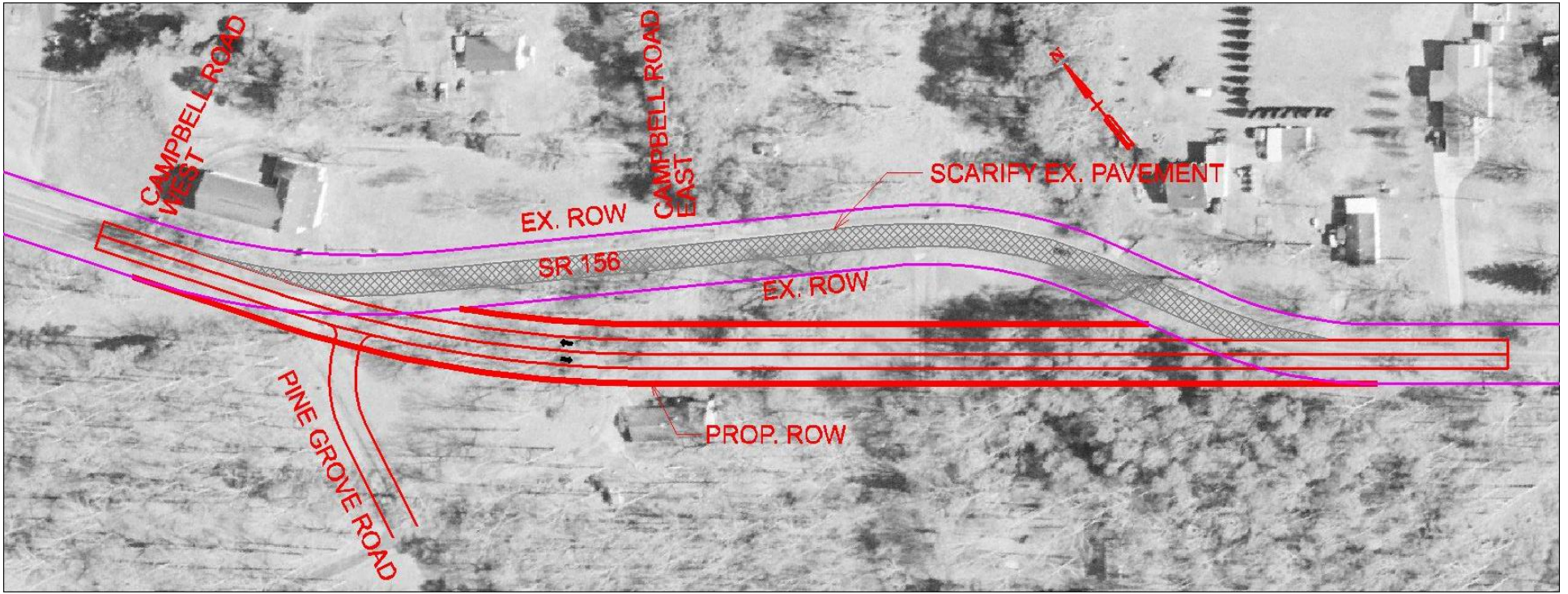


Horizontal curve at Log Mile 17.62, looking east



Horizontal curve at Log Mile 17.78, looking east





Recommendation for intersection of SR 156 with Campbell Road West and East and Curves at Log Miles 17.62 & 17.68

Vicinity of SR 156 and Griffin Lane (Log Mile 17.98)

The vertical curve in this area is deficient and restricts sight distance to and from Griffin Lane. In addition to the side road intersection, there are several driveways on either side of the vertical curve that have limited sight distance due to the deficient curve. Flattening of the vertical curve is recommended, with advanced warning signs, such as “Hill Blocks View,” placed on either side of the curve until the curve can be corrected. Right-of-way would be required from the adjacent properties with possible impacts to existing structures. If existing septic systems are located within the proposed right-of-way without an option for relocating to another portion of the affected property, right-of-way costs may significantly increase. Sewer, water, gas, and electric utilities would be impacted as well.



Vertical curve at Griffin Lane, looking east



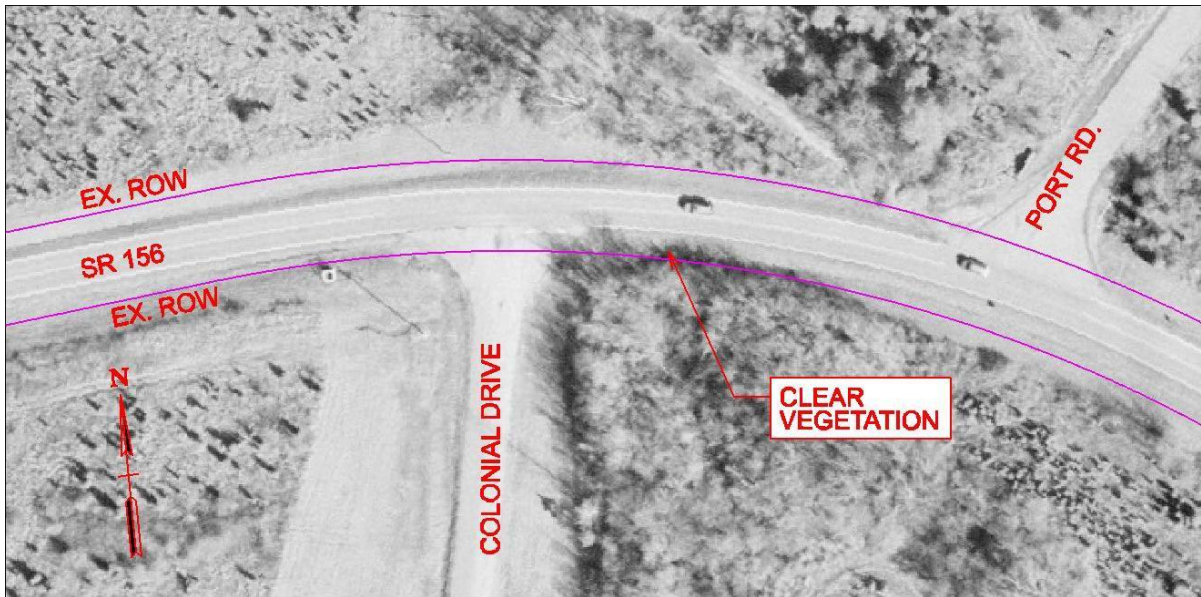
Vertical curve at Griffin Lane, looking west

Intersection of SR 156 and Colonial Drive (Log Mile 18.57)

Intersection sight distance looking from Colonial Drive to the east is impaired by vegetation. Clearing of the vegetation in the right-of-way is recommended.



Looking east from Colonial Drive



Recommendation for intersection of SR 156 and Colonial Drive

CSX Railroad Grade Crossing (Log Mile 18.75) and Curve at Log Mile 18.95

The vertical geometry of SR 156 is deficient at the CSX Railroad grade crossing. In addition the horizontal and vertical curves at log mile 18.95 are deficient. Realigning the horizontal and vertical curves to the north would improve safety and sight distance in this area. With horizontal realignment, the westbound traffic would have improved sight distance to the CSX railroad crossing. Realignment of the vertical curve would improve the grade crossing by raising the westbound approach to the railroad, but would not affect the rails themselves. Additional advanced warning signs are also recommended in this area.

Extensive right-of-way would be required of the properties to the north to construct the recommended improvements; however no structures would be impacted. Electric utilities would be minimally impacted.



CSX Railroad, looking east



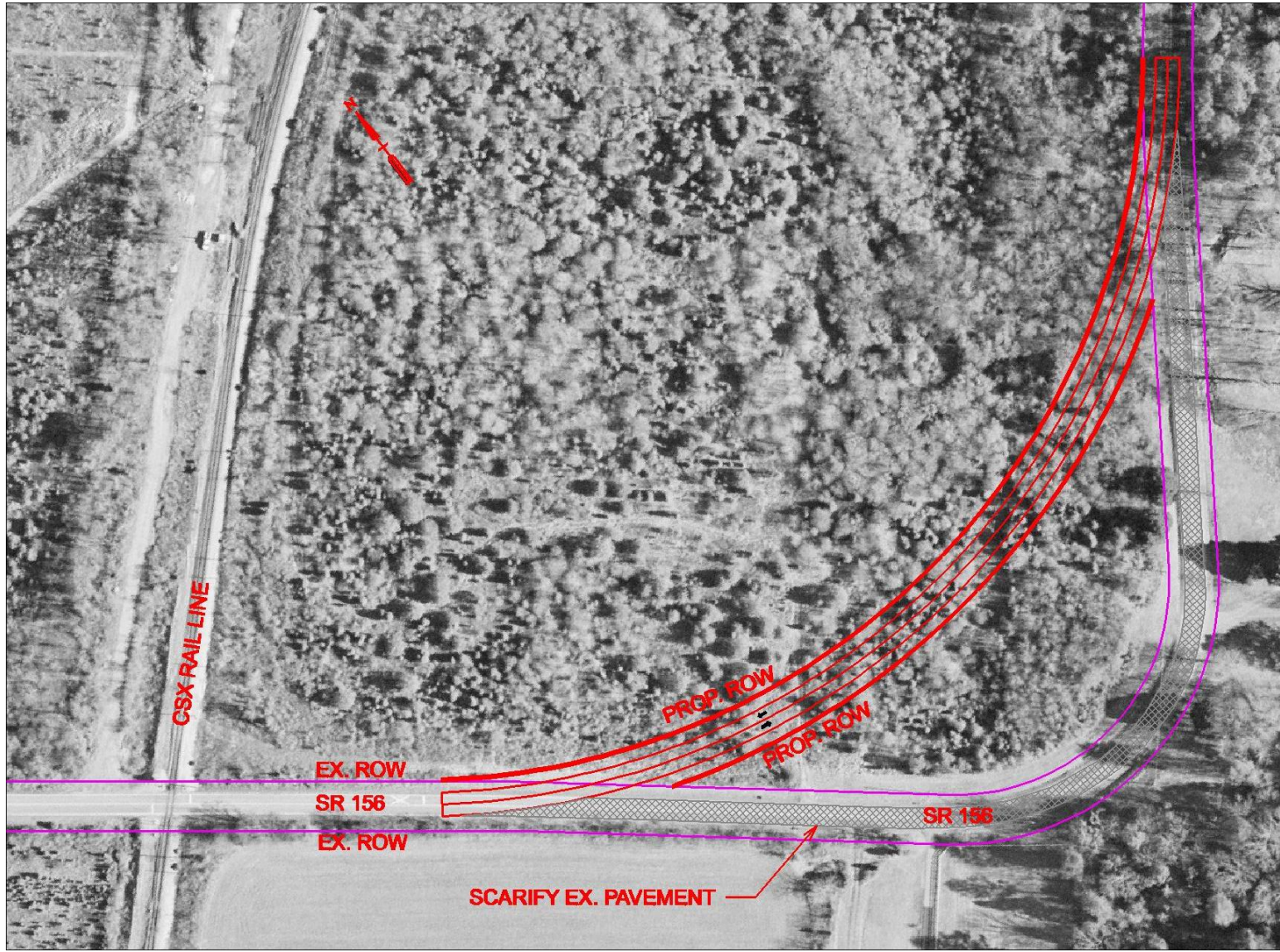
CSX Railroad, looking west



Curve at LM 18.95, looking east



Curve at LM 18.95, looking west



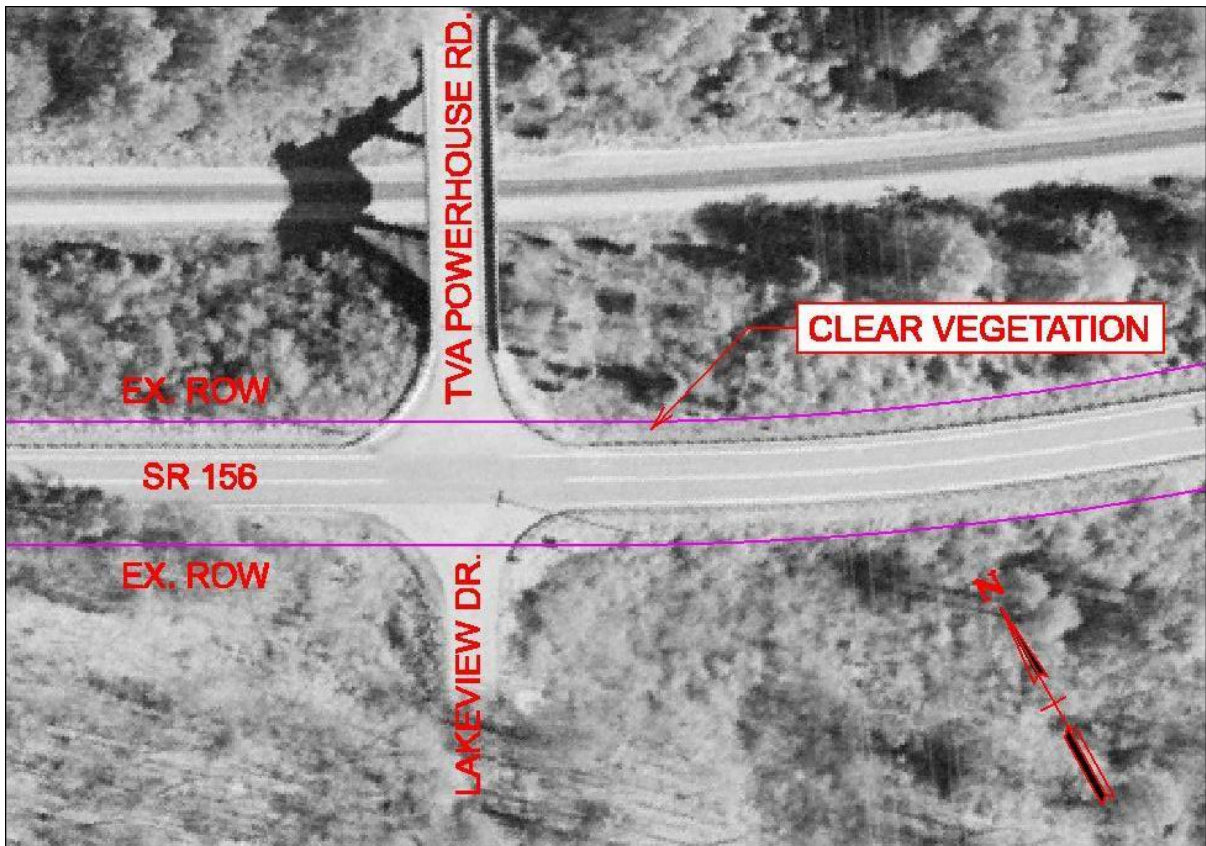
Recommendation for CSX Railroad Grade Crossing and Curve at Log Mile 18.95

Intersection of SR 156 and TVA Powerhouse Road (Log Mile 19.79)

Intersection sight distance looking to the east from TVA Powerhouse Road is impaired by vegetation. The existing vegetation should be cleared from within the right-of-way to improve the intersection sight distance. Perhaps coordination with TVA can provide additional clearing, if necessary.



TVA Powerhouse Road, looking east



Recommendation for intersection of SR 156 and TVA Powerhouse Road

**Operational Performance:**

Figure 9 in the Appendix illustrates the annual average daily traffic volumes on the Option C roadway network in 2012 and 2032. These volumes are the same as those forecasts for the No Build option. SR 156 volumes are forecasted to reach 19,530 vehicles per day by the year 2032, causing traffic operations on the roadway to decline to an unacceptable level of service E even with spot improvements. In the near-term horizon (2012), the volume of traffic on SR 156 is anticipated to reach approximately 9,000 vehicles per day, a volume that can be accommodated at an acceptable level of D. While the spot improvements proposed for Option C yield no measurable increase in level of service for traffic operations, it is likely that travel speed through the corridor would be increased as the severe horizontal and vertical curves are improved.

Future industrial development at the NPIP will produce additional truck traffic on SR 156. As a percent of total traffic, it is anticipated that truck traffic will range from 6-7%. Existing truck traffic on SR 156 ranges from 3-7% of the total volume in 2007. While these percentages seem to be fairly consistent from existing to future conditions, the total volume of traffic is significantly increased and so will the number of trucks. This increase in number of trucks on SR 156 would impact quality of life in the New Hope community and could have impacts to safety on the highway as higher volumes of traffic and a greater mix of heavy vehicles use the facility. Option C may be a consideration until occupancy of the industrial park warrants improved traffic operations.

As noted previously, the traffic crash rate on SR 156 for 2003-2005 is below the statewide average; however there have been 3 incapacitating injury crashes and 1 fatal crash within that period of time. The incapacitating injury crashes as well as the fatal crash occurred in the vicinity of a horizontal curve. Implementing spot improvements to correct horizontal and vertical curvature would likely yield some improvement in the crash rate if traffic volumes were to remain constant or with only modest growth. However, there is a possibility that the safety gains achieved through spot improvements would be offset by the increase in traffic anticipated on SR 156 with Option C.



### **6.3 Environmental Impacts**

There are no known threatened or endangered species within the study area. However, there is a colony of gray bats (*Myotis grisescens*) that nests in the Nickajack Cave, located approximately 0.5 mile from the nearest study area boundary. Nickajack Cave is a National Wildlife Refuge, co-managed by TVA and the Tennessee Wildlife Resources Agency. The gray bat is a Federally Endangered species (Federal Register, April 28, 1976). Further study is needed to determine whether or not the proposed options for SR 156 would have any impacts to the gray bat's habitat.

No studies have been conducted to identify whether there are any populations within the study area that would qualify for consideration under Title 6. In the 2000 Census, approximately 5.6% of Marion County's population was identified as non-white or of two or more races. Approximately 2.1% of the county's population speaks a language other than English in the home and approximately 14.1% were individuals living below poverty level. A detailed analysis will be needed to identify any environmental justice considerations.

There is forested land within the corridors defined for Options A and B.

Other environmental concerns specific to each considered option are as follows:

#### No Build

No specific environmental concerns are identified at this time for the No Build option.

#### Option A

The corridor for Option A encompasses ten blue line streams. Also, portions of Option A are in the 100 year flood zone of the Tennessee River. (See Figures 10 through 12 for approximate boundary of 100 year flood zone.) Option A crosses two areas of possible wetlands. This option has the potential to impact underground storage tanks (UST) of a prior gas station located along the existing route near SR 422 and identified on Figure 10. A detailed environmental study and concept plan for improvements would be needed to assess the UST impacts of construction.

#### Option B

The corridor for Option B encompasses ten blue line streams. Also, a portion of Option B is in the 100 year flood zone of the Tennessee River. (See Figure 10 for approximate boundary of 100 year flood zone.)

#### Option C

Existing SR 156 crosses one blue line stream near the spot improvement of the vertical curve at log mile 16.68. New Hope City Park, located on the north side of SR 156 at LM 17.45, is near two possible spot improvements. The park is to be avoided.

### **6.4 Cultural Impacts**

There are no National Register historic sites within the study area. A historic survey was conducted in the study area approximately fifteen (15) years ago and no National Register eligible structures or properties were identified. An updated survey may be needed to determine the current eligibility status of structures or properties in the study area.

There are known archaeologically significant sites within the study area; the sites are located along the banks of the Tennessee River and will need to be further evaluated in

relation to the corridors. These sites were identified as part of various surveys conducted on or adjacent to the river banks. The interior section of the study area has not been investigated to date. An archaeological investigation will be needed to assess the potential presence of archaeological resources in each of the corridors.

Other potential cultural impacts specific to each considered option are as follows:

#### No Build

No specific cultural concerns are identified at this time for the No Build option.

#### Option A

The corridor for Option A includes Ford Cemetery near Mail Loop Road. If Option A is selected, the bypass alignment should be routed to avoid impacting the cemetery.

#### Option B

The corridor for Option B includes New Hope Church of God on Short Hollow Road, New Hope Cemetery near Pine Grove Road, and McDaniel Moore Cemetery east of the CSX Railroad. If Option B is selected, the bypass alignment should be routed to avoid impacting these sites.

#### Option C

Correction of the vertical curve at log mile 16.68 has the potential to impact Annex United Methodist Church. Correction of the horizontal curve at log mile 17.33 has the slight potential to impact the New Hope City Hall and Volunteer Fire Department. Care should be taken to avoid these properties if at all possible.

### **6.5 Structural Impacts**

Options A and B include new grade separated crossings for SR 156 at the CSX railroad. Each grade separation would require a new bridge structure.

Option C includes a proposed correction to the vertical and horizontal curves on SR 156 adjacent to the at-grade CSX railroad crossing. No impacts to the rails are anticipated.

The steel and concrete bridge crossing the Tennessee River would not be modified in any way as a result of any of the study options.

### **6.6 Cost Estimate**

Preliminary cost estimates were prepared for each build option based upon per mile costs. Costs for Options A and B were estimated assuming a new two lane highway with access management in rolling terrain. The cost estimate for these corridor options includes purchasing sufficient right-of-way for the typical section and relocating utilities at all local road crossings. The preliminary cost estimate for Option C's spot improvements is based upon per mile costs for reconstruction of the existing two lane highway with no access control in rolling terrain. The Option C cost estimate includes purchasing sufficient right-of-way to improve the existing roadway as warranted and relocating utilities. Table 9 summarizes the estimated cost for each improvement option.

**Table 9  
Comparison of Construction Cost Estimates**

| <b>Option</b> | <b>Number of New Lanes</b> | <b>Number of New Interchanges</b> | <b>Construction Cost</b> | <b>Length</b> | <b>Cost Per Lane Mile</b> |
|---------------|----------------------------|-----------------------------------|--------------------------|---------------|---------------------------|
| No Build      | 0                          | 0                                 | N/A                      | 5.1           | N/A                       |
| A*            | 2                          | 0                                 | \$23,931,072             | 4.0           | \$5,982,768               |
| B*            | 2                          | 0                                 | \$27,271,406             | 4.6           | \$5,928,567               |
| C             | 0                          | 0                                 | \$7,513,289              | 1.2           | \$6,261,074               |

\*Options A & B would eliminate an at-grade railroad crossing.

## **7.0 ASSESSMENT OF CORRIDOR OPTIONS**

The Tennessee Department of Transportation has adopted seven guiding principles against which all transportation projects are to be evaluated. These guiding principles address concerns for system management, mobility, economic growth, safety, community, environmental stewardship, and fiscal responsibility. These guiding principles are discussed in the following paragraphs as they relate to the options discussed in this report.

### **7.1 Preserve and Manage the Existing Transportation System**

Options A and B involve construction of a bypass of SR 156. By diverting traffic from the existing system, the new road can help preserve the service life of the existing SR 156. The proposed bypass will allow the current SR 156 to function with fewer impacts from development in and around the Nickajack Port Industrial Park (NPIP) than would otherwise be experienced.

If constructed, access to the bypass should be carefully managed with minimum spacing requirements and turn lanes for high volume driveways so that the functionality of the newly constructed roadway is preserved into the future.

### **7.2 Move a Growing, Diverse, and Active Population**

Industry is a primary concern of the New Hope/Marion County economy. As previously discussed, local and state officials are actively marketing the NPIP to attract new industry to the county. If additional industry is brought to the study area, passenger car and truck traffic will increase on SR 156 from additional employees and residents. The Build Options A and B would provide improved access and an alternate route to trucks whose origin or destination is associated with the NPIP. Accommodation of the industrial traffic on a bypass would result in less disruption to the mobility and safety of local motorists on existing SR 156. Option C would likely improve travel speeds on existing SR 156 as horizontal and vertical curves are improved, but would not yield any measurable increase in capacity or level of service. With Option C, there would be significant increases in congestion and truck traffic on existing SR 156.

### **7.3 Support the State's Economy**

As stated above, the NPIP is a prime location for new industrial development in Marion County where the current unemployment rate is 6.2%. Improved access increases the likelihood of attracting future tenants to the industrial park. With new industries many unemployed workers would have new opportunities for employment.

### **7.4 Maximize Safety and Security**

A traffic crash rate was calculated for SR 156 from crash data for the years 2003 through 2005. During that period a total of 26 crashes were reported on SR 156 between the Tennessee River and Interstate 24. Of the reported crashes, 12% (3 crashes) resulted in an incapacitating injury and 4% (1 crash) resulted in a fatality. Most of the injury crashes as well as the fatal crash occurred in the vicinity of a horizontal curve. The overall crash rate for this section of SR 156 is less than the statewide average.

Option C includes spot improvements to the existing SR 156 that could yield some improvement in safety performance if traffic volumes were to remain constant or with only moderate growth. However, there is a possibility that the safety gains achieved through spot improvements would be offset by the significant increase in traffic anticipated on SR 156 with Option C.

With Options A and B, traffic volumes on the existing SR 156 would grow at a much lower rate than with the No Build option or Option C. With only modest increases in traffic on SR 156, the crash rate would likely remain stable or increase only slightly. Better crash performance is anticipated for the new bypass alignment because it would be constructed with modern design standards that yield better safety performance than is typically seen on older roadways like SR 156.

### **7.5 Build Partnerships for Livable Communities**

Throughout the process of this study, TDOT staff and Sain Associates have coordinated with local leaders to identify their concerns and objectives. The study documentation includes correspondence between local officials and TDOT Commissioner Gerald Nicely requesting TDOT's assistance in improving access to the NPIP.

In keeping with the goals of TDOT's current Public Involvement Process, several meetings have been held for the local officials to coordinate the transportation needs of Marion County. This public involvement process will continue as mandated by the provisions of the National Environmental Policy Act (NEPA).

It is noted the build options (Options A, B, and C) will have a greater impact on residential communities and agricultural and industrial lands than the No Build Option. The impacts can be minimized to ensure all transportation and community needs are met.

### **7.6 Promote Stewardship of the Environment**

A detailed environmental study is needed to fully address the impacts of each considered option. Table 11, located in the Summary (Section 8) of this report, summarizes the environmental considerations for each option based upon information of record. Reasonable efforts should be made to minimize impacts to natural and cultural resources.

### **7.7 Promote Financial Responsibility**

This Transportation Planning Report (TPR) is prepared in accordance with the Goals and Objectives set forth in Tennessee's Long Range Transportation Plan (LRTP).

In achieving the LRTP's goal of providing responsibility, accountability, and sustainability in the expenditure of transportation funds, this planning document includes the projects' estimated cost. These cost estimates are important decision tools when evaluating and maximizing the use of available Transportation resources.

Furthermore, the historic, existing, and projected project data documented in the TPR is instrumental in achieving the LRTP's objective of selecting and programming transportation projects based on regional needs and effectiveness.

Preliminary construction cost estimates were prepared for each considered option based upon typical per mile costs. Table 9 summarizes the construction cost estimates for all options. According to the preliminary estimates, Option B is the costliest option with 4.6 miles of new two-lane roadway at an approximate cost of \$27,271,406. The estimate for Option A is 4.0 miles of new two-lane roadway at an approximate cost of \$23,931,072. The estimated cost for Option C spot improvements is \$7,513,289. It should be noted that Options A and B include elimination of the at-grade CSX railroad crossing.

## 8.0 SUMMARY

### Purpose and Need

The primary purpose and need for improvement to SR 156 is to provide improved vehicular access to the Nickajack Port Industrial Park (NPIP) and mitigate the impact of future increased truck traffic on the adjacent community. Development of industrial sites at the NPIP would increase car and truck traffic on SR 156, resulting in noticeable impacts to the community of New Hope. Not only is improved transportation accommodation necessary to support development at the NPIP, it is also needed to minimize the negative impacts of increased roadway traffic on SR 156 in the surrounding community. Options for providing the needed transportation improvement include:

- construction of a bypass to relocate existing SR 156 and keep traffic associated with industrial development away from the New Hope community
- improve existing SR 156 with spot improvements where the existing horizontal and/or vertical alignment is inadequate to serve increased traffic.

The following options and potential benefits are considered:

### No Build Option

- Make no physical changes to the existing transportation infrastructure

### Option A:

- Construct a bypass on new location north of existing SR 156 that can better serve existing and future industrial traffic as well as through traffic
- Increase overall vehicular carrying capacity on the roadway network between the Tennessee River and SR 377
- Improve access for trucks traveling between I-24 and the NPIP
- Restrict truck traffic along the existing SR 156 in the New Hope community to local deliveries only
- Convert existing SR 156 to a local road to continue serving adjacent properties in New Hope

### Option B:

- Construct a bypass on new location south of existing SR 156 that can better serve existing and future industrial traffic as well as through traffic
- Increase overall vehicular carrying capacity on the roadway network between the Tennessee River and SR 377
- Improve access for trucks traveling between I-24 and the NPIP
- Restrict truck traffic along the existing SR 156 in the New Hope community to local deliveries only
- Convert existing SR 156 to a local road to continue serving adjacent properties in New Hope

### Option C:

- Construct spot improvements along existing SR 156 to improve horizontal and/or vertical curvature and intersection sight distance
- Improve access for trucks traveling between I-24 and the NPIP with improved curvature
- Likely improve travel speeds on SR 156 as horizontal and vertical curves are improved
- Improve safety, maneuverability, and driver comfort
- Consider until occupancy of the industrial park warrants improved traffic operations

## **Summary Tables**

### Comparison of Projected Operational Performance and Costs

The operational performance of each option was evaluated using the Highway Capacity Software and traffic projections for horizon years 2012 and 2032. Table 10 summarizes the level of service (LOS), volume/capacity ratio, and percentage of truck traffic computed for each option and horizon year. All options perform well in the 2012 horizon year. Results for horizon year 2032 indicate that Options A and B yield better traffic operations than the No Build Option and Option C. Preliminary cost estimates are also included in the summary on Table 10. Option B is estimated to be the costliest of the considered options based on these preliminary estimates.

### Comparison of Environmental Impacts

Table 11 summarizes the environmental considerations for each option based upon information of record. It should be noted the items listed on Table 5 are located within the identified corridors but may not necessarily be impacted. A detailed environmental study is needed to fully address the impacts of each considered option.

**Table 10  
Performance Measure Comparison  
2012 & 2032**

| <b>Performance Measure</b> | <b>Location</b>                     | <b>No Build 2012</b>         | <b>Option A 2012</b> | <b>Option B 2012</b> | <b>Option C 2012</b> | <b>No Build 2032</b> | <b>Option A 2032</b> | <b>Option B 2032</b> | <b>Option C 2032</b> |
|----------------------------|-------------------------------------|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| LOS                        | SR 156 from Tenn River to SR 422    | D                            | D                    | D                    | D                    | E                    | E                    | E                    | E                    |
| LOS                        | SR 156 bypass from SR 422 to NPIP   | -                            | C                    | C                    | -                    | -                    | D                    | D                    | -                    |
| LOS                        | Existing SR 156 from SR 422 to NPIP | D                            | C                    | C                    | D                    | E                    | C                    | C                    | E                    |
| LOS                        | SR 156 from NPIP to SR 377          | C                            | C                    | C                    | C                    | D                    | D                    | D                    | D                    |
| V/C Ratio                  | SR 156 from Tenn River to SR 422    | 0.34                         | 0.34                 | 0.34                 | 0.34                 | 0.64                 | 0.64                 | 0.64                 | 0.64                 |
| V/C Ratio                  | SR 156 bypass from SR 422 to NPIP   | -                            | 0.23                 | 0.23                 | -                    | -                    | 0.56                 | 0.56                 | -                    |
| V/C Ratio                  | Existing SR 156 from SR 422 to NPIP | 0.37                         | 0.18                 | 0.18                 | 0.37                 | 0.73                 | 0.18                 | 0.18                 | 0.73                 |
| V/C Ratio                  | SR 156 from NPIP to SR 377          | 0.17                         | 0.17                 | 0.17                 | 0.17                 | 0.34                 | 0.34                 | 0.34                 | 0.34                 |
| Truck %                    | SR 156 from Tenn River to SR 422    | 6%                           | 6%                   | 6%                   | 6%                   | 6%                   | 6%                   | 6%                   | 6%                   |
| Truck %                    | SR 156 bypass from SR 422 to NPIP   | -                            | 8%                   | 8%                   | -                    | -                    | 8%                   | 8%                   | -                    |
| Truck %                    | Existing SR 156 from SR 422 to NPIP | 6-7%                         | 3-4%                 | 3-4%                 | 6-7%                 | 6-7%                 | 3-4%                 | 3-4%                 | 6-7%                 |
| Truck %                    | SR 156 from NPIP to SR 377          | 6%                           | 6-7%                 | 6-7%                 | 6%                   | 6%                   | 6-7%                 | 6-7%                 | 6%                   |
| Construction Cost          | SR 156 from Tenn River to SR 377    | \$0                          | \$23,931,072         | \$27,271,406         | \$7,513,289          |                      |                      |                      |                      |
| Approximate Length         | SR 156 from Tenn River to SR 377    | 5.1 miles from SR 27 (US 72) | 4.0 miles            | 4.6 miles            | 1.2 miles            |                      |                      |                      |                      |



**Table 11  
Comparison of Environmental Considerations**

| <b>Option</b> | <b>UST</b> | <b>Streams</b> | <b>Wetlands</b> | <b>Archaeological Sites</b> | <b>Residential</b> | <b>Cemetery</b> | <b>Church</b> | <b>Public Building</b> |
|---------------|------------|----------------|-----------------|-----------------------------|--------------------|-----------------|---------------|------------------------|
| No Build      | 0          | 0              | 0               | 0                           | 0                  | 0               | 0             | 0                      |
| A             | 1          | 10             | 2               | 5                           | 80                 | 1               | 0             | 0                      |
| B             | 0          | 10             | 0               | 4                           | 80                 | 2               | 1             | 0                      |
| C             | 0          | 1              | 0               | 0                           | 3                  | 0               | 1             | 1                      |

\* UST = Underground Storage Tanks

(The above table is based on a preliminary environmental screening process performed by Sain Associates; detailed technical studies will be needed.)

## **Advantages/Disadvantages of Each Option**

Following are items that summarize the performance or issues associated with each option:

### No Build:

- Does not require additional right-of-way
- Does not meet the purpose and need for improved access to NPIP
- Does not reduce projected truck traffic in the New Hope community along SR 156
- Would likely result in an increase in traffic crashes as traffic volumes increase along SR 156 with no improvement in horizontal and vertical curvature
- Creates no additional environmental impacts
- Results in deficient traffic operations by the year 2032 (LOS E)
- Does not add approximately 4.0 to approximately 4.7 miles of roadway maintenance to local highway department

### Option A:

- Improves access for trucks traveling between I-24 and the NPIP
- Reduces truck traffic along the existing SR 156 in the New Hope community
- Yields acceptable traffic operations through 2032 on both the new bypass (LOS D) and existing SR 156 (LOS C)
- Does not improve roadway conditions (curvature, shoulders, etc) on existing SR 156, but does minimize growth in traffic which could otherwise contribute to an increase in crashes
- Requires a significant amount of right-of-way
- Has a higher potential for environmental impacts than No Build and Option C
- Adds approximately 4.0 miles of roadway maintenance to local highway department

### Option B:

- Improves access for trucks traveling between I-24 and the NPIP
- Reduces truck traffic along the existing SR 156 in the New Hope community
- Yields acceptable traffic operations through 2032 on both the new bypass (LOS D) and existing SR 156 (LOS C)
- Does not improve roadway conditions (curvature, shoulders, etc) on existing SR 156, but does minimize growth in traffic which could otherwise contribute to an increase in crashes
- Requires a significant amount of right-of-way
- Has a higher potential for environmental impacts than No Build and Option C
- Adds approximately 4.7 miles of roadway maintenance to local highway department

### Option C:

- Provides slightly improved access for trucks traveling between I-24 and the NPIP through spot improvements on SR 156
- Improves roadway safety, maneuverability, and driver comfort for all motorists traveling SR 156, but may not yield any improvement in crash rate due to increases in traffic volumes
- Requires minimal amount of additional right-of-way
- Does not reduce future increased truck traffic in the New Hope community along SR 156
- Has a lower potential for environmental impacts than Option A and Option B
- Results in deficient traffic operations by the year 2032 (LOS E)
- Likely improve travel speeds on SR 156 as horizontal and vertical curves are improved

- Consideration until occupancy of the industrial park warrants improved traffic operations

### **Summary Based on Purpose and Need**

SR 156 is a two-lane rural major collector that extends in a west/east orientation across Marion County. Within the study area, SR 156 provides access to SR 27 (US 72) on the west side of the Tennessee River and to Interstate 24 to the east. Existing (2007) average daily traffic volumes on SR 156 are low, ranging from 3,930 near the Tennessee River Bridge to 1,730 between SR 422 and SR 377. Existing truck traffic varies from approximately 3% of total traffic near the Tennessee River to approximately 7% of total traffic between SR 422 and SR 377.

A traffic crash rate was calculated for SR 156 from crash data for the years 2003 through 2005. During that period a total of 26 crashes were reported on SR 156 between the Tennessee River and Interstate 24. Of the reported crashes, 12% (3 crashes) resulted in an incapacitating injury and 4% (1 crash) resulted in a fatality. All of the incapacitating injury and fatal crashes occurred in the vicinity of a horizontal curve. The overall crash rate for this section of SR 156 is less than the statewide average.

The primary purpose and need for improvement to SR 156 is to promote enhanced economic development through better vehicular access to the Nickajack Port Industrial Park (NPIP) while minimizing the impact of increased traffic on the adjacent community. Development of the NPIP will support economic growth in New Hope and Marion County. With no roadway improvements, growth in traffic on SR 156 will noticeably impact traffic operations and safety.

Options A and B provide the most potential for operational and safety benefit to the study area. Both of the options, however, appear to have a greater potential for environmental impacts. Additional studies are needed to quantify the level of potential impact and possible mitigation measures. Option C is a lower cost option than A or B and could improve the attractiveness of the industrial development area, but would not provide any additional traffic capacity to the study area.

## **APPENDIX**

Field Review Attendance List and Minutes

Traffic Schematics

Cost Estimates

    Spot Improvements

    Segment Improvements

Aerial Photography / USGS Mapping

Typical / Conceptual Cross Sections



# sain associates

120 South First Street Pulaski, Tennessee 38478

## MEETING MINUTES

|                                   |               |                    |                            |
|-----------------------------------|---------------|--------------------|----------------------------|
| PROJECT: SR 156 MARION COUNTY TPR |               | PROJECT #: 07-0463 |                            |
| TITLE: STAKEHOLDERS' SITE VISIT   |               | REVISION #:<br>1   | REVISION DATE:<br>02/05/08 |
| LOCATION: MARION COUNTY           | PREPARER: ADH |                    |                            |
| PROJECT MANAGER: RICHARD HOLT     | DATE: 1/31/08 | PAGE: 1 OF 1       |                            |

|  |                           |
|--|---------------------------|
| MEETING DESCRIPTION: Stakeholders' Site Visit                    | MEETING DATE:<br>1/30/08  |
| MEETING LOCATION: Project Site and Stevarinos in South Pittsburg | MEETING TIME:<br>10:00 AM |
| ATTENDEES: See attached for a list of attendees.                 |                           |

The purpose of this meeting was to assemble all stakeholders for a site visit and further discussion of the project and TPR process.

### GENERAL DISCUSSIONS

- Richard Holt with Sain Associates gave an overview of the project and introductions were made by all attendees.
- Mayor Moss thanked the attendees and gave an update on the potential industrial park tenant, CBI.
- According to Leigh Ann, the study must begin and end at logical termini. Beginning – US 72 & SR 156. End at SR 377.
- During the design, the proposed route must pass over or under the railroad; there can not be an at-grade crossing.
- Sewer is on the left side of the road and water and gas on right. Sewer and water are in the state right-of-way, but gas is in an easement.
- Richard Holt provided a review of the crash and traffic data.
- Mark Myers, the New Hope mayor, expressed a concern from the citizens along SR 156 about the increased traffic from CBI.
- Sain Associates next step is to fine tune the traffic analysis then draft the TPR.
- According to Gena Gilliam, the turn around time for a TPR is approximately one month.
- The next RPO meeting is March 13.
- Erin Curry will email Leigh Ann pictures of the route, particularly the termini.
- During and after lunch, Sain Associates had a roll plot of the aerial photography of SR 156. All stakeholders were invited to provide comments.
- Sain Associates needs to be sure to review the original APR of the area before drafting report.
- Jody Rollins with Marion Gas may be able to provide paper plans showing the water line locations. Jody did provide guidance on the locations of gas, sewer, and water on the aerial map.
- The number of trains using the tracks daily should be obtained for the report. (Rev. 02/05/08)

### INDUSTRIAL SITE

- One hundred acres of the industrial site are publicly held. There are 1200 acres of potentially usable land.
- CBI intends to construct a 350,000 square feet manufacturing facility with the possible capacity to employ 350 people.

P:\2007\070463\Sainfrastructure\Correspondence\013008 meeting minutes.doc

p (931) 424-0300

f (931) 424-0370

www.sain.com

- There may be a possible railroad spur for the industrial park.

#### **ENVIRONMENTAL**

- Leigh Ann Tribble with FHWA discussed the importance of NEPA, the environmental document, which is the next step after the TPR approval.
- There may be a barn of historical interest along the route, but otherwise Leigh Ann did not notice any potential historic structures.
- Erin Curry provided an overview of her environmental research to date.
- Scott Medlin said to be sure to show any blue line streams.
- Approximate flood plain should be identified on maps provided in TPR.
- Leigh Ann Tribble provided Erin Curry with a TDOT contact for wetlands research. Dee Dee Kathman, 615-253-2472.
- Potential hazardous waste sites were identified by John Graham and Jody Rollins.
- A cemetery was identified in the curve just beyond the railroad tracks.
- The one hazardous waste site identified on EnviroMapper, Flexi-Dyne, is evidently an error, as no such business has ever existed on Graham Home Place Road.
- Leigh Ann Tribble mentioned the City Park property should be avoided as it is a Section 4(f) property. (Rev. 02/05/08)

Attachments: Attendance List

cc: Gena Gilliam  
Becky White  
File





Option A

**Option A  
ROW, Construction, & PE Cost**

| STATE ROUTES      | Base Cost/mile | Area Factor | Terrain Factor | Construction Factor | PE % | Length |                   |
|-------------------|----------------|-------------|----------------|---------------------|------|--------|-------------------|
| ROW               | \$845,000      | 1.00        |                |                     |      | 4      | \$3,380,000       |
| CON               | \$2,684,000    |             | 1.30           | 1.00                |      | 4      | \$13,956,800      |
| PE                |                |             |                |                     | 10%  |        | \$1,395,680       |
| <b>Total Cost</b> |                |             |                |                     |      |        | <b>18,732,480</b> |

| Utility Cost                 | feet relocated @ each crossing | Total feet to relocated |
|------------------------------|--------------------------------|-------------------------|
| Roads Crossed                | 8                              | 1600                    |
| #poles/200'                  | 2                              | 16                      |
|                              | \$/ft                          |                         |
| Water                        | \$ 17.00                       | \$ 27,200.00            |
| Gas                          | \$ 22.00                       | \$ 35,200.00            |
| UG Telephone                 | \$ 12.00                       | \$ 19,200.00            |
| Sewer                        | \$ 25.00                       | \$ 40,000.00            |
|                              | \$/pole                        |                         |
| Power                        | \$ 2,500.00                    | \$ 40,000.00            |
| Total Relocation Cost        |                                | \$ 161,600.00           |
| <b>Utility Cost Subtotal</b> | <b>30% Increase</b>            | <b>\$ 210,080.00</b>    |

Grade Separated Railroad Crossing **\$1,000,000.00**

**Current Cost** \$ 19,942,560.00  
 Inflation \$ 3,988,512.00  
**Total Cost** \$ 23,931,072.00

**Total Cost Per Mile** \$ 5,982,768.00



Option B

**Option B  
ROW, Construction, & PE Cost**

| STATE ROUTES      | Base Cost/mile | Area Factor | Terrain Factor | Construction Factor | PE % | Length |                   |
|-------------------|----------------|-------------|----------------|---------------------|------|--------|-------------------|
| ROW               | \$845,000      | 1.00        |                |                     |      | 4.6    | \$3,887,000       |
| CON               | \$2,684,000    |             | 1.30           | 1.00                |      | 4.6    | \$16,050,320      |
| PE                |                |             |                |                     | 10%  |        | \$1,605,032       |
| <b>Total Cost</b> |                |             |                |                     |      |        | <b>21,542,352</b> |

| Utility Cost                 | feet relocated @ each crossing | Total feet to relocated |
|------------------------------|--------------------------------|-------------------------|
| Roads Crossed                | 7                              | 1400                    |
| #poles/200'                  | 2                              | 14                      |
|                              | \$/ft                          |                         |
| Water                        | \$ 17.00                       | \$ 23,800.00            |
| Gas                          | \$ 22.00                       | \$ 30,800.00            |
| UG Telephone                 | \$ 12.00                       | \$ 16,800.00            |
| Sewer                        | \$ 25.00                       | \$ 35,000.00            |
|                              | \$/pole                        |                         |
| Power                        | \$ 2,500.00                    | \$ 35,000.00            |
| Total Relocation Cost        |                                | \$ 141,400.00           |
| <b>Utility Cost Subtotal</b> | <b>30% Increase</b>            | <b>\$ 183,820.00</b>    |

Grade Separated Railroad Crossing **\$1,000,000.00**

**Current Cost** \$ 22,726,172.00  
 Inflation \$ 4,545,234.40  
**Total Cost** \$ 27,271,406.40

**Total Cost Per Mile** \$ 5,928,566.61

Option C

Option C

**ROW, Construction, & PE Cost**

| STATE ROUTES         | Base Cost/mile | Area Factor | Terrain Factor | Construction Factor | PE % | Length |                  |
|----------------------|----------------|-------------|----------------|---------------------|------|--------|------------------|
| ROW                  | \$845,000      | 1.00        |                |                     |      | 1.2    | \$1,014,000      |
| CON                  | \$2,684,000    |             | 1.30           | 1.00                |      | 1.2    | \$4,187,040      |
| PE                   |                |             |                |                     | 10%  |        | \$418,704        |
| <b>Subtotal Cost</b> |                |             |                |                     |      |        | <b>5,619,744</b> |

**Utility Cost**

|                              |       |                     |                      |
|------------------------------|-------|---------------------|----------------------|
| Total Feet to Be Relocated   |       |                     | 6200                 |
|                              |       | \$/ft               |                      |
| Water                        | \$    | 14.00               | \$ 86,800.00         |
| Gas                          | \$    | 17.00               | \$ 105,400.00        |
| UG Telephone                 | \$    | 12.00               | \$ 74,400.00         |
| Sewer                        | \$    | 25.00               | \$ 155,000.00        |
|                              | poles | \$/pole             |                      |
| Power                        | 21    | \$ 2,500.00         | \$ 52,500.00         |
| Total Relocation Cost        |       |                     | \$ 474,100.00        |
| <b>Utility Cost Subtotal</b> |       | <b>30% Increase</b> | <b>\$ 616,330.00</b> |

|   |    |           |
|---|----|-----------|
| <b>Clearing and Embankment Flattening</b> | \$ | 20,000.00 |
| <b>Signing</b>                            | \$ | 5,000.00  |

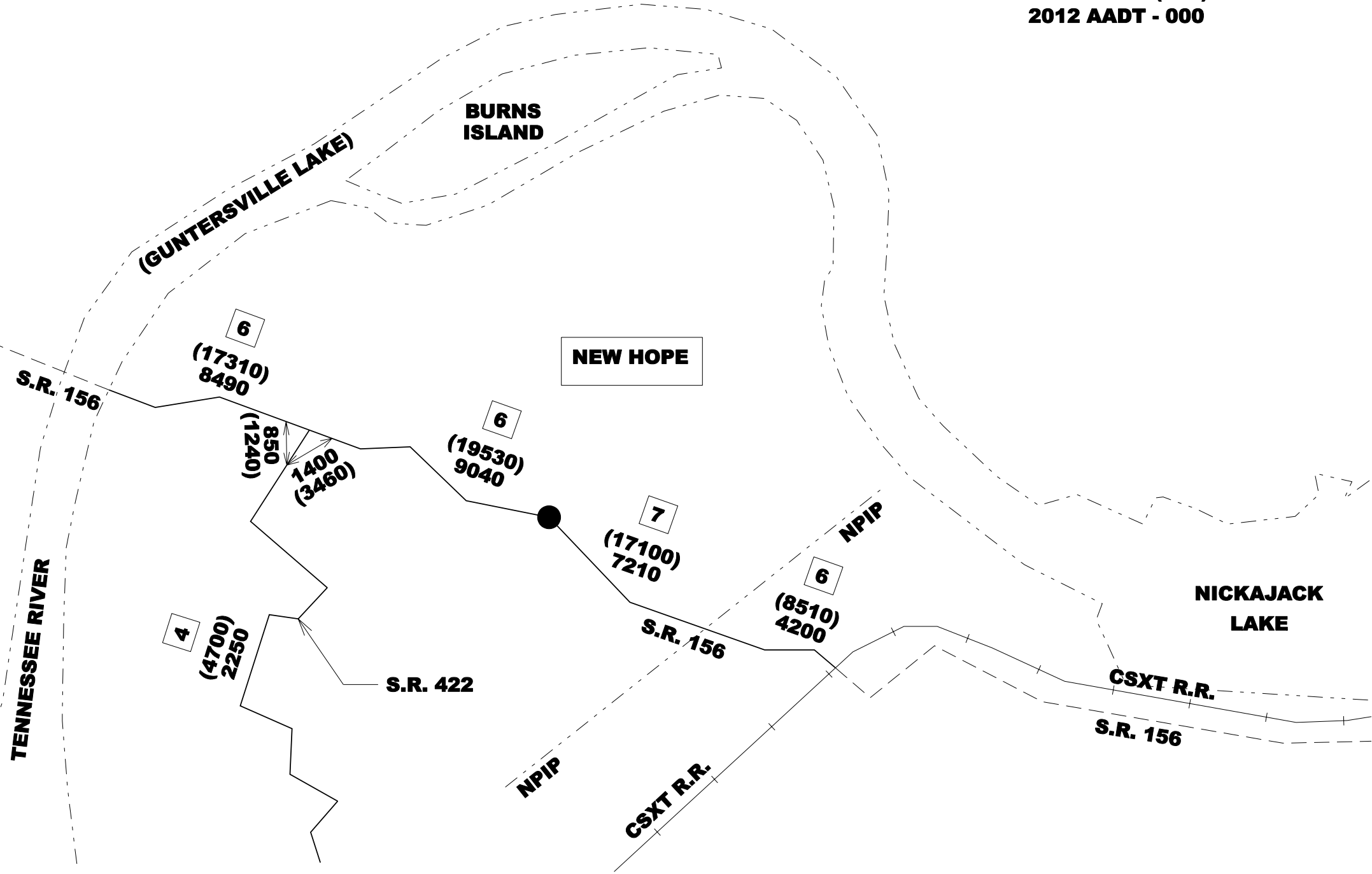
|                            |    |              |
|----------------------------|----|--------------|
| <b>Current Cost</b>        | \$ | 6,261,074.00 |
| Inflation                  | \$ | 1,252,214.80 |
| <b>Total Cost</b>          | \$ | 7,513,288.80 |
| <b>Total Cost Per Mile</b> | \$ | 6,261,074.00 |

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 60        |
|        |      |               |           |
|        |      |               |           |

FILE NO.



**LEGEND:**  
**AADT TRUCK % - 0**  
**2032 AADT -(000)**  
**2012 AADT - 000**



COORDINATE VALUES ARE NAD/83(1995)  
AND ARE DATUM ADJUSTED BY THE  
FACTOR 1.00 & TIED TO THE TGRN.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

**"NO BUILD"**  
**(EXISTING SYSTEM)**  
**AADT**

**FIGURE 6**

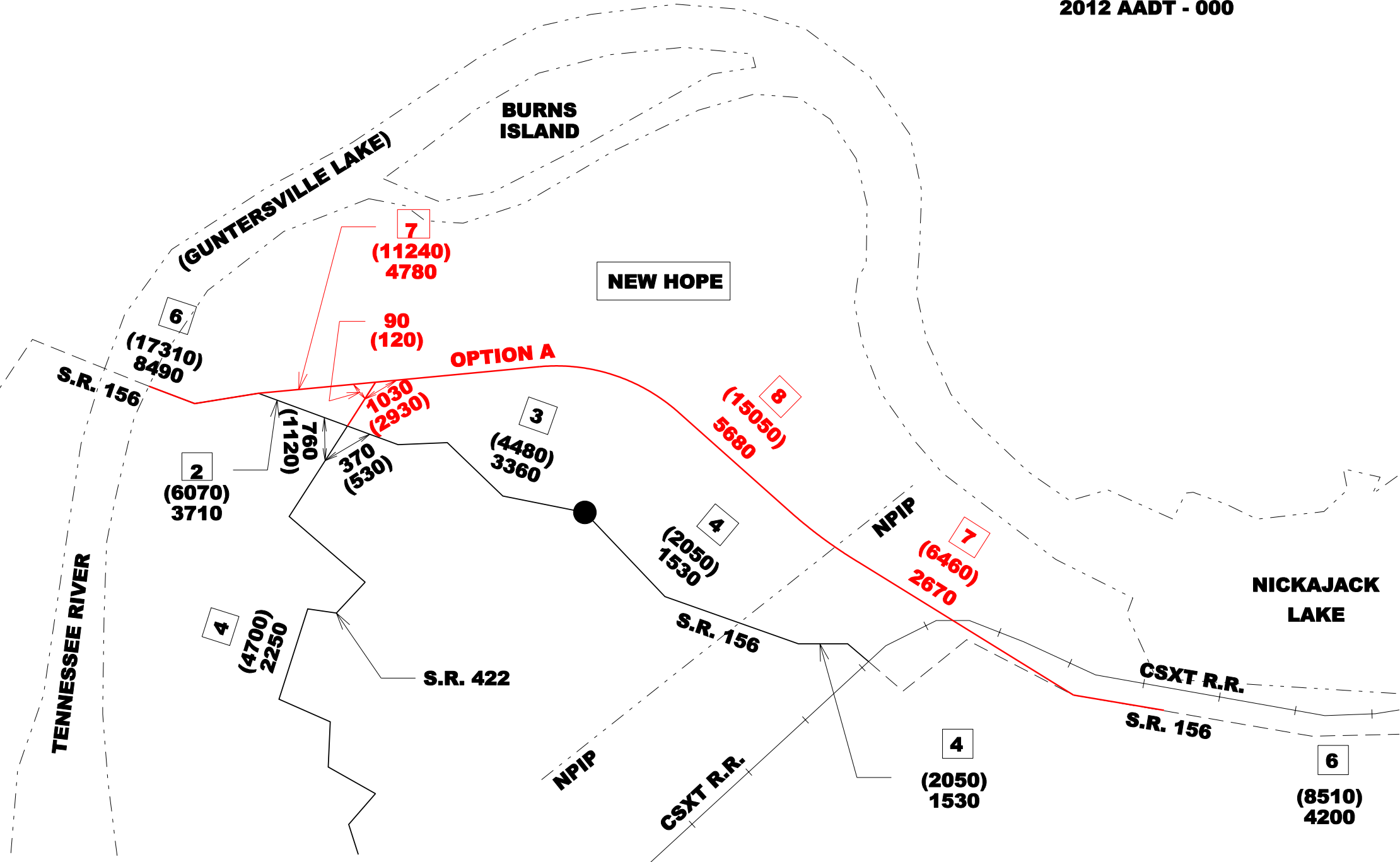
SCALE: 1" = 1/2 MILE

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 61        |
|        |      |               |           |
|        |      |               |           |

FILE NO.



**LEGEND:**  
**AADT TRUCK % - 0**  
**2032 AADT -(000)**  
**2012 AADT - 000**



COORDINATE VALUES ARE NAD/83(1995)  
AND ARE DATUM ADJUSTED BY THE  
FACTOR 1.00 & TIED TO THE TGRN.

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DEPARTMENT OF TRANSPORTATION

**BUILD  
OPTION A  
AADT  
FIGURE 7**

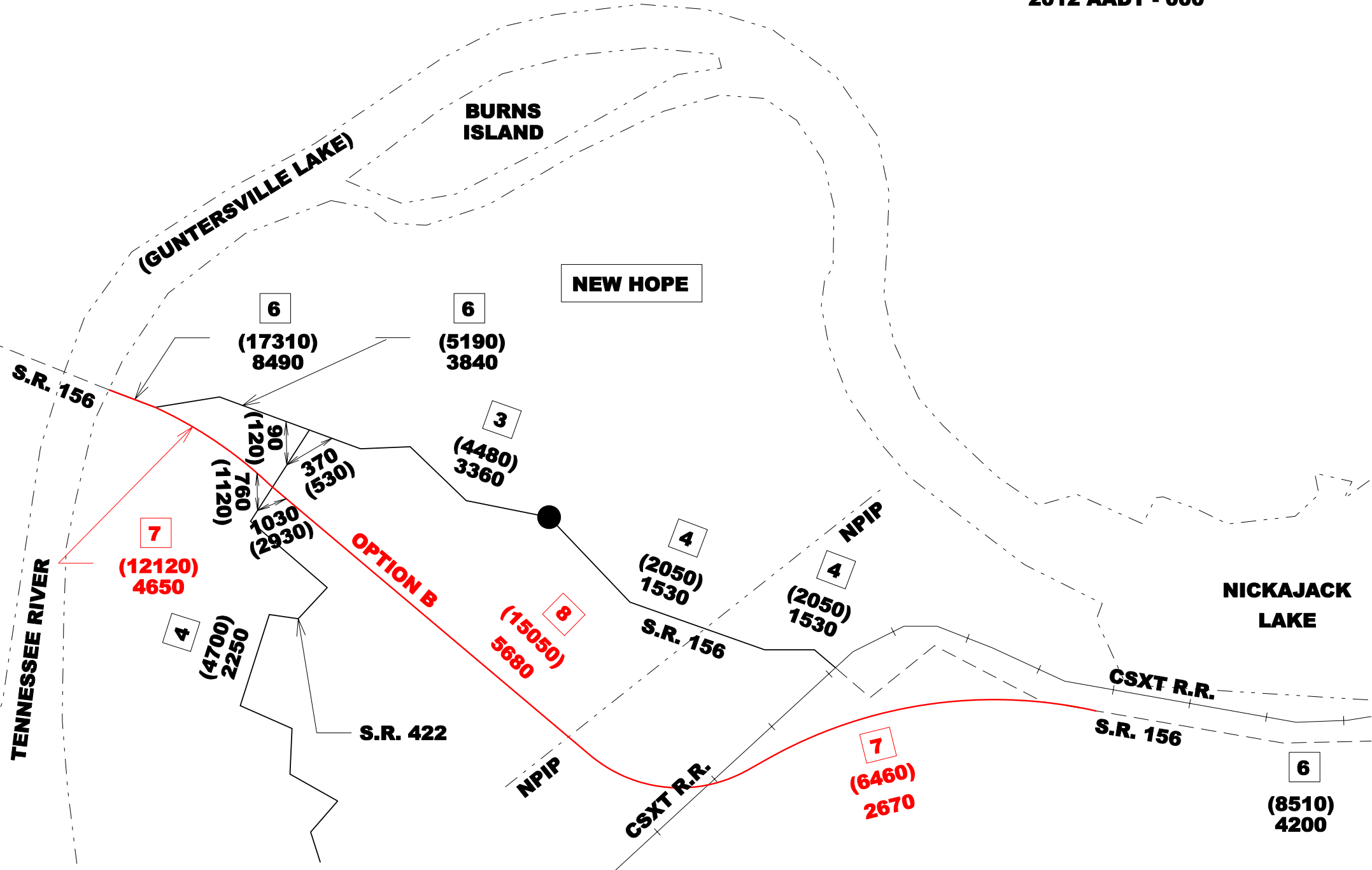
SCALE: 1" = 1/2 MILE

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 62        |
|        |      |               |           |
|        |      |               |           |

FILE NO.



**LEGEND:**  
**AAADT TRUCK % - 0**  
**2032 AADT -(000)**  
**2012 AADT - 000**



COORDINATE VALUES ARE NAD/83(1995)  
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DEPARTMENT OF TRANSPORTATION

**BUILD  
OPTION B  
AADT  
FIGURE 8**

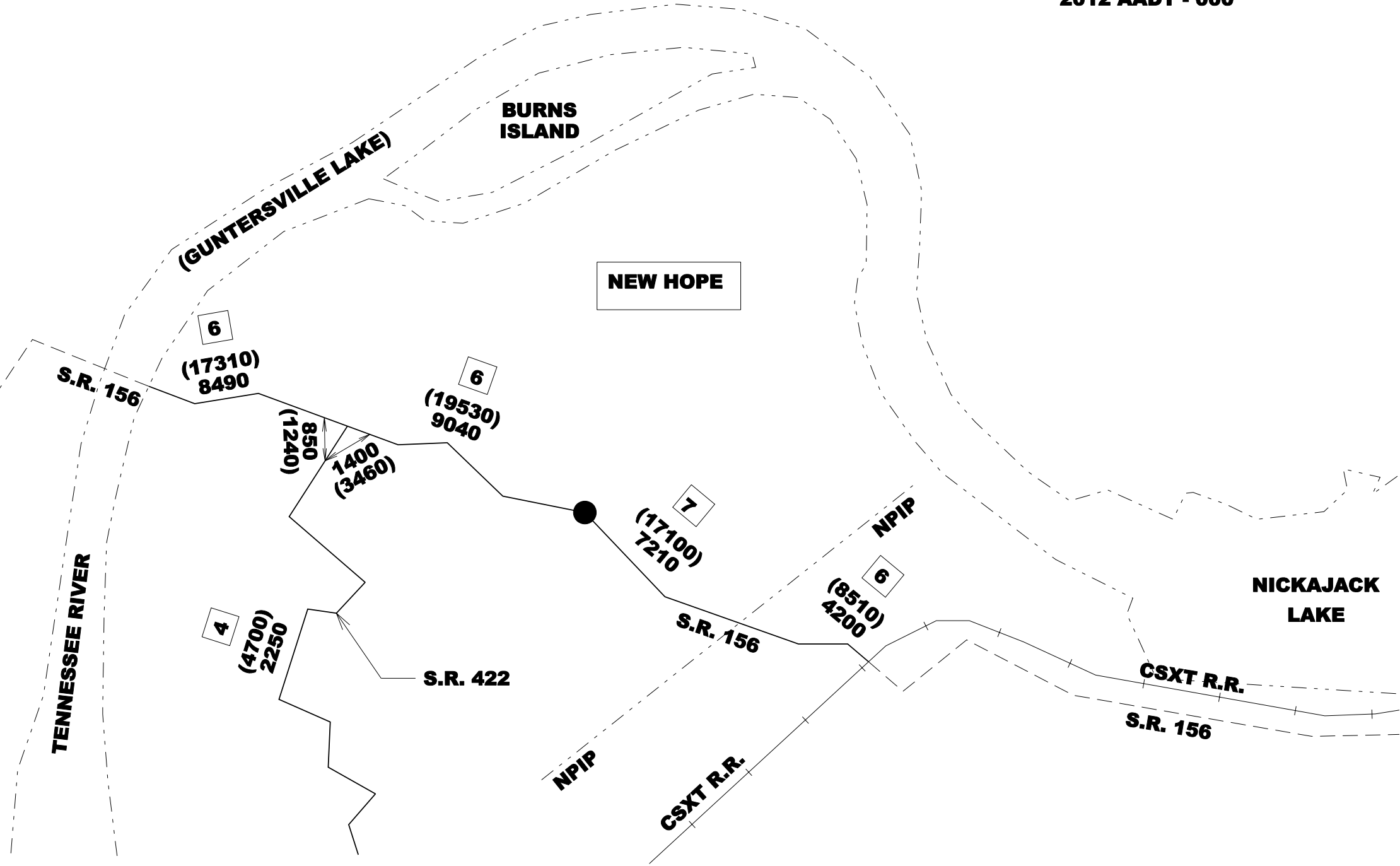
SCALE: 1" = 1/2 MILE

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 63        |
|        |      |               |           |
|        |      |               |           |

FILE NO.



**LEGEND:**  
**AAADT TRUCK % - 0**  
**2032 AADT -(000)**  
**2012 AADT - 000**



COORDINATE VALUES ARE NAD/83(1995)  
AND ARE DATUM ADJUSTED BY THE  
FACTOR 1.00 & TIED TO THE TGRN.

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DEPARTMENT OF TRANSPORTATION

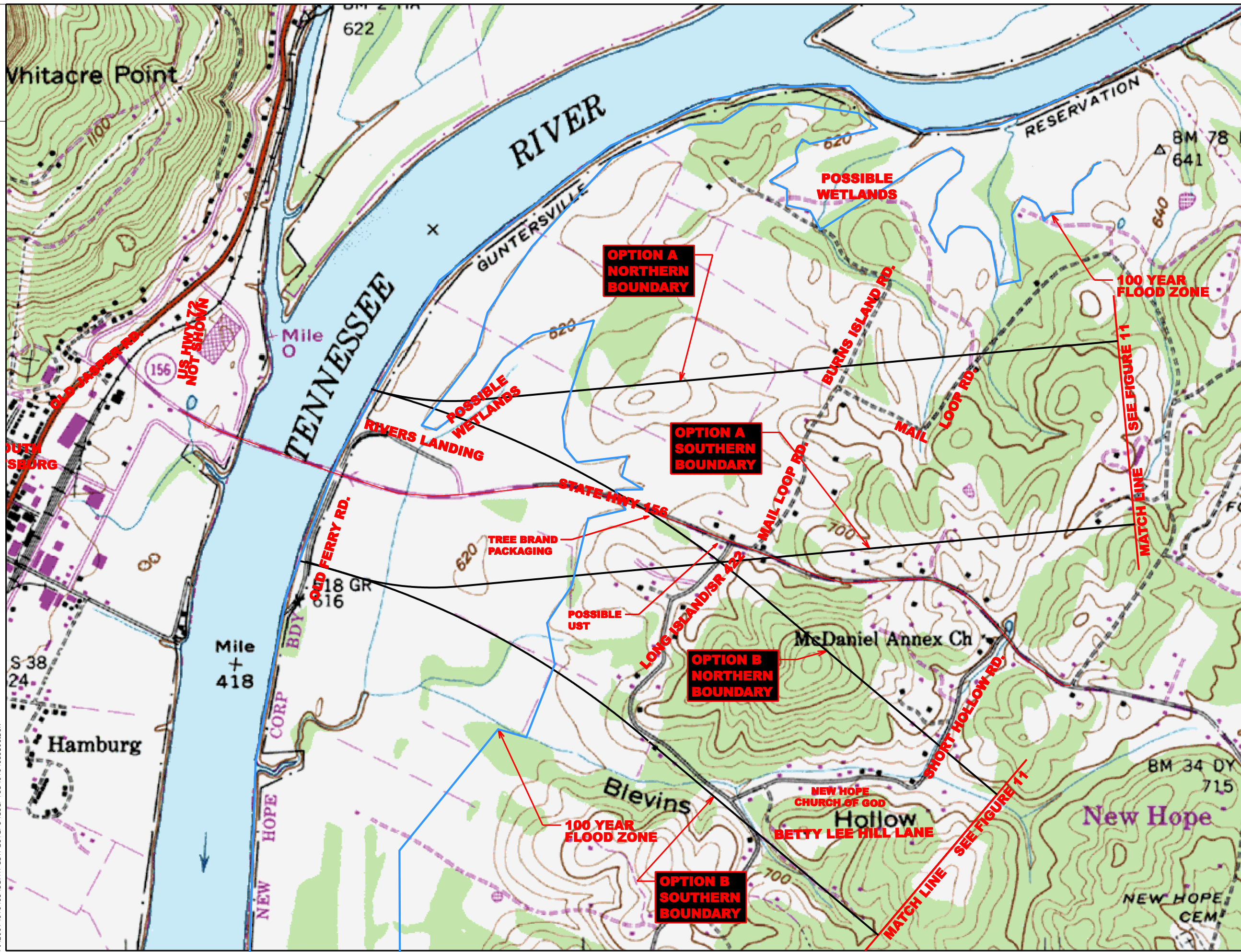
**BUILD  
OPTION C  
AADT  
FIGURE 9**

SCALE: 1" = 1/2 MILE

5/20/2008 8:50:31 AM  
P:\2007\070463\SoInFr\structure\dcortees\FIG\_09\_AADT\_Volumes.DGN

FILE NO.

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 64        |
|        |      |               |           |
|        |      |               |           |



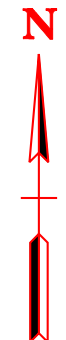
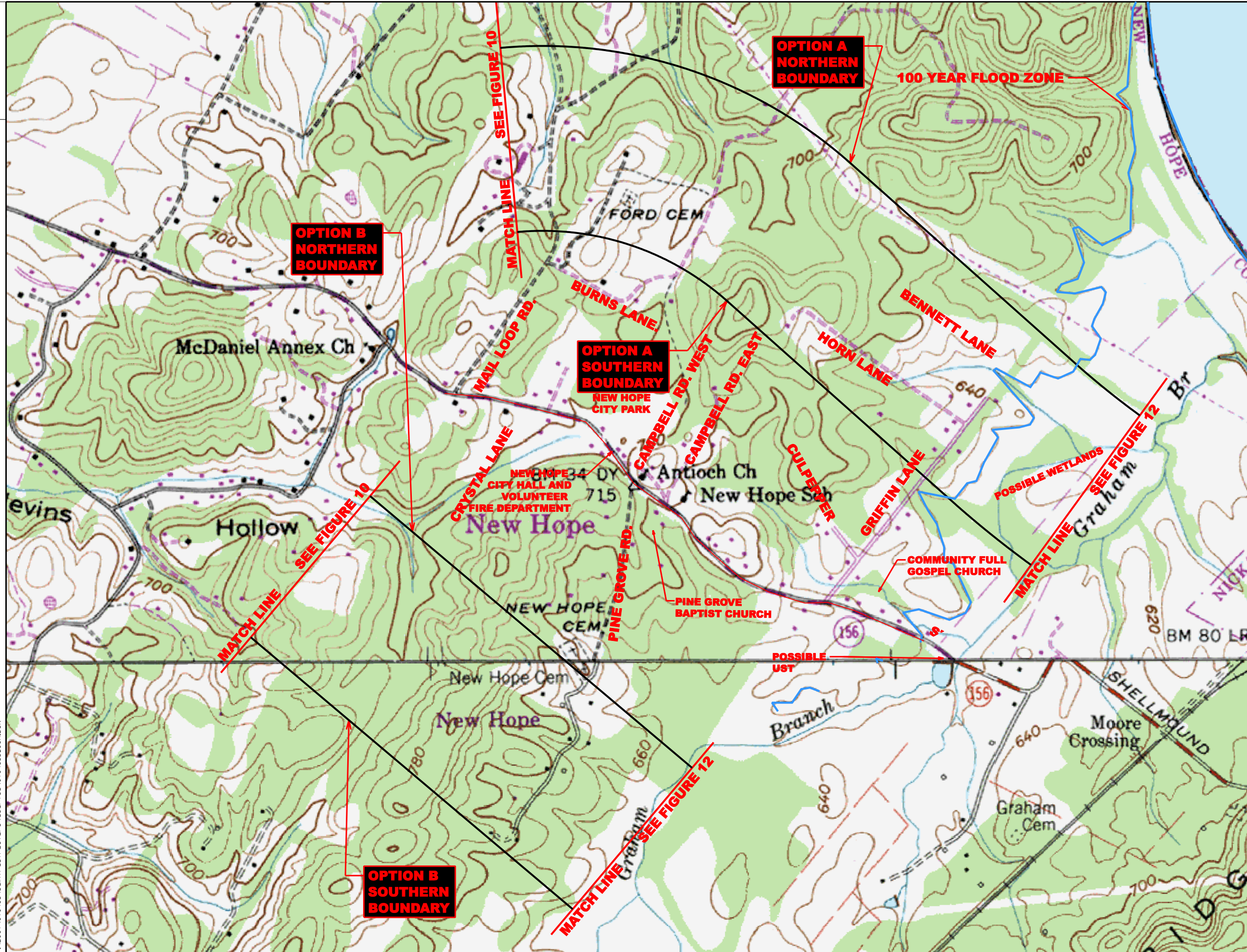
COORDINATE VALUES ARE NAD/83(1995)  
AND ARE DATUM ADJUSTED BY THE  
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DEPARTMENT OF TRANSPORTATION

**U.S.G.S.**  
**QUAD**  
**FIGURE 10**  
SCALE: 1" = 1000'

5/20/2008 8:57:08 AM  
P:\2007\070463\SiteStructure\corres\070463\_006.DGN

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 65        |
|        |      |               |           |
|        |      |               |           |



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FACTOR 1.00 & TIED TO THE TGRN.

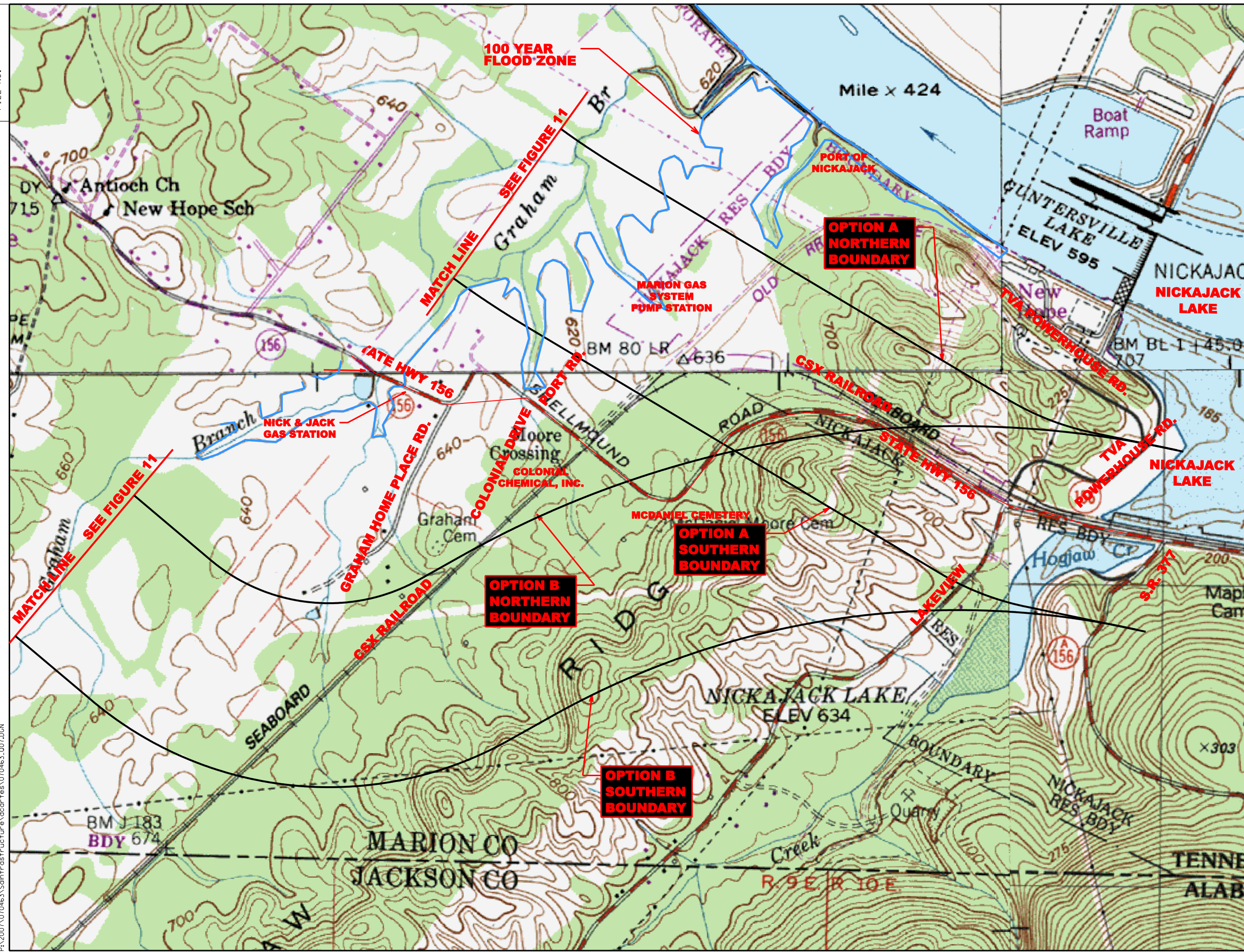
STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

**U.S.G.S.**  
**QUAD**  
**FIGURE 11**  
SCALE: 1" = 1000'



| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 66        |
|        |      |               |           |
|        |      |               |           |

FILE NO.



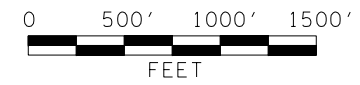
COORDINATE VALUES ARE NAD/83(1995)  
AND ARE DATUM ADJUSTED BY THE  
FACTOR 1.00 & TIED TO THE TGRN.

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DEPARTMENT OF TRANSPORTATION

**U.S.G.S.**  
**QUAD**  
**FIGURE 12**  
SCALE: 1" = 1000'

5/20/2008 8:59:46 AM  
P:\2007\070463\SiteStructure\corres\070463\_007.DGN

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 67        |
|        |      |               |           |
|        |      |               |           |

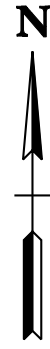


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AND ARE DATUM ADJUSTED BY THE  
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DEPARTMENT OF TRANSPORTATION

**AERIAL  
PHOTO  
FIGURE 13**  
SCALE: 1" = 1000'

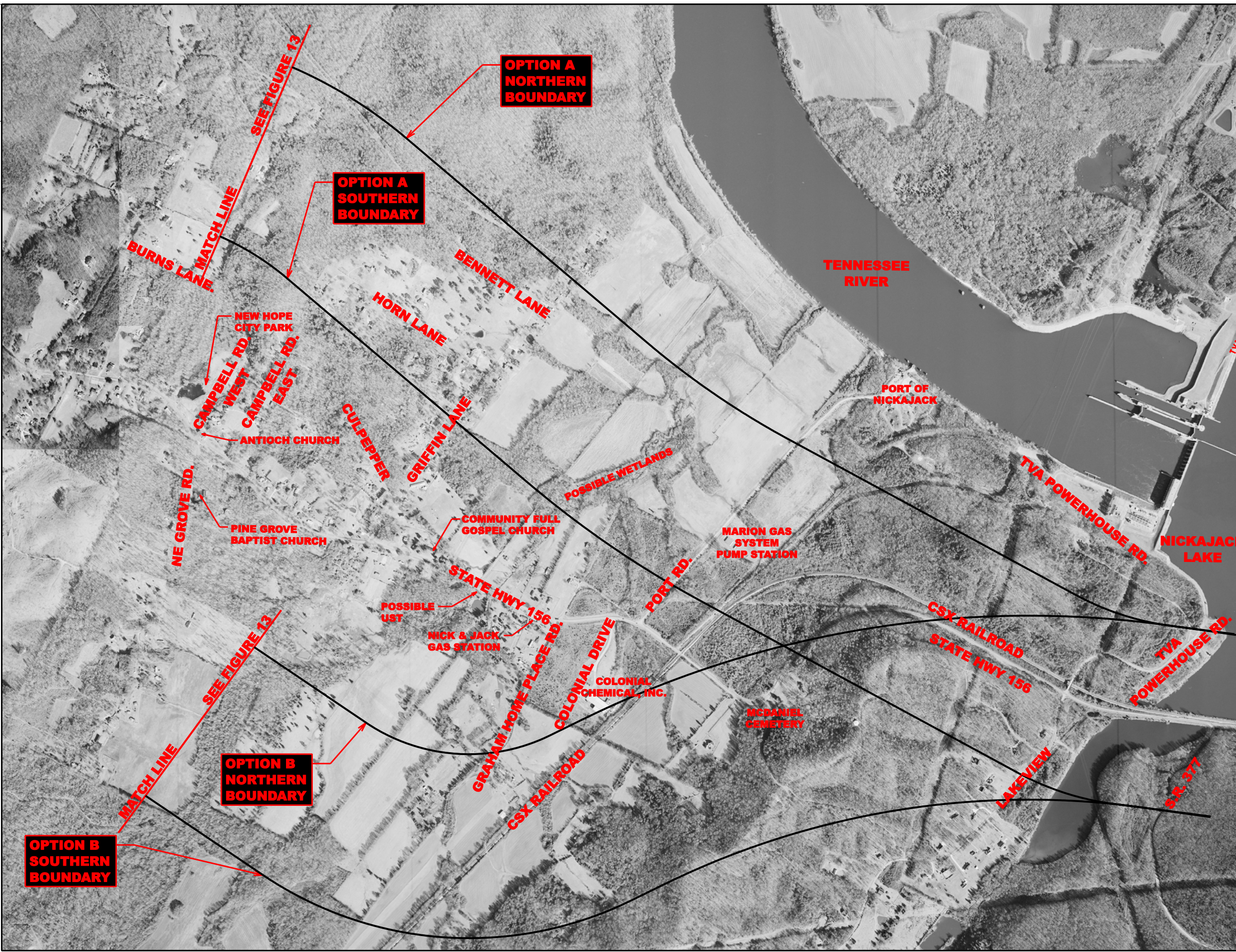
| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 68        |
|        |      |               |           |
|        |      |               |           |



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DEPARTMENT OF TRANSPORTATION

**AERIAL  
PHOTO  
FIGURE 14**  
SCALE: 1" = 1000'



**OPTION A  
NORTHERN  
BOUNDARY**

**OPTION A  
SOUTHERN  
BOUNDARY**

**OPTION B  
NORTHERN  
BOUNDARY**

**OPTION B  
SOUTHERN  
BOUNDARY**

**SEE FIGURE 13**

**SEE FIGURE 13**

**MATCH LINE**

**MATCH LINE**

**MATCH LINE**

**MATCH LINE**

**BURNS LANE**

**CAMPBELL RD.  
WEST  
CAMPBELL RD.  
EAST**

**NE GROVE RD.**

**PINE GROVE  
BAPTIST CHURCH**

**ANTIOCH CHURCH**

**CULPEPPER**

**HORN LANE**

**GRIFFIN LANE**

**BENNETT LANE**

**STATE HWY 156**

**NICK & JACK  
GAS STATION**

**POSSIBLE  
UST**

**GRANHAM HOME PLACE RD.**

**COLONIAL DRIVE**

**COLONIAL  
CHEMICAL, INC.**

**MCDANIEL  
CEMETERY**

**PORT RD.**

**MARION GAS  
SYSTEM  
PUMP STATION**

**POSSIBLE WETLANDS**

**CSX RAILROAD**

**STATE HWY 156**

**LAKEVIEW**

**TVA POWERHOUSE RD.  
NICKAJACK  
LAKE**

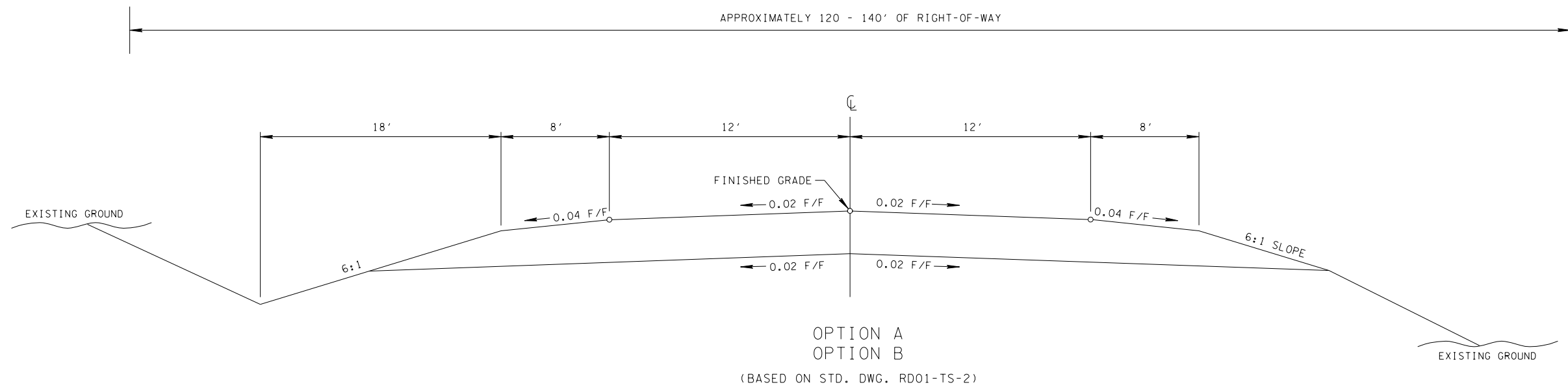
**P.R. 377**

**TENNESSEE  
RIVER**

**PORT OF  
NICKAJACK**

| TYPE   | YEAR | PROJECT NO.   | SHEET NO. |
|--------|------|---------------|-----------|
| T.P.R. | 2008 | 99107-7086-04 | 69        |
|        |      |               |           |
|        |      |               |           |

FILE NO.



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TYPICAL SECTION

FIGURE 15

NOT TO SCALE