

**Appendix I: Section 7 Consultation**

- USFWS/INDOT Coordination
- Biological Assessment – January 2018

**From:** [Boits, Leah](#)  
**To:** [McWilliams, Robin](#)  
**Cc:** [michelle.allen@dot.gov](mailto:michelle.allen@dot.gov); [Hilden, Laura](#); [Hope, Briana](#)  
**Subject:** RE: HHTC, Des. No. 1382612 - Section 7  
**Date:** Friday, February 10, 2017 11:49:00 AM

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Hi Robin,

Thanks for getting through the review so quickly. We'd like to include Michelle Allen and Laura Hilden (copied) in the conversation about proceeding with Section 7 consultation as it pertains to the gray bat. We were thinking that we could arrange a meeting at INDOT Central Office during the week of February 20<sup>th</sup> to have this discussion.

If meeting at INDOT works, would everyone let me know their availability that week?

Thank you,  
Leah

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**Leah Boits**  
Environmental Specialist, Environmental Services Group



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**From:** McWilliams, Robin [mailto:[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)]  
**Sent:** Thursday, February 09, 2017 11:33 AM  
**To:** Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)>  
**Subject:** Re: HHTC, Des. No. 1382612 - Section 7

Great, thanks! I sent my supervisor a note today explaining where things currently are on the project. I hope to meet with him to discuss on Monday. My guess is that we will need to do formal consultation for the gray bat but I'll let you know what route is best next week if that is ok.

Robin

Robin McWilliams Munson

U.S. Fish and Wildlife Service  
620 South Walker Street  
Bloomington, Indiana 46403  
812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p  
Wednesday, Thursday - telework 8:30a-3:00p

On Thu, Feb 9, 2017 at 11:18 AM, Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)> wrote:

Hi Robin,

We are still working through the process of evaluating all alternatives, including one that would utilize Port Road. However, we have not developed exhibits for this alternative at this time. We plan to have that alternative assessed and included in the alternatives matrix prior to our next agency meeting.

Thanks,  
Leah

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Leah Boits  
Environmental Specialist, Environmental Services Group



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**From:** McWilliams, Robin [mailto:[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)]

**Sent:** Thursday, February 09, 2017 10:11 AM

**To:** Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)>

**Subject:** Re: HHTC, Des. No. 1382612 - Section 7

Thanks Leah. I was wondering if there was any more discussion about developing a Port Road alternative. I know some of the agencies had asked about that as well.

Sincerely,  
Robin

Robin McWilliams Munson

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620 South Walker Street  
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Monday, Tuesday - 7:30a-3:00p  
Wednesday, Thursday - telework 8:30a-3:00p

On Thu, Feb 9, 2017 at 9:58 AM, Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)> wrote:

Robin,

Attached are two photos showing the cave-like feature; the field notebook is placed near the opening for scale. It is worth noting that scat (not guano) was found near the entrance of the karst feature. The opening was approximately 1' high x 1.5' wide. Please let me know if I can get you any additional information at this point in your review.

Thanks,  
Leah

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Leah Boits  
Environmental Specialist, Environmental Services Group



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**From:** McWilliams, Robin [mailto:[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)]

**Sent:** Thursday, February 09, 2017 9:18 AM

**To:** Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)>

**Subject:** Re: HHTC, Des. No. 1382612 - Section 7

Good morning Leah,

I am just curious about the cave-like feature that was discovered and wondered if you had more info on that feature for now.

Thanks,  
Robin

Robin McWilliams Munson

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Monday, Tuesday - 7:30a-3:00p  
Wednesday, Thursday - telework 8:30a-3:00p

On Thu, Feb 9, 2017 at 7:41 AM, Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)> wrote:

Hi Robin,

We are scheduled to have the draft karst report ready for agency review by mid- to end of March. Is there any specific karst information you need prior to this date to finish reviewing the Section 7 information that I sent to you?

Thanks,  
Leah

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Leah Boits  
Environmental Specialist, Environmental Services Group



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**From:** McWilliams, Robin [mailto:[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)]

**Sent:** Wednesday, February 08, 2017 12:24 PM

**To:** Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)>

**Subject:** Re: HHTC, Des. No. 1382612 - Section 7

Will there be a karst report with photos, etc.?

robin

Robin McWilliams Munson

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620 South Walker Street  
Bloomington, Indiana 46403  
812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p

Wednesday, Thursday - telework 8:30a-3:00p

On Wed, Feb 8, 2017 at 12:17 PM, McWilliams, Robin <[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)> wrote:

HI Leah,

Do you have a map of all of the karst features that were found?

Robin

Robin McWilliams Munson

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620 South Walker Street  
Bloomington, Indiana 46403

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Monday, Tuesday - 7:30a-3:00p

Wednesday, Thursday - telework 8:30a-3:00p

On Thu, Jan 26, 2017 at 4:35 PM, Boits, Leah <[lboits@structurepoint.com](mailto:lboits@structurepoint.com)> wrote:

Robin,

Please find attached documents related to Section 7 Coordination for the above-referenced project. The following documents are included for your review and comment:

- Scoping Worksheet for the Indiana Bat and Northern Long-Eared Bat Range-Wide Programmatic Informal Consultation
- USFWS Official List of Species as requested through IPaC
- Bat Mist Net Survey Report prepared by Eco-Tech Consultants, Inc.
- Karst Feature mapping

Because three of the questions in Step 1 of the Scoping Worksheet resulted an answer of “yes,” (Numbers 1, 2, and 5), the project is not covered by the range-wide programmatic informal consultation and per the instructions, the rest of the worksheet was not completed. Due to these results, a Bat Mist Survey was completed in July 2016. Eleven bats of three species were captured during the mist net survey, including five federally endangered gray bats. No Indiana bats or northern long-eared bats were captured. Due to the findings of the Mist Net Survey, we believe the project “May Affect, Not Likely to Adversely Effect – Without Avoidance and Minimization Measures” the Indiana bat and/or NLEB.

Since the completion of the Mist Net Survey, the fieldwork for karst investigation has been completed (December 19, 2016). Karst features identified within the Heavy Haul Transportation corridor primarily consisted of springs and subsidence-type sinkholes. However, one karst feature appeared to possess an open conduit into the subsurface which could possibly provide habitat for gray bats. This karst feature is highlighted on the attached mapping and is within two of the proposed alignments (Alignments D & E). No other karst features (caves/cave entrances, blind valleys, swallets or other insurgence features) were identified within the study area. Please note that Alternative DE (light pink) is a new alignment that is being considered based off of the comments received after the May 2016 agency meeting.

After your review, we would like to schedule a meeting to discuss the findings of the Mist Net Survey and Karst Study and how to proceed with Section 7 Consultation considering the presence of the gray bat within the study area. Please

let us know if you have any issues accessing the documents or if additional information is needed.

Thank you,  
Leah

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Leah Boits

Environmental Specialist, Environmental Services Group



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# SCOPING WORKSHEET

## INDIANA BAT AND NORTHERN LONG-EARED BAT RANGE-WIDE PROGRAMMATIC INFORMAL CONSULTATION

Complete the following steps to determine whether a project is within the scope of the range-wide programmatic informal consultation and to identify potential project effects on either the Indiana bat or Northern long-eared bat. The following information is needed to complete this form: project scope (including any construction methods to be used), project location, habitat characterization, completed survey results, and Avoidance and Minimization Measures (AMMs) to be included in the project.

### STEP 1: PROGRAMMATIC SCOPE (Users Guide p. 3)

*If answers to any of these questions are “yes”, the project is NOT covered by the range-wide programmatic informal consultation. Proceed no further in completing this worksheet. Separate consultation with the appropriate Service field office is necessary. If answers to all of the questions are “no”, proceed with Step 2 of this Worksheet.*

	Yes	No
1. Will the project construct a new road corridor (new alignment, not minor realignments)?	X	
2. Will project activities impact suitable forest habitat for bats > 100 feet from existing road/rail surfaces <i>at any time of year</i> (unless summer bat Presence/Probable Absence (P/A) surveys are negative)?	X	
3. Will the project raise the road profile above the tree canopy within 1,000 feet of known summer habitat (based on documented roosts and/or captures)?		X
4. Is the project within 0.5 mile of hibernacula (including Indiana bat critical habitat) and 1) include construction activities extending outside the existing road/rail surface or 2) include construction activities wholly within the existing road/rail service but include percussive or other activities that increase noise above existing traffic/background levels?		X
5. Will the project clear suitable forest habitat at any distance from a road during the active season <sup>1</sup> for bats (unless summer bat P/A surveys are negative)?	X	
6. Will the project remove documented roosts or foraging areas/travel corridors (based on radio telemetry) <i>at any time of year</i> or remove trees within 0.25 miles of documented roosts <i>at any time of year</i> ?		X
7. Bridge Projects <i>at any time of year</i> : (a) Will the project remove a bridge with bat colonies known to be roosting under the bridge? (b) Will the project modify a bridge with bat colonies known to be roosting under the bridge so that it is no longer suitable for roosting?		X
8. Will bridge or structure maintenance activities likely disturb bats while bats are documented to be present?		X

### STEP 2: POTENTIAL PROJECT EFFECTS

#### No Effect (NE) (User’s Guide p. 4)

*If answers to any of the criteria below are “yes” the project will have “No Effect” on the Indiana bat and/or NLEB. Stop here. Document “no effect” on the Project Submittal Form (Appendix B of the User Guide) and retain for your files. No coordination with the Service is required. If answers to all of the criteria below are “no”, proceed with this Worksheet.*

Check “NA” if the project will not involve the listed activity or condition.

	Yes	No	N/A
1. Is the project(s) outside the species range, based on USFWS IPaC database?			

<sup>1</sup> Coordinate with the local Service field office for active season dates.

2. Is the project inside the range and outside 0.5 mile of hibernacula, but no suitable summer habitat is present (e.g., high-density urban area or non-forested areas)?			
3. Are all project activities (anywhere, including within 0.5 miles of hibernacula) conducted completely within the existing road/rail surface and <u>do not involve</u> percussive or other activities that increase noise above existing traffic/background levels, such as blasting, use of pile drivers, rock drills, or hoe rams?			
4. Does the project involve maintenance, alteration, or demolition of bridge/structures and <u>the results of a bridge assessment indicate no signs of bats?</u>			
5. Does the project consist of non-construction activities (e.g., bridge assessment, property inspections, property sales, property easements, and equipment purchases)?			

**May Affect (MA)** (User’s Guide page 4)

*If the answer to each of the criteria below is “true”, assume the presence of Indiana bat and/or NLEB. Proceed with this Worksheet.*

	True	False
1. Project is in range of species, and		
2. Suitable habitat is present (for foraging, roosting, traveling, hibernating, swarming, nursing or other bat activities), and		
3. No bat surveys have been conducted or surveys are positive for presence of Indiana bat or NLEB.		

*If the answers to any of the criteria below are “yes” the project “May Affect” the Indiana bat and/or NLEB. Proceed with Step 3 of this Worksheet.*

Does the project action involve any of the following activities?	Yes	No	Unknown
1. Tree removal within suitable habitat			
2. Percussive activities that will increase noise above existing traffic/background levels (e.g., blasting, use of pile drivers, rock drills, or hoe rams)			
3. Increased lighting, either temporary or permanent (e.g., construction lighting or permanent lighting installation as part of project)			
4. Smoke/heat associated with burning brush piles			
5. Impacts to water bodies/wetlands where suitable bat habitat is present (e.g., piping a section of stream)			
6. Bridge or structure maintenance, repair or replacement at sites with bat activity			

**STEP 3: AVOIDANCE AND MINIMIZATION MEASURES** (User’s Guide page 5-6)

The next sets of questions will step through the process for determining whether a project “May Affect, but is Not Likely to Adversely Affect” the Indiana bat and/or NLEB. Avoidance and Minimization Measures (AMM’s) may be required.

**May Affect, Not Likely to Adversely Affect (NLAA)**

*If answers to any of the questions below are “Yes”, the project “May Affect, but is Not Likely to Adversely Affect” the Indiana bat and/or NLEB, and IS covered by the range-wide programmatic informal consultation. AMM’s are not required for these activities. Document on the Project Submittal Form (Appendix B of the User Guide). If answers to all of these questions are “No” or “Unknown”, proceed with this worksheet.*

Do any of the conditions below describe the project?	Yes	No	Unknown
1. Project is inside the range and in or near suitable habitat, but			

with negative bat P/A surveys. *If no bat surveys have been performed check "no" - presence of bats is to be assumed and AMM's will be required.			
2. Work activities will be conducted completely within the existing road/rail surface and <u>involve</u> percussive activities such as blasting and use of pile drivers, rock drills, or hoe rams.			
3. Work activities will take place in areas that contain suitable forested habitat, but no tree removal or habitat alteration will occur (e.g., landscaping rest areas, mowing, brush removal, sign or guardrail replacement, storm water management).			
4. No slash pile burning will occur.			
5. Wetland or stream protection activities associated with mitigation that do not clear suitable habitat.			

**May Affect, Not Likely to Adversely Affect - AMMs Required**

*For the actions below, site-specific AMM(s) may be required to make the project NLAA for either bat species. If there is an applicable AMM, it MUST be implemented for the project to be eligible for use within the range-wide programmatic informal consultation. If an AMM listed below is not applicable (based on the type of action/effect), document why it is not applicable. For some projects, additional project-specific AMM(s) not listed below may be needed. If such additional AMM(s) are implemented, document them.*

	Yes	No
<b>TREE REMOVAL</b>		
Will the project remove trees that are suitable maternity, roosting, foraging, or traveling habitat for Indiana Bat or NLEB? <i>If "No", proceed to next activity.</i>		
1. Will tree removal <i>at any time of year</i> occur <u>entirely</u> within 100 feet of existing road surface? (Note: If "no", this action is not covered under the range-wide programmatic Informal consultation. Proceed no further with worksheet. Separate consultation with the appropriate Service field office is necessary.)		
2. Will documented roosts or foraging habitat (based on radio telemetry) be removed <i>at any time of year</i> ? (Note: If "yes", this action is not covered under the range-wide programmatic informal consultation. Proceed no further with worksheet. Separate consultation with the appropriate Service field office is necessary.)		
3. Will trees be removed within 0.25 miles of documented roosts <i>at any time of year</i> ? (Note: If "yes", this action is not covered under the range-wide programmatic informal consultation. Proceed no further with worksheet. Separate consultation with the appropriate Service field office is necessary.)		
Unless current surveys document that the species are not present, all of the AMMs listed below will be applied, unless not relevant (e.g., no bridge work will occur). Indicate on the project submittal form which of the following tree removal AMMs will be implemented.		
<b>TREE REMOVAL AMM 1:</b> Modify all phases/aspects of project (e.g. temporary work areas, alignments) to avoid tree removal in excess of what is required to implement project safely. (Note: If this cannot be applied, project can still be MANLAA as long as removal is in winter and avoids known roosts.)		
<b>TREE REMOVAL AMM 2:</b> Apply time of year restrictions for tree removal when bats are not likely to be present.		
<b>TREE REMOVAL AMM 3:</b> Ensure tree removal is limited to that specified in project plans. Install bright orange flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits. Ensure that contractors understand the clearing limits and how they are marked in the field.		

<b>TREE REMOVAL AMM 4:</b> Avoid cutting down documented bat roosts that are still suitable for roosting or documented foraging habitat <i>at any time of year</i> . Avoid cutting down trees within 0.25 miles of documented roosts <i>at any time of year</i> . Ensure that suitable roosts remain on the landscape rather than focusing on general forest loss.		
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\*Note: "Trees" refers to trees that are suitable habitat for each species.

<b>LIGHTING</b>	<b>Yes</b>	<b>No</b>
1. Will the project involve the use of lighting during construction? <i>If "No", proceed to next activity.</i>		
2. Will the project action install permanent lighting? <i>If "No", proceed to next activity.</i>		
If the answer to either of above is "yes", indicate on the project submittal form which lighting AMM's will be implemented.		
<b>LIGHTING AMM 1:</b> Direct temporary lighting away from suitable habitat during construction.		
<b>LIGHTING AMM 2:</b> Use downward-facing, full cut-off lens lights, and direct lighting away from suitable habitat when installing new or replacing existing permanent lights.		

<b>BRIDGE MAINTENANCE, ALTERATION OR REMOVAL</b>	<b>Yes</b>	<b>No</b>
Does the project involve bridge maintenance, removal or other alteration? <i>If "No", proceed to next activity.</i>		
Unless current surveys or inspections document that the species are not present, the AMMs listed below will be applied, as appropriate. Indicate on the project submittal form which of the following AMMs will be implemented.		
<b>BRIDGE AMM 1:</b> Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the active season. <sup>2</sup>		
<b>BRIDGE AMM 2:</b> Bridge repair, retrofit, maintenance, and/or rehabilitation work outside of pup season (June 1 – July 31) will occur in the evening while the bats are feeding, starting one hour after sunset, and ending one hour before daylight excluding the hours between 10 pm and midnight. Lighting must be kept localized (See lighting AMM).		
<b>BRIDGE AMM 3:</b> If bridge repair, retrofit, maintenance, and/or rehabilitation work alters the bridge during the inactive season, then ensure suitable roosting sites remain after any bridge work. Suitable roosting sites may be incorporated into the design of a new bridge.		

<b>STRUCTURE (ARTIFICIAL ROOSTS) MAINTENANCE, ALTERATION OR REMOVAL</b>	<b>Yes</b>	<b>No</b>
Does the project involving any artificial roost such as a building, barn, shed, mobile home, telephone poles or other structure?		
Unless current surveys or inspections document that the species are not present, the AMMs listed below will be applied, as appropriate. Indicate on the project submittal form which of the following AMMs will be implemented.		
<b>STRUCTURE AMM 1:</b> If the goal of the project is to exclude bats, coordinate with the local Service field office.		
<b>STRUCTURE AMM 2:</b> Perform any maintenance and/or repair work outside of the active season.		
<b>STRUCTURE AMM 3:</b> If maintenance and/or repair work will be performed during the		

<sup>2</sup> Coordinate with the local Service field office for active season dates.

active season, determine if work will occur in an area with roosting bats. If so, coordinate with the local Service field office. If bat activity or signs of frequent bat activity are observed, avoid work or install bat exclusions or similar structure alteration during the active season, unless there are concerns about human health/safety/property and coordinate with the local USFWS Field Office and a nuisance wildlife control officer.		
<b>STRUCTURE AMM 4:</b> If bat activity or signs of frequent bat activity are observed, avoid structure removal unless there are concerns about human health/safety/property and coordinate with the local Service field office and a nuisance wildlife control officer.		

***A project that involves these activities and implements all applicable AMMs “May Affect, but is not likely to Adversely Affect” the Indiana bat and/or NLEB. With the implementation of the applicable AMMs, the project IS covered by the range-wide programmatic informal consultation. Document on the Project Submittal Form (Appendix B of the User Guide).***

Worksheet Prepared By: \_\_\_\_\_  
Name (Please print) Firm/Organization Date

Worksheet Reviewed By: \_\_\_\_\_  
Name (Please print) Firm/Organization Date

Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA)

Range-wide Programmatic Consultation for  
Indiana Bat and Northern Long-eared Bat

**Project Submittal Form**

*Updated May 2016*

In order to use the range-wide programmatic consultation to fulfill Endangered Species Act consultation requirements, transportation agencies must use this submittal form (or a comparable Service approved form) to provide project-level information for all actions that may affect the Indiana bat and/or northern long-eared bat (NLEB). The completed form should be submitted to the appropriate U.S. Fish and Wildlife Service (Service) Field Office prior to project commencement. For more information, see the Standard Operating Procedure for Site Specific Project(s) Submission in the User's Guide.

By submitting this form, the transportation agency ensures that the proposed project(s) adhere to the criteria and conditions of the range-wide programmatic consultation, as outlined in the biological assessment (BA) and biological opinion (BO). Upon submittal of this form, the appropriate Service Field Office may review the project-specific information provided and request additional information. For projects that may affect, but are not likely to adversely affect (NLAA) the Indiana bat and/or NLEB, if the applying transportation agency is **not** contacted by the Service with any questions or concerns within 14 calendar days of form submittal, it may proceed under the range-wide programmatic consultation and assume concurrence of the NLAA determination made by the Service in the BO. For projects that may affect, and are likely to adversely affect (LAA) the Indiana bat and/or the NLEB, the appropriate Service Field Office will respond (see recommended response letter template) within 30 calendar days of receiving a complete project-level submission, which includes, but may not be limited to this completed form.

Further instructions on completing the submittal form can be found by hovering your cursor over each text box.

---

1. Date:

2. Lead agency:

*This refers to the Federal governmental lead action agency initiating consultation; select FHWA, FRA or FTA as appropriate*

3. Requesting agency:

*This refers to the transportation agency completing the form (it may or may not be the same as the Lead Agency).*

- Name:

- Title:

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- Phone:
- Email:

4. Consultation code<sup>1</sup>:

5. Project name(s):

6. Project description:

*Please attach additional documentation or explanatory text if necessary*

7. Project location (county, state): Utica Township, Clark County, Indiana  
*If not delineated in IPaC, attach shape files*

8. For other species from IPaC official species list:

No effect – project(s) are inside the range, but no suitable habitat (see additional information attached).

May affect – see additional information provided for those species (see attached or forthcoming).

**Please confirm and identify how the proposed project(s) adhere to the criteria of the BO by completing the following (see User Guide Section 2.0):**

<sup>1</sup> Available through IPaC System Official Species List: <https://ecos.fws.gov/ipac/>

NO EFFECT

9. For Indiana bat/NLEB, if applicable, select your no effect determination:

No effect – project(s) are outside the species’ range. *submittal form complete*

No effect – project(s) are inside the species range but no suitable forested bat habitat; must also be greater than 0.5 miles from any hibernaculum. *submittal form complete*

No effect – project(s) do not involve any construction activities (e.g., bridge assessments, property inspections, planning and technical studies, property sales, property easements, and equipment purchases). *submittal form complete*

No effect – project(s) are completely within existing road/rail surface and do not involve percussive or other activities that increase noise above existing traffic/background levels (e.g., road line painting). *submittal form complete*

No effect – project(s) includes maintenance, alteration, or demolition of bridge(s)/structure(s) and indicate(s) no signs of bats from results of a bridge/structure assessment. *submittal form complete*

*Otherwise, please continue below.*

MAY AFFECT, NOT LIKELY TO ADVERSELY EFFECT – W/O AMMS

10. For Indiana bat/NLEB, if applicable, select your may affect, NLAA determination (without implementation of AMMs):

Bat Mist Net  
Survey (July 2016)  
uploaded to IPaC  
December 2016

NLAA – project(s) are inside the range and suitable bat habitat is present, but **negative** bat presence/absence (P/A) surveys; must also be greater than 0.5 miles from any hibernaculum. *submittal form complete*

NLAA – project(s) within suitable bat habitat that involve maintenance of existing facilities (e.g., rest areas, stormwater detention basins) but do not remove or alter the habitat (e.g., mowing, brush removal). *submittal form complete*

NLAA – project(s) within 300 feet of existing road/rail surfaces in areas that contain suitable habitat but do not remove or alter the habitat (e.g., mowing, brush removal). *submittal form complete*

NLAA – project(s) limited to slash pile burning. *submittal form complete*

NLAA –project(s) are limited to wetland or stream protection activities associated with compensatory wetland mitigation that do not clear suitable habitat. *submittal form complete*

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*Otherwise, please continue below.*

MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT – WITH AMMs

11. For Indiana bat/NLEB, if applicable, document your may affect, NLAA determination by completing the following section (**with implementation of AMMs**; use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

Verify that all tree removal occurs greater than 0.5 mile from any hibernaculum:

Verify that the project is within 100 feet of existing road/rail surfaces:

Verify that no documented Indiana bat and/or NLEB roosts and/or surrounding summer habitat within 0.25 mile of documented roosts will be impacted:

Verify that all tree removal will occur outside the active season (i.e., will occur in winter)<sup>2</sup>:

Acres of trees proposed for removal:

b. Bridge/Structure Work Projects

Proposed work:

Timing of work:

Evidence of bat activity on/in bridge/structure? Y/N

Verify that work will be conducted outside the active season, or if during the active season, verify that no roosting bats will be harmed or disturbed in any way:

Verify that work will not alter roosting potential in any way:

Verify that all applicable lighting minimization measures will be implemented:

c. Other (please explain)

<sup>2</sup> Coordinate with the local Service Field Office for appropriate dates.

MAY AFFECT, LIKELY TO ADVERSELY AFFECT

12. For Indiana bat/NLEB, if applicable, document your may affect, LAA determination by completing the following section (use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

Verify that all tree removal occurs greater than 0.5 mile from any hibernaculum:

Project Location:

0-100 feet from edge of existing road/rail surface

100-300 feet from edge of existing road/rail surface

Verify that no documented Indiana bat roosts or surrounding summer habitat within 0.25 mile of documented roosts will be impacted between May 1 and July 31:

Verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31:

Timing of tree removal:

Acres of trees proposed for removal:

b. Bridge/Structure Work Projects

Proposed work:

Timing of work:

Verify no signs of a colony:

Verify that work will not alter roosting potential in any way:

13. For Indiana bat/NLEB, **if applicable to the action type**, the following AMMs will be implemented<sup>3</sup> unless P/A surveys and/or bridge assessments document that the species are not likely to be present:

General AMM 1(required for all projects):

<sup>3</sup> See AMMs Fact Sheet (Appendix C) for more information on AMMs

Tree Removal AMM 1:  
Tree Removal AMM 2 (required for NLAA):  
Tree Removal AMM 3 (required for all projects):  
Tree Removal AMM 4 (required for NLAA):  
Tree Removal AMM 5 (required for LAA):  
Tree Removal AMM 6 (required for LAA):

Tree Removal AMM 7 (required for LAA):

Bridge AMM 1:  
Bridge AMM 2 (required for all projects during active season):  
Bridge AMM 3 (required for NLAA during active season):  
Bridge AMM 4 (required for NLAA during active season):  
Bridge AMM 5 (required for all projects):

Structure AMM 1 (required for all Indiana bat projects, required for NLAA NLEB projects):  
Structure AMM 2 (required for all Indiana bat projects, required for NLAA NLEB projects):  
Structure AMM 3 (required for all Indiana bat projects, required for NLAA NLEB projects):  
Structure AMM 4 (required for all Indiana bat projects, required for NLAA NLEB projects):

Lighting AMM 1 (required for all projects during the active season):  
Lighting AMM 2 (required for all projects):

Hibernacula AMM 1 (required for all projects):

14. For Indiana bat, if applicable, compensatory mitigation measures will also be required to offset adverse effects on the species (see Section 2.10 of the BA). Please verify the mechanism in which compensatory mitigation will be implemented and that sufficient information is provided to the Service.

Range-wide In Lieu Fee Program, The Conservation Fund

State, Regional, Recovery Unit-Specific In Lieu Fee Program  
Name:

Conservation Bank,  
Name:  
Location:

Local Conservation Site(s)  
Name:  
Location:  
Description:

---

## **Project Description**

The Indiana Department of Transportation (INDOT), in partnership with the Federal Highway Administration (FHWA), the Indiana Economic Development Corporation, the Ports of Indiana, the Board of Commissioners of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority (RRDA), is developing a federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville (Port) with other regional transportation assets. The proposed project is located in Utica Township, Clark County, Indiana.

The area is located on the Jeffersonville USGS 7.5 Minute Quadrangle Maps in Tracts 6-7, 14-17, and 24-25 and is within the Louisville Metropolitan Planning Area (LMPA), which consists of nine counties in Kentucky (Jefferson, Oldham, Trimble, Henry, Shelby, Spencer, Nelson, Bullit and Meade) and four Indiana counties (Washington, Harrison, Floyd and Clark). Preliminary corridor studies have identified an approximately 1.3-mile wide corridor between the Port of Indiana, Jeffersonville and State Road (SR) 265 to establish roadway alignment alternatives for the project. The alternatives are currently being developed and evaluated within the project corridor based upon environmental studies and coordination.

The project area has several major generators of traffic that consist primarily of heavy trucks or heavy haul vehicles. However, the road network in the area is primarily made of up of local facilities not designed to handle such vehicle loading. Heavy haul vehicles are generally 60 feet or more in length with a gross vehicle weight of 134,000 pounds, as compared to Indiana legal load limits of 80,000 pounds gross vehicle weight. Heavy haul vehicles require the design of facilities to take into account the maximum weight of the heavy haul vehicles and the anticipated number of heavy haul vehicles utilizing the facility on a daily basis. The resulting difference between a facility designed to carry heavy haul vehicles and standard load trucks is often a significant difference in pavement thickness. Based on current and predicted rapid industrial and commercial development associated with the major traffic generators in the project area it is anticipated that truck traffic will increase by 129 percent over the next 20 years.

The proposed project corridor is approximately 168 acres and generally extends north from the Port to the SR 265/Old Salem Road interchange. The area is a combination of forest, open grass, industrial, and farmed areas. Approximately 44% of the project area is forested, and the forested areas are generally on steep slopes. Few existing roads are located within this area. The proposed project corridor is bounded by the SR 265 corridor at the northern project limits. Lentzier Creek and several tributaries are located within the project corridor.

The proposed project consists of the construction of a 3-lane road designed to “heavy haul” specifications. The proposed road would have a design speed of 35 miles per hour with two 12-foot travel lanes and one 11- to 12-foot auxiliary lane. The road would likely be constructed on new alignment at a total length of approximately 1.75 miles. While only three lanes would be constructed, right-of-way would be wide enough to allow for future expansion to five lanes if required by traffic demand.



# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Bloomington Ecological Services Field Office  
620 SOUTH WALKER STREET  
BLOOMINGTON, IN 47403

PHONE: (812)334-4261 FAX: (812)334-4273

URL: [www.fws.gov/midwest/Endangered/section7/s7process/step1.html](http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html)

Consultation Code: 03E12000-2017-SLI-0166

December 06, 2016

Event Code: 03E12000-2017-E-00141

Project Name: Heavy Haul Transportation Corridor, Des. No. 1382612

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

## To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Service if they determine their project “may affect” listed species or critical habitat.

Under 50 CFR 402.12(e) (the regulations that implement Section 7 of the Endangered Species Act) the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally. You may verify the list by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation and completing the same process you used to receive the attached list. As an alternative, you may contact this Ecological Services Field Office for updates.

Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at - <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions which will help you determine if your project will have an adverse effect on listed species and will help lead you through the Section 7 process.

For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project or may be affected by your proposed project.

Although no longer protected under the Endangered Species Act, be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*) and Migratory Bird Treaty Act (16 U.S.C. 703 *et seq.*), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html> to help you determine if you can avoid impacting eagles or if a permit may be necessary.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment



United States Department of Interior  
Fish and Wildlife Service

Project name: Heavy Haul Transportation Corridor, Des. No. 1382612

## Official Species List

### Provided by:

Bloomington Ecological Services Field Office

620 SOUTH WALKER STREET

BLOOMINGTON, IN 47403

(812) 334-4261

<http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html>

**Consultation Code:** 03E12000-2017-SLI-0166

**Event Code:** 03E12000-2017-E-00141

**Project Type:** DEVELOPMENT

**Project Name:** Heavy Haul Transportation Corridor, Des. No. 1382612

**Project Description:** INDOT, in partnership with the FHWA, the Indiana Economic Development Corporation, the Ports of Indiana, the Board of Commissioners of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority (RRDA), is developing a federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville (Port) with other regional transportation assets. The proposed project is located in Utica Township, Clark County, Indiana.

The area is located on the Jeffersonville USGS 7.5 Minute Quadrangle Maps in Tracts 6-7, 14-17, and 24-25 and is within the Louisville Metropolitan Planning Area, which consists of nine counties in Kentucky (Jefferson, Oldham, Trimble, Henry, Shelby, Spencer, Nelson, Bullit and Meade) and four Indiana counties (Washington, Harrison, Floyd and Clark). Preliminary corridor studies have identified an approximately 1.3-mile wide corridor between the Port of Indiana, Jeffersonville and SR 265 to establish roadway alignment alternatives for the project. The alternatives are currently being developed and evaluated within the project corridor based upon environmental studies and coordination.

The project area has several major generators of traffic that consist primarily of heavy trucks or heavy haul vehicles. However, the road network in the area is primarily made of up of local facilities not designed to handle such vehicle loading. Heavy haul vehicles are generally 60 feet or more in length with a gross vehicle weight of 134,000 pounds, as compared to Indiana legal load



United States Department of Interior  
Fish and Wildlife Service

Project name: Heavy Haul Transportation Corridor, Des. No. 1382612

limits of 80,000 pounds gross vehicle weight. Heavy haul vehicles require the design of facilities to take into account the maximum weight of the heavy haul vehicles and the anticipated number of heavy haul vehicles utilizing the facility on a daily basis. The resulting difference between a facility designed to carry heavy haul vehicles and standard load trucks is often a significant difference in pavement thickness. Based on current and predicted rapid industrial and commercial development associated with the major traffic generators in the project area it is anticipated that truck traffic will increase by 129 percent over the next 20 years.

The proposed project corridor is approximately 168 acres and generally extends north from the Port to the SR 265/Old Salem Road interchange. The area is a combination of forest, open grass, industrial, and farmed areas. Approximately 44% of the project area is forested, and the forested areas are generally on steep slopes. Few existing roads are located within this area. The proposed project corridor is bounded by the SR 265 corridor at the northern project limits. Lentzier Creek and several tributaries are located within the project corridor.

The proposed project consists of the construction of a 3-lane road designed to “heavy haul” specifications. The proposed road would have a design speed of 35 miles per hour with two 12-foot travel lanes and one 11- to 12-foot auxiliary lane. The road would likely be constructed on new alignment at a total length of approximately 1.75 miles. While only three lanes would be constructed, right-of-way would be wide enough to allow for future expansion to five lanes if required by traffic demand.

**Please Note:** The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

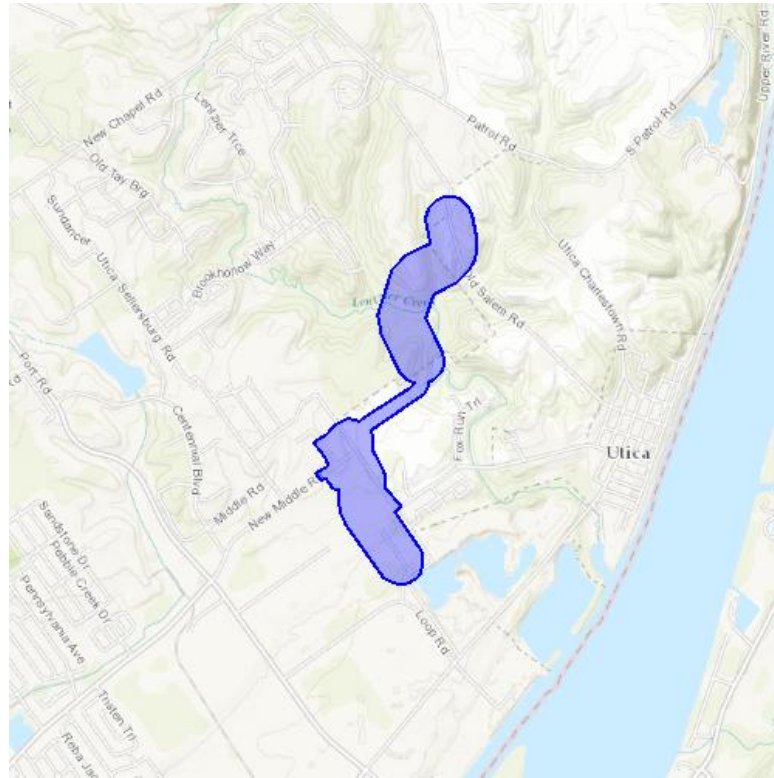




United States Department of Interior  
Fish and Wildlife Service

Project name: Heavy Haul Transportation Corridor, Des. No. 1382612

### Project Location Map:



**Project Coordinates:** The coordinates are too numerous to display here.

**Project Counties:** Clark, IN



United States Department of Interior  
Fish and Wildlife Service

Project name: Heavy Haul Transportation Corridor, Des. No. 1382612

## Endangered Species Act Species List

There are a total of 3 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Clams	Status	Has Critical Habitat	Condition(s)
Sheepnose Mussel ( <i>Plethobasus cyphus</i> ) Population: Wherever found	Endangered		
<b>Mammals</b>			
Gray bat ( <i>Myotis grisescens</i> ) Population: Wherever found	Endangered		
Indiana bat ( <i>Myotis sodalis</i> ) Population: Wherever found	Endangered		



United States Department of Interior  
Fish and Wildlife Service

Project name: Heavy Haul Transportation Corridor, Des. No. 1382612

## **Critical habitats that lie within your project area**

There are no critical habitats within your project area.

# **BIOLOGICAL ASSESSMENT**

*Myotis grisescens*  
**Gray Bat**

**INDOT Heavy Haul Transportation Corridor  
Indiana Ports-Jeffersonville to State Road 265  
Des. No. 1382612  
Clark County, Indiana**

**Prepared by:  
Eco-Tech Consultants, Inc.  
311 Clark Station Road  
Fisherville, KY 40023**

**Prepared for:  
Indiana Department of Transportation  
100 North Senate Avenue  
Room N642  
Indianapolis, Indiana 46204**

**January 2018**

## Executive Summary

Indiana Department of Transportation (INDOT), in partnership with the Federal Highway Administration, the Indiana Economic Development Corporation, the Ports of Indiana, the Boards of Commissioners of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority (RRDA), is developing a federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville with other regional transportation assets. This heavy haul transportation corridor Des. No. 1382612 (Proposed Alternative) is located in Utica Township, Clark County, Indiana and would also address expected increase in volume of heavy haul vehicles. The project is located within the Silver-Little Kentucky River Watershed, Hydrologic Unit Code (HUC) 05140101 with an approximate project midpoint located at coordinates 38.335539°, -85.6773004°. The total length of the project is 2.1 miles.

The Project Action Area includes all areas in which listed bat species would be directly and/or indirectly affected by the Proposed Alternative. Based on coordination with U.S. Fish and Wildlife Service's (USFWS) Indiana Field Office, the Proposed Alternative may directly or indirectly affect the federally endangered gray bat (*Myotis grisescens*). The Project Action Area was designated as a 1-mile radius of the Proposed Alternative (approximately 4,627 acres) as discussed with the USFWS through early agency coordination. The Project Action Area makes up approximately 15% of the Lentzier Creek - Ohio River 14-digit HUC watershed, which spans 27,080 acres in Indiana and Kentucky and is comprised of approximately 25% forest (1,178 acres). Desktop assessment of available gray bat foraging and flyway habitat within the Project Action Area documented 97.1 acres of total forest habitat and 42,799 linear feet of named perennial streams.

Bat presence/likely absence mist net surveys were conducted from June 28 - July 1, 2016. A total of 11 bats of three species were captured during the survey, including five federally-endangered gray bats. Records provided by USFWS documents a known maternity colony located within the Sellersburg limestone quarry approximately 4.5 miles northwest of the Proposed Alternative's northern terminus.

In addition to existing riparian forest habitat, Lentzier Creek, Lancassange Creek, Goose Creek, and their associated perennial tributaries provide suitable foraging and/or flyway corridors for gray bats. A desktop habitat evaluation within the Project Action Area determined that removal 9.1 acres of forest and impacts to 90 linear feet of Lentzier Creek by the Proposed Alternative would be minimal for maintaining gray bat riparian forest flyway and foraging habitat.

At this time, no critical habitat has been designated for the gray bat and no designated critical habitat for any federally listed bat species, including the Indiana bat (*M. sodalis*) or northern long-eared bat (*M. septentrionalis*) is present within the Project Action Area. Thus, the Proposed Alternative would have no effect on critical habitat for the gray bat or any other listed bat species.

Direct and indirect effects on gray bats would be avoided or minimized with implementation of construction and post-construction best management practices (BMPs) for water quality treatment of stormwater runoff to protect aquatic resources that support important macroinvertebrate food sources for gray bats. Temporary erosion control measures including sediment traps, check dams, silt fences, ditch inlet protections, temporary construction entrance stabilization, and temporary sediment basins are included within the preliminary construction plans to protect aquatic habitats. Permanent erosion control features include riprap installation over geotextile at the outflow of all culverts and paved side ditches in areas of 3 percent or steeper grades. All temporary ground disturbance will be protected using mulch and/or temporary grass seeding, usually an annual species. Permanent grass seeding will be applied to all permanent slopes and exposed surfaces prior to project completion. Sod will be installed along all ditch bottoms where grades are equal to or greater than 1% up to 3%.

While it is unknown if permanent lighting will be included within the construction plans, downward facing lights with full cutoff lenses are recommended to prevent disturbance to foraging bats. While it is unknown if blasting of subsurface minerals will be required for construction of the Proposed Alternative, all construction activities will take place during daylight hours to prevent blasting percussion disturbance to foraging bats. Construction of the Proposed Alternative will meet all requirements of 107.08(b) of the INDOT standard specifications for dust control.

The project team should consult with the United States Fish and Wildlife Service regarding the potential need for project-specific mitigation measures for the permanent loss of listed bat habitat associated with the Proposed Alternative. Upon implementation of these conservation measures and conditions, a determination that the proposed project “may affect, and is likely to adversely affect”, federally listed bat species is recommended.

No other federally listed bat species or other listed fauna were identified within the Proposed Alternative.

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## TABLES

- Table 1.** Bat capture summary table for the proposed INDOT Heavy Haul transportation corridor in Clark County, Indiana; June 28-July 1, 2016.
- Table 2.** Comprehensive bat capture data for the proposed INDOT project in Clark County, Indiana; June 28 – July 1, 2016.
- Table 3:** Baseline gray bat foraging and flyway habitat fragmentation bats for the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.
- Table 4:** Post-Action gray bat foraging and flyway habitat fragmentation bats for the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.
- Table 5.** Gray bat suitable habitat associated with the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.
- Table 6.** Determination of potential effects to gray bats for the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.

## GRAPHICS

- Graphic 1:** Summary of gray bat emergence counts at Sellersburg Quarry from 1982-2010 in Clark County, Indiana (Whitaker et. al. 2001; R. McWilliams pers. comm. 2017).

## FIGURES

- Figure 1:** Project Location Map
- Figure 2:** Gray Bat Known Range Map
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## EXHIBITS

- Exhibit A:** Listed Bat Consultation History
- Exhibit B:** 2016 Bat Mist Net Survey Report
- Exhibit C:** Project Construction Drawings and Site Plans



## 1. Introduction

Eco-Tech Consultants, Inc. (Eco-Tech) was contracted by United Consulting to prepare a Biological Assessment (BA) for the proposed Indiana Department of Transportation (INDOT) Heavy Haul transportation corridor, Des. No. 1382612 (project), in Clark County, Indiana (Figure 1). The project is located within the Silver-Little Kentucky River Watershed, Hydrologic Unit Code (HUC) 05140101 with an approximate project midpoint located at coordinates 38.335539°, -85.6773004°. The total length of the project is 2.1 miles.

This BA addresses the proposed action in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. Section 7 of the ESA requires that, through consultation with the U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat. The Proposed Alternative is within the range of the federally endangered gray bat (*Myotis grisescens*) (Figure 2), the federally endangered Indiana bat (*M. sodalis*), and the federally threatened northern long-eared bat (*M. septentrionalis*), as well as the sheepsnose mussel (*Plethoobasus cyphus*). This BA will evaluate potential direct, indirect, and cumulative effects of the proposed transportation project to the gray bat. Mist net surveys did not result in any captures of Indiana bat or northern long-eared bat and thus are not expected to be impacted from the Proposed Alternative. The sheepsnose mussel is endemic to large rivers such as the adjacent Ohio River, which will not be impacted by the Proposed Alternative.

## 2. Project Overview

The need and purpose for project Des. No. 1382612 is to construct a roadway designed to accommodate heavy trucks and haul vehicles. INDOT, in partnership with the Federal Highway Administration, the Indiana Economic Development Corporation, the Ports of Indiana-Jeffersonville (Port), the Board of Commissioners of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority (RRDA), is developing a federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville with other regional transportation assets. Due to an expected increase in volume of heavy haul vehicles in the area, a three-lane roadway designed to accommodate heavy trucks and haul vehicles is needed. A roadway with an adjacent auxiliary lane will allow for heavy haul traffic to avoid using the local roadways that are not meant to handle vehicles of such size and weight.

The Proposed Alternative is located in Utica Township in Clark County, Indiana, where a corridor that is approximately 2.1 miles long between the Port of Indiana-Jeffersonville and State Road (SR) 265. The area is located on the Jeffersonville and Charlestown USGS 7.5 Minute Quadrangle Maps in Tracts 6-7, 14-17, 24-27, 38-40, and 52-53 and is within the Louisville Metropolitan Planning Area (LMPA), which consists of nine counties in Kentucky (Jefferson, Oldham, Trimble, Henry, Shelby, Spencer, Nelson, Bullit and Meade) and four Indiana counties (Washington, Harrison, Floyd and Clark).

The project area has several major generators of traffic that consist primarily of heavy trucks or heavy haul vehicles. However, the road network in the area is primarily made up of local facilities not designed to handle such vehicle loading. Heavy haul vehicles are generally 60 feet or more in length with a gross vehicle weight of 134,000 pounds, as compared to Indiana legal load limits of 80,000 pounds gross vehicle weight. Heavy haul vehicles require the design of facilities to take into account the maximum weight of the heavy haul vehicles and the anticipated number of heavy haul vehicles utilizing the facility on a daily basis. The resulting difference between a facility designed to carry heavy haul vehicles and standard load trucks is often a significant difference in pavement thickness. Based on current and predicted rapid industrial and commercial development associated with the major traffic generators in the project area, it is anticipated that truck traffic will increase by 129 percent over the next 20 years. The purpose of the proposed project is to provide a route built specifically for heavy haul vehicles that provides continuous connection from the RRCC and the Port to the new SR-265/Old Salem Road interchange.

The proposed project consists of the construction of a two-lane road designed to “heavy haul” specifications. The proposed road would have a design speed of 35 miles per hour with two 13-foot wide travel lanes and two 11-foot wide shoulders. The road would likely be constructed on new alignment at a total length of approximately 1.75 miles. The proposed project corridor generally extends north from the Indiana-Jeffersonville Port to the SR-265/Old Salem Road interchange. The area is a combination of steeply sloped forest, old fields, industrial properties, and farmed areas. The proposed project area contains few existing roads, Lentzier Creek and several tributaries.

### **3. Project Setting**

The Proposed Alternative includes an area of 29.4 acres of potential disturbance while the Project Action Area is approximately 4,627 acres, and includes all planned project operations and the surrounding area that could be affected by the Proposed Alternative (Figure 3). For the purpose of the effects assessment, this Project Action Area includes a 1-mile (1.6-kilometer) buffer around the Proposed Alternative, which encompasses approximately 2.1 miles of construction, including all areas within the permanent and temporary ROW for construction. The 1-mile buffer was used to account for potential indirect effects to gray bats including noise, barrier effects, and disturbances with associated secondary development.

The Project Action Area is located within the Pre-Wisconsinian Drift Plains (55d) Level IV Ecoregion as mapped by Woods et al. (1998). This ecoregion is comprised of rolling till plain with local end moraines characterized by deeply-leached, acidic, pre-Wisconsinian till and thin loess. The area features widespread areas of flat, poorly-drained soils. Originally, the area was dominated by beech forests and elm-ash swamp, but is now commonly dominated by agriculture including soybeans, corn, tobacco, and livestock.

Land use classifications from the “USDA Land Use Land Cover Dataset 2011” (USDA 2011) indicate the Project Action Area consists of approximately 15% Open Water, 25% Forest, 27% Agricultural Land, and 33% Developed land. The large amount of open water in the Project Action Area is almost entirely comprised of the Ohio River. The large amount of developed land includes elements of an urban landscape: suburbs, residential lots, commercial development, and existing roadways.

Ares within the Proposed Alternative are comprised primarily of deciduous forest, developed/residential, and agricultural areas. The most notable bat habitat were the numerous trails, small access roads, ROW, and streams throughout the temperate deciduous forest. Lentzier Creek, a direct tributary to the Ohio River, provided a reliable water source and foraging corridor. The majority of the available forested land in and around the Proposed Alternative was younger forest with dense understory, especially when adjacent to agricultural fields. These mid-successional edge forests were dominated by American sycamore (*Platanus occidentalis*), tulip poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), and boxelder (*Acer negundo*), hackberry (*Celtis occidentalis*), and honey locust (*Gleditsia triacanthos*), with an average diameter at breast height (dbh) of 18 inches. The dense understory was dominated by tulip poplar, black walnut, and poison ivy (*Toxicodendron radicans*) with an average dbh of 2 inches.

#### **4. Consultation History**

Early coordination with the Indiana Department of Natural Resources (IDNR) and USFWS was initially conducted prior to ecological surveys by INDOT in April, 2016. This coordination was provided in an effort to solicit survey recommendations for the gray bat, Indiana bat, and northern long-eared bat.

A bat survey study plan outlining mist net survey methodologies and level of survey effort was submitted to USFWS on June 14 and June 23, 2016, with concurrence received from USFWS on June 23, 2016. This letter provided authorization to conduct summer mist net survey and radio-telemetry of listed bat within the range of the Proposed Alternative. Mist net surveys were conducted June 28-July 1 2016, capturing three lactating adult female gray bats, one non-reproductive adult male gray bat, and one non-reproductive juvenile female gray bat (Tables 1 & 2).

A teleconference was held by the project team and attended by personnel from the USFWS Indiana Field Office on June 14, 2017. Based on feedback from this meeting the project team elected to use a 1-mile radius to establish the Project Action Area.

Early coordination specific to gray bat records was again conducted with USFWS on April 13, 2017, which revealed records related to a nearby gray bat maternity colony located within a flooded limestone quarry known as the Sellersburg Quarry, approximately 4.5 miles northwest of the project’s northern terminus. Periodic emergence counts at this “cave” opening performed from 1982 through 2000 documented a steady increase in colony size from 400 individuals in 1982 to 3,768

individuals in 2000 (Whitaker et al. 2001). Additional emergence counts were also conducted by Whitaker, Pruitt, and Pruitt in 2001, 2002, 2003, 2004, 2006, and 2010 (R. M. Munson, pers. comm. 2017). Those counts also documented a continuous increase in colony sizes ranging from 1,144 individuals in 2001 to 6,530 individuals in 2010. Preliminary results from 2017 emergence surveys indicate a continued increase in colony size (R.M. Munson, pers. comm. 2017). These colony estimates were performed through visual observation of emerging bats without the aid of near infrared thermal infrared videography or with statistical software packages, and should be considered as a visual estimate of population size.

## **5. Species Description and Life History**

### **5.1 *Myotis grisescens* A. H. Howell, 1909 (gray bat)**

#### *5.1.1 Listing Status*

The gray bat was listed as a federally-endangered species on April 28, 1976 by the USFWS (1976), affording it protection under the Endangered Species Act of 1973 (Public Law 93-205), as amended. The USFWS biologists subsequently developed and released a recovery plan for the species in 1982 (USFWS 1982). A 5-year review summary and evaluation was completed in 2009 by the Service's Columbia, Missouri Ecological Services Field Office (USFWS 2009b).

#### *5.1.2 Description*

Gray bats have several morphological characteristics that differentiate them from other *Myotis* species. They are typically heavier, weighing 7 to 16 grams (Decher and Choate 1995). The wing membrane is attached to the foot at the ankle, often making the foot appear larger than other *Myotis* species. The fur is uniformly colored from base to tip (Decher and Choate 1995). There is a notch on the underside of the claws. The calcar is not keeled and the toe hairs are medium in length and sparse. Forearm length is 40 to 46 millimeters (Brack et al. 2010).

#### *5.1.3 Distribution*

The primary range of the gray bat is restricted to the karst regions of Alabama, Arkansas, Kentucky, Missouri, and Tennessee, with smaller populations found in adjacent states like Indiana (Barbour and Davis 1969). Although numerous caves are available throughout the range, only 5% of available caves provide suitable gray bat habitat (Tuttle 1979). The majority of the range-wide gray bat population hibernates in nine Priority 1 hibernacula (sites that currently and/or historically contained more than 25,000 individuals), which are located in Alabama (one site), Arkansas (one site), Kentucky (one site), Missouri (three sites), and Tennessee (three sites) (USFWS 1982).

In Indiana, gray bats have been documented in the following counties: Clark, Crawford, Floyd, Harrison, Jennings, Lawrence, Perry, and Spencer (Brack et al. 1983; Whitaker et al. 2001). While there is no known gray bat priority 1 or priority 2 hibernacula in Indiana, a limestone quarry at Camp Chelan near Sellersburg (Clark Co., IN) and the Indiana Army Ammunition Plant at Charlestown (Clark Co., IN) both harbor summer gray bat maternity colonies (Brack et al. 1984; Pruitt 1999; Whitaker et al. 2001, King 2005).

#### 5.1.4 *Natural History*

Gray bats are year-round cave residents. Females congregate in maternity caves and give birth to a single young in late May or early June (Tuttle 1976). Maternity colonies may contain tens of thousands of females and their young (USFWS 1982). Most young are volant within 20 to 25 days of birth (Saughey 1978). Lactation typically ends by late July, and most females and juveniles subsequently leave the maternity caves (LaVal and LaVal 1980). Most males and non-reproductive females use non-maternity caves during this part of the summer (Thomas 1994).

During late July and August, gray bats of mixed ages and sexes roost in caves throughout the summering area, and frequently move among caves in the home range of the colony (LaVal and LaVal 1980; Thomas 1994). In September, females begin to congregate at transitional caves, and by the end of the month most females have left to return to hibernacula (Gore 1992; LaVal and LaVal 1980). Most male gray bats leave summer habitat by November, although a small number of males may remain in transitional caves through winter (LaVal and LaVal 1980; USFWS 1982). Prior to entering hibernacula, gray bats will swarm at the entrance of the cave (USFWS 1982). By this time, males will be reproductively active and copulation takes place upon arrival at the cave (USFWS 1982). The majority of mating occurs in October and November (Barbour and Davis 1969). Females enter hibernation immediately after mating occurs, while males and some juveniles may stay active until early November (USFWS 1982). Supplemental copulation may occur during the period of hibernation (Saughey 1978). Females store sperm through the winter and fertilization is delayed until after emergence from hibernation (Guthrie and Jeffers 1938).

Upon emergence from roosts, gray bats typically follow a stream path to foraging areas (Tuttle 1976), though they may fly directly over land with little hydrological features to reach foraging areas (Thomas 1994). Foraging areas consist of water bodies (streams, reservoirs, lakes, wetlands), and adjacent riparian vegetation along wide sections of rivers (LaVal et al. 1977; Mitchell and Martin 2002; Rabinowitz and Tuttle 1982). Newly volant young often forage in forests that provide feeding cover surrounding the maternity cave (USFWS 1982). Both large and small perennial streams provide suitable foraging habitat for gray bats (LaVal et al. 1977). Forested riparian zones may improve the suitability of a river or reservoir for foraging gray bats.

Gray bats may fly up to 21 miles during nightly foraging trips (USFWS 1982). Tuttle (1976) indicated gray bats regularly made trips of 9 to 21 miles in a single night. In Tennessee, gray bat

foraging territories were identified up to 12 miles from the roost cave. In Missouri, gray bats were observed foraging as far as 12 miles from their roost cave, and other individuals traveled approximately 15 miles to reach a foraging area over a large lake (LaVal and LaVal 1980). In Alabama, gray bats foraged 3 to 13 miles from the roost cave (Goebel 1996).

#### *5.1.5 Habitat Requirements*

Gray bats inhabit caves year-round (Gore 1992). They occupy cold, often vertical, hibernacula that trap cold air during winter and form clusters with some aggregations up to thousands of individuals (Barbour and Davis 1969; Tuttle and Kennedy 2005). In summer, gray bats choose warmer caves for the summer maternity season. Gray bats show strong philopatry to both summer and winter sites (Tuttle 1976). During autumn and spring migration, gray bats may roost temporarily in caves and under bridges, referred to as transitional roosts, which may not otherwise be typically used for maternity or hibernation (Tuttle 1976). Gray bats (especially males and juveniles) have also been found day and night roosting under bridges (Keeley and Tuttle 1999; Johnson et al. 2002), which may be important resting places during foraging because of the long distances they travel. Moreover, bridges provide a thermal refuge for bats due to their tendency to retain radiant heat better than other types of night roosts (Johnson et al. 2002).

Gray bats may migrate long distances to and from their hibernacula. Reproductively active females leave their summer habitat and arrive at the caves in September before males and juveniles arrive in October (Tuttle 1976). Hall and Wilson (1966), documented that gray bats would travel 126 miles from a summer cave to a hibernaculum, when a bat banded in Hardin County, Illinois, was recovered at Coach Cave in Edmonson County, Kentucky. Tuttle (1976) found that the bats may travel 11 to 272 miles to and from hibernacula. Hall and Wilson (1966) point to the small number of hibernacula for a relatively wide-ranging species to account for this difference in migration distances. In 2016, an adult female gray bat caught and banded during surveys within the Proposed Action Area was subsequently discovered in Jesse James Cave in Kentucky later that year during winter hibernacula counts. Jesse James Cave is approximately 85 miles from the capture site (T. Wethington pers. comm. 2017).

Each summer colony occupies a home range that often contains several roost caves (Thomas 1994; Tuttle 1976). The colony home range may encompass up to 40 miles of river or reservoir shoreline (USFWS 1982). Thomas and Best (2000) found that gray bats in the Gunterville Reservoir area of northern Alabama had large home ranges with a minimum average size of 37.5 square miles. Individually, the bats exhibit fidelity to the colony home ranges, but may roost in several caves within the range (Goebel 1996; Tuttle 1976; USFWS 1982).

#### *5.1.6 Threats*

Five primary causes for the decline in gray bat populations outlined in the recovery plan are: direct human disturbance to individual bats, human disturbance to the environment, destruction

of roost caves by collapse or river impoundment, cave commercialization/ improper gating, and natural sources of mortality (USFWS 1982).

Since the 1982 Recovery Plan, the most severe and immediate threat to bats as a whole is White-Nose Syndrome (WNS). WNS is an epizootic disease in hibernating bats caused by the fungus *Pseudogymnoascus destructans* (Lorch et al. 2011). The fungus kills bats during hibernation by disrupting physiology and natural torpor arousal patterns (Reeder et al 2012; Verant et al. 2014). First documented in 2006 in New York, the fungus is now in 31 states and 5 Canadian provinces (USFWS 2017). The fungus was first discovered in Indiana in 2011 and is now confirmed in 9 counties in Indiana, but not including Clark County (IDNR 2017). The USFWS estimates bat mortality to be at least 5.7–6.2 million (USFWS 2017) individuals and some hibernaculum are reporting 90-100% mortality in infected bats (USFWS 2009a). While effects of WNS on gray bat populations does not appear to be as severe as those documented in other cave-dwelling species such as little brown bats and tri-colored bats, the long-term consequence of WNS to gray bats is still unknown at this time. Habitat protection, especially karst and cave winter habitat conservation, is still a priority for the perpetual maintenance of this species.

#### 5.1.7 Status of the Gray Bat

Following the protection of hibernacula and maternity caves from human disturbance, gray bat populations started to recover. In 2002, the range-wide gray bat population was estimated to be 2,678,137 bats, a 62% increase from 1,657,900 bats when the recovery plan was written in 1982 (Ellison et al. 2003). Gray bat numbers have continued to rebound and the 2009 range-wide population was estimated at 3.4 million individuals through the USFWS' Midwest Region's 2009 5-Year Review of the species (USFWS 2009b).

Even with the slow recovery of the species, two continuing issues currently negatively affect gray bats. Continued problems with human disturbance at some sites have led gray bat populations at the nine Priority 1 hibernacula to only reach 37% of its maximum historic populations in 2005 (Elliott 2008). Also, the fungus that causes WNS has continued to spread and is now throughout the range of gray bats. WNS was first confirmed to affect gray bats in Tennessee in 2012 (Holliday 2012). In the winter of 2013, WNS was discovered in Fern Cave, AL, the largest gray bat hibernaculum in the country. Based on winter counts at accessible portions of Fern Cave's Morgue and Little Morgue Pits on February 11, 2017, the USFWS estimates this hibernaculum to currently house 1,289,848 gray bats. (P. Pattavina, pers. comm. 2017). While gray bats seem to have lower fungal loads (Janicki et al. 2015) and do not suffer as high mortality as other bat species, it may be too early in this disease's development within the eastern United States to understand the residual effects of WNS on this species.

## 6. ENVIRONMENTAL BASELINE

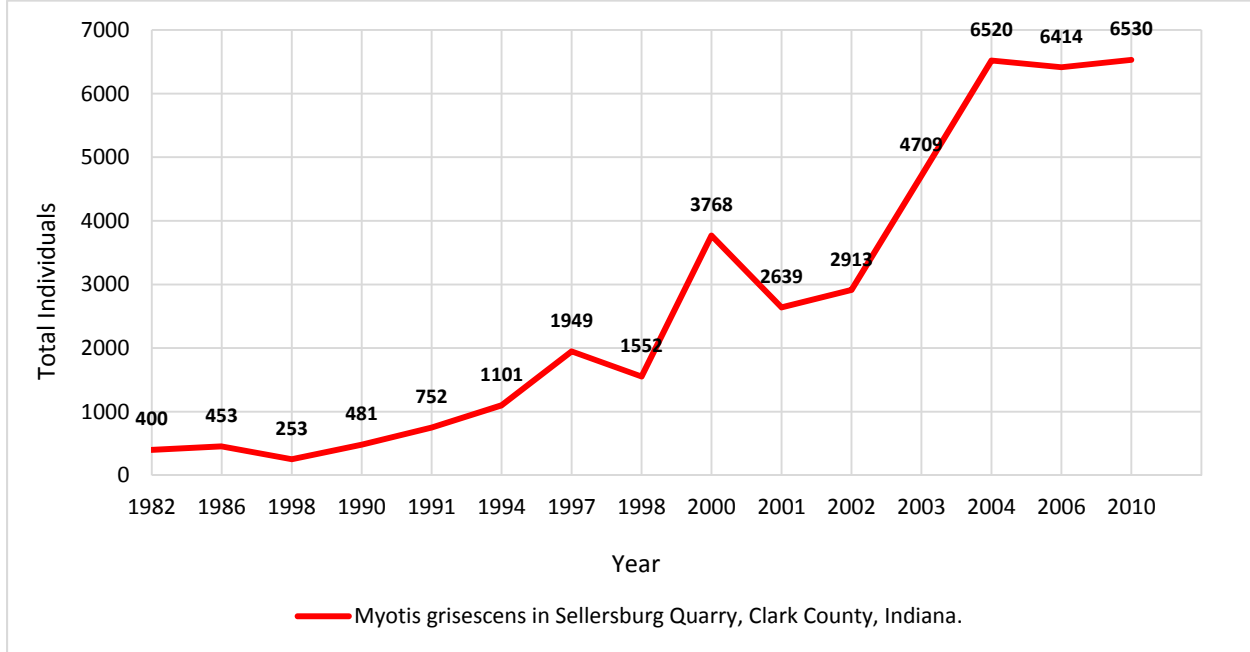
The environmental baseline describes the biological status of the gray bat and their physical habitat within the Project Action Area. This evaluation demonstrates the current status within the Project Action Area and does not include direct, indirect, or cumulative effects associated with the proposed action. The proposed project effects are discussed later in this section. The environmental baseline also includes anticipated impacts of other proposed projects with a federal nexus within the Project Action Area.

Limited data has been collected about gray bat population metrics, distribution, or roost ecology within southern Indiana. Survey efforts for gray bats first began in the early 1980s with the discovery of a gray bat maternity colony in a limestone quarry at Camp Chelan near Sellersburg (Clark Co., IN) (Brack et al. 1984). By the late 1990s, gray bats were radiotracked from the limestone quarry and the Indiana Army Ammunition Plant at Charlestown (Clark Co., IN) (Pruitt 1995; Pruitt 1997; 1999; Whitaker et al. 2001). Surveys in 1999 and 2000 recorded captures of gray bats within the Project Action Area along Lancassange Creek (R.M. Munson, pers. comm. 2017).

The closest confirmed maternity colony records of gray bat presence in Indiana is located within a flooded limestone quarry known as the Sellersburg Quarry Silver Creek Cave approximately 4.5 miles northwest of the project's northern terminus. Periodic emergence counts at this cave opening performed by from 1982 through 2000 documented a steady increase in colony size from 400 individuals in 1982 to 3,768 individuals in 2000 (Whitaker et al. 2001). Additional emergence counts were also conducted by Whitaker and Pruitt in 2001, 2002, 2003, 2004, 2006, and 2010. Those counts also documented a continuous increase from 2001 through 2004, with colony sizes ranging from 2,639 individuals in 2001 to 6,520 in 2004. Since that time colony size has remained stable with 6,530 individuals in 2010, although preliminary data from 2017 may indicate more growth of this colony size.



**Graphic 1:** Summary of gray bat emergence counts at Sellersburg Quarry from 1982-2010 in Clark County, Indiana (Whitaker and Pruitt, 2001; R.M. Munson pers. comm. 2017).



Several additional gray bat captures have been documented on the former Indiana Army Ammunition Plant (IAAP) approximately 3.5 miles to the north of the proposed alignment in studies conducted by USFWS within the last 20 years (USFWS 1997, 1998, 2004). Radiotracking of gray bat females from these projects seemed to indicate secondary maternity sites could be present in the vicinity of a cave opening complex along Jenny Lind Run. The conclusions of these reports were that bats using this area were part of the Sellersburg quarry colony five miles to the west and individuals may at times occupy karst features temporary during the maternity season and use the drainages as commuting corridors to foraging grounds along the Ohio River (USFWS 1997, 1998, 2004). Several records are also known from the Goose Creek drainage which is situated approximately four miles southeast of the Project Action Area in Jefferson County, Kentucky (R.M. Munson, pers. comm. 2017).

## 6.1 Biological Baseline Assessment Methods

### 6.1.1 Mist Net Survey Methods

A presence/likely absence mist net survey was conducted in 2016 in accordance with guidelines contained in the “2016 Range-wide Indiana Bat Summer Survey Guidelines” (USFWS 2015), which were acceptable for use for gray bat surveys in 2016, and survey modifications specific to the state of Indiana as approved by the USFWS Bloomington Field Office and the IDNR. These guidelines call for one net site, consisting of two independent net sets at least 30 meters apart,

to be netted for two calendar nights (i.e., four total “net nights”) per kilometer of suitable habitat for linear projects. Surveys are to be conducted between May 15 and August 15 and are temperature and precipitation dependent.

During the 2016 survey, two survey sites were surveyed for two consecutive calendar nights and during each night, two net sets were erected (i.e., four total “net-nights” per site) (Figure 4). Net sets were customized for each site and placed approximately perpendicular across flight corridors, filling the corridor from side to side and from the ground or stream bed to the overhanging canopy to completely block the flight corridor. Various combinations of ropes and poles were used to support the mist nets and were based on the specific flight corridor height to be covered.

The surveys commenced at sunset and lasted for no less than five hours. Nets were checked for bats in 10-minute intervals by two-person teams at each survey site. Netting did not take place during nights of continuous rain, cold temperatures (<50°F), or heavy wind.

Data collected for all captured bats included:

- species identification,
- sex,
- weight,
- age,
- sexual condition,
- wing damage index (Reichard and Kunz 2009), and
- right forearm length.

The teams adhered to the National White-Nose Syndrome Decontamination Protocol as set forth by the USFWS version 04.12.2016 (USFWS 2016).

## **6.2 Environmental Baseline Assessment Methods**

### *6.2.1 Watershed Assessment Methods*

To qualitatively assess potential project impacts on gray bat foraging and flyway habitat, the USGS Landcover Classification layer was analyzed within the Project Action Area. In order to quantify expected direct effects associated with the proposed project, land cover classification areas proposed for disturbance within the Project Alternative were deducted from the baseline watershed landcover quantities. These data were also used to qualitatively assess project impacts to gray bat travel corridors in the watershed.

### 6.2.2 *Suitable Habitat Assessment Methods*

Early coordination with the IDNR and USFWS was conducted in spring of 2016 and early 2017 to identify any known caves or other karst features that may serve as roosting habitat and/or winter hibernaculum within the Project Action Area. Gray bat foraging habitat in the Project Action Area was assessed through interpretation of publicly available GIS data and aerial photography. Forested areas within the Project Alternative were hand digitized at a scale of 1:5,000 using the most current available USGS aerial imagery. Early successional scrub forest and forest edges comprised of a single row of mature trees or stand-alone individual stems were not included as suitable in this assessment of foraging habitat.

A review of the Indiana Department of Environmental Managements' "Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA" (2016) identified any water quality data available for each of the named streams in the Project Action Area. These data provide assessment of existing water quality conditions and macroinvertebrate communities within a given watershed that may provide an indication of gray bat prey availability and foraging habitat quality.

## **6.3 Biological Baseline Assessment Results**

### 6.3.1 *Status of the Species within the Project Action Area*

The 2016 mist net survey captured reproductive adult females, adult males, and juvenile females, documenting the presence of both nearby maternity and male bachelor colonies. Gray bats are present within the vicinity of the Project Action Area outside of the winter hibernation season in maternity, bachelor, and transient populations. Because of the known proximity to a large maternity colony, and connectivity to both the Ohio River and several large perennial tributaries suitable for gray bat foraging and travel, it is assumed that gray bats can be present within the Project Action Area at any time outside of winter hibernation.

### 6.3.2 *Mist Net Survey Results*

During the 2016 survey, 11 bats were captured at two sites in and around the approved study area boundary provided by American Structurepoint. Two eastern red bats, four big brown bats, and five gray bats were captured (Tables 1 and 2). No other bat species were encountered, including Indiana bats or northern long-eared bats.

**Table 1.** Bat capture summary table for the proposed INDOT heavy haul transportation corridor in Clark County, Indiana; June 28-July 1, 2016.

Survey Site	Species Captured			Total
	<i>Eptesicus fuscus</i>	<i>Lasiurus borealis</i>	<i>Myotis grisescens</i>	
1	3	1	1	5
2	1	1	4	6
<b>Total</b>	<b>4</b>	<b>2</b>	<b>5</b>	<b>11</b>

**Table 2.** Comprehensive bat capture data for the proposed INDOT project in Clark County, Indiana; June 28 – July 1, 2016.

Site	Date	Species	Net	Time	Age	Sex	RC	Weight (g)	FA Length (mm)
1	6/28/2016	<i>Myotis grisescens</i>	A	22:10	A	F	L	10.5	43.0
		<i>Eptesicus fuscus</i>	B	22:20	J	F	NR	13.5	49.0
		<i>Eptesicus fuscus</i>	B	22:50	A	F	L	19.5	49.0
		<i>Lasiurus borealis</i>	B	00:50	A	M	NR	12	37.0
	6/29/2016	<i>Eptesicus fuscus</i>	C	22:25	A	F	NR	10.9	44.0
2	6/30/2016	<i>Myotis grisescens</i>	B	22:10	A	F	L	10.5	44.0
		<i>Myotis grisescens</i>	B	22:10	A	F	L	10.5	43.0
		<i>Lasiurus borealis</i>	A	22:30	A	M	NR	14	39.0
	7/1/2016	<i>Eptesicus fuscus</i>	B	21:50	A	F	L	17.0	47.0
		<i>Myotis grisescens</i>	B	22:05	A	M	NR	10.0	43.0
		<i>Myotis grisescens</i>	B	22:40	J	F	NR	8.5	43.0

Note: RC=reproductive condition, FA=forearm, A=adult, F=female, L=lactating, J=juvenile, NR=non-reproductive, M=male.

## 6.4 Environmental Baseline Assessment Results

### 6.4.1 Watershed Assessment Results

Approximately 25% (1,178 acres) of the Project Action Area is forest, with 1,174.4 acres of deciduous forest, 2.5 acres of evergreen forest, and 1.1 acres of woody wetlands. Agriculture and developed land made up 17% and 47% of the remaining landcover within the Project Action Area, respectively. The high amount of disturbed land speaks to the urban and suburban landscape that encompasses most of the Project Action Area. Core forest (forest at least 100 meters from the forest edge) constitutes only 4% (1,084 acres) of the Lentzier Creek - Ohio River 14-digit HUC

watershed. Of all core forest in this watershed, approximately 13% (142 acres) of it is in the Project Action Area.

#### 6.4.2 Suitable Foraging Habitat Assessment Results

The Project Action Area is mostly agriculture and urban land (Figure 5). The northwestern edge of the Project Action Area is a residential development, while the majority of the southern portion of the Project Action Area is mainly industrial. Agricultural fields and pasture are spread throughout the Project Action Area, while most of the forest blocks are in the north-central portion of the Project Action Area. About 25% (1,174 acres) of the Project Action Area is forested, with about 12% (142 acres) of that being core forest. Core forest is important for many species, including bat, which use large blocks of interior forest to commute between roost sites and nightly foraging grounds. These large blocks of core forest provide cover from nocturnal avian predators, as well as protection from anthropogenic disturbance.

Over 78,353 linear feet of streams are present in the Project Action Area, including 30,401 linear feet of large named streams such as Lentzier Creek, Lancassange Creek, Goose Creek, and the Ohio River (Figure 6). Goose Creek extends for 596 feet solely on the Kentucky side of the Project Action Area. Lancassange Creek accounts for 10,538 feet in the Southwest corner of the Project Action Area, and has several unnamed tributaries. Lentzier Creek and its tributaries flow across the northern and central parts of the Project Action Area. Lentzier Creek flows approximately 19,267 feet through the Project Action Area, and its tributaries account for much of the stream lengths in the Project Action Area. The remaining streams are short, unnamed streams immediately adjacent to the Ohio River, mainly on the eastern side of the Project Action Area. All named and unnamed streams in the Project Action Area drain southward into the Ohio River. Many of these streams, especially the named streams, most likely provide foraging and/or flyway corridors for gray bats.

A length of Lancassange Creek within the Project Action Area is listed by the Indiana Department of Environmental Management as a 303(d)-listed stream non-supporting its designated use due to elevated levels of *Escherichia coli* (E. coli) bacteria (IDEM 2016). E. Coli has also been found in the Ohio River just north of its confluence with Lentzier Creek. No impairments have been found in Lentzier Creek, but it is listed as having insufficient data in all 303(d) categories.

Approximately 57% of the stream lengths in the Project Action Area contain forested riparian habitat. Riparian corridors provide suitable commuting routes between roosting and foraging sites, woody debris stream inputs beneficial to macroinvertebrate habitat, stream shading affecting water quality and macroinvertebrate communities, and stormwater runoff amelioration that lessens sedimentation and streambank erosion related to increased stream velocities. The majority of the streams in the Project Action Area have only a single row of trees

along the streambank that presumably does not function at the same capacity as a fully forested corridor.

**Table 3.** Baseline gray bat riparian forest and riparian habitat metrics associated with the proposed INDOT Heavy Haul Transportation Corridor in Clark County, Indiana.

Foraging Habitat Metrics	Project Action Area (4,627 acres)		
	NLCD Forest Landcover Area (acres)	NHD Blue-Line Stream Length (feet)	NHD Named Stream Length (feet)
Baseline	1,178.0	66,979	30,401

\*

No known summer roosts or winter hibernacula, including caves, mines, or other suitable roosting karst features are known to occur within the Project Action Area. The closest known maternity colony and hibernaculum are approximately 4.5 miles to the northwest of the Project Action Area within the Sellersburg Quarry Silver Creek Cave. An emergence count was last performed on this colony in 2010, estimating the population at 6,530 gray bats at that time. While gray bats captured during the 2016 mist net survey were not radio tagged or tracked, it is suspected that these individuals resided at the Sellersburg Quarry maternity site at the time of capture.

### 6.5 Federal Actions within the Project Action Area

One project with a federal nexus requiring formal section 7 consultations or estimation of incidental take is currently known from the Project Action Area. The River Ridge Commerce Center is a 6,000 acres multi-use industrial complex located less than 1-mile northeast of the Proposed Alternatives northern terminus. The United States Congress declared the pre-existing Indiana Army Ammunition Plant surplus in 1998 and authorized this 6,000-tract to be conveyed to the River Ridge Development Authority for economic development. This development center has been in planning and development for several years and is not understood to be reliant or dependent up on the Proposed Alternative. During the Base Realignment and Closure process (BRAC), bat surveys performed by the USFWS recorded several gray bat records within this property. It was assumed that these individuals were occupying several nearby caves and utilizing the foraging corridor along various perennial streams. The Endangered Species Management Plan prepared for the INAAP committed to several perpetual conservation measures recorded as legal covenants that are retained regardless of property ownership. A review of the River Ridge Commerce Center’s Declaration of Covenants, Conditions, and Restrictions revealed that all karst features, caves, lakes, and perennial streams within the River Ridge Commerce Center are subject to a 100-foot undisturbed buffer and all intermittent streams are subject to a 50-foot undisturbed

buffer. These measures also include tree clearing restrictions within the Jenny Lind Run and Little Battle Creek watersheds.

## **7. PROJECT DETAILS**

### **7.1 Construction**

As this Proposed Alternative is currently within the preliminary design phase many aspects of project construction are not yet finalized. It is unknown if any temporary detours will be necessary in order to reconstruct several side road connections. The extent of earthwork and grading is unknown at this time. By definition, new impervious area will be added as part of the Proposed Alternative which is on new alignment. The Proposed Alternative design consists of two 13-foot wide travel lanes and two 11-foot wide shoulders and will increase impervious surface within the Project Action Area.

### **7.2 Project Timeline and Sequencing**

A construction schedule is to be developed by the selected contractor. The total anticipated construction duration for this project is uncertain at this time. It is expected that the Proposed Alternative will be constructed in its entirety since it is on new location and traffic shifts are not required.

### **7.3 Site Preparation**

As this Proposed Alternative is currently within the preliminary design phase many aspects of the erosion control plan are not yet finalized. The project's Erosion and Sediment Control Plan will conform to National Pollutant Discharge Elimination System (NPDES) for infrastructure projects. Prior to land clearing and grubbing operations, or any activity that disturbs existing ground, perimeter erosion control BMPs will be installed in order to prevent sediment from leaving the project area. These BMPs include sediment traps, check dams, silt fences, ditch inlet protections, temporary construction entrance stabilization, and temporary sediment basins are included within the preliminary construction plans to protect aquatic habitats. Permanent erosion control features include riprap installation over geotextile at the outflow of all culverts and paved side ditches in areas of 3 percent or steeper grades. Preliminary plans currently include riprap check dams that are subject to revision to transversable check dams should they be located within the final clearing zone.

All temporary ground disturbance will be protected using mulch and/or temporary grass seeding, usually an annual species. Permanent grass seeding will be applied to all permanent slopes and exposed surfaces prior to project completion. Sod will be installed along all ditch bottoms where grades are equal to or greater than 1% up to 3%. See Exhibit C for preliminary construction plans.

#### **7.4 Construction Access and Staging**

All staging areas will be determined by the selected contractor. This includes the placement of a project office trailer, which will likely be located in a displaced property either in an existing house or business or an office trailer delivered by the selected contractor. Any storage or laydown areas designated by the selected contractor will need to be within the permitted area, otherwise the selected contractor will need to permit those areas separately with the appropriate agencies.

#### **7.5 In-Water Work**

Culvert extensions will be done by utilizing existing culvert boxes and barrels as baseline channel conveyances, with diversions being used where the extension portion is being installed.

#### **7.6 Flow Diversion**

Flow diversions will be temporary when it comes to the new construction and extension of culverts. These diversions will be lined with heavy plastic to prevent erosion and scour of the temporary diversion stream bed.

#### **7.7 Potential Impacts on Water Quality**

All land disturbing activities associated with the proposed project action have the potential of affecting water quality negatively. The Proposed Alternative construction will adhere to all necessary water quality BMPs to minimize impacts to water quality within the Project Action Area.

#### **7.8 Post-Project Site Restoration**

The project area will be restored from temporary impacts by revegetation of native trees, shrubs, wildflowers, and suitable grasses, wherever possible. Permanent grassing will be applied to all permanent slopes and exposed surfaces prior to project completion. Sod will be installed along all ditch bottoms where grades are equal to or greater than 1% up to 3%. See Exhibit C for preliminary construction plans.

#### **7.9 Operations**

The widening portion of the project will extend or replace all stream crossings and won't result in additional barriers to aquatic species. There are no listed terrestrial species on this project. Stormwater will be conveyed via traditional highway stormwater drainage structures, i.e. catch basins, drop inlets, median inlets, and cross drains emptying into side ditches which ultimately drain to adjacent streams and wetlands. Post-construction stormwater BMPs will be constructed along with this project and maybe include filters, spill containment, and pollutant trapping storm drain



inserts. Construction of the Proposed Alternative will also meet all requirements of 107.08(b) of the INDOT standard specifications for dust control.

Vehicle volume per time-of-day is unknown at this time but most heavy truck traffic should be present during daylight hours, although some trucks will utilize the roadway at night when bats are active.

### **7.10 Maintenance**

The routine maintenance requirements for this finished project will include mostly mowing of shoulders, medians and ditches. This mowing is normally done 2-3 times per year during the growing season.

The selected contractor will be required to clean the drainage pipes of all silt as part of final compliance requirements before transferring maintenance responsibilities to INDOT. This is normally done by hand if the culvert or pipe is big enough to accommodate a worker. If not, a high-pressure hose connected to a fire hydrant or water truck is used to loosen and disperse the accumulated silt. Milling of existing pavement and resurfacing or pavement cracks is normally done approximately every 20 years. No other routine maintenance items are anticipated.

## **8. EFFECTS OF THE PROPOSED PROJECT ACTION**

Direct effects are caused by a proposed project action and occur at the same time and place as the action (e.g., tree removal, soil disturbance from digging). Indirect effects are caused by an action but the effects are dispersed over time and space (e.g., growth-inducing effects, population density or growth rate effects, lessened air and water quality). The cumulative effects of the project include the effects of future state and private activities that are reasonably certain to occur within the Project Action Area.

### **8.1 Direct Effects**

Five gray bats were captured during mist net surveys in 2016. The potential for direct adverse effects to the gray bat is likely. Tree clearing can directly affect gray bats. While the gray bats' roosting habitat includes caves, not trees, the loss of travel corridors to foraging habitat could directly impact gray bats.

The Proposed Alternative will result in the direct loss of 9.1 acres of forested habitat and will directly impact 90 linear feet of Lentzier Creek suitable for gray bat foraging and traveling, which makes up 0.1% of the mapped blue-line streams available within the Project Action Area (Figure 6). 9.1 acres of general forest habitat, which may be suitable for gray bat foraging and traveling.

These proposed impacts would affect 0.8% of the total forest landcover within the Project Action Area.

Although the majority of the forest landcover in the Project Action Area would be retained, the removal of riparian forest and disturbance to large perennial streams in potential gray bat foraging habitat along Lentzier Creek may result in a slight loss of energy reserves during transit and foraging. However, with the nearest roost site located over 4 miles away from the Project Action Area across mainly urban and agricultural land, the energy lost to avoid this minor habitat void is likely to be negligible.

Reviewing historic imagery available from 1992, a large forest block north of Lentzier Creek within the Proposed Alternative was harvested in 2004. Currently, this forest is still considered early successional forest, and is not preferred foraging, flyway, or roosting habitat for bats, including gray bats. Removal of a portion of this forest should be relatively inconsequential to gray bats. The forest south of Lentzier Creek is older forest, and based on available aerial imagery, is at least 25 years in age. Traveling corridors like Lentzier Creek, forest roads, and electrical utility ROWs are more likely to be used by gray bats for traveling from roost to foraging sites through this landscape.

The proposed clearing area for this project does not contain the necessary resources (e.g., caves or mines) to support a gray bat maternity colony.

**Table 4.** Post-Action gray bat foraging and flyway habitat fragmentation bats for the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.

Habitat Metrics	Project Action Area (4,627 acres)		
	Baseline Conditions	Post Action Impacts	Percent Impacted
Total NLCD Forested Area (ac)*	1,178.0	9.1	0.8%
Total NHD Blue-Line Stream Length (l.f)	66,979	90	0.1%
Named NHD Blue-Line Stream Length (l.f)	42,799	90	0.2%

Note: **NLCD** = 2010 National Land Cover Data, **NHD** = National Hydrography Dataset, **ac** = acres; **l.f** = linear feet  
 \* = deciduous forest, evergreen forest, & woody wetlands;

Noise disturbance created during construction is a potential direct effect to gray bats. If construction activities are completed during nighttime hours, it may disturb traveling/foraging activities of gray bats in the area. No nighttime construction is proposed at this time.

Construction of the proposed project may require blasting in various locations throughout the project corridor to allow for roadway widening at the proposed road grade. Explosive blasting

has the potential to affect gray bats directly if conducted during hibernation or indirectly when carried out in the spring, summer, or fall. Additionally, noise and vibration disturbance associated with blasting, along with changes to microclimate, have the potential to disturb roosting bats and degrade cave suitability. However, if blasting is necessary, this activity will utilize blasting mats to contain rock fragments (flyrock) within the construction limits of the Project Alternative. No known caves, tunnels, or underground mines are located within, or within the immediate vicinity of, the Project Action Area. The nearest known caves are located approximately 4.5 miles northwest of the proposed project clearing limits, and have known records of swarming, roosting, or hibernating gray bats. While a blasting plan has not been prepared at this time, no known gray bat maternity colony or hibernaculum is located within the Project Action Area. Thus, the likelihood of gray bat death, disturbance, or habitat degradation from blasting is negligible.

Construction of the Proposed Alternative may lead to increased dust accumulation in and around the project's construction limits. Dense clouds of construction-related dust may deter bats from the construction area or prevent successful foraging. Construction of the Proposed Alternative will meet all requirements of 107.08(b) of the INDOT standard specifications for dust control. These BMPs, along with the absence of night work when bats are actively foraging, should limit the negative effects of air born dust on active gray bats.

At this time, no critical habitat has been designated for the gray bat and no designated critical habitat for any federally listed bat species, including the Indiana bat (*M. sodalis*) or northern long-eared bat (*M. septentrionalis*) is present within the Project Action Area. Thus, the Proposed Alternative would have no effect on critical habitat for the gray bat or any other listed bat species.

## 8.2 Indirect Effects

Indirect effects to the gray bat created by maintenance and use of the improved and new roadway are possible, but are expected to be negligible. Noise disturbance and chemical contamination may be associated with maintenance activities, which may include, but are not limited to lighting, mowing, sidewalk repairs, painting, ditch maintenance, and management of woody species. Impacts associated with use of the roadway may include noise disturbance, stormwater runoff, and other contamination associated with increased vehicular use. Potential indirect effects to the aquatic environment may affect gray bats because they forage extensively on insects, and many insects have aquatic larvae.

Watersheds made up of urban, agricultural, or other converted landcover are potential indicators of poor stream and wetland health as those basins are subjected to higher levels of streambank erosion, pollutant runoff, sedimentation, aquatic habitat degradation, and hydrologic alteration of riverine wetlands. As such, evaluation of the percent forest landcover within a project areas drainage basin may provide an indication of watershed health. Assessment of percent forest cover removal may then provide an indication of proposed impacts to the aquatic environment

through the implementation of the project.

Because gray bats are nocturnal insectivores dependent upon prey born from aquatic habitats, the degradation of aquatic macroinvertebrate habitats has the potential to negatively affect these predator-prey relationships. The gray bats diet is largely comprised of insects that are dependent upon healthy streams free of sediment, such as those from the order Trichoptera, and as such is dependent upon clean streams within healthy watersheds. Conversion of forest lands within a given watershed can lead to increased sedimentation, alteration of stream pH balance and water temperature, and increase pollutants, all of which can degrade macroinvertebrate habitats leading to higher energy expenditure for gray bats searching for preferred prey. Approximately 75% (3,449 acres) of the 4,627-acre Project Action Area is currently classified as non-forest and the Proposed Alternative impacts 0.8% (9.1 acres) of the remaining forested acreage of the Project Action Area. As such, is not expected that the Proposed Alternative will have a significant impact on aquatic resources that may indirectly affect gray bats within the Project Action Area.

Predatory-prey relationships can also be altered through the removal of riparian forest as bat utilize overstory vegetative cover to avoid nocturnal avian predators such as owls. In addition to new roadway alignment creating canopy gaps that subject foraging bats to vehicular collisions, this forest removal may also increase vulnerability to natural predators or result in bats avoiding these portions of the riparian corridor thereby disrupting their preferred foraging corridors, decreasing foraging success and increasing energy expenditure. Gray bats are currently successfully foraging in the Project Action Area despite 75% of the available lands classified as non-forest. The Proposed Alternative will impact 0.8% of the forested habitat that gray bats are likely relying on for foraging and commuting. As such, it is not expected that the Proposed Alternative will have a significant impact on gray bat predation from nocturnal avian predators or vehicular collisions.

Artificial lighting can deter gray bats from otherwise suitable habitat, just as it exposes other types of active bats to avian predators (USFWS 2016). Gray bat foraging and flyway habitat can be disturbed from both permanent lighting installed for roadway safety considerations, as well as temporary lighting used for nighttime construction of roadway projects. No nighttime construction work is planned for the proposed project and thus no temporary lighting will be used to aid construction efforts. A permanent lighting plan has not been developed at this time but should consider the use of downward facing full cut-off lenses. Thus, the likelihood of habitat degradation and/or gray bat disturbance due to installation of new permanently fixed, downward facing lighting is negligible.

The proposed project action may indirectly lead to gray bat mortality later through collisions of bats with vehicles traversing the new roadway. Russell et al. (2009) documented mortality of 27 little brown bats, one Indiana bat, and one unidentifiable *Myotis* spp. found during searches of a 4.5-kilometer section of road in Pennsylvania over a four-month survey. In addition, Russell et al. (2009)

found that bats generally used forest canopy to cross roads. Tall forest canopy led to high-flying bats, while lower canopies ( $\leq 6$  meters) led to bats crossing the highway at heights of two to three meters. Despite bat usage of canopy closure for crossings, bats have been recorded actively avoiding road crossings with vehicle noise (Zurcher et al. 2010). Because of the width of the proposed roadway, there should be little to no canopy cover remaining over the roads for bats to use when crossing. With this lack of cover and high volume of large truck traffic, bats should be expected to cross the road less frequently when automobiles are present. Additionally, the heavy haul road crossing over Lentzier Creek, the presumed primary gray bat travel corridor, will be accomplished with a 553-ft long bridge span with a height of 60-80 feet from the creek bed. This should allow for ample flyway area under the bridge, further reducing the potential for vehicle encounters. Bat mortality related to vehicle strikes is not expected to be significant within this 2.1-mile corridor.

Construction projects within karst areas have the potential to indirectly affect gray bats through alteration of airflow within cave systems, flooding due to increased runoff, and introduction of contaminants. However, the nearest known cave is located approximately 4.5 miles to the northwest. Therefore, it is unlikely that karst systems will be impacted indirectly or by increased runoff potentially generated from project activities. In addition, design of the proposed project proposes temporary construction and permanent post-construction BMPs for water quality treatment of stormwater runoff from impervious areas within the proposed clearing limits and associated ROW. These measures including sediment traps, check dams, silt fences, ditch inlet protections, temporary construction entrance stabilization, temporary sediment basins, riprap installation over geotextile at the outflow of all culverts, and paved side ditches in areas of 3 percent or steeper grades are included within the preliminary construction plans to protect aquatic habitats. Permanent erosion control features include riprap installation over geotextile at the outflow of all culverts and paved side ditches in areas of 3 percent or steeper grades would alleviate potential contamination to nearby karst habitat, as well as protect aquatic environments that support vital macroinvertebrate food sources for gray bats. All temporary ground disturbance will be protected using mulch and/or temporary grass seeding, usually an annual species. Permanent grass seeding will be applied to all permanent slopes and exposed surfaces prior to project completion. Sod will be installed along all ditch bottoms where grades are equal to or greater than 1% up to 3%. Upon implementation of these erosion and sedimentation control BMPs it is not expected that the Proposed Alternative will have a significant effect on the water quality or macroinvertebrate communities within the Project Action Area, and will thus not significantly affect gray bat foraging habitat.

### **8.3 Cumulative Effects**

The cumulative effects of the proposed project include the effects of future state and private activities that are reasonably certain to occur within the Project Action Area. The primary need and purpose for the proposed project is to construct a roadway designed to accommodate heavy trucks and haul vehicles. INDOT, in partnership with the Federal Highway Administration, the Indiana Economic Development Corporation, the Ports of Indiana-Jeffersonville, the Board of Commissioners

of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority, is developing this federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville with other regional transportation assets. As such, a variety of currently-planned federal and non-federal actions may affect gray bats or bat habitat in the area.

Secondary development, such as industrial and commercial/retail construction, is likely and could impact gray bat habitat in the Project Action Area. Additional forest clearing, noise, and lighting would deter bats from using these areas in the future. However, the majority of the expected development within the Project Action Area is associated with the River Ridge Commerce Center and Ports of Indiana-Jeffersonville, which are existing commercial/industrial development projects and considered independent of the Proposed Alternative. Additionally, the Ohio River lies adjacent to a large portion of the Project Action Area. This is advantageous because this corridor provides resilient suitable foraging and flyway habitat within the immediate vicinity of the proposed clearing limits; providing bats with alternative habitat to stream corridors that may be cleared or disturbed from future secondary development in this region.

Habitat impacts related to commercialized and/or plantation forestry are negligible in this portion of southern Indiana with most forest stand sales originating from single-family parcels. The proposed project action is not expected to increase commercial forestry production within the Project Action Area.

The effects of secondary residential development are difficult to predict because this type of development is heavily dependent on outside factors such as economic and population growth. The majority of the Project Action Area is centered around industrial and commercial development and not conducive to residential growth. However, a small residential neighborhood is currently under construction approximately 0.4-mile east of the Proposed Alternative's intersection of Lentzier Creek along Old Salem Road. This residential development appears to be constructed within an existing homesite that previously cleared of forested habitat prior to 1992. It is unknown if the current development, or any future expansions of the site, would result in additional forested habitat clearing or impacts to Lentzier Creek at this location.

## **9. Conservation Measures**

Approximately 9.1 acres of forested habitat were described from within the Proposed Alternative's clearing limits. This habitat, as well as Lentzier Creek, Lancassange Creek, Goose Creek, their associated perennial tributaries provide suitable foraging and/or flyway corridors for gray bats and may provide travel corridors to more suitable maternity habitat for gray bats within the nearby Sellersburg Limestone Quarry. Based on the information collected, including captures of gray bats in 2016 and the presence of an existing gray bat maternity colony within approximately 4.5 miles of the Proposed Alternative, the following conservation measures are proposed:

## 9.1 Avoidance and Minimization Measures

- The project shall not remove trees or forested habitat outside of the proposed construction limits;
- Low-water in-stream work will be limited to installation of culverts, piers, pilings and/or footings, shaping of spill slopes adjacent to bridge abutments, and placement of riprap;
- Culverts will span the active stream channel and shall either be embedded or a 3-sided/open-arch culvert, and be installed where practicable on an essentially flat slope. When applicable, culverts placed in streams with high quality substrate such as gravel, cobbles and boulders, shall not disturb the native substrate within the stream bed in order to provide natural habitat for the aquatic community;
- In-stream channel work and vegetation clearing shall be restricted to the minimum necessary for installation of the stream crossing structure;
- Construction shall minimize the extent of hard armor (riprap) in bank stabilization by using bioengineering techniques whenever possible. If rip rap is utilized for bank stabilization, extend it below low-water elevation to provide aquatic habitat;
- Temporary erosion and sediment control BMPs will be utilized within areas of disturbed soil. All disturbed soil areas upon project completion will be vegetated following INDOT's standard specifications;
- Work within the inundated part of the stream channel (in perennial streams and larger intermittent streams) will be restricted to outside of the fish spawning season (April 1 through June 30), except for work within sealed structures such as caissons or cofferdams that were installed prior to the spawning season. No equipment shall be operated below the Ordinary High Water Mark during this time unless the machinery is within the caissons or on the cofferdams;
- The project proposes temporary construction and permanent post-construction BMPs for water quality treatment of stormwater runoff from impervious areas within the Proposed Alternative limits and INDOT ROW. Temporary construction BMPs will include sediment traps, check dams, silt fences, ditch inlet protections, temporary construction entrance stabilization, and temporary sediment basin within the preliminary construction plans to protect aquatic habitats. Permanent erosion control features include riprap installation over geotextile at the outflow of all culverts and paved side ditches in areas of 3 percent or steeper grades. Structural BMPs may also be employed to reduce stormwater pollution through filtration, biological uptake, and microbial activity. Post-construction BMPs are

effective in treating for total suspended solids, nutrients, and metals as well as reducing impervious area stormwater runoff, thereby protecting aquatic resources that support important macroinvertebrate food sources for gray bats;

- The project proposes any explosive blasting will be conducted in daylight hours and will utilize blasting mats to prevent flyrock from escaping the project's construction limits;
- If necessary, the project proposes downward facing permanent lighting to reduce disturbance to nearby suitable bat foraging habitat. No temporary lighting to facilitate nighttime construction will be used;
- If appropriate, the proposed project will evaluate wildlife crossings under bridges and culverts. Suitable crossings include flat areas below bridge abutments with suitable ground cover, high water shelves in culverts, amphibian tunnels and diversion fencing.

## 9.2 Mitigation

The project team should consult with the USFWS' Bloomington Field Office regarding implementation of project-specific mitigation measures for the permanent loss of 9.1 acres of forested habitat associated with the Proposed Alternative. Mitigation will need be provided at a minimum ratio of 1:1 for forest restoration along with 2:1 for forest preservation to compensate for forest impacts.

## 10. Determination of Effect

The bat mist net survey was conducted with the appropriate level of effort and under the appropriate conditions to investigate presence/likely absence of gray bats during the maternity season for the proposed INDOT Heavy Haul Transportation Corridor in Clark County, Indiana. Additionally, other potential roosting features, such as bridges and culverts, were inspected for the presence of bats. No caves or underground mines were located within, or within the immediate vicinity of, the Proposed Alternative or Project Action Area. The 2016 Bat Mist Net Survey Report can be found in Exhibit B.

The results of the 2016 mist net survey verified the presence of the gray bat within the immediate vicinity of the Proposed Alternative during the summer maternity season and documented presence of suitable foraging and flyway habitat in the Project Action Area (Table 5). Upon implementation of the aforementioned conservation measures, a determination that the proposed action "may affect, and is likely to adversely affect" is recommended for the federally-endangered gray bat (Table 6).



**Table 5.** Gray bat suitable habitat associated with the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.

Species	Roosting Habitat/Structures Present? If so, describe.	Habitat Suitable for Foraging? (Yes/No)	Habitat Suitable for Flyway? (Yes/No)
Gray bat	None present	Yes	Yes

**Table 6.** Determination of potential effects to gray bats for the proposed INDOT Heavy Haul Transportation Corridor Clark County, Indiana.

Common Name	Scientific Name	Current Listing Status	Recommended Effect Determination
Gray bat	<i>Myotis grisescens</i>	Federally Endangered	“May Affect, and is Likely to Adversely Affect”

## 11. References

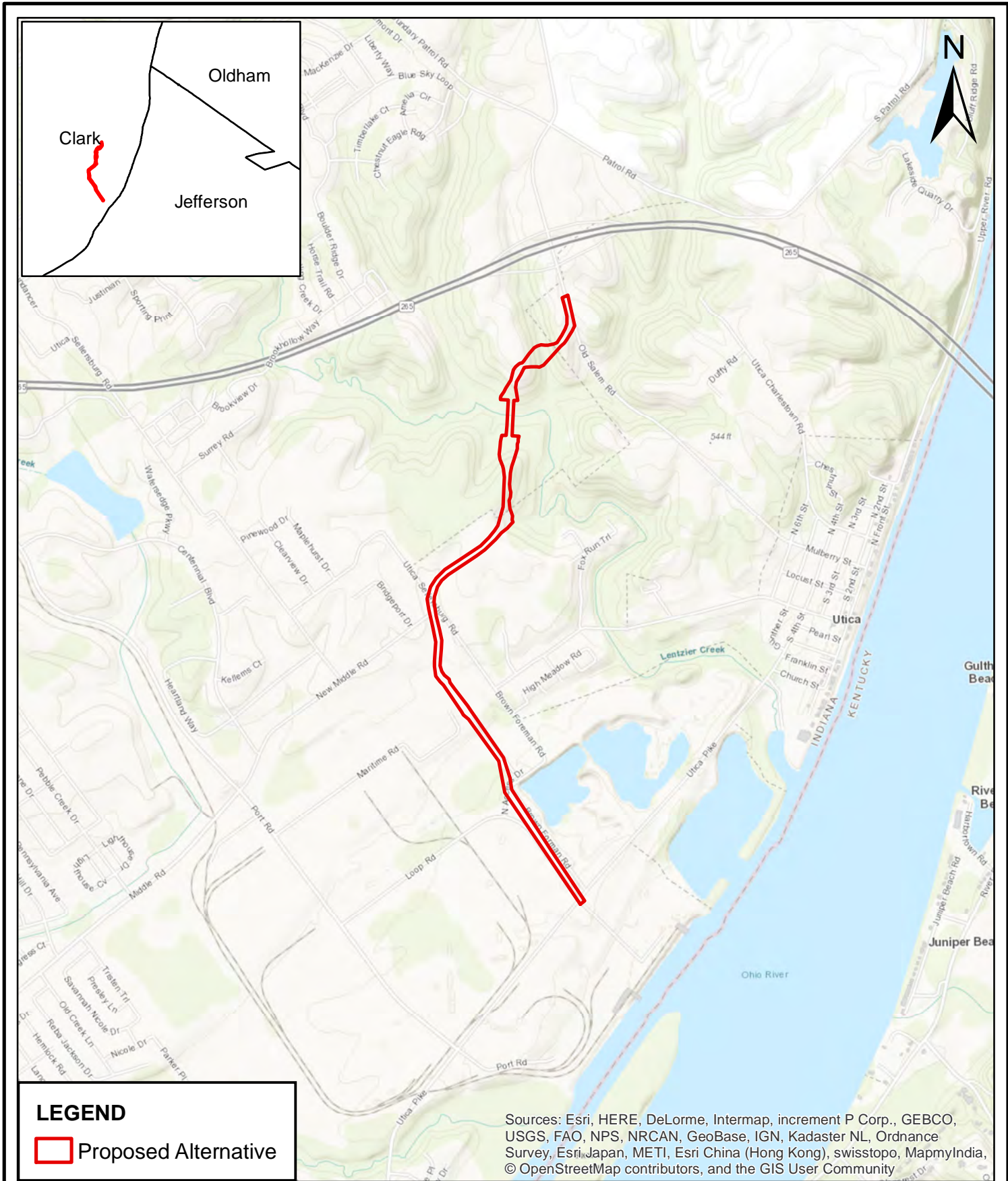
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### Personal Communication

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- U.S. Fish and Wildlife Service (USFWS) Bloomington Ecological Field Office. Robin McWilliams Munson. Ecologist. Email correspondence on 4/13/2017.



**INDOT Heavy Haul Corridor  
 Gray Bat Biological Assessment  
 Clark County, Indiana  
 INDOT Des. No. 1382612**

**FIGURE 1**

**Des. No. 1382612  
 Location Map**

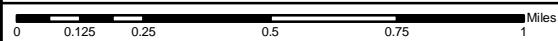


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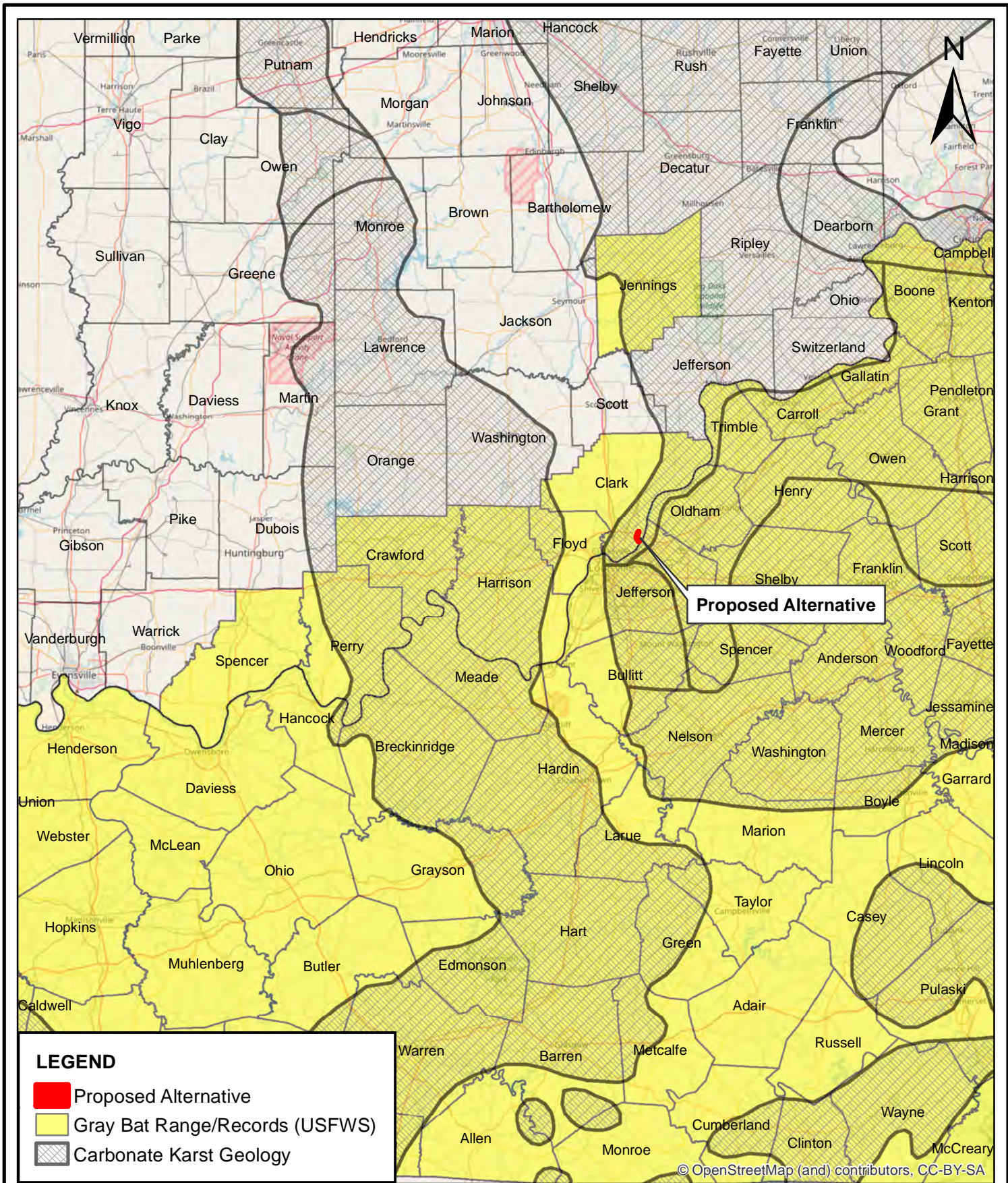
Prepared For: United Consulting

ETC File: LV2016025

Appendix I



Imagery Source: USGS 7.5' Topographic Quadrangle (Jeffersonville, IN)



**INDOT Heavy Haul Corridor  
Gray Bat Biological Assessment  
Clark County, Indiana  
INDOT Des. No. 1382612**

**FIGURE 2**

**Des. No. 1382612  
Gray Bat Range Map**



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Prepared For: United Consulting

ETC File: LV2016025

Appendix I


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
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Imagery Source: USGS 7.5' Topographic Quadrangle (Jeffersonville, IN)



**LEGEND**

 Proposed Alternative

 Project Action Area


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**INDOT Heavy Haul Corridor  
Gray Bat Biological Assessment  
Clark County, Indiana  
INDOT Des. No. 1382612**

Imagery Source: USGS 7.5' Topographic Quadrangle (Jeffersonville, IN)

**FIGURE 3**

**Des. No. 1382612  
Project Action Area Map**

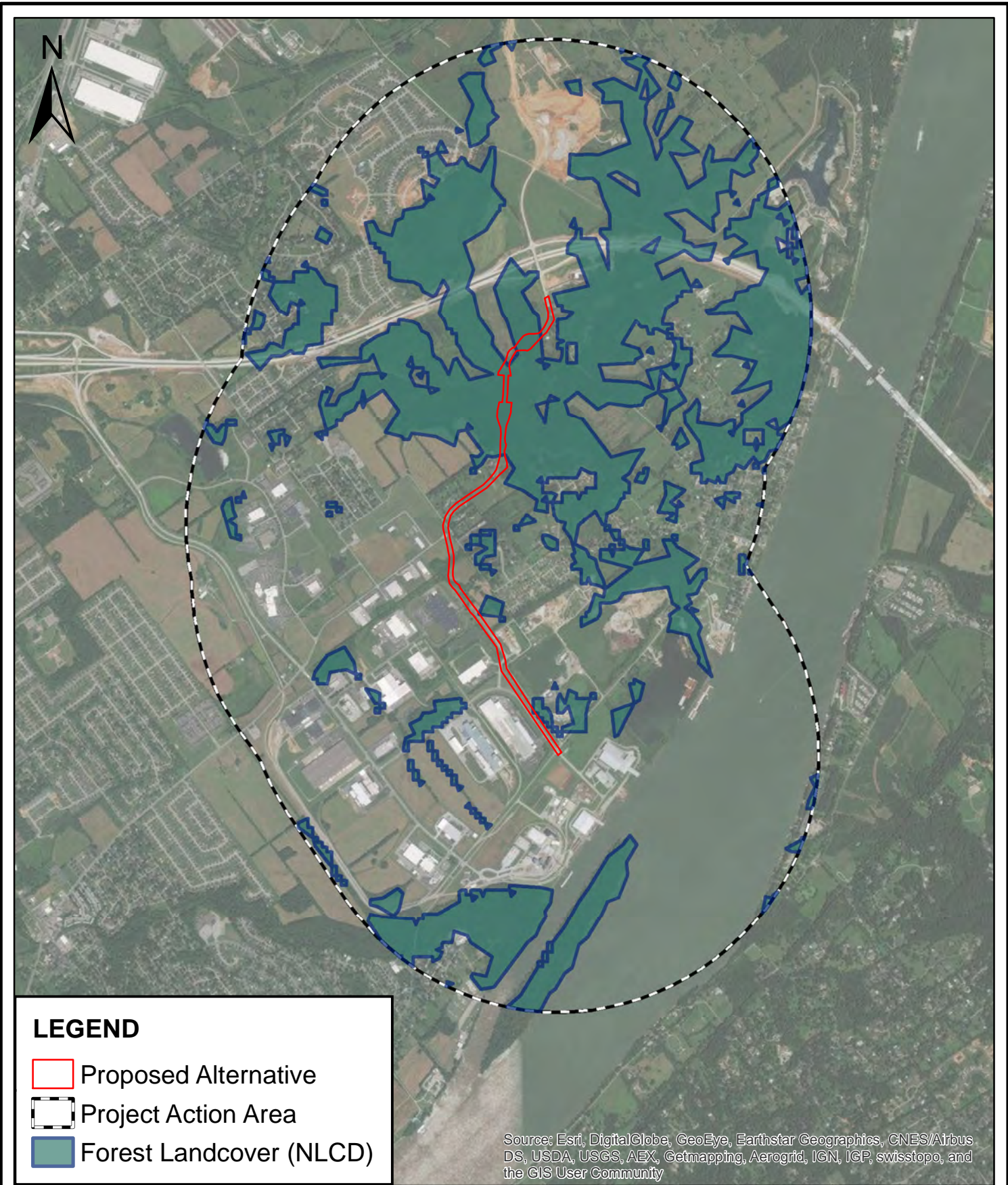


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Prepared For: United Consulting

ETC File: LV2016025 | Appendix I  
Page 1-61

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Due to Sensitive Information**

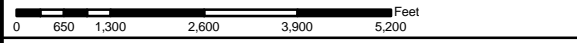


**LEGEND**

- Proposed Alternative
- Project Action Area
- Forest Landcover (NLCD)

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, ICP, swisstopo, and the GIS User Community

**INDOT Heavy Haul Corridor  
Gray Bat Biological Assessment  
Clark County, Indiana  
INDOT Des. No. 1382612**




Imagery Source: ESRI, World Imagery

**FIGURE 5**

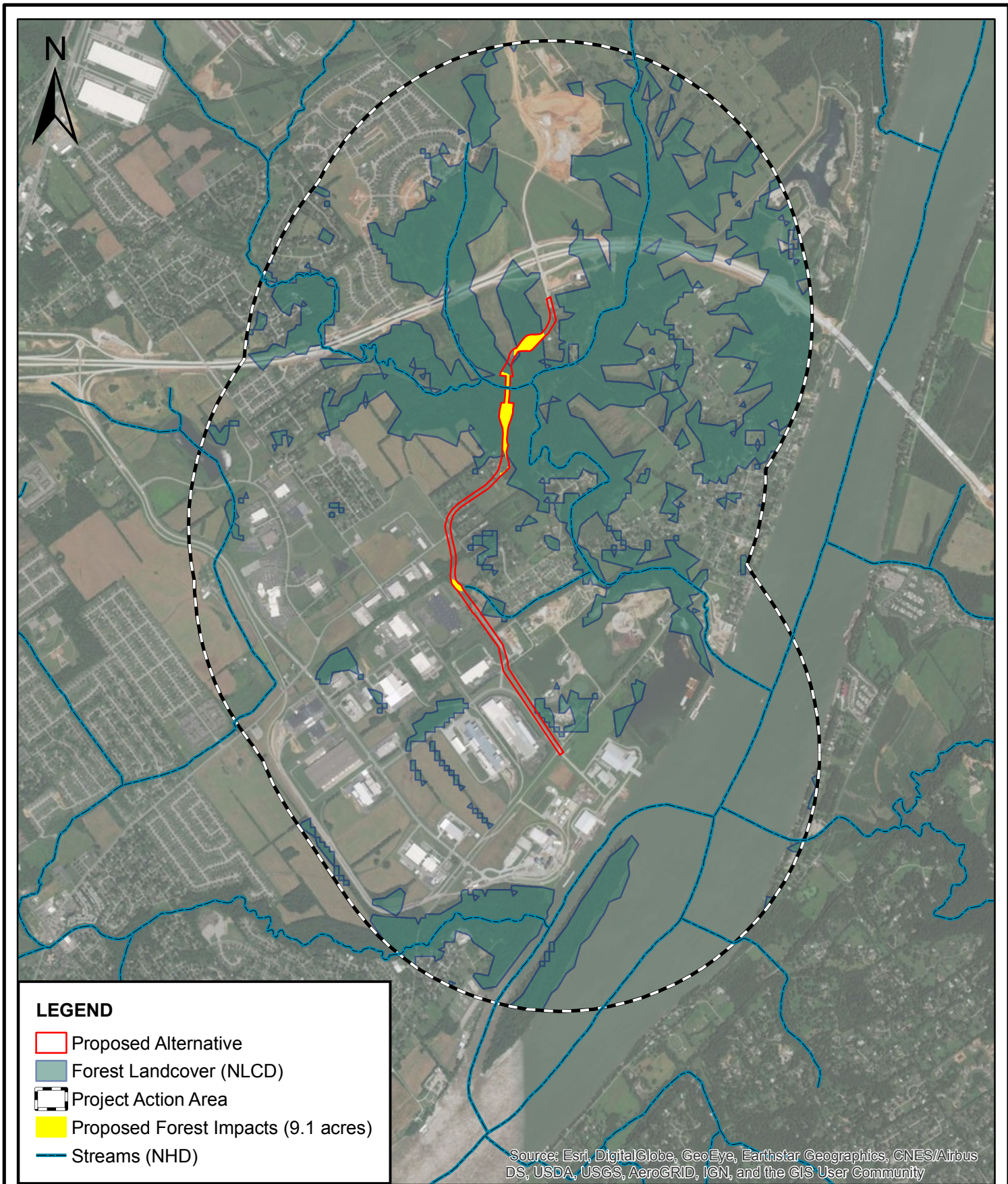
**Des. No. 1382612**

**Baseline Forest Habitat Map**



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Prepared For: United Consulting	
ETC File: LV2016025	





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**LEGEND**

- Proposed Alternative
- Forest Landcover (NLCD)
- Project Action Area
- Proposed Forest Impacts (9.1 acres)
- Streams (NHD)

**INDOT Heavy Haul Corridor  
Gray Bat Biological Assessment  
Clark County, Indiana  
INDOT Des. No. 1382612**

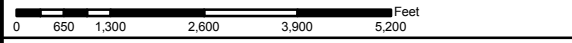
**FIGURE 6**

**Des. No. 1382612  
Forest Impact Map**



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Prepared For: United Consulting



Imagery Source: ESRI, World Imagery

ETC File: LV2016025 Appendix I  
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**EXHIBIT A – LISTED BAT CONSULTATION HISTORY**



# INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue  
Room N642  
Indianapolis, Indiana 46204

PHONE: (317) 233-6795  
FAX: (317) 233-4929

**Michael R. Pence, Governor**  
**Brandye L. Hendrickson,**  
**Commissioner**

April 8, 2016

«F2»  
«F3»  
«F4»  
«F5»  
«F6»  
«F7»  
«F8», «F9» «F10»

Re: Des. No. 1382612  
Heavy Haul Transportation Corridor  
Port of Indiana – Jeffersonville to SR 265  
Utica Township, Clark County, Indiana  
Project No. 2013.01857

Dear «Early\_Coordination\_Mailing\_List»:

The Indiana Department of Transportation (INDOT), in partnership with the Federal Highway Administration (FHWA), the Indiana Economic Development Corporation, the Ports of Indiana, the Board of Commissioners of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority (RRDA), is developing a federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville (Port) with other regional transportation assets. The proposed project is located in Utica Township, Clark County, Indiana.

The area is located on the Jeffersonville and Charlestown USGS 7.5 Minute Quadrangle Maps in Tracts 6-7, 14-17, 24-27, 38-40, and 52-53 and is within the Louisville Metropolitan Planning Area (LMPA), which consists of nine counties in Kentucky (Jefferson, Oldham, Trimble, Henry, Shelby, Spencer, Nelson, Bullit and Meade) and four Indiana counties (Washington, Harrison, Floyd and Clark). Preliminary corridor studies have identified an approximately 1.3-mile wide corridor between the Port of Indiana, Jeffersonville and State Road (SR) 265 to establish roadway alignment alternatives for the project. The alternatives are currently being developed and evaluated within the project corridor based upon environmental studies and coordination. Various maps and aerial photographs are enclosed showing the area being investigated.

The project area has several major generators of traffic that consist primarily of heavy trucks or heavy haul vehicles. However, the road network in the area is primarily made of up of local facilities not designed to handle such vehicle loading. Heavy haul vehicles (often referred to as Michigan truck trains) are generally 60 feet or more in length with a gross vehicle weight of 134,000 pounds, as compared to Indiana legal load limits of 80,000 pounds gross vehicle weight. Heavy haul vehicles require the design of facilities to take into account the maximum weight of the heavy haul vehicles and the anticipated number of heavy haul vehicles utilizing the facility on a daily basis. The resulting difference between a facility designed to carry heavy haul vehicles and standard load trucks is often a significant difference in pavement thickness. Based on current and predicted

rapid industrial and commercial development associated with the major traffic generators in the project area it is anticipated that truck traffic will increase by 129 percent over the next 20 years.

The need for the proposed project is due to the current and predicted rapid industrial and commercial development in the area that would result in a significant increase in volume of heavy haul vehicles mixing with local traffic. This growth, combined with the lack of connectivity and suitable roadways for heavy haul vehicles in the area, indicates a need for the proposed project. The purpose of the proposed project is to provide a route built specifically for heavy haul vehicles that provides continuous connection between the RRCC and the Port via the new SR 265/Old Salem Road interchange.

The proposed project corridor generally extends north from the Port to the SR 265/Old Salem Road interchange. The area is a combination of forest, open grass, industrial, and farmed areas. The forested areas are generally on steep slopes. Few existing roads are located within this area. The proposed project corridor is bounded by the SR 265 corridor at the northern project limits. Lentzier Creek and several tributaries are located within the project corridor.

The proposed project consists of the construction of a 3-lane road designed to “heavy haul” specifications. The proposed road would have a design speed of 35 miles per hour with two 12-foot travel lanes and one 11- to 12-foot auxiliary lane. The road would likely be constructed on new alignment at a total length of approximately 1.75 miles. While only three lanes would be constructed, right-of-way would be wide enough to allow for future expansion to five lanes if required by traffic demand.

A Red Flag Investigation has been conducted to identify potential infrastructure, water, mining, hazardous materials, cultural resources, and ecological resources that may impact or be impacted by the proposed project. Potential concerns and recommendations are listed below:

- Noting the potential location of the project within the karst region of Indiana, as defined by the Karst Memorandum of Understanding (Karst MOU), an investigation of karst features in the project corridor and determination of potential impacts will be conducted.
- Multiple water resources including National Wetland Inventory (NWI) wetlands and streams were mapped with the project corridor. A wetland delineation and waters investigation will be completed to identify resources within the project corridor.
- Coordination will be conducted with the Indiana Department of Natural Resources and the US Fish and Wildlife Service regarding the potential for threatened and endangered species in the proposed project area. The Gray Bat (*Myotis grisescens*), the Indiana Bat (*Myotis sodalis*), and the Northern Long-Eared Bat (*Myotis septentrionalis*) have all been identified as potentially occurring in or near the proposed project corridor.
- Two potential trails, Ohio River Greenway to Charlestown State Park and Porter Road Corridor, run through the proposed project area. Both are managed by the City of Jeffersonville. Appropriate coordination should occur with the City of Jeffersonville if work is proposed along either of these corridors.
- One natural gas pipeline, owned by Indiana Gas Co. Inc., crosses the proposed project area. Appropriate coordination should occur with the INDOT utilities coordinator if excavation is to occur in the area.
- Several potential hazardous materials sites were identified. Environmental Site Assessments will be conducted to further investigate several of these areas.
- Based on preliminary review of the State Historic Architectural and Archaeological Research Database (SHAARD) and the Clark County Interim Report, several historical sites and structures are located

within or near the project corridor. A Historic Property Report and an Archaeology Report will be prepared for the project. The Section 106 process will further investigate potential impacts to historic sites and structures.

This letter is part of the early coordination phase of the environmental review process. You are asked to review this information and provide any comments you may have relative to anticipated impacts of the project on areas in which you have jurisdiction or special expertise. We will incorporate your comments into a study of the project's environmental impacts. To facilitate the development of this project, you are asked to reply within 30 days of receipt of this letter. If no response is received by that date, it will be assumed you have no comments at the present time.

Your timely cooperation in the development of this project is appreciated. For general inquiries please contact myself at (317) 234-4916 or by e-mail at [rbales@indot.in.gov](mailto:rbales@indot.in.gov) or Michelle Allen of FHWA at (317) 226-7344 or by e-mail at [michelle.allen@dot.gov](mailto:michelle.allen@dot.gov). However, please contact our consultant, Leah Boits of American Structurepoint at (317) 547-5580 or by e-mail at [lboits@structurepoint.com](mailto:lboits@structurepoint.com) for coordination purposes, questions, or if additional information is needed.

Respectfully,



Ron Bales  
Environmental Policy Manager  
Indiana Department of Transportation

Enclosures

- State Location Map
- USGS Topographic Mapping
- 2014 Aerial Photography
- Red Flag Investigation Infrastructure Map
- Red Flag Investigation Water Resources Map
- Red Flag Investigation Mining/Mineral Exploration Map
- Red Flag Investigation Hazardous Material Concerns Map
- Early Coordination Distribution List



# United States Department of the Interior

## Fish and Wildlife Service



Bloomington Field Office (ES)  
620 South Walker Street  
Bloomington, IN 47403-2121  
Phone: (812) 334-4261 Fax: (812) 334-4273

23 June 2016

Mr. Lee Droppelman  
Eco-Tech Consultants, Inc.  
11321 Decimal Drive  
Louisville, KY 40299

RE: Pre-survey site-specific coordination and Bloomington, Indiana Field Office authorization for conducting mist-net surveys for the Federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*) for the proposed Indiana Department of Transportation (INDOT) heavy haul road construction from the Indiana Ports-Jeffersonville to Interstate 265, Clark County, Indiana.

Dear Mr. Droppelman:

This letter is in response to your bat survey plan and follow-up email dated June 14<sup>th</sup> and June 23<sup>rd</sup>, 2016, respectively, for authorization from the U.S. Fish and Wildlife Service's (USFWS) Bloomington Field Office (BFO) to conduct summer surveys and radio-telemetry of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*). We have reviewed the study plan and subsequent location maps and photos and agree that the survey effort will be sufficient for the scope of the proposed project.

Specifically, your request covers mist netting and telemetry activities at 2 sites along Lentzier Creek and its tributaries (and potentially an alternative location) in association with the above referenced project. Studies will be carried out under USFWS Federal Fish and Wildlife Permit issued to Peter Lee Droppelman (TE810274-11).

Up to two female Indiana and northern long-eared bats from each site will be radio-tagged and tracked to roost trees. Male Indiana and northern long-eared bats will be tagged and tracked from a site if: 1) no females are caught on night 1; and 2) a male is captured on night 2 prior to the capture of a female. If tagged bats are not found, then search efforts will continue for a minimum of 40 hours of ground searching. Bats will be tracked to roost trees for a minimum of 7 days. A minimum of two emergence counts will be conducted on any roost tree that is located. Additional counts and telemetry will be included if time permits.

Captures of Indiana bats and northern long-eared bats should be reported directly to Robin McWilliams Munson at this office within 24 hours (voice mail should be left at 812-334-4261 ext. 1207).

This letter serves as your authorization to conduct the work as specified in the request you submitted and must be carried with your federal permit when conducting work for this project. All activities must be carried out with strict adherence to permit conditions and authorizations specified in your federal permit (as well as your permit from the State of Indiana), including WNS decontamination protocols. This authorization is not valid if you have not obtained permission from the owner of the lands where activities will occur.

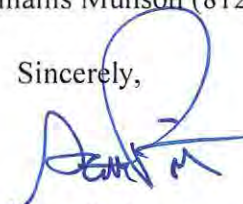
Region 3 of the USFWS has developed a new spreadsheet for reporting bat survey data; this spreadsheet must be used for reporting your survey results. The spreadsheet is available on the USFWS Indiana Bat Summer Survey Guidance website:

<http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>.

Finally, we want to remind you of the need for you and your staff to obtain or amend your State permits, as appropriate, for this project.

If the work expands beyond the scope of the request you provided or if there are adverse effects to bats that were not anticipated, cease all bat research activities and contact this office prior to continuing. If you have any questions please contact Robin McWilliams Munson (812-334-4261, extension 1207).

Sincerely,



Scott E. Pruitt  
Field Supervisor

cc: Scott Johnson, Indiana Department of Natural Resources  
Leah Boits, American StructurePoint, 7260 Shadeland Station, Indianapolis, IN 46256

**From:** McWilliams, Robin  
**To:** [Amanda Janicki](#)  
**Subject:** Re: data request for gray bats in Clark Co., Indiana  
**Date:** Monday, May 1, 2017 2:51:14 PM

---

Hi again. Here are the two reports by Lori Pruitt. I scanned them so let me know if they don't work.

Robin

Robin McWilliams Munson

U.S. Fish and Wildlife Service  
620 South Walker Street  
Bloomington, Indiana 46403  
812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p  
Wednesday, Thursday - telework 8:30a-3:00p

On Fri, Apr 28, 2017 at 8:35 AM, Amanda Janicki <[AJanicki@ecotechinc.com](mailto:AJanicki@ecotechinc.com)> wrote:

Thanks Robin!

Two additional questions – do you have a link for the BA/BO from the US265 bridge? I'm having trouble finding it. Also, Lori Pruitt has two unpublished reports that are relevant to this project (see below). Do you happen to have a copy of these or should I contact Lori directly?

Pruitt, L. 1997. 1997 Bat Survey at the Indiana Army Ammunition Plant at Charleston, Clark

County, Indiana. USFWS Report. Bloomington. 25 pp. (Unpubl. report)

Pruitt, L. 1998. 1998 Gray Bat Study at the Indiana Army Ammunition Plant at Charlestown,

Clark County, Indiana. USFWS Report. Bloomington. 23 pp. (Unpubl. report)

Thanks again. -Amanda



**\*\*\*\*PLEASE NOTE\*\*\*\***

Our main office is moving on May 15<sup>th</sup> and 16<sup>th</sup>, 2017.

Please update your records with our new address:

**311 Clark Station Road**

**Fisherville, KY 40023**

**Amanda Janicki**

**Terrestrial Ecologist**

**Eco-Tech Consultants, Inc.**

311 Clark Station Road

Fisherville, KY 40023

(502) 259-0454 Main

(502) 259-0462 Direct

(585) 730-9751 Mobile

[ajanicki@ecotechinc.com](mailto:ajanicki@ecotechinc.com)

[www.ecotechinc.com](http://www.ecotechinc.com)

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**From:** McWilliams, Robin [mailto:[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)]

**Sent:** Thursday, April 13, 2017 12:04 PM

**To:** Amanda Janicki <[AJanicki@ecotechinc.com](mailto:AJanicki@ecotechinc.com)>

**Subject:** Re: data request for gray bats in Clark Co., Indiana

For starters, these papers discuss status of gray bat in Indiana:

1) Gray bat account from Mammals of Indiana

2) Whitaker et al. 2001. Gray bat in Indiana. [http://www.indianaacademyofscience.org/Documents/Proceedings/V110/PIAS\\_v110\\_p114-122.aspx](http://www.indianaacademyofscience.org/Documents/Proceedings/V110/PIAS_v110_p114-122.aspx)

The 2001 paper has the counts for our only known maternity colony at Sellersburg Quarry. That paper summarizes counts through 2001. John Whitaker and Lori Pruitt (FWS) have continued to survey this colony sporadically since. Here are the data since 2000 (although not since 2010):

May 9, 2001	1,144
June 14, 2001	1,601
Aug 21, 2001	2,639
Aug 21, 2002	2,913
Aug 29, 2003	4,709
Aug 11, 2004	6,520
Aug 22, 2006	6,414
Sept 2, 2010	6,530

This is a flooded limestone quarry that has multiple openings. Visual counts are made at dusk as bats emerge by counters sitting adjacent to the openings used by bats. We are unassisted by any modern technology -- just error-prone humans. As such, estimates are certainly subject to error. On a few occasions when we had enough people we'd have 2 people independently estimate at the same opening -- estimates were generally close.

We haven't done any counts since 2010.

As I mentioned, the environmental docs from the 265 east end bridge should have some

survey info as well.

Robin

Robin McWilliams Munson

U.S. Fish and Wildlife Service

620 South Walker Street

Bloomington, Indiana 46403

812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p

Wednesday, Thursday - telework 8:30a-3:00p

On Thu, Apr 13, 2017 at 9:19 AM, McWilliams, Robin <[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)> wrote:

Hi Amanda,

I am checking to see what we have a what format we have it in. The BA/BO that was done for the US265 bridge should have some data and information for gray bats in the area. We do have a maternity colony at Sellersburg but have not surveyed there in a while (since 2010 I believe). According to the property owners, they still see quite a few bats.

I'll let you know what else I can find.

Robin

Robin McWilliams Munson

U.S. Fish and Wildlife Service

620 South Walker Street

Bloomington, Indiana 46403

812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p

Wednesday, Thursday - telework 8:30a-3:00p

On Thu, Apr 13, 2017 at 8:54 AM, Amanda Janicki <[AJanicki@ecotechinc.com](mailto:AJanicki@ecotechinc.com)> wrote:

Hi Robin,

I am working on the gray bat biological assessment for the INDOT heavy haul transportation corridor in Clark County, Indiana for United Consulting and American Structurepoint, and I was told that data requests for this project go through you. I would like to request any gray bat records you may be aware of in the area, including any maternity, roosting, or foraging data. Thanks. -Amanda

Amanda Janicki, MS x2

Ecologist

**Eco-Tech Consultants, Inc.**

[www.ecotechinc.com](http://www.ecotechinc.com)

11321 Decimal Drive

Louisville, KY 40299

502-259-0462 ext 1002 (office)

585-730-9751 (cell)

[ajanicki@ecotechinc.com](mailto:ajanicki@ecotechinc.com)

**From:** McWilliams, Robin  
**To:** [Amanda Janicki](#)  
**Subject:** Fwd: pdf copy of 2005 gray bat report for Charlestown/INAAP  
**Date:** Tuesday, May 2, 2017 9:10:30 AM

---

Hi Amanda,

here is another report from our office I found.

robin  
Robin McWilliams Munson

U.S. Fish and Wildlife Service  
620 South Walker Street  
Bloomington, Indiana 46403  
812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p  
Wednesday, Thursday - telework 8:30a-3:00p

----- Forwarded message -----

**From:** King, Andrew <[andrew\\_king@fws.gov](mailto:andrew_king@fws.gov)>  
**Date:** Mon, May 1, 2017 at 3:39 PM  
**Subject:** Re: pdf copy of 2005 gray bat report for Charlestown/INAAP  
**To:** "McWilliams, Robin" <[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)>

Hi Robin. It's attached.

RAK

---

R. Andrew King  
Fish and Wildlife Biologist  
U.S. Fish and Wildlife Service  
Indiana Field Office  
620 S. Walker Street  
Bloomington, IN 47403  
Phone: 812-334-4261 x1216  
Fax: 812-334-4273

On Mon, May 1, 2017 at 2:50 PM, McWilliams, Robin <[robin\\_mcwilliams@fws.gov](mailto:robin_mcwilliams@fws.gov)> wrote:

Hi Andy,

Do you have an electronic copy of this report I can share with a consultant writing the BA for the new road at the port?

Robin

Robin McWilliams Munson

U.S. Fish and Wildlife Service  
620 South Walker Street  
Bloomington, Indiana 46403  
812-334-4261 x. 207 Fax: 812-334-4273

Monday, Tuesday - 7:30a-3:00p  
Wednesday, Thursday - telework 8:30a-3:00p

**EXHIBIT B – 2016 BAT MIST NET SURVEY REPORT**



**Bat Mist Net Survey for the INDOT Heavy Haul Transportation Corridor  
Des. No. 1382612**

**CLARK COUNTY, INDIANA**



Prepared for:  
United Consulting  
Indianapolis, IN

Prepared by:  
Eco-Tech Consultants, Inc.  
Louisville, KY

July 2016





**BAT MIST NET SURVEY  
INDOT HEAVY HAUL TRANSPORTATION CORRIDOR  
DES. NO. 1382612**

**CLARK COUNTY, INDIANA**

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- Figure 1. Proposed Study Area Location Map.  
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**Photographic Log**

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- Appendix A Approved Study Plan and USFWS Correspondence.  
Appendix B Field Data Forms.

## 1. INTRODUCTION

Eco-Tech Consultants, Inc. (Eco-Tech) has been contracted by United Consulting to conduct bat mist net surveys for the proposed Indiana Department of Transportation (INDOT) Heavy Haul Transportation Corridor, Des. No. 1382612 (project) in Clark County, Indiana. The proposed project is within the known range of the federally endangered Indiana bat (*Myotis sodalis*), federally endangered gray bat (*Myotis grisescens*), and federally threatened northern long-eared bat (*Myotis septentrionalis*).

This report outlines mist net survey purpose, methodology, results, and conclusions based on field data collection and habitat present within the proposed study area.

## 2. PROJECT DESCRIPTION

INDOT, in partnership with the Federal Highway Administration, the Indiana Economic Development Corporation, the Ports of Indiana-Jeffersonville, the Board of Commissioners of Clark County, the City of Jeffersonville Redevelopment Commission, and the River Ridge Development Authority, is developing a federal-aid road project to improve connectivity for the Ports of Indiana-Jeffersonville with other regional transportation assets. Due to an expected increase in volume of heavy haul vehicles in the area, a three-lane roadway designed to accommodate heavy trucks and haul vehicles is needed. A roadway with an adjacent auxiliary lane will allow for heavy haul traffic to avoid using the local roadways that are not meant to handle vehicles of such size and weight.

The proposed project is located in Utica Township in Clark County, Indiana, where a corridor that is less than 2 miles long between the Port of Indiana-Jeffersonville, and State Road (SR) 265 may provide suitable roadway alignment alternatives (Figure 1). While only three lanes would be constructed, right-of-way would be wide enough to allow for future expansion to five lanes if required by traffic demand. The proposed project corridor generally extends north from the Indiana-Jeffersonville Port to the SR 265/Old Salem Road interchange. The area is a combination of steeply sloped forest, old fields, industrial properties, and farmed areas. The proposed project area contains few existing roads, Lentzier Creek and several tributaries.

## 3. QUALIFYING STATEMENT

Eco-Tech biologists have completed federally protected plant and animal surveys across the nation. Eco-Tech holds scientific collection permits for over 50 federally-listed species in more than 20 states, including bats and other small mammals, freshwater mussels, fish, and plants. Eco-Tech has conducted bat species surveys from California to New Jersey using a host of survey techniques, including mist nets, harp traps, passive/active acoustic monitoring, infrared/thermal video recording, aerial/ground telemetry, and technical cave searches. Eco-Tech has worked with numerous organizations to develop scientifically sound survey plans, biological assessments, protection and enhancement plans, and mitigation strategies.

The principal investigator for this project was Mr. Lee Droppelman. Mr. Droppelman has led and actively participated in bat surveys across the U.S. since 1998. He holds a federal collection permit (TE810274-11) for all eastern bats and over 50 other listed species throughout their ranges. Mr. Droppelman directs all agency formal consultations and is proficient in the determination of effects and development of cost-effective minimization, avoidance, and mitigation measures to offset potential project impacts.

Additionally, Eco-Tech has a qualified and extensive staff of federally permitted biologists. This scientific staff includes published authors, MS bat biologists, and trained Section 7 consultants with experience ranging from four to 25 years.

#### **4. STUDY AREA**

The proposed study area boundary encompassing 199.5 acres was provided by American Structurepoint (Structurepoint), an environmental sub-consultant to United Consulting. Eco-tech completed a desktop analysis of the area using recent aerial photography and United States Department of Agriculture land cover data in a GIS to determine land use within the boundary. Approximately 44% of the land inside the study area boundary (study area) is forested while the remainder is categorized as developed or agricultural.

The study area is located within the Pre-Wisconsinian Drift Plains (55d) Level IV Ecoregion as mapped by Woods et al. (1998). This ecoregion is comprised of rolling till plain with local end moraines characterized by deeply-leached, acidic, pre-Wisconsinian till and thin loess. The area features widespread areas of flat, poorly-drained soils. Originally, the area was dominated by beech forests and elm-ash swamp, but is now commonly dominated by agriculture including soybeans, corn, tobacco, and livestock.

#### **5. SPECIES DESCRIPTION AND LIFE HISTORY**

##### ***Myotis sodalis* Miller & Allen, 1928 (Indiana bat)**

##### ***Species Status***

The Indiana bat is a temperate, insectivorous, migratory bat that hibernates in caves and abandoned mines during winter and spends the summer season in forested areas. It was listed as an endangered species on March 11, 1967, by the United States Fish and Wildlife Service (USFWS) (USFWS 1967). However, the Indiana bat did not receive formal protection until enactment of the Endangered Species Act in 1973 (Public Law 93-205), as amended.

Indiana bat estimated population numbers consistently declined from 1965 to 2001. This steady overall decline was attributed to several causes including: human modifications to hibernacula and surrounding areas, disturbance and vandalism of hibernacula, natural catastrophes,

disturbance of summer habitat, and disturbance of migration pathways including loss and degradation of forested habitat (USFWS 2007).

However, estimates of range wide Indiana bat population totals from surveys conducted post-2001 actually increased. In 2007, a 23% population increase over a 2001 survey was found, yielding an approximate total of 467,947 Indiana bats (USFWS 2007). This large increase was likely due to increases in the local populations at 34 known high-priority hibernacula (USFWS 2007). Since then, however, white-nose syndrome (WNS), an affliction resulting in torpor disturbance from the fungus *Pseudogymnoascus destructans* (Minnis and Lindner 2013), has emerged as a new and severe threat to Indiana bats and all cave-dwelling bats (USFWS 2015a).

### ***Distribution/Abundance***

The Indiana bat's range includes most of the eastern United States, including Indiana. It is known to historically occur from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida (Barbour and Davis 1969, Gardner and Cook 2002). The species' core range is generally consistent with the presence of limestone caves that serve as hibernacula in the winter (Menzel et al. 2001). According to the USFWS (2007) winter survey results from 2005, over 90% of the total Indiana bat population hibernates in only five states: Indiana, Missouri, Kentucky, Illinois, and New York. Although most of the population overwinters in only a few states, Indiana bats are known to migrate up to 360 miles from their hibernacula to find suitable summer habitat to raise offspring (Kurta and Murray 2002, Winhold and Kurta 2006).

### ***Habitat Requirements***

Selection of roost trees by Indiana bat colonies are based on structural and situational characteristics. Tree diameter, solar exposure, and height in canopy are among the most important characteristics (Romme et al. 1995, Kurta and Murray 2002). Reproductive female Indiana bats tend to choose roosts in mature forests with large trees, scattered gaps in the canopy, and an open understory (Gardner et al. 1991, Callahan et al. 1997). The number of available roost trees in an area influences the suitability of habitat for female Indiana bats (Kurta 2005), and roost trees are an ephemeral resource (Gardner et al. 1991). Indiana bats require more than one roost tree to fulfill their needs during the summer (Callahan et al. 1997), with some using more than 18 roost trees in a summer (Barclay and Kurta 2004).

Maternity colonies have been found under sloughing bark of dead, partially dead, and live trees (Carter 2003, Gardner et al. 1991, Kurta et al. 1993, Kurta et al. 2002, Romme et al. 1995). Maternity roosts can contain over 350 individual bats during July and August (Kiser et al. 1998). More than 30 tree species have been found to be maternity roost trees for reproductive female Indiana bats, and most have been found to be deciduous species like ashes (*Fraxinus* spp.), elms (*Ulmus* spp.), hickories (*Carya* spp.), maples (*Acer* spp.), eastern cottonwood (*Populus deltoides*), and oaks (*Quercus* spp.) (USFWS 2007, Harvey 2002, Britzke et al. 2003). It appears that tree species use is more closely related to local availability and suitable structure than to broad regional preferences (USFWS 2007, Farmer et al. 1997)

Indiana bats hibernate primarily in caves, but they have also been documented using abandoned mines. As of November 2006, the USFWS (2007) has winter records of 281 distinct hibernacula in 19 states that have been occupied continually since 1995.

***Myotis grisescens* A. H. Howell, 1909 (gray bat)**

***Species Status***

The gray bat was listed as a federally-endangered species on April 28, 1976 by the USFWS (1976), affording it protection under the Endangered Species Act of 1973 (Public Law 93-205), as amended. USFWS biologists subsequently developed and released a recovery plan several years later. Five primary causes for the decline in gray bat populations are outlined in the recovery plan: direct human disturbance to individuals, human disturbance to the environment, destruction of roost caves by collapse or river impoundment, cave commercialization, and natural sources of mortality.

Following the protection of hibernacula and maternity caves from human disturbance, gray bat populations started to recover at all protected caves. Harvey (2001) reported a population increase of 16.5% since the time of listing.

In 2012, WNS was confirmed to affect gray bats in two counties in Tennessee (USFWS 2012). It has since been found in several caves harboring wintering gray bats across their range. In the winter of 2013, WNS was discovered in Fern Cave, AL. This hibernaculum contains more than one million gray bats, which is a significant portion of the entire population.

***Distribution/Abundance***

The range of the gray bat is restricted to the cave regions of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Mississippi, Missouri, Oklahoma, Tennessee, and Virginia (Barbour and Davis 1969). Most of the large concentrations of gray bats occur in Alabama, Kentucky, Missouri, and Tennessee. The majority of the range-wide population hibernates in nine Priority 1 hibernacula (sites that currently and/or historically contained more than 25,000 individuals), which are located in Alabama (one site), Arkansas (one site), Kentucky (one site), Missouri (three sites), and Tennessee (three sites) (USFWS 1982). There are no known gray bat priority 1 or priority 2 hibernacula in Indiana.

***Habitat Requirements***

Gray bats inhabit caves with different temperatures in the summer and winter months (Gore 1992). They typically hibernate in large groups and hang loosely with their forearms stuck out at angles, rather than parallel to the body (Barbour and Davis 1969). During autumn and spring migration, gray bats may roost temporarily in caves and under bridges, referred to as transitional roosts, which may not otherwise be typically used for maternity or hibernation (Tuttle 1976).

Each summer colony occupies a home range that often contains several roost caves (Thomas 1994, Tuttle 1976). Female gray bats often return to the same summer range each year (Tuttle 1976). The colony home range may encompass up to 40 miles of river or reservoir shoreline (USFWS 1982). Thomas and Best (2000) found that gray bats in the Guntersville Reservoir area of northern Alabama had large home ranges with a minimum average size of 37.5 square miles. Individually, the bats exhibit fidelity to the colony home ranges, but may roost in several caves within the range (Goebel 1996, Tuttle 1976, USFWS 1982).

### **Myotis septentrionalis Trouessart, 1897 (northern long-eared bat)**

#### ***Species Status***

In 2010 the Center for Biological Diversity (CBD) petitioned the USFWS to list the northern long-eared bat as threatened or endangered under the Endangered Species Act (CBD 2010). The USFWS concluded a 12-month finding on the status of the northern long-eared bat and on October 2, 2013, USFWS published its finding that protection is warranted under the Endangered Species Act. The northern long-eared bat was listed as a federally threatened species on May 4, 2015, by the USFWS (USFWS 2015b), affording it protection under the Endangered Species Act of 1973 (Public Law 93-205), as amended.

The status of northern long-eared bat populations is difficult to characterize, because they have a large geographic range, yet tend to hibernate in colonies smaller than 100 individuals (Barbour and Davis 1969, Caire et al. 1989). Their sparse distribution prevents biologists from counting a large percentage of the population at relatively few caves, as is possible with Indiana bats and federally-endangered gray bats. However, as part of the 12-month finding on the CBD petition, it was determined that several threats have caused and will continue to cause dramatic declines in the range-wide population of the northern long-eared bat (USFWS 2013). The status review and subsequent listing identified that the primary threat to the northern long-eared bat is WNS. The disease has led to dramatic and rapid population declines in northern long-eared bats of up to 99% from pre-WNS levels in some areas (USFWS 2013). Other sources of mortality to the species include: wind-energy development, habitat modification, destruction and disturbance (e.g., vandalism to hibernacula, roost tree removal), effects of climate change, and contaminants. Although no significant decline has been observed due to these factors, they may have cumulative effects to the species in addition to WNS (USFWS 2013).

#### ***Distribution/Abundance***

The northern long-eared bat ranges widely across much of Canada and the U.S., but is patchily distributed (Barbour and Davis 1969). It occurs in all Canadian provinces, in the Yukon and Northwest Territories, and in eastern, midwestern, and some southern states (e.g., Crnkovic 2003). A small number of sightings have also been reported in Montana and Wyoming (Schmidt 2001). In Indiana, the species range includes the entire state. It is more common in the northern

part of its range than in the southern portion (Harvey 1992), and relatively rare in the northwestern part of its range (Caceres and Barclay 2000).

### ***Habitat Requirements***

Northern long-eared bats use caves or mines in winter and generally roost in trees during the summer. This species is not considered to be migratory, as summer habitat and hibernacula have been found to be as far apart as 35 miles (Nagorsen and Brigham 1993). Maternity colonies are typically housed in cavities and under the peeling bark of snags and decaying trees (Caceres and Pybus 1997). Within winter hibernacula, the northern long-eared bat appears to prefer deep crevices (Caceres and Barclay 2000).

Summer habitat for the northern long-eared bat generally consists of mature forest. Characteristics of potential summer roosting habitat were summarized by the CBD (2010) as an uneven forest age, containing trees with advanced age (100 years old or older), a multi-layered vertical structure, single and multiple tree-fall gaps, standing snags, and woody debris.

In addition to its preference for more mature forests, northern long-eared bats are reliant on diverse, intact, interior forest; site occupancy has been documented as being inversely related to the proportion of edge habitat within a patch (Yates and Muzika 2006, Lacki and Schwierjohann 2001). Also, northern long-eared bats have a noted preference for feeding in the vicinity of ephemeral upland pools (Brooks and Ford 2005, Owen et al. 2003).

## **6. SURVEY METHODOLOGY**

### **Level of Effort**

Eco-Tech determined the level of survey effort through review of listed bat records within the proposed project vicinity and aerial photography to identify suitable forested habitat within the proposed study area. On-site habitat evaluations confirmed presence of approximately 1.9 km (~1 mile) of linear forested habitat scheduled for potential clearing within the proposed study area as previously identified with aerial photography.

Surveys were conducted in compliance with guidelines contained in the “2016 Rangewide Indiana Bat Summer Survey Guidelines” (USFWS 2016a), which are acceptable for use for northern long-eared bat surveys in 2016, and survey modifications specific to the state of Indiana as approved by the USFWS Bloomington Field Office and the Indiana Department of Natural Resources (INDNR). These guidelines call for a minimum of four net nights per km (0.6 miles) of suitable summer habitat. Surveys are to be conducted between May 15 and August 15 and are temperature and precipitation dependent.



### **Agency Coordination**

On 14 June 2016, Eco-Tech submitted a study plan detailing methodology and level of effort for mist net surveys of the proposed project to the USFWS' Bloomington Field Office. The USFWS approved the study plan on 23 June 2016. A copy of the approved study plan can be found in Appendix A. Mist net surveys were conducted under Eco-Tech's USFWS Federal Fish and Wildlife Permit #TE810274-11 and Indiana Department of Natural Resources Scientific Purposes License #16-230.

### **Mist Net Survey**

Two sites were surveyed for two consecutive calendar nights, and during each calendar night, two net sets were erected and monitored at each site (four total "net-nights" per survey site). Net sets were customized for each site and placed approximately perpendicular across flight corridors, filling the corridor from side to side and from the ground or stream bed to the overhanging canopy to completely block the flight corridor.

The surveys commenced at sunset and lasted for no less than five hours. Nets were checked for bats in 10-minute intervals by a two-person team at each survey site. Netting did not take place during nights of continuous rain, cold temperatures (<50°F), or heavy wind. If capture rates were low at a particular site, nets were relocated on the second night of sampling in an effort to increase capture success.

Captured bats were identified to species, sexed, weighed, aged, had their sexual condition determined, and right forearm length measured. Potential evidence of WNS was determined using the Reichard Wing Damage Index (Reichard and Kunz 2009). Bats were released, unharmed, at the capture site within 30 minutes of removal from the net.

The survey crews adhered to the National White-Nose Syndrome Decontamination Protocol as set forth by the USFWS Version 04.12.2016 (the most current version at the time of survey) (USFWS 2016b).

## **7. FIELD SURVEY CONDITIONS**

Mist net survey sites were selected within the northern portion of the study area in accessible areas with the best available habitat (Figure 2). Eco-Tech and the USFWS agreed that both net sites should be located in and around the large forest block in the northern portion of the study area, due to the lack of potential habitat in the southern section of the study area. Because of this, the southern forests in the study area were not scouted for mist net survey sites.

The most notable potential bat capture locations, based on available foraging habitat, were the numerous trails, small access roads, right-of-ways, and streams throughout the temperate deciduous forest in and around the study area. Lentzier Creek, a direct tributary to the Ohio River, provided a reliable water source and foraging corridor within the study area (Figure 1). Many

streams connected to Lentzier Creek appear to be ephemeral, and appeared to be little more than drainage ditches that were dry during scouting and surveys. Much of the accessible forested land in and around the study area was younger forest with thick understory, especially when adjacent to agricultural fields. Unfortunately, the majority of the contiguous forest within the study area was inaccessible due to a landowner dispute. Because of the inaccessible land and poor habitat quality throughout most of the study area, one of the survey sites was to the west of the study area (Figure 2).

Weather conditions from June 28 to July 1, 2016, were generally favorable for conducting mist net surveys. Night time temperatures ranged from 59°F to 80°F over the survey period with wind and fog being negligible. Relative humidity was greater than 56%.

Photographs of net sites are included in Section 11. Descriptions and sketches of each net site, along with additional wildlife observed and general comments pertaining to each net site are included on survey data forms in Appendix B. Detailed descriptions of the mist net locations are included below.

### **Mist Net Site 1**

Mist Net Site 1 was located on private property that spanned across Lentzier Creek in the central region of the proposed study area. This section of Lentzier Creek provides portions of suitable foraging corridors for Indiana bats, gray bats, and northern long-eared bats. Throughout the study area and along this property, Lentzier Creek was deep and narrow with areas of forested banks that provided a suitable flyway for bats. Most of the surveyed private property was forested and provided potential suitable summer roosting habitat for Indiana and northern long-eared bats.

Nets A and B were both 20 feet wide and 17 feet high. Net A was deployed across Lentzier Creek, and Net B was stretched across a forested road leading up a hill. The canopy at Site 1 was dominated by American sycamore (*Platanus occidentalis*), tulip poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), and boxelder (*Acer negundo*) with an average diameter at breast height (dbh) of 18 inches. The understory at Site 1 was moderately dense and was dominated by tulip poplar, black walnut, and poison ivy (*Toxicodendron radicans*) with an average dbh of 2 inches. Canopy closure at Nets A and B was 60% and 70%, respectively, at the time of the survey.

Due to low capture rates, Net A was moved to block a canopy opening that led across Lentzier Creek and was renamed Net C. Net C measured 30 feet wide and 17 feet high. The canopy closure at Net C was 60% at the time of the survey.

### **Mist Net Site 2**

Due to limited access, Mist Net Site 2 was located just west of the central portion of the study area boundary, in the same forest block that extended throughout the northern portion of the study area. The location of a mist net site outside the approved study area boundary was coordinated with the USFWS Bloomington Field Office prior to netting activities.

Site 2 was located within a privately-owned soybean farm with an abandoned residence. Net A was 30 feet wide and 17 feet high and Net B was 20 feet wide and 17 feet high. Net A was deployed across a forested corridor leading up to the residence and Net B was deployed across a forested opening between agricultural fields. The canopy closure at Nets A and B was 95% and 85%, respectively. The canopy was dominated by hackberry (*Celtis occidentalis*), honey locust (*Gleditsia triacanthos*), and black walnut and the average dbh was 18 inches. The forested understory was very dense and was dominated by bush honeysuckle (*Lonicera maackii*), multiflora rose (*Rosa multiflora*), and hackberry. The average understory dbh was 2 inches.

Due to low capture rates, Net A was moved to a second forested opening between farm fields and was renamed Net C on the second night of sampling. It measured 30 feet wide and 17 feet high with 25% canopy closure at the time of the survey.

## 8. RESULTS

Eleven bats of three species were captured during the survey effort including five gray bats, four big brown bats (*Eptesicus fuscus*), and two eastern red bats (*Lasiurus borealis*) (Table 1).

**Table 1.** Summary of bat capture data at the proposed INDOT heavy haul transportation corridor in Clark County, Indiana; 28 June through 1 July 2016.

Site	Date	Species	Net	Time	Height in Net (m)	Age	Sex	RC	Weight (g)	FA Length (mm)	Wing Scar Score
1	6/28/2016	<i>Myotis grisescens</i>	A	22:10	0	A	F	L	10.5	43.0	0
		<i>Eptesicus fuscus</i>	B	22:20	0	J	F	NR	13.5	49.0	1
		<i>Eptesicus fuscus</i>	B	22:50	3	A	F	L	19.5	49.0	0
		<i>Lasiurus borealis</i>	B	00:50	3.5	A	M	NR	12	37.0	0
	6/29/2016	<i>Eptesicus fuscus</i>	C	22:25	4	A	F	NR	10.9	44.0	0
2	6/30/2016	<i>Myotis grisescens</i>	B	22:10	2	A	F	L	10.5	44.0	0
		<i>Myotis grisescens</i>	B	22:10	2.5	A	F	L	10.5	43.0	0
		<i>Lasiurus borealis</i>	A	22:30	3.5	A	M	NR	14	39.0	0
	7/1/2016	<i>Eptesicus fuscus</i>	B	21:50	1.5	A	F	L	17.0	47.0	0
		<i>Myotis grisescens</i>	B	22:05	3	A	M	NR	10.0	43.0	0
		<i>Myotis grisescens</i>	B	22:40	4.5	J	F	NR	8.5	43.0	1P

Note: RC=reproductive condition, FA=forearm, A=adult, F=female, L=lactating, J=juvenile, NR=non-reproductive, M=male.

Five federally endangered gray bats were captured during the survey effort. A single adult female was captured at Site 1. Two adult females, a juvenile female, and an adult male were captured at Site 2. Structurepoint, Indiana Department of Natural Resources, and USFWS were notified of the endangered species captures. The project team will consult with the USFWS on the need for

further informal or formal consultation necessary to address the presence of gray bats within the proposed study area.

## **9. CONCLUSIONS**

Eco-Tech completed mist net surveys with appropriate levels of effort and under the appropriate conditions to investigate presence/probable absence of federally listed bats during the maternity season at the proposed INDOT Heavy Haul Transportation Corridor in Clark County, Indiana.

A total of 11 bats of three species were captured during this survey, including five federally endangered gray bats. Habitat in the study area is approximately 44% forested with several small creeks. The area provides suitable foraging habitat for Indiana bats, gray bats, and northern long-eared bats, and suitable roosting habitat for Indiana and northern long-eared bats. However, Indiana and northern long-eared bats were not encountered within the study area at the time of the survey and may not be present within the proposed study area during the summer maternity season. No impact avoidance or minimization measures related to Indiana bat and northern long-eared bat roosting such as seasonal tree clearing restrictions, are suggested for this proposed project.

Lentzier Creek provides suitable and confirmed foraging habitat for gray bats and as such, it is recommended that INDOT follow best management practices for erosion and sedimentation control to avoid or minimize impacts to this habitat (*e.g.* selective tree clearing and riparian width expansion/retention).

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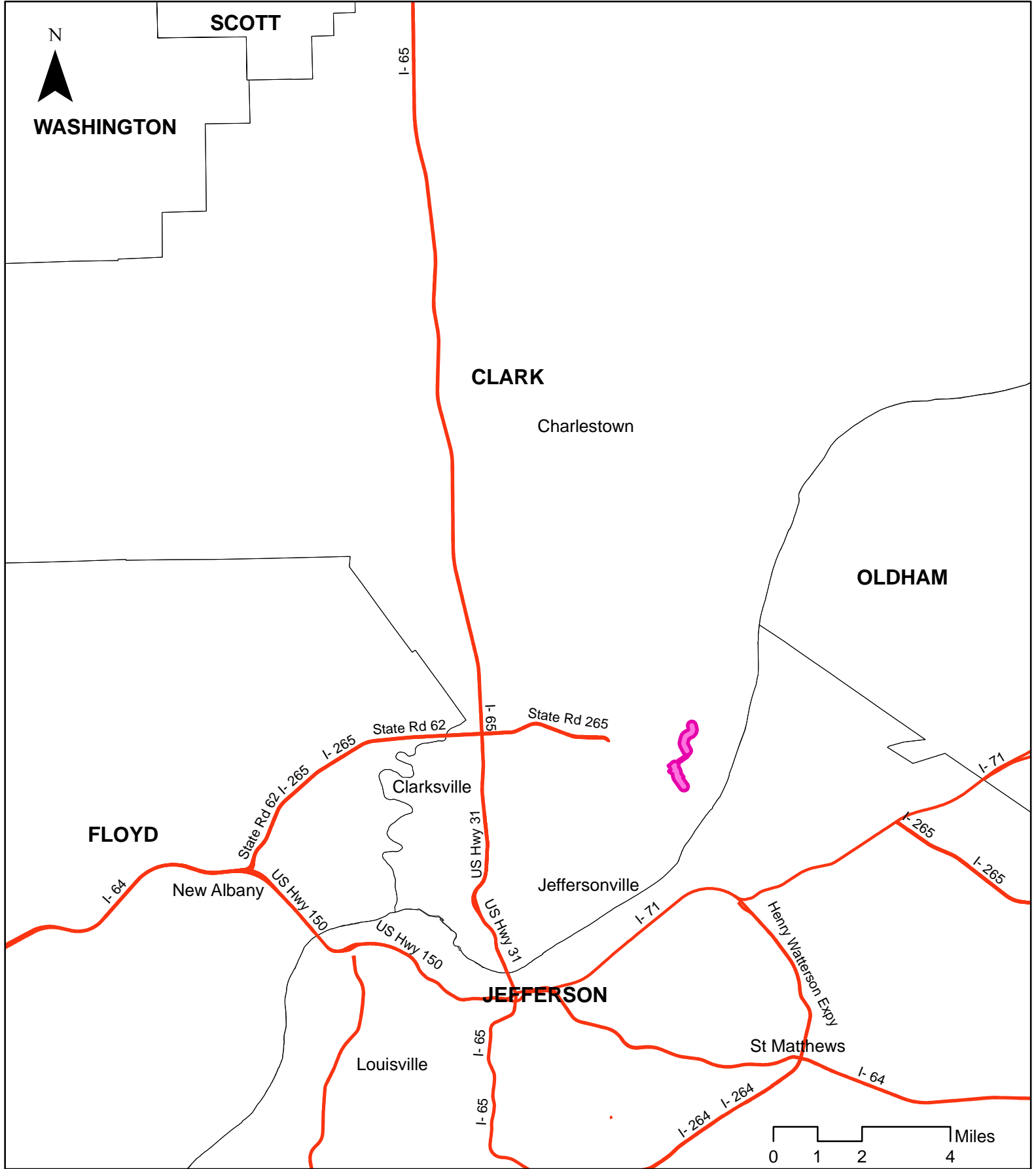
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### **Figures**

Figure 1. Proposed Study Location Area Map.

Figure 2. Proposed Study Area and Mist Net Survey Site Locations.



**Legend**

- Road
- Study area

Figure 1  
**Proposed Study Area  
 Location Map**  
 INDOT Heavy Haul Road  
 Clark County, Indiana



Date: 7-21-2016 | Drawn by: RRN

Project number: LV2016025  
 Appendix I  
 Page 157

**Page I-98 (Figure 2) Removed  
Due to Sensitive Information**

## Photographic Log



Mist Net Study Site 1 – Net A



Mist Net Study Site 1 – Net B



Mist Net Study Site 1 – Net C



Mist Net Study Site 2 – Net A



Mist Net Study Site 2 – Net B



Mist Net Study Site 2 – Net C



Gray Bat (*Myotis grisescens*) band #360 facial features diagnostic photo.





Gray Bat (*Myotis grisescens*) band #359 facial features diagnostic photo.



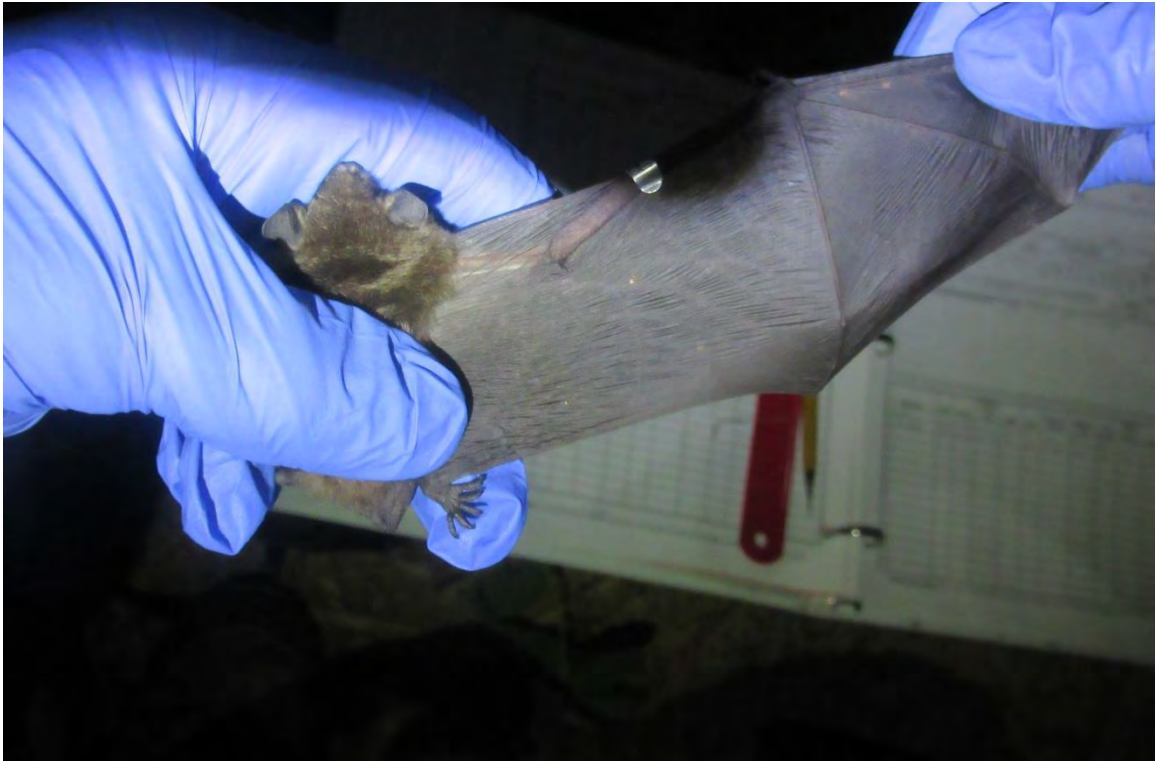
Gray Bat (*Myotis grisescens*) band #361 facial features diagnostic photo.



Gray Bat (*Myotis grisescens*) band #360 dorsum diagnostic photo.



Gray Bat (*Myotis grisescens*) band # 359 dorsum diagnostic photo.



Gray Bat (*Myotis grisescens*) band # 361 dorsum diagnostic photo.



Gray Bat (*Myotis grisescens*) band # 360 ankle/wing attachment diagnostic photo.



Gray Bat (*Myotis grisescens*) band # 359 ankle/wing attachment diagnostic photo.



Gray Bat (*Myotis grisescens*) band # 361 ankle/wing attachment diagnostic photo.

## **Appendix A**

### **Approved Study Plan and USFWS Correspondence**



# United States Department of the Interior

## Fish and Wildlife Service



Bloomington Field Office (ES)  
620 South Walker Street  
Bloomington, IN 47403-2121  
Phone: (812) 334-4261 Fax: (812) 334-4273

23 June 2016

Mr. Lee Droppelman  
Eco-Tech Consultants, Inc.  
11321 Decimal Drive  
Louisville, KY 40299

RE: Pre-survey site-specific coordination and Bloomington, Indiana Field Office authorization for conducting mist-net surveys for the Federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*) for the proposed Indiana Department of Transportation (INDOT) heavy haul road construction from the Indiana Ports-Jeffersonville to Interstate 265, Clark County, Indiana.

Dear Mr. Droppelman:

This letter is in response to your bat survey plan and follow-up email dated June 14<sup>th</sup> and June 23<sup>rd</sup>, 2016, respectively, for authorization from the U.S. Fish and Wildlife Service's (USFWS) Bloomington Field Office (BFO) to conduct summer surveys and radio-telemetry of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*). We have reviewed the study plan and subsequent location maps and photos and agree that the survey effort will be sufficient for the scope of the proposed project.

Specifically, your request covers mist netting and telemetry activities at 2 sites along Lentzier Creek and its tributaries (and potentially an alternative location) in association with the above referenced project. Studies will be carried out under USFWS Federal Fish and Wildlife Permit issued to Peter Lee Droppelman (TE810274-11).

Up to two female Indiana and northern long-eared bats from each site will be radio-tagged and tracked to roost trees. Male Indiana and northern long-eared bats will be tagged and tracked from a site if: 1) no females are caught on night 1; and 2) a male is captured on night 2 prior to the capture of a female. If tagged bats are not found, then search efforts will continue for a minimum of 40 hours of ground searching. Bats will be tracked to roost trees for a minimum of 7 days. A minimum of two emergence counts will be conducted on any roost tree that is located. Additional counts and telemetry will be included if time permits.

Captures of Indiana bats and northern long-eared bats should be reported directly to Robin McWilliams Munson at this office within 24 hours (voice mail should be left at 812-334-4261 ext. 1207).

This letter serves as your authorization to conduct the work as specified in the request you submitted and must be carried with your federal permit when conducting work for this project. All activities must be carried out with strict adherence to permit conditions and authorizations specified in your federal permit (as well as your permit from the State of Indiana), including WNS decontamination protocols. This authorization is not valid if you have not obtained permission from the owner of the lands where activities will occur.

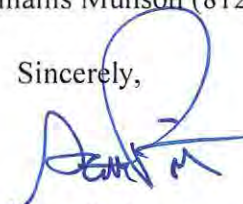
Region 3 of the USFWS has developed a new spreadsheet for reporting bat survey data; this spreadsheet must be used for reporting your survey results. The spreadsheet is available on the USFWS Indiana Bat Summer Survey Guidance website:

<http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>.

Finally, we want to remind you of the need for you and your staff to obtain or amend your State permits, as appropriate, for this project.

If the work expands beyond the scope of the request you provided or if there are adverse effects to bats that were not anticipated, cease all bat research activities and contact this office prior to continuing. If you have any questions please contact Robin McWilliams Munson (812-334-4261, extension 1207).

Sincerely,



Scott E. Pruitt  
Field Supervisor

cc: Scott Johnson, Indiana Department of Natural Resources  
Leah Boits, American StructurePoint, 7260 Shadeland Station, Indianapolis, IN 46256

**Appendix B**  
**Field Data Forms**



NET SITE DESCRIPTION

SITE: 1 PROJECT: INDOT Heavy Haul Rd DATES: 6/28/2010 + 6/29/2010

ID BY: L. Droppelman QUAD: Jeffersonville COUNTY: Clark STATE: IN

Net A Width (m): 10 Height (m): 5.2 Lat/Long: 38.338342 -85.66749

Net B Width (m): 6 Height (m): 5.2 (db1) Lat/Long: 38.33893 -85.66749

Net C <sup>(NIGHT 2)</sup> Width (m): 9 Height (m): 5.2 Lat/Long: 38.33842 -85.66745

Net D Width (m): \_\_\_\_\_ Height (m): \_\_\_\_\_ Lat/Long: \_\_\_\_\_

Anabat Lat/Long: N/A

Anabat Lat/Long: N/A

NIGHT 1 ~ nets A+B, NIGHT 2 ~ nets B+C

VEGETATION

Dominant Canopy Species:

- 1) Sycamore
- 2) Tulip poplar
- 3) Black walnut  
Boxelder

Percent Canopy Closure:

Net A 60 Net C 60  
Net B 70 Net D \_\_\_\_\_

Average Canopy DBH (in): \_\_\_\_\_

18

Dominant Understory Species:

- 1) Poison ivy
- 2) Black walnut
- 3) Tulip poplar

Understory Density:

Very Dense	
Moderate	X
Clear	

Average Understory DBH (in): \_\_\_\_\_

2

STREAM NAME:

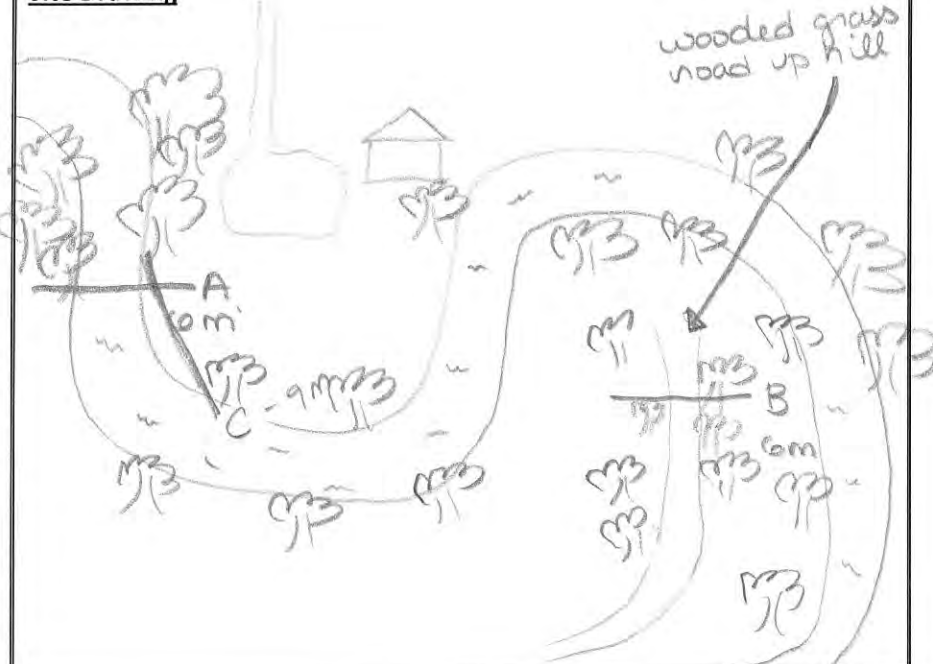
Bank Height (m): 1.5  
Channel Width (m): 6  
Water Width (m): 5

Average Water Depth (m): 2.5  
Dominant Substrate: mud  
Turbidity (clear/cloudy): cloudy

Comments/Descriptions

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Site Drawing



BAT CAPTURE DATA FORM

PROJECT: INDOT Heavy Haul Rd

SITE: 1 INVESTIGATORS: L. DROPELMAN, S. HATCH, D. HERLIHY DATE: 28 JUNE 2010

	TIME (24 HR)	AIR TEMP (F)	RH (%)	Fog (Y/N)	SKY CONDITIONS <small>0 = clear, 1 = few clouds, 2 = partly cloudy, 3 = cloudy or overcast, 4 = smoke or fog, 5 = drizzle or light rain, 6 = thunderstorm</small>	WIND Beaufort Scale <small>0 = calm (0 mph), 1 = lightwind (1-3 mph), 2 = lightbreeze (4-7 mph), 3 = gentle breeze (8-12 mph), 4 = moderate breeze (13-18 mph)</small>				
	MISTNET START	21:15	77	56	N	0 1 (2) 3 4 5 6	(0) 1 2 3 4			
MISTNET END	02:15	20	72	N	(0) 1 2 3 4 5 6	(0) 1 2 3 4				
LUNAR PHASE & % ILLUMINATION	New moon   Waxing crescent   First quarter   Waxing gibbous Full moon   Waning gibbous   Third quarter   Waning crescent						RISE (24 HR)		SET (24 HR)	
	40%						MOON	2:00	14:52	
							SUN	6:22	21:10	

COMMENTS AND OTHER WILDLIFE NOTED: GREEN FROG, GREAT BLUE HERON, AMERICAN TOAD, BARRED OWL

weather from weatherunderground.com station ME2401 @ 21:10 + 2:24

\*KESTREL APPEARS BROKEN

BATS WEIGHT 3g<sup>-4</sup><sub>2</sub>


Species	Net	Time	Height in net (m)	Age	Sex	Reprod. Cond.	Weight (g)	RFA (mm)	Wing Scar Score	Frequency	Band #
1. MYGR	A	22:10	0	A	F	L	10.5	43	0	N/A	358
2. EPFU	B	22:20	0	J	F	NR	13.5	49	1	—	—
3. EPFU	B	22:50	3	A	F	L	19.5	49	0	N/A	—
4. LABD	B	00:50	3.5	A	M	NR	12.0	37	0	N/A	—
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											

Reproductive Condition: N: non-reproductive; L: lactating; P: pregnant; PL: post-lactating; TD: testes descended Age: A: adult; J: juvenile Sex: M: male; F: female

**BAT CAPTURE DATA FORM**

**PROJECT:** INDOT Heavy Haul Rd

**SITE:** 1 **INVESTIGATORS:** L. Droppelman, S. Hatch, D. Herlihy **DATE:** 29 JUNE 2016

	<b>TIME (24 HR)</b>	<b>AIR TEMP (F)</b>	<b>RH (%)</b>	<b>Fog (Y/N)</b>	<b>SKY CONDITIONS</b> <small>0 = clear, 1 = few clouds, 2 = partly cloudy, 3 = cloudy or overcast, 4 = smoke or fog, 5 = drizzle or light rain, 6 = thunderstorm</small>	<b>WIND Beaufort Scale</b> <small>0 = calm (0 mph), 1 = lightwind (1-3 mph), 2 = lightbreeze (4-7 mph), 3 = gentle breeze (8-12 mph), 4 = moderate breeze (13-18 mph)</small>											
	<b>MISTNET START</b>	21:10	21.4	79.8	N	0	1	2	3	4	5	6	0	1	2	3	4
<b>MISTNET END</b>	02:10	14.8	93.4	N	0	1	2	3	4	5	6	0	1	2	3	4	
<b>LUNAR PHASE &amp; % ILLUMINATION</b>	New moon   Waxing crescent   First quarter   Waxing gibbous											<b>RISE (24 HR)</b>		<b>SET (24 HR)</b>			
	Full moon   Waning gibbous   Third quarter   <u>Waning crescent</u> 29%											<b>MOON</b>		2:37		16:00	
												<b>SUN</b>		6:22		21:10	

**COMMENTS AND OTHER WILDLIFE NOTED:**

Species	Net	Time	Height in net (m)	Age	Sex	Reprod. Cond.	Weight (g)	RFA (mm)	Wing Scar Score	Frequency	Band #
1. EFFU	C	22:25	4	J	F	NR	10.9	44	0	—	—
2.											
3.											
4.											
5.											
6.											
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9.											
10.											
11.											
12.											
13.											
14.											
15.											

**Reproductive Condition:** N: non-reproductive; L: lactating; P: pregnant; PL: post-lactating; TD: testes descended **Age:** A: adult; J: juvenile **Sex:** M: male; F: female

### NET SITE DESCRIPTION

SITE: 2 PROJECT: INDOT Heavy Haul Rd DATES: 6/30/2016

ID BY: L. Droppelman QUAD: Jeffersonville COUNTY: Clark STATE: IN

**Net A** Width (m): 9 Height (m): 5.2 Lat/Long: 38.33962 -85.67683

**Net B** Width (m): 6 Height (m): 5.2 Lat/Long: 38.33954 -85.67800

**Net C** Width (m): 9 Height (m): 5.2 Lat/Long: 38.340521 -85.67885

**Net D** Width (m): \_\_\_\_\_ Height (m): \_\_\_\_\_ Lat/Long: \_\_\_\_\_

**Anabat** Lat/Long: \_\_\_\_\_

**Anabat** Lat/Long: \_\_\_\_\_

**VEGETATION**

Dominant Canopy Species: Percent Canopy Closure: Average Canopy DBH (in):

1) Hackberry Net A 95 Net C 25

2) Honey locust Net B 85 Net D \_\_\_\_\_

3) Black walnut \_\_\_\_\_

Average Canopy DBH (in): 18

Dominant Understory Species: Understory Density: Average Understory DBH (in):

1) bush honeysuckle Very Dense  (in forested patches)

2) multiflora rose Moderate

3) hackberry Clear

Average Understory DBH (in): 2

**STREAM NAME:**

Bank Height (m): N/A Average Water Depth (m): N/A

Channel Width (m): N/A Dominant Substrate: N/A

Water Width (m): N/A Turbidity (clear/cloudy): N/A

**Comments/Descriptions**

site on farm with several planted soy fields.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

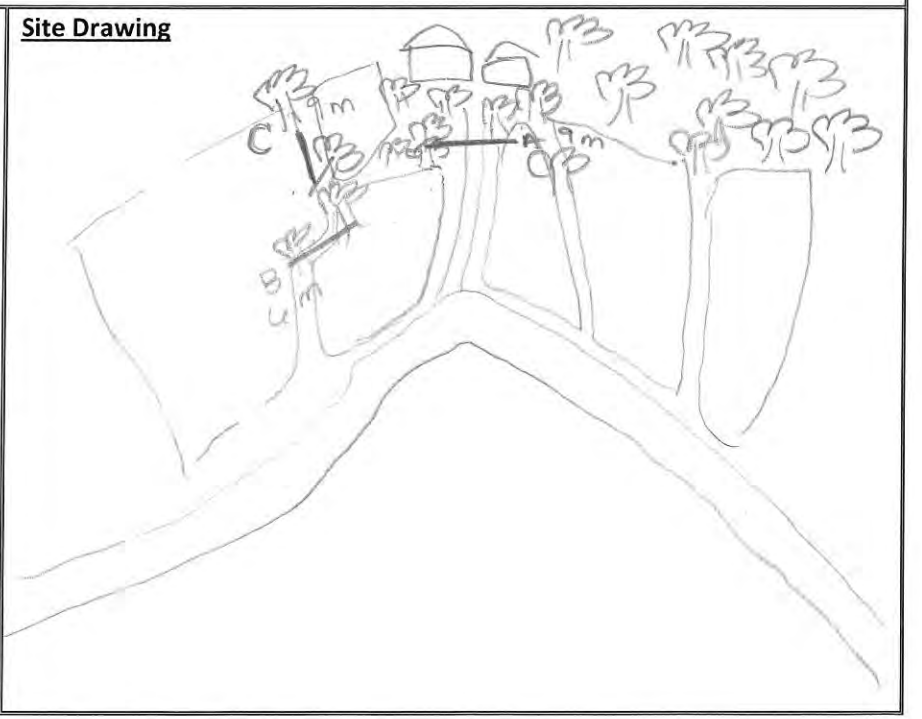
\_\_\_\_\_

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**BAT CAPTURE DATA FORM**

PROJECT: *INDOT Heavy Haul Rd*

SITE: *2* INVESTIGATORS: *L. Drappelman, S. Hatch, D. Herlihy* DATE: *30 JUNE 2016*

	TIME (24 HR)	AIR TEMP (F)	RH (%)	Fog (Y/N)	SKY CONDITIONS <small>0 = clear, 1 = few clouds, 2 = partly cloudy, 3 = cloudy or overcast, 4 = smoke or fog, 5 = drizzle or light rain, 6 = thunderstorm</small>	WIND Beaufort Scale <small>0 = calm (0 mph), 1 = lightwind (1-3 mph), 2 = lightbreeze (4-7 mph), 3 = gentle breeze (8-12 mph), 4 = moderate breeze (13-18 mph)</small>				
	MISTNET START	<i>21:15</i>	<i>21.4</i>	<i>83.7</i>	<i>N</i>	0 <u>1</u> 2 3 4 5 6	<u>0</u> 1 2 3 4			
MISTNET END	<i>02:15</i>	<i>21.1</i>	<i>92.9</i>	<i>N</i>	0 1 2 <u>3</u> 4 5 6	<u>0</u> 1 2 3 4				
LUNAR PHASE & % ILLUMINATION	New moon   Waxing crescent   First quarter   Waxing gibbous Full moon   Waning gibbous   Third quarter   <u>Waning crescent</u> <i>19%</i>							RISE (24 HR)	SET (24 HR)	
							MOON	<i>3:18</i>	<i>17:08</i>	
							SUN	<i>6:23</i>	<i>21:10</i>	

COMMENTS AND OTHER WILDLIFE NOTED: *COYOTES, eastern Hercules beetle,*


	Species	Net	Time	Height in net (m)	Age	Sex	Reprod. Cond.	Weight (g)	RFA (mm)	Wing Scar Score	Frequency	Band #
1.	<i>MYGR</i>	<i>B</i>	<i>22:10</i>	<i>2</i>	<i>A</i>	<i>F</i>	<i>L</i>	<i>10.5</i>	<i>44</i>	<i>0</i>	<i>—</i>	<i>359</i>
2.	<i>MYGR</i>	<i>B</i>	<i>22:10</i>	<i>2.5</i>	<i>A</i>	<i>F</i>	<i>L</i>	<i>10.5</i>	<i>43</i>	<i>0</i>	<i>—</i>	<i>360</i>
3.	<i>LABO</i>	<i>A</i>	<i>22:30</i>	<i>3.5</i>	<i>A</i>	<i>M</i>	<i>NR</i>	<i>140</i>	<i>39</i>	<i>0</i>	<i>—</i>	<i>—</i>
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												

Reproductive Condition: N: non-reproductive; L: lactating; P: pregnant; PL: post-lactating; TD: testes descended Age: A: adult; J: juvenile Sex: M: male; F: female

**BAT CAPTURE DATA FORM**

**PROJECT:** INDOOR Heavy Haul Rd

**SITE:** 2      **INVESTIGATORS:** S. Hatch, L. Drappelman, D. Herlihy      **DATE:** 1 JULY 2014

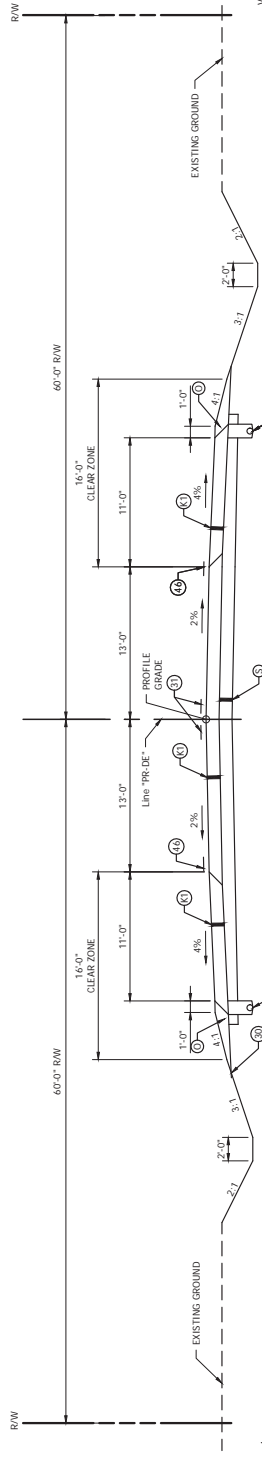
	<b>TIME (24 HR)</b>	<b>AIR TEMP (F)</b>	<b>RH (%)</b>	<b>Fog (Y/N)</b>	<b>SKY CONDITIONS</b> <small>0 = clear, 1 = few clouds, 2 = partly cloudy, 3 = cloudy or overcast, 4 = smoke or fog, 5 = drizzle or light rain, 6 = thunderstorm</small>						<b>WIND Beaufort Scale</b> <small>0 = calm (0 mph), 1 = lightwind (1-3 mph), 2 = lightbreeze (4-7 mph), 3 = gentle breeze (8-12 mph), 4 = moderate breeze (13-18 mph)</small>					
	<b>MISTNET START</b>	21:15	22.4	77.6	N	0	1	2	3	4	5	6	0	1	2	3
<b>MISTNET END</b>	02:15	17.8	80.6	N	0	1	2	3	4	5	6	0	1	2	3	4
<b>LUNAR PHASE &amp; % ILLUMINATION</b>	New moon   Waxing crescent   First quarter   Waxing gibbous Full moon   Waning gibbous   Third quarter   Waning crescent											<b>RISE (24 HR)</b>		<b>SET (24 HR)</b>		
	11%											<b>MOON</b>	4:02	18:16		
												<b>SUN</b>	6:23	21:10		

**COMMENTS AND OTHER WILDLIFE NOTED:** nets B+C opened tonight.

	Species	Net	Time	Height in net (m)	Age	Sex	Reprod. Cond.	Weight (g)	RFA (mm)	Wing Scar Score	Frequency	Band #
1.	EPFU	B	21:50	1.5	A	F	L	17.0	47	0	—	—
2.	MYGR	B	22:05	3.0	A	M	NR	10.0	43	0	—	361
3.	MYGR	B	22:40	4.5	J	F	NR	8.5	43	1P	photo 24	362 mites
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												

**Reproductive Condition:** N: non-reproductive; L: lactating; P: pregnant; PL: post-lactating; TD: testes descended    **Age:** A: adult; J: juvenile    **Sex:** M: male; F: female

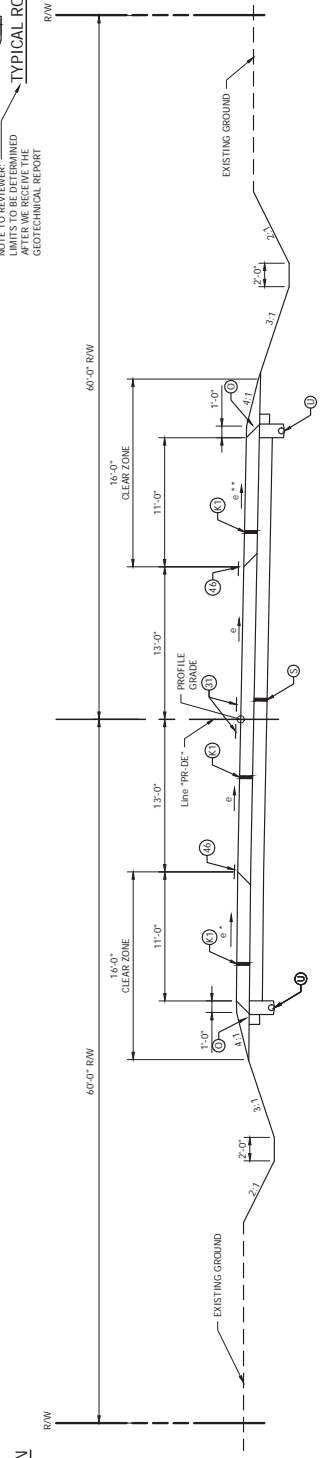
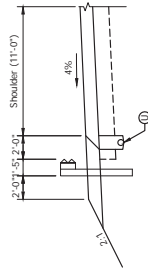
**EXHIBIT C – PROJECT CONSTRUCTION DRAWINGS AND SITE PLANS**



**TYPICAL SECTION**

Sta 10+00.00 to Sta. 23+85.00 "PR-DE"  
 Sta. 44+40.00 to Sta. 48+25.00 "PR-DE"  
 Sta. 88+75.00 to Sta. 88+74.00 "PR-DE"  
 Sta. 89+05.00 to Sta. 89+41.11 "PR-DE"

**TYPICAL GUARDRAIL SECTION**



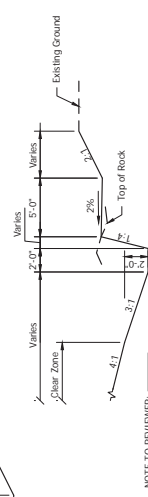
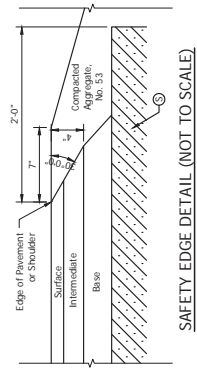
**SUPERELEVATION SECTION**

Sta. 23+85.00 to Sta. 44+40.00 "PR-DE"  
 Sta. 44+40.00 to Sta. 48+25.00 "PR-DE"  
 Sta. 88+75.00 to Sta. 88+74.00 "PR-DE"  
 Sta. 89+05.00 to Sta. 89+41.11 "PR-DE"

Curve to the right shown, curves to the left reversed.

\* High Side Shoulder - If e is 4% or less, grade shoulder at 4% down.  
 If e is greater than 4% and less than or equal to 6%, grade shoulder at 4% down.  
 If e greater than 6%, grade shoulder at 1% up.

\*\* Low Side Shoulder - If e is 4% or less, grade shoulder at 4% down.  
 If e is greater than 4%, grade shoulder in plane with the existing pavement.



**TYPICAL ROCK CUT DITCH**

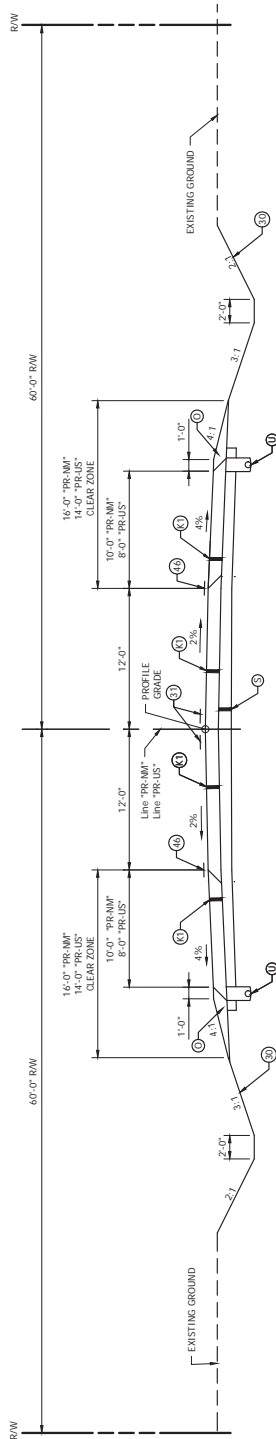
NOTE TO REVIEWER: REVISIONS SHOULD BE MADE AFTER WE RECEIVE THE GEOTECHNICAL REPORT

**LEGEND**

- (K) Full Depth Pavement
- (L) 275#/syd CCQA-HMA, 4, 7% Surface, 9.5mm
- (M) 440#/syd CCQA-HMA, 4, 7% Intermediate, 19.0mm
- (N) 250#/syd CCQA-HMA, 4, 6.4 Base, 25.0mm
- (O) 440#/syd CCQA-HMA, 4, 6.4 Base, 25.0mm
- (P) Subgrade Treatment, Type IB (Line)
- (Q) Underdrains
- (R) Seeding, U
- (S) Line, Thermoplastic, Solid, Yellow, 4"
- (T) Line, Thermoplastic, Solid, White, 4"
- (U) Compacted Aggregate, No. 53

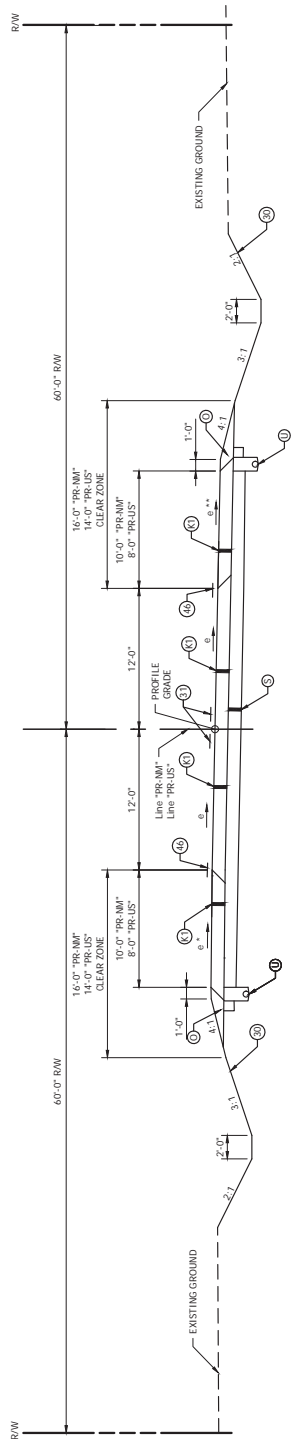
		1625 N. Post Road Indianapolis, IN 46219 Phone: 317-595-2585 Fax: 317-595-2596 www.uciindy.com	
RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	DATE	INDIANA DEPARTMENT OF TRANSPORTATION
DESIGNED: JBA	DRAWN: EAM	CHECKER: JMT	TYPICAL CROSS SECTIONS
CHECKED: JMT	CHECKER: JMT		TRANSPORTATION CORRIDOR
BRIDGE FILE 1" = 5' DESIGNATION 138262		SHEETS 3 CONTRACT R38260 138262	





**TYPICAL SECTION**

Sta. 400+00.00 to Sta. 400+60.00 "PR-MM"  
 Sta. 405+35.00 to Sta. 400+80.43 "PR-MM"  
 Sta. 500+00.00 to Sta. 501+00.00 "PR-US"



**SUPERELEVATION SECTION**

LINE "PR-MM", "PR-US"  
 Sta. 400+60.00 to Sta. 405+35.00 "PR-MM"  
 Sta. 405+35.00 to Sta. 400+80.43 "PR-MM"  
 Sta. 501+00.00 to Sta. 505+43.81 "PR-US"

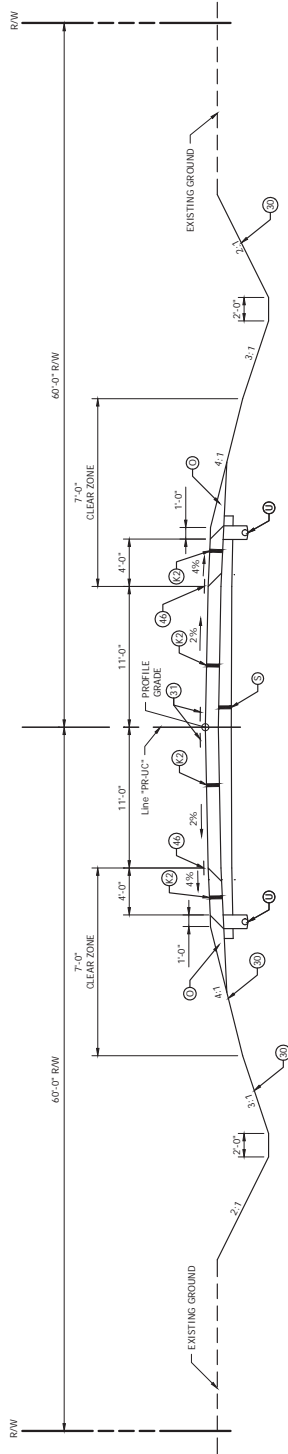
\* High Side Shoulder - If  $\epsilon$  is 4% or less, grade shoulder at 4% down.  
 If  $\epsilon$  is greater than 4% and less than or equal to 6%, grade shoulder at 2% down.  
 If  $\epsilon$  is greater than 6%, grade shoulder at 1% up.  
 \*\* Low Side Shoulder - If  $\epsilon$  is 4% or less, grade shoulder at 4% down.  
 If  $\epsilon$  is greater than 4%, grade shoulder in plane with the mainline pavement.

Curve to the right shown, curves to the left reversed.

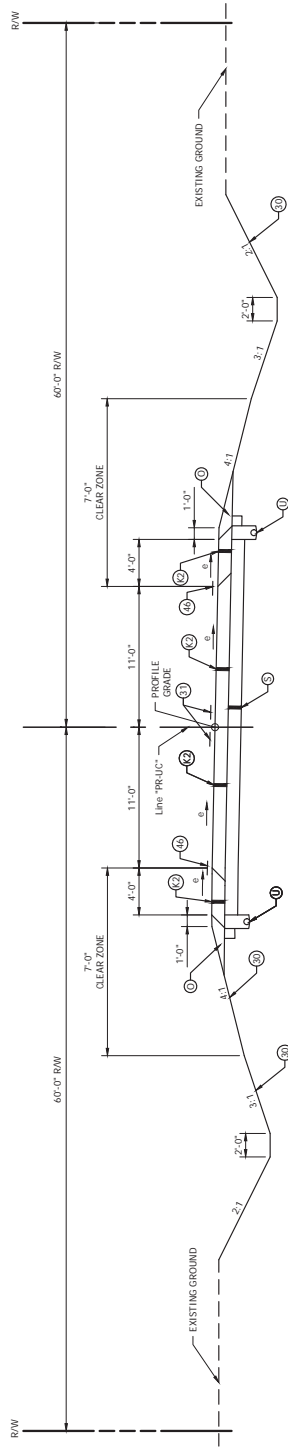
**LEGEND**

- (1) Full Depth Treatment
- (2) 16#/yd CO/CA-HMA, 4, 7A, Surface, 9.5mm
- (3) 27.5#/yd CO/CA-HMA, 4, 7A, Intermediate, 19.0mm
- (4) 48#/yd CO/CA-HMA, 4, 6.4, Base, 25.0mm
- (5) 48#/yd CO/CA-HMA, 5, 7A, Intermediate, 19.0mm
- (6) 48#/yd CO/CA-HMA, 4, 6.4, Base, 25.0mm
- (7) Subgrade Treatment, Type BB (Line)
- (8) Underslabs
- (9) Seeding, U
- (10) Line, Thermoplastic, Solid, Yellow, 4"
- (11) Line, Thermoplastic, Solid, White, 4"
- (12) Compacted Aggregate, No. 53

		1625 N. Post Road Indianapolis, IN 46219 Phone: 317-595-2585 Fax: 317-595-2596 www.uctindy.com		RECOMMENDED FOR APPROVAL _____ DATE _____ DESIGNER: JBA DRAWN: EAM CHECKED: MAT CHECKED: MAT	INDIANA DEPARTMENT OF TRANSPORTATION TYPICAL CROSS SECTIONS TRANSPORTATION CORRIDOR	HORIZONTAL SCALE 1" = 5' VERTICAL SCALE 1" = 5' DESIGNATION 13861Z SHEETS OF 1 4 CONTRACT R3-3660 13861Z
--	--	------------------------------------------------------------------------------------------------------------	--	----------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------



TYPICAL SECTION  
LINE "PR-UC"  
Sta. 902+65.00 to Sta. 903+76.81 "PR-UC"




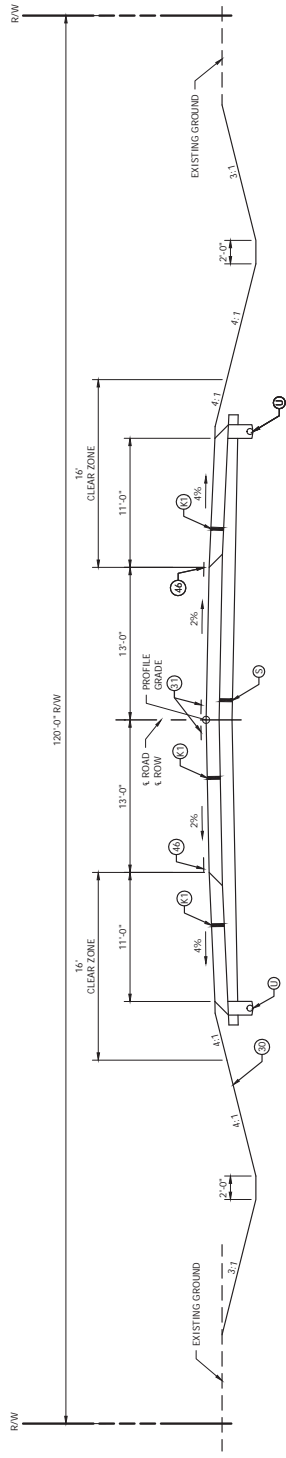
SUPERELEVATION SECTION  
LINE "PR-UC"  
Sta. 900+12.05 to Sta. 902+65.00 "PR-UC"

Curve to the right shown, curves to the left reversed.

**LEGEND**

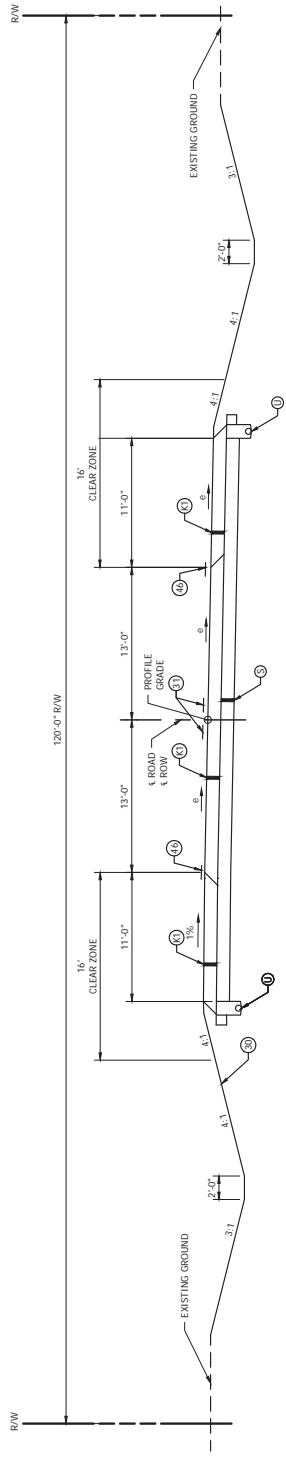
- (2) Full Depth Pavement
- (3) 4" Surface, 8.5mm
- (4) 4" Intermediate, 19.0mm
- (5) 6" Compacted Aggregate, Base, No. 53
- (6) Subgrade Treatment, Type B (Lime)
- (1) Undrains
- (U) Seeding, U
- (7) Lime, Thermoplastic, Solid, Yellow, 4"
- (8) Lime, Thermoplastic, Solid, White, 4"
- (9) Compacted Aggregate, No. 53

 1625 N. Post Road Indianapolis, IN 46219 Phone: 317-595-2585 Fax: 317-595-2596 www.uciindy.com	RECOMMENDED FOR APPROVAL _____ DESIGNER _____ DATE _____ DESIGNED: JBA DRAWN: EAM CHECKED: MAT	HORIZONTAL SCALE 1" = 5' VERTICAL SCALE 1" = 5' SURVEY BOOK CONTRACT R33660	BRIDGE FILE DESIGNATION 138617 SHEETS OF 11 NO. 5 138617 138662
	INDIANA DEPARTMENT OF TRANSPORTATION TYPICAL CROSS SECTIONS TRANSPORTATION CORRIDOR		



**TYPICAL SECTION**

Sta. 70+00.00 to Sta. 74+85.00 "PR-DE"  
 Sta. 44+60.00 to Sta. 48+25.00 "PR-DE"  
 Sta. 58+75.00 to Sta. 73+75.00 "PR-DE"




**SUPERELEVATION SECTION**

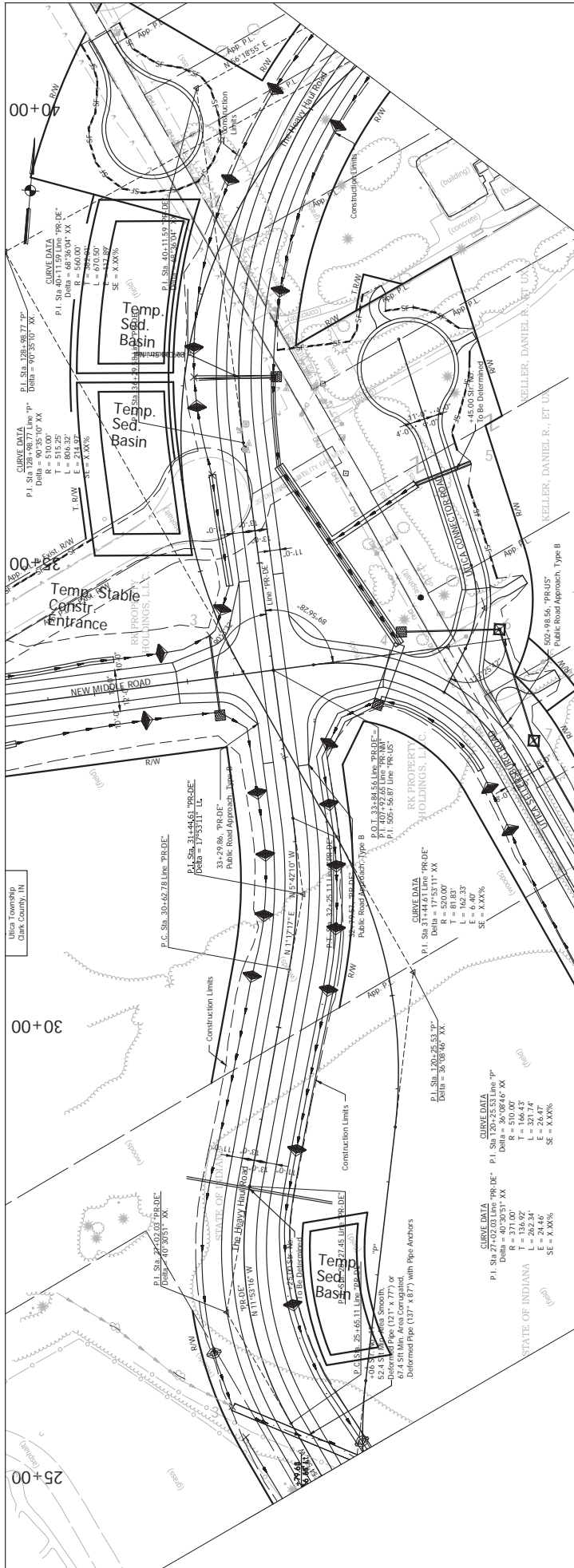
Sta. 23+85.00 to Sta. 33+90.00 "PR-DE"  
 Sta. 34+70.00 to Sta. 44+60.00 "PR-DE"  
 Sta. 66+00.00 to Sta. 73+75.00 "PR-DE"  
 Sta. 73+75.00 to Sta. 88+82.62 "PR-DE"

**LEGEND**

- (K) Full Depth Pavement, 4.76 Surface, 9.5mm Binder, 19.0mm Base, 25.0mm Subgrade Treatment, Type 11
- (L) Full Depth Pavement, 4.76 Surface, 9.5mm Binder, 19.0mm Base, 25.0mm Subgrade Treatment, Type 11
- (M) Full Depth Pavement, 4.76 Surface, 9.5mm Binder, 19.0mm Base, 25.0mm Subgrade Treatment, Type 11
- (N) Full Depth Pavement, 4.76 Surface, 9.5mm Binder, 19.0mm Base, 25.0mm Subgrade Treatment, Type 11
- (O) Full Depth Pavement, 4.76 Surface, 9.5mm Binder, 19.0mm Base, 25.0mm Subgrade Treatment, Type 11
- (P) Full Depth Pavement, 4.76 Surface, 9.5mm Binder, 19.0mm Base, 25.0mm Subgrade Treatment, Type 11
- (S) Subgrade Treatment, Type 1B (Lane)
- (U) Underdrains
- (R) Seeding, R
- (Y) Line, Thermoplastic, Solid, Yellow, 4"
- (W) Line, Thermoplastic, Solid, White, 4"

 1625 N. Post Road Indianapolis, IN 46219 Phone: 317-895-2585 Fax: 317-895-2596 www.uctindy.com	RECOMMENDED FOR APPROVAL _____ DISTRICT ENGINEER _____ DATE _____ DESIGNED: JRA DRAWN: EAM CHECKED: JMT CHECKED: JMT	INDIANA DEPARTMENT OF TRANSPORTATION TYPICAL CROSS SECTIONS TRANSPORTATION CORRIDOR	BRIDGE FILE _____ DESIGNATION XX DS8812 SURVEY BOOK _____ SHEETS 3 CONTRACT _____ PROJECT R-32660
	HORIZONTAL SCALE 1" = 5' VERTICAL SCALE DS8812		





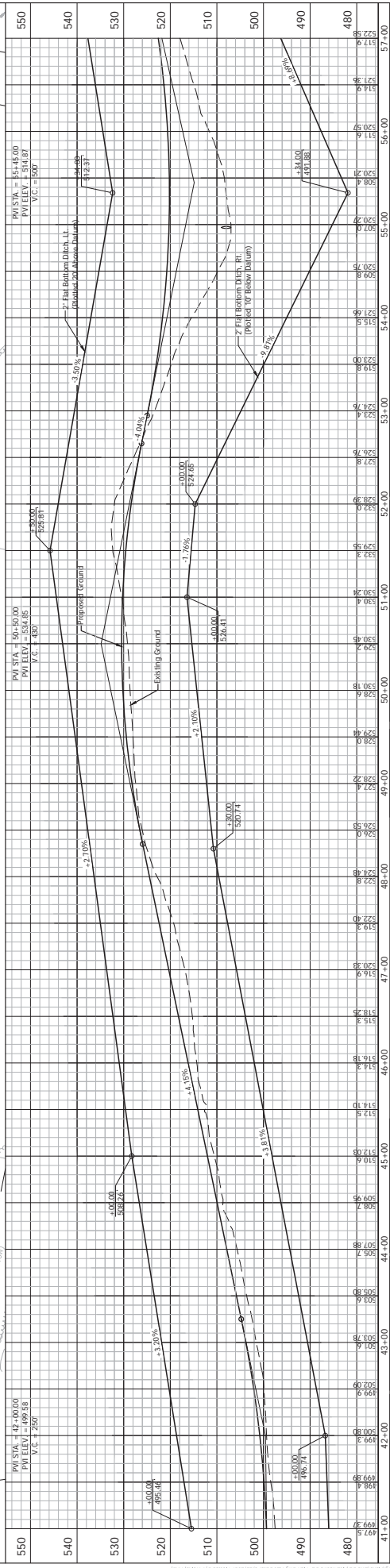
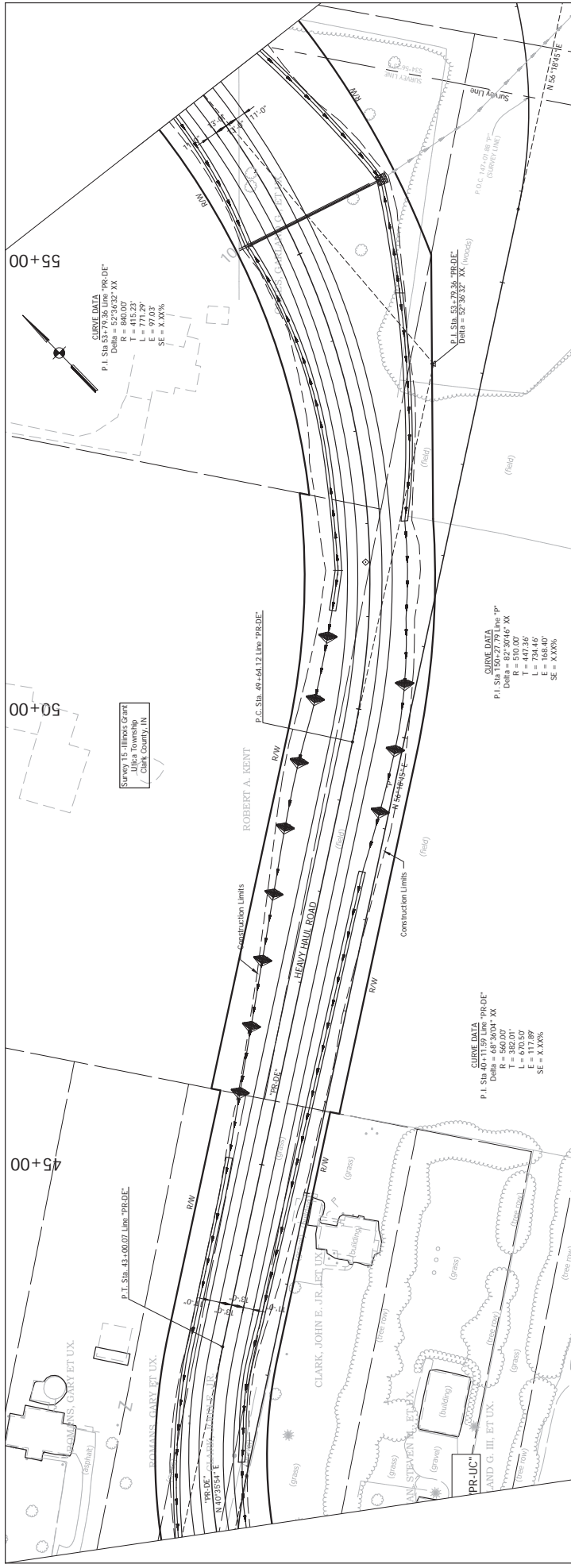
RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	DATE
DESIGNED: JRA	BROWN, EAM	
CHECKED: MAT	CHECKED: JRA	

INDIANA	HORIZONTAL SCALE	1" = 50'
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	1" = 10'
PLAN & PROFILES	SURVEY BOOK	1382612
LINE 'PRR-DE'	CONTRACT	R-36260
	PROJECT	XX
	DESIGNATION	1382612



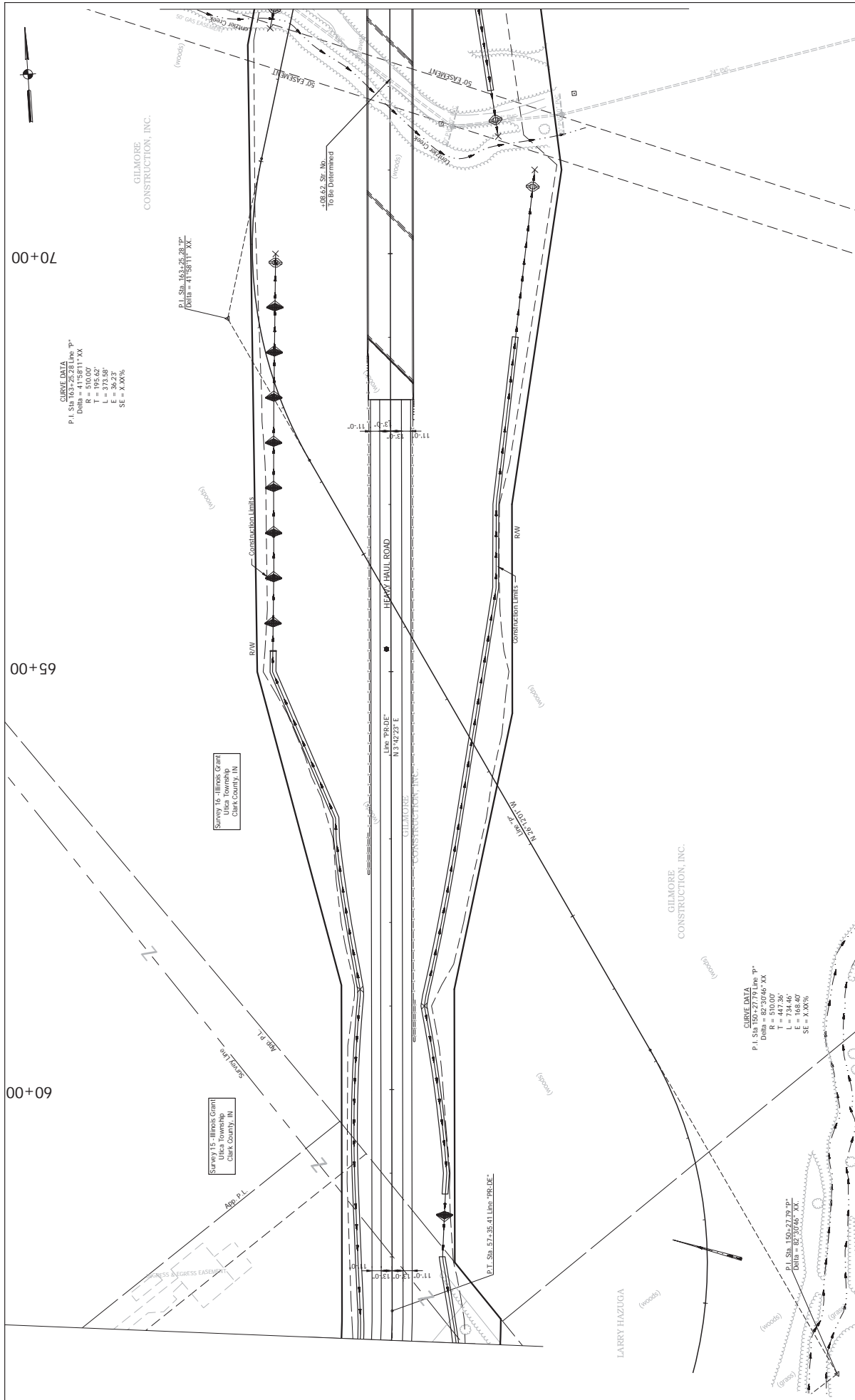
1625 N. Post Road  
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INDIANA		BROWN, EAM			
DEPARTMENT OF TRANSPORTATION		CHECKED: JRA			
PLAN & PROFILES		PROJECT		XX	
LINE 'PR-DE'		CONTRACT		R-36260	
		SHEETS		1382612	
		DESIGNATION		1382612	
		VERTICAL SCALE		1" = 10'	
		HORIZONTAL SCALE		1" = 50'	
		BRIDGE FILE		56-00	
		STATION		57+00	

1625 N. Post Road  
 Indianapolis, IN 46219  
 Phone 317-852-2955  
 Fax 317-852-2996  
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CURVE DATA  
 P.I. Sta. 163+25.311 P.C. Sta. 163+25.311  
 Delta = 41°58'11" XX  
 R = 510.00'  
 L = 375.58'  
 E = 36.23'  
 SE = X.XX%

P.I. Sta. 163+25.311  
 Delta = 41°58'11" XX

08.62 Str. No.  
 To Be Determined

Survey 15 - Illinois Grant  
 Ulica Township  
 Clark County, IN

Survey 15 - Illinois Grant  
 Ulica Township  
 Clark County, IN

CURVE DATA  
 P.I. Sta. 150+27.791 P.C. Sta. 150+27.791  
 Delta = 82°30'46" XX  
 R = 510.00'  
 L = 734.46'  
 E = 168.40'  
 SE = X.XX%

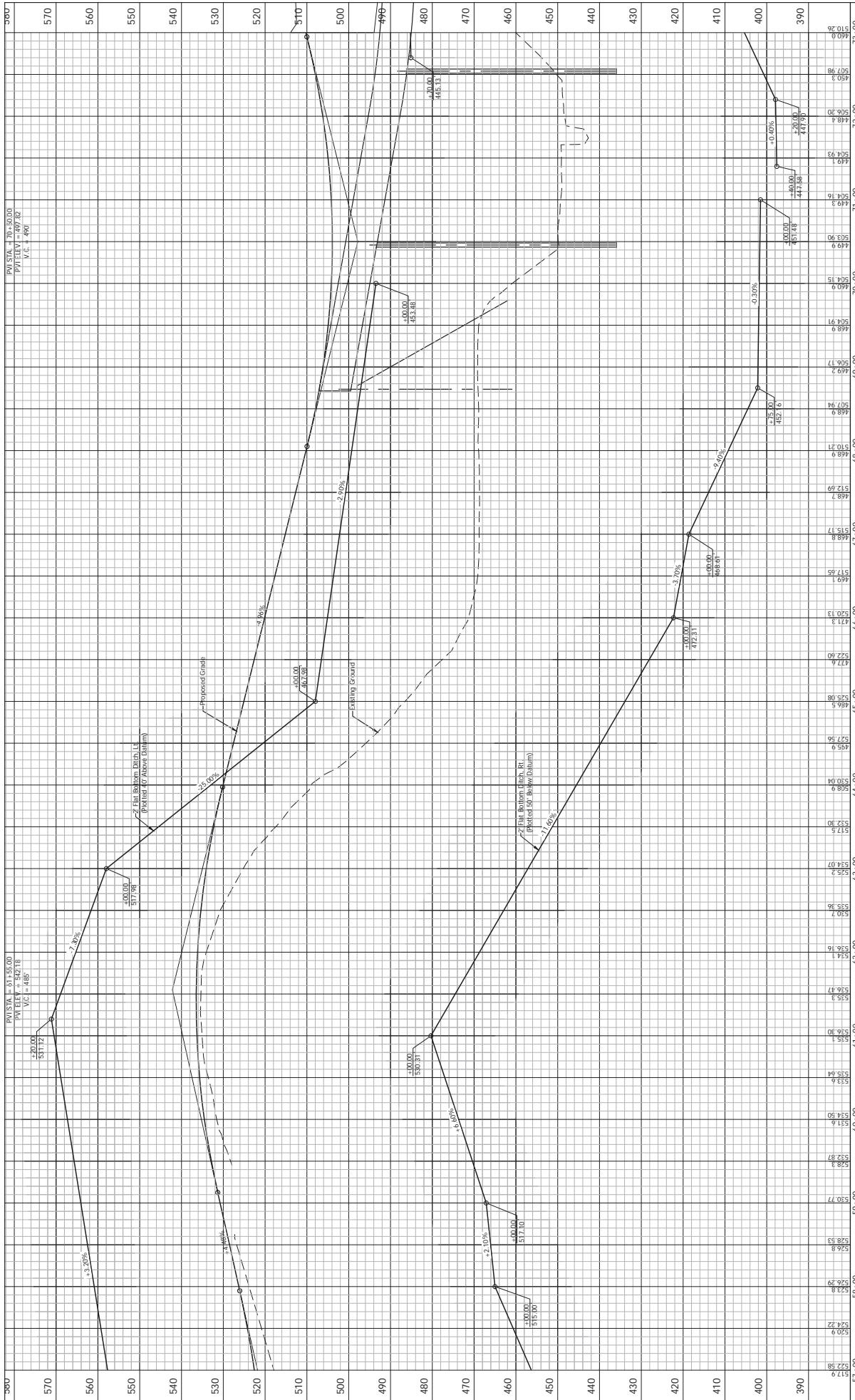
P.I. Sta. 150+27.791  
 Delta = 82°30'46" XX

RECOMMENDED FOR APPROVAL		DESIGN ENGINEER	DATE
DESIGNED: JRA		BROWN, EAM	
CHECKED: JRA		CHECKED: JRA	
INDIANA DEPARTMENT OF TRANSPORTATION		Plan and Profile	
BRIDGE FILE		LINE 'ppr-de'	
HORIZONTAL SCALE	1" = 50'	DESIGNATION	1382612
VERTICAL SCALE	1" = 10'	SURVEY BOOK	
		SHEETS	XX
		CONTRACT	R-36260
		PROJECT	1382612

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PVI STA. = 70+60.00 PVI ELEV. = 497.82 LVC. = 469		PVI STA. = 51+55.00 PVI ELEV. = 527.18 LVC. = 469	
HORIZONTAL SCALE 1" = 50'		VERTICAL SCALE 1" = 10'	
DESIGNATION 136262		SURVEY BOOK ---	
SHEETS XX		CONTRACT R-36260	
PROJECT 136262		136262	

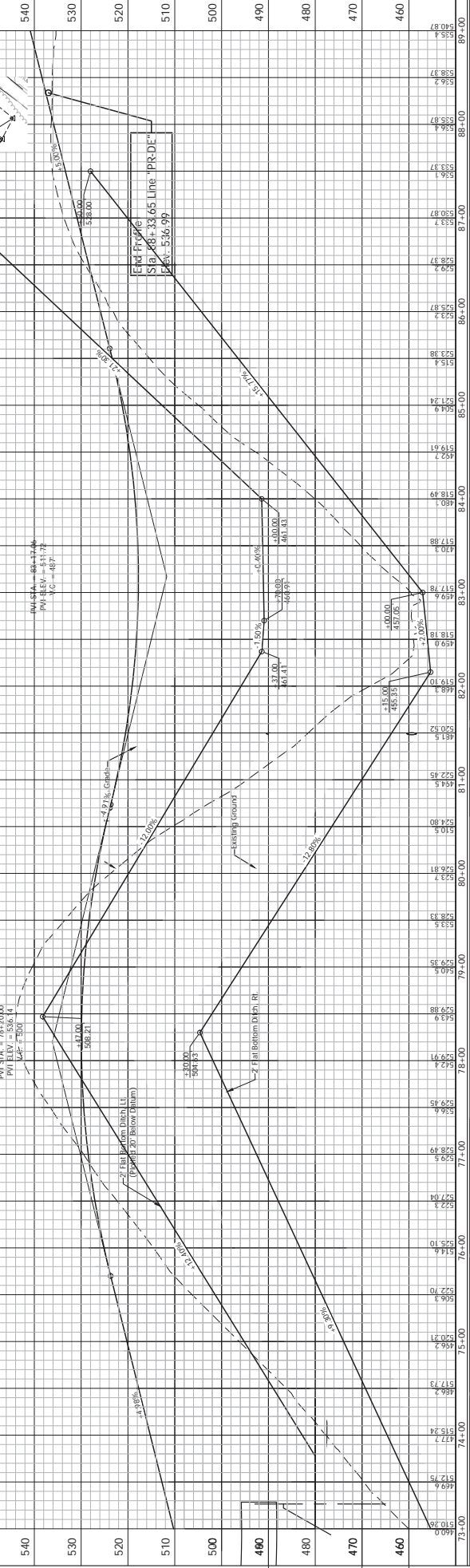
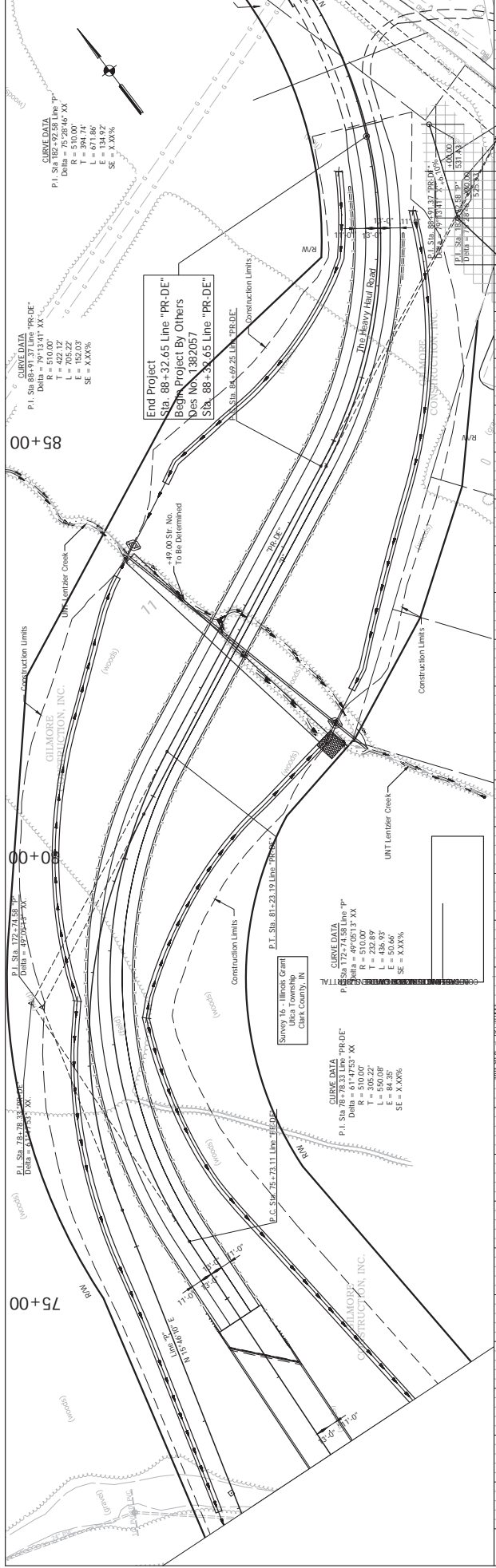
INDIANA  
 DEPARTMENT OF TRANSPORTATION  
 Plan and Profile  
 LINE 'ppr-de'

DESIGNED: JRA	CHECKED: JRA
DESIGNED: JRA	CHECKED: JRA
DESIGNED: JRA	CHECKED: JRA

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BRIDGE FILE	88-00	89+00
HORIZONTAL SCALE	1" = 50'	
VERTICAL SCALE	1" = 10'	
DESIGNATION	1382057	
SURETY BOOK	---	
SHEETS	XX	
PROJECT	---	
CONTRACT	R-26250	
PROJECT	1382057	

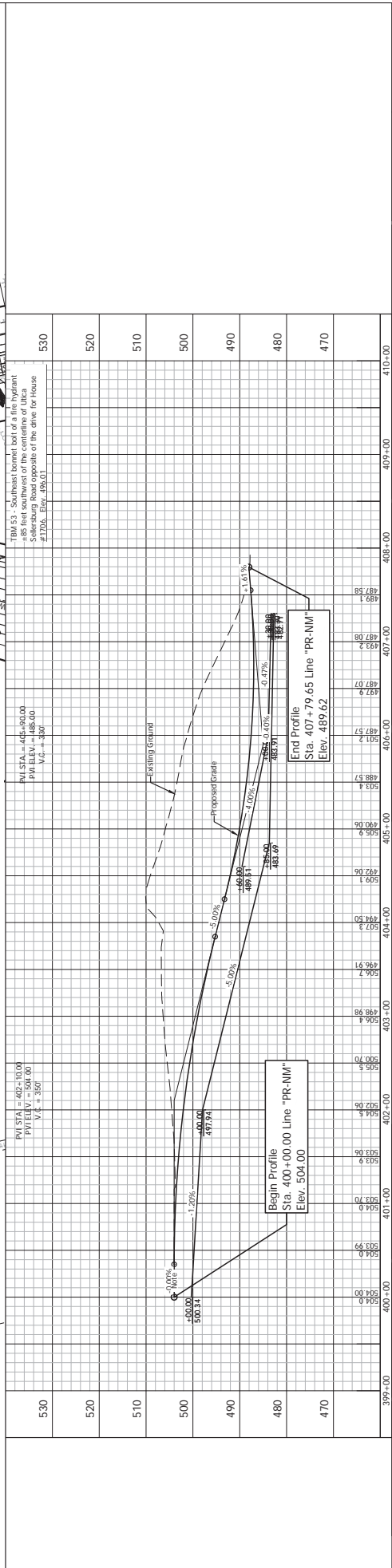
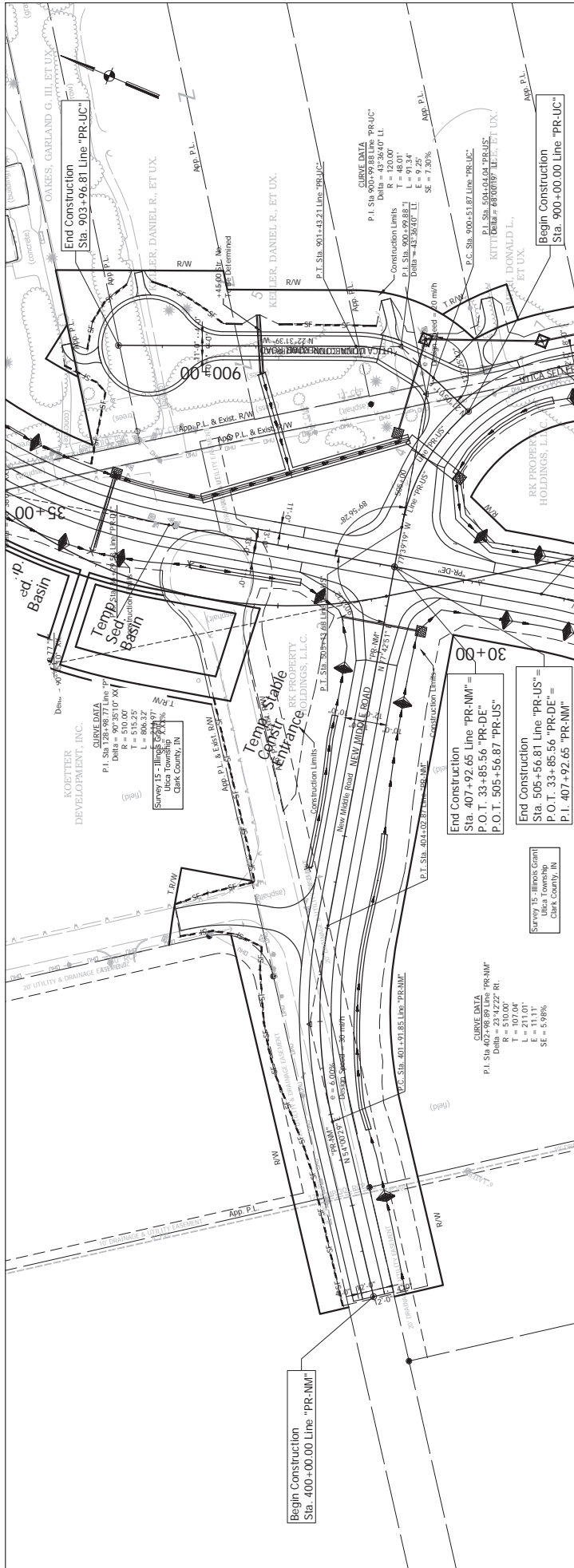
RECOMMENDED FOR APPROVAL	DESIGNED	CHECKED
DATE	DATE	DATE
DESIGNED: JBA	DRAWN: JBA	CHECKED: JBA
CHECKED: MAT		

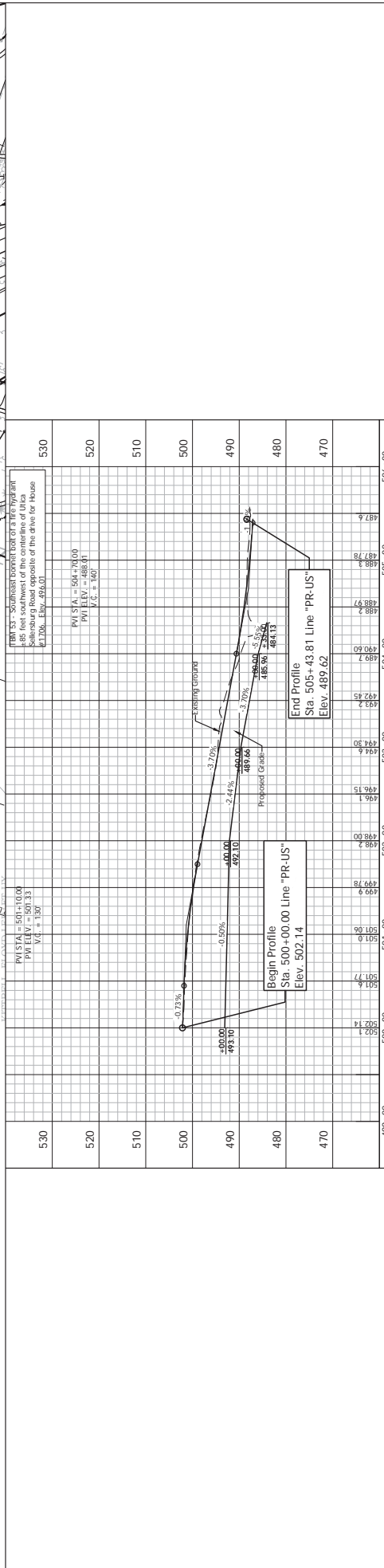
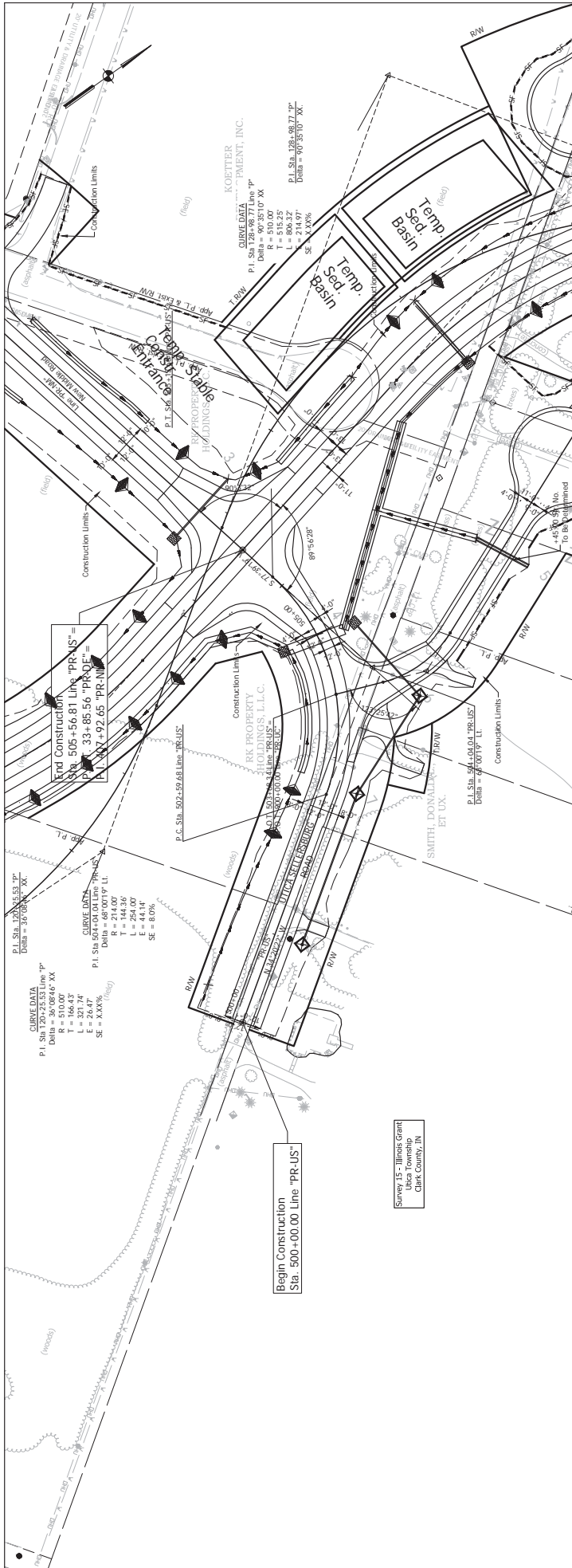
INDIANA
DEPARTMENT OF TRANSPORTATION
Plan and Profile
LINE "PR-DE"

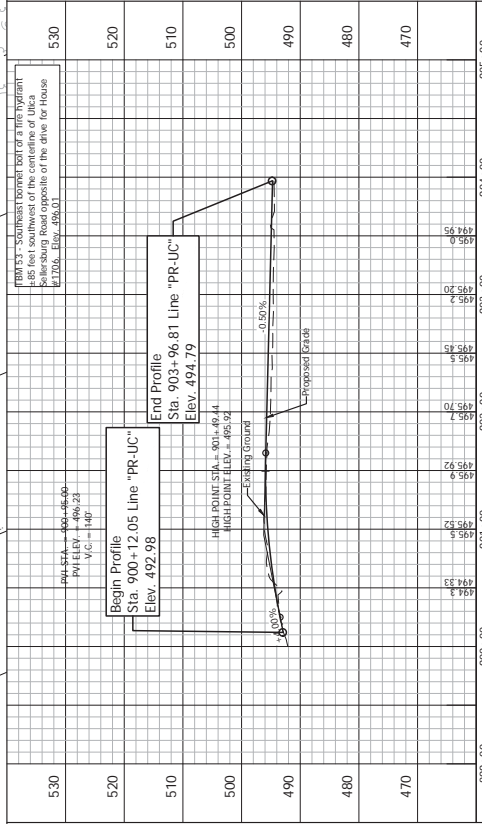
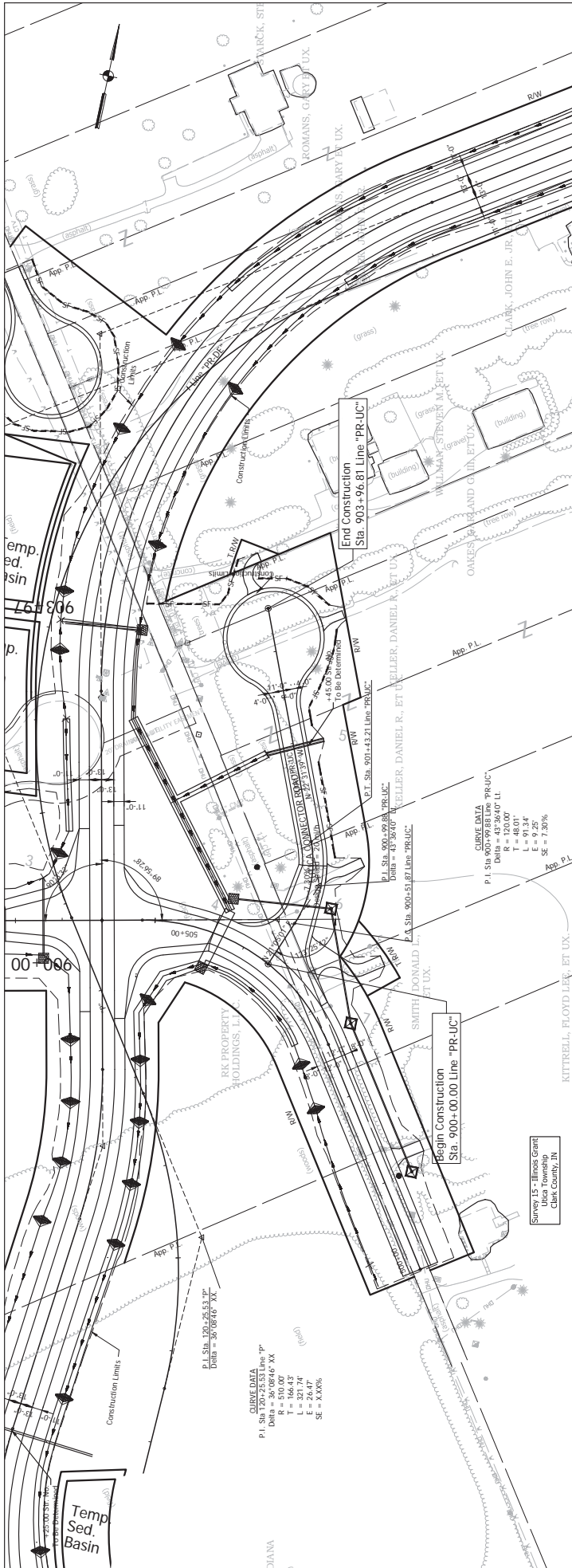
1625 N. West Road Indianapolis, IN 46219 Phone: 317-805-2585 Fax: 317-805-2596 www.unity.com
<b>UNITED</b> Consulting



HORIZONTAL SCALE 1" = 50'		VERTICAL SCALE 1" = 10'		BRIDGE FILE DESIGNATION 136212	
RECOMMENDED FOR APPROVAL DESIGN ENGINEER DATE		DRAWN: EAM CHECKED: JRA		DEPARTMENT OF TRANSPORTATION SUPER ELEVATIONS Line "PR-DE"	
1625 N. Post Road Indianapolis, IN 46219 Phone: 317-552-2855 Fax: 317-552-2696 www.unted.com				CONTRACT R-36260	
SURVEY 15 - Illinois Grant Ulica Township Clark County, IN		SURVEY BOOK XX		SHEETS 136212	



530	520	510	500	490	480	470	499+00	500+00	501+00	502+00	503+00	504+00	505+00	506+00
<p>RECOMMENDED FOR APPROVAL</p> <p>DESIGN ENGINEER: _____ DATE: _____</p> <p>DESIGNED: JRA BRAWN, EAM CHECKED: JRA _____</p>														
<p>INDIANA DEPARTMENT OF TRANSPORTATION SUPER ELEVATIONS Line "PR-DE"</p>														
<p>1625 N. Post Road Indianapolis, IN 46219 Phone: 317-852-2955 Fax: 317-852-2956 www.in.gov</p>														
<p>HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1" = 10' SURVEY BOOK: _____ CONTRACT: R-3650 SHEETS: 136812 PROJECT: 136812</p>														



INDIANA DEPARTMENT OF TRANSPORTATION SUPER ELEVATIONS Line "PR-DE"		RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	DATE
BRIDGE FILE		DESIGNATION	1382612	
HORIZONTAL SCALE 1" = 50'		VERTICAL SCALE 1" = 10'	SURVEY BOOK	
			SHEETS	
			CONTRACT	
			PROJECT	
			R-36260	
			1382612	

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