

US 41 and SR 352 Intersection Improvement (INDOT Des. No. 2100058)

Grant Township, Benton County, Indiana

Photographs taken on August 22, 2023



Photograph 73. View of upland SP12, upslope from Wetland E, which was taken to document RSD3 and did not meet the wetland vegetation or hydrology criteria, looking north.



Photograph 74. View of SP12 within the concave roadway swale (RSD3) and dominated by tall fescue (*Schedonorus arundinaceus*) and smooth brome (*Bromus inermis*), looking south.

US 41 and SR 352 Intersection Improvement (INDOT Des. No. 2100058)

Grant Township, Benton County, Indiana

Photographs taken on August 22, 2023



Photograph 75. View of the soil profile found at SP12 (RSD3) which met the Redox Dark Surface (F6) hydric soil indicator.



Photograph 76. View of the stormwater inlet basin within the US 41 median, north of SR 352 which captures hydrology from Wetland E.

US 41 and SR 352 Intersection Improvement (INDOT Des. No. 2100058)

Grant Township, Benton County, Indiana

Photographs taken on August 22, 2023



Photograph 77. View US 41 median roadway swale, the stormwater inlet basin (yellow arrow) and Wetland E (SP11)-upland RSD3 (TP5) transition (red arrow), north of SR 352.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP1

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S19 T24N R8W

Landform (hillside, terrace, etc.): Top Slope Terrace Local relief (concave, convex, none): None

Slope (%): 1-2 Lat: 40.521121 Long: -87.376611 Datum: WGS 84

Soil Map Unit Name: Odell silt loam, 0-2% slopes (OIA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: The Sample Point describes the mowed and maintained lawns at the top slope terraces across the investigation area.	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>) <u>Absolute % Cover</u> <u>Dominant Species?</u> <u>Indicator Status</u> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ =Total Cover	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ =Total Cover	Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>98</u> x 4 = <u>392</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>98</u> (A) <u>392</u> (B) Prevalence Index = B/A = <u>4.00</u>
<u>Herb Stratum</u> (Plot size: <u>5</u>) 1. <u>Festuca rubra</u> <u>50</u> Yes FACU 2. <u>Lolium perenne</u> <u>30</u> Yes FACU 3. <u>Poa annua</u> <u>18</u> No FACU 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ =Total Cover	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>) 1. _____ 2. _____ =Total Cover	Hydrophytic Vegetation Present? Yes _____ No <u>X</u>

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

Sample Point does not pass any test for hydrophytic indicators.

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-4	10YR 3/1	100					Loamy/Clayey	
4-12	2.5Y 4/2	70	10YR 3/1	30	C	M	Loamy/Clayey	Faint redox concentrations
12-18	2.5Y 5/2	80	10YR 3/1	20	C	M	Loamy/Clayey	Distinct redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

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

Indicators for Problematic Hydric Soils³:

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

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

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No **Remarks:**

The Sample Point does not meet any hydric soil indicator.

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)	
Surface Water (A1)	Water-Stained Leaves (B9)
High Water Table (A2)	Aquatic Fauna (B13)
Saturation (A3)	True Aquatic Plants (B14)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)
Drift Deposits (B3)	Presence of Reduced Iron (C4)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)
Iron Deposits (B5)	Thin Muck Surface (C7)
Inundation Visible on Aerial Imagery (B7)	Gauge or Well Data (D9)
Sparsely Vegetated Concave Surface (B8)	Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Stunted or Stressed Plants (D1)
Geomorphic Position (D2)
FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No

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

Remarks:

No wetland hydrology indicators were observed at the Sample Point.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP2

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S18 T24N R8W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 3-6 Lat: 40.521643 Long: -87.376306 Datum: WGS84

Soil Map Unit Name: Odell silt loam, 0-2% slopes (OIA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Hydric Soil Present? Yes <u>X</u> No _____	Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: The Sample Point represents Wetland A within the drainage swale west of US 41.			

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
1. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)
2. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
=Total Cover				
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>)	<u>20</u>	<u>Yes</u>	<u>FACW</u>	Prevalence Index worksheet: Total % Cover of: <u>20</u> Multiply by: OBL species <u>65</u> x 1 = <u>65</u>
1. <u>Salix interior</u>	_____	_____	_____	FACW species <u>50</u> x 2 = <u>100</u>
2. _____	_____	_____	_____	FAC species <u>0</u> x 3 = <u>0</u>
3. _____	_____	_____	_____	FACU species <u>0</u> x 4 = <u>0</u>
4. _____	_____	_____	_____	UPL species <u>0</u> x 5 = <u>0</u>
5. _____	_____	_____	_____	Column Totals: <u>115</u> (A) <u>165</u> (B)
=Total Cover				Prevalence Index = B/A = <u>1.43</u>
<u>Herb Stratum</u> (Plot size: <u>5</u>)	<u>65</u>	<u>Yes</u>	<u>OBL</u>	Hydrophytic Vegetation Indicators:
1. <u>Typha angustifolia</u>	_____	_____	_____	X 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Salix interior</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>	X 2 - Dominance Test is >50%
3. _____	_____	_____	_____	X 3 - Prevalence Index is $\leq 3.0^1$
4. _____	_____	_____	_____	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. _____	_____	_____	_____	Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
=Total Cover				
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>)	<u>95</u>			
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
=Total Cover				
Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____		

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

The Sample Point passes the Rapid Test, Dominance Test and Prevalence Index for hydrophytic vegetation.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023Applicant/Owner: INDOT State: IN Sampling Point: SP3Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S18 T24N R8WLandform (hillside, terrace, etc.): Toe Slope Local relief (concave, convex, none): ConcaveSlope (%): 4-6 Lat: 40.523566 Long: -87.376478 Datum: WGS84Soil Map Unit Name: Chalmers silty clay loam (Ch) NWI classification: NoneAre climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes <u>X</u> No _____	
<p>Remarks: The Sample Point represents the maintained roadway slope upslope from Wetland A</p>	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
1. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)
2. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50.0%</u> (A/B)
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
=Total Cover				
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>)	10	Yes	FAC	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____
1. <u>Morus alba</u>	10	Yes	FAC	OBL species <u>0</u> x 1 = <u>0</u>
2. _____	_____	_____	_____	FACW species <u>25</u> x 2 = <u>50</u>
3. _____	_____	_____	_____	FAC species <u>18</u> x 3 = <u>54</u>
4. _____	_____	_____	_____	FACU species <u>60</u> x 4 = <u>240</u>
5. _____	_____	_____	_____	UPL species <u>0</u> x 5 = <u>0</u>
=Total Cover				Column Totals: <u>103</u> (A) <u>344</u> (B)
				Prevalence Index = B/A = <u>3.34</u>
<u>Herb Stratum</u> (Plot size: <u>5</u>)	25	Yes	FACW	Hydrophytic Vegetation Indicators:
1. <u>Echinochloa crus-galli</u>	20	Yes	FACU	1 - Rapid Test for Hydrophytic Vegetation
2. <u>Lolium perenne</u>	20	Yes	FACU	2 - Dominance Test is >50%
3. <u>Asclepias verticillata</u>	10	No	FACU	3 - Prevalence Index is $\leq 3.0^1$
4. <u>Cirsium arvense</u>	10	No	FACU	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. <u>Festuca rubra</u>	10	No	FACU	Problems Hydrophytic Vegetation ¹ (Explain)
6. <u>Ipomoea hederacea</u>	8	No	FAC	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
=Total Cover				1 ^{Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.}
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>)	93			Hydrophytic Vegetation Present? Yes _____ No <u>X</u>
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
=Total Cover				

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

The Sample Point does not pass any test for hydrophytic vegetation.

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-12	10YR 3/1	100					Loamy/Clayey	
12-18	10YR 3/1	90	10YR 2/1	10	C	M	Loamy/Clayey	Faint redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

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

Indicators for Problematic Hydric Soils³:

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

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

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No **Remarks:**

The Sample Point did not meet any hydric soil indicator.

HYDROLOGY**Wetland Hydrology Indicators:****Primary Indicators (minimum of one is required; check all that apply)**

- Surface Water (A1) Water-Stained Leaves (B9)
- High Water Table (A2) Aquatic Fauna (B13)
- Saturation (A3) True Aquatic Plants (B14)
- Water Marks (B1) Hydrogen Sulfide Odor (C1)
- Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3)
- Drift Deposits (B3) Presence of Reduced Iron (C4)
- Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6)
- Iron Deposits (B5) Thin Muck Surface (C7)
- Inundation Visible on Aerial Imagery (B7) Gauge or Well Data (D9)
- Sparsely Vegetated Concave Surface (B8) Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes No

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

Remarks:

Two secondary indicators of wetland hydrology

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP4

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S19 T24N R8W

Landform (hillside, terrace, etc.): Toe Slope Local relief (concave, convex, none): Concave

Slope (%): 4-6 Lat: 40.519223 Long: -87.376337 Datum: WGS84

Soil Map Unit Name: Odell silt loam, 0-2% slopes (OIA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
<p>Remarks: The Sample Point represents the forested and shrub portion of the unmanaged landscape adjacent to the culvert inlet at the south terminus of Wetland A and the roadside ditch.</p>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	<p>Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>42.9%</u> (A/B)</p> <p>Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>95</u> x 3 = <u>285</u> FACU species <u>75</u> x 4 = <u>300</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>170</u> (A) <u>585</u> (B) Prevalence Index = B/A = <u>3.44</u></p> <p>Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problems Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p>		
1. <u>Morus alba</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>			
2. <u>Juglans nigra</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>			
3. _____	_____	_____	_____			
4. _____	_____	_____	_____			
5. _____	_____	_____	_____			
	<u>80</u>	=Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15</u>)						
1. <u>Fraxinus americana</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>			
2. <u>Acer negundo</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>			
3. _____	_____	_____	_____			
4. _____	_____	_____	_____			
5. _____	_____	_____	_____			
	<u>30</u>	=Total Cover				
Herb Stratum (Plot size: <u>5</u>)						
1. <u>Fraxinus americana</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>			
2. <u>Toxicodendron radicans</u>	<u>12</u>	<u>Yes</u>	<u>FAC</u>			
3. <u>Dactylis glomerata</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>			
4. <u>Rumex crispus</u>	<u>8</u>	<u>No</u>	<u>FAC</u>			
5. <u>Oxalis stricta</u>	<u>5</u>	<u>No</u>	<u>FACU</u>			
6. <u>Ambrosia artemisiifolia</u>	<u>5</u>	<u>No</u>	<u>FACU</u>			
7. <u>Geum canadense</u>	<u>5</u>	<u>No</u>	<u>FAC</u>			
8. _____	_____	_____	_____			
9. _____	_____	_____	_____			
10. _____	_____	_____	_____			
	<u>60</u>	=Total Cover				
Woody Vine Stratum (Plot size: <u>30</u>)						
1. _____	_____	_____	_____			
2. _____	_____	_____	_____			
	_____	=Total Cover				
Hydrophytic Vegetation Present? Yes _____ No <u>X</u>						

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

The Sample Point does not pass any test for hydrophytic vegetation.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-3	10YR 3/1	100					Loamy/Clayey	
3-6	10YR 3/1	97	10YR 5/2	3	D	M	Loamy/Clayey	
6-13	10YR 5/1	72	10YR 3/1	25	C	M	Loamy/Clayey	Faint redox concentrations
			10YR 5/6	3	C	M		Prominent redox concentrations
13-18	10YR 5/2	75	10YR 4/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
			2.5YR 3/6	5	C	M		Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

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

Indicators for Problematic Hydric Soils³:

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

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

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No _____**Remarks:**

The Sample Point passes the Depleted Below Dark Surface, A11, and Depleted Matrix, F3, hydric soil indicators.

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- Water-Stained Leaves (B9)
- High Water Table (A2)
- Aquatic Fauna (B13)
- Saturation (A3)
- True Aquatic Plants (B14)
- Water Marks (B1)
- Hydrogen Sulfide Odor (C1)
- Sediment Deposits (B2)
- Oxidized Rhizospheres on Living Roots (C3)
- Drift Deposits (B3)
- Presence of Reduced Iron (C4)
- Algal Mat or Crust (B4)
- Recent Iron Reduction in Tilled Soils (C6)
- Iron Deposits (B5)
- Thin Muck Surface (C7)
- Inundation Visible on Aerial Imagery (B7)
- Gauge or Well Data (D9)
- Sparsely Vegetated Concave Surface (B8)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No

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

Remarks:

No primary and one secondary wetland hydrology indicator was observed at the Sample Point. Not enough hydrology indicators were observed at the Sample Point to meet the hydrology criteria.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP5

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S19 T24N R8W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): Convex

Slope (%): 8-10 Lat: 40.519336 Long: -87.376203 Datum: WGS84

Soil Map Unit Name: Odell silt loam, 0-2% slopes (OIA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Hydric Soil Present? Yes <u>X</u> No _____	Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: The Sample Point represents a minor terrace within the maintained roadway slope which contained hydrophytic vegetation adjacent to Wetland A.			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>Morus alba</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)	
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
	<u>10</u>	=Total Cover			
Sapling/Shrub Stratum (Plot size: <u>15</u>)			Prevalence Index worksheet:		
1. _____	_____	_____	Total % Cover of: OBL species <u>30</u>	Multiply by: x 1 = <u>30</u>	
2. _____	_____	_____	FACW species <u>60</u>	x 2 = <u>120</u>	
3. _____	_____	_____	FAC species <u>10</u>	x 3 = <u>30</u>	
4. _____	_____	_____	FACU species <u>0</u>	x 4 = <u>0</u>	
5. _____	_____	_____	UPL species <u>0</u>	x 5 = <u>0</u>	
	=Total Cover		Column Totals: <u>100</u> (A)	<u>180</u> (B)	
Herb Stratum (Plot size: <u>5</u>)			Hydrophytic Vegetation Indicators:		
1. <u>Phalaris arundinacea</u>	<u>60</u>	<u>Yes</u>	<u>FACW</u>	1 - Rapid Test for Hydrophytic Vegetation	
2. <u>Typha angustifolia</u>	<u>30</u>	<u>Yes</u>	<u>OBL</u>	X 2 - Dominance Test is >50%	
3. _____	_____	_____	_____	3 - Prevalence Index is $\leq 3.0^1$	
4. _____	_____	_____	_____	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
5. _____	_____	_____	_____	Problematic Hydrophytic Vegetation ¹ (Explain)	
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
	<u>90</u>	=Total Cover			
Woody Vine Stratum (Plot size: <u>30</u>)			Hydrophytic Vegetation Present? Yes <u>X</u> No _____		
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
	=Total Cover				

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

The Sample Point passes the Dominance Test for hydrophytic vegetation.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: <u>US41 & SR352 Intersection Improvement (DES#2100058)</u>	City/County: <u>Benton County</u>	Sampling Date: <u>8/22/2023</u>
Applicant/Owner: <u>INDOT</u>	State: <u>IN</u>	Sampling Point: <u>SP6</u>
Investigator(s): <u>Ken Safranek, Rose Snyder; ASC Group, Inc.</u>	Section, Township, Range: <u>S19 T24N R8W</u>	
Landform (hillside, terrace, etc.): <u>Swale/Depression</u>	Local relief (concave, convex, none): <u>Concave</u>	
Slope (%): <u>1-3</u>	Lat: <u>40.519462</u>	Long: <u>-87.375918</u>
		Datum: <u>WGS84</u>
Soil Map Unit Name: <u>Odell silt loam, 0-2% slopes (OIA)</u>		NWI classification: <u>None</u>
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <u>X</u> No _____ (If no, explain in Remarks.)		
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed?		Are "Normal Circumstances" present? Yes <u>X</u> No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic?		(If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u>)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
				=Total Cover
Sapling/Shrub Stratum (Plot size: <u>15</u>)				
1.				
2.				
3.				
4.				
5.				
				=Total Cover
Herb Stratum (Plot size: <u>5</u>)				
1. <i>Phalaris arundinacea</i>	<u>30</u>	Yes	FACW	
2. <i>Bromus inermis</i>	<u>20</u>	Yes	FACU	
3. <i>Schedonorus arundinaceus</i>	<u>20</u>	Yes	FACU	
4. <i>Asclepias verticillata</i>	<u>12</u>	No	FACU	
5. <i>Euphorbia maculata</i>	<u>5</u>	No	FACU	
6. <i>Securigera varia</i>	<u>3</u>	No	UPL	
7.				
8.				
9.				
10.				
			=Total Cover	
Woody Vine Stratum (Plot size: <u>30</u>)				
1.				
2.				
			=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>30</u>	x 2 = <u>60</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>57</u>	x 4 = <u>228</u>
UPL species <u>3</u>	x 5 = <u>15</u>
Column Totals: <u>90</u> (A)	<u>303</u> (B)

Prevalence Index = B/A = 3.37

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is $\leq 3.0^1$
- 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No X

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

The Sample Point does not pass any test for hydrophytic vegetation.

Remarks: (Include photo numbers here or on a separate sheet.)
The Sample Point does not pass any test for hydrophytic vegetation.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023Applicant/Owner: INDOT State: IN Sampling Point: SP7Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S19 T24N R8WLandform (hillside, terrace, etc.): Top Slope Terrace Local relief (concave, convex, none): FlatSlope (%): 1-3 Lat: 40.519236 Long: -87.375583 Datum: WGS84Soil Map Unit Name: Odell silt loam, 0-2% slopes (OIA) NWI classification: NoneAre climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Hydric Soil Present? Yes _____ No <u>X</u>	Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: The Sample Point represents a partially unmanaged top slope terrace above the eastern roadway swale where hydrophytic vegetation was observed.			

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:		
1. <u>Morus alba</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)		
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)		
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)		
4. _____	_____	_____	_____			
5. _____	_____	_____	_____			
<u>25</u> =Total Cover						
Sapling/Shrub Stratum (Plot size: <u>15</u>)					Prevalence Index worksheet:	
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____		
2. _____	_____	_____	_____	OBL species	<u>0</u> x <u>1</u> = <u>0</u>	
3. _____	_____	_____	_____	FACW species	<u>90</u> x <u>2</u> = <u>180</u>	
4. _____	_____	_____	_____	FAC species	<u>25</u> x <u>3</u> = <u>75</u>	
5. _____	_____	_____	_____	FACU species	<u>10</u> x <u>4</u> = <u>40</u>	
<u>0</u> =Total Cover				UPL species	<u>0</u> x <u>5</u> = <u>0</u>	
Herb Stratum (Plot size: <u>5</u>)					Column Totals: <u>125</u> (A) <u>295</u> (B)	
1. <u>Phalaris arundinacea</u>	<u>90</u>	<u>Yes</u>	<u>FACW</u>	Prevalence Index = B/A = <u>2.36</u>		
2. <u>Schedonorus arundinaceus</u>	<u>10</u>	<u>No</u>	<u>FACU</u>			
3. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:		
4. _____	_____	_____	_____	1 - Rapid Test for Hydrophytic Vegetation		
5. _____	_____	_____	_____	X 2 - Dominance Test is >50%		
6. _____	_____	_____	_____	3 - Prevalence Index is $\leq 3.0^1$		
7. _____	_____	_____	_____	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)		
8. _____	_____	_____	_____	Problematic Hydrophytic Vegetation ¹ (Explain)		
9. _____	_____	_____	_____			
10. _____	_____	_____	_____			
<u>100</u> =Total Cover						
Woody Vine Stratum (Plot size: <u>30</u>)					1 ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
1. _____	_____	_____	_____			
2. _____	_____	_____	_____			
<u>0</u> =Total Cover						
Hydrophytic Vegetation Present? Yes <u>X</u> No _____						

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

The Sample Point passes the Dominance Test for hydrophytic vegetation.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP8

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S19 T24N R8W

Landform (hillside, terrace, etc.): Shoulder Slope Local relief (concave, convex, none): None

Slope (%): 15-20 Lat: 40.520034 Long: -87.375527 Datum: WGS84

Soil Map Unit Name: Chalmers silty clay loam (Ch) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
<p>Remarks: The Sample Point represents the mowed and maintained slopes within the right-of-way adjacent to the roadway swale.</p>	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<p>Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)</p> <p>Prevalence Index worksheet: Total % Cover of: <u>OBL species 0</u> x 1 = <u>0</u> <u>FACW species 15</u> x 2 = <u>30</u> <u>FAC species 8</u> x 3 = <u>24</u> <u>FACU species 80</u> x 4 = <u>320</u> <u>UPL species 0</u> x 5 = <u>0</u> Column Totals: <u>103</u> (A) <u>374</u> (B) Prevalence Index = B/A = <u>3.63</u></p> <p>Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p>	
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
=Total Cover					
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>		
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
=Total Cover					
<u>Herb Stratum</u> (Plot size: <u>5</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>		
1. <u>Bromus inermis</u>	<u>35</u>	<u>Yes</u>	<u>FACU</u>		
2. <u>Schedonorus arundinaceus</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>		
3. <u>Eleusine indica</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>		
4. <u>Echinochloa crus-galli</u>	<u>15</u>	<u>No</u>	<u>FACW</u>		
5. <u>Setaria pumila</u>	<u>8</u>	<u>No</u>	<u>FAC</u>		
6. <u>Cirsium arvense</u>	<u>5</u>	<u>No</u>	<u>FACU</u>		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
=Total Cover					
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<p>Hydrophytic Vegetation Present? Yes _____ No <u>X</u></p>	
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
=Total Cover					

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

The Sample Point does not pass any test for hydrophytic vegetation.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023
Applicant/Owner: INDOT State: IN Sampling Point: SP9
Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S18 T24N R8W
Landform (hillside, terrace, etc.): Swale/Depression Local relief (concave, convex, none): Concave
Slope (%): 1-3 Lat: 40.522227 Long: -87.375594 Datum: WGS84
Soil Map Unit Name: Chalmers silty clay loam (Ch) NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
<p>Remarks: The Sample Point represents Wetland B which was found in the roadway drainage swale east of US 41.</p>	

VEGETATION – Use scientific names of plants.

<p><u>Tree Stratum</u> (Plot size: <u>30</u>) <u>Absolute % Cover</u> <u>Dominant Species?</u> <u>Indicator Status</u></p> <p>1. _____ 2. _____ 3. _____ 4. _____ 5. _____ =Total Cover</p> <p><u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>) <u>15</u> <u>Yes</u> <u>FACW</u></p> <p>1. <u>Cornus amomum</u> _____ 2. _____ 3. _____ 4. _____ 5. _____ =Total Cover</p> <p><u>Herb Stratum</u> (Plot size: <u>5</u>) <u>60</u> <u>Yes</u> <u>FACW</u></p> <p>1. <u>Phalaris arundinacea</u> _____ 2. <u>Sympotrichum lateriflorum</u> _____ 3. <u>Typha angustifolia</u> _____ 4. <u>Acer negundo</u> _____ 5. <u>Rumex crispus</u> _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ =Total Cover</p> <p><u>Woody Vine Stratum</u> (Plot size: <u>30</u>) <u>95</u> <u>Yes</u> <u>FAC</u></p> <p>1. _____ 2. _____ =Total Cover</p>	<p>Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)</p> <p>Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>10</u> x 1 = <u>10</u> FACW species <u>90</u> x 2 = <u>180</u> FAC species <u>10</u> x 3 = <u>30</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>110</u> (A) <u>220</u> (B) Prevalence Index = B/A = <u>2.00</u></p> <p>Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u>X</u> 3 - Prevalence Index is $\leq 3.0^1$ <u>4</u> - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p> <p>Hydrophytic Vegetation Present? Yes <u>X</u> No _____</p>
<p>Remarks: (Include photo numbers here or on a separate sheet.) The Sample Point passes the Dominance Test and Prevalence Index for hydrophytic vegetation.</p>	

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP10

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S18 T24N R8W

Landform (hillside, terrace, etc.): Swale/Depression Local relief (concave, convex, none): Concave

Slope (%): 2-4 Lat: 40.522475 Long: -87.375573 Datum: WGS84

Soil Map Unit Name: Darroch silt loam, till substratum (Dp) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
<p>Remarks: The Sample Point represents the roadway drainage swale east of US 41 and upslope from Wetland B.</p>	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	<p>Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50.0%</u> (A/B)</p> <p>Prevalence Index worksheet: Total % Cover of: <u>15</u> Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>50</u> x 2 = <u>100</u> FAC species <u>5</u> x 3 = <u>15</u> FACU species <u>38</u> x 4 = <u>152</u> UPL species <u>20</u> x 5 = <u>100</u> Column Totals: <u>113</u> (A) <u>367</u> (B) Prevalence Index = B/A = <u>3.25</u></p> <p>Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problems with Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p>																																													
1. _____	_____	_____	_____																																														
2. _____	_____	_____	_____																																														
3. _____	_____	_____	_____																																														
4. _____	_____	_____	_____																																														
5. _____	_____	_____	_____																																														
=Total Cover <u>15</u>																																																	
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>)	<u>15</u>	<u>Yes</u>	<u>FACW</u>	<p>Herb Stratum (Plot size: <u>5</u>)</p> <table border="1"> <tr> <td>1. <u>Schedonorus arundinaceus</u></td> <td><u>30</u></td> <td><u>Yes</u></td> <td><u>FACU</u></td> </tr> <tr> <td>2. <u>Echinochloa crus-galli</u></td> <td><u>20</u></td> <td><u>Yes</u></td> <td><u>FACW</u></td> </tr> <tr> <td>3. <u>Securigera varia</u></td> <td><u>20</u></td> <td><u>Yes</u></td> <td><u>UPL</u></td> </tr> <tr> <td>4. <u>Elymus virginicus</u></td> <td><u>15</u></td> <td><u>No</u></td> <td><u>FACW</u></td> </tr> <tr> <td>5. <u>Eleusine indica</u></td> <td><u>8</u></td> <td><u>No</u></td> <td><u>FACU</u></td> </tr> <tr> <td>6. <u>Rumex crispus</u></td> <td><u>5</u></td> <td><u>No</u></td> <td><u>FAC</u></td> </tr> <tr> <td>7. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>8. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>9. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>10. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td colspan="4" style="text-align: right;">=Total Cover <u>98</u></td> </tr> </table>		1. <u>Schedonorus arundinaceus</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>	2. <u>Echinochloa crus-galli</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>	3. <u>Securigera varia</u>	<u>20</u>	<u>Yes</u>	<u>UPL</u>	4. <u>Elymus virginicus</u>	<u>15</u>	<u>No</u>	<u>FACW</u>	5. <u>Eleusine indica</u>	<u>8</u>	<u>No</u>	<u>FACU</u>	6. <u>Rumex crispus</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	7. _____	_____	_____	_____	8. _____	_____	_____	_____	9. _____	_____	_____	_____	10. _____	_____	_____	_____	=Total Cover <u>98</u>			
1. <u>Schedonorus arundinaceus</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>																																														
2. <u>Echinochloa crus-galli</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>																																														
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1. _____	_____	_____	_____																																														
2. _____	_____	_____	_____																																														
=Total Cover																																																	
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>)	<u>30</u>	<u>Yes</u>	<u>X</u>																																														

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

The Sample Point does not pass any test for hydrophytic vegetation.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP11

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S18 T24N R8W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 1-3 Lat: 40.521595 Long: -87.375921 Datum: WGS84

Soil Map Unit Name: Chalmers silty clay loam (Ch) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Hydric Soil Present? Yes <u>X</u> No _____	Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: The Sample Point represents Wetland C which was found in the grassed roadway median of US 41.			

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	Dominance Test worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)	
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
=Total Cover					
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	Prevalence Index worksheet:	
1. _____	_____	_____	_____	Total % Cover of: OBL species <u>28</u> x 1 = <u>28</u>	
2. _____	_____	_____	_____	FACW species <u>58</u> x 2 = <u>116</u>	
3. _____	_____	_____	_____	FAC species <u>10</u> x 3 = <u>30</u>	
4. _____	_____	_____	_____	FACU species <u>0</u> x 4 = <u>0</u>	
5. _____	_____	_____	_____	UPL species <u>0</u> x 5 = <u>0</u>	
=Total Cover				Column Totals: <u>96</u> (A) 174 (B)	
<u>Herb Stratum</u> (Plot size: <u>5</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	Prevalence Index = B/A = <u>1.81</u>	
1. <u>Echinochloa crus-galli</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>		
2. <u>Typha angustifolia</u>	<u>28</u>	<u>Yes</u>	<u>OBL</u>		
3. <u>Agrostis gigantea</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>		
4. <u>Hordeum jubatum</u>	<u>10</u>	<u>No</u>	<u>FAC</u>		
5. <u>Juncus torreyi</u>	<u>8</u>	<u>No</u>	<u>FACW</u>		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
=Total Cover					
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	Hydrophytic Vegetation Indicators:	
1. _____	_____	_____	_____	X 1 - Rapid Test for Hydrophytic Vegetation	
2. _____	_____	_____	_____	X 2 - Dominance Test is >50%	
=Total Cover				X 3 - Prevalence Index is $\leq 3.0^1$	
				4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
				Problems with Hydrophytic Vegetation ¹ (Explain)	
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.					
Hydrophytic Vegetation Present? Yes <u>X</u> No _____					

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

The Sample Point passes the Rapid Test, Dominance Test and Prevalence Index for hydrophytic vegetation.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-4	10YR 3/2	100					Loamy/Clayey	
4-15	10YR 3/2	65	10YR 5/4	20	C	M	Loamy/Clayey	Distinct redox concentrations
			10YR 5/2	10	D	M		
			10YR 5/8	5	C	M		Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

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

Indicators for Problematic Hydric Soils³:

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

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

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No _____**Remarks:**

The Sample Point meets the Redox Dark Surface, F6, hydric soil indicator.

HYDROLOGY**Wetland Hydrology Indicators:****Primary Indicators (minimum of one is required; check all that apply)**

- Surface Water (A1) Water-Stained Leaves (B9)
- High Water Table (A2) Aquatic Fauna (B13)
- Saturation (A3) True Aquatic Plants (B14)
- Water Marks (B1)
- Sediment Deposits (B2) Hydrogen Sulfide Odor (C1)
- Drift Deposits (B3) Oxidized Rhizospheres on Living Roots (C3)
- Algal Mat or Crust (B4) Presence of Reduced Iron (C4)
- Iron Deposits (B5) Recent Iron Reduction in Tilled Soils (C6)
- Inundation Visible on Aerial Imagery (B7) Thin Muck Surface (C7)
- Sparsely Vegetated Concave Surface (B8) Gauge or Well Data (D9)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes No _____

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

Remarks:

Several primary and secondary indicators of wetland hydrology were observed at the Sample Point. The primary hydrological input is stormwater runoff from US 41.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Midwest Region

See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024

Requirement Control Symbol EXEMPT:

(Authority: AR 335-15, paragraph 5-2a)

Project/Site: US41 & SR352 Intersection Improvement (DES#2100058) City/County: Benton County Sampling Date: 8/22/2023

Applicant/Owner: INDOT State: IN Sampling Point: SP12

Investigator(s): Ken Safranek, Rose Snyder; ASC Group, Inc. Section, Township, Range: S18 T24N R8W

Landform (hillside, terrace, etc.): Swale/Depression Local relief (concave, convex, none): Concave

Slope (%): 1-3 Lat: 40.523242 Long: -87.376063 Datum: WGS84

Soil Map Unit Name: Chalmers silty clay loam (Ch) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Hydric Soil Present? Yes <u>X</u> No _____	Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: The Sample Point represents the grassed roadway median of US 41 upslope from Wetland C.			

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
1. _____ 2. _____ 3. _____ 4. _____ 5. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
=Total Cover				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15</u>)	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>5</u> x 2 = <u>10</u> FAC species <u>5</u> x 3 = <u>15</u> FACU species <u>90</u> x 4 = <u>360</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>100</u> (A) <u>385</u> (B) Prevalence Index = B/A = <u>3.85</u>
<u>Herb Stratum</u> (Plot size: <u>5</u>)	_____	_____	_____	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problems with Hydrophytic Vegetation ¹ (Explain)
1. <u>Schedonorus arundinaceus</u> 2. <u>Bromus inermis</u> 3. <u>Elymus repens</u> 4. <u>Cyperus esculentus</u> 5. <u>Hordeum jubatum</u> 6. _____ 7. _____ 8. _____ 9. _____ 10. _____	50 25 15 5 5 _____	Yes Yes No No No _____	FACU FACU FACU FACW FAC _____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
=Total Cover				
<u>Woody Vine Stratum</u> (Plot size: <u>30</u>)	_____	_____	_____	Hydrophytic Vegetation Present? Yes _____ No <u>X</u>
1. _____ 2. _____	_____	_____	_____	
=Total Cover				

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

The Sample Point does not pass any test for hydrophytic vegetation.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-2	10YR 3/3	100					Loamy/Clayey	
2-4	10YR 3/1	100					Loamy/Clayey	
4-8	10YR 5/2	85	10YR 3/1	15	C	M	Loamy/Clayey	Faint redox concentrations
8-18	10YR 3/2	70	10YR 5/3	20	C	M	Loamy/Clayey	Faint redox concentrations
			10YR 5/6	10	C	M		Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

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

Indicators for Problematic Hydric Soils³:

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

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

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No _____**Remarks:**

The Sample Point meets the Redox Dark Surface, F6, hydric soil indicator.

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Gauge or Well Data (D9)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No Depth (inches): _____

Water Table Present? Yes _____ No Depth (inches): _____

Saturation Present? Yes _____ No Depth (inches): _____

(includes capillary fringe)

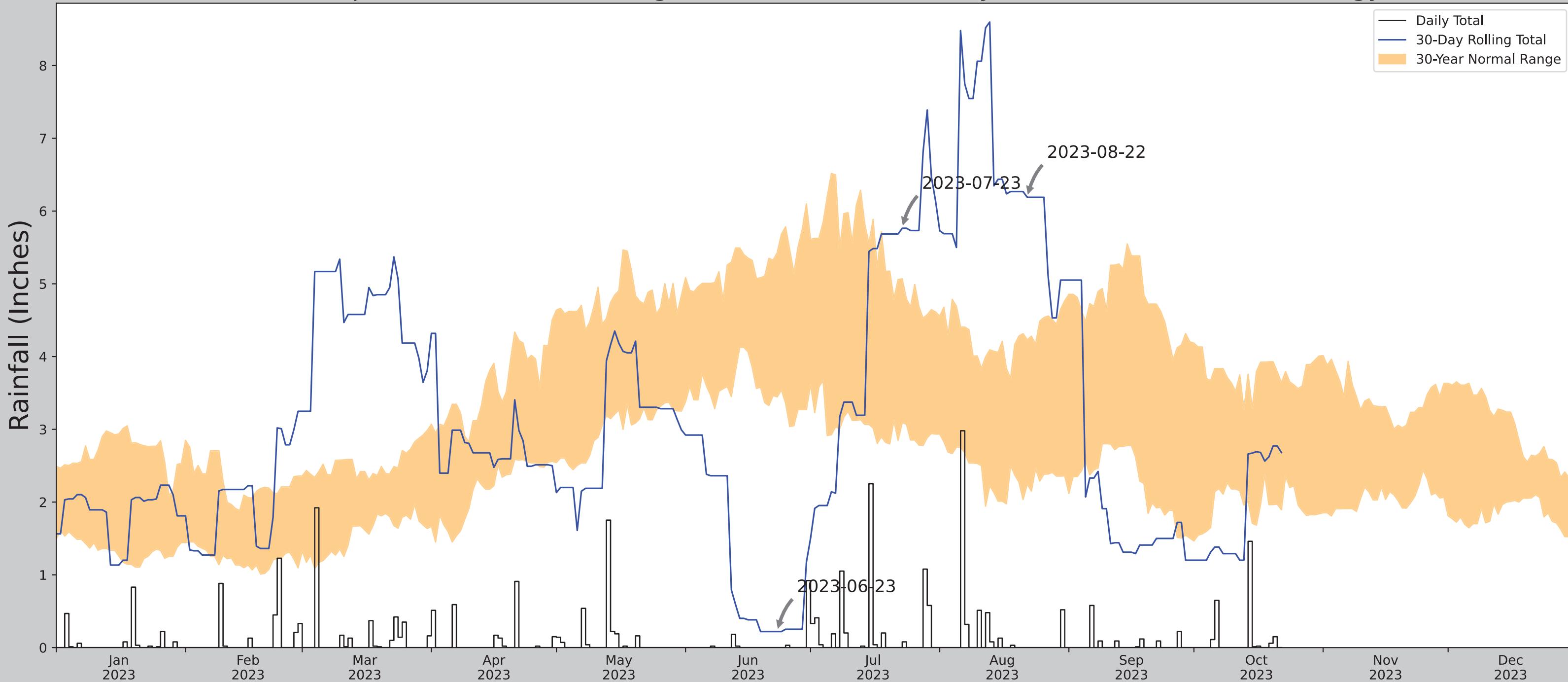
Wetland Hydrology Present? Yes _____ No

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

Remarks:

The Sample Point was observed within a concave, depressional landform and meets the Geomorphic Position, D2, secondary wetland hydrology indicator. However, the Sample Point does not contain enough indicators to meet the wetland hydrology criteria.

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	40.521141, -87.375943
Observation Date	2023-08-22
Elevation (ft)	757.863
Drought Index (PDSI)	Mild drought
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-08-22	2.246457	4.230709	6.188977	Wet	3	3	9
2023-07-23	3.09252	5.068504	5.76378	Wet	3	2	6
2023-06-23	3.446457	5.427953	0.220472	Dry	1	1	1
Result							Wetter than Normal - 16

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
PENCE 1 SW	40.3522, -87.525	700.131	14.06	57.732	7.139	10458	89
ROSSVILLE 5.7 E	40.3884, -87.5608	708.99	3.132	8.859	1.437	94	0
ROSSVILLE 4.4 SSE	40.3199, -87.6482	683.071	6.862	17.06	3.205	83	0
HOPESTON 4.6 E	40.4709, -87.5838	711.942	8.765	11.811	4.048	67	0
DANVILLE 7.6 N	40.2546, -87.6224	666.011	8.474	34.12	4.102	133	0
HENNING 3.4 SSE	40.2647, -87.6656	682.087	9.562	18.044	4.475	230	1
HOPESTON	F-87 40.4664, -87.685	709.974	11.538	9.843	5.306	288	0

PRELIMINARY JURISDICTIONAL DETERMINATION (PJD)

FORM BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: 3/4/2024

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Len Mikles, 9376 Castlegate Drive, Indianapolis, IN 46256

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:

The proposed project (INDOT Des. No. 2100058) is located at U.S. Route (US) 41 and State Road (SR) 352 in Grant Township, Benton County, Indiana (Figures 1–7). The project proposes to reconstruct the intersection as a restricted crossing U-Turn (RCUT). The purpose of this project is to increase the safety for vehicles crossing US 41 or turning left onto US 41 from SR 352. The need for this project is due to the intersection experiencing an above normal number of crashes and elevated crash severity for an unsignalized rural state intersection. The project may include pavement widening to accommodate added right turn lane, completely enclosing the unpaved median, and central island modifications with slotted northbound left turn lane on US 41 at SR 352. This project will not require the acquisition of temporary or permanent right-of-way (ROW).

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

State: IN County/parish/borough: Benton Township: Grant

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

Lat.: 40.521141 Long.: -87.375946

Universal Transverse Mercator: 16N

Name of nearest waterbody: Goose Creek

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

- Office (Desk) Determination. Date:
- Field Determination. Date:

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

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)
Wetland A	40.521634	-87.376330	0.048-acre	Wetland	Section 404
Wetland B	40.520131	-87.376305	0.110-acre	Wetland	Section 404
Wetland C	40.521684	-87.375592	0.058-acre	Wetland	Section 404
Wetland D	40.519964	-87.375559	0.094-acre	Wetland	Section 404
Wetland E	40.521421	-87.375942	0.010-acre	Wetland	Section 404

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

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

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

Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:

Map: Aerials with Aquatic Resources and Photograph Key mapping included in the Waters of the U.S. Determination and Wetland Delineation Report for the US 41 and SR 352, Grant Township, Benton County, Indiana Intersection Improvement Project (INDOT Des. No. 2100058)

Data sheets prepared/submitted by or on behalf of the PJD requestor.

Office concurs with data sheets/delineation report.

Office does not concur with data sheets/delineation report. Rationale: _____

Data sheets prepared by the Corps: _____

Corps navigable waters' study: _____

U.S. Geological Survey Hydrologic Atlas: ([USGS, NHD 2019](#))

USGS NHD data.

USGS 8 and 12 digit HUC maps.

U.S. Geological Survey map(s). Cite scale & quad name: [Boswell, IN quadrangle \(USGS 7.5' topographic map\)](#)

Natural Resources Conservation Service Soil Survey. Citation: Benton County (USDA, NRCS 2023)

National wetlands inventory map(s). Cite name: U.S. Fish and Wildlife Service Wetlands Online Mapper website ([USFWS 2023](#))

State/local wetland inventory map(s): _____

FEMA/FIRM maps _____

100-year Floodplain Elevation is:

Photographs: Aerial (Name & Date): 2023 Aerial

or Other (Name & Date): August 22, 2023 Site Photographs

Previous determination(s). File no. and date of response letter: _____

Other information (please specify): [IDNR Floodplain Maps \(2023\)](#) _____

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

Signature and date of
Regulatory staff member
completing PJD

Len Mikles 3/4/2024

Signature and date of person
requesting PJD (REQUIRED,
unless obtaining the signature
is impracticable)¹

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



Point of Interest

Base Flood Elevation Point

FLD_ZONE, SOURCE_DNR,
ZONE_SUBTY

Not Mapped

The information provided below is based on the point of interest shown in the map above.

County: **Benton**

Approximate Ground Elevation: **757.8 feet (NAVD88)**

Stream Name:

Base Flood Elevation: **737.5 Feet (NAVD88)**

Goose Creek

Drainage Area: **Not Available**

Best Available Flood Hazard Zone: **Not Mapped**

National Flood Hazard Zone: **Not Mapped**

Is a Flood Control Act permit from the DNR needed for this location? **See following pages**

Is a local floodplain permit needed for this location? **Contact your local Floodplain Administrator-**

Floodplain Administrator: No Floodplain Administrator Name Available

Community Jurisdiction: **Benton County, County proper**

Phone: **No Phone Number Available**

Email: **No Email Address Available**

US Army Corps of Engineers District: **Louisville**

F-91

Date Generated: 10/27/2023

APPENDIX G: PUBLIC INVOLVEMENT (DRAFT)

Notice of Survey Letter
Public Involvement Information - TBD



1285 S. Jackson Street, Suite B
Greencastle, IN. 46135
765.653.6710
www.aligncec.com

Notice of Survey

Date: 01/06/2023

SUBJECT: US 41 / SR 352

DES No. 2100058, Benton County, Indiana

Dear Property Owner:

Our information indicates that you own or occupy property near the above referenced project. Our employees will be performing a survey of the project area in the near future. It may be necessary for them to come onto your property to complete this work. This is permitted by law per Indiana Code IC 8-23-7-26. They will show you their identification, if you are available, before coming onto your property. If you have sold this property, or it is occupied by someone else, please let us know the name and address of the new owner or current occupant so we can contact them about the survey.

At this stage, we generally do not know what effect, if any, our project may eventually have on your property. If we determine later that your property is involved, you will be contacted with additional information.

The survey work will include mapping the location of features such as trees, buildings, fences and drives, and obtaining ground elevations. The survey is needed for the proper planning and design of this project. Please be assured of our sincere desire to cause you as little inconvenience as possible during this survey. If any problems do occur, please contact our field crew or contact me at the telephone number or address shown above for our office. The Project Manager Adam Christenberry, is also available for questions concerning this project.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam Christenberry".

Adam Christenberry, PS
Senior Project Manager / Field Survey Manager

APPENDIX H: AIR QUALITY

STIP Pages

Indiana Department of Transportation (INDOT)

State Preservation and Local Initiated Projects FY 2024 - 2028

SPONSOR	CONTR ACT # / LEAD DES	STIP NAME	ROUTE	WORK TYPE	DISTRICT	MILES	FEDERAL CATEGORY	Total Cost of Project*	PROGRAM	PHASE	FEDERAL	MATCH	2024	2025	2026	2027	2028
Indiana Department of Transportation	43424 / 2001830	M 32	SR 71	HMA Overlay, Preventive Maintenance	Crawfordsville	10.537	STBG	\$5,361,979.00	Road ROW	RW	\$0.00	\$0.00	(\$200,000.00)	\$200,000.00			
									Road Construction	CN	\$3,493,263.20	\$873,315.80	(\$400,000.00)	\$400,000.00	\$4,366,579.00		
Performance Measure Impacted: Pavement Condition																	
Location: From SR 18 to US 24																	
Comments:move FY24 \$200,000 to FY25. move FY24 \$400,000 to FY25																	
Indiana Department of Transportation	43424 / 2001830	M 45	SR 71	HMA Overlay, Preventive Maintenance	Crawfordsville	10.537	STBG	\$5,361,979.00	Road ROW	RW	\$0.00	\$0.00	(\$200,000.00)	\$200,000.00			
Performance Measure Impacted: Pavement Condition																	
Location: From SR 18 to US 24																	
Comments:Move RW from FY 25 to FY 26																	
Indiana Department of Transportation	43453 / 2002000	Init.	SR 18	Bridge Replacement	Crawfordsville	0	STBG	\$2,159,000.00	Bridge Construction	CN	\$1,695,200.00	\$423,800.00	\$80,000.00	\$2,039,000.00			
Performance Measure Impacted: Bridge Condition																	
Location: 6.84 mi E of US 52; over Greenwood Ditch																	
Comments:Include DES 2002000																	
Indiana Department of Transportation	43688 / 2100187	Init.	SR 55	HMA Overlay Minor Structural	Crawfordsville	1.38	STBG	\$4,805,000.00	Safety Construction	CN	\$727,200.00	\$181,800.00	\$73,000.00		\$836,000.00		
									Road Construction	CN	\$2,748,000.00	\$687,000.00		\$500,000.00	\$2,935,000.00		
									Safety ROW	RW	\$40,000.00	\$10,000.00		\$50,000.00			
									Road ROW	RW	\$320,000.00	\$80,000.00	\$200,000.00	\$200,000.00			
Performance Measure Impacted: Pavement Condition																	
Location: SR 55, From SR 352 S Jct to 0.82 mi N of SR 352 N Jct (Oxford) and intersection at US 41 & SR 18.																	
Comments:Include DES 2100059, 2100187																	
Indiana Department of Transportation	43688 / 2100187	M 45	SR 55	HMA Overlay Minor Structural	Crawfordsville	1.38	STBG	\$4,805,000.00	Road ROW	RW	\$0.00	\$0.00	(\$200,000.00)	\$200,000.00			
Performance Measure Impacted: Pavement Condition																	
Location: SR 55, From SR 352 S Jct to 0.82 mi N of SR 352 N Jct (Oxford)-Small Town Reconstruction Project- HMA Overlay, Minor Structure includes (1) intersection improv w/ added turn lanes at US 41 & SR 18.																	
Comments:Move RW from FY 25 to FY 26																	
Indiana Department of Transportation	43690 / 2100058	Init.	US 41	Intersect. Improv. W/ Added Turn Lanes	Crawfordsville	.2	NHPP	\$1,557,000.00	Safety ROW	RW	\$24,000.00	\$6,000.00		\$30,000.00			
									Safety Construction	CN	\$1,004,000.00	\$251,000.00	\$84,000.00	\$269,000.00	\$902,000.00		

Indiana Department of Transportation (INDOT)

State Preservation and Local Initiated Projects FY 2024 - 2028

SPONSOR	CONTR ACT # / LEAD DES	STIP NAME	ROUTE	WORK TYPE	DISTRICT	MILES	FEDERAL CATEGORY	Total Cost of Project*	PROGRAM	PHASE	FEDERAL	MATCH	2024	2025	2026	2027	2028
Performance Measure Impacted: Safety																	
Location: US 41 & SR 352																	
Comments:Include DES 2100058																	
Indiana Department of Transportation	43690 / 2100058	A 06	US 41	Intersect. Improv. W/ Added Turn Lanes	Crawfordsville	.2	NHPP	\$1,483,086.00	Safety Consulting	PE	\$20,000.00	\$5,000.00	\$25,000.00				
Performance Measure Impacted: Safety																	
Location: US 41 & SR 352, RCI																	
Comments:add FY24 PE \$25,000																	
Indiana Department of Transportation	44370 / 2200796	Init.	SR 352	Pavement Replacement	Crawfordsville	.78	STBG	\$7,193,000.00	Bridge Construction	CN	\$120,000.00	\$30,000.00			\$150,000.00		
Performance Measure Impacted: Pavement Condition																	
Location: SR 352, Pavement Replacement from 0.75 mi W of US 41 (Gillen Ditch) to US 41, adding Bike/Ped facilities. HMA Overlay Preventive Maintenance SR 352 from SR 55 E jct. to US 52.																	
Comments:Include DES 2200091, 2200796, 2200797																	
Indiana Department of Transportation	44370 / 2200796	A 05	SR 352	Pavement Replacement	Crawfordsville	.78	STBG	\$0.00	Safety Construction	CN	-\$4,996,000.00	-\$1,249,000.00			(\$450,000.00)	(\$5,795,000.00)	
Performance Measure Impacted: Pavement Condition																	
Location: SR 352, Pavement Replacement from 0.75 mi W of US 41 (Gillen Ditch) to US 41, adding Bike/Ped facilities. HMA Overlay Preventive Maintenance SR 352 from SR 55 E jct. to US 52.																	
Comments:Eliminate project																	
Indiana Department of Transportation	44382 / 2200795	Init.	US 52	HMA Overlay Minor Structural	Crawfordsville	10.306	NHPP	\$30,328,000.00	Road Construction	CN	\$22,422,400.00	\$5,605,600.00			\$15,000.00	\$28,013,000.00	

APPENDIX I: ADDITIONAL STUDIES/REPORTS

Land and Water Conservation Fund List - Benton County
Abbreviated Engineering Assessment

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

ProjectNumber	SubProjectCode	County	Property
1800027	1800027	Benton	Fowler Park and Community Swimming Pool
1800535	1800535	Benton	Fowler Park and Community Swimming Pool
1800569	1800569	Benton	Fowler Park and Community Swimming Pool

*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.

Found at: <https://www.in.gov/indot/engineering/environmental-services/environmental-policy/>

PARSONS

Abbreviated Engineering Assessment

US 41 and SR 352 Intersection

Crawfordsville District

Indiana Department of Transportation



Prepared for INDOT Crawfordsville District

December 2021



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Appendices have been removed from report

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LIST OF ABBREVIATIONS

- AADT – Average Annual Daily Traffic
- ADA – Americans with Disabilities Act
- CE – Categorical Exclusion
- EA – Environmental Assessment
- EB – Eastbound
- HCS – Highway Capacity Software
- HSM – Highway Safety Manual
- ICC – Index of Crash Cost
- ICF – Index Crash Frequency
- IDEM – Indiana Department of Environmental Management
- IDM – Indiana Design Manual
- IDNR – Indiana Department of Natural Resources
- INDOT – Indiana Department of Transportation
- HMA – Hot Mix Asphalt
- LOS – Level of Service
- MPH – Miles Per Hour
- MPPA – Minor Projects Programmatic Agreement
- MOT – Maintenance of Traffic
- MUTCD – Manual of Uniform Traffic Control Devices
- NCHRP - National Cooperative Highway Research Program
- NEPA – National Environmental Policy Act
- NB – Northbound
- RFI – Red Flag Investigation
- RoadHAT – Road Hazard Analysis Tool
- SB - Southbound
- SR – State Road
- SUE – Subsurface Utility Exploration
- USACE – United States Army Corps of Engineers
- WB – Westbound
- WQC – Water Quality Certification

SECTION 1: PROJECT OVERVIEW

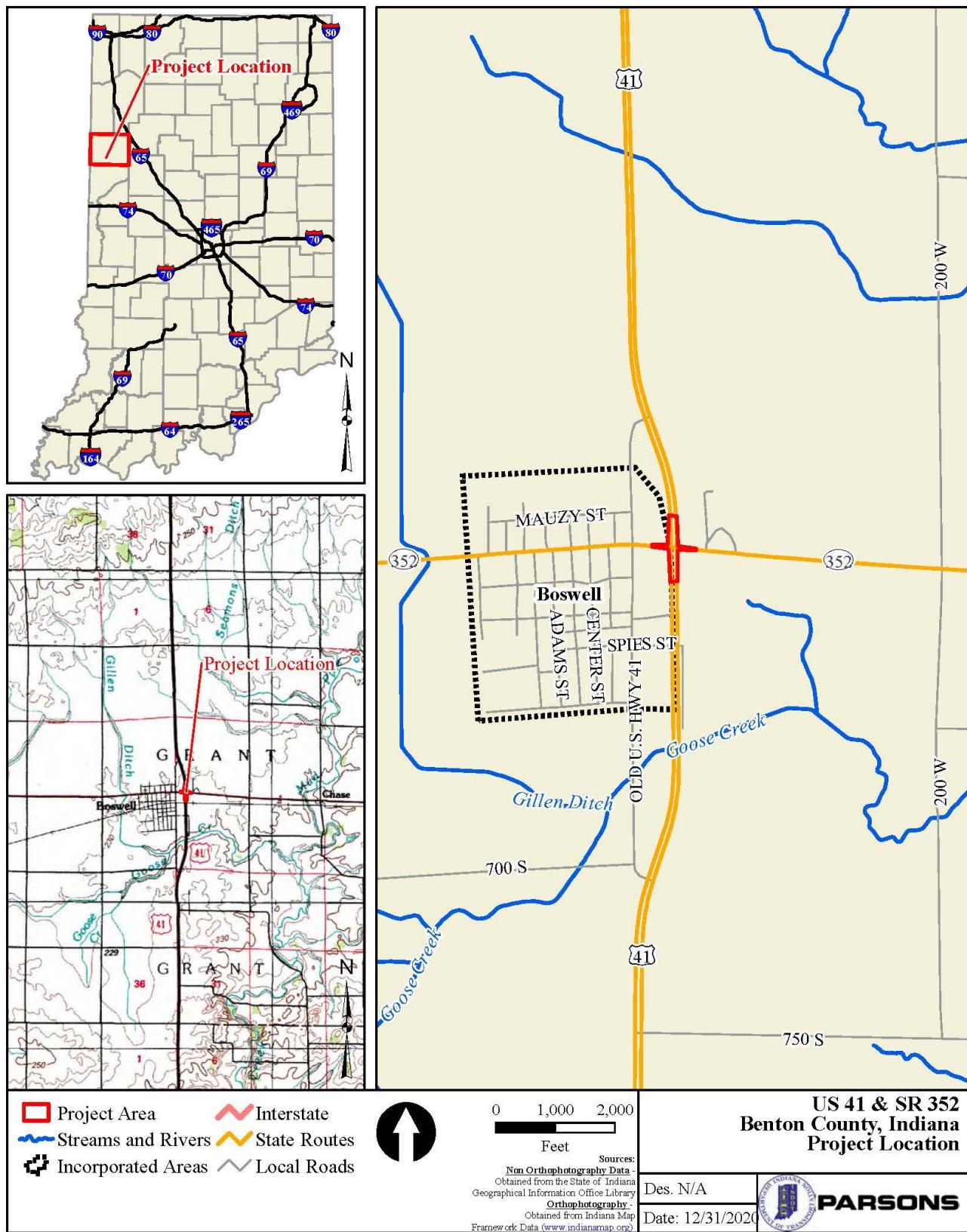
1.1 PROJECT LOCATION

The US 41 and SR 352 Intersection Project is located approximately 4.0 miles north of SR 26 and 7.0 miles south of SR 18 in township 24N, Range 8 W and Sections 18 and 19 in Grant Township in Benton County, Indiana. The approximate location of the project has a latitude of $40^{\circ}31'16''$ and a longitude of $87^{\circ}22'33''$ within the subdistrict of West Lafayette of the INDOT Crawfordville District. The Project Limits are shown in Figure 1 below. The town of Boswell, Indiana is on the west side of the intersection

1.2 PURPOSE AND NEED STATEMENT

Within the project limits, the US 41 and SR 352 Intersection is experiencing an above normal number of crashes and crash severity for an Unsignalized Rural State Intersection.

The purpose of this project is to increase public safety by reducing the number of crashes at this intersection and to reduce right angle crashes.



Created by: KDV

Figure 1: Project Area

SECTION 2: EXISTING CONDITIONS

2.1 HISTORY AND GEOMETRY

US 41 is a rural principal arterial and SR 352 is a major collector. US 41 is on the National Highway System and on the National Truck Network and serves heavy commercial traffic over long distances. SR 352 serves more localized, shorter distance trips. The US 41 and SR 352 intersection is classified as an Unsignalized Rural State Intersection. US 41 is a four-lane divided highway and is constructed with two 12-foot travel lanes with 10-foot outside shoulders and four-foot median shoulders in each direction. SR 352 is a two-lane undivided highway and is constructed with two 11-foot lanes with 1-foot shoulders within the project limit. The posted speed along US 41 is 60 mph and 50 mph along SR 352 east of the intersection and 30 mph west of the intersection.

US 41 within the project limits was constructed in 1925 with concrete pavement and then reconstructed and widened in 1974. In 2013, US 41 was overlaid with asphalt pavement. Right and left turn lanes exist in both the northbound and southbound direction on US 41. There is a superelevated horizontal curve just north of the intersection on US 41.

2.2 EXISTING UTILITIES

Aerial electric and communication lines are present in the project area on the east side of US 41 and south side of SR 352. There is also an overhead red/yellow flashing beacon that spans across US 41 at the intersection. A railroad flashing signal is present south of the intersection. There is a railroad track located 0.15 miles south of the intersection. A call ticket was created and is attached in Appendix 5.

2.3 EXISTING DRAINAGE

There are two culverts within the project limits; one is located under SR 352 east of US 41 and the second one is located under SR 352 west of US 41. Multiple median inlets are located in the US 41 grass median within the project limits. The median inlets are draining east and west into the existing roadside ditches along US 41.

SECTION 3: TRAFFIC AND CRASH DATA

3.1 TRAFFIC DATA

The AADT per INDOT's Traffic Count Database System (TCDS) from 2020 is 3928 vehicles per day on US 41 and 1583 vehicles per day on SR 352. The truck percentages are 45-50% for US 41 and 10% for SR 352.

3.2 CRASH DATA

There were 13 crashes at this intersection between 2015 and 2020 including one fatal crash. From the available information in the narratives of the crashes, three crashes involved incapacitating injuries (when either the driver or the passenger was transported to the hospital), two crashes involved non-incapacitating injuries, and seven crashes involved property damages only.

The roadway performance was analyzed using RoadHAT. This Segment has an Index of Crash Frequency (ICF) of 0.57 and an Index of Crash Costs (ICC) of 1.01. The RoadHAT report and crash data are attached in Appendix 1. An ICF and ICC above 0 and less than 1 indicates that the number of crashes and their severity are slightly higher than usual.

The primary crash factors for all the recorded incidents are listed in Table 1 which shows the majority of crashes are more likely attributable to driver failure to yield right of way than road features.

Table 1: Primary cause of accidents

MANNER OF COLLISION	% OF ACCIDENTS CAUSED
DRIVER DISTRACTED	8%
REAR END	15%
RIGHT ANGLE	77%

SECTION 4: ALTERNATIVE ANALYSIS

The project team analyzed different alternatives in order to determine the optimized solution. Several alternatives were considered using a WB-67 as the design vehicle. A brief description of each alternative is below.

4.1 NO BUILD ALTERNATIVE

No-Build Alternative: Matches the Existing conditions with No Improvements

The no-build alternative would include no changes to either the existing geometry or the roadside features. This alternative will not reduce the number of crashes and will not meet the Project Purpose and Need.

4.2 LOW-COST ALTERNATIVE

Low-Cost Alternative: Install a Traffic Signal

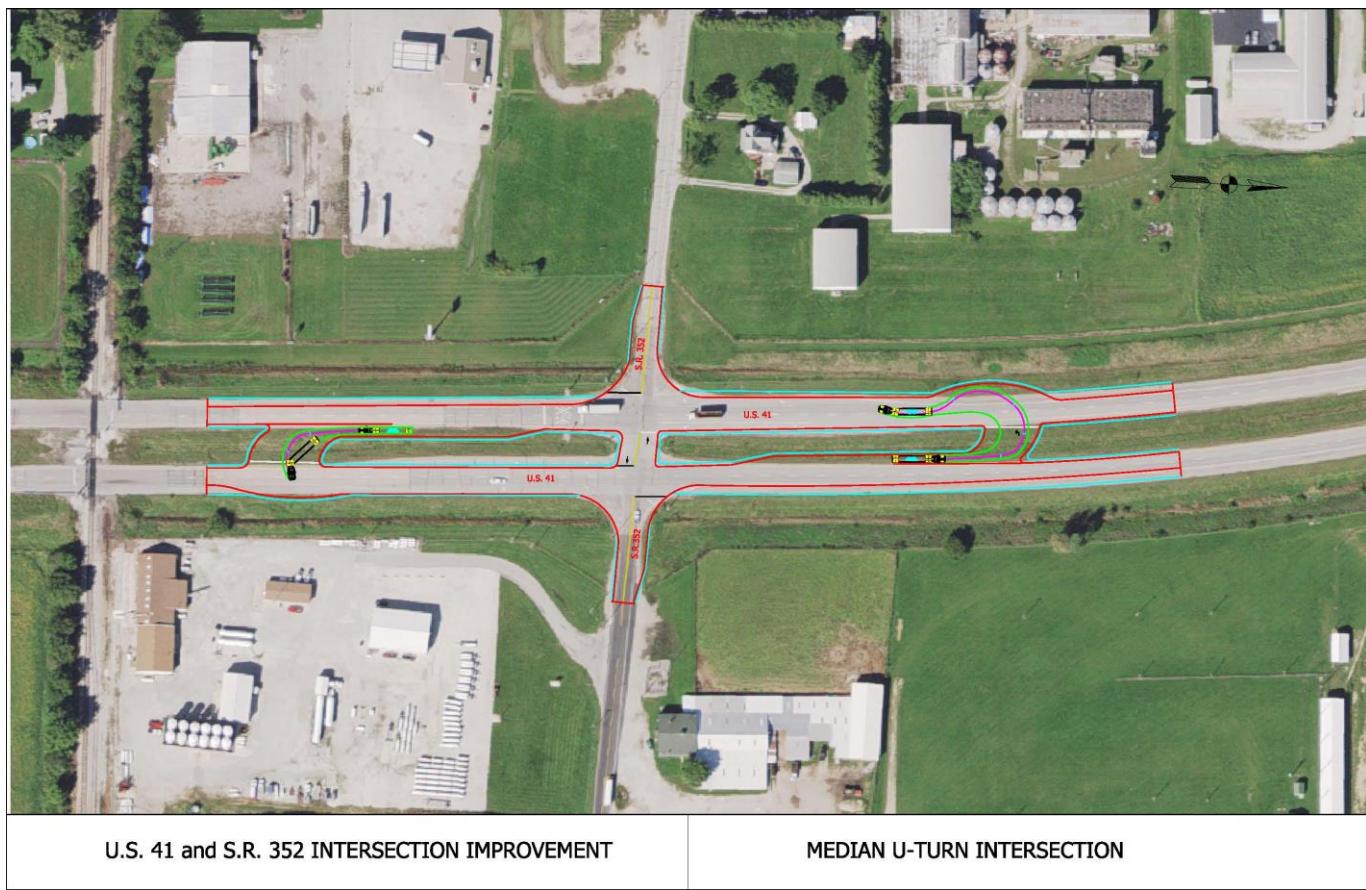
Traffic signal warrants have been checked by District Traffic personnel who found a signal is not warranted for this location. Installing an unwarranted signal will cause excessive delay, higher crash rates and may result in disobedience of the traffic signal in this rural area. This alternative will not meet the Project Purpose and Need and therefore is discarded from consideration. The signal warrant can be found in Appendix 6.

4.3 RECONSTRUCTION ALTERNATIVES

Reconstruction Alternative 1: Median U-Turn Intersection

The Median U-Turn (MUT) Intersection is also known as the Median U-Turn Crossover and sometimes referred to as a Michigan Left Turn. The MUT refers to an intersection replacing direct left turns at an intersection with indirect left turns using a U-turn movement in a wide median. The MUT intersection requires drivers on SR 352 to turn right onto the main road and then make a U-turn maneuver at a one-way median opening at least 400 feet after the intersection. The MUT intersection also eliminates left turns on SR 352 from US 41 and thus reduces the number of conflict points at the main crossing intersection, resulting in improved safety at the intersection. Right turn lanes were incorporated in the design, but they are not required; this would separate the through vehicles from the turning vehicles. The addition of the right turning lanes are included in the cost estimate. This alternative would be un-signalized. US 41 and SR 352 will be milled and resurfaced after the completion of adding the median U-turns.

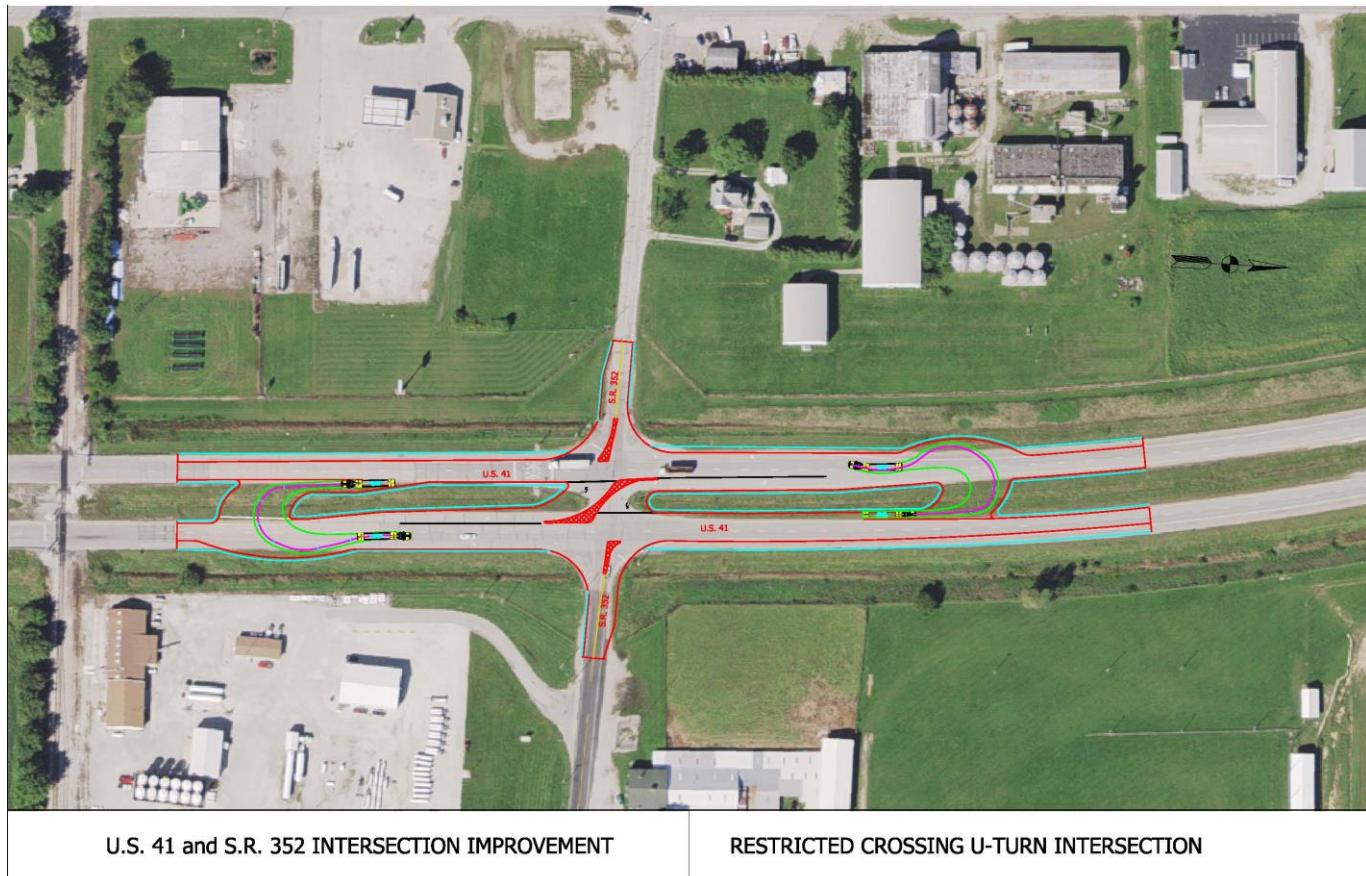
Figure 2: Median U-Turn



Reconstruction Alternative 2: Restricted Crossing U-Turn Intersection

The Restricted Crossing U-Turn (RCUT) Intersection is also known as a superstreet intersection, a J-turn intersection, and synchronized street intersection. The RCUT intersection differs from a conventional intersection by eliminating the left-turn and through movements from cross street approaches. To accommodate these movements, the RCUT intersection requires SR 352 drivers to turn right onto the main road and then make a U-turn maneuver at a one-way median opening at least 400 feet after the intersection. US 41 traffic will still be allowed to turn left on SR 352. RCUT intersections can have either three or four legs. In the case of a four-legged RCUT intersection, there are two U-turn crossovers, and minor street left-turn and through movements are not allowed to be made directly at the intersection. A stop-controlled RCUT intersection is used as a safety treatment at an isolated intersection on a four-lane divided arterial in a rural area. This alternative would be un-signalized and the turns (both the right and U-turns) would be stop controlled. US 41 and SR 352 will be milled and resurfaced after the completion of adding the median U-turns and center medians.

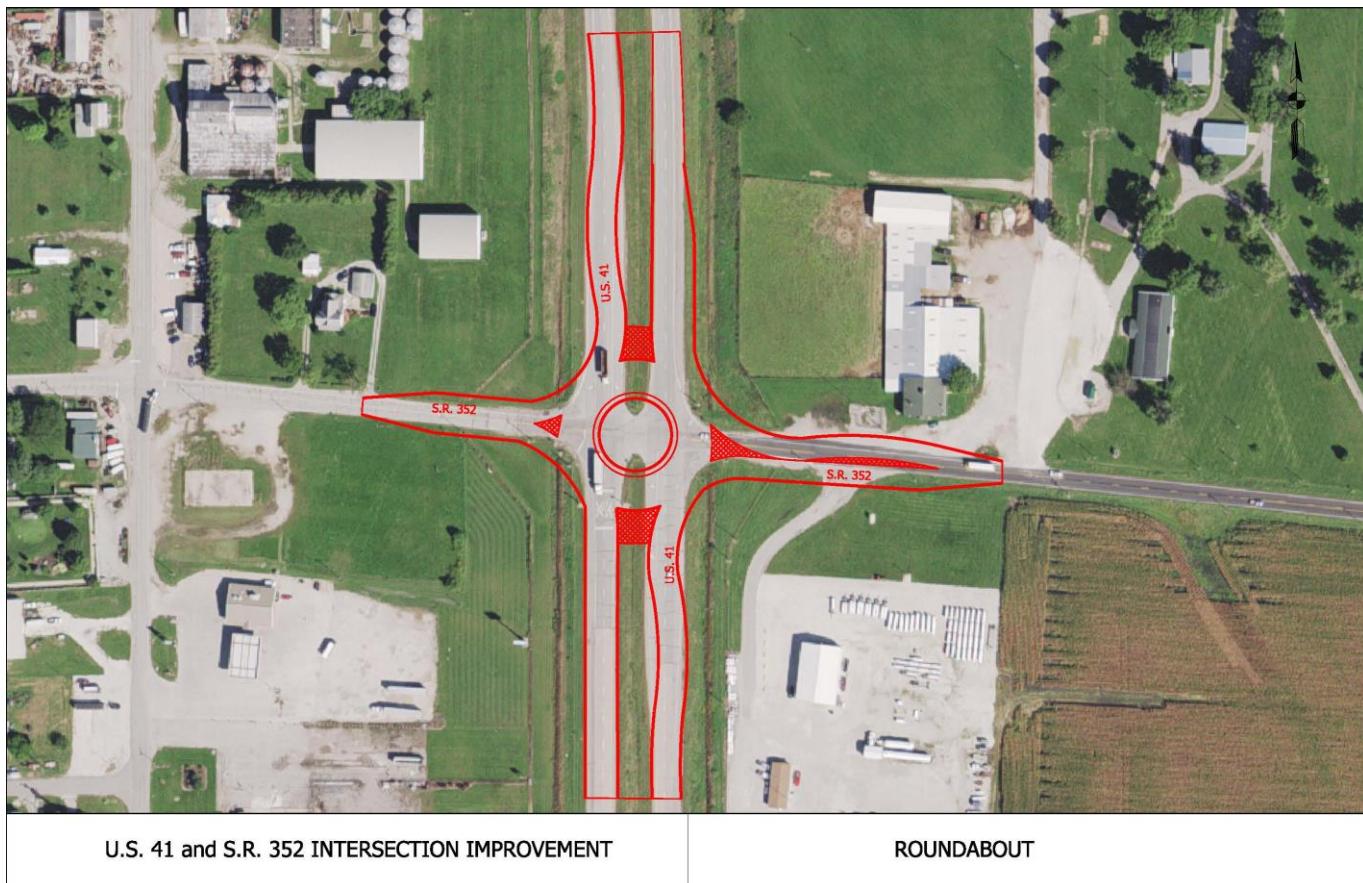
Figure 3: Restricted Crossing U-Turn



Reconstruction Alternative 3: Multi-Lane Roundabout

This alternative will consist of a multi-lane roundabout that follows the design standards per NCHRP 672 and the IDM. Multi-lane roundabouts have at least one entry with two or more lanes. SR 352 will be widened to two entry lanes to allow more vehicles to enter the roundabout. The geometric design will include raised spitter islands, truck apron, non-traversable central island, and appropriate entry path deflection. Since US 41 and the east leg of SR 352 are high speed roadways, a series of curves will be designed leading up to the roundabout to reduce the speed of vehicles. US 41 and SR 352 will be milled and resurfaced after the completion of the roundabout.

Figure 4: Multi-Lane Roundabout



4.4 MAINTENANCE OF TRAFFIC

The maintenance of traffic (MOT) for all reconstruction alternatives is to close one lane in each direction on US 41 while still maintaining one lane in each direction. For the median U-turn and restricted U-turn alternatives, the inside travel lanes will be closed in both directions in order to build the U-turns. For the restricted U-turn alternative, U-turns would be built first then the main intersection will be closed in order to construct the new islands while the through movement on SR 352 can now use the U-turns. US 41 left turns can also use the U-turns during construction of the central islands. For the roundabout alternative, construction would require 2 phases. Traffic would be shifted onto one side by using median crossovers and half of the roundabout would be built then and switched to the other side to build the other half. This may

require temporary widening and shoulder strengthening on one side of US 41 and assumes that permanent shoulders would be wider than the existing shoulders to help maintain traffic through the zone.

4.5 ENVIRONMENTAL

Impacts

A preliminary Red Flag Investigation (RFI) was performed for the project area. One 'Contributing' historic resource was noted adjacent to the project area. Per the current scope of work, this project will likely fall under the Minor Projects Programmatic Agreement (MPAA).

Other resources, including a pipeline, landfill, and other hazardous resources were identified within or adjacent to the project area. Any areas that will be disturbed outside of pavement work and drainage improvements will need to be investigated for potential water resources. No other resources are anticipated to be impacted by the proposed project.

The CE level will be dependent on the Section 106 investigations and right-of-way amounts.

Permits Required

It is anticipated that there will be >1 acre of disturbance. Therefore, a Rule 5 permit is anticipated. If water resources are identified within any of the disturbed areas outside of pavement, a USACE Section 404 permit and IDEM Section 401 WQC will be required. Per the current scope of work, an IDNR Construction in a Floodway permit is not anticipated to be required.

4.6 UTILITY COORDINATION

Utility impacts are expected for the existing utilities within the project limits. Culverts under SR 352 would need to be extended due to the lane addition. The traffic signal will need to be removed to allow for an auxiliary lane. Utility poles will need to be relocated due to pavement widening.

4.7 RAILROAD COORDINATION

There is an existing railroad track that is located 750 feet south of the US 41 and SR 352 intersection. Work is not anticipated on the adjacent railroad grade crossings' approaches. No railroad gates will be installed or repaired. A railroad clear certification must be obtained.

4.8 RIGHT OF WAY

Permanent right of way is required for the roundabout alternative. Right of Way Engineering and Title Research is required for any affected parcels.

SECTION 5: COST ESTIMATE

5.1 CONSTRUCTION COST

The estimated total project costs for all alternatives including preliminary engineering, survey, utility coordination, construction and construction services are shown in Table 2.

Table 2: Construction Cost

TASK #	TASK	COST		
		ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
1	Preliminary Engineering	\$45,000	\$45,000	\$120,000
2	Survey	\$35,000	\$35,000	\$90,000
3	Right of Way	\$0	\$0	\$29,500
4	Utility Coordination	\$69,000	\$69,000	\$147,450
5	Construction (20% Contingency)	\$760,495	\$809,715	\$2,532,385
6	Construction Support Services	\$42,000	\$42,000	\$120,000
TOTAL		\$951,495	\$1,000,715	\$3,039,335

The quantities and assumptions for each pay item is included with Appendix 2.

SECTION 6: CONCLUSION

6.1 ANALYSIS

Each reconstruction alternative was analyzed to determine how effectively it met the Project Purpose and Need.

The Multi-Lane Roundabout is not well suited to very high truck volumes combined with higher speeds on US 41 compared to the low volumes of traffic on SR 352. The trucks traveling from US 41 would be forced to slow down and navigate a roundabout on a rural US highway with very little traffic on the side roads. It is anticipated that this alternative will receive political opposition from local stakeholders, the public and truck drivers who drive this road regularly. Maintenance of traffic is more difficult for the roundabout and right of way is required. Since the roundabout has a larger footprint at the intersection, more drainage analysis is required and more grading is expected. The roundabout has significantly higher construction costs compared to the other reconstruction alternatives. For these reasons, the Multi-Lane Roundabout is discounted from further consideration.

The RCUT intersection meets the purpose and need and is a little safer than the MUT intersection. However, one major disadvantage of the RCUT intersection is that it prevents traffic on SR 352 from traveling straight through the intersection at US 41. RCUT intersection have 14 conflict points compared to 32 at a conventional intersection. Eliminating every through movement on SR 352 at US 41 does add an extra level of safety. It is anticipated that the local stakeholders and traveling public will be opposed to the RCUT intersection since through movements are not allowed.

The MUT intersection meets the purpose and need but does not close off the US 41 median to through traffic on SR 352 which will do little to reduce the number of crashes because of non-compliance and/or confusion. MUT intersection have 16 conflict points compared to 32 at conventional intersection without including the non-compliance left turn movements. This intersection will experience a reduction in crashes by using signs to require SR 352 traffic turning left onto US 41 to turn right and then make a U-turn. However, an MUT intersection has no physical restriction to stop traffic from turning left at the intersection so the presence of law enforcement may be encouraged for a longer duration upon opening the new intersection.

Per FHWA, enforcement needs at RCUT intersections may be higher in the short term but those needs are anticipated to drop in the long term. Upon opening a new MUT intersection in Michigan, MDOT typically allocates extra enforcement resources during the first few weeks of operation. Such an enforcement program is also desirable for RCUT intersections to help confused motorists avoid wrong-way movements through crossovers. Enforcement during the periods after the

RCUT intersections are initially opened to traffic help drivers become familiar and help reduce unintentional illegal maneuvers. After drivers form new habits, the need for extra enforcement is likely to subside, and normal vigilance in enforcing traffic laws at RCUT and MUT intersections should suffice.

The MUT and RCUT have smaller footprints than the roundabout which minimizes impacts to existing drainage patterns. MOT is similar for both the MUT and RCUT. The major difference between the MUT and the RCUT intersections in this scenario is that in the RCUT, there is an inability for SR 352 to make an illegal through or left turn movement. Once the central island is built in the RCUT, through and left turning traffic on SR 352 will no longer be able to go through the intersection, which can reduce the amount and severity of the crashes. The traffic in the RCUT will be forced to make the right turn onto US 41 and then a U-turn, which allows for that traffic to only have to cross one direction of traffic at a time.

6.2 RECOMMENDED ALTERNATIVE

After considering the reconstruction alternatives, even though the cost of the MUT intersection is the smallest, it has been determined that the Restricted Crossing U-Turn Intersection (Reconstruction Alternative 2) is the recommended alternative for how effectively it meets the Project Purpose and Need and not that much more in cost.

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