

# ***TECHNICAL REPORT***

***WESTSIDE DRIVE/CEDAR LANE***  
***From Clement Drive to North Jackson Street***  
***Coffee County***



## ***TENNESSEE***

### ***DEPARTMENT OF TRANSPORTATION***

***PREPARED BY GRESHAM SMITH***  
***for the***  
***TDOT Long Range Planning Division***

| Recommended by:   | Signature | DATE |
|---|-----------|------|
| TRANSPORTATION DIRECTOR<br>LONG RANGE PLANNING DIVISION |           |      |

## **EXECUTIVE SUMMARY**

### **PURPOSE OF THE REPORT**

The City of Tullahoma identified a section of roadway along Westside Drive and Cedar Lane in Tullahoma, Coffee County, as an area with pedestrian safety, traffic safety, road capacity, and truck maneuverability issues. This report provides engineering analysis of the existing conditions as well as an available option for improvement. The study was divided into seven (7) tasks:

Task 1: Data Collection/Review – Comprehensive gathering and organization of the existing roadway, signal system, and traffic information as well as manual counts at the intersections. Safety and crash data were gathered from the State of Tennessee Enhanced Tennessee Roadway Information Management System (ETRIMS) for analysis.

Task 2: Develop Crash Analysis and Diagrams – Crash Rate Analysis using data for the most recent 3-year period was conducted. The analysis and crash diagrams used to identify potential safety deficiencies are presented in this report.

Task 3: Field Review – A field review with City of Tullahoma staff, the Tennessee Department of Transportation (TDOT) personnel, and South Central East Rural Planning Organization (RPO) was held. A summary of the field review is included in this report.

Task 4: Operational Analyses – A Level of Service (LOS) capacity analyses was conducted utilizing Highway Capacity Manual (HCM) Software and SYNCHRO for the following conditions: 2026 AM/PM No Build, 2026 AM/PM Build, 2046 AM/PM No Build, and 2046 AM/PM Build.

Task 5: Horizontal Conceptual Design and Layouts – Based on input from TDOT and South Central East RPO, one improvement option and one typical section for the segment were developed and are presented in this report.

Task 6: - Cost Estimate – A cost estimation was developed utilizing TDOT's Cost Estimate Tool.

Task 7: Final Report – The preparation of this document or the Final Report (with appendices) that includes the results of the tasks listed above and recommendations for corridor improvements.

### **OVERVIEW OF ADJOINING PROJECTS**

There are two ongoing projects within the area of this project:

- Intersection improvements at Cedar Lane and Wilson Avenue (PIN #101589.01)
    - This project will add a separated right turn lane off Cedar Lane to Wilson Avenue, add additional through and receiving lanes at each leg of the intersection and add multimodal facilities.
  - TDOT Local Programs Sidewalk project (PIN #128184.00)
    - This project will add approximately 5,500 feet of five (5) foot sidewalk to the northern/eastern side of existing Cedar Lane from approximately the Church of Christ at Cedar Lane to William Northern Boulevard.
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## **DESCRIPTION OF EXISTING CONDITIONS**

Westside Drive/Cedar Lane is a two (2) -lane (one in each direction) urban minor arterial with lane widths of approximately eleven (11) feet and shoulder widths that vary from less than one (1) foot to two (2) feet. This corridor study begins at the intersection of Westside Drive and Clement Drive. At its intersection with West Lincoln Street, the corridor's name changes to Cedar Lane, where it continues to the termini of this study at the intersection of North Jackson Street [State Route (SR) 16 / US-41A]. Westside Drive and Cedar Lane has a speed limit posted 30 miles per hour (mph) from Clement Drive at LM 0.0 to just north of McKellar Drive at LM 1.59. Cedar Lane is posted 35 mph from McKellar at LM 1.59 to North Jackson Street at LM 2.70. The pavement condition is adequate. There are no observed geometric design deficiencies. Currently, there is intermittent sidewalk on the west side of the roadway. There are no bicycle facilities along the study corridor.

## **EXISTING AND HORIZON TRAFFIC**

Average Annual Daily Traffic (AADT) values were projected to the 2026 Base Year and 2046 Design Year. The AADT is projected to increase on Westside Drive/Cedar Lane from 9,846 in 2026 to 10,128 in 2046.

## **RECOMMENDED IMPROVEMENTS**

The proposed improvements are summarized below:

Widening improvements for Westside Drive/Cedar Lane: Approximately 2.25 miles of Westside Drive/Cedar Lane will be widen to accommodate a two way left turn lane. A five (5) foot sidewalk will be added on the west side of the roadway and a ten (10) foot shared use path will be added on the east side of the roadway. Pedestrian crossings at major intersections will be upgraded to meet Americans with Disabilities Act (ADA) standards.

The opinion of probable cost for the 3 phases of roadway improvements is \$43,500,000 in the 2026 Base Year.

The cost of a potential engineering flood study/CLOMR is not included in this cost.

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## **1.0 INTRODUCTION**

### **1.1 REPORT GOALS**

Corridor improvement options have been evaluated for Westside Drive/Cedar Lane from Clement Drive, Log Mile (LM) 0.00 to North Jackson Street [State Route (SR) 16 / US-41A], LM 2.70. Recommended improvements along the corridor will address traffic operations and safety deficiencies.

### **1.2 PROJECT INITIATION**

The City of Tullahoma received a Transportation Planning Grant (TPG) to develop this Technical Report. The grant provides 90% funding by the Tennessee Department of Transportation (TDOT) for this Corridor Study. The Grant Application is included in **Appendix 1**.

During development of the Technical Report, a project kick-off meeting and field review, with relevant stakeholders, was held on September 27, 2022. Stakeholders included the City Administrator, Planning Director, City Mayor, a Tennessee Department of Transportation (TDOT) representative, South Central East Rural Planning Organization (RPO) personnel, and Gresham Smith personnel.

During the kick-off meeting and field review, Gresham Smith presented the study timeline with, a draft document being submitted to TDOT in April 2023, a map was displayed and areas of interest were discussed. There was a discussion about current and future projects in the area and Gresham Smith requested project area data from TDOT and the City. After the meeting, Gresham Smith, TDOT, and South Central East RPO personnel drove the project site to take photographs. Any issues were noted and where applicable, will be included in the recommendations.

The study area is defined as Westside Drive/Cedar Lane from Clement Drive (LM 0.00) to North Jackson Street (SR 16 / US-41A) (LM 2.70).

**Figure 1** through **Figure 3** provide maps of the study area.

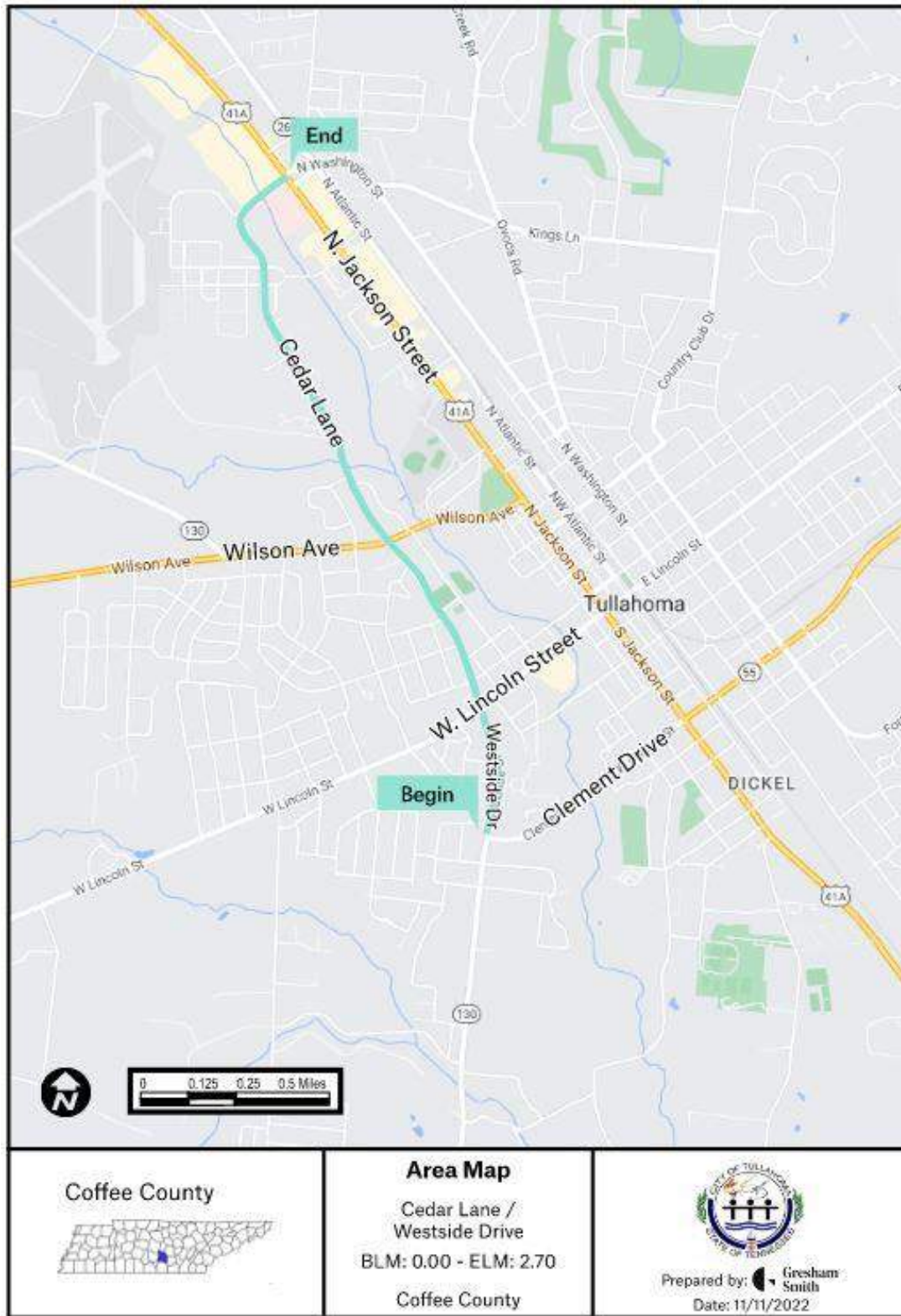


FIGURE 1: AREA MAP



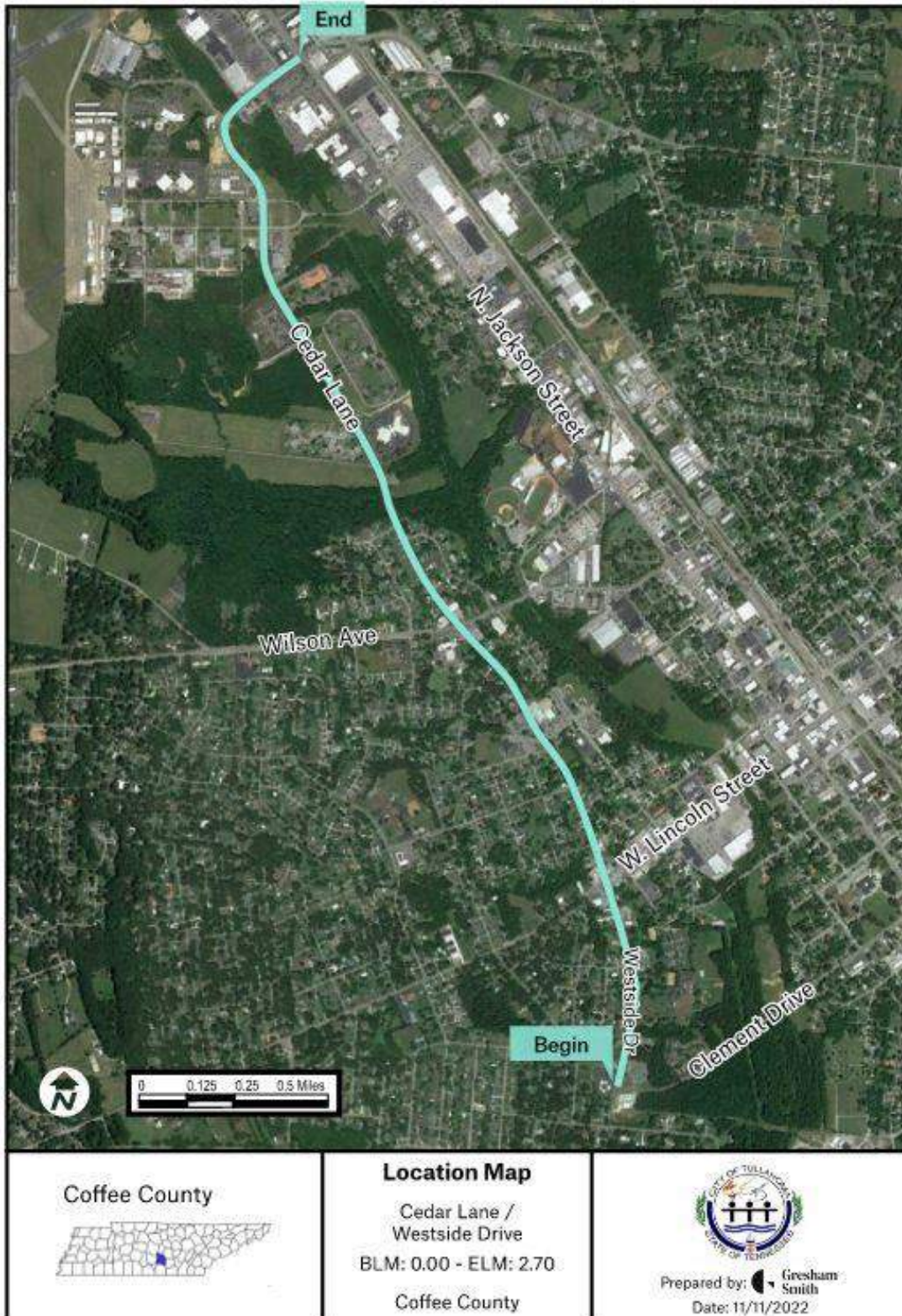


FIGURE 2: LOCATION MAP WITH AERIAL IMAGERY



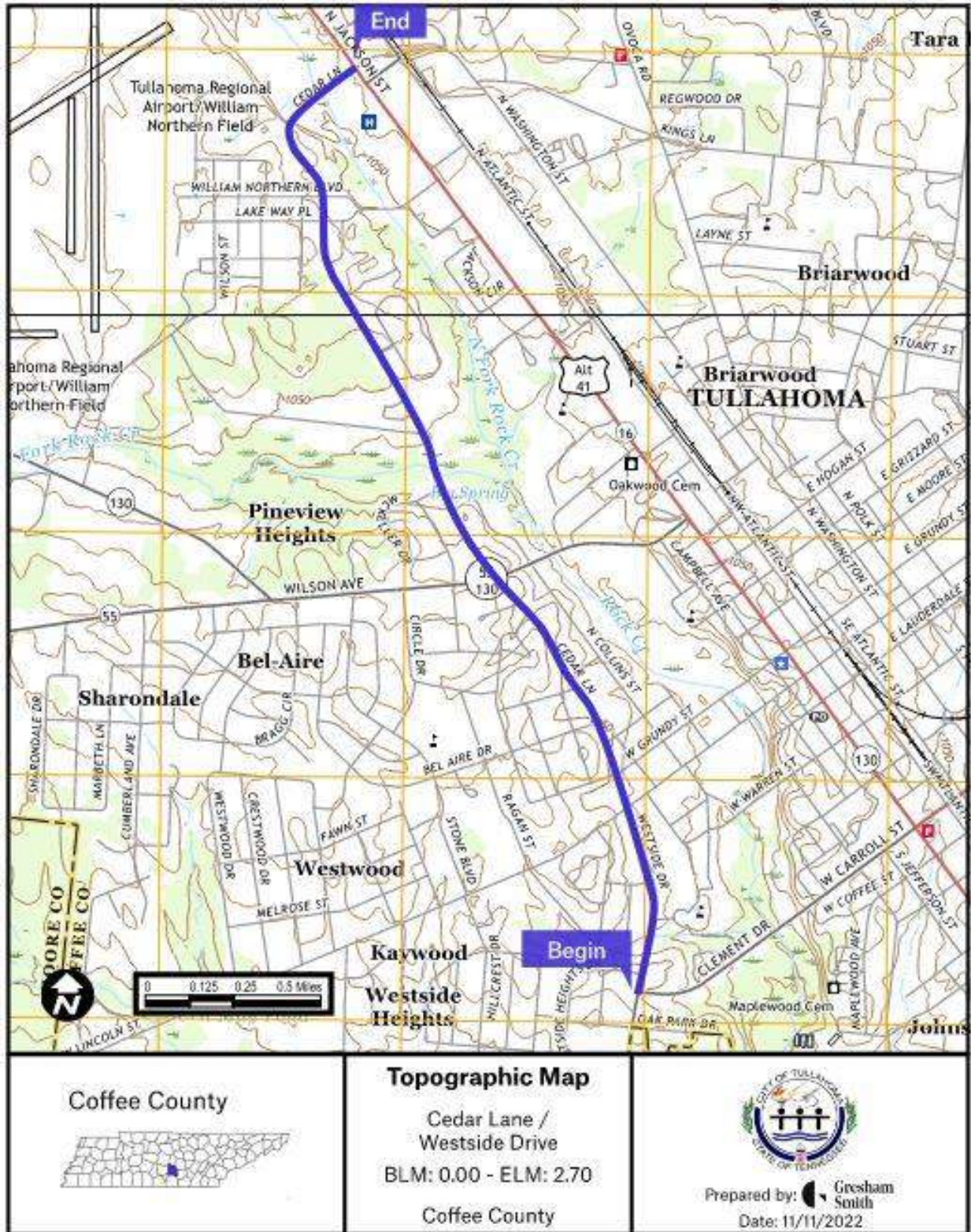


FIGURE 3: TOPOGRAPHIC MAP

## **2.0 PRELIMINARY PURPOSE AND NEED**

A need for the project is to improve safety, this is reflected in the Crash Analysis (see **Appendix 3**). The largest number of non-intersection crash types located along this segment of roadway are the “rear-end” crashes with 70 in a 3-year period. This type of crash is often associated with arterial streets with high driveway density and no turn lanes like this corridor. In the initial study year of 2026, the intersections of the corridor operate at a Level of Service (LOS) B or C in AM and PM peak hours under existing conditions. By the Design Year of 2046, the LOS of the intersections are expected to drop to a C or D the addition of the center turn lane is needed to improve traffic operations.

The main pedestrian traffic generators along the corridor are Jack T. Farrar Elementary School, two housing authority apartment complexes, Continental Apartments, and Parkview Senior Living (a 100-unit independent senior living facility). Tullahoma City School System does not offer bus service so children must walk, bicycle, or have an adult drive them to the campus. In addition to roadway improvements, pedestrian facilities are needed to provide a connectivity to existing greenways near West Hogan Street and Flooring Solutions. There are currently three segments that have sidewalks on the west side of Westside Drive/Cedar Lane, pedestrian improvements are also needed for this section of roadway to provide continuity with existing facilities.

The purpose of this project is to improve roadway safety and traffic operations along Westside Drive/Cedar Lane between Clement Drive and North Jackson Street (SR 16 / US-41A). This corridor has become popular with cut through traffic looking for other routes to deviate away from the heavily congested North Jackson Street (SR 16 / US-41A). There is also a growing number of destinations within the area. The proposed improvements including a continuous Two Way Left Turn Lane (TWLTL) would reduce this “rear-end” crash risk.

The purpose of the pedestrian facilities is to improve access to walking and biking destinations in the project area, thereby providing enhanced recreational opportunities, improved public health outcomes, and promotion of the overall livability of the City.



### **3.0 EXISTING CONDITIONS**

The study area is located within the City of Tullahoma in Coffee County, Tennessee. The surrounding land uses are a mix of urban, commercial, and residential.

#### **3.1 ROADWAY GEOMETRICS**

Westside Drive/Cedar Lane is a two-lane (one in each direction) urban minor arterial with lane widths of approximately eleven (11) feet and shoulder widths that vary from less than one (1) foot to two (2) feet (see **Figure 4**). The pavement condition is adequate. There are no observed geometric design deficiencies. Currently, there is intermittent sidewalk on the west side of the roadway. There are no bicycle facilities along the study corridor. The right-of-way width listed in the State of Tennessee Enhanced Tennessee Roadway Information Management System (eTRIMS) varies from 40 feet to 70 feet. There are four (4) major intersections. These intersections and their traffic control are summarized in **Table 1** and **Figure 5**.

There are three existing sidewalk segments on the west side of Westside Drive/Cedar Lane, they are from Clement Drive to West Lincoln Street, Bel Aire Drive to entrance to Highland Baptist Church, and William Northern Boulevard to North Jackson Street this project would provide continuity between the existing sidewalk segments. In addition the bike and pedestrian facilities would provide connectivity to an existing greenways near West Hogan Street and Flooring Solutions. There are no existing bicycle facilities in this corridor. In a separate project, a sidewalk is proposed adjacent to the northern/eastern side of Cedar Lane from approximately the Church of Christ at Cedar Lane to William Northern Boulevard (PIN #128184.00).



**FIGURE 4: PHOTO OF TYPICAL SECTION**

**TABLE 1: INTERSECTIONS ANALYZED WITH CONTROL TYPE**

| <b>ID</b> | <b>Intersection</b>                         | <b>Existing Control</b> |
|-----------|---|-------------------------|
| 1         | Westside Drive at Clement Drive             | Signal                  |
| 2         | Westside Drive/Cedar Lane at Lincoln Street | Signal                  |
| 3         | Cedar Lane at Wilson Avenue                 | Signal                  |
| 4         | Cedar Lane at North Jackson Street          | Signal                  |



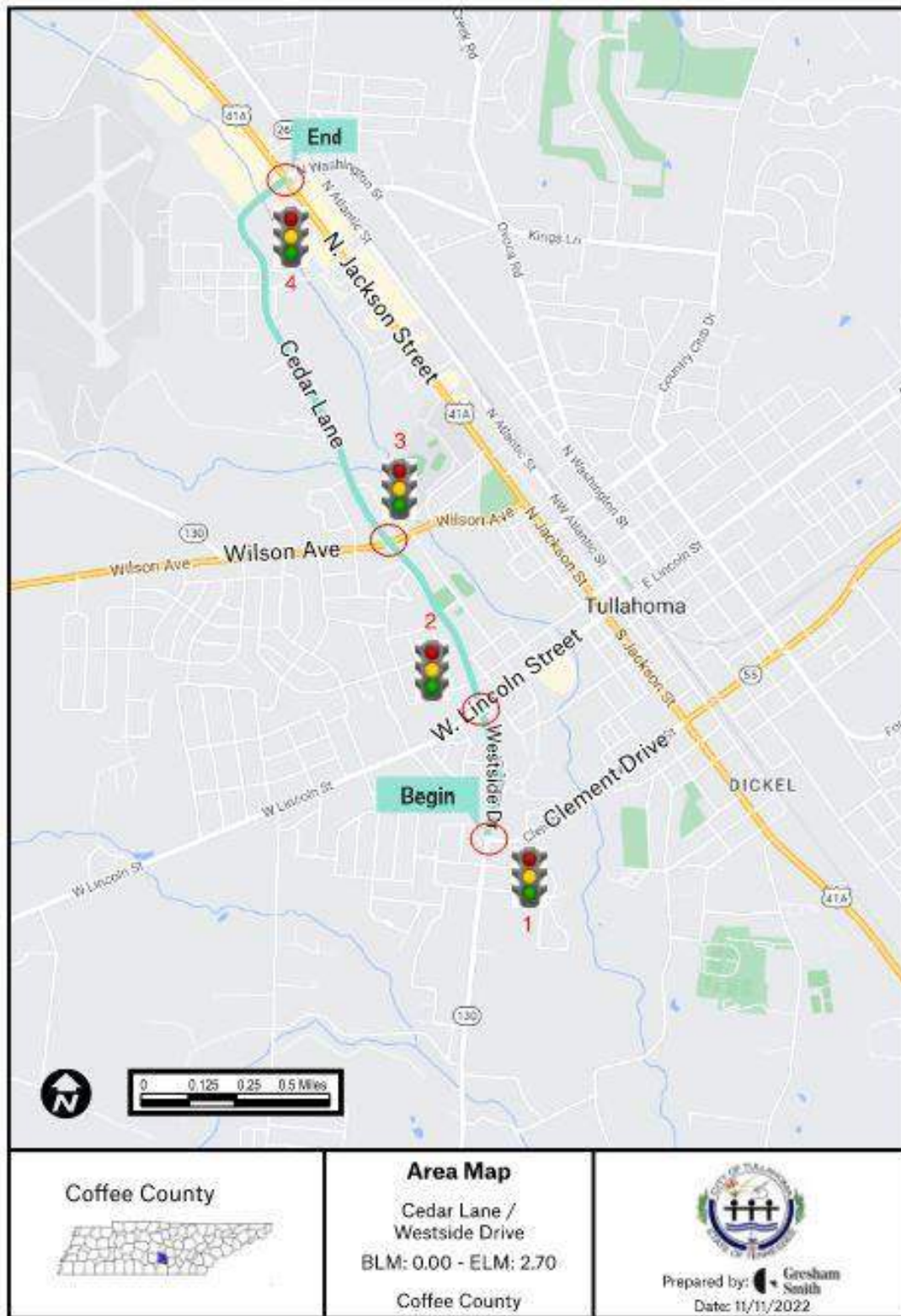


FIGURE 5: PROJECT INTERSECTIONS AND TRAFFIC CONTROL

### 3.2 DEMOGRAPHICS

City, County, State, and United States census data is located in **Table 2** below:

**TABLE 2: U.S. CENSUS DATA**

| Characteristic                            | Tullahoma | Coffee County | Tennessee | United States |
|---|-----------|---------------|-----------|---------------|
| <b>Growth Rate (2015 – 2021)</b>          | 8.3%      | 7.1%          | 5.5%      | 4.2%          |
| <b>Unemployment (2021)</b>                | 2.3%      | 2.5%          | 3.3%      | 3.5%          |
| <b>Minority Population (2021)</b>         | 12.7%     | 10.4%         | 24.2%     | 31.8%         |
| <b>Median Household Income (2021)</b>     | \$52,411  | \$52,626      | \$58,516  | \$69,021      |
| <b>Persons Below Poverty Level (2021)</b> | 17.2%     | 16.0%         | 14.3%     | 12.6%         |
| <b>Median Age (2021)</b>                  | 40.1      | 39.1          | 38.8      | 38.4          |

*Sources: U.S. Census Bureau American Community Survey (ACS) 2021 5-Year Estimates; ACS 2015 5-Year Estimates*

### 3.3 EXISTING LAND USE AND ZONING

The project area's surrounding land uses are a mix of residential and commercial. It is primarily zoned Residential R-1 (low density residential), R-3 (high-density residential), with pockets of commercial. Commercial facilities include churches, a funeral home, schools, a community center, medical offices, gas stations, and various businesses.

### 3.4 PRELIMINARY ENVIRONMENTAL CONSTRAINTS

A preliminary environmental screening analysis was conducted for the subject study area in the event federal funds are utilized during project development. The purpose of the screening is to understand any major environmental, cultural, or social features of the project area that may warrant particular attention during the National Environmental Policy Act (NEPA) phase of the project's development. NEPA requirements only apply with federal funding, and are not necessarily required in the event the project is implemented with City funds. However, it is good environmental stewardship to follow NEPA guidance, regardless of funding source. Based on a review of the proposed alignment on aerial photography, state and federal database searches, and geospatial analysis in a Geographic Information System (GIS), the project's potential impacts are summarized below:

Air Quality: Coffee County is in attainment for all regulated criteria pollutants.

Noise: The project consists of adding a TWLTL and bicycle/pedestrian improvements; no noise impacts are anticipated; no noise study is needed.

Ecology: The Tennessee Department of Environment and Conservation (TDEC) Water Quality Assessment Data Mapper was reviewed for the project area. Two streams are indicated within the project area, they are Rock Creek and the West Fork of Rock Creek. Rock Creek is on the Tennessee Department of Environment and Conservation's 303d list for sedimentation.

The National Wetland Inventory Mapper was reviewed for the project area. Five wetlands or other riparian features were indicated within the project area, they are as follows:

- South of the entrance to Jack T. Farrar Elementary School is a freshwater forested/shrub wetland;
- North of McKeller Drive is a riverine habitat, the West Fork of Rock Creek;
- Adjacent to the West Fork of Rock Creek is a freshwater forested/shrub wetland;

- South of 7<sup>th</sup> Street is a freshwater forested/shrub wetland; and
- East of Airpark Drive is a freshwater forested/shrub wetland associated with Rock Creek.

The presence of wetlands and riparian features within the project area will be determined during the NEPA phase of project development, which will involve coordination with state and federal agencies with regulatory authority.

A review of the TDEC Division of Natural Heritage database for threatened and endangered species was conducted for the Tullahoma quadrangle, which contains the project area. The database listed the following:

- Twenty state listed flowering plants – Roughish Witchgrass (*Dichanthelium acuminatum* ssp. *leucothrix*), Short-leaved Panic Grass (*Dichanthelium ensifolium* ssp. *curtifolium*), Dwarf Sundew (*Drosera brevifolia*), Ridge-stem False-foxglove (*Agalinis oligophylla*), Cluster Fescue (*Festuca paradoxa*), Dwarf Huckleberry (*Gaylussacia dumosa*), Broad-leaved Beardgrass (*Gymnopogon brevifolius*), Broad-leaved Barbara's-buttons (*Marshallia trinervia*), Rough Rattlesnake-root (*Prenanthes aspera*), Sand Cherry (*Prunus pumila*), Low Frostweed (*Helianthemum propinquum*), Eggert's Sunflower (*Helianthus eggertii*), Narrowleaf Bushclover (*Lespedeza angustifolia*), Fen Orchis (*Liparis loeselii*), Mayberry (*Vaccinium elliotii*), Obscure Beak-rush (*Rhynchospora perplexa*), Elliot's Rush (*Juncus elliotii*), Pale False-foxglove (*Agalinis skinneriana*), Harvey's Beakrush (*Rhynchospora harveyi*), and Death-camas (*Stenanthium tennesseense*)
- One state/federally listed flowering plant - Slender Blue Flag (*Iris prismatica*)
- Two state listed reptiles – Eastern Slender Glass Lizard (*Ophisaurus attenuatus longicaudus*), and Northern Pinesnake (*Pituophis melanoleucus*)
- Two state/federally listed mollusc – Littlewing Pearlymussel (*Pegias fabula*) and Pale Lilliput (*Toxolasma cylindrellus*)
- One state listed mollusc – Warty Rocksnail (*Lithasia lima*)
- One state listed fish – Flame Chub (*Hemitremia flammea*)
- One state listed bird – Bachman's Sparrow (*Peucaea aestivalis*)
- One International Terrestrial Ecological System Classification Plant Community – Eastern Highland Rim Prairie Barrens

Presence of potential habitat for these species within the project area will be determined during the NEPA phase of project development, which will involve coordination with state and federal agencies with regulatory authority over threatened and endangered species. If it is determined that habitat is present, subsequent surveys for the presence of particular species may be required.

Flood Maps: The project areas along West Fork Rock Creek and North Fork Rock Creek are located in Federal Emergency Management Agency (FEMA) Zone X. Small portions of the project fall in Zone AE, which is the floodplain where Base Flood Elevations (BFE) have been determined. **Appendix 3** displays FEMA Maps for the study area.

Archaeology: An archaeological study and coordination with the Tennessee State Historic Preservation Office (TN-SHPO) will be required during the NEPA phase to determine the presence of archaeological resources.

Historic/Parks: A search of the National Park Service (NPS) database did not indicate a National Register of Historic Places (NRHP) site within the project area.

The Tennessee Historic Commission Viewer was reviewed. There are no structures fifty (50) years or older indicated in the database along the project area. However, based on the field review, there appear to be several structures 50 years or older that have not been added to the database. The project will be coordinated with the TN-SHPO to determine whether there will be impacts to historic resources.

There is an existing greenway that connects walking destinations within Tullahoma, it has two termini within the project area, near the intersection of West Hogan Street and Cedar Lane and north of Flooring Solutions on Cedar Street.

Displacements: Business relocations are not anticipated along the proposed project corridor. Four residential relocations are anticipated along the proposed project corridor. A Conceptual Stage Relocation Plan will be developed in accordance with state and federal guidelines as part of the NEPA phase of the project for relocations.

Hazardous Materials: No Environmental Protection Agency (EPA) National Priorities List (NPL) sites are located within the project area. The project will be coordinated with TDOT Hazardous Materials Section during the NEPA Phase of project development to determine the presence of other hazardous materials sites or concerns.

This discussion of preliminary environmental concerns for the project is not intended to be a final or complete analysis of potential environmental impacts. A full analysis of environmental conditions and concerns will be evaluated during the NEPA phase of project development consistent with all applicable state and federal regulations. A NEPA phase of project development only applies if federal funding is utilized.

### **3.5 UTILITY INFRASTRUCTURE**

The following utilities are known within the Westside Drive/Cedar Lane project area:

- Existing water lines (unknown sizes)
- Existing sanitary sewer lines (unknown sizes)
- Existing gas lines (unknown sizes)
- Existing overhead power and communication lines

### **3.6 MAJOR STRUCTURES**

There is an existing three (3) barrel fifteen (15) foot by seven (7) foot box culvert for West Fork Rock Creek (LM 1.48) just north of McKellar Drive that will need to be extended in order to accommodate the wider typical section for this corridor. This box culvert was inspected on January 10, 2022, its general condition was noted as fair with a sufficiency rating of 74.4.

There are four (4) additional crossings, however, these crossings are not inspected by TDOT since the length of the culverts are under twenty (20) feet.

### **3.7 GEOMETRIC AND OTHER PHYSICAL CHARACTERISTICS OF THE CORRIDOR**

The study corridor is a 2-lane section with grass lined ditches and a sidewalk on the west side between Westside Drive at Clement Drive LM 0.00 to the intersection of West Lincoln Street at LM 0.49. From West Lincoln Street LM 0.49 to Trinity Lane LM 1.05, Cedar Lane is a 2-lane section with grass lined or concrete ditches and a sidewalk on the west side between Bel Aire Drive LM 0.717 and the entrance to Highland Baptist Church. From Trinity Lane LM 1.05 to north

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of Wilson Avenue LM 1.17, Cedar Lane is a 2-lane section with curb and gutter. From north of Wilson Avenue LM 1.17 to William Northern Boulevard LM 2.25, Cedar Lane is a 2-lane section with grass lined ditches. From William Northern Boulevard at LM 2.25 to North Jackson Street LM 2.70, Cedar Lane is a 3-lane section with curb and gutter and a TWLTL.

Westside Drive and Cedar Lane has a speed limit posted 30 mph from Clement Drive at LM 0.0 to just north of McKellar Drive at LM 1.59. Cedar Lane is posted 35 mph from McKellar at LM 1.59 to North Jackson Street at LM 2.70. Roadway characteristics are located in **Table 3** below.

**TABLE 3: STREET & INTERSECTION CHARACTERISTICS**

**WESTSIDE DRIVE - CEDAR LANE SUMMARY**

| STREET         | STREET SEGMENT                | NBR_RTE | LM INTERSECTION | LM CEDAR     | AADT (2021) | SECTION DESCRIPTION   | POSTED SPEED (MPH) | FUNCTIONAL           |
|----------------|-------------------------------|---------|-----------------|--------------|-------------|---|--------------------|----------------------|
| WESTSIDE DRIVE | Clement to W Lincoln          | 3434    | NA              | 0.00 TO 0.49 | 8,237       | 2 LANE<br>SIDEWALK ONE SIDE                                       | 30                 | Urban Minor Arterial |
| CEDAR LANE     | W Lincoln to Wilson           | 3434    | NA              | 0.49 TO 1.17 | 9,431       | 2 LANE  | 30                 | Urban Minor Arterial |
| CEDAR LANE     | Wilson to William Northern    | 3434    | NA              | 1.17 TO 2.25 | 10,447      | 2 LANE  | 30                 | Urban Minor Arterial |
| CEDAR LANE     | William Northern to N Jackson | 3434    | NA              | 2.25 TO 2.70 | 9,729       | 2 LANE OR<br>2 LANE W TWLTL<br>CURB & GUTTER<br>SIDEWALK ONE SIDE | 35                 | Urban Minor Arterial |

**INTERSECTING SIDESTREET SUMMARY**

| STREET                  | SIDE STREET SEGMENT                                    | NBR_RTE            | LM INTERSECTION | LM CEDAR | AADT (2021) | SECTION DESCRIPTION                                    | POSTED SPEED (MPH) | FUNCTIONAL               |
|-------------------------|--|--------------------|-----------------|----------|-------------|--|--------------------|--------------------------|
| WESTSIDE DRIVE          | SEGMENT<br>(JUST SOUTH OF STUDY<br>CORRIDOR)           | SR130              | 3.18            | 0        | 6,056       | 2 LANE   | 30                 | Urban Minor Arterial     |
| CLEMENT DRIVE           | INTERSECTION<br>Westside Drive<br>BEGIN STUDY CORRIDOR | SR130              | 3.18            | 0        | 7,783       | 2 LANE W TWLTL   | 40                 | Urban Minor Arterial     |
| WEST LINCOLN STREET     | INTERSECTION<br>Cedar Lane / Westside Drive            | 1030               | 2.97            | 0.49     | 7,530       | 2 LANE W TWLTL<br>CURB & GUTTER<br>SIDEWALK BOTH SIDES | 30                 | Urban Major Collector    |
| WILSON AVENUE           | INTERSECTION<br>Cedar Lane                             | SR055              | 2.06            | 1.17     | 8,738       | 2 LANE W TWLTL<br>CURB & GUTTER<br>SIDEWALK BOTH SIDES | 30                 | Urban Principal Arterial |
| NORTH JACKSON STREET    | INTERSECTION<br>Cedar Lane<br>END STUDY CORRIDOR       | SR016 OR<br>US 41A | 1.94            | 2.7      | 23,395      | 4 LANE W TWLTL<br>CURB & GUTTER<br>SIDEWALK BOTH SIDES | 40                 | Urban Principal Arterial |
| NORTH WASHINGTON STREET | INTERSECTION<br>Cedar Lane / N Jackson Street          | 4329               | 1.47            | 2.7      | 4,008       | 4 LANE<br>CURB & GUTTER<br>SIDEWALK BOTH SIDES         | 30                 | Urban Minor Arterial     |

**3.8 CRASH HISTORY**

Crash data along Cedar Lane / Westside Drive from LM 0.00 to LM 2.70 were obtained from TDOT’s ETRIMS database. The crash data from January 1, 2019 to December 31, 2021 were utilized in this analysis. In these years, there were 181 total crashes along the 2.70 mile study corridor. There were zero (0) fatal crashes, one (1) incapacitating crash, and twenty-two (22) other injury crashes, and one hundred and fifty eight (158) property damage only crashes. Other data is summarized in **Table 4** below.

**TABLE 4: CRASH SUMMARY**

| <b>TULLAHOMA - WESTSIDE DRIVE - CEDAR LANE<br/>01.01.2019 TO 12.31.2021<br/>CRASH SUMMARY</b> |                      |                        |
|---|----------------------|------------------------|
| <b>Condition</b>  | <b>Study Area</b>    |                        |
|   | Number of<br>Crashes | Percentage of<br>Total |
| <b>Severity</b>   |                      |                        |
| Fatal   | 0                    | 0%                     |
| Incap. Injury   | 1                    | 1%                     |
| Other Injury  | 22                   | 12%                    |
| PDO   | 158                  | 87%                    |
| <b>Manner of Collision</b>  |                      |                        |
| Angle   | 37                   | 20%                    |
| Rear-End  | 97                   | 54%                    |
| Single Car  | 13                   | 7%                     |
| Sideswipe   | 19                   | 10%                    |
| Head-On   | 7                    | 4%                     |
| Rear-to-Rear  | 1                    | 1%                     |
| Unknown   | 7                    | 4%                     |
| <b>Road Conditions</b>  |                      |                        |
| Ice   | 0                    | 0%                     |
| Snow  | 1                    | 1%                     |
| Sand/Mud/Dirt   | 0                    | 0%                     |
| Cloudy  | 25                   | 14%                    |
| Wet   | 39                   | 22%                    |
| Dry   | 116                  | 64%                    |
| <b>Light Condition</b>  |                      |                        |
| Daylight  | 158                  | 87%                    |
| Dusk / Dawn   | 2                    | 1%                     |
| Dark/Lighted  | 14                   | 8%                     |
| Dark/Not Lighted  | 6                    | 3%                     |
| Not Indicated   | 1                    | 1%                     |
| <b>Crash Location</b>   |                      |                        |
| Along Roadway   | 118                  | 65%                    |
| At Intersection   | 63                   | 35%                    |
| <b>TOTAL</b>  | <b>181</b>           |                        |

**CRASH LOCATIONS / DRAWINGS / SUMMARY:**

See **Appendix 3** for crash type, severity, and general location of crashes. **Table 5** below is a tabulation of crash types shown on each drawing sheet and whether they are associated with a particular roadway segment or intersection. The largest number of non-intersection crash types are the “rear-end” crashes with 70 in a 3-year period. This type of crash is often associated with arterial streets with high driveway density and no turn lanes like the roadway segments along this corridor. The proposed improvements including a TWLTL would reduce this “rear-end” crash risk.

**TABLE 5: CRASH SUMMARY CRASH DRAWING - CRASH TYPE & LOCATION SUMMARY**

| DRAWING SHEET               | CRASH TYPE SUMMARY |          |                            |          |                 |           |                      |                       |          |            |
|-----------------------------|--------------------|----------|----------------------------|----------|-----------------|-----------|----------------------|-----------------------|----------|------------|
|                             | ANGLE              | HEAD-ON  | NO COLLISION<br>W/ VEHICLE | OTHER    | REAR<br>TO REAR | REAR-END  | SIDESWIPE<br>OPP DIR | SIDESWIPE<br>SAME DIR | UNKNOWN  | SUB-TOTAL  |
| <b>SHEET 1</b>              | <b>3</b>           | <b>0</b> | <b>3</b>                   | <b>1</b> | <b>0</b>        | <b>3</b>  | <b>0</b>             | <b>1</b>              | <b>0</b> | <b>11</b>  |
| SEGMENT                     | 2                  | 0        | 2                          | 0        | 0               | 2         | 0                    | 0                     | 0        | 6          |
| INTERSECTION                | 1                  | 0        | 1                          | 1        | 0               | 1         | 0                    | 1                     | 0        | 5          |
| <b>SHEET 2</b>              | <b>6</b>           | <b>2</b> | <b>3</b>                   | <b>3</b> | <b>0</b>        | <b>42</b> | <b>0</b>             | <b>2</b>              | <b>1</b> | <b>59</b>  |
| SEGMENT                     | 5                  | 1        | 3                          | 2        | 0               | 33        | 0                    | 1                     | 0        | 45         |
| INTERSECTION                | 1                  | 1        | 0                          | 1        | 0               | 9         | 0                    | 1                     | 1        | 14         |
| <b>SHEET 3</b>              | <b>4</b>           | <b>1</b> | <b>5</b>                   | <b>0</b> | <b>0</b>        | <b>20</b> | <b>1</b>             | <b>4</b>              | <b>0</b> | <b>35</b>  |
| SEGMENT                     | 2                  | 1        | 3                          | 0        | 0               | 14        | 1                    | 2                     | 0        | 23         |
| INTERSECTION                | 2                  | 0        | 2                          | 0        | 0               | 6         | 0                    | 2                     | 0        | 12         |
| <b>SHEET 4</b>              | <b>1</b>           | <b>0</b> | <b>2</b>                   | <b>0</b> | <b>0</b>        | <b>11</b> | <b>1</b>             | <b>1</b>              | <b>0</b> | <b>16</b>  |
| SEGMENT                     | 1                  | 0        | 2                          | 0        | 0               | 11        | 1                    | 1                     | 0        | 16         |
| INTERSECTION                | 0                  | 0        | 0                          | 0        | 0               | 0         | 0                    | 0                     | 0        | 0          |
| <b>SHEET 5</b>              | <b>23</b>          | <b>4</b> | <b>0</b>                   | <b>2</b> | <b>1</b>        | <b>21</b> | <b>0</b>             | <b>9</b>              | <b>0</b> | <b>60</b>  |
| SEGMENT                     | 12                 | 2        | 0                          | 2        | 0               | 10        | 0                    | 2                     | 0        | 28         |
| INTERSECTION                | 11                 | 2        | 0                          | 0        | 1               | 11        | 0                    | 7                     | 0        | 32         |
| <b>SHEET 1 TO 5 - TOTAL</b> | <b>37</b>          | <b>7</b> | <b>13</b>                  | <b>6</b> | <b>1</b>        | <b>97</b> | <b>2</b>             | <b>17</b>             | <b>1</b> | <b>181</b> |
| SEGMENT                     | 22                 | 4        | 10                         | 4        | 0               | 70        | 2                    | 6                     | 0        | 118        |
| INTERSECTION                | 15                 | 3        | 3                          | 2        | 1               | 27        | 0                    | 11                    | 1        | 63         |

**CRASH ANALYSIS - INTERSECTIONS:**

The intersection analysis in **Table 6** that follows summarizes 3-year crash rates at 11 intersections along the corridor. Cedar Lane at North Jackson Street has a crash rate that is 1.66 times greater than the state average rate for similar intersections. This rate appears to be just above the “critical” rate that TDOT would consider evaluation of safety due to crash rates. Crash rates at other intersections on the corridor are within satisfactory levels relative to their critical crash rate. West Grundy Street, Bel Aire Drive, and Lake Way Place are non-signalized intersections that have crash rates above the state average but below the critical rate.



**Table 6 - Crash Analysis - Intersection Crashes Only**

| Crash Statistics (INTERSECTION CRASHES ONLY), Cedar Lane - Westside Drive, Coffee County (1/1/2019 TO 12/31/2021) |       |          |           |              |       |               |      |                  |      |                |                  |               |                 |                     |
|---|-------|----------|-----------|--------------|-------|---------------|------|------------------|------|----------------|------------------|---------------|-----------------|---------------------|
| ID  | LM    | Route    | Side Road | ADT Mainline |       | ADT Side Road |      | Three Year Total |      | Statewide Rate | Actual/Statewide | Critical Rate | Actual/Critical | NOTES               |
|   |       |          |           | South        | North | West          | East | # Crashes        | Rate |                |                  |               |                 |                     |
| 1   | 0     | WESTSIDE | CLEMENT   | 8,237        |       | 7,783         |      | 5                | 0.29 | 0.61           | 0.47             | 1.07          | 0.27            | Signalized          |
| 2   | 0.49  | WESTSIDE | LINCOLN   | 8,834        |       | 7,530         |      | 8                | 0.45 | 0.61           | 0.73             | 1.07          | 0.42            | Signalized          |
| 3   | 0.579 | CEDAR    | GRUNDY    | 9,431        |       | 500           |      | 2                | 0.18 | 0.16           | 1.18             | 0.49          | 0.38            | Unsignalized w/o TL |
| 4   | 0.717 | CEDAR    | BEL AIRE  | 9,431        |       | 871           |      | 3                | 0.27 | 0.16           | 1.66             | 0.48          | 0.55            | Unsignalized w/o TL |
| 5   | 0.819 | CEDAR    | HICKORY   | 9,431        |       | 500           |      | 0                | 0.00 | 0.16           | 0.00             |               |                 | Unsignalized w/o TL |
| 6   | 0.85  | CEDAR    | HOGAN     | 9,431        |       | 250           |      | 1                | 0.09 | 0.16           | 0.60             |               |                 | Unsignalized w/o TL |
| 7   | 1.17  | CEDAR    | WILSON    | 10,447       |       | 8,738         |      | 12               | 0.57 | 0.61           | 0.94             | 1.03          | 0.55            | Signalized          |
| 8   | 1.435 | CEDAR    | MCKELLAR  | 10,447       |       | 500           |      | 0                | 0.00 | 0.16           | 0.00             |               |                 | Unsignalized w/o TL |
| 9   | 2.187 | CEDAR    | LAKE WAY  | 10,447       |       | 1,000         |      | 2                | 0.16 | 0.16           | 1.02             | 0.46          | 0.35            | Unsignalized w/o TL |
| 10  | 2.247 | CEDAR    | WILLIAMS  | 10,447       |       | 1,000         |      | 1                | 0.08 | 0.13           | 0.64             | 0.41          | 0.19            | Unsignalized w/ TL  |
| 11  | 2.7   | CEDAR    | JACKSON   | 6,869        |       | 19,344        |      | 29               | 1.01 | 0.61           | 1.66             | 0.97          | 1.04            | Signalized          |
| <b>TOTAL</b>  |       |          |           |              |       |               |      | <b>63</b>        |      |                |                  |               |                 |                     |

NOTES:

2017-2019 STID Statewide Intersection Crash for urban intersections for 2-lane w/ turn and w/o turn facilities

AADT DATA from TDOT ETRIMS

Critical Rate Calculations using TDOT IIE Form v2

Intersection Crash Rate Units is crashes per million entering vehicles

**CRASH ANALYSIS - SEGMENTS:**

**Tables 7 and 8** are a summary of segment or roadway crashes along the study corridor. This data indicates that the roadway segment between West Lincoln Street and Wilson Avenue has the highest rate of crashes at 2.04 times the statewide rate and an Actual / Critical Rate of 1.38. The data for this 3 year period produced 43 rear-end crashes that are not associated with an intersection. The proposed 2-lane section with a TWLTL lane would reduce the risk of these type of crashes and is recommended based on the crash history and driveway density along this section of roadway.

**TABLE 7 - CRASH ANALYSIS - SEGMENT CRASHES ONLY**

| Crash Statistics (SEGMENT CRASHES ONLY), Cedar Lane - Westside Drive, Coffee County (1/1/2019 TO 12/31/2021) |              |       |                    |       |                  |       |             |            |          |             |            |            |              |                |                |                  |               |                 |
|--|--------------|-------|--------------------|-------|------------------|-------|-------------|------------|----------|-------------|------------|------------|--------------|----------------|----------------|------------------|---------------|-----------------|
| ROUTE  | LANE CONFIG  | Begin |                    | End   |                  | Dist. | AADT 2021   | Crashes    |          |             |            |            | Overall Rate | Severity Index | Statewide Rate | Actual/Statewide | Critical Rate | Actual/Critical |
|  |              | LM    | Description        | LM    | Description      |       |             | Total      | Fatal    | Incap. Inj. | Other Inj. | PDO        |              |                |                |                  |               |                 |
| WESTSIDE   | 2 LN         | 0.000 | WESTSIDE - CLEMENT | 0.490 | W LINCOLN ST     | 0.490 | 8,237       | 11         | 0        | 0           | 0          | 11         | 2.49         | 0.00           | 3.346          | 0.74             | 5.48          | 0.45            |
| CEDAR  | 2 LN         | 0.490 | W LINCOLN ST       | 1.170 | WILSON AVE       | 0.680 | 10,447      | 53         | 0        | 0           | 6          | 47         | 6.81         | 0.11           | 3.346          | 2.04             | 4.94          | 1.38            |
| CEDAR  | 2 LN         | 1.170 | WILSON AVE         | 2.250 | WILLIAM NORTHERN | 1.080 | 10,447      | 33         | 0        | 0           | 4          | 29         | 2.67         | 0.12           | 3.346          | 0.80             | 4.60          | 0.58            |
| CEDAR  | 2 LN W TWLTL | 2.250 | WILLIAM NORTHERN   | 2.700 | N JACKSON ST     | 0.450 | 9,729       | 21         | 0        | 0           | 3          | 18         | 4.38         | 0.14           | 3.461          | 1.27             | 5.54          | 0.79            |
| <b>TOTAL</b>   |              |       |                    |       |                  |       | <b>2.70</b> | <b>118</b> | <b>0</b> | <b>0</b>    | <b>13</b>  | <b>105</b> |              |                |                |                  |               |                 |

NOTES:

2017-2019 STID Statewide average crash rate for similar facilities (2 LN = Urban Section 2 or 3 LN) is 3.346 crashes per million vehicle miles

2017-2019 STID Statewide average crash rate for similar facilities (2 LN w/TWLTL = Urban Section 2 or 3 LN) is 3.461 crashes per million vehicle miles

AADT DATA from TDOT ETRIMS

Segment Crash Rate Units is crashes per million miles traveled

**TABLE 8 - CRASH ANALYSIS - TOTAL CRASHES (SEGMENTS & INTERSECTION)**

| Crash Statistics (Total), Cedar Lane - Westside Drive, Coffee County (1/1/2019 TO 12/31/2021) |              |       |                    |       |                  |       |             |            |          |             |            |            |              |                |  |
|---|--------------|-------|--------------------|-------|------------------|-------|-------------|------------|----------|-------------|------------|------------|--------------|----------------|--|
| ROUTE   | LANE CONFIG  | Begin |                    | End   |                  | Dist. | AADT 2021   | Crashes    |          |             |            |            | Overall Rate | Severity Index |  |
|   |              | LM    | Description        | LM    | Description      |       |             | Total      | Fatal    | Incap. Inj. | Other Inj. | PDO        |              |                |  |
| WESTSIDE  | 2 LN         | 0.000 | WESTSIDE - CLEMENT | 0.490 | W LINCOLN ST     | 0.49  | 8,237       | 24         | 0        | 1           | 4          | 19         | 5.43         | 0.25           |  |
| CEDAR   | 2 LN         | 0.490 | W LINCOLN ST       | 1.170 | WILSON AVE       | 0.68  | 10,447      | 71         | 0        | 0           | 7          | 64         | 9.13         | 0.10           |  |
| CEDAR   | 2 LN         | 1.170 | WILSON AVE         | 2.250 | WILLIAM NORTHERN | 1.08  | 10,447      | 36         | 0        | 0           | 5          | 31         | 2.91         | 0.14           |  |
| CEDAR   | 2 LN W TWLTL | 2.250 | WILLIAM NORTHERN   | 2.700 | N JACKSON ST     | 0.45  | 9,729       | 50         | 0        | 0           | 6          | 44         | 10.43        | 0.12           |  |
| <b>TOTAL</b>  |              |       |                    |       |                  |       | <b>2.70</b> | <b>181</b> | <b>0</b> | <b>1</b>    | <b>22</b>  | <b>158</b> |              |                |  |

NOTES:

AADT DATA from TDOT ETRIMS



## 4.0 EXISTING AND FUTURE TRAFFIC PROJECTIONS

Traffic was projected to the Initial Study Year of 2026 and the Design Year of 2046. The following intersections were included in the projections:

1. Westside Drive at Clement Drive
2. Westside Drive/Cedar Lane at Lincoln Street
3. Cedar Lane at Wilson Avenue
4. Cedar Lane at North Jackson Street

Annual Average Daily Traffic (AADT) along Westside Drive & Cedar Lane within the study area are projected to range as indicated in **Table 9** that follows:

**TABLE 9: PROJECTED AADT**

| Projected AADT |        |
|----------------|--------|
| 2026 AADT      | 9,846  |
| 2046 AADT      | 10,128 |

## 5.0 CONCEPTUAL ALTERNATIVE

The analysis performed as part of this study indicates that operational issues along this corridor are generally caused by a lack of left turn lanes along the Westside Drive and Cedar Lane study corridor. A typical TWLTL is needed to address safety and congestion concerns along these roadway segments. The addition of multimodal facilities will improve pedestrian mobility and pedestrian safety.

### 5.1 OVERVIEW OF ADJOINING PROJECTS

A multi-modal study for the City of Tullahoma and Manchester have been previously completed.

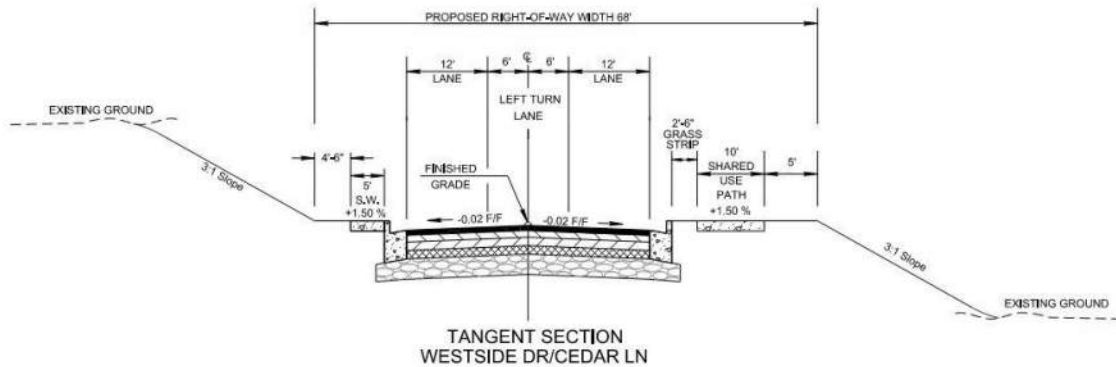
The intersection at Cedar Lane and Wilson Avenue is currently under design for improvements under PIN #101589.01. The proposed widening of Westside Drive/Cedar Lane will tie to the project limits of the intersection improvement project.

Sidewalk improvements adjacent to the northern/eastern side of Cedar Lane from approximately the Church of Christ at Cedar Lane to William Northern Boulevard are also proposed under PIN #128184.00. The alignment of the proposed project will need to be modified to match the outside edge of the proposed multi-use path in order to accommodate maintenance of traffic and constructability of Cedar Lane widening without removing recently placed sidewalk.

Improvement recommendations for the study area are described below. Conceptual plans with views of both the No Build Option and Build Option follow.

### 5.2 TYPICAL SECTION

The proposed typical section (shown in **Figure 6**) would include a two (2)-lane roadway with a TWLTL. Design criteria is consistent with TDOT Standard Drawing RD11-TS-7A. It would include a ten (10) foot shared use path with a two (2) foot six (6) inch grass strip adjacent to the north side of the roadway and a five (5) foot sidewalk adjacent to the south side of the roadway.



**FIGURE 6: PROPOSED TYPICAL SECTION**

### **5.3 HORIZONTAL ALIGNMENT**

The proposed horizontal and vertical alignment will follow the existing route for most portions of the study corridor, with the exception of the area near the DW Wilson Community Center. In this section, the alignment will be shifted slightly towards the south in order to avoid any impacts to the community center. Existing right-of-way varies throughout the corridor with widths between 40 feet and 70 feet. Varying amounts of right-of-way will be required for many properties along the study corridor in order to fit the widened typical section into this corridor.

### **5.4 MAINTENANCE OF TRAFFIC AND CONSTRUCTABILITY**

Westside Drive/Cedar Lane will be widened from the existing centerline, with the exception of the shifted alignment area near the DW Wilson Community Center. Two way traffic will be maintained throughout the duration of construction through the use of temporary pavement on the north side of the existing roadway.

### **5.5 INTERSECTION IMPROVEMENTS**

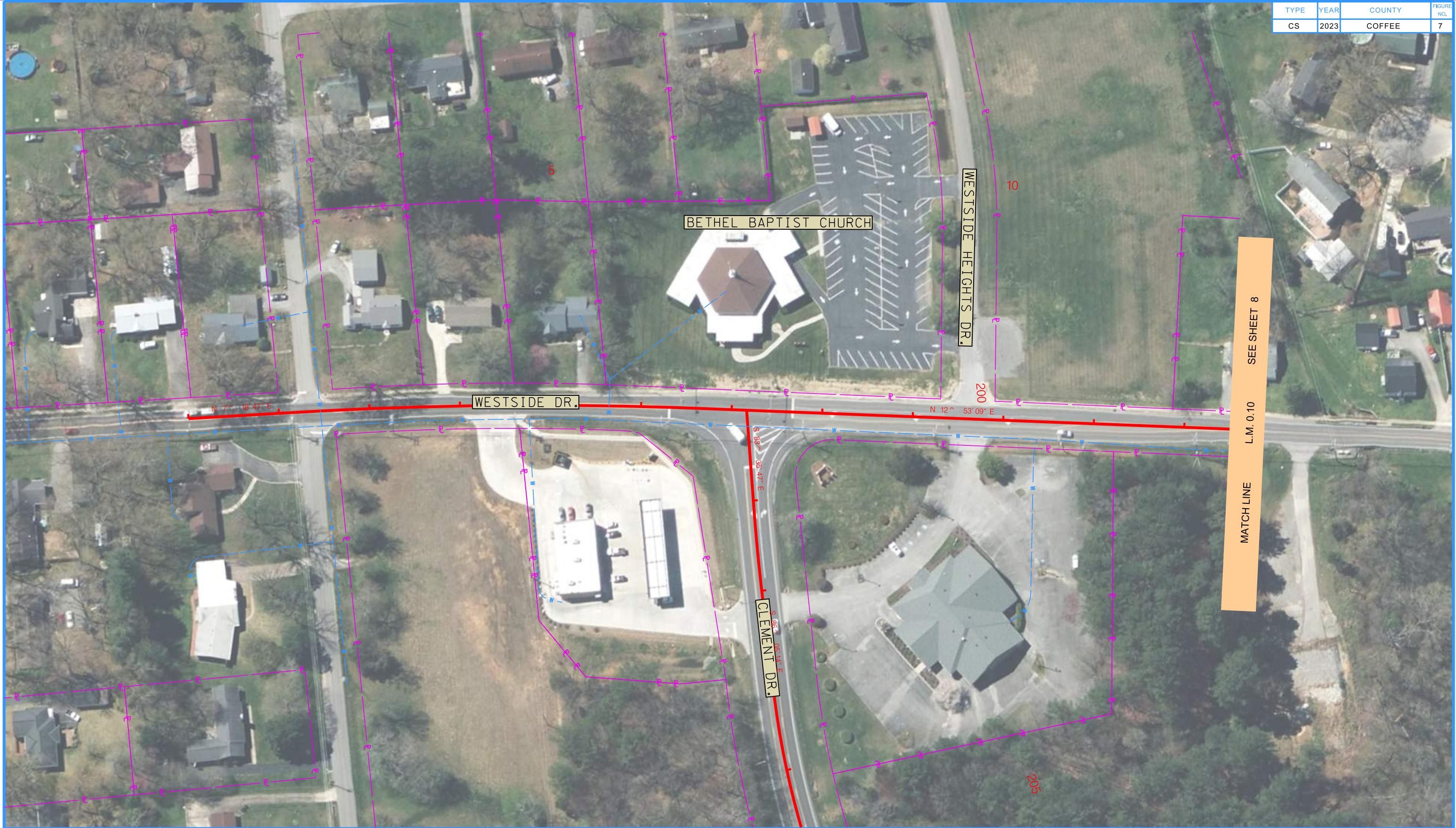
Multimodal improvements will be made at all of the intersections of Westside Drive & Clement Drive, Westside Drive/Cedar Lane & West Lincoln Street and Cedar Lane & William Northern Boulevard. All existing crosswalks, signal indications, pedestrian buttons, curb ramps, advanced traffic control features where appropriate, will be upgraded to meet Americans with Disabilities (ADA) standards and new curb ramps will be added where necessary.

### **5.6 CONCEPTUAL PLANS**

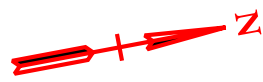
The Westside Drive/Cedar Lane conceptual plans are provided on the following pages in **Figures 7-18**. The plan sheets show both the No Build Condition and the Build Option. The study corridor was analyzed from Clement Drive to North Jackson Street, however, improvements are shown from Clement Drive to William Northern Boulevard. The section of corridor from William Northern Boulevard to North Jackson Street has already been improved with a TWLTL and sidewalk.



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 7          |



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## CORRIDOR STUDY NO BUILD LAYOUT

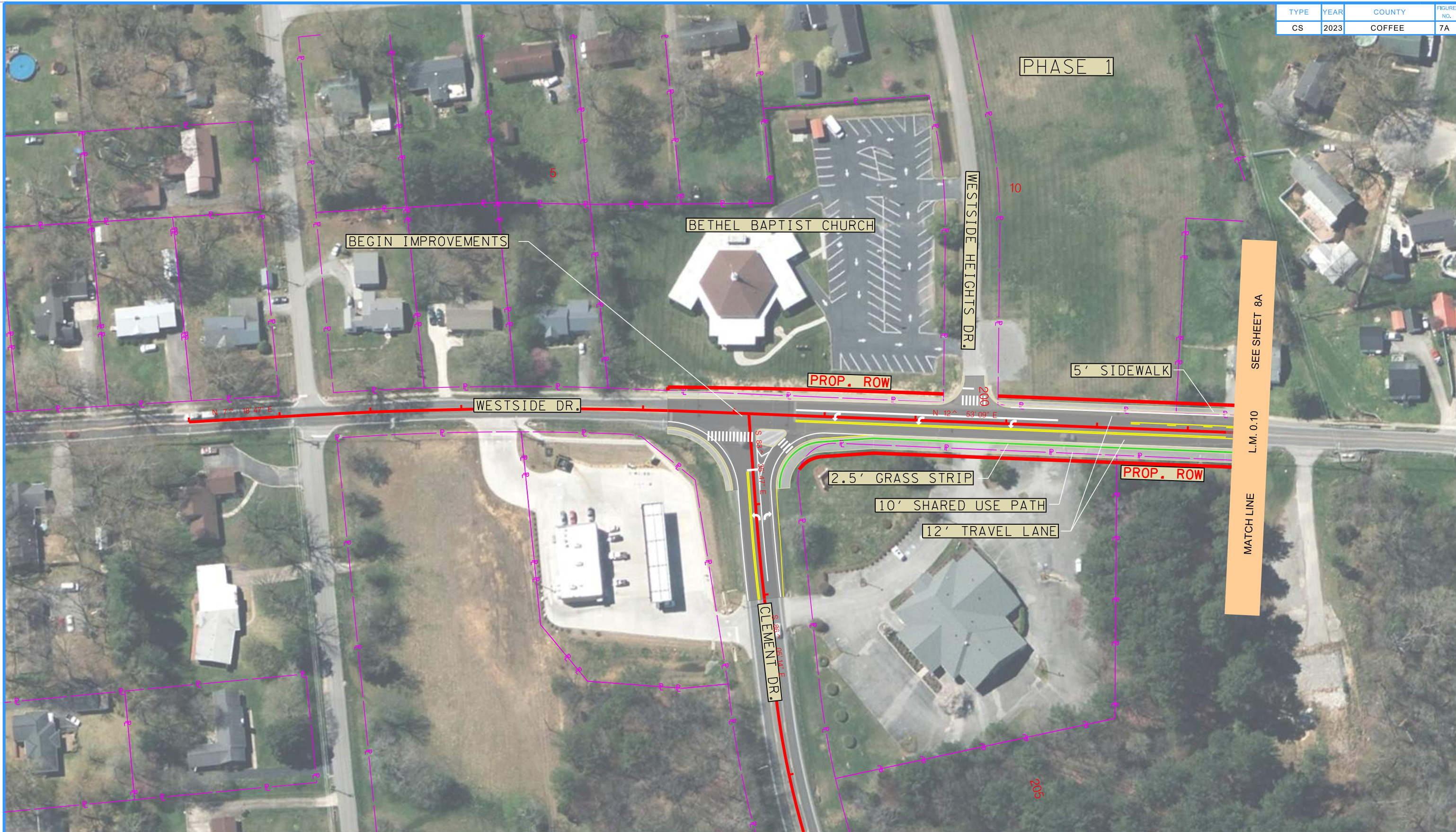
WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

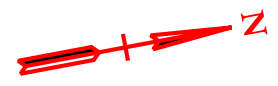
FIGURE 7



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 7A         |



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## CORRIDOR STUDY BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

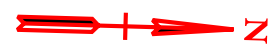
FIGURE 7A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 8          |



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## CORRIDOR STUDY NO BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

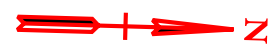
FIGURE 8



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 8A         |



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## CORRIDOR STUDY BUILD LAYOUT

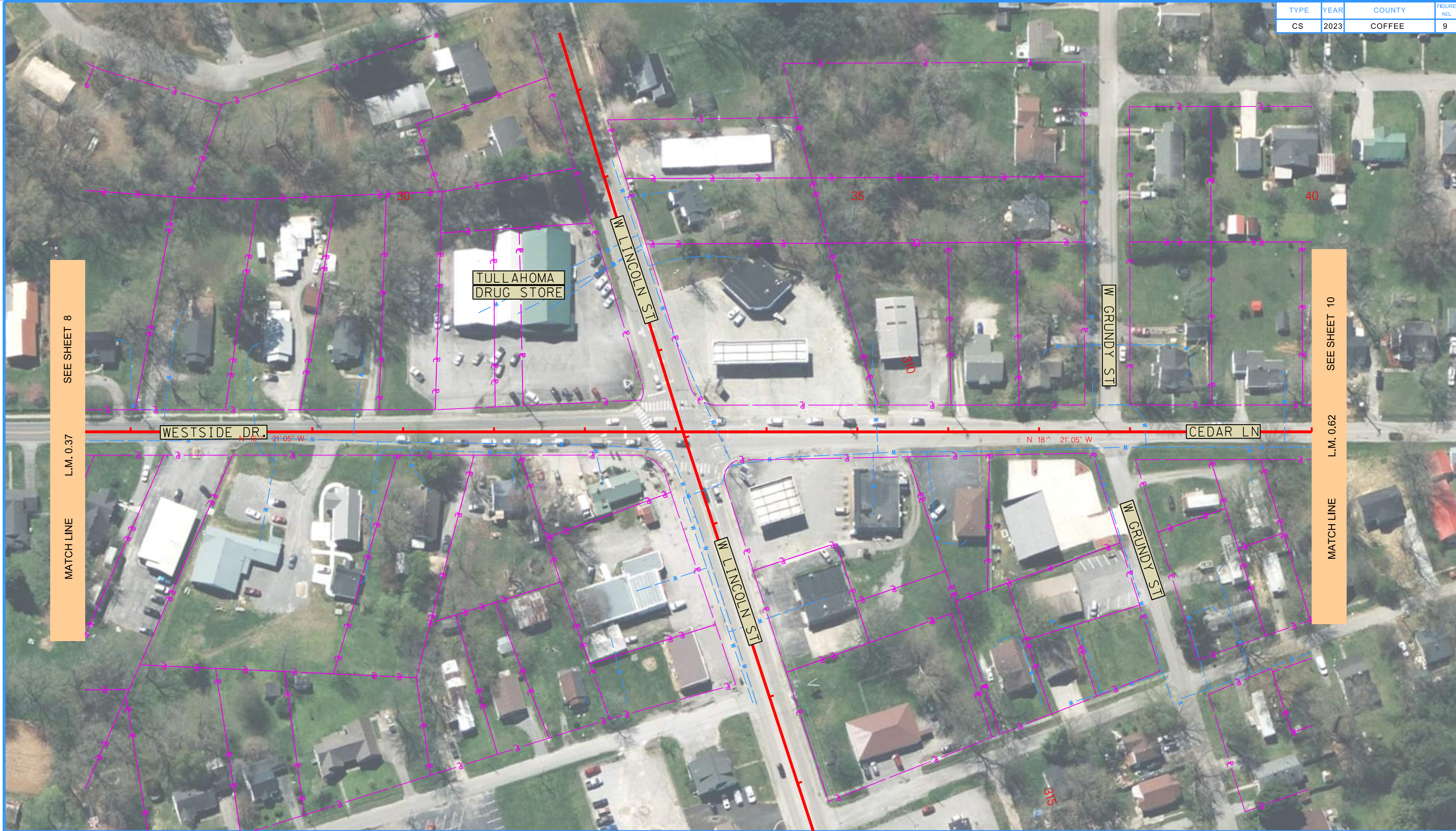
WESTSIDE DRIVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

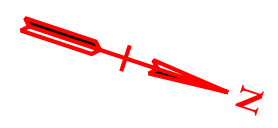
FIGURE 8A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
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## CORRIDOR STUDY NO BUILD LAYOUT

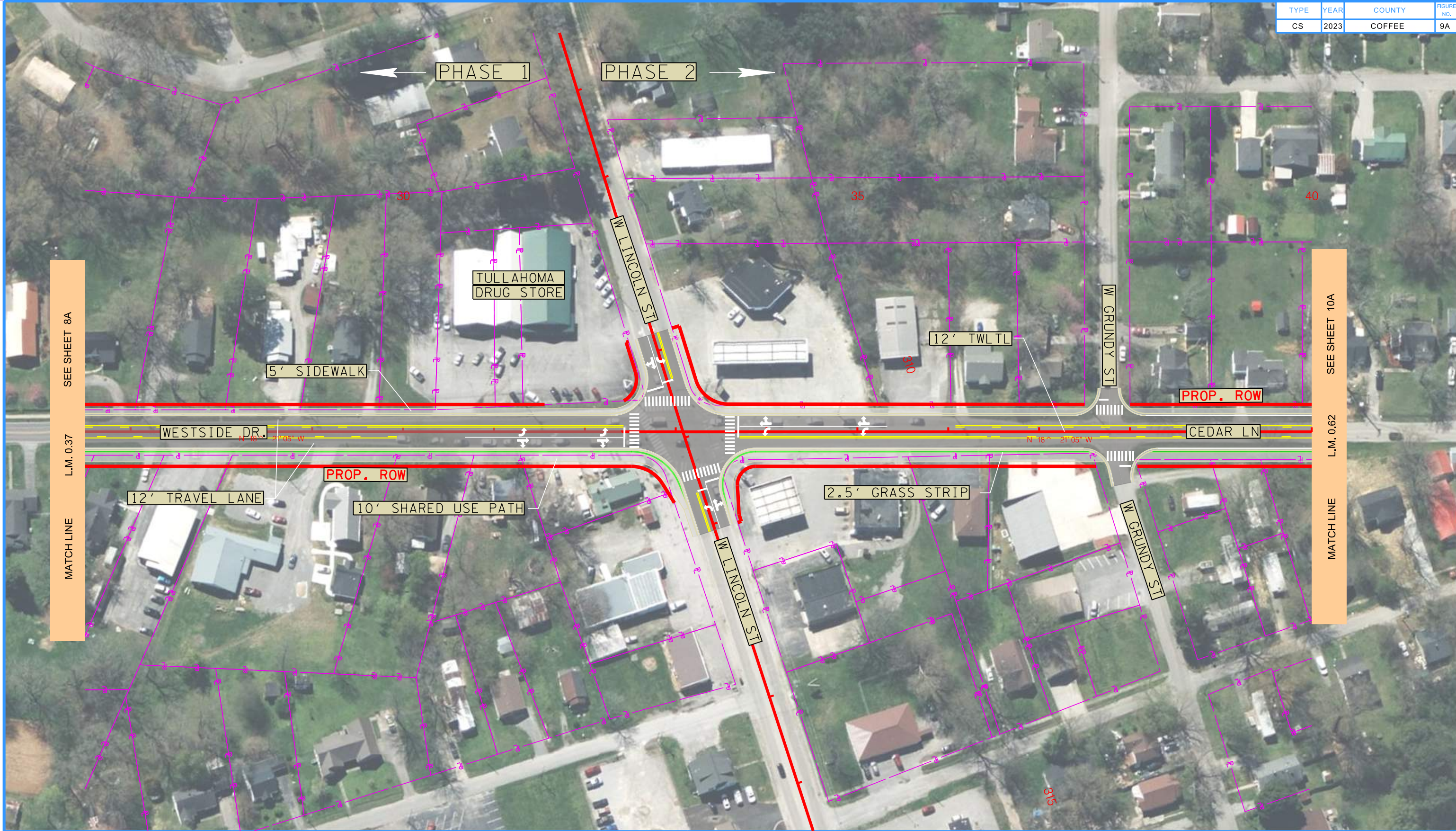
WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

FIGURE 9

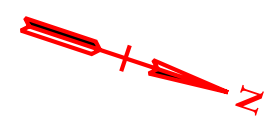


| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 9A         |



SEE SHEET 8A  
L.M. 0.37  
MATCH LINE

SEE SHEET 10A  
L.M. 0.62  
MATCH LINE



## CORRIDOR STUDY BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

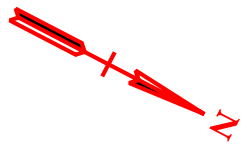
FIGURE 9A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 10         |



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 \\global.gsp\data\hna\_nf0814460606101Work\01\CAD\Tullahoma\_Figure4.sht



## CORRIDOR STUDY NO BUILD LAYOUT

WESTSIDE DRIVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

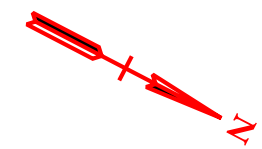
FIGURE 10



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 10A        |



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 \\global.gsp\data\hna\_nf0814460606101\Work\01\CAD\Tullahoma\_Figure4A.sht



## CORRIDOR STUDY BUILD LAYOUT

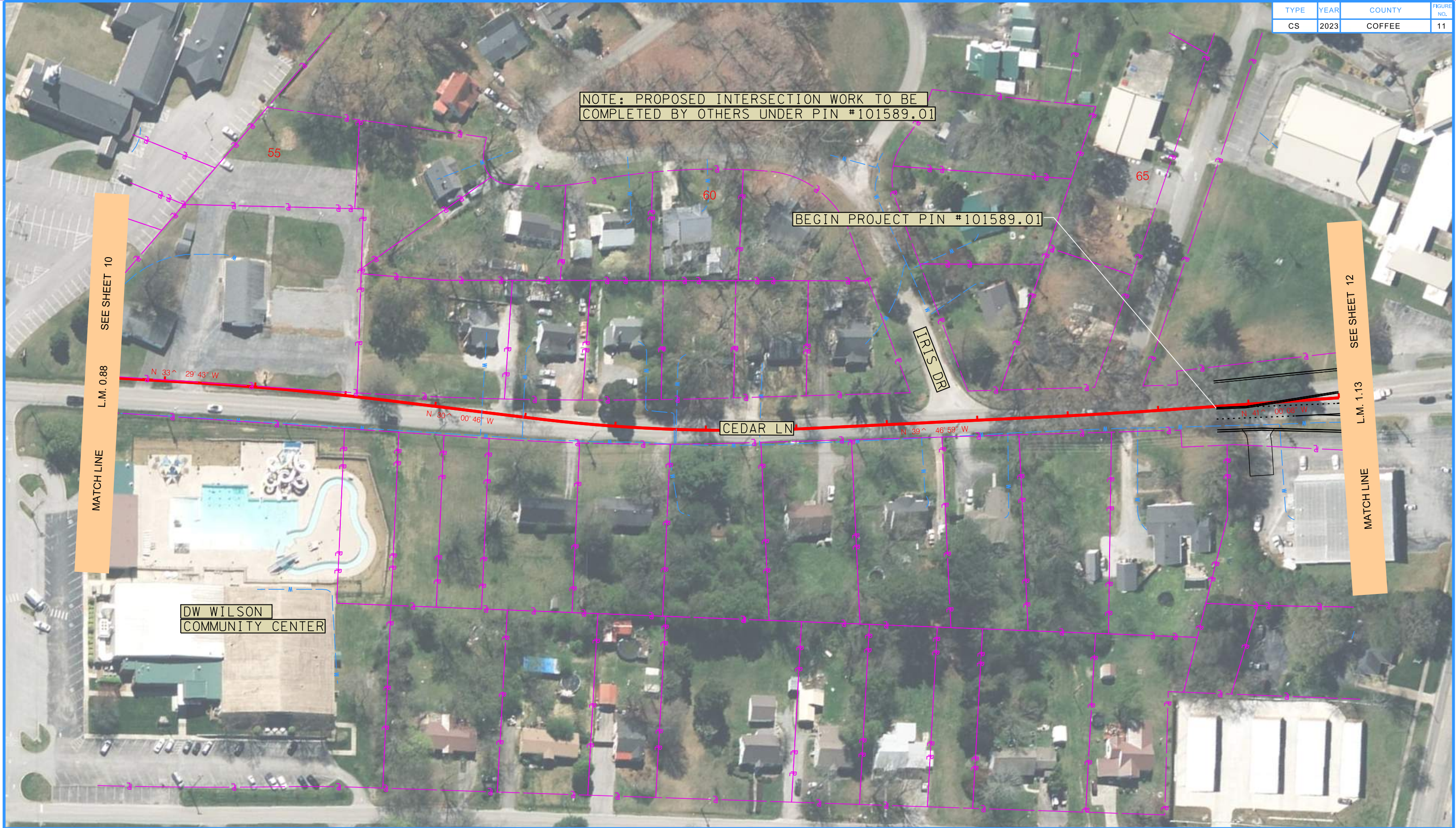
WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

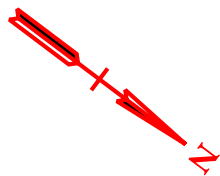
FIGURE 10A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 11         |



7/6/2023 4:37:07 PM  
 \\global.gsp\data\hna\_nf0814460606101\Work\01\CAD\Tullahoma\_Figure5.sht



## CORRIDOR STUDY NO BUILD LAYOUT

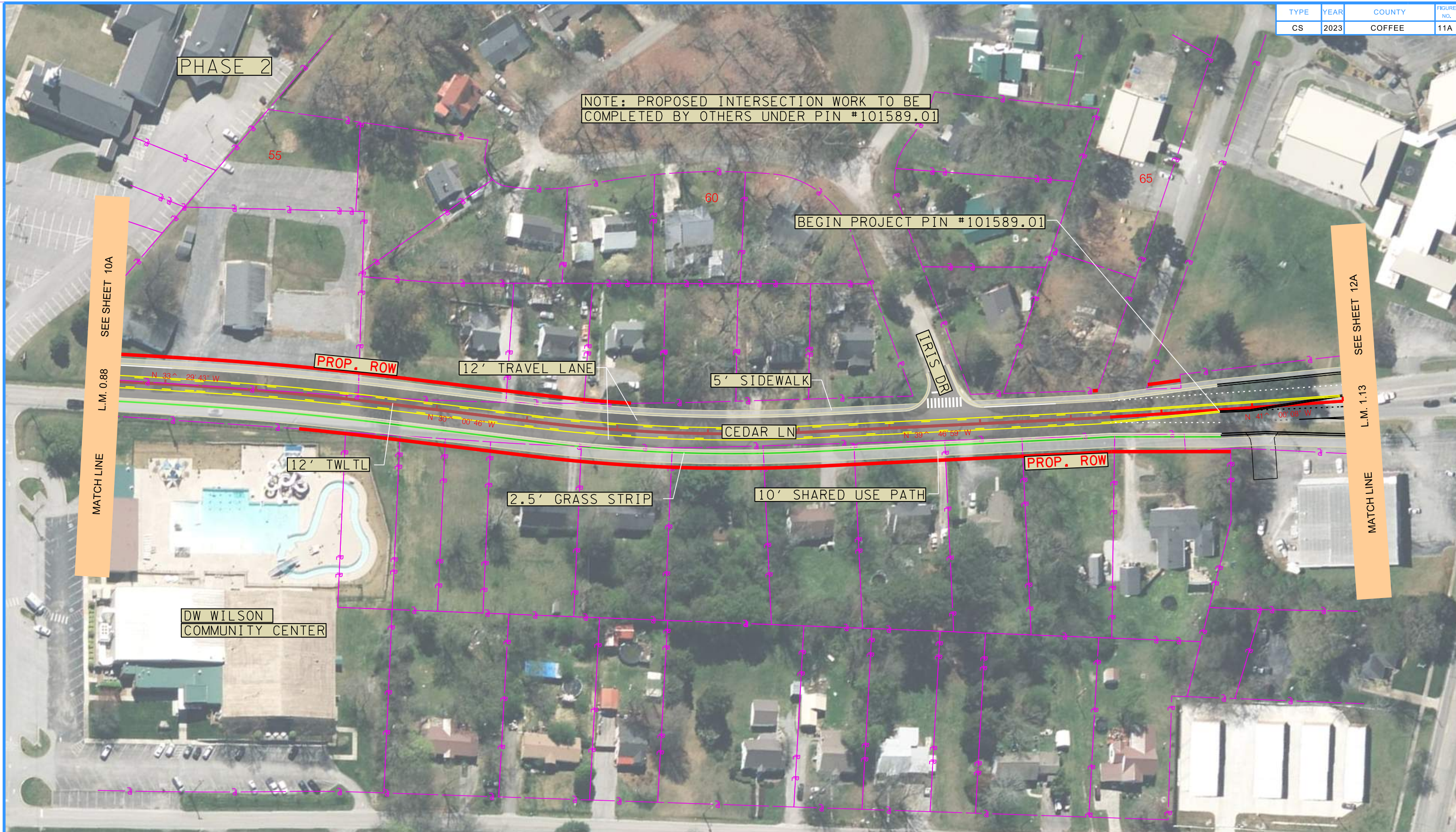
WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

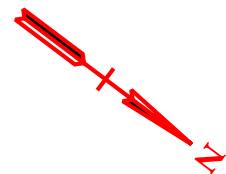
FIGURE 11



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 11A        |



7/6/2023 4:37:42 PM  
 \\global.gsp\data\hna\_nf0814460606101\Work\01\CAD\Tullahoma\_Figure5A.sht



## CORRIDOR STUDY BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

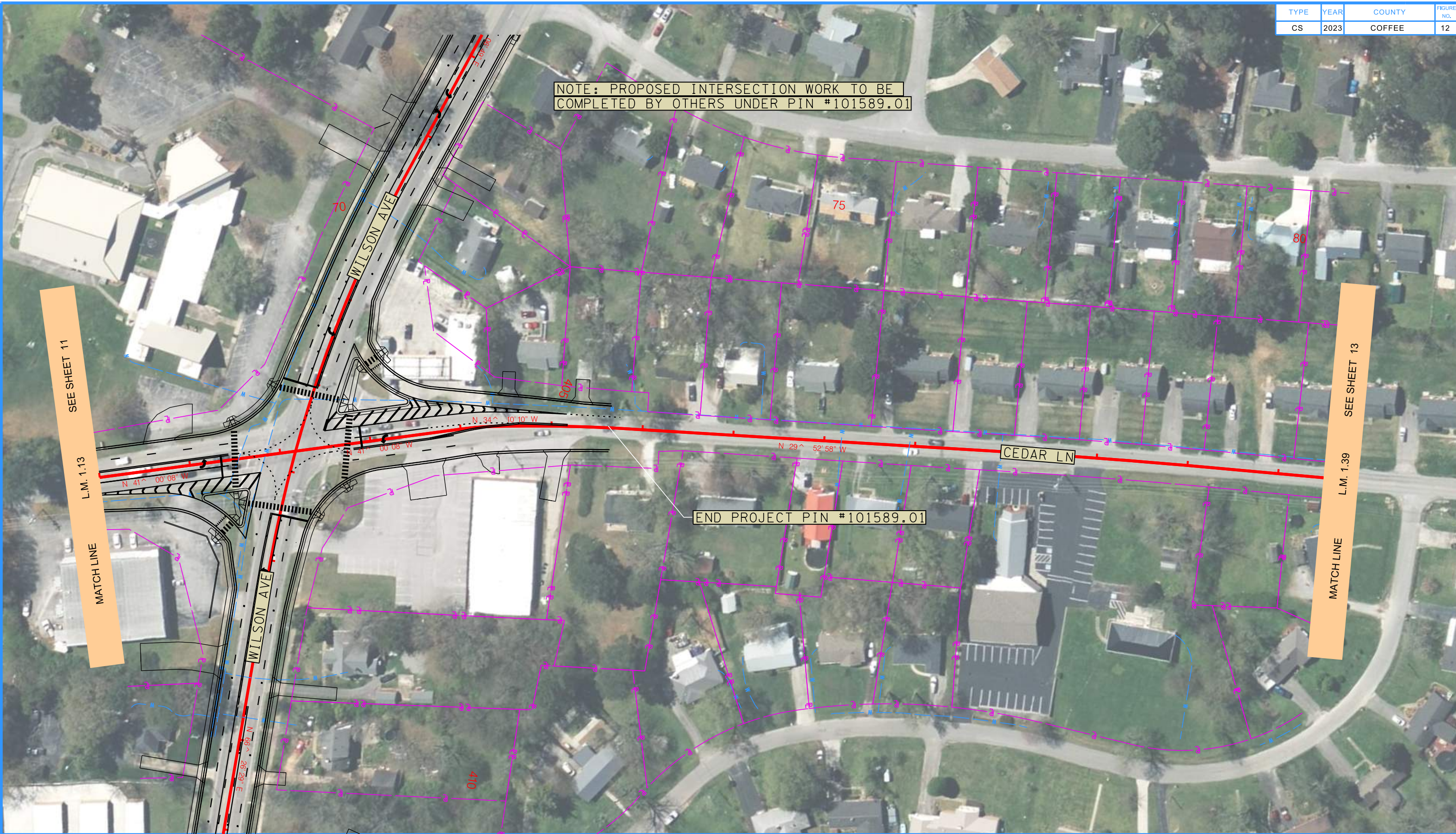
STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

FIGURE 11A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 12         |

NOTE: PROPOSED INTERSECTION WORK TO BE COMPLETED BY OTHERS UNDER PIN #101589.01



## CORRIDOR STUDY NO BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

FIGURE 12

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| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 12A        |

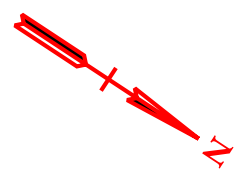
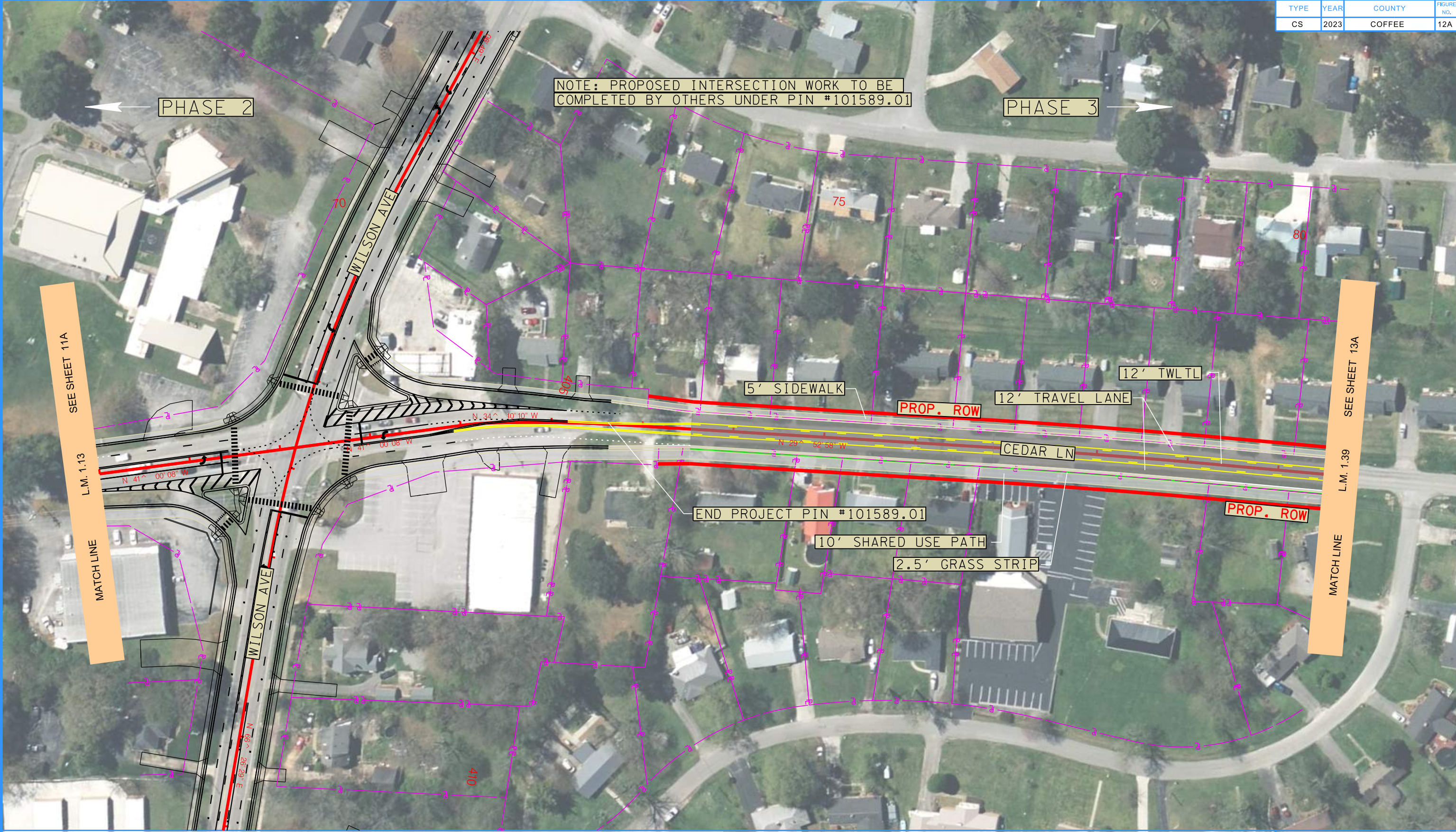
NOTE: PROPOSED INTERSECTION WORK TO BE COMPLETED BY OTHERS UNDER PIN #101589.01

PHASE 2

PHASE 3

SEE SHEET 11A  
L.M. 1.13  
MATCH LINE

SEE SHEET 13A  
L.M. 1.39  
MATCH LINE



## CORRIDOR STUDY BUILD LAYOUT

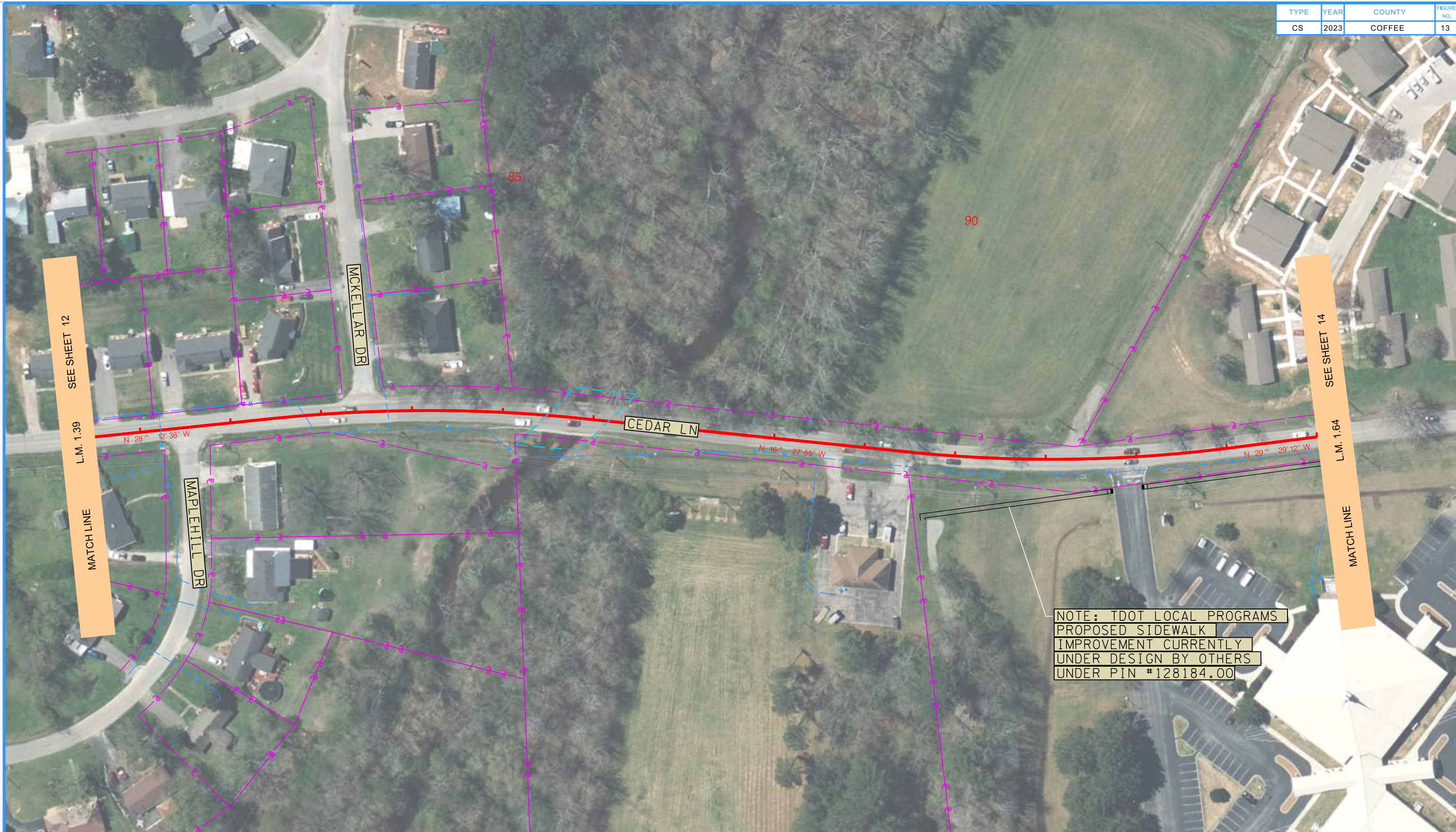
WESTSIDE DRVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

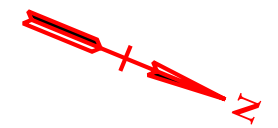
FIGURE 12A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 13         |



7/6/2023 4:39:26 PM  
 \\global.gsp\data\hna\_n\0814460606\01\Work\01\CAD\Tullahoma\_Figure7.sht



## CORRIDOR STUDY NO BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

NOTE: TDOT LOCAL PROGRAMS  
 PROPOSED SIDEWALK  
 IMPROVEMENT CURRENTLY  
 UNDER DESIGN BY OTHERS  
 UNDER PIN #128184.00

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

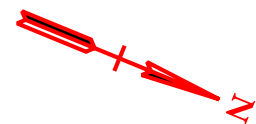
FIGURE 13



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 13A        |



7/6/2023 4:39:59 PM  
 \\global.gsp\data\hna\_n\0814460606101\Work\01\CAD\Tullahoma\_Figure7A.sht



## CORRIDOR STUDY BUILD LAYOUT

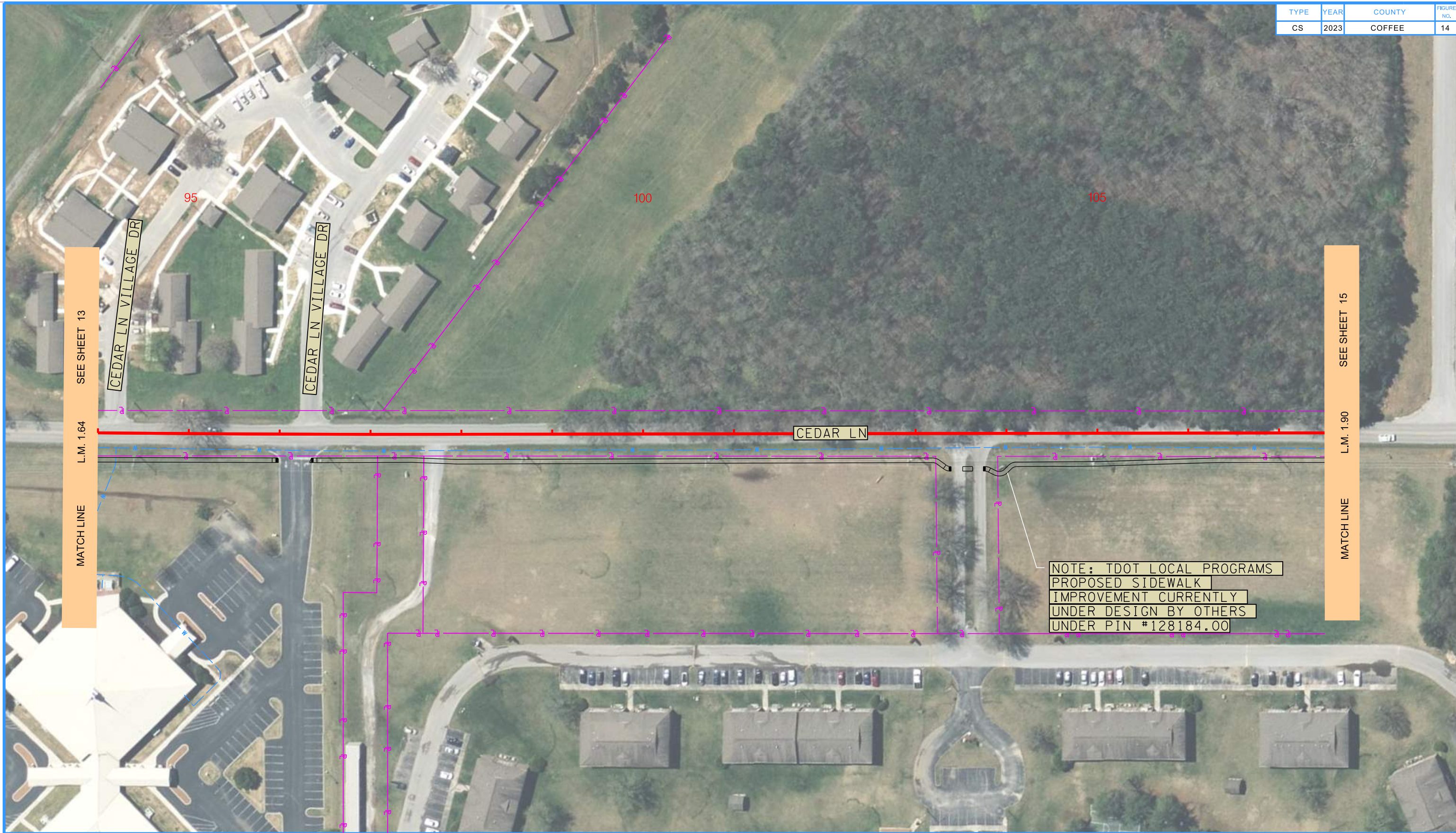
WESTSIDE DRIVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

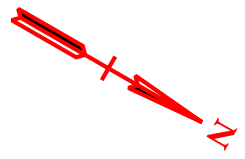
FIGURE 13A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 14         |



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 \\global.gsp\data\hina\_n\0814460606\01Work\01CAD\Tullahoma\_Figure8.sht



## CORRIDOR STUDY NO BUILD LAYOUT

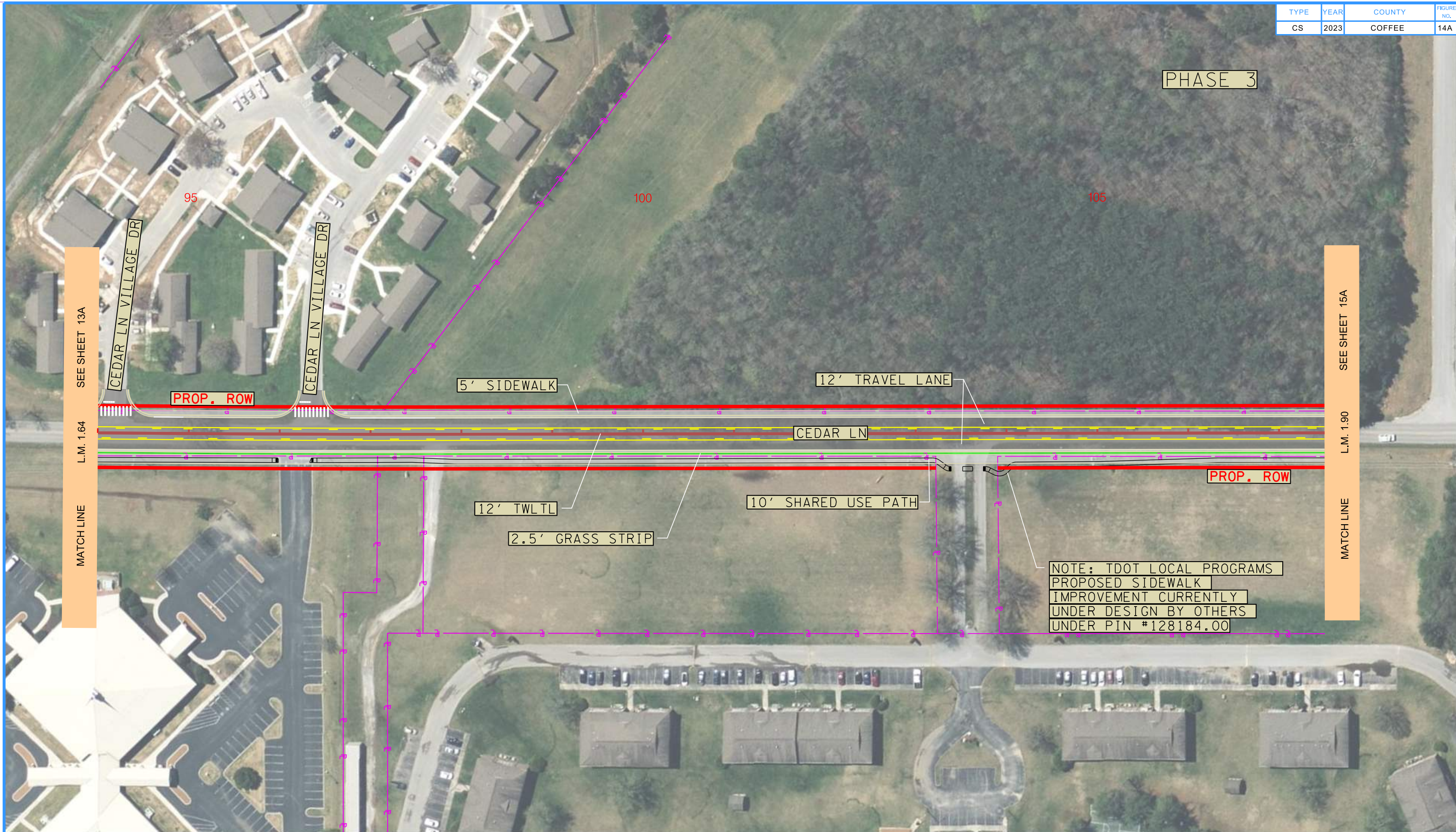
WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

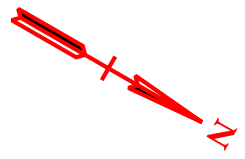
FIGURE 14



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 14A        |



7/6/2023 4:41:03 PM \\global.gsp\data\hna\_n\0814460606\01Work\01CAD\Tullahoma\_Figure8A.sht



## CORRIDOR STUDY BUILD LAYOUT

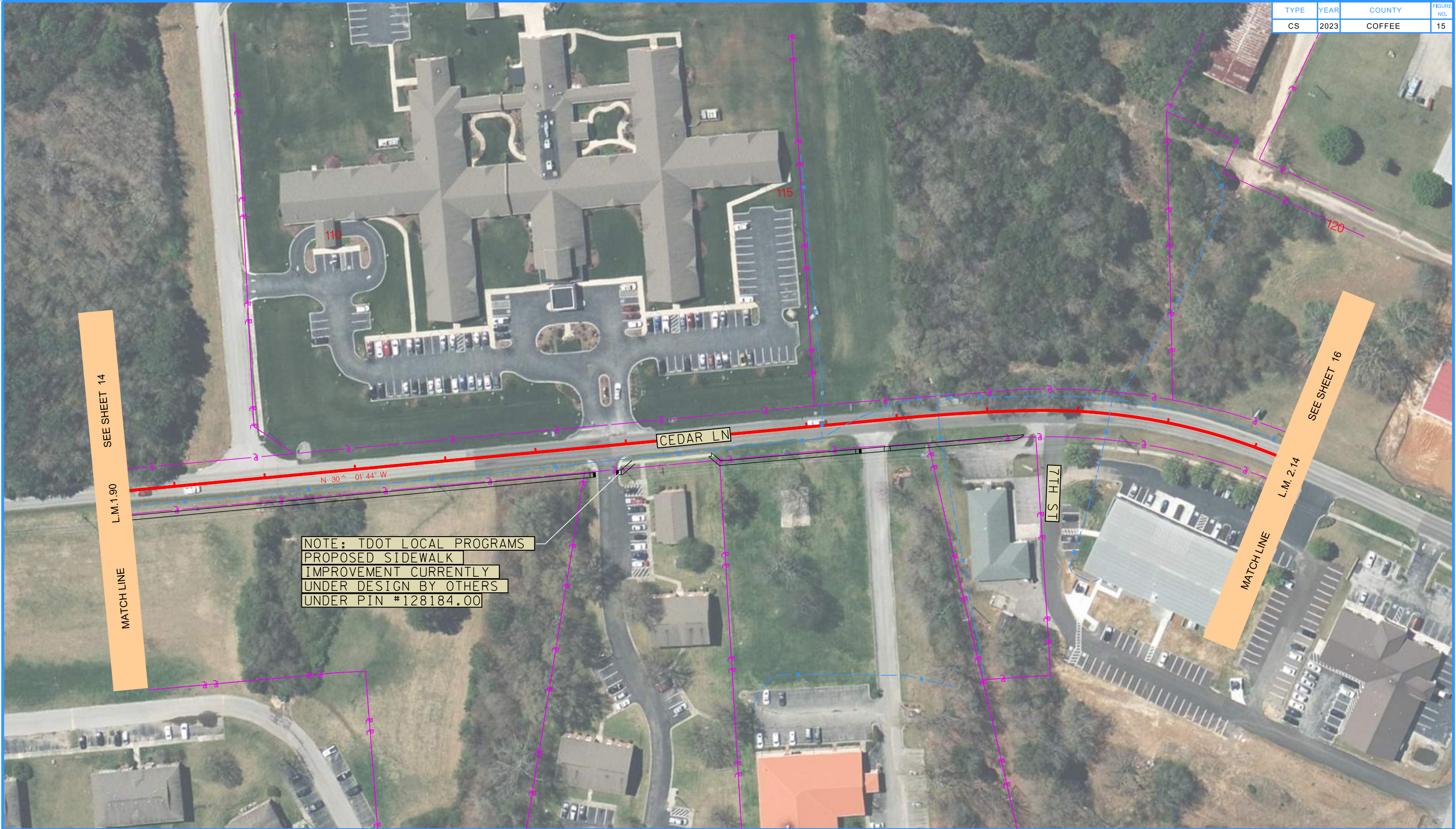
WESTSIDE DRIVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

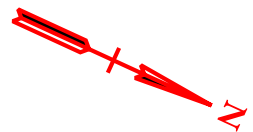
FIGURE 14A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 15         |



NOTE: TDOT LOCAL PROGRAMS  
 PROPOSED SIDEWALK  
 IMPROVEMENT CURRENTLY  
 UNDER DESIGN BY OTHERS  
 UNDER PIN #128184.00



## CORRIDOR STUDY NO BUILD LAYOUT

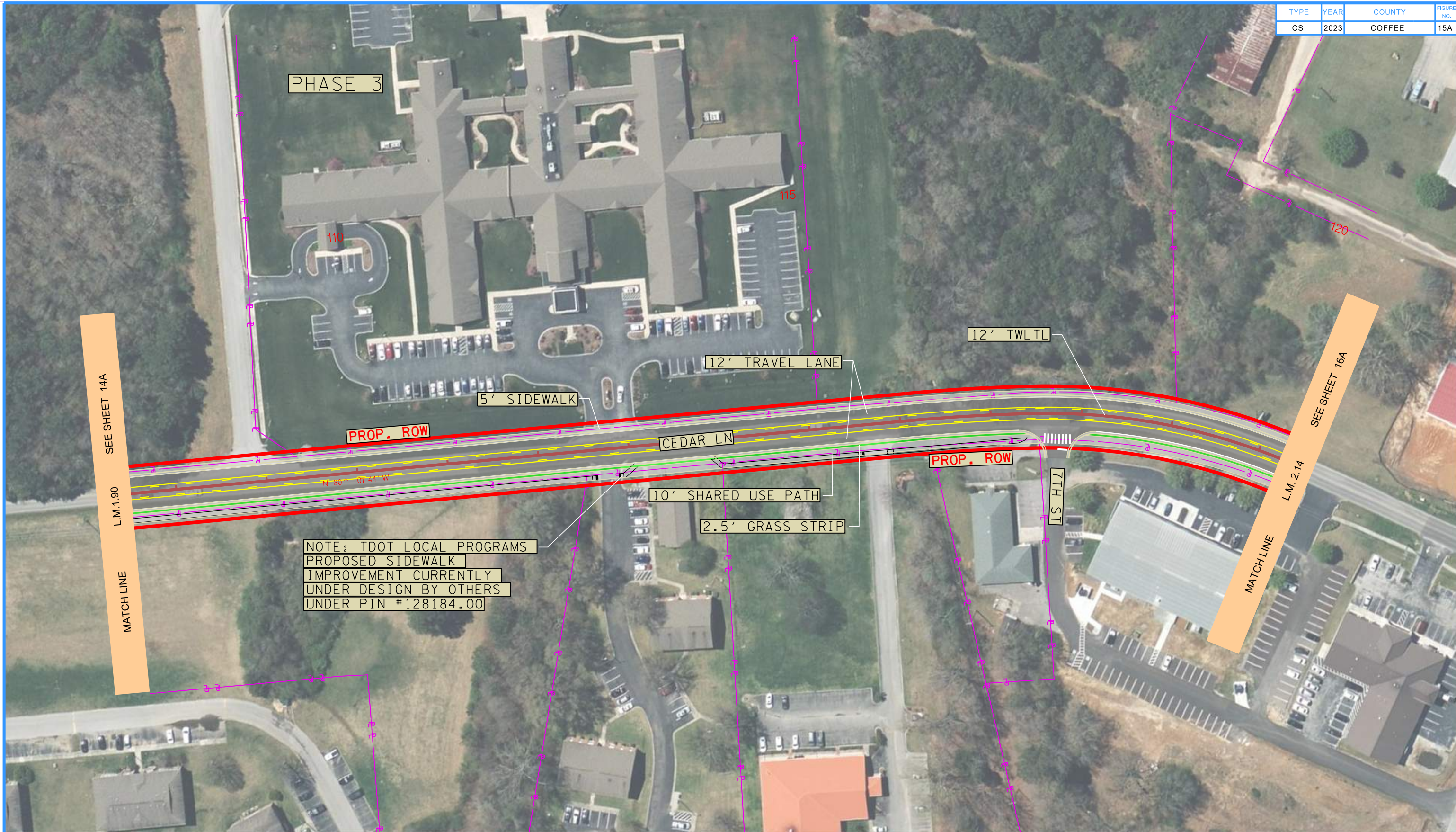
WESTSIDE DRIVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

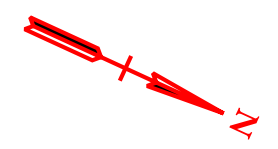
FIGURE 15



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 15A        |



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\\global.gsp\data\hna\_n\0814460606\01\Work\01\CAD\Tullahoma\_Figure9A.sht



## CORRIDOR STUDY BUILD LAYOUT

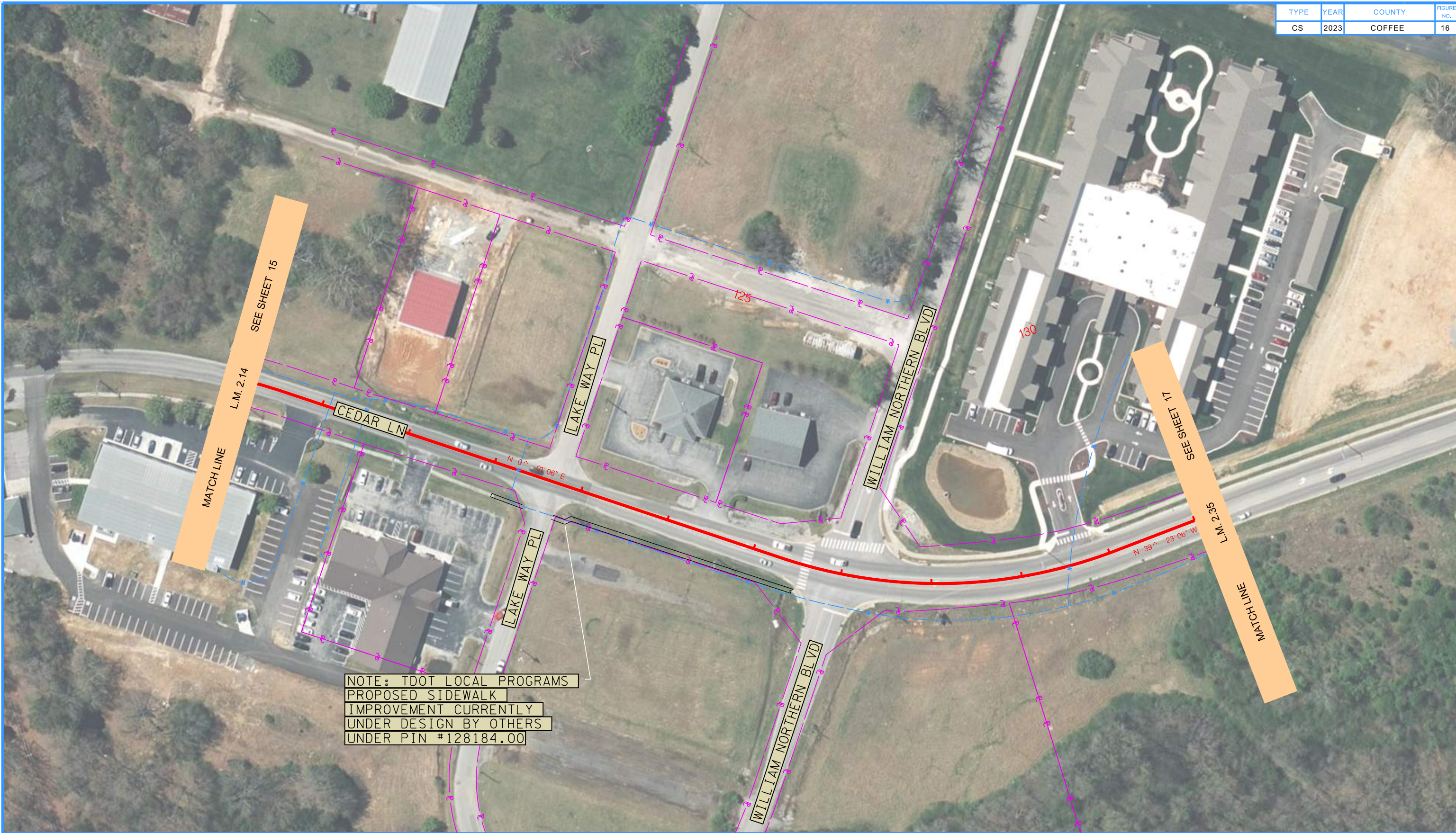
WESTSIDE DRVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

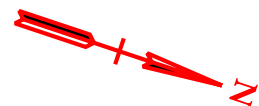
FIGURE 15A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 16         |



NOTE: TDOT LOCAL PROGRAMS  
 PROPOSED SIDEWALK  
 IMPROVEMENT CURRENTLY  
 UNDER DESIGN BY OTHERS  
 UNDER PIN #128184.00



## CORRIDOR STUDY NO BUILD LAYOUT

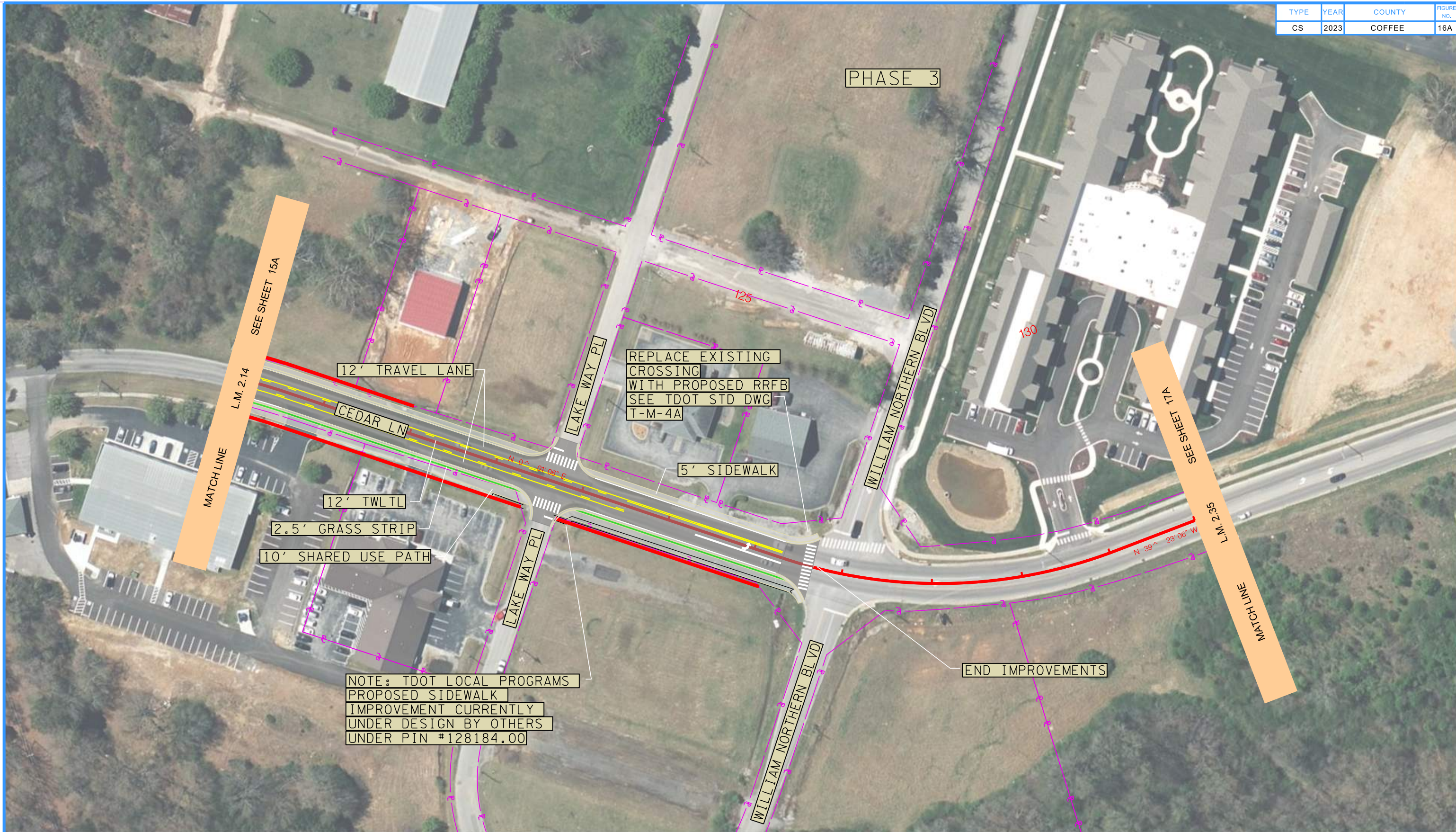
WESTSIDE DRIVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

FIGURE 16



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 16A        |



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## CORRIDOR STUDY BUILD LAYOUT

WESTSIDE DRIVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

FIGURE 16A



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 17         |



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 \\global.gsp\data\hina\_n\0814460606\01Work\01CAD\Tullahoma\_Figure11.sht



## CORRIDOR STUDY NO BUILD LAYOUT

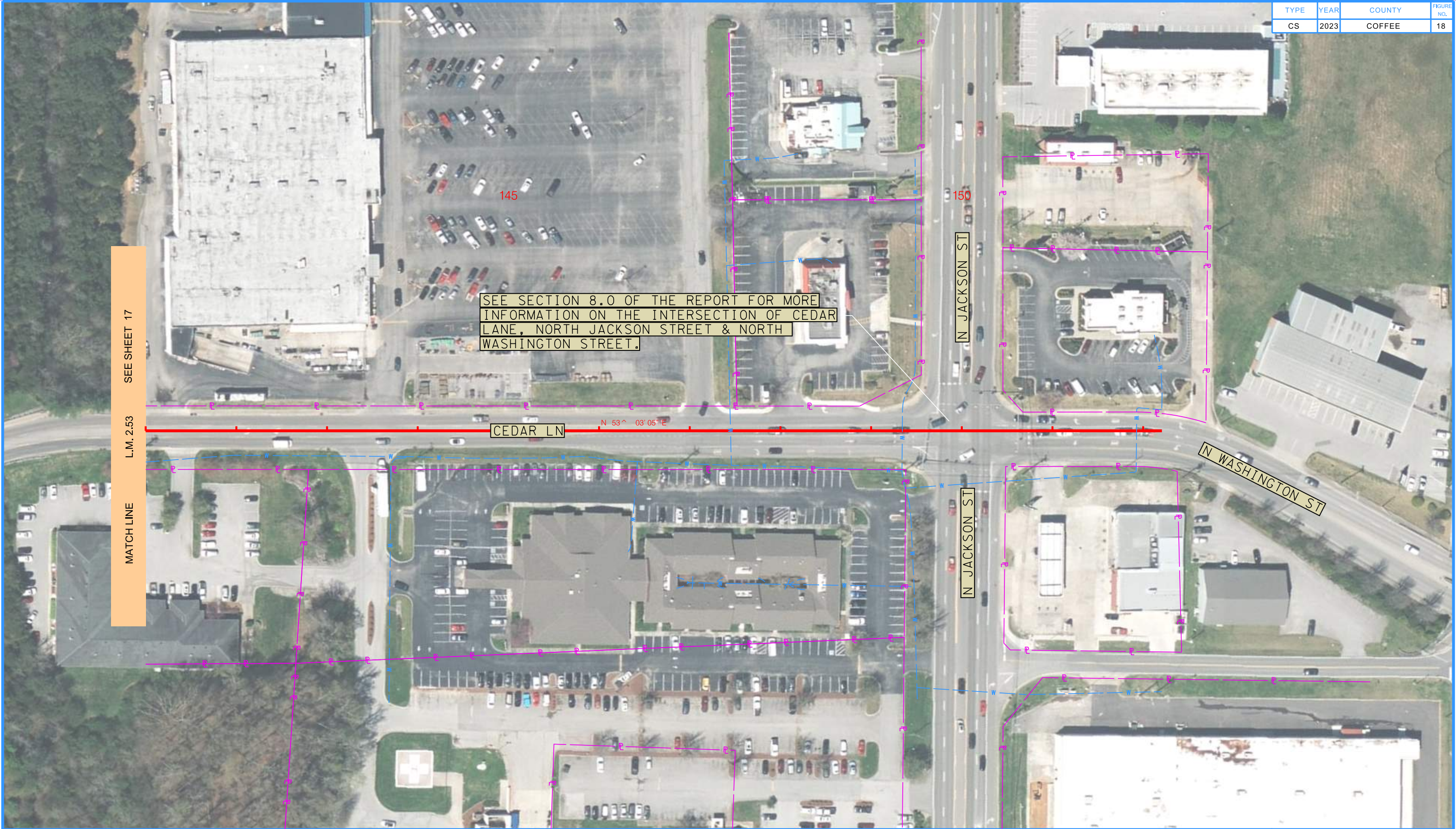
WESTSIDE DRVE - CEDAR LANE  
 FROM CLEMENT DRIVE (L.M. 0.00 TO  
 NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 S.T.I.D.

FIGURE 17



| TYPE | YEAR | COUNTY | FIGURE NO. |
|------|------|--------|------------|
| CS   | 2023 | COFFEE | 18         |



MATCH LINE  
L.M. 2.53  
SEE SHEET 17

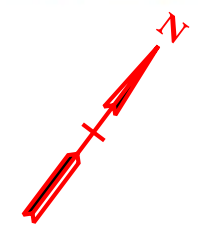
SEE SECTION 8.0 OF THE REPORT FOR MORE INFORMATION ON THE INTERSECTION OF CEDAR LANE, NORTH JACKSON STREET & NORTH WASHINGTON STREET.

## CORRIDOR STUDY NO BUILD LAYOUT

WESTSIDE DRVE - CEDAR LANE  
FROM CLEMENT DRIVE (L.M. 0.00 TO  
NORTH JACKSON STREET (L.M. 2.70)

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

FIGURE 18





## **5.7 DESIGN EXCEPTIONS, RETAINING WALLS, SLOPE ADJUSTMENTS**

No design exceptions or significant retaining walls or slope adjustments are anticipated.

## **5.8 CONSTRUCTION PHASING**


To provide options for construction of the proposed widening project, the overall plan has been broken into 3 phases to aid in the availability of funds, with Phase 1 extending from Clement Drive to West Lincoln, Phase 2 from West Lincoln to Wilson Avenue, and Phase 3 from Wilson Avenue to North Jackson. The order of construction can be determined by the amount of funds available at the time of project initiation; however, Phase 2 should not be constructed prior to Phase 1 or Phase 3.

## **5.9 COST ESTIMATE**

The preliminary opinion of probable cost was calculated utilizing TDOT Strategic Transportation Investments Division's cost estimating tool. The Proposed Option cost estimate is \$37,550,000 in 2023 dollars with Phase 1 totaling \$9,150,000, Phase 2 totaling \$10,600,000 and Phase 3 totaling \$17,800,000. This includes construction, right-of-way, utilities, and engineering costs. By the 2026 Initial Study Year, the cost is estimated at \$43,500,000, with Phase 1 totaling \$10,600,000, Phase 2 totaling \$12,300,000 and Phase 3 totaling \$20,600,000 assuming five (5) percent inflation per year.

**Table 10-12** provide the Cost Estimate Summary for the three phases. The full calculations are provided in **Appendices 4-6**.

**TABLE 10: PHASE 1 COST ESTIMATE SUMMARY**


|                       |  |  |
|-----------------------|--|--|
| Route:                | Westside Dr  |                   |
| Termini:              | From Clement Drive to West Lincoln Street            |  |
| Scope of Work:        | Widening to 3-Lane Typical Section w/ Multi-Use Path |  |
| Project Type of Work: | Widen and Resurfacing                                |  |
| County:               | Coffee   |  |
| Length:               | 0.51 Miles   | <b>Estimate Developed By</b><br><b>Initial/Organization</b><br><br><b>GRESHAM SMITH</b><br><b>MG</b> |
| Date:                 | July 6, 2023   |  |
| Estimate Type:        | Concept  |  |
| Years Inflated:       | 3  |  |

| DESCRIPTION                                      | LOCAL<br>0%         | STATE<br>0%         | FEDERAL<br>0%         | TOTAL               |
|--|---------------------|---------------------|-----------------------|---------------------|
| <b>Construction Items</b>                        |                     |                     |                       |                     |
| Removal Items                                    | \$0                 | \$0                 | \$0                   | \$21,400            |
| Asphalt Paving                                   | \$0                 | \$0                 | \$0                   | \$807,000           |
| Concrete Pavement                                | \$0                 | \$0                 | \$0                   | \$116               |
| Drainage   | \$0                 | \$0                 | \$0                   | \$754,000           |
| Appurtenances                                    | \$0                 | \$0                 | \$0                   | \$351,000           |
| Structures                                       | \$0                 | \$0                 | \$0                   | \$0                 |
| Fencing  | \$0                 | \$0                 | \$0                   | \$0                 |
| Signalization & Lighting                         | \$0                 | \$0                 | \$0                   | \$18,500            |
| Railroad Crossing                                | \$0                 | \$0                 | \$0                   | \$0                 |
| Earthwork  | \$0                 | \$0                 | \$0                   | \$392,000           |
| Clearing and Grubbing                            | \$0                 | \$0                 | \$0                   | \$70,600            |
| Seeding & Sodding                                | \$0                 | \$0                 | \$0                   | \$55,800            |
| Rip-Rap or Slope Protection                      | \$0                 | \$0                 | \$0                   | \$11,300            |
| Guardrail  | \$0                 | \$0                 | \$0                   | \$232               |
| Signing  | \$0                 | \$0                 | \$0                   | \$58,100            |
| Pavement Markings                                | \$0                 | \$0                 | \$0                   | \$12,700            |
| Maintenance of Traffic                           | \$0                 | \$0                 | \$0                   | \$132,000           |
| Mobilization 5%                                  | \$0                 | \$0                 | \$0                   | \$155,000           |
| Other Items and Annual Inflation 10%             | \$0                 | \$0                 | \$0                   | \$329,000           |
| Const. Contingency (Structures Not Included) 50% | \$0                 | \$0                 | \$0                   | \$1,830,000         |
| Const. Eng. & Inspec. 10%                        | \$0                 | \$0                 | \$0                   | \$579,000           |
| <b>Construction Estimate</b>                     | <b>\$0</b>          | <b>\$0</b>          | <b>\$0</b>            | <b>\$6,460,000</b>  |
| <b>Interchanges &amp; Unique Intersections</b>   |                     |                     |                       |                     |
| Roundabouts                                      | \$0                 | \$0                 | \$0                   | \$0                 |
| Interchanges                                     | \$0                 | \$0                 | \$0                   | \$0                 |
| <b>Right-of-Way &amp; Utilities</b>              | <b>LOCAL<br/>0%</b> | <b>STATE<br/>0%</b> | <b>FEDERAL<br/>0%</b> | <b>TOTAL</b>        |
| Right-of-Way                                     | \$0                 | \$0                 | \$0                   | \$449,000           |
| Utilities  | \$0                 | \$0                 | \$0                   | \$1,590,000         |
| <b>Preliminary Engineering</b>                   | <b>LOCAL<br/>0%</b> | <b>STATE<br/>0%</b> | <b>FEDERAL<br/>0%</b> | <b>TOTAL</b>        |
| Prelim. Eng. 10.0%                               | \$0                 | \$0                 | \$0                   | \$646,000           |
| <b>Total Project Cost (2023)</b>                 | <b>\$ -</b>         | <b>\$ -</b>         | <b>\$ -</b>           | <b>\$ 9,150,000</b> |

| <b>COST ESTIMATE SUMMARY (2023)</b> |                       |                          |               |              |               |                            |
|-------------------------------------|-----------------------|--------------------------|---------------|--------------|---------------|----------------------------|
| PIN                                 | Project Type of Work  | Preliminary Engineering: | Right-of-Way: | Utilities:   | Construction: | Total Project Cost (2023): |
| 0.00                                | Widen and Resurfacing | \$ 646,000               | \$ 449,000    | \$ 1,590,000 | \$ 6,460,000  | \$ 9,150,000               |

| <b>INFLATED COST ESTIMATE SUMMARY</b> |      |                          |               |              |               | Report Type:                | Technical Report |
|---------------------------------------|------|--------------------------|---------------|--------------|---------------|-----------------------------|------------------|
| No. of Years                          | Year | Preliminary Engineering: | Right-of-Way: | Utilities:   | Construction: | Total Inflated Project Cost |                  |
| 3                                     | 2026 | \$ 748,000               | \$ 520,000    | \$ 1,840,000 | \$ 7,480,000  | \$ 10,600,000               |                  |
| 10                                    | 2033 | \$ 1,050,000             | \$ 731,000    | \$ 2,590,000 | \$ 10,500,000 | \$ 14,900,000               |                  |

**TABLE 11: PHASE 2 COST ESTIMATE SUMMARY**

|                              |  |   |  |
|------------------------------|--|---|--|
| <b>Route:</b>                | Cedar Lane   |  |  |
| <b>Termini:</b>              | From West Lincoln Drive to Wilson Avenue             |   |  |
| <b>Scope of Work:</b>        | Widening to 3-Lane Typical Section w/ Multi-Use Path |   |  |
| <b>Project Type of Work:</b> | Widen and Resurfacing                                |   |  |
| <b>County:</b>               | Coffee   | <b>Estimate Developed By</b>  |  |
| <b>Length:</b>               | 0.68 Miles   | <b>Initial/Organization</b>   |  |
| <b>Date:</b>                 | July 6, 2023   | GRESHAM SMITH   |  |
| <b>Estimate Type:</b>        | Concept  | MG  |  |
| <b>Years Inflated:</b>       | 3  |   |  |


  

| DESCRIPTION                                      | LOCAL<br>0%         | STATE<br>0%         | FEDERAL<br>0%         | TOTAL                |
|--|---------------------|---------------------|-----------------------|----------------------|
| <b>Construction Items</b>                        |                     |                     |                       |                      |
| Removal Items                                    | \$0                 | \$0                 | \$0                   | \$35,200             |
| Asphalt Paving                                   | \$0                 | \$0                 | \$0                   | \$1,040,000          |
| Concrete Pavement                                | \$0                 | \$0                 | \$0                   | \$0                  |
| Drainage   | \$0                 | \$0                 | \$0                   | \$934,000            |
| Appurtenances                                    | \$0                 | \$0                 | \$0                   | \$458,000            |
| Structures                                       | \$0                 | \$0                 | \$0                   | \$0                  |
| Fencing  | \$0                 | \$0                 | \$0                   | \$0                  |
| Signalization & Lighting                         | \$0                 | \$0                 | \$0                   | \$18,500             |
| Railroad Crossing                                | \$0                 | \$0                 | \$0                   | \$0                  |
| Earthwork  | \$0                 | \$0                 | \$0                   | \$481,000            |
| Clearing and Grubbing                            | \$0                 | \$0                 | \$0                   | \$70,600             |
| Seeding & Sodding                                | \$0                 | \$0                 | \$0                   | \$63,100             |
| Rip-Rap or Slope Protection                      | \$0                 | \$0                 | \$0                   | \$13,900             |
| Guardrail  | \$0                 | \$0                 | \$0                   | \$0                  |
| Signing  | \$0                 | \$0                 | \$0                   | \$62,400             |
| Pavement Markings                                | \$0                 | \$0                 | \$0                   | \$28,000             |
| Maintenance of Traffic                           | \$0                 | \$0                 | \$0                   | \$163,000            |
| Mobilization 5%                                  | \$0                 | \$0                 | \$0                   | \$195,000            |
| Other Items and Annual Inflation 10%             | \$0                 | \$0                 | \$0                   | \$412,000            |
| Const. Contingency (Structures Not Included) 50% | \$0                 | \$0                 | \$0                   | \$2,300,000          |
| Const. Eng. & Inspec. 10%                        | \$0                 | \$0                 | \$0                   | \$726,000            |
| <b>Construction Estimate</b>                     | <b>\$0</b>          | <b>\$0</b>          | <b>\$0</b>            | <b>\$8,100,000</b>   |
| <b>Interchanges &amp; Unique Intersections</b>   |                     |                     |                       |                      |
| Roundabouts                                      | \$0                 | \$0                 | \$0                   | \$0                  |
| Interchanges                                     | \$0                 | \$0                 | \$0                   | \$0                  |
| <b>Right-of-Way &amp; Utilities</b>              | <b>LOCAL<br/>0%</b> | <b>STATE<br/>0%</b> | <b>FEDERAL<br/>0%</b> | <b>TOTAL</b>         |
| Right-of-Way                                     | \$0                 | \$0                 | \$0                   | \$618,000            |
| Utilities  | \$0                 | \$0                 | \$0                   | \$1,050,000          |
| <b>Preliminary Engineering</b>                   | <b>LOCAL<br/>0%</b> | <b>STATE<br/>0%</b> | <b>FEDERAL<br/>0%</b> | <b>TOTAL</b>         |
| Prelim. Eng. 10.0%                               | \$0                 | \$0                 | \$0                   | \$810,000            |
| <b>Total Project Cost (2023)</b>                 | <b>\$ -</b>         | <b>\$ -</b>         | <b>\$ -</b>           | <b>\$ 10,600,000</b> |

| COST ESTIMATE SUMMARY (2023) |                       |                          |               |              |               |                            |
|------------------------------|-----------------------|--------------------------|---------------|--------------|---------------|----------------------------|
| PIN                          | Project Type of Work  | Preliminary Engineering: | Right-of-Way: | Utilities:   | Construction: | Total Project Cost (2023): |
| 0.00                         | Widen and Resurfacing | \$ 810,000               | \$ 618,000    | \$ 1,050,000 | \$ 8,100,000  | \$ 10,600,000              |

| INFLATED COST ESTIMATE SUMMARY |      |                          |               |              |               | Report Type:                | Technical Report |
|--------------------------------|------|--------------------------|---------------|--------------|---------------|-----------------------------|------------------|
| No. of Years                   | Year | Preliminary Engineering: | Right-of-Way: | Utilities:   | Construction: | Total Inflated Project Cost |                  |
| 3                              | 2026 | \$ 938,000               | \$ 715,000    | \$ 1,220,000 | \$ 9,380,000  | \$ 12,300,000               |                  |
| 10                             | 2033 | \$ 1,320,000             | \$ 1,010,000  | \$ 1,710,000 | \$ 13,200,000 | \$ 17,300,000               |                  |

**TABLE 12: PHASE 3 COST ESTIMATE SUMMARY**

|                       |  |  |
|-----------------------|--|--|
| Route:                | Westside Dr/Cedar Lane                               |                   |
| Termini:              | From Wilson Avenue to North Jackson Street           |  |
| Scope of Work:        | Widening to 3-Lane Typical Section w/ Multi-Use Path | <b>Estimate Developed By</b><br><b>Initial/Organization</b><br><br><b>GRESHAM SMITH</b><br><b>MG</b> |
| Project Type of Work: | Widen and Resurfacing                                |  |
| County:               | Coffee   |  |
| Length:               | 1.09 Miles   |  |
| Date:                 | July 6, 2023   |  |
| Estimate Type:        | Concept  |  |
| Years Inflated:       | 3  |  |

| DESCRIPTION                                      | LOCAL<br>0% | STATE<br>0% | FEDERAL<br>0% | TOTAL         |
|--|-------------|-------------|---------------|---------------|
| <b>Construction Items</b>                        |             |             |               |               |
| Removal Items                                    | \$0         | \$0         | \$0           | \$45,700      |
| Asphalt Paving                                   | \$0         | \$0         | \$0           | \$1,610,000   |
| Concrete Pavement                                | \$0         | \$0         | \$0           | \$0           |
| Drainage   | \$0         | \$0         | \$0           | \$1,630,000   |
| Appurtenances                                    | \$0         | \$0         | \$0           | \$717,000     |
| Structures                                       | \$0         | \$0         | \$0           | \$493,000     |
| Fencing  | \$0         | \$0         | \$0           | \$0           |
| Signalization & Lighting                         | \$0         | \$0         | \$0           | \$74,100      |
| Railroad Crossing                                | \$0         | \$0         | \$0           | \$0           |
| Earthwork  | \$0         | \$0         | \$0           | \$930,000     |
| Clearing and Grubbing                            | \$0         | \$0         | \$0           | \$70,600      |
| Seeding & Sodding                                | \$0         | \$0         | \$0           | \$80,000      |
| Rip-Rap or Slope Protection                      | \$0         | \$0         | \$0           | \$82,000      |
| Guardrail  | \$0         | \$0         | \$0           | \$7,760       |
| Signing  | \$0         | \$0         | \$0           | \$94,100      |
| Pavement Markings                                | \$0         | \$0         | \$0           | \$38,100      |
| Maintenance of Traffic                           | \$0         | \$0         | \$0           | \$133,000     |
| Mobilization 5%                                  | \$0         | \$0         | \$0           | \$348,000     |
| Other Items and Annual Inflation 10%             | \$0         | \$0         | \$0           | \$735,000     |
| Const. Contingency (Structures Not Included) 50% | \$0         | \$0         | \$0           | \$3,820,000   |
| Const. Eng. & Inspec. 10%                        | \$0         | \$0         | \$0           | \$1,260,000   |
| Construction Estimate                            | \$0         | \$0         | \$0           | \$14,100,000  |
| <b>Interchanges &amp; Unique Intersections</b>   |             |             |               |               |
| Roundabouts                                      | \$0         | \$0         | \$0           | \$0           |
| Interchanges                                     | \$0         | \$0         | \$0           | \$0           |
| <b>Right-of-Way &amp; Utilities</b>              |             |             |               |               |
|  | LOCAL<br>0% | STATE<br>0% | FEDERAL<br>0% | TOTAL         |
| Right-of-Way                                     | \$0         | \$0         | \$0           | \$795,000     |
| Utilities  | \$0         | \$0         | \$0           | \$1,680,000   |
| <b>Preliminary Engineering</b>                   |             |             |               |               |
|  | LOCAL<br>0% | STATE<br>0% | FEDERAL<br>0% | TOTAL         |
| Prelim. Eng. 8.8%                                | \$0         | \$0         | \$0           | \$1,250,000   |
| <b>Total Project Cost (2023)</b>                 | \$ -        | \$ -        | \$ -          | \$ 17,800,000 |

| <b>COST ESTIMATE SUMMARY (2023)</b> |                       |                          |               |              |               |                            |
|-------------------------------------|-----------------------|--------------------------|---------------|--------------|---------------|----------------------------|
| PIN                                 | Project Type of Work  | Preliminary Engineering: | Right-of-Way: | Utilities:   | Construction: | Total Project Cost (2023): |
| 0.00                                | Widen and Resurfacing | \$ 1,250,000             | \$ 795,000    | \$ 1,680,000 | \$ 14,100,000 | \$ 17,800,000              |

| <b>INFLATED COST ESTIMATE SUMMARY</b> |      |                          |               |              |               | Report Type:                | Technical Report |
|---------------------------------------|------|--------------------------|---------------|--------------|---------------|-----------------------------|------------------|
| No. of Years                          | Year | Preliminary Engineering: | Right-of-Way: | Utilities:   | Construction: | Total Inflated Project Cost |                  |
| 3                                     | 2026 | \$ 1,450,000             | \$ 920,000    | \$ 1,940,000 | \$ 16,300,000 | \$ 20,600,000               |                  |
| 10                                    | 2033 | \$ 2,040,000             | \$ 1,290,000  | \$ 2,740,000 | \$ 23,000,000 | \$ 29,000,000               |                  |



## **6.0 TRAFFIC ANALYSIS**

### **6.1 DESCRIPTION OF CORRIDOR**

The study area is approximately 2.70 miles in length and the primary modes of transportation are a combination of vehicles and pedestrians. There is a substantial flow of vehicle traffic on Cedar Lane / Westside Drive from intersections with U.S. Hwy 41A (23,995 Average Daily Traffic (AADT)), SR-55 (7,783 AADT), Lincoln Street (7,530 AADT), and SR-130 (8,738 AADT).

### **6.2 TRAFFIC PROJECTIONS**

Traffic volumes were projected from 2021 Traffic Data to the Base Year of 2026 and the Design Year of 2046 using methods found in the TDOT Traffic Design Manual. Traffic volume data is based on TDOT AADT Data TDOT Count Stations 16000214 and 16000212 found on TDOT's Transportation Data Management System (<https://tdot.public.ms2soft.com>).

The 2026 Base Year & 2046 Design Year projections account for historical / background growth of the traffic network.

### **6.3 TRAFFIC ANALYSIS METHODOLOGY**

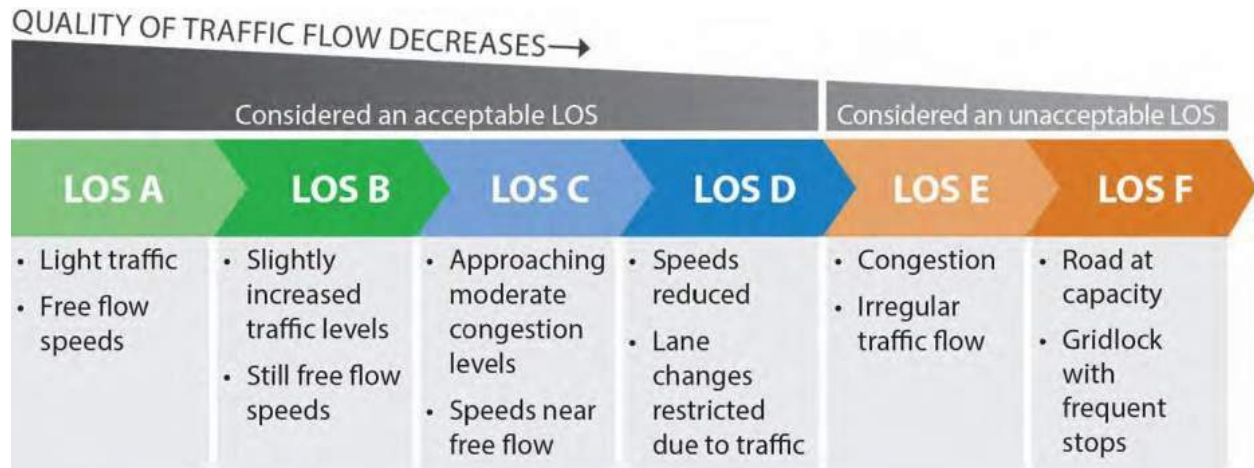
Westside Drive / Cedar Lane was analyzed as a highway segment utilizing the Highway Capacity Software (HCS), version 7 subprogram for two lane highways. The studied intersections were analyzed with the Synchro software application, Version 11. Both HCS and Synchro follow the methodology found in the 6<sup>th</sup> Edition of the Highway Capacity Manual (HCM). See Appendix 5 for the traffic analysis output.

Level of Service (LOS) is a qualitative traffic capacity measure that is used to gauge the operational performance of an intersection or roadway segment. There are six (6) levels ranging from 'A' to 'F', with 'F' being the worst. Each level represents a range of operating conditions.

**Table 13** defines the traffic flow conditions and **Figure 19** approximates driver comfort at each LOS for signalized and unsignalized intersections.

**TABLE 13: LEVEL OF SERVICE INDEX FOR INTERSECTIONS**

| LOS | TRAFFIC FLOW CONDITIONS   | SIGNALIZED INTERSECTIONS DELAY (SEC/VEH) | UNSIGNALIZED INTERSECTIONS DELAY (SEC/VEH) |
|-----|---|--|--|
| A   | Progression is extremely favorable, and most vehicles do not stop at all. | 0-10                                     | 0-10                                       |
| B   | Good progression, some delay.   | 10-20                                    | 10-15                                      |
| C   | Fair progression, higher delay.   | 20-35                                    | 15-25                                      |
| D   | Unfavorable progression, congestion becomes apparent.                     | 35-55                                    | 25-35                                      |
| E   | Poor progression, significant delay.                                      | 55-80                                    | 35-50                                      |
| F   | Poor progression, extreme delay.  | >80                                      | >50  |



**FIGURE 19: LOS TRAFFIC FLOW CONDITIONS**

## **6.4 EXISTING CONDITIONS**

### **Existing Geometric and Other Physical Characteristics:**

Westside Drive, Cedar Lane and major side street attributes (including traffic volumes, functional classifications, speed limit, and TDOT log mile references) are detailed in **Table 3**.

The study corridor is a 2-lane section with grass lined ditches and a sidewalk on the west side between Westside Drive at LM 0.00 at Clement Drive to the intersection of West Lincoln Street at LM 0.49. From West Lincoln Street LM 0.49 to Trinity Lane LM 1.05, Cedar Lane is a 2-lane section with grass lined or concrete ditches and a sidewalk on the west side between Bel Aire Drive LM 0.717 and the entrance to Highland Baptist Church. From Trinity Lane LM 1.05 to north of Wilson Avenue LM 1.17, Cedar Lane is a 2-lane section with curb and gutter. From north of Wilson Avenue LM 1.17 to William Northern Boulevard LM 2.25, Cedar Lane is a 2-lane section with grassy ditches. From William Northern Boulevard at LM 2.25 to North Jackson Street LM 2.70, Cedar Lane is a 3-lane section with curb and gutter and a TWLTL.

Westside Drive and Cedar Lane has a speed limit posted 30 mph from Clement Drive at LM 0.0 to just north of McKellar Drive at LM 1.59. Cedar Lane is posted 35 mph from McKellar at LM 1.59 to North Jackson Street at LM 2.70.

## **6.5 LEVEL OF SERVICE (LOS) NO BUILD OPTION**

The No Build and Build LOS are reported for the entire intersection and for each approach for all signalized intersections within the corridor. The Base Year and Design Year are 2026 and 2046, respectively. AM and PM Peak Hours were analyzed for both. **Table 14** summarizes the traffic analysis for the No Build Option (see **Appendix 5** Traffic Study).

No Build 2026, intersections of Cedar Lane at Wilson Avenue, Cedar Lane at North Jackson Street, and Westside Drive / Cedar Lane at Lincoln Street maintain a LOS C for most AM and PM Peak hours. The intersection Westside Drive and Clement Drive show a LOS B in the AM and PM Peak hours. The AM northbound approach at this intersections shows a high queue length likely due to the elementary school north of the intersection.

The 2026 Base Year does not impact the LOS, but does reduce queue length and delay when compared to the No Build 2026.

The 2046 Design Year, corridor intersection capacity is reduced by annual background traffic growth. LOS at AM Peak hours does not worsen for all intersections. LOS for the PM Peak hours drops a letter from C to D at Lincoln Street and Wilson Avenue.

**TABLE 14: INTERSECTION TRAFFIC ANALYSIS – 2026 AND 2046 NO BUILD OPTION**

| No-Build 2026 |                                      |        |         | Overall Intersection |       |         | Approach LOS |    |    |    | Queue Length (ft) |     |     |     |     |     |     |     |     |     |     |     |
|---------------|--------------------------------------|--------|---------|----------------------|-------|---------|--------------|----|----|----|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ID            | Intersection                         | Type   | Peak HR | LOS                  | Delay | Max v/c | EB           | WB | NB | SB | EBL               | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| 1             | Westside Dr. & Clement Dr.           | Signal | AM      | B                    | 15.4  | 0.76    | -            | C  | B  | A  | -                 | -   | -   | 66  | -   | 0   | -   | 210 | -   | 12  | 10  | -   |
|               |                                      |        | PM      | B                    | 13.3  | 0.82    | -            | C  | B  | A  | -                 | -   | -   | 126 | -   | 0   | -   | 98  | -   | 34  | 44  | -   |
| 2             | Westside Dr./Cedar Ln. & Lincoln St. | Signal | AM      | C                    | 23.9  | 0.87    | C            | C  | C  | B  | 90                | 146 | -   | 18  | 106 | -   | 12  | 232 | -   | 50  | 80  | -   |
|               |                                      |        | PM      | C                    | 29.5  | 0.92    | B            | C  | C  | D  | 46                | 110 | -   | 34  | 204 | -   | 28  | 194 | -   | 42  | 280 | -   |
| 3             | Cedar Ln. & Wilson Ave.              | Signal | AM      | C                    | 25.2  | 0.84    | C            | C  | C  | C  | 78                | 236 | -   | 14  | 138 | -   | 28  | 182 | 108 | 20  | 76  | 46  |
|               |                                      |        | PM      | C                    | 28.9  | 0.86    | C            | C  | C  | C  | 62                | 240 | -   | 48  | 234 | -   | 42  | 106 | 44  | 24  | 234 | 140 |
| 4             | Cedar Ln. & N Jackson St.            | Signal | AM      | C                    | 21.0  | 0.74    | C            | C  | B  | B  | 84                | 74  | 0   | 146 | 118 | 0   | 36  | 64  | 0   | 52  | 58  | 0   |
|               |                                      |        | PM      | C                    | 24.9  | 0.77    | C            | C  | C  | C  | 66                | 112 | 0   | 92  | 84  | 0   | 54  | 182 | 0   | 100 | 164 | 0   |

| No-Build 2046 |                                      |        |         | Overall Intersection |       |         | Approach LOS |    |    |    | Queue Length (ft) |     |     |     |     |     |     |     |     |     |     |     |
|---------------|--------------------------------------|--------|---------|----------------------|-------|---------|--------------|----|----|----|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ID            | Intersection                         | Type   | Peak HR | LOS                  | Delay | Max v/c | EB           | WB | NB | SB | EBL               | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| 1             | Westside Dr. & Clement Dr.           | Signal | AM      | B                    | 20.0  | 0.85    | -            | D  | C  | A  | -                 | -   | -   | 100 | -   | 0   | -   | 328 | -   | 36  | 16  | -   |
|               |                                      |        | PM      | B                    | 16.1  | 0.84    | -            | C  | B  | A  | -                 | -   | -   | 152 | -   | 0   | -   | 152 | -   | 50  | 64  | -   |
| 2             | Westside Dr./Cedar Ln. & Lincoln St. | Signal | AM      | C                    | 31.3  | 0.91    | C            | C  | D  | C  | 88                | 210 | -   | 14  | 164 | -   | 16  | 316 | -   | 76  | 108 | -   |
|               |                                      |        | PM      | D                    | 36.0  | 0.92    | C            | D  | D  | D  | 78                | 170 | -   | 27  | 320 | -   | 46  | 302 | -   | 86  | 374 | -   |
| 3             | Cedar Ln. & Wilson Ave.              | Signal | AM      | C                    | 31.7  | 0.90    | C            | C  | D  | C  | 122               | 336 | -   | 24  | 204 | -   | 48  | 318 | 190 | 34  | 132 | 80  |
|               |                                      |        | PM      | D                    | 37.0  | 0.92    | D            | D  | C  | D  | 122               | 340 | -   | 82  | 328 | -   | 70  | 137 | 72  | 40  | 374 | 220 |
| 4             | Cedar Ln. & N Jackson St.            | Signal | AM      | C                    | 25.1  | 0.86    | C            | D  | B  | B  | 124               | 96  | 0   | 108 | 150 | 0   | 36  | 88  | 0   | 68  | 78  | 0   |
|               |                                      |        | PM      | C                    | 34.5  | 0.99    | D            | C  | C  | C  | 208               | 170 | 0   | 170 | 142 | 0   | 82  | 256 | 0   | 166 | 228 | 0   |



**6.6 PROPOSED CONDITIONS / BUILD OPTIONS**

This study evaluated the traffic impacts of the build conditions being proposed along the corridor including the addition of a TWLTL as well as signalization upgrades at each intersection. The purpose of the proposed improvements in the build options is to improve traffic Los and enhance safety along the project corridor.

**6.7 PLANNING LEVEL SIGNAL ASSESSMENT**

TDOT’s Roadway Design Guidelines provide a planning level table to predict if unsignalized intersections are likely to need signalization. The table is based on AADT volumes. The AADT criteria, shown in **Table 15**, can be used to estimate if a traffic signal will be warranted. Signalization may be considered suitable if the current major street AADT and minor street AADT both meet the criteria for Warrant 1 or Warrant 2.

**TABLE 15: TDOT PLANNING LEVEL SIGNAL WARRANTS**

| NUMBER OF APPROACH LANES |           | WARRANT 1  |            | WARRANT 2  |            |
|--------------------------|-----------|------------|------------|------------|------------|
| Major                    | Minor     | Major AADT | Minor AADT | Major AADT | Minor AADT |
| 1                        | 1         | 5000       | 3000       | 7500       | 1500       |
| 2 or more                | 1         | 6000       | 3000       | 9000       | 1500       |
| 2 or more                | 2 or more | 6000       | 4000       | 9000       | 2000       |
| 1                        | 2 or more | 5000       | 4000       | 7500       | 2000       |

All of the non-signalized intersections within the study area have either a single or two lane approach. The 2026 AADT along Cedar Lane and Westside Drive is projected to be 9,846 vehicles per day (vpd) and increases to 10,128 vpd by 2046. All unsignalized side street intersections along the corridor have an AADT less than 1,500 vpd and are not likely to benefit from signalization.

**6.8 PROPOSED MODIFICATIONS – BUILD OPTIONS**

The proposed improvements include widening Westside Drive and Cedar Lane to include two way left turn lanes and sidewalks. Both the northbound and southbound left turn lanes at the signalized intersections will transition to a center TWLTL that will extend past the intersection. A TWLTL would allow thru traffic to bypass stopped, left turning motorists that may be accessing other side roads and driveways. TDOT Standard Drawing RD11-TS-7A would be utilized.

## **6.9 LEVEL OF SERVICE – BUILD OPTION**

**Table 16** summarizes the traffic analysis for the proposed conditions, also called the Build Option. The LOS are reported for all signalized intersections and for each approach. The Base Year 2026 and Design Year 2046 were analyzed for both AM and PM peak hourly volumes.

For Build 2026, corridor intersections will typically operate at LOS C or better. Build 2046 models indicate that two intersections in the PM Peak will operate at LOS D, while all other intersections will operate at LOS C or B. Within the Build Options, many intersections show improvements of delay and queue length.

Queues within Build 2026 improved at Clement Drive in the PM. For Build 2046, queues improve compared to No-Build 2046 at all AM approaches Wilson Avenue, and northbound and southbound PM Wilson Avenue. The Build 2046 scenario shows maintained delay at all intersections except for Wilson Ave.

An HCS Capacity Analysis of the existing No Build two (2) lane section results in LOS no better than D for all segments and direction during peak hour traffic. This is a result of the high number of driveways and access points along the corridor and no turn lane storage for vehicles waiting to turn across opposing traffic. Building the TWLTL will result in LOS of A or B in much of the corridor's segments that are not affected by signal queues or nearby major intersections. The TWLTL will improve the throughput along the roadway because it will accommodate left turns for the significant number of driveways and access points.

**TABLE 16: INTERSECTION TRAFFIC ANALYSIS – 2026 AND 2046 BUILD OPTION**

| Build 2026 |                                      |        |         | Overall Intersection |       |         | Approach LOS |    |    |    | Queue Length (ft) |     |     |     |     |     |     |     |     |     |     |     |
|------------|--------------------------------------|--------|---------|----------------------|-------|---------|--------------|----|----|----|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ID         | Intersection                         | Type   | Peak HR | LOS                  | Delay | Max v/c | EB           | WB | NB | SB | EBL               | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| 1          | Westside Dr. & Clement Dr.           | Signal | AM      | B                    | 15.4  | 0.76    | -            | C  | B  | A  | -                 | -   | -   | 66  | -   | 0   | -   | 210 | -   | 12  | 10  | -   |
|            |                                      |        | PM      | B                    | 13.0  | 0.81    | -            | C  | B  | A  | -                 | -   | -   | 108 | -   | 0   | -   | 94  | -   | 32  | 40  | -   |
| 2          | Westside Dr./Cedar Ln. & Lincoln St. | Signal | AM      | C                    | 23.9  | 0.87    | C            | C  | C  | B  | 90                | 146 | -   | 18  | 106 | -   | 12  | 232 | -   | 50  | 80  | -   |
|            |                                      |        | PM      | C                    | 29.5  | 0.92    | B            | C  | C  | D  | 46                | 110 | -   | 34  | 204 | -   | 28  | 194 | -   | 42  | 280 | -   |
| 3          | Cedar Ln. & Wilson Ave.              | Signal | AM      | C                    | 25.2  | 0.83    | C            | C  | C  | C  | 78                | 236 | -   | 14  | 138 | -   | 28  | 182 | 108 | 20  | 76  | 46  |
|            |                                      |        | PM      | C                    | 31.1  | 0.83    | C            | C  | C  | D  | 62                | 240 | -   | 48  | 234 | -   | 42  | 106 | 44  | 24  | 234 | 140 |
| 4          | Cedar Ln. & N Jackson St.            | Signal | AM      | C                    | 21.0  | 0.68    | C            | C  | B  | B  | 84                | 74  | 0   | 146 | 118 | 0   | 36  | 64  | 0   | 52  | 58  | 0   |
|            |                                      |        | PM      | C                    | 24.9  | 0.76    | C            | C  | C  | C  | 66                | 112 | 0   | 92  | 84  | 0   | 54  | 182 | 0   | 100 | 164 | 0   |

| Build 2046 |                                      |        |         | Overall Intersection |       |         | Approach LOS |    |    |    | Queue Length (ft) |     |     |     |     |     |     |     |     |     |     |     |
|------------|--------------------------------------|--------|---------|----------------------|-------|---------|--------------|----|----|----|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ID         | Intersection                         | Type   | Peak HR | LOS                  | Delay | Max v/c | EB           | WB | NB | SB | EBL               | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| 1          | Westside Dr. & Clement Dr.           | Signal | AM      | B                    | 20.0  | 0.85    | -            | D  | C  | A  | -                 | -   | -   | 100 | -   | 0   | -   | 328 | -   | 36  | 16  | -   |
|            |                                      |        | PM      | B                    | 16.1  | 0.84    | -            | C  | B  | A  | -                 | -   | -   | 152 | -   | 0   | -   | 152 | -   | 50  | 64  | -   |
| 2          | Westside Dr./Cedar Ln. & Lincoln St. | Signal | AM      | C                    | 31.3  | 0.91    | C            | C  | D  | C  | 88                | 210 | -   | 14  | 164 | -   | 16  | 316 | -   | 76  | 108 | -   |
|            |                                      |        | PM      | D                    | 36.0  | 0.92    | C            | D  | D  | D  | 78                | 170 | -   | 27  | 320 | -   | 46  | 302 | -   | 86  | 374 | -   |
| 3          | Cedar Ln. & Wilson Ave.              | Signal | AM      | C                    | 31.8  | 0.91    | C            | C  | D  | C  | 122               | 334 | -   | 24  | 202 | -   | 48  | 318 | 0   | 34  | 132 | 0   |
|            |                                      |        | PM      | D                    | 38.2  | 0.93    | D            | D  | C  | D  | 122               | 340 | -   | 82  | 328 | -   | 70  | 137 | 0   | 40  | 374 | 0   |
| 4          | Cedar Ln. & N Jackson St.            | Signal | AM      | C                    | 25.2  | 0.86    | C            | D  | B  | B  | 124               | 96  | 0   | 108 | 150 | 0   | 36  | 88  | 0   | 68  | 76  | 0   |
|            |                                      |        | PM      | C                    | 34.5  | 0.99    | D            | C  | C  | C  | 208               | 170 | 0   | 170 | 142 | 0   | 82  | 256 | 0   | 166 | 228 | 0   |

Note: Green/red highted data signifies improvement/worsening compared to No-Build scenarios.

## **7.0 PREDICTIVE CRASH ANALYSIS**

Improving the shoulder width from the existing widths, which are as narrow as zero (0) feet to a curb and gutter section provides up to fifty (50) percent anticipated reduction in crashes using AASHTO's 2010 Highway Safety Manual methods. Inclusion of a TWLTL provides a Crash Modification Factor (CMF) of 0.92, or an eight (8) percent reduction in crashes ([www.cmfclearinghouse.org](http://www.cmfclearinghouse.org), CMF ID 1285, Hovey and Chowdhury, 2005).

This study reported 118 segment crashes over a 3-year period at this corridor's intersections and roadway segments. There were approximately 40 crashes per year that could be reduced by up to 50% yielding 20 fewer crashes per year along the roadway segments.

There will be additional improvements in safety anticipated with the proposed turn lane and signalization improvements at intersections and improved safety for bicyclists and pedestrians with the proposed sidewalks and multi-use paths.

Based on HSM predictive analysis methods, 3-lane roadways with continuous TWLTL yield lower crash rates than 2-lane roadways without turn lanes. The overall crash reduction varies predominantly based on the number of driveways. 3-lane urban roadways become increasingly more effective at reducing vehicular crashes compared to a 2-lane urban roadways as the number of driveways increases.

## **8.0 RECOMMENDATIONS AND CONCLUSIONS**

This traffic analysis indicates that operational issues along this corridor are generally caused by a lack of left turn lanes along Westside Drive and Cedar Lane study corridor. A typical TWLTL is needed to address safety and congestion concerns along this roadway segment. The Build vs No Build analysis indicates that the proposed improvements along the corridor will improve road safety and operations as well as reduce delay.

The analysis also indicates that the efficiency of operations for the benefit of all users of the roadway are accomplished by improving intersections identified in the Corridor Study plans. Intersection improvements include adding or increasing the length of left turn lanes, improving signal operations with flashing yellow arrows, Advanced Transportation Controllers (ATC) that provide advanced safety features for pedestrians using the crosswalks, and pedestrian signal actuation and indications.

This report is recommending roadway segment improvements that include widening the typical section from two (2) lanes to a three (3) lane roadway from Clement Road to William Northern Boulevard. There will be one (1) lane in each direction with a center TWLTL. This improvement will provide all major intersections along the route with a left turn lane for either Westside Drive or Cedar Lane. Pedestrians and bikes will be accommodated with a sidewalk and multi-use path that will connect residential areas with employment opportunities, shopping, and schools. Midblock or crossings at unsignalized intersections may benefit from the use of rectangular rapid flashing beacons (RRFB) and the utilization of a refuge island within the TWLTL that increases visibility of often hard to see vulnerable roadway users.

RRFB and enhanced pedestrian crossings are recommended at the following locations:

- Westside Drive - Driveway at Jack T Farrar Elementary School
- Cedar Lane - Intersection at Hogan Street - DW Wilson Community Center
- Cedar Lane - Midblock at Rock Creek Greenway (near Flooring Solutions Entrance)
- Cedar Lane - Intersection at Northern William Boulevard

Options for intersection improvements of Cedar Lane at North Jackson Street

1. Revise southbound North Washington Street thru lane to a left turn and thru lane

- This change could potentially increase the southbound left turn capacity for the North Washington Street leg of the intersection, reducing queues and delay for this movement
- The signal controller will need to be reprogrammed so that the northbound Cedar Lane and North Washington Street left turns are split and do not conflict with the added thru movement
- This configuration and signal change will increase signal control delay for other movements
- This improvement will require future evaluation for impacts to overall intersection performance



2. Realignment of Cedar Lane to the east so that northbound thru movements travel directly across intersection and add northbound left turn lane
  - The additional left turn capacity will reduce queues and decrease delay for this movement as well as conflicts with private driveways
  - The realignment and additional left turn lane will require right-of-way/easement acquisition
  - This improvements will require future evaluation for impacts to overall intersection performance
  
3. Reduce crosswalk distance by creating pedestrian refuge areas within new raised right turn channelization islands
  - The development of these improvements will need to consider specialized pedestrian indications/APS-ADA accommodations/pedestrian button pedestal poles
  - ADA ramp compliance within new raised right turn channelization islands and sidewalk ramp areas should be considered
  - High visibility crosswalk markings should be included for all crosswalks at this intersection
  - Special ATC signal programming to exclude conflicting movements with pedestrians such as red arrow indications, pedestrian warning beacons and other overhead warning signs

The planning level estimate for the listed roadway improvements is \$43,500,000 in the 2026 Initial Study Year.

#### Adoption of the Resolution

As of the release of this document, Mayor Ray L. Knowis and the Tullahoma Board of Mayor and Aldermen passed Resolution No. 1945 - A Resolution to Adopt the Technical Study for the Westside Drive/Cedar Lane Corridor, officially recognizing the start of the process to begin implementing the components of the Corridor Study in the City of Tullahoma. The resolution can be found in Appendix 8.

**APPENDIX 1: GRANT APPLICATION**

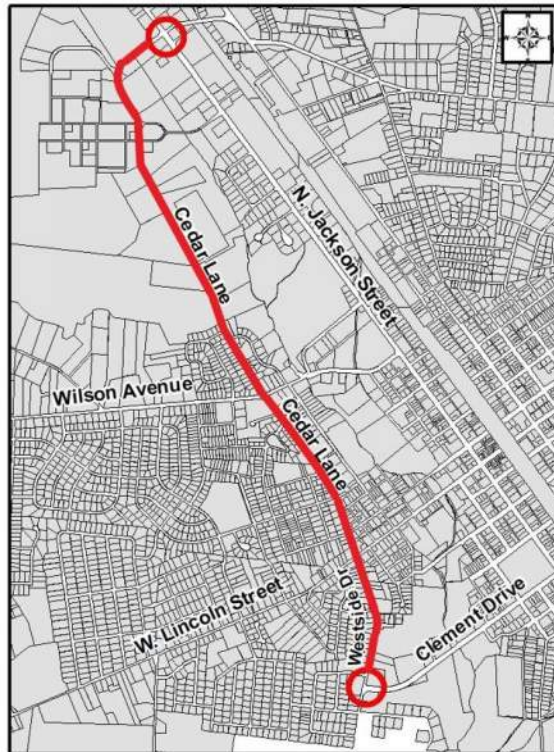
# CITY OF TULLAHOMA

P.O. Box 807  
Tullahoma, TN 37388

Phone 931-455-2282  
Fax 931-454-1765



## COMMUNITY TRANSPORTATION PLANNING GRANT FY2022 APPLICATION



### Cedar Lane/ Westside Drive Corridor Study

## CONTEXT

The City of Tullahoma is located approximately 65 miles southeast of Nashville in the southwest corner of Coffee County. The city has a population of over 20,000 and has experienced consistent growth during the past several decades. Tullahoma is home to US Air Force's Arnold Engineering Development Center (AEDC) of the Air Force as well as the University of Tennessee Space Institute and serves as the main commercial center for the Tullahoma-Manchester Micropolitan. Roads that originally served low density residential development or agricultural land, such as Cedar Lane in Tullahoma, are now experiencing safety and capacity issues as vehicle and active transportation traffic have increased. Ensuring that transportation facilities are adequate to accommodate growth can strengthen the cities' overall transportation networks.

The study area is located one and one-half miles northwest of downtown Tullahoma. The Cedar Lane/ Westside Drive Corridor is classified as a minor arterial street on the City of Tullahoma's Major Thoroughfare Map and the TDOT Functional Classification System Map. The corridor travels north and south and runs parallel to U.S. Hwy 41A. The recurring issues throughout the Cedar Lane/ Westside Drive Corridor are pedestrian safety, traffic safety, road capacity, and truck maneuverability. The City of Tullahoma's municipal airport, D.W. Wilson Community Center, baseball fields, the Tullahoma Senior Citizens Center, and a trailhead to the City's greenway are along the corridor.

## PURPOSE AND GOALS

The study area is approximately 2.7 miles in length and the primary modes of transportation are a combination of vehicles and pedestrians. There is a substantial flow of vehicle traffic on Cedar Lane from intersections with state routes (U.S. Hwy 41A, SR-55, and SR-130).

| Intersection segment along Cedar Lane | Average Daily Traffic Counts |
|---------------------------------------|------------------------------|
| N. Jackson Street to SR 55            | 11,741                       |
| SR 55 to W. Lincoln Street            | 10,570                       |
| W. Lincoln Street to Clement Drive    | 9,234                        |

<https://tdot.public.ms2soft.com/tcds/tsearch.asp?loc=Tdot&mod=TCDS>

Tourists coming through Tullahoma to visit Jack Daniels Distillery are increasing the traffic counts at the intersection of SR-55 and Cedar Lane while daily commuters from Franklin County use the corridor as a by-pass to avoid traffic delays on N. Jackson Street (U.S. 41A) during weekday peak hours. The main pedestrian traffic generators along the corridor are Jack T. Farrar Elementary School, two housing authority apartment complexes, Continental Apartments, and Parkview Senior Living (a 100-unit independent senior living facility). Tullahoma City School System does not offer bus service so children must walk, bicycle, or have an adult drive them to the campuses.

The Cedar Lane corridor is an identified transportation need for local and regional connectivity. The purpose of the corridor study would be to produce a planning document utilizing a regional evaluation of the challenges and opportunities for the Cedar Lane/ Westside Drive Corridor in Tullahoma. Future growth along the corridor will affect the safe and efficient movement of people and freight through Tullahoma. The impact of the growth will not be restricted to the political boundaries of Tullahoma. The corridor study will include analysis to determine multimodal transportation needs to increase the accessibility, mobility, and safety of people and freight on this route as an alternative to HWY-41A.

There are several traffic stations with LOS 'C' along Jackson Street (south of Wilson Avenue), Cedar Lane, Carroll Street, and Anderson Street. The evaluation of the level of service of streets in the City of Tullahoma using current traffic counts indicates what is apparent to most motorists travelling within the city. The most congested areas are along N. Jackson Street in the northern section of town where commercial growth is occurring. As a Federal route, US 41-A, Jackson Street serves not only community traffic but traffic of a regional nature, therefore any improvements to improve local access while facilitating regional traffic would be of great benefit. Also, Cedar Lane, which acts as an alternate route to N. Jackson Street, is heavily travelled. Carroll Street and Anderson Street are heavily travelled due to the entrance into the city in the southerly section and movements to the Arnold Engineering Development Complex (AEDC) and Interstate 24.

Another goal of the corridor study is to assess the level of service of the roadway and to establish recommendations for improvements needed in the next 10-20 years. This study will ensure traffic circulation is efficient and safe within Tullahoma and the adjoining counties (Franklin and Moore) experience growth.

## ECONOMIC DEVELOPMENT

As the North Jackson Street corridor reaches build-out, other areas should be identified for the future growth of the community. The primary area is between Jackson Street and the Tullahoma Municipal Airport which Cedar Lane bisects. The *Tullahoma Regional Airport Area Development Study* was completed in 2000 by the City. It identified areas adjacent to the airport that might be viable for economic development. A secondary area is that area north of Ledford Mill road on both the east and west side of Jackson Street.

A Land Use Study focused on the Cedar Lane roadway was approved in 2003 from US41-A to Wilson Avenue as well as the area between US41-A and State Route 130. The need for transportation improvements in the airport area was a recommendation to accompany an expanding hospital, additional medical facilities, and to market the development of aviation-related businesses and industries. Both industries are targeted for significant growth in the City's proposed 2040 Comprehensive Plan Update. It is noted that some of the roadway improvements will be driven by the public sector while others will be developed by the private sector. Based on recommendations of the study, the City of Tullahoma moved forward with a Surface Transportation Project to widen Cedar Lane from North Jackson Street to William Northern



Boulevard with construction completed. The city is currently in the engineering phase of constructing missing sidewalk sections within this same segment of Cedar Lane.

The study also recommended improved access from Cedar Lane to SR 130. Several other proposed projects on existing alignments have been discussed with a high priority level assigned, such as improvements to future phases of Cedar Lane to create a three-lane minor arterial street on the west side of the City that serves as an alternate route to North and South Jackson Street. TDOT funding will play a critical role in years to come in the ability to construct the longer segments of Cedar lane.

## SAFETY

One of the primary goals of the corridor study is to evaluate how safety can be improved for different modes of transportation (pedestrians, bicyclists, and motorized vehicles) along the corridor and at intersections across major streets. How could more sidewalks, crosswalks, signalization, lower speed limits, and bike lanes promote more modes of transportation safely within the corridor study area?

Accident data was evaluated and ranked using TDOT’s accepted methodology within the Community Mobility Plan for the Cities of Manchester and Tullahoma - 2019. Table III-2 below shows the ranking criteria and results to correctly evaluate the degree of concern with the safety of the major intersections or segments in the City. The following intersections have the most significant accident histories in Tullahoma for the two year period studied and are listed in descending order of R/Rc:

- North Jackson Street (US41-A/SR16) at Cedar Lane/Washington Street
- West Lincoln Street at Cedar Lane
- Wilson Avenue (SR55) at Cedar Lane

**Table III-2**  
**Intersection Accident Analysis Using TDOT Methodology**

| Intersection                   | A  | PI+F | V      | T   | Ra *   | E     | Rc   | R    | R/Rc         | SI   |
|--------------------------------|----|------|--------|-----|--------|-------|------|------|--------------|------|
| Jackson St. & Cedar/Washington | 76 | 8    | 12,279 | 730 | 0.3175 | 8.96  | 0.81 | 8.48 | <b>10.45</b> | 0.11 |
| Jackson St. & Carroll St.      | 31 | 2    | 12,974 | 730 | 0.3175 | 9.47  | 0.80 | 3.27 | <b>4.11</b>  | 0.06 |
| Lincoln St. & Cedar Ln         | 24 | 4    | 8,443  | 730 | 0.4151 | 6.16  | 1.10 | 3.89 | <b>3.54</b>  | 0.17 |
| Wilson Ave. & Cedar Ln         | 22 | 3    | 10,000 | 730 | 0.3175 | 7.30  | 0.87 | 3.01 | <b>3.46</b>  | 0.14 |
| Lincoln St. & Anderson St.     | 22 | 4    | 7,017  | 730 | 0.4970 | 5.12  | 1.32 | 4.29 | <b>3.26</b>  | 0.18 |
| Jackson St. & Wilson Ave.      | 20 | 4    | 17,167 | 730 | 0.3175 | 12.53 | 0.73 | 1.60 | <b>2.19</b>  | 0.20 |
| Anderson St. & Carroll St.     | 14 | 4    | 11,208 | 730 | 0.3175 | 8.18  | 0.84 | 1.71 | <b>2.04</b>  | 0.29 |
| Jackson St. & Lincoln St       | 15 | 2    | 14,536 | 730 | 0.3175 | 10.61 | 0.77 | 1.41 | <b>1.84</b>  | 0.13 |
| Kings Ln. & Country Club Dr.   | 9  | 2    | 3,634  | 730 | 0.5891 | 2.65  | 1.87 | 3.39 | <b>1.81</b>  | 0.22 |
| Lincoln St. & Washington St.   | 8  | 1    | 5,809  | 730 | 0.4970 | 4.24  | 1.41 | 1.89 | <b>1.34</b>  | 0.13 |
| Jackson St. & Lauderdale St.   | 10 | 1    | 13,365 | 730 | 0.3175 | 9.76  | 0.79 | 1.02 | <b>1.30</b>  | 0.10 |
| Anderson St. & Hogan St.       | 2  | 0    | 4,926  | 730 | 0.4151 | 3.60  | 1.34 | 0.56 | <b>0.41</b>  | 0.00 |
| Westside Dr. & Clement Dr.     | 1  | 0    | 3,969  | 730 | 0.2383 | 2.90  | 1.08 | 0.35 | <b>0.32</b>  | 0.00 |

\* Ra Values from: *TDOT: Statewide Average Rate for Sections & Spots (2006-2008)*

The Tullahoma Pedestrian Network Plan builds upon the city's existing sidewalk system and provides improved connectivity among key activity centers. Supported by the extensive greenway extensions around the city's perimeter, new sidewalks fill in existing gaps in the network, such as those along US-41A/North Jackson Street and provide improved connectivity in residential areas south of downtown, particularly along Cedar Lane, Old Shelbyville Highway, and Stone Boulevard.

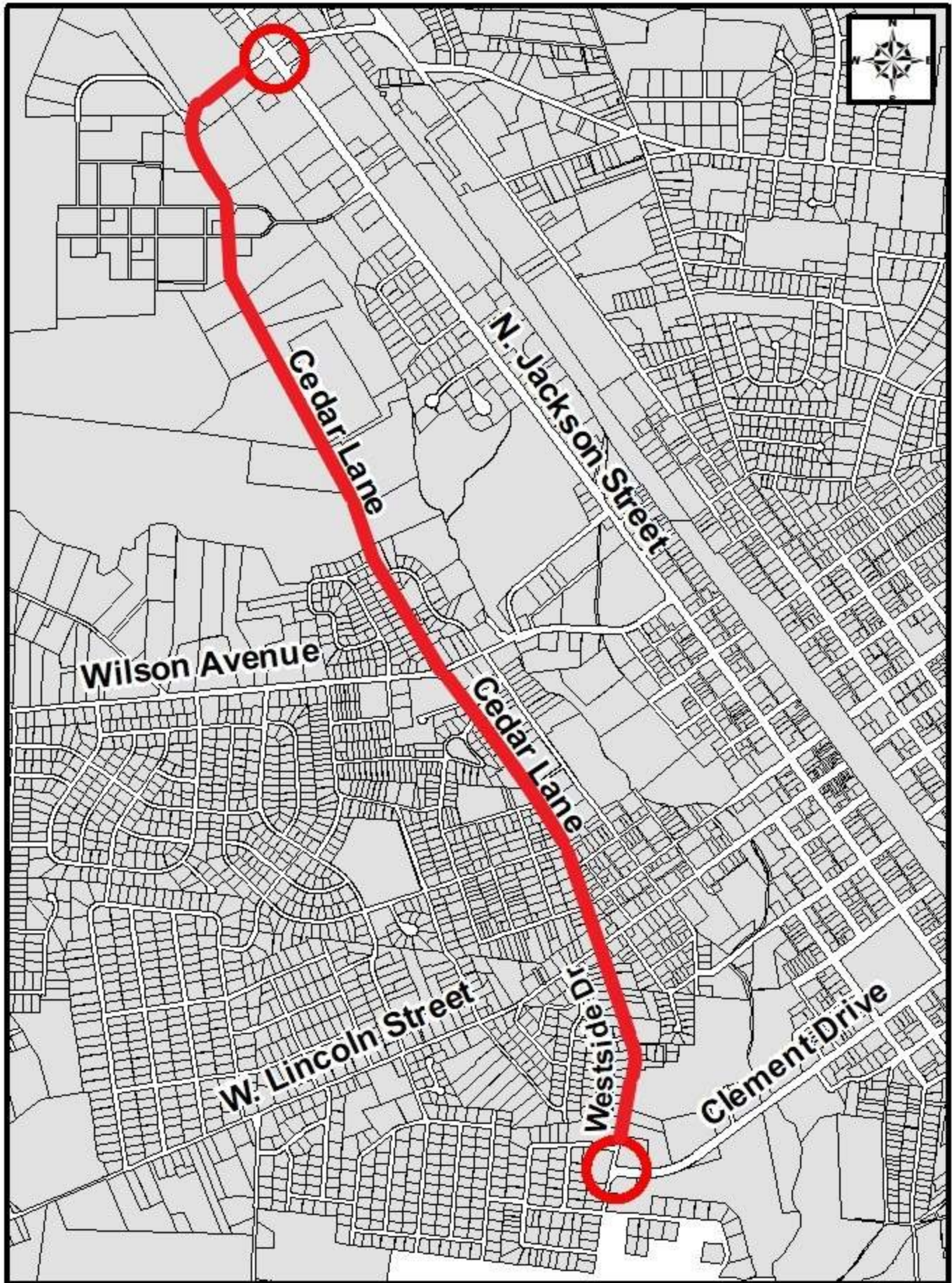
### Community Support

The City of Tullahoma will establish a dedicated Steering Committee of community leaders, the RPO Coordinator and a member from our OCT staff who will participate for the length of the study. City of Tullahoma staff will schedule and organize time for meetings and facilitating community input.

The Mayor of Tullahoma as formally directed by the Board of Mayor and Alderman has been granted authority to sign the application as well as committed to the 10% match. Private sector partners within the project area recognize the need for and importance of the planning effort to their community.



# Cedar Ln/ Westside Dr Corridor



**Monday, December 13, 2021**

|  |    |
|--|----|
| Report from City Attorney              |    |
| Report from City Administrator         |    |
| Summary of Agenda Items and Voting Log | 3  |
| Departmental Reports                   | 36 |

*Note: All matters listed under the Consent Agenda are considered to be routine and will be enacted by one motion. There will be no separate discussion of these items, unless a Board member or citizen so requests, in which case the item will be removed from the Consent Agenda and considered separately. During the portion of the meeting reserved for comments from citizens, as shown on the agenda, citizens may request that the Board remove an item from the Consent Agenda so that discussion may be held on the item.*

**Consent Agenda:** **Page**

1. **Item No. 21-153-** Minutes of the November 8, 2021, Public Hearing, Regular Meeting, and November 10, 2021, Special Called Meeting. 57
2. **Item No. 21-154-** October 2021 Financial Report. 67
3. **Item No. 21-155-** Accept donations for a City Hall Holiday Tree and Trimmings, in total valued at approximately \$825, from Lowe’s, Big Lots, Walmart and Hobby Lobby of Tullahoma. 70
4. **Item No. 21-156-** Authorize an Application to the Tennessee Department of Transportation’s 2022 Community Transportation Planning Grant, for a corridor study of Cedar Lane/Westside Drive, with an estimated total project cost of \$125,000 and 10% local match requirement. 71
5. **Item No. 21-157-** Authorize an Application to the U.S. Department of Homeland Security’s Assistance for Firefighters Grant (AFG) program for full replacement of all SCBA’s for the Tullahoma Fire Department, estimated total cost of \$432,190 with a 10% local match requirement. 72
6. **Item No. 21-158-** Authorize an Application to T-Mobile Hometown Grants Program for renovations to the Baltz Historical Building (formerly known as the American Red Cross Building) requesting support up to \$50,000 with no local match required. 73
7. **Item No. 21-159-** Accept a \$5,000 donation from the South Central TN Business Development Corporation to support upgrades to the Baltz Historical building as a historical museum. 77

**Old Business:** **Page**

8. **ORDINANCE NO. 1570- AN ORDINANCE TO AMEND THE ZONING MAP OF THE CITY OF TULLAHOMA, TENNESSEE, AS SET FORTH IN THE TULLAHOMA MUNICIPAL CODE, WHICH IS ORDINANCE NO. 1392, TO RE-ZONE AN APPROXIMATELY 35.26 ACRE PARCEL LOCATED AT THE 200 BLOCK OF LEDFORD MILL ROAD (COFFEE COUNTY TAX MAP 108, PARCEL 091.01) FROM C-2, GENERAL COMMERCIAL DISTRICT, TO R-3, HIGH DENSITY RESIDENTIAL DISTRICT,** for passage on second of two readings. 78
9. Other Old Business N/a



# CITY OF TULLAHOMA

P.O. Box 807  
Tullahoma, TN 37388

Phone 931-455-2648  
Fax 931-454-0038



December 15, 2021

TDOT – Office of Community Transportation  
James K. Polk Building  
505 Deaderick Street  
Nashville, TN 37243-0341

Re: Community Transportation Planning Grant 2022 Application – Cedar Lane/Westside Drive Corridor Study (City of Tullahoma – TDOT Region 2)

Dear Ms. Stacy Morrison,

On behalf of the Board of Mayor and Aldermen of the City of Tullahoma, we request a FY2022 CTP Grant through TDOT for the Cedar Lane/Westside Drive Corridor Study project. The Cedar Lane/ Westside Drive Corridor is classified as a minor arterial street on the City of Tullahoma's Major Thoroughfare Map and the TDOT Functional Classification System Map. The corridor travels north and south and runs parallel to U.S. Hwy 41A. The recurring issues throughout the Cedar Lane/ Westside Drive Corridor are pedestrian safety, traffic safety, road capacity, and truck maneuverability.

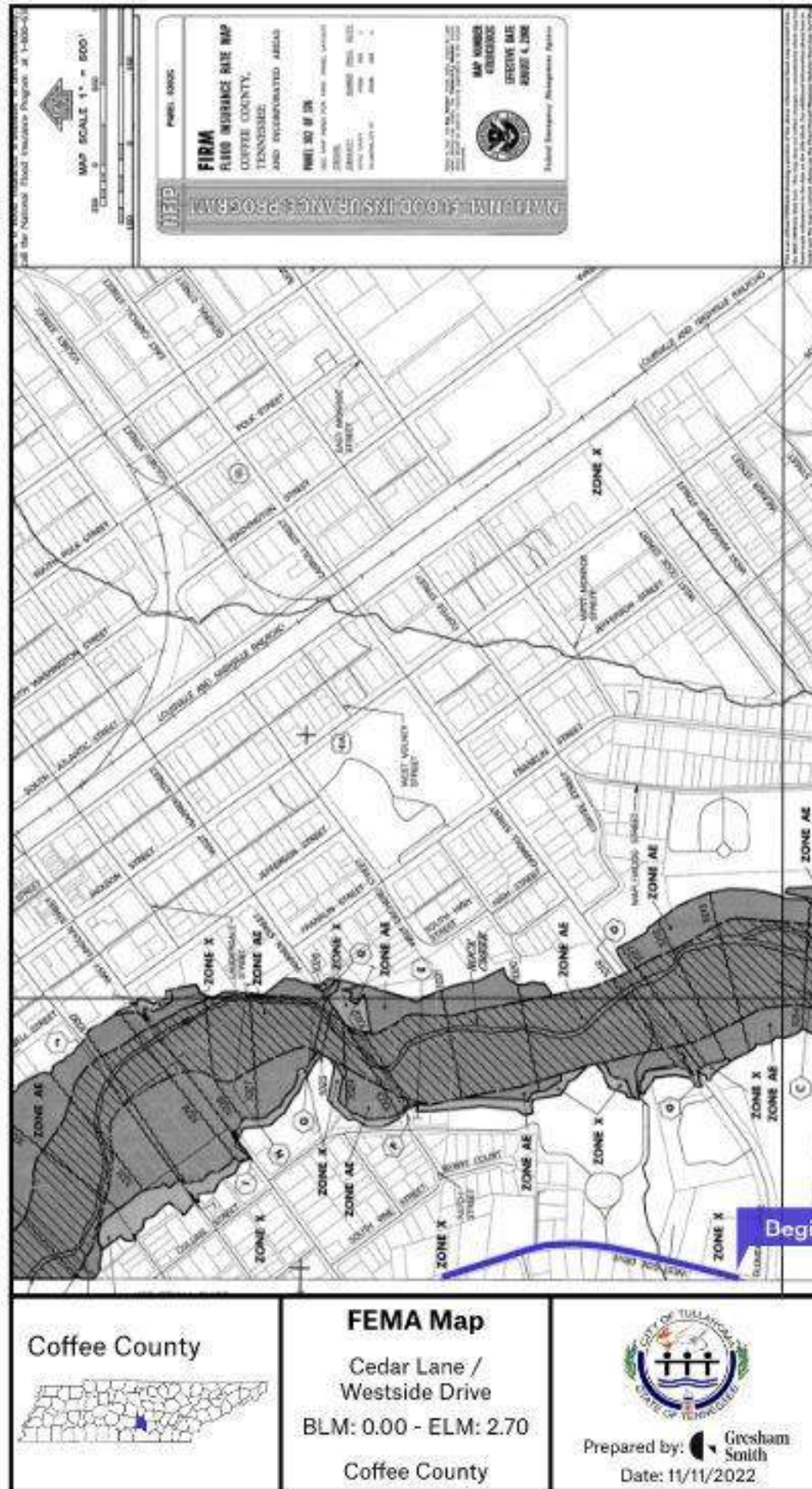
Tullahoma is an active and growing community that has experienced increased traffic and safety concerns along Cedar Lane. Cedar Lane was historically a local two-lane road that served the western section of the City. Over time and with the increased traffic on US-41A, Cedar Lane has become a by-pass road with major intersections with U.S. Hwy 41A, SR-55, and SR-130. Beginning in the early 2000s, Tullahoma has taken an active role in remedying some of the traffic and safety concerns repeatedly identified by City residents. The northern portion of Cedar Lane has been widened to three lanes and sidewalk improvements are in the engineering stages this year. Tullahoma is committed to continuing this project with further expansions and improvements to this critical corridor in our City. A vital step in this overall project is to secure a corridor study that will provide transportation facilities that are adequate to accommodate growth as well as ensure the safety for users of alternatives modes of transportation. The project is needed to ensure that Tullahoma continues to provide regional connectivity and economic vitality.

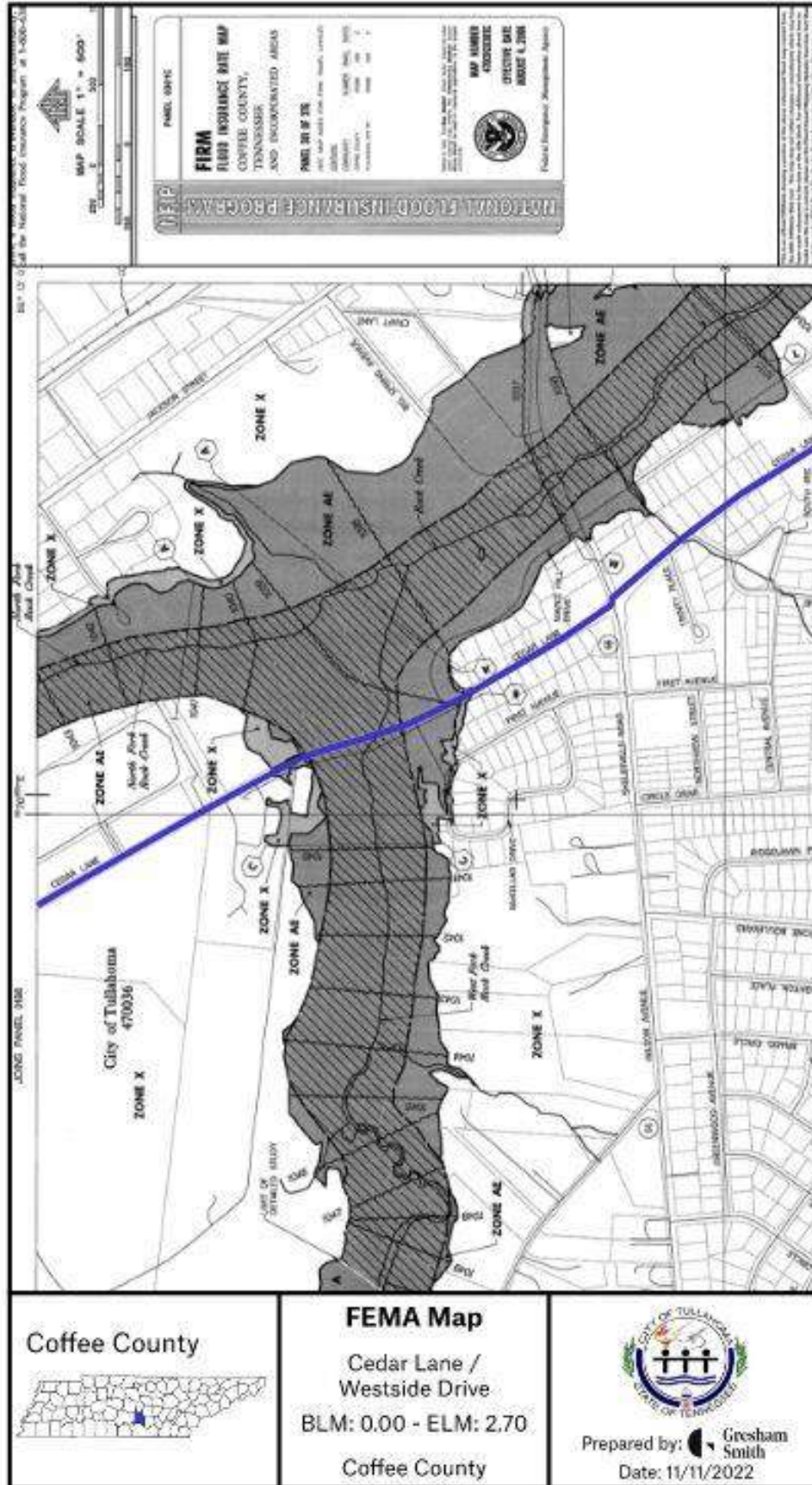
Sincerely,

  
Ray Knowis  
Mayor

**APPENDIX 2: FEMA MAPS**

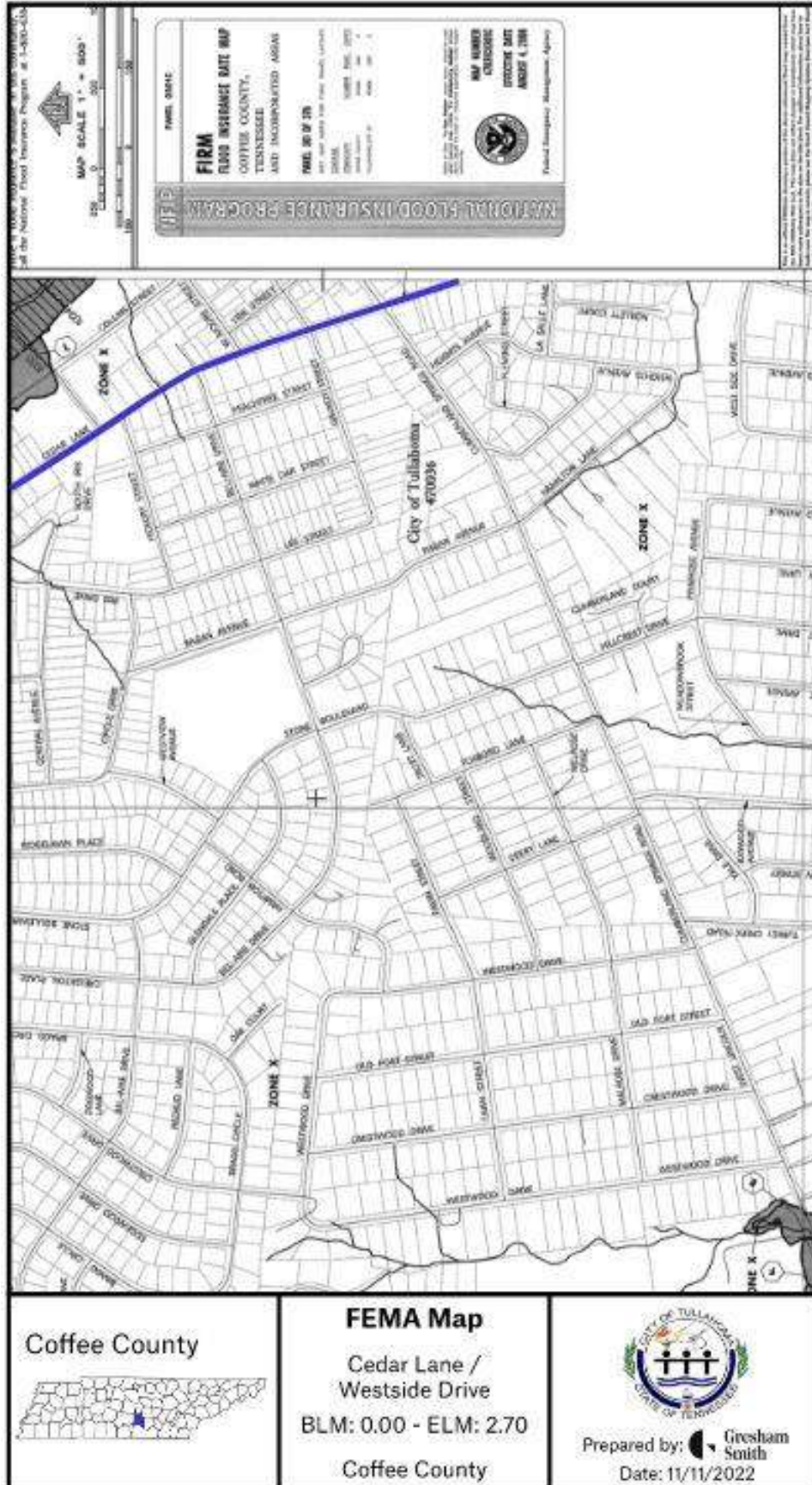








**Westside Dr/Cedar Lane Technical Report  
Tullahoma, Coffee County, TN**



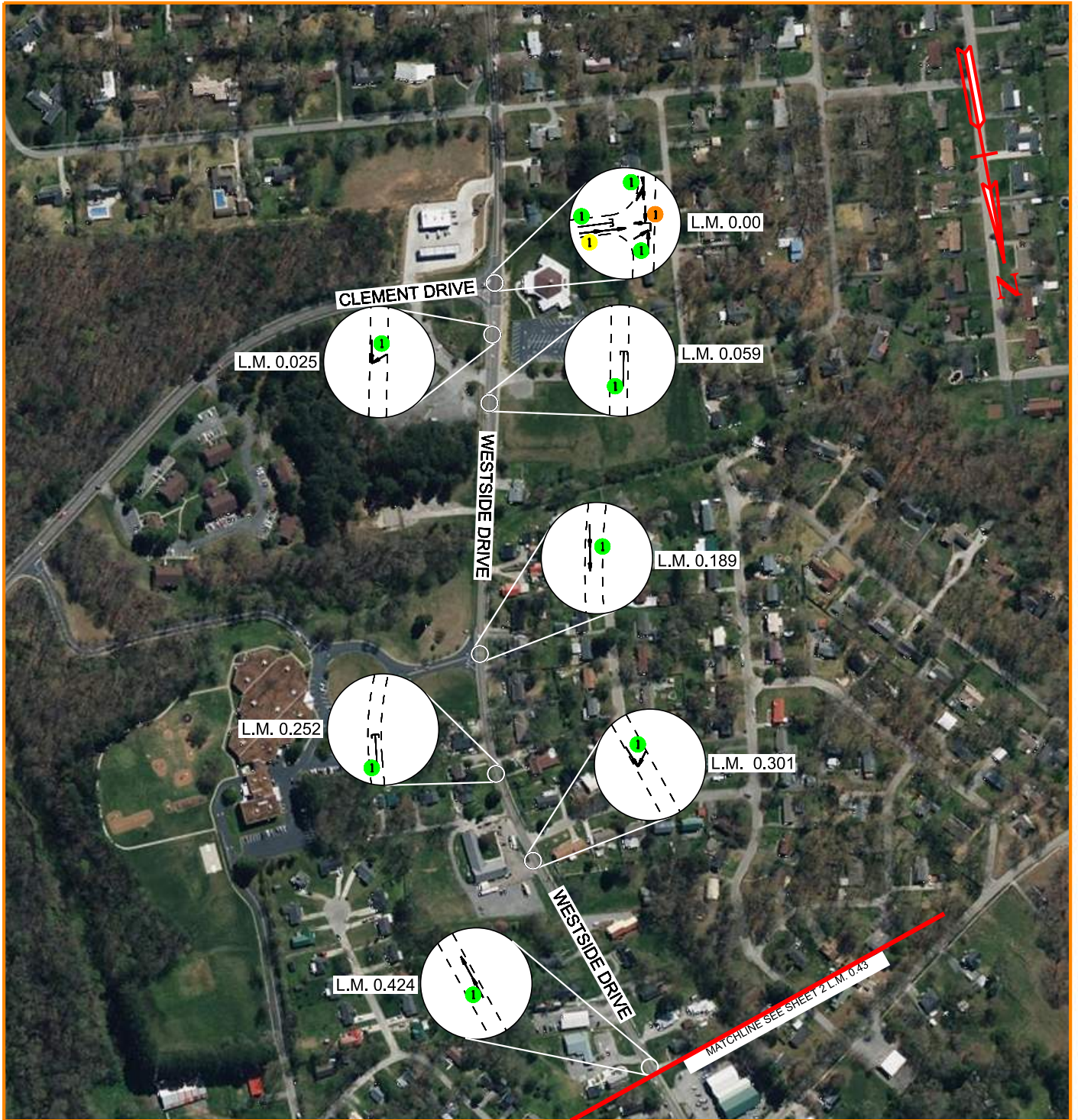




**APPENDIX 3: CRASH SUMMARY SHEETS**

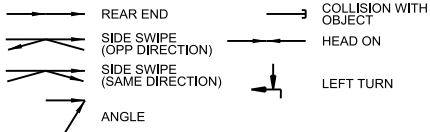


# CRASH MAP



**LEGEND:**

**MANNER OF CRASH**



**TYPE OF CRASH**

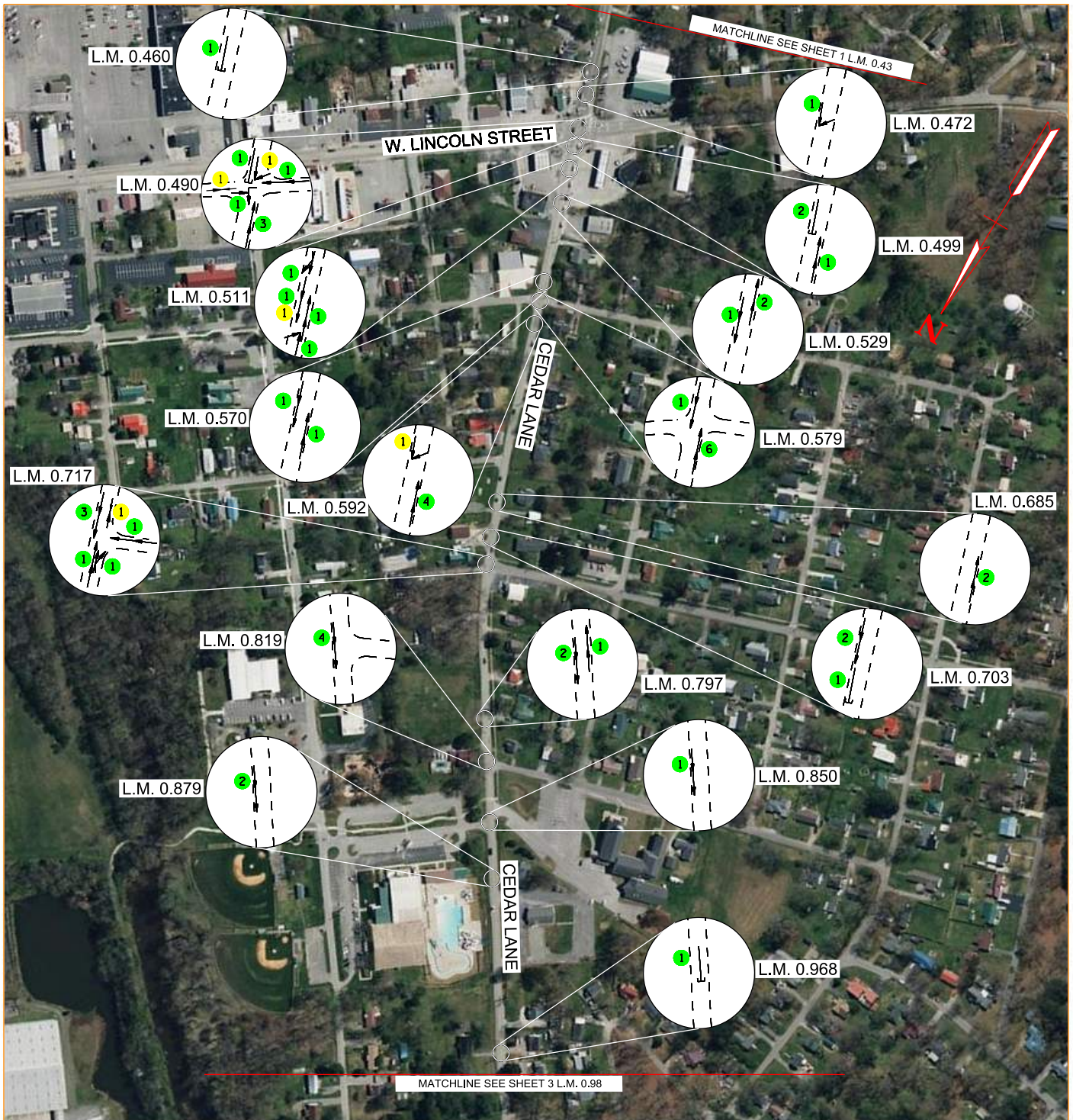


## WESTSIDE DRIVE (CITY OF TULLAHOMA) CRASHES

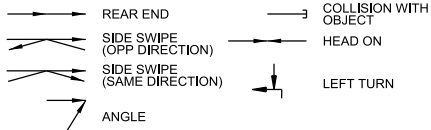




# CRASH MAP



### MANNER OF CRASH



### LEGEND:



### TYPE OF CRASH

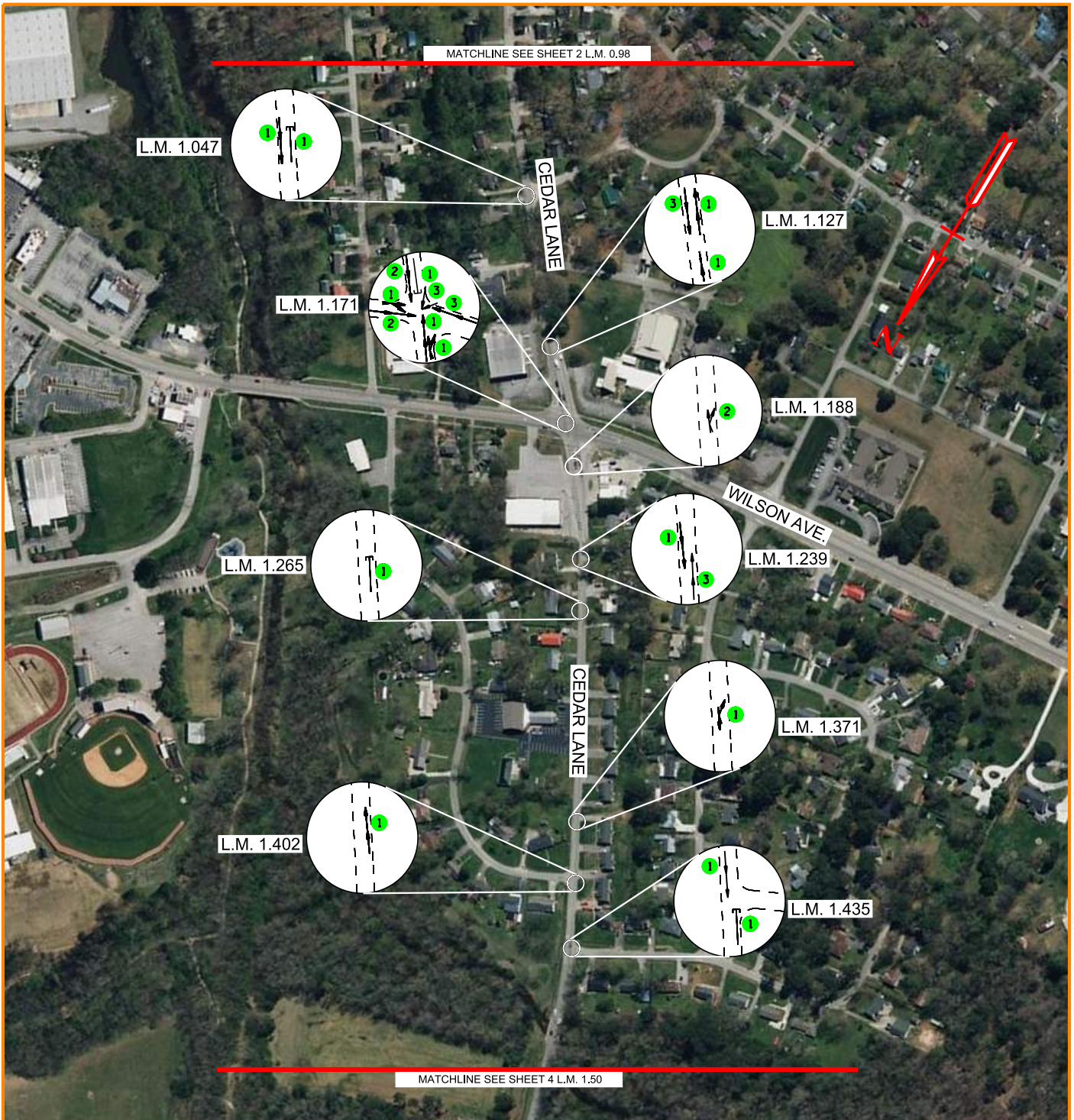


**Gresham  
Smith**

## WESTSIDE DRIVE (CITY OF TULLAHOMA) CRASHES



# CRASH MAP



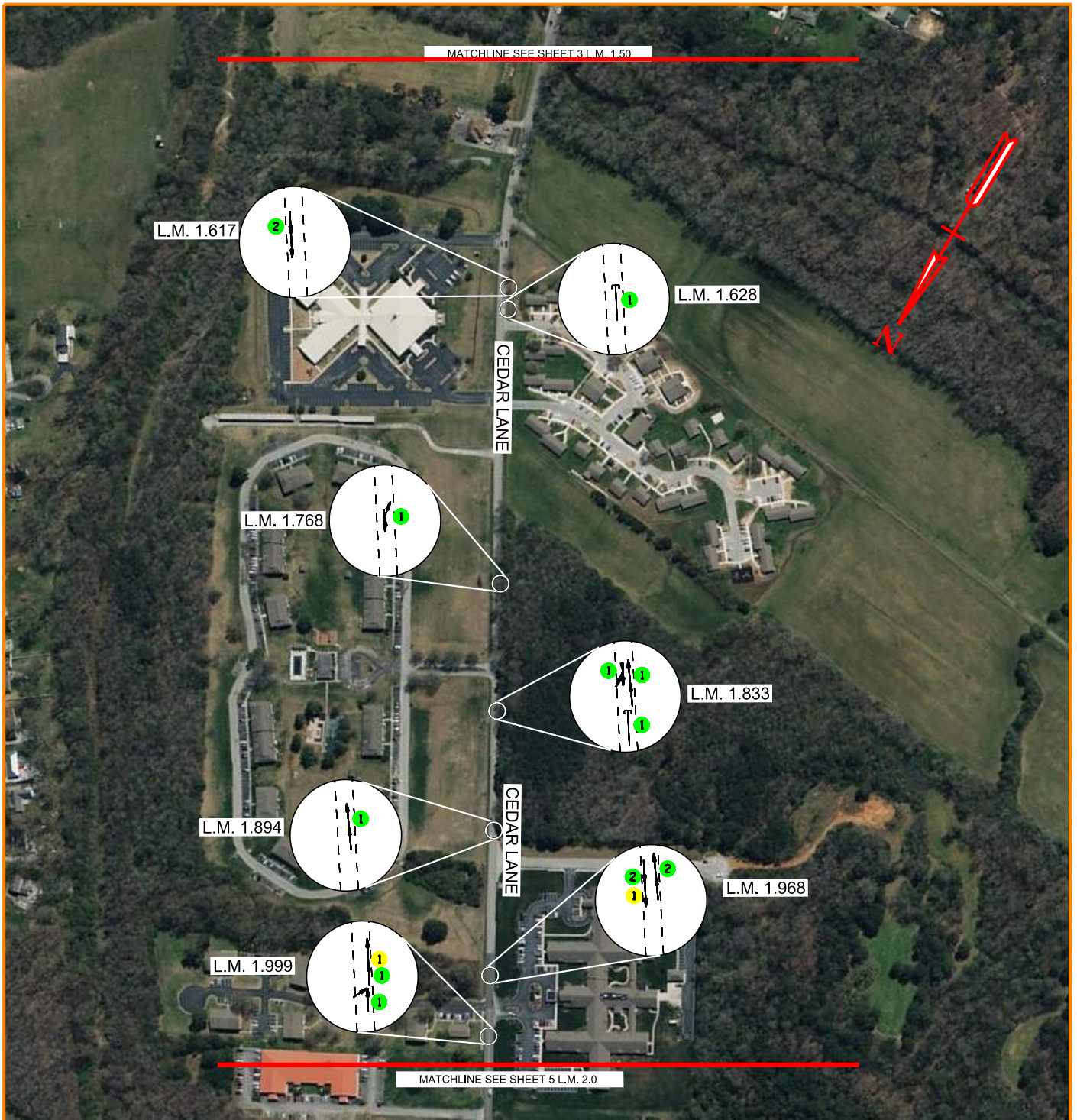
| MANNER OF CRASH |                             | LEGEND: |                                  | TYPE OF CRASH |                                |
|-----------------|-----------------------------|---------|----------------------------------|---------------|--------------------------------|
|                 | REAR END                    |         | COLLISION WITH OBJECT            |               | FATAL CRASH                    |
|                 | SIDE SWIPE (OPP DIRECTION)  |         | HEAD ON                          |               | SUSPECTED SERIOUS INJURY CRASH |
|                 | SIDE SWIPE (SAME DIRECTION) |         | LEFT TURN                        |               | SUSPECTED MINOR INJURY CRASH   |
|                 | ANGLE                       |         | NUMBER OF FATALITIES OR INJURIES |               | PROPERTY DAMAGE CRASH          |
|                 |                             |         | NUMBER OF CRASHES                |               |                                |



## WESTSIDE DRIVE (CITY OF TULLAHOMA) CRASHES



# CRASH MAP



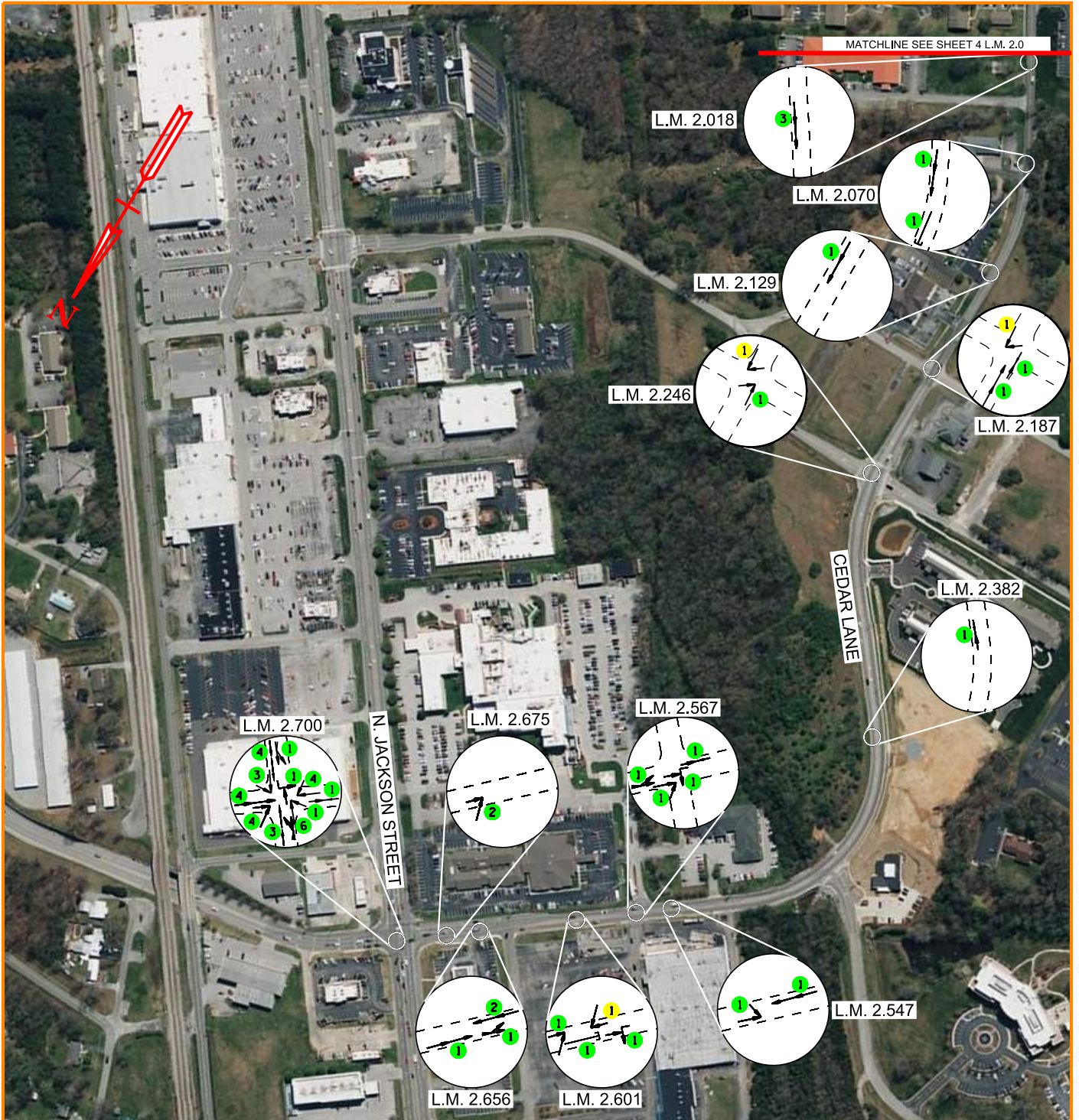
| MANNER OF CRASH |                             | LEGEND: |                                  | TYPE OF CRASH |                                |
|-----------------|-----------------------------|---------|----------------------------------|---------------|--------------------------------|
|                 | REAR END                    |         | COLLISION WITH OBJECT            |               | FATAL CRASH                    |
|                 | SIDE SWIPE (OPP DIRECTION)  |         | HEAD ON                          |               | SUSPECTED SERIOUS INJURY CRASH |
|                 | SIDE SWIPE (SAME DIRECTION) |         | LEFT TURN                        |               | SUSPECTED MINOR INJURY CRASH   |
|                 | ANGLE                       |         |                                  |               | PROPERTY DAMAGE CRASH          |
|                 |                             |         | NUMBER OF FATALITIES OR INJURIES |               | NUMBER OF CRASHES              |

## WESTSIDE DRIVE (CITY OF TULLAHOMA) CRASHES





# CRASH MAP



| MANNER OF CRASH |                             | LEGEND: |                       | TYPE OF CRASH |                              |
|-----------------|-----------------------------|---------|-----------------------|---------------|------------------------------|
|                 | REAR END                    |         | COLLISION WITH OBJECT |               | FATAL CRASH                  |
|                 | SIDE SWIPE (OPP DIRECTION)  |         | HEAD ON               |               | SUSPECT SERIOUS INJURY CRASH |
|                 | SIDE SWIPE (SAME DIRECTION) |         | LEFT TURN             |               | SUSPECTED MINOR INJURY CRASH |
|                 | ANGLE                       |         |                       |               | PROPERTY DAMAGE CRASH        |



## WESTSIDE DRIVE (CITY OF TULLAHOMA) CRASHES

**APPENDIX 4: PAY ITEM SUMMARY PHASE 1**



# PAY ITEM SUMMARY

| TDOT PAY ITEM   | TDOT DESCRIPTION   | UNIT | TOOL QUANTITIES | ADDITIONAL QUANTITIES | TOOL QUANTITIES + ADDITIONAL QUANTITIES | Statewide UNIT COST | TOTAL COST                                     |
|---|--|------|-----------------|-----------------------|---|---------------------|--|
|   |  |      |                 |                       |   |                     | <b>&lt;-- Unit Cost Trends with Quantities</b> |
| <b>Pavment Removal</b>                                    |  |      |                 |                       |   |                     |  |
| 415-01.02   | COLD PLANING BITUMINOUS PAVEMENT                         | SY   | 7181            |                       | 7181                                    | \$ 2.57             | \$ 18,475.89                                   |
| <b>PAVEMENT REMOVAL TOTAL (ROUNDED)</b>                   |  |      |                 |                       |   |                     | <b>\$ 18,500</b>                               |
| <b>Asphalt Roads</b>                                      |  |      |                 |                       |   |                     |  |
| 203-06  | WATER  | MG   |                 | 60                    | 60                                      | \$ 10.27            | \$ 616.20                                      |
| 303-01  | MINERAL AGGREGATE, TYPE A BASE, GRADING D                | TON  | 10921           |                       | 10921                                   | \$ 28.37            | \$ 309,790.18                                  |
| 307-(01, 02, 03).01                                       | ASPHALT CONCRETE MIX (All Grades) (BPMB-HM) GRADING A    | TON  | 723             |                       | 723                                     | \$ 97.32            | \$ 70,317.48                                   |
| 307-01.(20 & 21 & 22)                                     | AGGREGATE (BPMB-HM) GRADING A-S MIX                      | TON  | 485             |                       | 485                                     | \$ 86.50            | \$ 41,926.55                                   |
| 307-(01 & 02 & 03).08                                     | ASPHALT CONCRETE MIX (ALL GRADES) (BPMB-HM) GRADING B-M2 | TON  | 744             |                       | 744                                     | \$ 130.16           | \$ 96,815.35                                   |
| 402-01  | BITUMINOUS MATERIAL FOR PRIME COAT (PC)                  | TON  | 9               |                       | 9                                       | \$ 807.84           | \$ 7,366.29                                    |
| 402-02  | AGGREGATE FOR COVER MATERIAL (PC)                        | TON  | 33              |                       | 33                                      | \$ 65.62            | \$ 2,159.75                                    |
| 403-01  | BITUMINOUS MATERIAL FOR TACK COAT (TC)                   | TON  | 6               |                       | 6                                       | \$ 747.73           | \$ 4,745.61                                    |
| 407-20.05   | SAW CUTTING ASPHALT PAVEMENT                             | LS   |                 | 5400                  | 5400                                    | \$ 3.10             | \$ 16,740.00                                   |
| 411-01.07   | ACS MIX (PG64-22) GRADING E SHOULDER                     | TON  | 241             |                       | 241                                     | \$ 122.31           | \$ 29,505.18                                   |
| 411-(01 & 02 & 03).10                                     | ACS MIX(ALL GRADES) GRADING D                            | TON  | 774             |                       | 774                                     | \$ 134.54           | \$ 104,155.94                                  |
| 411-03.07   | ASC Mix (PG64-22) Thin Lift CS Asphalt                   | TON  |                 | 200                   | 200                                     | \$ 64.91            | \$ 12,982.00                                   |
| <b>PAVING TOTAL (ROUNDED)</b>                             |  |      |                 |                       |   |                     | <b>\$ 697,200</b>                              |
| <b>Drainage</b>   |  |      |                 |                       |   |                     |  |
| 209-05  | SEDIMENT REMOVAL   | CY   |                 | 180                   | 180                                     | \$ 7.60             | \$ 1,368.00                                    |
| 209-08.03   | TEMPORARY SILT FENCE (WITHOUT BACKING)                   | LF   |                 | 640                   | 640                                     | \$ 1.10             | \$ 704.00                                      |
| 209-08.07   | ROCK CHECK DAM PER                                       | EACH |                 | 10                    | 10                                      | \$ 186.64           | \$ 1,866.40                                    |
| 209-08.08   | ENHANCED ROCK CHECK DAM                                  | EACH |                 | 5                     | 5                                       | \$ 492.59           | \$ 2,462.95                                    |
| 209-09.04   | SEDIMENT FILTER BAG(15' X 10')                           | EACH |                 | 2                     | 2                                       | \$ 604.27           | \$ 1,208.54                                    |
| 209-09.43   | CURB INLET PROTECTION (TYPE 4)                           | EACH |                 | 30                    | 30                                      | \$ 154.77           | \$ 4,643.10                                    |
| 209-40.33   | CATCH BASIN PROTECTION (TYPE D)                          | EACH |                 | 25                    | 25                                      | \$ 237.16           | \$ 5,929.00                                    |
| 607-05.02   | 24" CONCRETE PIPE CULVERT (CLASS III)                    | LF   | 3312            | 1000                  | 4312                                    | \$ 86.55            | \$ 373,231.05                                  |
| 607-09.02   | 48" CONCRETE PIPE CULVERT (CLASS III)                    | LF   |                 | 150                   | 150                                     | \$ 143.27           | \$ 21,490.50                                   |
| 607-39.02   | 18" PIPE CULVERT (SIDE DRAIN)                            | LF   |                 | 800                   | 800                                     | \$ 32.99            | \$ 26,392.00                                   |
| 611-01.03   | MANHOLES, > 8' - 12' DEPTH                               | EA   |                 | 3                     | 3                                       | \$ 5,454.05         | \$ 16,362.15                                   |
| 611-12.02   | CATCH BASINS, TYPE 12, > 4' - 8' DEPTH                   | EA   | 11              | 4                     | 15                                      | \$ 4,727.84         | \$ 69,835.88                                   |
| 611-14.02   | CATCH BASINS, TYPE 14, > 4' - 8' DEPTH                   | EA   | 5               | 5                     | 5                                       | \$ 8,964.99         | \$ 48,281.84                                   |
| 611-42.02   | CATCH BASINS, TYPE 42, > 4' - 8' DEPTH                   | EA   | 2               | 3                     | 5                                       | \$ 5,541.90         | \$ 30,192.29                                   |
| 710-02  | Aggregate Underdrains (with pipe)                        | LF   | 5386            |                       | 5386                                    | \$ 7.10             | \$ 38,222.26                                   |
| 740-10.03   | GEOTEXTILE (TYPE III)(EROSION CONTROL)                   | SY   |                 | 500                   | 500                                     | \$ 2.91             | \$ 1,455.00                                    |
| 740-11.03   | TEMPORARY SEDIMENT TUBE 18IN (18 IN)                     | LF   |                 | 2000                  | 2000                                    | \$ 3.43             | \$ 6,860.00                                    |
| 740-11.04   | TEMPORARY SEDIMENT TUBE 20IN (DESCRIPTION)               | LF   |                 | 150                   | 150                                     | \$ 3.56             | \$ 534.00                                      |
| <b>DRAINAGE TOTAL (ROUNDED)</b>                           |  |      |                 |                       |   |                     | <b>\$ 651,100</b>                              |
| <b>Appurtenances</b>                                      |  |      |                 |                       |   |                     |  |
| 701-01.01   | CONCRETE SIDEWALK (4 ")                                  | SF   | 13464           |                       | 13464                                   | \$ 6.78             | \$ 91,266.17                                   |
| 701-02  | CONCRETE DRIVEWAY  | SF   |                 | 6000                  | 6000                                    | \$ 5.80             | \$ 34,800.00                                   |
| 701-02.03   | CONCRETE CURB RAMP                                       | SF   |                 | 500                   | 500                                     | \$ 13.01            | \$ 6,505.00                                    |
| 702-01.02   | CONCRETE CURB  | LF   |                 | 500                   | 500                                     | \$ 20.77            | \$ 10,385.00                                   |
| 702-03  | CONCRETE COMBINED CURB & GUTTER                          | CY   | 387             | 13                    | 400                                     | \$ 400.17           | \$ 159,963.20                                  |
| <b>ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)</b> |  |      |                 |                       |   |                     | <b>\$ 303,000</b>                              |
| <b>Earthwork &amp; Mineral</b>                            |  |      |                 |                       |   |                     |  |
| 105-01  | CONSTRUCTION STAKES, LINES AND GRADES                    | LS   | 1               |                       | 1                                       | \$ 38,965.62        | \$ 38,965.62                                   |
| 203-01  | ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED)                | CY   | 10173           |                       | 10173                                   | \$ 14.91            | \$ 151,637.13                                  |
| 203-03  | BORROW EXCAVATION (UNCLASSIFIED)                         | CY   | 6782            | 4000                  | 10782                                   | \$ 12.35            | \$ 133,155.95                                  |
| 204-06.01   | FLOWABLE FILL (GENERAL)                                  | CY   |                 | 30                    | 30                                      | \$ 250.00           | \$ 7,500.00                                    |
| 303-10.01   | MINERAL AGGREGATE (SIZE 57)                              | TON  |                 | 250                   | 250                                     | \$ 30.59            | \$ 7,647.50                                    |

# PAY ITEM SUMMARY

EARTHWORK & MINERAL TOTAL (ROUNDED) \$ 339,000

**Structures**

STRUCTURES TOTAL (ROUNDED) \$ -

**Interchanges and Unique Intersections**

INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED) \$ -

**Lighting & Signalization**

LIGHTING & SIGNALIZATION TOTAL (ROUNDED) \$ 16,000

**Guardrail**

|                              |                   |    |  |     |     |         |           |
|------------------------------|-------------------|----|--|-----|-----|---------|-----------|
| 706-01                       | GUARDRAIL REMOVED | LF |  | 200 | 200 | \$ 0.89 | \$ 178.00 |
| GUARDRAIL TOTAL (ROUNDED) \$ |                   |    |  |     |     |         | 200       |

**Seeding and Sodding**

|                            |  |      |    |      |      |              |              |
|----------------------------|--|------|----|------|------|--------------|--------------|
| 801-01                     | SEEDING (WITH MULCH)                       | UNIT | 67 |      | 67   | \$ 27.26     | \$ 1,835.14  |
| 801-01.07                  | TEMPORARY SEEDING (WITH MULCH)             | UNIT | 50 |      | 50   | \$ 22.31     | \$ 1,126.43  |
| 801-02                     | SEEDING (WITHOUT MULCH)                    | UNIT | 50 |      | 50   | \$ 17.70     | \$ 893.67    |
| 803-01                     | SODDING (NEW SOD)                          | SY   |    | 6250 | 6250 | \$ 2.45      | \$ 15,312.50 |
| 806-02.12                  | Mowing, Weedeating & Litter Pickup (Urban) | Cycl |    | 2    | 2    | \$ 4,000.00  | \$ 8,000.00  |
| 806-03.01                  | TREE CUTTING                               | LS   |    | 2    | 2    | \$ 10,500.00 | \$ 21,000.00 |
| SODDING TOTAL (ROUNDED) \$ |  |      |    |      |      |              | 48,200       |

**Maintenance of Traffic**

|   |                                      |    |     |     |     |              |              |
|---|--------------------------------------|----|-----|-----|-----|--------------|--------------|
| N/A                                       | Traffic Control                      | LS | 1   |     | 1   |              | \$ 79,911.43 |
| 712-01                                    | TRAFFIC CONTROL                      | LS |     | 1   | 1   | \$ 21,717.03 | \$ 21,717.03 |
| 712-02.02                                 | INTERCONNECTED PORTABLE BARRIER RAIL | LF | 135 | 265 | 400 | \$ 30.18     | \$ 12,061.14 |
| MAINTENANCE OF TRAFFIC TOTAL (ROUNDED) \$ |                                      |    |     |     |     |              | 113,700      |

**Signs**

|                            |  |    |   |     |     |             |              |
|----------------------------|--|----|---|-----|-----|-------------|--------------|
| 713-11.01                  | "U" SECTION STEEL POSTS                  | LB |   | 500 | 500 | \$ 3.21     | \$ 1,605.00  |
| 713-11.02                  | PERFORATED/KNOCKOUT SQUARE TUBE POST     | LB |   | 500 | 500 | \$ 4.23     | \$ 2,115.00  |
| 713-13.02                  | FLAT SHEET ALUMINUM SIGNS (0.080" THICK) | SF |   | 500 | 500 | \$ 12.94    | \$ 6,470.00  |
| 713-13.03                  | FLAT SHEET ALUMINUM SIGNS (0.100" THICK) | SF |   | 250 | 250 | \$ 14.26    | \$ 3,565.00  |
| 713-15.41                  | SIGN REMOVAL (DESCRIPTION)               | LS |   | 1   | 1   | \$ 403.33   | \$ 403.33    |
| 713-16.01                  | CHANGEABLE MESSAGE SIGN UNIT             | EA |   | 2   | 2   | \$ 5,916.82 | \$ 11,833.64 |
| 713-16.25                  | SIGNS (STOP (R1-1))                      | EA |   | 3   | 3   | \$ 132.66   | \$ 397.98    |
| 713-99.91                  | Signs                                    | LS |   | 3   | 3   | \$ 7,100.00 | \$ 21,300.00 |
| Not Listed                 | Signs (Construction)                     | LS | 1 |     | 1   | \$ -        | \$ 2,500     |
| SIGNING TOTAL (ROUNDED) \$ |  |    |   |     |     |             | 50,200       |

**Pavement Markings**

|                                      |   |    |  |     |     |             |             |
|--------------------------------------|---|----|--|-----|-----|-------------|-------------|
| 716-02.02                            | PLASTIC PAVEMENT MKG (8" BARRIER LINE)              | LF |  | 100 | 100 | \$ 2.95     | \$ 295.00   |
| 716-02.03                            | Plastic Pavement Marking (Cross-Walk)               | LF |  | 350 | 350 | \$ 9.81     | \$ 3,433.50 |
| 716-02.05                            | Plastic Pavement Marking (Stop Line)                | LF |  | 110 | 110 | \$ 11.37    | \$ 1,250.70 |
| 716-02.06                            | Plastic Pavement Marking (Turn Lane Arrow)          | EA |  | 8   | 8   | \$ 138.38   | \$ 1,107.04 |
| 716-04.01                            | Plastic Word Pavement Marking (Straight-Turn Arrow) | EA |  | 4   | 4   | \$ 184.72   | \$ 738.88   |
| 716-13.02                            | Spray Thermo P.M. (60 mil 6")                       | LM |  | 1.5 | 1.5 | \$ 2,749.24 | \$ 4,123.86 |
| PAVEMENT MARKINGS TOTAL (ROUNDED) \$ |   |    |  |     |     |             | 11,000      |

**Fencing**

FENCE TOTAL (ROUNDED) \$ -

**Rip-Rap**

|   |                              |     |  |     |     |          |             |
|---|------------------------------|-----|--|-----|-----|----------|-------------|
| 709-05.06                                     | Machined Rip-Rap (Class A-1) | TON |  | 200 | 200 | \$ 32.99 | \$ 6,598.00 |
| 709-05.08                                     | Machined Rip-Rap (Class B)   | TON |  | 100 | 100 | \$ 31.09 | \$ 3,109.00 |
| RIP-RAP & SLOPE PROTECTION TOTAL (ROUNDED) \$ |                              |     |  |     |     |          | 9,800.00    |

**Clearing and Grubing**



# PAY ITEM SUMMARY

|                                    |                       |    |  |   |   |              |              |
|------------------------------------|-----------------------|----|--|---|---|--------------|--------------|
| 201-01                             | Clearing and Grubbing | LS |  | 1 | 1 | \$ 60,931.51 | \$ 60,931.51 |
| CLEAR AND GRUBBING TOTAL (ROUNDED) |                       |    |  |   |   | \$           | 61,000.00    |

**Railroad At-Grade Crossing**

RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED) \$ -

**Utilities**

|                           |                       |    |      |  |      |            |            |
|---------------------------|-----------------------|----|------|--|------|------------|------------|
| N/A                       | Overhead Distribution | LM | 0.51 |  | 0.51 | \$ 750,000 | \$ 382,500 |
| N/A                       | Underground Water     | LM | 0.7  |  | 0.7  | \$ 700,000 | \$ 490,000 |
| UTILITIES TOTAL (ROUNDED) |                       |    |      |  |      | \$         | 872,500.00 |

**Right-of-Way**

|                              |              |    |   |   |   |               |               |
|------------------------------|--------------|----|---|---|---|---------------|---------------|
| N/A                          | Right-of-Way | LS | 1 | 1 | 2 | \$ 193,745.45 | \$ 387,490.91 |
| RIGHT-OF-WAY TOTAL (ROUNDED) |              |    |   |   |   | \$            | 387,500.00    |

**APPENDIX 5: PAY ITEM SUMMARY PHASE 2**



# PAY ITEM SUMMARY

| TDOT PAY ITEM   | TDOT DESCRIPTION   | UNIT | TOOL QUANTITIES | ADDITIONAL QUANTITIES | TOOL QUANTITIES +<br>ADDITIONAL QUANTITIES | Statewide<br>UNIT COST | TOTAL COST                                     |
|---|--|------|-----------------|-----------------------|--|------------------------|--|
|   |  |      |                 |                       |  |                        | <b>&lt;-- Unit Cost Trends with Quantities</b> |
| <b>Pavment Removal</b>                                    |  |      |                 |                       |  |                        |  |
| 202-03.01   | REMOVAL OF ASPHALT PAVEMENT                              | SY   | 0               | 500                   | 500  | \$ 11.50               | \$ 5,750.06                                    |
| 415-01.02   | COLD PLANING BITUMINOUS PAVEMENT                         | SY   | 9574            |                       | 9574                                       | \$ 2.57                | \$ 24,634.52                                   |
| <b>PAVEMENT REMOVAL TOTAL (ROUNDED)</b>                   |  |      |                 |                       |  |                        | <b>\$ 30,400</b>                               |
| <b>Asphalt Roads</b>                                      |  |      |                 |                       |  |                        |  |
| 203-06  | WATER  | MG   |                 | 80                    | 80   | \$ 10.27               | \$ 821.60                                      |
| 303-01  | MINERAL AGGREGATE, TYPE A BASE, GRADING D                | TON  | 14561           |                       | 14561                                      | \$ 27.27               | \$ 397,093.39                                  |
| 307-(01, 02, 03).01                                       | ASPHALT CONCRETE MIX (All Grades) (BPMB-HM) GRADING A    | TON  | 963             |                       | 963  | \$ 96.50               | \$ 92,966.94                                   |
| 307-01.(20 & 21 & 22)                                     | AGGREGATE (BPMB-HM) GRADING A-S MIX                      | TON  | 646             |                       | 646  | \$ 86.50               | \$ 55,902.07                                   |
| 307-(01 & 02 & 03).08                                     | ASPHALT CONCRETE MIX (ALL GRADES) (BPMB-HM) GRADING B-M2 | TON  | 992             |                       | 992  | \$ 124.87              | \$ 123,844.02                                  |
| 402-01  | BITUMINOUS MATERIAL FOR PRIME COAT (PC)                  | TON  | 12              |                       | 12   | \$ 807.84              | \$ 9,821.72                                    |
| 402-02  | AGGREGATE FOR COVER MATERIAL (PC)                        | TON  | 44              |                       | 44   | \$ 62.50               | \$ 2,742.72                                    |
| 403-01  | BITUMINOUS MATERIAL FOR TACK COAT (TC)                   | TON  | 8               |                       | 8  | \$ 747.73              | \$ 6,327.48                                    |
| 407-20.05   | SAW CUTTING ASPHALT PAVEMENT                             | LS   |                 | 7200                  | 7200                                       | \$ 3.10                | \$ 22,320.00                                   |
| 411-01.07   | ACS MIX (PG64-22) GRADING E SHOULDER                     | TON  | 322             |                       | 322  | \$ 119.59              | \$ 38,464.60                                   |
| 411-(01 & 02 & 03).10                                     | ACS MIX(ALL GRADES) GRADING D                            | TON  | 1032            |                       | 1032                                       | \$ 130.56              | \$ 134,766.34                                  |
| 411-03.07   | ASC Mix (PG64-22) Thin Lift CS Asphalt                   | TON  |                 | 250                   | 250  | \$ 64.91               | \$ 16,227.50                                   |
| <b>PAVING TOTAL (ROUNDED)</b>                             |  |      |                 |                       |  |                        | <b>\$ 901,300</b>                              |
| <b>Concrete Roads</b>                                     |  |      |                 |                       |  |                        |  |
| <b>CONCRETE RAMPS AND ROADWAYS TOTAL (ROUNDED)</b>        |  |      |                 |                       |  |                        | <b>\$ -</b>                                    |
| <b>Drainage</b>   |  |      |                 |                       |  |                        |  |
| 209-05  | SEDIMENT REMOVAL   | CY   |                 | 220                   | 220  | \$ 7.60                | \$ 1,672.00                                    |
| 209-08.03   | TEMPORARY SILT FENCE (WITHOUT BACKING)                   | LF   |                 | 1500                  | 1500                                       | \$ 1.10                | \$ 1,650.00                                    |
| 209-08.07   | ROCK CHECK DAM PER                                       | EACH |                 | 16                    | 16   | \$ 186.64              | \$ 2,986.24                                    |
| 209-08.08   | ENHANCED ROCK CHECK DAM                                  | EACH |                 | 8                     | 8  | \$ 492.59              | \$ 3,940.72                                    |
| 209-09.43   | CURB INLET PROTECTION (TYPE 4)                           | EACH |                 | 35                    | 35   | \$ 154.77              | \$ 5,416.95                                    |
| 209-40.33   | CATCH BASIN PROTECTION (TYPE D)                          | EACH |                 | 27                    | 27   | \$ 237.16              | \$ 6,403.32                                    |
| 607-05.02   | 24" CONCRETE PIPE CULVERT (CLASS III)                    | LF   | 4416            |                       | 5800                                       | \$ 86.55               | \$ 502,026.77                                  |
| 607-09.02   | 48" CONCRETE PIPE CULVERT (CLASS III)                    | LF   |                 | 150                   | 150  | \$ 143.27              | \$ 21,490.50                                   |
| 607-39.02   | 18" PIPE CULVERT (SIDE DRAIN)                            | LF   |                 | 600                   | 600  | \$ 32.99               | \$ 19,794.00                                   |
| 611-01.03   | MANHOLES, > 8' - 12' DEPTH                               | EA   |                 | 3                     | 3  | \$ 5,454.05            | \$ 16,362.15                                   |
| 611-12.02   | CATCH BASINS, TYPE 12, > 4' - 8' DEPTH                   | EA   | 14              |                       | 14   | \$ 4,727.84            | \$ 67,899.35                                   |
| 611-14.02   | CATCH BASINS, TYPE 14, > 4' - 8' DEPTH                   | EA   | 7               |                       | 7  | \$ 8,964.99            | \$ 64,375.79                                   |
| 611-42.02   | CATCH BASINS, TYPE 42, > 4' - 8' DEPTH                   | EA   | 3               |                       | 5  | \$ 5,541.90            | \$ 29,172.58                                   |
| 710-02  | Aggregate Underdrains (with pipe)                        | LF   | 7181            |                       | 7181                                       | \$ 7.10                | \$ 50,963.01                                   |
| 740-10.03   | GEOTEXTILE (TYPE III)(EROSION CONTROL)                   | SY   |                 | 600                   | 600  | \$ 2.91                | \$ 1,746.00                                    |
| 740-11.03   | TEMPORARY SEDIMENT TUBE 18IN (18 IN)                     | LF   |                 | 3000                  | 3000                                       | \$ 3.43                | \$ 10,290.00                                   |
| 740-11.04   | TEMPORARY SEDIMENT TUBE 20IN (DESCRIPTION)               | LF   |                 | 250                   | 250  | \$ 3.56                | \$ 890.00                                      |
| <b>DRAINAGE TOTAL (ROUNDED)</b>                           |  |      |                 |                       |  |                        | <b>\$ 807,100</b>                              |
| <b>Appurtenances</b>                                      |  |      |                 |                       |  |                        |  |
| 701-01.01   | CONCRETE SIDEWALK (4")                                   | SF   | 17952           |                       | 17952                                      | \$ 6.78                | \$ 121,688.22                                  |
| 701-02  | CONCRETE DRIVEWAY  | SF   |                 | 8000                  | 8000                                       | \$ 5.80                | \$ 46,400.00                                   |
| 701-02.03   | CONCRETE CURB RAMP                                       | SF   |                 | 670                   | 670  | \$ 13.01               | \$ 8,716.70                                    |
| 702-01.02   | CONCRETE CURB  | LF   |                 | 600                   | 600  | \$ 20.77               | \$ 12,462.00                                   |
| 702-03  | CONCRETE COMBINED CURB & GUTTER                          | CY   | 516             |                       | 516  | \$ 400.17              | \$ 206,348.02                                  |
| <b>ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)</b> |  |      |                 |                       |  |                        | <b>\$ 395,700</b>                              |
| <b>Earthwork &amp; Mineral</b>                            |  |      |                 |                       |  |                        |  |
| 105-01  | CONSTRUCTION STAKES, LINES AND GRADES                    | LS   | 1               |                       | 1  | \$ 46,607.86           | \$ 46,607.86                                   |
| 203-01  | ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED)                | CY   | 13564           |                       | 13564                                      | \$ 14.25               | \$ 193,282.27                                  |

# PAY ITEM SUMMARY

|  |                                  |     |      |      |       |           |                   |
|--|----------------------------------|-----|------|------|-------|-----------|-------------------|
| 203-03   | BORROW EXCAVATION (UNCLASSIFIED) | CY  | 9042 | 4000 | 13042 | \$ 12.08  | \$ 157,519.54     |
| 204-06.01                                      | FLOWABLE FILL (GENERAL)          | CY  |      | 30   | 30    | \$ 250.00 | \$ 7,500.00       |
| 303-10.01                                      | MINERAL AGGREGATE (SIZE 57)      | TON |      | 350  | 350   | \$ 30.59  | \$ 10,706.50      |
| <b>EARTHWORK &amp; MINERAL TOTAL (ROUNDED)</b> |                                  |     |      |      |       |           | <b>\$ 415,700</b> |

|                   |                                   |             |
|-------------------|-----------------------------------|-------------|
| <b>Structures</b> | <b>STRUCTURES TOTAL (ROUNDED)</b> | <b>\$ -</b> |
|-------------------|-----------------------------------|-------------|

|  |  |             |
|--|--|-------------|
| <b>Interchanges and Unique Intersections</b> | <b>INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED)</b> | <b>\$ -</b> |
|--|--|-------------|

|                                     |   |                  |
|-------------------------------------|---|------------------|
| <b>Lighting &amp; Signalization</b> | <b>LIGHTING &amp; SIGNALIZATION TOTAL (ROUNDED)</b> | <b>\$ 16,000</b> |
|-------------------------------------|---|------------------|

|                  |                                  |             |
|------------------|----------------------------------|-------------|
| <b>Guardrail</b> | <b>GUARDRAIL TOTAL (ROUNDED)</b> | <b>\$ -</b> |
|------------------|----------------------------------|-------------|

|                                |  |      |    |      |      |              |                  |
|--------------------------------|--|------|----|------|------|--------------|------------------|
| <b>Seeding and Sodding</b>     |  |      |    |      |      |              |                  |
| 801-01                         | SEEDING (WITH MULCH)                       | UNIT | 90 |      | 90   | \$ 27.26     | \$ 2,446.86      |
| 801-01.07                      | TEMPORARY SEEDING (WITH MULCH)             | UNIT | 67 |      | 67   | \$ 22.31     | \$ 1,501.91      |
| 801-02                         | SEEDING (WITHOUT MULCH)                    | UNIT | 67 |      | 67   | \$ 17.70     | \$ 1,191.56      |
| 803-01                         | SODDING (NEW SOD)                          | SY   |    | 8300 | 8300 | \$ 2.45      | \$ 20,335.00     |
| 806-02.12                      | Mowing, Weedeating & Litter Pickup (Urban) | Cycl |    | 2    | 2    | \$ 4,000.00  | \$ 8,000.00      |
| 806-03.01                      | TREE CUTTING                               | LS   |    | 2    | 2    | \$ 10,500.00 | \$ 21,000.00     |
| <b>SODDING TOTAL (ROUNDED)</b> |  |      |    |      |      |              | <b>\$ 54,500</b> |

|   |                                      |    |     |     |     |              |                   |
|---|--------------------------------------|----|-----|-----|-----|--------------|-------------------|
| <b>Maintenance of Traffic</b>                 |                                      |    |     |     |     |              |                   |
| N/A   | Traffic Control                      | LS | 1   |     | 1   |              | \$ 84,996.66      |
| 712-01  | TRAFFIC CONTROL                      | LS |     | 2   | 2   | \$ 21,717.03 | \$ 43,434.06      |
| 712-02.02                                     | INTERCONNECTED PORTABLE BARRIER RAIL | LF | 180 | 220 | 400 | \$ 30.18     | \$ 12,057.51      |
| <b>MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)</b> |                                      |    |     |     |     |              | <b>\$ 140,500</b> |

|                                |  |    |   |     |     |             |                  |
|--------------------------------|--|----|---|-----|-----|-------------|------------------|
| <b>Signs</b>                   |  |    |   |     |     |             |                  |
| 713-11.01                      | "U" SECTION STEEL POSTS                  | LB |   | 600 | 600 | \$ 3.21     | \$ 1,926.00      |
| 713-11.02                      | PERFORATED/KNOCKOUT SQUARE TUBE POST     | LB |   | 600 | 600 | \$ 4.23     | \$ 2,538.00      |
| 713-13.02                      | FLAT SHEET ALUMINUM SIGNS (0.080" THICK) | SF |   | 600 | 600 | \$ 12.94    | \$ 7,764.00      |
| 713-13.03                      | FLAT SHEET ALUMINUM SIGNS (0.100" THICK) | SF |   | 300 | 300 | \$ 14.26    | \$ 4,278.00      |
| 713-15.41                      | SIGN REMOVAL (DESCRIPTION)               | LS |   | 1   | 1   | \$ 403.33   | \$ 403.33        |
| 713-16.01                      | CHANGEABLE MESSAGE SIGN UNIT             | EA |   | 2   | 2   | \$ 5,916.82 | \$ 11,833.64     |
| 713-16.25                      | SIGNS (STOP (R1-1))                      | EA |   | 5   | 5   | \$ 132.66   | \$ 663.30        |
| 713-99.91                      | Signs                                    | LS |   | 3   | 3   | \$ 7,100.00 | \$ 21,300.00     |
| Not Listed                     | Signs (Construction)                     | LS | 1 |     | 1   | \$ -        | \$ 3,100         |
| <b>SIGNING TOTAL (ROUNDED)</b> |  |    |   |     |     |             | <b>\$ 53,900</b> |

|  |   |    |  |     |     |             |                  |
|--|---|----|--|-----|-----|-------------|------------------|
| <b>Pavement Markings</b>                 |   |    |  |     |     |             |                  |
| 716-02.02                                | PLASTIC PAVEMENT MKG (8" BARRIER LINE)              | LF |  | 200 | 200 | \$ 2.95     | \$ 590.00        |
| 716-02.03                                | Plastic Pavement Marking (Cross-Walk)               | LF |  | 350 | 350 | \$ 9.81     | \$ 3,433.50      |
| 716-02.05                                | Plastic Pavement Marking (Stop Line)                | LF |  | 170 | 170 | \$ 11.37    | \$ 1,932.90      |
| 716-02.06                                | Plastic Pavement Marking (Turn Lane Arrow)          | EA |  | 3   | 3   | \$ 138.38   | \$ 415.14        |
| 716-04.01                                | Plastic Word Pavement Marking (Straight-Turn Arrow) | EA |  | 3   | 3   | \$ 184.72   | \$ 554.16        |
| 716-13.02                                | Spray Thermo P.M. (60 mil 6")                       | LM |  | 6.3 | 6.3 | \$ 2,749.24 | \$ 17,320.21     |
| <b>PAVEMENT MARKINGS TOTAL (ROUNDED)</b> |   |    |  |     |     |             | <b>\$ 24,200</b> |

|                |                              |             |
|----------------|------------------------------|-------------|
| <b>Fencing</b> | <b>FENCE TOTAL (ROUNDED)</b> | <b>\$ -</b> |
|----------------|------------------------------|-------------|

|   |                              |     |  |     |     |          |                     |
|---|------------------------------|-----|--|-----|-----|----------|---------------------|
| <b>Rip-Rap</b>  |                              |     |  |     |     |          |                     |
| 709-05.06   | Machined Rip-Rap (Class A-1) | TON |  | 250 | 250 | \$ 32.99 | \$ 8,247.50         |
| 709-05.08   | Machined Rip-Rap (Class B)   | TON |  | 120 | 120 | \$ 31.09 | \$ 3,730.80         |
| <b>RIP-RAP &amp; SLOPE PROTECTION TOTAL (ROUNDED)</b> |                              |     |  |     |     |          | <b>\$ 12,000.00</b> |



# PAY ITEM SUMMARY

| Clearing and Grubbing                           |                       |    |      |  |      |   |               |               |
|---|-----------------------|----|------|--|------|---|---------------|---------------|
| 201-01  | Clearing and Grubbing | LS |      |  | 1    | 1 | \$ 60,931.51  | \$ 60,931.51  |
| CLEAR AND GRUBBING TOTAL (ROUNDED)              |                       |    |      |  |      |   | \$            | 61,000.00     |
| Railroad At-Grade Crossing                      |                       |    |      |  |      |   |               |               |
| RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED) |                       |    |      |  |      |   | \$            | -             |
| Utilities                                       |                       |    |      |  |      |   |               |               |
| N/A   | Overhead Distribution | LM | 0.68 |  | 0.68 |   | \$ 750,000    | \$ 510,000    |
| N/A   | Underground Water     | LM | 0.43 |  | 0.43 |   | \$ 700,000    | \$ 301,000    |
| UTILITIES TOTAL (ROUNDED)                       |                       |    |      |  |      |   | \$            | 811,000.00    |
| Right-of-Way                                    |                       |    |      |  |      |   |               |               |
| N/A   | Right-of-Way          | LS | 1    |  | 1    | 2 | \$ 267,054.55 | \$ 534,109.09 |
| RIGHT-OF-WAY TOTAL (ROUNDED)                    |                       |    |      |  |      |   | \$            | 534,200.00    |

**APPENDIX 6: PAY ITEM SUMMARY PHASE 3**



# PAY ITEM SUMMARY

| TDOT PAY ITEM   | TDOT DESCRIPTION   | UNIT | TOOL QUANTITIES | ADDITIONAL QUANTITIES | TOOL QUANTITIES + ADDITIONAL QUANTITIES | Statewide UNIT COST | TOTAL COST                           |
|---|--|------|-----------------|-----------------------|---|---------------------|--------------------------------------|
|   |  |      |                 |                       |   |                     | <-- Unit Cost Trends with Quantities |
| <b>Pavment Removal</b>                                    |  |      |                 |                       |   |                     |                                      |
| 415-01.02   | COLD PLANING BITUMINOUS PAVEMENT                         | SY   | 15347           |                       | 15347                                   | \$ 2.57             | \$ 39,487.68                         |
| <b>PAVEMENT REMOVAL TOTAL (ROUNDED)</b>                   |  |      |                 |                       |   |                     | <b>\$ 39,500</b>                     |
| <b>Asphalt Roads</b>                                      |  |      |                 |                       |   |                     |                                      |
| 203-06  | WATER  | MG   |                 | 110                   | 110                                     | \$ 10.27            | \$ 1,129.70                          |
| 303-01  | MINERAL AGGREGATE, TYPE A BASE, GRADING D                | TON  | 23341           |                       | 23341                                   | \$ 26.00            | \$ 606,908.97                        |
| 307-(01, 02, 03).01                                       | ASPHALT CONCRETE MIX (All Grades) (BPMB-HM) GRADING A    | TON  | 1544            |                       | 1544                                    | \$ 96.50            | \$ 149,020.53                        |
| 307-01.(20 & 21 & 22)                                     | AGGREGATE (BPMB-HM) GRADING A-S MIX                      | TON  | 1036            |                       | 1036                                    | \$ 86.50            | \$ 89,607.73                         |
| 307-(01 & 02 & 03).08                                     | ASPHALT CONCRETE MIX (ALL GRADES) (BPMB-HM) GRADING B-M2 | TON  | 1590            |                       | 1590                                    | \$ 116.20           | \$ 184,730.26                        |
| 402-01  | BITUMINOUS MATERIAL FOR PRIME COAT (PC)                  | TON  | 19              |                       | 19                                      | \$ 807.84           | \$ 15,743.65                         |
| 402-02  | AGGREGATE FOR COVER MATERIAL (PC)                        | TON  | 70              |                       | 70                                      | \$ 57.38            | \$ 4,036.38                          |
| 403-01  | BITUMINOUS MATERIAL FOR TACK COAT (TC)                   | TON  | 14              |                       | 14                                      | \$ 747.73           | \$ 10,142.59                         |
| 407-20.05   | SAW CUTTING ASPHALT PAVEMENT                             | LS   |                 | 11600                 | 11600                                   | \$ 3.10             | \$ 35,960.00                         |
| 411-01.07   | ACS MIX (PG64-22) GRADING E SHOULDER                     | TON  | 516             |                       | 516                                     | \$ 115.12           | \$ 59,354.37                         |
| 411-(01 & 02 & 03).10                                     | ACS MIX(ALL GRADES) GRADING D                            | TON  | 1655            |                       | 1655                                    | \$ 124.03           | \$ 205,221.69                        |
| 411-03.07   | ASC Mix (PG64-22) Thin Lift CS Asphalt                   | TON  |                 | 500                   | 500                                     | \$ 64.91            | \$ 32,455.00                         |
| <b>PAVING TOTAL (ROUNDED)</b>                             |  |      |                 |                       |   |                     | <b>\$ 1,394,400</b>                  |
| <b>Concrete Roads</b>                                     |  |      |                 |                       |   |                     |                                      |
| <b>CONCRETE RAMPS AND ROADWAYS TOTAL (ROUNDED)</b>        |  |      |                 |                       |   |                     | <b>\$ -</b>                          |
| <b>Drainage</b>   |  |      |                 |                       |   |                     |                                      |
| 209-05  | SEDIMENT REMOVAL   | CY   |                 | 350                   | 350                                     | \$ 7.60             | \$ 2,660.00                          |
| 209-08.03   | TEMPORARY SILT FENCE (WITHOUT BACKING)                   | LF   |                 | 2500                  | 2500                                    | \$ 1.10             | \$ 2,750.00                          |
| 209-08.07   | ROCK CHECK DAM PER                                       | EACH |                 | 25                    | 25                                      | \$ 186.64           | \$ 4,666.00                          |
| 209-08.08   | ENHANCED ROCK CHECK DAM                                  | EACH |                 | 25                    | 25                                      | \$ 492.59           | \$ 12,314.75                         |
| 209-09.01   | SANDBAGS   | BAG  |                 | 100                   | 100                                     | \$ 3.44             | \$ 344.00                            |
| 209-09.04   | SEDIMENT FILTER BAG(15' X 10')                           | EACH |                 | 2                     | 2                                       | \$ 604.27           | \$ 1,208.54                          |
| 209-09.43   | CURB INLET PROTECTION (TYPE 4)                           | EACH |                 | 60                    | 60                                      | \$ 154.77           | \$ 9,286.20                          |
| 209-40.33   | CATCH BASIN PROTECTION (TYPE D)                          | EACH |                 | 50                    | 50                                      | \$ 237.16           | \$ 11,858.00                         |
| 209-65.04   | TEMPORARY IN STREAM DIVERSION                            | LF   |                 | 125                   | 125                                     | \$ 50.00            | \$ 6,250.00                          |
| 607-05.02   | 24" CONCRETE PIPE CULVERT (CLASS III)                    | LF   | 7079            |                       | 9579                                    | \$ 86.55            | \$ 829,086.74                        |
| 607-09.02   | 48" CONCRETE PIPE CULVERT (CLASS III)                    | LF   |                 | 500                   | 500                                     | \$ 143.27           | \$ 71,635.00                         |
| 607-39.02   | 18" PIPE CULVERT (SIDE DRAIN)                            | LF   |                 | 1000                  | 1000                                    | \$ 32.99            | \$ 32,990.00                         |
| 611-01.03   | MANHOLES, > 8' - 12' DEPTH                               | EA   |                 | 6                     | 6                                       | \$ 5,454.05         | \$ 32,724.30                         |
| 611-12.02   | CATCH BASINS, TYPE 12, > 4' - 8' DEPTH                   | EA   | 23              |                       | 28                                      | \$ 4,727.84         | \$ 132,477.87                        |
| 611-14.02   | CATCH BASINS, TYPE 14, > 4' - 8' DEPTH                   | EA   | 12              |                       | 12                                      | \$ 8,964.99         | \$ 103,190.60                        |
| 611-42.02   | CATCH BASINS, TYPE 42, > 4' - 8' DEPTH                   | EA   | 5               | 5                     | 10                                      | \$ 5,541.90         | \$ 56,704.75                         |
| 710-02  | Aggregate Underdrains (with pipe)                        | LF   | 11510           |                       | 11510                                   | \$ 7.10             | \$ 81,690.70                         |
| 740-10.03   | GEOTEXTILE (TYPE III)(EROSION CONTROL)                   | SY   |                 | 1000                  | 1000                                    | \$ 2.91             | \$ 2,910.00                          |
| 740-11.03   | TEMPORARY SEDIMENT TUBE 18IN (18 IN)                     | LF   |                 | 2500                  | 2500                                    | \$ 3.43             | \$ 8,575.00                          |
| 740-11.04   | TEMPORARY SEDIMENT TUBE 20IN (DESCRIPTION)               | LF   |                 | 300                   | 300                                     | \$ 3.56             | \$ 1,068.00                          |
| <b>DRAINAGE TOTAL (ROUNDED)</b>                           |  |      |                 |                       |   |                     | <b>\$ 1,404,400</b>                  |
| <b>Appurtenances</b>                                      |  |      |                 |                       |   |                     |                                      |
| 701-01.01   | CONCRETE SIDEWALK (4 ")                                  | SF   | 28776           |                       | 28776                                   | \$ 6.78             | \$ 195,059.06                        |
| 701-02  | CONCRETE DRIVEWAY  | SF   |                 | 11000                 | 11000                                   | \$ 5.80             | \$ 63,800.00                         |
| 701-02.03   | CONCRETE CURB RAMP                                       | SF   |                 | 1000                  | 1000                                    | \$ 13.01            | \$ 13,010.00                         |
| 702-01.02   | CONCRETE CURB  | LF   |                 | 800                   | 800                                     | \$ 20.77            | \$ 16,616.00                         |
| 702-03  | CONCRETE COMBINED CURB & GUTTER                          | CY   | 827             |                       | 827                                     | \$ 400.17           | \$ 330,763.74                        |
| <b>ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)</b> |  |      |                 |                       |   |                     | <b>\$ 619,300</b>                    |
| <b>Earthwork &amp; Mineral</b>                            |  |      |                 |                       |   |                     |                                      |

# PAY ITEM SUMMARY

|                                     |   |     |       |      |       |              |               |
|-------------------------------------|---|-----|-------|------|-------|--------------|---------------|
| 105-01                              | CONSTRUCTION STAKES, LINES AND GRADES     | LS  | 1     |      | 1     | \$ 77,225.40 | \$ 77,225.40  |
| 203-01                              | ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) | CY  | 37041 |      | 37041 | \$ 11.96     | \$ 442,950.38 |
| 203-02.01                           | BORROW EXCAVATION (GRADED SOLID ROCK)     | TON | 1748  |      | 1748  | \$ 32.33     | \$ 56,502.61  |
| 203-03                              | BORROW EXCAVATION (UNCLASSIFIED)          | CY  | 8319  | 8000 | 16319 | \$ 11.76     | \$ 191,855.64 |
| 204-03.01                           | WET EXCAVATION (BRIDGES)                  | CY  |       | 200  | 200   | \$ 34.28     | \$ 6,856.00   |
| 204-06.01                           | FLOWABLE FILL (GENERAL)                   | CY  |       | 50   | 50    | \$ 250.00    | \$ 12,500.00  |
| 303-10.01                           | MINERAL AGGREGATE (SIZE 57)               | TON |       | 500  | 500   | \$ 30.59     | \$ 15,295.00  |
| EARTHWORK & MINERAL TOTAL (ROUNDED) |   |     |       |      |       |              | \$ 803,200    |

## Structures

|                            |                              |    |      |  |      |           |               |
|----------------------------|------------------------------|----|------|--|------|-----------|---------------|
| N/A                        | Widen Existing Bridge (Box): | SF | 3425 |  | 3425 | \$ 52.50  | \$ 179,812.50 |
| N/A                        | New Bridge (Box):            | SF | 1950 |  | 1950 | \$ 126.00 | \$ 245,700.00 |
| STRUCTURES TOTAL (ROUNDED) |                              |    |      |  |      |           | \$ 425,600    |

## Interchanges and Unique Intersections

|   |  |  |  |  |  |  |      |
|---|--|--|--|--|--|--|------|
| INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED) |  |  |  |  |  |  | \$ - |
|---|--|--|--|--|--|--|------|

## Lighting & Signalization

|  |  |  |  |  |  |  |           |
|--|--|--|--|--|--|--|-----------|
| LIGHTING & SIGNALIZATION TOTAL (ROUNDED) |  |  |  |  |  |  | \$ 64,000 |
|--|--|--|--|--|--|--|-----------|

## Guardrail

|                           |                          |    |     |  |     |          |             |
|---------------------------|--------------------------|----|-----|--|-----|----------|-------------|
| 705-01.01                 | GUARDRAIL AT BRIDGE ENDS | LF | 100 |  | 100 | \$ 66.52 | \$ 6,651.84 |
| GUARDRAIL TOTAL (ROUNDED) |                          |    |     |  |     |          | \$ 6,700    |

## Seeding and Sodding

|                         |  |      |     |       |       |              |              |
|-------------------------|--|------|-----|-------|-------|--------------|--------------|
| 801-01                  | SEEDING (WITH MULCH)                       | UNIT | 144 |       | 144   | \$ 27.26     | \$ 3,922.17  |
| 801-01.07               | TEMPORARY SEEDING (WITH MULCH)             | UNIT | 108 |       | 108   | \$ 22.31     | \$ 2,407.47  |
| 801-02                  | SEEDING (WITHOUT MULCH)                    | UNIT | 108 |       | 108   | \$ 17.70     | \$ 1,910.01  |
| 803-01                  | SODDING (NEW SOD)                          | SY   |     | 13000 | 13000 | \$ 2.45      | \$ 31,850.00 |
| 806-02.12               | Mowing, Weedeating & Litter Pickup (Urban) | Cycl |     | 2     | 2     | \$ 4,000.00  | \$ 8,000.00  |
| 806-03.01               | TREE CUTTING                               | LS   |     | 2     | 2     | \$ 10,500.00 | \$ 21,000.00 |
| SODDING TOTAL (ROUNDED) |  |      |     |       |       |              | \$ 69,100    |

## Maintenance of Traffic

|  |                                      |    |     |  |     |          |               |
|--|--------------------------------------|----|-----|--|-----|----------|---------------|
| N/A                                    | Traffic Control                      | LS | 1   |  | 1   |          | \$ 105,804.41 |
| 712-02.02                              | INTERCONNECTED PORTABLE BARRIER RAIL | LF | 288 |  | 288 | \$ 30.18 | \$ 8,684.60   |
| MAINTENANCE OF TRAFFIC TOTAL (ROUNDED) |                                      |    |     |  |     |          | \$ 114,500    |

## Signs

|                         |  |    |   |      |      |             |              |
|-------------------------|--|----|---|------|------|-------------|--------------|
| 713-11.01               | "U" SECTION STEEL POSTS                  | LB |   | 1000 | 1000 | \$ 3.21     | \$ 3,210.00  |
| 713-11.02               | PERFORATED/KNOCKOUT SQUARE TUBE POST     | LB |   | 1000 | 1000 | \$ 4.23     | \$ 4,230.00  |
| 713-13.02               | FLAT SHEET ALUMINUM SIGNS (0.080" THICK) | SF |   | 1000 | 1000 | \$ 12.94    | \$ 12,940.00 |
| 713-13.03               | FLAT SHEET ALUMINUM SIGNS (0.100" THICK) | SF |   | 500  | 500  | \$ 14.26    | \$ 7,130.00  |
| 713-15.41               | SIGN REMOVAL (DESCRIPTION)               | LS |   | 1    | 1    | \$ 403.33   | \$ 403.33    |
| 713-16.01               | CHANGEABLE MESSAGE SIGN UNIT             | EA |   | 4    | 4    | \$ 5,916.82 | \$ 23,667.28 |
| 713-16.25               | SIGNS (STOP (R1-1))                      | EA |   | 20   | 20   | \$ 132.66   | \$ 2,653.20  |
| 713-99.91               | Signs                                    | LS |   | 3    | 3    | \$ 7,100.00 | \$ 21,300.00 |
| Not Listed              | Signs (Construction)                     | LS | 1 |      | 1    | \$ -        | \$ 5,700     |
| SIGNING TOTAL (ROUNDED) |  |    |   |      |      |             | \$ 81,300    |

## Pavement Markings

|                                   |  |    |      |     |     |             |              |
|-----------------------------------|--|----|------|-----|-----|-------------|--------------|
| 716-02.02                         | PLASTIC PAVEMENT MKG (8" BARRIER LINE)     | LF |      | 100 | 100 | \$ 2.95     | \$ 295.00    |
| 716-02.03                         | Plastic Pavement Marking (Cross-Walk)      | LF |      | 310 | 310 | \$ 9.81     | \$ 3,041.10  |
| 716-02.05                         | Plastic Pavement Marking (Stop Line)       | LF |      | 160 | 160 | \$ 11.37    | \$ 1,819.20  |
| 716-02.06                         | Plastic Pavement Marking (Turn Lane Arrow) | EA |      | 1   | 1   | \$ 138.38   | \$ 138.38    |
| 716-13.02                         | Spray Thermo P.M. (60 mil 6")              | LM |      | 10  | 10  | \$ 2,749.24 | \$ 27,492.40 |
| 716-13.06                         | Spray Thermo P.M. (40 mil 4")              | LM | 10.0 | -10 | 0.0 | \$ 1,654.23 | \$ 46.32     |
| PAVEMENT MARKINGS TOTAL (ROUNDED) |  |    |      |     |     |             | \$ 32,900    |

## Fencing



# PAY ITEM SUMMARY

|  |                              |     |      |     |      |               |    |            |              |
|--|------------------------------|-----|------|-----|------|---------------|----|------------|--------------|
| <b>FENCE TOTAL (ROUNDED)</b>                           |                              |     |      |     |      |               |    | \$         | -            |
| <b>Rip-Rap</b>   |                              |     |      |     |      |               |    |            |              |
| 709-05.05  | Machined Rip-Rap (Class A-3) | TON | 800  |     | 800  | \$ 39.85      | \$ | 31,880.00  |              |
| 709-05.06  | Machined Rip-Rap (Class A-1) | TON |      | 800 | 800  | \$ 32.99      | \$ | 26,392.00  |              |
| 709-05.08  | Machined Rip-Rap (Class B)   | TON |      | 400 | 400  | \$ 31.09      | \$ | 12,436.00  |              |
| <b>RIP-RAP &amp; SLOPE PROTECTION TOTAL (ROUNDED)</b>  |                              |     |      |     |      |               |    | \$         | 70,800.00    |
| <b>Clearing and Grubbing</b>                           |                              |     |      |     |      |               |    |            |              |
| 201-01   | Clearing and Grubbing        | LS  |      | 1   | 1    | \$ 60,931.51  | \$ | 60,931.51  |              |
| <b>CLEAR AND GRUBBING TOTAL (ROUNDED)</b>              |                              |     |      |     |      |               |    | \$         | 61,000.00    |
| <b>Railroad At-Grade Crossing</b>                      |                              |     |      |     |      |               |    |            |              |
| <b>RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)</b> |                              |     |      |     |      |               |    | \$         | -            |
| <b>Utilities</b>                                       |                              |     |      |     |      |               |    |            |              |
| N/A  | Overhead Distribution        | LM  | 1.09 |     | 1.09 | \$ 750,000    | \$ | 817,500    |              |
| N/A  | Underground Water            | LM  | 0.9  |     | 0.9  | \$ 700,000    | \$ | 630,000    |              |
| <b>UTILITIES TOTAL (ROUNDED)</b>                       |                              |     |      |     |      |               |    | \$         | 1,447,500.00 |
| <b>Right-of-Way</b>                                    |                              |     |      |     |      |               |    |            |              |
| N/A  | Right-of-Way                 | LS  | 1    |     | 1    | \$ 686,618.18 | \$ | 686,618.18 |              |
| <b>RIGHT-OF-WAY TOTAL (ROUNDED)</b>                    |                              |     |      |     |      |               |    | \$         | 686,700.00   |

**APPENDIX 7: TRAFFIC ANALYSIS OUTPUTS**



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 125  | 73   | 367  | 266  | 105  | 123  |
| Future Volume (veh/h)        | 125  | 73   | 367  | 266  | 105  | 123  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 136  | 0    | 399  | 289  | 114  | 134  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 178  |      | 524  | 379  | 438  | 1353 |
| Arrive On Green              | 0.10 | 0.00 | 0.53 | 0.53 | 0.08 | 0.69 |
| Sat Flow, veh/h              | 1731 | 1540 | 996  | 721  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 136  | 0    | 0    | 688  | 114  | 134  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1717 | 1856 | 1949 |
| Q Serve(g_s), s              | 4.1  | 0.0  | 0.0  | 17.2 | 1.3  | 1.2  |
| Cycle Q Clear(g_c), s        | 4.1  | 0.0  | 0.0  | 17.2 | 1.3  | 1.2  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.42 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 178  |      | 0    | 903  | 438  | 1353 |
| V/C Ratio(X)                 | 0.76 |      | 0.00 | 0.76 | 0.26 | 0.10 |
| Avail Cap(c_a), veh/h        | 591  |      | 0    | 903  | 537  | 1457 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 23.7 | 0.0  | 0.0  | 10.1 | 7.7  | 2.7  |
| Incr Delay (d2), s/veh       | 6.7  | 0.0  | 0.0  | 6.0  | 0.3  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.3  | 0.0  | 0.0  | 10.5 | 0.6  | 0.5  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 30.4 | 0.0  | 0.0  | 16.2 | 8.0  | 2.8  |
| LnGrp LOS                    | C    |      | A    | B    | A    | A    |
| Approach Vol, veh/h          | 136  |      | 688  |      |      | 248  |
| Approach Delay, s/veh        | 30.4 |      | 16.2 |      |      | 5.2  |
| Approach LOS                 | C    |      | B    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 43.1 |      | 11.1 | 9.1  | 34.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 40.5 |      | 18.5 | 7.0  | 28.5 |
| Max Q Clear Time (g_c+I1), s |      | 3.2  |      | 6.1  | 3.3  | 19.2 |
| Green Ext Time (p_c), s      |      | 0.8  |      | 0.2  | 0.1  | 3.4  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 15.4 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 222  | 233  | 52   | 47   | 116  | 93   | 32   | 323  | 56   | 128  | 134  | 54   |
| Future Volume (veh/h)        | 222  | 233  | 52   | 47   | 116  | 93   | 32   | 323  | 56   | 128  | 134  | 54   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 241  | 253  | 57   | 51   | 126  | 101  | 35   | 351  | 61   | 139  | 146  | 59   |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 458  | 479  | 108  | 352  | 210  | 168  | 429  | 403  | 70   | 299  | 377  | 152  |
| Arrive On Green              | 0.10 | 0.29 | 0.29 | 0.05 | 0.24 | 0.24 | 0.04 | 0.25 | 0.25 | 0.08 | 0.30 | 0.30 |
| Sat Flow, veh/h              | 1968 | 1633 | 368  | 1641 | 886  | 710  | 1818 | 1584 | 275  | 1776 | 1262 | 510  |
| Grp Volume(v), veh/h         | 241  | 0    | 310  | 51   | 0    | 227  | 35   | 0    | 412  | 139  | 0    | 205  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 2000 | 1641 | 0    | 1595 | 1818 | 0    | 1860 | 1776 | 0    | 1773 |
| Q Serve(g_s), s              | 5.8  | 0.0  | 8.2  | 1.4  | 0.0  | 8.0  | 0.9  | 0.0  | 13.4 | 3.6  | 0.0  | 5.8  |
| Cycle Q Clear(g_c), s        | 5.8  | 0.0  | 8.2  | 1.4  | 0.0  | 8.0  | 0.9  | 0.0  | 13.4 | 3.6  | 0.0  | 5.8  |
| Prop In Lane                 | 1.00 |      | 0.18 | 1.00 |      | 0.44 | 1.00 |      | 0.15 | 1.00 |      | 0.29 |
| Lane Grp Cap(c), veh/h       | 458  | 0    | 586  | 352  | 0    | 378  | 429  | 0    | 473  | 299  | 0    | 530  |
| V/C Ratio(X)                 | 0.53 | 0.00 | 0.53 | 0.14 | 0.00 | 0.60 | 0.08 | 0.00 | 0.87 | 0.47 | 0.00 | 0.39 |
| Avail Cap(c_a), veh/h        | 458  | 0    | 586  | 444  | 0    | 468  | 550  | 0    | 531  | 338  | 0    | 530  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 16.3 | 0.0  | 18.7 | 16.9 | 0.0  | 21.4 | 16.3 | 0.0  | 22.5 | 16.8 | 0.0  | 17.5 |
| Incr Delay (d2), s/veh       | 1.1  | 0.0  | 3.4  | 0.2  | 0.0  | 1.5  | 0.1  | 0.0  | 13.6 | 1.1  | 0.0  | 0.5  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 4.5  | 0.0  | 7.3  | 0.9  | 0.0  | 5.3  | 0.6  | 0.0  | 11.6 | 2.5  | 0.0  | 4.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 17.4 | 0.0  | 22.0 | 17.1 | 0.0  | 22.9 | 16.3 | 0.0  | 36.1 | 17.9 | 0.0  | 18.0 |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | B    | A    | D    | B    | A    | B    |
| Approach Vol, veh/h          |      | 551  |      |      | 278  |      |      | 447  |      |      | 344  |      |
| Approach Delay, s/veh        |      | 20.0 |      |      | 21.9 |      |      | 34.6 |      |      | 18.0 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | B    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 8.5  | 23.0 | 10.6 | 21.0 | 12.0 | 19.5 | 7.8  | 23.9 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 5.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 18.5 | 6.5  | 18.0 | 6.5  | 18.5 | 6.5  | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 3.4  | 10.2 | 5.6  | 15.4 | 7.8  | 10.0 | 2.9  | 7.8  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.1  | 0.0  | 0.7  | 0.0  | 0.8  | 0.0  | 0.8  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      | 23.9 |      |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      | C    |      |      |      |      |      |      |      |      |      |



# HCM 6th Signalized Intersection Summary

## 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 205  | 361  | 72   | 37   | 178  | 78   | 68   | 318  | 211  | 46   | 159  | 100  |
| Future Volume (veh/h)        | 205  | 361  | 72   | 37   | 178  | 78   | 68   | 318  | 211  | 46   | 159  | 100  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 223  | 392  | 78   | 40   | 193  | 85   | 74   | 346  | 0    | 50   | 173  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 427  | 490  | 97   | 268  | 342  | 151  | 383  | 424  |      | 252  | 402  |      |
| Arrive On Green              | 0.09 | 0.32 | 0.32 | 0.04 | 0.28 | 0.28 | 0.06 | 0.23 | 0.00 | 0.05 | 0.21 | 0.00 |
| Sat Flow, veh/h              | 1781 | 1515 | 301  | 1781 | 1231 | 542  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 223  | 0    | 470  | 40   | 0    | 278  | 74   | 346  | 0    | 50   | 173  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1816 | 1781 | 0    | 1773 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 5.3  | 0.0  | 14.6 | 1.0  | 0.0  | 8.3  | 2.0  | 10.9 | 0.0  | 1.3  | 5.0  | 0.0  |
| Cycle Q Clear(g_c), s        | 5.3  | 0.0  | 14.6 | 1.0  | 0.0  | 8.3  | 2.0  | 10.9 | 0.0  | 1.3  | 5.0  | 0.0  |
| Prop In Lane                 | 1.00 |      | 0.17 | 1.00 |      | 0.31 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 427  | 0    | 587  | 268  | 0    | 493  | 383  | 424  |      | 252  | 402  |      |
| V/C Ratio(X)                 | 0.52 | 0.00 | 0.80 | 0.15 | 0.00 | 0.56 | 0.19 | 0.82 |      | 0.20 | 0.43 |      |
| Avail Cap(c_a), veh/h        | 427  | 0    | 587  | 355  | 0    | 493  | 496  | 604  |      | 313  | 529  |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 15.4 | 0.0  | 19.1 | 15.9 | 0.0  | 19.1 | 17.3 | 22.7 | 0.0  | 18.2 | 21.0 | 0.0  |
| Incr Delay (d2), s/veh       | 1.2  | 0.0  | 11.0 | 0.3  | 0.0  | 4.6  | 0.2  | 5.8  | 0.0  | 0.4  | 0.7  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.9  | 0.0  | 11.8 | 0.7  | 0.0  | 6.8  | 1.4  | 8.8  | 0.0  | 1.0  | 3.8  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 16.6 | 0.0  | 30.1 | 16.2 | 0.0  | 23.8 | 17.5 | 28.6 | 0.0  | 18.6 | 21.8 | 0.0  |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | B    | C    |      | B    | C    |      |
| Approach Vol, veh/h          |      | 693  |      |      | 318  |      |      | 420  |      |      | 223  |      |
| Approach Delay, s/veh        |      | 25.7 |      |      | 22.8 |      |      | 26.6 |      |      | 21.0 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 8.0  | 26.0 | 9.1  | 18.8 | 10.8 | 23.2 | 8.4  | 19.5 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 17.0 | 7.5  | 17.5 | 5.3  | 17.2 | 5.0  | 20.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 3.0  | 16.6 | 4.0  | 7.0  | 7.3  | 10.3 | 3.3  | 12.9 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.1  | 0.0  | 0.6  | 0.0  | 0.9  | 0.0  | 1.2  |      |      |      |      |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 24.8 |
| HCM 6th LOS        | C    |

### Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 181  | 133  | 74   | 283  | 203  | 234  | 77   | 304  | 119  | 155  | 296  | 165  |
| Future Volume (veh/h)        | 181  | 133  | 74   | 283  | 203  | 234  | 77   | 304  | 119  | 155  | 296  | 165  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 197  | 145  | 0    | 308  | 221  | 0    | 84   | 330  | 0    | 168  | 322  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 372  | 246  |      | 455  | 299  |      | 490  | 1031 |      | 512  | 1164 |      |
| Arrive On Green              | 0.12 | 0.14 | 0.00 | 0.13 | 0.15 | 0.00 | 0.06 | 0.29 | 0.00 | 0.09 | 0.32 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 197  | 145  | 0    | 308  | 221  | 0    | 84   | 330  | 0    | 168  | 322  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 6.2  | 4.9  | 0.0  | 8.5  | 6.6  | 0.0  | 2.0  | 4.6  | 0.0  | 4.0  | 4.2  | 0.0  |
| Cycle Q Clear(g_c), s        | 6.2  | 4.9  | 0.0  | 8.5  | 6.6  | 0.0  | 2.0  | 4.6  | 0.0  | 4.0  | 4.2  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 372  | 246  |      | 455  | 299  |      | 490  | 1031 |      | 512  | 1164 |      |
| V/C Ratio(X)                 | 0.53 | 0.59 |      | 0.68 | 0.74 |      | 0.17 | 0.32 |      | 0.33 | 0.28 |      |
| Avail Cap(c_a), veh/h        | 384  | 503  |      | 455  | 577  |      | 605  | 1031 |      | 576  | 1164 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 19.9 | 25.7 | 0.0  | 20.4 | 25.9 | 0.0  | 14.1 | 17.6 | 0.0  | 13.6 | 16.1 | 0.0  |
| Incr Delay (d2), s/veh       | 1.3  | 2.2  | 0.0  | 4.0  | 3.6  | 0.0  | 0.2  | 0.8  | 0.0  | 0.4  | 0.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 4.2  | 3.7  | 0.0  | 7.3  | 5.9  | 0.0  | 1.3  | 3.2  | 0.0  | 2.6  | 2.9  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 21.2 | 27.9 | 0.0  | 24.4 | 29.5 | 0.0  | 14.2 | 18.4 | 0.0  | 14.0 | 16.7 | 0.0  |
| LnGrp LOS                    | C    | C    |      | C    | C    |      | B    | B    |      | B    | B    |      |
| Approach Vol, veh/h          |      | 342  |      |      | 529  |      |      | 414  |      |      | 490  |      |
| Approach Delay, s/veh        |      | 24.0 |      |      | 26.5 |      |      | 17.6 |      |      | 15.7 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | B    |      |      | B    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 10.8 | 24.0 | 14.0 | 14.8 | 8.9  | 25.9 | 13.4 | 15.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.5  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 8.0  | 18.5 | 8.5  | 18.0 | 8.0  | 18.5 | 8.4  | 18.1 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 6.0  | 6.6  | 10.5 | 6.9  | 4.0  | 6.2  | 8.2  | 8.6  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.1  | 1.5  | 0.0  | 0.5  | 0.1  | 1.5  | 0.0  | 0.7  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 21.0 |
| HCM 6th LOS        | C    |

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 261  | 249  | 154  | 134  | 184  | 282  |
| Future Volume (veh/h)        | 261  | 249  | 154  | 134  | 184  | 282  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 284  | 0    | 167  | 146  | 200  | 307  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 353  |      | 342  | 299  | 585  | 1116 |
| Arrive On Green              | 0.20 | 0.00 | 0.38 | 0.38 | 0.10 | 0.57 |
| Sat Flow, veh/h              | 1731 | 1540 | 909  | 795  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 284  | 0    | 0    | 313  | 200  | 307  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1704 | 1856 | 1949 |
| Q Serve(g_s), s              | 7.7  | 0.0  | 0.0  | 6.9  | 2.9  | 3.9  |
| Cycle Q Clear(g_c), s        | 7.7  | 0.0  | 0.0  | 6.9  | 2.9  | 3.9  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.47 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 353  |      | 0    | 640  | 585  | 1116 |
| V/C Ratio(X)                 | 0.81 |      | 0.00 | 0.49 | 0.34 | 0.28 |
| Avail Cap(c_a), veh/h        | 651  |      | 0    | 640  | 672  | 1208 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 18.7 | 0.0  | 0.0  | 11.7 | 7.6  | 5.3  |
| Incr Delay (d2), s/veh       | 4.4  | 0.0  | 0.0  | 2.7  | 0.3  | 0.1  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 5.4  | 0.0  | 0.0  | 4.7  | 1.6  | 2.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 23.0 | 0.0  | 0.0  | 14.4 | 7.9  | 5.5  |
| LnGrp LOS                    | C    |      | A    | B    | A    | A    |
| Approach Vol, veh/h          | 284  |      | 313  |      |      | 507  |
| Approach Delay, s/veh        | 23.0 |      | 14.4 |      |      | 6.4  |
| Approach LOS                 | C    |      | B    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 33.7 |      | 15.5 | 9.7  | 24.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 30.5 |      | 18.5 | 7.0  | 18.5 |
| Max Q Clear Time (g_c+I1), s |      | 5.9  |      | 9.7  | 4.9  | 8.9  |
| Green Ext Time (p_c), s      |      | 1.8  |      | 0.5  | 0.1  | 1.3  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 13.0 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 119  | 172  | 47   | 88   | 241  | 100  | 70   | 268  | 77   | 104  | 289  | 123  |
| Future Volume (veh/h)        | 119  | 172  | 47   | 88   | 241  | 100  | 70   | 268  | 77   | 104  | 289  | 123  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 129  | 187  | 51   | 96   | 262  | 109  | 76   | 291  | 84   | 113  | 314  | 134  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 325  | 447  | 122  | 414  | 323  | 134  | 246  | 380  | 110  | 310  | 343  | 146  |
| Arrive On Green              | 0.07 | 0.29 | 0.29 | 0.06 | 0.28 | 0.28 | 0.06 | 0.27 | 0.27 | 0.07 | 0.28 | 0.28 |
| Sat Flow, veh/h              | 1968 | 1563 | 426  | 1641 | 1156 | 481  | 1818 | 1424 | 411  | 1776 | 1240 | 529  |
| Grp Volume(v), veh/h         | 129  | 0    | 238  | 96   | 0    | 371  | 76   | 0    | 375  | 113  | 0    | 448  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 1990 | 1641 | 0    | 1637 | 1818 | 0    | 1835 | 1776 | 0    | 1769 |
| Q Serve(g_s), s              | 3.0  | 0.0  | 6.3  | 2.6  | 0.0  | 13.7 | 1.9  | 0.0  | 12.2 | 2.9  | 0.0  | 15.9 |
| Cycle Q Clear(g_c), s        | 3.0  | 0.0  | 6.3  | 2.6  | 0.0  | 13.7 | 1.9  | 0.0  | 12.2 | 2.9  | 0.0  | 15.9 |
| Prop In Lane                 | 1.00 |      | 0.21 | 1.00 |      | 0.29 | 1.00 |      | 0.22 | 1.00 |      | 0.30 |
| Lane Grp Cap(c), veh/h       | 325  | 0    | 568  | 414  | 0    | 457  | 246  | 0    | 490  | 310  | 0    | 490  |
| V/C Ratio(X)                 | 0.40 | 0.00 | 0.42 | 0.23 | 0.00 | 0.81 | 0.31 | 0.00 | 0.76 | 0.36 | 0.00 | 0.92 |
| Avail Cap(c_a), veh/h        | 385  | 0    | 568  | 474  | 0    | 468  | 324  | 0    | 510  | 369  | 0    | 492  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 16.3 | 0.0  | 18.8 | 15.1 | 0.0  | 21.7 | 17.4 | 0.0  | 21.9 | 16.6 | 0.0  | 22.7 |
| Incr Delay (d2), s/veh       | 0.8  | 0.0  | 2.3  | 0.3  | 0.0  | 10.2 | 0.7  | 0.0  | 6.6  | 0.7  | 0.0  | 21.7 |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 2.3  | 0.0  | 5.5  | 1.7  | 0.0  | 10.2 | 1.4  | 0.0  | 9.7  | 2.1  | 0.0  | 14.0 |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 17.1 | 0.0  | 21.0 | 15.4 | 0.0  | 31.9 | 18.1 | 0.0  | 28.4 | 17.3 | 0.0  | 44.4 |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | B    | A    | C    | B    | A    | D    |
| Approach Vol, veh/h          |      | 367  |      |      | 467  |      |      | 451  |      |      | 561  |      |
| Approach Delay, s/veh        |      | 19.6 |      |      | 28.5 |      |      | 26.7 |      |      | 39.0 |      |
| Approach LOS                 |      | B    |      |      | C    |      |      | C    |      |      | D    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 9.6  | 23.0 | 9.8  | 22.3 | 10.0 | 22.6 | 9.2  | 22.9 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 5.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 18.5 | 6.5  | 18.0 | 6.5  | 18.5 | 6.5  | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 4.6  | 8.3  | 4.9  | 14.2 | 5.0  | 15.7 | 3.9  | 17.9 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.9  | 0.0  | 0.8  | 0.0  | 0.6  | 0.0  | 0.0  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      | 29.5 |      |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      | C    |      |      |      |      |      |      |      |      |      |



HCM 6th Signalized Intersection Summary  
 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          | ↖    | ↗    |      | ↖    | ↗    |      | ↖    | ↗    | ↗    | ↖    | ↗    | ↖    |
| Traffic Volume (veh/h)       | 149  | 251  | 120  | 114  | 311  | 50   | 98   | 215  | 97   | 59   | 367  | 246  |
| Future Volume (veh/h)        | 149  | 251  | 120  | 114  | 311  | 50   | 98   | 215  | 97   | 59   | 367  | 246  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 162  | 273  | 130  | 124  | 338  | 54   | 107  | 234  | 0    | 64   | 399  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 315  | 328  | 156  | 296  | 423  | 68   | 266  | 480  |      | 377  | 456  |      |
| Arrive On Green              | 0.08 | 0.27 | 0.27 | 0.07 | 0.27 | 0.27 | 0.07 | 0.26 | 0.00 | 0.05 | 0.24 | 0.00 |
| Sat Flow, veh/h              | 1781 | 1197 | 570  | 1781 | 1574 | 251  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 162  | 0    | 403  | 124  | 0    | 392  | 107  | 234  | 0    | 64   | 399  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1768 | 1781 | 0    | 1825 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 4.3  | 0.0  | 14.0 | 3.2  | 0.0  | 13.0 | 2.9  | 6.9  | 0.0  | 1.7  | 13.4 | 0.0  |
| Cycle Q Clear(g_c), s        | 4.3  | 0.0  | 14.0 | 3.2  | 0.0  | 13.0 | 2.9  | 6.9  | 0.0  | 1.7  | 13.4 | 0.0  |
| Prop In Lane                 | 1.00 |      | 0.32 | 1.00 |      | 0.14 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 315  | 0    | 484  | 296  | 0    | 490  | 266  | 480  |      | 377  | 456  |      |
| V/C Ratio(X)                 | 0.51 | 0.00 | 0.83 | 0.42 | 0.00 | 0.80 | 0.40 | 0.49 |      | 0.17 | 0.88 |      |
| Avail Cap(c_a), veh/h        | 315  | 0    | 484  | 319  | 0    | 490  | 354  | 571  |      | 422  | 502  |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 16.9 | 0.0  | 22.3 | 16.9 | 0.0  | 22.2 | 18.1 | 20.6 | 0.0  | 17.0 | 23.7 | 0.0  |
| Incr Delay (d2), s/veh       | 1.4  | 0.0  | 15.4 | 0.9  | 0.0  | 12.8 | 1.0  | 0.8  | 0.0  | 0.2  | 14.9 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.1  | 0.0  | 11.9 | 2.3  | 0.0  | 11.2 | 2.1  | 5.3  | 0.0  | 1.2  | 11.8 | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 18.3 | 0.0  | 37.7 | 17.8 | 0.0  | 35.0 | 19.1 | 21.3 | 0.0  | 17.2 | 38.5 | 0.0  |
| LnGrp LOS                    | B    | A    | D    | B    | A    | D    | B    | C    |      | B    | D    |      |
| Approach Vol, veh/h          |      | 565  |      |      | 516  |      |      | 341  |      |      | 463  |      |
| Approach Delay, s/veh        |      | 32.1 |      |      | 30.9 |      |      | 20.6 |      |      | 35.6 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | D    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 10.2 | 23.8 | 9.8  | 21.4 | 10.5 | 23.5 | 8.9  | 22.2 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 17.0 | 7.5  | 17.5 | 5.0  | 17.5 | 5.1  | 19.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 5.2  | 16.0 | 4.9  | 15.4 | 6.3  | 15.0 | 3.7  | 8.9  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.3  | 0.1  | 0.5  | 0.0  | 0.6  | 0.0  | 0.9  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 30.6 |
| HCM 6th LOS        | C    |

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 272  | 179  | 116  | 186  | 147  | 241  | 145  | 677  | 264  | 248  | 678  | 230  |
| Future Volume (veh/h)        | 272  | 179  | 116  | 186  | 147  | 241  | 145  | 677  | 264  | 248  | 678  | 230  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 296  | 195  | 0    | 202  | 160  | 0    | 158  | 736  | 0    | 270  | 737  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 376  | 258  |      | 367  | 288  |      | 376  | 1002 |      | 418  | 1186 |      |
| Arrive On Green              | 0.11 | 0.15 | 0.00 | 0.11 | 0.14 | 0.00 | 0.09 | 0.28 | 0.00 | 0.13 | 0.33 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 296  | 195  | 0    | 202  | 160  | 0    | 158  | 736  | 0    | 270  | 737  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 7.3  | 7.0  | 0.0  | 5.8  | 4.9  | 0.0  | 4.1  | 12.4 | 0.0  | 6.7  | 11.3 | 0.0  |
| Cycle Q Clear(g_c), s        | 7.3  | 7.0  | 0.0  | 5.8  | 4.9  | 0.0  | 4.1  | 12.4 | 0.0  | 6.7  | 11.3 | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 376  | 258  |      | 367  | 288  |      | 376  | 1002 |      | 418  | 1186 |      |
| V/C Ratio(X)                 | 0.79 | 0.76 |      | 0.55 | 0.56 |      | 0.42 | 0.73 |      | 0.65 | 0.62 |      |
| Avail Cap(c_a), veh/h        | 376  | 489  |      | 367  | 552  |      | 435  | 1002 |      | 426  | 1186 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 24.2 | 27.1 | 0.0  | 21.2 | 26.4 | 0.0  | 15.1 | 21.5 | 0.0  | 15.1 | 18.8 | 0.0  |
| Incr Delay (d2), s/veh       | 10.7 | 4.5  | 0.0  | 1.7  | 1.7  | 0.0  | 0.7  | 4.8  | 0.0  | 3.3  | 2.5  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.7  | 5.5  | 0.0  | 4.6  | 4.2  | 0.0  | 2.7  | 9.0  | 0.0  | 4.9  | 8.1  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 34.9 | 31.6 | 0.0  | 22.9 | 28.1 | 0.0  | 15.8 | 26.2 | 0.0  | 18.4 | 21.2 | 0.0  |
| LnGrp LOS                    | C    | C    |      | C    | C    |      | B    | C    |      | B    | C    |      |
| Approach Vol, veh/h          |      | 491  |      |      | 362  |      |      | 894  |      |      | 1007 |      |
| Approach Delay, s/veh        |      | 33.6 |      |      | 25.2 |      |      | 24.4 |      |      | 20.5 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 13.7 | 24.2 | 12.6 | 15.6 | 10.8 | 27.1 | 12.8 | 15.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.5  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 9.0  | 18.7 | 7.1  | 18.2 | 8.0  | 19.7 | 7.3  | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 8.7  | 14.4 | 7.8  | 9.0  | 6.1  | 13.3 | 9.3  | 6.9  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.8  | 0.0  | 0.6  | 0.1  | 2.5  | 0.0  | 0.5  |      |      |      |      |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 24.7 |
| HCM 6th LOS        | C    |

### Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 125  | 73   | 367  | 266  | 105  | 123  |
| Future Volume (veh/h)        | 125  | 73   | 367  | 266  | 105  | 123  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 136  | 0    | 399  | 289  | 114  | 134  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 178  |      | 524  | 379  | 438  | 1353 |
| Arrive On Green              | 0.10 | 0.00 | 0.53 | 0.53 | 0.08 | 0.69 |
| Sat Flow, veh/h              | 1731 | 1540 | 996  | 721  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 136  | 0    | 0    | 688  | 114  | 134  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1717 | 1856 | 1949 |
| Q Serve(g_s), s              | 4.1  | 0.0  | 0.0  | 17.2 | 1.3  | 1.2  |
| Cycle Q Clear(g_c), s        | 4.1  | 0.0  | 0.0  | 17.2 | 1.3  | 1.2  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.42 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 178  |      | 0    | 903  | 438  | 1353 |
| V/C Ratio(X)                 | 0.76 |      | 0.00 | 0.76 | 0.26 | 0.10 |
| Avail Cap(c_a), veh/h        | 591  |      | 0    | 903  | 537  | 1457 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 23.7 | 0.0  | 0.0  | 10.1 | 7.7  | 2.7  |
| Incr Delay (d2), s/veh       | 6.7  | 0.0  | 0.0  | 6.0  | 0.3  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.3  | 0.0  | 0.0  | 10.5 | 0.6  | 0.5  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 30.4 | 0.0  | 0.0  | 16.2 | 8.0  | 2.8  |
| LnGrp LOS                    | C    |      | A    | B    | A    | A    |
| Approach Vol, veh/h          | 136  |      | 688  |      |      | 248  |
| Approach Delay, s/veh        | 30.4 |      | 16.2 |      |      | 5.2  |
| Approach LOS                 | C    |      | B    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 43.1 |      | 11.1 | 9.1  | 34.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 40.5 |      | 18.5 | 7.0  | 28.5 |
| Max Q Clear Time (g_c+I1), s |      | 3.2  |      | 6.1  | 3.3  | 19.2 |
| Green Ext Time (p_c), s      |      | 0.8  |      | 0.2  | 0.1  | 3.4  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 15.4 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 222  | 233  | 52   | 47   | 116  | 93   | 32   | 323  | 56   | 128  | 134  | 54   |
| Future Volume (veh/h)        | 222  | 233  | 52   | 47   | 116  | 93   | 32   | 323  | 56   | 128  | 134  | 54   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 241  | 253  | 57   | 51   | 126  | 101  | 35   | 351  | 61   | 139  | 146  | 59   |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 458  | 479  | 108  | 352  | 210  | 168  | 429  | 403  | 70   | 299  | 377  | 152  |
| Arrive On Green              | 0.10 | 0.29 | 0.29 | 0.05 | 0.24 | 0.24 | 0.04 | 0.25 | 0.25 | 0.08 | 0.30 | 0.30 |
| Sat Flow, veh/h              | 1968 | 1633 | 368  | 1641 | 886  | 710  | 1818 | 1584 | 275  | 1776 | 1262 | 510  |
| Grp Volume(v), veh/h         | 241  | 0    | 310  | 51   | 0    | 227  | 35   | 0    | 412  | 139  | 0    | 205  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 2000 | 1641 | 0    | 1595 | 1818 | 0    | 1860 | 1776 | 0    | 1773 |
| Q Serve(g_s), s              | 5.8  | 0.0  | 8.2  | 1.4  | 0.0  | 8.0  | 0.9  | 0.0  | 13.4 | 3.6  | 0.0  | 5.8  |
| Cycle Q Clear(g_c), s        | 5.8  | 0.0  | 8.2  | 1.4  | 0.0  | 8.0  | 0.9  | 0.0  | 13.4 | 3.6  | 0.0  | 5.8  |
| Prop In Lane                 | 1.00 |      | 0.18 | 1.00 |      | 0.44 | 1.00 |      | 0.15 | 1.00 |      | 0.29 |
| Lane Grp Cap(c), veh/h       | 458  | 0    | 586  | 352  | 0    | 378  | 429  | 0    | 473  | 299  | 0    | 530  |
| V/C Ratio(X)                 | 0.53 | 0.00 | 0.53 | 0.14 | 0.00 | 0.60 | 0.08 | 0.00 | 0.87 | 0.47 | 0.00 | 0.39 |
| Avail Cap(c_a), veh/h        | 458  | 0    | 586  | 444  | 0    | 468  | 550  | 0    | 531  | 338  | 0    | 530  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 16.3 | 0.0  | 18.7 | 16.9 | 0.0  | 21.4 | 16.3 | 0.0  | 22.5 | 16.8 | 0.0  | 17.5 |
| Incr Delay (d2), s/veh       | 1.1  | 0.0  | 3.4  | 0.2  | 0.0  | 1.5  | 0.1  | 0.0  | 13.6 | 1.1  | 0.0  | 0.5  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 4.5  | 0.0  | 7.3  | 0.9  | 0.0  | 5.3  | 0.6  | 0.0  | 11.6 | 2.5  | 0.0  | 4.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 17.4 | 0.0  | 22.0 | 17.1 | 0.0  | 22.9 | 16.3 | 0.0  | 36.1 | 17.9 | 0.0  | 18.0 |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | B    | A    | D    | B    | A    | B    |
| Approach Vol, veh/h          |      | 551  |      |      | 278  |      |      | 447  |      |      | 344  |      |
| Approach Delay, s/veh        |      | 20.0 |      |      | 21.9 |      |      | 34.6 |      |      | 18.0 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | B    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 8.5  | 23.0 | 10.6 | 21.0 | 12.0 | 19.5 | 7.8  | 23.9 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 5.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 18.5 | 6.5  | 18.0 | 6.5  | 18.5 | 6.5  | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 3.4  | 10.2 | 5.6  | 15.4 | 7.8  | 10.0 | 2.9  | 7.8  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.1  | 0.0  | 0.7  | 0.0  | 0.8  | 0.0  | 0.8  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      | 23.9 |      |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      | C    |      |      |      |      |      |      |      |      |      |



HCM 6th Signalized Intersection Summary  
 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 205  | 361  | 72   | 37   | 178  | 78   | 68   | 318  | 211  | 46   | 159  | 100  |
| Future Volume (veh/h)        | 205  | 361  | 72   | 37   | 178  | 78   | 68   | 318  | 211  | 46   | 159  | 100  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 223  | 392  | 78   | 40   | 193  | 85   | 74   | 346  | 229  | 50   | 173  | 109  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 427  | 489  | 97   | 267  | 337  | 149  | 369  | 426  | 361  | 243  | 405  | 343  |
| Arrive On Green              | 0.09 | 0.32 | 0.32 | 0.04 | 0.27 | 0.27 | 0.06 | 0.23 | 0.23 | 0.05 | 0.22 | 0.22 |
| Sat Flow, veh/h              | 1781 | 1515 | 301  | 1781 | 1231 | 542  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 223  | 0    | 470  | 40   | 0    | 278  | 74   | 346  | 229  | 50   | 173  | 109  |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1816 | 1781 | 0    | 1773 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 5.5  | 0.0  | 14.7 | 1.0  | 0.0  | 8.4  | 2.0  | 10.9 | 8.1  | 1.3  | 5.0  | 3.6  |
| Cycle Q Clear(g_c), s        | 5.5  | 0.0  | 14.7 | 1.0  | 0.0  | 8.4  | 2.0  | 10.9 | 8.1  | 1.3  | 5.0  | 3.6  |
| Prop In Lane                 | 1.00 |      | 0.17 | 1.00 |      | 0.31 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 427  | 0    | 586  | 267  | 0    | 486  | 369  | 426  | 361  | 243  | 405  | 343  |
| V/C Ratio(X)                 | 0.52 | 0.00 | 0.80 | 0.15 | 0.00 | 0.57 | 0.20 | 0.81 | 0.63 | 0.21 | 0.43 | 0.32 |
| Avail Cap(c_a), veh/h        | 427  | 0    | 586  | 354  | 0    | 486  | 481  | 528  | 447  | 376  | 528  | 447  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 15.3 | 0.0  | 19.2 | 16.1 | 0.0  | 19.4 | 17.2 | 22.7 | 21.6 | 18.2 | 21.0 | 20.4 |
| Incr Delay (d2), s/veh       | 1.1  | 0.0  | 11.1 | 0.3  | 0.0  | 4.8  | 0.3  | 7.7  | 2.0  | 0.4  | 0.7  | 0.5  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.9  | 0.0  | 11.8 | 0.7  | 0.0  | 6.9  | 1.4  | 9.1  | 5.4  | 1.0  | 3.8  | 2.3  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 16.4 | 0.0  | 30.3 | 16.3 | 0.0  | 24.2 | 17.5 | 30.4 | 23.6 | 18.6 | 21.7 | 21.0 |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | B    | C    | C    | B    | C    | C    |
| Approach Vol, veh/h          |      | 693  |      |      | 318  |      |      | 649  |      |      | 332  |      |
| Approach Delay, s/veh        |      | 25.8 |      |      | 23.2 |      |      | 26.5 |      |      | 21.0 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 8.0  | 26.0 | 9.1  | 18.9 | 11.0 | 23.0 | 8.4  | 19.6 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 17.0 | 7.5  | 17.5 | 5.5  | 17.0 | 7.5  | 17.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 3.0  | 16.7 | 4.0  | 7.0  | 7.5  | 10.4 | 3.3  | 12.9 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.1  | 0.0  | 0.9  | 0.0  | 0.9  | 0.0  | 1.3  |      |      |      |      |

| Intersection Summary |  |  |  |  |  |  |  |  |  |  |      |  |
|----------------------|--|--|--|--|--|--|--|--|--|--|------|--|
| HCM 6th Ctrl Delay   |  |  |  |  |  |  |  |  |  |  | 24.8 |  |
| HCM 6th LOS          |  |  |  |  |  |  |  |  |  |  | C    |  |

HCM 6th Signalized Intersection Summary  
 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 181  | 133  | 74   | 283  | 203  | 234  | 77   | 304  | 119  | 155  | 296  | 165  |
| Future Volume (veh/h)        | 181  | 133  | 74   | 283  | 203  | 234  | 77   | 304  | 119  | 155  | 296  | 165  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 197  | 145  | 0    | 308  | 221  | 0    | 84   | 330  | 0    | 168  | 322  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 372  | 246  |      | 455  | 299  |      | 490  | 1031 |      | 512  | 1164 |      |
| Arrive On Green              | 0.12 | 0.14 | 0.00 | 0.13 | 0.15 | 0.00 | 0.06 | 0.29 | 0.00 | 0.09 | 0.32 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 197  | 145  | 0    | 308  | 221  | 0    | 84   | 330  | 0    | 168  | 322  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 6.2  | 4.9  | 0.0  | 8.5  | 6.6  | 0.0  | 2.0  | 4.6  | 0.0  | 4.0  | 4.2  | 0.0  |
| Cycle Q Clear(g_c), s        | 6.2  | 4.9  | 0.0  | 8.5  | 6.6  | 0.0  | 2.0  | 4.6  | 0.0  | 4.0  | 4.2  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 372  | 246  |      | 455  | 299  |      | 490  | 1031 |      | 512  | 1164 |      |
| V/C Ratio(X)                 | 0.53 | 0.59 |      | 0.68 | 0.74 |      | 0.17 | 0.32 |      | 0.33 | 0.28 |      |
| Avail Cap(c_a), veh/h        | 384  | 503  |      | 455  | 577  |      | 605  | 1031 |      | 576  | 1164 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 19.9 | 25.7 | 0.0  | 20.4 | 25.9 | 0.0  | 14.1 | 17.6 | 0.0  | 13.6 | 16.1 | 0.0  |
| Incr Delay (d2), s/veh       | 1.3  | 2.2  | 0.0  | 4.0  | 3.6  | 0.0  | 0.2  | 0.8  | 0.0  | 0.4  | 0.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 4.2  | 3.7  | 0.0  | 7.3  | 5.9  | 0.0  | 1.3  | 3.2  | 0.0  | 2.6  | 2.9  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 21.2 | 27.9 | 0.0  | 24.4 | 29.5 | 0.0  | 14.2 | 18.4 | 0.0  | 14.0 | 16.7 | 0.0  |
| LnGrp LOS                    | C    | C    |      | C    | C    |      | B    | B    |      | B    | B    |      |
| Approach Vol, veh/h          |      | 342  |      |      | 529  |      |      | 414  |      |      | 490  |      |
| Approach Delay, s/veh        |      | 24.0 |      |      | 26.5 |      |      | 17.6 |      |      | 15.7 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | B    |      |      | B    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 10.8 | 24.0 | 14.0 | 14.8 | 8.9  | 25.9 | 13.4 | 15.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.5  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 8.0  | 18.5 | 8.5  | 18.0 | 8.0  | 18.5 | 8.4  | 18.1 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 6.0  | 6.6  | 10.5 | 6.9  | 4.0  | 6.2  | 8.2  | 8.6  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.1  | 1.5  | 0.0  | 0.5  | 0.1  | 1.5  | 0.0  | 0.7  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 21.0 |
| HCM 6th LOS        | C    |

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 261  | 249  | 154  | 134  | 184  | 282  |
| Future Volume (veh/h)        | 261  | 249  | 154  | 134  | 184  | 282  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 284  | 0    | 167  | 146  | 200  | 307  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 353  |      | 342  | 299  | 585  | 1116 |
| Arrive On Green              | 0.20 | 0.00 | 0.38 | 0.38 | 0.10 | 0.57 |
| Sat Flow, veh/h              | 1731 | 1540 | 909  | 795  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 284  | 0    | 0    | 313  | 200  | 307  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1704 | 1856 | 1949 |
| Q Serve(g_s), s              | 7.7  | 0.0  | 0.0  | 6.9  | 2.9  | 3.9  |
| Cycle Q Clear(g_c), s        | 7.7  | 0.0  | 0.0  | 6.9  | 2.9  | 3.9  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.47 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 353  |      | 0    | 640  | 585  | 1116 |
| V/C Ratio(X)                 | 0.81 |      | 0.00 | 0.49 | 0.34 | 0.28 |
| Avail Cap(c_a), veh/h        | 651  |      | 0    | 640  | 672  | 1208 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 18.7 | 0.0  | 0.0  | 11.7 | 7.6  | 5.3  |
| Incr Delay (d2), s/veh       | 4.4  | 0.0  | 0.0  | 2.7  | 0.3  | 0.1  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 5.4  | 0.0  | 0.0  | 4.7  | 1.6  | 2.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 23.0 | 0.0  | 0.0  | 14.4 | 7.9  | 5.5  |
| LnGrp LOS                    | C    |      | A    | B    | A    | A    |
| Approach Vol, veh/h          | 284  |      | 313  |      |      | 507  |
| Approach Delay, s/veh        | 23.0 |      | 14.4 |      |      | 6.4  |
| Approach LOS                 | C    |      | B    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 33.7 |      | 15.5 | 9.7  | 24.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 30.5 |      | 18.5 | 7.0  | 18.5 |
| Max Q Clear Time (g_c+I1), s |      | 5.9  |      | 9.7  | 4.9  | 8.9  |
| Green Ext Time (p_c), s      |      | 1.8  |      | 0.5  | 0.1  | 1.3  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 13.0 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 119  | 172  | 47   | 88   | 241  | 100  | 70   | 268  | 77   | 104  | 289  | 123  |
| Future Volume (veh/h)        | 119  | 172  | 47   | 88   | 241  | 100  | 70   | 268  | 77   | 104  | 289  | 123  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 129  | 187  | 51   | 96   | 262  | 109  | 76   | 291  | 84   | 113  | 314  | 134  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 325  | 447  | 122  | 414  | 323  | 134  | 246  | 380  | 110  | 310  | 343  | 146  |
| Arrive On Green              | 0.07 | 0.29 | 0.29 | 0.06 | 0.28 | 0.28 | 0.06 | 0.27 | 0.27 | 0.07 | 0.28 | 0.28 |
| Sat Flow, veh/h              | 1968 | 1563 | 426  | 1641 | 1156 | 481  | 1818 | 1424 | 411  | 1776 | 1240 | 529  |
| Grp Volume(v), veh/h         | 129  | 0    | 238  | 96   | 0    | 371  | 76   | 0    | 375  | 113  | 0    | 448  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 1990 | 1641 | 0    | 1637 | 1818 | 0    | 1835 | 1776 | 0    | 1769 |
| Q Serve(g_s), s              | 3.0  | 0.0  | 6.3  | 2.6  | 0.0  | 13.7 | 1.9  | 0.0  | 12.2 | 2.9  | 0.0  | 15.9 |
| Cycle Q Clear(g_c), s        | 3.0  | 0.0  | 6.3  | 2.6  | 0.0  | 13.7 | 1.9  | 0.0  | 12.2 | 2.9  | 0.0  | 15.9 |
| Prop In Lane                 | 1.00 |      | 0.21 | 1.00 |      | 0.29 | 1.00 |      | 0.22 | 1.00 |      | 0.30 |
| Lane Grp Cap(c), veh/h       | 325  | 0    | 568  | 414  | 0    | 457  | 246  | 0    | 490  | 310  | 0    | 490  |
| V/C Ratio(X)                 | 0.40 | 0.00 | 0.42 | 0.23 | 0.00 | 0.81 | 0.31 | 0.00 | 0.76 | 0.36 | 0.00 | 0.92 |
| Avail Cap(c_a), veh/h        | 385  | 0    | 568  | 474  | 0    | 468  | 324  | 0    | 510  | 369  | 0    | 492  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 16.3 | 0.0  | 18.8 | 15.1 | 0.0  | 21.7 | 17.4 | 0.0  | 21.9 | 16.6 | 0.0  | 22.7 |
| Incr Delay (d2), s/veh       | 0.8  | 0.0  | 2.3  | 0.3  | 0.0  | 10.2 | 0.7  | 0.0  | 6.6  | 0.7  | 0.0  | 21.7 |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 2.3  | 0.0  | 5.5  | 1.7  | 0.0  | 10.2 | 1.4  | 0.0  | 9.7  | 2.1  | 0.0  | 14.0 |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 17.1 | 0.0  | 21.0 | 15.4 | 0.0  | 31.9 | 18.1 | 0.0  | 28.4 | 17.3 | 0.0  | 44.4 |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | B    | A    | C    | B    | A    | D    |
| Approach Vol, veh/h          |      | 367  |      |      | 467  |      |      | 451  |      |      | 561  |      |
| Approach Delay, s/veh        |      | 19.6 |      |      | 28.5 |      |      | 26.7 |      |      | 39.0 |      |
| Approach LOS                 |      | B    |      |      | C    |      |      | C    |      |      | D    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 9.6  | 23.0 | 9.8  | 22.3 | 10.0 | 22.6 | 9.2  | 22.9 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 5.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 18.5 | 6.5  | 18.0 | 6.5  | 18.5 | 6.5  | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 4.6  | 8.3  | 4.9  | 14.2 | 5.0  | 15.7 | 3.9  | 17.9 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.9  | 0.0  | 0.8  | 0.0  | 0.6  | 0.0  | 0.0  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      | 29.5 |      |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      | C    |      |      |      |      |      |      |      |      |      |



# HCM 6th Signalized Intersection Summary

## 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 149  | 251  | 120  | 114  | 311  | 50   | 98   | 215  | 97   | 59   | 367  | 246  |
| Future Volume (veh/h)        | 149  | 251  | 120  | 114  | 311  | 50   | 98   | 215  | 97   | 59   | 367  | 246  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 162  | 273  | 130  | 124  | 338  | 54   | 107  | 234  | 105  | 64   | 399  | 267  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 317  | 325  | 155  | 294  | 409  | 65   | 259  | 486  | 412  | 364  | 462  | 391  |
| Arrive On Green              | 0.08 | 0.27 | 0.27 | 0.07 | 0.26 | 0.26 | 0.07 | 0.26 | 0.26 | 0.05 | 0.25 | 0.25 |
| Sat Flow, veh/h              | 1781 | 1197 | 570  | 1781 | 1574 | 251  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 162  | 0    | 403  | 124  | 0    | 392  | 107  | 234  | 105  | 64   | 399  | 267  |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1768 | 1781 | 0    | 1825 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 4.3  | 0.0  | 14.1 | 3.3  | 0.0  | 13.2 | 2.9  | 6.9  | 3.4  | 1.7  | 13.4 | 10.0 |
| Cycle Q Clear(g_c), s        | 4.3  | 0.0  | 14.1 | 3.3  | 0.0  | 13.2 | 2.9  | 6.9  | 3.4  | 1.7  | 13.4 | 10.0 |
| Prop In Lane                 | 1.00 |      | 0.32 | 1.00 |      | 0.14 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 317  | 0    | 480  | 294  | 0    | 474  | 259  | 486  | 412  | 364  | 462  | 391  |
| V/C Ratio(X)                 | 0.51 | 0.00 | 0.84 | 0.42 | 0.00 | 0.83 | 0.41 | 0.48 | 0.26 | 0.18 | 0.86 | 0.68 |
| Avail Cap(c_a), veh/h        | 317  | 0    | 480  | 315  | 0    | 474  | 347  | 500  | 424  | 474  | 500  | 424  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 17.1 | 0.0  | 22.5 | 17.2 | 0.0  | 22.8 | 18.0 | 20.5 | 19.2 | 17.0 | 23.6 | 22.3 |
| Incr Delay (d2), s/veh       | 1.4  | 0.0  | 16.0 | 1.0  | 0.0  | 15.2 | 1.0  | 0.7  | 0.3  | 0.2  | 13.8 | 4.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.1  | 0.0  | 12.0 | 2.4  | 0.0  | 11.7 | 2.1  | 5.3  | 2.2  | 1.2  | 11.7 | 7.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 18.5 | 0.0  | 38.5 | 18.2 | 0.0  | 38.0 | 19.1 | 21.2 | 19.5 | 17.2 | 37.4 | 26.4 |
| LnGrp LOS                    | B    | A    | D    | B    | A    | D    | B    | C    | B    | B    | D    | C    |
| Approach Vol, veh/h          |      | 565  |      |      | 516  |      |      | 446  |      |      | 730  |      |
| Approach Delay, s/veh        |      | 32.8 |      |      | 33.2 |      |      | 20.3 |      |      | 31.6 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 10.2 | 23.8 | 9.8  | 21.6 | 11.0 | 23.0 | 8.9  | 22.5 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 17.0 | 7.5  | 17.5 | 5.5  | 17.0 | 7.5  | 17.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 5.3  | 16.1 | 4.9  | 15.4 | 6.3  | 15.2 | 3.7  | 8.9  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.2  | 0.1  | 0.8  | 0.0  | 0.4  | 0.0  | 1.1  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      | 30.0 |      |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      | C    |      |      |      |      |      |      |      |      |      |

HCM 6th Signalized Intersection Summary  
 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          | ↖    | ↗    | ↘    | ↖    | ↗    | ↘    | ↖    | ↗    | ↘    | ↖    | ↗    | ↘    |
| Traffic Volume (veh/h)       | 272  | 179  | 116  | 186  | 147  | 241  | 145  | 677  | 264  | 248  | 678  | 230  |
| Future Volume (veh/h)        | 272  | 179  | 116  | 186  | 147  | 241  | 145  | 677  | 264  | 248  | 678  | 230  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 296  | 195  | 0    | 202  | 160  | 0    | 158  | 736  | 0    | 270  | 737  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 376  | 258  |      | 367  | 288  |      | 376  | 1002 |      | 418  | 1186 |      |
| Arrive On Green              | 0.11 | 0.15 | 0.00 | 0.11 | 0.14 | 0.00 | 0.09 | 0.28 | 0.00 | 0.13 | 0.33 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 296  | 195  | 0    | 202  | 160  | 0    | 158  | 736  | 0    | 270  | 737  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 7.3  | 7.0  | 0.0  | 5.8  | 4.9  | 0.0  | 4.1  | 12.4 | 0.0  | 6.7  | 11.3 | 0.0  |
| Cycle Q Clear(g_c), s        | 7.3  | 7.0  | 0.0  | 5.8  | 4.9  | 0.0  | 4.1  | 12.4 | 0.0  | 6.7  | 11.3 | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 376  | 258  |      | 367  | 288  |      | 376  | 1002 |      | 418  | 1186 |      |
| V/C Ratio(X)                 | 0.79 | 0.76 |      | 0.55 | 0.56 |      | 0.42 | 0.73 |      | 0.65 | 0.62 |      |
| Avail Cap(c_a), veh/h        | 376  | 489  |      | 367  | 552  |      | 435  | 1002 |      | 426  | 1186 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 24.2 | 27.1 | 0.0  | 21.2 | 26.4 | 0.0  | 15.1 | 21.5 | 0.0  | 15.1 | 18.8 | 0.0  |
| Incr Delay (d2), s/veh       | 10.7 | 4.5  | 0.0  | 1.7  | 1.7  | 0.0  | 0.7  | 4.8  | 0.0  | 3.3  | 2.5  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.7  | 5.5  | 0.0  | 4.6  | 4.2  | 0.0  | 2.7  | 9.0  | 0.0  | 4.9  | 8.1  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 34.9 | 31.6 | 0.0  | 22.9 | 28.1 | 0.0  | 15.8 | 26.2 | 0.0  | 18.4 | 21.2 | 0.0  |
| LnGrp LOS                    | C    | C    |      | C    | C    |      | B    | C    |      | B    | C    |      |
| Approach Vol, veh/h          |      | 491  |      |      | 362  |      |      | 894  |      |      | 1007 |      |
| Approach Delay, s/veh        |      | 33.6 |      |      | 25.2 |      |      | 24.4 |      |      | 20.5 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 13.7 | 24.2 | 12.6 | 15.6 | 10.8 | 27.1 | 12.8 | 15.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.5  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 9.0  | 18.7 | 7.1  | 18.2 | 8.0  | 19.7 | 7.3  | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 8.7  | 14.4 | 7.8  | 9.0  | 6.1  | 13.3 | 9.3  | 6.9  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.8  | 0.0  | 0.6  | 0.1  | 2.5  | 0.0  | 0.5  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 24.7 |
| HCM 6th LOS        | C    |

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 152  | 89   | 448  | 325  | 128  | 150  |
| Future Volume (veh/h)        | 152  | 89   | 448  | 325  | 128  | 150  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 165  | 0    | 487  | 353  | 139  | 163  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 209  |      | 570  | 413  | 346  | 1394 |
| Arrive On Green              | 0.12 | 0.00 | 0.57 | 0.57 | 0.07 | 0.72 |
| Sat Flow, veh/h              | 1731 | 1540 | 995  | 722  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 165  | 0    | 0    | 840  | 139  | 163  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1717 | 1856 | 1949 |
| Q Serve(g_s), s              | 6.2  | 0.0  | 0.0  | 27.5 | 1.8  | 1.7  |
| Cycle Q Clear(g_c), s        | 6.2  | 0.0  | 0.0  | 27.5 | 1.8  | 1.7  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.42 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 209  |      | 0    | 983  | 346  | 1394 |
| V/C Ratio(X)                 | 0.79 |      | 0.00 | 0.85 | 0.40 | 0.12 |
| Avail Cap(c_a), veh/h        | 476  |      | 0    | 983  | 411  | 1463 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 28.7 | 0.0  | 0.0  | 12.0 | 12.1 | 3.0  |
| Incr Delay (d2), s/veh       | 6.5  | 0.0  | 0.0  | 9.4  | 0.8  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 5.0  | 0.0  | 0.0  | 16.4 | 1.8  | 0.8  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 35.2 | 0.0  | 0.0  | 21.4 | 12.8 | 3.0  |
| LnGrp LOS                    | D    |      | A    | C    | B    | A    |
| Approach Vol, veh/h          | 165  |      | 840  |      |      | 302  |
| Approach Delay, s/veh        | 35.2 |      | 21.4 |      |      | 7.5  |
| Approach LOS                 | D    |      | C    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 53.6 |      | 13.6 | 9.6  | 44.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 50.5 |      | 18.5 | 7.0  | 38.5 |
| Max Q Clear Time (g_c+I1), s |      | 3.7  |      | 8.2  | 3.8  | 29.5 |
| Green Ext Time (p_c), s      |      | 1.0  |      | 0.3  | 0.1  | 4.2  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 20.0 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 270  | 284  | 63   | 57   | 141  | 113  | 39   | 394  | 69   | 156  | 164  | 66   |
| Future Volume (veh/h)        | 270  | 284  | 63   | 57   | 141  | 113  | 39   | 394  | 69   | 156  | 164  | 66   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 293  | 309  | 68   | 62   | 153  | 123  | 42   | 428  | 75   | 170  | 178  | 72   |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 369  | 450  | 99   | 281  | 206  | 165  | 451  | 468  | 82   | 270  | 439  | 178  |
| Arrive On Green              | 0.09 | 0.27 | 0.27 | 0.05 | 0.23 | 0.23 | 0.04 | 0.30 | 0.30 | 0.08 | 0.35 | 0.35 |
| Sat Flow, veh/h              | 1968 | 1641 | 361  | 1641 | 884  | 711  | 1818 | 1582 | 277  | 1776 | 1262 | 511  |
| Grp Volume(v), veh/h         | 293  | 0    | 377  | 62   | 0    | 276  | 42   | 0    | 503  | 170  | 0    | 250  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 2002 | 1641 | 0    | 1595 | 1818 | 0    | 1859 | 1776 | 0    | 1773 |
| Q Serve(g_s), s              | 6.5  | 0.0  | 12.0 | 2.0  | 0.0  | 11.4 | 1.1  | 0.0  | 18.6 | 4.7  | 0.0  | 7.6  |
| Cycle Q Clear(g_c), s        | 6.5  | 0.0  | 12.0 | 2.0  | 0.0  | 11.4 | 1.1  | 0.0  | 18.6 | 4.7  | 0.0  | 7.6  |
| Prop In Lane                 | 1.00 |      | 0.18 | 1.00 |      | 0.45 | 1.00 |      | 0.15 | 1.00 |      | 0.29 |
| Lane Grp Cap(c), veh/h       | 369  | 0    | 549  | 281  | 0    | 371  | 451  | 0    | 550  | 270  | 0    | 617  |
| V/C Ratio(X)                 | 0.79 | 0.00 | 0.69 | 0.22 | 0.00 | 0.74 | 0.09 | 0.00 | 0.91 | 0.63 | 0.00 | 0.41 |
| Avail Cap(c_a), veh/h        | 369  | 0    | 549  | 350  | 0    | 438  | 545  | 0    | 576  | 270  | 0    | 617  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 22.6 | 0.0  | 23.1 | 19.6 | 0.0  | 25.3 | 16.2 | 0.0  | 24.1 | 18.3 | 0.0  | 17.6 |
| Incr Delay (d2), s/veh       | 11.3 | 0.0  | 6.8  | 0.4  | 0.0  | 5.7  | 0.1  | 0.0  | 18.7 | 4.6  | 0.0  | 0.4  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 4.4  | 0.0  | 10.5 | 1.4  | 0.0  | 8.2  | 0.8  | 0.0  | 15.8 | 3.8  | 0.0  | 5.4  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 33.9 | 0.0  | 29.9 | 20.0 | 0.0  | 31.0 | 16.3 | 0.0  | 42.9 | 22.9 | 0.0  | 18.0 |
| LnGrp LOS                    | C    | A    | C    | C    | A    | C    | B    | A    | D    | C    | A    | B    |
| Approach Vol, veh/h          |      | 670  |      |      | 338  |      |      | 545  |      |      |      | 420  |
| Approach Delay, s/veh        |      | 31.7 |      |      | 29.0 |      |      | 40.8 |      |      |      | 20.0 |
| Approach LOS                 |      | C    |      |      | C    |      |      | D    |      |      |      | C    |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 9.0  | 24.0 | 12.0 | 26.0 | 12.0 | 21.0 | 8.3  | 29.7 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 6.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 19.5 | 5.5  | 22.0 | 6.5  | 19.5 | 6.5  | 22.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 4.0  | 14.0 | 6.7  | 20.6 | 8.5  | 13.4 | 3.1  | 9.6  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.1  | 0.0  | 0.5  | 0.0  | 0.8  | 0.0  | 1.1  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      |      | 31.3 |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      |      | C    |      |      |      |      |      |      |      |      |



HCM 6th Signalized Intersection Summary  
3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 250  | 441  | 88   | 46   | 217  | 95   | 83   | 389  | 258  | 56   | 194  | 122  |
| Future Volume (veh/h)        | 250  | 441  | 88   | 46   | 217  | 95   | 83   | 389  | 258  | 56   | 194  | 122  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 272  | 479  | 96   | 50   | 236  | 103  | 90   | 423  | 0    | 61   | 211  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 437  | 567  | 114  | 239  | 380  | 166  | 357  | 462  |      | 202  | 447  |      |
| Arrive On Green              | 0.11 | 0.37 | 0.37 | 0.04 | 0.31 | 0.31 | 0.06 | 0.25 | 0.00 | 0.05 | 0.24 | 0.00 |
| Sat Flow, veh/h              | 1781 | 1513 | 303  | 1781 | 1235 | 539  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 272  | 0    | 575  | 50   | 0    | 339  | 90   | 423  | 0    | 61   | 211  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1816 | 1781 | 0    | 1773 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 7.9  | 0.0  | 22.6 | 1.5  | 0.0  | 12.7 | 2.9  | 17.1 | 0.0  | 2.0  | 7.5  | 0.0  |
| Cycle Q Clear(g_c), s        | 7.9  | 0.0  | 22.6 | 1.5  | 0.0  | 12.7 | 2.9  | 17.1 | 0.0  | 2.0  | 7.5  | 0.0  |
| Prop In Lane                 | 1.00 |      | 0.17 | 1.00 |      | 0.30 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 437  | 0    | 680  | 239  | 0    | 546  | 357  | 462  |      | 202  | 447  |      |
| V/C Ratio(X)                 | 0.62 | 0.00 | 0.85 | 0.21 | 0.00 | 0.62 | 0.25 | 0.92 |      | 0.30 | 0.47 |      |
| Avail Cap(c_a), veh/h        | 437  | 0    | 680  | 289  | 0    | 546  | 430  | 468  |      | 244  | 447  |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 16.3 | 0.0  | 22.3 | 19.0 | 0.0  | 23.1 | 20.8 | 28.5 | 0.0  | 22.4 | 25.4 | 0.0  |
| Incr Delay (d2), s/veh       | 2.7  | 0.0  | 12.3 | 0.4  | 0.0  | 5.2  | 0.4  | 22.5 | 0.0  | 0.8  | 0.8  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 5.9  | 0.0  | 16.8 | 1.1  | 0.0  | 9.8  | 2.2  | 15.5 | 0.0  | 1.5  | 6.0  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 19.0 | 0.0  | 34.6 | 19.4 | 0.0  | 28.3 | 21.2 | 51.1 | 0.0  | 23.3 | 26.2 | 0.0  |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | C    | D    |      | C    | C    |      |
| Approach Vol, veh/h          |      | 847  |      |      | 389  |      |      | 513  |      |      | 272  |      |
| Approach Delay, s/veh        |      | 29.6 |      |      | 27.1 |      |      | 45.8 |      |      | 25.5 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | D    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 8.8  | 35.2 | 9.8  | 24.1 | 14.0 | 30.0 | 9.2  | 24.7 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 27.0 | 7.5  | 17.5 | 8.5  | 24.0 | 5.5  | 19.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 3.5  | 24.6 | 4.9  | 9.5  | 9.9  | 14.7 | 4.0  | 19.1 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.9  | 0.0  | 0.7  | 0.0  | 1.4  | 0.0  | 0.1  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 32.7 |
| HCM 6th LOS        | C    |

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          | ↶    | ↷    | ↷    | ↶    | ↷    | ↷    | ↶    | ↷    | ↷    | ↶    | ↷    | ↷    |
| Traffic Volume (veh/h)       | 221  | 163  | 90   | 345  | 248  | 286  | 94   | 371  | 145  | 189  | 361  | 202  |
| Future Volume (veh/h)        | 221  | 163  | 90   | 345  | 248  | 286  | 94   | 371  | 145  | 189  | 361  | 202  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 240  | 177  | 0    | 375  | 270  | 0    | 102  | 403  | 0    | 205  | 392  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 344  | 272  |      | 435  | 348  |      | 459  | 990  |      | 490  | 1168 |      |
| Arrive On Green              | 0.11 | 0.15 | 0.00 | 0.13 | 0.17 | 0.00 | 0.06 | 0.28 | 0.00 | 0.11 | 0.32 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 240  | 177  | 0    | 375  | 270  | 0    | 102  | 403  | 0    | 205  | 392  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 7.4  | 6.2  | 0.0  | 8.5  | 8.4  | 0.0  | 2.6  | 6.1  | 0.0  | 5.2  | 5.4  | 0.0  |
| Cycle Q Clear(g_c), s        | 7.4  | 6.2  | 0.0  | 8.5  | 8.4  | 0.0  | 2.6  | 6.1  | 0.0  | 5.2  | 5.4  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 344  | 272  |      | 435  | 348  |      | 459  | 990  |      | 490  | 1168 |      |
| V/C Ratio(X)                 | 0.70 | 0.65 |      | 0.86 | 0.78 |      | 0.22 | 0.41 |      | 0.42 | 0.34 |      |
| Avail Cap(c_a), veh/h        | 344  | 483  |      | 435  | 588  |      | 561  | 990  |      | 516  | 1168 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 21.9 | 26.4 | 0.0  | 23.2 | 26.2 | 0.0  | 15.2 | 19.4 | 0.0  | 14.4 | 17.1 | 0.0  |
| Incr Delay (d2), s/veh       | 6.0  | 2.6  | 0.0  | 16.2 | 3.8  | 0.0  | 0.2  | 1.2  | 0.0  | 0.6  | 0.8  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 6.2  | 4.8  | 0.0  | 5.4  | 7.5  | 0.0  | 1.8  | 4.4  | 0.0  | 3.4  | 3.8  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 27.9 | 29.0 | 0.0  | 39.3 | 30.0 | 0.0  | 15.4 | 20.6 | 0.0  | 15.0 | 17.8 | 0.0  |
| LnGrp LOS                    | C    | C    |      | D    | C    |      | B    | C    |      | B    | B    |      |
| Approach Vol, veh/h          |      | 417  |      |      | 645  |      |      | 505  |      |      | 597  |      |
| Approach Delay, s/veh        |      | 28.4 |      |      | 35.4 |      |      | 19.6 |      |      | 16.9 |      |
| Approach LOS                 |      | C    |      |      | D    |      |      | B    |      |      | B    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 12.0 | 24.0 | 14.0 | 16.2 | 9.2  | 26.8 | 12.8 | 17.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.4  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 8.0  | 18.5 | 8.5  | 18.0 | 8.0  | 18.5 | 7.4  | 19.2 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 7.2  | 8.1  | 10.5 | 8.2  | 4.6  | 7.4  | 9.4  | 10.4 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.7  | 0.0  | 0.6  | 0.1  | 1.7  | 0.0  | 0.9  |      |      |      |      |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 25.2 |
| HCM 6th LOS        | C    |

### Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 319  | 303  | 188  | 164  | 225  | 344  |
| Future Volume (veh/h)        | 319  | 303  | 188  | 164  | 225  | 344  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 347  | 0    | 204  | 178  | 245  | 374  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 412  |      | 317  | 277  | 511  | 1081 |
| Arrive On Green              | 0.24 | 0.00 | 0.35 | 0.35 | 0.11 | 0.55 |
| Sat Flow, veh/h              | 1731 | 1540 | 910  | 794  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 347  | 0    | 0    | 382  | 245  | 374  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1704 | 1856 | 1949 |
| Q Serve(g_s), s              | 10.1 | 0.0  | 0.0  | 10.0 | 4.1  | 5.6  |
| Cycle Q Clear(g_c), s        | 10.1 | 0.0  | 0.0  | 10.0 | 4.1  | 5.6  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.47 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 412  |      | 0    | 594  | 511  | 1081 |
| V/C Ratio(X)                 | 0.84 |      | 0.00 | 0.64 | 0.48 | 0.35 |
| Avail Cap(c_a), veh/h        | 603  |      | 0    | 594  | 547  | 1119 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 19.3 | 0.0  | 0.0  | 14.5 | 9.5  | 6.5  |
| Incr Delay (d2), s/veh       | 7.1  | 0.0  | 0.0  | 5.3  | 0.7  | 0.2  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 7.6  | 0.0  | 0.0  | 7.6  | 2.5  | 3.2  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 26.3 | 0.0  | 0.0  | 19.8 | 10.2 | 6.7  |
| LnGrp LOS                    | C    |      | A    | B    | B    | A    |
| Approach Vol, veh/h          | 347  |      | 382  |      |      | 619  |
| Approach Delay, s/veh        | 26.3 |      | 19.8 |      |      | 8.1  |
| Approach LOS                 | C    |      | B    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 35.0 |      | 18.1 | 11.0 | 24.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 30.5 |      | 18.5 | 7.0  | 18.5 |
| Max Q Clear Time (g_c+I1), s |      | 7.6  |      | 12.1 | 6.1  | 12.0 |
| Green Ext Time (p_c), s      |      | 2.3  |      | 0.6  | 0.1  | 1.3  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 16.1 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 145  | 210  | 57   | 108  | 295  | 122  | 85   | 328  | 94   | 150  | 353  | 127  |
| Future Volume (veh/h)        | 145  | 210  | 57   | 108  | 295  | 122  | 85   | 328  | 94   | 150  | 353  | 127  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 158  | 228  | 62   | 117  | 321  | 133  | 92   | 357  | 102  | 163  | 384  | 138  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 285  | 505  | 137  | 402  | 364  | 151  | 210  | 419  | 120  | 274  | 416  | 150  |
| Arrive On Green              | 0.07 | 0.32 | 0.32 | 0.07 | 0.31 | 0.31 | 0.05 | 0.29 | 0.29 | 0.08 | 0.32 | 0.32 |
| Sat Flow, veh/h              | 1968 | 1565 | 425  | 1641 | 1157 | 480  | 1818 | 1428 | 408  | 1776 | 1309 | 471  |
| Grp Volume(v), veh/h         | 158  | 0    | 290  | 117  | 0    | 454  | 92   | 0    | 459  | 163  | 0    | 522  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 1990 | 1641 | 0    | 1637 | 1818 | 0    | 1836 | 1776 | 0    | 1780 |
| Q Serve(g_s), s              | 4.5  | 0.0  | 9.8  | 4.0  | 0.0  | 22.4 | 3.0  | 0.0  | 20.1 | 5.4  | 0.0  | 24.1 |
| Cycle Q Clear(g_c), s        | 4.5  | 0.0  | 9.8  | 4.0  | 0.0  | 22.4 | 3.0  | 0.0  | 20.1 | 5.4  | 0.0  | 24.1 |
| Prop In Lane                 | 1.00 |      | 0.21 | 1.00 |      | 0.29 | 1.00 |      | 0.22 | 1.00 |      | 0.26 |
| Lane Grp Cap(c), veh/h       | 285  | 0    | 642  | 402  | 0    | 515  | 210  | 0    | 539  | 274  | 0    | 566  |
| V/C Ratio(X)                 | 0.55 | 0.00 | 0.45 | 0.29 | 0.00 | 0.88 | 0.44 | 0.00 | 0.85 | 0.59 | 0.00 | 0.92 |
| Avail Cap(c_a), veh/h        | 288  | 0    | 642  | 418  | 0    | 528  | 254  | 0    | 625  | 274  | 0    | 606  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 20.7 | 0.0  | 22.9 | 18.1 | 0.0  | 27.7 | 22.4 | 0.0  | 28.3 | 21.5 | 0.0  | 28.0 |
| Incr Delay (d2), s/veh       | 2.3  | 0.0  | 2.3  | 0.4  | 0.0  | 15.7 | 1.4  | 0.0  | 9.8  | 3.5  | 0.0  | 19.2 |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.9  | 0.0  | 8.5  | 2.7  | 0.0  | 16.0 | 2.3  | 0.0  | 15.1 | 4.3  | 0.0  | 18.7 |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 23.0 | 0.0  | 25.1 | 18.5 | 0.0  | 43.4 | 23.8 | 0.0  | 38.1 | 24.9 | 0.0  | 47.2 |
| LnGrp LOS                    | C    | A    | C    | B    | A    | D    | C    | A    | D    | C    | A    | D    |
| Approach Vol, veh/h          |      | 448  |      |      | 571  |      |      | 551  |      |      |      | 685  |
| Approach Delay, s/veh        |      | 24.4 |      |      | 38.3 |      |      | 35.7 |      |      |      | 41.9 |
| Approach LOS                 |      | C    |      |      | D    |      |      | D    |      |      |      | D    |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 11.2 | 32.0 | 12.0 | 30.0 | 11.9 | 31.3 | 9.9  | 32.1 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 5.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 27.5 | 6.5  | 29.0 | 6.5  | 27.5 | 6.5  | 29.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 6.0  | 11.8 | 7.4  | 22.1 | 6.5  | 24.4 | 5.0  | 26.1 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.5  | 0.0  | 1.6  | 0.0  | 0.9  | 0.0  | 1.0  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      |      | 36.0 |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      |      | D    |      |      |      |      |      |      |      |      |



HCM 6th Signalized Intersection Summary  
 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 182  | 306  | 146  | 140  | 380  | 61   | 119  | 263  | 118  | 72   | 448  | 300  |
| Future Volume (veh/h)        | 182  | 306  | 146  | 140  | 380  | 61   | 119  | 263  | 118  | 72   | 448  | 300  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 198  | 333  | 159  | 152  | 413  | 66   | 129  | 286  | 0    | 78   | 487  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 292  | 395  | 189  | 258  | 476  | 76   | 233  | 566  |      | 362  | 525  |      |
| Arrive On Green              | 0.09 | 0.33 | 0.33 | 0.06 | 0.30 | 0.30 | 0.07 | 0.30 | 0.00 | 0.05 | 0.28 | 0.00 |
| Sat Flow, veh/h              | 1781 | 1196 | 571  | 1781 | 1574 | 251  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 198  | 0    | 492  | 152  | 0    | 479  | 129  | 286  | 0    | 78   | 487  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1768 | 1781 | 0    | 1825 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 6.7  | 0.0  | 22.7 | 5.2  | 0.0  | 21.8 | 4.5  | 11.1 | 0.0  | 2.7  | 22.2 | 0.0  |
| Cycle Q Clear(g_c), s        | 6.7  | 0.0  | 22.7 | 5.2  | 0.0  | 21.8 | 4.5  | 11.1 | 0.0  | 2.7  | 22.2 | 0.0  |
| Prop In Lane                 | 1.00 |      | 0.32 | 1.00 |      | 0.14 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 292  | 0    | 583  | 258  | 0    | 553  | 233  | 566  |      | 362  | 525  |      |
| V/C Ratio(X)                 | 0.68 | 0.00 | 0.84 | 0.59 | 0.00 | 0.87 | 0.55 | 0.51 |      | 0.22 | 0.93 |      |
| Avail Cap(c_a), veh/h        | 292  | 0    | 583  | 258  | 0    | 553  | 259  | 585  |      | 387  | 543  |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 21.6 | 0.0  | 27.3 | 22.2 | 0.0  | 29.0 | 23.2 | 25.2 | 0.0  | 21.2 | 30.7 | 0.0  |
| Incr Delay (d2), s/veh       | 6.1  | 0.0  | 13.9 | 3.5  | 0.0  | 16.6 | 2.1  | 0.7  | 0.0  | 0.3  | 22.0 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 5.7  | 0.0  | 17.0 | 4.2  | 0.0  | 17.3 | 3.5  | 8.5  | 0.0  | 2.0  | 18.8 | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 27.8 | 0.0  | 41.2 | 25.6 | 0.0  | 45.6 | 25.2 | 25.9 | 0.0  | 21.5 | 52.8 | 0.0  |
| LnGrp LOS                    | C    | A    | D    | C    | A    | D    | C    | C    |      | C    | D    |      |
| Approach Vol, veh/h          |      | 690  |      |      | 631  |      |      | 415  |      |      | 565  |      |
| Approach Delay, s/veh        |      | 37.3 |      |      | 40.8 |      |      | 25.7 |      |      | 48.5 |      |
| Approach LOS                 |      | D    |      |      | D    |      |      | C    |      |      | D    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 11.0 | 35.0 | 11.7 | 30.2 | 13.4 | 32.6 | 9.8  | 32.1 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 29.0 | 7.5  | 25.5 | 7.9  | 26.6 | 5.5  | 27.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 7.2  | 24.7 | 6.5  | 24.2 | 8.7  | 23.8 | 4.7  | 13.1 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.3  | 0.0  | 0.4  | 0.0  | 0.8  | 0.0  | 1.4  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 38.9 |
| HCM 6th LOS        | D    |

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 331  | 218  | 141  | 227  | 179  | 295  | 176  | 827  | 323  | 302  | 828  | 281  |
| Future Volume (veh/h)        | 331  | 218  | 141  | 227  | 179  | 295  | 176  | 827  | 323  | 302  | 828  | 281  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 360  | 237  | 0    | 247  | 195  | 0    | 191  | 899  | 0    | 328  | 900  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 362  | 289  |      | 330  | 255  |      | 355  | 1151 |      | 404  | 1349 |      |
| Arrive On Green              | 0.14 | 0.16 | 0.00 | 0.10 | 0.13 | 0.00 | 0.09 | 0.32 | 0.00 | 0.14 | 0.37 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 360  | 237  | 0    | 247  | 195  | 0    | 191  | 899  | 0    | 328  | 900  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 11.5 | 10.6 | 0.0  | 8.5  | 7.6  | 0.0  | 5.7  | 18.8 | 0.0  | 9.5  | 17.0 | 0.0  |
| Cycle Q Clear(g_c), s        | 11.5 | 10.6 | 0.0  | 8.5  | 7.6  | 0.0  | 5.7  | 18.8 | 0.0  | 9.5  | 17.0 | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 362  | 289  |      | 330  | 255  |      | 355  | 1151 |      | 404  | 1349 |      |
| V/C Ratio(X)                 | 0.99 | 0.82 |      | 0.75 | 0.76 |      | 0.54 | 0.78 |      | 0.81 | 0.67 |      |
| Avail Cap(c_a), veh/h        | 362  | 455  |      | 330  | 445  |      | 363  | 1151 |      | 414  | 1349 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 30.3 | 33.2 | 0.0  | 28.9 | 34.6 | 0.0  | 17.1 | 25.0 | 0.0  | 17.6 | 21.5 | 0.0  |
| Incr Delay (d2), s/veh       | 45.5 | 6.6  | 0.0  | 9.2  | 4.7  | 0.0  | 1.5  | 5.3  | 0.0  | 11.5 | 2.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 10.4 | 8.5  | 0.0  | 8.5  | 7.1  | 0.0  | 4.1  | 12.8 | 0.0  | 8.3  | 11.4 | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 75.8 | 39.7 | 0.0  | 38.1 | 39.4 | 0.0  | 18.6 | 30.3 | 0.0  | 29.1 | 24.1 | 0.0  |
| LnGrp LOS                    | E    | D    |      | D    | D    |      | B    | C    |      | C    | C    |      |
| Approach Vol, veh/h          |      | 597  |      |      | 442  |      |      | 1090 |      |      | 1228 |      |
| Approach Delay, s/veh        |      | 61.5 |      |      | 38.7 |      |      | 28.3 |      |      | 25.5 |      |
| Approach LOS                 |      | E    |      |      | D    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 16.5 | 32.1 | 14.0 | 19.3 | 12.7 | 36.0 | 17.0 | 16.3 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.5  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 12.0 | 26.5 | 8.5  | 21.0 | 8.0  | 30.5 | 11.5 | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 11.5 | 20.8 | 10.5 | 12.6 | 7.7  | 19.0 | 13.5 | 9.6  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.1  | 2.8  | 0.0  | 0.8  | 0.0  | 4.5  | 0.0  | 0.6  |      |      |      |      |

Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 34.5 |
| HCM 6th LOS        | C    |

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 152  | 89   | 448  | 325  | 128  | 150  |
| Future Volume (veh/h)        | 152  | 89   | 448  | 325  | 128  | 150  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 165  | 0    | 487  | 353  | 139  | 163  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 209  |      | 570  | 413  | 346  | 1394 |
| Arrive On Green              | 0.12 | 0.00 | 0.57 | 0.57 | 0.07 | 0.72 |
| Sat Flow, veh/h              | 1731 | 1540 | 995  | 722  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 165  | 0    | 0    | 840  | 139  | 163  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1717 | 1856 | 1949 |
| Q Serve(g_s), s              | 6.2  | 0.0  | 0.0  | 27.5 | 1.8  | 1.7  |
| Cycle Q Clear(g_c), s        | 6.2  | 0.0  | 0.0  | 27.5 | 1.8  | 1.7  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.42 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 209  |      | 0    | 983  | 346  | 1394 |
| V/C Ratio(X)                 | 0.79 |      | 0.00 | 0.85 | 0.40 | 0.12 |
| Avail Cap(c_a), veh/h        | 476  |      | 0    | 983  | 411  | 1463 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 28.7 | 0.0  | 0.0  | 12.0 | 12.1 | 3.0  |
| Incr Delay (d2), s/veh       | 6.5  | 0.0  | 0.0  | 9.4  | 0.8  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 5.0  | 0.0  | 0.0  | 16.4 | 1.8  | 0.8  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 35.2 | 0.0  | 0.0  | 21.4 | 12.8 | 3.0  |
| LnGrp LOS                    | D    |      | A    | C    | B    | A    |
| Approach Vol, veh/h          | 165  |      | 840  |      |      | 302  |
| Approach Delay, s/veh        | 35.2 |      | 21.4 |      |      | 7.5  |
| Approach LOS                 | D    |      | C    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 53.6 |      | 13.6 | 9.6  | 44.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 50.5 |      | 18.5 | 7.0  | 38.5 |
| Max Q Clear Time (g_c+I1), s |      | 3.7  |      | 8.2  | 3.8  | 29.5 |
| Green Ext Time (p_c), s      |      | 1.0  |      | 0.3  | 0.1  | 4.2  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 20.0 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 270  | 284  | 63   | 57   | 141  | 113  | 39   | 394  | 69   | 156  | 164  | 66   |
| Future Volume (veh/h)        | 270  | 284  | 63   | 57   | 141  | 113  | 39   | 394  | 69   | 156  | 164  | 66   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 293  | 309  | 68   | 62   | 153  | 123  | 42   | 428  | 75   | 170  | 178  | 72   |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 369  | 450  | 99   | 281  | 206  | 165  | 451  | 468  | 82   | 270  | 439  | 178  |
| Arrive On Green              | 0.09 | 0.27 | 0.27 | 0.05 | 0.23 | 0.23 | 0.04 | 0.30 | 0.30 | 0.08 | 0.35 | 0.35 |
| Sat Flow, veh/h              | 1968 | 1641 | 361  | 1641 | 884  | 711  | 1818 | 1582 | 277  | 1776 | 1262 | 511  |
| Grp Volume(v), veh/h         | 293  | 0    | 377  | 62   | 0    | 276  | 42   | 0    | 503  | 170  | 0    | 250  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 2002 | 1641 | 0    | 1595 | 1818 | 0    | 1859 | 1776 | 0    | 1773 |
| Q Serve(g_s), s              | 6.5  | 0.0  | 12.0 | 2.0  | 0.0  | 11.4 | 1.1  | 0.0  | 18.6 | 4.7  | 0.0  | 7.6  |
| Cycle Q Clear(g_c), s        | 6.5  | 0.0  | 12.0 | 2.0  | 0.0  | 11.4 | 1.1  | 0.0  | 18.6 | 4.7  | 0.0  | 7.6  |
| Prop In Lane                 | 1.00 |      | 0.18 | 1.00 |      | 0.45 | 1.00 |      | 0.15 | 1.00 |      | 0.29 |
| Lane Grp Cap(c), veh/h       | 369  | 0    | 549  | 281  | 0    | 371  | 451  | 0    | 550  | 270  | 0    | 617  |
| V/C Ratio(X)                 | 0.79 | 0.00 | 0.69 | 0.22 | 0.00 | 0.74 | 0.09 | 0.00 | 0.91 | 0.63 | 0.00 | 0.41 |
| Avail Cap(c_a), veh/h        | 369  | 0    | 549  | 350  | 0    | 438  | 545  | 0    | 576  | 270  | 0    | 617  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 22.6 | 0.0  | 23.1 | 19.6 | 0.0  | 25.3 | 16.2 | 0.0  | 24.1 | 18.3 | 0.0  | 17.6 |
| Incr Delay (d2), s/veh       | 11.3 | 0.0  | 6.8  | 0.4  | 0.0  | 5.7  | 0.1  | 0.0  | 18.7 | 4.6  | 0.0  | 0.4  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 4.4  | 0.0  | 10.5 | 1.4  | 0.0  | 8.2  | 0.8  | 0.0  | 15.8 | 3.8  | 0.0  | 5.4  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 33.9 | 0.0  | 29.9 | 20.0 | 0.0  | 31.0 | 16.3 | 0.0  | 42.9 | 22.9 | 0.0  | 18.0 |
| LnGrp LOS                    | C    | A    | C    | C    | A    | C    | B    | A    | D    | C    | A    | B    |
| Approach Vol, veh/h          |      | 670  |      |      | 338  |      |      | 545  |      |      |      | 420  |
| Approach Delay, s/veh        |      | 31.7 |      |      | 29.0 |      |      | 40.8 |      |      |      | 20.0 |
| Approach LOS                 |      | C    |      |      | C    |      |      | D    |      |      |      | C    |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 9.0  | 24.0 | 12.0 | 26.0 | 12.0 | 21.0 | 8.3  | 29.7 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 6.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 19.5 | 5.5  | 22.0 | 6.5  | 19.5 | 6.5  | 22.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 4.0  | 14.0 | 6.7  | 20.6 | 8.5  | 13.4 | 3.1  | 9.6  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.1  | 0.0  | 0.5  | 0.0  | 0.8  | 0.0  | 1.1  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      |      | 31.3 |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      |      | C    |      |      |      |      |      |      |      |      |



# HCM 6th Signalized Intersection Summary

## 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 250  | 441  | 88   | 46   | 217  | 95   | 83   | 389  | 258  | 56   | 194  | 122  |
| Future Volume (veh/h)        | 250  | 441  | 88   | 46   | 217  | 95   | 83   | 389  | 258  | 56   | 194  | 122  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 272  | 479  | 96   | 50   | 236  | 103  | 90   | 423  | 280  | 61   | 211  | 133  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 460  | 604  | 121  | 259  | 406  | 177  | 331  | 469  | 398  | 188  | 452  | 383  |
| Arrive On Green              | 0.11 | 0.40 | 0.40 | 0.04 | 0.33 | 0.33 | 0.05 | 0.25 | 0.25 | 0.04 | 0.24 | 0.24 |
| Sat Flow, veh/h              | 1781 | 1513 | 303  | 1781 | 1235 | 539  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 272  | 0    | 575  | 50   | 0    | 339  | 90   | 423  | 280  | 61   | 211  | 133  |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1816 | 1781 | 0    | 1773 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 8.2  | 0.0  | 23.7 | 1.6  | 0.0  | 13.5 | 3.2  | 18.7 | 13.7 | 2.2  | 8.2  | 5.9  |
| Cycle Q Clear(g_c), s        | 8.2  | 0.0  | 23.7 | 1.6  | 0.0  | 13.5 | 3.2  | 18.7 | 13.7 | 2.2  | 8.2  | 5.9  |
| Prop In Lane                 | 1.00 |      | 0.17 | 1.00 |      | 0.30 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 460  | 0    | 725  | 259  | 0    | 583  | 331  | 469  | 398  | 188  | 452  | 383  |
| V/C Ratio(X)                 | 0.59 | 0.00 | 0.79 | 0.19 | 0.00 | 0.58 | 0.27 | 0.90 | 0.70 | 0.32 | 0.47 | 0.35 |
| Avail Cap(c_a), veh/h        | 460  | 0    | 725  | 301  | 0    | 583  | 392  | 494  | 419  | 265  | 494  | 419  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 16.4 | 0.0  | 22.5 | 19.4 | 0.0  | 23.7 | 22.7 | 30.9 | 29.0 | 24.5 | 27.6 | 26.7 |
| Incr Delay (d2), s/veh       | 2.0  | 0.0  | 8.7  | 0.4  | 0.0  | 4.2  | 0.4  | 19.0 | 5.0  | 1.0  | 0.8  | 0.5  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 6.1  | 0.0  | 16.8 | 1.2  | 0.0  | 10.2 | 2.4  | 15.9 | 9.5  | 1.7  | 6.6  | 4.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 18.4 | 0.0  | 31.2 | 19.7 | 0.0  | 27.9 | 23.1 | 49.9 | 34.0 | 25.5 | 28.4 | 27.3 |
| LnGrp LOS                    | B    | A    | C    | B    | A    | C    | C    | D    | C    | C    | C    | C    |
| Approach Vol, veh/h          |      | 847  |      |      | 389  |      |      | 793  |      |      | 405  |      |
| Approach Delay, s/veh        |      | 27.1 |      |      | 26.9 |      |      | 41.2 |      |      | 27.6 |      |
| Approach LOS                 |      | C    |      |      | C    |      |      | D    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 9.0  | 40.0 | 10.1 | 26.1 | 15.0 | 34.0 | 9.3  | 26.9 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 5.5  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 32.0 | 7.5  | 22.5 | 9.5  | 28.0 | 7.5  | 22.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 3.6  | 25.7 | 5.2  | 10.2 | 10.2 | 15.5 | 4.2  | 20.7 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 2.0  | 0.0  | 1.3  | 0.0  | 1.6  | 0.0  | 0.7  |      |      |      |      |

### Intersection Summary

|                    |  |  |      |  |  |  |  |  |  |  |  |  |
|--------------------|--|--|------|--|--|--|--|--|--|--|--|--|
| HCM 6th Ctrl Delay |  |  | 31.7 |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS        |  |  | C    |  |  |  |  |  |  |  |  |  |

# HCM 6th Signalized Intersection Summary

## 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 221  | 163  | 90   | 345  | 248  | 286  | 94   | 371  | 145  | 189  | 361  | 202  |
| Future Volume (veh/h)        | 221  | 163  | 90   | 345  | 248  | 286  | 94   | 371  | 145  | 189  | 361  | 202  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 240  | 177  | 0    | 375  | 270  | 0    | 102  | 403  | 0    | 205  | 392  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 344  | 272  |      | 435  | 348  |      | 459  | 990  |      | 490  | 1168 |      |
| Arrive On Green              | 0.11 | 0.15 | 0.00 | 0.13 | 0.17 | 0.00 | 0.06 | 0.28 | 0.00 | 0.11 | 0.32 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 240  | 177  | 0    | 375  | 270  | 0    | 102  | 403  | 0    | 205  | 392  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 7.4  | 6.2  | 0.0  | 8.5  | 8.4  | 0.0  | 2.6  | 6.1  | 0.0  | 5.2  | 5.4  | 0.0  |
| Cycle Q Clear(g_c), s        | 7.4  | 6.2  | 0.0  | 8.5  | 8.4  | 0.0  | 2.6  | 6.1  | 0.0  | 5.2  | 5.4  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 344  | 272  |      | 435  | 348  |      | 459  | 990  |      | 490  | 1168 |      |
| V/C Ratio(X)                 | 0.70 | 0.65 |      | 0.86 | 0.78 |      | 0.22 | 0.41 |      | 0.42 | 0.34 |      |
| Avail Cap(c_a), veh/h        | 344  | 483  |      | 435  | 588  |      | 561  | 990  |      | 516  | 1168 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 21.9 | 26.4 | 0.0  | 23.2 | 26.2 | 0.0  | 15.2 | 19.4 | 0.0  | 14.4 | 17.1 | 0.0  |
| Incr Delay (d2), s/veh       | 6.0  | 2.6  | 0.0  | 16.2 | 3.8  | 0.0  | 0.2  | 1.2  | 0.0  | 0.6  | 0.8  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 6.2  | 4.8  | 0.0  | 5.4  | 7.5  | 0.0  | 1.8  | 4.4  | 0.0  | 3.4  | 3.8  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 27.9 | 29.0 | 0.0  | 39.3 | 30.0 | 0.0  | 15.4 | 20.6 | 0.0  | 15.0 | 17.8 | 0.0  |
| LnGrp LOS                    | C    | C    |      | D    | C    |      | B    | C    |      | B    | B    |      |
| Approach Vol, veh/h          |      | 417  |      |      | 645  |      |      | 505  |      |      | 597  |      |
| Approach Delay, s/veh        |      | 28.4 |      |      | 35.4 |      |      | 19.6 |      |      | 16.9 |      |
| Approach LOS                 |      | C    |      |      | D    |      |      | B    |      |      | B    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 12.0 | 24.0 | 14.0 | 16.2 | 9.2  | 26.8 | 12.8 | 17.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.4  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 8.0  | 18.5 | 8.5  | 18.0 | 8.0  | 18.5 | 7.4  | 19.2 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 7.2  | 8.1  | 10.5 | 8.2  | 4.6  | 7.4  | 9.4  | 10.4 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.7  | 0.0  | 0.6  | 0.1  | 1.7  | 0.0  | 0.9  |      |      |      |      |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 25.2 |
| HCM 6th LOS        | C    |

### Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 1: Westside Dr. & Clement Dr.

06/09/2023



| Movement                     | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 319  | 303  | 188  | 164  | 225  | 344  |
| Future Volume (veh/h)        | 319  | 303  | 188  | 164  | 225  | 344  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 |      | 1.00 | 1.00 |      |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      | No   |      |      | No   |
| Adj Sat Flow, veh/h/ln       | 1817 | 1817 | 1847 | 1847 | 1949 | 1949 |
| Adj Flow Rate, veh/h         | 347  | 0    | 204  | 178  | 245  | 374  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 412  |      | 317  | 277  | 511  | 1081 |
| Arrive On Green              | 0.24 | 0.00 | 0.35 | 0.35 | 0.11 | 0.55 |
| Sat Flow, veh/h              | 1731 | 1540 | 910  | 794  | 1856 | 1949 |
| Grp Volume(v), veh/h         | 347  | 0    | 0    | 382  | 245  | 374  |
| Grp Sat Flow(s),veh/h/ln     | 1731 | 1540 | 0    | 1704 | 1856 | 1949 |
| Q Serve(g_s), s              | 10.1 | 0.0  | 0.0  | 10.0 | 4.1  | 5.6  |
| Cycle Q Clear(g_c), s        | 10.1 | 0.0  | 0.0  | 10.0 | 4.1  | 5.6  |
| Prop In Lane                 | 1.00 | 1.00 |      | 0.47 | 1.00 |      |
| Lane Grp Cap(c), veh/h       | 412  |      | 0    | 594  | 511  | 1081 |
| V/C Ratio(X)                 | 0.84 |      | 0.00 | 0.64 | 0.48 | 0.35 |
| Avail Cap(c_a), veh/h        | 603  |      | 0    | 594  | 547  | 1119 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l)           | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 19.3 | 0.0  | 0.0  | 14.5 | 9.5  | 6.5  |
| Incr Delay (d2), s/veh       | 7.1  | 0.0  | 0.0  | 5.3  | 0.7  | 0.2  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 7.6  | 0.0  | 0.0  | 7.6  | 2.5  | 3.2  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 26.3 | 0.0  | 0.0  | 19.8 | 10.2 | 6.7  |
| LnGrp LOS                    | C    |      | A    | B    | B    | A    |
| Approach Vol, veh/h          | 347  |      | 382  |      |      | 619  |
| Approach Delay, s/veh        | 26.3 |      | 19.8 |      |      | 8.1  |
| Approach LOS                 | C    |      | B    |      |      | A    |
| Timer - Assigned Phs         |      | 2    |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     |      | 35.0 |      | 18.1 | 11.0 | 24.0 |
| Change Period (Y+Rc), s      |      | 5.5  |      | 5.5  | 5.0  | 5.5  |
| Max Green Setting (Gmax), s  |      | 30.5 |      | 18.5 | 7.0  | 18.5 |
| Max Q Clear Time (g_c+I1), s |      | 7.6  |      | 12.1 | 6.1  | 12.0 |
| Green Ext Time (p_c), s      |      | 2.3  |      | 0.6  | 0.1  | 1.3  |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 16.1 |
| HCM 6th LOS        | B    |

### Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 2: Westside Dr./Cedar Ln. & Lincoln St.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 145  | 210  | 57   | 108  | 295  | 122  | 85   | 328  | 94   | 150  | 353  | 127  |
| Future Volume (veh/h)        | 145  | 210  | 57   | 108  | 295  | 122  | 85   | 328  | 94   | 150  | 353  | 127  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 2067 | 2067 | 2067 | 1723 | 1723 | 1723 | 1909 | 1909 | 1909 | 1864 | 1864 | 1864 |
| Adj Flow Rate, veh/h         | 158  | 228  | 62   | 117  | 321  | 133  | 92   | 357  | 102  | 163  | 384  | 138  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 285  | 505  | 137  | 402  | 364  | 151  | 210  | 419  | 120  | 274  | 416  | 150  |
| Arrive On Green              | 0.07 | 0.32 | 0.32 | 0.07 | 0.31 | 0.31 | 0.05 | 0.29 | 0.29 | 0.08 | 0.32 | 0.32 |
| Sat Flow, veh/h              | 1968 | 1565 | 425  | 1641 | 1157 | 480  | 1818 | 1428 | 408  | 1776 | 1309 | 471  |
| Grp Volume(v), veh/h         | 158  | 0    | 290  | 117  | 0    | 454  | 92   | 0    | 459  | 163  | 0    | 522  |
| Grp Sat Flow(s),veh/h/ln     | 1968 | 0    | 1990 | 1641 | 0    | 1637 | 1818 | 0    | 1836 | 1776 | 0    | 1780 |
| Q Serve(g_s), s              | 4.5  | 0.0  | 9.8  | 4.0  | 0.0  | 22.4 | 3.0  | 0.0  | 20.1 | 5.4  | 0.0  | 24.1 |
| Cycle Q Clear(g_c), s        | 4.5  | 0.0  | 9.8  | 4.0  | 0.0  | 22.4 | 3.0  | 0.0  | 20.1 | 5.4  | 0.0  | 24.1 |
| Prop In Lane                 | 1.00 |      | 0.21 | 1.00 |      | 0.29 | 1.00 |      | 0.22 | 1.00 |      | 0.26 |
| Lane Grp Cap(c), veh/h       | 285  | 0    | 642  | 402  | 0    | 515  | 210  | 0    | 539  | 274  | 0    | 566  |
| V/C Ratio(X)                 | 0.55 | 0.00 | 0.45 | 0.29 | 0.00 | 0.88 | 0.44 | 0.00 | 0.85 | 0.59 | 0.00 | 0.92 |
| Avail Cap(c_a), veh/h        | 288  | 0    | 642  | 418  | 0    | 528  | 254  | 0    | 625  | 274  | 0    | 606  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh     | 20.7 | 0.0  | 22.9 | 18.1 | 0.0  | 27.7 | 22.4 | 0.0  | 28.3 | 21.5 | 0.0  | 28.0 |
| Incr Delay (d2), s/veh       | 2.3  | 0.0  | 2.3  | 0.4  | 0.0  | 15.7 | 1.4  | 0.0  | 9.8  | 3.5  | 0.0  | 19.2 |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 3.9  | 0.0  | 8.5  | 2.7  | 0.0  | 16.0 | 2.3  | 0.0  | 15.1 | 4.3  | 0.0  | 18.7 |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 23.0 | 0.0  | 25.1 | 18.5 | 0.0  | 43.4 | 23.8 | 0.0  | 38.1 | 24.9 | 0.0  | 47.2 |
| LnGrp LOS                    | C    | A    | C    | B    | A    | D    | C    | A    | D    | C    | A    | D    |
| Approach Vol, veh/h          |      | 448  |      |      | 571  |      |      | 551  |      |      |      | 685  |
| Approach Delay, s/veh        |      | 24.4 |      |      | 38.3 |      |      | 35.7 |      |      |      | 41.9 |
| Approach LOS                 |      | C    |      |      | D    |      |      | D    |      |      |      | D    |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 11.2 | 32.0 | 12.0 | 30.0 | 11.9 | 31.3 | 9.9  | 32.1 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 4.5  | 5.5  | 5.0  | 5.5  | 4.5  | 5.5  | 5.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.5  | 27.5 | 6.5  | 29.0 | 6.5  | 27.5 | 6.5  | 29.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 6.0  | 11.8 | 7.4  | 22.1 | 6.5  | 24.4 | 5.0  | 26.1 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.5  | 0.0  | 1.6  | 0.0  | 0.9  | 0.0  | 1.0  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |      |      |      | 36.0 |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |      |      |      | D    |      |      |      |      |      |      |      |      |



# HCM 6th Signalized Intersection Summary

## 3: Cedar Ln. & Wilson Ave.

06/09/2023



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 182  | 306  | 146  | 140  | 380  | 61   | 119  | 263  | 118  | 72   | 448  | 300  |
| Future Volume (veh/h)        | 182  | 306  | 146  | 140  | 380  | 61   | 119  | 263  | 118  | 72   | 448  | 300  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h         | 198  | 333  | 159  | 152  | 413  | 66   | 129  | 286  | 128  | 78   | 487  | 326  |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 272  | 394  | 188  | 257  | 500  | 80   | 227  | 569  | 482  | 342  | 528  | 447  |
| Arrive On Green              | 0.07 | 0.33 | 0.33 | 0.06 | 0.32 | 0.32 | 0.07 | 0.30 | 0.30 | 0.05 | 0.28 | 0.28 |
| Sat Flow, veh/h              | 1781 | 1196 | 571  | 1781 | 1574 | 251  | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h         | 198  | 0    | 492  | 152  | 0    | 479  | 129  | 286  | 128  | 78   | 487  | 326  |
| Grp Sat Flow(s),veh/h/ln     | 1781 | 0    | 1768 | 1781 | 0    | 1825 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s              | 6.0  | 0.0  | 22.8 | 5.1  | 0.0  | 21.4 | 4.5  | 11.1 | 5.4  | 2.7  | 22.3 | 16.4 |
| Cycle Q Clear(g_c), s        | 6.0  | 0.0  | 22.8 | 5.1  | 0.0  | 21.4 | 4.5  | 11.1 | 5.4  | 2.7  | 22.3 | 16.4 |
| Prop In Lane                 | 1.00 |      | 0.32 | 1.00 |      | 0.14 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 272  | 0    | 582  | 257  | 0    | 580  | 227  | 569  | 482  | 342  | 528  | 447  |
| V/C Ratio(X)                 | 0.73 | 0.00 | 0.85 | 0.59 | 0.00 | 0.83 | 0.57 | 0.50 | 0.27 | 0.23 | 0.92 | 0.73 |
| Avail Cap(c_a), veh/h        | 272  | 0    | 582  | 257  | 0    | 580  | 253  | 569  | 482  | 407  | 542  | 459  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 23.9 | 0.0  | 27.4 | 21.7 | 0.0  | 27.8 | 23.2 | 25.2 | 23.2 | 21.1 | 30.7 | 28.6 |
| Incr Delay (d2), s/veh       | 9.4  | 0.0  | 14.0 | 3.6  | 0.0  | 12.6 | 2.4  | 0.7  | 0.3  | 0.3  | 21.3 | 5.6  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 6.1  | 0.0  | 17.0 | 4.1  | 0.0  | 16.4 | 3.5  | 8.5  | 3.6  | 2.0  | 18.7 | 11.0 |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 33.3 | 0.0  | 41.5 | 25.3 | 0.0  | 40.4 | 25.6 | 25.9 | 23.5 | 21.5 | 52.0 | 34.2 |
| LnGrp LOS                    | C    | A    | D    | C    | A    | D    | C    | C    | C    | C    | D    | C    |
| Approach Vol, veh/h          |      | 690  |      |      | 631  |      |      | 543  |      |      | 891  |      |
| Approach Delay, s/veh        |      | 39.1 |      |      | 36.7 |      |      | 25.2 |      |      | 42.8 |      |
| Approach LOS                 |      | D    |      |      | D    |      |      | C    |      |      | D    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 11.0 | 35.0 | 11.7 | 30.3 | 12.0 | 34.0 | 9.8  | 32.3 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.5  | 6.0  | 5.5  | 5.5  | 6.0  | 6.0  | 5.5  | 5.5  |      |      |      |      |
| Max Green Setting (Gmax), s  | 5.5  | 29.0 | 7.5  | 25.5 | 6.0  | 28.0 | 7.5  | 25.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 7.1  | 24.8 | 6.5  | 24.3 | 8.0  | 23.4 | 4.7  | 13.1 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.2  | 0.0  | 0.6  | 0.0  | 1.3  | 0.0  | 1.7  |      |      |      |      |

### Intersection Summary

|                    |      |
|--------------------|------|
| HCM 6th Ctrl Delay | 37.0 |
| HCM 6th LOS        | D    |

HCM 6th Signalized Intersection Summary  
 4: N Jackson St. & Cedar Ln./Washington St.

06/09/2023

| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 331  | 218  | 141  | 227  | 179  | 295  | 176  | 827  | 323  | 302  | 828  | 281  |
| Future Volume (veh/h)        | 331  | 218  | 141  | 227  | 179  | 295  | 176  | 827  | 323  | 302  | 828  | 281  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      | No   |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1776 | 1776 | 1776 | 2027 | 2027 | 2027 | 1864 | 1864 | 1864 | 1909 | 1909 | 1909 |
| Adj Flow Rate, veh/h         | 360  | 237  | 0    | 247  | 195  | 0    | 191  | 899  | 0    | 328  | 900  | 0    |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Cap, veh/h                   | 362  | 289  |      | 330  | 255  |      | 355  | 1151 |      | 404  | 1349 |      |
| Arrive On Green              | 0.14 | 0.16 | 0.00 | 0.10 | 0.13 | 0.00 | 0.09 | 0.32 | 0.00 | 0.14 | 0.37 | 0.00 |
| Sat Flow, veh/h              | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 3542 | 1580 | 1818 | 3628 | 1618 |
| Grp Volume(v), veh/h         | 360  | 237  | 0    | 247  | 195  | 0    | 191  | 899  | 0    | 328  | 900  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1692 | 1776 | 1505 | 1931 | 2027 | 1718 | 1776 | 1771 | 1580 | 1818 | 1814 | 1618 |
| Q Serve(g_s), s              | 11.5 | 10.6 | 0.0  | 8.5  | 7.6  | 0.0  | 5.7  | 18.8 | 0.0  | 9.5  | 17.0 | 0.0  |
| Cycle Q Clear(g_c), s        | 11.5 | 10.6 | 0.0  | 8.5  | 7.6  | 0.0  | 5.7  | 18.8 | 0.0  | 9.5  | 17.0 | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 362  | 289  |      | 330  | 255  |      | 355  | 1151 |      | 404  | 1349 |      |
| V/C Ratio(X)                 | 0.99 | 0.82 |      | 0.75 | 0.76 |      | 0.54 | 0.78 |      | 0.81 | 0.67 |      |
| Avail Cap(c_a), veh/h        | 362  | 455  |      | 330  | 445  |      | 363  | 1151 |      | 414  | 1349 |      |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 30.3 | 33.2 | 0.0  | 28.9 | 34.6 | 0.0  | 17.1 | 25.0 | 0.0  | 17.6 | 21.5 | 0.0  |
| Incr Delay (d2), s/veh       | 45.5 | 6.6  | 0.0  | 9.2  | 4.7  | 0.0  | 1.5  | 5.3  | 0.0  | 11.5 | 2.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 10.4 | 8.5  | 0.0  | 8.5  | 7.1  | 0.0  | 4.1  | 12.8 | 0.0  | 8.3  | 11.4 | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 75.8 | 39.7 | 0.0  | 38.1 | 39.4 | 0.0  | 18.6 | 30.3 | 0.0  | 29.1 | 24.1 | 0.0  |
| LnGrp LOS                    | E    | D    |      | D    | D    |      | B    | C    |      | C    | C    |      |
| Approach Vol, veh/h          |      | 597  |      |      | 442  |      |      | 1090 |      |      | 1228 |      |
| Approach Delay, s/veh        |      | 61.5 |      |      | 38.7 |      |      | 28.3 |      |      | 25.5 |      |
| Approach LOS                 |      | E    |      |      | D    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 16.5 | 32.1 | 14.0 | 19.3 | 12.7 | 36.0 | 17.0 | 16.3 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.0  | 5.5  | 5.5  | 6.0  | 5.0  | 5.5  | 5.5  | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 12.0 | 26.5 | 8.5  | 21.0 | 8.0  | 30.5 | 11.5 | 18.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 11.5 | 20.8 | 10.5 | 12.6 | 7.7  | 19.0 | 13.5 | 9.6  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.1  | 2.8  | 0.0  | 0.8  | 0.0  | 4.5  | 0.0  | 0.6  |      |      |      |      |

| Intersection Summary |  |  |  |      |  |  |  |  |  |  |  |  |
|----------------------|--|--|--|------|--|--|--|--|--|--|--|--|
| HCM 6th Ctrl Delay   |  |  |  | 34.5 |  |  |  |  |  |  |  |  |
| HCM 6th LOS          |  |  |  | C    |  |  |  |  |  |  |  |  |

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



**APPENDIX 8: RESOLUTION**

**RESOLUTION NO. 1945**

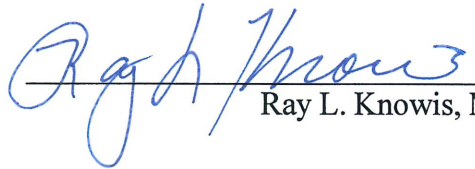
**A RESOLUTION TO ADOPT THE TECHNICAL REPORT  
FOR THE WESTSIDE DRIVE/CEDAR LANE CORRIDOR**

**WHEREAS**, The City of Tullahoma, Tennessee received a Community Planning Grant from the Tennessee Department of Transportation in April of 2022 for a Technical Study of the Westside Drive/Cedar Lane corridor; and

**WHEREAS**, there exists a need to adopt the final draft of the Technical Study of the Westside Drive/Cedar Lane corridor prior to final submittal to the Tennessee Department of Transportation;

**NOW THEREFORE, BE IT RESOLVED** by the Board of Mayor and Aldermen of the City of Tullahoma, Tennessee that the Technical Study of the Westside Drive/Cedar Lane corridor be adopted for the purpose of guiding future transportation improvement decisions, and the regulations set forth therein shall be in full force and effect immediately, the public welfare requiring it, on this 14<sup>th</sup> day of August 2023.

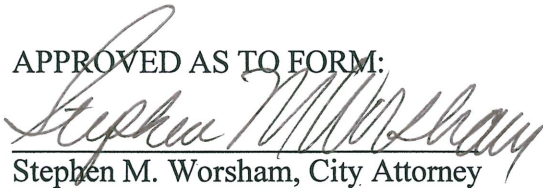
CITY OF TULLAHOMA, TENNESSEE

  
Ray L. Knowis, Mayor

ATTEST:

  
Lori Ashley, City Recorder

APPROVED AS TO FORM:

  
Stephen M. Worsham, City Attorney