



# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

**QHEI Score:** 45.5
**Stream & Location:** Haviland-North Delphos T-Line **qh-mdt11/3/2016-03** **RM:** \_ \_ \_ **Date:** 11/3/2016

Hageman Creek

**Scorers Full Name & Affiliation:** Thomayer, Lubbers AECOM

**River Code:** \_ \_ \_ \_ **STORET #:** \_ \_ \_ \_ **Lat./ Long.:** 40.99875, -84.549039 **Office verified location** ☐
**1] SUBSTRATE** Check **ONLY Two** substrate **TYPE BOXES**; estimate % or note every type present

Check ONE (Or 2 &amp; average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE		ORIGIN		QUALITY		Substrate <div style="border: 1px solid black; border-radius: 10px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">8</div> Maximum 20
<input type="checkbox"/>	BLDR /SLABS [10]			<input type="checkbox"/>	HARDPAN [4]			<input type="checkbox"/>	LIMESTONE [1]	<input type="checkbox"/>	HEAVY [-2]	
<input type="checkbox"/>	BOULDER [9]			<input type="checkbox"/>	DETRITUS [3]			<input type="checkbox"/>	TILLS [1]	<input checked="" type="checkbox"/>	MODERATE [-1]	
<input type="checkbox"/>	COBBLE [8]	10	10	<input type="checkbox"/>	MUCK [2]			<input type="checkbox"/>	WETLANDS [0]	<input type="checkbox"/>	NORMAL [0]	
<input type="checkbox"/>	GRAVEL [7]	10	15	<input checked="" type="checkbox"/>	SILT [2]	55	50	<input checked="" type="checkbox"/>	HARDPAN [0]	<input type="checkbox"/>	FREE [1]	
<input checked="" type="checkbox"/>	SAND [6]	25	5	<input type="checkbox"/>	ARTIFICIAL [0]		20	<input type="checkbox"/>	SANDSTONE [0]	<input checked="" type="checkbox"/>	EXTENSIVE [-2]	
<input type="checkbox"/>	BEDROCK [5]			(Score natural substrates; ignore)				<input type="checkbox"/>	RIP/RAP [0]	<input checked="" type="checkbox"/>	MODERATE [-1]	
								<input type="checkbox"/>	LACUSTURINE [0]	<input type="checkbox"/>	NORMAL [0]	
								<input type="checkbox"/>	SHALE [-1]	<input type="checkbox"/>	NONE [1]	
								<input type="checkbox"/>	COAL FINES [-2]			

**NUMBER OF BEST TYPES:** ☒ 4 or more [2] ☐ 3 or less [0] ☐ sludge from point-sources

**Comments**
**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

**AMOUNT**

Check ONE (Or 2 &amp; average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input checked="" type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

**Comments**
**Cover**  
Maximum 20  
11
**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

**Comments**
**Channel**  
Maximum 20  
11
**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for **EACH BANK** (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]				
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]				
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]				
	<input checked="" type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]					
	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]					

Indicate predominant land use(s) past 100m riparian.

**Comments**
**Riparian**  
Maximum 10  
4
**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**
**MAXIMUM DEPTH**

Check ONE (ONLY!)

☐ > 1m [6]  
☐ 0.7-<1m [4]  
☐ 0.4-<0.7m [2]  
☒ 0.2-<0.4m [1]  
☐ < 0.2m [0]

**CHANNEL WIDTH**

Check ONE (Or 2 &amp; average)

☒ POOL WIDTH > RIFFLE WIDTH [2]  
☐ POOL WIDTH = RIFFLE WIDTH [1]  
☐ POOL WIDTH < RIFFLE WIDTH [0]

**CURRENT VELOCITY**

Check ALL that apply

☐ TORRENTIAL [-1] ☐ SLOW [1]  
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]  
☐ FAST [1] ☐ INTERMITTENT [-2]  
☒ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

**Recreation Potential**
**Primary Contact**
**Secondary Contact**  
(circle one and comment on back)

**Comments** 18"

**Pool / Current**  
Maximum 12  
4

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 &amp; average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

**Comments**
**Riffle / Run**  
Maximum 8  
3.5

<b>6] GRADIENT</b> ( 1.5 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]
<b>DRAINAGE AREA</b> ( 13.4 mi <sup>2</sup> )	<input type="checkbox"/> MODERATE [6-10]
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]

%POOL: 10	%GLIDE: 35
%RUN: 40	%RIFFLE: 15

**Gradient**  
Maximum 10  
4

## AJ SAMPLED REACH

Check ALL that apply

### METHOD

- ☐ BOAT  
☒ WADE  
☐ L. LINE  
☐ OTHER

### STAGE

- 1st -sample pass- 2nd  
☐ HIGH  
☐ UP  
☒ NORMAL  
☐ LOW  
☐ DRY

### DISTANCE

- ☐ 0.5 Km  
☐ 0.2 Km  
☐ 0.15 Km  
☐ 0.12 Km  
☐ OTHER

200 feet

### CANOPY

- ☒ > 85%- OPEN  
☐ 55%-<85%  
☐ 30%-<55%  
☐ 10%-<30%  
☐ <10%- CLOSED

### CLARITY

- 1st --sample pass-- 2nd  
☐ < 20 cm  
☐ 20-<40 cm  
☐ 40-70 cm  
☐ > 70 cm/ CTB  
☐ SECCHI DEPTH

1st \_\_\_\_\_ cm  
2nd \_\_\_\_\_ cm

### CJ REC

ION AREA DEPTH  
POOL: ☐ >100ft<sup>2</sup> ☐ >3ft

### BJ AESTHETIC

- ☐ NUISANCE ALGAE  
☐ INVASIVE MACROPHYTES  
☐ EXCESS TURBIDITY  
☐ DISCOLORATION  
☐ FOAM / SCUM  
☐ OIL SHEEN  
☐ TRASH / LITTER  
☐ NUISANCE ODOR  
☐ SLUDGE DEPOSITS  
☐ CSOs/SSOs/OUTFALLS

### DJ MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA  
ACTIVE / HISTORIC / BOTH / NA  
YOUNG-SUCCESSION-OLD  
SPRAY / SNAG / REMOVED  
MODIFIED / DIPPED OUT / NA  
LEVEED / ONE SIDED  
RELOCATED / CUTOFFS  
MOVING-BEDLOAD-STABLE  
ARMOURED / SLUMPS  
ISLANDS / SCOURD  
IMPOUNDED / DESICCATED  
FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

### EJ ISSUES

- WWTP / CSO / NPDES / INDUSTRY  
HARDENED / URBAN / DIRT&GRIME  
CONTAMINATED / LANDFILL  
BMPs-CONSTRUCTION-SEDIMENT  
LOGGING / IRRIGATION / COOLING  
BANK / EROSION / SURFACE  
FALSE BANK / MANURE / LAGOON  
WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
ACID / MINE / QUARRY / FLOW  
NATURAL / WETLAND / STAGNANT  
PARK / GOLF / LAWN / HOME  
ATMOSPHERE / DATA PAUCITY

### FJ MEASUREMENTS

- $\bar{x}$  width  
 $\bar{x}$  depth  
max. depth  
 $\bar{x}$  bankfull width  
bankfull  $\bar{x}$  depth  
W/D ratio  
bankfull max. depth  
floodprone x<sup>2</sup> width  
entrench. ratio

Le Tree:

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

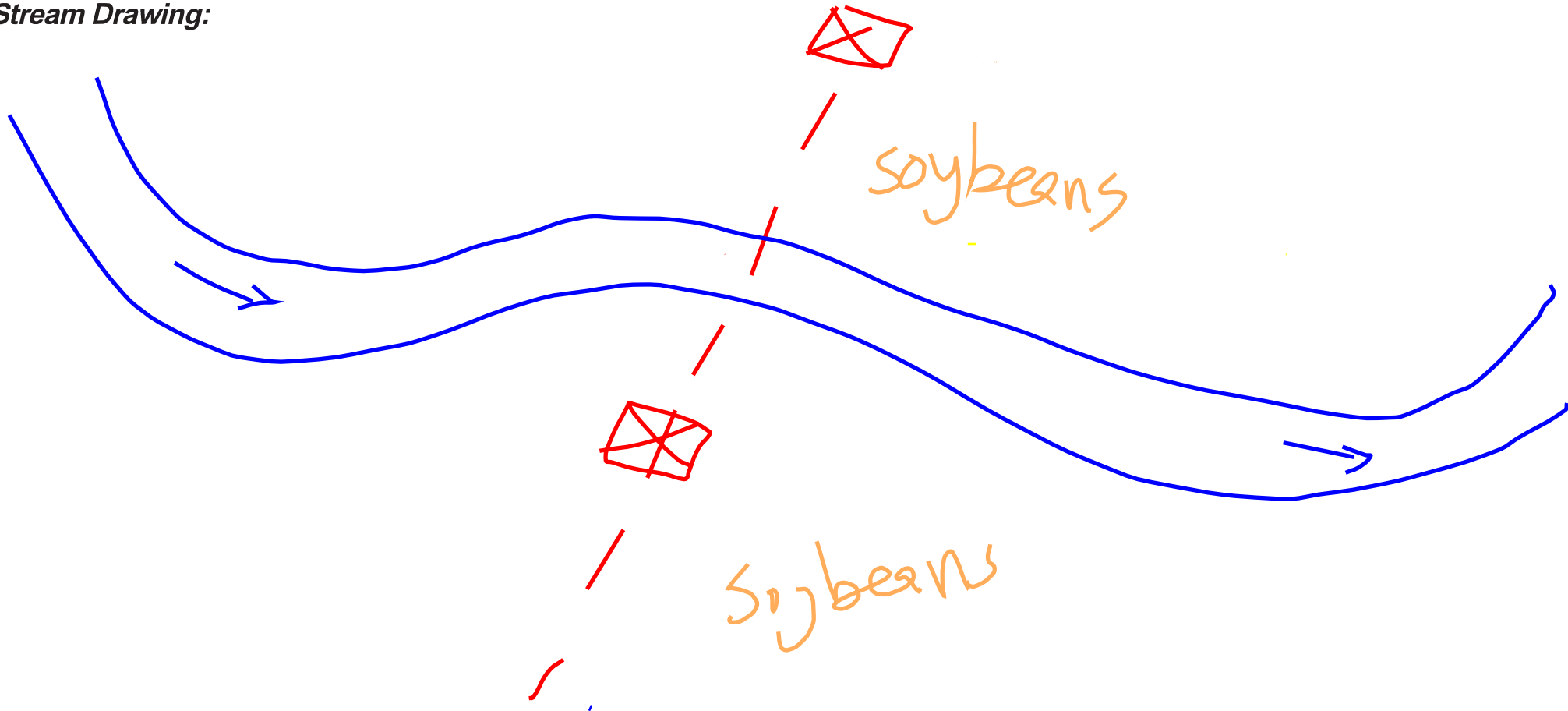
MPD=18"

OHWM Width=10'

TOB Width=30'

mussel shell observed on bank; minnows observed

## Stream Drawing:





## Primary Headwater Habitat Evaluation Form

15

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Haviland-North Delphos T-Line**hh-mdt-11032016-05 SITE NUMBER RIVER BASIN DRAINAGE AREA (mi<sup>2</sup>)

LENGTH OF STREAM REACH (ft) LAT. LONG. RIVER CODE RIVER MILE

DATE **11/03/16** SCORER **MDT, JBL** COMMENTS **ephemeral**

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS: **channelized along road;**

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<input type="text" value="0%"/>	<input checked="" type="checkbox"/> SILT [3 pt]	<input type="text" value="40%"/>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> BEDROCK [16 pt]	<input type="text" value="0%"/>	<input type="checkbox"/> FINE DETRITUS [3 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<input type="text" value="0%"/>	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<input type="text" value="60%"/>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> MUCK [0 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> ARTIFICIAL [3 pts]	<input type="text" value="0%"/>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

3

TOTAL NUMBER OF SUBSTRATE TYPES:

2

HHEI Metric Points

Substrate Max = 40

5

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS MAXIMUM POOL DEPTH (Inches): **1.00**

Pool Depth Max = 30

5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS AVERAGE BANKFULL WIDTH (Feet): **1.00**

Bankfull Width Max=30

5

This information must also be completed

## RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

## RIPARIAN WIDTH

## FLOODPLAIN QUALITY

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

## STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)

**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name:  Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name:  NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: **Paulding** Township / City:

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **11/02/16** Quantity: **0.00**  
Photograph Information:   
Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **100%**  
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

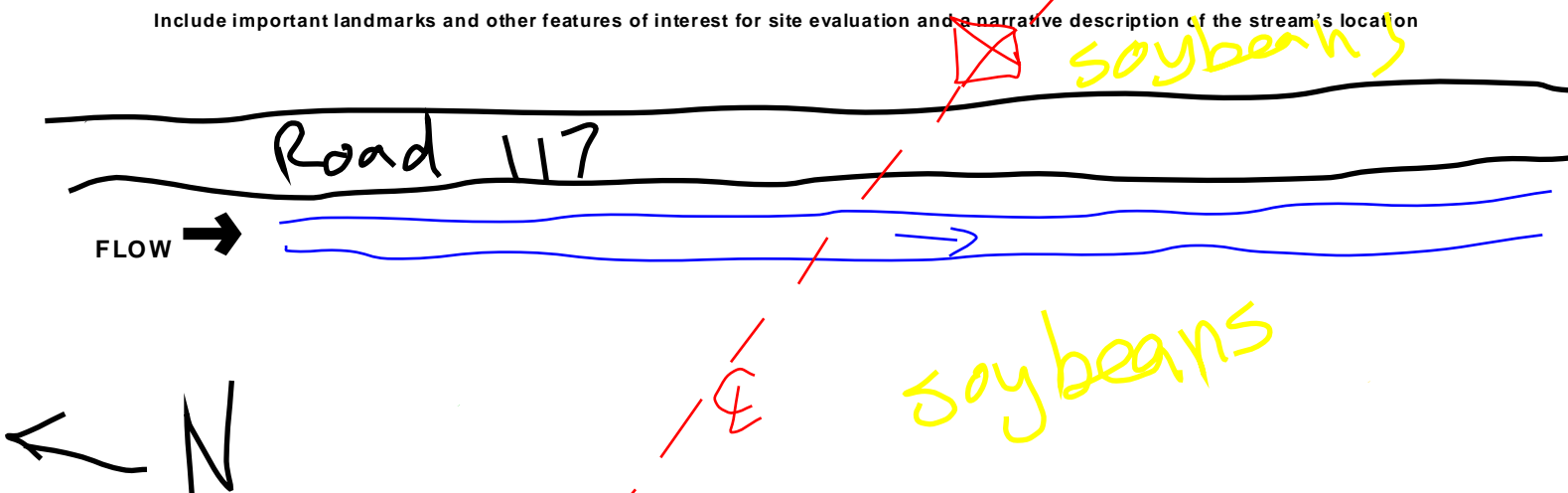
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N  
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N  
Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

39

**Stream & Location:** Haviland-North Delphos T-Line **qh-mdt11/3/2016-02** **RM:** **Date:** 11/3/2016

Dry Creek

**Scorers Full Name & Affiliation:** Thomayer, Lubbers AECOM
**River Code:** **STORET #:** **Lat./ Long.:** 41.004694, -84.563076 **Office verified location** ☐

## 1] SUBSTRATE

Check **ONLY Two** substrate **TYPE BOXES**; estimate % or note every type present

Check ONE (Or 2 &amp; average)

BEST TYPES		POOL RIFFLE		OTHER TYPES		POOL RIFFLE		ORIGIN		QUALITY		Substrate 6 Maximum 20
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<input type="checkbox"/>	GRAVEL [7]	<input type="checkbox"/>	10 15	<input checked="" type="checkbox"/>	SILT [2]	<input type="checkbox"/>	70 60	<input checked="" type="checkbox"/>	HARDPAN [0]	<input type="checkbox"/>	FREE [1]	
<input type="checkbox"/>	SAND [6]	<input type="checkbox"/>		<input type="checkbox"/>	ARTIFICIAL [0]	<input type="checkbox"/>	25	<input type="checkbox"/>	SANDSTONE [0]	<input checked="" type="checkbox"/>	EXTENSIVE [-2]	
<input type="checkbox"/>	BEDROCK [5]	<input type="checkbox"/>		(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/>	RIP/RAP [0]	<input checked="" type="checkbox"/>	MODERATE [-1]	
								<input type="checkbox"/>	LACUSTURINE [0]	<input type="checkbox"/>	NORMAL [0]	
								<input type="checkbox"/>	SHALE [-1]	<input type="checkbox"/>	NONE [1]	
								<input type="checkbox"/>	COAL FINES [-2]			

**NUMBER OF BEST TYPES:** ☒ 4 or more [2] ☐ 3 or less [0]

Comments

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Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

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Comments

 Cover  
Maximum  
20  
10

## 3] CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 &amp; average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
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<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input checked="" type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

 Channel  
Maximum  
20  
9.5

## 4] BANK EROSION AND RIPARIAN ZONE

River right looking downstream

Check ONE in each category for EACH BANK (Or 2 per bank &amp; average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]				
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	<input checked="" type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]					
	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]					

Indicate predominant land use(s) past 100m riparian.

Comments

 Riparian  
Maximum  
10  
3

## 5] POOL / GLIDE AND RIFFLE / RUN QUALITY

### MAXIMUM DEPTH

Check ONE (ONLY!)

☐ > 1m [6]  
☐ 0.7-<1m [4]  
☐ 0.4-<0.7m [2]  
☐ 0.2-<0.4m [1]  
☒ < 0.2m [0]

### CHANNEL WIDTH

Check ONE (Or 2 &amp; average)

☒ POOL WIDTH > RIFFLE WIDTH [2]  
☐ POOL WIDTH = RIFFLE WIDTH [1]  
☐ POOL WIDTH < RIFFLE WIDTH [0]

### CURRENT VELOCITY

Check ALL that apply

☐ TORRENTIAL [-1] ☐ SLOW [1]  
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]  
☐ FAST [1] ☐ INTERMITTENT [-2]  
☒ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

### Recreation Potential

Primary Contact

Secondary Contact  
(circle one and comment on back)

Comments 6"

 Pool /  
Current  
Maximum  
12  
3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 &amp; average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

 Riffle /  
Run  
Maximum  
8  
3.5

<b>6] GRADIENT</b> ( 1.5 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]	%POOL: 20	%GLIDE: 20	Gradient Maximum 10 4
<b>DRAINAGE AREA</b> ( 2.29 mi <sup>2</sup> )	<input type="checkbox"/> MODERATE [6-10]	%RUN: 45	%RIFFLE: 15	
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

## AJ SAMPLED REACH

Check ALL that apply

### METHOD

- ☐ BOAT  
☒ WADE  
☐ L. LINE  
☐ OTHER

### STAGE

- 1st -sample pass- 2nd  
☐ HIGH  
☐ UP  
☒ NORMAL  
☐ LOW  
☐ DRY

### DISTANCE

- ☐ 0.5 Km  
☐ 0.2 Km  
☐ 0.15 Km  
☐ 0.12 Km  
☐ OTHER

200 feet

### CANOPY

- ☒ > 85%- OPEN  
☐ 55%-<85%  
☐ 30%-<55%  
☐ 10%-<30%  
☐ <10%- CLOSED

### CLARITY

- 1st --sample pass-- 2nd  
☐ < 20 cm  
☐ 20-<40 cm  
☐ 40-70 cm  
☐ > 70 cm/ CTB  
☐ SECCHI DEPTH

1st \_\_\_\_\_ cm  
2nd \_\_\_\_\_ cm

### CJ REC

MPD=6"

OHWM Width=6'

TOB Width=12'

### BJ AESTHETIC

- ☐ NUISANCE ALGAE  
☐ INVASIVE MACROPHYTES  
☐ EXCESS TURBIDITY  
☐ DISCOLORATION  
☐ FOAM / SCUM  
☐ OIL SHEEN  
☐ TRASH / LITTER  
☐ NUISANCE ODOR  
☐ SLUDGE DEPOSITS  
☐ CSOs/SSOs/OUTFALLS

ION AREA DEPTH  
POOL: ☐ >100ft<sup>2</sup> ☐ >3ft

### DJ MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA  
ACTIVE / HISTORIC / BOTH / NA  
YOUNG-SUCCESSION-OLD  
SPRAY / SNAG / REMOVED  
MODIFIED / DIPPED OUT / NA  
LEVEED / ONE SIDED  
RELOCATED / CUTOFFS  
MOVING-BEDLOAD-STABLE  
ARMOURED / SLUMPS  
ISLANDS / SCoured  
IMPOUNDED / DESICCATED  
FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

### EJ ISSUES

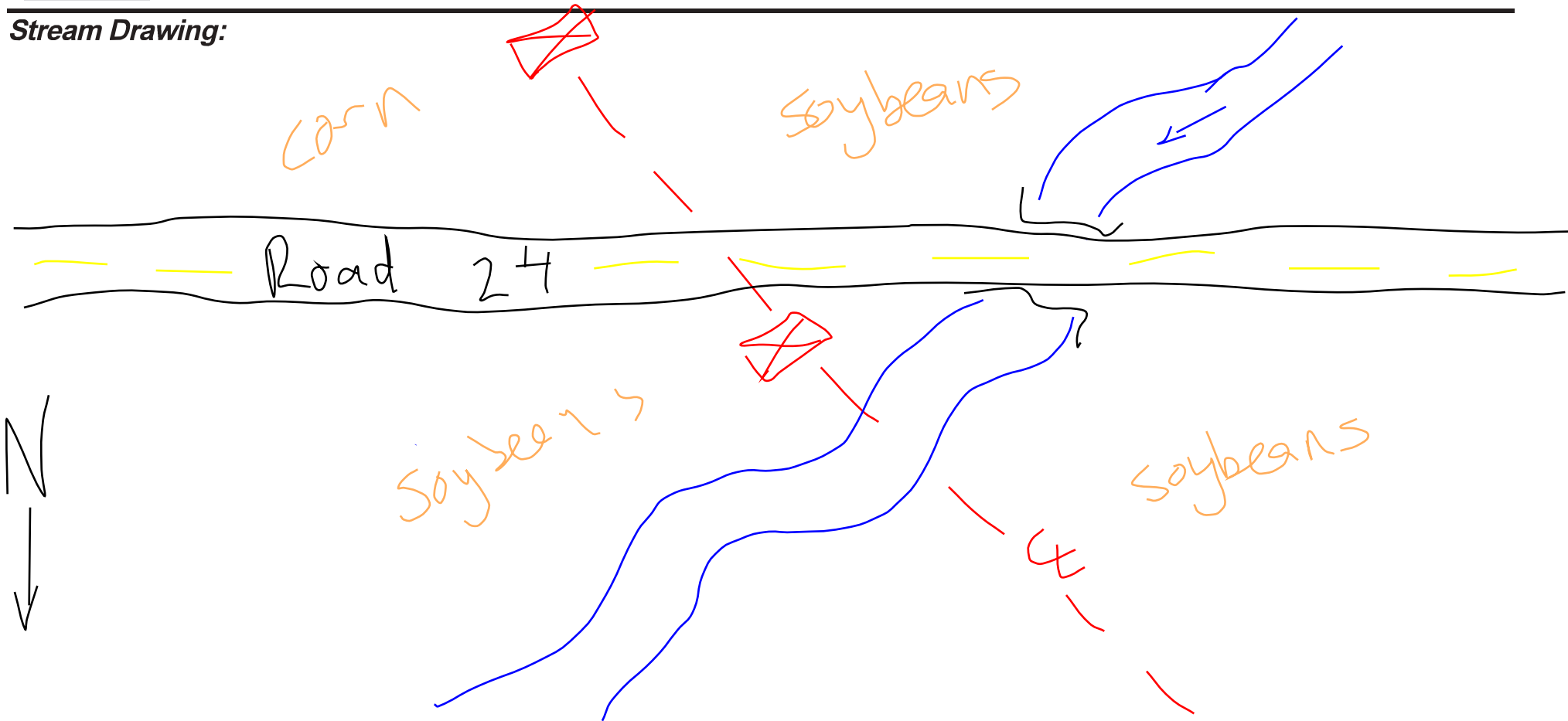
- WWTP / CSO / NPDES / INDUSTRY  
HARDENED / URBAN / DIRT&GRIME  
CONTAMINATED / LANDFILL  
BMPs-CONSTRUCTION-SEDIMENT  
LOGGING / IRRIGATION / COOLING  
BANK / EROSION / SURFACE  
FALSE BANK / MANURE / LAGOON  
WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
ACID / MINE / QUARRY / FLOW  
NATURAL / WETLAND / STAGNANT  
PARK / GOLF / LAWN / HOME  
ATMOSPHERE / DATA PAUCITY

### FJ MEASUREMENTS

- $\bar{x}$  width  
 $\bar{x}$  depth  
max. depth  
 $\bar{x}$  bankfull width  
bankfull  $\bar{x}$  depth  
W/D ratio  
bankfull max. depth  
floodprone  $x^2$  width  
entrench. ratio

Le Tree:

## Stream Drawing:







## Primary Headwater Habitat Evaluation Form

10

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Haviland-North Delphos T-Line**hh-mdt-11032016-04 SITE NUMBER RIVER BASIN DRAINAGE AREA (mi<sup>2</sup>)LENGTH OF STREAM REACH (ft) **200** LAT. **41.00694** LONG. **-84.56783** RIVER CODE RIVER MILEDATE **11/03/16** SCORER **MDT, JBL** COMMENTS **ephemeral**

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS: **channelized through ag fields; some wet vegetation in channel**

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<input type="text" value="0%"/>	<input checked="" type="checkbox"/> SILT [3 pt]	<input type="text" value="70%"/>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> BEDROCK [16 pt]	<input type="text" value="0%"/>	<input type="checkbox"/> FINE DETRITUS [3 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<input type="text" value="0%"/>	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<input type="text" value="30%"/>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> MUCK [0 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> ARTIFICIAL [3 pts]	<input type="text" value="0%"/>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A) Substrate Percentage Check

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **3**TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

5

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (Inches): **0.00**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (Feet): **1.50**

This information must also be completed

## RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

## RIPARIAN WIDTH

## FLOODPLAIN QUALITY

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

## STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)
 ☐ Flat to Moderate
 ☐ Moderate (2 ft/100 ft)
 ☐ Moderate to Severe
 ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)

**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name:  Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name:  NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: **Paulding** Township / City:

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **11/02/16** Quantity: **0.00**  
Photograph Information:   
Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **100%**  
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

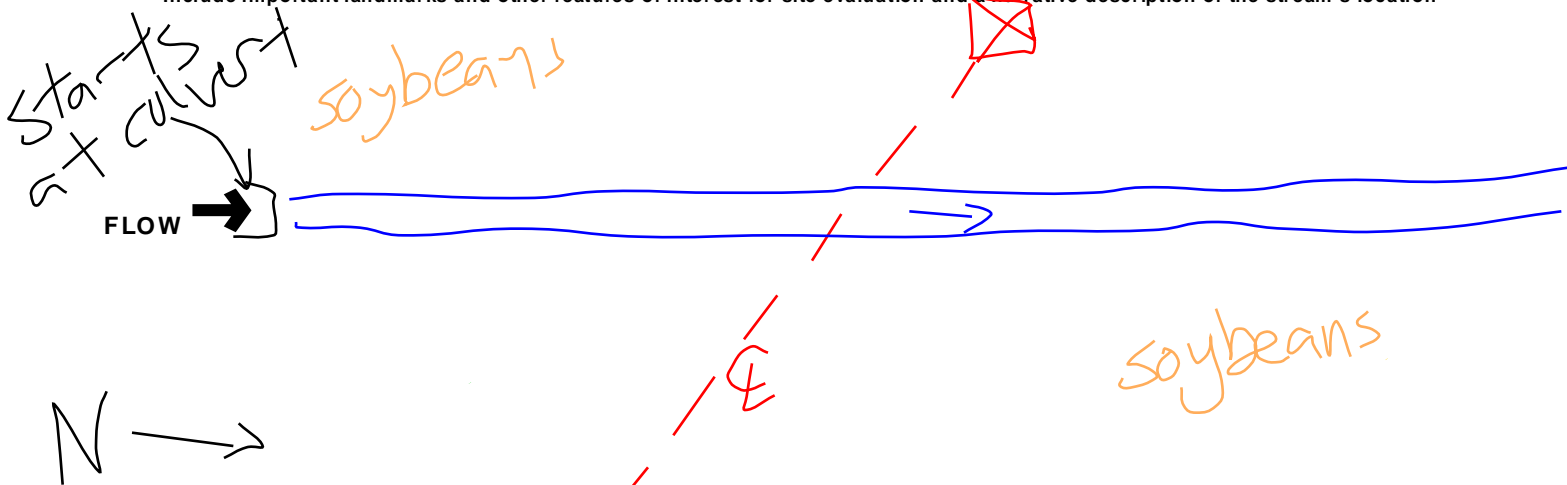
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N  
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N  
Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location







## Primary Headwater Habitat Evaluation Form

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HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Haviland-North Delphos T-Line**hh-mdt-11032016-03 SITE NUMBER RIVER BASIN DRAINAGE AREA (mi<sup>2</sup>)LENGTH OF STREAM REACH (ft) **200** LAT. **41.00901** LONG. **-84.57294** RIVER CODE RIVER MILEDATE **11/03/16** SCORER **MDT, JBL** COMMENTS **ephemeral**

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY  
 MODIFICATIONS: **channelized to parallel road; some wet vegetation in channel**

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<b>0%</b>	<input checked="" type="checkbox"/> SILT [3 pt]	<b>60%</b>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<b>0%</b>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<b>0%</b>
<input type="checkbox"/> BEDROCK [16 pt]	<b>0%</b>	<input type="checkbox"/> FINE DETRITUS [3 pts]	<b>0%</b>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<b>0%</b>	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<b>30%</b>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<b>0%</b>	<input type="checkbox"/> MUCK [0 pts]	<b>0%</b>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<b>0%</b>	<input type="checkbox"/> ARTIFICIAL [3 pts]	<b>10%</b>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A) Substrate Percentage Check

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **3**TOTAL NUMBER OF SUBSTRATE TYPES: **3**HHEI  
Metric  
PointsSubstrate  
Max = 40

6

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS MAXIMUM POOL DEPTH (Inches): **2.00**Pool Depth  
Max = 30

5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS AVERAGE BANKFULL WIDTH (Feet): **3.00**Bankfull  
Width  
Max=30

5

This information must also be completed

## RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

## RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS

## FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

## STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)





# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

**QHEI Score:** 26.5
**Stream & Location:** Haviland-North Delphos T-Line **qh-mdt11/3/2016-01** **RM:** **Date:** 11/3/2016

Prairie Creek

**Scorers Full Name & Affiliation:** Thomayer, Lubbers AECOM

**River Code:** **STORET #:** **Lat./ Long.:** 41.01109, -84.577413 **Office verified location** ☐
**1] SUBSTRATE** Check **ONLY Two** substrate **TYPE BOXES**; estimate % or note every type present

Check ONE (Or 2 &amp; average)

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input checked="" type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input checked="" type="checkbox"/> SILT	<input checked="" type="checkbox"/> HEAVY [-2]	<b>Substrate</b> <span style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block; text-align: center;">2</span> Maximum 20
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/>	<input type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> 10	<input checked="" type="checkbox"/> SILT [2]	<input type="checkbox"/> 70	<input checked="" type="checkbox"/> HARDPAN [0]	<input type="checkbox"/>	<input checked="" type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/>	<input checked="" type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/>	<input type="checkbox"/> NORMAL [0]	
				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/>	<input type="checkbox"/> NONE [1]	
				<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/>		

**NUMBER OF BEST TYPES:** ☐ 4 or more [2] ☒ 3 or less [0]

**Comments**
**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

**AMOUNT**

Check ONE (Or 2 &amp; average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input checked="" type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

**Cover**  
Maximum 20

**Comments**
**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input checked="" type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

**Channel**  
Maximum 20

**Comments**
**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for **EACH BANK** (Or 2 per bank & average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]				
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]				
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]				
	<input checked="" type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]					
	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]					

Indicate predominant land use(s) past 100m riparian.

**Riparian**  
Maximum 10

**Comments**
**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**
**MAXIMUM DEPTH**

Check ONE (ONLY!)

☐ > 1m [6]  
☐ 0.7-<1m [4]  
☒ 0.4-<0.7m [2]  
☐ 0.2-<0.4m [1]  
☐ < 0.2m [0]

**CHANNEL WIDTH**

Check ONE (Or 2 &amp; average)

☐ POOL WIDTH > RIFFLE WIDTH [2]  
☒ POOL WIDTH = RIFFLE WIDTH [1]  
☐ POOL WIDTH < RIFFLE WIDTH [0]

**CURRENT VELOCITY**

Check ALL that apply

☐ TORRENTIAL [-1] ☒ SLOW [1]  
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]  
☐ FAST [1] ☐ INTERMITTENT [-2]  
☐ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

**Recreation Potential**
**Primary Contact**
**Secondary Contact**  
(circle one and comment on back)

**Pool / Current**  
Maximum 12

**Comments** assume 2'

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 &amp; average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

**Riffle / Run**  
Maximum 8

**Comments**

<b>6] GRADIENT</b> ( 2 ft/mi)	<input checked="" type="checkbox"/> VERY LOW - LOW [2-4]
<b>DRAINAGE AREA</b> ( 19.1 mi <sup>2</sup> )	<input type="checkbox"/> MODERATE [6-10]
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]

%POOL: 0	%GLIDE: 100
%RUN: 0	%RIFFLE: 0

**Gradient**  
Maximum 10

## AJ SAMPLED REACH

Check ALL that apply

### METHOD

- ☐ BOAT  
☒ WADE  
☐ L. LINE  
☐ OTHER

### STAGE

1st -sample pass- 2nd

- ☐ HIGH  
☐ UP  
☒ NORMAL  
☐ LOW  
☐ DRY

### DISTANCE

- ☐ 0.5 Km  
☐ 0.2 Km  
☐ 0.15 Km  
☐ 0.12 Km  
☐ OTHER

200 feet

### CANOPY

- ☒ > 85%- OPEN  
☐ 55%-<85%  
☐ 30%-<55%  
☐ 10%-<30%  
☐ <10%- CLOSED

### CLARITY

1st --sample pass-- 2nd

- ☒ < 20 cm  
☐ 20-<40 cm  
☐ 40-70 cm  
☐ > 70 cm/ CTB  
☐ SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

### CJ REC

MPD=24"

OHWM Width=18'

TOB Width=25'

### BJ AESTHETIC

- ☐ NUISANCE ALGAE  
☐ INVASIVE MACROPHYTES  
☐ EXCESS TURBIDITY  
☐ DISCOLORATION  
☐ FOAM / SCUM  
☐ OIL SHEEN  
☐ TRASH / LITTER  
☐ NUISANCE ODOR  
☐ SLUDGE DEPOSITS  
☐ CSOs/SSOs/OUTFALLS

### DJ MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA  
ACTIVE / HISTORIC / BOTH / NA  
YOUNG-SUCCESSION-OLD  
SPRAY / SNAG / REMOVED  
MODIFIED / DIPPED OUT / NA  
LEVEED / ONE SIDED  
RELOCATED / CUTOFFS  
MOVING-BEDLOAD-STABLE  
ARMOURED / SLUMPS  
ISLANDS / SCOURD  
IMPOUNDED / DESICCATED  
FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

### EJ ISSUES

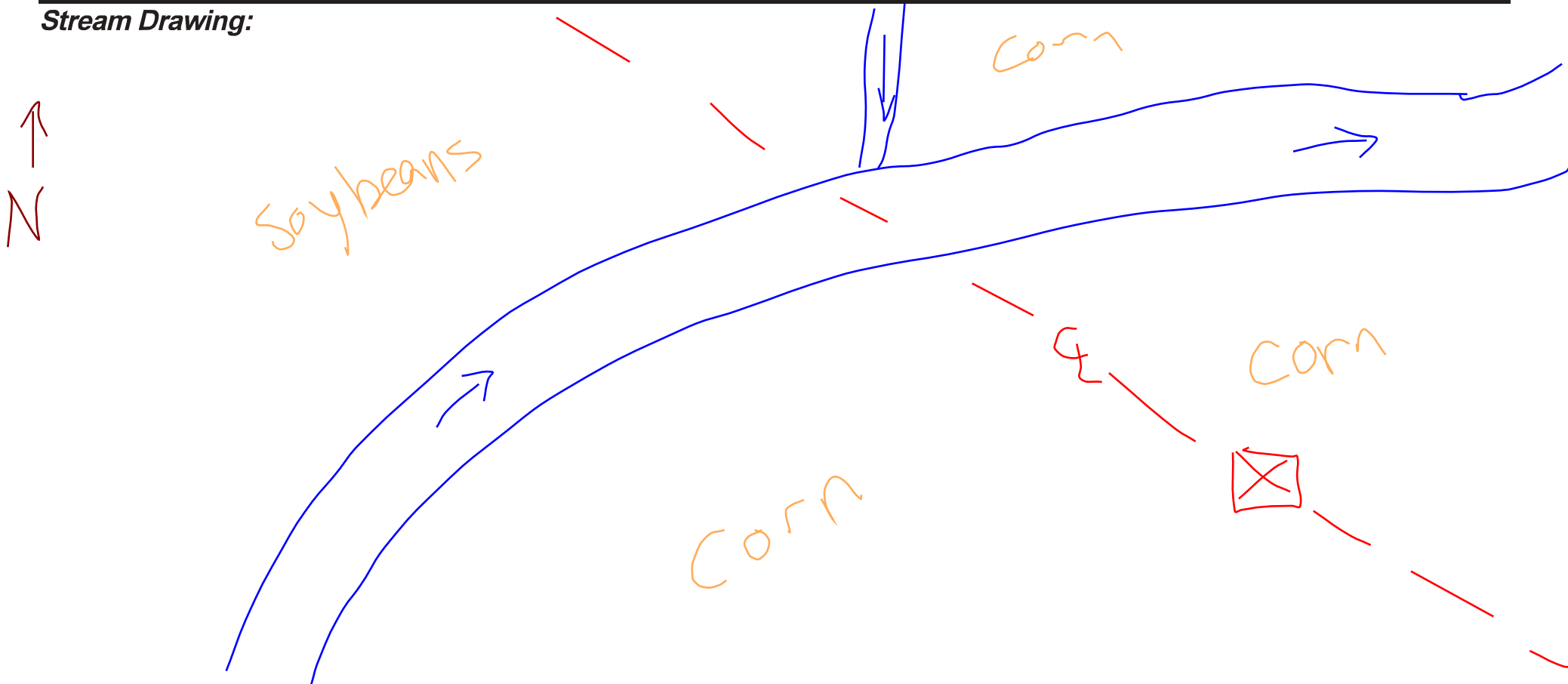
- WWTP / CSO / NPDES / INDUSTRY  
HARDENED / URBAN / DIRT&GRIME  
CONTAMINATED / LANDFILL  
BMPs-CONSTRUCTION-SEDIMENT  
LOGGING / IRRIGATION / COOLING  
BANK / EROSION / SURFACE  
FALSE BANK / MANURE / LAGOON  
WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
ACID / MINE / QUARRY / FLOW  
NATURAL / WETLAND / STAGNANT  
PARK / GOLF / LAWN / HOME  
ATMOSPHERE / DATA PAUCITY

### FJ MEASUREMENTS

- $\bar{x}$  width  
 $\bar{x}$  depth  
max. depth  
 $\bar{x}$  bankfull width  
bankfull  $\bar{x}$  depth  
W/D ratio  
bankfull max. depth  
floodprone  $x^2$  width  
entrench. ratio

Le Tree:

## Stream Drawing:





## Primary Headwater Habitat Evaluation Form

18

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **AEP NorthDelphos-Haviland**

hh-mdt-11032016-02

SITE NUMBER

RIVER BASIN

DRAINAGE AREA (mi<sup>2</sup>)LENGTH OF STREAM REACH (ft) **200**

LAT.

**41.01135**

LONG.

**-84.57770**

RIVER CODE

RIVER MILE

DATE **11/03/16**SCORER **mdt,jbl**COMMENTS **ephemeral**

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL  
MODIFICATIONS:☐ NONE / NATURAL CHANNEL☐ RECOVERED☒ RECOVERING☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<input type="text" value="0%"/>	<input checked="" type="checkbox"/> SILT [3 pt]	<input type="text" value="95%"/>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> BEDROCK [16 pt]	<input type="text" value="0%"/>	<input type="checkbox"/> FINE DETRITUS [3 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<input type="text" value="0%"/>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<input type="text" value="0%"/>	<input type="checkbox"/> MUCK [0 pts]	<input type="text" value="0%"/>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<input type="text" value="0%"/>	<input checked="" type="checkbox"/> ARTIFICIAL [3 pts]	<input type="text" value="5%"/>

Total of Percentages of  
Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage  
Check

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

**6**

TOTAL NUMBER OF SUBSTRATE TYPES:

**2**HHEI  
Metric  
PointsSubstrate  
Max = 40**8**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH

(Inches):

**1.00**Pool Depth  
Max = 30**5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH

(Feet):

**1.50**Bankfull  
Width  
Max=30**5**

This information must also be completed

## RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

## RIPARIAN WIDTH

## FLOODPLAIN QUALITY

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

## STREAM GRADIENT ESTIMATE

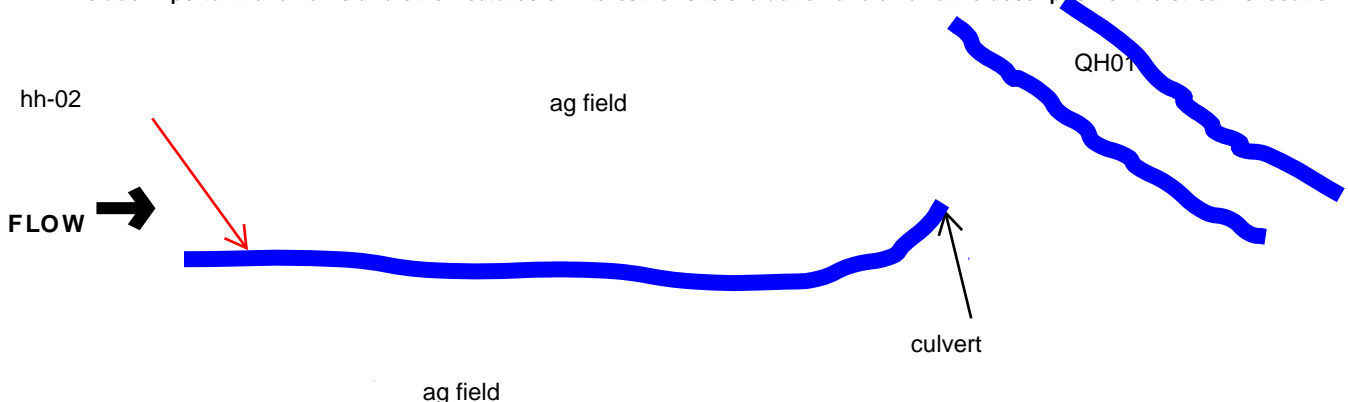
☒ Flat (0.5 ft/100 ft)
 ☐ Flat to Moderate
 ☐ Moderate (2 ft/100 ft)
 ☐ Moderate to Severe
 ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

<input type="checkbox"/> WWH Name:	<input type="text"/>	Distance from Evaluated Stream	<input type="text"/>
<input type="checkbox"/> CWH Name:	<input type="text"/>	Distance from Evaluated Stream	<input type="text"/>
<input type="checkbox"/> EWH Name:	<input type="text"/>	Distance from Evaluated Stream	<input type="text"/>

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**USGS Quadrangle Name:  NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: **Paulding** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☐ N Date of last precipitation: **11/03/16** Quantity: **0.20**  
Photograph Information:   
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): **85%**  
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N) ☐ Y If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N  
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N  
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location







## Primary Headwater Habitat Evaluation Form

26

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Haviland-North Delphos T-Line**hh-mdt-11032016-01 SITE NUMBER RIVER BASIN DRAINAGE AREA (mi<sup>2</sup>)LENGTH OF STREAM REACH (ft) **200** LAT. **41.01600** LONG. **-84.59214** RIVER CODE RIVER MILEDATE **11/03/16** SCORER **MDT, JBL** COMMENTS **ephemeral**

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS: **channelized to parallel road**

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<b>0%</b>	<input checked="" type="checkbox"/> SILT [3 pt]	<b>50%</b>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<b>0%</b>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<b>0%</b>
<input type="checkbox"/> BEDROCK [16 pt]	<b>0%</b>	<input type="checkbox"/> FINE DETRITUS [3 pts]	<b>0%</b>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<b>0%</b>	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<b>40%</b>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<b>0%</b>	<input type="checkbox"/> MUCK [0 pts]	<b>0%</b>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<b>0%</b>	<input type="checkbox"/> ARTIFICIAL [3 pts]	<b>10%</b>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

**3**

TOTAL NUMBER OF SUBSTRATE TYPES:

**3**

HHEI Metric Points

Substrate Max = 40

**6**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS MAXIMUM POOL DEPTH (Inches): **3.00**

Pool Depth Max = 30

**15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS AVERAGE BANKFULL WIDTH (Feet): **3.00**

Bankfull Width Max=30

**5**

This information must also be completed

## RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

## RIPARIAN WIDTH

## FLOODPLAIN QUALITY

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

## STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)

**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name:  Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name:  NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: **Van Wert** Township / City:

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **11/02/16** Quantity: **0.00**  
Photograph Information:   
Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **0%**  
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

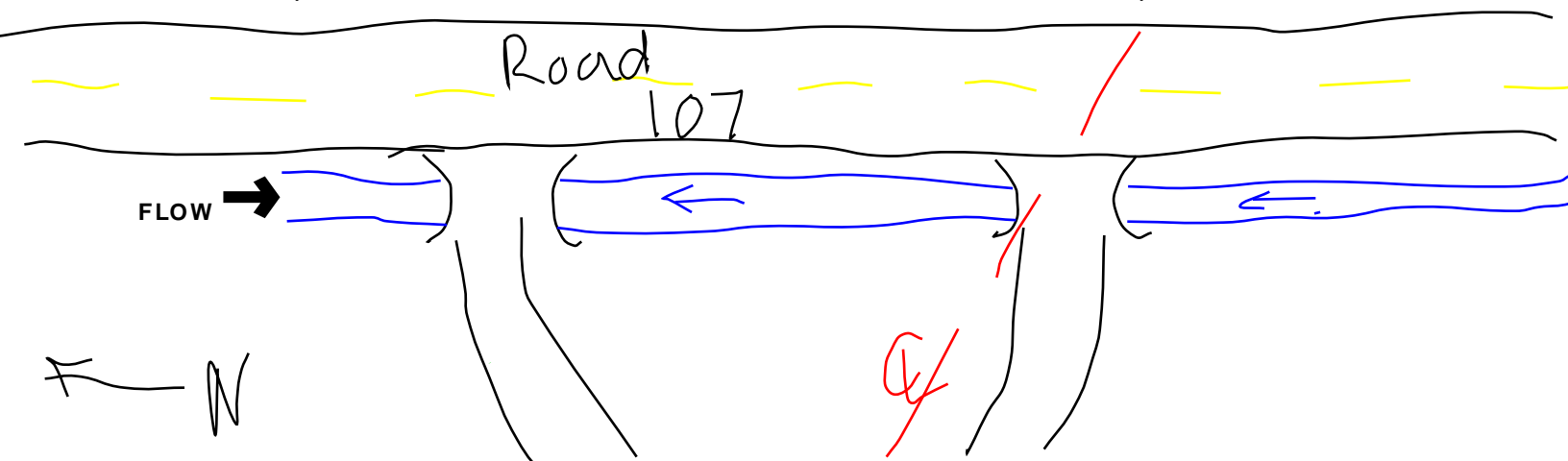
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N  
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N  
Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



**APPENDIX B****DELINEATED FEATURES PHOTOGRAPHS**

<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 1</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 21 Ephemeral Modified Class 1 Facing upstream	

<b>Photo No. 2</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 22 Ephemeral Modified Class 1 Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 3</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 26 Ephemeral Modified Class 1 Facing downstream	

<b>Photo No. 4</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 31 Ephemeral Modified Class 1 Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 5</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 33 Ephemeral Modified Class 1 Facing upstream	

<b>Photo No. 6</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 34 Ephemeral Modified Class 1 Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 7</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 36  Ephemeral  Modified Class 1  Facing upstream	

<b>Photo No. 8</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 37  Ephemeral  Modified Class 1  Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 9</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 01 Intermittent Modified Class 1 Facing upstream	

<b>Photo No. 10</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 02 Intermittent Modified Class 1 Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 11</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 11  Intermittent  Modified Class 1  Facing upstream	

<b>Photo No. 12</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 12  Intermittent  Modified Class 1  Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 13</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 13  Intermittent  Modified Class 1  Facing upstream	

<b>Photo No. 14</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 14  Intermittent  Modified Class 1  Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 15</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 16 Intermittent Modified Class 1 Facing upstream	

<b>Photo No. 16</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 24 Intermittent Modified Class 1 Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 17</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 03  Intermittent  Modified Class 2  Facing downstream	

<b>Photo No. 18</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 06  Intermittent  Modified Class 2  Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 19</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 09  Intermittent  Modified Class 2  Facing upstream	

<b>Photo No. 20</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 10  Intermittent  Modified Class 2  Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 21</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 20  Intermittent  Modified Class 2  Facing downstream	

<b>Photo No. 22</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 29  Intermittent  Modified Class 2  Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 23</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 04  Intermittent  Very Poor Warmwater  Facing downstream	

<b>Photo No. 24</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 15  Intermittent  Very Poor Warmwater  Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 25</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 23 Intermittent Very Poor Warmwater Facing upstream	

<b>Photo No. 26</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 05 Intermittent Poor Warmwater Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 27</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 17  Intermittent  Poor Warmwater  Facing downstream	

<b>Photo No. 28</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 18  Intermittent  Poor Warmwater  Facing downstreamstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 29</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 35 Perennial Very Poor Warmwater Facing downstream	

<b>Photo No. 30</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 08 Perennial Poor Warmwater Facing upstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 31</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 19  Perennial  Poor Warmwater  Facing downstream	

<b>Photo No. 32</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 25  Perennial  Poor Warmwater  Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 33</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 27  Perennial  Poor Warmwater  Facing downstream	

<b>Photo No. 34</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 32  Perennial  Poor Warmwater  Facing downstream	



<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 35</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 07 Perennial Fair Warmwater Facing upstream	

<b>Photo No. 36</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b> Stream 28 Perennial Fair Warmwater Facing downstream	

<b>Client Name:</b> AEP	<b>Site Location:</b> Haviland-North Delphos 138kV Transmission Line Project	<b>Project No.</b> 60506297
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<b>Photo No. 37</b>	
<b>Date:</b> November 3, 2016	
<b>Description:</b>  Stream 30  Perennial  Fair Warmwater  Facing upstream	

**APPENDIX C****CORRESPONDENCE LETTERS FROM USFWS AND ODNR**





# Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

JAMES ZEHRINGER, DIRECTOR

**Ohio Division of Wildlife**  
*Raymond W. Petering, Chief*  
2045 Morse Rd., Bldg. G  
Columbus, OH 43229-6693  
Phone: (614) 265-6300

June 6, 2016

Jason Tucker  
AECOM  
525 Vine St.  
Cincinnati, OH 45202

Dear Mr. Tucker,

Per your request, I have e-mailed you a set of shapefiles with our Natural Heritage Program data for the Haviland-North Delphos 138 kV Line Rebuild project, including a one mile radius, in Blue Creek and Latty Townships, Paulding County, Hoaglin and Jackson Townships, Van Wert County, and Monterey and Jennings Township, Putnam County, Ohio. This data will not be published or distributed beyond the scope of the project description on the data request form.

Records included in the data layer may be for rare and endangered plants and animals, geologic features, high quality plant communities and animal assemblages. Fields included are scientific and common names, state and federal statuses, as well as managed area and date of the most recent observation. State and federal statuses are defined as: E = endangered, T = threatened, P = potentially threatened, SC = species of concern, SI = special interest, FE = federal endangered, FT = federal threatened and A = recently added to inventory, status not yet determined.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. This letter only represents a review of rare species and natural features data within the Ohio Natural Heritage Database. It does not fulfill coordination under the National Environmental Policy Act (NEPA) or the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S. C. 661 et seq.) and does not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

A handwritten signature in blue ink that reads "Debbie Woischke".

Debbie Woischke  
Ohio Natural Heritage Program





# Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

JAMES ZEHRINGER, DIRECTOR

## Office of Real Estate

*Paul R. Baldrige, Chief*  
2045 Morse Road – Bldg. E-2  
Columbus, OH 43229  
Phone: (614) 265-6649  
Fax: (614) 267-4764

July 28, 2016

Rachel Day  
AECOM  
525 Vine Street, Suite 1800  
Cincinnati, Ohio 45202

**Re:** 16-441; Haviland-North Delphos 138 kV Transmission Line Rebuild Project

**Project:** The proposed project involves the installation of approximately 17 miles with 138 kV transmission line utilizing both existing and new right-of-way between Haviland Station and North Delphos Station

**Location:** The proposed project is located in Paulding, Putnam, and Van Wert Counties Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

**Natural Heritage Database:** The Natural Heritage Database has no data at or within a one mile radius of the project area.

A review of the Ohio Natural Heritage Database indicates there are no records of state endangered or threatened plants or animals within the project area. There are also no records of state potentially threatened plants, special interest or species of concern animals, or any federally listed species. In addition, we are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, state nature preserves, state or national parks, state or national forests, national wildlife refuges, or other protected natural areas within the project area. The review was performed on the project area you specified in your request as well as an additional one mile radius. Records searched date from 1980.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

**Fish and Wildlife:** The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to streams, wetlands and other water resources be avoided and minimized to the fullest extent possible, and that best management practices be utilized to minimize erosion and sedimentation.

The project is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*). Indiana bat roost trees consists of trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. However, Indiana bats are also dependent on the forest structure surrounding roost trees. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31. If suitable trees must be cut during the summer months, the DOW recommends a net survey be conducted between June 1 and August 15, prior to any cutting. Net surveys should incorporate either nine net nights per square 0.5 kilometer of project area, or four net nights per kilometer for linear projects. If no tree removal is proposed, this project is not likely to impact this species.

This project must not have an impact on freshwater native mussels at the project site. This applies to both listed and non-listed species. Per the Ohio Mussel Survey Protocol (2016), all Group 2, 3, and 4 streams (Appendix A) require a mussel survey. Per the Ohio Mussel Survey Protocol, Group 1 streams (Appendix A) and unlisted streams with a watershed of 10 square miles or larger above the point of impact should be assessed using the Reconnaissance Survey for Unionid Mussels (Appendix B) to determine if mussels are present. Mussel surveys may be recommended for these streams as well. This is further explained within the Ohio Mussel Survey Protocol. Therefore, if in-water work is planned in any stream that meets any of the above criteria, the DOW recommends the applicant provide information to indicate no mussel impacts will occur. If this is not possible, the DOW recommends a professional malacologist conduct a mussel survey in the project area. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the project site. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol. The Ohio Mussel Survey Protocol (2016) can be found at:

<http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/licenses%20&%20permits/OH%20Mussel%20Survey%20Protocol.pdf>

The project is within the range the greater redhorse (*Moxostoma valenciennesi*), a state threatened fish. The DOW recommends no in-water work from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed in a perennial stream, this project is not likely to impact this or other aquatic species.

The project is within the range of the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*), a state endangered species and a federal species of concern. Due to the location,

and that there is no in-water work proposed in a perennial stream of sufficient size to provide suitable habitat, this project is not likely to impact this species.

The project is within the range of the eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. The eastern massasauga uses a range of habitats including wet prairies, fens, and other wetlands, as well as drier upland habitat. Due to the location, the type of habitat present along the project route and within the vicinity of the project area, and the type of work proposed, this project is not likely to impact this species.

The project is within the range of the upland sandpiper (*Bartramia longicauda*), a state endangered bird. Nesting upland sandpipers utilize dry grasslands including native grasslands, seeded grasslands, grazed and ungrazed pasture, hayfields, and grasslands established through the Conservation Reserve Program (CRP). If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 15 to July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species. Due to the mobility of this species, this project is not likely to impact this species.

Due to the potential of impacts to federally listed species, as well as to state listed species, we recommend that this project be coordinated with the U.S. Fish & Wildlife Service.

**Water Resources:** The Division of Water Resources has the following comment.

Based upon the site map identifying the location of the proposed development, the project appears to be located within the Special Flood Hazard Area (SFHA) (i.e., one-percent-annual-chance or 100-year floodplain) as shown on Flood Insurance Rate Map (FIRM) panel: Crawford County, Ohio and Incorporated Areas FIRM, Community Panel Number(s): 39033C0100D Effective 1/19/2011; Richland County, Ohio and Incorporated Areas FIRM, Community Panel Number(s): 39139C0106E Effective 4/4/2011; 39139C0043E Effective 4/4/2011. A local floodplain development permit may be required for this project. For additional information regarding local floodplain management requirements, please contact Richland County's designated Floodplain Manager, Mr. Matt Christian at (419) 747-8077 or [christian.matt@richlandswcd.net](mailto:christian.matt@richlandswcd.net); Shelby (Richland County's) designated Floodplain Manager, Mr. Joe Gies at 419.342.3600 or [joegies@shelbyohio.org](mailto:joegies@shelbyohio.org); Crawford County's designated Floodplain Manager, Mr. Mark Baker at (419) 563-1521 or [markb@crawford-co.org](mailto:markb@crawford-co.org); or Seneca County's designated Floodplain Manager, Mr. Jason Kirgis at (419) 447-7073 or [jkirgis@conservesenecacounty.com](mailto:jkirgis@conservesenecacounty.com).

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler  
ODNR Office of Real Estate  
2045 Morse Road, Building E-2  
Columbus, Ohio 43229-6693  
[John.Kessler@dnr.state.oh.us](mailto:John.Kessler@dnr.state.oh.us)

**From:** susan\_zimmermann@fws.gov on behalf of Ohio, FW3 <ohio@fws.gov>  
**Sent:** Tuesday, July 12, 2016 10:47 AM  
**To:** Day, Rachel  
**Cc:** Jenny Norris; nathan.reardon@dnr.state.oh.us  
**Subject:** Five (5) Transmission Line Rebuild Projects in Various Ohio Counties

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged



UNITED STATES DEPARTMENT OF THE INTERIOR  
U.S. Fish and Wildlife Service  
Ecological Services Office  
4625 Morse Road, Suite 104  
Columbus, Ohio 43230  
(614) 416-8993 / Fax (614) 416-8994



TAILS #'s

03E15000-2016-TA-1349 - East Tiffin-Carrothers 69 kV Seneca Co.  
03E15000-2016-TA-1350 - Buckley Rd.-Fremont Center 138 kV Seneca Co.  
03E15000-2016-TA-1351 - Carrothers-Howard 69 kV Crawford, Richland, Seneca Co's.  
03E15000-2016-TA-1352 - Haviland-North Delphos 138 kV Paulding, Putnam, Van Wert Co's.  
03E15000-2016-TA-1353 - North Delphos-Rockhill 138 kV, Allen and Putnam Co's.

Dear Ms. Day,

We have received your recent correspondence requesting information about the subject proposal. There are no federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. The following comments and recommendations will assist you in fulfilling the requirements for consultation under section 7 of the Endangered Species Act of 1973, as amended (ESA).

The U.S. Fish and Wildlife Service (Service) recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat (e.g., forests, streams, wetlands). Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted to determine whether a Clean Water Act section 404 permit is required. Best management practices should be used to minimize erosion, especially on slopes. All disturbed areas should be mulched and revegetated with native plant species. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats.

**FEDERALLY LISTED SPECIES COMMENTS:** All projects in the State of Ohio lie within the range of the federally endangered **Indiana bat** (*Myotis sodalis*) and the federally threatened **northern long-eared bat** (*Myotis septentrionalis*). In Ohio, presence of the Indiana bat and northern long-eared bat is assumed wherever suitable habitat occurs unless a presence/absence survey has been performed to document absence. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or



snags  $\geq 3$  inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. In the winter, Indiana bats and northern long-eared bats hibernate in caves and abandoned mines.

Should the proposed site contain trees  $\geq 3$  inches dbh, we recommend that trees be saved wherever possible. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring portal surveys are warranted. If no caves or abandoned mines are present and trees  $\geq 3$  inches dbh cannot be avoided, we recommend that removal of any trees  $\geq 3$  inches dbh only occur between October 1 and March 31. Seasonal clearing is being recommended to avoid adverse effects to Indiana bats and northern long-eared bats. While incidental take of northern long-eared bats from most tree clearing is exempted by a 4(d) rule (see <http://www.fws.gov/midwest/endangered/mammals/nleb/index.html>), incidental take of Indiana bats is still prohibited without a project-specific exemption. Thus, seasonal clearing is recommended where Indiana bats are assumed present.

If implementation of this seasonal tree cutting recommendation is not possible, summer surveys may be conducted to document the presence or probable absence of Indiana bats within the project area during the summer. If a summer survey documents probable absence of Indiana bats, the 4(d) rule for the northern long-eared bat could be applied. Surveys must be conducted by an approved surveyor and be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have a valid federal permit. Please note that summer surveys may only be conducted between June 1 and August 15.

If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), no tree clearing should occur on any portion of the project area until consultation under section 7 of the ESA, between the Service and the federal action agency, is completed. We recommend that the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence.

Due to the project type, size, and location, we do not anticipate adverse effects to any other federally endangered, threatened, proposed, or candidate species. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the ESA, and are consistent with the intent of the National Environmental Policy Act of 1969 and the Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. We recommend that the project be coordinated with the Ohio Department of Natural Resources due to the potential for the project to affect state listed species and/or state lands. Contact John Kessler, Environmental Services Administrator, at (614) 265-6621 or at [john.kessler@dnr.state.oh.us](mailto:john.kessler@dnr.state.oh.us).

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or [ohio@fws.gov](mailto:ohio@fws.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "Dan Everson".

Dan Everson

Field Office Supervisor

cc: Nathan Reardon, ODNR-DOW

Jennifer Norris, ODNR-DOW

LETTER OF NOTIFICATION FOR HAVILAND-NORTH DELPHOS 138 KV TRANSMISSION LINE PROJECT

September 27, 2017

Appendix C      Cultural Reports





**History/Architecture Survey for the 27.4 km (17 mi) Haviland-  
North Delphos 138kV Rebuild Project in Jennings and  
Monterey Townships in Putnam County, Latty and Blue Creek  
Townships in Paulding County, and Jackson and Hoaglin  
Townships in Van Wert County, Ohio.**

**Jacquelyn Lehmann**

**July 7, 2017**

1395 West Fifth Ave.  
Columbus, OH 43212  
Phone: 614.485.9435  
Fax: 614.485.9439  
Website: [www.wellercrm.com](http://www.wellercrm.com)

**History/Architecture Survey for the 27.4 km (17 mi) Haviland-  
North Delphos 138kV Rebuild Project in Jennings and  
Monterey Townships in Putnam County, Latty and Blue Creek  
Townships in Paulding County, and Jackson and Hoaglin  
Townships in Van Wert County, Ohio.**

By

**Jacquelyn Lehmann**

Submitted By:

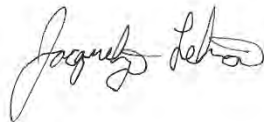
**Ryan Weller, P.I  
Weller & Associates, Inc.  
1395 West Fifth Ave.  
Columbus, OH 43212  
Phone: 614.485.9435 Fax: 614.485.9439**

Prepared For:

**American Electric Power  
700 Morrison Road  
Gahanna, OH 43230**

Lead Agency:

**Ohio Power Siting Board**



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**Jacquelyn Lehmann**

**July 7, 2017**

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W-2248



## **Abstract**

In June of 2017, Weller & Associates, Inc. conducted a history/architecture survey for the 27.4 km (17 mi) Haviland-North Delphos 138kV Rebuild Project in Putnam, Paulding, and Van Wert Counties, Ohio. The existing right-of-way is the only route currently under consideration and the replacement structures will be constructed within the cleared right of way. The project consists of rebuilding an existing 138kV electric line that extends from east of the community of Haviland in Paulding County to the vicinity of Ft. Jennings in Putnam County. The existing right-of-way for this project includes an approximate 100 ft. wide transmission line corridor. The lines will be rebuilt for continued operation at 138 kV.

The investigations, including a background literature review and intensive field survey, were conducted in accordance with the guidelines set forth by the Ohio State Historic Preservation Office and Ohio Administrative Code Chapter 4906-15-06(F), which concerns socioeconomic and land use impact analysis in applications for certificates for electric transmission facilities through the Ohio Power Siting Board.

The investigations were conducted in two parts: a history/architecture survey and an archaeological investigation. This report covers the results of the history/architecture survey of the entire area that may be affected by the proposed development of the project. The history/architecture investigations consisted of a systematic survey of all properties 50 years of age or older that are situated within 1,000 feet on either side of the proposed project site. The results of the archaeological investigations will be presented in a separate report.

In total, thirty-four individual properties of fifty years of age or older were identified within the survey APE that may have a direct line-of-sight to the project. Photographs and structural data for each property were collected in the field. The properties identified in this survey were determined not eligible for listing in the National Register of Historic Places due to alterations, additions, and a loss of historic integrity. As there are no historic properties present in the project or survey area, Weller & Associates, Inc. recommends a finding of no historic properties affected.

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## **Introduction**

In June of 2017, Weller & Associates, Inc. conducted a history/architecture survey for the 27.4 km (17 mi) Haviland-North Delphos 138kV Rebuild Project in Paulding, Van Wert, and Putnam Counties, Ohio (Figures 1-9). The existing right-of-way is the only route currently under consideration and the replacement structures will be constructed within the cleared right of way. The project consists of rebuilding an existing 138kV electric line that extends from east of the community of Haviland in Paulding County to the vicinity of Ft. Jennings in Putnam County. The existing right-of-way for this project includes an approximate 100 ft. wide transmission line corridor. The lines will be rebuilt for continued operation at 138 kV.

The project is subject to Ohio Power Siting Board Application requirements under Chapter 4906 of the Ohio Revised Code. The investigations, including a background literature review and intensive field survey, were conducted in accordance with the guidelines set forth by the Ohio State Historic Preservation Office and Ohio Administrative Code Chapter 4906-15-06(F), which concerns socioeconomic and land use impact analysis in applications for certificates for electric transmission facilities through the Ohio Power Siting Board. The guidelines established in 36 CFR Part 800 are used to guide the assessment of effects (impacts) on cultural resources for the Project. These guidelines are well-established in their use for projects that fall under Section 106 of the National Historic Preservation Act of 1966. The project was therefore conducted in a manner suitable for a Section 106 survey. While OPSB projects do not fall under Section 106, the established guidelines provide an appropriate and consistent avenue to assess effects.

The investigations were conducted in two parts: a history/architecture survey and archaeological investigation. This report covers the results of the history/architecture survey of the entire area that may be affected by the proposed development of the project. The history/architecture investigations consisted of a systematic survey of all properties 50 years of age or older that are situated within 1,000 feet on either side of the proposed project site. The results of the archaeological investigations will be presented in a separate report.

The documentation of properties in the field, archival research, and report authoring were conducted by Jacquelyn Lehmann who served as Principal Investigator for the project and Timothy Miller. Mapping for the project was generated by Alex Thomas. The archival research was conducted on June 28, 2017 and the field survey was conducted on June 29, 2017.

## **Research Design**

The purpose of the history/architecture portion of the project was to identify any historic properties in the area that may be affected by the proposed development of the project. These effects may be direct or indirect. Direct effects occur within the boundaries of the project, while indirect effects can occur for areas outside the direct boundaries and can include visual, audible, and atmospheric effects that are associated with the development of the project. Based on the nature of the project, the history/architecture investigations consisted of a systematic survey of all properties 50 years of age or older that are situated within 1,000 feet of the centerline of the proposed project.



## ***Methods***

This survey was conducted following the guidelines established in *Archeology and Preservation: Secretary of the Interior's Standards and Guidelines* (National Park Service 1983) and *Guidelines for Local Surveys: A Basis for Preservation Planning. National Register Bulletin No. 24* (National Park Service 1997). When properties are identified, they are subjected to the guidelines outlined in *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation* (National Park Service 1996).

There are four criteria for eligibility to be listed in the National Register of Historic Places (NRHP). Only one of these criteria must be met to be considered eligible for listing; however, oftentimes more than one of the criteria is met. The criteria for significance include:

- A. Association with historic events or patterns of events;
- B. Association with persons important to our past;
- C. Exceptional or important architectural characteristics; and/or
- D. Data potential.

Architectural properties typically qualify under Criteria A, B, or C. Criterion D is typically reserved for archaeological sites.

In addition to meeting at least one of the established criteria, the appropriate integrity must also be retained by the resource. There must be integrity of location, design, workmanship, setting, materials, feeling, and association.

Prior to commencing fieldwork, a literature review was conducted to determine if any previously recorded architectural properties, NRHP properties, or Ohio Genealogical Society cemeteries were present within the APE. Historic maps were also reviewed to aid in guiding the fieldwork and detecting the possible presence of properties 50 years of age or older within the APE. Background research was also conducted in order to establish a historic context of the region. The context was compiled by utilizing materials from the SHPO, archival materials at the respective county courthouses, local libraries, and several online resources. The establishment of the historic context helped to guide the interpretation of the field survey results.

The field survey included a systematic approach to identifying all properties that have potential significance for inclusion within the NRHP, within the survey area (1,000 feet to either side of project) of the proposed project. Some areas will be obscured from having a direct line-of-sight to the proposed project by topography and forested areas. The areas that did not have a direct line-of-sight to the project were visually verified in the field and the survey did not include all of these areas. An advantage for this project is the presence of an existing line to gauge the direct line-of-sight from properties through field verification during the survey. Each property identified within the survey area that will have a direct line-of-sight was photographed and annotated on appropriate mapping and included in the report. Each property identified within the survey area was photographed and annotated on appropriate mapping and included in the report. The approach was to identify those properties with NRHP potential, followed by a more intensive documentation and evaluation of those potentially eligible aboveground resources. The comprehensive survey

involved recording of each property with potential historic significance to a baseline level of documentation.

Weller focused on the ground plan, the height, and the roof configuration of each structure, noting all visible materials, appendages, extensions, or other alterations. Housing types and structural details within the report and utilized on OHI forms follow the terminology used by geographers Jakle, Bastian, and Meyer (1988), architectural historians McAlester and McAlester (2013), and Gordon (1992). Weller then supplemented the field survey data with an examination of available tax records, aerial photographs, and cartographic sources.

### ***Definitions***

Within this report, an *architectural resource* is defined as aboveground buildings or structures that are 50 years of age or older. A *historic property* is defined as a building, structure, object, or site that is listed in, or considered eligible for listing in, the NRHP. An *effect* is defined as an activity associated with the project that alters a characteristic of a historic property that qualified it for inclusion in the NRHP.

## **Historic Context**

### ***Paulding County History***

Paulding County was formed on April 1, 1820. The county was named after John Paulding, one of the men who captured Major John Andre during the Revolutionary War. The area was previously known as the South and East of the First Principle Meridian land subdivision of Ohio. It is in the Huron-Erie Lake Plains, more specifically, the Maumee Lake Plains and Paulding Clay Bottom Physiographic Regions of Ohio. It is within what was once the Black Swamp and is nearly level, but has since been drained. The county is drained by the Maumee and Auglaize Rivers and once was home to both the Miami and Erie and the Wabash and Erie Canals.

Paulding County was one of the last to be organized in Ohio circa 1839. This was due to its late settlement relative to its location within the Black Swamp. The county's namesake is John Paulding, a Revolutionary War hero that, with Van Wert and Putnam, were integral in the capture of Benedict Arnold. The initial settlement of the county was stymied by the inhospitable conditions with the swamp and the presence of Native Americans in the area. American settlers began to arrive in the county after much of the lands were ceded by the Native Americans in 1817; however, some of the early trade was conducted with those that were soon removed from the region. The Black Swamp covered most of the county, hindering settlement and forcing most of the early settlers to live along the Maumee and Auglaize Rivers. The Town of Paulding became the permanent County Seat in 1850 and prior to that, it was in the now defunct community of Charloe (Morrow and Bashore 1892; Knapp 1872). Charloe was named after Chief Charloe and was formerly near the center of the Oquanoxa Indian Reservation. This reservation was abandoned as of the Treaty of 1831 and the prospective village was supposedly located in the southeastern corner of the reservation (Royce 1899).

These early immigrants relied on subsistence farming and the sale of furs. The earliest grist mills were built in the 1850s, but agriculture continued to be insignificant except for subsistence. The Black Swamp prevented large tracts of crops from being cultivated until it could be effectively drained. Until that time, the primary industry that developed was affiliated with timber. Vast forest covered the county in the early days. Internally, these woods were used for stave manufacture, canal locks, railroad ties, and ship construction. The Maumee and Auglaize Rivers were the primary means of transportation from the 1820s-1830s. This was supplemented by Wabash and Erie Canal in 1843 along the Maumee River and the Miami Canal in 1845 along the Auglaize River. The local residents utilized the canals to export lumber. The first railroad was the Toledo, Wabash & Western and was built in 1855. Several other lines passed through the county by the late 1800s. The efficient transportation systems stimulated the lumber business. In 1864-1865 two blast furnaces (Paulding and Antwerp) were built in the county because of the abundance of wood charcoal. Iron ore was shipped to these furnaces from Toledo and Michigan. The blast furnaces were in service until the 1880s. Stave and wood related factories were developed in Paulding around 1880, Holcombe in 1886, and Antwerp in 1873. In 1892, the Holcombe factory was reported to have produced 16 million staves cut per annum (Morrow and Bashore 1892). The extensive use of Paulding County's timber resources for charcoal and lumber devastated the county's virgin forests, which were largely gone by the 1890s. With the loss of this industry and the increased drainage of the swamp by the canal and other means, tiling, the county's agriculture began to take hold.

The majority of Paulding County is affiliated with agricultural activity. By the 1890s, most of the county has been cleared of its forests and the swamps were drained, leaving tillable fields with excellent, organic-rich soils. However, these soils were very clayey. Agriculture was the dominant means of income by the twentieth century. Other minor industries included oil wells, limestone quarries, and ceramic tile industries (Morrow and Bashore 1892). The tile industries of the region benefitted from dense topsoil clay and the necessity of tiling the fields for drainage. Agriculture and the tiling industry are complementary to one another in this area.

Little has changed in Paulding County stemming from the twentieth century. The county still has a low population and it is largely reliant upon agriculture. The tiling industry still prospers, though there has been a shift from clay to corrugated plastic. Roads are typically lined with deep ditches, which are still necessary for drainage. Aspects of the former swamp are still perceivable in the remnant woods that are scattered about the county.

### ***Blue Creek Township History (Paulding County)***

Blue Creek Township is located in southern Paulding County along the border with Van Wert County. The township contains the villages of Haviland and Scott. The terrain is generally flat, being located in the Maumee Lake Plains Physiographic Region. The area is drained by Blue and Prairie Creeks, both tributaries of the Auglaize River. The Penn Central Railroad once extended to Haviland from Paulding, but is longer in use. The township is bisected by St Rt. 114 and U.S. 127 which intersect near Haviland. Agriculture is the foremost industry in the township with very little residential, commercial, or industrial development (Slocum 1905).



### ***Latty Township History (Paulding County)***

Latty Township is one of twelve townships in Paulding County and lies in the southeast portion of the county. The community of Latty is located in Blue Creek Township. Blue Creek is the main drainage tributary in the township, Prairie Creek and Hagerman Creek also run through the township. Industries in and around Latty have been tile manufacturing, grain and timber mills. The nearby town of Dague was a lumber yard and was abandoned due to the timber running out. The Village of Grover Hill is located in southeastern Latty Township and was a rising town created as a stop along the railroad. A restaurant “The Depot” pays tribute to the towns beginnings.

### ***Van Wert County History***

April 1, 1820 is the date of record for Van Wert County though commissioners had not met to organize it until 1835 (Gilliland 1906). At the Treaty of Wapakoneta in 1818, the U. S. government purchased lands from the Indians. It was out of these “Indiana lands” that Van Wert emerged. The county bears the name of Isaac Van Wert, a hero of the War for Independence (Sutton 1882; Winter 1917). Captain James Riley was the first settler to move into the county in 1821 and he later laid out the town of Willshire. In 1834, Peter Aughenbaugh, George Marsh, and James Watson Riley bought land and platted Van Wert city in the center of the county. In only four years, Van Wert asserted its superiority by gaining the county seat from Willshire.

Because of the richness of the soil in Van Wert County, agriculture has been its mainstay. Besides the usual staple crops, fruit flourished in this dark soil. Oliver Stacy was an early settler who had large orchards including apples, crab apples, peaches, and pears. Wild plums reportedly grew throughout the region (Gilliland 1906).

There have been several advances that have improved local agriculture thereby increasing the profitability and respect of Van Wert’s farming community. Agriculture greatly benefited from the growth of the tile mill industry. Clay tile mills sprang up in Van Wert and in neighboring counties producing field tiles to help drain the saturated soils of the Black Swamp. This advance allowed farming to spread to formerly impossible locations. A second advancement was the formation of the grange in the autumn of 1873 and a farmers’ institute later on. This gave Van Wert County farmers a venue to share ideas and challenge each other to increased efficiency (Gilliland 1906; Sutton 1882).

Farms were not the only scenes of development however. Schools appeared early. A county infirmary began treating the community in 1867. Government and justice presided and grew from the time of county organization as well. The Pittsburg, Fort Wayne, and Chicago Railroad was the first rail to pass through Van Wert in 1854. The name changed to the Indiana and Ohio Railroad later on and still later sold to Conrail (Gilliland 1906; O’Daffer 1990; Sutton 1882; Winter 1917). Presently, the economy of Van Wert County still shows agriculture strong, but manufacturing and service industries are beginning to surge as well.

### ***Jackson Township History (Van Wert County)***

Jackson Township was organized around the year 1820. It is located in the northwestern portion of Van Wert County. Neighboring townships include Washington to the north, Monterey to the east Washington to the south and Hoaglin to the west. The topography in Jackson Township is primarily level with little to no rolling or hilly areas. Because the soil's density, it will not absorb water making it hard to get successful crops (Howe 1854).

Before the arrival of European influence, the area was populated with dense forests. Thousands of acres were cleared during the early years of settlement for agricultural and construction purposes. The timber was used to build homes, barns, shops, schoolhouses and churches. Many of the European settlers immigrated from surrounding states and counties (Howe 1854).

During the infancy of the township, populations were low creating the need for communities to work together in order to be successful. Agriculture was the leading industry in Jackson Township. The main products were corn, wheat and potatoes. Children were essential to the success of crops. Students would often stay home from school in order to help their families (Winter 1917).

Schoolhouses during the early settlement were typically one-room log constructions with a fireplace implemented for winter sessions. Due to budget restrictions, early in the townships formation schools also served a place of worship. Religion played a vital role within the culture of Jackson Township. The primary denomination is Baptist. Gatherings at the church gave residents the opportunity to worship, discuss local issues and organize community events (Winter 1917).

### ***Hoaglin Township History (Van Wert County)***

Hoaglin Township takes its name from the family which first settled there. Enoch and Aaron came in May of 1839. Later that year, and in the following year, L. J. Mitchell, John Speeler, Adley Calhoun, Elias Beamer, David Tolan, Jacob Shaffer, Joshua Shaffer, William Hagerman, Henry Blythe, Jacob Stripe, John Clayton, Henry Taylor, Frederick Taylor, Andrew Hattery and Andrew Hattery, Jr., became their neighbors (Gilliland 1906; O'Daffer 1990; Sutton 1882; Van Wert County Historical Society 1981).

Township organization followed on the heels of these pioneers in 1840. At the first vote, both Hoaglin patriarchs were elected to public office and the family honored by the name of the township. Enoch hosted the first religious services in his home organizing a Methodist Episcopal Church in 1842. He also taught the first school and Sunday School (Wert County Historical Society 1981).

The earliest industry of the township arrived in the form of a tile mill under the direction of one Mr. Griffin. Otherwise, nothing of economic interest exists beyond the farms of the township. These were aided by the organization of the Hoaglin Grange in 1880. There is no

railroad in this township, and no town; undoubtedly, their absences are interrelated (Wert County Historical Society 1981).

### ***Putnam County History***

The county was formed on April 1, 1820, but was not formally organized until 1834. David Murphy was one of the first settlers in the area who arrived circa 1824. He settled along the Auglaize River in an area referred to as “The Bayou”. The first town in the county was that of Kalida and was platted in 1834. It was the county seat until 1866 when it was moved to Ottawa since it was more centrally located within the county. The comparably late settlement of Putnam County and its neighboring counties was due to its position within the Black Swamp. There were two Native American villages known in the county including Upper and Lower Tawa Towns (Howe 1888). These were located near Ottawa.

The primary economy of Putnam County is associated with agricultural pursuits. Stock raising and crop farming is the mainstay of every community (Kinder 1915; Sommers 1934). Many of the early settlers to the area were of Welsh descent and arrived from Cincinnati. The southeastern part of the county got an influx of Swiss Mennonites who arrived from 1830-1870. These immigrated either directly from Switzerland or from Wayne County, Ohio. They built two of the largest churches in the county: Grace Church and St. John Church (Calvin 1981 and 1989). Today, the population is largely dominated by German Catholics. Nearly every community has a Catholic steeple that can be seen for some distance due to the flat nature of the terrain.

In 1845, the Miami & Erie Canal was completed through Monterey Township. This was an important economic boon to the region and the county as it allowed for the local goods to be available in the market economy. However, the canal was short-lived as it gave way to the railroads. The Baltimore & Ohio was the first railroad built in the county around 1856. A few years later the Dayton Michigan Railroad was completed. The Lima-Defiance Traction extended through the communities of Rice, Continental, and Kalida but did not last long due to financial difficulties (Kinder 1915).

Just like the nineteenth century, modern Putnam County remains primarily affiliated with agriculture. There are small communities scattered throughout the area and the larger ones tend to have granaries. Much of the population is rural and occupies isolated farmsteads that dot the landscape.

### ***Jennings Township History (Putnam County)***

Jennings Township was organized in the 1830's and received its name from Colonel Jennings. It is located in the south-western portion of Putnam County. Neighboring townships include Jackson to the north, Sugar Creek to the east, Marion and Allen to the south and Monterey to the west. The topography in Jennings Township is primarily level with little to no rolling or hilly areas. Located in a swamp region, the soil is mostly damp but produces an excellent crop when drained (Howe 1854).



Before the arrival of European influence, Jennings Township was heavily populated with old growth forests. Many of the early settlers came from eastern Ohio and were of German, French, British and Irish. The early immigrants cut down thousands of acres of forest for agricultural and construction purposes. The timber was used to build homes, barns, schoolhouses and for other various crafting. The first European settler was a man named Samuel Washburn who came to the township in 1828. It was here he established two farms which were later sold to Isaiah Clawson (Kinder 1915).

The production of corn whiskey was Jennings earliest industry. It wasn't until the canal was implemented and drained the swamp that the soil became fertile (Kinder 1915). Agriculture was a leading source of economic success during the infancy of Jennings Township. The main crops included corn, wheat, rye, potatoes and barley. Children were essential to the production of goods. Often times they would stay home from school in order to assist with household duties. Schoolhouses were typically one room log constructions with a single fireplace implemented for winter sessions (Howe 1854). The economy was booming in the town of Fort. Jennings in 1852. A multitude of mills opened up along with a variation of businesses. It was a very progressive location at the time in comparison to other towns in the area (Kinder 1915).

### ***Monterey Township History (Putnam County)***

Monterey Township was organized in the year 1849. It is located in the south-western portion of Putnam County. Neighboring townships include Jackson to the northeast, Jennings to the southeast, Washington to the south west and Jackson to the west. The topography in Monterey Township is primarily level with little to no rolling or hilly areas (Howe 1854).

Lush forests covered the majority of the township prior to the arrival of European immigrants. The forests were removed during the infancy of the township and were used for agriculture and construction (Howe 1854). The majority of settlers came from surroundings areas and were of German heritage. Roman Catholicism was the leading religious doctrine throughout Monterey Township. It was the backbone of their culture in when it came to public policy, rule of law and everyday living. Gatherings at the church allowed the residents to seek solace, discuss local issues and organize community events (Kinder 1915).

Like many of the surrounding townships, Monterey's soil is fertile and produces an excellent crop. The staple products were corn, wheat, rye and potatoes (Howe 1854). The community relied solely upon the farming community until the town of Ottoville started to boom. Ottoville is home to a variation of mills, businesses and beautiful architecture. One example is St. Mary's Immaculate Conception Church. Ottoville was a successful farming town with exceptional roads and educational funding (Kinder 1915).

### **Literature Review**

The records review for this project indicated that there is one previously recorded Ohio Historic Inventory (OHI) resource, no Determination of Eligibility (DOE) properties, and no National Register of Historic Places (NRHP) listed properties located within the survey APE for

this project (Figures 2-11). In addition to surveying the APE for properties that have not been subject to previous recordation, the OHI properties were visited during the survey.

**Table 1. Previously Recorded Resources Identified in the Study Area.**

Resource #	Present Name	Location	Place Name	Style	Date	NRHP Status
PAU0000409	Alfred & Henry Sherer Log House	Scott Road, 1,000 ft. south of St. Rt. 114	Haviland	Log House	Ca.1880	Not Listed

## Architectural Survey Results

Fieldwork confirmed that the project area consists primarily of rural agricultural areas. In total 34 resources 50 years of age or older were identified within the survey APE (Figures 12-38). Summarized data for all documented structures within the APE is provided in Table 2. None of the resources are currently listed in the NRHP. Originally recorded in the OHI in 1977 and noted at the time as being vacant, the PAU0000409/Alfred & Henry Sherer Log House was found in the field to no longer be extant (Figures 12). All of the resources identified in the field were found to not be eligible due to alterations, additions, and a loss of historic integrity.

**Table 2. Field Survey Results**

Field #	County	Map #	Classification	Date	Stylistic Influence	Type	NRHP Status
PAU0000409	Paulding	Figure 12	Building	Ca.1880	Log House	Unknown	Demolished
S-1	Van Wert	Figures 21,22	Building	Ca.1900	Vernacular	Irregular Form	Not Eligible
S-2	Van Wert	Figures 21,22	Building	1895	Vernacular	One Room Schoolhouse	Not Eligible
S-3	Van Wert	Figures 21,22	Building	Ca.1900	Vernacular	Side Gable House	Not Eligible
S-4	Van Wert	Figure 26	Building	Ca.1900	Vernacular	Gable and Wing	Not Eligible
S-5	Van Wert	Figures 26,27	Building	1956	Vernacular	Side Gable House	Not Eligible

S-6	Van Wert	Figures 27,28	Building	Ca.1900	Vernacular	Cross Gable House	Not Eligible
S-7	Van Wert	Figure 27	Building	Ca.1900	Vernacular	Cross Gable House	Not Eligible
S-8	Van Wert	Figure 28	Building	Ca.1940	Vernacular	Side Gable House	Not Eligible
S-9	Putnam	Figures 30,31	Building	Ca.1900	Vernacular	Irregular Form	Not Eligible
S-10	Putnam	Figure 30	Building	1919	Vernacular	Bungalow	Not Eligible
S-11	Van Wert	Figures 29,30	Building	Ca.1950	Ranch	Ranch	Not Eligible
S-12	Putnam	Figures 31,32	Building	1911	Vernacular	Pyramidal	Not Eligible
S-13	Putnam	Figures 31,32	Building	1933	Vernacular	Side Gable House	Not Eligible
S-14	Putnam	Figure 34	Building	1940	Vernacular	Irregular Form	Not Eligible
S-15	Putnam	Figure 35	Building	1956	Vernacular	Ranch	Not Eligible
S-16	Putnam	Figure 35	Building	1950	Vernacular	Side Gable House	Not Eligible
S-17	Putnam	Figure 35	Building	1950	Vernacular	Side Gable House	Not Eligible
S-18	Putnam	Figures 35,36	Building	1912	Vernacular	Side Gable House	Not Eligible



S-19	Putnam	Figure 36	Building	Ca.1900	Vernacular	Side Gable House	Not Eligible
S-20	Putnam	Figure 38	Building	1924	Vernacular	Cross Gable House	Not Eligible
S-21	Putnam	Figure 38	Building	1966	Vernacular	Side Gable House	Not Eligible
S-22	Putnam	Figure 38	Building	Ca.1950	Vernacular	Side Gable House	Not Eligible
S-23	Putnam	Figure 38	Building	Ca.1920	Vernacular	Hipped	Not Eligible
S-24	Putnam	Figure 38	Building	Ca.1900	Vernacular	Gable Front House	Not Eligible
S-25	Paulding	Figures 12,13	Building	Ca.1900	Vernacular	Side Gable House	Not Eligible
S-26	Paulding	Figures 13,14	Building	1957	Vernacular	Ranch	Not Eligible
S-27	Paulding	Figure 17	Building	Ca.1900	Vernacular	Side Gable House	Not Eligible
S-28	Paulding	Figure 17	Building	Ca.1960	Vernacular	Side Gable House	Not Eligible
S-29	Paulding	Figure 17	Building	Ca.1900	Vernacular	Cross Gable House	Not Eligible
S-30	Paulding	Figure 19	Building	Ca.1920	Vernacular	Gable Front House	Not Eligible
S-31	Van Wert	Figures 20,21	Building	Ca.1900	Vernacular	Cross Gable House	Not Eligible

S-32	Van Wert	Figures 20,21	Building	Ca.1900	Vernacular	Cross Gable House	Not Eligible
S-33	Van Wert	Figure 21	Building	Ca.1900	Vernacular	Cross Gable House	Not Eligible
S-34	Van Wert	Figure 21	Building	Ca.1940	Vernacular	Side Gable House	Not Eligible

## Conclusions

In June of 2017, Weller & Associates, Inc. conducted a history/architecture survey for the 27.4 km (17 mi) Haviland-North Delphos 138kV Rebuild Project in Putnam, Paulding, and Van Wert Counties, Ohio. The project is subject to Ohio Power Siting Board Application requirements under Chapter 4906 of the Ohio Revised Code.

The project APE was largely rural during the nineteenth century as it remains today. The viewshed within the survey APE includes several modern intrusions, such as wind turbines, industrial development, and existing transmission lines. Many of the modern rural residential areas occur along the outer boundaries of farmlands where farmers have parceled off small lots for modern residential development. While some older farmsteads remain, a vast majority of the residential properties and the structures on them have been modified.

The results of the field survey identified 34 individual properties of 50 years of age or older. All of the resources were found to not be eligible due to alterations, additions, and a loss of historic integrity. The previously recorded PAU0000409 resource was found in the field to no longer be extant. As there are no historic properties present in the project or survey area, Weller & Associates, Inc. recommends a finding of no historic properties affected.

## References Cited

Calvin, M.

1981 *People and Places: Putnam County, Ohio 1800-1900*. Hubbard Company, Defiance, Ohio.

1989 *The Welsh in Putnam County 1880*. Putnam County District Library, Ottawa, Ohio.

Gilliand, T. S., ed.

1906 *History of Van Wert County, Ohio and Representative Citizens*. Richmond and Arnold, Chicago.

Historic Aerials

NETR online. Electronic Document, <http://www.historicaerials.com/>, accessed June 28, 2017.

Howe, H.

1888 *Historical Collections of Ohio, Volume II*.

1854 *Historical Collections of Ohio*. E. Morgan & Co's. Cincinnati.

1996 *How to Apply the NRHP Criteria for Evaluation*. NRHP Bulletin 15. National Park Service, Department of the Interior, Washington, D.C.

Kinder, G. D.

1915 *History of Putnam County. It's People, Industries, and Institutions*. B. F. Bowen and Company, Inc., Indianapolis.

Knapp, H. S.

1872 *History of the Maumee Valley: Commencing with its Occupation by the French in 1680*. Slade Mammoth Printing and Publishing House, Toledo, Ohio.

McAlester, V. and L.

2013 *A Field Guide to American Houses*. Alfred A. Knopf, New York.

Morrow, O. and F. W. Bashore

1892 *Historical Atlas of Paulding County, Ohio*. The Western Publishing Company. Madison, Wisconsin.



National Park Service

1983 *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines*. National Park Service, Department of the Interior, Washington, D.C.

1996 *How to Apply the NRHP Criteria for Evaluation*. NRHP Bulletin 15. National Park Service, Department of the Interior, Washington, D.C.

1997 *Guidelines for Local Surveys: A Basis for Preservation Planning*. NRHP Bulletin 24. National Park Service, Department of the Interior, Washington, D.C.

Nelson, Christopher L.

2014 *Cultural Historic Survey for the AEP Biers Run-Hopetown-Delano 138 kV Transmission Line Project, Union and Green Townships, Ross County, Ohio*. Cultural Resource Analysts, Inc., Lancaster, Ohio. Copy on file at the Ohio State Historic Preservation Office, Columbus, Ohio.

O'Daffer, F. C.

1990 *History of Van Wert County*. Fairway Press, Lima, Ohio.

Royce, C. C.

1899 *Indian Land Cessions in the United States (Eighteenth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution, 1896 – 97)*. Edited by J. W. Powell. Government Printing Office, 1<sup>st</sup> Edition 1899.

Slocum, Charles E.

1905 *History of the Maumee River Basin*. Bowen and Slocum, Indianapolis and Toledo.

Sommers, E.

1934 *Centennial Celebration of Putnam County, Ohio, U.S.A.* Putnam County Centennial Committee, Ohio.

Sutton, R.

1882 *History of Van Wert and Mercer Counties, Ohio*. R. Sutton and Company, Wapakoneta, Ohio.

USGS Historical Topographic Map Explorer

Electronic Document, <http://historicalmaps.arcgis.com/usgs/>, accessed June 28, 2017.

Van Wert County Historical Society, Inc., pub.

1981 *History of Van Wert County Ohio*. Van Wert County Historical Society, Inc., Van Wert, Ohio.

Winter, N. O.

1917 *A History of Northwest Ohio: Narrative Account of Its Historical Progress and Development from the First European Exploration of the Maumee and Sandusky Valleys and the Adjacent Shores of Lake Erie, down to the Present Time.* The Lewis Publishing Company, Chicago and New York.

## FIGURES

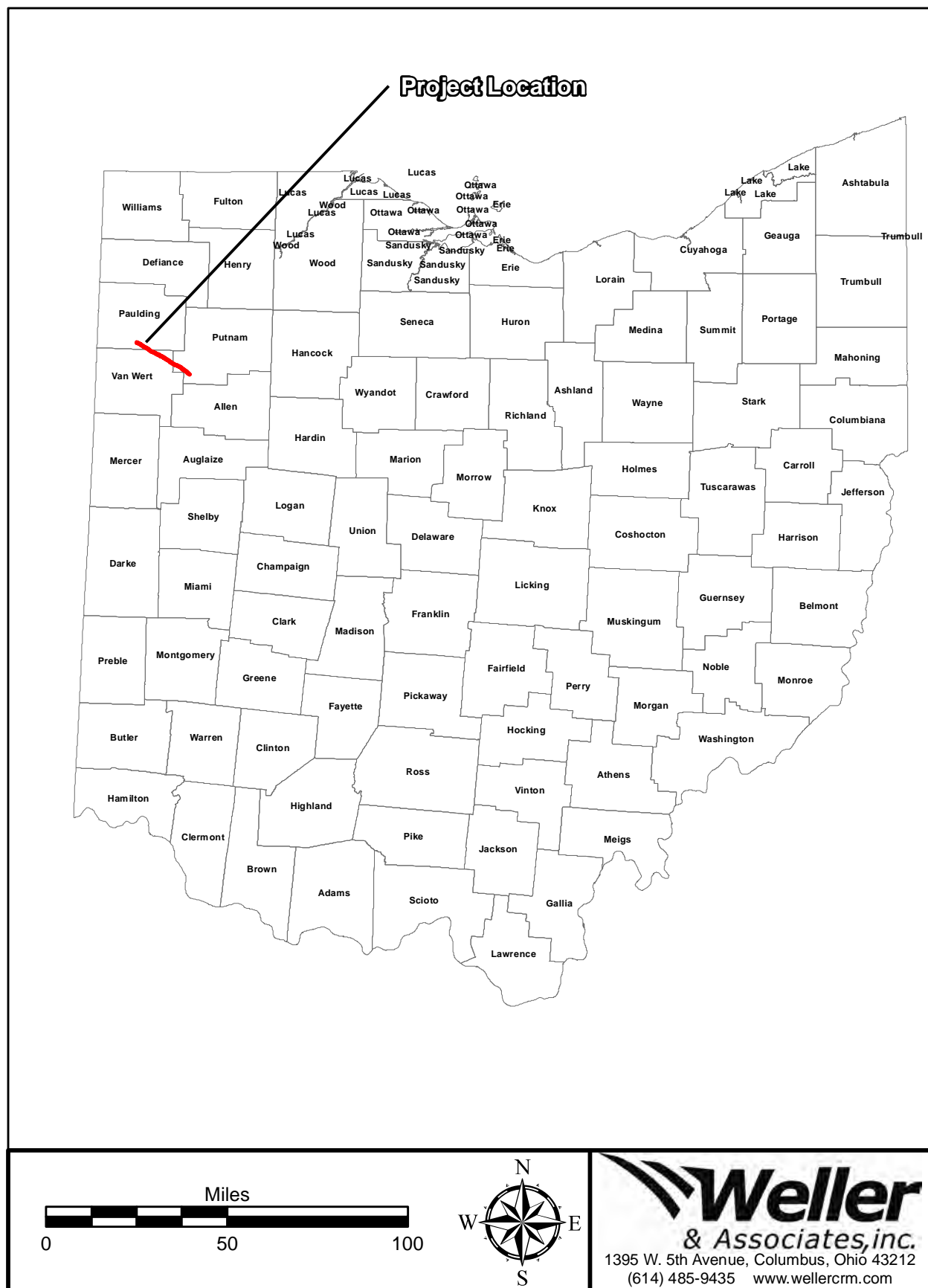


Figure 1. Political map of Ohio showing the approximate location of the project.



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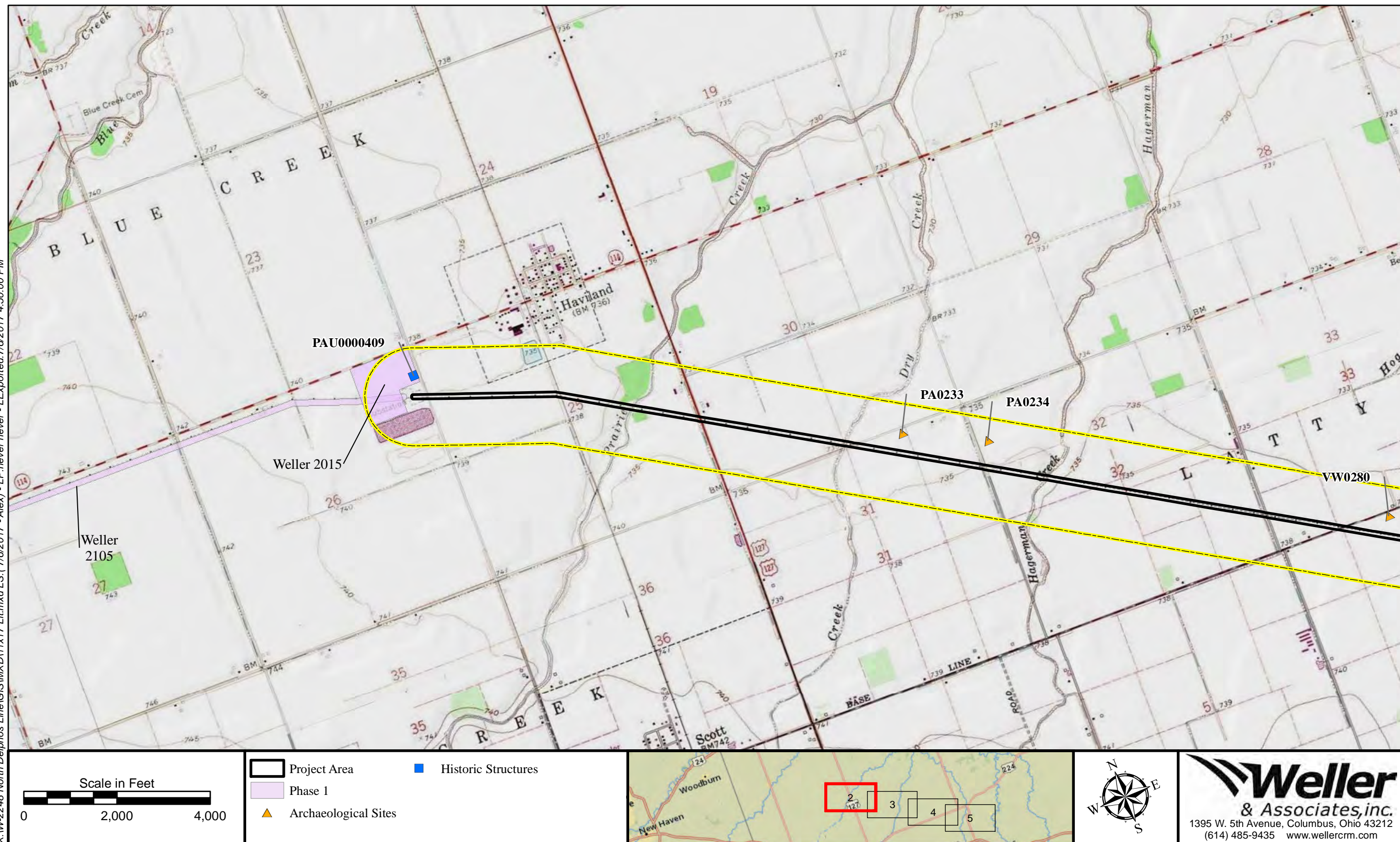


Figure 2. Portions of the USGS 1974 *Payne*, 1974 *Latty*, and 1983 *Scott*, Ohio 7.5 Minute Series (*Topographic*) maps indicating the location of the project and previously recorded resources in the study area.



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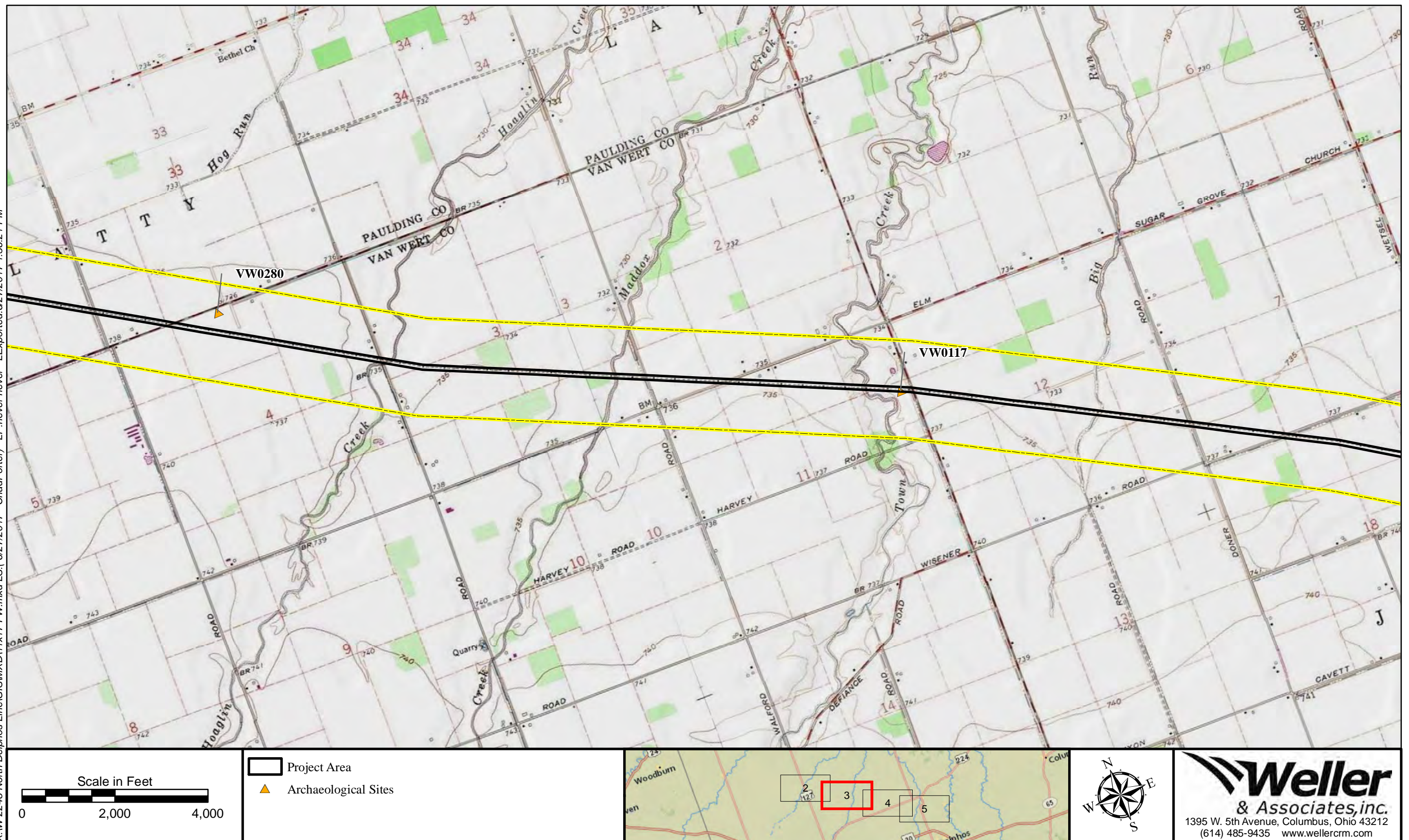


Figure 3. Portions of the USGS 1972 Wetsel, 1974 Latty, 1973 Wood, and 1983 Scott, Ohio 7.5 Minute Series (Topographic) maps indicating the location of the project and previously recorded resources in the study area.



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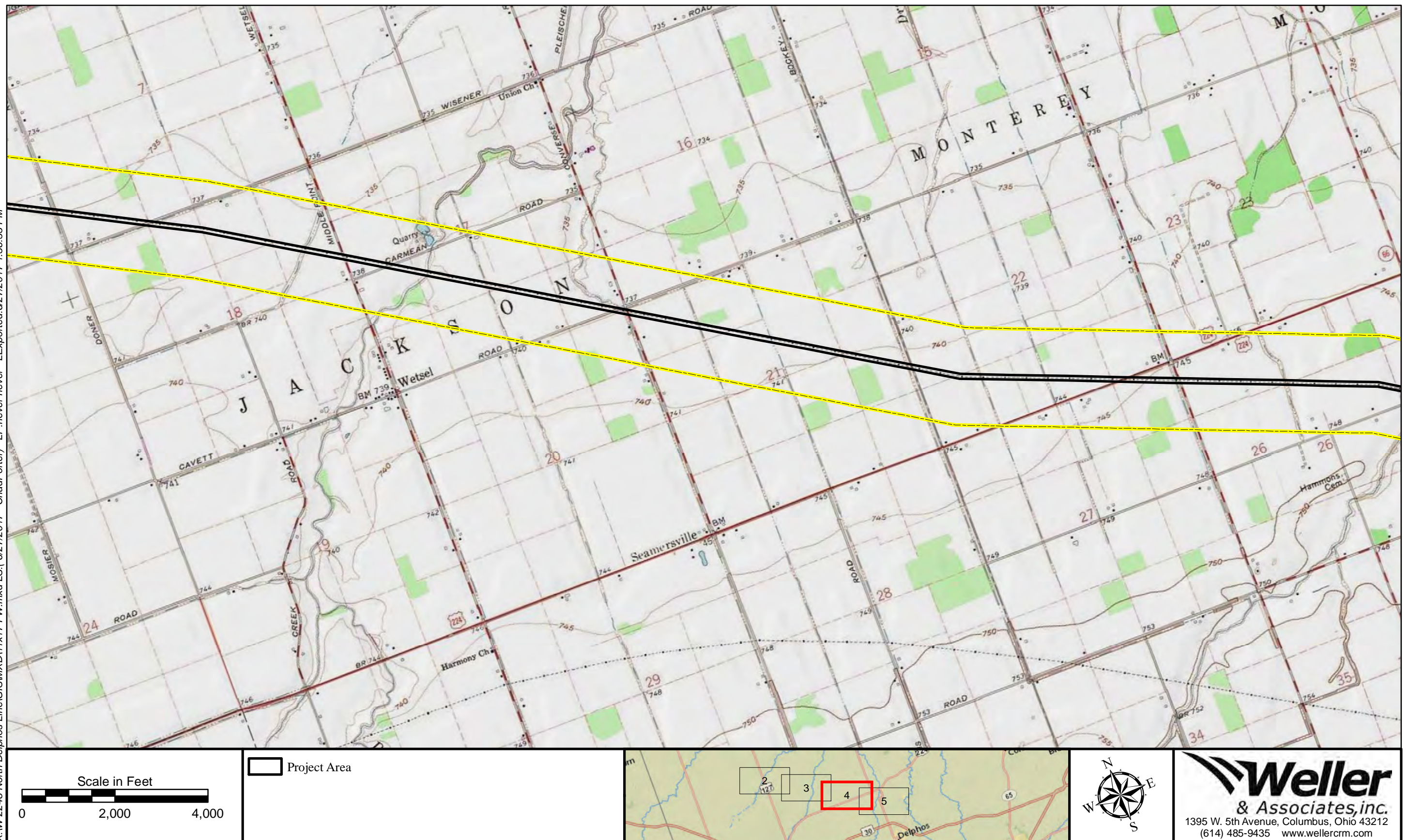


Figure 4. Portions of the USGS 1972 Wetzel, and 1973 Ottoville, Ohio 7.5 Minute Series (Topographic) maps indicating the location of the project and previously recorded resources in the study area.



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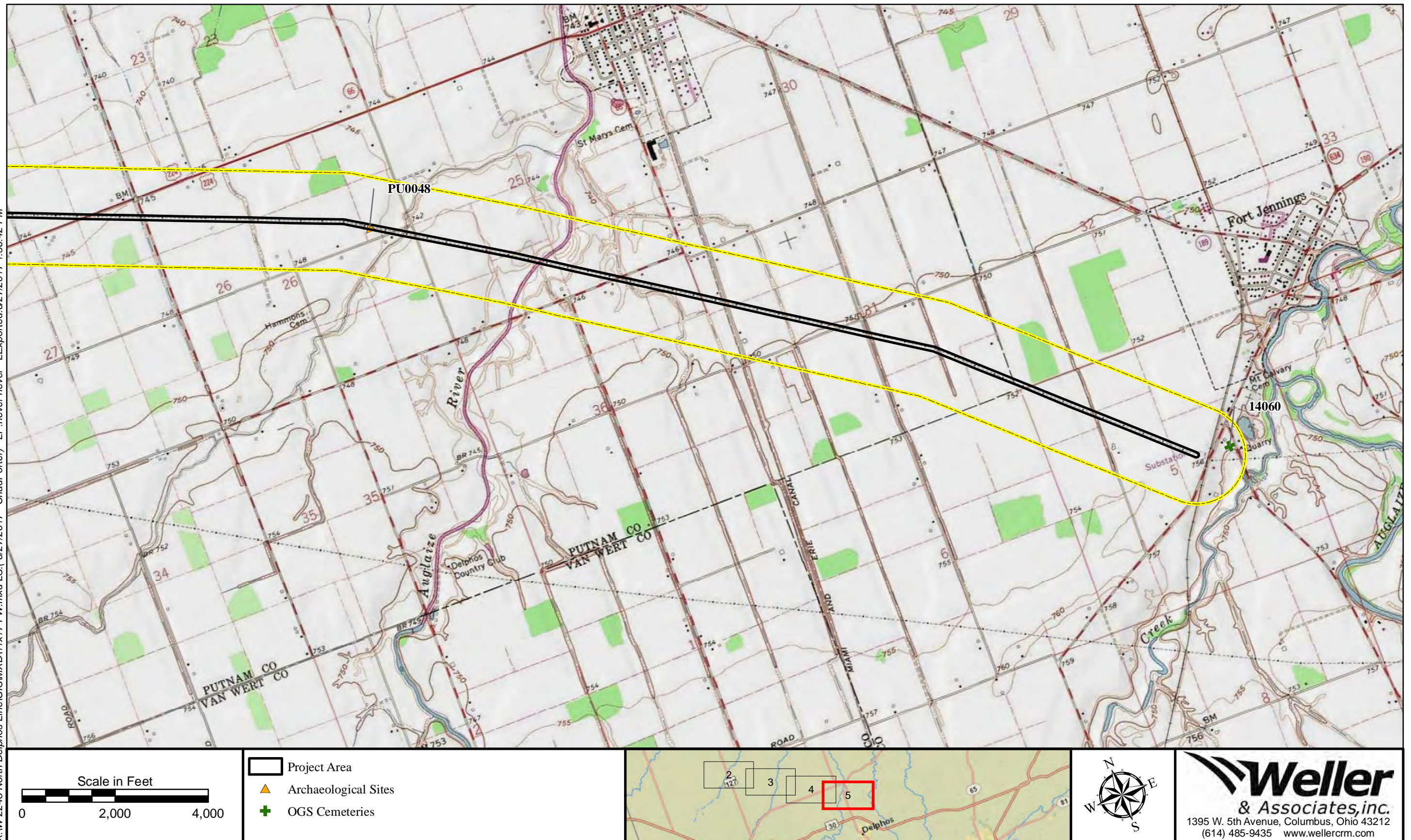


Figure 5. Portions of the USGS 1972 Wetsel, and 1973 Ottoville, Ohio 7.5 Minute Series (Topographic) maps indicating the location of the project and previously recorded resources in the study area.



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Summary: Letter of Notification electronically filed by Ms. Christen M. Blend on behalf of AEP Ohio Transmission Power Company, Inc.