



# PRELIMINARY ENGINEERING ASSESSMENT

LOCAL ROAD IMPROVEMENTS

TOWN OF DAYTON

DAYTON TOWN HALL

EAST SOUTH STREET EXTENSION

1 BLOCK SOUTH OF WALNUT STREET (STATE ROAD 38)

TIPPECANOE COUNTY



## **VS ENGINEERING, INC.**

4275 North High School Road  
vsei@vsengineering.com  
Phone: (317) 293-3542

Indianapolis, Indiana 46254  
www.vsengineering.com  
Fax: (317) 293-4737

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
PURPOSE OF REPORT	1
PROJECT LOCATION	1
PURPOSE AND NEED	2
ROAD HISTORY	2
EXISTING CONDITIONS	2 - 4
DESIGN CRITERIA	4
ALTERNATIVE ANALYSIS	5 - 6
COST ESTIMATE	6
RIGHT-OF-WAY SUMMARY	7
CONCLUSIONS AND RECOMMENDATIONS	7 - 8

ATTACHMENTS

<u>APPENDICES</u>	<u>APPENDIX NO.</u>
VICINITY MAP	A-1
TOPOGRAPHIC MAP	A-2
GROUND LEVEL PICTURES	A-3 thru A-8
UTILITY MAPS	A-9 thru A-13
PRELIMINARY RED FLAG MAP	A-14
FLOOD MAP	A-15
ALTERNATIVE EXHIBITS	A-16 thru A-18
PRELIMINARY COST ESTIMATES	A-19 thru A-21

## PURPOSE OF REPORT

At the Dayton Town Council meeting on April 2, 2018, Dayton Street Commissioner and Town Council Member, Ashley Stephenson presented new business concerning access and connectivity concerns at East South Street where it ends at an alley. The road doesn't continue as a public road connecting anywhere nor does it provide public turn around capabilities. VS Engineering, Inc. was approved to evaluate the study area, provide alternatives to consider and present our findings in a Preliminary Engineer's Report.

This report documents the engineering assessment phase to evaluate the extension of South Street east to a cul-de-sac or a new intersection with Adams Road (Appendix A-1). This report contains relevant background data; identifies the purpose and need; provides alternative concepts with cost estimates for each; and provides conclusions and recommendations for value driven executive decision making.

## PROJECT LOCATION

The improvement project study area is in the Town of Dayton, in Section 9 of T-22-N, R-3-W, Sheffield Township, Tippecanoe County. It starts about 280 feet south of Walnut Street (State Road 38), at the east end of South Street, and extends to Adams Road. The Norfolk and Southern Railroad runs east to west along the south side of the study area. Walnut Street covers the northern limit. The GPS coordinates of the project are 40°22'23.52"N, 86°45'44.37"W. Refer to the Vicinity Map in Appendix A-1 and the Project Location Map in Figure 1 below.

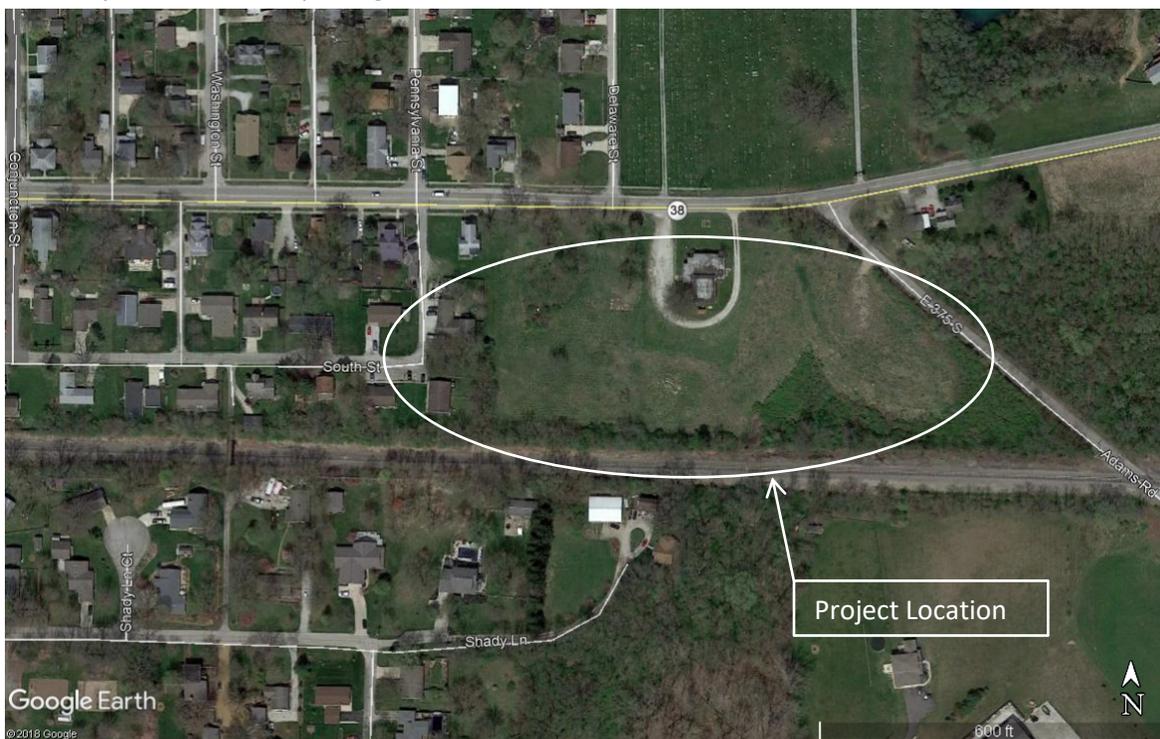


Figure 1: Project Location Map

## **PURPOSE AND NEED**

The primary purpose of this project is to improve the operational deficiencies and connectivity of East South Street. A secondary purpose is to improve water supply circulation and water quality of the service area.

The need is due to South Street, as it continues east of Conjunction Street, ends at an alley that doesn't provide a functional means to outlet; and does not provide road network connectivity. The alley, between South Street and Walnut Street (State Route 38), only serves one direction and has a functional use different from a public road. Alleys provide access and service needs for the properties along them and are sometimes blocked temporarily. Opposing vehicles can't get around each other. School buses do not go beyond Conjunction Street.

The secondary need for the project is to eliminate two dead end waterline extensions with new pipe connections (A-10). Two existing waterlines dead end, one on South Street, and another at Delaware Street on the north side of Walnut Street.

## **ROAD HISTORY**

South Street is a local residential public road within the Town of Dayton. The town was platted in 1829. The two subdivisions on either side of South Street, Bush's 1<sup>st</sup> Addition, and Bush's 2<sup>nd</sup> Addition were platted in 1837 along with the public road.

## **EXISTING CONDITIONS**

### **Road**

South Street is a 2-lane asphalt road functionally classified as a local rural residential subdivision road. The road width is typically 18-feet widening to 19-feet in places with no shoulders. Paved parking areas for right-angle parking exist at the south side at the roads end. There is no curb or apparent drainage features. The road ends 675-feet east of Conjunction Street at a public alley between Walnut Street and South Street. Pavement condition is fair, with moderate longitudinal surface cracks occurring. Some cracks have been sealed from previous maintenance.

### **Study Area**

A 40-foot platted Right-of-Way (RW) continues east to the end of the subdivision. The RW serves as side yards for the residential properties. Three (3) mature trees fall within the middle portion of the RW. East of Bush's Subdivision, the area opens up to several acres of two (2) unimproved vacant property. The area stays open up to tree-lined Adams Road. A local Masonic Lodge is centered in a pocket on the south side of Walnut Street. The Norfolk and Southern Railroad runs east to west along the south side of the study area.

## Drainage

Hydrology and Hydraulic analysis was not included in the scope of work for the study. The resource for information provided is the Tippecanoe County GIS Topography layer found in Appendix A-2. On the existing road, storm water sheet flows from west to east on about a 2.5% grade. Once flow reaches the east side of the subdivision the terrain drops 30-feet over the next 700-feet or so, around a 4% drop.

About 650-feet east of where South Street ends, a natural ravine shaped swale catches the portion of storm water falling that way and directs it toward the railroad side ditch. The remaining run-off continues east until it enters the side ditch of Adams Road. The Adams Road side ditch flows southeast towards the railroad.

## Utilities

Utilities found serving the Town of Dayton covering the two project study areas include:

- Water & Sewer – Dayton Municipal Utilities
- Electric – Duke Energy
- Communication – Frontier Communication
- Telephone – Mulberry Cooperative Telephone Company
- Gas – Vectren

Utility maps for Dayton Municipal Utilities, Duke Energy and Frontier Communication showing the approximate location of their facilities are found in Appendix A-9 thru A-13. No information from the telephone or gas providers has been made available.

Frontier communication facilities exist on the north side of South Street ending at the west side of the alley. Duke Energy has facilities at the end of South Street and along the alley. Overhead lines exist along the north side of Walnut Street and the west side of Adams Road.

Water and sanitary sewer facilities exist within the existing roadway corridor. Water lines are shown outside the north pavement edge of South Street up to the alley and ends. Sanitary sewer continues east to where Delaware Street extended would align and then turns north to connect at Walnut Street.

## Preliminary Red Flag

A preliminary red flag investigation found minimal concerns. No hazardous material sites were found that could impact the project. Proposed improvements will avoid potential impacts (A-14). Project areas are outside FEMA mapped floodplains (A-15). A mapped wetland area may exist at the southeast corner of the study area near Adams Road. The Dayton Cemetery is located on the north side of Walnut Street (State Road 38) but should not be adversely impacted by any of the alternatives.

## Right-of-Way (RW)

RW research in the context of this study shows existing roadway falls within a 40-foot wide platted RW to the roads end at a public alley extending north. The platted 40-foot RW continues east approximately 90-feet to the east boundary of the Bush's Subdivision. East of the subdivision, the study area involves three (3) additional parcels. Immediately adjacent to Bush's Subdivision is a 3.58 acre R1 zoned unimproved parcel. An apparent easement exists for the sanitary sewer as it continues east from South Street and turns north to Walnut Street. Masonic Lodge is 1.12 acres midway between South Street and Adams Road along State Route 38. The last parcel is 2.75 acres zoned R3 up to and along Adams Road from State Route 38 to the railroad RW.

## DESIGN CRITERIA

With the unimproved properties in the study area zoned R1 and R3, new roads should follow the design criteria for a local residential subdivision road. Since the Town of Dayton is within the Urban Area Boundary (UAB) mapped for Tippecanoe County, an urban local residential road is applicable. For the purpose of this report, the Tippecanoe County Highway Department (TCHD) Rural Estates Local Subdivision Road Specifications, Unified Subdivision Ordinance (USO) of Tippecanoe County Area Plan Commission and INDOT Geometric Design Criteria for Urban Local Roads (New construction or Reconstruction) are included in Table 1 below showing minimum design criteria for new local subdivision roads.

Design Standards	Minimum Width of Right-of-Way(ft)	Minimum Pavement Width(ft)	Minimum Side Ditch Width(ft)	Minimum Shoulder Width(ft)	Maximum Grade	Minimum Radius of Curve(ft)	Minimum Length of Tangent(ft)	Minimum Sight Distance(ft)	Minimum Turn-around(ft)
New Construction									
TCHD Rural Estates Local Subdivision Road Specifications	52	20	12	4 (earth)	7.5%	100	100	200	76
USO Local Urban Subdivision Road Specifications	50	26	NA	NA	7.5%	100	100	200	76
INDOT New Local Urban Road	As Needed	22	As Needed	2 (useable)	10%	250	100	200	-
South Street Existing	40	18	-	2 (earth)	2.5%	No Curves	675	> 200	0

Table 1 Design Criteria Comparison

Comparing design criteria with existing conditions found the values highlighted in yellow not meeting minimum criteria in either of the design standard documents. These include having a minimum RW of only 40-feet and having only a minimum pavement width of 18-feet.

## ALTERNATIVE ANALYSIS

Table 1 minimum design criteria are used in evaluation of improvement alternatives. The two (2) alternatives being considered per the scope of work for this report include adding a cul-de-sac and extending the road to Adams Street. The applicable design criteria is the urban local residential subdivision road standard; however, this section does not fit within the existing 40-foot platted RW. A 20-foot rural estates local subdivision road section maintaining the character geometrics of the existing road is proposed for the 90-foot segment matching the characteristics of the subdivision.

A separate alternative in this report is an additional scope of work item to provide a cost estimate for a new water line connection between existing pipes on South Street extending east and turning north to the water line ending at Delaware Street.

### 1. SOUTH STREET EXTENSION ALTERNATIVES

#### **ALTERNATE 1.1: Cul-de-sac Dead End Roads (A-16)**

This alternative extends South Street 90-feet with a 20-foot wide asphalt pavement east to the end of the platted subdivision. A 38-foot radius cul-de-sac, able to accommodate a school bus turn-around, connects at the end of the extended street with a 2-foot aggregate shoulder around the perimeter. The pavement section includes 1.5-inches asphalt surface over 4.5-inches asphalt base over 12-inches for compacted aggregate base. Significant earthwork and grading is required due to the terrain dropping sharply in outer half of the proposed cul-de-sac.

No utility impacts are anticipated. A design must avoid impact to the existing sanitary sewer.

RW acquisition is necessary from one (1) parcel. The initial layout estimates 0.19 acres of additional RW. New RW is a minimum of 50-feet from the cul-de-sac center point.

#### **ALTERNATE 1.2: Extend South Street East to connect with Adams Road (A-16)**

This alternative provides the same 90-foot rural estates road section as in Alternative 1.1 to the end of Bush's Subdivision. The new road extension continues east to Adams Road meeting urban local residential subdivision road standards. TCHD urban local residential subdivision road criteria shown in Table 1 are applicable.

This 765-foot asphalt road extension is 25-feet wide with 2.5-foot roll curb on both sides. Storm water is collected in curb inlets in a closed storm water system with pipe outlets at the two outfall locations. Proposed RW width is 25-feet from centerline or 50-feet total. The pavement structural section is the same as noted in Alternate 1.1.

No utility impacts are expected with the understanding the road can be designed to avoid impacts to the existing sanitary sewer and Duke Energy overhead power along Adams Road.

RW acquisition is necessary from two (2) parcels. The initial layout estimates 0.89 acres of additional RW base on a new RW width set at a 50-foot minimum.

## 2. WATER MAIN LOOP CONNECTION

This alternative is independent of the other alternatives as it is unrelated to transportation and the existing road network. It provides a new water line connecting the existing water lines terminating at the end of Delaware Street and the other waterline ending at South Street. Existing water line pipe sizes have not been confirmed, but are assumed to be 8-inch diameter ductile iron pipe. Approximately 658-ft. of new pipe is estimated. Water valves are considered a contingency item. The waterline crossing Walnut Street (State Route 38) must be a trenchless installation as INDOT requires for a state highway crossing. A perpendicular crossing of the existing sanitary sewer line is necessary. The water line must be designed with proper sanitary sewer separation requirements.

Each alternative would necessitate a utility easement – one extending south from Delaware Street. In Alternative 1.1, the easement then turns west to align with the existing waterline on South Street extended east. The proposed easement ends at the new RW for the cul-de-sac. For Alternative 1.2, the waterline is proposed for the north side of the new road connection outside the roll curb but staying within acquired RW.

## COST ESTIMATE

The construction cost estimates consider major pay items and a contingency for other miscellaneous items. A summary of construction cost estimates are provided in Appendix A-19 thru A-21 and summarized in Table 2 below:

Item Description	Alternate 1.1 Cul-de-Sac	Alternate 1.2 Extension	Water Line Connection Standalone
Engineering	\$21,000	\$74,000	\$14,000
Right-of-way	\$8,000	\$24,000	\$6,000
Construction	\$125,000	\$376,000	\$89,000
Project Total	\$154,000	\$474,000	\$109,000

Table 2: Cost Estimate Summary

## RIGHT-OF-WAY SUMMARY

Proposed right-of-way requirements presented in this Preliminary Engineers Report are approximate, developed using limited information available at this stage. The more refined right-of-way limits generated from later phases may differ from the estimates presented at this time. Later phases of project development will establish precise right-of-way requirements.

RIGHT-OF-WAY SUMMARY					
Parcel Key #	Property Owner	Existing Parcel (acres)	Alternative 1.1 Cul-de-Sac	Alternative 1.2 Extension	Alternative 2 Water Line Connection
			Proposed RW (acres)	Proposed RW (acres)	Proposed Easement
154082000105	Gutwein Andrew T	3.58	0.19	0.60	15' X 520'
154082000248	Gutwein Andrew T	2.75	-	0.29	-

Table 3: Right-of-Way Summary

## CONCLUSIONS AND RECOMMENDATIONS

Alternative 1.1 – A cul-de-sac added to the end of the dead end road **does not fully satisfy the purpose** nor does it address all of the need. Though a new cul-de-sac would provide a means for a school bus and larger commercial vehicles to turn around, it does not provide public road connectivity. 2-way access is still limited from Conjunction Street.

Alternative 1.2 – A new South Street extension to Adams Street **satisfies the purpose** and addresses the need. A street connection to Adams Road would provide direct access to South Street and Bush’s Subdivision from the east. The connection would complete the South Street corridor from Dayton Road to Adams Street. The new road provides direct access to undeveloped property making sites nearly ready for development.

Only Alternative 1.2 satisfies the purpose and need as it provides both operational improvements and connectivity. It would be **recommended** if only to satisfy a purpose and need. The impact to the R1 zoned property could be considered severe and costly if not designed to maximize land use. The same is true when cutting through the R3 zoned parcel.

Other relevant factors to consider include:

- For Alternative 1.1, extending South Street 90-feet with permanent improvements and installing a temporary cul-de-sac with aggregate materials. A temporary easement until a land use change in lieu of acquiring new RW for a cul-de-sac appears favorable to both owner and town. This cost savings improvement achieves the partial purpose of providing the functional

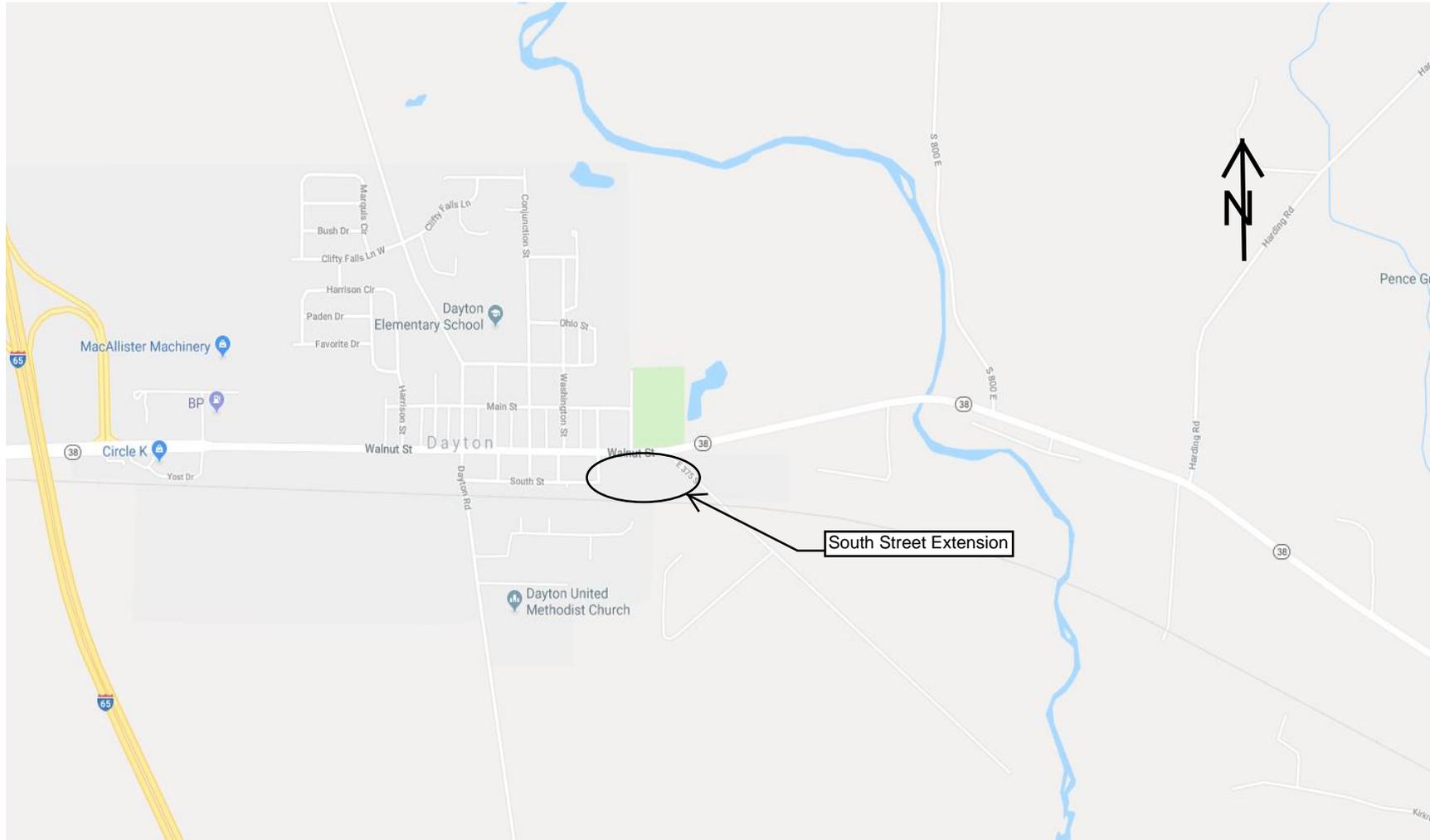
capabilities of a school bus turning around. Future development opportunities are enhanced with the permanent road connection constructed to the property line.

- For Alternate 1.1, by adding the 90-foot extension and cul-de-sac to the length of South Adams Street from Constitution Street is still within the maximum 800-feet allowed for a cul-de-sac per USO Standards.
- Having a public alley available for access, emergency responders still have two (2) access points available when responding.
- Building the road with public funds will require purchasing right-of-way. RW becomes public along with the road for a platted subdivision developed by others.
- A developer driven road connection allows for a design that maximizes land-use while incorporating regulated drainage requirements.
- The developer bears the cost of new roads within a proposed development along with access improvements that are designed and built to required standards before it can be accepted as a public road.
- Local Government decides what typical road section standards to follow when financing a new public road. For Alternate 1.2, an option to only construct a rural estates local subdivision street could save up to 40% of the estimated cost for the alternative.



Submitted by : Mark A Albers Date: 9/10/2018

Mark A. Albers, P.E., Sr. Project Manager  
VS Engineering, Inc.



Vicinity Map



South Street Topographic Map



Picture 1: On South Street West of Alley Looking East



Picture 2: On South Street at Alley Looking North



Picture 3: On South Street at Alley Looking East



Picture 4: West End of South Street Looking East



Picture 5: West End of Study Area Looking South



Picture 6: West End of Study Area Looking North



Picture 7: Near West End of Study Area Looking West



Picture 8: Southeast Corner of Study Area Looking Westerly



Picture 9: Southeast Corner of Study Area Looking Northerly



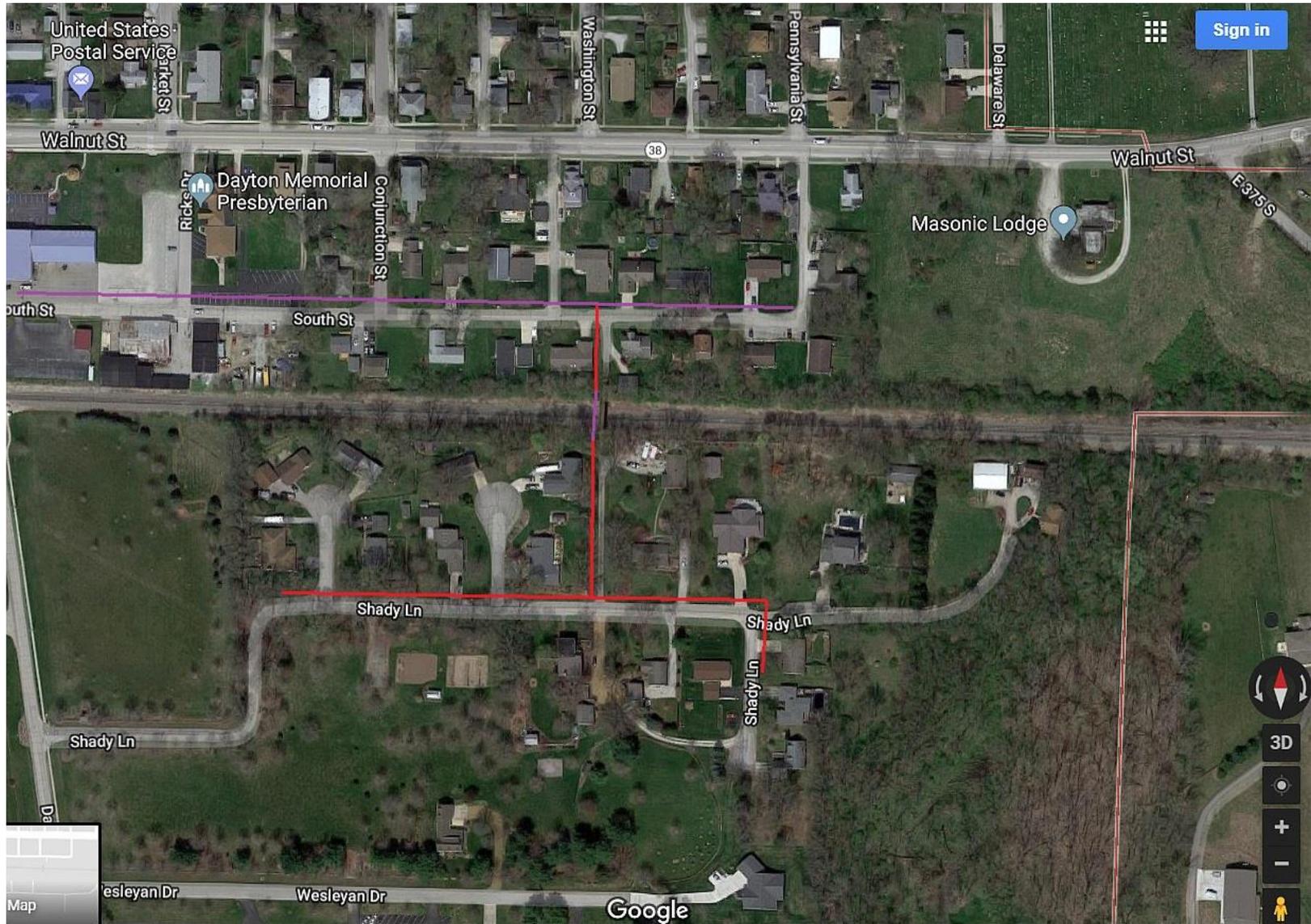
Picture 10: East End of Study Area at Adams Street Looking towards Walnut Street



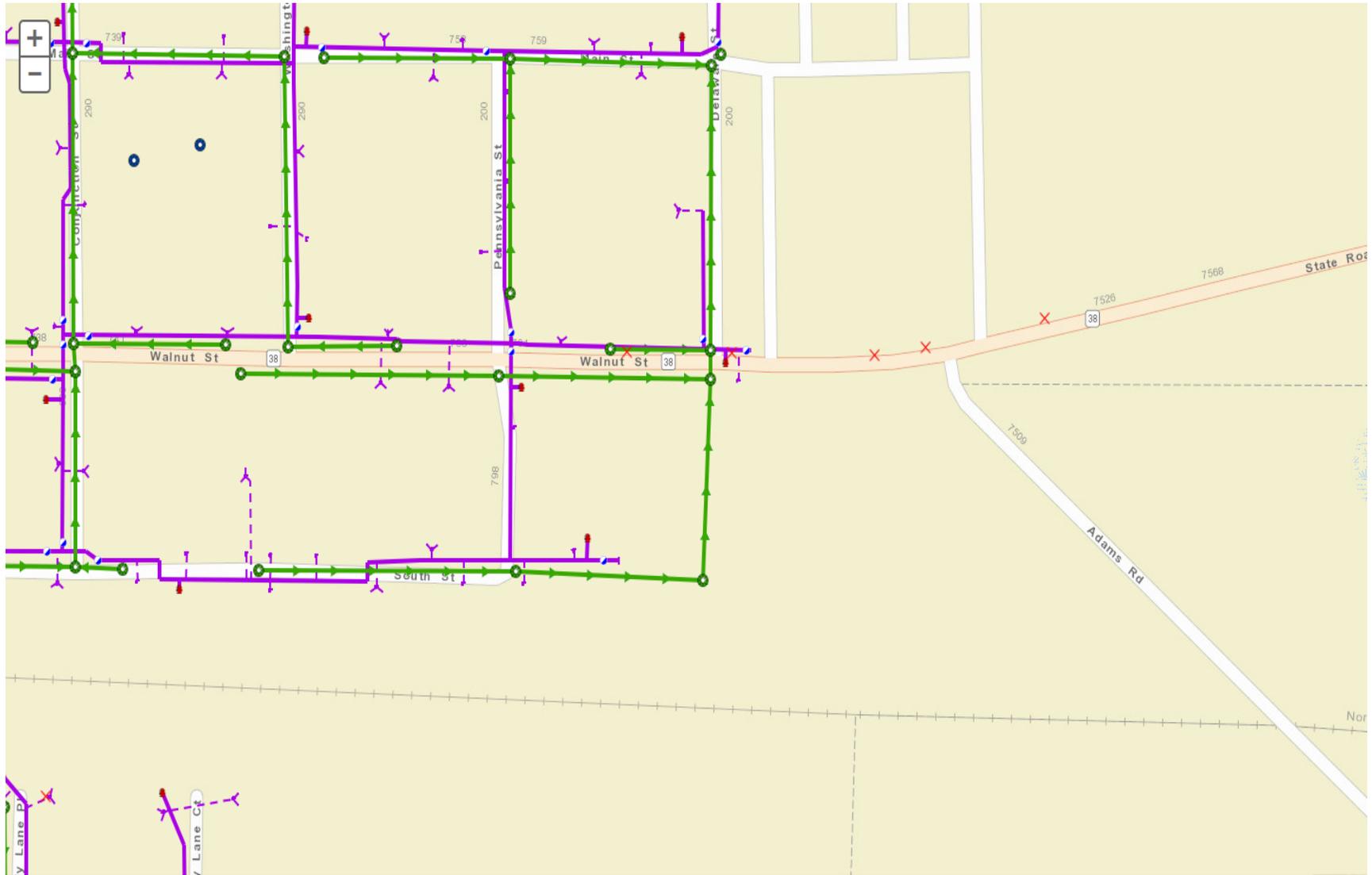
Picture 11: At Walnut Street Looking North towards Delaware Street



Picture 12: At Walnut Street Across from Delaware Street Looking South



South Street Frontier Communication Utilities



South Street Water and Sewer Map

Legend

**Sanitary Manhole**



**Sanitary Pipe**



**Sanitary Flow Arrows**

Sanitary Pipe Arrows



**Water Main**



**Water Svc Lateral**





Date: July 2, 2018

Duke Energy NOI Response Form

A. INDOT/LPA Project Information

- (1) Des No. NA
- (2) Route Number: Shady Lane
- (3) Location: Shady Lane to Wesleyan Drive, Shady Lane to Dayton Road and South Street to Adams Road., Dayton, IN
- (4) Work Type: Road Reconstruction

B. Utility Designated Contact - Information

- (1) Primary contact person: Connie Maus
- (2) Office telephone: 765-454-6180
- (3) Email address: [connie.maus@duke-energy.com](mailto:connie.maus@duke-energy.com)
- (4) Secondary contact person: Cindy Rowland
- (5) Office telephone: 317-776-5341
- (6) Email address: [cindy.rowland@duke-energy.com](mailto:cindy.rowland@duke-energy.com)
- (7) Agency name: Duke Energy
- (8) Address: 1619 W Deffenbaugh Street
- (9) City, State, Zip Code: Kokomo, IN 46902

C. By signing here, the Utility has determined to the best of their ability that they do not have facilities within the project area:

\_\_\_\_\_ : \_\_\_\_\_

D. By signing here, the Utility has determined to the best of their ability that they have facilities within the project area and the facilities are not in conflict with the project based upon the plans received on:

\_\_\_\_\_ : \_\_\_\_\_

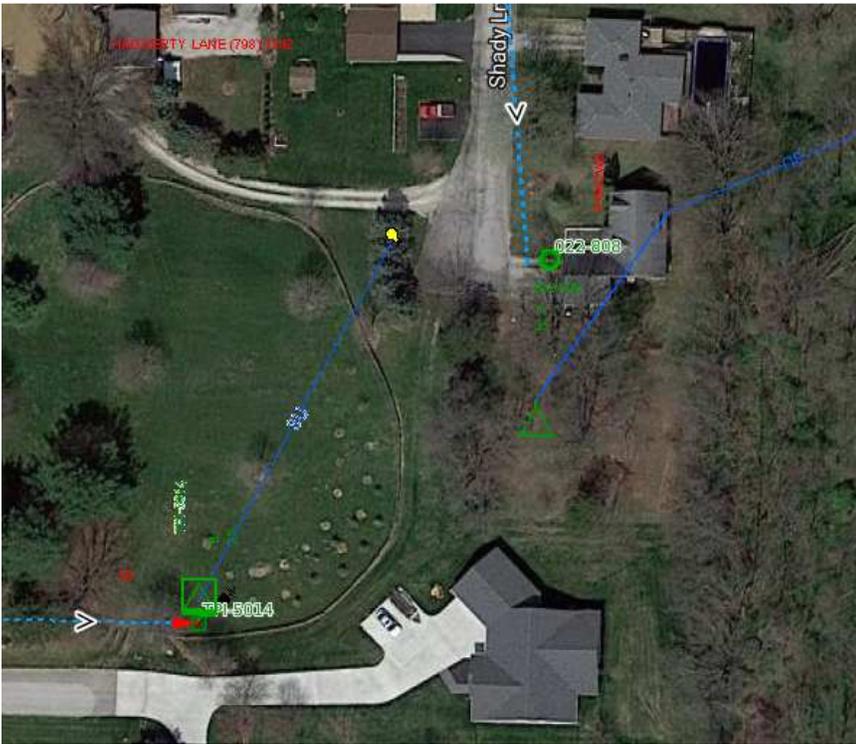
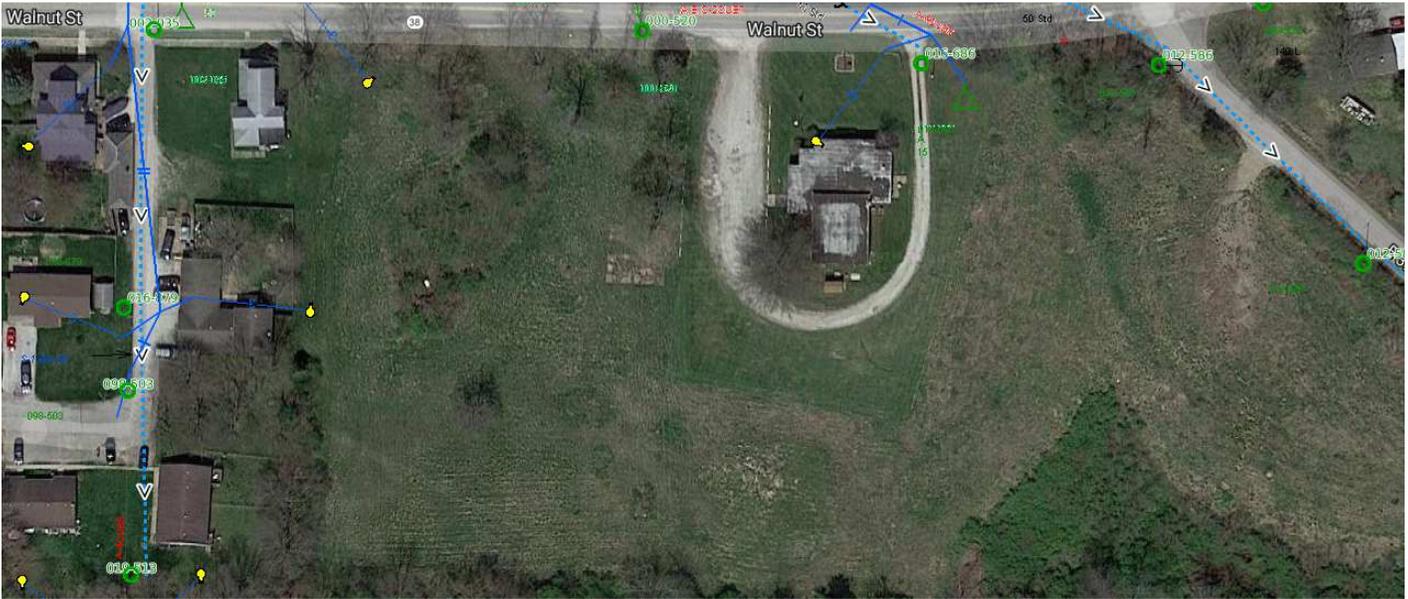
E. By signing here, the Utility has determined to the best of their ability that they have facilities within the project area and the facilities are in conflict with the project based upon the plans received on:

7/2/2018 : Frank Hancock

F. Project Notes:

Duke Energy does have OH facilities within the project limits. See the attach map of the area.

Attach EGIS Screenshot here:



Please note the above referenced drawing is not to scale and the equipment shown has not been field verified for accuracy. This is only to be used for ensuring locates and surveys are more accurate during the Conflict Analysis / Verification of Facilities phase.



"Notable" Italianate house  
IHSSI # 157-612-47008

potential emergent wetland  
area identified by NWI mapping.





South Street Flood Plain Map

ROW Area: 0.19 acres

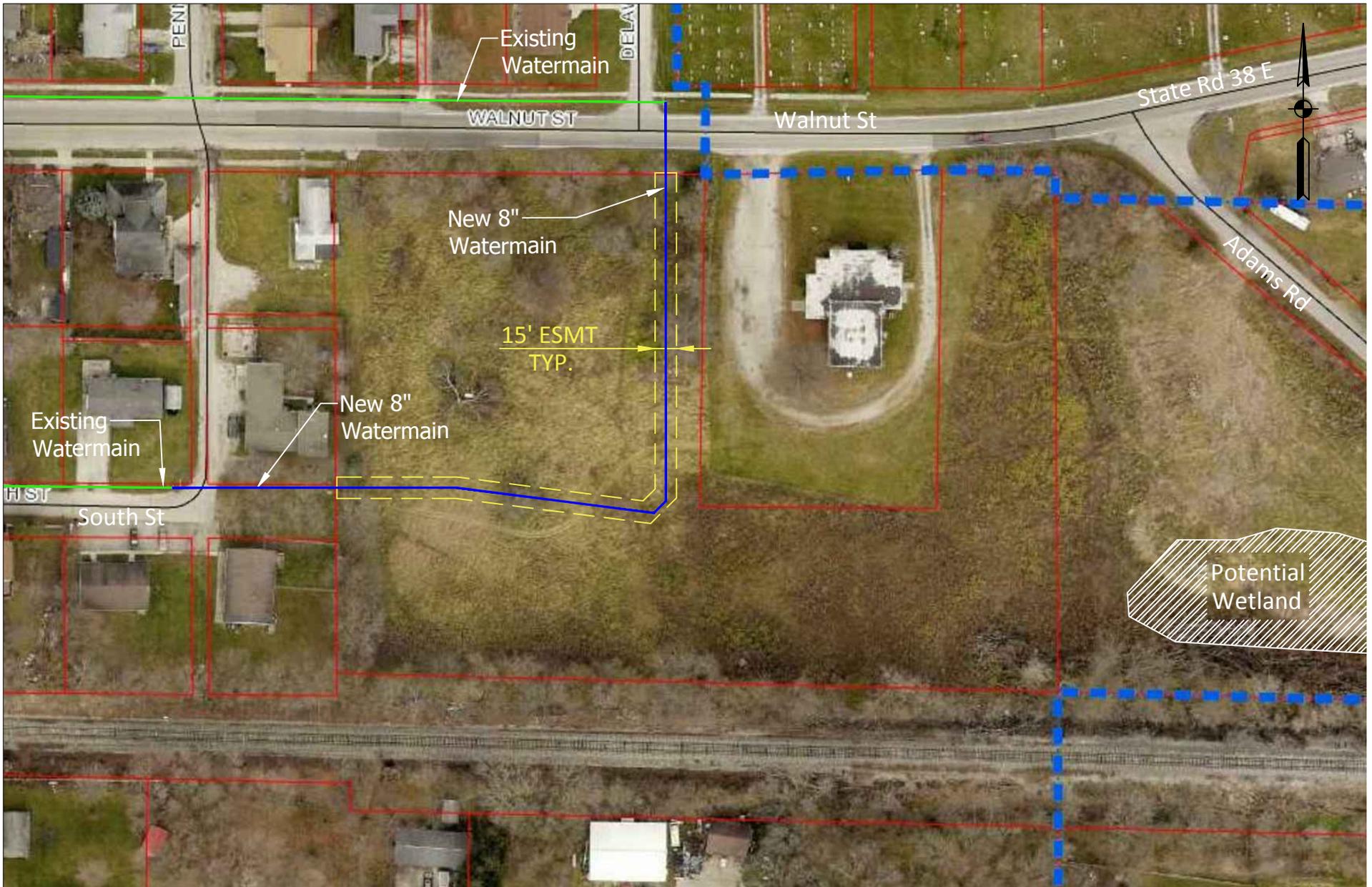
Pavement Area: 848 SYS



Typical Cross-Section  
Alternative 1.1



Proposed Waterline: 658'



Waterline Only  
Alternative 2

**QUANTITY SUMMARY SHEET**

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	Unit Price	Ext.
105-06845	CONSTRUCTION ENGINEERING	1	LS	\$3,000.00	\$3,000.00
110-01001	MOBILIZATION AND DEMOBILIZATION	1	LS	\$1,400.00	\$1,400.00
201-52370	CLEARING RIGHT OF WAY	1	LS	\$2,500.00	\$2,500.00
203-02000	EXCAVATION, COMMON	667	CYS	\$46.00	\$30,682.00
203-02070	BORROW	1,260	CYS	\$1.00	\$1,260.00
207-08262	SUBGRADE TREATMENT, TYPE I	800	SYS	\$6.00	\$4,800.00
303-01180	COMPACTED AGGREGATE NO. 53	589	TON	\$23.00	\$13,547.00
306-08034	MILLING, ASPHALT, 1 1/2 IN.	48	SYS	\$1.50	\$72.00
610-07487	HMA FOR APPROACHES, TYPE B	268	TON	\$175.00	\$46,900.00
801-06775	MAINTAINING TRAFFIC	1	LS	\$500.00	\$500.00

Subtotal:	\$104,000.00
Contingency(20%):	\$21,000.00
Total:	<b>\$125,000.00</b>

**QUANTITY SUMMARY SHEET**

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	Unit Price	Ext.
105-06845	CONSTRUCTION ENGINEERING	1	LS	\$4,500.00	\$4,500.00
110-01001	MOBILIZATION AND DEMOBILIZATION	1	LS	\$10,000.00	\$10,000.00
201-52370	CLEARING RIGHT OF WAY	1	LS	\$5,000.00	\$5,000.00
203-02000	EXCAVATION, COMMON	2,069	CYS	\$46.00	\$95,174.00
203-02070	BORROW	950	CYS	\$1.00	\$950.00
207-08262	SUBGRADE TREATMENT, TYPE I	2,480	SYS	\$6.00	\$14,880.00
303-01180	COMPACTED AGGREGATE NO. 53	1,781	TON	\$23.00	\$40,963.00
306-08034	MILLING, ASPHALT, 1 1/2 IN.	48	SYS	\$1.50	\$72.00
401-07345	QC/QA-HMA, 2, 70, SURFACE, 12.5 mm	193	TON	\$78.00	\$15,054.00
401-07427	QC/QA-HMA, 2, 70, BASE, 19.0 mm	580	TON	\$65.00	\$37,700.00
605-97937	CURB AND GUTTER, ROLL CURB	1,580	LFT	\$20.00	\$31,600.00
610-07487	HMA FOR APPROACHES, TYPE B	49	TON	\$150.00	\$7,350.00
801-06775	MAINTAINING TRAFFIC	1	LS	\$500.00	\$500.00
720-XXXXX	URBAN DRAINAGE FEATUES - INLETS, MANHOLES, CATCH BASINS, PIPE, CULVERTS	1	LS	\$49,748.60	\$49,748.60

Subtotal:	\$313,000.00
Contingency(20%):	\$63,000.00
Total:	<b>\$376,000.00</b>

**QUANTITY SUMMARY SHEET**

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	Unit Price	Ext.
105-06845	CONSTRUCTION ENGINEERING	1	LS	\$1,200.00	\$1,200.00
110-01001	MOBILIZATION AND DEMOBILIZATION	1	LS	\$3,000.00	\$3,000.00
304-07490	HMA PATCHING, TYPE B	1	TON	\$600.00	\$600.00
715-11571	WATER MAIN, DUCTILE IRON, 8 IN.	658	LFT	\$100.00	\$65,800.00
716-09129	PIPE INSTALLATION, TRENCHLESS, 8 IN.	48	LFT	\$140.00	\$6,720.00
801-06775	MAINTAINING TRAFFIC	1	LS	\$750.00	\$750.00

Subtotal: \$77,000.00  
 Contingency(15%): \$12,000.00

Total: **\$89,000.00**