

# Appendix F:

## Water Resources

**Waters Report**  
**SR 47 Road Reconstruction & Mule Barn Road Realignment**  
**SR 47 & SR 38 Roundabout**  
**Hamilton County, Indiana**  
**INDOT Designation Number 1601982 & 2000816**



***Prepared for:***  
Indiana Department of Transportation

***Prepared by:***  
Michael Baker International  
3815 River Crossing Parkway, Suite 20  
Indianapolis, Indiana 46240

September 2, 2021

**WATERS REPORT**  
**SR 47 Road Reconstruction & Mule Barn Road Realignment**  
**SR 47 & SR 38 Roundabout**  
**Hamilton County, Indiana**  
**INDOT Designation Number 1601982 & 2000816**

Prepared by: Laura Jack, Environmental Scientist  
Contact Information: [laura.jack@mbakerintl.com](mailto:laura.jack@mbakerintl.com), 312-575-3902  
Michael Baker International  
September 2, 2021

## **I: Project Information**

### **Fieldwork Dates:**

Fieldwork for this report was conducted on October 6, 2020 by Michael Baker International (Michael Baker).

### **Contributors:**

Laura Jack, Environmental Scientist

### **Project Location:**

SR 47, Mule Barn Road, and SR 38  
Section 5 and 6, T19N, R3E & Section 31 and 32, Township 20N, R3E  
From the Boone/Hamilton County Line (N CR 1200 E) to SR 38  
USGS Sheridan Quadrangle  
Hamilton County, Indiana  
Latitude/Longitude: 40.129765, -86.224105

### **Project Description:**

The proposed state project is located on SR 47, from the Boone/Hamilton County line on N County Road (CR) 1200 E to SR 38 in Sheridan, Hamilton County, Indiana. The project includes the SR 47 road reconstruction and Mule Barn Road realignment, and SR 47 & SR 38 roundabout. The project includes a mill and overlay with patching along with a 3-foot widening from the Boone/Hamilton County line to 0.52 miles east on SR 47 (just west of what is referred to as the Sheridan Mall). A full reconstruction with curb and gutter will be conducted from the Sheridan Mall to SR 38. Mule Barn Road will be realigned approximately 600 feet to align with California Street. A roundabout is proposed at the intersection of SR 47 and SR 38 along with an enclosed drainage system throughout.

## **II: Office Evaluation**

### **Methodology:**

A desktop review of the study area was conducted to identify potential waters of the US and waters of the State (streams, wetlands, ponds, etc.). This included a review of historic and recent aerial photography for any areas with a water signature or a sharp change in vegetation. Any such areas were flagged for follow-up in the field. United States Geological Survey (USGS) topographic mapping, National Wetlands Inventory (NWI) mapping and Natural Resources Conservation Service (NRCS) mapped soil units were also reviewed.

### **USGS Mapping:**

The USGS 7.5-minute series Sheridan Quadrangle topographic map was reviewed, which identified two perennial (solid blue-lines) and one intermittent (dashed blue-line) stream within the study area (pgs. A1 & A5). One blue-line perennial stream is identified as Eagle Creek.

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### **NWI and Floodplain Mapping:**

During a review of the NWI dataset, one NWI wetland area was identified within the study area. This wetland is classified as palustrine forested broad-leaved deciduous temporary flooded (PFO1A). One riverine area labeled Eagle Creek was identified on the NWI mapping and classified as riverine unknown perennial unconsolidated bottom permanently flooded (R5UBH). The National Hydrography Dataset (NHD) located six water resources within the study area (pg. A9).

The Digital Flood Insurance Rate Map (DFIRM) did not identify the project area within the 100-year floodplain (pg. A6).

The Indiana HUC Finder (<https://www.in.gov/idem/cleanwater/pages/huc/>) was used to determine that the project is located on the line of two watersheds, the Eagle Creek watershed (HUC 12-digit 051202011101) and the Teter Branch-Little Cicero Creek watershed (HUC 12-digit 051202010607).

### **Mapped Soil Units:**

NRCS classifies soil types as follows: hydric (100%), predominantly hydric (66-99%), partially hydric (33-65%), predominantly non-hydric (1-32%), and not hydric (0%). According to the Soil Survey Geographic (SSURGO) database for Hamilton County, Indiana, there are three mapped nationally listed hydric soils located within the study area (pg. A7). Table 1 identifies the mapped soils and hydric ratings.

**Table 1- Mapped Soils**

Map Abbreviation	Soil Name	Hydric Rating	Hydric
Br	Brookston Silty Clay Loam, 0 to 2 percent slopes	95%	Yes
CrA	Crosby Silt Loam, fine-loamy subsoil, 0 to 2 percent slopes	2%	Yes
Pn	Patton Silty Clay Loam, 0 to 2 percent slopes	90%	Yes

## **III: Field Reconnaissance**

### **Methodology:**

Michael Baker conducted a field investigation on October 6, 2020, to determine the presence of streams, wetlands, and other water resources within the study area. The entire study area, as well as the immediate surroundings, were reviewed for resources via a walking survey. All areas flagged during desktop analysis were reviewed and documented. When observed, features located adjacent to, but outside of, the study area were noted. A resource map showing all identified features is attached for reference (pg. A10).

Photographs were taken throughout the study area, and specifically for each feature identified. A photo-key orientation map and selected photographs are included within this report for reference (pgs. B1-B5).

The ordinary high-water marks (OHWMs) of any identified streams were obtained using a measuring tape. A hand-held Global Positioning System (GPS) unit (Trimble Geoexplorer 7000 Series) was used to map these resources.

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If wetlands were identified, vegetation, soil, and hydrology data were collected using the methods described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (USACE 2010). Wetland indicator statuses for plants were obtained from *The National Wetland Plant List* (Lichvar 2016). When present, data forms for each wetland were prepared, and a visual assessment of each wetland's quality and function was conducted. A hand-held GPS unit (Trimble Geoplotter 7000 Series) was used to map the boundary of any identified wetlands, as well as the locations of any data points, recorded. If wetlands were not present, data points were recorded documenting upland areas.

### **Streams:**

A field investigation on October 6, 2020 resulted in the identification of two jurisdictional streams totaling approximately 51.5 linear feet within the study area. These features are summarized in the Stream Resources Table (Table 2). No other features exhibiting an OHWM were observed within the study area. No waterways are listed on the Federal Wild and Scenic River, State Natural, and Recreation River, or on the Indiana Register's Listing of Outstanding Rivers and Streams, nor are any located within two miles of any such resources.

#### **UNT to Eagle Creek**

UNT to Eagle Creek, identified on the USGS NHD map, was identified in the field west of the Sheridan Mall. UNT to Eagle Creek is an intermittent dashed stream within the study area according to the USGS topographic map and is not classified on the NWI map. UNT to Eagle Creek is approximately 24.2 linear feet within the study area and has an average OHWM of 8 feet wide and a depth of less than 1 inch. The stream substrate was vegetated and silt. The riparian land included maintained/mowed upland grass. The quality would be considered poor because it has no riffles and pools or canopy cover. UNT to Eagle Creek flows south then east into Eagle Creek approximately 0.52 miles from the study area. UNT to Eagle Creek is likely a jurisdictional waterway.

Per the USGS StreamStats online application (<https://water.usgs.gov/osw/streamstats/Indiana.html>), UNT to Eagle Creek has an upstream drainage area of approximately 0.056 square miles at the study area location (pg. A11).

#### **Eagle Creek**

Eagle Creek, identified on the USGS NHD and NWI maps, was identified in the field east of the Sheridan Mall. Eagle Creek is identified as a blue-line perennial stream on the USGS topographic map and classified as R5UBH on the NWI map. Eagle Creek is approximately 27.3 feet within the study area and has an average OHWM of 8 feet wide and a depth of 6 inches. The stream substrate was gravel. The riparian corridor consists of mowed upland grass. The quality would be considered poor because it has no riffles and pools and no canopy cover. Eagle Creek flows south. Eagle Creek is likely a jurisdictional waterway.

Per the USGS StreamStats online application (<https://water.usgs.gov/osw/streamstats/Indiana.html>), Eagle Creek has an upstream drainage area of approximately 0.365 square miles at the study area location (pg. A14).

**Table 2- Stream Resources**

Water Feature Name	Photos	Lat/Long	Average OHWM Width and Depth	USGS Blue-line?	USGS Blue-Line Type	Riffles? Pools?	Quality	Substrate	Likely Water of the US
UNT to Eagle Creek	8,9,10	40.129651/ -86.232290	8 ft. wide <1 in. deep	Yes	Intermittent	No	Poor	Vegetated /Silt	Yes
Eagle Creek	11,12	40.129622/ -86.228002	8 ft. wide 6 in. deep	Yes	Perennial	No	Poor	Gravel	Yes

**Wetlands:**

Michael Baker investigated for the presence of wetlands on October 6, 2020. Sampling locations were determined using wetland vegetation, visual indications of hydrology, and NRCS hydric soil mapping. Data points were taken at two locations and data sheets are attached (pgs. C1-C4). Data points collected during the field reconnaissance are summarized in Table 3. One wetland was identified within the study area (Table 4).

**Table 3 - Data Point Summary Table**

Data Point	Vegetation	Soils	Hydrology	Wetland
W-DP1	Yes	Yes	Yes	Yes
Upl-DP2	No	No	No	No

**Wetland 1**

Wetland 1 is located south of SR 47. Wetland 1 was identified as a PFO1A on the NWI map. Wetland 1 is a forested wetland that is approximately 0.42 acres. One data point, W-DP1, was taken within Wetland 1 (pgs. C1-C2). The dominant vegetation at W-DP1 was cattails (*Typha angustifolia*). The soil was identified as 0-6 inches 10YR 2/1 clay and 6-18 inches 10YR 4/1 silty clay with 5% 10YR 6/6 redox which meets the hydric soil indicators Depleted Below Dark Surface (A11) and Depleted Matrix (F3). Hydrology was present with saturation (A3). Wetland 1 would be classified as average quality within the study area because there was a diverse plant community however it is also disturbed near the roadway. Wetland 1 extends south outside of the study area. Wetland 1 would likely be a jurisdictional wetland because it directly abuts to UNT to Eagle Creek outside of the study area limits approximately 254 feet south of SR 47. One data point, Upl-DP2 was taken outside of Wetland 1. The dominant vegetation at Upl-DP2 was Kentucky bluegrass (*Poa pratensis*) and white clover (*Trifolium repens*). The soil was identified as 0-10 inches 10YR 3/3 loam with a restrictive layer of rocks/gravel at 10 inches. There was no wetland hydrology present. No wetland indicators were identified at Upl-DP2.

**Table 4 - Wetland Summary Table**

Wetland Name	Photos	Lat/Long	Type	Total Area (acres)	Quality	Likely Water of the US
Wetland 1	1,2,3,4,6,7	40.129627/ -86.234141	Forested	0.42	Average	Yes

#### **IV: Conclusions**

Based on the field investigation of October 6, 2020, the study area contains two waterways, UNT to Eagle Creek and Eagle Creek, totaling 51.5 linear feet. These waterways are all likely Waters of the U.S. that would fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE). One wetland, Wetland 1, approximately 0.42 acres was identified within the study area and is likely a Waters of the U.S. No other likely waters of the US or waters of the State were identified.

Every effort should be taken to avoid and minimize impacts to these waterways. If impacts are necessary, then mitigation may be required. The INDOT Environmental Services Division should be contacted immediately if impacts will occur. The final determination of jurisdictional waters is ultimately made by the USACE. This report is our best judgment based on the guidelines set forth by the Corps.

A preliminary jurisdictional determination (pre-JD) form is attached to the end of this report (pgs. D1-D3).

#### **V: Acknowledgement**

This waters determination has been prepared based on the best available information, interpreted in the light of the investigator's training, experience and professional judgement in conformance with the 1987 *Corps of Engineers Wetlands Delineation Manual*, the appropriate regional supplement, the USACE *Jurisdictional Determination Form Instructional Guidebook*, and other appropriate agency guidelines.



Laura Jack  
Environmental Scientist  
Michael Baker International

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## **VI: References**

Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 Wetland Ratings*. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

U. S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Environmental Laboratories. 1987. *Corps of Engineers Wetland Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterway Experiment Station, Vicksburg, Mississippi.

USDA, NRCS. 2017. The PLANTS Database (<http://plants.usda.gov>, 4 December 2017). National Plant Data Team, Greensboro, NC 27401-4901 USA.

## **VII: Supporting Documentation**

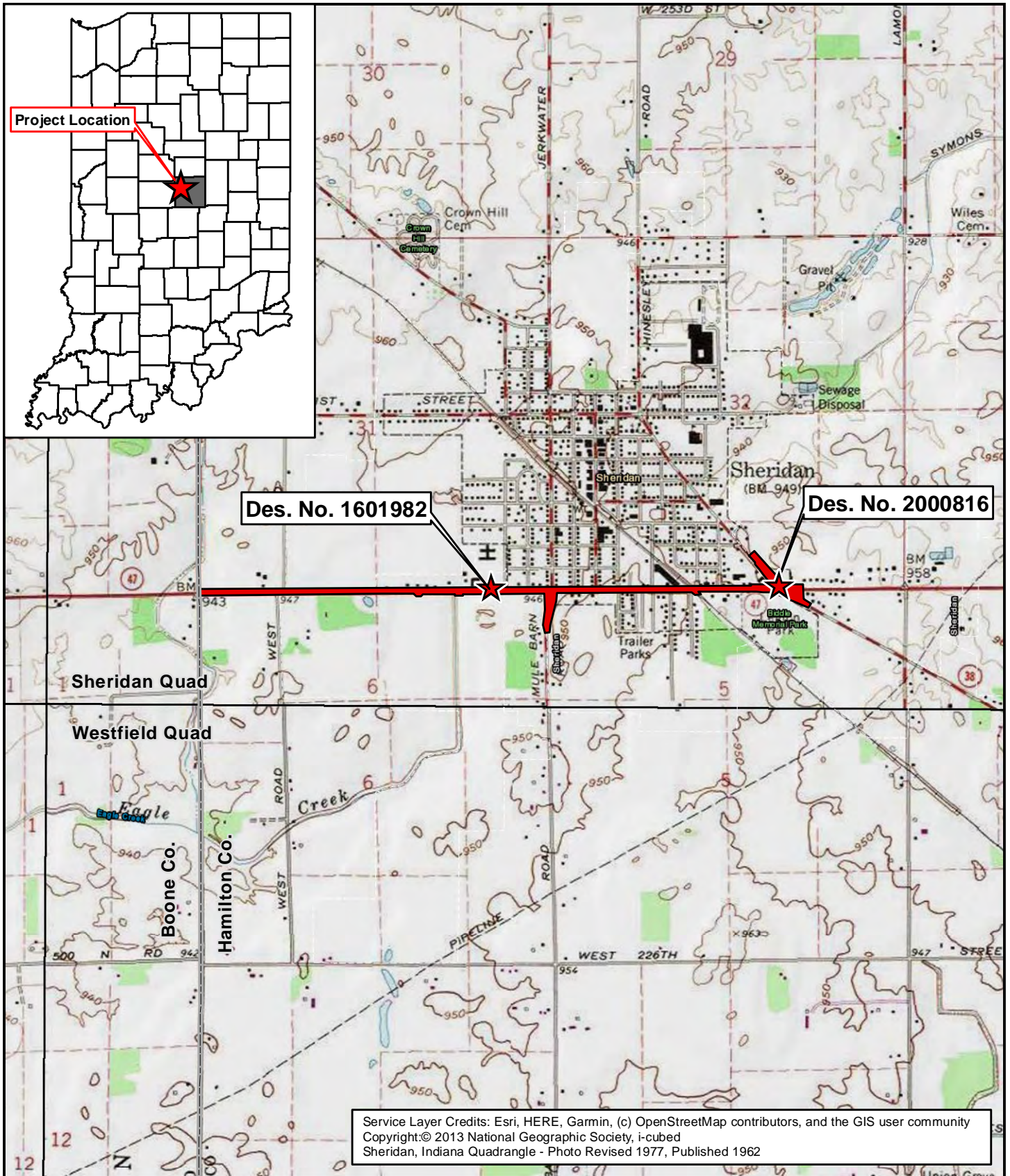
Exhibits A1-A18

Photo Location Map and Photographs B1-B5

Wetland Determination Data Forms C1-C4

Preliminary JD Form D1-D3





Project Location

Des. No. 1601982

Des. No. 2000816


Sheridan Quad

Westfield Quad


Boone Co.  
Hamilton Co.

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community  
 Copyright © 2013 National Geographic Society, i-cubed  
 Sheridan, Indiana Quadrangle - Photo Revised 1977, Published 1962

**Legend**

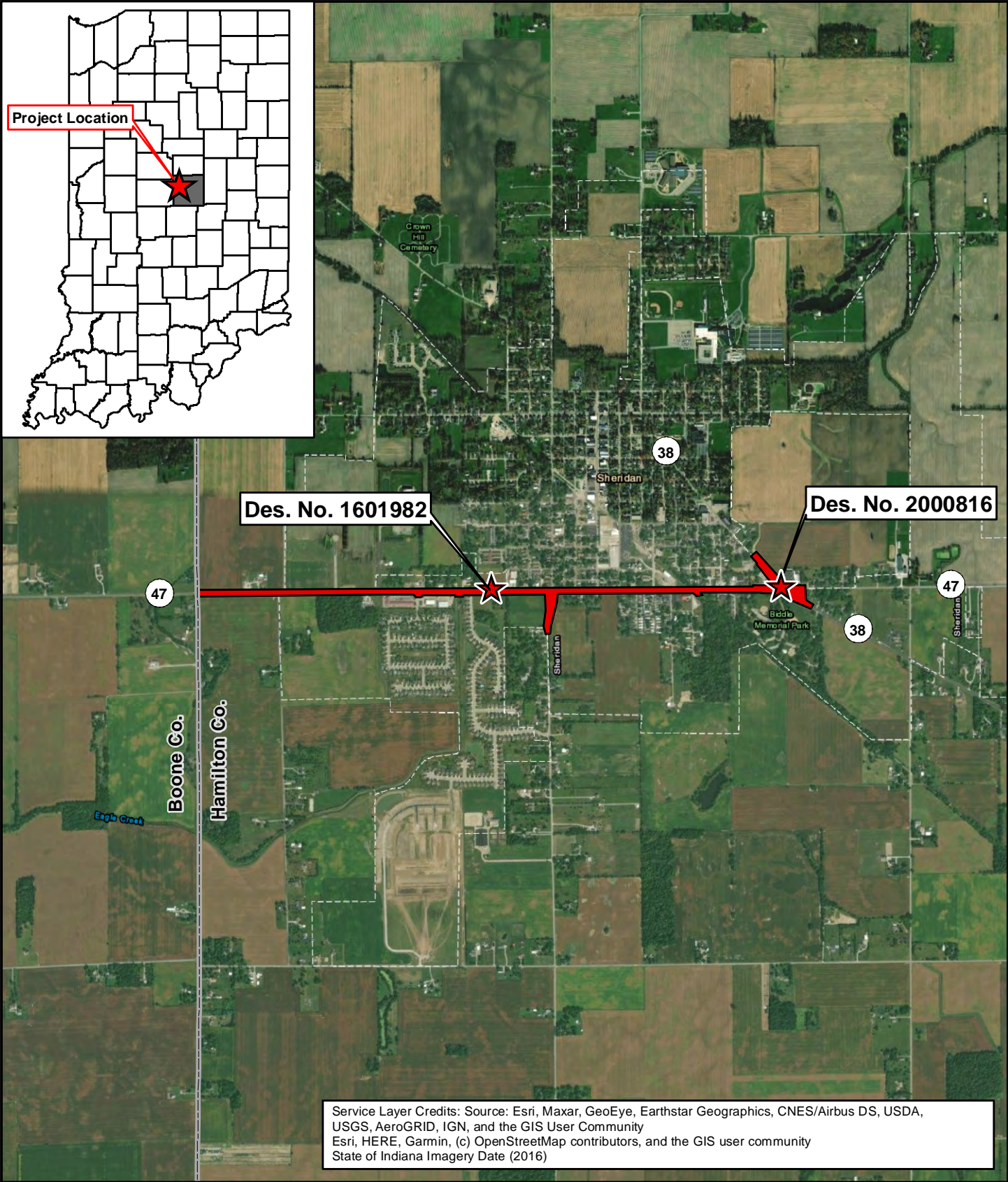
 Study Area

 Project Location

0 1,000 2,000  
 Feet



**SR 47 Roadway Reconstruction &  
 Mule Barn Rd. (DES. No. 1601982)  
 SR 47 & SR 38 Roundabout (DES. No. 2000816)  
 Hamilton County, Indiana  
 USGS Project Location Map**



Project Location

Des. No. 1601982

Des. No. 2000816

47

38

38

47

Eagle Creek

Boone Co.

Hamilton Co.

Sheridan


Sheridan

Biddle Memorial Park


Sheridan

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community  
 State of Indiana Imagery Date (2016)

**Legend**

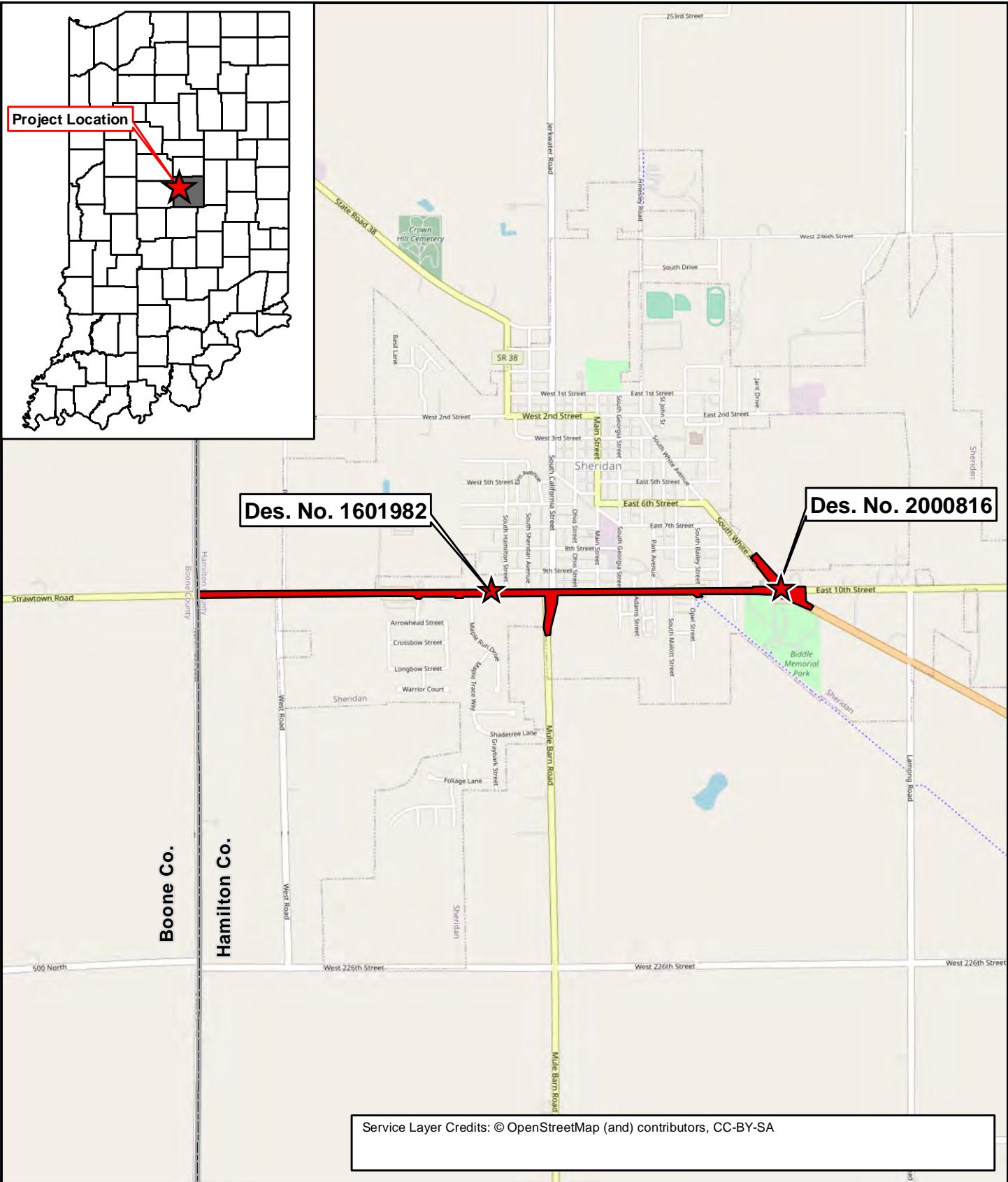
 Study Area

 Project Location

0 1,000 2,000  
 Feet



**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
 Hamilton County, Indiana  
**Aerial Project Location Map**




Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

**Legend**

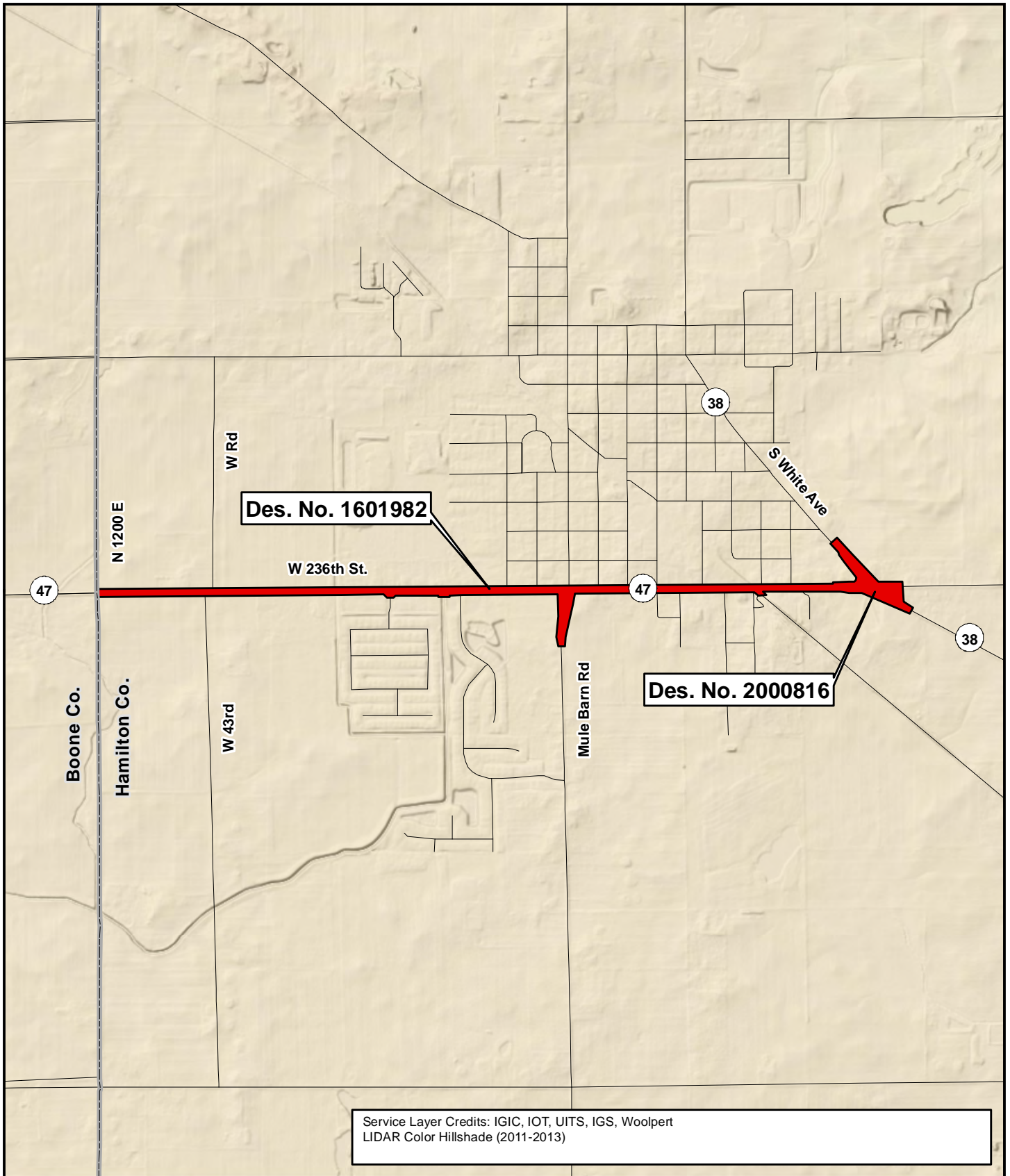
 Study Area

 Project Location

0 1,000 2,000  
 Feet



**SR 77 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)  
 SR 77 & SR 38 Roundabout (DES. No. 2000816)  
 Hamilton County, Indiana  
 Project Location Map**



**Legend**

**LiDAR Color Hillshade (2011-2013)**  Study Area

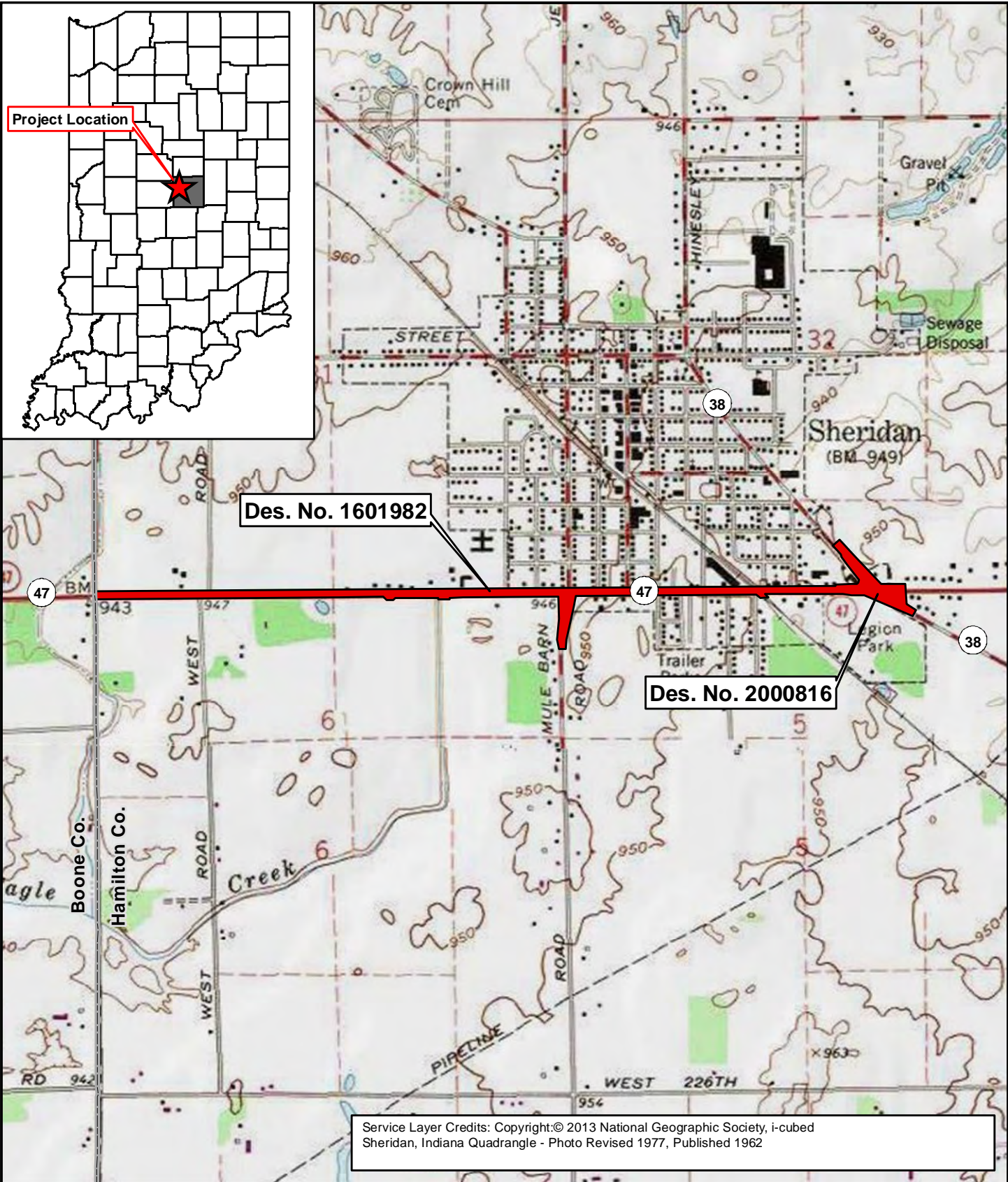
	High : 1256
	Low : 247

0 600 1,200 1,800

Feet

N

**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
 Hamilton County, Indiana  
**LIDAR Color Hillshade**



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 Sheridan, Indiana Quadrangle - Photo Revised 1977, Published 1962

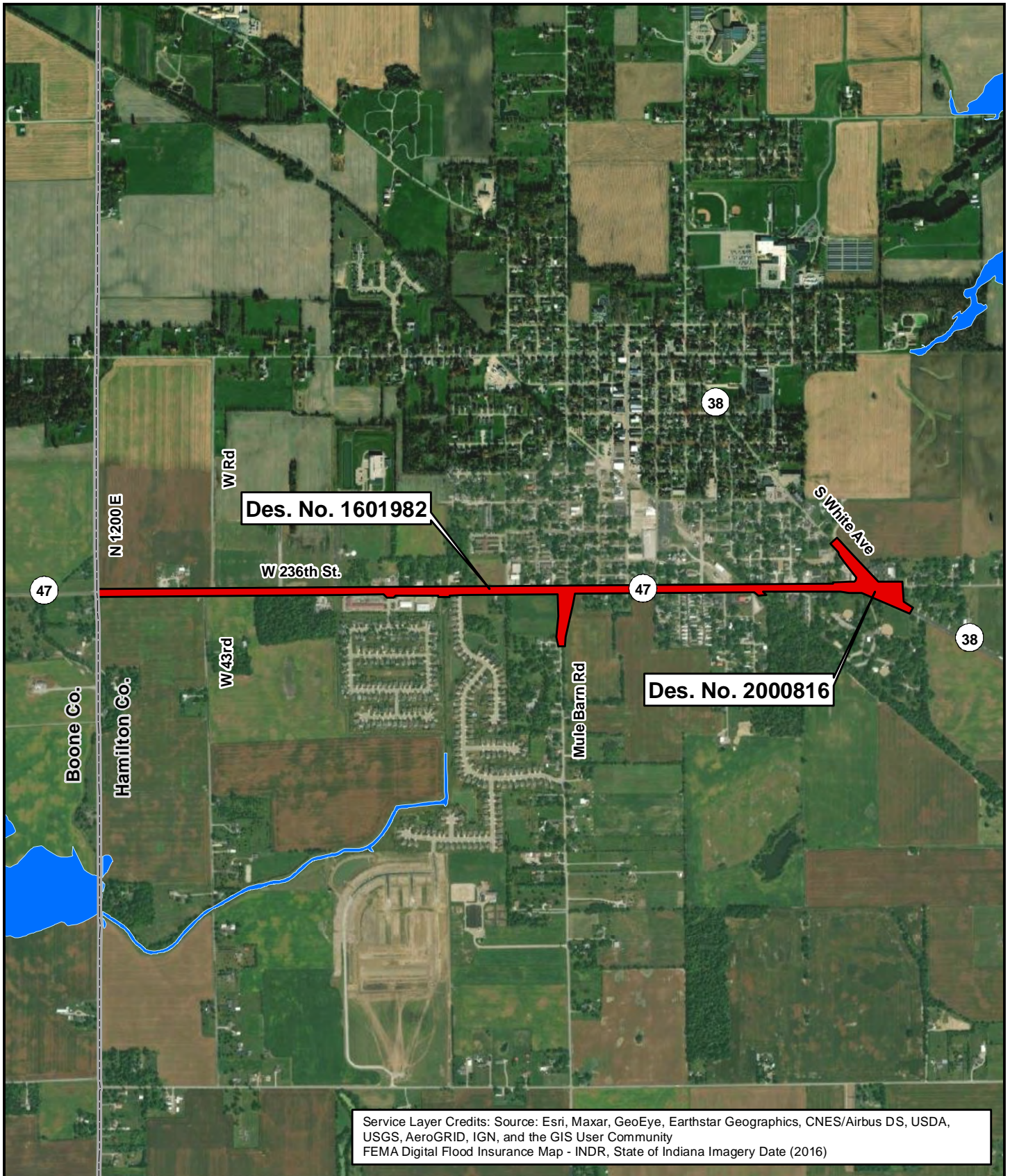
**Legend**

 Study Area

0 600 1,200 1,800  
 Feet



**SR 47 Roadway Reconstruction &  
 Mule Barn Rd. (DES. No. 1601982)  
 SR 47 & SR 38 Roundabout (DES No. 2000816)  
 Hamilton County, Indiana  
 USGS Study Area Map**

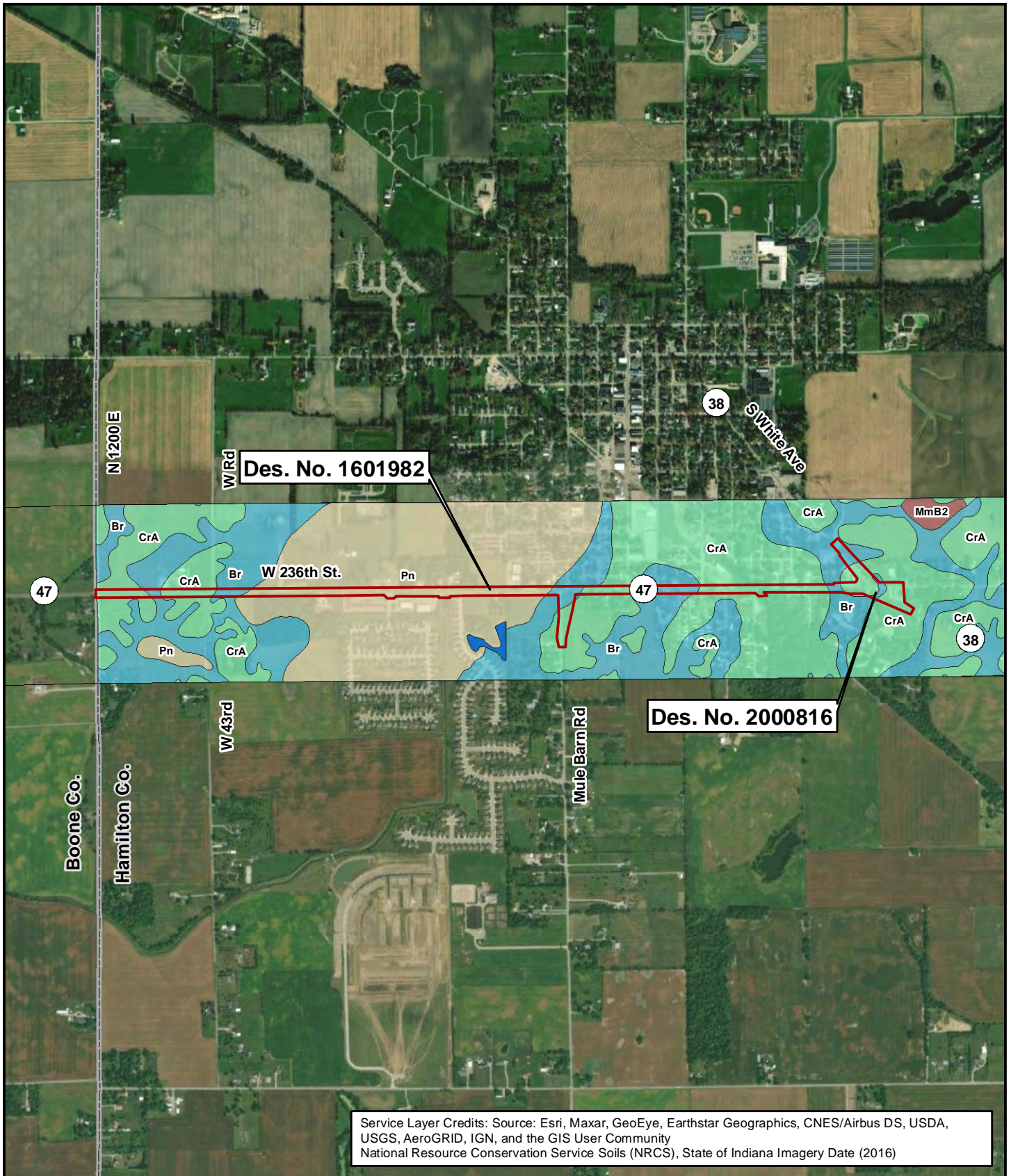


**Legend**

- Study Area
- 100-Year Floodplain



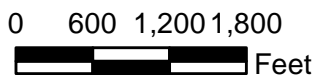
**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
 Hamilton County, Indiana  
**FEMA Floodplain Map**



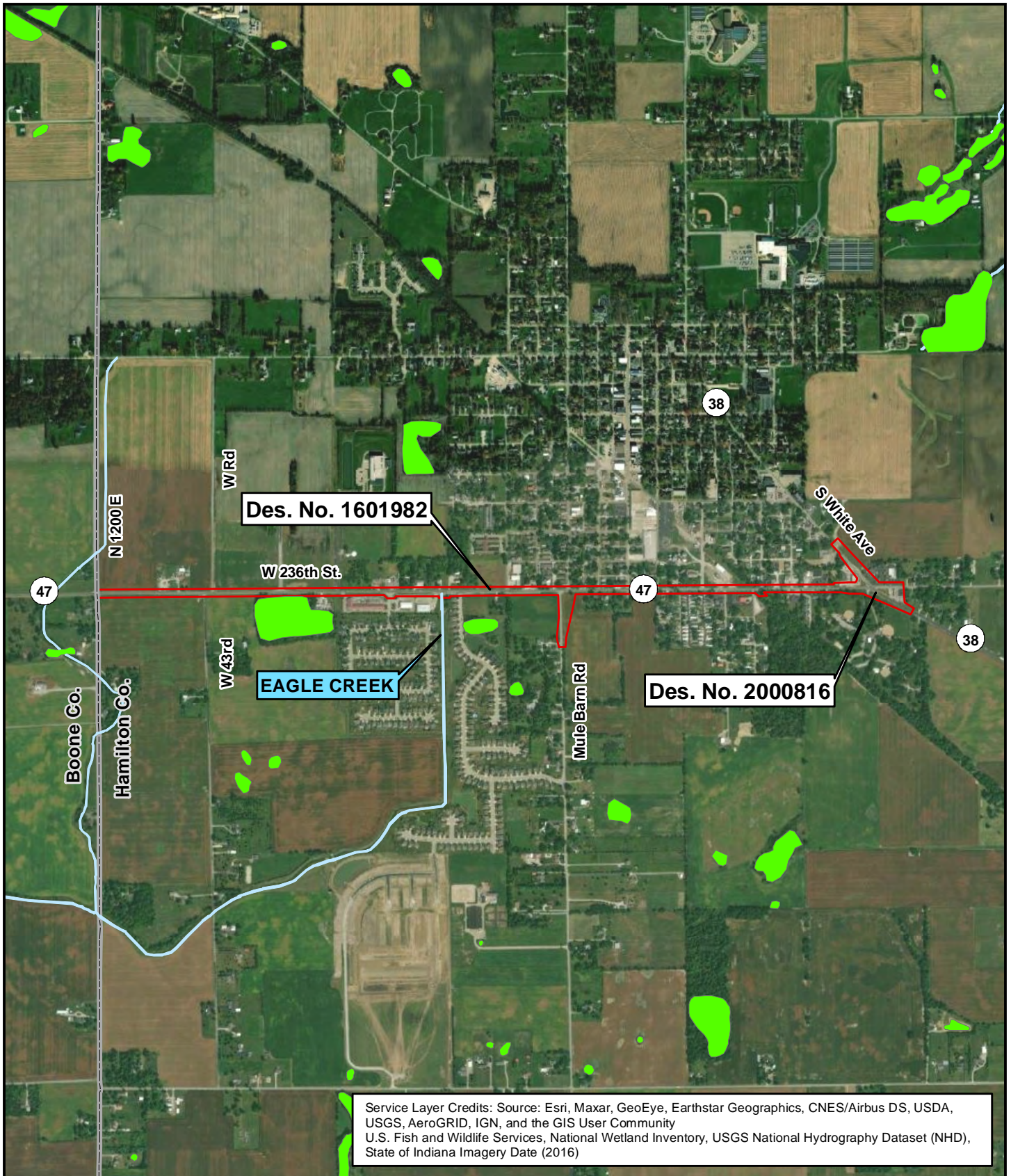
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 National Resource Conservation Service Soils (NRCS), State of Indiana Imagery Date (2016)

**Legend**

- Br - Brookston Silty Clay Loam
- CrA - Crosby Silt Loam
- MmB2 - Miami Silt Loam
- Pn - Patton Silty Clay Loam
- W - Water
- Study Area



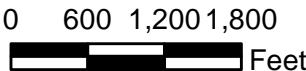
**SR 47 Roadway Reconstruction &  
 Mule Barn Rd. (DES. No. 1601982)  
 SR 47 & SR 38 Roundabout (DES No. 2000816)  
 Hamilton County, Indiana  
 NRCS Soils Map**



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 U.S. Fish and Wildlife Services, National Wetland Inventory, USGS National Hydrography Dataset (NHD), State of Indiana Imagery Date (2016)

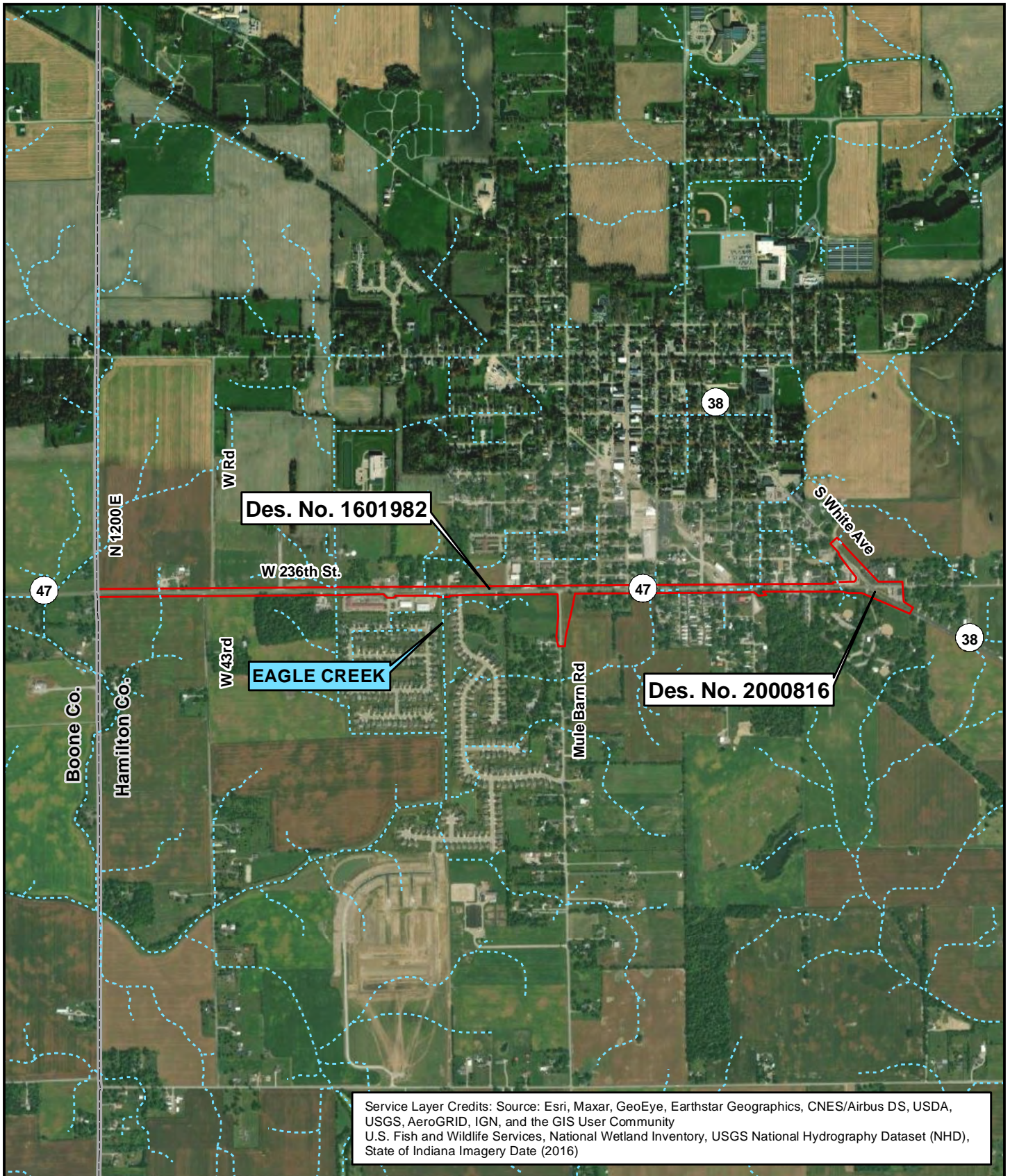
**Legend**

- Study Area
- NWI Wetland
- NWI Riverine



**SR 47 Roadway Reconstruction &  
 Mule Barn Rd. (DES. No. 1601982)  
 SR 47 & SR 38 Roundabout (DES No. 2000816)  
 Hamilton County, Indiana  
 USFWS NWI Map**





Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 U.S. Fish and Wildlife Services, National Wetland Inventory, USGS National Hydrography Dataset (NHD), State of Indiana Imagery Date (2016)

**Legend**

- Study Area
- NHD Flowline



**SR 47 Roadway Reconstruction &  
 Mule Barn Rd. (DES. No. 1601982)  
 SR 47 & SR 38 Roundabout (DES No. 2000816)  
 Hamilton County, Indiana  
 USGS NHD Water Resources Map**



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community State of Indiana Imagery Date (2016), Field Identified Resources (2021)

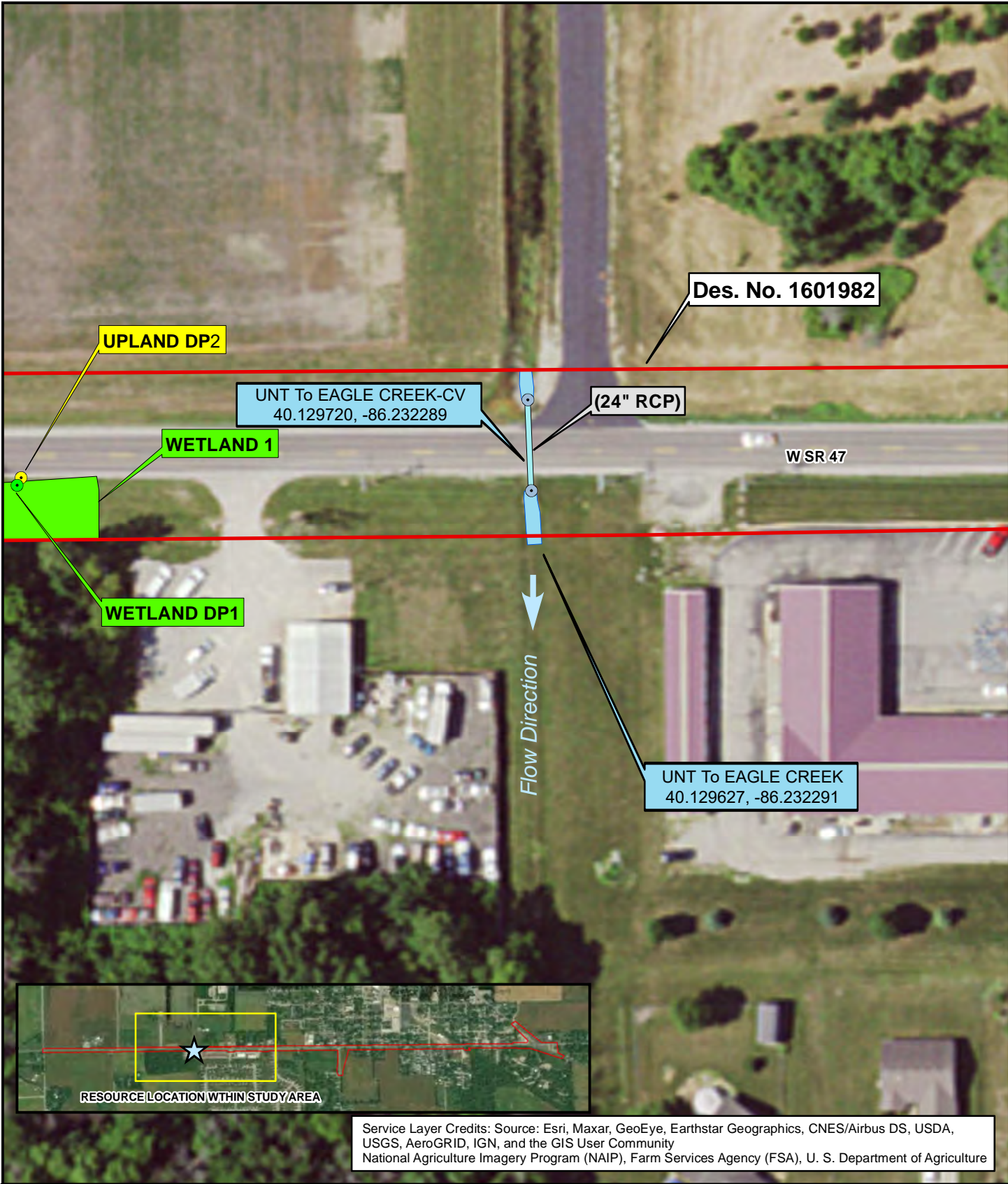
**Legend**

Study Area	Culvert 1	Upland DP1
Streams	Culvert 2	Wetland DP1
Wetland		Wetland Extends Beyond Study Area

0 100 200 300 Feet



**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
 Hamilton County, Indiana  
**Field Identified Resources Map**

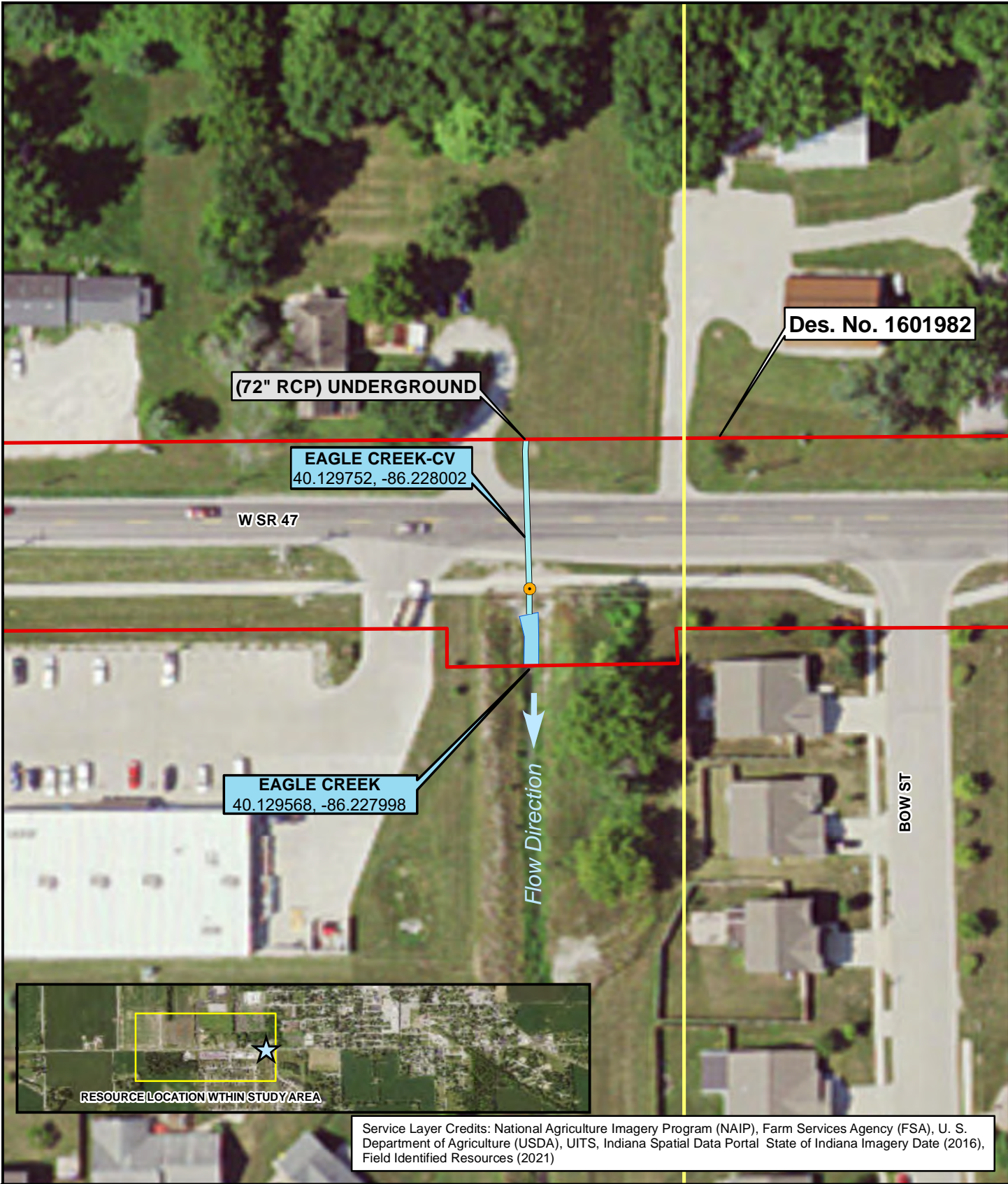


**Legend**

Study Area	Culvert 1	Wetland DP1
Streams	Upland DP1	
Wetland		

0 20 40 60  
Feet

**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
 Hamilton County, Indiana  
**Field Identified Resources Map**



Service Layer Credits: National Agriculture Imagery Program (NAIP), Farm Services Agency (FSA), U. S. Department of Agriculture (USDA), UITS, Indiana Spatial Data Portal State of Indiana Imagery Date (2016), Field Identified Resources (2021)

**Legend**

- Study Area
- Culvert 2
- Streams

0 20 40 60  
 Feet

**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
**Hamilton County, Indiana**  
**Field Identified Resources Map**

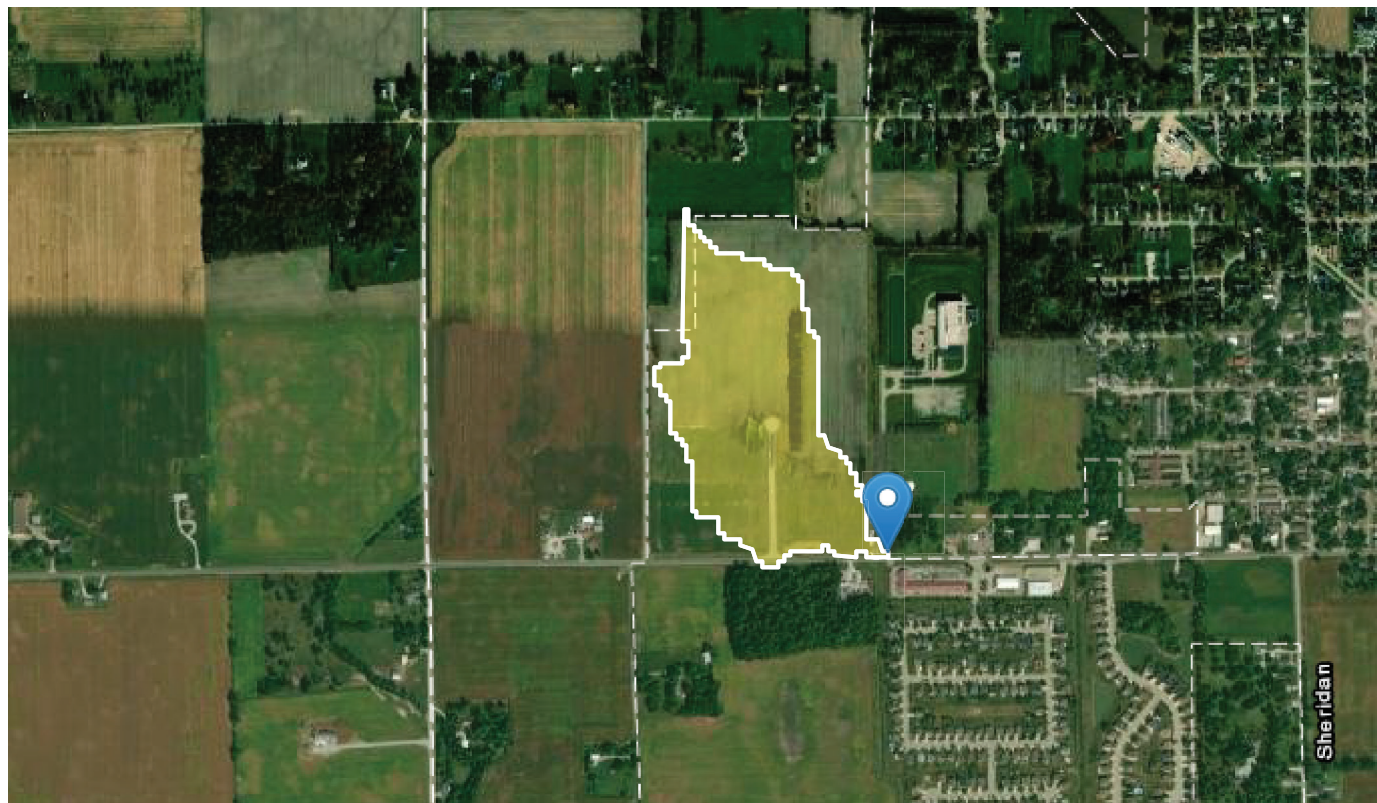
# SR 47 Rd Reconstruction & Mule Barn Rd Realignment & SR 47/SR 38 Roundabout, Ditch 1

Region ID: IN

Workspace ID: IN20210706204233967000

Clicked Point (Latitude, Longitude): 40.12967, -86.23231

Time: 2021-07-06 15:42:51 -0500



### Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.056	square miles
BFREGNO	BFREGNO	1566	dimensionless
BSLDEM10M	Mean basin slope computed from 10 m DEM	0.63	percent
CONTDA	Area that contributes flow to a point on a stream	0.056	square miles

<b>Parameter Code</b>	<b>Parameter Description</b>	<b>Value</b>	<b>Unit</b>
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	16.5	feet per mi
HIGHREG	HIGHREG	1008	dimensionless
INSINKHOLE	Percent Sinkhole drainage area per basin from Indiana Geological Survey.	0	percent
INSINKING	Percent Sinking stream drainage area from Indiana Geological Survey.	0	percent
K1INDNR	Average hydraulic conductivity (ft/d) for the top 70 ft of unconsolidated deposits from InDNR well database.	21	ft per day
K2INDNR	Average hydraulic conductivity (ft/d) for the full depth of unconsolidated deposits from InDNR well database.	16	ft per day
LAT_OUT	Latitude of Basin Outlet	40.129786	degrees
LC01FOREST	Percentage of forest from NLCD 2001 classes 41-43	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	2.29	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.6	percent
LOWREG	Low Flow Region Number	1729	dimensionless
QSSPERMTHK	Index of the permeability of surficial Quaternary sediments computed as in SIR 2014-5177	150	dimensionless
ST2INDNR	Average transmissivity (ft <sup>2</sup> /d) for the full depth of unconsolidated deposits within 1000 ft of stream channel from InDNR well database.	undefined	square feet per day
T2INDNR	Average transmissivity (ft <sup>2</sup> /d) for the full depth of unconsolidated deposits from InDNR well database.	1993	square feet per day
URBAN	Percentage of basin with urban development	0	percent
WETLAND	Percentage of Wetlands	0	percent

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.5.3

StreamStats Services Version: 1.2.22

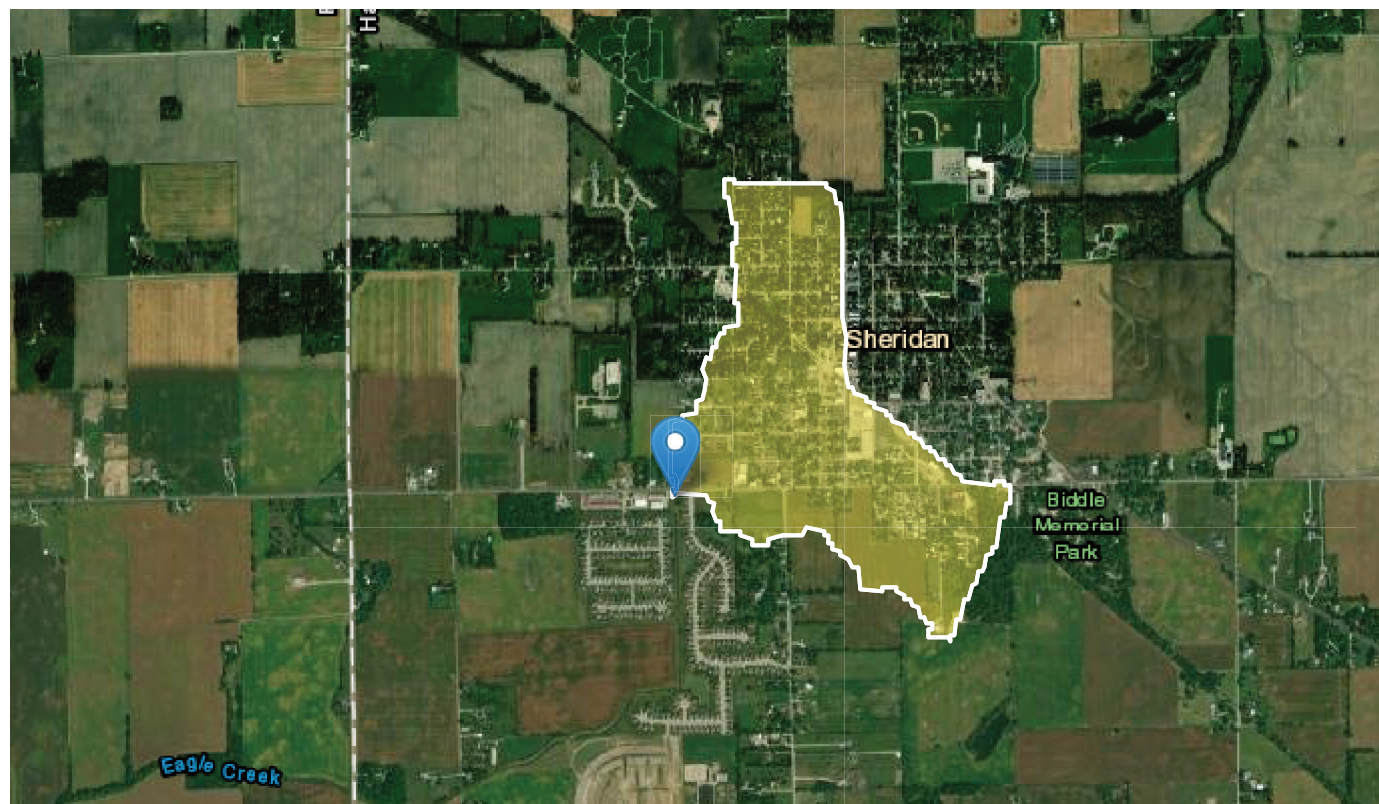
NSS Services Version: 2.1.2

# SR 47 Rd Reconstruction & Mule Barn Rd Realignment & SR 47/SR 38 Roundabout, Eagle Creek

Workspace ID: IN20210706205806501000

Region ID: IN  
 Clicked Point (Latitude, Longitude): 40.12962, -86.22804

Time: 2021-07-06 15:58:25 -0500



### Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BFREGNO	BFREGNO	1566	dimensionless
BSLDEM10M	Mean basin slope computed from 10 m DEM	1.14	percent
CONTDA	Area that contributes flow to a point on a stream		square miles
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known		feet per mi
DRNAREA	Area that drains to a point on a stream	0.365	square miles



<b>Parameter Code</b>	<b>Parameter Description</b>	<b>Value</b>	<b>Unit</b>
HIGHREG	HIGHREG	1008	dimensionless
INSINKHOLE	Percent Sinkhole drainage area per basin from Indiana Geological Survey.		percent
INSINKING	Percent Sinking stream drainage area from Indiana Geological Survey.		percent
K1INDNR	Average hydraulic conductivity (ft/d) for the top 70 ft of unconsolidated deposits from InDNR well database.	9	ft per day
WETLAND	Percentage of Wetlands		percent
URBAN	Percentage of basin with urban development		percent
ST2INDNR	Average transmissivity (ft <sup>2</sup> /d) for the full depth of unconsolidated deposits within 1000 ft of stream channel from InDNR well database.	1615	square feet per day
T2INDNR	Average transmissivity (ft <sup>2</sup> /d) for the full depth of unconsolidated deposits from InDNR well database.	1568	square feet per day
QSSPERMTHK	Index of the permeability of surficial Quaternary sediments computed as in SIR 2014-5177	160.98	dimensionless
LOWREG	Low Flow Region Number	1729	dimensionless
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset		percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24		percent
LC01FOREST	Percentage of forest from NLCD 2001 classes 41-43	0.2	percent
LAT_OUT	Latitude of Basin Outlet	40.129489	degrees

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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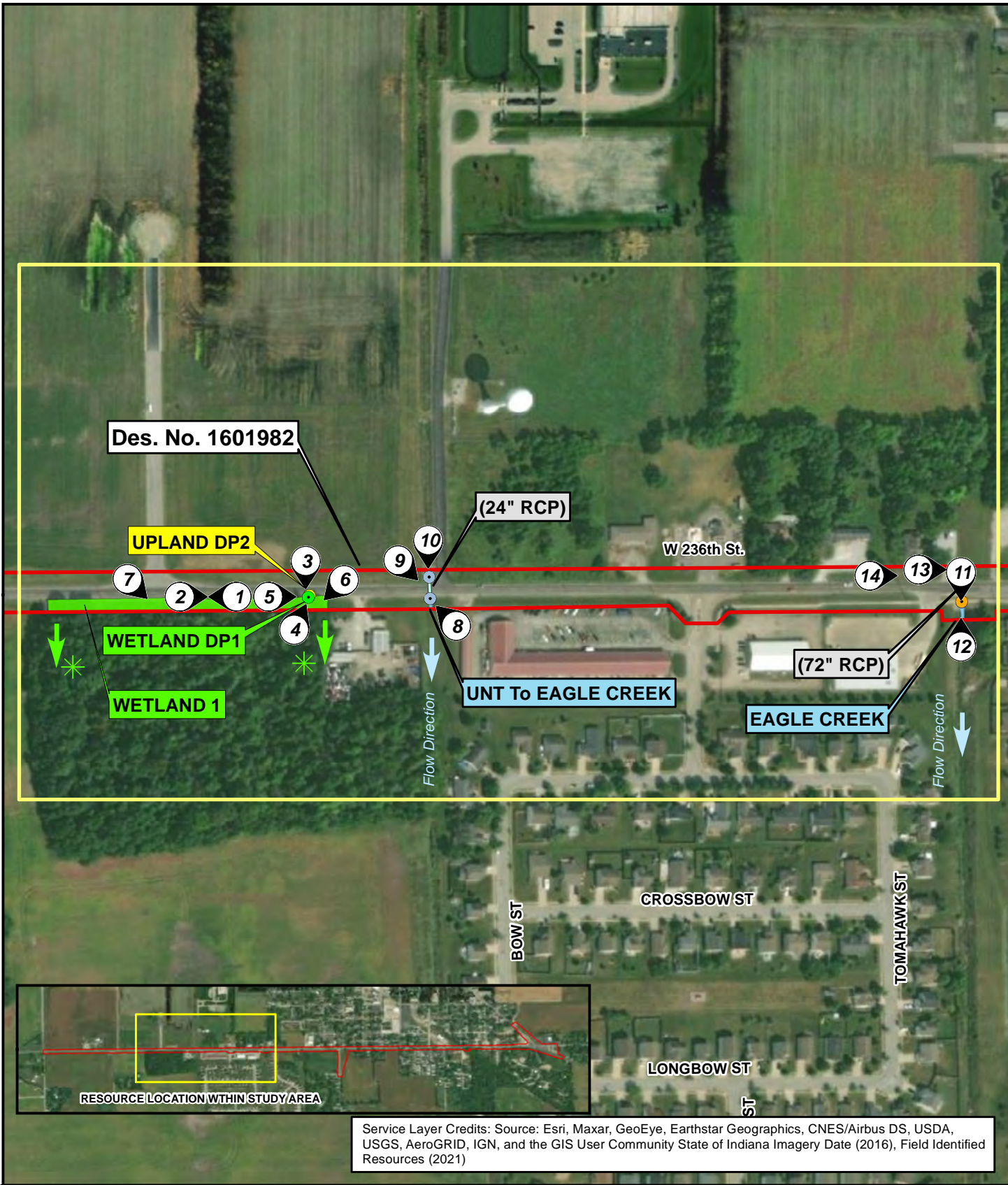
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Application Version: 4.5.3

StreamStats Services Version: 1.2.22

NSS Services Version: 2.1.2



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community State of Indiana Imagery Date (2016), Field Identified Resources (2021)

**Legend**

Study Area	Culvert 1	Upland DP1
Streams	Culvert 2	Wetland DP1
Wetland	Photo Number and Direction	Wetland Extends Beyond Study Area

0 100 200 300 Feet

**SR 47 Roadway Reconstruction & Mule Barn Rd. (DES. No. 1601982)**  
**SR 47 & SR 38 Roundabout (DES No. 2000816)**  
 Hamilton County, Indiana  
**Photo Location Map**



Photo 1: Facing west at south side of SR 47 and Wetland 1

Photo 2: Facing east at south side of SR 47 and Wetland 1



Photo 3: Facing south at Wetland 1 data point (W-DP1)

Photo 4: Wetland 1 data point (W-DP1)



Photo 5: Facing northeast at upland data point (Upl-DP2)



Photo 6: Upland data point (Upl-DP2)



Photo 7: Facing southeast at Wetland 1



Photo 8: Facing northwest at UNT to Eagle Creek upstream view



Photo 9: Facing southeast at UNT to Eagle Creek downstream view



Photo 10: Facing south at UNT to Eagle Creek downstream view



Photo 11: Facing south at Eagle Creek downstream view



Photo 12: Facing north at Eagle Creek upstream view

Des. No. 1601982 & 2000816  
SR 47 Roadway Reconstruction & Mule Barn Road Realignment  
SR 47 & SR 38 Roundabout

Photos Taken October 6, 2020



Photo 13: Facing east at north side of SR 47



Photo 14: Facing east at north side of SR 47

**WETLAND DETERMINATION DATA FORM – Midwest Region**

Project/Site: SR 47 & Mule Barn & SR 47/SR 38 Roundabout City/County: Sheridan/Hamilton Sampling Date: 10/6/2020  
 Applicant/Owner: INDOT State: IN Sampling Point: W-DP1  
 Investigator(s): Laura Jack Section, Township, Range: S6, T19N, R3E  
 Landform (hillside, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): concave  
 Slope (%): \_\_\_\_\_ Lat: 40.129673 Long: -86.233273 Datum: NAD 88  
 Soil Map Unit Name: Pn - Patton Silty Clay Loam NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	<b>Is the Sampled Area within a Wetland?</b> Yes <u>X</u> No _____
Remarks: _____	

**VEGETATION – Use scientific names of plants.**

Tree Stratum	(Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status																	
1.	_____	_____	_____	_____	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																
2.	_____	_____	_____	_____																	
3.	_____	_____	_____	_____																	
4.	_____	_____	_____	_____																	
5.	_____	_____	_____	_____																	
				=Total Cover																	
Sapling/Shrub Stratum	(Plot size: _____)																				
1.	_____	_____	_____	_____	<b>Prevalence Index worksheet:</b> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Total % Cover of:</td> <td style="width:50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>82</u></td> <td>x 1 = <u>82</u></td> </tr> <tr> <td>FACW species <u>5</u></td> <td>x 2 = <u>10</u></td> </tr> <tr> <td>FAC species <u>10</u></td> <td>x 3 = <u>30</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>97</u> (A)</td> <td><u>122</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>1.26</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>82</u>	x 1 = <u>82</u>	FACW species <u>5</u>	x 2 = <u>10</u>	FAC species <u>10</u>	x 3 = <u>30</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>97</u> (A)	<u>122</u> (B)	Prevalence Index = B/A = <u>1.26</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>82</u>	x 1 = <u>82</u>																				
FACW species <u>5</u>	x 2 = <u>10</u>																				
FAC species <u>10</u>	x 3 = <u>30</u>																				
FACU species <u>0</u>	x 4 = <u>0</u>																				
UPL species <u>0</u>	x 5 = <u>0</u>																				
Column Totals: <u>97</u> (A)	<u>122</u> (B)																				
Prevalence Index = B/A = <u>1.26</u>																					
2.	_____	_____	_____	_____																	
3.	_____	_____	_____	_____																	
4.	_____	_____	_____	_____																	
5.	_____	_____	_____	_____																	
				=Total Cover																	
Herb Stratum	(Plot size: <u>5ft</u> )																				
1.	<u>Typha angustifolia</u>	<u>80</u>	<u>Yes</u>	<u>OBL</u>	<b>Hydrophytic Vegetation Indicators:</b> _____ 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u>X</u> 3 - Prevalence Index is ≤3.0 <sup>1</sup> _____ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) _____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2.	<u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
3.	<u>Panicum virgatum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
4.	<u>Persicaria pensylvanica</u>	<u>5</u>	<u>No</u>	<u>FACW</u>																	
5.	<u>Echinochloa muricata</u>	<u>2</u>	<u>No</u>	<u>OBL</u>																	
6.	_____	_____	_____	_____																	
7.	_____	_____	_____	_____																	
8.	_____	_____	_____	_____																	
9.	_____	_____	_____	_____																	
10.	_____	_____	_____	_____																	
				<u>97</u> =Total Cover																	
Woody Vine Stratum	(Plot size: _____)																				
1.	_____	_____	_____	_____	<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____																
2.	_____	_____	_____	_____																	
				=Total Cover																	
Remarks: (Include photo numbers here or on a separate sheet.)																					



**SOIL**

Sampling Point: W-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 2/1	100					Loamy/Clayey	
6-18	10YR 4/1	95	10YR 6/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:			Indicators for Problematic Hydric Soils <sup>3</sup> :		
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Iron-Manganese Masses (F12)			
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> Very Shallow Dark Surface (F22)			
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)				
<input checked="" type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)				
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)				
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)				
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)	<input type="checkbox"/> Redox Depressions (F8)				

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if observed):</b> Type: _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	---

Remarks:  
 This data form is revised from Midwest Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. ([http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_051293.docx](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx))

**HYDROLOGY**

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)	

<b>Field Observations:</b> Surface Water Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present?      Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present?        Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: SR 47 & Mule Barn Rd & SR 47/SR 38 Roundabout City/County: Sheridan/Hamilton Sampling Date: 10/6/2020  
 Applicant/Owner: INDOT State: IN Sampling Point: Upl-DP2  
 Investigator(s): Laura Jack Section, Township, Range: S6, T19N, R3E  
 Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): convex  
 Slope (%): 1 Lat: 40.129685 Long: -86.233264 Datum: NAD 88  
 Soil Map Unit Name: Pn - Patton Silty Clay Loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)  
 Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>    </u> No <u>X</u> Hydric Soil Present? Yes <u>    </u> No <u>X</u> Wetland Hydrology Present? Yes <u>    </u> No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b> Yes <u>    </u> No <u>X</u>
Remarks:	

### VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>    </u> )	Absolute % Cover	Dominant Species?	Indicator Status																	
1.					<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50.0%</u> (A/B)																
2.																					
3.																					
4.																					
5.																					
		=Total Cover																			
Sapling/Shrub Stratum	(Plot size: <u>    </u> )																				
1.					<b>Prevalence Index worksheet:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>60</u></td> <td>x 3 = <u>180</u></td> </tr> <tr> <td>FACU species <u>20</u></td> <td>x 4 = <u>80</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>80</u> (A)</td> <td><u>260</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.25</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>60</u>	x 3 = <u>180</u>	FACU species <u>20</u>	x 4 = <u>80</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>80</u> (A)	<u>260</u> (B)	Prevalence Index = B/A = <u>3.25</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>0</u>	x 1 = <u>0</u>																				
FACW species <u>0</u>	x 2 = <u>0</u>																				
FAC species <u>60</u>	x 3 = <u>180</u>																				
FACU species <u>20</u>	x 4 = <u>80</u>																				
UPL species <u>0</u>	x 5 = <u>0</u>																				
Column Totals: <u>80</u> (A)	<u>260</u> (B)																				
Prevalence Index = B/A = <u>3.25</u>																					
2.																					
3.																					
4.																					
5.																					
		=Total Cover																			
Herb Stratum	(Plot size: <u>5ft</u> )																				
1.	<u>Poa pratensis</u>	<u>60</u>	Yes	FAC	<b>Hydrophytic Vegetation Indicators:</b> <u>    </u> 1 - Rapid Test for Hydrophytic Vegetation <u>    </u> 2 - Dominance Test is >50% <u>    </u> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <u>    </u> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <u>    </u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2.	<u>Trifolium repens</u>	<u>20</u>	Yes	FACU																	
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					
		<u>80</u> =Total Cover																			
Woody Vine Stratum	(Plot size: <u>    </u> )																				
1.					<b>Hydrophytic Vegetation Present?</b> Yes <u>    </u> No <u>X</u>																
2.																					
		=Total Cover																			

Remarks: (Include photo numbers here or on a separate sheet.)

**SOIL**

Sampling Point: Upl-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>		
0-10	10YR 3/3	100				Loamy/Clayey	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5 cm Mucky Peat or Peat (S3)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- Coast Prairie Redox (A16)
- Iron-Manganese Masses (F12)
- Red Parent Material (F21)
- Very Shallow Dark Surface (F22)
- Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type:                      Rocks/Gravel  
 Depth (inches):                      10

Hydric Soil Present?      Yes       No

Remarks:

This data form is revised from Midwest Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. ([http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_051293.docx](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx))

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		

**Field Observations:**

Surface Water Present?    Yes     No     Depth (inches):                       
 Water Table Present?    Yes     No     Depth (inches):                       
 Saturation Present?    Yes     No     Depth (inches):                       
 (includes capillary fringe)

Wetland Hydrology Present?    Yes     No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM**

**BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR PJD:** September 9, 2021

**B. NAME AND ADDRESS OF PERSON REQUESTING PJD:** Laura Jack Michael Baker International 3815 River Crossing Parkway, Suite 20, Indianapolis, IN 46240

**C. DISTRICT OFFICE, FILE NAME, AND NUMBER:**

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:** INDOT Greenfield District. INDOT Des. 1601982 & 2000816. SR 47 Rd Reconstruction & Mule Barn Rd Realignment and SR 47/SR 38 Roundabout. From the Boone/Hamilton County Line (N CR 1200E) to SR 38.

**(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)**

State: IN County/parish/borough: Hamilton City: Sheridan

Center coordinates of site (lat/long in degree decimal format):

Lat.: 40.129765 Long.: -86.224105

Universal Transverse Mercator: 16N

Name of nearest waterbody: Eagle Creek

**E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

Office (Desk) Determination. Date:

Field Determination. Date(s):

**TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH “MAY BE” SUBJECT TO REGULATORY JURISDICTION.**

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)
Wetland 1	40.129627	-86.234141	0.42 ac	wetland	Section 404
UNT to Eagle Creek	40.129651	-86.232290	24.2 LF, 0.004 ac	non-wetland	Section 404
Eagle Creek	40.129622	-86.228002	27.3 LF, 0.005 ac	non-wetland	Section 404

- 1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.
- 2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there "*may be*" waters of the U.S. and/or that there "*may be*" navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:


**SUPPORTING DATA. Data reviewed for PJD (check all that apply)**

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:  
Map: Aerial Map, USGS Topo Map, Water Resource Map
- Data sheets prepared/submitted by or on behalf of the PJD requestor.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report. Rationale: \_\_\_\_\_
- Data sheets prepared by the Corps: \_\_\_\_\_
- Corps navigable waters' study: \_\_\_\_\_
- U.S. Geological Survey Hydrologic Atlas: 2016 USGS NHD
  - USGS NHD data.
  - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite scale & quad name: Sheridan
- Natural Resources Conservation Service Soil Survey. Citation: NRCS 2016
- National wetlands inventory map(s). Cite name: USFWS 2016
- State/local wetland inventory map(s): \_\_\_\_\_
- FEMA/FIRM maps: FEMA Digital Flood Insurance Map - IDNR, Aerial Date: 2016
- 100-year Floodplain Elevation is: \_\_\_\_\_.(National Geodetic Vertical Datum of 1929)
- Photographs:  Aerial (Name & Date): ESRI Aerial Photo  
or  Other (Name & Date): Field Photographs Taken October 6, 2020
- Previous determination(s). File no. and date of response letter: \_\_\_\_\_
- Other information (please specify): \_\_\_\_\_

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

\_\_\_\_\_  
Signature and date of  
Regulatory staff member  
completing PJD

  
\_\_\_\_\_  
Signature and date of  
person requesting PJD  
(REQUIRED, unless obtaining  
the signature is impracticable)<sup>1</sup>

<sup>1</sup> Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

# Appendix G:

## Public Involvement

«Name»

«Street\_Address»

«City», «STATE» «Zip»

RE: Des. Nos. 1601982 (lead #) and 2000816  
SR 47 Reconstruction and SR 47/SR 38 Roundabout, Hamilton County, located along  
SR 47 from N1200 E to SR 38 (S White Avenue/Sheridan Avenue)

Notice of Entry for Investigation  
February 23, 2021

Dear «Name»,

Our information indicates that you own property near the above proposed transportation project. Representatives of the Indiana Department of Transportation (INDOT) will be conducting environmental surveys of the project area in the near future. It may be necessary for them to enter onto your property to complete this work. The project consists of three parts: the reconstruction of SR 47, the construction of a single-lane roundabout at the intersection of SR 47 and 38, and the realignment of Mule Barn Road.

Representatives of INDOT will be conducting a cultural resources historic property survey which will include photographing buildings, structures, and landscape features. Other environmental work will include archaeological investigations that may consist of subsurface soil test borings and shovel probes for the proposed project from March 1, 2021 through April 11, 2021 (weather dependent).

It is possible that INDOT's representatives will need to conduct a portion of the required subsurface investigation work on or adjacent to property that available records indicate you currently own. If you own this property but do not currently occupy it, we request you provide this letter to the current occupant. If you no longer own this property, please let us know.

The purpose of the historic property survey and archaeological investigation is to comply with Section 106 of the National Historic Preservation Act of 1966, which requires federal agencies to consider the effects on historic properties of projects they carry out, assist, fund, permit, license, or approve. To do this, the agency first has to identify the locations of historic properties.

Anyone performing this type of work has been instructed to identify him or herself to you, if you are available, before they enter your property.

Indiana Code § 8-23-7-26 provides authorized representatives of INDOT, *Right of Entry* to the project site (including private property) upon proper notification. A copy of the relevant code and a Notice of Entry discussion sheet, as found on INDOT's website, are attached to this letter. Pursuant to Indiana Code § 8-23-7-27, this letter serves as written notification of the intention to take photographs, drill test borings, take shovel probes, and walk or drive on your property in the next several weeks.



If any problems do occur, please contact the field crew or contact the INDOT Project Manager, Jennifer Beck, email: [jbeck@indot.in.gov](mailto:jbeck@indot.in.gov) or Consultant Project Manager, William Curtis at 317-689-6935, email: [william.curtis@mbakerintl.com](mailto:william.curtis@mbakerintl.com).

Please be aware that Indiana Code § 8-23-7-27 and 28 provides that you may seek compensation from INDOT for damages occurring to your property (land or water) that result from INDOT's entry for the purposes mentioned above in Indiana Code § 8-23-7-26. In this case, a basic procedure that may be followed is for you and/or an INDOT employee or representative to present an account of the damages to one of the two above named INDOT staff or representative. They will check the information and forward it to the appropriate person at INDOT who will contact you to discuss the situation and compensation.

In addition, you may contact William Geibel, INDOT Real Estate Director, at [WGeibel@indot.in.gov](mailto:WGeibel@indot.in.gov). The Real Estate Director can provide you with a form to request compensation for damages. After filling out the form, you can return it to the Real Estate Director for consideration, and the Real Estate Director may be contacted if you have questions regarding the matter, rights, and procedures.

If you are not satisfied with the compensation that INDOT determines is owed you, Indiana Code § 8-23-7-8 provides the following:

The amount of damages shall be assessed by the county agricultural extension educator of the county in which the land or water is located and two (2) disinterested residents of the county, one (1) appointed by the aggrieved party and one (1) appointed by the department. A written report of the assessment of the damages shall be mailed to the aggrieved party and the department by first class United States mail. If either the department or the aggrieved party is not satisfied with the assessment of damages, either or both may file a petition, not later than fifteen (15) days after receiving the report, in the circuit or superior court of the county in which the land or water is located.

Please be assured it is our sincere desire to cause as little inconvenience and disruption to your property. Thank you in advance for your cooperation.

Sincerely,



William Curtis, PE  
Project Manager

Attachments



# INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue  
Room N642  
Indianapolis, Indiana 46204

**Eric J. Holcomb, Governor**  
**Joe McGuinness, Commissioner**

## Indiana Department of Transportation Notice of Entry for Survey or Investigation Indiana Department of Transportation

If you have received a “Notice of Entry for Survey or Investigation” from INDOT or an INDOT representative, you may be wondering what it means. In the early stages of a project’s development, INDOT must collect as much information as possible to ensure that sound decisions are made in designing the proposed project. Before entering onto private property to collect that data, INDOT is required to notify landowners that personnel will be in the area and may need to enter onto their property. Indiana Code, Title 8, Article 23, Chapter 7, Section 26 deals with the department’s authority to enter onto any property within Indiana.

Receipt of a Notice of Entry for Survey or Investigation does not necessarily mean that INDOT will be buying property from you. It doesn’t even necessarily mean that the project will involve your property at all. Since the Notice of Entry for Survey or Investigation is sent out in the very early stages and since we want to collect data within AND surrounding the project’s limits more landowners are contacted than will actually fall within the eventual project limits. It may also be that your property falls within the project limits but we will not need to purchase property from you to make improvements to the roadway. Another thing to keep in mind is that when you receive a Notice of Entry for Survey or Investigation, very few specifics have been worked out and actual construction of the project may be several years in the future.

Before INDOT begins a project that requires them to purchase property from landowners, they must first offer the opportunity for a public hearing. If you were on the list of people who received a Notice of Entry for Survey or Investigation, you should also receive a notice informing you of your opportunity to request a public hearing. These notices will also be published in your local newspaper so interested individuals who are not adjacent to the project will also have the opportunity to request a public hearing. If a public hearing is to be held, INDOT will publicize the date, location, and time. INDOT will present detailed project information at the public hearing, comments will be taken from the public in spoken and written form, and question and answer sessions will be offered. Based on the feedback INDOT receives from the public, a project can be modified and improved to better serve the public.

So, if you have received a “Notice of Entry for Survey or Investigation”, remember:

1. You do not need to take any action at this time. It is merely letting you know that people in orange/lime vests are going to be in your neighborhood.
2. The project is still in its very early planning stages.
3. You will be notified of your opportunity to comment on the project at a later date.



[www.in.gov/dot/](http://www.in.gov/dot/)  
**An Equal Opportunity Employer**



## IC 8-23-7

### Chapter 7. Real Property Transactions

#### IC 8-23-7-26

##### **Surveys and investigations; right of entry**

Sec. 26. An authorized employee or representative of the department engaged in a survey or investigation authorized by the commissioner or the commissioner's designee, including a survey or investigation for purposes of IC 8-23-5-9, may enter upon, over, or under any land or property within Indiana to conduct the survey or investigation by manual or mechanical means, which include the following:

- (1) Inspecting.
- (2) Measuring.
- (3) Leveling.
- (4) Boring.
- (5) Trenching.
- (6) Sample-taking.
- (7) Archeological digging.
- (8) Investigating soil and foundation.
- (9) Transporting equipment.
- (10) Any other work necessary to carry out the survey or investigation.

*As added by P.L.18-1990, SEC.216. Amended by P.L.99-2008, SEC.2.*

#### IC 8-23-7-27

##### **Surveys and investigations; notification of occupants**

Sec. 27. (a) Before an authorized employee or representative of the department enters upon, over, or under any land or water under section 26 of this chapter, the occupant of the land or water shall be notified in writing by first class United States mail of the entry not later than five (5) days before the date of entry. The employee or representative of the department shall present written identification or authorization to the occupant of the land or water before entering the land or water.

(b) At the same time and in the same manner as the notice required under subsection (a), the department shall notify the occupant and the record owner of the land or property of the following:

(1) With respect to damage that occurs to the land or property as a result of entry upon, over, or under the land or property as set forth in section 26 of this chapter:

(A) a description of the aggrieved party's right to compensation for the damage from the department;  
and

(B) the procedure that the aggrieved party must follow to obtain the compensation. (2) The name, mailing address, and telephone number of an individual or office within the department to which an aggrieved party may direct questions concerning the rights and procedures described in subdivision (1).

*As added by P.L.18-1990, SEC.216. Amended by P.L.99-2008, SEC.3.*

#### IC 8-23-7-28

##### **Surveys and investigations; compensation for damages**



# INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue  
Room N642  
Indianapolis, Indiana 46204

**Eric J. Holcomb, Governor**  
**Joe McGuinness, Commissioner**

Sec. 28. If during an entry under section 26 of this chapter damage occurs to the land or water as a result of the entry or work performed during the entry, the department shall compensate the aggrieved party. If the aggrieved party is not satisfied with the compensation determined by the department, the amount of damages shall be assessed by the county agricultural extension educator of the county in which the land or water is located and two (2) disinterested residents of the county, one (1) appointed by the aggrieved party and one (1) appointed by the department. A written report of the assessment of damages shall be mailed to the aggrieved party and the department by first class United States mail. If either the department or the aggrieved party is not satisfied with the assessment of damages, either or both may file a petition, not later than fifteen (15) days after receiving the report, in the circuit or superior court of the county in which the land or water is located. The department shall pay any compensation awarded to an aggrieved party under this section:

(1) not more than sixty (60) days after the date on which the parties agree to the amount of the compensation;  
or

(2) as ordered by the circuit or superior court.

*As added by P.L.18-1990, SEC.216. Amended by P.L.40-1993, SEC.3; P.L.99-2008, SEC.4.*



[www.in.gov/dot/](http://www.in.gov/dot/)  
**An Equal Opportunity Employer**

# INDOT Public Information Meeting



WEDNESDAY  
JULY 27TH

5:30 - 7:30PM

SHERIDAN  
COMMUNITY  
CENTER

300 E 6TH STREET  
SHERIDAN, IN  
46069

## Topic of Discussion

Improvements to SR 38 & 47 in Sheridan

Open House with Presentation at 6pm.



See more project details  
at the INDOT website

# SR 38 & SR 47 Improvements within the Town of Sheridan

INDOT > About INDOT > Central Office > Welcome to the Greenfield District > SR 38 & SR 47 Improvements within the Town of Sheridan

SR 47 Reconstruction from Hamilton/Boone County Line to SR 38: Des 1601982 & 2000816

## Project Purpose & Need

The need for this project is due to the lack of drainage and poor condition of the existing pavement. The purpose of this project is to create an effective drainage system and restore rideability of the roadway.

## Proposed Improvements

To address this need and fulfill the project's purpose, INDOT is proposing to make the following improvements;

- Resurface SR 47 from Hamilton/Boone County Line to just west of Arrow St.
  - Add 4 ft paved shoulders
- Fully Reconstruct SR 47 from just west of Arrow Street through the SR 38 intersection
  - Add curb and gutter drainage system
  - Add 5-6ft sidewalk along the south side of SR 47
- Build a roundabout at SR 47 & SR 38 intersection
- Realign Mule Barn Rd with California Street
- Add midblock crossings for pedestrian crossings of SR 47
- Add enhanced Monon Trail crossing at SR 47

[Project Exhibit – Hamilton/Boone County Line to Wesco Pkwy](#)

[Project Exhibit – Wesco Pkwy to Hamilton St.](#)

[Project Exhibit – Hamilton St to Park Street](#)

[Project Exhibit – Park Street to SR 38](#)

## Maintenance of Traffic

Most of this project will be performed under phased closures. Coordination with the Town of Sheridan, EMS, Schools, businesses, etc. is ongoing, and updating information will be shared when available.

## Schedule

This project is currently in the Environmental Review phase with R/W Appraising and Acquisition just beginning. INDOT anticipates completing the Environmental process in 2022 with R/W being completed early 2023.

This project is currently scheduled to bid in 2023 with road construction to take place in 2024.

**INDOT will be hosting a Public Information Meeting to present the proposed improvements and gather public input on the project.**

**Wednesday, July 27<sup>th</sup> from 5:30PM - 7:30PM**

**Open House with Presentation at 6PM**

**Sheridan Community Center**

**300 E 6<sup>th</sup> Street**

**Sheridan, IN 46069**

For additional information on this project, please contact us at [www.indot4u.com](http://www.indot4u.com) or 1-855-463-6848.



## Public Meeting to be held for resurface and reconstruction in Hamilton County

Indiana Department of Transportation sent this bulletin at 07/18/2022 09:49 AM EDT

Having trouble viewing this email? [View it as a Web page.](#)



## Indiana Department of Transportation News Release

### Public Hearing to be held for resurface and reconstruction in Hamilton County

**HAMILTON COUNTY, Ind.** - The Indiana Department of Transportation announces a public information meeting will be held Wednesday, July 27, to offer an opportunity for public comment on preliminary design plans and environmental documentation for the S.R. 38 and S.R. 47 improvements within the town of Sheridan. The purpose of this project is to restore the rideability of the roadway, delay further deterioration of the existing asphalt pavement and extend the service life of the roadway.

The informational meeting will be held at the Sheridan Community Center, located at 300 E. 6th St., 46069 in Sheridan. Doors open at 5:30 p.m. for the open house portion of the meeting. The formal presentation will begin at 6:00 p.m.

The S.R. 38 project proposes resurfacing and reconstructing S.R. 38 in Hamilton/Boone County Line to S.R. 47 as this road way is in poor condition due to the existing pavement. It would fully reconstruct pavement from 2nd St. to 6th St. in downtown Sheridan, replace segmented curb with permanent curb, increase turning radii at W. 2nd St. & Sherman St. and E. 6th St. & Main St., replace a majority of sidewalk along 6th St., add sidewalk from Tinker St. to S.R. 47, repair curb ramps throughout entire project limits and replace and repair several drainage structures.

The S.R. 47 project proposes resurfacing and adding 4 feet paved shoulders from Hamilton/Boone County Line to Arrow St., realigning Mule Barn Rd at California St., fully reconstructing the pavement, adding curb and gutter with enclosed drainage, sidewalk and pedestrian crossings from Arrow St. to S.R. 38 and replacing the 4-way stop at S.R. 47 & S.R. 38 with a roundabout.

Most of the S.R. 38 project will be performed under traffic, however there will be planned closures for the full depth pavement replacement between 2nd at 6th St. S.R. 47 will be built in phased closures.

The public information meeting is an opportunity for INDOT to meet with members of the community regarding the road work, solicit input and address concerns community members may have regarding the proposed project. Material from the meeting will be posted on the project website afterwards for anyone who cannot attend [here](#).

## Stay Informed

Motorists in East Central Indiana can monitor road closures, road conditions, and traffic alerts any time via:

- Facebook: [facebook.com/INDOTEast](https://www.facebook.com/INDOTEast)
- Twitter: [@INDOTEast](https://twitter.com/INDOTEast)
- TrafficWise: [511in.org](https://www.511in.org)
- Mobile App: [iTunes App Store](https://itunes.apple.com/us/app/indot-east-central-indiana/id1088888888) and the [Google Play store for Android](https://play.google.com/store/apps/details?id=com.indot.indiana)



## About the Indiana Department of Transportation

Over the past 100 years, INDOT has transformed the state of Indiana into the Crossroads of America we know today. With six district offices and 3,500 employees, the agency is responsible for constructing and maintaining more than 29,000 lane miles of highways, more than 5,700 bridges, and supporting 4,500 rail miles and 117 airports across the state. Indiana once again ranked #1 in the U.S. for infrastructure in CNBC's 2019 "America's Top States for Business" ranking. Learn more about INDOT at [in.gov/indot](https://www.in.gov/indot).

## About the Indiana Hands-Free Law

On July 1, 2020, Governor Eric J. Holcomb signed the Indiana Hands-Free Law to reduce distracted driving across the state. Since then, drivers have been prohibited from holding a mobile device while their vehicles are in motion. With help from the Indiana State Police and other law enforcement agencies, over 5,400 citations and more than 10,500 warnings have been issued. For more information on Indiana's Hands-Free Law, visit [www.HandsFreeIndiana.com](https://www.HandsFreeIndiana.com).

## Customer Service

1-855-463-6848

[www.indot4u.com](https://www.indot4u.com)

[indot@indot.IN.gov](mailto:indot@indot.IN.gov)

## Media Contact

Kyleigh Cramer

317-864-3164

[kcramer@indot.in.gov](mailto:kcramer@indot.in.gov)







# INDOT to hold public hearing for SR 38/SR 47 projects in Sheridan

**POSTED BY: [THE REPORTER](#)** JULY 20, 2022

The Indiana Department of Transportation (INDOT) will hold a public information meeting on Wednesday, July 27, to offer an opportunity for public comment on preliminary design plans and environmental documentation for the State Road 38 and State Road 47 improvements within the town of Sheridan.

The purpose of this project is to restore the rideability of the roadway, delay further deterioration of the existing asphalt pavement, and extend the service life of the roadway.

The informational meeting will be held at the Sheridan Community Center, located at 300 E. 6th St. Doors open at 5:30 p.m. for the open house portion of the meeting. The formal presentation will begin at 6 p.m.

The SR 38 project proposes resurfacing and reconstructing SR 38 from the Hamilton/Boone county line to SR 47 as this roadway is in poor condition due to the existing pavement. It would fully reconstruct pavement from 2nd Street to 6th Street in downtown Sheridan, replace segmented curb with permanent curb, increase turning radii at West 2nd Street and Sherman Street and East 6th Street and Main Street, replace a majority of sidewalk along 6th Street, add sidewalk from Tinker Street to SR 47, repair curb ramps throughout the entire project limits and replace and repair several drainage structures.

The SR 47 project proposes resurfacing and adding four-foot paved shoulders from the Hamilton/Boone county line to Arrow Street, realigning Mule Barn Road at California Street, fully reconstructing the pavement, adding curb and gutter with enclosed drainage, sidewalk and pedestrian crossings from Arrow Street to SR 38 and replacing the four-way stop at SR 47 and SR 38 with a roundabout.

<https://readthereporter.com/indot-to-hold-public-hearing-for-sr-38-sr-47-projects-in-sheridan/>

Most of the SR 38 project will be performed under traffic; however, there will be planned closures for the full depth pavement replacement between 2<sup>nd</sup> and 6<sup>th</sup> streets. SR 47 will be built in phased closures.

The public information meeting is an opportunity for INDOT to meet with members of the community regarding the road work, solicit input, and address concerns community members may have regarding the proposed project. Material from the meeting will be posted on the [project website](#) afterwards for anyone who cannot attend.

**SR 38 & SR 47 Projects**


---

**SR 38 HMA Overlay (Des 1592544)**  
**SR 47 Pavement Reconstruction (Des 1601982)**  
**SR47/SR38 Roundabout Intersection (Des 2000816)**

in Sheridan  
Hamilton County

**Indiana Department of Transportation**

Wednesday, July 27<sup>th</sup>  
6:00pm  
Sheridan Community Center




1

**Welcome**

---

- Public Information Meeting Format
- Team Introductions
- Purpose and Need Overview
- Proposed Project Improvements
  - Maintenance of Traffic
- Environmental Process
- Anticipated Project Schedule
- Open House/Project display area



2

## Public Information Meeting Format

- Meeting Purpose
  - Gather input on the design – written comment forms available
  - Answer any questions from the public
- Meeting Notices
  - Press Release via GovDelivery
  - Flyers were distributed throughout Town
  - **Project Information can be found online at: [Greenfield.indot.in.gov](http://Greenfield.indot.in.gov)**
    - SR 38 & SR 47 Improvements within the Town of Sheridan
- Today's Schedule
  - 5:30 – 6:00 PM Welcome, Sign-in, Open House
  - 6:00 – 6:30 PM Presentation
  - 6:30 – 7:30 PM Open House
- Future Public Hearing – Fall 2022



3

## Project Team

- Jennifer Beck, INDOT Project Manager
- Bill Curtis, Michael Baker Project Manager
- INDOT Greenfield District
  - Customer Service
  - Public Relations Director
  - Environmental Services
- Michael Baker Team
  - Engineering
  - Design
  - Environmental Analysis
- Marie Jett, HNTB R/W Manager
  - Appraisers & Buyers



4

## Project Need

- SR 38
  - Fatigue and block style cracking in the pavement
  - Broken curbs, corners overran by trucks
  - Lacking ADA compliant ramps and sidewalk
- SR 47
  - Very poor quality of pavement – no drainage
  - Narrow lanes with no shoulders or turn lanes
  - Minimal pedestrian facilities
- SR 47 & SR 38 Intersection
  - Near traffic capacity for a 4-way stop



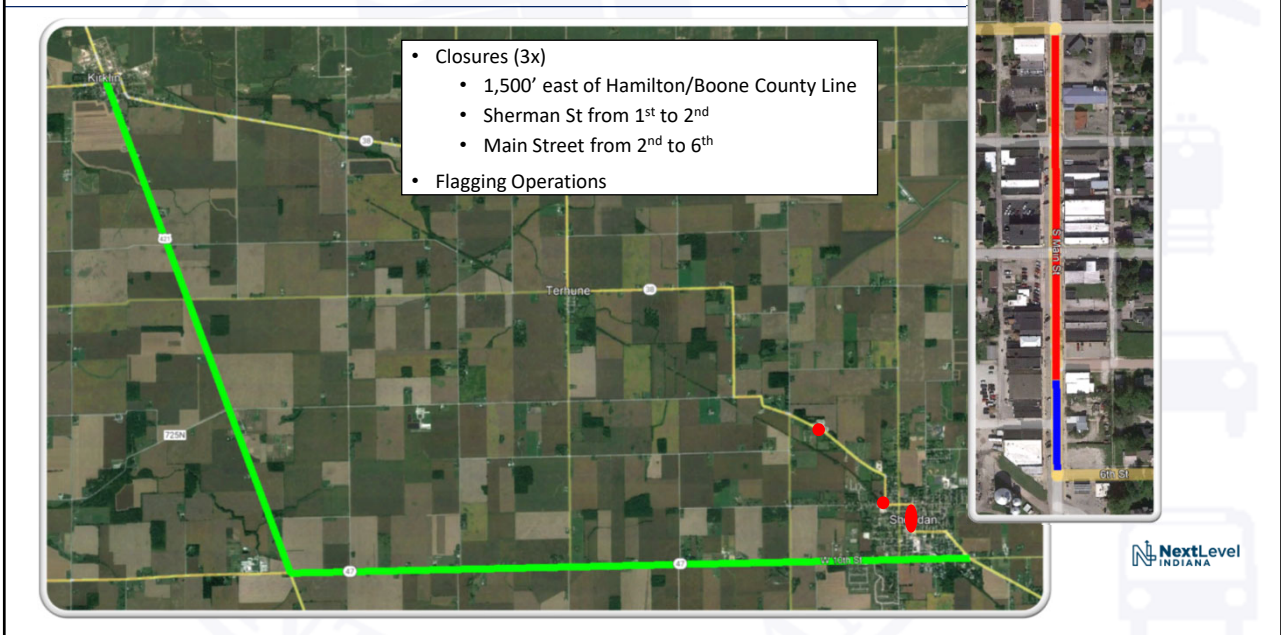
5

## Proposed Project – SR 38



6

# SR 38 – Maintenance of Traffic



7

# Proposed Project – SR 47



8

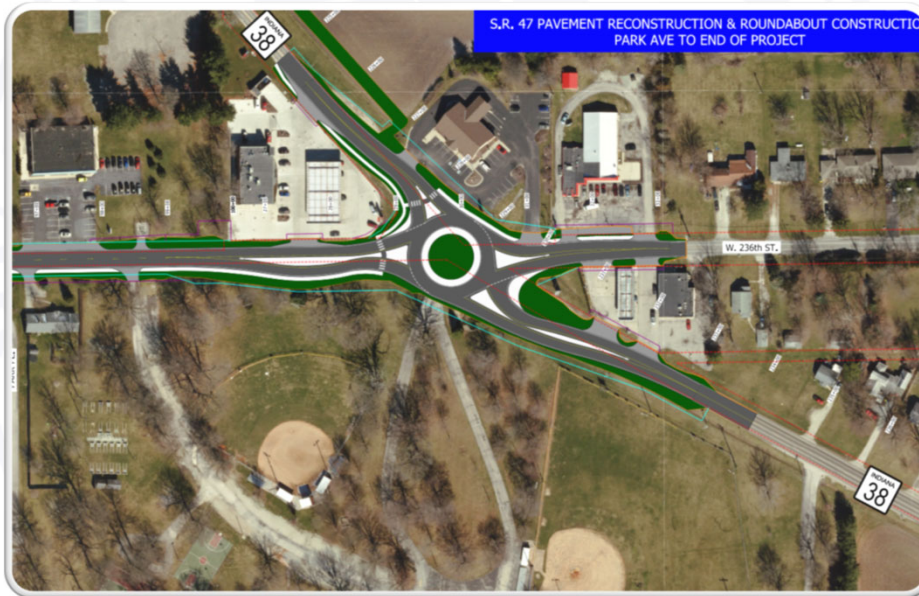
# SR 47 – Maintenance of Traffic

- Closures (3x)
  - Hamilton/Boone County Line to Sheridan Water Tower
  - Sheridan Water Tower to Mule Barn Road
  - Mule Barn Road to 360' west of SR 38



9

# Proposed Project – SR 47 at SR 38 Roundabout



10

## Maintenance of Traffic

- SR 47/SR 38 Roundabout
  - Two Phases (East/West)
    - SR47/236th Street will be closed based on phase
  - Two-way traffic will be maintained via temporary traffic signal



NextLevel  
INDIANA

11

## Environmental Document

### National Environmental Policy Act (NEPA)

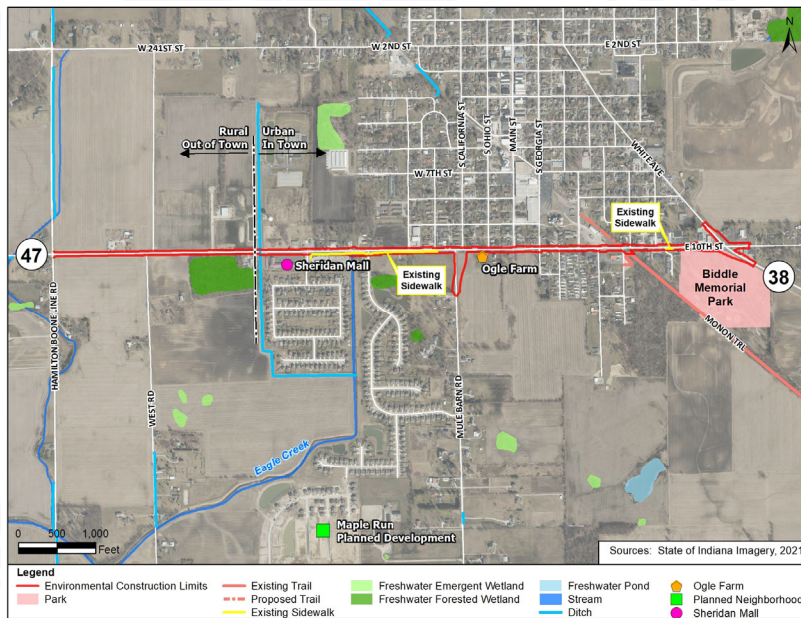
- Requires INDOT to analyze and evaluate the impacts of a proposed project to the natural and socio-economic environments
- NEPA is a decision-making process
  - Purpose and Need
  - Alternatives Screening
  - Preferred Alternative
- **Impacts are analyzed, evaluated, and described in an environmental document**
  - What are the impacts this project might have on the community?
  - How can impacts be avoided?
  - Can impacts be minimized?
  - Mitigation for impacts?
- **Anticipated Environmental document**
  - CE-4
    - Roundabout, change in traffic flow
    - Section 4(f), which are publicly owned resources, *de minimis* use
      - Biddle Memorial Park, Monon Trail and parcel eligible for listing in the National Register for Historic Places

NextLevel  
INDIANA

12

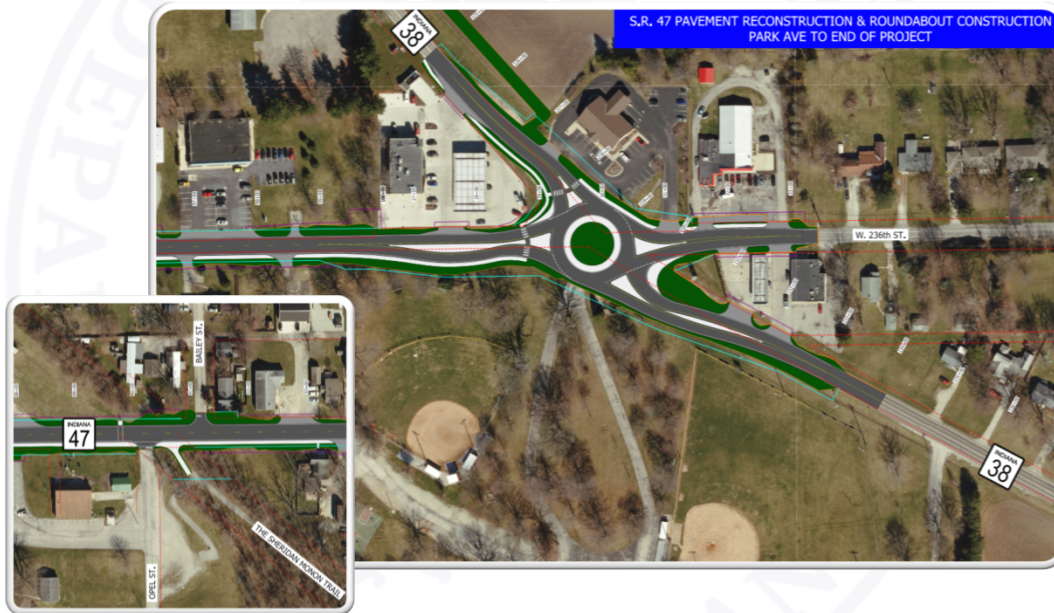


# Existing Conditions/Environmental Review



13

# Section 4 (f) Resources



14

## Section 4 (f) Resources



15

## Project Schedule

### SR 38

- R/W Acquisition Ongoing
- Letting Winter 2022
- Construction 2023

### SR 47 & SR 47/SR 38 Roundabout

- R/W Acquisition Ongoing
- Letting Spring 2023
- Construction 2023 (Utilities) 2024 (Road Construction)

16

## Open House

### **Transportation Services Call Center**

Provides citizens and business customers with a single point of contact to request transportation services, obtain information, or provide feedback through multiple channels of communication.

**855-463-6848 • [INDOT4U.com](http://INDOT4U.com) • [INDOT@indot.in.gov](mailto:INDOT@indot.in.gov)**



855-463-6848



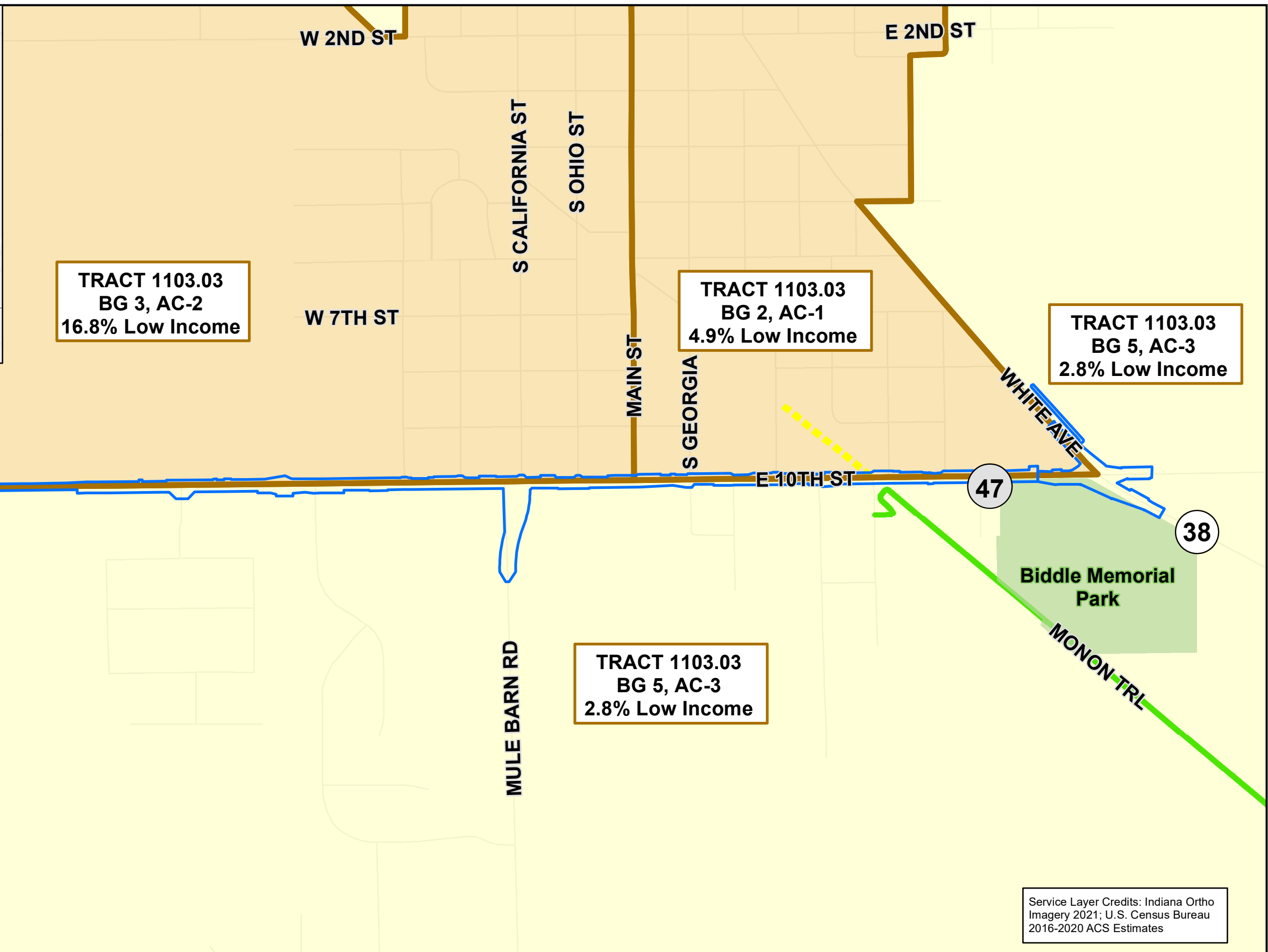
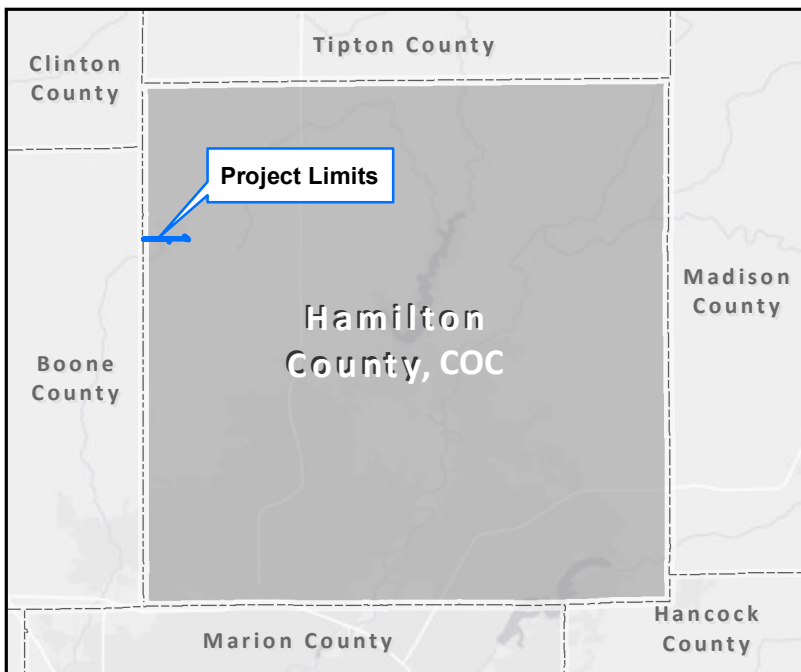
# Appendix H:

## Air Quality

\*Project is in the STIP amendment A24-06 which is currently in progress. The updated 2024-2028 STIP will be included in the final document

# Appendix I:

## Environmental Justice



TRACT 1103.03  
BG 3, AC-2  
16.8% Low Income

TRACT 1103.03  
BG 2, AC-1  
4.9% Low Income

TRACT 1103.03  
BG 5, AC-3  
2.8% Low Income

TRACT 1103.03  
BG 5, AC-3  
2.8% Low Income

Service Layer Credits: Indiana Ortho  
Imagery 2021; U.S. Census Bureau  
2016-2020 ACS Estimates

**Legend**

- Census Block Group Boundary (2020)
- Environmental Construction Limits

**Percent Low Income Households**

- <3.71%
- >=3.71% (EJ Concern)

- Park
- Existing Trail
- Proposed Trail

0 600 Feet

**SR 47 Roadway Reconstruction &  
SR 47/SR 38 Roundabout  
DES NO 1601982 & 2000816  
Hamilton County, Indiana  
Environmental Justice (EJ) Analysis**


<b>POVERTY STATUS IN THE PAST 12 MONTHS OF FAMILIES BY FAMILY TYPE BY PRESENCE OF RELATED CHILDREN UNDER 18 YEARS BY AGE OF RELATED CHILDREN</b>		
<b>Note: The table shown may have been modified by user selections. Some information may be missing.</b>		
<b>DATA NOTES</b>		
TABLE ID:	B17010	
SURVEY/PROGRAM:	American Community Survey	
VINTAGE:	2020	
DATASET:	ACSDT5Y2020	
PRODUCT:	ACS 5-Year Estimates Detailed Tables	
UNIVERSE:	Families	
FTP URL:	None	
API URL:	<a href="https://api.census.gov/data/2020/acs/acs5">https://api.census.gov/data/2020/acs/acs5</a>	
<b>USER SELECTIONS</b>		
GEOS	Hamilton County, Indiana; Block Group 2, Census Tract 1103.03, Hamilton County, Indiana; Block Group 3, Census Tract 1103.03, Hamilton County, Indiana; Block Group 5, Census Tract 1103.03, Hamilton County, Indiana	
DATASETS	ACS 5-Year Estimates Detailed Tables	
<b>EXCLUDED COLUMNS</b>		
	None	
<b>APPLIED FILTERS</b>		
	None	
<b>APPLIED SORTS</b>		
	None	
<b>PIVOT &amp; GROUPING</b>		
	None	
<b>WEB ADDRESS</b>		
	<a href="https://data.census.gov/cedsci/table?q=United%20States&amp;g=0400000US18_0500000US18057_1500000US180571103032,180571103033,180571103035&amp;d=ACS%205-Year%20Estimates%20Detailed%20Tables&amp;tid=ACSDT5Y2020.B17010">https://data.census.gov/cedsci/table?q=United%20States&amp;g=0400000US18_0500000US18057_1500000US180571103032,180571103033,180571103035&amp;d=ACS%205-Year%20Estimates%20Detailed%20Tables&amp;tid=ACSDT5Y2020.B17010</a>	

Table: ACSDT5Y2020.B17010

<p><b>TABLE NOTES</b></p>	<p>Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2020, the 2020 Census provides the official counts of the population and housing units for the nation, states, counties, cities, and towns. For 2016 to 2019, the Population Estimates Program provides estimates of the population for the nation, states, counties, cities, and towns and intercensal housing unit estimates for the nation, states, and counties.</p>
	<p>Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.</p> <p>Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.</p>
	<p>Source: U.S. Census Bureau, 2016-2020 American Community Survey 5-Year Estimates</p>
	<p>Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.</p>
	<p>The categories for relationship to householder were revised in 2019. For more information see Revisions to the Relationship to Household item.</p>
	<p>The 2016-2020 American Community Survey (ACS) data generally reflect the September 2018 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances, the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities.</p>
	<p>Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.</p>



Table: ACSDT5Y2020.B17010

	<p>Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution.N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available.median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-")median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+").** The margin of error could not be computed because there were an insufficient number of sample observations.*** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.***** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.</p>
<b>COLUMN NOTES</b>	None

Table: ACSDT5Y2020.B17010

Label	Hamilton County, Indiana		Block Group 2, Census Tract 1103.03, Hamilton County, Indiana	
	Estimate	Margin of Error	Estimate	Margin of Error
Total:	92,017	±1,380	204	±76
Income in the past 12 months below poverty level:	2,730	±487	10	±11
Married-couple family:	1,088	±313	5	±8
With related children of the householder under 18 years:	702	±275	0	±12
Under 5 years only	62	±66	0	±12
Under 5 years and 5 to 17 years	240	±149	0	±12
5 to 17 years only	400	±181	0	±12
No related children of the householder under 18 years	386	±153	5	±8
Other family:	1,642	±375	5	±8
Male householder, no spouse present:	178	±90	0	±12
With related children of the householder under 18 years:	138	±85	0	±12
Under 5 years only	22	±31	0	±12
Under 5 years and 5 to 17 years	8	±14	0	±12
5 to 17 years only	108	±79	0	±12
No related children of the householder under 18 years	40	±32	0	±12
Female householder, no spouse present:	1,464	±353	5	±8

Table: ACSDT5Y2020.B17010

Label	Block Group 3, Census Tract 1103.03, Hamilton County, Indiana		Block Group 5, Census Tract 1103.03, Hamilton County, Indiana	
	Estimate	Margin of Error	Estimate	Margin of Error
Total:	262	±92	650	±125
Income in the past 12 months below poverty level:	44	±75	18	±20
Married-couple family:	0	±12	5	±10
With related children of the householder under 18 years:	0	±12	0	±12
Under 5 years only	0	±12	0	±12
Under 5 years and 5 to 17 years	0	±12	0	±12
5 to 17 years only	0	±12	0	±12
No related children of the householder under 18 years	0	±12	5	±10
Other family:	44	±75	13	±17
Male householder, no spouse present:	0	±12	8	±14
With related children of the householder under 18 years:	0	±12	8	±14
Under 5 years only	0	±12	0	±12
Under 5 years and 5 to 17 years	0	±12	8	±14
5 to 17 years only	0	±12	0	±12
No related children of the householder under 18 years	0	±12	0	±12
Female householder, no spouse present:	44	±75	5	±9

Table: ACSDT5Y2020.B17010

Label	Hamilton County, Indiana		Block Group 2, Census Tract 1103.03, Hamilton County, Indiana	
	Estimate	Margin of Error	Estimate	Margin of Error
With related children of the householder under 18 years:	1,383	±336	5	±8
Under 5 years only	266	±146	0	±12
Under 5 years and 5 to 17 years	315	±184	0	±12
5 to 17 years only	802	±257	5	±8
No related children of the householder under 18 years	81	±98	0	±12
Income in the past 12 months at or above poverty level:	89,287	±1,433	194	±75
Married-couple family:	76,457	±1,826	94	±50
With related children of the householder under 18 years:	39,108	±1,271	37	±27
Under 5 years only	7,303	±751	0	±12
Under 5 years and 5 to 17 years	7,453	±783	12	±14
5 to 17 years only	24,352	±1,182	25	±23
No related children of the householder under 18 years	37,349	±1,542	57	±39
Other family:	12,830	±1,127	100	±65
Male householder, no spouse present:	4,435	±633	18	±19
With related children of the householder under 18 years:	2,701	±462	13	±15
Under 5 years only	444	±243	7	±11

Table: ACSDT5Y2020.B17010

	Block Group 3, Census Tract 1103.03, Hamilton County, Indiana		Block Group 5, Census Tract 1103.03, Hamilton County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error
With related children of the householder under 18 years:	44	±75	5	±9
Under 5 years only	44	±75	5	±9
Under 5 years and 5 to 17 years	0	±12	0	±12
5 to 17 years only	0	±12	0	±12
No related children of the householder under 18 years	0	±12	0	±12
Income in the past 12 months at or above poverty level:	218	±54	632	±128
Married-couple family:	126	±50	563	±127
With related children of the householder under 18 years:	46	±35	241	±83
Under 5 years only	0	±12	26	±22
Under 5 years and 5 to 17 years	29	±31	59	±39
5 to 17 years only	17	±18	156	±83
No related children of the householder under 18 years	80	±36	322	±130
Other family:	92	±45	69	±40
Male householder, no spouse present:	48	±40	0	±12
With related children of the householder under 18 years:	35	±35	0	±12
Under 5 years only	0	±12	0	±12

Table: ACSDT5Y2020.B17010

	Hamilton County, Indiana		Block Group 2, Census Tract 1103.03, Hamilton County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error
Under 5 years and 5 to 17 years	158	±112	0	±12
5 to 17 years only	2,099	±388	6	±9
No related children of the householder under 18 years	1,734	±449	5	±10
Female householder, no spouse present:	8,395	±895	82	±63
With related children of the householder under 18 years:	5,581	±781	37	±31
Under 5 years only	641	±242	8	±13
Under 5 years and 5 to 17 years	290	±177	7	±12
5 to 17 years only	4,650	±703	22	±25
No related children of the householder under 18 years	2,814	±579	45	±55
Percent Below Poverty Level	2.97%		4.90%	
125% of COC	3.71%			

Table: ACSDT5Y2020.B17010

	Block Group 3, Census Tract 1103.03, Hamilton County, Indiana		Block Group 5, Census Tract 1103.03, Hamilton County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error
Under 5 years and 5 to 17 years	12	±20	0	±12
5 to 17 years only	23	±30	0	±12
No related children of the householder under 18 years	13	±21	0	±12
Female householder, no spouse present:	44	±30	69	±40
With related children of the householder under 18 years:	35	±30	50	±37
Under 5 years only	0	±12	16	±27
Under 5 years and 5 to 17 years	8	±12	0	±12
5 to 17 years only	27	±28	34	±28
No related children of the householder under 18 years	9	±13	19	±17
Percent Below Poverty Level 125% of COC	16.79%		2.77%	

<b>RACE</b>		<b>United States<sup>®</sup> Census Bureau</b>
<b>Note: The table shown may have been modified by user selections. Some information may be missing.</b>		
<b>DATA NOTES</b>		
TABLE ID:	B02001	
SURVEY/PROGRAM:	American Community Survey	
VINTAGE:	2020	
DATASET:	ACSDT5Y2020	
PRODUCT:	ACS 5-Year Estimates Detailed Tables	
UNIVERSE:	Total population	
FTP URL:	None	
API URL:	<a href="https://api.census.gov/data/2020/acs/acs5">https://api.census.gov/data/2020/acs/acs5</a>	
<b>USER SELECTIONS</b>		
GEOS	Hamilton County, Indiana; Block Group 2, Census Tract 1103.03, Hamilton County, Indiana; Block Group 3, Census Tract 1103.03, Hamilton County, Indiana; Block Group 5, Census Tract 1103.03, Hamilton County, Indiana	
DATASETS	ACS 5-Year Estimates Detailed Tables	
<b>EXCLUDED COLUMNS</b>		
	None	
<b>APPLIED FILTERS</b>		
	None	
<b>APPLIED SORTS</b>		
	None	
<b>PIVOT &amp; GROUPING</b>		
	None	
<b>WEB ADDRESS</b>		
	<a href="https://data.census.gov/cedsci/table?q=United%20States&amp;g=0400000US18_0500000US18057_1500000US180571103032,180571103033,180571103035&amp;d=ACS%205-Year%20Estimates%20Detailed%20Tables&amp;tid=ACSDT5Y2020.B02001">https://data.census.gov/cedsci/table?q=United%20States&amp;g=0400000US18_0500000US18057_1500000US180571103032,180571103033,180571103035&amp;d=ACS%205-Year%20Estimates%20Detailed%20Tables&amp;tid=ACSDT5Y2020.B02001</a>	



Table: ACSDT5Y2020.B02001

<p><b>TABLE NOTES</b></p>	<p>Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2020, the 2020 Census provides the official counts of the population and housing units for the nation, states, counties, cities, and towns. For 2016 to 2019, the Population Estimates Program provides estimates of the population for the nation, states, counties, cities, and towns and intercensal housing unit estimates for the nation, states, and counties.</p>
	<p>Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.</p> <p>Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.</p>
	<p>Source: U.S. Census Bureau, 2016-2020 American Community Survey 5-Year Estimates</p>
	<p>Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.</p>
	<p>The Hispanic origin and race codes were updated in 2020. For more information on the Hispanic origin and race code changes, please visit the American Community Survey Technical Documentation website.</p>
	<p>The 2016-2020 American Community Survey (ACS) data generally reflect the September 2018 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances, the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities.</p>
	<p>Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.</p>

Table: ACSDT5Y2020.B02001

	<p>Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available. median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-") median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+"). ** The margin of error could not be computed because there were an insufficient number of sample observations. *** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution. **** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.</p>
<b>COLUMN NOTES</b>	None

Table: ACSDT5Y2020.B02001

	Hamilton County, Indiana		Block Group 2, Census Tract 1103.03, Hamilton County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error
Total:	330,455	*****	802	±214
White alone	284,188	±786	802	±214
Black or African American alone	12,919	±698	0	±12
American Indian and Alaska Native alone	514	±128	0	±12
Asian alone	20,014	±794	0	±12
Native Hawaiian and Other Pacific Islander alone	102	±47	0	±12
Some other race alone	2,682	±699	0	±12
Two or more races:	10,036	±1,209	0	±12
Two races including Some other race	1,871	±548	0	±12
Two races excluding Some other race, and three or more races	8,165	±1,053	0	±12
Non-White	46,267		0	
Percent Minority Population	14.00%		0.00%	

Table: ACSDT5Y2020.B02001

	Block Group 3, Census Tract 1103.03, Hamilton County, Indiana		Block Group 5, Census Tract 1103.03, Hamilton County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error
Total:	1,114	±302	2,182	±327
White alone	1,012	±257	2,136	±330
Black or African American alone	0	±12	0	±12
American Indian and Alaska Native alone	0	±12	0	±12
Asian alone	0	±12	12	±13
Native Hawaiian and Other Pacific Islander alone	0	±12	0	±12
Some other race alone	7	±11	1	±3
Two or more races:	95	±154	33	±37
Two races including Some other race	0	±12	6	±14
Two races excluding Some other race, and three or more races	95	±154	27	±33
Non-White	102		46	
Percent Minority Population	9.16%		2.11%	

**From:** [Fair, Terri](#)  
**To:** [Jack, Laura](#)  
**Cc:** [Passmore, Andrew D](#)  
**Subject:** EXTERNAL: Des 1601982 & 2000816 SR 47 Rd Reconstruction and SR 47/SR 38 Roundabout EJ Analysis  
**Date:** Friday, December 8, 2023 1:42:50 PM  
**Attachments:** [2023.1206. Des 1601982 2000816 Environmental Justice Analysis.pdf](#)

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**EXTERNAL EMAIL**

INDOT-Environmental Services Division (ESD) has reviewed the project information along with the Environmental Justice (EJ) Analysis for the above referenced project. With the information provided, the project may require right-of-way, requires no relocations, and would not disrupt community cohesion or create a physical barrier. With the information provided, INDOT-ESD would not consider the impacts associated with this project as causing a disproportionately high and adverse effect on minority and/or low-income populations of EJ concern relative to non-EJ populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23a. No further EJ Analysis is required.

# Appendix J:

## Additional Studies

PUBLISHER'S AFFIDAVIT

State of Indiana )  
 ) ss:  
**Hamilton** County )

Personally appeared before me, a notary public in and for said county and state, the undersigned Tim Timmons who, being duly sworn, says that he is Publisher of **The Times** newspaper of general circulation printed and published in the English language in the city of **Noblesville** in state and county afore-said, and that the printed matter attached hereto is a true copy, which was duly published in said paper for **1** time(s), the date(s) of publication being as follows:

**8/18/2021**



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Subscribed and sworn to before me this **18** day of **August, 2021**.

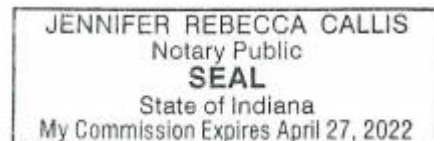


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Notary Public

My commission expires: **04/27/2022**  
**Jennifer Rebecca Callis**  
**Resident of Montgomery County**

Publisher's Fee: **\$242.36**



**Cause #NOI (INDOT Des. No. 1601982), (INDOT Des. No. 2000816)**  
**TICKET: TL18176**

PUBLIC NOTICES

LEGAL ADVERTISEMENT NOTIFICATION OF CONSTRUCTION ACTIVITY

Wilfong Land Companies, (14199 Nicholas Drive, Carmel, IN 46074) is submitting a Notice of Intent to the Indiana Department of Environmental Management of our intent to comply with the requirements of 327 IAC 15-5 to discharge storm water from construction activities associated with the Sonic Project is located at The NW corner of East Spring Mill Pointe Drive and Austrian Pine Way, Westfield, Hamilton County, Indiana. Run-off from the project site will discharge into the SR32 Arm of the Anna Kendall Drain. Questions or comments regarding this project should be directed to Beau Wilfong of Wilfong Land Companies at the above mentioned address.

LEGAL ADVERTISEMENT NOTIFICATION OF CONSTRUCTION ACTIVITY

In compliance with Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 USC 303), hereafter referred to as "Section 4(f)" of 23 CFR 774.5(b)(2), the public is being notified through this notice that the Indiana Department of Transportation (INDOT) will request the Federal Highway Administration (FHWA) to make a de minimis (or minor) use finding for impacts to the Monon Trail and Biddle Memorial Park from the SR 47 Road Reconstruction and Mule Barn Road Realignment (INDOT Des. No. 1601982) and SR 47 and SR 38 Roundabout (Des. No. 2000816) projects. These projects are located on SR 47 from the Boone/Hamilton County Line (CR N 1200 E) through the SR 47 and SR 38 intersection and on Mule Barn Road approximately 0.11 mile south of SR 47 in Sheridan, Hamilton County, Indiana. Public notice and opportunity for public review and comment on the de minimis use is required.

The western 0.5 mile of SR 47 includes patching, milling, overlay and widening. The remainder of SR 47 would be reconstructed with new pavement and drainage features. Mule Barn Road would be reconstructed and realigned with California Street. The intersection of SR 47 and SR 38 would be reconstructed as a single lane roundabout intersection. The Monon Trail would be extended to meet the SR 47 roadway and a crosswalk would be added across SR 47. The projects would be split into two phases for construction. Phase 1 for the SR 47 Road Reconstruction and Mule Barn Road Realignment and Phase 2 for the SR 47/SR 38 Roundabout. INDOT is leading these projects in close collaboration with the Town of Sheridan.

Approximately 0.58 acre of permanent right-of-way (ROW) would be needed from the CSX Transportation to extend the Monon Trail and approximately 0.88 acre of permanent ROW would be needed from Biddle Memorial Park to construct the proposed SR 47 roadway reconstruction and roundabout at the SR 47 and SR 38 intersection. Approximately 0.05 acre of temporary ROW would also be needed from Biddle Memorial Park during construction.

The proposed work would involve the northern portion of the Monon Trail in the Town of Sheridan. The trail currently ends and connects to a gravel parking lot. Construction would occur at the northern end of the trail to extend the trail to meet SR 47. The trail would be temporarily closed at this location during construction from August 2023 to November 2023. After construction, the trail would be fully reopened and connect to SR 47.

The proposed work would involve removal of one of the three existing entrances to Biddle Memorial Park at the SR 47 and SR 38 intersection to allow the construction of the roundabout. There would still be access to Biddle Memorial Park from the SR 47 access located on the west end of the park and the SR 38 (also referred to as Sheridan Avenue) access on the east end of the park. There would be temporary closure of the SR 47 entrance during construction from August 2023 to November 2023. The park would remain open to the greatest extent possible during all construction phases.

The full duration for the Phase 1 construction is from August 2023 to November 2023. Phase 2 construction would occur at a later date. There would be no change of ownership for the Monon Trail or Biddle Memorial Park. While there would be a physical change to the driveway of the park and the trail, the functionality of these entities would remain unchanged. The designed action will not adversely impact the activities, features, and attributes that qualify the properties for protection under Section 4(f) of the Department of Transportation Act of 1966 and in accordance with SAFETEA-LU Section 6009 (a). As such, it is the intent of INDOT, along with the Federal Highway Administration to issue a finding of de minimis.

INDOT has coordinated with the Town of Sheridan, the officials with jurisdiction over the Monon Trail and Biddle Memorial Park. In accordance with SAFETEA-LU Section 6009 (a), the views of the public are being sought regarding the effect of the proposed project on the public recreational area. Please respond with any comments no later than September 17, 2021 to the contact information below. The public is requested to provide comments on this use of Section 4(f) resources. Information on this proposed project is available by contacting Jennifer Beck, at the following:

Indiana Department of Transportation
32 S. Broadway Street
Greenfield, IN 46140
(317) 525-4995
E-Mail: jbeck@indot.in.gov

Comments must be submitted, in writing, to Jennifer Beck, Indiana Department of Transportation during the 30-day comment period. The comment deadline is September 17, 2021. Comments will be discussed with the officials with jurisdiction before concurrence is requested and will become part of the environmental document.

TL18176 8/18 1t hspaxlp

SS COURT
COUNTY OF HAMILTON ) ESTATE NO.: 29D01-2108-EU-000371
IN THE MATTER OF THE UNSUPERVISED )
ADMINISTRATION OF THE ESTATE OF )
SANDRA FINK, DECEASED )

NOTICE OF UNSUPERVISED ADMINISTRATION

Notice is hereby given that Sarah Rae Bender Sanfrey was on August 5, 2021, appointed administrator of the Estate of Sandra Fink, deceased, who died on the 7th day of July, 2021.

All persons who have claims against this Estate, whether or not now due, must file the claim in the Office of the Clerk of this Court within three (3) months from the date of the first publication of this notice or within nine (9) months after the Decedent's death, whichever is earlier, or the claims will be forever barred. Dated at Noblesville, Indiana, this August 5, 2021.

Kathy Kreag Williams
Clerk of the Superior Court
Hamilton County, Indiana
TL18175 8/18 8/25 2t hspaxlp

NOTICE TO PROPERTY OWNERS OF PUBLIC HEARING
Board of Zoning Appeals
City of Noblesville, Indiana

This notice is to inform you of a Public Hearing that will be held by the Noblesville Board of Zoning Appeals on the 7th day of September, 2021. This hearing, to discuss application BZNA-0154-2021, will begin at 6:00 p.m. in the Common Council Chambers, Noblesville City Hall at 16 South 10th Street. The applications, submitted by the City of Noblesville request that approval be granted for a Variance of Development Standards from Unified Development Ordinance (UDO) § 10.0.4.B.1. to reduce the required parking lot setback at 16605 Mercantile Boulevard, that approval be granted for a Variance of Development Standards from UDO § 12.0.5.D.2. to eliminate required parking perimeter landscaping at 16605 Mercantile Boulevard, and that approval be granted for a Variance of Development Standards from UDO § 12.0.8.B.1. to eliminate required trash receptacle screening for 16605 Mercantile Boulevard.

Written suggestions or objections relative to the application above may be filed with the Department of Planning and Development, at or before such meeting, and will be heard by the Noblesville Board of Zoning Appeals. Interested persons desiring to present their views, either in writing or verbally, will have an opportunity to be heard at the above-mentioned time and place.

This hearing may be continued from time to time as found necessary by the Noblesville Board of Zoning Appeals. A copy of the proposal is on file in the Department of Planning and Development at 16 South 10th Street, Suite B140 and may be reviewed during regular office hours: 8:00 a.m. to 4:30 p.m. A copy of the file may also be viewed on the Department of Planning website, http://www.cityofnoblesville.org/planning, by clicking the Boards & Committees button, clicking the icon on the map relating to this location and selecting the application materials link.

Noblesville Board of Zoning Appeals
Caleb Gutshall, Secretary

TL18174 8/18 1t hspaxlp

STATE OF INDIANA ) IN THE HAMILTON COUNTY SUPERIOR COURT
) SS:
COUNTY OF HAMILTON ) CAUSE NO. 29D01-2107-EU-000325
IN THE MATTER OF THE UNSUPERVISED )
ADMINISTRATION OF THE ESTATE OF )
BARBARA G. TAYLOR, DECEASED. )

NOTICE OF ADMINISTRATION

IN THE SUPERIOR COURT OF HAMILTON COUNTY, INDIANA
In the matter of the estate of Barbara G. Taylor, deceased.
Estate Docket: 29D01-2107-EU-000325

Notice is hereby given that on July 7, 2021, Maurice E. Taylor, Jr. was appointed Personal Representative of the estate of Barbara G. Taylor, deceased, who died on April 28, 2021.

All persons having claims against said estate, whether or not now due, must file the claim in the office of the Clerk of this Court within three (3) months from the date of the first publication of this notice, or within nine (9) months after the decedent's death, whichever is earlier, or the claims will be forever barred. Dated at Noblesville, Indiana, this July 7, 2021.

Kathy Kreag Williams
Clerk of the Hamilton Superior Court

Prepared by:
Anna M. Howard, Atty. #28606-49
SEVERNS & HOWARD
10293 N. Meridian Street, Suite 150
Carmel, Indiana 46290
(317) 817-0300

TL18173 8/18 8/25 2t hspaxlp

STATE OF INDIANA ) IN THE HAMILTON COUNTY SUPERIOR
) SS COURT
COUNTY OF HAMILTON ) ESTATE NO.: 29D01-2108-EU-000379
IN THE MATTER OF THE UNSUPERVISED )
ADMINISTRATION OF THE ESTATE OF )
JAVIER A. BOBBIO, DECEASED )

NOTICE OF ADMINISTRATION

IN THE SUPERIOR COURT OF HAMILTON COUNTY, INDIANA.
In the matter of Javier A. Bobbio, deceased.
Cause Number: 29D01-2108-EU-000379

Notice is hereby given that on August 10, 2021, Sara I. Diaz was appointed personal representative of the estate of Javier A. Bobbio, deceased, who died on the 7th day of June, 2020.

All persons who have claims against this Estate, whether or not now due, must file the claim in the Office of the Clerk of this Court within three (3) months from the date of the first publication of this notice or within nine (9) months after the Decedent's death, whichever is earlier, or the claims will be forever barred. Dated at Noblesville, Indiana, this August 10, 2021.

Kathy Kreag Williams
Clerk of the Superior Court
Hamilton County, Indiana

Gregory M. Halcomb
HALCOMB I SINGLER, LLP
789 W. Main St.
Carmel, IN 46032
(317) 575-8222

TL18171 8/18 8/25 2t hspaxlp

Monon Greenway to close for resurfacing project

Beginning on or around Monday, August 23, the 146th Street to 1st Street NW section of the Monon Greenway will close for resurfacing. This will be a multi-day project ending by Friday, August 27 involving two coats of asphalt and lane striping.

Resurfacing of the section from 1st Street NW to Main Street will initiate on or around Monday, August 30 in coordination with the City of Carmel's crossing at 1st Street NW. The trail will reopen by Wednesday,

September 1. Thank you in advance for your patience. Plans may change dependent on weather and conditions. If you have any questions or concerns about the closures, please contact Michael Allen, Director of Parks & Natural Resources, at mallen@carmelclay-parks.com.

ABOUT CARMEL CLAY PARKS & RECREATION Carmel Clay Parks & Recreation (CCPR) holds the Gold Medal Award

for Excellence in Park and Recreation Management by the American Academy for Park and Recreation Administration (AAPRA) in partnership with the National Recreation and Park Association (NRPA) for parks serving populations of 75,001 to 150,000. As an accredited agency, the department serves the recreation, fitness and nature needs of the community, manages and develops existing spaces and resources and creates a sustainable future for parks and rec-

reation programs through a financially viable and environmentally conscious parks system. CCPR manages and maintains more than 500 park acres and numerous recreation facilities, including the Monon Community Center and The Waterpark. In addition, CCPR has partnered with Carmel Clay Schools to establish Extended School Enrichment (ESE), a before and after-school care program for K-6 students located at all eleven Carmel elementary schools.

CRASH

From Page A1

Hamilton Southeastern High School, died in the crash. Brianna Foster was a 2020 HSE graduate. Parents and classmates across the Hamilton Southeastern school district as well as families across the Fishers community are heartbroken over the loss.

The owner of Jack's Donuts in Fishers had close ties to Brianna Foster and her family. Jack's donated 100 percent of the store's profits on Tuesday to help the loved ones of all four teens. Jack's sold out by mid-morning.

"I am deeply saddened to hear of the young lives lost today," Fishers Mayor

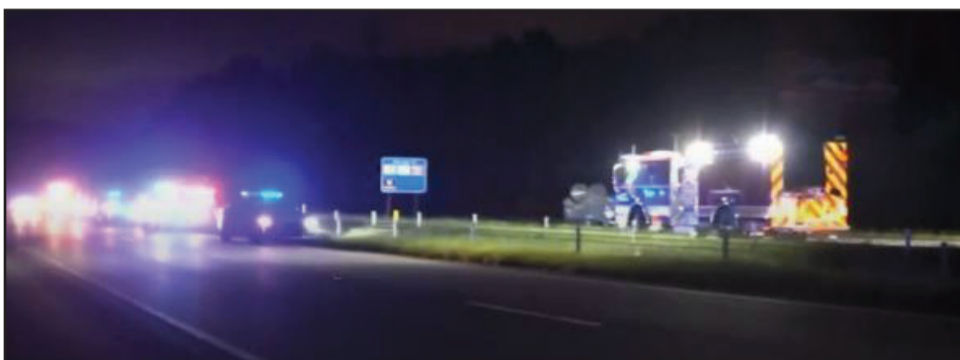


Photo courtesy of WTHR

Families from all across the Fishers community are heartbroken over the loss.

Scott Fadness said in a statement. "These young women were members of the HSE and Fishers family, and their tragic loss will be felt throughout our entire community. Our

thoughts and prayers are with the families of those deceased and injured in this terrible accident. I hope with this sad news that we can put our differences aside to support and

mourn with the families. Our community has always taken care of one another and I have every confidence that we can come together in this difficult moment."

EMPLOYMENT OPPORTUNITY

Sheridan Street Department has an immediate full-time position available. You may pick up a job description and application at the Sheridan Town Hall located at 506 South Main Street, Sheridan, IN 46069 or you may mail your Resume to the same address. The deadline to apply is Monday, July 26, 2021, by 4:00 p.m. No calls please.

Equal Employment Opportunity Employer Participates in E-Verify



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Noblesville, IN 46062

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Interested? Send us an email with your resume or why you think you would be a good fit for us to jobs@thetimes24-7.com



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AUGUST 28, 2021 NOON - 10 PM

LIVE MUSIC

1 pm - Highland Reign
4:30 pm - War Radio
8 pm - Strawbury Jam

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\$7 ADULTS
\$3 STUDENTS
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# INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue  
Room N758-ES  
Indianapolis, Indiana 46204

PHONE: 1-855-463-6848

**Eric Holcomb, Governor**  
**Joe McGuinness, Commissioner**

September 17, 2021

Town of Sheridan  
506 S. Main Street  
Sheridan, IN 46069

**Subject: Section 4(f) *de minimis* use of the Monon Trail and Biddle Memorial Park for SR 47 Road Reconstruction and Mule Barn Road Realignment (Des. No. 1601982) and SR 47 and SR 38 Roundabout (Des. No. 2000816) Official with Jurisdiction Concurrence**

Dear Town of Sheridan,

The purpose of this correspondence is to document that the official with jurisdiction (OWJ), which is the Town of Sheridan, understands that the following proposed projects will impact Section 4(f) resources under their jurisdiction and concurs with the measures to minimize harm and the assessment of impacts to the Section 4(f) resources.

The Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) have two proposed improvement projects, SR 47 Road Reconstruction and Mule Barn Road Realignment (INDOT Des. No. 1601982) and SR 47 and SR 38 Roundabout (INDOT Des. No. 2000816). These projects are located on SR 47 from the Boone/Hamilton County Line (CR N 1200 E) through the SR 47 and SR 38 intersection and on Mule Barn Road approximately 0.11 mile south of SR 47 in Sheridan, Hamilton County, Indiana.

The proposed work will be split into two phases, Phase 1 for the SR 47 Road Reconstruction and Mule Barn Road Realignment and Phase 2 for the SR 47/SR 38 Roundabout. The full duration for Phase 1 is from August 2023 to November 2023. Phase 2 construction will occur at a later date. Phase 1 includes patching, milling, overlay, and widening on the western 0.5 mile of SR 47. The remainder of SR 47 will be reconstructed with new pavement and drainage features. Mule Barn Road will be reconstructed and realigned with California Street. The proposed work will involve the northern portion of the Monon Trail. The trail currently ends and connects to a gravel parking lot. Construction would occur at the northern end of the trail to extend the trail to meet SR 47. The Monon Trail will extend to meet the SR 47 roadway and a crosswalk will be added across SR 47. The trail will be temporarily closed at this location during construction from August 2023 to November 2023. After construction, the trail would be fully reopened and connect to SR 47. There will be a temporary closure of the SR 47 entrance to Biddle Memorial Park during construction from August 2023 to November 2023. There will still be access to Biddle Memorial Park from two other entrances.

Phase 2 includes reconstruction of the intersection of SR 47 and SR 38 to a single lane roundabout intersection. The proposed work will remove an entrance to Biddle Memorial Park at the SR 47 and SR 38 intersection to

[www.in.gov/dot/](http://www.in.gov/dot/)

***An Equal Opportunity Employer***

allow the construction of the roundabout. There are three existing entrances to Biddle Memorial Park. The entrance to be removed connects to an existing driveway that would be modified after the closure. After construction, there will still be two permanent access locations to Biddle Memorial Park, the SR 47 access located on the west end of the park and the SR 38 (also referred to as Sheridan Avenue) access on the east end of the park. The park will remain open to the greatest extent possible during construction.

Biddle Memorial Park is a publicly owned park/recreation area, and the Monon Trail is a publicly owned recreation trail therefore they are classified as Section 4(f) resources. The projects will not result in a change of ownership for Biddle Memorial Park or the Monon Trail. While there will be a physical change to the driveway of the park and the trail, the functionality of these entities will remain unchanged.

The projects will require approximately 0.58 acre of permanent right-of-way (ROW) from CSX Transportation to extend the Monon Trail to connect to the improved sidewalk and crosswalk associated with the new roadway. Approximately 0.88 acre of permanent ROW is needed from Biddle Memorial Park to construct the proposed SR 47 roadway reconstruction and the new roundabout at the SR 47 and SR 38 intersection. Approximately 0.05 acre of temporary ROW will also be required from Biddle Memorial Park during construction.

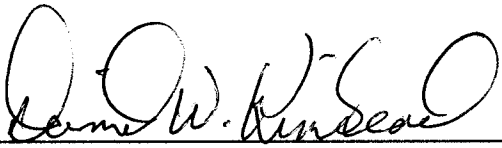
The following measures to minimize harm will be incorporated into the project and will be provided as project commitments:

1. Upgrade the entrance to Biddle Memorial Park on SR 47
2. Connect the Monon Trail to the SR 47 sidewalk
  - i. With the Town of Sheridan building a new segment of the Monon Trail north of SR 47, INDOT will install a crossing on SR 47 for connection to the northern limits of the trail
3. Pay a cost to cure for the Biddle Memorial Park sign and reestablish vehicular circulation within the park (connect the two roads that connected to the existing drive at the intersection)

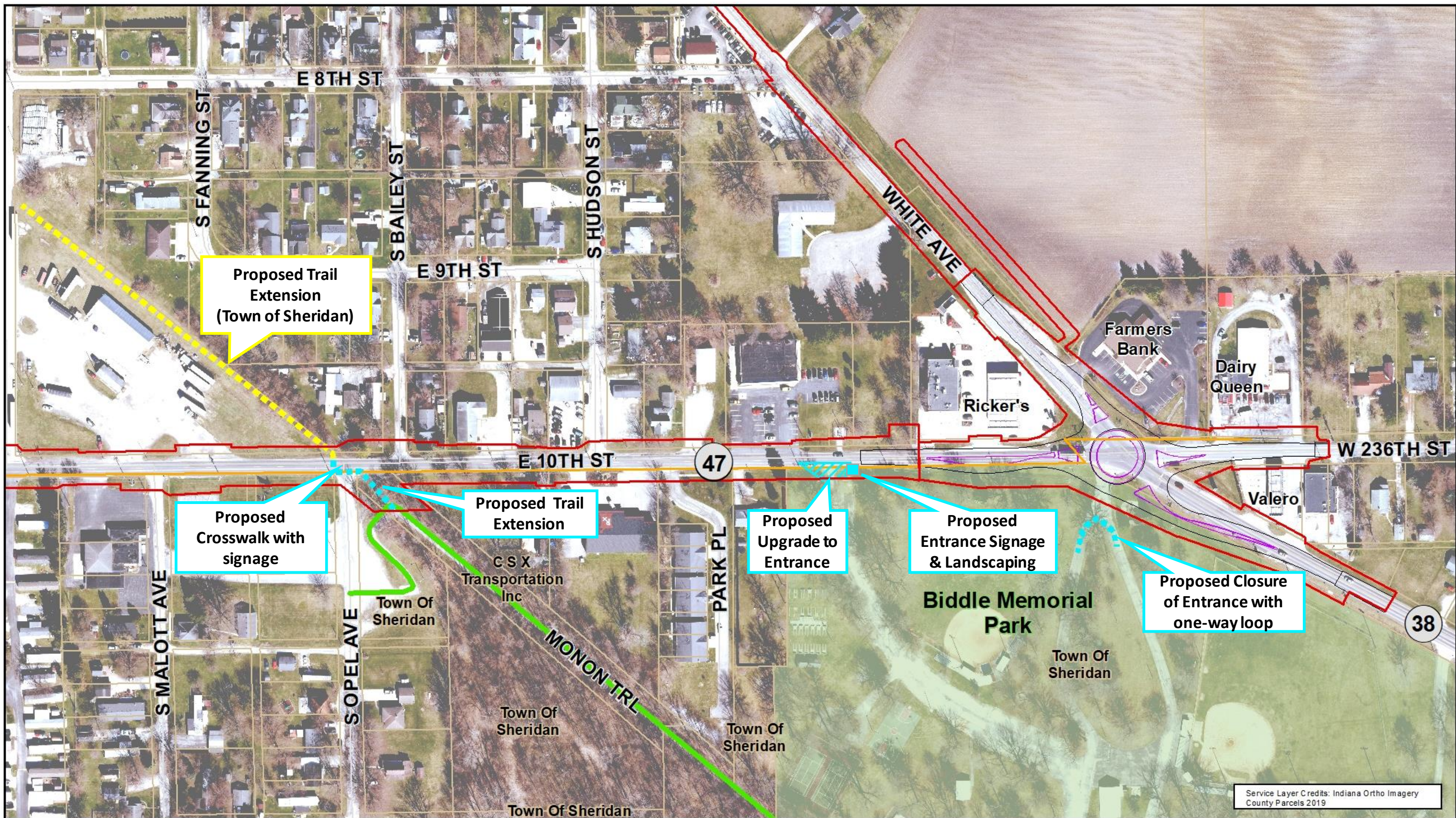
Due to the use of federal funds, the proposed transportation project is subject to the requirements of Section 4(f) of the Department of Transportation (DOT) Act of 1966, that prohibits the use of certain public and historic lands for federally funded transportation facilities unless there is no feasible and prudent alternative. The law applies to significant publicly owned parks, recreation areas, and wildlife/waterfowl refuges, and the National Register eligible or listed historic properties. Minor uses may qualify for a *de minimis* finding when the use does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f). The designed action for Des. No. 1601982 and Des. No. 2000816 will not adversely impact the activities, features, and attributes that qualify the properties, Biddle Memorial Park and the Monon Trail, for protection under Section 4(f) of the Department of Transportation Act of 1966 and in accordance with SAFETEA-LU Section 6009 (a). As such, it is the intent of INDOT, along with the Federal Highway Administration to issue a finding of *de minimis*.

A public notice was posted for the projects on August 18, 2021 offering the public an opportunity to provide comments on the use of the Section 4(f) resources. No comments were received.

The Town of Sheridan concurs with these measures and the *de minimis* use of Biddle Memorial Park and the Monon Trail.

Signature   
Town of Sheridan

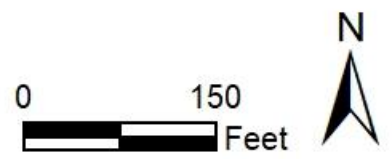
Date 10/25/2021



Service Layer Credits: Indiana Ortho Imagery  
County Parcels 2019

**Legend**

- Preliminary Construction Limit
- Sidewalk
- Park
- - - Mitigation Options
- Edge of Pavement
- Parcel Boundary
- Existing Trail
- - - Proposed Trail
- Traffic Island



**SR 38 and SR 47**  
**Sheridan, Hamilton County, Indiana**  
 Des. No. 1601982, 1592544, 2000816  
**Mitigation Options**

# Town of Sheridan

506 S. Main Street  
Sheridan, Indiana 46069  
(317) 758-5293  
Fax: (317) 758-2505

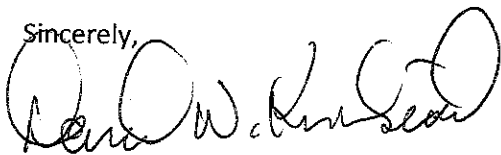
September 16, 2021

Dear Ms. Beck,

We appreciate the opportunity to work with you on the SR 47 project. The Town of Sheridan is in the process of designing a Monon Trail extension from SR 47 to Main Street. We expect construction to be completed by end of the year 2022. We would appreciate INDOT putting in their reconstruction plans for SR 47 an appropriate pedestrian crossing of SR 47 that would tie into our proposed trail.

We appreciate your help with this Visionary Trail project.

Sincerely,

A handwritten signature in black ink, appearing to read "David Kinkead". The signature is fluid and cursive, with a large loop at the end.

David Kinkead  
Town Council President

**Land and Water Conservation Fund (LWCF) County Property List for Indiana (Last Updated March 2022)**

ProjectNumber	SubProjectCode	County	Property
1800017	1800017	Hamilton	Forest Park & Trail, White River Access Site
1800058	1800058	Hamilton	Forest Park & Trail, White River Access Site
1800128	1800128	Hamilton	Morse Park & Beach
1800198	1800198	Hamilton	Cicero Community Park
1800236	1800236	Hamilton	Forest Park & Trail, White River Access Site
1800493	1800493	Hamilton	Flowing Well Park
1800502	1800502	Hamilton	Cool Creek County Park
1800519	1800519	Hamilton	Taylor Property
1800551	1800551	Hamilton	MacGregor Park
1800581	1800581	Hamilton	MacGregor Park

\*Park names may have changed. If acquisition of publically owned land or impacts to publically owned land is anticipated, coordination with IDNR, Division of Outdoor Recreation, should occur.

## APPENDIX D: Bridge/Structure Bat Assessment Form

### Bridge/Structure Bat Assessment Form Instructions

- This form will be completed to document bat occupancy or bat use of bridges, culverts, and other structures. This form shall be submitted to the appropriate personnel within the DOT and USFWS for recordkeeping (or uploaded into the Information, Planning, and Consultation (IPaC) Determination Key for use of the Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat) prior to conducting: any activities below the deck surface either from the underside or from above the deck surface that bore down to the underside; any activities that could impact expansion joints; any activities involving deck removal on bridges; or any activities involving structure demolition for bridges, culverts, and/or other structures.
- Assessments must be completed within two (2) years of conducting any work (see the above bullet), regardless of whether assessments have been conducted in the past. Assessments must be completed in appropriate weather conditions, suitable for the assessor to observe common signs of bat use.
- Evidence of bat use may include visual observation (live and/or dead), presence of guano, presence of staining, audible observation, and/or odor observation. Presence of one or more indicators is sufficient evidence that bats may be using the bridge, culvert, and/or other structure.
- If bat use of a bridge, culvert, and/or other structure is noted, additional studies may be undertaken during bat active season to identify the specific bat species utilizing the structure, or protected bat species presence can be assumed, in order to comply with threatened and endangered species regulations. Bat active season dates, typically between April and November, vary regionally and by species, so assessors should consult with their local USFWS Field Office for more specific active season dates.
- For use of the Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat – If the bridge/structure is 1,000 feet or more from suitable bat habitat<sup>1</sup> (e.g., an urban or agricultural area without suitable foraging habitat or corridors linking the bridge to suitable foraging habitat), check the appropriate box and fill out the table below. **No further assessment is required.**








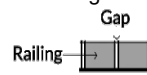

Date & Time of Assessment	DOT Project #	Route/Facility Carried	County
<b>Federal Structure ID</b>	<b>Structure Coordinates</b> (latitude and longitude)	<input type="checkbox"/> This bridge/structure is 1,000 feet or more from suitable bat habitat <sup>2</sup>  Name: _____ Signature: <u>Laura Jack</u>	

- Any questions pertaining to assessments or this form should be directed to the local USFWS Field Office.

<sup>1</sup> Refer to the USFWS's summer survey guidance for the definition of suitable habitat (<http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>).

<sup>2</sup> This condition is only for use of the Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat

# Bridge/Structure Bat Assessment Form

Date & Time of Assessment	DOT Project Number	Route/Facility Carried	County
Federal Structure ID	Structure Coordinates (latitude and longitude)	Structure Height (approximate)	Structure Length
<b>Structure Type (check one)</b>		<b>Structure Material (check all that apply)</b>	
<i>Bridge Construction Style</i>		<i>Deck Material</i>	<i>Beam Material</i> <i>End/Back Wall Material</i>
<input type="checkbox"/> Cast-in-place 	<input type="checkbox"/> Pre-stressed Girder 	<input type="checkbox"/> Metal	<input type="checkbox"/> None <input type="checkbox"/> Concrete
<input type="checkbox"/> Flat Slab/Box 	<input type="checkbox"/> Steel I-beam 	<input type="checkbox"/> Concrete	<input type="checkbox"/> Concrete
<input type="checkbox"/> Truss 	<input type="checkbox"/> Covered 	<input type="checkbox"/> Timber	<input type="checkbox"/> Steel
<input type="checkbox"/> Parallel Box Beam 	Other: _____	<input type="checkbox"/> Open grid	<input type="checkbox"/> Timber
		<input type="checkbox"/> Other:	<input type="checkbox"/> Other:
<i>Culvert Type</i>		<i>Culvert Material</i>	
<input type="checkbox"/> Box	<i>Other Structure</i>	<input type="checkbox"/> Metal	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Pipe/Round		<input type="checkbox"/> Concrete	<input type="checkbox"/> Unknown
<input type="checkbox"/> Other:		<input type="checkbox"/> Plastic	<i>Notes:</i>
		<input type="checkbox"/> Stone/Masonry	
<b>Crossings Traversed (check all that apply)</b>		<b>Surrounding Habitat (check all that apply)</b>	
<input type="checkbox"/> Bare ground	<input type="checkbox"/> Open vegetation	<input type="checkbox"/> Agricultural	<input type="checkbox"/> Grassland
<input type="checkbox"/> Rip-rap	<input type="checkbox"/> Closed vegetation	<input type="checkbox"/> Commercial	<input type="checkbox"/> Ranching
<input type="checkbox"/> Flowing water	<input type="checkbox"/> Railroad	<input type="checkbox"/> Residential-urban	<input type="checkbox"/> Riparian/wetland
<input type="checkbox"/> Standing water	<input type="checkbox"/> Road/trail - Type: _____	<input type="checkbox"/> Residential-rural	<input type="checkbox"/> Mixed use
<input type="checkbox"/> Seasonal water	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Woodland/forested	<input type="checkbox"/> Other: _____
<b>Areas Assessed (check all that apply)</b>			
Check all areas that apply. If an area is not present in the structure, check the "not present" box.			
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.			
<b>Area (check if assessed)</b>	<b>Assessment Notes</b>	<b>Evidence of Bats (include photos if present)</b>	
<input type="checkbox"/> All crevices and cracks: <b>Bridges/culverts:</b> rough surfaces or imperfections in concrete <b>Other structures:</b> soffits, rafters, attic areas	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> Concrete surfaces (open roosting on concrete)	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> Spaces between concrete end walls and the bridge deck	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> Crack between concrete railings on top of the bridge deck 	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> Vertical surfaces on concrete I-beams	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> Spaces between walls, ceiling joists	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> Weep holes, scupper drains, and inlets/pipes	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> All guiderails	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
<input type="checkbox"/> All expansion joints	<input type="checkbox"/> Not present	<input type="checkbox"/> Visual - live #    dead #	<input type="checkbox"/> Audible <input type="checkbox"/> Species <input type="checkbox"/> Odor <input type="checkbox"/> Photos <input type="checkbox"/> Staining
Name: _____		Signature: 	





# Appendix K:

## Engineering Report

# Engineering Assessment Report

SR 47

Des. No. 1601982

Sheridan, IN

Hamilton County

February 7, 2020



Prepared for:

Indiana Department of Transportation  
Greenfield District

Prepared by:

Michael Baker International, Inc.



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## Purpose of Report

This Engineering Assessment Report has been developed to document the engineering assessment phase to improve pavement condition, safety, pedestrian accommodations, and to provide a drainage solution for SR 47 in Hamilton County, under Des. No. 1601982.

The report provides documentation of design alternatives, identification of potential issues, and a recommendation for a preferred alternative that cost effectively achieves the project purpose and need in congruence with the identified goals in the 2013 Sheridan Comprehensive Plan.

The report will serve as a guide for continued project development in the successive environmental, design, and construction phases. Separate Engineering Assessment Reports have been prepared for the rehabilitation of SR 38 in Hamilton County, under Des. No. 1592544, and the improvements at the intersection of SR 47 and SR 38, under Des. No. 2000816.

## Project Location

The project is located along SR 47 in and near the Town of Sheridan in Hamilton County. The SR 47 project limits extend from the Boone/Hamilton County Line (RP 62.58) east to intersection SR 38 (RP 64.22). A location map for the proposed project area can be found in **Appendix A, Project Location Maps**.

## Project Purpose and Need

The existing pavement is in poor condition with fatigue, block, and edge cracking requiring ongoing maintenance.

There is no comprehensive storm sewer system along the SR 47 corridor. Sporadic curb inlets exist along the northern side streets between Main Street and Biddle Memorial Park. In many areas, there are no side ditches to convey water away from the roadway resulting in a saturated subgrade. This saturation leads to deterioration of pavement and can result in safety issues including the potential for hydroplaning in locations of wheel path rutting and sliding off the roadway in winter conditions. Some areas of the roadway do not appear to have a crown exacerbating pavement drainage issues.

As part of Sheridan's 2013 Comprehensive Plan, pedestrian access throughout the SR 47 corridor was identified as a need. With the majority of the Sheridan population residing north of SR 47, pedestrian crossings located specifically at the Sheridan Mall strip mall, the Monon Trail and Biddle Memorial Park are also necessary to meet the connectivity goals of the community.

The need for the project is to address the failing pavement, safety concerns related to the narrow cross section and limited shoulders, inadequate drainage throughout the corridor, and to provide pedestrian facilities from Maple Run Drive east to SR 38.

The purpose of the project is to increase the service life and load carrying capacity of the pavement. Safety, drainage, and pedestrian facilities will be addressed through a widened section with curb and gutter, pedestrian facilities (sidewalks), and an enclosed storm sewer system. While the project will not include all aspects requested by the Town of Sheridan, including a gateway feature at the intersection of SR 47 and SR 38 and a grade separated crossing at the Monon Trail, the designed will not preclude opportunities for these amenities in the future.

## Project History

The INDOT mini scope was developed for Des. No. 1601982 in January of 2017. The mini scope identifies failing pavement and maintenance issues as well as drainage conditions and concerns. See **Appendix K, Mini Scope** for additional information.

### *Pedestrian Accommodations and Trail Crossing*

The miniscope does not include provisions for pedestrian accommodations. Town officials expressed during the initial project kickoff meeting in November of 2018 and again in the second project kickoff meeting in August of 2019 that pedestrian access and safety along SR 47 are of paramount importance particularly for connectivity of the Sheridan Mall strip mall, the Monon Trail, and Biddle Memorial Park. During the August 15, 2019 kickoff meeting, INDOT confirmed pedestrian facilities would be provided along SR 47 from SR 38 to South Arrow Street. In addition, cost effective and safe pedestrian crossing would be evaluated at the three SR 47 crossings. A copy of the meeting minutes can be found in **Appendix B, Meeting Minutes and Materials**.

The miniscope does not include provisions for a trail crossing at the terminus of the Monon Trail. Town officials noted interest in including a crossing at SR 47 as a piece of the ultimate goal of extending the trail through Sheridan at a project meeting in November of 2018. It was confirmed in a meeting with the Town held on August 15, 2019 that safe and affordable at-grade crossings would be evaluated with this engineering assessment. The Town has expressed interest in a grade separated trail crossing; this analysis is beyond the scope of this project. However, the recommended alternative should not preclude future expansion and construction of a grade-separated trail crossing. See **Appendix B, Meeting Minutes and Materials** for additional meeting notes.

### *Intersection Improvement*

The miniscope does not include provisions for intersection improvement at the intersection of SR 47 with SR 38. The town expressed their desire for an intersection improvement prior to the project kickoff meeting in October 2018 and in the subsequent meeting in November of 2018 where identified action items included developing specified alternatives and performing an intersection improvement analysis. There was discussion on Town preferences for type of intersection improvement at a project meeting in August 2019. An Intersection Evaluation was completed for the intersection improvement under Des No. 2000816 and is provided under separate cover. See **Appendix B, Meeting Minutes and Materials** for additional meeting notes.

### *Realignment of Mule Barn Road*

The miniscope does not include provisions for the realignment of Mule Barn Road. At both kickoff meetings, town officials indicated that a realignment of Mule Barn Road is desired. It was noted that there is a crash history and the intersection of Mule Barn Road with SR 47 on the south and the intersection of California Street and SR 47 on the north. It was noted that California Street is a significant thoroughfare through town. Action items Identified in the November 2018 project meeting include a preliminary realignment and cost estimate to be provided by Michael Baker International (Michael Baker) for the town to consider in their decision to pursue. See **Appendix B, Meeting Minutes and Materials** for the

preliminary alignment exhibit used to develop a cost estimate. A&F Engineering was hired to acquire traffic data to determine the need for realignment.

Based on a preliminary analysis of traffic counts and review of crash data, the realignment of Mule Barn Road with California Street is not warranted at this time. See Traffic Data and Crash Data sections for more information.

It is acknowledged that future development may increase traffic volumes and would be cause to reassess if traffic volumes and movements merit reevaluating the realignment of Mule Barn Road for operational and/or safety considerations as a through route for the Town.

#### *Turn Lanes at Main Street*

The miniscope does not include provisions for intersection improvement at the intersection of South Main Street with SR 47. A&F Engineering was hired to acquire traffic data to determine whether a left turn lane is warranted at this location. Based on a preliminary analysis of traffic counts, it is recommended to add a left turn lane on SR 47 for traffic traveling northbound to Main Street. See Traffic Data for more information.

### Existing Conditions

SR 47 runs along the southern edge of the Town of Sheridan and is a well-travelled corridor with an AADT of 6,359. It serves a combination of commercial and residential traffic within the Sheridan town limits and operating as a major east-west route for the town and a major through route for adjacent communities. It offers the most direct access to both I-65 to the west and U.S. 31 to the east of Sheridan.

SR 47 is rural on the west end of the project and urban on the east end of the project. Development has blurred the distinction between the rural section of the corridor and the urban section of the corridor. Generally, the western edge of the Sheridan Mall strip mall on the south side of SR 47 marks the boundary between rural and urban.

The intersection with N 1200 E (Boone/Hamilton County Line) at the west end of the project limits is stop-controlled for the north-south movement. The intersection with SR 38 at the east end of the project limits is four-way stop-controlled. There are numerous T intersections throughout the project. Georgia Street is the only North-South through movement that intersects SR 47 within the project limits; the south leg of the intersection is a dead-end street. Park Avenue ends on the south at the intersection with SR 47. There is a driveway to a manufactured home community across from the terminus of Park Avenue on the south side of SR 47. This is a through movement for residents of the community.

There are numerous commercial driveways as well as unofficial driveway pull outs that have developed at residences on the north side of SR 47.

SR 47 has a speed limit of 55 mph at the west end of the project. The speed limit is reduced to 35 mph approximately 0.45 miles east of the Boone/Hamilton County Line.

The roadway received a deep patch and chip seal in 2015, and more recently, an intermittent mill and overlay between Mule Barn Road and the western limits of Biddle Memorial Park.

### *Design Criteria*

SR 47 is functionally classified as a major collector. **See Appendix A, Project Location Maps** for regional transportation map. SR 47 is not a part of the National Highway System or the National Truck Network.

### *Roadway Cross Section & Alignment*

The typical cross section is consistent throughout the project. SR 47 is a two-lane highway with 11-foot lanes and approximately 2-foot aggregate shoulders. At the intersection with Maple Run Drive, a dedicated right turn lane is developed in the eastbound direction for traffic entering the development.

The roadway is crowned although lane cross slopes are flatter than the standard 2 percent cross slope in most instances. Generally, the roadway is slightly higher than the adjacent properties. With limited exceptions there are no side ditches on the project. Drainage is conveyed by flowing off the roadway to the shoulder and adjacent grassed area.

The horizontal alignment of SR 47 is a tangent through the project limits.

The vertical alignment through the project limits is relatively level.

### *Pedestrian Facilities and Park and Trail Access*

Throughout the project limits, there is generally no pedestrian accommodations. As part of the development of the Maple Run and Sheridan Estates neighborhoods, sidewalk was added on the south side of SR 47 from Arrow Street to South Sheridan Avenue. A pedestrian crossing was introduced at South Sheridan Avenue. This sidewalk connects the residential areas on the north side of SR 47 to the Maple Run and Sheridan Estates communities as well as the Sheridan Mall. This run of sidewalk does have ADA curb ramps installed.

There is a section of sidewalk on the south side of SR 47 from Park Place to 85 feet east of Park Place terminating at a residential lot line.

Most of the residential streets on the north side of SR 47 include sidewalk. In some cases, the sidewalk extends to the intersection of SR47; in these instances, there are no curb ramps. In some cases, the sidewalk terminates on the side street at the residence located at the intersection with SR 47.

The northern terminus of the Monon Trail is approximately 50 feet south of SR 47.

### *Drainage and Structures*

As noted in the Roadway Cross Section and Alignment section, generally there are no side ditches on the project. Additionally, there is no dedicated storm sewer system for SR 47 within the project limits.

Typically, there is ponding on and just off the roadway during large rain events.

Michael Baker visited the SR 47 and SR 38 project sites on September 9, 2018 after a three-day period of heavy rain. Areas of ponding were observed on and just off the roadways.

There is a shallow swale on the north side of SR 47 extending from Arrow Street on the west to Maple Run on the east. Similarly, there is a shallow swale on either side of the exit driveway of the Millwood Estates manufactured home community; the swale is visibly graded to approximately 50 feet west and 100 feet east of the driveway.



The swales on either side of the SR 47 corridor have utility poles within the project area. The existing swales will not offer the capacity for conveyance or storage of the runoff required by the proposed improvements that will add to the impervious area within the project.

Generally, the roadway profile of SR 47 is relatively flat, with multiple sag locations. The minimum profile slope recommended in the Indiana Design Manual (IDM) is 0.3%. There is some existing storm sewer infrastructure outside of the SR 47 corridor that was evident during the field visit. There is potential to outlet the proposed storm infrastructure to the existing sewer pending further investigation.

There are multiple residential and commercial driveways along the SR 47 corridor that currently drain to the swales on the side or have existing culverts underneath them. The capacity of these culverts will require evaluation per the current Indiana Design Manual (IDM) guidelines.

There was indication of stormwater ponding in low lying areas adjacent to the SR 47 corridor. Some examples include the parking area near the American Legion building. There are indications that the retaining embankment immediately adjacent to the SR 47 roadway may require repair.

### *Public Utilities*

An Initial Notice of Proposed Improvements letter was sent to utilities which have been identified as having facilities in or near the project limits. All utility responses received can be found in **Appendix C, Utility Responses**. A summary of responses provided by the utilities is provided below:

- AT&T Indiana (telephone)
  - Drawings provided to indicate the approximate locations of AT&T overhead and underground facilities.
- Boone County REMC (electric)
  - Responded that Boone County REMC does not have facilities within the proposed project limits.
- Crown Castle Fiber (formerly Fibertech)
  - Indicated they have underground facilities in the area but did not provide drawings showing their location.
- Duke Energy – Distribution (electric)
  - Drawings provided to indicate the approximate locations of Duke overhead and underground facilities.
- Duke Energy – Transmission (electric)
  - No response has been provided.
- Indiana American Water (sewer)
  - Drawings provided to indicate the approximate locations of Indiana American Water (sewer) underground facilities.
- Indiana American Water (water)
  - Drawings provided to indicate the approximate locations of Indiana American Water (water) underground facilities.
- Midcontinent Independent System Operator (MISO)
  - Not included in the original Initial Notice of Proposed Improvements. Coordination effort have just begun.
- Swayzee Communication Corp. (cable)

- No response has been provided.
- Vectren Energy – Distribution (gas)
  - Drawings provided to indicate the approximate locations of Vectren Energy – Distribution underground facilities.
- Vectren Energy – Transmission (gas)
  - Responded that Vectren Energy does not have transmission facilities within the proposed project limits.

A SUE is recommended for inclusion in this contract.

### *Land Usage*

The land use varies within the project limits. At the west end of the project outside of the corporate limits of town, the land use is agricultural on the south and industrial on the north.

From the corporate limits of Sheridan east to South Hamilton Street, the properties adjacent the roadway are zoned commercial.

East of South Hamilton Street, the properties adjacent the roadway are zoned a combination of residential and commercial, with an industrial segment south/west of the Monon Trail alignment. At the east project limits of the intersection of SR 47 with SR 38, adjacent properties are zoned commercial on the north side of the roadway and public space on the south for Biddle Memorial Park.

The commercial developments generate a notable volume of pedestrian traffic.

See **Appendix A. Project Location** Map County Zoning Map for detailed information.

## Adjacent INDOT Projects

### *SR 38*

Pavement resurfacing is scheduled to be completed along SR 38 from the intersection with SR 47 to the north approximately 2.5 miles through the Town of Sheridan. The project under Des. No. 1592544 includes spot replacement of curb and gutter and drainage structures as well as the installation of ADA compliant curb ramps at intersections where sidewalk is present. SR 38 under Des. No. 1592544 and SR 47 under Des. No. 1601982 will not be constructed concurrently.

### *SR 47 and US 31 Intersection Improvement*

Intersection improvements are scheduled to be completed at the intersection of SR 47 and US 31. This county project extends from SR 38 to Bridge 201 and will be let in Fiscal Year 2021/2022. Michael Baker will coordinate with Brad Davis and RQAW to ensure that there is no conflict between work performed under this project and work performed under the Sheridan SR 47 project.

## Traffic Data

### *SR 47*

Traffic data was obtained from the INDOT Traffic Count Database System (TCDS). See **Table 1** for a summary of traffic data.

Table 1. Traffic Data

Road Segment	AADT			% DHV	Truck % AADT
	2016 (Count Year)	2023 (Construction Year)	2045 (Design Year)		
Start of Project to West Road	4,613	5,039	6,379	9	25
Hamilton Street to Main Street	7,331	8,269	11,215	10	15
Main Street to SR 38	7,132	7,914	10,371	9	10

*Mule Barn Road and California Street*

Traffic data was obtained from the INDOT website. Mule Barn Road has a 2018 AADT of 1958 vehicles. Turning movement count data was provided by A&F Engineering. Preliminary analysis indicates that the majority of northbound traffic on Mule Barn Road makes a right turn to travel eastbound on SR 47. It is notable that more than half of the southbound traffic on California Street makes a through movement to continue southbound on Mule Barn Road during the AM peak hour; however, this traffic accounts for less than 3 percent of the total traffic movements in the AM peak hour. Traffic data supports that California Street is used as a route southbound through the Town. More than 85 percent of traffic traveling eastbound or westbound on SR 47 continues traveling through the intersection. Northbound and southbound through volumes account for less than 5 percent of the total traffic movements at the intersection in both the AM and PM peak hours. See **Appendix E, Traffic Counts** for traffic data.

*Main Street*

Traffic count data was provided by A&F Engineering. Preliminary analysis indicates roughly 22 percent (95 vehicles) of the AM peak hour and 17 percent (89 vehicles) of the PM peak hour eastbound traffic on SR 47 makes a left turn to travel northbound on Main Street. Based on the criteria shown in Figure 46-4C of the Indiana Design Manual, an exclusive left turn lane is warranted at this location. See **Appendix E, Traffic Counts** for traffic data and **Appendix H, IDM Figures** for Figure 46-4C.

**Crash Data**

*SR 47*

Crash data was provided for the period of January 2016 through December 2018. Approximately 18 crashes have occurred on SR 47 within the project limits. There were no fatalities associated with these crashes. See **Table 2** for a summary of the crash data.

Table 2. Crash Summary by Severity

Crash Type	PDO	Injury	Fatality	Total
Left Turn	0	1	0	1
Non-collision	0	1	0	1
Run Off	3	0	0	3
Rear End	3	2	0	5
Right Angle	1	1	0	2
Sideswipe	2	0	0	2
Other	3	1	0	4
<b>Total</b>	<b>11</b>	<b>7</b>	<b>0</b>	<b>18</b>

Based on the three years of crash history obtained, an average of six crashes per year occur along SR 47 within the limits of Des. No. 1601982. Also, throughout the three-year period, a total of seven crashes resulted in personal injury within the limits of this project. There is no pattern in the manner of collision of these crashes. The primary factors in the cause of the crashes can be attributed to driver error. There are no indications that any of the crashes resulting in property damage only or personal injury were caused by a deficiency in the safety of the roadway.

The Index of Crash Frequency (ICF) and Index of Crash Cost (ICC) were calculated along SR 47 using the Roadside Hazard Analysis Tool (RoadHAT). The RoadHAT analysis resulted in an ICF of -0.02 and an ICC of -0.40. See **Appendix F, Crash Analysis** for the RoadHAT report. The deviation from the mean value for similar roadways is less than 0.5 standard deviations for both the ICF and ICC indicating that the roadway is operating within a normal range for similar roadways in the state of Indiana.

#### *Mule Barn Road and California Street*

Crash data was provided for the period of January 2016 through December 2018. Five crashes occurred at the intersection of Mule Barn Road, south of SR 47, and California Street, north of SR 47, with SR 47. There were no fatalities associated with these crashes. Based on the three years of crash history obtained, an average of 1.7 crashes per year occur at this intersection. Throughout the three-year period, one crash resulted in personal injury. The manner of collision for four of the five crashes was a rear end. The primary factors in the cause of the crashes can be attributed to driver error. There are no indications that any of the crashes resulting in property damage only or personal injury were caused by a deficiency in the safety of the intersection.

The Index of Crash Frequency (ICF) and Index of Crash Cost (ICC) were calculated along Mule Barn Road using the Roadside Hazard Analysis Tool (RoadHAT). The RoadHAT analysis resulted in an ICF of 1.20 and an ICC of 0.08. See **Appendix F, Crash Analysis** for the RoadHAT report. An ICF deviation of 1.2 standard deviations indicates that the number of crashes exceeds the number expected for similar roadways in the State of Indiana. An ICF of 2 standard deviations or higher may be considered a high crash location. The deviation from the mean value for similar roadways is 0.08 for the ICC indicating that the roadway is operating within a normal range for similar roadways in the state of Indiana.

### *Main Street*

Crash data was provided for the period of January 2016 through December 2018. Three crashes have occurred at the intersection of Main Street and SR 47. There were no fatalities associated with these crashes. Based on the three years of crash history obtained, an average of 1 crash per year occur at this intersection. Throughout the three-year period, no crashes resulted in personal injury. The manner of collision was different for all three crashes including a backing collision, a collision with an object in the road, and a rear end collision. The primary factors in the cause of the crashes can be attributed to driver error. There are no indications that any of the crashes resulting in property damage only were caused by a deficiency in the safety of the intersection.

## Alternatives

### *Design Criteria*

The roadway reconstruction project will be designed to the 4R project type geometric design criteria for urban collectors (suburban) per IDM Fig 53-8 for the in-town segment of the project and to the geometric design criteria for state route rural collectors for the out of town segment of the project. See **Appendix H, IDM Figures** for Figure 53-8 Geometric Design Criteria for Urban Collector and for Figure 53-3 Geometric Design Criteria for Rural Collector, State Route.

### *Discussion of Pavement Reconstruction Alternatives/Recommendations – Inside of Town*

- Alternative R1: Reconstruct with curb
- Alternative R2: No-build option

#### ***Pavement Reconstruction Alternative R1 – Reconstruct with curb***

For the build alternative, the assumed pavement section is HMA with concrete curb and gutter.

The pavement will be reconstructed with 12-foot lanes in each direction at a normal crown. In the case that drainage alternative D3 is selected, the westbound travel lane will be rotated such that both the eastbound and westbound travel lanes drain to the south. See Discussion of Drainage Facility Alternatives/Recommendations for more information.

A curb and gutter section will be added on both sides of SR 47 to allow for the accumulation and transportation of stormwater runoff. In addition, curb and gutter acts as a traffic calming device, encouraging lower speeds throughout the developed limits of the Town of Sheridan.

The western limit of the Sheridan Mall marks the line between the in-town section of the roadway and the out of town section of the roadway.

This build-alternative is the base for each pedestrian and drainage alternative. See **Appendix G, Typical Cross Section** for typical cross sections for the build alternatives.

#### ***Pavement Reconstruction Alternative R2 – No-build option***

This option is the no-build option. This option does not address the purpose and need of the project and is therefore discarded.

*Discussion of Pavement Reconstruction Alternatives/Recommendations – Outside of Town*

Two alternatives for pavement reconstruction for the out of town section of the project have been considered. The no-build alternative is included as Alternative 3 and provided for reference.

The western limit of the Sheridan Mall marks the line between the in-town section of the roadway and the out of town section of the roadway.

The mini-scope noted that it is desirable to add shoulders and ditches, if possible, in the out of town portion of the project. It is possible to add both shoulders and ditches, but upon evaluation, it is not recommended. Both a proposed shoulder with 10 feet of usable width (8 feet paved) per IDM Figure 53-3 and a roadside ditch of the assumed channel section would require over 1 acre of right of way acquisition from commercial, industrial, and agricultural property types. There are no existing drainage concerns in the out of town portion of the roadway. The typical section of the existing SR 47 corridor through and beyond the limits of the project includes a less than 2-foot paved shoulder. The length of the out of town portion of the project is approximately one-half mile. Given these considerations, it is not recommended to include a full 8-foot paved shoulder width and roadside ditch in this segment of the project.

See **Appendix H, IDM Figures** for Figure 53-3 Geometric Design Criteria for Rural Collector, State Route.

- Alternative O1: Functional overlay
- Alternative O2: Reconstruct with rural shoulder
- Alternative O3: No-build option

*Pavement Reconstruction Alternative O1 – Functional overlay*

This alternative includes a 4-inch mill of the existing pavement. The overlay includes a two-lifts of HMA pavement.

*Pavement Reconstruction Alternative O2 – Reconstruct with rural shoulder*

For the reconstruct alternative, the assumed pavement section is HMA with paved shoulders. The pavement will be reconstructed with 12-foot lanes in each direction at a normal crown. A rural shoulder with a 2-foot usable width is proposed.

A level one design exception would be required to implement the minimized proposed shoulder width in order to reduce the amount of right of way acquisition and impacts to adjacent properties.

*Pavement Reconstruction Alternative O3 – No-build option*

This option is the no-build option. This option does not address the purpose and need of the project and is therefore discarded.

*Discussion of Pedestrian Facility Alternatives/Recommendations*

Three alternatives for pedestrian facilities in the in-town section of the project have been considered. The no-build alternative is included as Alternative 4 and provided for reference.

- Alternative P1: Sidewalk with no buffer constructed along the north and south sides of SR 47
- Alternative P2: Sidewalk with no buffer constructed on the south side of SR 47
- Alternative P3: Shared use path constructed along the south side of SR 47
- Alternative P4: No-build option

For each build alternative, a curb and gutter section will be added on both sides of SR 47 to allow for the addition of the pedestrian facility immediately adjacent the roadway.

Pedestrian facilities will be provided from SR 38 to Arrow Street. Arrow Street is the western terminus of the existing sidewalk along the south side of SR 47. The pedestrian facilities along SR 47 will tie into the facilities constructed with the intersection improvements to SR 38 and SR 47.

For each pedestrian alternative, a pedestrian crossing will be provided at the terminus of the Monon Trail on the south side of SR 47 and at the approach to the intersection with SR 38. The existing pedestrian crossing at Sheridan Avenue will be maintained. One pedestrian crossing application that could be considered include a HAWK system with an approximate cost of \$100,000 per treatment. Another pedestrian crossing application that could be considered is using a Rapid Rectangular Flashing Beacon with a cost of approximately \$25,000 per treatment. Application options to facilitate safety and visibility at the crossing at these locations will be further evaluated in the final design phase. A HAWK or RRFB will be implemented at the Monon Trail and Sheridan Avenue pedestrian crossings. The SR 38 intersection crossing will be controlled through pedestrian facilities incorporated with the proposed signal.

For any pedestrian facility all ADA criteria must be met unless a Determination of Technical Infeasibility is granted by INDOT. The ADA criteria is included in the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG).

See **Appendix G, Typical Cross Section** for typical cross sections for each build alternative.

#### ***Pedestrian Facility Alternative P1 - Sidewalk constructed along the north and south sides of SR 47***

This option studied the construction of sidewalk along the north and south sides of SR 47.

This option provides for pedestrian accessibility on both sides of the roadway through the in-town section of the corridor. It provides a direct connection on the south side of the roadway to the northern terminus of the Monon trail which is of significant value to the Town.

With this alternative, the sidewalk along the south side of SR 47 would widen to include a buffer to match into an utilize the newly constructed sidewalk along the south side of SR 47 from Sheridan Avenue to Arrow Street saving construction and material costs.

Right of way acquisition will be required on both sides of the roadway with this alternative. See Right-of-Way Impact section for additional information. To reduce impacts, we propose the construction of a sidewalk without buffer with a total width of 6 feet per IDM 45-1.06. The proposed sidewalk without buffer is compatible with drainage alternatives D1 and D2. In the case that drainage alternative D3 is selected, the sidewalk on the south side of the roadway would be separated from the curb with a ditch. See Discussion of Drainage Facility Alternatives/Recommendations for more information.

#### ***Pedestrian Facility Alternative P2 - Sidewalk constructed on the south side of SR 47***

This option studied the construction of sidewalk along the south side of SR 47. The south side of SR 47 was selected as the number and magnitude of the impacts to properties is fewer and less than the number and magnitude of the equivalent impacts if the sidewalk were to be constructed on the north side of SR 47.

It provides a direct connection on the south side of the roadway to the northern terminus of the Monon trail which is of significant value to the Town.

With this alternative, the sidewalk along the south side of SR 47 would widen to include a buffer to match into the newly constructed sidewalk along the south side of SR 47 from Sheridan Avenue to Arrow Street saving construction and material costs by utilizing existing infrastructure.

Right of way acquisition will be required on the south side of the roadway with this alternative. See Right-of-Way Impact section for additional information. To reduce impacts, we propose the construction of a sidewalk without buffer with a total width of 6 feet per IDM 45-1.06.

The proposed sidewalk without buffer is compatible with drainage alternatives D1 and D2. In the case that drainage alternative D3 is selected, the sidewalk would be separated from the curb with a ditch. See Discussion of Drainage Facility Alternatives/Recommendations for more information.

#### ***Pedestrian Facility Alternative P3 - Shared use path constructed along the south side of SR 47***

This option studied the construction of a shared use path along the south side of SR 47. The south side of SR 47 was selected as the number and magnitude of the impacts to properties is fewer and less than the number and magnitude of the equivalent impacts if the sidewalk were to be constructed on the north side of SR 47.

It provides a direct connection on the south side of the roadway to the northern terminus of the Monon trail which is of significant value to the Town.

With this alternative, the shared use path along the south side of SR 47 would narrow to match into the newly constructed sidewalk along the south side of SR 47 from Sheridan Avenue to Arrow Street saving construction and material costs by utilizing existing infrastructure.

Right of way acquisition will be required on the south side of the roadway with this alternative. See Right-of-Way Impact section for additional information. To reduce impacts, we propose the construction of a shared use path with a reduced 5-foot buffer per IDM 51-7.05(02).

See **Appendix H, IDM Figures** for Figures 51-7E and 51-7F Shared-Use-Path Separation from Roadway with Curb.

The proposed shared use path is compatible with drainage alternatives D1 and D2. In the case that drainage alternative D3 is selected, the shared use path would be separated from the curb with a ditch. See Discussion of Drainage Facility Alternatives/Recommendations for more information.

#### **Pedestrian Facility Alternative P4 – No-build option**

This option is the no-build option. This option does not address the purpose and need of the project and is therefore discarded.

#### *Discussion of Drainage Facility Alternatives/Recommendations – Inside of Town*

Three alternatives for drainage facilities in the in-town section of the project have been considered. The no-build alternative is included as Alternative 4 and provided for reference.

- Alternative D1: Storm sewer outlet to detention pond
- Alternative D2: Storm sewer with in-line detention
- Alternative D3: Roadside ditch
- Alternative D4: No-build option



Proposed roadway improvements will require stormwater conveyance infrastructure. Additionally, the improvements will increase the impervious area within the project, requiring detention.

Preliminary hydrologic and hydraulic analysis were performed for the SR 47 project area. Hydrologic analysis was conducted by importing GIS data including current aerial imagery and digital elevation models downloaded from Indiana Spatial Data Portal into CAD. Watershed delineation was performed in CAD for the existing and proposed conditions. Hydrologic parameters were adopted from part 2 of the current Indiana Design Manual (IDM). The design rainfall was developed in HydroCAD using Huff Distribution for City of Indianapolis from Figure 29-10A. Precipitation depths for storm durations of 5 min through 24 hours were downloaded from NOAA Precipitation Frequency Data Server. The peak discharge rates in 100-year design storm from the dry-detention systems in proposed conditions do not exceed the peak discharge rates in a 10-year storm in existing conditions in congruence with the IDM requirements. Peak flows were computed for existing and proposed conditions.

For the preliminary design of proposed storm sewer conveyance network, inlet spacing computations were performed using worksheets provided by INDOT Office of Hydraulics. A minimum 0.3% profile slope, an IDM requirement, was considered in the spacing layout.

In addition to the stormwater conveyance system, which is required for all configurations, two alternatives for storm water detention were developed. One system utilizing multiple dry-detention (ditch ponds) ponds throughout the corridor, and the other utilizing an oversized pipe network with orifice plates restricting the discharge from the system.

For both alternatives, in-line detention is proposed at the east end of the project to tie in with the recently completed Krause Drain reconstruction.

See **Appendix G, Typical Cross Section** for typical cross sections for each build alternative.

#### *Drainage Facility Alternative D1 – Storm sewer outlet to detention pond*

The standard conveyance system developed will discharge into multiple dry-detention basins located throughout the project, which controls the release from the system. The savings realized in infrastructure cost are offset by an increase in required right of way. This alternative provides multiple opportunities to incorporate green infrastructure.

#### *Drainage Facility Alternative D2 - Storm sewer with in-line detention*

The oversized pipes associated with this system will be located under the proposed sidewalk, minimizing the need for additional right of way. The right of way savings are offset by an increase in the construction cost due to large pipes and junction structures. The potential for green infrastructure is limited with this alternative.

#### *Drainage Facility Alternative D3 – Roadside Ditch*

This option studied the construction of a ditch conveyance system along the south side of SR 47. The south side of SR 47 was selected as the number and magnitude of the impacts to properties is fewer and less than the number and magnitude of the equivalent impacts if the roadside ditch were to be constructed on the north side of SR 47. See Right-of-Way Impact section for additional information.

For roadway drainage to be accommodated by a drainage conveyance system located on the south side of the roadway only, the westbound travel lane must be rotated to a +2.0% cross slope.

Curb turnouts will be used to channel roadway drainage to the roadside ditch.

For each pedestrian alternative, the roadside ditch would be located between the proposed roadway and the proposed pedestrian facility.

The proposed channel consists of a 4-foot-wide flat bottom with 4:1 side slopes. The recommended depth of channel is 3 feet. The total width of the installation of a roadside ditch with these parameters is 28 feet wide. A 2-foot buffer will be provided between the ditch and the back of curb and edge of sidewalk.

To meet detention requirements, in-line ditch detention may be considered. The outlet from each linear detention basin controlled by berms with weirs within the channel. Berms are anticipated to be required along the low point of SR 47 near the Monon Trail.

It is important to note the right of way required to accommodate a roadside ditch is significant and would impact a number of buildings if implemented. In these cases, the associated cost of implementing this facility includes right of way, fair market value of the properties affected, as well as relocation costs.

The buildings on the north side of SR 47 are primarily residential homes with foundations located within 5-25 feet of the existing right of way line. The proposed channel parameters require approximately 25 feet of right of way on the north side of the roadway. This would impact nearly every building on the north side of the road including residences and commercial buildings. It would also impact the Vectren facility and significantly reduce the parking lot capacity of a commercial property. For this reason, a roadside ditch is not recommended on the north side of the road and is not considered a feasible option to evaluate further.

The buildings on the south side of SR 47 are primarily residential homes with foundations located typically more than 25 feet outside of the existing right of way line. Therefore, fewer buildings would be impacted by the roadside ditch on the south side of the roadway than the north side of the roadway. For this reason, a roadside ditch is not recommended on the south side of the road but is a feasible option and was evaluated for comparison purposes.

#### *Drainage Facility Alternative D4 – No-build option*

This option is the no-build option. This option does not address the purpose and need of the project and is therefore discarded.

#### *Discussion of Intersection Alternatives/Recommendations*

- Alternative I1: No-build option
- Alternative I2: Signalization of the Existing Geometry
- Alternative I3: Signalization of the Existing Geometry including Auxiliary Lanes - **Preferred Intersection Alternative 1**
- Alternative I4A: Signalization with Improved Geometry including Auxiliary Lanes (South Leg Shift 40 Degree Skew from Perpendicular)
- Alternative I4B: Signalization with Improved Geometry including Auxiliary Lanes (North/South Leg Shift 30 Degree Skew from Perpendicular)
- Alternative I5: Single Lane Roundabout - **Preferred Intersection Alternative 2**

See the Intersection Evaluation under Des No. 2000816 for more information regarding alternatives for improvements at the intersection of SR 47 and SR 38.

## Cost Estimate

There various options and associated costs for different aspects of the design of each alternative.

The preferred alternative identified in the mini-scope is denoted in this report with reconstruction alternative R1 and drainage alternatives D1 or D2 for the in-town portion of the project. The preferred alternative identified in the mini-scope is denoted in this report with reconstruction alternative O1 for the out of town portion of the project. Alternatives for pedestrian accommodations have been included in this report by request of the Town and a preferred alternative identified.

The total cost of the preferred alternatives is summarized in **Table 3**. The preferred pedestrian alternative is included in this table. **Tables 4-6** show comparative costs for the various reconstruction, pedestrian, and drainage alternatives, respectively. See **Appendix I, Cost Estimates** for additional information.

*Table 3. Alternative Cost Estimate Summary*

	Base Alternative	
	Alternative	Cost
Reconstruct – In-town	<b>R1, O1</b>	\$4,227,000
Reconstruct – Left Turn Lane at Main Street	<b>N/A</b>	\$351,000
Pedestrian – In-town	<b>P2</b>	\$278,000
Drainage – In-town	<b>D1</b>	\$2,171,000
Total		\$6,676,000

*Table 4. Reconstruction Alternative Cost Summary*

	Reconstruction Alternative Cost Summary		
	Alternative	Cost	Cost above base
Reconstruct – In-town Resurface – Out of town	<b>R1, O1</b>	\$4,227,000	\$0
Reconstruct – In-town Reconstruct – Out of town	<b>R1, O2</b>	\$5,026,000	\$799,000

*Table 5. Pedestrian Alternative Cost Summary*

	Pedestrian Alternative Cost Summary		
	Alternative	Cost	Cost above base
Sidewalk with no buffer (both sides)	<b>P1</b>	\$596,000	\$318,000
Sidewalk with no buffer (south side)	<b>P2</b>	\$278,000	\$0
Shared use path (south side)	<b>P3</b>	\$319,000	\$41,000

*Table 6. Drainage Alternative Cost Summary*

	Drainage Alternative Cost Summary		
	Alternative	Cost	Cost above base
Storm sewer outlet to detention pond	<b>D1</b>	\$2,171,000	\$1,836,000
Storm sewer with in-line detention	<b>D2</b>	\$2,551,000	\$2,216,000
Roadside Ditch	<b>D3</b>	\$335,000	\$0

## Environmental Impacts and Issues

All alternatives will have similar environmental impacts.

It is anticipated that there will be infrastructure impacts to the in-town portion of the project for each alternative. Coordination will be involved with stakeholders and property owners in areas where infrastructure impacts may be required.

Preparation of a Waters of the US Report and coordination with INDOT ES Ecology and Waterway Permitting will be required. There are three lakes and two segments of Eagle Creek that flow through the project area. Wetlands have been identified adjacent to the project area.

There are four hazmat sites within the project limits that will require further investigation. If excavation occurs in these areas, proper removal and disposal of soil and/or groundwater will be necessary.

- One State Clean-up Site: This site has been identified as within a half-mile of the project. However, there is no address is listed with IDEM and there is no state clean-up site identified under the listed agency interest ID.
- Speedway, 511 S Main Street: There are four underground storage tanks located adjacent to the project area that are currently in use.
- Brownfield Site, S Opal Street and SR 47: There is a brownfield site is located adjacent to the project area at the Biddle Park parking lot. The site once contained evidence of improper/illegal disposal of solid waste.

Section 106 of the Historic Preservation Act will be processed under the Minor Programmatic Projects Agreement (MPPA) category B. The project is anticipated to have little to no potential to affect historic properties. However, an Archaeological Short report will be completed.

Biddle Memorial Park is a section 4(f) resource located adjacent to the project. If the project impacts the park, the project will have a de minimis impact and a letter will be prepared for the review of INDOT and the Federal Highway Administration (FHWA).

An Environmental Justice Analysis is anticipated as the project requires over 0.5 acres of right-of-way. It is not anticipated that there will be agricultural right of way acquisition.

A Categorical Exclusion 4 will be prepared for completion of the project. Upon finalization of impacts a permits determination will be submitted to INDOT permitting.

A Red Flag Investigation Report was conducted for Des. Numbers 1592544 and 1601982 and was submitted to INDOT on October 12, 2019, for review. See **Appendix J, Red Flag Identification** for further details.

## Survey Requirements

Topographical survey has not been obtained within the project limits. It is anticipated that subsequent design phases will require a survey to be performed.

## Right-of-Way Impact

The existing right-of-way width through the projects is generally 17.5 feet on either side of SR 47. Right of way acquisition is not anticipated for the R1 reconstruction alternative or the O1 and O2 reconstruction

alternatives. Right of way acquisition is anticipated for the in-town portion of the project for each pedestrian alternative and drainage alternatives 1 and 3. Right of way acquisition is anticipated for the out of town portion of the project for drainage alternative 3. Right of way price per acre have been approximated as noted in **Table 8** and **Table 10**. Temporary right-of-way acquisition is expected for construction operations.

*Table 7. Right of Way Acquisition Acreage Summary – Drainage Alternatives*

Drainage Facility	Permanent Right of Way Acquisition Area				
	Residential	Commercial	Industrial	Agricultural	Total (Acres)
<b>D1</b>	0.17	0.96	0.00	0.00	1.13
<b>D2</b>	0.00	0.00	0.00	0.00	0.00
<b>D3 – In-town</b>	0.55	1.53	0.08	0.00	2.16
<b>D3 – Out of town</b>	0.00	0.15	0.74	0.40	1.29

*Table 8. Right of Way Acquisition Cost Summary – Drainage Alternatives*

Drainage Facility	Permanent Right of Way Acquisition Cost				
	Residential (\$60,000/acre)	Commercial (\$150,000/acre)	Industrial (\$30,000/acre)	Agricultural (\$13,000/acre)	Total Cost (Dollars)
<b>D1</b>	\$10,200	\$144,000	\$0	\$0	\$154,200
<b>D2</b>	\$0	\$0	\$0	\$0	\$0
<b>D3 – In-town</b>	\$33,000	\$229,500	\$2,400	\$0	\$264,900
<b>D3 – Out of town</b>	\$0	\$22,500	\$22,200	\$5,200	\$49,900

*Table 9. Right of Way Acquisition Acreage Summary – Pedestrian Alternatives*

Pedestrian Facility (With Drainage Alt D2)	Permanent Right of Way Acquisition Area			
	Residential	Commercial	Industrial	Total (Acres)
<b>P1</b>	0.23	0.51	0.12	0.86
<b>P2</b>	0.19	0.43	0.08	0.70
<b>P3</b>	0.36	1.14	0.08	1.58

*Table 10. Right of Way Acquisition Cost Summary – Pedestrian Alternatives*

Pedestrian Facility (With Drainage Alt D2)	Permanent Right of Way Acquisition Cost			
	Residential (\$60,000/acre)	Commercial (\$150,000/acre)	Industrial (\$30,000/acre)	Total Cost (Dollars)
<b>P1</b>	\$13,800	\$76,500	\$3,600	\$93,900
<b>P2</b>	\$11,400	\$64,500	\$2,400	\$78,300
<b>P3</b>	\$21,600	\$171,000	\$2,400	\$195,000

In addition to right of way acquisition, for the in-town segment of the roadway, there are instances where proposed section would impact existing structures, primarily residential structures. In other instances, while the proposed section would not impact a structure, it would impact the associated property with such a manner that it is no longer feasible to maintain a residence. In these instances, payment of fair market value for the property as well as relocation fees would be required. These impacts are

approximated as impacts and probable impacts as noted in **Table 11**. Impacts are identified as those in which the proposed section would impact an existing structure and probable impacts are identified as those in which the existing structure is located within 10 feet of the outside edge of the proposed section.

Similarly, in some instances, there may be impacts to existing utility facilities and impacts to parking lots for commercial properties that may be deemed significant. These impacts are not noted in these tables.

The option of a roadside ditch on the north side of the road was eliminated as not feasible due to anticipated impacts to residential properties which included 14 minimum impacts and 8 probable impacts for a total of 22 residential impacts.

*Table 11. Approximated Property Impacts – Pedestrian and Drainage Alternatives*

Alternative	Residential Impacts – In-town			
	Impacts	Probable Impacts	Total	Value for Impacts Only (Based on Zillow.com)
<b>Pedestrian Alternatives (Applicable with Drainage Alternatives D1 and D2)</b>				
P1	0	6	6	\$0
P2	0	4	4	\$0
P3	0	6	6	\$0
<b>Pedestrian Alternatives - (Applicable with Drainage Alternative D3)</b>				
P1	3	3	6	\$461,000
P2	3	3	6	\$461,000
P3	6	2	8	\$722,000

## Maintenance of Traffic

Maintenance of traffic may be accomplished by maintaining one lane of traffic during construction operations to provide accessibility to residents and businesses and to limit the amount of traffic detoured to other roadways.

It is recommended to maintain traffic in the westbound direction and detour traffic traveling in the eastbound direction. A primary consideration for detouring eastbound traffic is acknowledging that a significant amount of EB traffic is using SR 47 as an access route to U.S. 31 approximately 4 miles east of the project limits. Through traffic includes truck traffic.

The recommended detour for eastbound traffic is to travel south on U.S. 421 to U.S. 32, and to travel on U.S. 32 east to U.S. 31. Continue north on U.S. to SR 38 and continue travelling northwest along SR 38. The recommended detour to the south is the most direct route for through traffic connecting with U.S. 31.

The recommended detour south is preferred to detour eastbound traffic to the north as it avoids travelling through the towns of Kirklin and Sheridan. The detour to the south is also preferable in that it includes three 90-degree turns compared to 11 90-degree turns for a detour to the north through town. Reducing the amount of 90-degree turns is preferable for through truck traffic.

Maintenance of traffic will be coordinated with Des. No. 1592544.

## **Conclusion**

The preferred alternative is a combination of the following: functional overlay outside of the Town limits, pavement reconstruction with curbs within the Town limits, sidewalk with no buffer on the south side of the road, and storm sewers with in-line detention. Additionally, a left turn lane will be added along SR 46 at the intersection of Main St.


<b>Estimated Project Costs</b>	
Construction (CN)	\$ 7,407,000
Right of Way <sup>1</sup>	\$ 100,000
Utility <sup>2</sup>	\$ 750,000
Preliminary Engineering (PE)	\$ 700,000
<b>TOTAL COST</b>	<b>\$ 8,957,000</b>


- 1- Based on assumed cost per acre without the benefit of topographic survey and right-of-way engineering information. Value was rounded to the nearest \$100,000 to reflect the level of accuracy.
- 2- Assumed 10% of construction. Based on limited amount of utility information and without the benefit of topographic survey.

Concurrence

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Concur:  Date: 2/7/2020  
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Concur:  Date February 10, 2020  
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Concur:  Date 02/14/2020  
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Concur:  Date February 11, 2020  
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# Intersection Evaluation

SR 38 & SR 47  
Des. No. 2000816

Sheridan, IN  
Hamilton County  
February 7, 2020



Prepared for:

Indiana Department of Transportation  
Greenfield District

Prepared by:

Michael Baker International, Inc.



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## PURPOSE OF REPORT

This report documents a conceptual engineering study to evaluate improved geometry and intersection performance at the intersection of SR 38 and SR 47/West 236<sup>th</sup> Street within the Town of Sheridan, Hamilton County, Indiana. This report evaluates the traffic performance of the existing intersection, as well as several improvement options for the opening/construction year and the design year. Conceptual layouts of each improvement alternative that were used to identify utility, environmental, and property impacts on a conceptual level are included in **Appendix A**.

Five alternatives are being considered and include the following:

1. No Build
2. Signalization of the Existing Geometry
3. Signalization of the Existing Geometry including Auxiliary Lanes
4. Signalization with Improved Geometry including Auxiliary Lanes
5. Single Lane Roundabout

## STUDY AREA

The study area is the intersection of SR 38 and SR 47/W. 236<sup>th</sup> Street and the intersection approaches. The study area is located in the southeast corner of the Town of Sheridan and is the primary route to enter the Town from the south and east. Commercial establishments are located at the southeast, northeast, and northwest quadrants of the intersection. Biddle Memorial Park is located at the southwest quadrant of the intersection and contains recreational sporting fields. The main entrance to the park is located in close proximity to the study intersection. Additional access points to the park from SR 47 and SR 38 are located approximately 500' from the study intersection. Coordinates at the center of the project intersection are approximately 40°07'47.9" N, 86°12'38.7" W. The study area is located within the Indiana Department of Transportation (INDOT) Greenfield District. The Study Area Map is shown on **Figure 1**.

## EXISTING CONDITIONS

The study intersection is a four-leg intersection with stop control on each approach of the intersection. The SR 38 northbound approach has an existing skew of approximately 60° from perpendicular. The SR 38 southbound approach has an existing skew of approximately 40° from perpendicular. The posted speed limit along each single lane intersection approach is 35 MPH. SR 38, SR 47, and W. 236<sup>th</sup> Street are classified as major collector roadways through the project area. No weight limit postings are present along any of the study roadways.

## TRAFFIC DATA

INDOT provided 15-minute manual turning movement traffic counts for the study intersection, which were collected on February 6, 2018. The counts were segregated in standard vehicle classifications. AM and PM peak hours were determined, including other associated traffic parameters used for capacity analysis (e.g. peak hour factors, heavy vehicle percentages). A summary of the AM and PM peak hour turning movement volumes can be found in **Appendix B**.

INDOT also provided the project team with forecasted turning movement volumes for the 2023 Opening Year, along with intermediate future years. For forecasting future traffic volumes, a linear growth rate of 1.16% per year was applied to each intersection approach.

*Figure 1 - Study Area Map*

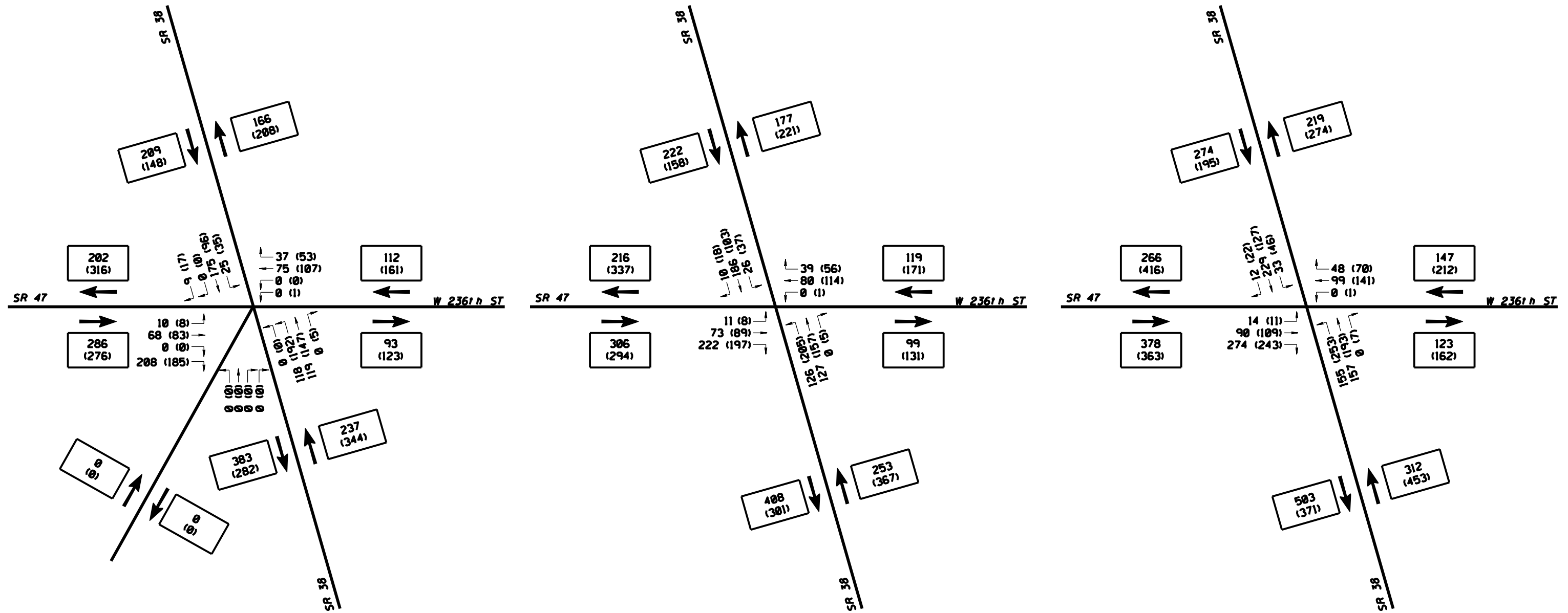
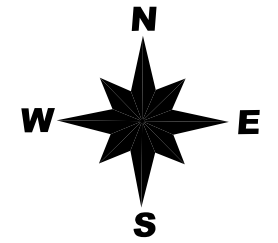


Upon discussion and concurrence with INDOT, 2043 was selected as the design year to be used in the capacity analysis. Michael Baker adjusted the future turning movement volume forecasts to reflect this horizon year, using the 1.16% per year linear growth rate provided. A summary of the turning movement forecasts can be found in **Appendix B**. Turning movement figures illustrating the AM and PM peak period turning movement volumes for Existing Year 2018, Opening Year 2023 and Design Year 2043 can be found in **Figure 2**.

EXISTING YEAR: 2018 TURNING MOVEMENT VOLUMES

OPENING YEAR: 2023 TURNING MOVEMENT VOLUMES

DESIGN YEAR: 2043 TURNING MOVEMENT VOLUMES



MAY 2019

LEGEND:

- AM (PM) PEAK HOUR VOLUMES  
AM Peak 7:15 AM - 8:15 AM  
PM Peak 4:45 PM - 5:45 PM
- TRAFFIC FLOW

# SR 38/SR 47 INTERSECTION STUDY

INDIANA DEPARTMENT OF TRANSPORTATION

**Michael Baker**  
INTERNATIONAL

PEAK HOUR TRAFFIC VOLUMES

FIGURE 2

Page 3

## TRAFFIC SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was performed by INDOT staff to determine if a traffic signal is warranted at the study intersection. Standard traffic signal warrants from the *Manual on Uniform Traffic Control Devices* (MUTCD) were assessed. The 70% factor was applied in the signal warrants evaluated since the intersection lies within the built-up area of an isolated community having a population of less than 10,000.

Traffic Signal Warrant 1, Eight-Hour Vehicular Volume and Traffic Signal Warrant 2, Four-Hour Vehicular Volume were evaluated by INDOT staff. The existing traffic volumes collected in February 2018 were used in the traffic signal warrant evaluation.

The analysis conducted showed that Warrant 2: Four-Hour Vehicular Volume was met for the existing condition. A copy of the worksheets completed for the traffic signal warrant analysis can be found in **Appendix C**.

## TURN LANE LENGTH ANALYSIS

The need for and lengths of proposed turn lanes at the study intersection were evaluated following the procedures outline in Chapter 305 of the *Indiana Design Manual*.

For right turn lanes, the SR 47 eastbound Design Year 2043 forecasted right turn volume is over 200 vph. According to Figure 46-4A of the *Design Manual*, a right turn lane should be considered for the eastbound approach. However, the capacity analysis and low frequency of crashes, both of which will be described in detail later in this report, suggest that operations and safety will not significantly improve with the implementation of a right turn lane at this approach. The Design Year forecasts for the remaining right turns at the intersection did not fall within the area in Figure 46-4A to consider the need for a right turn lane. Therefore, right turn lanes are not proposed at the study intersection.

For left turn lanes, the SR 38 northbound Design Year 2043 forecasted left turn volume is 155 vph and 253 vph for the AM and PM peak hours, respectively. On the SR 38 northbound approach, the left turn volume is roughly the same as the through and right turn volume in the AM peak hour and is higher than the through and right turn volume in the PM peak hour (see **Figure 2**). As a result, one of the proposed improvement alternatives adds a left turn lane along the SR 38 northbound approach along with a left turn lane along the SR 38 southbound approach to add uniformity to the intersection to ensure that no lane shifts occur through the intersection. Left turn lanes were not considered for the SR 47 eastbound approach and W. 236<sup>th</sup> Street westbound approach since the left turning volumes are low.

The left turn lane lengths for the SR 38 northbound and southbound approaches were determined according to the guidelines outlined in the 7<sup>th</sup> Edition of *A Policy on Geometric Design of Highways and Streets* (*Green Book*). The values described in the *Indiana Design Manual* are unnecessarily conservative, while the values provided in the *Green Book* are more representative of driver behavior. The full width length of the proposed left turn lanes provides for vehicle storage and vehicle deceleration, taper included.

The proposed deceleration length, with included taper, portion of the turn lane was determined using Table 9-20 Desirable Lane Change and Deceleration Distances of the *Green Book*. With a posted speed limit of 35 mph and approach grades less than 2%, the desirable lane change and deceleration distance for the left turn lanes is 205'.

The storage length portion of the left turn lane was determined using Table 9-22 Calculated Storage Lengths to Accommodate the 85<sup>th</sup> Percentile Critical Gap of the Green Book. As a result, the storage length for the SR 38 southbound left turn lane was determined to be 50'. The storage length for the SR 38 northbound left turn lane was determined to be 75'. The total full width lengths of the left turn lanes are shown in the table below.

Table 1 - SR 38 Full Width Turn Lane Lengths

Approach	Storage Length	Deceleration Length (taper length included)	Total Full Width Length
SR 38 SB	50 ft	205 ft	255 ft
SR 38 NB	75 ft	205 ft	280 ft

## DISCUSSION OF CONCEPT ALTERNATIVES

### *Alternative 1 - No Build*

Under the No Build Alternative, the intersection of SR 38 and SR 47/W. 236<sup>th</sup> Street would remain an all-way stop controlled intersection with single lane approaches.

### *Alternative 2 - Signalization of the Existing Geometry*

Alternative 2 includes the installation of a traffic signal at the intersection, as warranted under INDOT's Traffic Signal Warrant Evaluation. Under this option, no widening for turn lanes was included.

### *Alternative 3 - Signalization of the Existing Geometry including Auxiliary Lanes*

This alternative consists of widening the SR 38 northbound and southbound approaches to accommodate exclusive left turn lanes. The SR 38 roadway typical sections would consist of three (3) 12' lanes. All intersection approaches within the limits of work would include a 6" vertical face curb, with a 2' offset from the edge of the travel lane. The curb would help with traffic calming along with separation of vehicular and pedestrian facilities. **Figure A-1, in Appendix A** –depicts this alternative.

The overall intersection limits of work would accommodate the addition of the SR 38 turn lanes along with minor side road modifications to adjust radius returns and curb installation with sidewalk. The south leg length of construction would begin approximately 600' from the intersection. This length accommodates a 75' storage length, 205' deceleration and taper length combined, and 270' lane shift length to accommodate a 45 mph taper rate (45:1). The speed limit of SR 38 changes from 45 mph to 35 mph in the area of this lane shift. The north leg limit of work would extend approximately 550' beyond the intersection. This length accommodates a 50' storage length, 205' deceleration and taper length combined, and 120' lane shift length to accommodate a taper rate of 20:1 at 35 mph and pedestrian facilities. The west leg of SR 47 limit of work would extend roughly 200' beyond the intersection to Ricker's driveway and would accommodate adjustments to the intersection radius returns and pedestrian facilities. The east leg of W. 236<sup>th</sup> Street limit of work would extend roughly 200' beyond the intersection to the Dairy Queen and Valero driveways and would accommodate adjustments to the intersection radius returns and pedestrian facilities.

A sidewalk along the western side of the north leg was incorporated into this concept to safely accommodate pedestrians from the neighborhoods to the north and the west, the park, and Dairy Queen. The proposed sidewalk and crosswalks were designed using the guidelines in the *Indiana Design Manual, Chapter 502 (Traffic Design)* and Standard Drawings *E 604 SDWK-01 (Sidewalk with Buffer)* and *E 604 SDWK-02 (Sidewalk Adjacent to Curb)*.

Sidewalk also was incorporated at the northeast quadrant of the intersection and along W. 236<sup>th</sup> St (east leg). The sidewalk is 5' wide and set 4' behind the curb to avoid utility impacts. The new sidewalk would give pedestrians access from the park and adjacent neighborhoods to Dairy Queen. A crosswalk at the SR 38 north leg would connect pedestrian access from the Dairy Queen to the pedestrian infrastructure.

Sidewalk also was included on both sides of SR 47 (west leg) to accommodate pedestrian traffic from the neighborhood to the west and Biddle Memorial Park. This sidewalk would tie into proposed sidewalk of a separate project on SR 47. A crosswalk is proposed to cross the SR 47 approach to connect pedestrians from the neighborhood to the north and the Dairy Queen to the park.

This alternative has minimal right-of-way impacts within the limits of work. Impacts would not exceed sliver takes or additional easements. Utility impacts would occur in the northwest quadrant intersection radius return. Impact to a high-pressure gas line in the southwest intersection quadrant along the radius return is a possibility under this alternative. According to the *Indiana Design Manual*, at grade intersections should not exceed 20° off perpendicular or 30° off perpendicular in conditions to limit geographic, utility, and right of way constraints. The existing intersection skews are 40° off perpendicular for the SR 38 north leg and almost 60° off perpendicular for the SR 38 south leg.

*Alternative 4a - Signalization with Improved Geometry including Auxiliary Lanes (South Leg Shift 40 Degree Skew from Perpendicular)*

This alternative resembles Alternative 3 for the SR 38 north leg, the SR 47 west leg, and the W. 236<sup>th</sup> Street east leg. Under this concept, the SR 38 south leg would shift off the existing alignment via a reverse curve approaching the intersection. This reverse curve aligns the SR 38 north leg and the SR 38 south leg at the same skew angle. The first horizontal curve has a radius that maintains normal crown for a design speed of 35 mph. The second horizontal curve has a radius to accommodate full superelevation at a design superelevation of 4%. This alternative would implement the same pedestrian accommodations listed in Alternative 3: Signalization of the Existing Geometry including Auxiliary Lanes. **Figure A-2 in Appendix A** illustrates this alternative.

This alternative would require right-of-way from Biddle Memorial Park to accommodate the shifted alignment of the SR 38 south leg. However, the impacts would not affect the ballfield adjacent to the roadway.

Three utility poles are located between SR 38 and Biddle Memorial Park that would likely need to be relocated. In addition, the high-pressure gas line at the southwest quadrant of the intersection would most likely be impacted.



*Alternative 4b – Signalization with Improved Geometry including Auxiliary Lanes (North/South Leg Shift 30 Degree Skew from Perpendicular)*

As shown on **Figure A-3 in Appendix A**, this alternative likely would result with impacts to one of the Biddle Memorial Park ballfields, as well as impacts to The Farmer’s Bank driveway. By shifting the intersection tie-in point east or west, impacts can be shifted north or south of the intersection.

This alternative has not been advanced as far as the other options. It is shown to illustrate the impacts involved with accommodating INDOT standards of not exceeding a 30-degree skew from perpendicular. The design would utilize a horizontal reverse curve on SR 38 for both the south leg and the north leg. The outer two (2) curves of the reverse curves would accommodate normal crown at 35 mph. The two (2) horizontal curves adjacent to the intersection accommodate full superelevation for a design superelevation of 4% at 35 mph.

*Alternative 5 – Single Lane Roundabout*

As shown on **Figure A-4 in Appendix A**, this alternative would result in impacts to Biddle Memorial Park, slightly impacting one of its ballfields, as well as impacts to The Farmer’s Bank driveway. Minor impacts would occur to the green space of Rickers gas station and Valero gas station.

A roundabout having an inscribed circle of 125’ was selected to reduce right-of-way impacts surrounding the intersection while still accommodate the design vehicle. A truck apron was used in the center island to help accommodate turning movements of larger vehicles.

Raised splitter islands were placed at all four (4) legs to encourage proper vehicle deflection and flow into the roundabout. Due to the acute angles between legs in the northwest and southeast quadrants, additional pavement is required to provide for truck off tracking during these right turn movements. There are several viable approaches to compensate for truck off tracking including, exterior truck aprons, realignment of approach legs, right turn bypass lanes, and signage (larger vehicles would need to circle the roundabout, rather than making a direct right turn). Right turn bypass lanes have been included in Figure A-4, as the most conservative approach. The final configuration will be determined during the design phase. Performance checks for fastest path, sight distance, angles of visibility, and autoturn paths are satisfied for this concept. Treatment and landscaping of the center circle would need to be at an appropriate height to maintain proper sight distance. Gateway treatments within the central island would also need to be evaluated to ensure they do not impact sight lines.

Pedestrian accommodations were incorporated into this concept just as the other concepts. Pedestrian crossings are on the northern leg and western leg of the intersection. The splitter islands provide the 6’ minimum width for pedestrian refuge. Crosswalks are set far enough back from the entrance line to allow for one vehicle between them.

## CAPACITY ANALYSIS

A traffic capacity analysis was performed for the five (5) options considered. The analysis evaluated the intersection performance of the various options for the Opening Year 2023 and Design Year 2043 in the AM and PM peak hours. Options that were evaluated included the following:

1. No Build
2. Signalization of the Existing Geometry

3. Signalization of the Existing Geometry including Auxiliary Lanes
4. Signalization with Improved Geometry including Auxiliary Lanes
5. Single Lane Roundabout

Synchro Version 10, using Highway Capacity Manual (HCM) 2010 methodology, was used to analyze the No Build and Signalization options. SIDRA Intersection 8.0 was used to analyze the roundabout option, incorporating HCM 6<sup>th</sup> Edition methodology. The control delay and corresponding Level of Service (LOS) results are reported using HCM 2010 methodology (for No Build and Signalization options) and HCM 6<sup>th</sup> Edition (for the roundabout option). Queuing results are reported for the 95<sup>th</sup> percentile queues. For the signalized intersection options, signal timing splits were optimized for each peak period separately. Signal cycle lengths were also optimized for each peak period separately.

#### *Alternative 1 - No Build Condition*

The No Build intersection capacity analysis was performed using future Opening Year 2023 and Design Year 2043 traffic forecasts assuming no improvements to the intersection (i.e. all-way stop control). For Opening Year 2023, all of the approach LOS results are predicted to operate at a LOS C or better in both the AM and PM peak periods. The overall intersection LOS is predicted to be LOS B and LOS C for the AM and PM peak hours, respectively. **Tables 2, 4, and 6** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Opening Year 2023.

For Design Year 2043, all of the approaches are projected to operate at a LOS C or better during the AM and PM peak hours, except for the following: the SR 47 eastbound approach is projected to operate at a LOS D for both the AM and PM peak hours and the SR 38 northbound approach is project to operate at a LOS F and has a volume-to-capacity (v/c) ratio of 0.99 during the PM peak hour. The overall intersection level of service for the Design Year 2043 is a LOS C for the AM peak hour and a LOS E for the PM peak hour. **Tables 3, 5, and 7** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Design Year 2043.

**Appendix D** contains a printout of the analysis results for Alternative 1 – No Build Condition.

#### *Alternative 2 - Signalization with Existing Geometry*

The first improvement option evaluated was replacement of the all-way stop traffic control with a traffic signal. The traffic signal was evaluated as actuated-uncoordinated, and the existing geometrics of the intersection were retained.

For Opening Year 2023, each approach is projected to operate at a LOS A in both the AM and PM peak hours, except for the SR 47 eastbound approach, which is projected to operate at a LOS B. The overall intersection is projected to operate at a LOS A for both peak hours. **Tables 2, 4, and 6** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Opening Year 2023.

For Design Year 2043, each approach is projected to operate at a LOS A or B in both the AM and PM peak hours. The overall intersection is projected to operate at a LOS B for both peak hours. **Tables 3, 5, and 7** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Design Year 2043.

**Appendix D** contains printouts of the analysis results for the Alternative 2 – Signalization with Existing Geometry.

Table 2 - Opening Year 2023 Level of Service Summary

Lane Group	Alternative 1 No Build		Alternative 2 Signal with Existing Geometry		Alternative 3 Signal with Auxiliary Lanes		Alternative 4 Signal with Auxiliary Lanes and Realignment		Alternative 5 Roundabout	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EBLTR	C (15.4)	B (14.8)	B (10.2)	B (11.0)	B (10.9)	A (9.9)	B (10.2)	A (9.9)	A (7.3)	A (6.1)
WBLTR	B (11.1)	B (12.3)	A (8.3)	A (9.5)	A (8.3)	A (8.5)	A (8.3)	A (8.5)	A (5.3)	A (6.9)
NBL	B (14.3)	C (21.1)	A (9.1)	A (9.9)	B (11.1)	B (10.9)	B (11.1)	B (10.9)	A (5.4)	A (6.8)
NBTR					A (8.1)	A (8.3)	A (8.1)	A (8.3)		
SBL	B (13.2)	B (12.1)	A (8.8)	A (7.8)	A (8.8)	A (9.3)	A (8.8)	A (9.3)	A (5.9)	A (5.8)
SBTR					A (8.7)	A (8.1)	A (8.7)	A (8.1)		
Overall	B (14.0)	C (16.3)	A (9.3)	A (9.8)	A (9.4)	A (9.4)	A (9.4)	A (9.4)	A (6.2)	A (6.4)

Table 3 - Design Year 2043 Level of Service Summary

Lane Group	Alternative 1 No Build		Alternative 2 Signal with Existing Geometry		Alternative 3 Signal with Auxiliary Lanes		Alternative 4 Signal with Auxiliary Lanes and Realignment		Alternative 5 Roundabout	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EBLTR	D (31.1)	D (30.8)	B (10.9)	B (14.2)	B (10.9)	B (10.8)	B (10.9)	B (10.8)	A (9.7)	A (7.4)
WBLTR	B (14.4)	C (18.3)	A (8.2)	B (11.5)	A (8.2)	A (8.8)	A (8.2)	A (8.8)	A (6.3)	A (9.2)
NBL	C (24.3)	F (66.1)	B (10.4)	B (11.2)	B (13.5)	B (12.5)	B (13.5)	B (12.5)	A (6.4)	A (8.5)
NBTR					A (8.9)	A (8.7)	A (8.9)	A (8.7)		
SBL	C (20.6)	C (17.7)	A (9.9)	A (8.1)	A (9.9)	A (10.0)	A (9.9)	A (10.0)	A (7.2)	A (7.2)
SBTR					A (9.9)	A (8.4)	A (9.9)	A (8.4)		
Overall	C (24.4)	E (39.6)	B (10.1)	B (11.6)	B (10.4)	B (10.1)	B (10.4)	B (10.1)	A (7.7)	A (8.1)

Table 4 - Opening Year 2023 V/C Summary

Lane Group	Alternative 1 No Build		Alternative 2 Signal with Existing Geometry		Alternative 3 Signal with Auxiliary Lanes		Alternative 4 Signal with Auxiliary Lanes and Realignment		Alternative 5 Roundabout	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EBLTR	0.55	0.52	0.56	0.55	0.56	0.52	0.56	0.52	0.35	0.30
WBLTR	0.23	0.33	0.25	0.31	0.25	0.29	0.25	0.29	0.15	0.23
NBL	0.48	0.68	0.43	0.57	0.29	0.41	0.29	0.41	0.25	0.25
NBTR					0.25	0.30	0.25	0.30		
SBL	0.42	0.31	0.37	0.23	0.06	0.08	0.06	0.08	0.25	0.19
SBTR					0.39	0.23	0.39	0.23		

Table 5 - Design Year 2043 V/C Summary

Lane Group	Alternative 1 No Build		Alternative 2 Signal with Existing Geometry		Alternative 3 Signal with Auxiliary Lanes		Alternative 4 Signal with Auxiliary Lanes and Realignment		Alternative 5 Roundabout	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EBLRT	0.79	0.78	0.66	0.69	0.66	0.64	0.66	0.64	0.47	0.38
WBLRT	0.35	0.50	0.29	0.39	0.29	0.36	0.29	0.36	0.20	0.33
NBL	0.69	0.99	0.54	0.67	0.41	0.53	0.41	0.53	0.32	0.46
NBTR					0.31	0.37	0.31	0.37		
SBL	0.61	0.47	0.47	0.26	0.08	0.10	0.08	0.10	0.33	0.26
SBTR					0.50	0.28	0.50	0.28		

Table 6 - Opening Year 2023 95th Percentile Queue Summary

Lane Group	Alternative 1 No Build		Alternative 2 Signal with Existing Geometry		Alternative 3 Signal with Auxiliary Lanes		Alternative 4 Signal with Auxiliary Lanes and Realignment		Alternative 5 Roundabout	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EBLTR	66	60	61	88	48	65	48	65	58	50
WBLTR	18	28	43	76	34	59	34	59	19	32
NBL	50	106	100	170	49	85	49	85	40	63
NBT					44	58	44	58		
SBL	40	26	80	58	14	19	14	19	35	26
SBT					64	41	64	41		

Table 7 - Design Year 2043 95th Percentile Queue Summary

Lane Group	Alternative 1 No Build		Alternative 2 Signal with Existing Geometry		Alternative 3 Signal with Auxiliary Lanes		Alternative 4 Signal with Auxiliary Lanes and Realignment		Alternative 5 Roundabout	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EBLTR	152	142	102	123	82	122	82	122	83	70
WBLTR	30	56	61	93	50	93	50	93	27	47
NBL	106	272	156	317	75	131	75	131	55	90
NBT					65	84	65	84		
SBL	80	50	119	84	20	27	20	27	49	37
SBT					98	61	98	61		



### *Alternative 3 - Signalization with Existing Geometry and Auxiliary Lanes*

For this improvement option, a traffic signal system was added to the intersection for traffic control and northbound and southbound left turn lanes of 320' and 480', respectively, were added on SR 38.

Traffic signal phasing was set to permitted left turn phasing for the left turns on SR 38. The opposing approach volumes, along with the approach level of service results, did not show the need for a protected left turn phase.

For Opening Year 2023, each approach is projected to operate at a LOS A in both the AM and PM peak hours, except for the SR 47 eastbound approach, which is projected to operate at a LOS B. The overall intersection is projected to operate at a LOS A for both peak hours. **Tables 2, 4, and 6** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Opening Year 2023.

For Design Year 2043, each intersection approach is projected to operate at a LOS B or better in both the AM and PM peak hours. The overall intersection is projected to operate at a LOS B for both peak hours. **Tables 3, 5, and 7** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Design Year 2043.

**Appendix D** contains printouts of the analysis results for the option with adding signalization and left turn lanes to the SR 38 approaches.

### *Alternative 4 – Signalization with Improvement Geometry and Auxiliary Lanes*

For this improvement option, a traffic signal was added at the study intersection along with left turn lanes on the SR 38 northbound and southbound approaches. Under this option, the SR 38 northbound approach is slightly shifted from its existing alignment to the west. This shift is provided to geometrically enhance the intersection by allowing the SR 38 northbound and southbound approaches to be more aligned.

This alignment shift was applied to the Synchro model to conduct intersection capacity analyses. Due to limitations of the HCM methodology, the geometric shift does not have any influence on the intersection traffic operations. The output results for the AM and PM peak periods in both the Opening Year 2023 and Design Year 2043 are identical to those of the previous option with signalization on the existing alignment with left turn lanes on SR 38. **Tables 2, 4, and 6** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Opening Year 2023. **Tables 3, 5, and 7** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Design Year 2043.

**Appendix D** contains printouts of the analysis results for Alternative 4 – Signalization

### *Alternative 5 - Roundabout*

For this improvement option, a single lane roundabout was analyzed at the study intersection. The SR 47 eastbound approach and W. 236<sup>th</sup> Street westbound approach remain on their existing alignments. The SR 38 northbound and southbound approaches are slightly shifted to provide better roundabout approach geometry.

For Opening Year 2023, each approach to the roundabout is projected to operate at LOS A in both the AM and PM peak hours. Likewise, the overall intersection level of service is projected to be a LOS A for both peak hours. **Tables 2, 4, and 6** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Opening Year 2023.

Similarly, for the Design Year 2043, each approach is projected to operate at a LOS A, and the overall intersection level of service is projected to be a LOS A for both the AM and PM peak hours. **Tables 3, 5, and 7** summarize the levels of service, v/c ratios, and 95<sup>th</sup> percentile queues, respectively, for the Design Year 2043.

**Appendix D** contains printouts of the SIDRA results for the roundabout option.

## CRASH ANALYSIS

### *Study Area*

As outlined in the introduction, the study intersection for this analysis is SR 38/SR 47 and W. 236<sup>th</sup> Street. SR 38 is a two-lane, bi-directional rural highway that runs North-South with a posted speed limit of 35 MPH. SR 38 intersects SR 47 – W. 236<sup>th</sup> Street, also a two-lane, bidirectional rural highway, at a skew. The north leg of the intersection is approximately 40° off the perpendicular while the south leg is approximately 60° off the perpendicular.

### *Methodology*

INDOT crash history over a four-year period (2014 to 2017) was analyzed to determine the type and severity of collisions that occurred at the study intersection and to identify potential safety benefits from the evaluated intersection alternatives. The crash data provided by INDOT did not provide sufficient detail to create a collision diagram.

A total of 12 crashes were reported in the study area between 2014 and 2017, with most crashes either being rear-end or sideswipe collisions occurring in dry, daylight conditions. No reported crashes resulted in fatalities and no reported crashes involved pedestrians or bicyclists. The crash types are summarized in **Figure 3** and **Table 8**. The crash severity is summarized in **Figure 4** and **Table 9**.

**Appendix E** includes the INDOT crash data.

Figure 3. Crash Summary by Type

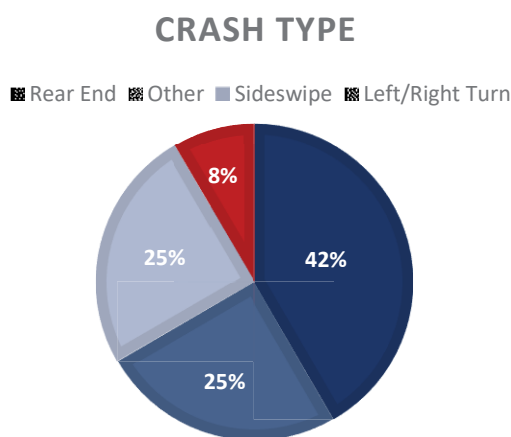


Figure 4: Crash Summary by Severity

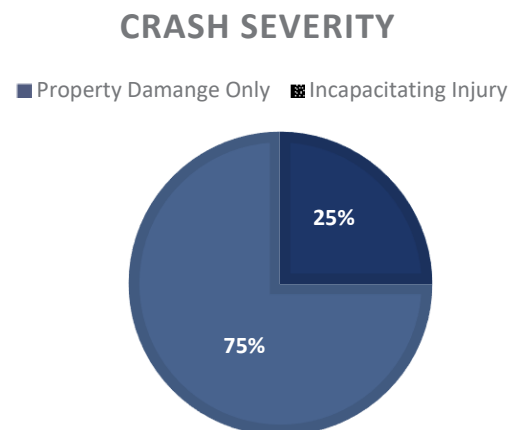


Table 8 - Crash Summary Type

Crash Type	Quantity
Rear End	5
Other	3
Sideswipe	3
Left/Right Turn	1

Table 9 - Crash Summary by Severity

Severity	Quantity
Fatality	0
Incapacitating Injury	3
Non-Incapacitating and Possible Injury	0
Property Damage Only	9

The intersection was analyzed by INDOT using the Road Hazard Analysis Tool (RoadHAT) to evaluate crash frequency and severity for comparison to similar facilities in Indiana. The Index of Crash Frequency (ICF) and Index of Crash Cost (ICC) for the subject intersection are 0.31 and 1.44, respectively. ICF is a measure of total crash frequency expected for a given location, while ICC is a measure of total crash cost (damages resulting from a crash) expected at a given location. Both ICF and ICC are statistically significant measures and screening criteria that reflect the overall safety problem at an intersection, as determined by crash frequency and severity. Values above 1.5 or 2 generally indicate intersections with legitimate safety concerns (as opposed to being attributed to random fluctuations). Given this threshold, the RoadHAT analysis for this study intersection resulted in a relatively low ICF value and an average ICC value, indicating that safety concerns at this location may be a result of random fluctuations.

Full RoadHAT analysis results are included in **Appendix F**.

Four improvement alternatives were developed for the study intersection, as discussed in previous sections. Crash Modification Factors (CMFs) were researched to predict the potential safety benefits of implementing each alternative. According to FHWA, a CMF is a multiplicative factor used to estimate the expected number of crashes after implementing a given countermeasure at a specific site. **Table 10** shows the anticipated CMF for each alternative. These values are taken from the FHWA funded CMF Clearinghouse ([cmfclearinghouse.org](http://cmfclearinghouse.org)), and filtered for *location* (US and Canada), *road type* (2-lane, 4-leg intersections), *area type* (rural, suburban, all, or unspecified), and *study quality* (3-, 4- and 5- star rated studies). Details on each CMF referenced are provided in **Appendix G**.

Table 10 - Crash Modification Factors

Alternative	2. Signalized with Existing Geometry	3. Signalized with Existing Geometry + Turn Lanes	4. Signalized with Improved Geometry + Turn Lanes	5. Single-Lane Roundabout
Expected CMF	<p>Install a traffic signal at a 4-leg, stop controlled intersection:</p> <p><b>0.56 - 0.66</b></p>	<p>Install a traffic signal at a 4-leg, minor road stop-controlled intersection and add left turn lanes:</p> <p><b>0.57<sup>1</sup></b></p>	<p>Improve geometry</p> <p><b>0.91<sup>2</sup></b></p> <p>Improve geometry in combination with Traffic Signal and left turn lanes:</p> <p><b>0.52<sup>3</sup></b></p>	<p>Convert all way, stop controlled intersection to single lane roundabout:</p> <p><b>1.03 to 1.11</b></p> <p><b>0.544</b> (fatalities and injury crashes only)</p>

Results

*Alternative 2 - Signalization of Existing Geometry*, is anticipated to reduce crashes by converting an all-way stop controlled intersection into a signalized intersection. By installing a traffic signal, Alternative 2 can be expected to increase driver awareness of turning vehicles, decrease improper yield and turning maneuvers, provide some traffic calming effects, and reduce the probability of head-on collisions. This is anticipated to result in an estimated 34 – 44% anticipated reduction in crashes<sup>4</sup>. While overall crashes are expected to significantly decrease, converting the intersection from stop controlled to signalized may increase the potential for rear-end collisions<sup>5</sup>.

*Alternative 3 - Signalization and Auxiliary Turn Lanes*, is anticipated to reduce all crashes by an estimated 43% through increasing driver awareness, decreasing improper yield and turning maneuvers, reducing conflict points through exclusive left turns, and providing some traffic calming effects through

<sup>1</sup> Study based on stop signs on minor road

<sup>2</sup> Based on Improved Geometry only

<sup>3</sup> Based on all crashes; see discussion for results relating to severe crashes

<sup>4</sup> CMF ID 5525 = **0.66** for all crashes (Wang and Abdel-Aty, 2014); CMF ID 7982 = **0.61** for all crashes (Srinivasan et al., 2014); CMF ID 325 = **0.56** for all crashes (Harkey et al., 2008);

<sup>5</sup> CMF ID 328 = **1.58** for rear end crashes (Harkey et al., 2008)

signalization<sup>6</sup>. In studies, severe crashes (including fatalities and injuries) saw higher decreases<sup>7</sup>. Conflicts with through moving vehicles in the same direction are also reduced by removing the left turning vehicles from the through traffic movement. Rear-end collisions are the most prevalent crash type at a signalized intersection due to the constant change in traffic flow inherent with a signal. Due to the limited availability of CMFs for this alternative, the limitations of this CMF should be noted. One limitation of this CMF is that it utilizes stop control on minor roads only instead of all-way stop control. In addition, the CMF applied included installation of a traffic signal and the installation of left turn lanes only.

*Alternative 4 - Signalization of Improved Geometry*, combines Alternative 3 (Installation of a Traffic Signal and Left Turn Lanes) with Improved Geometry that reduces the skew of the intersecting roadway. Roadways set at skewed angles typically have impeded sight lines and increased difficulty with turning<sup>8</sup>. The Indiana DOT Intersection Decision Guide recommends multiplying individual CMF factors together when combining unique treatments that apply to the same crash type. On its own, improving the geometry of an intersection (reducing skew) is expected to reduce crashes<sup>9</sup> through improved sight lines, shorter sight distances, and smaller intersection areas. Further safety benefits are expected when this treatment is combined with installing a traffic signal and left turn lanes, as both treatments are anticipated to reduce crashes individually.

*Alternative 5 - Single-Lane Roundabout*, is expected to mitigate fatal and injury crashes due to the traffic calming effects of the roundabout. Converting a traditional all-way stop-controlled intersection into a roundabout intersection will reduce the number of property damage crashes and significantly reduce the severity of crashes (including fatalities and severe and minor injuries)<sup>10</sup>. By streamlining vehicles in a single direction of travel, single lane roundabouts drastically reduce the total number of conflict points at an intersection. Roundabouts also provide traffic calming effects by reducing speeds.

Although the CMFs for single-lane roundabouts appear to be greater than the other alternatives, with signalizing and adding turning lanes, converting a stop-controlled intersection into a roundabout would typically result in greater overall safety benefits.

## INTERSECTION DECISION GUIDE

INDOT's *Intersection Decision Guide* (IDG) was used as a tool in evaluating alternatives for the intersection. For the initial feasibility screening of alternatives, IDG's Stage 1 Decision Tree was consulted. Given the existing two-lane cross-section of SR 38, SR 47, and West 236<sup>th</sup> Street, the close proximity of several

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<sup>6</sup> CMF ID 7967 = **0.57** for all crashes (Srinivasan et al., 2014)

<sup>7</sup> CMF ID 7970 = **0.48** for fatalities and all injuries (Srinivasan et al., 2014)

<sup>8</sup> Federal Highway Administration. "Realign Intersection Approaches to Reduce or Eliminate Intersection Skew" *Unsignalized Intersection Safety Strategies*. NCHRP Report 500, Volume 5: A Guide for Addressing Unsignalized Intersection Collisions, Strategy B16.  
[https://safety.fhwa.dot.gov/intersection/other\\_topics/fhwasa08008/ub16\\_intersection\\_skew.pdf](https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa08008/ub16_intersection_skew.pdf)

<sup>9</sup> CMF ID 5189 = **0.91** for all crashes on minor arterial roadways (Harwood et al., 2000)

<sup>10</sup> CMF ID 4933 = **0.54** for fatalities and all injuries (Qin et al., 2013);

businesses and Biddle Memorial Park to the intersection, the following intersection types were considered infeasible:

- Median U-turn,
- Displaced Left Turn,
- Offset-T,
- Green-T,
- Quadrant Roadway, and
- Grade Separation.

The remaining intersection types, conventional (including signal control with and without turn lanes, signal control with realignment to eliminate the skew) and roundabout, were evaluated under Stage 2 – Secondary, Expanded Performance Assessment criteria. Specifically, the Stage 2 criteria included the following:

- Performance relative to traffic mobility service,
- Performance relative to traffic safety service,
- Cost effectiveness (value in terms of service performance vs. cost), and
- Efficiency regarding other performance measures (including stakeholders, timeline, continuity, environmental impacts, right-of-way impacts, and utility impacts).<sup>11</sup>

#### *Traffic Mobility Service*

As described in *Capacity Analysis* section, each alternative was evaluated to determine the level of service, volume/capacity ratio, and 95<sup>th</sup> percentile queue. As demonstrated in Section 8, each of the improvement alternatives analyzed provided some improvement in levels of service over the No Build Condition in the design year. Under the No Build Condition, the overall intersection is projected to operate at a LOS E during the PM peak hour. Additionally, the northbound approach is projected to operate at a LOS F during the PM Peak hour. Under the signalized alternatives, the overall intersection is projected to operate at a LOS A or LOS B during both the AM and PM peak hours. Each approach of the intersection also is projected to operate at a LOS B or better during the AM and PM peak hours. The roundabout alternative is projected to operate with slightly better levels of service, with all approaches and the overall intersection operating at a LOS A during both the AM and PM peak hours.

The 95<sup>th</sup> percentile queues are projected to increase under the signalized alternative with the existing geometry compared to the No Build condition. Under the other signalized alternatives with the addition of auxiliary lanes, the queues on the eastbound approach and in the northbound through/right lane are projected to decrease compared to the No Build condition. Queues on the westbound approach and in the southbound through/right lane would increase slightly; however, those queues will remain relatively short at less than 100 feet in length in the design year. Under the roundabout alternative, the 95<sup>th</sup> percentile queue lengths are expected to be less than 100 feet on each approach in the design year.

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<sup>11</sup> Evaluation of other performance measures was not included in this study.

*Traffic Safety Service*

In accordance with the IDG, Annual Expected Crash Reductions were calculated for each alternative. The results are summarized in the table below:

*Table 11 - Annual Expected Crash Reduction*

Alt. No.	Description	Crash Reduction <sup>1</sup>
1	No Build	0
2	Signal with Existing Geometry	17.8
3	Signal with Auxiliary Turn Lanes	19.7
4	Signal with Auxiliary Turn Lanes and Realignment	24.1
5	Roundabout (CMF 4933 - fatalities and injury crashes only)	20.9
<sup>1</sup> Crash Reduction calculated as follows: Annual PD Equivalent Crashes x CRF <sub>Composite</sub> ; where PD = Property Damage and CRF = Crash Reduction Factor. Annual PD Equivalent Crashes and CRF calculated in accordance with the IDG methodology.		

As shown in **Table 11**, the number of crashes is expected to increase slightly under the roundabout alternative. However, it is important to note that the increase applies to ALL crashes compared to the all-way stop condition. When looking at a roundabout's impact on fatal, severe injury, and minor injury crashes, the number of crashes is expected to decrease.

*Cost effectiveness*

In accordance with the methodology outlined in the IDG, the annual uniform cost of each alternative was calculated and compared to: (1) traffic mobility benefits and (2) traffic safety benefits. The results are summarized below in **Tables 12** and **13**. The cost estimates for each alternative are detailed in **Appendix H** and summarized in **Table 14**.

Table 12 - Cost Effectiveness vs. Mobility

Alt. No.	Description	CE <sub>mobility</sub> <sup>1</sup>
1	No Build	NA
2	Signal with Existing Geometry	\$10,871 317' (max 95 <sup>th</sup> %tile Q); 11.6 sec/veh delay (avg intersection delay)
3	Signal with Auxiliary Turn Lanes	\$115,229 131' (max 95 <sup>th</sup> %tile Q); 10.4 sec/veh delay (avg intersection delay)
4	Signal with Auxiliary Turn Lanes and Realignment	\$121,751 131' (max 95 <sup>th</sup> %tile Q); 10.4 sec/veh delay (avg intersection delay)
5	Roundabout	\$99,285 90' (max 95 <sup>th</sup> %tile Q); 8.1 sec/veh delay (avg intersection delay)

<sup>1</sup> Cost-Effectiveness (CE) expressed as ratio of Annual Uniform Cost vs. maximum 95<sup>th</sup> percentile queue and average intersection delay. Annual Uniform Cost does not include right-of-way costs or annual maintenance costs.

Table 13 - Cost Effectiveness vs. Safety

Alt. No.	Description	CE <sub>safety</sub> <sup>1</sup>
1	No Build	NA
2	Signal with Existing Geometry	\$609
3	Signal with Auxiliary Turn Lanes	\$5,857
4	Signal with Auxiliary Turn Lanes and Realignment	\$5,052
5	Roundabout (CMF 4933 - fatalities and injury crashes only)	\$4,759

<sup>1</sup> Cost-Effectiveness (CE) expressed cost per number of reduced crashes.

Table 14 – Cost Estimates

Alt. No.	Description	Cost
1	No Build	N/A
2	Signal with Existing Geometry	\$150,000
3	Signal with Auxiliary Turn Lanes	\$1,590,000
4	Signal with Auxiliary Turn Lanes and Realignment	\$1,680,000
5	Roundabout	\$1,370,000



## CONCLUSIONS

The four improvement alternatives evaluated, each operate with improved levels of service and queues when compared to the No Build scenario. While alternatives 2 and 4 generally meet the project goals, they are not recommended as Alt 2 does not address the need for left turn lanes and the realignment associated with Alt 4 does not provide a benefit to traffic operations. The levels of service and queues for each improvement alternative are similar; however, the roundabout alternative does have slightly better levels of service and slightly shorter queues. From a safety perspective, installation of a traffic signal with auxiliary turn lanes and realignment to reduce the skew is expected to have the highest reduction in crashes, followed by the installation of a signal with auxiliary lanes keeping the existing geometry. Although the roundabout shows a slight increase in crashes, it is important to note that roundabouts have been shown to have a reduction in fatal, severe injury, and minor injury crashes.


Alt 5: Roundabout provides the lowest cost and greatest safety benefit for the project intersection and is the preferred alternative of INDOT. Through coordination meetings with the Town of Sheridan, concern was expressed at the level of acceptance of a roundabout within the community. Based on these concerns in conjunction with a minor increase in cost and decrease in safety, INDOT is also agreeable to the installation of Alt 3: Signal with Auxiliary Turn Lanes. Further coordination with the Town of Sheridan will be required to determine the final improvement.

### **Estimated Project Costs**


	<u>Signal with Turn Lanes</u>	<u>Roundabout</u>
Construction (CN)	\$ 1,590,000	\$ 1,370,000
Right of Way <sup>1</sup>	\$ 20,000	\$ 50,000
Utility <sup>2</sup>	\$ 0	\$ 150,000
Preliminary Engineering (PE)	\$ 140,000	\$ 185,000
<b>TOTAL COST</b>	<b>\$ 1,750,000</b>	<b>\$ 1755,000</b>

- 1- Based on assumed cost per acre without the benefit of topographic survey and right-of-way engineering information. It is assumed no costs would be incurred for R/W required from Biddle Memorial Park.
- 2- Utility impacts estimated at 10% of construction for the roundabout. Based on limited amount of utility information and without the benefit of topographic survey. No utility impacts are anticipated with the Signal alternative.

**CONCURRENCE**

Prepared by:  Date 2/7/2020  
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Michael Baker Intl.

Concur:  Date: 2/7/2020  
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INDOT Greenfield District Project Manager

Concur:  Date February 10, 2020  
Aschalew Aberra, PE  
INDOT Greenfield District Scoping Manager

Concur:  Date 02/13/2020  
Luis Laracuente, PE  
INDOT Greenfield District Traffic Engineer

Concur:  Date February 11, 2020  
Amy Groff, PE  
INDOT Greenfield District System Asset Manager