Appendix F: Water Resources

APPROVED
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2/18/21

Waters of the U.S. Report

I-65 Added Travel Lanes

Tippecanoe County

Des. Nos.

2001172 and 2100049

Asset IDs

I65-177-02402 BNBL
I65-177-02402 JCSB
I65-178-05485 BNBL
I65-178-05485 JBSB
I65-178-05486 JBNB
I65-178-05486 BSBL
I65-180-05489

Waters of the U.S. Report Attachments were removed to minimize file size. Maps showing wetlands and streams can be found in Appendix B of this CE document.

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1. PROJECT INFORMATION

Date(s) of Field Reconnaissance: May 7, July 28-30, August 7, September 2, October 8, and October 30, 2020

1.1 LOCATION

The project is located along Interstate 65 (I-65), approximately 1.33 miles north of State Road (SR) 25 to 2.43 miles north of SR 43 near Lafayette and Battle Ground, Indiana, in Tippecanoe Township, Tippecanoe County, Indiana (Attachments, page 1). Additional length north and south of these limits is included in the project area for median crossovers for maintenance of traffic.

- North End of Project Area: 40.527082, -86.903275
- South End of Project Area: 40.46510, -86.850528
- Sections 17, 20, 21, 27, 28 of Township 24N, Range 4W; Section 3, Township 23N, Range 4W; and Burnett's Reserve
- Tippecanoe Indiana Quadrangle

1.2 PROJECT DESCRIPTION

The Federal Highway Administration (FHWA) and Indiana Department of Transportation (INDOT), Crawfordsville District are planning to proceed with an added travel lanes project along I-65 in Tippecanoe County, Indiana. The project will begin approximately 1.33 miles north of the interchange with SR 25 and end approximately 2.43 miles north of the interchange with SR 43.

Project activities include:

- Travel lane and shoulder pavement replacement;
- Addition of lanes/extension of turn lanes and pavement replacement on I-65/SR 43 interchange ramps;
- Addition of a travel lane in each direction in the median with traffic separated by a concrete barrier;
- Bridge deck replacement and widening of the I-65 northbound and southbound bridges over 9th Street/CSX Railroad/Burnett Creek/Wabash Heritage Trail (Bridge Nos. I-65-77-02402 BNBL and I-65-177-02402 JCSB);
- Bridge deck replacement and widening of I-65 northbound and southbound bridges over Prophets Rock Road (Bridge Nos. I65-178-05485 BNBL, I65-178-05485 JBSB);
- Bridge deck replacement and widening of I-65 northbound and southbound bridges over SR 43 (Note: the environmental impacts of work to these bridges were previously documented in a separate Categorical Exclusion (CE) document under Des. Nos. 1601088 and 1601090, Bridge Nos. I65-178-05486 JBNB, I65-178-05486 BSBL);
- Bridge deck replacement and raising the elevation of CR 725 N. bridge over I-65 (Bridge No. I65-180-05489); and

- Replacement of culverts crossing under I-65 and/or construction of median drains, culverts, and detention basins for roadway drainage.

The bridges over Burnett Creek, south of CR 600 N., will have a deck replacement and be widened as part of a separate project prior to this added travel lanes project. Environmental impacts of that bridge work will be documented in a separate CE document under Des Nos. 1601091 and 1601092.

2. Desktop Reconnaissance

2.1 Soil Associations and Series Types

According to the Soil Survey Geographic (SSURGO) Database for Tippecanoe County, Indiana, the following 20 mapped soils series are within the I-65 added travel lanes project area (Attachments, pages 37-46).

- **Allison silt loam (Ap):** deep, well drained and moderately well drained, moderately permeable soils that formed in stratified moderately fine and medium textured alluvium on flood plains. Slope ranges from 0 to 7 percent. These soils are not hydric; however, they have hydric inclusions of Sawabesh. This soil type has a hydric rating of 3%.

- **Battleground silt loam (Bb):** very deep, well drained soils that formed in silty alluvium and are on flood plains. Slope ranges from 0 to 2 percent. These soils are not hydric; however, they have hydric inclusions of Sawabesh. This soil type has a hydric rating of 3%.

- **Billett fine sandy loam, gravelly substratum, 0-2 percent (BIA):** very deep, well drained and moderately well drained soils formed in water-deposited or wind-deposited loamy or sandy sediments. These soils are on nearly level to moderately steep convex crests and side slopes on outwash plains, stream terraces, or hills that border river valleys. Slopes range from 0 to 2 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Billett fine sandy loam, gravelly substratum, 2-6 percent (BIB2):** very deep, well drained and moderately well drained soils formed in water-deposited or wind-deposited loamy or sandy sediments. These soils are on nearly level to moderately steep convex crests and side slopes on outwash plains, stream terraces, or hills that border river valleys. Slopes range from 2 to 6 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Ceresco loam (Cl):** very deep, somewhat poorly drained soils that formed in loamy alluvium on flood plains in river valleys. Slope ranges from 0 to 3 percent. These soils are not hydric; however, they have hydric inclusions of Cohoctah. This soil type has a hydric rating of 3%.

- **Crosby-Miami silt loam (CwB2):** very deep, somewhat poorly drained soils that are moderately deep to dense till. Crosby-Miami soils formed in as much as 56 cm (22 inches) of loess or other silty material and in the underlying loamy till. They are on till plains. Slopes range from 2 to 4 percent. These soils are not hydric; however, they have hydric inclusions of Treaty. This soil type has a hydric rating of 3%.

- **Kosciusko gravelly sandy clay loam (KpC3):** well drained soils formed in loamy gravelly outwash on outwash plains, kames, and moraines. They are moderately deep stratified calcareous, very gravelly coarse sand. Slopes range from 6 to 12 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Lash silt loam (Lm):** very deep, well drained soils that formed in alluvium on flood plains. Slope ranges from 0 to 2 percent. These soils are on stream terraces, outwash plains, outwash terraces, and till plains. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Mahalasville-Treaty complex (Md):** very deep, poorly drained and very poorly drained soils that formed in loess or other silty material and in the underlying loamy and sandy outwash. The Mahalasville soils are on outwash plains, lake plains, till plains, and deltas. Treaty soils are in depressions on till plains. Slope ranges from 0 to 2 percent. These soils are hydric. This soil type has a hydric rating of 100%.

- **Miami silt loam, 6 to 12 percent (MsC2):** very deep, moderately well drained soils that are moderately deep to dense till. Miami soils formed in as much as 46 cm (18 inches) of loess or silty material and in the underlying loamy till. They are on till plains. Slopes range from 6 to 12 percent. These soils are not hydric; however, they have hydric inclusions of Treaty. This soil type has a hydric rating of 5%.

- **Miami silt loam, 12 to 18 percent (MsD2):** very deep, moderately well drained soils that are moderately deep to dense till. Miami soils formed in as much as 46 cm (18 inches) of loess or silty material and in the underlying loamy till. They are on till plains. Slopes range from 12 to 18 percent. These soils are not hydric; however, they have hydric inclusions of Cyclone. This soil type has a hydric rating of 5%.

- **Ockley silt loam (OgA):** very deep, well drained soils that are deep or very deep to calcareous, stratified sandy and gravelly outwash. Ockley soils formed in as much as 51 cm (20 inches) of loess or silty material and in the underlying loamy outwash. They are commonly on stream terraces and outwash plains, and less commonly on kame moraines and eskers. Slopes range from 0 to 2 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Ouiatenon loamy sand (Ox):** very deep, somewhat excessively drained soils that formed in calcareous, sandy and gravelly alluvium on flood plains. Slope ranges from 0 to 2 percent. These soils are not considered hydric; however, they have hydric inclusions of Cohocton. This soil type has a hydric rating of 3%.

- **Palms muck (Pc):** very deep, very poorly drained soils formed in herbaceous organic materials 41 to 130 cm (16 to 51 in) thick and the underlying loamy deposits in closed depressions on moraines, lake plains, till plains, outwash plains, and hillside seep areas, and on back swamps of flood plains. Slopes range from 0 to 6 percent. These soils are considered hydric. This soil type has a hydric rating of 100%.

- **Pits, gravel (Pt):** N/A

- **Rodman gravelly loam (RsF):** very deep, excessively drained soils that are shallow to calcareous, stratified sandy and gravelly outwash. The Rodman soils formed in sandy and gravelly outwash. They are on kames, eskers, moraines, outwash plains, and valley trains. Slopes range from 25 to 60 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Starks-Fincastle complex (SwA):** very deep, somewhat poorly drained soils formed in loess or other silty material and in the underlying loamy stratified outwash. They are on outwash plains, stream terraces, and alluvial fans. Slopes range from 0 to 2 percent. These soils are not considered hydric; however, they have inclusions of Treaty and Mahalasville. This soil type has a hydric rating of 6%.

- **Strawn-Rodman complex (SyF):** very deep, well drained soils on end moraines and dissected ground moraines. They are moderately permeable in the solum and moderately or moderately slowly permeable in the substratum. Strawn soils formed in loamy, calcareous till**.** Slopes range from 18 to 50 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Udorthents, loamy (Ua):** moderately well drained to excessively drained soils that have been disturbed by cuffing or filling, and areas that are covered by buildings and pavement. The areas are mostly larger than 5 acres. Slopes range from 0 to 10 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

- **Wea silt loam (Wta):** very deep, well drained soils on outwash plains and stream terraces. They formed in loess or other silty material and in the underlying loamy outwash and are deep to sandy and gravelly deposits. Slope ranges from 0 to 5 percent. These soils are not considered hydric. This soil type has a hydric rating of 0%.

2.2 National Wetlands Inventory

Based on the U.S. Fish and Wildlife National Wetlands Inventory (NWI) data (www.fws.gov/wetlands/Data/State-Downloads.html), seven wetland polygons are mapped within the investigated area (Attachments, pages 47-49). Three of these wetland polygons represent the channels of the Wabash River, Burnett Creek (south crossing), and Burnett Creek (north crossing), and an Unnamed Tributary (UNT) to North Fork Burnett Creek (no stream was identified within the investigated area at this location). The Wabash River, Burnett Creek (south crossing), Burnett Creek (north crossing), and UNT to North Fork Burnett Creek wetlands are classified as a riverine, lower perennial unconsolidated bottom, permanently flooded wetlands (R2UBH). The other three wetland polygons are classified as palustrine, forested, broad-leaved deciduous, seasonally flooded (PCO1C) wetlands.

2.3 Hydrology

Throughout the investigated area, the general landscape is characterized by relatively flat topography, road surface, and areas of cut slopes along the bluffs and fill slopes crossing the v-shaped canyons and gullies and waterways. The project area is within the Central Till Plain physiographic region. Hydrologically speaking, this region is characterized by these numerous v-shaped drainageways, draining the numerous tributaries to the Wabash River, Burnett Creek, and the North Fork Burnett Creek.

The investigated area is within five 12-digit watersheds:

- Dry Run-Wildcat Creek (HUC12-051201070409)
- Harrison Creek-Wabash River (HUC12-051201050603)
- Cedar Hollow-Wabash River (HUC12-051201080501)

- Headwaters Burnett Creek (HUC12-051201080202)
- North Fork Burnett Creek (HUC12-051201080201)

A map displaying the 12-digit watersheds can be found in Attachments, page 60.

According to the Indiana Floodplain Information Portal, portions of the investigated area are within 100-year floodplains or regulatory floodways of the Wabash River, Burnett Creek (south crossing), and Burnett Creek (north crossing) (http://dnrmaps.dnr.in.gov/appsphp/fdms/) (Attachments, pages 50-59). The Wabash River has a base floodplain elevation of 535.4 feet, Burnett Creek (south crossing) has a base floodplain elevation of 540.9 feet, and Burnett Creek (north crossing) has a base floodplain elevation of 614.4 feet (NAVD88). Although the Wabash River is within the project area, all work will be related to maintenance of traffic and limited to the existing bridge, no work will occur within the river. Therefore, this river and its characteristics will not be discussed in detail.

3. Field Reconnaissance

HNTB Indiana staff performed field reviews on May 7, July 28-30, August 7, September 2, October 8, and October 30, 2020. The purpose was to determine the presence of Waters of the U.S. within the investigated area. HNTB Indiana staff collected data during the field reviews to determine the presence or absence of jurisdictional waters. The investigated area encompassed the area required for construction access and completion of the I-65 added travel lanes work. HNTB Indiana staff photographed select features and areas of interest throughout the investigated area. A photo location map and selected photographs are included as Attachments, pages 61-150.

The investigated area was analyzed using the methods outlined in the Routine Determination, On-site Inspection Necessary procedure in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual Midwest Region* (U.S. Army Corps of Engineers, 2010). Identification of indicator status of plant species utilized the 2019 Midwest Region National Wetland Plant List. Field GIS data was collected using a Trimble R1 GNSS GPS with sub-meter accuracy.

The southern portion of the investigated area, from the north end of the bridge over the Wabash River to the southern limits, was an active construction zone at the time of the field investigations because that bridge was being widened (INDOT Des. Nos. 1005681 and 1005682). Therefore, no field investigations took place in this area. Construction work for the I-65 added travel lanes project will only include maintenance of traffic measures within previously disturbed areas within this portion of the investigated area and no impacts to water resources are anticipated here.

4. Waters

The May, July, August, September, and October 2020 field reconnaissance for the I-65 added travel lanes project identified 27 wetlands and 12 streams.

4.1 Wetlands

Twenty-seven wetlands were identified within the investigated area of the I-65 added travel lanes project. Due to the relatively low relief and compacted soils of roadside ditches, wetland conditions often resulted from ponding at the base

of roadside slopes and median drain outfalls or cross drains, despite few hydric soils being mapped within the investigated area. Wetland conditions were also observed within the floodplains of larger streams.

Due to the large number of wetlands delineated within the investigated area, wetlands will be summarized in Table 1. This table contains characteristic data that can be found on the wetland determination forms (Attachments, pages 151-329). Nine data points (data points 1-5, 30, 45, 52, 55) were taken to confirm the absence of wetlands. These data points are not discussed in detail in the report text, but the data sheets are included in the attachments. Any preliminary jurisdictional determination of "yes" in the "Likely Water of the U.S.?" column was made based a water resources field review conducted by HNTB Indiana staff. The features that have been given a preliminary jurisdictional determination of "yes" are wetlands that are directly abutting an Ordinary High Water Mark (OHWM) of a stream. All other wetlands are considered isolated and are not Waters of the U.S. The rationale for these preliminary determinations are summarized below in Table 1. Final Jurisdictional Determinations are the purview of the U.S. Army Corps of Engineers (USACE).

Table 1: WETLAND SUMMARY

Wetland	Lat/Long	Photo ID	Photo Location Map/Photo Attachment Page	Acreage	Length (lf) of Roadside Ditch	Quality	Data Point ID (DP)	Dominant Vegetation	Hydric Soil Indicator(s)	Hydrology Indicators(s)	Wetland Class	NWI Classification	Likely Water of the U.S.?
1	40.492972, -86.860381	28-29	Map 7, Attachment 96-97	0.079	N/A	Poor	6, 7	*Typha angustifolia, Echinochloa crus-galli, Euthamia graminifolia*	F6	A1, D5	Class I	PEM	No
2	40.496596, -86.866439	44-45	Map 9, Attachment Pages 104-105	0.410	N/A	Poor	8, 9	*Juncus tenuis, Phragmites australis*	S5	A1, A2, B6, D5	Class I	PEM	No
3a	40.495936, -86.868033	52	Map 9, Attachment Page 108	0.173	N/A	Poor	10, 11	*Phragmites australis*	F2	A1, D5	Class I	PEM	No
3b	40.497643. -86.86757	50-51	Map 9, Attachment Pages 107-108	0.247	N/A	Poor	10, 11	*Phragmites australis*	F2	A1, D5	Class I	PEM	No
4	40.498132, -86.867266	46-47	Map 9, Attachment Pages 105-106	0.028	118	Poor	12, 13	*Typha latifolia, Schoenoplectus acutus*	F3	A1, A2, A3, D5	Class I	PEM	No
5	40.498326, -86.868156	48	Map 9, Attachment Page 106	0.088	285	Poor	14, 15	*Schoenoplectus taberneamontani*	A11, F2	A1, B10, D5	Class I	PEM	No
6	40.495374, -86.867726	53-54	Map 9, Attachment Page 109	0.127	433	Poor	16, 17	*Schoenoplectus taberneamontani*	Inaccessible due to riprap	A1, B10, D5	Class I	PEM	No
7	40.498548, -86.872807	61-62	Map 10, Attachment Page 113	0.014	N/A	Poor	18, 19	*Phalaris arundinacea*	F1, F6	B10, D5	Class I	PEM	No
8	40.498938, -86.875802	68-71	Map 11, Attachment Pages 116-118	0.191	1089	Poor	20, 21	*Phalaris arundinacea, Schoenoplectus tabernaemontani*	F3	A1, A3, D5	Class I	PEM	No

Wetland	Lat/Long	Photo ID	Photo Location Map/Photo Attachment Page	Acreage	Length (lf) of Roadside Ditch	Quality	Data Point ID (DP)	Dominant Vegetation	Hydric Soil Indicator(s)	Hydrology Indicators(s)	Wetland Class	NWI Classification	Likely Water of the U.S.?
9	40.499741, -86.876631	63-67	Maps 11-12, Attachment Pages 114-116	0.144	720	Poor	22, 23	*Juncus tenuis, Carex muskingumensis*	F3	A1, D5	Class I	PEM	No
10a	40.504205, -86.886086	85-86	Map 14, Attachment Page 125	0.030	166	Poor	24, 25	*Phalaris arundinacea*	Inaccessible due to concrete ditch	A3, D5	Class I	PEM	No
10b	40.50355, -86.88541	83-84	Map 14, Attachment Page 124	0.037	165	Poor	26, 27	*Typha latifolia, Leersia virginica*	Inaccessible due to concrete ditch	A3, D5	Class I	PEM	No
11	40.503349, -86.885654	87-89	Map 14, Attachment Pages 126-127	0.053	235	Poor	28, 29	*Juncus interior, Typha angustifolia*	F1	A3, D5	Class I	PEM	No
12	40.506065, -86.887437	94	Map 14, Attachment Page 129	0.080	193	Poor	31, 32	*Typha angustifolia*	F1, F6	A3, D5	Class I	PEM	No
13	40.506864, -86.88879	95	Map 15, Attachment Page 130	0.021	100	Poor	34, 35	*Phalaris arundinacea*	F3	B10, D2, D5	Class I	PEM	No
14	40.507749, -86.888666	96-98	Map 15, Attachment Pages 130-131	0.072	334	Poor	36, 37	*Phalaris arundinacea*	F6	B6, D5	Class I	PEM	No
15	40.507483, -86.889258	99-100	Map 15, Attachment Page 132	0.035	170	Poor	38, 39	*Phalaris arundinacea*	A11, F3	B10, D5	Class I	PEM	No
16	40.508033, -86.889645	DP 40 Photos	Map 15, Attachment Page 269	0.003	N/A	Poor	40, 41	*Phalaris arundinacea*	F6	A1, A3, B10, D5	Class I	PEM	No
17	40.508005, -86.889255	101	Map 15, Attachment Page 133	0.224	934	Poor	33, 42	*Lolium multiflorum, Echinochloa crus-galli*	F6	A1, D5	Class I	PEM	No

Wetland	Lat/Long	Photo ID	Photo Location Map/Photo Attachment Page	Acreage	Length (lf) of Roadside Ditch	Quality	Data Point ID (DP)	Dominant Vegetation	Hydric Soil Indicator(s)	Hydrology Indicators(s)	Wetland Class	NWI Classification	Likely Water of the U.S.?
18	40.511966, -86.891723	103-106	Map 16, Attachment Pages 134-135	0.088	373	Poor	43, 44	*Schoenoplectus acutus*	F1, F6	A1, B6, D5	Class I	PEM	No
19	40.514727, -86.893658	109-111, 113	Maps 16-17, Attachment Pages 137-139	0.039	134	Poor	46, 47	*Typha angustifolia*	F6	A1, A3, C3, D5	N/A	PEM	Yes, abutting intermittent stream outside of investigated area
20	40.514382, -86.894339	114-115	Map 17, Attachment Pages 139-140	0.010	N/A	Poor	48, 49	*Phalaris arundinacea, Typha angustifolia*	S5	A1, C3, D5	Class I	PEM	No
21	40.514661, -86.894649	116-117	Map 17, Attachment Pages 140-141	0.007	N/A	Poor	50, 51	*Phalaris arundinacea*	F6	A1, A3, B10, D5	Class I	PEM	No
22	40.517016, -86.895436	119-121	Map 17, Attachment Page 142-143	0.070	315	Poor	53, 54	*Typha angustifolia, Apocynum cannabinum*	A10, F6	A1, D5	Class I	PEM	No
23	40.518318, -86.895987	122-123	Maps 17-18, Attachment Pages 143-144	0.397	1363	Poor	56, 57	*Typha angustifolia, Agrostis stolonifera*	F3	A3, D5	Class I	PEM	No
24	40.524797, -86.901526	125, 128-129	Maps 18, 20, 21, Attachment Pages 145-147	0.301	1938	Poor	58, 59, 60	*Cyperus esculentus, Schoenoplectus tabernaemontani, Echinochloa crus-galli, Carex vulpinoidea, Poa pratensis*	F6	B4, B6, D5	Class I	PEM	No
25	40.496324, -86.865511	41-43	Maps 8-9, Attachment Pages 103-104	0.136	571	Poor	14, 15	*Schoenoplectus taberneamontani*	F6	B4, B6, D5	Class I	PEM	No

Table 2: DATA POINT SUMMARY TABLE

Data Point ID	Vegetation	Soils	Hydrology	Within a Wetland?
1	Yes	No	No	No
2	Yes	No	No	No
3	Yes	No	Yes	No
4	No	No	No	No
5	Yes	No	No	No
6	Yes	Yes	Yes	Yes, Wetland 1
7	No	Yes	No	No
8	Yes	Yes	Yes	Yes, Wetland 2
9	No	No	No	No
10	Yes	Yes	Yes	Yes, Wetland 3a & 3b
11	No	Yes	No	No
12	Yes	Yes	Yes	Yes, Wetland 4
13	No	Yes	No	No
14	Yes	Yes	Yes	Yes, Wetland 5, Wetland 25
15	No	Yes	No	No
16	Yes	Yes	Yes	Yes, Wetland 6
17	No	No	No	No
18	Yes	Yes	Yes	Yes, Wetland 7
19	No	No	No	No
20	Yes	Yes	Yes	Yes, Wetland 8
21	No	No	No	No
22	Yes	Yes	Yes	Yes, Wetland 9
23	No	No	No	No
24	Yes	Yes	Yes	Yes, Wetland 10a
25	No	No	Yes	No
26	Yes	Yes	Yes	Yes, Wetland 10b
27	No	Yes	No	No
28	Yes	Yes	Yes	Yes, Wetland 11
29	No	No	No	No
30	Yes	Yes	No	No
31	Yes	Yes	Yes	Yes, Wetland 12
32	No	No	No	No
33	Yes	Yes	No	No
34	Yes	Yes	Yes	Yes, Wetland 13
35	No	No	No	No

Data Point ID	Vegetation	Soils	Hydrology	Within a Wetland?
36	Yes	Yes	Yes	Yes, Wetland 14
37	No	No	No	No
38	Yes	Yes	Yes	Yes, Wetland 15
39	No	No	No	No
40	Yes	Yes	Yes	Yes, Wetland 16
41	No	No	No	No
42	Yes	Yes	Yes	Yes, Wetland 17
43	Yes	Yes	Yes	Yes, Wetland 18
44	No	Yes	No	No
45	Yes	No	No	No
46	Yes	Yes	Yes	Yes, Wetland 19
47	No	No	No	No
48	Yes	Yes	Yes	Yes, Wetland 20
49	No	Yes	No	No
50	Yes	Yes	Yes	Yes, Wetland 21
51	No	No	No	No
52	Yes	Yes	No	No
53	Yes	Yes	Yes	Yes, Wetland 22
54	No	Yes	No	No
55	Yes	Yes	No	No
56	Yes	Yes	Yes	Yes, Wetland 23
57	No	No	No	No
58	Yes	Yes	Yes	Yes, Wetland 24
59	Yes	Yes	Yes	Yes, Wetland 24
60	No	No	No	No

Wetland 1 (Photos 28-29/Attachment Pages 96-97/Photo Map 7): Wetland 1 is located on the roadside embankment extending to the right-of-way line beyond the toe of slope of I-65. This wetland formed as a result of a seep or drain in the side slope of the roadway embankment resulting in flowing water down the embankment and ponded water at the toe of slope extending to the right-of-way line. Water ponding at the base of the roadside embankment is due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by a change in the plant community and the presence of surface water hydrology only within the wetland data point. Wetland 1 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 1 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 1 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected

by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 1 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 2 (Photos 44-45/Attachment Pages 104-105/Photo Map 9): Wetland 2 is located within the interchange of I-65 and SR 43. This wetland formed as a result of ponding due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 2 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 2 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 2 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 2 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 3a (Photos 52/Attachment Page 108/Photo Map 9): Wetland 3a is located in the roadside ditch of SR 43 and the I-65 southbound entrance ramp. The wetland is connected to Wetland 3b by a drainage pipe. This wetland formed as a result of ponding within the constructed roadside ditch due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 3a is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 3a is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 3a is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 3a is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 3b (Photos 50-51/Attachment Pages 107-108/Photo Map 9): Wetland 3b is located in the roadside ditch of the I-65 northbound entrance ramp from SR 43. The wetland is connected to Wetland 3a by a drainage pipe. This wetland formed as a result of ponding within the constructed roadside ditch due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 3b is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 3b is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 3b is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 3b is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 4 (Photos 46-47/Attachment Pages 105-106/Photo Map 9): Wetland 4 is located within a roadside ditch/roadside cut hillslope of the I-65 northbound off-ramp to SR 43. This wetland formed as a result of a seep on the hillslope resulting in flowing water down the embankment and ponded water on the slope above the riprap armored roadside ditch. The boundaries of this wetland were determined by a change in the plant community as documented with an upland data point. Wetland 4 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 4 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 4 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 4 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 5 (Photo 48/Attachment Page 106/Photo Map 9): Wetland 5 is located within a roadside ditch of SR 43. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils in the area. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 5 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 5 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 5 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 5 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 6 (Photos 53-54/Attachment Page 109/Photo Map 9): Wetland 6 is located within a roadside ditch of the SR 43 entrance ramp to I-65 southbound. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 6 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 6 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 6 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 6 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 7 (Photos 61-62/Attachment Page 113/Photo Map 10): Wetland 7 is located within a roadside ditch. This wetland formed at the outlet of a cross pipe as a result of ponding in the roadside ditch due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 7 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 7 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 7 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 7 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 8 (Photos 68-71/Attachment Pages 116-118/Photo Map 11): Wetland 8 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 8 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 8 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 8 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 8 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 9 (Photos 63-67/Attachment Pages 114-116/Photo Maps 11-12): Wetland 9 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 9 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and likely non-jurisdictional.

Wetland 9 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 9 is a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 9 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 10a (Photos 85-86/Attachment Page 125/Photo Map 14): Wetland 10a is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 10a is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 10a is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 10a is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 10a is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 10b (Photos 83-84/Attachment Page 124/Photo Map 14): Wetland 10b is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 10b is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 10b is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 10b is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 10b is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 11 (Photos 87-89/Attachment Pages 126-127/Photo Map 14): Wetland 11 is located within a roadside median. This wetland formed as a result of ponding within the median due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography towards the interstate lanes and a change in the plant community as documented with an upland data point. Wetland 11 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 11 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 11 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 11 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 12 (Photo 94/Attachment Page 129/Photo Map 14): Wetland 12 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 12 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 12 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 12 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 12 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 13 (Photo 95/Attachment Page 130/Photo Map 15): Wetland 13 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 13 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 13 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 13 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 13 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 14 (Photos 96-98/Attachment Pages 130-131/Photo Map 15): Wetland 14 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 14 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 14 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 14 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 14 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 15 (Photos 99-100/Attachment Page 132/Photo Map 15): Wetland 15 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 15 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 15 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 15 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 15 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 16 (DP 40 Photos/Attachment Page 269/Photo Map 15): Wetland 16 is located within a roadside ditch adjacent to an underdrain. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 16 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 16 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 16 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 16 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 17 (Photo 101/Attachment Page 133/Photo Map 15): Wetland 17 is located within a roadside median. This wetland formed as a result of ponding within the median due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography towards the interstate lanes and a change in the plant community as documented with an upland data point. Wetland 17 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 17 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 17 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 17 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 18 (Photo 103-106/Attachment Pages 134-135/Photo Map 16): Wetland 18 is located within a roadside ditch and drains into UNT 9, an ephemeral stream. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 18 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 18 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 18 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 18 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 19 (Photos 109-111, 113/Attachment Pages 137-139/Photo Maps 16-17): Wetland 19 is located within a roadside ditch and has a culvert outlet present within it. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 19 is an emergent wetland with demonstrative connection to an intermittent stream beginning outside of the investigated area. This wetland is likely a jurisdictional waters of the U.S. This wetland is classified as poor due to the presence of invasive species and its position within a roadside ditch.

Wetland 19 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 19 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 20 (Photos 114-115/Attachment Page 139-140/Photo Map 17): Wetland 20 is located within a roadside ditch. This wetland formed as a result of ponding within the bottom of a relatively low relief ditch line. A concrete channel acts as the southern boundary to this wetland that appears to recruit hydrology from a seep or underdrain beneath I-65. The boundaries of this wetland were determined based on a change in the plant community as documented with an upland data point. Wetland 20 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 20 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 20 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 20 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 21 (Photos 116-117/Attachment Pages 140-141/Photo Map 17): Wetland 21 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 21 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 21 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 21 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 21 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 22 (Photos 119-121/Attachment Page 142-143/Photo Map 17): Wetland 22 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 22 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 22 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 22 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 22 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 23 (Photos 122-123/Attachment Pages 143-144/Photo Maps 17-18): Wetland 23 is located within a roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community as documented with an upland data point. Wetland 23 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 23 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 23 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 23 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 24 (Photos 125, 128-129/Attachment Pages 145-147/Photo Maps 18, 20, 21): Wetland 24 is located within a roadside median. This wetland formed as a result of ponding within the median due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography towards the interstate lanes and a change in the plant community as documented with an upland data point. Wetland 24 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 24 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 24 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 24 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

Wetland 25 (Photos 41-43/Attachment Pages 103-104/Photo Maps 8-9): Wetland 25 is located within a riprap lined roadside ditch. This wetland formed as a result of ponding at the base of the roadside slope due to the relatively low relief and compacted soils along the interstate. The boundaries of this wetland were determined by sloping topography and a change in the plant community. The data points taken for Wetland 5 are representative of the conditions at Wetland 25. Wetland 25 is an emergent wetland with no demonstrative connection to a jurisdictional feature. This wetland is likely incidental and non-jurisdictional.

Wetland 25 is fully contained within the existing INDOT right-of-way and is part of the roadside drainage system for I-65. Wetland 25 is likely a Class I isolated wetland because more than 50% of the wetland area has been disturbed or affected by human activity or development by removal or replacement of the natural vegetation and through modification of the natural hydrology. Wetland 25 is typified by low species diversity, does not support significant wildlife or aquatic habitat, and does not possess significant hydrologic function.

4.2 STREAMS

The field investigation for the I-65 added travel lanes project resulted in the evaluation of 12 streams, four of which are likely jurisdictional streams. No roadside ditches with an OHWM were observed or documented. Due to the large number of stream features delineated within the project area, stream characteristics are summarized in Table 3 below. For stream reaches whose drainages areas were not able to be delineated via USGS StreamStats, a drainage area of <1 square mile was assumed. Any preliminary jurisdictional determination of "yes" in the "Likely Water of the U.S." column was made based a water resources field review conducted by HNTB Indiana Staff. The rationale for these preliminary determinations are summarized below in Table 3. Final Jurisdictional Determinations are the purview of the USACE. The following table summarizes the stream assessment data.

TABLE 3: STREAM SUMMARY

Stream Name	Lat/Long	Photo ID	Photo Location Map/Photo Attachment Page	Linear feet within ROW	Drainage Area (sq. mi.)	Blueline	Quality	OHWM	OHWM Lat/Long	Substrate	Riffles/ Pools present?	Waters of the U.S.
Wabash River*	39.205372, -85.957071	N/A	N/A	130	6394	Yes, perennial	N/A	N/A	N/A	N/A	N/A	Yes, perennial
UNT 1	40.475039, -86.853099	1-4	Map 3, Attachment Pages 83-84	705	<1	No	Average	5 ft deep x 15 ft wide	40.475778, -86.853352	Silt	No	No, ephemeral
UNT 2	40.474609, -86.85428	8-9	Map 3, Attachment Pages 86-87	579	<1	No	Average	2 ft deep x 20 ft wide	40.474925, -86.854306	Silt	No	No, ephemeral
Burnett Creek (South)	40.492032, -86.860324	26-27, 130-131	Map 7, Attachment Pages 95-96, 147-148	363	52	Yes, perennial	Average	1.8 feet deep x 22.2 ft wide	40.491789, -86.860407	Silt and cobble	Yes	Yes, perennial
UNT 3	40.495284, -86.869004	58-59	Map 9, Attachment Pages 111-112	181	<1	No	Poor	6 in deep x 3 ft wide	40.495076, -86.868972	Riprap and silt	No	No, ephemeral
UNT 4	40.496081, -86.870368	60, 132	Map 10, Attachment Pages 111, 148, 150	549	<1	No	Poor	10 in deep x 3 ft wide	40.495919, -86.870154	Silt	No	No, ephemeral
UNT 5	40.50019, -86.878811	74-76, 133	Map 12, Attachment Pages 119-120, 149	364	<1	No	Poor	3 in deep x 5.5 ft wide	40.49973, -86.878758	Silt	No	Yes, intermittent
UNT 6	40.50039, -86.878355	72-74	Map 12, Attachment Pages 118-119	340	<1	No	Poor	5 in deep x 4 ft wide	40.500162, -86.877846	Silt	No	No, ephemeral
UNT 7	40.494803, -86.862402	32-38	Map 8, Attachment Pages 98-101	1111	<1	No	Poor	3 in deep x 5 ft wide	40.494364, -86.861826	Silt	No	No, ephemeral
UNT 8	40.501013, -86.881307	77-78	Maps 12 and 13, Attachment Page 121	329	<1	No	Poor	3 in deep x 2.5 ft wide	40.501409, -86.881243	Silt	No	No, ephemeral
Burnett Creek (North)	40.501527, -86.882545	79-81	Map 13, Attachment Pages 122-123	303	25	Yes, perennial	Average	3.6 ft deep x 20 ft wide	40.501654, -86.882477	Silt	No	Yes, perennial
UNT 9	40.512755, -86.892256	107-108, 134	Map 16, Attachment Pages 136, 149	218	<1	No	Poor	1 ft deep x 3 ft wide	40.512713, -86.89223	Silt	No	No, ephemeral

*Wabash River was not evaluated as part of this investigation. The current scope of the project is limited to maintenance of traffic work on the bridge over the Wabash River. No work below the OHWM of the Wabash River will occur as a result of this project.

4.3 Roadside Drainage Features

The site investigation resulted in the identification of three likely non-jurisdictional roadside ditches (RSDs), RSD 1-3, within the investigated area. The roadside ditches did not exhibit consistent OHWM or defined bed and banks. These features are stormwater control features constructed or excavated in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run-off. RSDs 1-3 were likely constructed to convey stormwater drainage from I-65. Table 4 summarizes the roadside ditch assessment data. Ground level photographs of RSDs 1-3 are included in Attachments, pages 83-150.

Table 4: Roadside Ditch Summary

Name	Lat/Long	Photo ID	Photo Location Map/Photo Attachment Page	Linear feet within ROW	Blueline	Waters of the U.S.
RSD 1	40.477296, -86.853883	5-7	Maps 3-4, Attachment Pages 85-86	917	No	No
RSD 2	40.476988, -86.854928	9-11	Maps 3-4, Attachment Pages 87-88	1188	No	No
RSD 3	40.496086, -86.865176	41-43	Maps 8-9, Attachment Pages 103	198	No	No

5. Conclusion

The May, July, August, September, and October 2020 field reviews for the I-65 added travel lanes project identified five likely jurisdictional features within the investigated area. One wetland and four streams are likely Waters of the U.S.

Every effort should be taken to avoid and minimize impacts to the water resources listed above. Disturbance of a wetland or stream could result in a mitigation requirement to secure the required permits for the I-65 added travel lanes project. If construction exceeds the limits of the survey review area illustrated in this document, further field investigation will be needed. This report is this office's best judgment of water resources that are likely to be under federal jurisdiction, based on the guidelines set forth by the USACE. The final determination of jurisdictional waters is ultimately the responsibility of the USACE. The INDOT Office of Environmental Services should be contacted immediately if impacts occur.

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.

PREPARERS:

Responsible Staff	Position	Contributing Effort
Kate Williams, PWS, HNTB Indiana	Science Project Manager	Project Management Field Data Collection
Chris Meador, HNTB Indiana	Science Project Manager	Field Data Collection
Caroline Tegeler, HNTB Indiana	Scientist	Field Data Collection Report Preparation
Landon Little, HNTB Indiana	Scientist	Field Data Collection

Caroline Tegeler

From: Mcgill, Justus <JMcgill@indot.IN.gov>
Sent: Thursday, February 18, 2021 2:05 PM
To: Caroline Tegeler; Landon Little
Cc: Kate Williams; Christine Meador; Rehder, Crystal; Ahmed, Arshad
Subject: RE: Document Submittal - I-65 Added Travel Lanes (Des. No. 2001172) Draft Waters Report
Attachments: Pages from 2001172 Waters Report ES 2.18.21.pdf

Hello All,

Thank you for submitting the waters report for **I-65 Added Travel Lanes, DES 2001172.** The approved report is attached and can also be found on Projectwise through this link: Wetland - Waters. It is the responsibility of the Project Manager to forward a copy of this report to the Project Designer.

Please note that this version does included the EWPO specialist approval signature. Make sure to use this version with any document submittals.

The information in the Waters Report should be used by the Designer to determine if Waters of the U.S. or wetlands will be impacted by the project. Avoidance and minimization must occur before mitigation will be considered. If mitigation is required, the Project manager or Designer must include the mitigation work in their project design, request Environmental Services to work on the mitigation, or include the mitigation work in the design contract (if the design of the project is let).

Thanks,

Justus McGill, WPIT
Ecology and Waterway Permitting Office (Crawfordsville District)
100 N Senate Ave. Indianapolis, IN 46204
Office: (317)-509-7296
Office Hours: Mon to Fri 6:30am to 2:30pm.
Email: jmcgill@indot.in.gov

From: Mcgill, Justus
Sent: Monday, February 8, 2021 1:09 PM
To: Caroline Tegeler <ctegeler@HNTB.com>; Landon Little <ltlittle@HNTB.com>
Cc: Kate Williams <klwilliams@HNTB.com>; Christine Meador <CMeador@HNTB.com>
Subject: RE: Document Submittal - I-65 Added Travel Lanes (Des. No. 2001172) Draft Waters Report

Hi Caroline,

I have finished reviewing the updated waters report. Below are some additional comments I wanted to include into the report.

1. **Wetland 19 narrative-** I would include a statement that this is likely a waters of the US.
2. **Stream Summary Table Column Blueline-** Please indicate what blueline type the stream is.
3. **Photo 113 description-** I would recommend to change the description as it describes wetland 19. I would state something like “facing NE to inlet near wetland 20”.

Appendix G: Public Involvement

Information will be added to this appendix following public involvement activities.

Appendix H: Air Quality

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*Estimated Costs left to Complete Project column is for costs that may extend beyond the four years of a STIP. This column is not fiscally constrained and is for information purposes.

Table 6: Funded Indiana Department of Transportation Projects, continued

	Project Location & Description	Ph	Fund Code	Federal Funds	State Funds	Total Cost	Anticipated Year
94	**I-65, Des # 1900665**	CN	NHPP	198,000	22,000	220,000	2021
	SB over CSX, N 9th, Burnett Ck, Bridge Maintenance and Repair						
95	**I-65, Des # 1902678**	PE	NHPP	73,890	8,210	82,100	2021
	CR 100W to US 24	RW					
	Plant & Shrub Windbreak	CN	HSIP	1,030,849	114,539	1,145,388	2022
96	**I-65, Des # 2001172**	PE	NHPP	5,283,900	587,100	5,871,000	2021
	N of Wabash. R. to N of SR 43	RW					
	Added Travel Lanes	CN	NHPP	24,468,865	2,718,762	27,187,627	2022
97	**I-65, Des # 2001743**	PE	NHPP	81,000	9,000	90,000	2021
	SB Bridge over NS Railroad	UT/RR	NHPP	90,000	10,000	100,000	2022
	Bridge Deck Overlay						
98	**I-65, Des # 2001932**	PE	NHPP	45,000	5,000	50,000	2021
	CR 680S over Ditch	RW	NHPP	27,000	3,000	30,000	2022
	Small Structure Pipe Lining						
99	**I-65, Des # 2002107**	PE	NHPP	81,000	9,000	90,000	2021
	NB Bridge over NS Railroad	UT/RR	NHPP	90,000	10,000	100,000	2022
	Bridge Deck Overlay						
100	**I-65, Des # 2002108**	PE	NHPP	94,500	10,500	105,000	2021
	NB Bridge over SR 38, Bridge Deck Overlay						
101	**I-65, Des # 2002109**	PE	NHPP	108,000	12,000	120,000	2021
	SB Bridge over SR 38, Bridge Deck Overlay						
102	**I-65, Des # 2002110**	PE	NHPP	36,000	4,000	40,000	2021
	NB Bridge over SR 26, Bridge Deck Overlay						
103	**I-65, Des # 2002111**	PE	NHPP	36,000	4,000	40,000	2021
	SB Bridge over SR 26, Bridge Deck Overlay						
104	**I-65, Des # 2002112**	PE	NHPP	54,000	6,000	60,000	2021
	NB Bridge over Wildcat Creek	CN	NHPP	501,873	55,764	557,637	2024
	Bridge Thin Deck Overlay						
105	**I-65, Des # 2002113**	PE	NHPP	49,500	5,500	55,000	2021
	SB Bridge over Wildcat Creek	CN	NHPP	501,873	55,764	557,637	2024
	Bridge Thin Deck Overlay						
106	**I-65, Des # 2002114**	PE	NHPP	270,000	30,000	300,000	2021
	NB Bridge over CSX, N 9th, Burnett	UT/RR	NHPP	27,000	3,000	30,000	2021
	Bridge Deck Replacement	CN	NHPP	3,419,714	379,968	3,799,682	2022

Table 6: Funded Indiana Department of Transportation Projects, continued

	Project Location & Description	Ph	Fund Code	Federal Funds	State Funds	Total Cost	Anticipated Year
107	**I-65, Des # 2002115**	PE	NHPP	171,000	19,000	190,000	2021
	SB Bridge over CSX, N 9th, Burnett	UT/RR	NHPP	135,000	15,000	150,000	2022
	Bridge Deck Replacement	CN	NHPP	1,825,662	202,851	2,028,513	2022
108	**I-65, Des # 2002116**	PE	NHPP	144,000	16,000	160,000	2021
	NB Bridge over Prophets Rock	CN	NHPP	1,449,139	161,015	1,610154	2022
	Bridge Deck Replacement						
109	**I-65, Des # 2002117**	PE	NHPP	144,000	16,000	160,000	2021
	SB Bridge over Prophets Rock	CN	NHPP	1,449,139	161,015	1,610,154	2022
	Bridge Deck Replacement						
110	**I-65, Des #2002364**	PE	NHPP	160,000	40,000	200,000	2021
	CR 72N Bridge over I-65	CN	NHPP	1,457,023	364,256	1,821,279	2022
	Bridge Deck Replacement						
111	**I-65, Des #2100049**	PE					
	N of SR 43 to N of CR 725N	RW					
	Added Travel Lanes	CN	NHPP	34,931,145	3,881,238	38,812,383	2022
112	**Statewide, Des # 1601207**	PE	NHPP	120,000	30,000	150,000	2020
	Underwater Inspections	PE	NHPP	120,000	30,000	150,000	2021
	Bridge Inspection						
113	**Statewide, Des # 1601208**	PE	NHPP	400,000	100,000	500,000	2020
	Fracture Critical & Special Inspect.	PE	NHPP	400,000	100,000	500,000	2021
	Bridge Inspections						
114	**Statewide, Des # 1601209**	PE	NHPP	120,000	30,000	150,000	2020
	Vertical Clearance Data Collection	PE	NHPP	120,000	30,000	150,000	2021
	Bridge Inspections, Statewide						
115	**Statewide, Des # 1802826**	PE	STBG	1,680,000	420,000	2,100,000	2020
	On-call Consultant Review	PE	STBG	1,680,000	420,000	2,100,000	2021
		PE	STBG	1,680,000	420,000	2,100,000	2022
		PE	STBG	1,680,000	420,000	2,100,000	2023
116	**Statewide, Des # 1900554**	PE	HSIP	1,039,144	115,460	1,154,604	2020
	HELPERS Program performed by LTAP						
117	**Statewide, Des # 2001708**	PE	STBG	666,263	166,566	832,829	2021
	Overhead Sign Structure Inspections						
118	**Statewide, Des # 2001709**	PE	STBG	200,000	50,000	250,000	2021
	High Mast Lighting Tower Inspections						

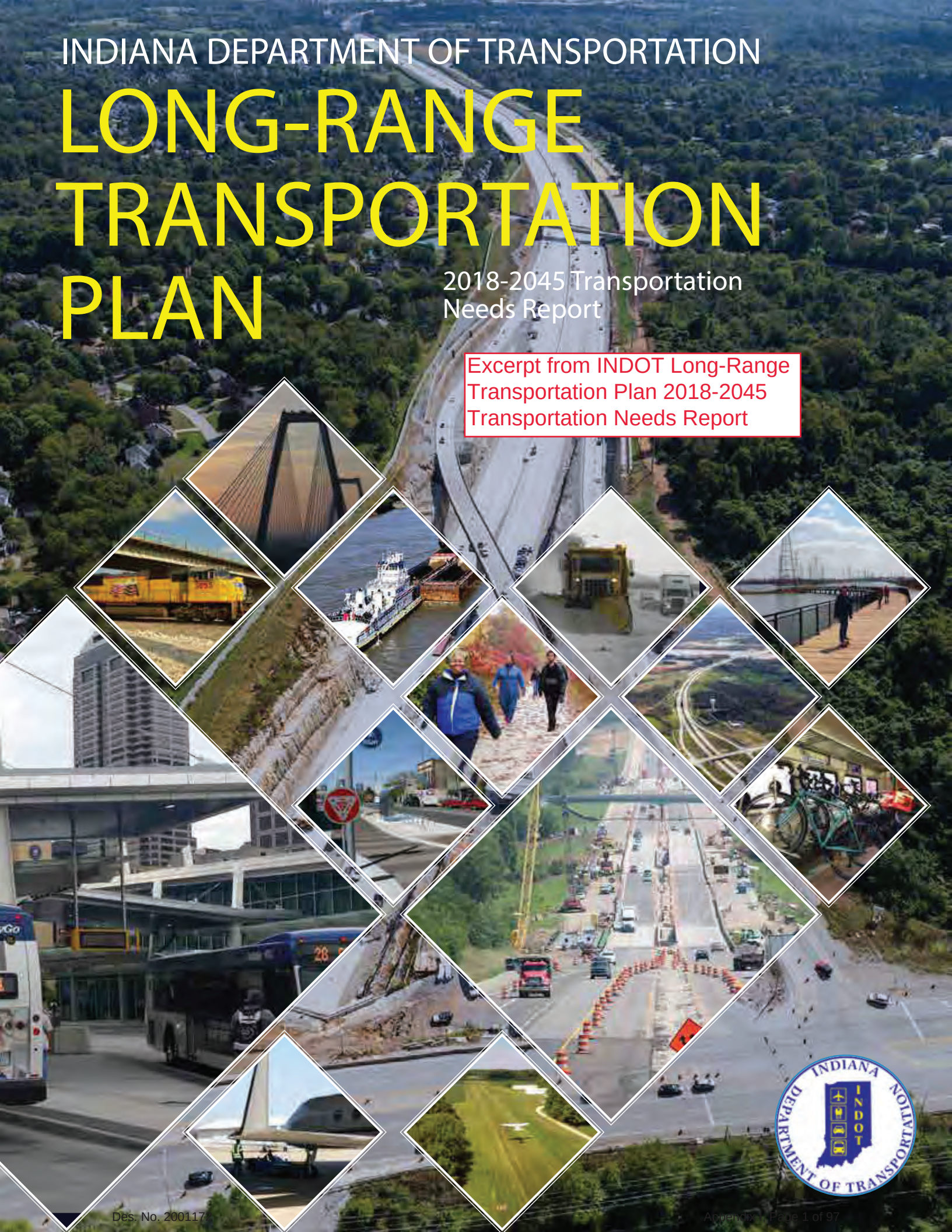
Appendix I: Additional Information

INDIANA DEPARTMENT OF TRANSPORTATION

LONG-RANGE TRANSPORTATION PLAN

2018-2045 Transportation Needs Report

Excerpt from INDOT Long-Range Transportation Plan 2018-2045 Transportation Needs Report



The corridors, listed below, are critical to mobility and economic activity throughout all regions of Indiana. The following table lists major corridor improvement projects, but do not resemble a priority or ranking of importance.

Major Corridors

NO.	NAME	DESCRIPTION
HIGHWAY EXPANSIONS & MODERNIZATIONS		
1	I-69, Section 6	New 26-mile north-south interstate from south side of Martinsville to I-465 south junction in Indianapolis
2	I-69 Ohio River Crossing	New bridge crossing in Evansville
3	I-70	From 4-lane sections to 6 lanes across the state
4	I-65	From 4-lane sections to 6 lanes across the state
5	I-465	From West 86th Street to US 31 north junction northwest Indianapolis
6	I-465	From White River bridge north junction to Fall Creek northeast Indianapolis
7	I-465	From I-70 east junction to I-70 west junction Indianapolis south
8	I-94	Transportation Systems Management (TSM) treatments from Illinois state line to I-65
9	I-69 expansion	From SR 9/SR 109 Anderson north 15 miles to SR 332 Muncie
10	Items 10-14: I-65 and I-70 reconstruction inside the I-465 beltway in Indianapolis (north/south split as well as adjacent spokes)	I-70 segment from 3 miles west of I-65 south junction to I-65 south junction
11		Eliminate weaving areas on the west leg of I-65/I-70 inner belt from South Split interchange to North Split interchange
12		I-70 segment from the I-65 north junction east 7 miles to I-465 east junction
13		I-65 segment from I-70 north junction north 6 miles to West 38th Street
14		I-65 segment from I-465 south junction north 4 miles to I-70 south junction
15	US 31	From SR 38 in Hamilton County to south of Kokomo, the goal is freeway improvements; from Kokomo north to US 30, improvements to improve traffic flow and safety
16	US 30	Upgrade 100-mile stretch (from Fort Wayne to Valparaiso) to improve traffic flow and safety
17	US 36	From SR 267 east 7 miles to I-465 west junction, Indianapolis and Avon
18	US 20	Northern Indiana bridge and pavement preservation
19	I-64 and I-265	From Sherman-Minton bridge to SR 64, and from I-64 to I-65

Major Corridors continued

NO.	NAME	DESCRIPTION
FREIGHT/LOGISTICS		
20	Heavy-Haul Corridor, Mount Vernon Port	New road Improvements to SR-69 from to I-64 in Posey County to provide truck access to Mount Vernon Port
21	Heavy-Haul Corridor, Segment A	New road to connect the Ports of Indiana-Jeffersonville with SR 265

There are ongoing statewide efforts to consider long-term improvement needs, including investments along corridor systems and interchange areas. The Statewide Corridor Planning Study aims to develop corridor visions for state jurisdictional roadway facilities. The Statewide Interchange Planning Study aims to identify interchange enhancements and evaluate potential new interchange locations. These studies will serve as an input into the statewide and MPO planning process and help to support mobility asset management activities.

States are encouraged to take action to deploy alternative fuels and vehicles. To improve the mobility of alternative fuel vehicles, FHWA has helped build momentum towards greater alternative fuel corridor planning and coordination among states. In Indiana, no corridors have been designated for alternative fuel vehicles. However, the Greater Indiana Clean Cities Coalition has recommended several corridors for nomination where there is demonstrated eligibility for designation. The I-465 loop and portions of I-70 could be designated corridor-ready for electric vehicle charging. The I-465 loop as well as portions of I-65, I-94, and I-70 could be designated as corridor-ready or corridor-pending for compressed natural gas. The I-465 loop as well as portions of I-65, I-69, and I-70 could be designated as corridor-ready or corridor-pending for liquefied petroleum gas.

Excerpt from I-65 Added Travel Lanes Project Abbreviated Engineer's Report

I-65 ADDED TRAVEL LANES PROJECT

ABBREVIATED ENGINEER'S REPORT

1.33 miles north of SR 25 interchange to 2.43 miles north of SR 43 interchange

Contract ID R-42909

Des. No. 2001172

July 2020

State of Indiana Department of Transportation
Crawfordsville District
41 W 300 N
Crawfordsville, IN, 47933

This document was prepared by:

DATE: 7-13-2020

Austin Hastings, P.E.
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111 Monument Circle, Suite 1200
Indianapolis, IN, 46206

Reviewed by:

DATE: _____

Vanessa McCauley, P.E.
District Pavement Engineer, Crawfordsville District
Recommended: APPROVAL / DISAPPROVAL

DATE: _____

Mike Eubank, P.E.
Scoping Manager, Crawfordsville District
Recommended: APPROVAL / DISAPPROVAL

DATE: _____

Chris Wheeler, P.E.
Asset Bridge Engineer, Crawfordsville District
Recommended: APPROVAL / DISAPPROVAL

Approved by:

DATE: _____

Scott Chandler, P.E.
System Asset Manager, Crawfordsville District

DATE: _____

Arshad Ahmed, P.E.
Project Manager, Crawfordsville District

Table of Contents

List of Appendices

SECTION 1: INTRODUCTION

REPORT PURPOSE

The purpose of this report is to document the engineering assessment phase of project development. This document outlines the proposal and is intended to serve as a guide for subsequent roadway, drainage, bridges, traffic, environmental, survey, utilities, railroad, and right-of-way. The preferred alternative listed is considered preliminary pending environmental studies and design analysis.

PROJECT LOCATION

The project extends 4.33 miles along Interstate 65 (I-65), starting from 1.33 miles north of the State Road (SR) 25 interchange to 2.43 miles north of the SR 43 interchange, which is from reference post 176+0.47 to reference post 181+0.18 in Tippecanoe County, Indiana. The GPS Coordinates range from 40°28'29" N, 86°51'13" W at the beginning of the project and 40°31'37" N, 86°54'12" W at the end of the project.

The project is located entirely in the Indiana Department of Transportation (INDOT) Crawfordsville District, within the West Lafayette Sub-District. The project is also located within the boundaries of the Area Plan Commission of Tippecanoe County, a Metropolitan Planning Organization (MPO). A project map is included in Appendix A of this report.

PURPOSE AND NEED

The primary purpose of this project is to improve roadway safety and reduce travel time in this segment by improving the pavement condition and increasing the segment capacity. Improving this corridor will result in enhanced freight movement, improved overall traffic operations, and improved safety due to better anticipated normal operating speeds. The continued need for roadway preservation and maintenance of the deteriorating mainline pavement directly impacts corridor safety and would result in increased motorist delays along I-65.

The need for this project stems from INDOT's Long Range Transportation Needs Report. Expanding I-65 to a 6-lane section (3 lanes in each direction) was identified a major corridor improvement that is critical to mobility and economic activity throughout the state. I-65 is a Statewide Mobility Corridor and is a priority for auto travel as well as freight. This project will replace pavement on I-65 that is in poor condition and nearing the end of its lifecycle, rehabilitate bridges along the corridor and reduce traffic congestion.

SECTION 2: EXISTING CONDITIONS

ROADWAY

The table below provides basic design elements for I-65 within the project limits.

Table 2.1.1 I-65 Design Elements	
Functional Class	Interstate
Posted Speed	65/70 mph[1]
Member Road Systems	On the National Highway System (NHS)
	On the National Truck Network (NTN)
	Statewide Mobility Corridor
Access Control	Full Access Control

1. I-65 has a posted speed limit of 65 mph from the beginning of the project, 1.33 miles north of SR 25, to SR 43. From SR 43 to the end project limits, 2.43 miles north of SR 43, the posted speed limit is 70 mph.

Table 2.1.2 presents additional details about the existing roadway.

Table 2.1.2 Existing Roadway Information			
Geometric Criteria			
Design Criteria	4R (Freeway)	Rural/Urban	Rural
Terrain	Level		
Cross Section			
Travel Lane Count	4 Lanes (2 in each direction)	Travel Lane Width	12 feet
Inside Shoulder Width (Usable)	4 feet	Inside Shoulder Width (Paved)	4 feet
Outside Shoulder Width (Usable)	12 feet	Outside Shoulder Width (Paved)	10 feet
Mainline Pavement	HMA Overlay on Continuously Reinforced Concrete Pavement	Shoulder Pavement	HMA
Alignment			
Horizontal	Two horizontal curves within project limits; maintain existing alignment.	Vertical	Maintain existing profile as closely as possible, while meeting vertical clearance requirements under bridges.

The existing roadway consists of two 12’ travel lanes in each direction and 10’ paved outside shoulders and 4’ paved inside shoulders. The entire project is within a rural area except for a section from Ninth Street to County Road (CR) 600 N, which is classified rural/urban. The project will tie into a recently reconstructed six-lane segment and tie to a similarly configured four-lane segment at the northern end. The adjacent Wabash River bridge is currently under construction and is scheduled to be completed by the end of 2020.

PAVEMENT HISTORY

I-65 within the project limits was originally constructed in 1966 with four lanes of continuously reinforced concrete pavement and three-inch paved bituminous shoulders. The mainline was overlaid in 1991 from the Wabash River to CR 725 N with approximately six inches of HMA.

Table 2.2 -Pavement History

Year	Width	Work Type
1966	2 at 24’	Construction of 9-inch Reinforced Concrete (Travel Lanes), 3" Asphalt (Shoulders)
1991	2 at 24’	HMA Overlay from the Wabash River to CR 725 N

EXISTING DRAINAGE

The existing roadway includes median and side ditches as well as underdrains constructed in 1966. A geo-composite drainage edge was installed in 1991 as part of the HMA overlay comprised of four-inch PVC pipe outlets spaced at 300 feet to 600 feet along the corridor. Shoulder drains were installed at each mainline pavement patch as part of the mainline overlay in 1991. No small structures exist under mainline currently, though several small pipes (36” or smaller) drain the medians and ditches through the corridor. Information regarding existing small pipes and median drains are tabulated in Appendix C, along with maps indicating the location of each.

EXISTING STRUCTURES

The project limits encompass four sets of bridges on I-65 and three bridges which over-pass I-65. The structures carrying Swisher Road over I-65 and CR 600 N over I-65 were rehabilitated in 2017 and are considered in satisfactory to good condition. The I-65 bridge over Burnett’s Creek is programmed for a deck replacement and widening as a part of a separate project (DES 1601091 & 1601092) to be constructed in 2021. The existing bridges to be rehabilitated as part of this project include I-65 over CSX/ 9th Street/ Burnett Creek, I-65 over Prophets Rock Road, and CR 725 N over I-65. The contract to include rehabilitation of the I-65 bridges over SR 43 is yet to be determined.

Existing Bridges

The table below provides existing condition ratings for the bridges within the project limits.

Table 2.4.1.1 Existing Bridge Condition Based on 2019 Bridge Inspection Reports

Feature Intersecting I-65	Asset Name	Asset Code	Year Built	Year Reconstructed	Inventory Rating	Wearing Surface Rating	Deck Rating	Superstructure Rating	Substructure Rating	Channel & Channel Protection Rating	Approach Slab Rating
Swisher Rd	I65-177-05484 A	037730	1968	2017	39	7	7	6	6	N/A	8
CSX, 9th St., Burnett Cr	I65-177-02402 BNBL	037740	1968	1993	36	5	5	6	6	8	5
CSX, 9th St., Burnett Cr	I65-177-02402 JCSB	037750	1968	1993	39	6	6	6	7	7	5
Prophets Rock Rd	I65-178-05485 BNBL	037760	1968	1993	38	4	6	5	6	N/A	5
Prophets Rock Rd	I65-178-05485 JBSB	037770	1968	1993	38	4	6	5	6	N/A	5
SR 43	I65-178-05486 JBNB	037780	1968	1993	37	5	5	5	6	N/A	6
SR 43	I65-178-05486 BSBL	037790	1968	1993	37	5	5	5	5	N/A	5
Burnett Cr	I65-179-05487 BNBL	037800	1968	1993	38	4	5	5	6	8	5
Burnett Cr	I65-179-05487 BSBL	037810	1968	1993	38	5	5	5	7	6	5
CR 600 N	I65-179-05488 B	037820	1968	2017	47	7	7	7	7	N/A	8
CR 725 N	I65-180-05489	037830	1968	N/A	38	5	5	6	7	N/A	6

SECTION 3: TRAFFIC

TRAFFIC FORECASTS

Daily traffic forecasts for mainline I-65 were developed based on recent counts and historic growth rates. Recent counts were obtained from INDOT's interactive traffic data website. Forecasts were prepared for years 2022, 2042, and 2052. It is not anticipated that the addition of a third travel lane will significantly increase traffic on I-65. Refer to Appendix F for the traffic forecasts.

PLANNING LEVEL CAPACITY ANALYSIS

Planning level analysis was performed for I-65 mainline. Service volumes were used to determine the level of service (LOS) based on daily traffic. I-65 over the Wabash River is a 6-lane freeway and transitions to a 4-lane freeway just north of the Wabash River bridge. It was determined that the 4-lane portion of I-65 will perform at LOS D in 2042 and operations will deteriorate to LOS E by 2052. Traffic volumes on I-65 are lower north of SR 43 and it is anticipated that it will perform at LOS C through 2052. Based on this analysis, a third lane is needed on I-65 from north of the Wabash River to SR 43 to reduce congestion. Refer to Appendix F for planning level traffic analysis and Appendix J for project termini justification.

SECTION 4: PROJECT DIRECTED ALTERNATIVE

PROPOSED ROADWAY IMPROVEMENTS

Alternative 1: No Build Alternative

The no build alternative leaves the existing roadway and structures in place. This alternative was not considered further as it does not address the purpose of the project to widen from four lanes to six lanes as part of the INDOT Long Range Transportation Plan (LTRP) and does not improve the structural deficiencies of the pavement.

Alternative 2: Added Travel Lanes

The added travel lanes alternative will expand I-65 from four lanes to six lanes from 1.33 miles north of SR 25 to 2.43 miles north of SR 43. This alternative will tie into the six-lane bridge over the Wabash River, scheduled to be completed by the end of 2020. The added travel lanes will include the full-depth reconstruction of I-65 through the project limits and adding an additional travel lane in each. Roadway widening will be towards the median with traffic separated by a concrete median barrier. Concrete median barrier is advised over an open median and guardrail separator per Crawfordsville district preference and to match the concrete barrier at the south project limits. Refer to Appendix K for meeting minutes from June 12, 2020 justifying this approach. The project will also include the reconstruction of the ramps at the I-65/SR 43 interchange. The project will follow design criteria as described by the Indiana Design Manual (IDM) Figure 53-1 Geometric Design Criteria for Freeway, 4R. The proposed design criteria are included in Appendix G. The proposed cross section will include three 12-foot lanes in each direction with 12-foot paved outside shoulders and 12-foot paved inside shoulders. The typical cross sections are included in Appendix E.

Preferred Alternative:

Alternative 2, added travel lanes is the preferred alternative as it addresses the need for improved pavement conditions through the corridor, improves congestion, and is the ultimate long range plan to provide three lanes each direction on I-65. A cost analysis of the alternative is provided in Section 6.

PROPOSED STRUCTURAL IMPROVEMENTS

The preferred alternative of added travel lanes necessitates improvements of the structures within the project limits. Structure condition will be improved through rehabilitation or replacement as part of adding travel lanes to I-65.

Bridges

The three crossings included in this project have approved scoping reports which provide detailed recommendations for rehabilitation. The scope of work for Southbound I-65 over CSX/ 9th Street/ Burnett Creek has been revised. Based on the existing satisfactory condition of the deck and wearing surface INDOT has elected to overlay the Southbound existing and widened bridge deck rather than replace as outlined in the approved scoping report. All other work for the bridges within the project limits shall follow the recommendations of the approved scoping reports. Approved Scoping Reports are included in Appendix D.

Culverts and Pipes

The additional impervious area and enclosure of the median is anticipated to require the replacement and/or supplementation of existing drainage pipes with larger or additional median drains and culverts to allow proper roadway drainage. Because no right of way acquisition is anticipated in this project, increases to peak runoff will be mitigated in-line, in ditches where possible, and underground as needed.

SECTION 5: MAINTENANCE OF TRAFFIC

GENERAL CONDITIONS

The project will adhere to the INDOT Interstate Highway Congestion Policy (IHCP). Table 5.1 presents general maintenance of traffic requirements:

Table 5.1 Maintenance of Traffic Concept	
Is this a Mobility Significant Project/Require a Traffic Management Plan (TMP)?	Yes
Can this road be closed to traffic (detour)?	No

During all phases, temporary pavement will provide access to and from the SR 43 interchange. However, extended closures will be required to reconstruct the existing ramps. The project is anticipated to be constructed in four phases, which consist of the following:

- *Phase I* – Close inside shoulders and construct median crossovers south of the Wabash River Bridges and north of the CR 600 N overpass. The crossovers will be designed to accommodate crossovers to both directions. Profiles will be evaluated for both final condition as well as MOT to determine vertical clearance at bridges. Temporary barriers may also function as retaining walls in these locations as needed. Reduce the existing southbound travel lanes to 11 feet and install a temporary concrete barrier along the current edge of travel way. Temporary pavement along the inside edge of the southbound travel lanes will be constructed, which will be used for

northbound traffic in the following phase. During this phase bridge widening along the southbound bridges will be completed.

- *Phase II* – Shift I-65 northbound traffic to the new travel lanes directly adjacent to the existing I-65 southbound lanes. Traffic will be separated by a temporary traffic barrier with two-foot wide minimum shoulders. During this phase the existing northbound pavement will be removed, and the full pavement width will be constructed along with all bridge improvements for the bridges along I-65 northbound. Access to the SR 43 northbound entrance and exit ramps will be provided during this phase; however, the ramps will need to be closed to perform ramp reconstruction and construct permanent pavement.

- *Phase III* – Shift I-65 southbound traffic to the completed northbound lanes to complete the remaining work along the I-65 southbound pavement. Utilizing the three proposed travel lanes and the reconstructed shoulder, two lanes will be maintained in each direction. Traffic will be separated by a temporary traffic barrier with two-foot wide minimum shoulders. During this phase both existing and temporary southbound pavement will be removed, and the full pavement width will be constructed. In addition, the permanent median barrier and remaining bridge work along the I-65 southbound bridges will be constructed. Access to the SR 43 southbound entrance and exit ramps will be provided during this phase; however, the ramps will need to be closed to perform ramp reconstruction and construct permanent pavement.

- *Phase IV* – I-65 southbound traffic will be shifted back over to the I-65 southbound lanes; however, the two proposed outside travel lanes will be open to traffic as the inside lane will remain closed to allow for the removal of the temporary crossovers used during Phases II and III.

Appendix H illustrates the overall schematic of the maintenance of traffic plan along with typical sections along the roadway. A detailed maintenance of traffic plan shall be required. This will be in accordance with the INDOT Standard Drawings and the IN MUTCD.

SPECIFIC DESIGN CONSIDERATIONS

In addition to the scheme presented above, there are specific maintenance of traffic design considerations that have been considered, which are described below.

Wabash Heritage Trail

The Wabash Heritage Trail crosses under I-65 along the west side of Burnett Creek under the bridge over 9th Street and the CSX railroad. The trail is approximately 13 miles long, starting at Tippecanoe Battlefield in Battle Ground and ending at Fort Ouiatenon. The Tippecanoe County Parks Department maintains the portion of the trail within the I-65 project area. The Wabash Heritage Trail is a publicly owned recreational property and is therefore subject to Section 4(f) of the Department of Transportation Act of 1966 which prohibits the use of certain public and

historic lands for federally funded transportation facilities unless there is no feasible and prudent alternative. Access to the trail will be maintained for as long as possible during construction to qualify for temporary occupancy under Section 4(f) or a de minimis finding. Coordination with the Tippecanoe County Parks Department will occur to address their concerns and obtain written concurrence with the temporary occupancy determination or de minimis finding. Limiting the length of the path closure will be prioritized while conducting alternative analysis.

Coordination with Adjacent Projects

Bridge improvements at SR 43 (Des. Nos. 1601088 and 1601090) are currently under design by Butler, Fairman & Seufert, Inc. The project's Maintenance of Traffic Plan consists of the following construction sequence:

1. Reconstruct outside shoulder to full depth pavement.

2. Shift traffic to the outside on to the reconstructed shoulder, with two lanes maintained in each direction. During this phase, the closed portion of the existing bridge deck would be widened and replaced.

3. Shift traffic to the inside using the previously improved portion of the bridge, while the remaining portion of the bridges are improved.

As the Maintenance of Traffic plan for this project involves moving all traffic to one side of the mainline during Phases II and III, the plans for these bridges will need to be revised as part of this project.

The bridges carrying I-65 over Burnett's Creek (Des. No. 1601091 and 1601092) are currently under design by American Structurepoint Inc. and construction is scheduled for the first quarter of 2021 under Contract B-39661. The project's plans include a closed median with bridge clear roadway widths capable of carrying three 12'-0" travel lanes and shoulders of variable width from 9'-10 ½" to 16'-4 ½".

SECTION 6: COST ESTIMATE

A preliminary cost estimate has been developed utilizing the criteria listed throughout this report and the following assumptions:

1. The cost estimates for bridge work utilize approved bridge scoping reports. As these reports were completed in 2017, an additional 3 years at an assumed 3% inflation rate was added to each overall cost.

2. Since the approved report for the 9th Street bridges assumes full deck replacement for both structures, the estimate was modified to account for overlay instead of replacement of the southbound bridge.

3. The SR 43 bridge project pavement design is being utilized as a placeholder for the purposes of this cost estimate.

4. Per INDOT guidance, concrete barrier is the advised median separator due to safety and maintenance.

5. This cost estimate assumes no additional right-of way acquisitions.

6. This cost estimate assumes a 10% contingency for roadway costs.

Table 6.1 presents the cost estimate summary:

Table 6.1 Cost Estimate Summary	
Roadway	$62,487,000
I-65 over Prophets Rock (*both bridges*)	$3,900,000
I-65 over 9th Street (*both bridges*)	$8,700,000
CR 725 over I-65	$1,500,000
ORIGINAL PROGRAM SUBTOTAL	**$76,587,000**
I-65 over SR 43 (*both bridges*)	$4,900,000
TOTAL	**$81,487,000**

Appendix B illustrates an itemized breakdown of the cost estimate.

SECTION 7: ENVIRONMENTAL IMPACTS

It is anticipated that this project will require a Categorical Exclusion Level 4 (CE-4) due to the added through lane and noise analysis. The CE-4 will be prepared in accordance with the National Environmental Policy Act, National Historic Preservation Act, and other relevant state and federal regulations. The noise analysis will be completed in accordance with INDOT's Traffic Noise Analysis Procedures (2017).

The Wabash Heritage Trail, described in Section 5.2.1 above, is a Section 4(f) resource. Coordination with the Tippecanoe County Parks Department will occur to obtain written concurrence with the temporary occupancy determination or Section 4(f) *de minimis* finding.
A review of the Indiana Historic Buildings, Bridges, and Cemeteries Map showed no properties listed in or potentially eligible for the National Register of Historic Places mapped adjacent to the project area. The project is anticipated to qualify for the Section 106 Minor Projects Programmatic Agreement (MPPA). Coordination will occur with the INDOT Cultural Resources Office to confirm the project qualifies for the MPPA.

Wetlands and streams will be delineated, and a Waters of the U.S. Report will be prepared for the

project. The project will likely require a U.S. Army Corps of Engineers (USACE) Section 404 Permit, Indiana Department of Environmental Management (IDEM) Section 401 Water Quality Certification, Indiana Department of Natural Resources (IDNR) Construction in a Floodway.

Permit, and IDEM Rule 5 Notice of Intent. Best management practices for erosion and sediment control will be incorporated into the plans and implemented during construction.

SECTION 8: SURVEY REQUIREMENTS

The survey for this project will utilize conventional survey methods to supplement mobile and drone LIDAR in the project limits per INDOT survey standards. The project coordinate system will be based upon the INGCS Tippecanoe system and tying into published validation monumentation. The reestablishment of existing roadway alignments from plans for previous projects will be performed. No location route survey or deed research was performed as there will be no right-of-way acquisition, as this project will be performed in the existing right-of-way.

SECTION 9: UTILITY COORDINATION

Based on the existing plans, Indiana 811 design ticket requests, and initial site investigation, various utilities appear to exist within the project limits. All utilities that were identified by Indiana 811 locators in the field were mapped during the process of the field survey. A list of potential existing utilities believed to be located within the proposed project limits are provided below in Table 9.1.

Table 9.1 – Existing Utilities

Utility	*Type*
American Suburban Utilities, Inc.	Wastewater
Battle Ground Utilities	Water/Wastewater
CenturyLink	Communications
Comcast Cable (Fort Wayne)	Communications
Duke Energy	Electric
Frontier	Communications
Indiana Dateline Corp (Tipmont)	Communications
Level 3/CenturyLink	Communications
MCI	Communications
Metro FiberNet, LLC	Communications
Tipmont R.E.M.C.	Electric/Communications
Vectren	Gas
City of West Lafayette	Wastewater

As work will primarily be restricted to the existing roadway and other infrastructure within the existing limited access right-of-way, significant utility impacts are not expected. Full utility coordination will be required for this project. Detailed utility contact information can be found in Appendix I.

SECTION 10: RAILROAD

There is one railroad crossing within the project limits, which is owned by CSX. I-65 intersects crossing #341302T at 40°29'29" N, 86°51'36" W. As this work will consist of deck replacement and widening for the northbound bridge and overlay and widening for the southbound bridge, notice and coordination with CSX will be required.

SECTION 11: RELATED PROJECTS

The following table summarizes related projects included in contract R-42909 to be completed within the project limits in conjunction with the added travels lanes along I-65.

Table 11.1 – Summary of Related Projects

Designation No.	Location	Work Type	Priority Year
1592725/1592726	I-65 over CSX Railroad and 9th Street	Northbound: Deck Replacement and Widening Southbound: Overlay and Widening	2022
1592704/1592705	I-65 over Prophets Rock Road	Deck Replacement and Widening	2022
1601088/1601090	I-65 over SR 43	Deck Replacement and Widening	2022
1500644	CR 725 N over I-65	Deck Replacement	2022

SECTION 12: RIGHT-OF-WAY

As the scope of this work primarily consists of improving the existing travel lanes and widening towards the median, additional permanent right-of-way is not anticipated for this project. Temporary right-of-way for grading or maintenance of traffic is not anticipated but will be further evaluated as the design progresses.

DES No.: 1700189
Engineering Assessment
SR 43 & I-65 South Intersection Improvement Project
Tippecanoe County, Indiana

October 25th, 2019

Excerpt from DES No.: 1700189
Engineering Assessment

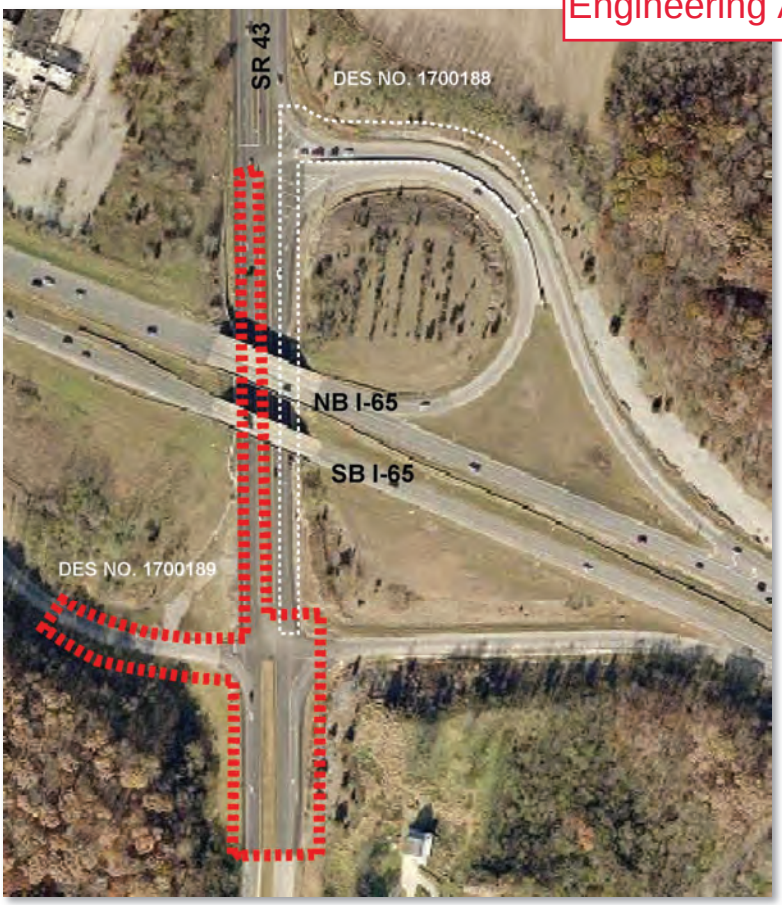

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Table of Contents

LAND USE

The land around the project area is primarily zoned as agricultural with some business nearby to the north and south.

PEDESTRIAN AND BIKE TRAILS

No pedestrian facilities are present at this intersection and none are expected to be built at this time. The Wabash Heritage Trail is located approximately 0.34 miles east of the project area; however, no impact is expected.

MEMORIAL MONUMENTS AND SIGNAGE

No notable monuments or signs are in the area of the study intersection.

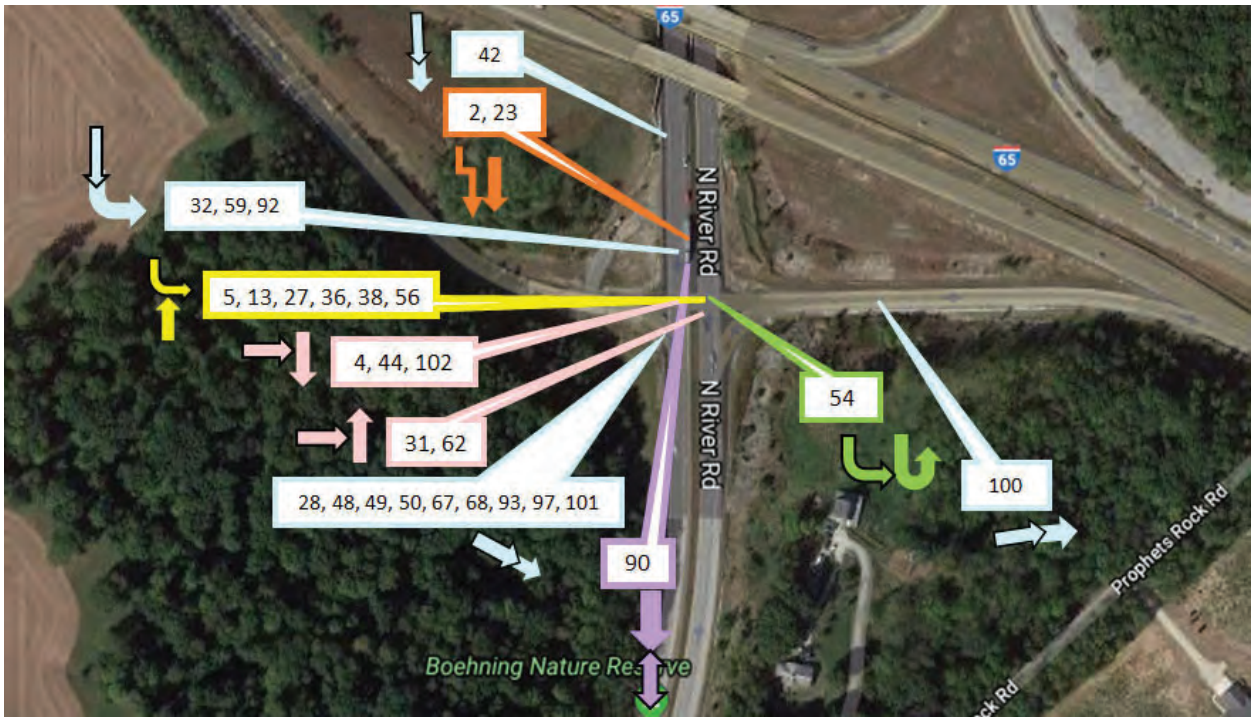
LIGHTING

Lighting is present along SR 43 from approximately 50 ft south of the study intersection to 1350 ft north of the study intersection. Existing lighting is placed approximately 25 ft off the edge of the southbound travel lane, and spaced approximately 190 ft apart. Structures are standard INDOT aluminum poles, with mast arms and trusses, and high pressure sodium luminaires.

Crash Data and Analysis

Traffic crash data and analysis at the intersection of SR 43 and I-65 north ramp was provided by INDOT for records between July 1, 2015 and June 30, 2018. The analysis confirms the existing deficiency and provides the expected base level of future crashes for the “Do Nothing” option. **Exhibit 1,** provided by INDOT, summarizes the results of the crash data.

Exhibit 1 – Crash Analysis Results



An analysis of the crashes using the Road Hazard Analysis Tool (RoadHAT) enables a quick comparison of the study intersection against expected values for an intersection of the same type (geometry, functional classification, etc.). The first factor used is the index of crash frequency (Icf), which is the number of standard deviations the crashes at an intersection exceed the expected crashes for the given intersection type. The Icf for the study intersection is calculated to be 0.94. The second factor used is the Index of Crash Cost (Icc), which is the number of standard deviations the crash cost at an intersection exceed the expected crash cost for the given intersection type. The Icc for the study intersection is calculated to be 0.64.

In addition, the Intersection Crash Rate “R” is approximately 1.66 crashes per million vehicles entering the intersection (based upon the PM peak hour volume and assumed design hour factor of 10%). Over the past 3 years, the intersection crash average was 10 crashes per year; however, further review of the intersection crash frequency shows an upward trend beginning with 7 crashes in the first year, 11 crashes in the second year, and 11 crashes in the third year.

The intersection had a total of 29 crashes. Two resulted in injury, with one resulting in an incapacitating injury. Both injuries were due to a “Failure to Yield” right of way to the northbound

traffic while attempting to access the southbound I-65 on-ramp. One from the southbound left-turn lane (the incapacitating injury) and the other from the eastbound exit ramp (the non-capacitating injury). In both scenarios, these would be classified as right-angle type collisions.

Regarding the crash history on the exit ramp, specific to the right-turn movement, there were a total of 9 rear-end crashes; 1 crash in the first year, 3 crashes in the second year, and 5 crashes in the third year.

Regarding the crash history related to the southbound SR 43 lane balance, which requires 3 lanes to merge into 1 within approximately 500 ft of the intersection, there were no crashes reported in the 3 year period.

In total, 11 of the 29 intersection crashes were right-angle crashes due to a "Failure to Yield" and 13 of the 29 crashes were rear-end crashes due to "Following too Closely." The crash data and statistical results indicate a pattern of right-angle and rear-end type accidents. Both "Following Too Close" and "Failure to Yield" have driver-related contributing circumstances and can be improved by safety enhancements. The following crash reduction methods, as listed in Chapter 55 of the Indiana Design Manual (IDM), may provide the most beneficial crash type reduction:

- Provide adequate channelization
- Improve advance warning signs and markings
- Improve marking and signing

Traffic Data and Capacity Analysis

In addition to an analysis of roadway safety, it is important to consider the impact of roadway changes with respect to capacity.

TRAFFIC DATA

Traffic volume data was collected by INDOT for 24 hours from Wednesday September 26, 2018 to Thursday September 27, 2018. From this data, the highest hour of traffic (peak hour) was determined to be from 7:00-8:00 AM and 4:30-5:30 PM. The following capacity analysis utilizes these peak hours in order to determine the most appropriate solution. As the highest traffic volume hour, if the capacity analysis is acceptable during the peak hour, it will be acceptable for all other hours.

TRAFFIC FORECASTING

A traffic volume growth rate was given by INDOT for each road in the study area. This accounts for expected background development over the design life and not for any specific development. SR 43 is expected to grow at a rate of 1.03% north of the study intersection and 1.27% south of the study intersection. The eastbound left was accordingly set to grow 1.03% and the eastbound right was set to grow 1.27%. The following table summarizes the results of the traffic volume data and forecasting:

SR 43 & I-65 South Ramp										
		Eastbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018	AM	14	3	71	---	232	178	568	706	---
	PM	19	2	71	---	566	171	311	453	---
2022	AM	15	3	75	---	244	187	591	742	---
	PM	20	2	75	---	595	180	324	476	---
2032	AM	17	3	85	---	275	211	652	836	---
	PM	22	2	85	---	671	203	357	536	---
2042	AM	19	3	96	---	310	238	719	942	---
	PM	24	2	96	---	756	229	394	604	---

CAPACITY ANALYSIS

The most common methodology to analyze the capacity of a roadway network is a level-of-service (LOS) analysis. The following table summarizes the range of delays as listed in the *2010 HCM* that are associated with each LOS letter for signalized and unsignalized intersections.

Level-of-Service (LOS) Descriptions for Intersections

LOS	DELAY RANGE (SECONDS PER VEHICLE)		ACCEPTABLE LOS AND UNACCEPTABLE LOS
	SIGNALIZED	UNSIGNALIZED (STOP SIGN OR ROUNDABOUT)	
A	0 – 10	0 – 10	LOS "C" or better is always considered as an acceptable LOS.
B	> 10 – 20	> 10 – 15	
C	> 20 – 35	> 15 – 25	
D	> 35 – 55	> 25 – 35	LOS "D" is often considered as an acceptable LOS, especially for existing urban intersections.
E	> 55 – 80	> 35 – 50	LOS "E" and "F" are typically considered as an unacceptable LOS.
F	> 80	> 50	

The Indiana Design Manual also provides criteria for "Desirable" and "Minimum" LOS for roadways depending on the characteristics of the roadway. For SR 43, Figure 55-3E (Geometric Design Criteria for Urban Arterial, Four or More Lanes, 3R Project) under the Suburban category has a desirable LOS of B with a minimum LOS of D. For the I-65 ramp, Figure 54-2A (Geometric Design Criteria for Freeway, 3R or Partial 4R Project) under the Urban category has a desirable LOS of B with a minimum LOS of D.

The following section provides the capacity analysis broken down by the reviewed intersection improvement alternatives.

Alternatives and Recommendations

A summary of the capacity analysis is as follows:

Intersection LOS and Vehicle Delay – Unsignalized Options

SR 43 & I-65 South Ramp LOS							
Approach	LOS - Delay (sec/veh)						
	Alternative A		Alternative B			Alternative C	
	2018	2042	2018	2032	2042	2018	2042
AM Peak Hour							
Southbound Left	B - 11	C - 16	B - 11	B - 12	B - 13	B - 11	C - 16
Eastbound	B - 11	C - 19	F - >100	F - >100	F - >100	B - 11	C - 19
PM Peak Hour							
Southbound Left	B - 12	B - 14	B - 12	B - 13	C - 16	B - 12	B - 14
Eastbound	A - 9	F - >100 **	F - 98	F - >100	F - >100	A - 9	F - >100 **

*** Eastbound LOS was determined to be failing with a LOS of "E" by 2030.*

Note: Some years omitted from analysis for simplicity when the scenario was not determined to be useful for recommendations.

Intersection LOS and Vehicle Delay – Signalized Options

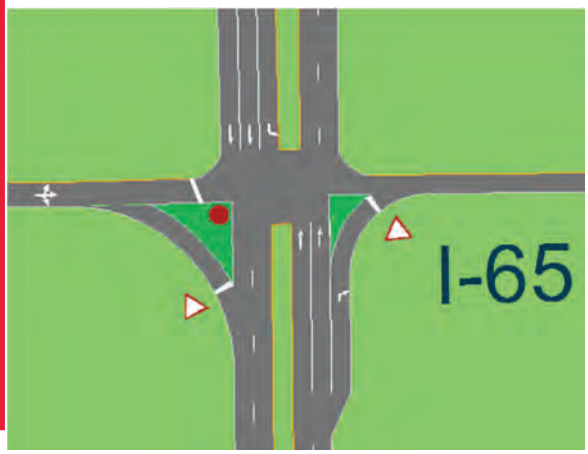
SR 43 & I-65 South Ramp LOS				
Approach	LOS - Delay (sec/veh)			
	Alternative D	Alternative E	Alternative F	Alternative G
	2042	2042	2042	2042
AM Peak Hour				
Northbound	C – 21	C – 26	C – 26	B – 13
Southbound	B – 19	B – 19	C – 21	B – 16
Eastbound	D – 54	D – 46	D – 46	D – 36
Intersection	B – 19	C – 22	C – 23	B – 17
PM Peak Hour				
Northbound	D – 39	D – 39	D – 39	C – 31
Southbound	A – 7	B – 11	B – 11	A – 9
Eastbound	D – 54	D – 41	D – 41	D – 36
Intersection	C – 23	C – 25	C – 25	C – 21

Note: Some years omitted from analysis for simplicity when the scenario was not determined to be useful for recommendations.

ALTERNATIVE A: DO NOTHING

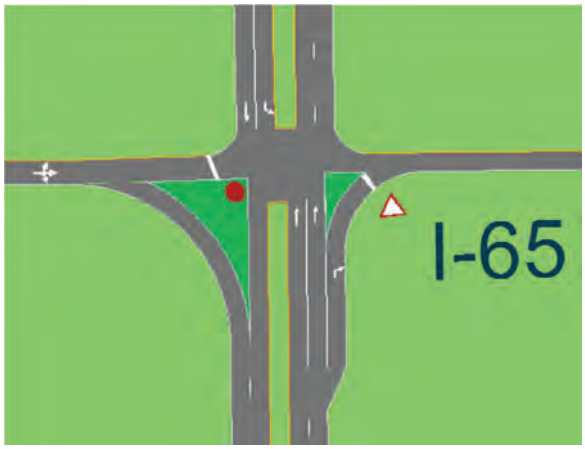
This alternative currently operates with acceptable LOS, but is projected to approach unacceptable LOS by 2030. There will likely be a gradual increase in the frequency and severity of crashes, notably of right angle crashes that have a high potential for injuries.

This alternative not recommended



ALTERNATIVE B: MODIFY SOUTHBOUND LANE CONFIGURATION

Alternative B consists of converting lane geometry along SR 43, with new pavement markings and signage, to merge the two southbound through lanes north of the study intersection, and allow the southbound off-ramp to free flow onto SR 43, prior to merging. These modifications would stagger the lane merges, thereby promoting smoother traffic operations through improved mobility and lane balance.



In this alternative, the west most southbound through lane would merge into the east most southbound through lane downstream of the signalized northbound interchange. The southbound left-turn lane for I-65 southbound remains in its current state, and the original west most through lane becomes part of the wider shoulder.

At the southbound interchange, the eastbound right-turn island would be striped larger to incorporate the west most southbound SR 43 lane; this allows the eastbound right-turn lane to be a free-flowing movement into the merge lane, instead of a yield condition, and decrease the delay on the I-65 southbound off-ramp for right-turning vehicles only.

Due to the increased delay for the shared eastbound left with eastbound through (EBL+EBT) movement, this alternative will not operate safely without additional improvements. It is

DES No.: 1700188
Engineering Assessment
SR 43 & I-65 North Intersection Improvement Project
Tippecanoe County, Indiana

October 25th, 2019

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Engineering Assessment

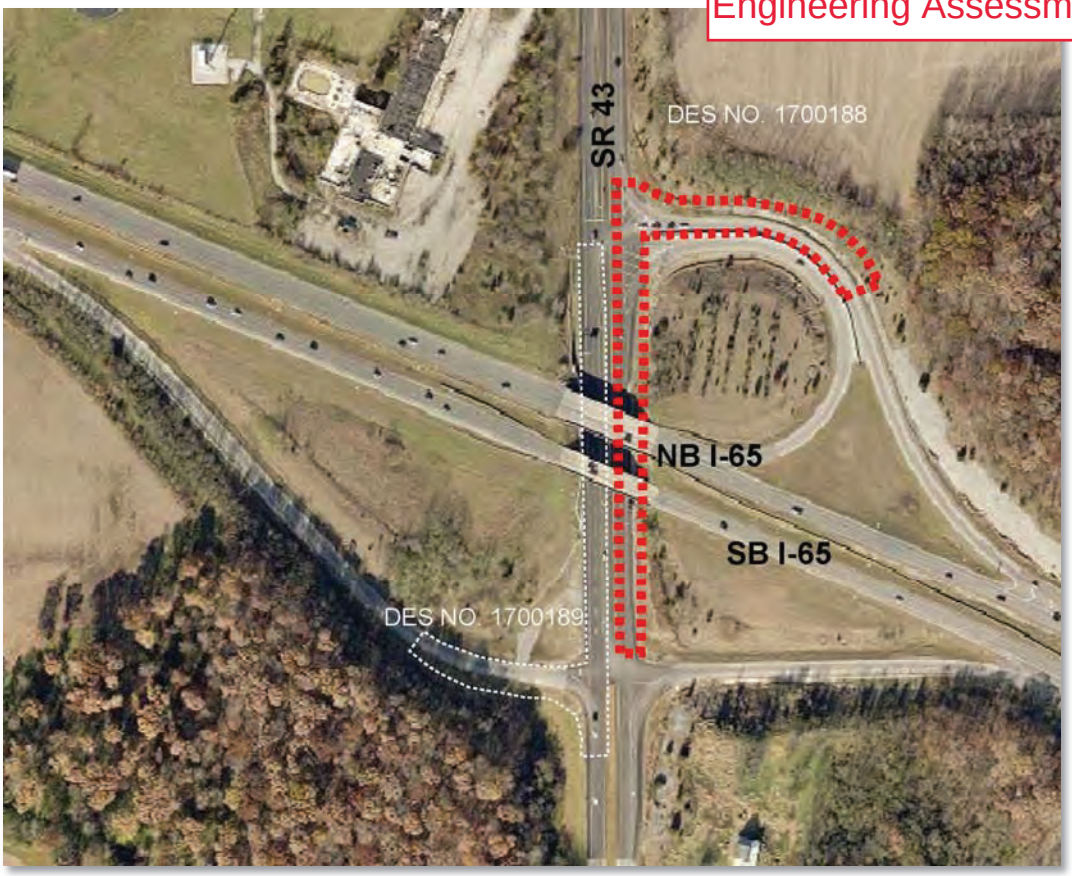

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Table of Contents

LAND USE

The land around the project area is primarily zoned as business with some agricultural nearby to the south and west.

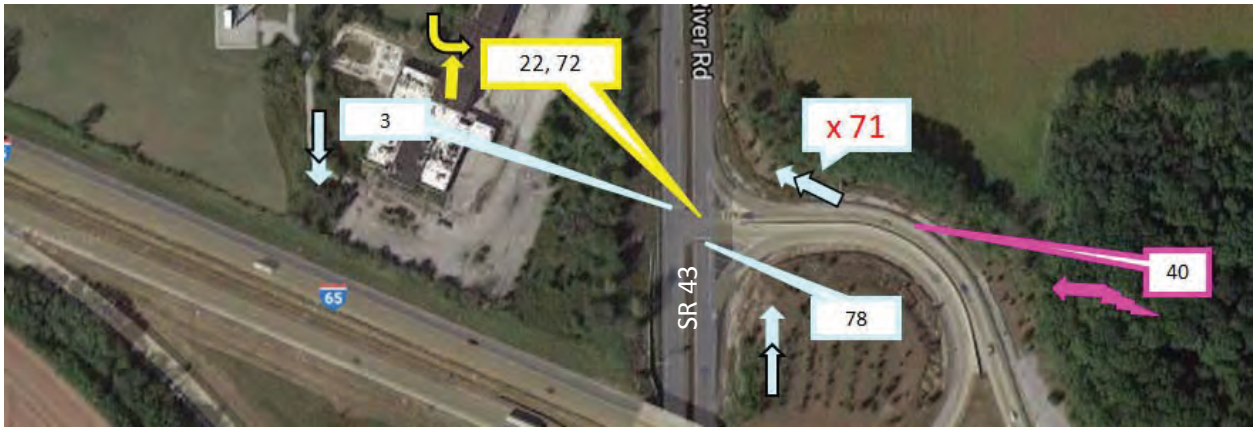
LIGHTING

Lighting is present along SR 43 from approximately 900 ft south of the intersection to 500 ft north of the intersection. Existing lighting is placed approximately 30 ft off the edge of the northbound travel lane, and spaced approximately 160 ft apart. Structures are standard INDOT aluminum poles, with mast arms and trusses, and high pressure sodium luminaires.

Crash Data and Analysis

Traffic crash data and analysis at the intersection of SR 43 and I-65 north ramp was provided by INDOT for records between July 1, 2015 and June 30, 2018. The analysis confirms the existing roadway deficiency and provides the expected base-level of future crashes for the "Do Nothing" option. **Exhibit 1,** provided by INDOT and shown below, summarizes the results of the crash data.

Exhibit 1 – Crash Analysis Results



Note: Each box contains an ID for a crash report showing one or two crashes at each location except the westbound right-turn, which shows the total number of crashes.

An analysis of the crashes using the Road Hazard Analysis Tool (RoadHAT) enables a quick comparison of the study intersection against expected values for an intersection of the same type (geometry, functional classification, etc.). The first factor used is the index of crash frequency (Icf), which is the number of standard deviations the crashes at an intersection exceed the expected crashes for the given intersection type. The Icf for the study intersection is calculated to be 4.59. The second factor used is the Index of Crash Cost (Icc), which is the number of standard deviations the crash cost at an intersection exceed the expected crash cost for the given intersection type. The Icc for the study intersection is calculated to be 1.82.

Based upon the provided data, the Intersection Crash Rate "R" is approximately 3.56 crashes per million vehicles entering the intersection per year (based upon the PM peak hour volume and assumed design hour factor of 10%). Over the past 3 years, the intersection crash average was 25 crashes per year; however, further review of the intersection crash frequency shows an upward trend beginning with 21 crashes in the first year, 19 crashes in the second year, and 36 crashes in the third year.

Of the 71 rear-end right-turning crashes, all were property damage only and most noted that the cause was "Following Too Close" or "Failure to Yield to Right-of-Way". Of the 76 total intersection crashes, none were incapacitating.

It should be noted that the westbound right-turn was changed from a yield condition to a signal control condition by use of new signal heads using right arrow indications and "Right on Red Arrow After Stop" overhead sign. The new signal head was activated on April 13th, 2017. Although the intent of the new signal control was to reduce the number of rear end crashes by using a green phase where westbound right-turn drivers are not required to turn their head, the crash reports show no significant reduction in rear-end crashes after this change.

The crash data and statistical results indicate a pattern of rear-end type accidents. Both "Following Too Close" and "Failure to Yield" are driver-related contributing circumstance and can be improved by safety enhancements. The following crash reduction methods, as listed in Chapter 55 of the IDM, may provide the most beneficial crash type reduction:

- Provide adequate channelization
- Provide left/right run lanes
- Improve advance warning signs and markings
- Improve marking and signing

Traffic Data and Capacity Analysis

In addition to an analysis of roadway safety, it is important to consider the impact of roadway changes with respect to capacity.

TRAFFIC DATA

Traffic volume data was collected by INDOT for 24 hours from Wednesday October 26, 2018 to Thursday October 27, 2018. From this data, the highest hour of traffic (peak hour) was determined to be from 7:00-8:00 AM and 4:30-5:30 PM. The following capacity analysis utilizes these peak hours in order to determine the most appropriate solution. As the highest traffic volume hour, if the capacity analysis is acceptable during the peak hour, it will be acceptable for all other hours.

TRAFFIC FORECASTING

A traffic volume growth rate was given by INDOT for each road in the study area. This accounts for expected background development over the design life and not for any specific development. SR 43 is expected to grow at a rate of 1.03% north of the study intersection and 1.27% south of the study intersection. The westbound left was accordingly set to grow 1.27% and the westbound right was set to grow 1.03%.

The following table summarizes the results of the traffic volume data and forecasting:

SR 43 & I-65 North Ramp										
		Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018	AM	148	---	288	---	195	53	13	1129	---
	PM	167	---	607	---	528	72	23	554	---
2022	AM	156	---	300	---	203	56	14	1176	---
	PM	175	---	632	---	550	76	24	577	---
2032	AM	176	---	331	---	224	63	15	1297	---
	PM	197	---	697	---	607	86	26	636	---
2042	AM	198	---	365	---	247	71	17	1431	---
	PM	222	---	769	---	670	97	29	702	---

CAPACITY ANALYSIS

The most common methodology to analyze the capacity of a roadway network is a level-of-service (LOS) analysis. The following table summarizes the range of delays as listed in the *2010 HCM* that are associated with each LOS letter for signalized and unsignalized intersections:

Level-of-Service (LOS) Descriptions for Intersections

LOS	DELAY RANGE (SECONDS PER VEHICLE)		ACCEPTABLE LOS AND UNACCEPTABLE LOS
	SIGNALIZED	UNSIGNALIZED (STOP SIGN OR ROUNDABOUT)	
A	0 – 10	0 – 10	LOS "C" or better is always considered as an acceptable LOS.
B	> 10 – 20	> 10 – 15	
C	> 20 – 35	> 15 – 25	
D	> 35 – 55	> 25 – 35	LOS "D" is often considered as an acceptable LOS, especially for existing urban intersections.
E	> 55 – 80	> 35 – 50	LOS "E" and "F" are typically considered as an unacceptable LOS.
F	> 80	> 50	

The Indiana Design Manual also provides criteria for "Desirable" and "Minimum" LOS for roadways depending on the characteristics of the roadway. For SR 43, Figure 55-3E (Geometric Design Criteria for Urban Arterial, Four or More Lanes, 3R Project) under the Suburban category has a desirable LOS of B with a minimum LOS of D. For the I-65 ramp, Figure 54-2A (Geometric Design Criteria for Freeway, 3R or Partial 4R Project) under the Urban category has a desirable LOS of B with a minimum LOS of D.

The following section provides the capacity analysis broken down by the reviewed intersection improvement alternatives.

Alternatives and Recommendations

A summary of the capacity analysis is as follows:

Intersection LOS and Vehicle Delay

SR 43 & I-65 North Ramp LOS										
Approach	LOS - Delay (sec/veh)									
	Alternative A		Alternative B			Alternative C			Alternative D	Alternative E
	2018	2042	2022	2032	2042	2022	2032	2042	2042	2042
AM Peak Hour										
Northbound	B - 18	C - 23	B - 11	B - 12	B - 12	A - 8	A - 8	A - 8	B – 12	B – 15
Southbound	C - 23	E - 63	A - 8	B - 12	B - 13	A - 8	A - 9	B - 11	A – 9	A – 9
Westbound	D - 50	F - >100	C - 28	C - 28	C - 33	B - 14	B - 19	C - 28	D – 44	C – 32
Intersection	C - 29	E - 68	B - 13	B - 16	B - 18	A - 9	B - 11	B - 14	B – 15	B – 19
PM Peak Hour										
Northbound	D - 45	E - 61	C - 28	D - 39	E - 66	B - 12	B - 11	B - 12	C – 24	B – 12
Southbound	C - 32	C - 34	A - 6	A - 6	A - 7	A - 6	A - 6	A - 7	A – 8	B – 17
Westbound	D - 54	F - >100	F - 84	F - 93	F - >100	A - 7	B - 11	B - 16	D – 48	E - 76
Intersection	D - 45	F - >100	D - 44	D - 51	E - 64	A - 8	A - 9	B - 12	B – 19	D - 40

Note: Some years omitted from analysis for simplicity, when the scenario was not determined to be useful for recommendations.

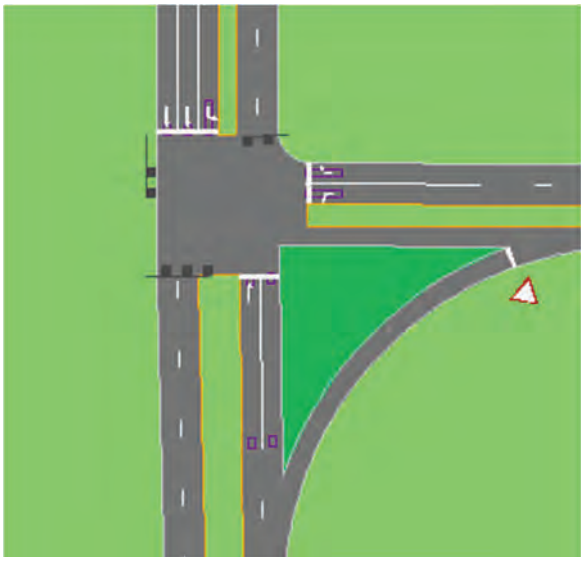
ALTERNATIVE A: DO NOTHING

This alternative will result in an increase in the frequency and severity of crashes as traffic continues to grow and westbound right-turn drivers have a harder time finding a gap in northbound traffic. The westbound movement is close to operating with unacceptable delay with current traffic and the intersection as a whole will operate with unacceptable delay by the design year.

This alternative is not recommended.

ALTERNATIVE B: SEPARATE WB-RT & WB-LT STORAGE, REDUCE WB-RT RADIUS AND SIGNALIZE WB-RT

The year 2042 traffic is projected to create a 95th percentile westbound-left queue of 327 ft during the peak hour. Adequate storage would be necessary for separate left and right-turn lanes, in order that right-turning traffic is not "starved" or prevented from reaching the stop bar by a long left-turn queue. The westbound-right queue will, however, reach 872' by 2042. While this is not back to I-65, it will starve the westbound left-turning queue and be an unsafe option considering the speed of drivers making an exit from I-65.



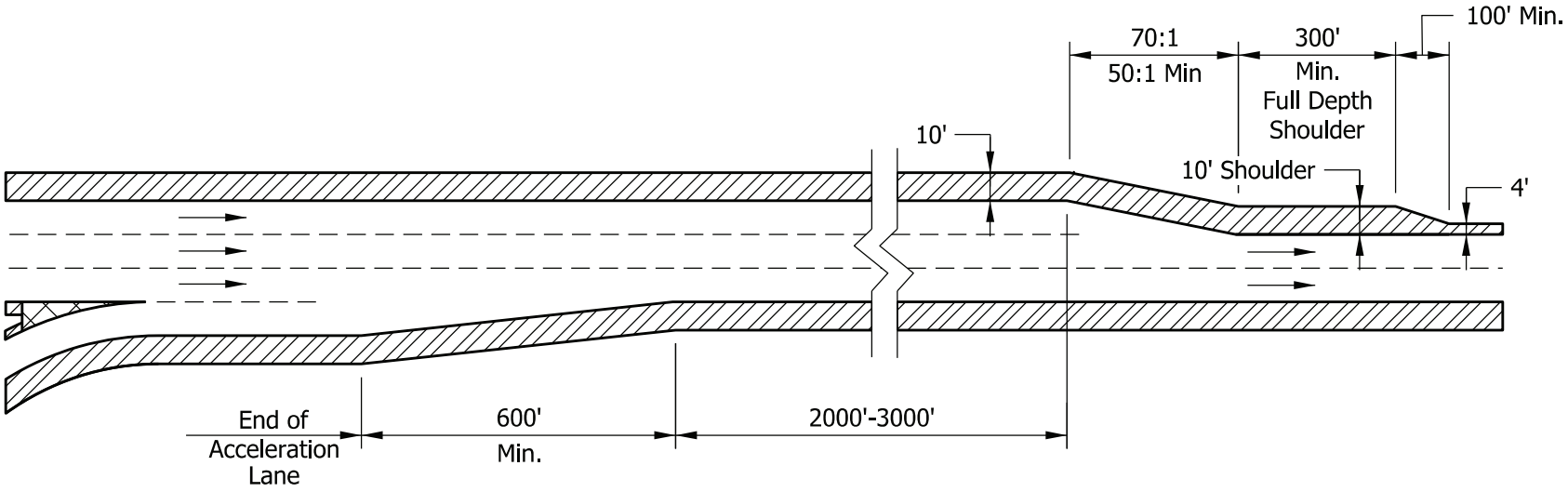
Providing separate right-turn storage along the off-ramp, while reducing the right-turn radius at the SR 43 signal, is expected to reduce the number of rear-end crashes due to speed constraints, improved sight distance, and improved mobility; however, the capacity of the SR 43 and I-65 north ramp intersection is unacceptable for this alternative. The westbound delay

NOTE: This chapter is currently being re-written and its content will be included in Chapter 306 in the future.

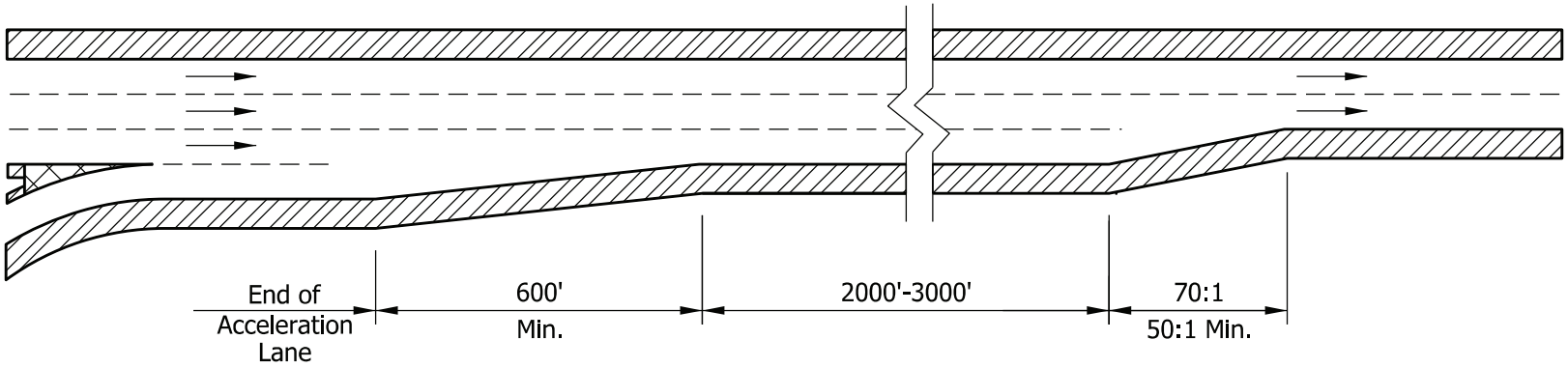
CHAPTER 48

Interchanges

Design Memorandum	Revision Date	Sections Affected
18-16	Aug. 2018	All sections revised.
19-02	Feb. 2019	48-5.02, Figure 48-5B
20-02	Jan. 2020	48-5.04(01)



Left Side Freeway Lane Drop



Right Side Freeway Lane Drop

FREEWAY LANE DROP

Figure 48-6A

DESIGN CRITERIA FOR BRIDGES:

Structure/NBI Number(s): P512

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Reinforced Concrete Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 247-foot long corrugated metal pipe conveying stormwater drainage beneath I-65. The small structure is located approximately 0.59 mile south of CR 725 N. (Appendix B, page 21). This structure will be replaced with a 48-inch wide by 247-foot long reinforced concrete pipe. Wetland 19 is located at the outlet of the existing culvert. Approximately 0.004 acre of Wetland 19 will be permanently impacted by the small structure replacement, slope grading, and placement of riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P511

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Reinforced Concrete Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 206-foot long corrugated metal pipe conveying stormwater drainage beneath I-65. The small structure is located approximately 0.70 mile south of CR 725 N. (Appendix B, page 20). This structure will be replaced with a 48-inch wide by 206-foot long reinforced concrete pipe. No waterway impacts are expected as a result of the small structure replacement because there are no jurisdictional waterways present at this location.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P510

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Reinforced Concrete Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 212-foot long corrugated metal pipe conveying stormwater drainage beneath I-65. The small structure is located approximately 0.83 mile south of CR 725 N. (Appendix B, page 20). This structure will be replaced with a 42-inch wide by 212-foot long reinforced concrete pipe. Wetland 18 is located at the outlet of the existing culvert. Approximately 0.007 acre of Wetland 18 will be permanently impacted due to the small structure replacement, slope grading, and the placement of riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P509

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 183-foot long corrugated metal pipe conveying stormwater drainage beneath I-65. The small structure is located approximately 0.30 mile north of CR 600 N. (Appendix B, page 19). This structure will be replaced with a 36-inch wide by 183-foot long corrugated metal pipe. Wetland 14 is located at the outlet of the existing culvert. Approximately 0.072 acre of Wetland 14 will be permanently impacted by small structure replacement and the placement of riprap. Wetland 15 is located at the structure inlet. Approximately 0.035 acre of Wetland 15 will be permanently impacted due to slope grading and the placement of riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P508

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 18-inch wide by 123-foot long corrugated metal pipe conveying stormwater drainage along I-65 beneath the CR 600 N. overpass (Appendix B, page 18). This structure will be replaced with a 30-inch wide by 194-foot long corrugated metal pipe. No waterway impacts are expected as a result of the small structure replacement because there are no jurisdictional waterways present at this location.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P507

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 139-foot long corrugated metal pipe conveying stormwater drainage along I-65 beneath the CR 600 N. overpass (Appendix B, page 18). This structure will be replaced with a 36-inch wide by 197-foot long corrugated metal pipe. Wetland 10a is located at the inlet of the small structure. Approximately 0.03 acre of Wetland 10a will be permanently impacted by the small structure replacement, slope grading, and the placement of riprap. Wetland 10b is located at the outlet of this small structure. Approximately 0.037 acre of Wetland 10b will be impacted by the small structure replacement, slope grading, and the placement of riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P506

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 241-foot long corrugated metal pipe conveying UNT 8 beneath I-65. The small structure is located approximately 0.75 mile north of SR 43 (Appendix B, pages 16-17). This structure will be replaced with a 42-inch wide by 250-foot long corrugated metal pipe. UNT 8 flows through the existing pipe; however, UNT 8 is likely not a jurisdictional stream so no impacts to jurisdictional streams will occur with the replacement of this small structure.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P505

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			350 permanent; 30 temporary	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 320-foot long corrugated metal pipe UNT 5 beneath I-65. The small structure is located approximately 0.60 mile north of SR 43 (Appendix B, page 16). This structure will be replaced with a 42-inch wide by 321-foot long corrugated metal pipe. UNT 5 is likely a jurisdictional stream and flows through the existing pipe. Approximately 350 linear feet of permanent impacts will occur from stream encapsulation. Approximately 30 linear feet of temporary impacts could occur for a pump around for dewatering activities.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P504

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		N/A	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 220-foot long corrugated metal pipe conveying stormwater drainage beneath I-65. The small structure is located approximately 0.27 mile north of SR 43 (Appendix B, pages 14-15). This structure will be removed and not replaced. Wetland 7 is located at the outlet of the small structure. Approximately 0.014 acre of Wetland 7 will be permanently impacted by the small structure removal and slope grading activities.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?		X	

Structure/NBI Number(s): P702

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch by 145-foot corrugated metal pipe conveying UNT 3 beneath the I-65 southbound exit ramp to SR 43 (Appendix B, pages 13-14). This structure will be replaced with a 36-inch wide by 134-foot long corrugated metal pipe. UNT 3 flows through the existing pipe; however, UNT 3 is likely not a jurisdictional stream so no impacts to jurisdictional streams will occur with the replacement of this small structure.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P703

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Elliptical Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 32-inch wide by 76-foot long elliptical corrugated metal pipe conveying stormwater drainage beneath the I-65 southbound on-ramp to SR 43 (Appendix B, page 13). This structure will be replaced with a 36-inch wide by 76-foot wide corrugated metal pipe. Wetland 3a is located at the small structure inlet. Approximately 0.173 acre of Wetland 3a will be permanently impacted by the small structure replacement, slope grading, and the placement of riprap. Wetland 6 is located at the small structure outlet. Approximately 0.072 acre of Wetland 6 will be permanently impacted by the small structure replacement, slope grading, and the placement of revetment riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P704

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 76-foot long corrugated metal pipe conveying stormwater drainage beneath the I-65 southbound on-ramp to SR 43 (Appendix B, page 13). This structure will be replaced with a 36-inch wide by 80-foot long corrugated metal pipe. No waterway impacts are expected as a result of the small structure replacement because there are no jurisdictional waterways present at this location.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P706

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 24-inch wide by 71-foot long corrugated metal pipe conveying stormwater drainage beneath the I-65 northbound exit ramp to SR 43 (Appendix B, page 13). This structure will be replaced with a 36-inch wide by 80-foot long corrugated metal pipe. The inlet of the small structure is located within Wetland 25. Wetland 25 will be filled as part of the roadway construction. Approximately 0.136 acre of Wetland 25 will be impacted. The outlet of the small structure is in Wetland 2. Approximately 0.410 acre of Wetland 2 will be permanently impacted by slope grading and the placement of riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P515

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Concrete Elliptical Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 24-inch wide by 100-foot long corrugated metal pipe conveying stormwater drainage beneath the I-65 northbound exit ramp to SR 43 (Appendix B, page 13). This structure will be replaced with a 34-inch wide by 99-foot long reinforced concrete elliptical pipe. The inlet of the small structure is located within Wetland 3b. Approximately 0.247 acre of Wetland 3b will be permanently impacted by the small structure replacement, slope grading, and placement of riprap. The outlet of the small structure is located within Wetland 5. Approximately 0.072 acre of Wetland 5 will be permanently impacted by the small structure replacement, slope grading, and placement of riprap.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P707

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 24-inch wide by 150-foot wide corrugated metal pipe conveying stormwater drainage along I-65 beneath the Swisher Road overpass (Appendix B, page 10). This structure will be replaced with a 36-inch wide by 169-foot long corrugated metal pipe. No waterway impacts are expected as a result of the small structure replacement because there are no jurisdictional waterways present at this location.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P707B

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		Corrugated Metal Pipe	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 15-inch wide by 158-foot long corrugated metal pipe conveying stormwater drainage along I-65 beneath the Swisher Road overpass (Appendix B, page 10). This structure will be replaced with a 30-inch wide by 193-foot long corrugated metal pipe. No waterway impacts are expected as a result of the small structure replacement because there are no jurisdictional waterways present at this location.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?	X		

Structure/NBI Number(s): P501

Sufficiency Rating: N/A
(Rating, Source of Information)

	Existing		Proposed	
Bridge Type:	Corrugated Metal Pipe		N/A	
Number of Spans:	N/A		N/A	
Weight Restrictions:	N/A	ton	N/A	ton
Height Restrictions:	N/A	ft.	N/A	ft.
Curb to Curb Width:	N/A	ft.	N/A	ft.
Outside to Outside Width:	N/A	ft.	N/A	ft.
Shoulder Width:	N/A	ft.	N/A	ft.
Length of Channel Work:			N/A	ft.

Describe bridges and structures; provide specific location information for small structures.

Remarks: The existing structure is a 36-inch wide by 184-foot long corrugated metal pipe conveying stormwater drainage beneath I-65. The small structure is located approximately 0.25 mile south of Swisher Road (Appendix B, page 9). This structure will be removed and not replaced. No waterway impacts are expected as a result of the small structure replacement because there are no jurisdictional waterways present at this location.

	Yes	No	N/A
Will the structure be rehabilitated or replaced as part of the project?		X	

The HNTB Companies
Infrastructure Solutions

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December 14, 2020

Mr. Allen Nail
Director
Tippecanoe County Parks and Recreation Department
4449 State Road 43 N.
West Lafayette, IN 47906

Re: Wabash Heritage Trail – Section 4(f) Temporary Occupancy
Des. No. 2001172 (Lead)
I-65 Added Travel Lanes Project
Tippecanoe County, Indiana

Dear Mr. Nail:

The Indiana Department of Transportation (INDOT) and Federal Highway Administration (FHWA) intend to proceed with an added travel lanes project along Interstate 65 (I-65). The project is located along I-65 from approximately 1.33 miles north of SR 25 to approximately 2.43 miles north of SR 43 near Lafayette and Battle Ground in Tippecanoe County, Indiana. Additional length north and south of these limits is included in the project area for median crossovers for maintenance of traffic. The project also includes the deck replacement of the CR 725 N. bridge over I-65, which is approximately 390 feet north of the added travel lane limits. The project is expected to take place entirely within existing right-of-way. The adjacent land use includes residential, agricultural, recreational, and forest. Maps of the project area are included as attachments.

As part of the environmental evaluation of the community and natural resource impacts of the proposed project, any potential recreation areas must be identified and evaluated for protection under Section 4(f) of the Department of Transportation Act of 1966, 49 USC 303(c). Section 4(f) protects publicly-owned parks, recreational areas (including trails), wildlife and waterfowl refuges, and public and private historic sites against direct or constructive use impacts from transportation projects. Section 4(f) requires coordination with an official with jurisdiction over these historic and recreational resources regarding applicability of Section 4(f) and the impacts of the project on Section 4(f) resources. In the case of recreational properties, the officials with jurisdiction are the officials of the agency or agencies that own or administer the property in question and who are empowered to represent the agency on matters related to the property. The Wabash Heritage Trail described below is within your agency's jurisdiction and is located within the I-65 Added Travel Lanes Project area. See Attachment 3 for more information about the location of the trail.

Wabash Heritage Trail (Section 4(f) Temporary Occupancy)

The Wabash Heritage Trail is an earthen path that crosses under I-65 along the west side of Burnett Creek under the bridge over 9th Street and the CSX railroad (Photos of the trail within the project area are on page 2). The trail is approximately 13 miles long, starting at Tippecanoe Battlefield in Battle Ground and ending at Fort Ouiatenon. The Wabash Heritage Trail is a publicly owned recreational property and is therefore subject to Section 4(f) of the Department of Transportation Act of 1966 which prohibits the use of certain public and historic lands for federally funded transportation facilities unless there is no feasible and prudent alternative.

Approximately 365 feet of the Wabash Heritage Trail is within the existing I-65 right-of-way. No right-of-way will be acquired from the trail, and no part of the trail will be converted to a transportation use. As part of the I-65 Added Travel Lanes Project, bridge widening and deck work will be completed on the I-65 bridges over 9th Street/CSX Railroad/Burnett Creek/Wabash Heritage Trail. Riprap for scour protection will also be installed at this bridge. The Wabash Heritage Trail will require a temporary closure during project construction. The closure will be no longer than six (6) months. Construction of the entire I-65 Added Travel Lanes project is anticipated to last approximately two (2) years. Prior to construction of the 9th Street/CSX Railroad/Burnett Creek bridges, the contractor will be

required to notify the Tippecanoe County Parks and Recreation Department about the trail closure at least two (2) weeks in advance so the appropriate signage can be placed.

Although not required by Section 4(f), as part of the I-65 Added Travel Lanes project, the elevation of the Wabash Heritage Trail will be raised by a maximum of approximately six (6) inches within the existing INDOT right-of-way. The trail would be replaced with compacted earth, similar to its existing condition. This is based on a request from the Tippecanoe County Parks and Recreation Department to improve drainage in the area. Raising the elevation of the trail as part of the project is contingent on it not delaying the water resource permitting process.

Because the Wabash Heritage Trail may be temporarily closed during project construction, it is being evaluated for Section 4(f) temporary occupancy. Under 23 CFR 774.13(d), a temporary occupancy of protected land for a construction project will not constitute a Section 4(f) use when all of the conditions listed below are satisfied:

1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;

3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;

4. The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and

5. There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

For the proposed I-65 Added Travel Lanes Project, closure of the Wabash Heritage Trail will be temporary and less than the time needed for construction of the project. There will be no adverse physical impacts to the trail, and it will be re-opened in a condition which is as good as that which existed prior to the project. **As the official with**

jurisdiction over Wabash Heritage Trail, your documented agreement of this project's meeting the above five criteria is required in order for the trail closure to be considered a temporary occupancy under Section 4(f).

Conclusion

The I-65 Added Travel Lanes Project will not require acquisition of right-of-way from any parks or trails, and therefore no recreational properties will be altered or permanently incorporated into the transportation project.

Because the Wabash Heritage Trail will be temporarily closed during project construction, it is being evaluated for Section 4(f) temporary occupancy.

A response from you is requested within 30 days to determine the following:

If you agree with the statement below, please sign this letter and return it for inclusion in the environmental document for this project.

As the Official with Jurisdiction over Wabash Heritage Trail, I agree that the proposed project meets the above five criteria for temporary occupancy of a Section 4(f) resource.

SIGNATURE: Allen Nail **DATE:** 12-15-20

Printed Name and Title: Allen Nail - Superintendent of Parks

If you have any questions regarding this matter, please feel free to contact Kia Gillette, of HNTB Corporation, at kgillette@hntb.com or 317-695-0825. Thank you for your assistance in the development of this project.

Sincerely,
HNTB CORPORATION

Kia M. Gillette

Kia M. Gillette
Environmental Project Manager

Attachments have been removed to avoid duplication of materials. Maps can be found in Appendix B of this CE document.

Attachments: Attachment 1: General Project Location Map
Attachment 2: USGS Topographic Map
Attachment 3: Project Elements Map (including Wabash Heritage Trail)

Cc: Ron Bales, INDOT Environmental Services Division
Brandon Miller, INDOT Environmental Services Division
Arshad Ahmed, INDOT Project Manager
Wade Garriott, Wabash Heritage Trail Manager

HNTB

Meeting Minutes

Purpose: I-65 Added Travel Lanes/Wabash Heritage Trail Meeting Minutes
Date/Time: June 24, 2020, 1:00 - 2:00 pm
Location: WebEx

Attendees:

Allen Nail, Director Tippecanoe County Parks and Recreation Department
Wade Garriott, Wabash Heritage Trail Manager
Arshad Ahmed, INDOT Project Manager, Crawfordsville District
Youlanda Belew, INDOT Geotechnical Services
Brian Trenner, Resource International
Hanumanth Kulkarni, Resource International
Nicholas Jones, S&ME, Inc.
Austin Hastings, HNTB
Kia Gillette, HNTB

1) Introductions/Meeting Purpose
Kia Gillette introduced meeting participants. The purpose of the meeting is to discuss the I-65 Added Travel Lanes project and potential impacts to the Wabash Heritage Trail. The Wabash Heritage Trail is managed by the Tippecanoe County Parks and Recreation Department and crosses under I-65 at the 9th Street/CSX/Burnett Creek bridge.

2) I-65 ATL Project Overview
Austin Hastings provided a description of the project. The project involves pavement replacement and adding a travel lane to the median of I-65 from north of the Wabash River to 2.43 miles north of SR 43. The bridges over 9th Street/CSX RR/Burnett Creek/Wabash Heritage Trail will receive a deck replacement (northbound) and deck overlay (southbound) and be widened to the median.

3) Wabash Heritage Trail
Allen Nail and Wade Garriott provided and overview of the Wabash Heritage Trail within the project area. The bridge crosses the CSX railroad, 9th Street, Burnett Creek, and the Wabash Heritage Trail. The trail has an earthen substrate and is northwest of the creek. The nearest access to the trail is the Tippecanoe Battlefield Park to the north or Burnett Road to the south. There is no good access to the trail near the project area. The Tippecanoe County Parks Board owns the land upstream and parcel immediately adjacent to the trail. The land downstream is privately owned and the Tippecanoe County Parks Board has an easement for the trail on the property. The trail does become very wet upstream of I-65 when it rains.

With the existing access for the trail, a detour during construction is not likely viable.

4) Section 4(f)
Kia provided a brief overview of Section 4(f). Section 4(f) is a law that affects transportation projects. It protects publicly owned recreational properties, such as the Wabash Heritage Trail, from conversion to a transportation use. It will require some specific documentation for the environmental process. The project team will continue to coordinate with the Tippecanoe County Parks and Recreation Department as the project progresses.

Purpose: I-65 Added Travel Lanes/Wabash Heritage Trail Meeting Minutes
Date/Time: June 24, 2020, 1:00 - 2:00 pm
Location: WebEx

5) Geotechnical Work at I-65 Bridge
Brian Trenner and Nick Jones discussed some upcoming geotechnical work needed at the bridge. Brian provided photos and an access map to meeting attendees prior to the meeting. They will need to complete a boring at the bridge to depth of approximately 90 feet. The drill rig is approximately eight feet wide and will need to be placed in the middle of the trail. Access to this location will be via the northbound interstate embankment and through the right-of-way fence. The trail is likely six to eight feet wide in the project area, but not for the entire length. Some minor brush or limb clearing will likely be required. They will grout the boring and clean up the area when complete.

This work will require closure of the trail for approximately two days for safety reasons. The geotech crew will install temporary measures (cones, signs, barricades, etc.) to keep people away from the immediate project area. The Tippecanoe County Parks and Recreation Department will install signs at the trail heads north and south of I-65 indicating the trail is closed. They will need at least a couple of days of notice to place the signs.

Brian indicated they are waiting on a permit from the railroad and anticipate that in mid-July. Once they have the permit they will develop a firm schedule and will provide the Tippecanoe County Parks and Recreation Department with notice at least one week ahead of the work.

Since the drill rig will not require crossing private property, notice of survey letters will not be sent out. If the Tippecanoe County Parks and Recreation Department receives questions about the geotechnical work they can tell them about the I-65 project and can direct them to Kia or Austin for additional information.

Austin will provide slope information to the Geotech subconsultants to confirm access for the drill rig.

6) Temporary Impacts During Construction
Work to the bridges over the trail will require closure of the trail for some duration. The Tippecanoe County Parks and Recreation Department indicated the colder and wetter months would be better for a trail closure because there are less people using it during those times. They also understand the project needs to be completed and it will be better in the end. It was agreed that a trail closure was preferable to a detour for safety reasons. The project team's goal is to try and minimize the trail closure time. The project team will come up with some ideas and coordinate with the Tippecanoe County Parks and Recreation Department in a few weeks.

7) Permanent Impacts Post Construction
Permanent impacts to the trail after construction are not anticipated.

8) Other Concerns
Allen asked if it would be possible to raise the elevation of the trail within the construction limits. This would be a significant improvement for the trail. The project team will investigate this.

Purpose: I-65 Added Travel Lanes/Wabash Heritage Trail Meeting Minutes
Date/Time: June 24, 2020, 1:00 - 2:00 pm
Location: WebEx

The project is not anticipated to change drainage in the area.

9) Action Items
   - Brian will contact the Tippecanoe County Parks and Recreation Department at least one week in advance of the trail closure needed for the geotechnical work.
   - The project team will investigate possible trail options and set up a call with the Tippecanoe County Parks and Recreation Department in a few weeks.
   - The project team will investigate the possibility of raising the trail elevation within the project limits.

HNTB

Meeting Minutes

Purpose: I-65 Added Travel Lanes/Wabash Heritage Trail Meeting Minutes
Date/Time: July 21, 2020, 1:00 - 1:30 pm
Location: WebEx

Attendees:

Allen Nail, Director Tippecanoe County Parks and Recreation Department
Wade Garriott, Wabash Heritage Trail Manager
Austin Hastings, HNTB
Matt Canada, HNTB
Kia Gillette, HNTB

1) Introductions/Meeting Purpose
Kia Gillette introduced meeting participants. The purpose of the meeting is to follow up on items discussed at the previous I-65 Added Travel Lanes Project/Wabash Heritage Trail meeting on June 24, 2020.

2) Wabash Heritage Trail Closure During Construction Update
Austin Hastings summarized the anticipated trail closure timeframe. HNTB developed a construction schedule for the work at the 9th Street/CSX Railroad/Burnett's Creek bridges. During warm weather months it is anticipated construction at these bridges could be completed within 4 months. This means the trail would require a 4-month closure. If the trail closure occurred during winter months, the timeframe would likely be 5 months. Allen Nail responded the Tippecanoe County Parks Department prefers what is the most efficient for the project and they will adjust accordingly. Wade Garriott agreed with this response.

3) Wabash Heritage Trail Elevation Increase Update
Matt Canada indicated HNTB has reviewed the trail alignment within the I-65 right-of-way and we anticipate the trail profile can be raised a maximum of 5-6 inches within the right-of-way. The trail would be replaced with compacted earth, similar to its existing condition. It would likely be 6-8 feet wide within the right-of-way limits, which is a length of 400 feet. Allen said they would prefer whatever is put back to be as good or better than the existing condition. He also asked the trail be compacted so it does not wash into the creek during rain events. Matt also indicated that we will try and improve upon drainage conditions in the area if possible, by sloping the trail back towards Burnett Creek. The trail currently slopes away from Burnett Creek.

4) Section 4(f) Letter
Kia stated HNTB will draft a letter describing the project impacts and will send it to Allen and Wade for review. Once they are comfortable with the language, we will need Allen to sign the letter. This will address the Section 4(f) requirements.

5) Other Considerations
Completion of the geotechnical work near the trail is pending receipt of a permit from the CSX Railroad. Brian Trenner is leading the geotechnical effort. Brian, Kia, or Austin will notify Allen and Wade once that permit has been received and a schedule is available for the borings. Allen asked about the width of the geotechnical equipment. After reviewing previous meeting minutes, that width is approximately 8 feet wide. Some small brush and branches may need to be removed to

access the site. Coordination with Brian Trenner stated that they are still waiting on coordination with CSX to schedule the borings in the location of the trail.

Allen asked about notification of future construction work. Prior to construction of the 9th Street/CSX Railroad/Burnett Creek bridges, the contractor will be required to notify the Tippecanoe County Parks Department about the trail closure so the appropriate signage can be placed. This commitment will be included in the contract documents.

6) Action Items
   - Brian Trenner will contact the Tippecanoe County Parks and Recreation Department at least one week in advance of the trail closure needed for the geotechnical work.
   - Kia will prepare and send the Section 4(f) letter to the Tippecanoe County Parks Department for their review

TRAFFIC NOISE ANALYSIS

I-65 Added Travel Lanes

Des. Nos: 2001172 and 2100049

Tippecanoe County, Indiana

Prepared by:

HNTB

111 Monument Circle, Suite 1200
Indianapolis, IN 46204

January 2021

EXECUTIVE SUMMARY

This report evaluates the potential noise impacts of the proposed improvements within the I-65 Added Travel Lanes project (Des. Nos. 2001172 and 2100049) study area in conformance with corresponding Federal regulations and guidance, and the National Environmental Policy Act (NEPA). The noise analysis presents the existing and future acoustical environment along the project corridor.

Existing noise level measurements were conducted on July 27, 2020 at three representative sites in the project corridor. A 20-minute measurement was taken at each site. The measurements were made in accordance with Federal Highway Administration (FHWA) and Indiana Department of Transportation (INDOT) guidelines using an integrating sound level analyzer meeting American National Standard Institute (ANSI) and International Electrotechnical Commission (IEC) Type 1 specifications. Traffic counts were taken concurrently with the noise measurements.

The latest version of the FHWA's Traffic Noise Model, TNM®2.5, was used to model existing (2020) and design year (2044) worst hourly traffic noise levels within the I-65 Added Travel Lanes project study area. Because some impacts were identified 500 feet beyond the nearest edge of pavement, per INDOT's Traffic Noise Analysis Procedure noise impacts were modeled to a distance of 800 feet. Fifty-eight (58) noise receivers representing eighty (80) receptors were modeled in the Existing and No Build conditions. Receivers consist of residences, commercial facilities, institutional, recreational, and agricultural land.

Existing peak hour (2020) noise levels ranged from 58.6 to 73.3 dBA L_{eq}(1h). Residential noise levels ranged from 58.6 to 73.3 dBA L_{eq}(1h).

Predicted future design year (2044) noise levels adjacent to the proposed project would approach or exceed the NAC at twenty-five (25) noise sensitive receptors. The noise levels would range from 59.5 to 74.8 dBA L_{eq}(1h). Noise levels at residential receivers would range from 59.5 to 74.8 dBA L_{eq}(1h).

Predicted future noise levels change over existing noise levels range from 0.8 to 3.3 dBA. Therefore, none of the predicted future noise levels would substantially exceed existing noise levels.

Nine noise barriers were modeled in the study area. None of the barriers met the conditions for feasible and reasonable abatement as identified in the 2017 INDOT Traffic Noise Analysis Procedure.

Based on the studies thus far accomplished, the State of Indiana has not identified any locations where noise abatement is likely. Noise abatement measures that were studied at these locations were based upon preliminary design costs and design criteria. Three barriers, NB1, NB4, and SB1 would be considered feasible abatement measures and would achieve INDOT's design goal for the first row impacted receptors. However, these barriers would exceed the maximum allowable cost of $25,000 per benefited receptor. Barriers NB2, NB5, and SB4 would be considered feasible abatement measures but would not achieve INDOT's design goal for any impacted receptors and would exceed the maximum allowable cost of $25,000 per benefited receptor. Barriers NB3, SB2, and SB3 would not achieve a 5 dBA reduction at any of the impacted receptors. Therefore, would not be considered feasible or reasonable. A re-evaluation of the noise analysis will occur during final design. If during final design it has been determined that conditions have changed such that noise abatement is feasible and reasonable, the abatement measures might be provided. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes.

Noise Analysis Report

Table of Contents

Appendices B and C have been removed to reduce the file size.

Noise Analysis Report

1.0 INTRODUCTION

The Indiana Department of Transportation (INDOT) is proposing the addition of travel lanes along I-65. The project is located along I-65 from approximately 1.33 miles north of State Route (SR) 25 to approximately 2.43 miles north of SR 43 near Lafayette and Battle Ground in Tippecanoe County, Indiana. Additional length north and south of these limits is included in the project area for median crossovers for maintenance of traffic. The project also includes the deck replacement of the County Road (CR) 725 N. bridge over I-65, which is approximately 390 feet north of the added travel lane limits.

The proposed project includes the following elements:

- Travel lane and shoulder pavement replacement;
- Addition of lanes/extension of turn lanes on I-65/SR 43 interchange ramps;
- Addition of a travel lane in each direction in the median with traffic separated by a concrete barrier;
- Bridge deck replacement and widening of I-65 northbound and southbound bridges over 9th Street/CSX Railroad/Burnett Creek/Wabash Heritage Trail (Des. Nos. 2002114 and 2002115). Riprap for scour protection will also be installed at this bridge;
- Raising the elevation of the Wabash Heritage Trail within the existing INDOT right-of-way. The trail is an earthen path under the I-65 bridges over 9th Street/CSX Railroad/Burnett Creek;
- Bridge deck replacement and widening of I-65 northbound and southbound bridges over Prophets Rock Road (Des. Nos. 2002116 and 2002117);
- Lowering the elevation of Prophets Rock Road to obtain proper vertical clearance for the I-65 bridges over it;
- Bridge deck replacement and widening of I-65 northbound and southbound bridges over SR 43 (Note: the environmental impacts of work to these bridges were previously documented in a separate Categorical Exclusion (CE) document under Des. Nos. 1601088 and 1601090);
- Bridge deck replacement of CR 725 N. bridge over I-65 (Des. No. 2002364); the elevation of CR 725 N. will be raised to obtain proper vertical clearance over I-65;
- Replacement of culverts crossing under I-65 and/or construction of median drains, culverts, and detention basins for roadway drainage;
- Guardrail will be installed as needed intermittently along I-65 and Prophets Rock Road and CR 725 N;
- Existing signs are being replaced in kind. Additional signage will be warranted including but not limited to three concrete median mounted overhead cantilever signs at the north limits for the lane ending;
- Additional lighting will be installed along the SR 43 entrance and exit ramps.

The bridges over Burnett Creek, south of CR 600 N., will have a deck replacement and be widened as part of a separate project prior to this added travel lanes project. Environmental impacts of that bridge work will be documented in a separate CE document under Des Nos. 1601091 and 1601092.

The project location is shown on Figure 1.

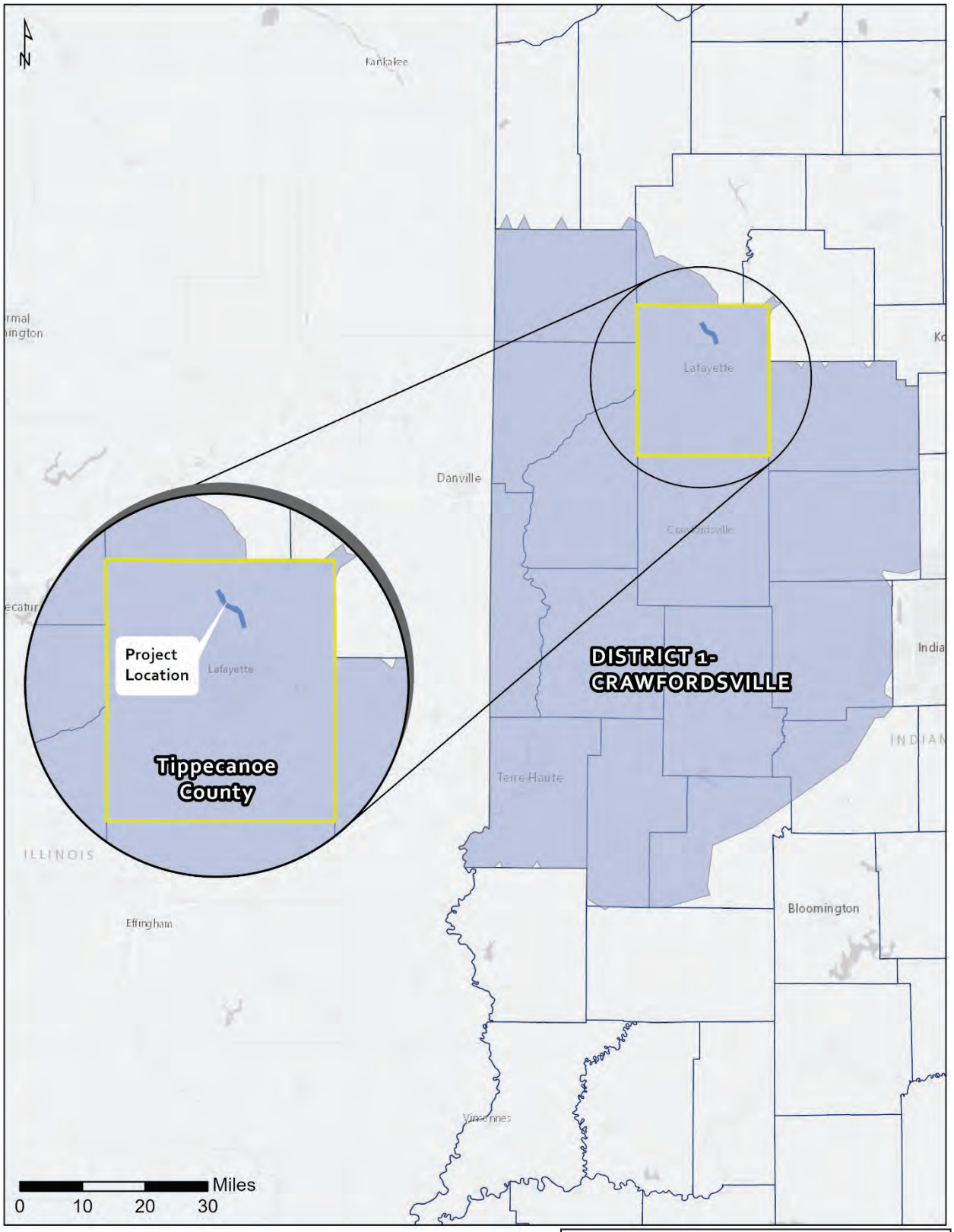


Figure 1. Project Location Map

2.0 NOISE ANALYSIS OVERVIEW

This report evaluates the potential noise impacts of the I-65 Added Travel Lanes Project preferred alternative in conformance with corresponding Federal regulations and guidance, and the National Environmental Policy Act (NEPA). The noise analysis presents the existing and future acoustical environment at various receptors located within the study area.

The determination of noise abatement measures and locations is in compliance with the Federal Highway Administration's (FHWA) *Procedures for Abatement of Highway Traffic Noise and Construction Noise* as presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772) and the INDOT's "Traffic Noise Analysis Procedure".

Basic Noise Information

Noise is defined as unwanted and disruptive sound. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are most commonly measured in decibels (dB).

The dB is the unit of measurement for sound. The decibel scale audible to humans spans approximately 140 dB. A level of zero dB corresponds to the lower limit of audibility, while 140 dB produces a sensation more akin to pain than sound. The dB scale is a logarithmic representation of the actual sound pressure variations. Therefore, a 26 percent change in the energy level only changes the sound level one-dB. The human ear would not detect this change except in an acoustical laboratory. A doubling of the energy level would result in a three-dB increase, which would be barely perceptible in the natural environment. A tripling in energy sound level would result in a clearly noticeable change of five-dB in the sound level. A change of ten times the energy level would result in a ten-dB change in the sound level. This would be perceived as a doubling (or halving) of the apparent loudness.

The human ear has a non-linear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The "A" weighting scale is widely used in environmental work because it closely resembles the non-linearity of human hearing. Therefore, the unit of measurement for an A-weighted noise level is dBA.

Traffic noise is not constant. It varies as each vehicle passes through a certain location. The time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure. In an urban environment, noise is made up of two distinct parts. One is ambient or background noise. Wind noise and distant traffic noise make up the acoustical environment surrounding the project. These sounds are not readily recognized but combine to produce a non-irritating ambient sound level. This background sound level varies throughout the day, being lowest at night and highest during the day. The other component of urban noise is intermittent and louder than the background noise. Transportation noise and local industrial noise are examples of this type of noise. It is for these reasons that environmental noise is analyzed statistically.

The statistical descriptor used for traffic noise is L_{eq}. L_{eq} is the constant, average sound level, which over a period of time contains the same amount of sound energy as the varying levels of the traffic noise. The L_{eq} correlates reasonably well with the effects of noise on people. It is also easily measurable with integrating sound level meters. The time period for traffic noise is 1-hour. Therefore, the unit of measure for traffic noise is L_{eq}(1h) dBA.

Highway noise sources have been divided into five types of vehicles; automobiles, medium trucks, heavy trucks, buses and motorcycles. Each vehicle type is defined as follows[2]:

- Automobiles – all vehicles with two axles and four tires, includes passenger vehicles and light trucks, less than 10,000 pounds.
- Medium trucks – all vehicles having two axles and six tires, vehicle weight between 10,000 and 26,000 pounds.
- Heavy trucks – all vehicles having three or more axles, vehicle weight greater than 26,000 pounds.
- Buses – all vehicles designed to carry more than nine passengers.
- Motorcycles – all vehicles with two or three tires and an open-air driver/passenger compartment.

Noise levels produced by highway vehicles can be attributed to three major categories:

- Running gear and accessories (tires, drive train, fan and other auxiliary equipment)
- Engine (intake and exhaust noise, radiation from engine casing)
- Aerodynamic and body noise

Tire sound levels increase with vehicle speed but also depend upon road surface, vehicle weight, tread design and wear. Change in any of these can vary noise levels. At lower speeds, especially in trucks and buses, the dominant noise source is the engine and related accessories.

Noise Model and Analysis

The FHWA's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* is presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772). This regulation, plus other guidance documents written to explain the regulation, sets forth the process for performing a traffic noise analysis. The process includes the following:

- Identify existing and proposed land uses in the study area;
- Determine existing noise levels:
    - through modeling, and
    - noise measurements with concurrent classification counts of vehicles passing the noise monitoring site;
- Validate predicted noise levels through comparison between measured and predicted levels;
- Model future design year traffic noise levels which will yield the worst hourly traffic noise on a regular basis (design hour noise levels);

[2] G.S. Anderson, C.S.Y. Lee, G.G. Fleming and C. Menge, "FHWA Traffic Noise Model®, Version 1.0 User's Guide", Federal Highway Administration, January 1998, p.60.

- Identify locations that would be exposed to a noise impact based upon the Noise Abatement Criteria (NAC) as presented in Table 1;
- Model noise abatement measures to mitigate the predicted design year traffic noise impacts; and
- Modeling must be performed with FHWA's most recent version of the Traffic Noise Model® (TNM).

INDOT's Traffic Noise Analysis Procedure is the state's tool for implementing 23 CFR 772. The NAC, which is presented in 23 CFR 772, establishes the noise abatement criteria for various land uses. The noise level descriptor used is the equivalent sound level, L_{eq}, defined as the steady state sound level which, in a stated time period (usually one hour), contains the same sound energy as the actual time-varying sound.

Noise abatement measures will be considered when the predicted noise levels approach or exceed those values shown for the appropriate activity category in Table 1, or when the predicted traffic noise levels substantially exceed the existing noise levels. INDOT has defined the approach value to be within 1.0 dBA of the appropriate NAC[3] as shown in Table 1. INDOT has defined an increase in noise levels for which the future noise levels exceed the existing noise by 15.0 dBA as substantial.

TNM® is FHWA's "computer program for highway traffic noise prediction and analysis."[4] The following parameters are used in this model to calculate an hourly L_{eq}(1h) at a specific receiver location:

- Distance between roadway and receiver;
- Relative elevations of roadway and receiver;
- Hourly traffic volume in light-duty (two axles, four tires), medium-duty (two axles, six tires), and heavy-duty (three or more axles) vehicles;
- Vehicle speed;
- Ground absorption; and
- Topographic features, including retaining walls and berms.

The I-65 Added Travel Lanes project study area consists of residential (NAC B), non-sensitive commercial (NAC F), recreational (NAC C), institutional (NAC C), and agricultural and industrial (NAC F) land uses. The criteria stated in Table 1 will help to determine if the proposed project will produce noise levels that approach or exceed the NAC throughout the corridor.

[3] "Traffic Noise Analysis Procedure", Indiana Department of Transportation, 2017, Page 3 of 10.
[4] "FHWA Traffic Noise Model®, Version 1.0 Users Guide", Report Documentation Page.

Table 1: Noise Abatement Criteria (NAC) Hourly A-Weighted Sound Level-Decibels (dBA)

Activity Category	Activity Criteria L_{eq}(1h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	Exterior	Residential
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	N/A	N/A	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	N/A	N/A	Undeveloped lands that are not permitted.

Source: 23 CFR Part 772

3.0 NOISE MEASUREMENTS

Existing noise level measurements were conducted on July 27, 2020 at three representative sites in the project corridor. A 20-minute measurement was taken at each site. The measurements were made in accordance with FHWA and INDOT guidelines using a Larson Davis LXT integrating sound level analyzer meeting ANSI and IEC Type 1 specifications. Traffic classification counts were taken concurrently with the noise measurements. The data collected at the three sites is presented in Table 2. The noise measurement sites, FM1 through FM3 are shown on Figures 2C, 2F, and 2J in Appendix A. The field data sheets are presented in Appendix B and the sound level analyzer laboratory calibration certificates are presented in Appendix C of this report.

Table 2: Field Measurements
Tippecanoe County, Indiana

Field Site #	Figure #	Date	Start Time	Duration	Traffic[1)*]							Noise Level, dBA L_{eq}(1h)
					Roadway	A[a]	MT[b]	HT[c]	MC[d]	Buses[e]	Speed mph	
FM1	2C	07/27/2020	10:40pm	20:00	I-65 SB	660	78	306	3	0	72	65.6
					I-65 NB	792	63	210	3	0	72	
FM2	2F	07/27/2020	11:34am	20:00	I-65 SB	759	54	348	0	0	72	65.6
					I-65 NB	588	63	414	3	0	72	
FM3	2J	07/27/2020	12:47pm	20:00	I-65 SB	822	90	426	0	0	72	72.0
					I-65 NB	660	72	348	3	0	72	

1) Vehicle counts classified as follows:
   a. Autos (A) defined as vehicles with 2-axles and 4-tires.
   b. Medium trucks (MT) defined as vehicles with 2-axles and 6-tires.
   c. Heavy trucks (HT) defined as vehicles with 3 or more axles.
   d. Motorcycle (MC) defined as vehicles with two or three-wheeled motorized vehicles.
   e. Buses defined as vehicles carrying more than 9 passengers.

2) Traffic counts shown represent a proration to 60-minute duration for model validation (L_{eq}(1h))
   Source: HNTB Corporation, July 2020

Measured vs. Modeled

TNM® 2.5 was used to validate the predicted noise levels through comparison with the measured and predicted noise levels. Traffic was counted and classified concurrently during the noise measurement by vehicle type: cars, medium trucks, heavy trucks, and buses. During the field measurements the skies were overcast, the temperatures ranged from 84 to 88 degrees F and the winds were from the SW at 6 to 8 mph. The traffic data from these three sites were used in the model. Results for these three field sites modeled were within 3 dBA of the measured levels. The model is considered to be validated since all of the field measurements were within 3 dBA of the predicted value.

Table 3: Comparison of Measured and Modeled Noise Levels
I-65 Added Travel Lanes
Tippecanoe, Indiana

Field Site	Figure #	Noise Level, dBA L_{eq}(1h)		Difference in Noise Level, dBA L_{eq}(1h) (Modeled Minus Measured)
		Measured	Modeled	
FM1	2C	65.6	68.6	-3
FM2	2F	65.6	67.1	-1.5
FM3	2J	72.0	74.2	-2.2

Source: HNTB Corporation, July 2020

4.0 NOISE MODELING

The latest version of the FHWA's Traffic Noise Model, TNM®2.5, was used to model existing (2020) and design year (2044) worst hourly traffic noise levels within the I-65 study area. Modeling limits were determined by the construction limits of the project. Modeled roadway segments were constrained to the project limits. Receivers were modeled where these limits would produce meaningful results, following FHWA's 8:1 (roadway length: receiver distance from edge of pavement) recommendation. Roadway segments were modeled to match these extents. Upon establishing these modeling limits, receivers were placed where accurate modeling results could be obtained. Because some impacts were identified 500 feet beyond the nearest edge of pavement, per INDOT's Traffic Noise Analysis Procedure noise impacts were modeled to a distance of 800 feet. Fifty-eight (58) noise receivers representing eighty (80) receptors were modeled in the Existing and No Build conditions. Noise receivers are shown in Appendix A.

Two NAC Category C land uses (places of worship and recreational), R28, West Lafayette Apostolic Christian Church and R54, Wabash Heritage Trail, were identified within the project area. For these receivers, a separate algorithm was used to translate usage data into an appropriate number of receptors. For R28, 96[1] users per day was used to determine number of receptors to assign to this receiver in the noise model. The algorithm used to determine number of receptors is as follows, where:

[1] Through coordination with the West Lafayette Apostolic Church, this was based on a congregation size of 300 people meeting two days a week and a separate group of 70 people meeting 1 day per week.

Daily number of people per day = 96
Average number of people per household = 2.52
Percent of property within 500 feet = 60%
(96 / 2.52) * 0.60 = (22.86) = **23 receptors**

For R54, an estimated 150[2] users per day was used to determine number of receptors to assign to this receiver in the noise model. The algorithm used to determine number of receivers (receptors) is as follows, where;

Daily number of people per day = 150
Average number of people per household = 2.52
Trail segment length = 19,008 feet[3]
Trail segment within study area = 1,000 feet
Percent of trail segment within study area = 5%
(150 / 2.52) * (1,000/19,008) = (3.13) **= 4 receptors**

The results of the computer modeling are presented in Table 4.

Table 4: Design Hour Noise Levels, dBA Leq(1h)
I-65 Added Travel Lanes
Tippecanoe, Indiana

Receiver ID	Land Use	Activity Category*	Noise Abatement Criteria (NAC) Leq(1h)**	Receptors	Existing Leq(1h)	Future Leq(1h)	Increase (Future – Existing)	Impact
1	Industrial	F	--	1	60.1	63.4	3.3	N
2	Industrial	F	--	1	65.5	68.7	3.2	N
3	Agriculture	F	--	1	71.4	73.6	2.2	N
4	Single-Family Residential	B	67	1	64.9	65.8	0.8	N
5	Single-Family Residential	B	67	1	64.9	66.1	1.2	Y
6	Single-Family Residential	B	67	1	62.5	63.9	1.4	N
7	Single-Family Residential	B	67	1	60.2	61.5	1.3	N
8	Single-Family Residential	B	67	1	65.4	66.3	0.9	Y

[2] Through coordination with local officials, trail usage varies throughout the year and was estimated to be between 50 people daily with peak usage at 200 people for scheduled events.
[3] Length of segment of Wabash Heritage Trail for which daily usage is being estimated between the trail head and the Tippecanoe Battlefield, 19,008 ft = 3.6 miles

Receiver ID	Land Use	Activity Category*	Noise Abatement Criteria (NAC) Leq(1h)**	Receptors	Existing Leq(1h)	Future Leq(1h)	Increase (Future – Existing)	Impact
9	Single-Family Residential	B	67	1	65.4	67.2	1.8	Y
10	Single-Family Residential	B	67	1	63.2	64.3	1.1	N
11	Residential	B	67	1	60.9	62.4	1.5	N
12	Residential	B	67	1	62.8	63.6	0.8	N
13	Agriculture	F	--	1	70.2	71	0.8	N
14	Vacant Non-Sensitive Commercial	F	--	1	68.8	70.4	1.6	N
15	Single-Family Residential	B	67	1	60.3	61.3	1	N
16	Single-Family Residential	B	67	1	67.8	68.7	0.9	Y
17	Single-Family Residential	B	67	1	63.7	65.1	1.4	N
18	Single-Family Residential	B	67	1	64.6	65.8	1.2	N
19	Single-Family Residential	B	67	1	59.9	61.4	1.5	N
20	Single-Family Residential	B	67	1	62.1	63.4	1.3	N
21	Single-Family Residential	B	67	1	58.6	59.5	0.9	N
22	Single-Family Residential	B	67	1	61.6	64	2.4	N
23	Single-Family Residential	B	67	1	62.3	64.9	2.6	N
24	Single-Family Residential	B	67	1	63.1	64.5	1.4	N

Receiver ID	Land Use	Activity Category*	Noise Abatement Criteria (NAC) Leq(1h)**	Receptors	Existing Leq(1h)	Future Leq(1h)	Increase (Future – Existing)	Impact
25	Single-Family Residential	B	67	1	65.6	67.8	2.2	Y
26	Single-Family Residential	B	67	1	68.6	69.8	1.2	Y
27	Single-Family Residential	B	67	1	60.7	64	3.3	N
28	Institutional	C	67	23	59.5	61.5	2	N
29	Single-Family Residential	B	67	1	65.8	68.5	2.7	Y
30	Single-Family Residential	B	67	1	64.2	67.1	2.9	Y
31	Single-Family Residential	B	67	1	66.8	69.5	2.7	Y
32	Single-Family Residential	B	67	1	70.2	72.8	2.6	Y
33	Single-Family Residential	B	67	1	73.3	74.8	1.5	Y
34	Single-Family Residential	B	67	1	72.4	74	1.6	Y
35	Single-Family Residential	B	67	1	63.8	66.5	2.7	Y
36	Single-Family Residential	B	67	1	65.7	68.8	3.1	Y
37	Single-Family Residential	B	67	1	67.3	69.8	2.5	Y
38	Single-Family Residential	B	67	1	65.7	68.6	2.9	Y
39	Single-Family Residential	B	67	1	61.9	64.4	2.5	N

Receiver ID	Land Use	Activity Category*	Noise Abatement Criteria (NAC) Leq(1h)**	Receptors	Existing Leq(1h)	Future Leq(1h)	Increase (Future – Existing)	Impact
40	Single-Family Residential	B	67	1	62.8	65.7	2.9	N
41	Single-Family Residential	B	67	1	64.3	67.3	3	Y
42	Single-Family Residential	B	67	1	70.9	72.6	1.7	Y
43	Single-Family Residential	B	67	1	61.2	64.1	2.9	N
44	Single-Family Residential	B	67	1	71.2	72.6	1.4	Y
45	Agriculture	F	--	1	68.4	69.3	0.9	N
46	Single-Family Residential	B	67	1	66.7	68.7	2	Y
47	Agriculture	F	--	1	69	70.7	1.7	N
48	Single-Family Residential	B	67	1	64.1	66.9	2.8	Y
49	Single-Family Residential	B	67	1	64.5	65.3	0.8	N
50	Single-Family Residential	B	67	1	63.8	65.7	1.9	N
51	Single-Family Residential	B	67	1	63.2	64.4	1.2	N
52	Agriculture	F	--	1	70	72.1	2.1	N
53	Agriculture	F	--	1	72	73.5	1.5	N
54-A	Wabash Heritage Trail	C	67	1	66.4	67.6	1.2	Y
54-B	Wabash Heritage Trail	C	67	1	65.2	66.6	1.4	Y
54-C	Wabash Heritage Trail	C	67	1	70.5	71.1	0.6	Y

Receiver ID	Land Use	Activity Category*	Noise Abatement Criteria (NAC) Leq(1h)**	Receptors	Existing Leq(1h)	Future Leq(1h)	Increase (Future – Existing)	Impact
54-D	Wabash Heritage Trail	C	67	1	68.4	69.2	0.8	Y
55	Single-Family Residential	B	67	1	60.9	61.3	0.4	N

* NAC Category F results are disclosed for informational purposes only
**The approach criteria for impact determination is within 1dBA of the NAC

5.0 IMPACT ASSESSMENT

Existing peak hour (2020) noise levels range from 58.6 to 73.3 dBA L_{eq}(1h). Residential noise levels ranged from 58.6 to 73.3 dBA L_{eq}(1h).

Predicted future design year (2044) noise levels adjacent to the proposed project would approach or exceed the NAC at 25 noise sensitive receptors. The noise levels would range from 59.5 to 74.8 dBA L_{eq}(1h). Noise levels at residential receivers would range from 59.5 to 74.8 dBA L_{eq}(1h).

Predicted future noise levels increase over existing noise levels range from 0.8 to 3.3 dBA. Therefore, none of the predicted future noise levels would substantially exceed existing noise levels.

6.0 NOISE ABATEMENT MEASURES

A noise analysis identifies "where noise abatement is feasible and reasonable, and locations with impacts that have no feasible or reasonable noise abatement alternatives."

Factors to be considered in determining noise abatement feasibility:

> "Acoustic Feasibility: INDOT requires that noise barriers achieve a 5dBA reduction at a majority (greater than 50%) of the impacted receptors. If a barrier cannot achieve this acoustic goal, abatement is considered to not be acoustically feasible.
>
> "Engineering Feasibility: INDOT requires noise abatement measures to be based on sound engineering practices and standards and requires that any measures be evaluated at the optimum location. For instances in which the roadway is located on fill and is at a higher location than nearby receptors, a barrier will be evaluated near the shoulder. For instances in which the roadway is located below the nearby receptors, a barrier will be evaluated near the edge of the right-of-way near the receptors. In addition, noise barriers require long, uninterrupted segments of barrier to be feasible. As such, if there are existing access points and/or driveways, it is not feasible to construct effective noise barriers for the roadway."

> "Engineering feasibility also takes into account topography, drainage, safety, barrier height, utilities, and access/maintenance needs (which may include right-of-way considerations). In situations where engineering considerations make noise barrier not feasible, the noise analysis will explicitly state the reasons (topography, drainage, safety, etc.). To be feasible, a mitigation measure must be acoustically feasible and must meet engineering requirements for constructability."

Factors to be considered in determining reasonableness:

> "To determine cost effectiveness, the estimated cost of constructing a noise barrier (including installation and additional necessary construction such as foundations or guardrails) will be divided by the number of benefited receptors (those who would receive a reduction of at least 5 dBA). A base material and design cost of $25,000 or less per benefited receiver is currently considered to be cost-effective. Development in which a majority (more than 50%) of the receptors was in place prior to the initial construction of the roadway in its current state (functional classification) will receive additional consideration for noise abatement. The cost-effectiveness criteria used for these cases will be 20% greater (currently $30,000 per benefited receptor)." The estimated construction costs of a noise barrier are based on a unit cost of $30.00 per square foot.

> "INDOT's goal for substantial noise reduction is to provide at least a 7.0 dBA reduction for benefited first row receptors in the design year. However, conflicts with adjacent lands may make it impossible to achieve substantial noise reduction at all impacted first row receptors. Therefore, the noise reduction design goal for Indiana is 7dBA for a majority (greater than 50%) of the impacted first row receptors."

> "Consideration and Obtaining Views of Residents and Property Owners." "A survey will be mailed to each benefited resident. If the property owner is different from the current resident, both the resident and the property owners are surveyed. The concerns and opinions of the property owner and the unit occupants will be balanced with other considerations in determining whether a barrier is appropriate for a given location."

Nine (9) noise barriers were modeled in the study area. The results of these analyses are summarized in Table 5.

Table 5: Noise Barrier Summary
I-65 Added Travel Lanes
Tippecanoe, Indiana

Noise Barrier	Receivers	Feasible	Meets Design Goal	Benefited Receptors	Length (ft)	Height (ft)	Square Footage (Sq ft)	Estimated Barrier Cost	Cost per Benefited Receptor @ $30/sq. ft	Cost Threshold	Reasonable
NB1	R5, R6, R7, R54-A, R54-B	Yes	Yes	2	1,116	6-12	12,011	$360,330	$180,165	$25,000	No
NB2	R16, R17, R18, R19, R20, R21	Yes	No	1	829	30	24,884	$746,520	$746,520	$25,000	No
NB3	R25, R26	No	No	0	556	30	16,674	$500,220	--	$25,000	No
NB4	R34, R36, R38, R39, R40, R41, R42, R44, R45	Yes	Yes	3	1,308	12-18	20,365	$610,950	$203,650	$25,000	No
NB5	R46, R48, R49, R50	Yes	No	1	1,016	30	30,493	$914,790	$914,790	$25,000	No
SB1	R29, R30, R31, R32, R33, R35, R37, R43	Yes	Yes	7	1,925	16-22	38,264	$1,147,920	$163,989	$25,000	No
SB2	R9	No	No	0	664	30	19,920	$597,600	--	$25,000	No
SB3	R8	No	No	0	857	12-30	22,441	$673,230	--	$25,000	No
SB4	R4, R54-C, R54-D	Yes	No	1	650	12-30	12,262	$367,860	$367,860	$25,000	No

NB1 would be considered a feasible abatement measure and would achieve INDOT's design goal for the first row impacted receptors; however, NB 1 would exceed the maximum allowable cost of $25,000 per benefited receptor. Consequently, NB1 was found to not be reasonable.

While NB2 would be considered a feasible abatement measure, it would not achieve INDOT's design goal for any of the impacted receptors and would exceed the maximum allowable cost of $25,000 per benefited receptor; therefore, NB2 was found to not be reasonable.

Due to the distance of the impacted receivers from the roadway, NB3 could not achieve a 5 dBA reduction at any of the impacted receptors; therefore, NB3 was found to not be feasible or reasonable.

While NB4 would be considered a feasible abatement measure and would achieve INDOT's design goal, it would exceed the maximum allowable cost of $25,000 per benefited receptor; therefore, NB4 was found to not be reasonable.

While NB5 would be considered a feasible abatement measure, it would not achieve INDOT's design goal for any of the impacted receptors and would exceed the maximum allowable cost of $25,000 per benefited receptor; therefore, NB5 was found to not be reasonable.

While SB1 would be considered a feasible abatement measure and would achieve INDOT's design goal, it would exceed the maximum allowable cost of $25,000 per benefited receptor; therefore, SB1 was found to not be reasonable.

Due to the distance of the impacted receivers from the roadway, SB2 could not achieve a 5 dBA reduction at any of the impacted receptors; therefore, SB2 was found to not be feasible or reasonable.

Due to the distance of the impacted receivers from the roadway, SB3 could not achieve a 5 dBA reduction at any of the impacted receptors; therefore, SB3 was found to not be feasible or reasonable.

While SB4 would be considered a feasible abatement measure, SB4 could not achieve a 7 dBA reduction at any of the impacted receptors; therefore, SB4 was found to not be reasonable.

7.0 UNDEVELOPED LANDS

The distances to 66 dB(A) $L_{eq}(1h)$ noise level contour, which vary along the study area, were developed to assist local planning authorities in developing land use control over the remaining undeveloped lands within the study area to prevent development of incompatible land use. The data in Table 6 below provides information to aid local officials with jurisdiction over properties in proximity to the project. Large undeveloped lands without permitted/anticipated future development along the project corridor were modeled at 50-feet (from the nearest edge of pavement), 100 feet, and then 100-foot intervals. Given the similarities in local topography and traffic volumes utilized in the analysis, two study area groups, Study Areas A and B, were identified and are considered representative of the project corridor. Study Areas A and B were evaluated on the east and west sides of I-65, respectively. It is recommended that any future development proposed around the project be modeled with accurate survey data to avoid creating incompatible land uses adjacent to the project. Highlighted cells indicate an

approximate distance from the roadway noise source where noise levels are predicted to be lower than the residential NAC.

Table 6: Estimated Noise for Undeveloped Lands
I-65 Added Travel Lanes Project
Tippecanoe County, IN

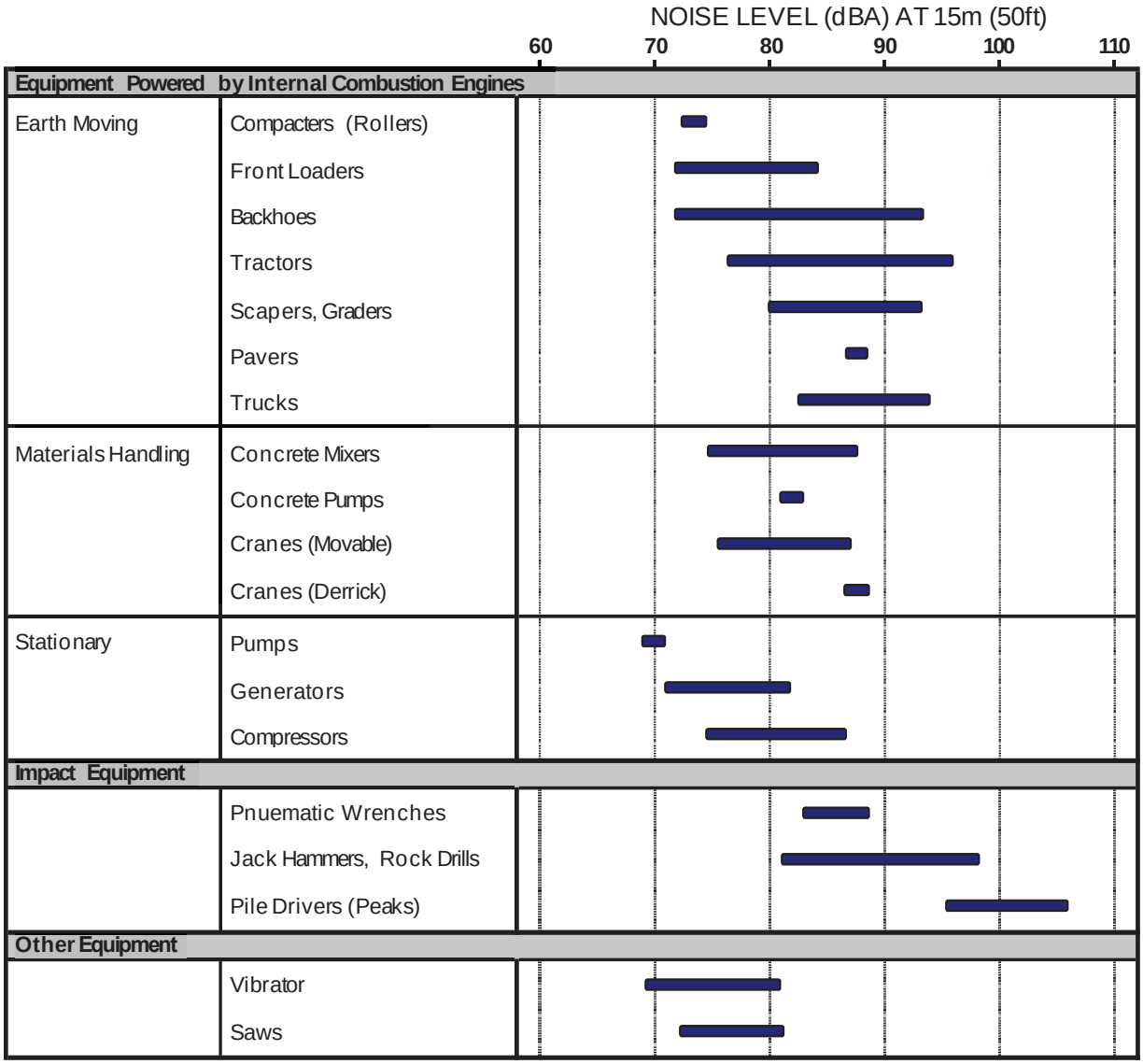
Study Area	50 feet	100 feet	200 feet	300 feet	400 feet	500 feet	600 feet	700 feet	800 feet
A	75.9	74.5	73.7	71.2	68.9	67.1	65.5	64.1	63.1
B	73.5	72.2	70.2	70	67.8	66	64.5	63.1	61.6

8.0 CONSTRUCTION NOISE

In addition to noise from traffic, construction activities themselves can produce increased noise of a temporary nature. INDOT will be sensitive to local needs and may make adjustments to work practices in order to reduce inconvenience to the public.

The major construction elements of this project are expected to be demolition, hauling, grading, paving, and bridge construction. Construction of the proposed improvements will result in a temporary increase in the ambient noise level within the study area. General construction noise impacts for passerby and those individuals living or working near the project can be expected particularly from demolition, earth moving, pile driving, and paving operations. Equipment associated with construction generally includes backhoes, graders, pavers, concrete trucks, compressors, and other miscellaneous heavy equipment. Table 7 lists some typical peak operating noise levels at a distance of 15 m (50 feet), grouping construction equipment according to mobility and operating characteristics. Considering the relatively short-term nature of construction noise, impacts are not expected to be substantial. The transmission loss characteristics of nearby structures are believed to be sufficient to moderate the effects of intrusive construction noise.

Table 7: Construction Equipment Sound Levels



SOURCE: U.S. Report to the President and Congress on Noise, February, 1972.

9.0 CONCLUSION

Based on the studies completed to date, the State of Indiana has identified twenty-five (25) impacted receptors and has determined that noise abatement is not likely at these locations. Noise abatement measures that were studied at these locations were based upon preliminary design costs and design criteria. Three barriers, NB1, NB4, and SB1, would be considered feasible abatement measures and would achieve INDOT's design goal for the first row impacted receptors. However, these barriers would exceed the maximum allowable cost of $25,000 per benefited receptor. Barriers NB2, NB5, and SB4 would be considered feasible abatement measures but would not achieve INDOT's design goal for any impacted receptors and would exceed the maximum allowable cost of $25,000 per benefited receptor. Barriers NB3, SB2, and SB3 would not achieve a 5 dBA reduction at any of the impacted receptors; therefore, these barriers would not be considered feasible or reasonable. A re-evaluation of the noise analysis will occur during final design. If during final design it has been determined that conditions have changed such that noise abatement is feasible and reasonable, the abatement measures might be provided. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes.

10.0 REFERENCES

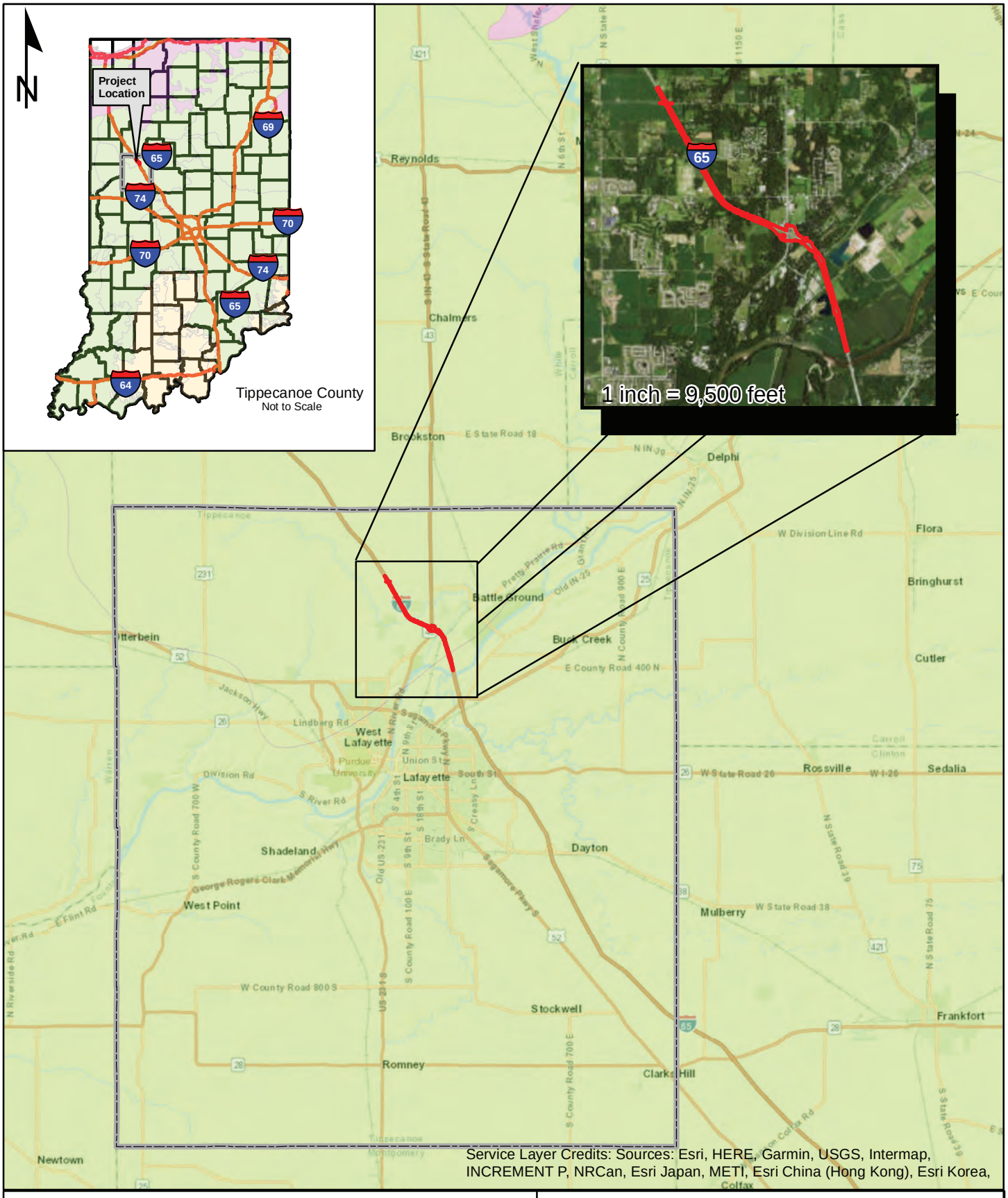
Anderson, G. S., C.S.Y. Lee, G.G. Fleming and C. Menge, "FHWA Traffic Noise Model®, Version 1.0 User's Guide", Federal Highway Administration, January 1998, p. 60.

Lau, Michael C., Cynthia S. Y. Lee, Gregg G. Judith L. Rochat, Eric R. Boeker, and Gregg C. Fleming. FHWA Traffic Noise Model® Users Guide (Version 2.5 Addendum). Federal Highway Administration, April 2004.

"PART 772 - PROCEDURES FOR ABATEMENT OF HIGHWAY TRAFFIC NOISE AND CONSTRUCTION NOISE, FHWA, 2010.
https://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0772.htm

"Traffic Noise Analysis Procedure", Indiana Department of Transportation's, 2017.
http://www.in.gov/indot/files/2017%20INDOT%20Noise%20Policy.pdf

APPENDIX A
Modeling and Measurement Locations



Project Area

Tippecanoe County

NRCS Land Resource Regions

Northeast and Northcentral

Midwest

Eastern Mountains and Piedmont

0 2.5 5 Miles

Project Location Map

I-65 Added Travel Lanes Project

Tippecanoe County, Indiana

Des. No. 2001172

1 inch = 5 miles

Graphics created by HNTB Corporation (2020)

Figure 2A- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Figure 2B- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Des. No. 2001172

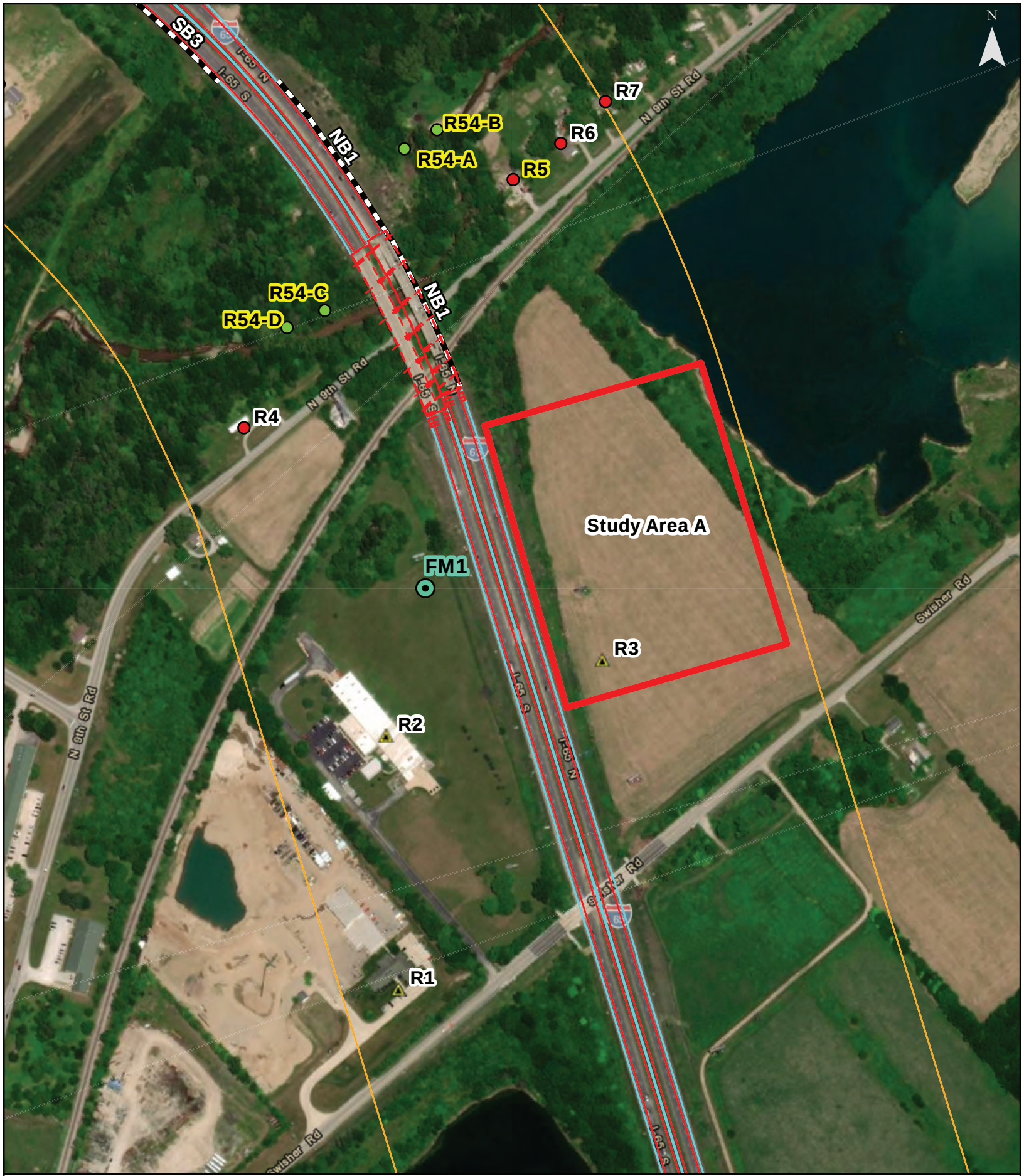


Figure 2C- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Des. No. 2001172

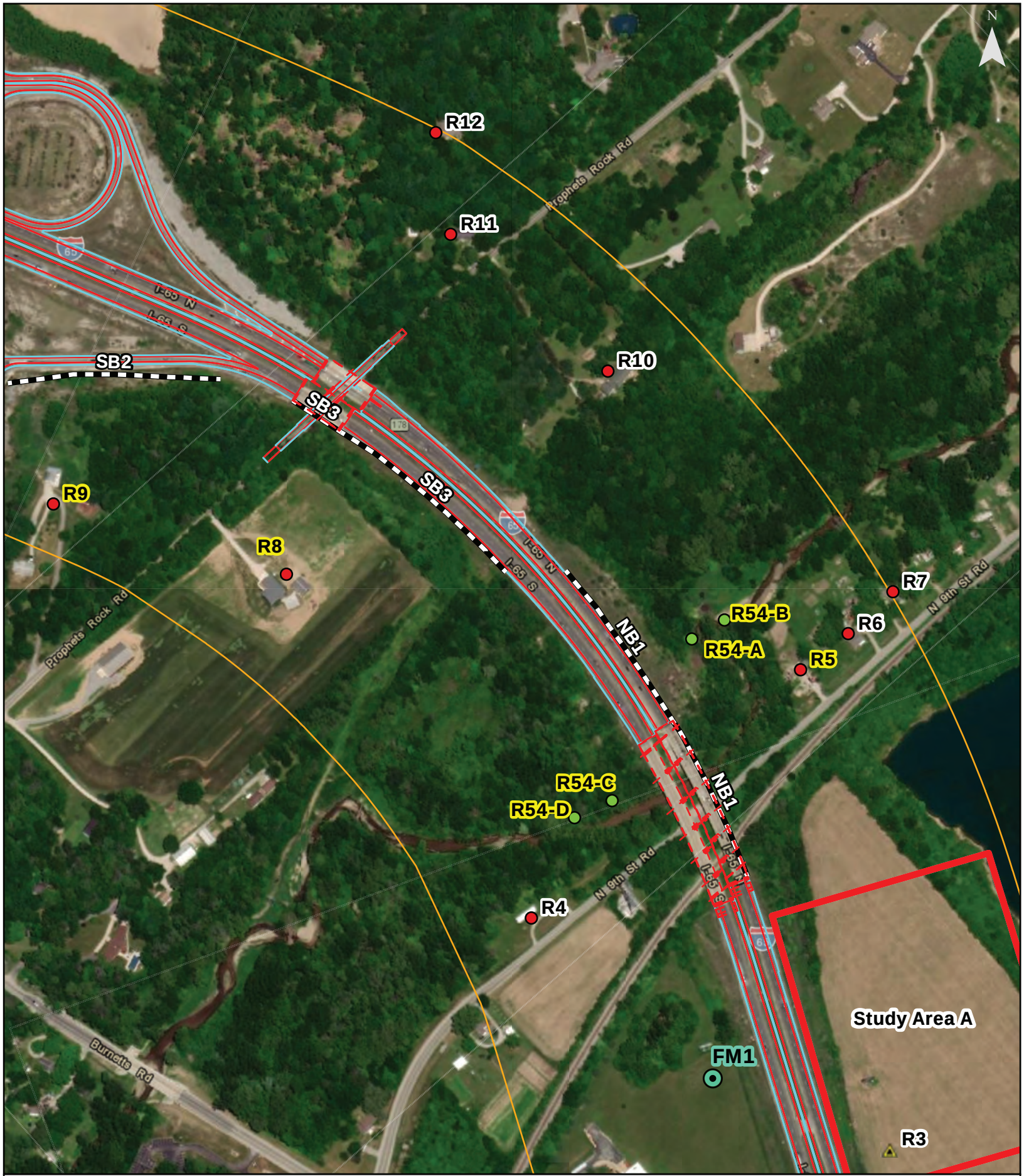


Figure 2D- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Des. No. 2001172

Figure 2E- Receivers

- Category B
- Category C
- Category F
- Field Measurement (FM)
- # Impacted

- Not Reasonable and Feasible
- Pavement Edge
- Shoulder Edge
- Bridge
- 800 Ft. Buffer
- Study Area

0 130 260 520 780 Feet

Des. No. 2001172

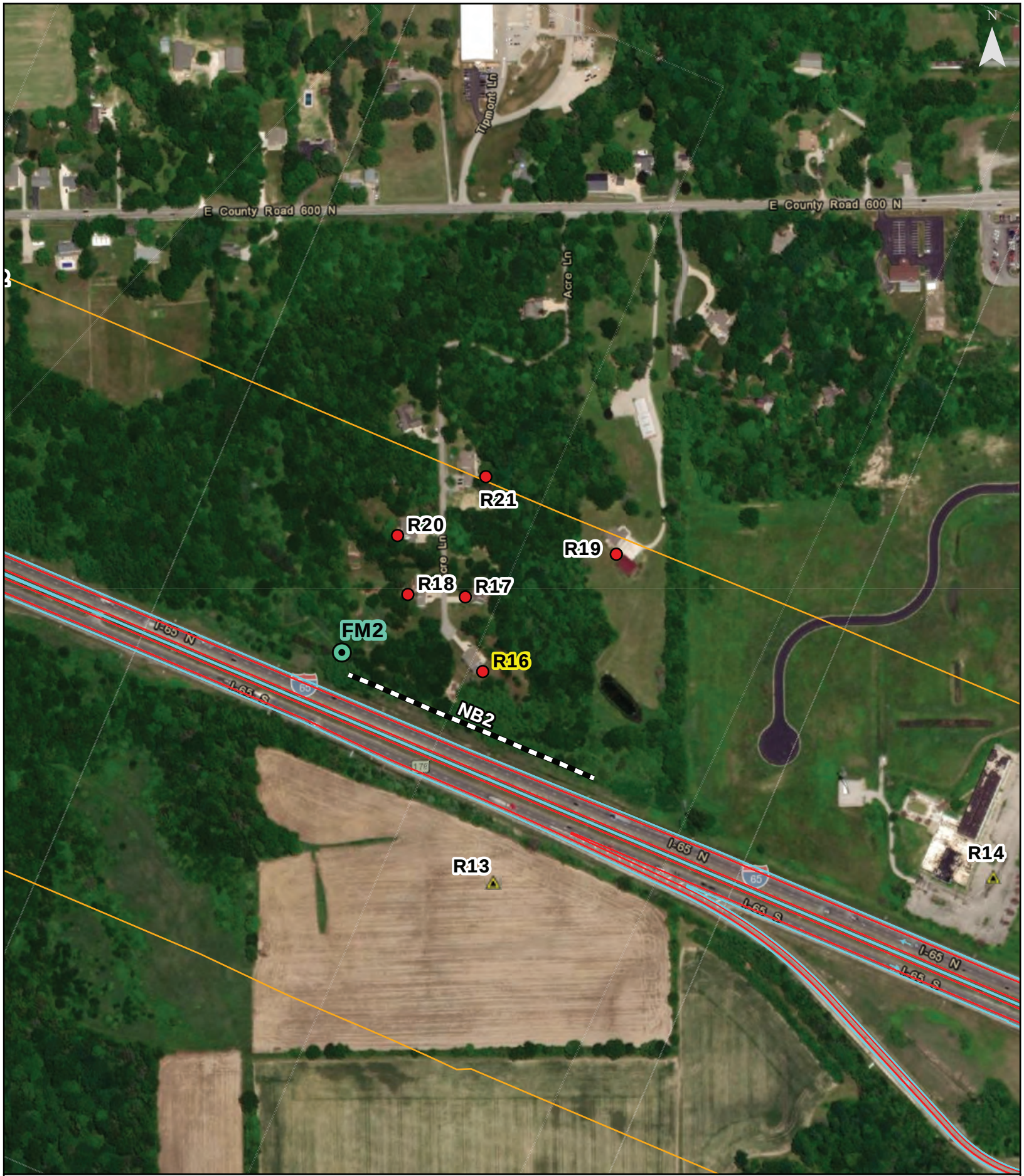


Figure 2F- Receivers

0 130 260 520 780 Feet

Des. No. 2001172

- Category B
- Category C
- Category F
- Field Measurement (FM)
- # Impacted
- Not Reasonable and Feasible
- Pavement Edge
- Shoulder Edge
- Bridge
- 800 Ft. Buffer
- Study Area

Figure 2G- Receivers

- Category B
- Category C
- Category F
- Field Measurement (FM)
- Impacted
- Not Reasonable and Feasible
- Pavement Edge
- Shoulder Edge
- Bridge
- 800 Ft. Buffer
- Study Area

0 130 260 520 780 Feet

Des. No. 2001172

Figure 2H- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Des. No. 2001172

Figure 21- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Des. No. 2001172

Figure 2J- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Figure 2K- Receivers

Category B
Category C
Category F
Field Measurement (FM)
Impacted

Not Reasonable and Feasible
Pavement Edge
Shoulder Edge
Bridge
800 Ft. Buffer
Study Area

0 130 260 520 780 Feet

Des. No. 2001172

Figure 2L- Receivers

- Category B
- Category C
- Category F
- Field Measurement (FM)
- Impacted
- Not Reasonable and Feasible
- Pavement Edge
- Shoulder Edge
- Bridge
- 800 Ft. Buffer
- Study Area

0 130 260 520 780 Feet

Des. No. 2001172

From:	Miller, Brandon
To:	Kia Gillette
Cc:	Ahmed, Arshad; Bales, Ronald
Subject:	Des No 2001172 and 2100049, I-65 Added Travel Lanes project, Tippecanoe County, Indiana (Noise Report)
Date:	Monday, March 15, 2021 3:46:19 PM
Attachments:	image001.png image002.png image003.png image004.png

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A traffic noise analysis report was completed by HNTB Corporation in January 2021 to evaluate potential traffic noise impacts for the proposed I-65 added travel lane project in Tippecanoe County, Indiana. Traffic noise was evaluated at all receptors within 500 feet of edge of pavement. Impacts were identified at the 500 foot mark and as a result, per the 2017 Indiana Department of Transportation's (INDOT) *Traffic Noise Analysis Procedure*, the distance was extended to 800 feet from the edge of pavement. Traffic noise levels were evaluated for the existing (2020) and projected (2044) traffic volumes for the build alternative.

This report evaluated potential noise impacts for the proposed improvements for the I-65 added travel lanes project in compliance with the Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise as presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772) and the INDOT *Traffic Noise Analysis Procedure* (2017).

Existing modeled (2020) peak hour noise levels ranged from 58.6 to 73.3 dBA. Predicted design year (2044) noise levels would approach or exceed the Noise Abatement Criteria (NAC) at twenty-five (25) noise sensitive receptors resulting in the need to evaluate noise abatement. Noise abatement was analyzed, however, no noise barrier met both the feasibility and reasonableness criterion established by the INDOT *Traffic Noise Analysis Procedure* (2017).

Based on the studies thus far accomplished, the State of Indiana has not identified any locations where noise abatement is likely. A reevaluation of the noise analysis will occur during final design. If during final design it has been determined that conditions have changed such that noise abatement is feasible and reasonable, the abatement measures might be provided. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement process.

This email will serve as INDOT's approval of the traffic noise analysis report for the proposed I-65 added travel lane project (Des 2001172 and 2100049)

Brandon Miller
NEPA Team Lead
INDOT Environmental Services Division
100 N. Senate Ave., Rm. N758-ES
Indianapolis, IN 46204
New Work Cell Number: (317) 439-7500

From:	Grant Heinold
To:	Kia Gillette
Subject:	Re: Comment regarding Des. No. 2001172
Date:	Wednesday, January 13, 2021 2:56:14 PM

Kia,

We've had a few outdoor events in the yard such as wedding receptions and Vacation Bible School activities, but these are infrequent. Wedding receptions outside would be probably 1-2/year with 200-300 people. VBS is one week (5 days) per year with ~150 people.

Thank you,
Grant

On Wed, Jan 13, 2021 at 2:14 PM Kia Gillette <kgillette@hntb.com> wrote:

> Grant,
>
> I apologize. I do have another question. Does the church use the field to the east and south of the building for any outdoor events? If so, approximately how often would these occur and how many people would attend? This can just be your best guess. I realize you likely don't have exact numbers.
>
> Thanks,
>
> Kia
>
> **Kia Gillette**
>
> Environmental Project Manager
>
> **Email** kgillette@hntb.com
>
> **From:** Grant Heinold <gheinold@gmail.com>
> **Sent:** Tuesday, January 12, 2021 2:28 PM
> **To:** Kia Gillette <kgillette@HNTB.com>
> **Subject:** Re: Comment regarding Des. No. 2001172
>
> Kia,
>
> That estimate is accurate for our church services. There are various other small groups that

use the building, but the only one of significance would be a home-school group. They have 70 people and use the building 1 day/week.

Thanks again,

Grant

On Tue, Jan 12, 2021 at 1:25 PM Kia Gillette <kgillette@hntb.com> wrote:

> Hi Grant,
>
> I wanted to let you know we are working the I-65 project noise analysis. The church is considered in the noise analysis and predicted noise values are modeled for that location. Do you happen to know the average number of people who would use the church on a daily basis? We estimated a congregation size of 300 based on the size and number of pews in the sanctuary, and assumed 2 days a week based on the normal service schedule (from information on the website). Does that sound appropriate? I know it could likely vary week by week, so we are looking for an average estimate.
>
> Thanks,
>
> Kia
>
> **Kia Gillette**
>
> Environmental Project Manager
>
> **Email** kgillette@hntb.com
>
> **From:** Grant Heinold <gheinold@gmail.com>
> **Sent:** Monday, July 27, 2020 10:01 AM
> **To:** Kia Gillette <kgillette@HNTB.com>
> **Subject:** Re: Comment regarding Des. No. 2001172
>
> Thanks, Kia.

From:	Wade Garriott
To:	Allen Nail; Kia Gillette
Subject:	Re: I-65 Added Travel Lanes Project - Wabash-Heritage Trail use numbers?
Date:	Wednesday, January 13, 2021 8:49:16 AM
Attachments:	image001.png image002.png image003.png image004.png

Reaching 200 people would only be if an event was to take place. During the winter months less than 50. Summer may be around 100 or so a day at most.

Wade Garriott

From: Allen Nail <anail@tippecanoe.in.gov>
Sent: Tuesday, January 12, 2021 3:11:05 PM
To: Kia Gillette <kgillette@HNTB.com>; Wade Garriott <wgarriott@tippecanoe.in.gov>
Subject: Re: I-65 Added Travel Lanes Project - Wabash-Heritage Trail use numbers?

Kia,

I'll defer to Wade, but the numbers vary greatly by season and even weekdays vs weekends. There are some scheduled events like Wabash River Runners Club which would push the 200 level by themselves, but as an average I would guess less than the 200 threshold, considerably less in cold/wet weather or times of high water levels on Burnett's Creek.
Wade?

Best Regards,
Allen

From: Kia Gillette <kgillette@HNTB.com>
Sent: Tuesday, January 12, 2021 1:47 PM
To: Allen Nail <anail@tippecanoe.in.gov>; Wade Garriott <wgarriott@tippecanoe.in.gov>
Subject: I-65 Added Travel Lanes Project - Wabash-Heritage Trail use numbers?

Hi Allen and Wade,

As part of the I-65 Added Travel Lanes Project noise analysis, the Wabash-Heritage Trail is considered a noise receptor and noise values are predicted there in the noise model. Do you by chance have an estimate of the daily users of the trail in the vicinity of the I-65 bridge? We are estimating an average of 200 people per day on the trail there, but were not sure if you had better information.

Please let me know if you have questions.

Thanks,
Kia

POVERTY STATUS IN THE PAST 12 MONTHS BY SEX BY AGE

TABLE ID: B17001
SURVEY/PROGRAM American Community Survey
PRODUCT: ACS 5-Year Estimates Detailed Tables

Note: The table shown may have been modified by user selections. Some information may be missing.

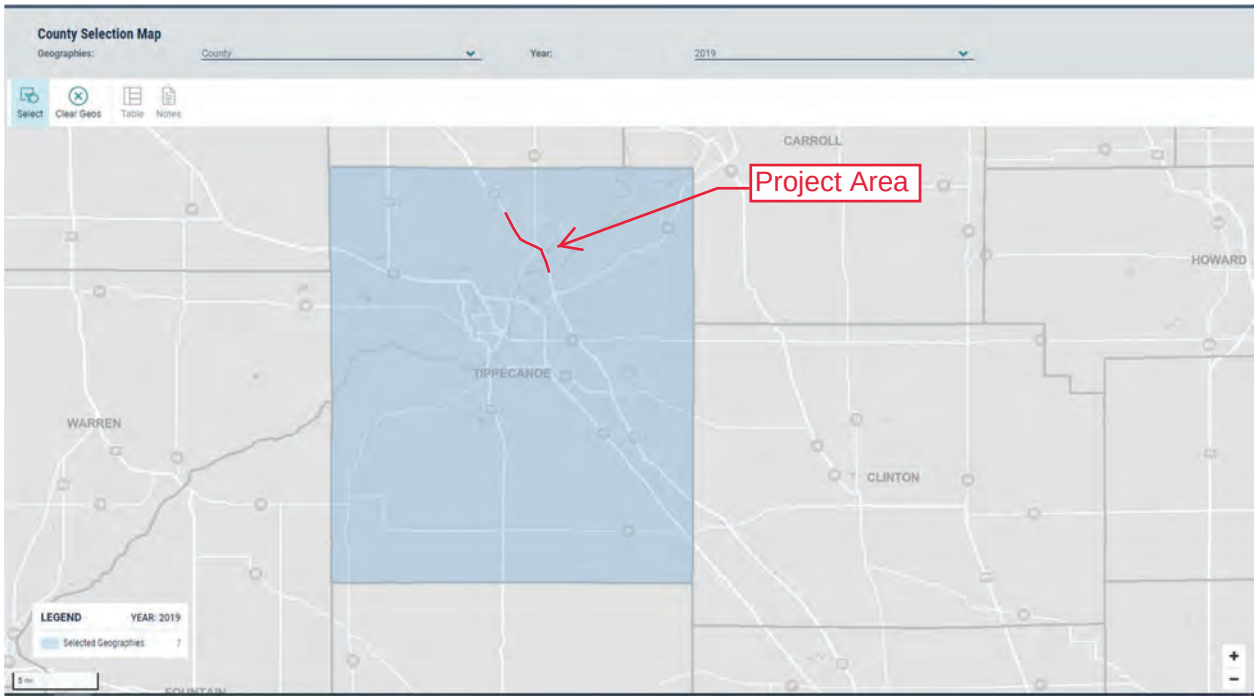
	Tippecanoe County, Indiana	Census Tract 101, Tippecanoe County, Indiana	Census Tract 102.01, Tippecanoe County, Indiana	Census Tract 102.03, Tippecanoe County, Indiana
Label	**Estimate**	**Estimate**	**Estimate**	**Estimate**
Total:	172,972	6,175	5,181	10,211
Income in the past 12 months below poverty level:	35,639	384	485	2,632
	20.60	6.22	9.36	25.78
125% COC	25.75	AC < 125% COC	AC < 125% COC	AC > 125% COC
EJ Community		No	No	Yes

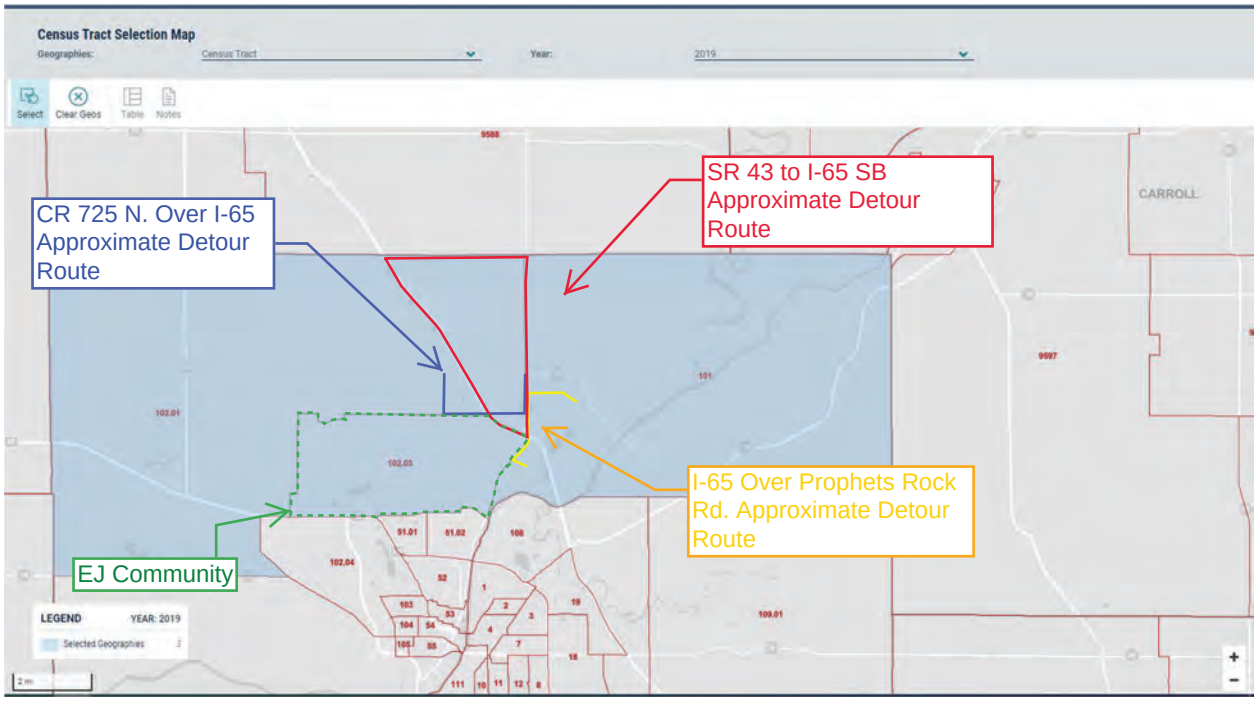
HISPANIC OR LATINO ORIGIN BY RACE

TABLE ID: B03002
SURVEY/PROGRAM American Community Survey
PRODUCT: ACS 5-Year Estimates Detailed Tables

Note: The table shown may have been modified by user selections. Some information may be missing.

	Tippecanoe County, Indiana	Census Tract 101, Tippecanoe County, Indiana	Census Tract 102.01, Tippecanoe County, Indiana	Census Tract 102.03, Tippecanoe County, Indiana
Label	**Estimate**	**Estimate**	**Estimate**	**Estimate**
Total:	191,553	6,064	5,224	10,907
Not Hispanic or Latino:	175,605	5,946	5,043	10,094
White alone	145,252	5,839	4,914	7,100
Percent Minority	24.17	3.71	5.93	34.90
125% COC	30.21	AC < 125% COC	AC < 125% COC	AC > 125% COC
EJ Community		No	No	Yes


County Selection Map
Geographies:
County
Year:
2019
Select
Clear Geos
Table
Notes
CARROLL
Project Area
HOWARD
TIPPECANOE
WARREN
CLINTON
LEGEND
YEAR: 2019
Selected Geographies


Census Tract Selection Map
Geographies:
Census Tract
Year:
2019
Select
Clear Geos
Table
Notes
CR 725 N. Over I-65 Approximate Detour Route
SR 43 to I-65 SB Approximate Detour Route
I-65 Over Prophets Rock Rd. Approximate Detour Route
EJ Community
CARROLL
LEGEND
YEAR: 2019
Selected Geographies

Land and Water Conservation Fund (LWCF) County Property List for Indiana (Last Updated July 2020)

ProjectNumber	SubProjectCode	County	Property
1800028	1800028	Tippecanoe	Tippecanoe County Fairgrounds
1800101	1800101	Tippecanoe	Wabash River Park - McAllister Park
1800101.2	1800101.2	Tippecanoe	South Tipp Park
1800115	1800115	Tippecanoe	Wabash River Golf Course - McAllister Park
1800121	1800121	Tippecanoe	Tapawingo Park
1800155	1800155	Tippecanoe	Happy Hollow Park
1800256	1800256	Tippecanoe	Tommy Johnston Park
1800275	1800275	Tippecanoe	Tippecanoe Battlefield Park
1800279	1800279	Tippecanoe	Hanna Park
1800345	1800345	Tippecanoe	McCaw Park
1800345	1800345.1	Tippecanoe	Munger Park
1800494	1800494	Tippecanoe	Celery Bog Nature Area
1800506	1800506	Tippecanoe	Celery Bog Nature Area
1800515	1800515	Tippecanoe	Celery Bog Nature Area
1800517	1800517	Tippecanoe	Celery Bog Nature Area
1800532	1800532	Tippecanoe	Prophetstown State Park
1800532.1	1800532.1	Tippecanoe	Prophetstown State Park
1800532.2	1800532.2	Tippecanoe	Prophetstown State 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.