



Wolverine Pipe Line Company

Conservation Plan and Incidental Take Permit Application Amendment

Wolverine CU-LK Pipeline Repairs Project

November 22, 2023

Project No.: 0693543

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Acronyms and Abbreviations

Acronym	Description
AMSL	Above mean sea level
BMPs	Best management practices
CFR	Code of Federal Regulations
CNRR	Canadian National Railroad
Com Ed	Commonwealth Edison
CU-LK	Lemont to Lockport pipeline segment
dBA	A-weighted decibels
DBH	Diameter at breast height
gpm	Gallons per minute
HCP	Habitat Conservation Plan
HDD	Horizontal directional drill
HED	Hine's Emerald Dragonfly
HMS	Hanson Material Service
I&M Canal	Illinois and Michigan Canal
IDNR	Illinois Department of Natural Resources
ITA	Incidental take authorization
LPC	Leafy prairie clover
mph	Miles per hour
PHMSA	Pipeline and Hazardous Materials Safety Administration
Project	Wolverine CU-LK Pipeline Repairs Project
RIV2	Rivulet 2
RIV4	Rivulet 4
RIV5	Rivulet 5
RIV9	Rivulet 9
ROI	Radius of influence
SDS	Safety Data Sheet
SHE	Wolverine Safety, Health, and Environment Department
U.S.	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WPL or Wolverine	Wolverine Pipe Line Company

1. INTRODUCTION AND DESCRIPTION OF IMPACTS LIKELY TO RESULT

- Project Applicant: Wolverine Pipe Line Company
- Project Name: Wolverine CU-LK Pipeline Repairs Project
- County: Will
- Area of Impact: Up to 1.24 acres (temporary ground disturbance)

Wolverine Pipe Line Company (Wolverine or WPL) proposes to excavate, expose, inspect, and repair up to 162 feet of an existing 18-inch diameter Lemont to Lockport (CU-LK) pipeline segment located in Lockport (Will County), Illinois, as part of its ongoing integrity and maintenance program. The updated length includes an additional 50 feet at a new anomaly location (GW 1920) identified in August 2023.

Since the original Conservation Plan, the area of excavation effects has increased by 0.02 acre (to 0.05 acre), and the area of workspace effects has increased by 0.11 acre (to 0.36 acre). Both of these changes are a result of the addition of the new GW 1920 location. Staging and access effects have been reduced by obtaining north access for the two northern anomalies, eliminating the need for the middle portion of the access path and eliminating the RIV2 crossing. Considering those changes and adding the GW 1920 location and a short section of access path decreases the total Project ground disturbance effects (as compared to the executed Incidental Take Authorization) by 0.16 acre, to 1.24 acres total (Table 1). The groundwater radius of influence (ROI) increases to 7.71 acres.

Table 1. Quantified Potential Effects (updated August 2023)

	Habitat Effects (acres)	Dimensions (feet)
PR-01		
Excavation	0.01	10x35
Workspace	0.11	50x100
Dewatering Pads	0.01	15x30
Total Ground Disturbance	0.13	
ROI	1.55	
FR-04		
Excavation	0.01	10x35
Workspace	0.11	50x100
Dewatering Pads	0.01	15x15
Total Ground Disturbance	0.13	
ROI	1.50	
GW 1920		
Excavation	0.02	15x50
Workspace	0.11	50x100
Dewatering Pads	0.01	15x15

Total Ground Disturbance	0.14	
ROI	3.79	
FR-02		
Excavation	0.01	12x20
Workspace	0.03	30x50
Dewatering Pads	0.01	15x15
Total Ground Disturbance	0.05	
ROI	2.37	
Access North	0.10	
Access and Staging South	0.69	
Total Ground Disturbance	1.24	
Total ROI *	7.71	

* Total ROI is less than the sum because of overlaps at the northern and southern pairs of locations.

The Wolverine CU-LK Pipeline Repairs Project (Project) is required to maintain pipeline integrity and safety, in accordance with Pipeline and Hazardous Materials Safety Administration (PHMSA) enforced regulations, Title 49 CFR Parts 190-199. The Project site includes known presence of the federal and state endangered Hine’s Emerald Dragonfly (*Somatochlora hineana*, HED) as well as the state endangered Blanding’s Turtle (*Emydoidea blandingii*), American Bittern (*Botaurus lentiginosus*), and federal and state endangered Leafy Prairie Clover (*Dalea foliosa*).

1.1 Purpose of Document

The purpose of this Conservation Plan Addendum is to apply for an amendment to an incidental take authorization (ITA) for the Wolverine CU-LK Pipeline Repairs Project per 520 Illinois Compiled Statutes 10/5.5 and 17 Ill. Adm. Code 1080, which was issued on July 18, 2023.

This Conservation Plan was developed to meet ITA permit application requirements, per the Illinois Department of Natural Resources (IDNR) September 2021 guidance (IDNR 2021a).

Federal Endangered Species Act authorization is being addressed through a re-initiation of Section 7 formal consultation with the United States (U.S.) Fish and Wildlife Service (USFWS) through the U.S. Army Corps of Engineers (USACE); a biological assessment (BA) was prepared and provided to the federal agencies (ERM 2022a) and a BA addendum provided concurrent with this Conservation Plan Addendum.

1.2 Area to Be Affected by the Proposed Project

1.2.1 Description of the Area to be Affected

The area to be affected, or for purposes of this document the “Permit Area” includes the entire area known as the Commonwealth Edison (Com Ed) Parcel, located south of 135th Street and immediately west of New Avenue near Lockport, Illinois at approximately 41.636114/-88.049520 (Appendix A, Figure 1), in addition to a buffer of 150 feet around the Wolverine Pipe Line located along the eastern portion of the Permit Area. The

Permit Area also includes a 150-foot buffer around the proposed access route (Appendix A, Figure 2). The newly identified anomaly is entirely within this previously identified Permit Area, which is unchanged.

1.2.2 Permit Area Existing Conditions

The new GW 1920 location is characterized by dense shrub cover along the pipeline alignment, and low herbaceous vegetation dominated by reed canary grass in the rest of the workspace. There are no rivulets or other open water features, and no crayfish burrows were noted in past surveys.

Habitat conditions within the larger Permit Area have changed slightly from those described in the original conservation plan. Invasive plants have continued to encroach into new areas, and common reed in particular is more widespread than in 2022. An exception is purple loosestrife, which has died back within the Permit Area in summer 2023 leaving dried stalks. The Permit Area was subjected to dry conditions in the summer of 2022, with wetlands and rivulets largely drying by early July 2022. In spring and early summer 2023, the region was subject to a “flash drought.” As a result, all rivulets except for RIV2 were dry by sometime in May (observed already completely dry on June 1) and remained dry until heavy rains in early July. Most rivulets had once again dried or partially dried by late July, then were inundated again by storms in August.

Other baseline conditions remain as reported in the original Conservation Plan.

1.3 Biological Data on the Affected Species

The Illinois Ecological Compliance Assessment Tool was reviewed on August 11, 2023, to ensure that no new State protected resources were known in the Project vicinity. The updated EcoCAT report (Appendix B) did not identify any resources which have not previously been evaluated.

The following sections report only updated information on species known or reasonably expected to occur within the Permit Area. Full accounts for each species were included in the original Conservation Plan.

1.3.1 Hine’s Emerald Dragonfly

ERM conducted HED adult transect monitoring in July 2022 within the Permit Area, and did not observe any HED on transects. A few incidental (off transect) observations were made, including a few close to the pipeline alignment just southwest of FR-04. All were of foraging individuals within low native herbaceous openings. Results were reported in ERM (2022b).

Field work for WPL in the Permit Area in 2023 was limited to baseline vegetation and water quality monitoring and cage growth rate studies of captive-reared HED larvae in RIV2 (Soluk and Soluk 2023). Larval monitoring for the Heidelberg HCP also occurred in July, although only RIV2 and the upper part of RIV4 were able to be sampled because of dry conditions. No HED larvae were captured. There were two incidental observations of HED adults, one southwest of FR-04 and one a considerable distance west of the pipeline in sedge meadow north of RIV5.

RIV5, where HED larvae were found in 2021, was dry for much of the late spring and summer, and the rivulet was overgrown and difficult to follow. Crayfish burrows appeared to be inactive or abandoned and none had fresh chimneys. RIV9, the other 2021 larval location, was so overgrown with common reed and hawthorne in 2023 that we were unable to locate the rivulet and the canopy was so dense that adult dragonfly access would have been difficult or impossible. Crayfish burrows were present in 2023 but appeared to be inactive and none had fresh chimneys. The area alternated between very dry from May through early July, then wet, then dry, then wet again in August.

1.3.2 Blanding’s Turtle

There were no new observations of this species in proximity to the pipeline alignment in 2022 or 2023.

1.3.3 American Bittern

There were no new observations of this species in proximity to the pipeline alignment in 2022 or 2023.

1.3.4 Leafy Prairie Clover

ERM observed leafy prairie clover a considerable distance west of the pipeline alignment in July 2023, in areas where it has long been known to occur.

1.4 Description of the Project Activities

1.4.1 Project Elements

1.4.1.1 Introduction and Description of Work

As part of its ongoing integrity and maintenance program, WPL proposes to excavate, expose, inspect, and repair an additional distinct location along their CU-LK pipeline segment located in Lockport (Will County), Illinois. The anomaly, identified as GW 1920, was recently identified during pipeline integrity testing. The repair would require excavation of up to 50 feet of pipeline, all of which is within HED critical habitat. (Appendix A – Figure 2). The CU-LK pipeline segment is currently in operation and is used to transport a variety of refined petroleum products, including gasoline, diesel, and jet fuel. The Project is required to maintain pipeline integrity and safety, in accordance with PHMSA enforced regulations, which require pipeline operators to take prompt action to address all anomalous pipeline conditions that are discovered through integrity assessment or information analysis (Amdt. 195-22, 46 FR 38360). The repair work planned by Wolverine would minimize the likelihood of more extensive and impactful work in this area in the future. Specifically, the additional GW 1920 anomaly would be classified as a 60-day dig priority, per 49 CFR 195.452(h)(4)(ii)(B), as the anomaly is a dent on the bottom of the pipeline with some corrosion (i.e., metal loss).

The Project involves the temporary excavation, inspection, and repair of one newly identified anomaly or pipeline integrity issue, herein referred to as anomalies. WPL assigns unique identifiers to each anomaly. From north to south the anomalies included in this Project are PR-01, FR-04, GW 1920, and FR-02 (Appendix A – Figure 2). Repairs may require excavation of up to 162 feet of pipeline (35 feet for PR-01, 35 feet for FR-04, 50 feet for GW 1920, and 42 feet for FR-02), 152 feet of which would be within HED critical habitat. New excavations for pipeline repairs would impact approximately 0.02 acre, bringing the total excavation to 0.05 acre in total within critical habitat. In addition to excavation, temporary impacts for access routes to the new location establishing temporary workspace from which equipment would be positioned to excavate these locations, and dewatering discharge areas would involve temporary disturbance of additional land. This brings total temporary impacts to 1.24 acres, of which 0.61 acre are within wetland (Appendix A – Figure 2).

No rivulets are present within the new excavation or workspace areas, which are located south of RIV2. WPL would access the new location from the south and thereby avoid crossing RIV2. No soil disturbance is anticipated within or around RIV2. Other small streams, or rivulets would not be disturbed during Project activities. All planned impacts to wetlands and waterbodies would be permitted according to Section 404 of the Clean Water Act, in coordination with the USACE, and impacts would be considered temporary. There would be no permanent loss of wetlands or waterbodies to complete the pipeline repairs.

After initial excavation of the pipeline and preparation of the pipeline at the anomaly location (i.e., coating removal, sandblasting, etc.), inspection and repairs to the pipeline would occur. Specific pipeline repair activities that may be performed as part of the Project include:

- pipeline coating repair/replacement,
- removal of metal in close proximity to the pipe,

- welding of a protective sleeve,
- testing/replacement of casing end seals,
- repairing/replacing casing vents,
- casing wax-fill, and
- possible cut-out and replacement of pipeline segments, if identified.

In addition, depending on the conditions of soils during backfill (e.g., abundance of rocks present within the native soil, size of rocks present, etc.) and the proximity of the pipe to bedrock, Tuff-Nuff® Pipeline Rock Shield or similar pipeline padding material may be installed around the pipeline to provide additional abrasion protection and prevent pipeline damage. Additional details regarding work activities anticipated at each of the anomaly locations are provided in the sections below.

Equipment and machinery planned for use during the Project would likely include the following:

- Excavator with attachment
- Wheel loader
- Jackhammers
- Skid-steer
- Welding truck (i.e., grinder, welding machine, etc.)
- Dewatering pumps
- Pickup trucks
- Steel trench boxes
- Job trailers (i.e., t-post driver, hand tools, etc.)
- Light plants and generators
- Air compressor

1.4.1.2 Access and Staging

Access to the west side of the CNRR and New Avenue for the new location would occur from the south via an existing gravel road that intersects New Avenue, using the same staging area and access path as for previously described FR-02, but extending it further north to the new GW 1920 location. North access directly from the Metra Station would continue to be utilized for the PR-01 and FR-04 excavations and would not overlap with the new location (Appendix A – Figure 2).

The access road from the south would primarily follow paths previously cleared of large woody vegetation, but some clearing of woody vegetation greater than 3-inches diameter at breast height (DBH) may be required for safe access to the Project work area. Access roads would be approximately 14 feet wide, and all areas of the proposed access road that do not overlap with the existing gravel road would be matted with timber or composite mats to protect the ground surface and minimize rutting. Because the new segment of access path would stop well short of RIV2, there would be no need to bridge rivulets for the new location.

As previously described in the earlier BA and Biological Opinion, an approximately 150-foot wide by 100-foot long temporary staging area would be constructed adjacent to the access road leading in from New Avenue. The temporary staging area would be situated just south of a third party's existing meter station. All areas used for staging would be matted. In addition, an approximately 25-foot wide by 25-foot long matted temporary turnaround area would be constructed south of location FR-02 to facilitate vehicle access to the

FR-02 anomaly location. All mats used for access and staging would be cleaned prior to use on the Project. As previously noted, WPL has secured approval to access PR-01 and FR-04 from the north. GW 1920 and FR-02 would be accessed from the south. Heavy equipment working in wetlands would be placed on mats to minimize soil compaction and rutting.

1.4.1.3 Workspace, Excavation, Spoil Storage, and Backfill

The following description applies only to the newly identified anomaly (GW 1920). The other three excavation locations (PR-01, FR-04, and FR-02) were described in the earlier conservation plan and work at those locations remains unchanged.

GW 1920 – Mechanical excavation will begin at location GW 1920 by exposing each end of the target joint, which is 37.2 feet in length, to verify joint signature and confirm seam orientation (estimated 2.5-foot depth to top of pipe). The workspace will be accessed from the south (beyond FR-02) to not cross any rivulets. Once verified, excavation will expose the pipe to determine if repair is required. If repair is required, installation of a B sleeve would occur as per usual procedure. The excavation trench will extend 50-feet long by 15-feet wide by 6- to 8-feet deep. The trench box will be centered on the target anomaly. Excavation will need to go at least two feet below the pipe to allow the welders room to weld, if necessary, and for the machine used to apply the RD6 coating to rotate freely around the pipe. Temporary workspace adjacent to the excavation would include the maximum dimensions of 100-feet long by 50-feet wide, with one additional 15-foot long by 15-foot-wide matted dewatering pads located just west of the workspace.

Excavated soil at each of the anomaly locations would be temporarily stockpiled adjacent to the excavation. For excavation in wetlands, topsoil (top 12 inches) would be stockpiled separately from subsoils. Backfilling the trench would occur so that the original stratification of soil is retained by first replacing the subsoil and then replacing the topsoil as the upper-most layer. Temporarily excavated soils would remain on mats.

Excavated soils would be utilized for backfill unless the native soil material contains rocks that are too abundant or too large to be placed against the pipeline as backfill. If present, large rocks (greater than three inches) would be removed from proximity to the pipeline. Rocks greater than three inches in diameter in close proximity to the pipeline present a risk to the pipeline coating. Seasonal freeze-thaw events that result in frost-heave dynamics in the soil can force rocks along or into contact with the pipeline, which can cause future damage to the pipeline coating or the pipeline itself. Therefore, during backfill the native materials would be inspected and rocks would be removed as necessary. Soil volume that needs to be supplemented would come from the source identified as outlined below. In addition, while WPL does not anticipate contaminated soils in the excavations, to comply with requests by agency staff, WPL will complete pre-work sampling of soils as outlined in later sections of this document. Should contaminated soils be identified, WPL will replace the soil with backfill material similar to the native soils removed. If additional material is needed during backfill to restore grade or to support and pad the pipe from adjacent bedrock, a soil with similar textural characteristics to native substrate would be used. WPL would identify suitable source materials for alternative backfill substrate and provide the sourcing information to the USACE and USFWS prior to mobilizing to the site.

WPL intends to avoid bedrock removal if possible, and limit bedrock removal if avoidance is not possible. WPL completed probing to assess bedrock depth on March 3, 2022. Results indicate that bedrock removal will likely be required in some locations along the excavations, but no information is currently available on bedrock depth at GW 1920. At PR-01, probing encountered rock at depths ranging from 0.8 foot to over 8 feet in depth, generally trending shallower east of the pipeline than west of the pipeline. At FR-04, probing encountered rock at depths ranging from 0.1 foot to 3.4 feet in depth, with no clear pattern of depth variation along or across the pipeline. Probing results were not able to discern between individual rocks within the middle or upper soil profile versus actual bedrock. It appears bedrock removal will not be required throughout each excavation, but minor bedrock excavation (18-inches deep maximum) to facilitate pipeline inspection

and repair cannot be ruled out at the locations where the pipeline would be excavated. Once excavated, if the pipeline is either resting on or too close to bedrock to allow for pipeline repairs, then a minor amount of chipping of bedrock may be necessary to allow sufficient space around the pipeline for the repairs. The maximum excavation depth described above for each excavation location includes any bedrock excavation that may be required.

1.4.1.4 Soil Erosion and Sediment Control

For the Project work areas west of the CNRR and New Avenue, silt fence or straw wattle/straw bales would be installed along the northern, western, and southern boundaries of the workspaces as illustrated on Appendix A – Figure 2 to prevent soil materials from moving outside work areas if precipitation events occur during the work.

1.4.1.5 Trench Dewatering and Rivulet Flow Bypass

For Project work areas west of the CNRR and New Avenue, groundwater accumulation within the excavated trench would be removed from the trench utilizing the smallest pump practical. Based on assumed volumes of groundwater inflows to the trench, WPL estimates that a 5-10 horsepower pump with a 2-inch outlet would be sufficient to move the water within the trench (pumps such as made by a wide range of manufacturers such as Honda, DUROMAX, Generac, NorthStart to name a few, and have pumping rates ranging from 130 to 185 gallons per minute). It is expected that the pumps will be run only as necessary and may be cycled on and off as needed to remove water from the trench. Discharged trench water would be directed to well-vegetated areas west of the trench (downgradient) through a filter bag placed on matting. Filter bags would not be placed directly within rivulets or within five feet of rivulets, and discharge locations would be approved by a biologist in the field prior to the start of dewatering. Discharge of water to the surface downgradient from the trench, but within approximately 50 feet of the trench, would allow water to infiltrate back into the soil to minimize the potential for downgradient drawdown impacts. Intake hoses within the trench would be placed in perforated buckets on the bottom of the trench to minimize sediment from entering the hose. Dewatering of the excavated trench would be continuous while it is open for the repair work. Once the work is completed, pumping would cease and the trench would be backfilled.

1.4.1.6 Restoration

Areas disturbed by excavation would be restored to original contours to match adjacent undisturbed areas and seeded with the existing appropriate native and locally sourced seed mix as soon as practical after backfill. Disturbed areas would be temporarily stabilized with straw mulch that would be free of any invasive species.

1.4.1.7 Timing

The Project is planned to start in November 2023 and be completed before March 1, 2024. Work would only begin once required permits and authorizations have been received. It is anticipated that the Project would require up to 10 weeks to complete the work. It is anticipated that each separate excavation would take a maximum of two weeks from the start of excavation to backfill. Trench dewatering at each excavation location would occur within the two-week window but likely would not occur for the full duration.

2. EFFECTS ANALYSIS ON LISTED SPECIES

2.1 Overview

Effects of the Project are all consequences to listed species that are caused by the proposed Project, including consequences of other activities that are caused by the proposed Project. The analysis of effects of the Project considers stressors from Project actions, exposure to stressors, and finally the response to exposure to stressors to determine consequences. The effects of the Project are used to make determinations for each listed species.

2.2 Hine's Emerald Dragonfly

2.2.1 Temporary Habitat Loss

The proposed Project would result in the temporary disturbance (new excavation, workspace, and dewatering pads) of up to an additional 0.14 acre within the Permit Area; of this amount, approximately 0.02 acre would be impacted by new excavation. This brings the total temporary disturbance, including that analyzed in the original conservation plan, to 1.24 acres (including 0.05 acres total due to excavation). Temporary impacts are generally defined as excavation impacts, which occur for pipeline repair for a duration of no more than two weeks and that are then restored to pre-construction contours when pipeline repair activities are complete. Where vegetation is covered with mats for access, stockpile, or staging temporary impacts are defined as a duration of less than one year.

Disturbance would be the result of excavation along the existing pipeline corridor, placement of mats followed by equipment access adjacent to the excavation area and on an access road, and temporary stockpiling of topsoil. The maximum excavation at GW 1920 would be 50-feet long by 15-feet wide. The excavation area may be less depending on initial findings. Once work is complete, the excavation would be backfilled, mats and stockpiles removed, and the ground returned to pre-disturbance contours. The disturbed Project footprint would be seeded with an herbaceous native seed mix to re-establish vegetation within one growing season after Project activities conclude, and dense revegetation is anticipated within two years. Baseline information would be collected pre-construction to facilitate return to pre-disturbance conditions (or better, in the case of currently invasive species dominated areas). Limits of invasives will be documented prior to construction in the vicinity of the excavation and observations of vegetation species and their visual cover estimate will be documented at each anomaly prior to the repair.

There would not be any new disturbance of any rivulet. There are no known crayfish burrows within the excavation areas (but see the groundwater discussion below).

Habitat within the GW 1920 workspace and access path includes dense shrub cover (buckthorn and other weedy shrubs) and degraded wet meadow dominated by cattails and bulrush, which transitions into *Phragmites*. The meadow could provide potential HED foraging habitat, although none have been seen there to date. The dense shrub cover is considered non-habitat for HED.

There would be no known direct larval habitat loss from excavation because there are no rivulets or known burrows in the workspace. No larvae were captured within the workspace limits in 2021. Two of the four larvae captured in 2021 were found west of the GW 1920 workspace, in burrows within RIV9. This area is further addressed below.

2.2.2 Crayfish Mortality

There are no known crayfish burrows within the GW 1920 workspace or new access path, based on observations in summer 2021 and in June-July 2023. Crayfish are capable of mostly nocturnal, short-distance dispersal through wetlands (Animal Diversity Web 2022). Thus, we assume that some limited impacts to

crayfish could occur if they enter the workspace area prior to the Project. Pre-project clearance surveys and the conservation measure limiting work to winter are expected to avoid much of this risk.

2.2.3 Sedimentation

The Project includes erosion and sediment control BMPs and other measures designed to minimize erosion and sedimentation, enhance revegetation, and minimize impacts on waterbodies and associated aquatic resources (see Section 3.1.2). These measures are unchanged from the original conservation plan, and would likely prevent Project activities from spreading sediment beyond the area of temporary habitat loss described above in Section 2.2.1.

2.2.4 Impingement and Entrainment

Because no rivulet is present in the new workspace and because of avoidance and minimization measures limiting the work window to winter months, the risk of impingement or entrainment is believed to be greatly minimized. See the original conservation plan for a detailed analysis.

2.2.5 Excavation Dewatering

The entire dewatering discussion is retained here from the original conservation plan, and updated with new information because dewatering accounts for the only noteworthy increase in effects resulting from the new GW 1920 location.

Removing water within an open excavation is required to establish safe working conditions within a temporary trench where groundwater is present within the trench. There is potential that removal of water from the excavation would temporarily reduce surface and near-surface groundwater elevations in wetlands and streams in the immediate vicinity of the excavation due to actively using a sump pump to drain the excavation. The lowering of water levels within and in the immediate vicinity of the excavation would be intermittent, occurring only during sump operation.

Groundwater elevation in proximity of the Permit Area is noted as moving from east to west, perpendicular to the Illinois and Michigan Canal (Kay et al. 2018; Figures 8 and 9). Additional monitoring data indicate water levels are lower during summer months, higher in the winter (Kay et al. 2018; Table 1). This is further supported with groundwater monitoring data from 2005 to 2019 indicating levels within the Permit Area typically range between approximately 0.1 foot in the early growing season and two feet below the ground surface later in summer and fall. Seasonal and inter-annual variation in groundwater elevation at monitoring wells near the work area typically vary by a range of approximately one foot. Within the Permit Area, groundwater flows generally from east to west (Hanson Material Service 2021).

The maximum depth of excavation during pipeline repairs at GW 1920 is not expected to exceed six to eight feet. A trench excavation dewatering analysis was performed for the new location to predict how much groundwater may flow into the excavation and the potential Radius of Influence (ROI) that would propagate while operating a water pump (described in Section 2.2.5.3) to remove water from the open excavation. The analysis used the following assumptions:

2.2.5.1 Hydraulic Conductivity

The Permit Area is located within alluvial deposits over Silurian Dolomite (Kay et al. 2018; Figure 8).

Based on Kay et al. (2018), local alluvial deposits consist of sand and gravel, but also can contain clay, silt and gravel. To represent potential horizontal hydraulic conductivities in this heterogeneous alluvial environment, values between 10 and 50 feet/day (ft/d) were used from literature representative of silty to clean sand (Freeze and Cherry 1979). A maximum hydraulic conductivity of 50 ft/d was selected as the value

allowing a conservative upper bound based on collected soil samples at the excavation sites showing clayey-muck, mucky-sandy-loam, and silty-clay.

2.2.5.2 Excavation Elevation

Monitoring well CEP-3S was used to estimate ground elevation at excavations PR-01 and FR-04, which was at approximately 592 feet AMSL. Additionally, elevation at excavation GW 1920 was estimated using monitoring wells CEP-10S and CEP-12S at approximately 588 feet AMSL. Monitoring well completion information is provided in Table 1 of Kay et al. 2018.

For dewatering analysis, excavations were assumed to be completely saturated such that excavations GW 1920 has eight feet of water for removal.

2.2.5.3 Dewatering

Using the above information, a method to simulate linear unconfined flow into a trench was used (Neville 2017, Part 1, Model 2), which is based on the solution presented in Mansur and Kaufman, 1962. Input variables are:

- Hydraulic conductivity, set at a conservative 50 ft/d. Note, a sensitivity analysis respective of potential ROIs with hydraulic conductivity range previously discussed was completed and further discussed below;
- Excavation elevation depth, set respective of the excavation depth from ground elevation;
- Distance to a constant head boundary (where the boundary resides signifying water level elevation controlling the degree of trench inflow). This was set at unity assuming water delivered to the excavation is directly from the sidewall;
- Width of the aquifer transverse to groundwater flow, set as the excavation width;
- Head at the constant head boundary (equal to the constant head boundary distance represented by the excavation sidewall), based on a potentiometric map representative of winter conditions (Kay et al. 2018, Figure 10); and
- Head in the excavation, set representative to the excavation depth.

A ROI was also calculated to assess potential dewatering influence due to operating a sump pump in the open trench, which was calculated according to Louwyck et al., 2022. Input variables (Table 2) are:

- Storage, set at 15%, being representative of shallow unconfined lithology (Fetter 2001);
- Sump operational time, conservatively set at 14 days of continuous use (actual operational time is expected to be less);
- Predicted trench inflow rate, based on the calculated inflow rate as discussed above, ranges from 103 gallons per minute (gpm) for excavations PR-01 and FR-04, to 374 gpm for excavation FR-02, to 436 gpm for excavation GW 1920.

Table 2. Parameters Used to Calculate Groundwater Flow into a Trench

Variable	GW 1920
K (ft/day)	10, 30, 50
H (ft AMSL)	589
h _d (ft AMSL)	581
A (ft)	1
L (ft)	15
Excavation Depth (ft)	8

Notes: ft/d - feet per day, ft – feet.

Using the above parameters, the distances from excavation GW 1920 to the nearest documented HED larval presence are approximately 222 feet to RIV9 and 805 feet to RIV5, compared to the projected ROIs for this excavation approximated at 296 feet (Appendix A – Figure 2). There are 21 mapped crayfish burrows identified within the respective ROI distance for the excavation GW 1920. Note, at these distances, the ROI effectively relates to changes in groundwater level such that there may be some measurable change. Additionally, this analysis used the highest (most conservative) approximate hydraulic conductivity at 50 ft/d under assumed rates equated to projected trench inflows. Other projected ROIs are depicted in Table 3 for a sensitivity analysis respective of different hydraulic conductivity values. Lastly, these results assume continuous sump pump operation over a course of 14 days and use projected trench inflow rates for ROI calculations; however, in reality the actual sump pump extraction rate would be less for trench dewatering and as a result projected ROIs would be less. Again, this analysis is conservative and considered worst-case such that actual field-influence during dewatering would be less.

Table 3. Hydraulic Conductivity Sensitivity on Predicted ROI

Excavation	Hydraulic Conductivity (ft/d)	ROI (ft)
PR-01 and FR-04	10	40
	30	69
	50	90
FR-02	10	110
	30	190
	50	245
GW 1920	10	133
	30	230
	50	296

Notes: ft/d - feet per day, ft – feet. Excavations PR-01 and FR-04 reside in proximity to each other and exhibit similar properties respective of excavation dimensions such that resulting ROI calculations are similar.

Based on the analysis above, the ROI intersects known crayfish burrows associated with RIV2 and RIV9. The area in proximity to the proposed excavation was searched very thoroughly for burrows after the spring prescribed burn in 2021, when there was very little vegetative cover, and again in summer 2023. Eight burrows were within the original ROI; with the addition of a new and larger ROI associated with GW 1920, 21 additional burrows or a total of 29 burrows are within the potential drawdown area. If any crayfish excavate new burrows within the ROI prior to the start of work, then those burrows may be influenced by pumping, although summer 2023 surveys suggest that the number and location of burrows has changed little. HED larvae would be potentially affected only if present within the ROI.

2.2.6 Rivulet Bypass

No rivulets are within the GW 1920 workspace. Portions of RIV2, which is semi-perennial, and RIV9, which is flashy and seasonal, are within the 296-foot ROI described above. HED larvae have not been captured in surface waters at either location and would not be expected to be surface active during the winter work window. Groundwater discharge can be directed to minimize drawdown near rivulets and associated crayfish burrows.

2.2.7 Contamination

Potential contamination effects were described in detail in the original conservation plan. There are no known contamination concerns associated with the new GW 1920 location; however, given proximity to an existing CNRR rail line, New Avenue, and the long industrial history of the vicinity, the same low-level risks described previously would still apply. The conservation measures included in the original conservation plan would be applied to this new location to minimize any risk.

2.2.8 Bedrock Excavation and Backfill

Due to the shallow depth to bedrock within the Permit Area, exploratory probing was completed on March 3, 2022. Results indicate that bedrock removal will likely be required in some locations along the excavations. If needed at GW 1920, bedrock excavation would be conducted with a jackhammer or equivalent. Excavated bedrock would be hauled to an upland location on the site for disposal. If additional soil is needed during backfill to restore grade or to support and pad the pipe from adjacent bedrock, a soil with similar textural characteristics to native substrate would be used. WPL would identify suitable source materials for alternative backfill substrate and provide the sourcing information to the USACE and USFWS prior to mobilizing to the site.

Bedrock excavation, if required, may temporarily affect groundwater elevation within the Permit Area, which could impact crayfish burrow distribution and larval HED habitat availability. Excavation of bedrock may temporarily lower groundwater elevation within the area immediately above the pipeline. Furthermore, removal of bedrock could expose new bedrock fractures that could further alter groundwater elevation or change groundwater flow patterns in either positive or negative ways.

Considering the maximum depth of bedrock excavation that may be required, the small area of excavation, and the measured groundwater elevation in the Permit Area, impact to groundwater elevation would be minor and likely of brief duration, returning to local equilibrium after pipeline repair activities are complete and the trench is backfilled. The surface of bedrock in the ground disturbance area is likely weathered. It is unlikely that bedrock excavation would expose additional fractures to water flow that were not already present and possibly exposed, and if it does this would not alter the existing regional patterns of bedrock groundwater flow. However, bedrock conditions cannot be precisely known until excavation occurs.

2.2.9 Noise and Vibration

Potential effects of noise and vibration were assessed in detail in the original conservation plan. Similar methods would be used for excavation at GW 1920, and that earlier analysis applies to the new location.

We concluded that noise and vibration from Project activities may affect HED larvae or aquatic crayfish in close proximity, but that noise and vibration would not approach injury or behavioral response thresholds. Further, construction-related noise is only slightly above typical existing ambient daytime levels, and noise levels associated with occasional high-speed passenger trains exceed construction-related noise levels. This is corroborated by the baseline presence in July 2021 and July 2023 of crayfish and other aquatic macroinvertebrates within the future work area.

2.2.10 Invasive Species

The Project would remove invasive and weedy native species, including buckthorn at GW 1920. These areas would be restored post-Project with native vegetation. Invasive vegetation and restoration are discussed in greater detail in the original conservation plan and the same conservation measures would apply to the new location.

2.2.11 Crushing

There are no known rivulets or crayfish burrows in the new GW 1920 workspace or access path extension. Thus, direct crushing of HED is not anticipated. Crayfish are unlikely to be surface active during the winter work window.

Other vehicle-HED interactions are not expected. Work would be conducted outside of the adult flight season, and vehicles would be limited to 8 mph; all conservation measures from the original conservation plan would apply.

2.2.12 Lighting

Wolverine is currently anticipating that night work would be required due to the 24-hour nature of dewatering and associated pump watch. Lighting would only be required in specific locations around the pumps to facilitate safe inspection and operation of the dewatering pumps during nighttime hours. The potential effects of lighting were addressed in detail in the original conservation plan and there are no proposed changes at the new location.

2.3 Blanding's Turtle

Blanding's Turtle occurs within the Permit Area at low density; despite years of summer field work on other species and two focused surveys for Blanding's Turtles (Feng and Dreslik 2015; RES 2021), only six individuals have been reported to date. Four of these including the only juvenile were in the west end of the Permit Area, while two were within about 200 feet west of the staging area and existing gravel access road. No turtles were observed near the pipeline alignment during baseline surveys conducted in July 2023.

There are no changes to the effects analysis for this species as a result of the new anomaly GW 1920, other than a slight increase in acreage assessed. There is no suitable breeding or hibernating habitat and no potential core wetland habitat within the new workspace or access path. Potential effects are limited to those previously discussed. Because work would occur in winter, turtles are not likely to be active unless prolonged unseasonably warm conditions occur.

Potential Project-related effects on Blanding's Turtles include direct damage resulting in harm or mortality from earth moving equipment or vehicles within the excavation area, on the access road or in the staging area; sub-lethal effects related to noise/vibration or dewatering which are unlikely to injure animals but could force movement or otherwise disrupt behavior; and post-project changes in habitat structure, which in this case are more likely to be positive than negative because of the removal of invasive vegetation. Of these potential effects, vehicle or equipment interactions are of greatest concern.

Effects would potentially occur to adults, subadults, and possibly juveniles (if any are present on the east end of the site). There is no suitable nesting habitat within the ground disturbance area, which is densely vegetated, level, and for the most part seasonally wet. The well-drained, loose soils needed for nesting are not present.

Most work would occur outside the Blanding's Turtle active season. No potential hibernating areas are present within or adjacent to the ground disturbance area, so winter impacts are considered extremely unlikely. Surface activity could occur in September and October, or in early spring although construction is not

expected to continue for that long. No suitable activity center wetlands are present in the workspace. Given the timing of construction activities, the resulting short duration of potential surface interactions, the absence of activity center wetlands in the workspace, and the avoidance, minimization, and mitigation measures detailed elsewhere in this document, there is a low risk of negative effects on Blanding's Turtle.

2.4 American Bittern

Given the general rarity of American Bitterns on the landscape in Will County, and only one incidental record of the species from the Permit Area, the potential for species occurrence is thought to be low. American Bitterns are only present in Illinois during spring and fall migration and the breeding season. As the Project will occur completely outside the breeding season (generally April through July), there will be no temporal overlap between potential nesting and any effects of the Project. Therefore, no effects to breeding adults, nests, or chicks would occur.

No American Bitterns were observed near the pipeline alignment during baseline surveys in June and July 2023. Based on eBird records from Will County (i.e., migrating individuals), adult and juvenile bitterns could potentially occur in spring and fall within the Permit Area. While potential for occurrence is low within the Permit Area, presence cannot be completely ruled out. However, given the fact that any potential activities which could impact the species (e.g., noise disturbance, clearing, and grubbing) will be limited to the far eastern portion of the Permit Area, and the only species occurrence (and marginally suitable habitat) is located on the far western side of the Permit Area (allowing for considerable vegetation screening and noise attenuation), potential for exposure to any effects of the Project would be insignificant. Further, it is assumed that if any individuals were present within the Permit Area near active construction, they would rapidly disperse. Because construction would be limited to the winter months, no effects to migrating adults or juveniles are expected.

There is no change to the assessment as a result of the new GW 1920 workspace. Given the considerable amount of invasive vegetation present within the overall Permit Area, proposed habitat enhancement associated with this Project is anticipated to generally result in a beneficial effect to the species overall. As no negative effects to the species are anticipated as a result of this Project, no take is requested. The species is not considered further herein.

2.5 Leafy Prairie Clover

The closest known occurrence of LPC in the Permit Area is approximately 450 feet west of the Wolverine CU-LK pipeline, and the continued presence in that area was confirmed by ERM staff in July 2023. Habitat within the temporary workspace is generally not appropriate to support this species. The limits of the Project workspace would be delineated with silt fence, which would further limit the potential for impacts to LPC outside of the workspace by vehicles or equipment. The Project would not permanently affect groundwater or surface water flow in a way that could alter the nature of distant down-gradient habitat where this species is currently present. LPC grows on shallow soils over bedrock, which are not generally influenced by groundwater. Although the LPC population is west/down gradient of the work area, there would be no siltation because of distance, BMPs, and dense intermediate herbaceous vegetation. No other potential effects have been identified. There is no change to the assessment as a result of the new GW 1920 workspace.

3. CONSERVATION, AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

3.1 Conservation, Avoidance and Minimization Measures

The conservation measures in Section 3.1.1 below were provided by USFWS and USACE, and reviewed by IDNR during agency input on the BA. BMPs and avoidance/minimization measures in Section 3.1.2 generally are sourced or modified from the Com Ed low impact Habitat Conservation Plan (HCP; Com Ed, 2013). Due to the differences in type of work described between the Project and the Com Ed HCP, modification of certain measures was required to ensure relevancy and feasibility. Measures that were modified have been clearly designated as such (see Com Ed, 2013 – Modified). Additional measures have been proposed for ground disturbing activities not covered by the Com Ed low impact HCP. These measures are consistent with the original Conservation Plan and there are no changes as a result of the new GW 1920 anomaly. The same conservation, avoidance, and minimization methods apply to the new excavation, workspace, and access path.

3.1.1 Conservation Measures

These conservation measures apply to the first reach of the disturbed system indicated as Rivulet 4 except for conservation measure “c”, which also applies to all other areas excavated or disturbed by the proposed project (stockpile locations, access locations, etc.). These other areas may provide habitat for the adult stage of the dragonfly and the measures set forth under conservation measure “c” will meet the requirements for adult habitat. Some monitoring activities in conservation measure “e” would occur in Rivulet 5.

Within the first reach of the disturbed system indicated as Rivulet 4 the essential features for egg deposition and larval growth and development will be restored based on the criteria below:

(a) Organic soils overlying calcareous substrate (predominantly dolomite and limestone bedrock).

Conservation Measure: Replace excavated and other disturbed soil with native materials maintaining the existing soil horizon. If contaminated soil is found work should be suspended until contamination can be contained and replacement native soil is identified.

(b) Calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets, and/or sheet flow within fens.

Conservation Measure: Groundwater levels may not be reduced below average levels recorded for that time of year in any of the existing immediate nearby wells unless the Palmer Drought Severity index reports a drought in the prior three months. Collect baseline data on depth, width, flow rate, and temperature every five meters. Restore streamlet within the first reach of the disturbed system based on baseline data and replace detritus with native cut foliage.

(c) Emergent herbaceous and woody vegetation for emergence facilitation and refugia.

Conservation Measure: Applicant will coordinate vegetation restoration with Hanson Material Service. Note: This Conservation Measure will most likely be implemented by Hanson Material Service under their current 404 permit, ITP and ITA. Wolverine shall coordinate with HMS to achieve these performance standards:

- Less than 10% cover by non-native and/or weedy native trees or shrubs (e.g., green ash, box elder, or gray dogwood) in both the ground layer and the woody canopy layer within three years after the start of restoration. This standard must be met again at the end of year 5.
- At least 70% native cover in the ground layer at the end of year 3 after restoration. This standard must be met again at the end of year 5.

- None of the three most dominant ground layer plant species may be non-native species (according to Swink and Wilhelm 1994) or common reed (*Phragmites australis*) within three years after the start of restoration. This standard must be met again at the end of year 5.

(d) Occupied burrows maintained by crayfish for refugia.

Conservation Measure: Pre-construction salvage of Hine's emerald dragonfly larvae and crayfish (*Lacunicambarus nebrascensis*) from Rivulet 4 will be conducted by the applicant. Fate of salvaged organisms will be determined and handled by USFWS. Crayfish will be restored based on a burrow density of 0.223 m². Note: The average crayfish burrow density in the Lower DesPlaines River Valley as recorded in 16 separate Hine's emerald dragonfly larval habitat areas is 0.3375m² (average density). The density of 0.223m² is the most common density or mode – 3 of 16 streamlets in the Lower DesPlaines River Valley. If crayfish density is not achieved by year two, acquire crayfish for onsite augmentation to advance restoration. Crayfish may be acquired from local areas outside of Hine's emerald dragonfly habitat or funds could be contributed to an existing captive rearing program. Continue annual monitoring.

(e) Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms.

Conservation Measure: Monitor to determine preconstruction growth rates of caged larvae in the second reach of the system, indicated as Rivulet 5, where larvae were found during preconstruction surveys and at 5 meters and 10 meters past the documented locations. Monitor to determine post construction growth rates. Prey base will be considered restored when caged larvae can survive and maintain preconstruction growth rates in Rivulet 5 in the locations where larvae were found in previous surveys and at 5 meters past and 10 meters past documented locations. In year one, if caged larvae do not survive, fund an existing captive rearing program for Hine's emerald dragonfly and continue to restore and monitor the system. By year three, if caged larvae do not survive or maintain preconstruction growth rates, fund an existing captive rearing program for the Hine's emerald dragonfly for an additional 5 years and continue to restore and monitor the system.

The discovery of an additional anomaly within the HED critical habitat (discussed above) necessitated additional analysis from the USFWS. The analyses above suggest that the level of incidental take would not exceed that which would occur from the original proposal. These additional conservation measures have been provided in response to the new ROI.

Three years of surface water and groundwater monitoring shall be conducted, as well larval monitoring and burrow density monitoring within the new ROI (specifically RIV2 and RIV9). If monitoring results show no differences from baseline conditions, no additional monitoring would be required in this area. If monitoring results show differences from baseline conditions, actions will be implemented to address the impact and monitoring would be extended for seven more years for a total of 10 years of monitoring (which would coincide with the 10-year requirement in the initial Biological Opinion).

- (a) Monitoring activities shall begin prior to the start of excavation and associated activities to obtain sufficient antecedent/baseline data for comparison of trends and configurations. There are some existing monitoring wells available at the ComEd parcel. Wolverine shall coordinate with the owners of the wells to identify and obtain access to monitoring wells throughout the ComEd parcel. Wolverine shall conduct a reconnaissance of available monitoring wells and identify which wells will be used to monitor groundwater elevations upgradient, near, and downgradient of pipeline activities and/or nearby key rivulets. Wolverine shall inspect the well integrity and ensure it is suitable for water level and potentially water quality monitoring should the soils and/or pipeline have larger impacts than anticipated. Wolverine shall identify any data gaps in groundwater level monitoring near pipeline activities and at potentially impacted areas.

(b) Rivulet baseline data shall also be collected. Provide specific details on the exact locations of this monitoring and frequency as described in the BO.

(c) Conduct baseline water quality assessments of field parameters and PID readings prior to pipeline work and after repairs as described in the BO.

Monitoring and Contingency

The Corps will require a minimum 10 years of Hine's emerald dragonfly larval habitat monitoring post excavation and disturbance contingent on the success of post construction restoration. Monitoring will be recorded on a monthly, from May 1 to August 31, and reported annually by the following December 31, or earlier, if or when measures are not being achieved.

If after 3 years all measures are achieved and caged larvae survive or maintain preconstruction growth rates, monitoring will continue for 7 more years (for a total of 10 years). If monitoring indicates that any of the measures (a through e) are not being achieved in any year within the 7 year period (years 4 through 10), adaptive management will be implemented, as determined by the USFWS Chicago Field Office, to continue to restore the system. If by year 10, all measures are achieved, then monitoring will end by year 10. However, if after 3 years all measures are not achieved (e.g., caged larvae do not survive or maintain preconstruction growth rates), restoration efforts and monitoring will still continue for an additional 7 years. In addition, the permittee will implement the additional conservation measures of captive rearing of Hine's emerald dragonflies and *L. nebrascensis*, stated above, for 5 years based on a 5-year Hine's emerald dragonfly life history and temporal loss of reproduction. If monitoring indicates that measures are not being achieved in any year within the 7 year period (years 4 through 10), adaptive management will be implemented to continue to restore the system and monitoring will continue to be required. If adaptive management is successful within the 7 year period and measures are being achieved, funding for the captive rearing program would cease (unless measures are not being met again). If by year 10, all measures are not achieved, an additional 5 years of captive rearing will be required (years 11 through 15), based on a 5-year Hine's emerald dragonfly life history and temporal loss of reproduction. Therefore, contingent upon monitoring results, the conservation measures may be completed within 10 years or up to 15 years.

- Monitor habitat to make sure Soil Erosion & Sediment Control measures are working.
- Monitor water quality parameters (already in the BA) and include groundwater monitoring.
- Timing – all pipeline work shall occur in frozen conditions to minimize impacts to designated critical habitat.
- Post project monitoring – RIV 4 & RIV 5 for 10 years to ensure geomorphology, larvae, and crayfish (translocated or caged) meet baseline conditions/ survive.
- Surveys and salvage of larvae and crayfish will be performed by Service and IDNR approved, qualified personnel who are thoroughly trained on the techniques to be used.
- Any T&E species accidentally killed, or that are moribund or fresh dead and contain soft tissues, will be reported immediately to the Service and IDNR and preserved according to standard museum practices, properly identified, or indexed (date of collection, complete scientific and common name, latitude and longitude of collection site, description of exact location in collection site), and submitted to a recognized museum or scientific repository as determined by the Service and IDNR.
- Notification will be made to the following Service offices and IDNR at least two weeks prior to beginning salvage and monitoring activities:

Chicago Field Office,
230 South Dearborn St.

Suite 2938, Chicago, Illinois 60604,
Phone: (847) 366-2345, Attention: Shawn Cirton
Incidental Take Authorization Coordinator
One Natural Resources Way
Springfield, IL 62702
Phone: (217) 782-2456, Attention: Heather Osborn

- A report documenting the salvage effort will be prepared and submitted to the Service's Chicago Field Office and the IDNR within three months of completion of the translocation. A preliminary electronic draft summary (email) including number of listed species encountered will be submitted within 5 working days following the completion of fieldwork. The final report will include an introduction, GIS mapping, methods section, results section, conclusion and/or summary, and any relevant supplementary information (e.g., names and qualification of surveyors, E&T permit numbers). The methods section will detail the protocols used for surveying, holding, handling, and translocating larvae; and establishment and location of the relocation site. The results section will include; the total number of individuals collected and relocated; date collected; water and air temperatures; total number of live and dead listed species collected; condition, size, and approximate age of live listed species; and GIS maps or figures showing the project features and Permit Area. Electronic files including GIS data (shapefiles or database with coordinates) of species locations will be provided to the Service and IDNR.

3.1.2 Best Management Practices and Avoidance Measures

3.1.2.1 Soil Erosion and Sedimentation Control

- Silt fence or straw wattle/straw bales would be installed along the boundary of areas where temporary excavation and spoils stockpiling would take place. Silt fence or straw wattle/straw bales would at a minimum be installed on the downslope side of the workspace and between nearby rivulets and the associated excavation workspace. Straw wattles/straw bales, if used, would be certified weed-free.
- Proposed access roads that do not overlap with the existing gravel road would be matted with timber or composite mats. All areas of the approximately 150-foot wide by 100-foot long temporary staging area and 25-foot wide by 25-foot long matted temporary turnaround area would be matted.
- Groundwater discharged from trench excavation west of the CNRR would be directed to well-vegetated areas west of the trench through a filter bag placed on matting. Filter bags would not be placed in or within five feet of rivulets. Intake hoses would be screened (maximum of 10 mesh [2mm]) and placed in perforated buckets on the bottom of the trench to minimize sediment from entering the hose and to minimize entrainment of small aquatic organisms. The smallest pump practical (approximately 2-inch, 5-10 horsepower) would be utilized for trench dewatering. Groundwater discharge locations would be selected after considering the locations of any downgradient HED habitat features including rivulets and crayfish burrows.

3.1.2.2 Wetland and Rivulet Impact Minimization and Restoration

To minimize rutting and soil disturbance in wetlands, equipment working in wetlands would be placed on mats. Topsoil (top 12 inches) would be stockpiled separately from subsoils during trench excavation. Topsoil and subsoil would be returned to the trench in the same stratification in which they were removed during backfill.

3.1.2.3 Invasive Species Spread Minimization

Mats and equipment with the potential to contact bare or disturbed soils would be cleaned prior to transport to the Project work area in order to avoid the spread of invasive species (Com Ed, 2013 - Modified).

The temporary workspace, excavation areas, and access routes would be pretreated with herbicides to minimize the spread and regrowth of invasive species upon backfill. An accepted herbicide formulated for aquatic use would be utilized. Herbicide would be applied according to manufacturer label specifications and USEPA requirements. Application near rivulets would be conducted in a direct application method with areas away from rivulets applied by spray application, according to an approach to be verified with USFWS. Some of this work may occur in advance as part of the Hanson Material Service HCP.

3.1.2.4 Federal and State Listed Species Avoidance and Minimization Measures

The Project would be performed between November 1 and March 1 when freezing temperatures are typical, to avoid periods when HED and Blanding's Turtle are most active and to avoid the American Bittern nesting season in Illinois.

Vehicles used within the Permit Area would be limited to 8 mph during the Project to minimize impact to adult HED and Blanding's Turtle (Com Ed, 2013).

Blanding's Turtles would be excluded from the work area by appropriate barriers installed to control sediment as described above. In the event that a Blanding's Turtle is observed on the access road or otherwise within the work area, nearby activity would be halted and the turtle allowed to move away on its own. If the turtle does not quickly move to a safer area, the standby biologist would relocate the animal to nearby suitable habitat.

Vehicle use would be limited outside of existing or pre-determined access pathways and workspaces. Access would be allowed only by foot outside of existing and pre-determined pathways and workspaces (Com Ed, 2013 - Modified).

Workers would adhere to the Wolverine Safety, Health, and Environmental (SHE) Department's internal Emergency Response Plan (Wolverine 2022) and associated spill containment documents and procedures (Job Loss Assessments and Equipment Inspection Checklist) and take precautions with all fuels used in operations to avoid spills and provide proper spill cleanup. Except for stationary equipment (i.e., pumps, generators, etc.), refueling would be performed at the staging area within secondary containment. Stationary equipment would be refueled in place using secondary containment. Furthermore, all hydraulic fluid used on-site would be eco-friendly or bio-based.

Environmental awareness training would be provided to all workers at the start of pipeline repair work. Training would discuss the specific species of concern for the Project and protocol for approaching work in sensitive habitats. Informational materials and species photos would be provided to workers.

A qualified biologist would be on standby for the duration of the Project in the event that WPL encounters unanticipated conditions, with a goal of mobilization to the site within 24 hours or less.

To minimize the duration of drawdown of groundwater in the immediate area of the excavation, dewatering would occur a maximum of two weeks in duration at each of the excavation locations. If additional time is needed past two weeks, the USFWS would be contacted and additional conservation measures would be considered if needed (i.e., cease pumping for a period of time before resuming, assessment of down-gradient groundwater elevation).

3.1.2.5 Contamination Avoidance

Contamination avoidance measures are as noted in the original Conservation Plan. Although there is no expectation of contamination at GW 1920, given the long history of industrial use in nearby areas and the proximity of rail and road activity, the same measures would apply to the new location.

Monarch Butterfly

Although not currently listed and not a covered species in this Conservation Plan, the Monarch is being considered for federal listing and is a species of conservation concern. During summer 2021 through 2023 HED surveys, a high density of Monarch was noted in the Permit Area (ERM 2021) and spring prescribed burns conducted for the Project resulted in higher milkweed density. WPL voluntarily includes the following conservation measures to further avoid/minimize Monarch effects.

While a small number of milkweed plants would likely be removed during pipeline repair activities, any large (more than 20 clustered plants) occurrence of milkweed within 50 feet west of the work area limits would be identified with a short section of orange exclusion fence or other visually distinctive identifier to reduce risk of accidental damage.

Milkweed would be included in the revegetation seed mix.

3.2 Mitigation Measures

As part of the ITA process, impacts are expected to be mitigated at a conservation value ratio of 5.5:1 (IDNR 2021a). Temporary impacts total up to 1.24 acres, mostly workspace and access but including 0.05 acre of excavation and backfill. The 1.24-acre total accounts for north access for PR-01 and FR-04, and south access for FR-02 and GW 1920.

Target mitigation credit required at 5.5:1 equates to 6.820 acres. Note that this number is based on maximum potential ground disturbance, and it is possible that the impact area would be less depending on the results of inspection during initial excavation.

As part of the proposed Project, at least 0.34 acre of invasive common reed would be treated with herbicides, removed, and replanted post-impact with native species. Some purple loosestrife, reed canary grass, and buckthorn would also be removed (0.18 acre combined). At 100 percent restoration credit, this equates to at least 0.52 acre of mitigation credit not including treatment of invasive species other than common reed. The area of Phragmites is based on updated 2023 mapping by ERM. The limits of invasive species within the workspace and access routes would be mapped prior to the start of construction to determine a precise baseline.

Additional conservation measures included in the original and amended BAs and conservation plan as part of consultation with USFWS and IDNR apply to the 7.7 acre ROI, and qualify for additional credit.

3.3 Monitoring

The objective of monitoring would be to track progress as applicable portions of the Permit Area (the area of excavation impacts and the adjacent workspace) are restored to suitable natural habitat for the covered species. Hydrology would ideally be within pre-Project ranges, and revegetation would ideally be on a trajectory to dense herbaceous native cover with a lesser presence of invasive vegetation than baseline, based on realistic past experience with successful habitat mitigation in the Midwest. Performance standards and monitoring requirements are outlined in detail in the conservation measures in section 3.1.1 above. The Mitigation and Monitoring Plan (Appendix H of the original Conservation Plan) outlines monitoring requirements by year according to the conservation measures. An annual monitoring report would be provided to USACE, USFWS, and IDNR by December 31 of each year beginning in the year after completion of pipeline repairs, for the duration of the monitoring period. Monitoring is unchanged from the original Conservation Plan, and the same measures would apply to GW 1920.

3.4 Adaptive Management

This section is unchanged from the original Conservation Plan, and would apply to the new GW 1920 location.

3.5 Funding

This section is unchanged from the original Conservation Plan, and would apply to the new GW 1920 location.

4. ALTERNATIVES CONSIDERED

The alternatives discussion is unchanged from the original Conservation Plan.

5. ANALYSIS OF TAKE ON SPECIES SURVIVAL OR RECOVERY

This Conservation Plan was prepared to identify and analyze the potential effects of the proposed Project on Illinois-listed species, and to identify measures to avoid, minimize, and mitigate take of those species. Take is defined in the Illinois Endangered Species Protection Act as to “harm, hunt, shoot, pursue, lure, wound, kill, destroy, harass, gig, spear, ensnare, trap, capture, collect [an endangered or threatened species], or an attempt to engage in such conduct” (520 Illinois Compiled Statutes 10/2). Four listed species were determined to be present within the Permit Area that could potentially be affected and/or taken by the proposed Project: the Hine’s Emerald Dragonfly, Blanding’s Turtle, American Bittern, and the LPC. A biological assessment has also been prepared and submitted to USFWS as part of Federal Section 7 consultation and covers some of the same species. A BA addendum to re-initiate consultation has been submitted concurrent with this Plan.

The proposed project may affect and is likely to adversely affect the HED. The primary additional effect from the new GW 1920 anomaly is an expanded groundwater drawdown ROI, which extends 296 feet from the new excavation and encompasses 21 additional crayfish burrows including one historically occupied by HED larvae.

As a result of the overall Project including the new GW 1920 anomaly, there would be temporary disturbance of up to about 35 linear feet of potential and possibly historic breeding rivulet, which is currently dominated by invasive common reed. There would be no direct loss of any known associated crayfish burrows from excavation, although up to 21 burrows may be affected by groundwater drawdown of up to two weeks during construction. Pre-construction clearance surveys of RIV4 and associated burrows have been scheduled to further reduce effects. Although larval presence in RIV4 is believed to be low probability, it is possible, and historic breeding habitat exists approximately 370 feet to the west. There would be temporary disturbance of up to 1.24 acres of habitat, most of it dominated by invasive common reed with small areas of higher quality known or potential adult HED foraging habitat nearby. North access for PR-01 and FR-04 has been approved, which minimizes access effects. Limiting construction activity to the winter months along with other conservation measures described above would further reduce or offset potential effects.

The proposed project may affect the Blanding’s Turtle. Although Blanding’s Turtles have been reported within a few hundred feet of the workspace, are quite mobile, and could occasionally move through the workspace, there is no core wetland habitat or known suitable nesting habitat within or adjacent to the workspace. Limiting construction to the winter months greatly reduces the risk of surface activity. If any Blanding’s Turtles are encountered they would be allowed to leave on their own or relocated out of the work area by a qualified and permitted biologist. The proposed Project is not expected to result in any direct take of Blanding’s Turtle because of avoidance and minimization measures, and only a temporary and minor loss of peripheral habitat. The addition of the new GW 1920 location does not alter this finding in any way. However, as a conservative

precaution, we acknowledge a small risk of take of a Blanding's Turtle. The requested take is not anticipated to reduce the likelihood of the survival or recovery of the species in Illinois.

There is potential marginal foraging and nesting habitat within the work area for American Bittern. However, the species' potential to occur within the Permit Area at any given time is low; the only observation after years of biological surveys was on the opposite end of the 103-acre Com Ed Parcel. Because no work would occur during nesting season, with avoidance and minimization measures there would be no take of American Bittern as part of the proposed Project. The addition of the new GW 1920 location does not alter this finding in any way.

LPC occurs in the central portion of the Com Ed Parcel, about 450 feet west of the work area. The proposed Project would have no effect on LPC. The addition of the new GW 1920 location does not alter this finding in any way, as no suitable habitat is present in the immediate Project area.

The above findings assume maximum worst case impacts to the 162-foot long area of pipeline that could be excavated. It is possible that pending initial subsurface inspection early in the project, a lesser length would need to be excavated. If so, impacts would be reduced from those analyzed above. The most conservative scenario was analyzed to prevent the need for additional future consultation on the proposed Project and reduce the risk of delays.

6. LITERATURE CITED

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7. LIST OF CONTACTS MADE AND PREPARERS

7.1 List of Contacts

Randall Boisvert, Hanson Material Service, 21 July 2021 during site visit.

Michael LeFrancois, ERM, provided technical review and interpretation to address groundwater drawdown analysis, completed August 2023, email.

7.2 Preparers

Authors

Ken Mierzwa, Principal Consultant, ERM (lead author).

Mr. Mierzwa has extensive experience with Hine's Emerald Dragonfly from 1994 to present, and holds a Federal 10(a)(1)(a) permit (TE38793A-2) and Illinois endangered species permit (12075) for the species. He led quantitative monitoring for the species in the lower Des Plaines River Valley from 1995 through 2014, including within the present Permit Area from 2007 to 2014. He has also monitored or visited localities in Door County, Wisconsin and Reynolds County, Missouri as well as the now extirpated type locality in Logan County, Ohio. Mr. Mierzwa has extensive Section 7 consultation experience in Illinois, Indiana, Florida, Texas, California, and other states. Selected specific examples of consultation experience include the I-355 South Extension Tollway Bridge in Lemont, Illinois (2006); the CNRR acquisition of EJ&E Railroad in northeast Illinois and northwest Indiana (2009); a combined USFWS/NMFS BA for the Netflix movie Birdbox, filmed in part on the wild and scenic Smith River in northwestern California (2017); and a programmatic BA for the State of Florida's assumption of Section 404 authority which covered the entire state of Florida and 236 listed and proposed species (2019).

Michael LeFrancois, Principal Consultant, ERM

Mike is a geologist/hydrogeologist that works on environmental and water resource projects. Within this role, he provides technical guidance related to site strategy development, site investigation and assessment, hydrogeologic investigations, and hydraulic well testing and analysis. His project experience encompasses quantitative and qualitative hydrogeology, field geology, and groundwater modelling. He has directed and designed dozens of hydraulic investigations ranging from pumping test design, implementation and analysis, capture zone analyses, and downhole geophysical testing. He has developed/overseen numerous local and regional groundwater models, including contaminant fate and

Reviewers

Ryan Lisson, Managing Consultant/Scientist, ERM

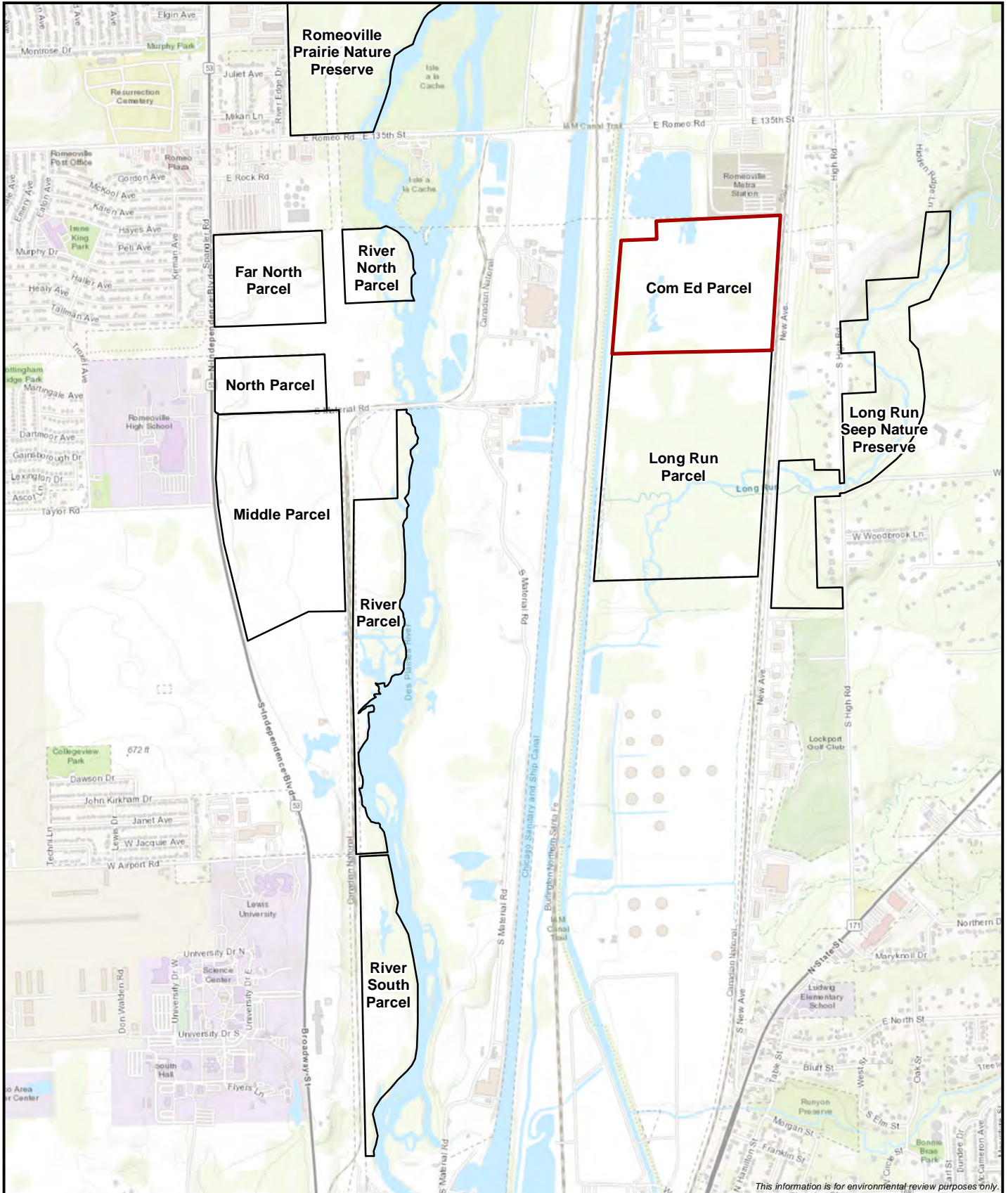
Ryan is an experienced project manager, biological resource lead, and field survey coordinator on oil and gas, mining, and power projects in the United States and internationally. He has been involved in the Wolverine project since 2021. Ryan has over 13 years of consulting experience, including managing permitting for local oil and gas distribution companies in Minnesota and long-range transmission projects across the United States. He has coordinated with U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and state agencies on numerous projects. Ryan served as a technical reviewer for this project Conservation Plan Addendum.

Ross Vellacott, Partner, ERM

Ross has extensive experience in environmental consulting in various projects and leadership roles including Partner-in-Charge of leading multi-disciplinary teams performing environmental baseline studies, impact assessment, permitting, and compliance management for major capital projects. He has successfully managed diverse projects throughout the U.S. and internationally for the energy, oil and gas, and mining sectors working with various state and federal agencies including USACE, USFWS, USFS, and FERC. Ross

served as the Partner-in-Charge for this project, responsible for engaging and directing technical subject matter experts, and ensuring complete and accurate work products.

APPENDIX A FIGURES



This information is for environmental review purposes only.



 Permit Area
 Other Listed Species Parcel

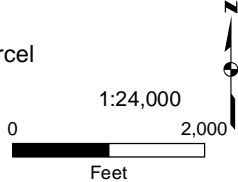
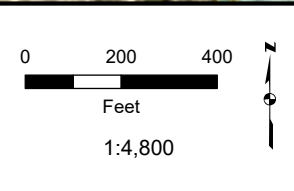
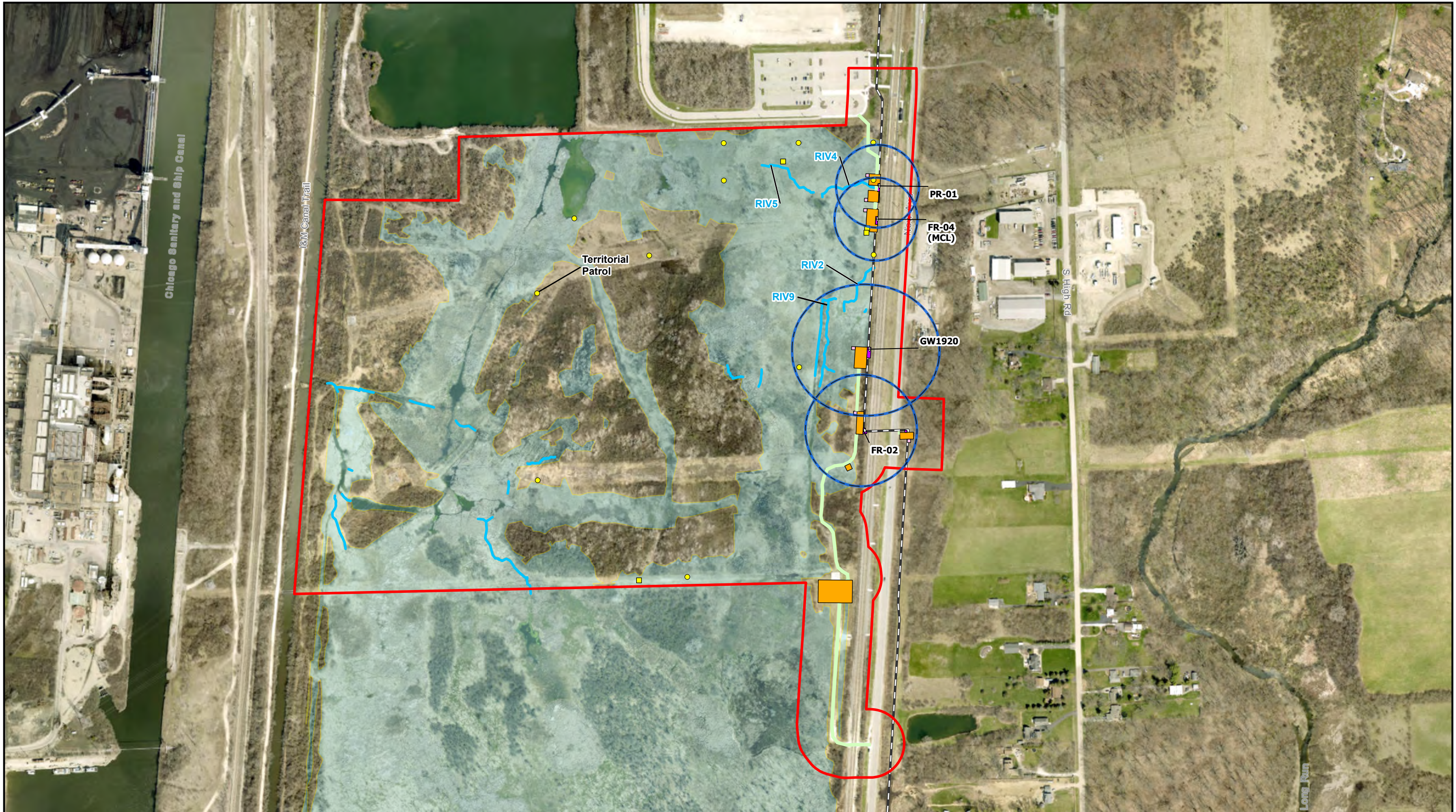


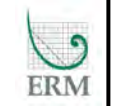
Figure 1
Vicinity Map
 WPL CU-LK Repairs
 Will County, Illinois





2021 HED Adult Point Count and Incidental Observations		Dig Location		Permit Area	
■	Incidental Adult Observation	◇	Dig Location		Permit Area
●	Point Count Adult Observation	—	Rivulet		Dewatering
			Lemont to Lockport 18"		Excavation
			Delineated Wetlands		Temporary Workspace
					Access Road
					Projected Conservative Radius of Influence

Figure 2
Project Workspace and Effects
 WPL CU-LK Repairs
 Will County, Illinois



APPENDIX B ECOCAT RESULTS

Applicant: Environmental Resources Management
Contact: Jack Connell
Address: 1701 Golf Road
Suite 1-700
Rolling Meadows, IL 60008

IDNR Project Number: 2402929
Date: 08/11/2023

Project: Wolverine Pipeline Lockport
Address: 13699 New Ave, Lockport

Description: Repair of pipeline anomaly

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

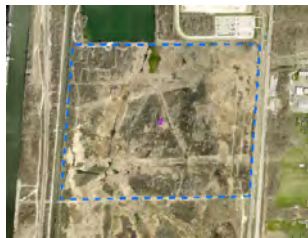
- Long Run Seep INAI Site
- Romeoville Prairie INAI Site
- Long Run Seep Nature Preserve
- Romeoville Prairie Nature Preserve
- Blanding's Turtle (*Emydoidea blandingii*)
- Grass Pink Orchid (*Calopogon tuberosus*)
- Hine's Emerald Dragonfly (*Somatochlora hineana*)
- Hine's Emerald Dragonfly (*Somatochlora hineana*)
- Quillwort (*Isoetes butleri*)
- Spotted Turtle (*Clemmys guttata*)

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Will

Township, Range, Section:
36N, 10E, 2



IL Department of Natural Resources

Contact

Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

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Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.



EcoCAT Receipt	Project Code 2402929
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APPLICANT	DATE
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Environmental Resources Management Jack Connell 1701 Golf Road Suite 1-700 Rolling Meadows, IL 60008	8/11/2023
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DESCRIPTION	FEE	CONVENIENCE FEE	TOTAL PAID
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EcoCAT Consultation	\$ 25.00	\$ 1.00	\$ 26.00
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TOTAL PAID	\$ 26.00
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Holland, MI 49424

T: 616-399-3500

www.erm.com

An implementing agreement, which shall include:

- A. Names of all participants in the execution of the conservation plan, including public bodies, corporations, organizations, and private individuals.**

Wolverine Pipe Line Company
Mr. Spencer Welling
Safety, Health, and Environmental Supervisor
8075 Creekside Drive, Suite 210
Portage, MI 49024

- B. The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of the activities in the conservation plan and a schedule for preparation of progress report to be provided to the Department.**

The Illinois Department of Natural Resources (“DNR”) is responsible for the review of the enclosed Conservation Plan and for subsequent issuance of the Incidental Take Authorization, prior to Wolverine Pipe Line Company’s execution of work.

Wolverine Pipe Line has completed pre-construction surveys that recorded species as outlined in the Conservation Plan, and will address avoidance, minimization, and mitigation measures as outlined in the Conservation Plan. Monitoring of post-construction restoration success will be required by Wolverine Pipe Line Company, with a report of monitoring being provided to the Illinois DNR, as outlined in the conservation measures and monitoring section of the Conservation Plan.

- C. Assurances that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan.**

Wolverine Pipe Line Company is the owner of the existing Lemont to Lockport (CU-LK) pipeline and is required to maintain compliance with the Code of Federal Regulations as enforced by the Pipeline and Hazardous Materials Safety Administration, which require pipeline operators to take prompt action to address all anomalous pipeline conditions that are discovered through integrity assessment or information analysis (CFR 195.452 and 49 CFR Appendix C to Part 195). Wolverine Pipe Line Company maintains an easement to operate the Lemont to Lockport pipeline, which will be the subject of the Project repairs. Wolverine Pipe Line Company will be executing temporary work authorization to utilize land adjacent to the pipeline easement from Heidelberg Materials (previously Hanson Material Services). Wolverine Pipe Line Company acknowledges through this implementing agreement that measures outlined in the Conservation Plan are the responsibility of Wolverine Pipe Line Company to carry out and complete, utilizing applicable permits and land agreements required to achieve the activities outlined in the Conservation Plan.

D. Assurances of compliance with all other federal, state, and local regulations pertinent to the proposed action and to execution of the conservation plan.

Wolverine Pipe Line Company abides by all associated state and federal environmental regulations in operating its assets for distribution of refined petroleum products to the Great Lakes region. The Project is being permitted through the U.S. Army Corps of Engineers – Chicago District, and to complete the work Wolverine Pipe Line Company will acquire applicable state and local permits, where required.


E. Copies of any federal authorizations for taking already issued to the applicant.

Wolverine Pipe Line Company has submitted an applicant prepared Biological Assessment to the U.S. Army Corps of Engineers, Chicago District. As the lead federal agency for the Project, the Army Corps has been engaged in agency-to-agency consultation with the U.S. Fish and Wildlife Service. Wolverine Pipe Line Company understands the consultation process was concluded via execution of a final amended Biological Opinion on October 27, 2023, and subsequent execution of the Conservation Plan is contingent on execution of the Biological Opinion by the U.S. Fish and Wildlife Service.

F. For projects that will result in the taking of endangered or threatened species of plants, copies of expressed written permission of the landowner.

Not applicable since the Hine's emerald dragonfly and Blanding's turtle are both considered animals under the Illinois Endangered Species Act.

CERTIFICATION: Wolverine Pipe Line Company hereby certifies that it has the authority and funding to complete the project and to address the issues proposed in the Incidental Take Conservation Plan for the state-listed Hine's emerald dragonfly and Blanding's turtle. Wolverine Pipe Line Company is in charge of the pipeline repair project and will acquire and implement applicable state, federal, and local regulations during the completion of the Project.


Chris Neely – Vice President and Manager

11-21-23
Date



Conservation Plan and Incidental Take Permit Application

Wolverine Pipe Line Company

Wolverine CU-LK Pipeline Repairs Project

November 16, 2022

Project No.: 0537915

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
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Document subtitle	Wolverine CU-LK Pipeline Repairs Project
Project No.	0537915
Date	November 16, 2022
Version	2.0
Author	Ken Mierzwa, Genevieve Rozhon, and Wade Hammer
Client Name	Wolverine Pipe Line Company

Document history

Version	Revision	Author	Reviewed by	ERM approval to issue		Comments
				Name	Date	
Draft	00	Ken Mierzwa, Genevieve Rozhon	Wade Hammer	Name	November 16, 2022	Text

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Acronyms and Abbreviations

Acronym	Description
AMSL	Above mean sea level
BMPs	Best management practices
CFR	Code of Federal Regulations
CNRR	Canadian National Railroad
Com Ed	Commonwealth Edison
CU-LK	Lemont to Lockport pipeline segment
dBA	A-weighted decibels
DBH	Diameter at breast height
Gpm	Gallons per minut
HCP	Habitat Conservation Plan
HDD	Horizontal directional drill
HED	Hine's Emerald Dragonfly
HMS	Hanson Material Service
I&M Canal	Illinois and Michigan Canal
IDNR	Illinois Department of Natural Resources
ITA	Incidental take authorization
LPC	Leafy prairie clover
mph	Miles per hour
PHMSA	Pipeline and Hazardous Materials Safety Administration
Project	Wolverine CU-LK Pipeline Repairs Project
RIV2	Rivulet 2
RIV4	Rivulet 4
RIV5	Rivulet 5
RIV9	Rivulet 9
ROI	Radius of influence
SDS	Safety Data Sheet
SHE	Wolverine Safety, Health, and Environment Department
U.S.	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WPL or Wolverine	Wolverine Pipe Line Company

1. INTRODUCTION AND DESCRIPTION OF IMPACTS LIKELY TO RESULT

- Project Applicant: Wolverine Pipe Line Company
- Project Name: Wolverine CU-LK Pipeline Repairs Project
- County: Will
- Area of Impact: Up to 1.4 acres (temporary ground disturbance)

Wolverine Pipe Line Company (Wolverine or WPL) proposes to excavate, expose, inspect, and repair up to 112 feet of an existing 18-inch diameter Lemont to Lockport (CU-LK) pipeline segment located in Lockport (Will County), Illinois, as part of its ongoing integrity and maintenance program. The Wolverine CU-LK Pipeline Repairs Project (Project) is required to maintain pipeline integrity and safety, in accordance with Pipeline and Hazardous Materials Safety Administration (PHMSA) enforced regulations, Title 49 CFR Parts 190-199. The Project site includes known presence of the federal and state endangered Hine's Emerald Dragonfly (*Somatochlora hineana*, HED) as well as the state endangered Blanding's Turtle (*Emydoidea blandingii*), American Bittern (*Botaurus lentiginosus*), and federal and state endangered Leafy Prairie Clover (*Dalea foliosa*).

1.1 Purpose of Document

The purpose of this Conservation Plan is to apply for an incidental take authorization (ITA) for the Wolverine CU-LK Pipeline Repairs Project per 520 Illinois Compiled Statutes 10/5.5 and 17 Ill. Adm. Code 1080.

This Conservation Plan was developed to meet ITA permit application requirements, per the Illinois Department of Natural Resources (IDNR) September 2021 guidance (IDNR 2021a).

Federal Endangered Species Act authorization is being addressed through Section 7 formal consultation with the United States (U.S.) Fish and Wildlife Service (USFWS) through the U.S. Army Corps of Engineers (USACE); a biological assessment was prepared and provided to the federal agencies (ERM 2022).

1.2 Area to Be Affected by the Proposed Project

1.2.1 Description of the Area to be Affected

The area to be affected, or for purposes of this document the "Permit Area" includes the entire area known as the Commonwealth Edison (Com Ed) Parcel, located south of 135th Street and immediately west of New Avenue near Lockport, Illinois at approximately 41.636114/-88.049520 (Appendix A, Figure 1), in addition to a buffer of 150 feet around the Wolverine Pipe Line located along the eastern portion of the Permit Area. The Permit Area also includes a 150-foot buffer around the proposed access route (Appendix A, Figure 2). This area is intended to encompass all effects associated with typical pipeline repair activities (noise, vibration, sediment control, etc.) as well as potential downgradient effects on surface or groundwater (which generally tend to flow from east to west in this area; Kay et al. 2018). The Permit Area extends approximately 2,300 feet to the west of proposed pipeline repair activities and encompasses already completed activities related to the Project, including prescribed burns and Blanding's Turtle surveys completed in April 2021 (ERM 2021a; RES 2021) and HED surveys completed in July 2021 (ERM 2021b). To the east of the pipeline, a buffer of 150 feet in width was established because existing activities including rail traffic and auto/truck traffic on New Avenue result in high ambient noise levels and a variety of other potential effects unrelated to the present Project, and because there is no known surface or groundwater movement to the east.

The approximately 103 acre Permit Area is intended to facilitate full analysis of all potential direct and indirect effects, whether negative, neutral, or positive, including habitat management and surveys for listed species.

This Conservation Plan refers to two smaller areas nested within the Permit Area, and these terms are defined as follows:

The workspace includes an area of up to 1.4 acres, primarily inside sediment control barriers, where all direct Project-related work (excavation, staging, access, stockpiling) would occur. As described below, not all of this area would be impacted, and some effects (driving down a narrow access road) would be limited.

The excavation area includes up to approximately 0.03 acres (maximum 112 feet long in total) along the pipeline corridor where excavation may occur. This is the only area where ground disturbance is planned to occur below the soil surface.

Depending on findings after initial excavation of each anomaly, it may not be necessary to excavate the entire 112-foot length. Thus, the above areas represent the maximum possible extent of effects or the worst case scenario.

Most of the Permit Area overlaps with a Habitat Conservation Plan (HCP) prepared by Hanson Material Service (HMS), landowner of the Com Ed Parcel. The HCP was approved by USFWS on November 15, 2021. The State ITA for the HCP was completed in December 2021.

1.2.2 Permit Area Existing Conditions

This section provides an overview of current habitat conditions within the Permit Area to provide context. Baseline conditions for the species included in this assessment are addressed below, in the individual species accounts.

The Permit Area is located in the Northern Illinois and Indiana Heavy Till Plain Major Land Resource Area, which is part of the larger Central Feed Grains and Livestock Land Resource Region (USDA 2006). When this area was settled, about 60 percent of the total land cover supported prairie vegetation (USDA 2006). Per the IDNR Natural Division and Section classification (Schwegman 1997), the Permit Area is located within the Northeastern Morainal Natural Division. This division contains a landscape of the most recently glaciated portion of Illinois, and hosts the greatest biodiversity in Illinois (Schwegman 1997). Like most areas of the state, natural land cover has been extensively altered, although urbanization is considerably more extensive in this division due to the proximity to outlying suburbs of Chicago, and expansion of development continues to be a major threat in this area (Schwegman 1997).

The Permit Area (Appendix A, Figure 2) has been modified by a variety of past activities, including construction of the Illinois and Michigan Canal in 1848 at the west boundary and subsequent construction of the Chicago and Sanitary and Ship Canal, which opened in 1900, just to the west. Construction of these significant infrastructural features likely resulted in selective scraping of overburden and deposition of spoil piles of rock and soil in and around the Permit Area. Disturbance to some parts of the Permit Area thus dates back a minimum of 173 years and possibly longer. Construction of New Avenue and the Canadian National Railroad (CNRR) rail line through the east edge of the Permit Area also would have altered hydrology by funneling water through culverts or filtering through rock ballast associated with the railroad. The WPL CU-LK pipeline was constructed in 1969.

Approximately 24 distinct land cover or habitat classifications have been identified within the Permit Area (AES 2019). Upland shrubland, cattail marsh, bottomland shrubland, and wet-mesic dolomite prairie represent the four most common habitat types (AES 2019). Habitat within the Permit Area is known to include dolomite prairie, which is a globally rare habitat that has almost completely disappeared from the Midwest (Suloway et al. 1996). Dolomite prairie wetlands specifically are prairie ecosystems sitting over shallow bedrock that support a high diversity of plant and animal species, including federally threatened and endangered species that are found in few other areas (Com Ed 2013, Molano-Flores et al. 2015). Due to the history of development within and surrounding the Permit Area, undesirable species, including common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), cattail (*Typha* sp.), and European

buckthorn (*Rhamnus cathartica*), have begun to proliferate within the Permit (AES 2018a, AES 2019). Common reed has expanded considerably since 2011, when it was first noted along upper Rivulet 2 (RIV2) (Mierzwa field notes). A transect walked in July 2021 by ERM documented common reed along almost half of the pipeline segment within the Permit Area, including most of the PR-01 and FR-02 workspaces (See site photos in Appendix B).

Topography within the Permit Area is generally flat with minimal relief. Elevation ranges from approximately 596 feet above mean sea level (AMSL) near the eastern border to 588 feet AMSL near the western border. In general, the Permit Area slopes downward from east to west. Groundwater flow direction in the Permit Area is generally from east to west (AECOM 2013, Kay et al. 2018), and surface water flow has been observed to follow a similar pattern (ERM 2021a). Groundwater elevations across the Permit Area generally range from 581.5 to 587.5 AMSL (AECOM 2013). Boring logs from previous surveys reveal typical depth to bedrock of 1 to 2 feet across the Permit Area, and dolomite bedrock was observed at all boring locations (AECOM 2011). Water infiltration in the Permit Area is limited by the shallow bedrock and groundwater seeps and rivulets have been observed as a result of the underlying geology (ERM 2021a). Per the U.S. Department of Agriculture web soil survey, soil types within the Permit Area generally consist of Joliet silt loam, 0 to 2 percent slopes and Romeo silt loam, 0 to 2 percent slopes (USDA 2020). Kay et al. (2018) report that alluvial sands are present, presumably deposited as the much larger post-glacial river receded.

Numerous pipelines, transmission lines, and a road and railroad intersect the Permit Area. A spill of crude oil from a pipeline operated by West Shore Pipe Line Company occurred in December 2010, near the southern boundary of the Permit Area (Com Ed 2013). A controlled burn was conducted within the Permit Area west of the CNRR in March 2021 (ERM 2021a). This resulted in cutting of some buckthorn thickets and burning of common reed, cattails, and herbaceous vegetation, which largely resprouted in spring/summer 2021.

1.3 Biological Data on the Affected Species

ERM submitted an initial information request to IDNR at the beginning of the Project, and received a response on March 18, 2018. The initial review of the Illinois Natural Heritage Database identified two species: Blanding's Turtle and Leafy Prairie Clover.

As part of subsequent permit application preparation, a more thorough review was completed. For federal consultation, IPaC was reviewed on August 30, 2021 (USFWS 2021). The Illinois Ecological Compliance Assessment Tool was reviewed on August 4, 2021, and six State protected resources were identified in the Project vicinity. IDNR requested consultation on these resources on November 22, 2021:

- Long Run Seep Illinois Natural Areas Inventory site and Long Run Seep Nature Preserve
 - Long Run Seep (Illinois Natural Areas Inventory site and Nature Preserve) is located well southeast of and outside of the Permit Area, upgradient and across New Avenue. There would be no Project-related effects.
- Blanding's Turtle (*Emydoidea blandingii*), Hine's Emerald Dragonfly (*Somatochlora hineana*), and American Bittern (*Botaurus lentiginosus*)
 - Blanding's Turtle and Hine's Emerald Dragonfly have been documented within the Permit Area by past studies and Project studies, and are fully analyzed below. An additional State protected resource, the American Bittern, was observed during Project-related studies in spring 2021 and is also fully analyzed below.
- Grass Pink Orchid (*Calopogon tuberosus*)
 - Grass Pink Orchid is typically associated with bogs, wet sand prairies, and associated wetland communities. Although known from southwest Will County, we are not aware of any populations in the vicinity of the Permit Area. Thorough botanical inventories completed for the HMS HCP (HMS

2021) have not reported this species. Thus, it is not believed to be present and is not analyzed further in this document. No take is anticipated.

■ **Quillwort (*Isoetes butleri*)**

- Quillwort occurs on thin soils in dolomite prairie habitat, especially where vegetation is sparse. There is a recent record from public lands a few miles south of the Permit Area. Although dolomite prairie is present within the Permit Area, it occurs within the temporary disturbance footprint only as a deeper soil and partially shaded variant in a small portion of the north end, and Quillwort has not been reported during extensive botanical inventories completed for the HMS HCP (HMS 2021); the HCP does not cover this species. It was not noted during 2021 fieldwork (RES 2021; ERM 2021b). The requisite exposed dolomite or very thin and sparsely vegetated soils occur in the central part of the Permit Area but are not present in or within several hundred feet of the workspace, which is entirely covered in dense herbaceous vegetation except for the developed existing access road. Quillwort is not believed to be present and is not analyzed further in this document. No take is anticipated.

■ **Leafy Prairie Clover (*Dalea foliosa*)**

- Leafy Prairie Clover is known to occur on dolomite exposures and thin soils in the central part of the Permit Area, especially where historical scraping exposed bedrock. Due to its well-documented presence, the species is analyzed below, although no take is anticipated because of distance from proposed ground disturbance.

We also reviewed available lists of state-listed species by county; none of the additional species identified on the Will County list are known or reasonably expected to occur within the Permit Area. Full accounts for the species identified as present in the Permit Area follow.

1.3.1 Hine's Emerald Dragonfly

1.3.1.1 Federal and State Status

The HED was listed as endangered effective January 26, 1995 (60 FR 5267). Critical habitat for HED was designated on September 5, 2007 (72 FR 51101) and revised on April 23, 2010 (75 FR 21393). HED was listed as endangered by the State of Illinois in 1991 (IESPB 2012).

1.3.1.2 Life History

Hine's emerald dragonfly eggs are deposited in summer and the eggs overwinter, hatching in spring. Larval development requires three to five years (Soluk and Satyshur 2005). As with many invertebrates, survival rates are low for smaller larvae (USFWS 2013). Emergence as adults occurs over a period of several weeks in late June and early July (Foster and Soluk 2004).

1.3.1.3 Biological Requirements

Most extant populations are associated with shallow soils over dolomite bedrock and seepage or spring-fed wetlands. Adults tend to be most abundant close to breeding sites and in areas of good habitat interspersion, especially where breaks in height of native vegetation are present (e.g., sedge meadow-cattail edges) (Mierzwa et al. 1998, Wildermuth 1986). Larvae inhabit small rivulets with slow flow and moderate water temperatures, or sedge meadows where shallow water pools between tussocks are present. Exceptions to these habitat requirements include the type locality in Ohio, where bedrock is at considerable depth; however hydrology at this site was altered by 1930 (Williamson 1931) so the original condition is known only from the written description.

Presence of crayfish burrows is thought to be a requirement, because larvae use burrows to escape drought and high or low temperatures. Burrows of *Lacunicambarus nebrascensis* (formerly *Cambarus diogenes*) are utilized at River South Parcel (Soluk 2006) and in Door County, Wisconsin (Pintor and Soluk 2006). Other species of crayfish occur within HED breeding habitat, including *Procambarus gracilis* in Ozaukee County, Wisconsin (Soluk et al. 2003, cited in USFWS 2013)a and *Procambarus acutus* in the Permit Area (Brown and Soluk 2012). Use of burrows of other species of crayfish has not been documented. When found, larvae are often in crayfish burrows close to rivulets (Pintor and Soluk 2006), although in sedge meadows, burrows may be in the bases of sedge tussocks and well dispersed with no clear spatial pattern (Mierzwa and Webb 2011).

1.3.1.4 Rangewide Status

Extant populations are known in Wisconsin, Illinois, Michigan, Missouri, and Ontario with the largest populations in Door County, Wisconsin (USFWS 2013). Historic populations in Ohio are extirpated, and older isolated records from Indiana and Alabama are of uncertain status.

Detailed trend data is available only for the Illinois populations (Soluk and Mierzwa 2012); numbers decreased substantially after 2002 and remain low. The size of the Illinois population "... is very low for any insect and appears to be on a downward trend" (USFWS 2013).

Six different haplotypes or genetic variants have been found within the Illinois Lower Des Plaines River Valley subpopulation 1, which includes multiple sites. The two Illinois sites with the greatest numbers of HED are Lockport Prairie and River South, see immediately below for full list. Because of this high genetic diversity and unique haplotypes, USFWS (2013) has identified the subpopulation as important to the long-term viability of the species.

The HED Recovery Plan prioritizes, among other things, protection and management of extant populations (Zercher 2001) and searches for additional populations.

1.3.1.5 Permit Area Numbers, Reproduction, and Distribution

The Permit Area includes the Com Ed Parcel owned by Hanson Material Service and a small buffer to the east. The hierarchy of sites as defined by USFWS (2013) is:

Southern recovery unit

Illinois population

Illinois subpopulation 1 (*Lockport Prairie, River South, Middle Parcel, Romeoville Prairie, Long Run Seep NP and Long Run/Com Ed Parcel*)

Critical Habitat Unit 7 (*Long Run Seep NP and Long Run/Com Ed Parcel*)

Permit Area (*Com Ed Parcel plus a 150-foot buffer to the east*)

Past adult HED studies conducted within the Permit Area include random transects and distance sampling, resulting in density estimates and map points, led by Ken Mierzwa from 2004 through 2011 (Mierzwa and Webb 2011) with limited follow-up qualitative observations in subsequent years. Adult HED observations from these studies are included on Appendix A, Figure 3 (2021 observations) and Appendix A, Figure 4 (2004-2016, HED adult observations data provided by USFWS), which indicate behavior (territorial patrols, foraging activity, and other less frequent observations such as teneral or perched animals). These studies covered the eastern 60 percent of Com Ed Parcel and an irregular polygon encompassing open habitat in the northern and western parts of Long Run Parcel. Mierzwa et al. (2010) also conducted HED adult point counts along the CNRR at the east edge of the Permit Area. Although not strictly comparable in a quantitative sense, presence-absence data from this effort suggests presence along most of the corridor between Long Run

Seep Nature Preserve, Long Run Parcel, and Com Ed Parcel with three areas of higher activity near the northeast sedge meadow, across from the Long Run Seep Nature Preserve breeding rivulet, and one small area in between along the rail segment.

In general, from 2004 through 2011 adult observations were concentrated in four areas: 1) In the northeast sedge meadow, defined here as the area extending 500 feet west from the pipeline and 1,200 feet south from the edge of the Metra Station parking lot at the north limit of the Permit Area; the highest concentration of observations was near the northern edge of the site between 90 and 300 feet west of the railroad, just north of the recent RIV5 larval observation; 2) in the northeast corner of the Long Run Parcel; 3) near a seasonal pond and marsh in the north-central part of Long Run Parcel, just west of where Brown and Soluk (2012) reported larvae; and 4) in a seasonally wet sedge meadow near the center of the Long Run Parcel. Only the first of these locations is entirely within the Permit Area.

Table 1. Adult HED Observations at Long Run/Com Ed Parcel, 2004-2011.

Common Name	Number of Transects	Transect Observations	Incidental Observations	Estimated Density per Hectare	Distribution of Observations
2004	12	4	4	0.37	Widely scattered across eastern quarter of site, no concentrations
2005	18	0	2	0.00	Both in northeast sedge meadow, about 240 ft west of RR
2006	18	9	1	0.49	7 in Long Run Parcel, 1 in northeast sedge meadow
2007	18	7	1	0.32	Evenly split between northeast sedge meadow and Long Run Parcel
2008	18	9	5	1.09	Most on Long Run Parcel, 5 in northeast sedge meadow
2009	18	2	1	0.18	Both about 300 ft west of RR in sedge meadow
2010	20	7	3	1.44	NE and SE parts of site; one teneral near RIV9
2011	15	3	3	0.36	Two in northeast sedge meadow 180-210 ft west of RR
Mean		5.13	2.5	0.53	

Notes: The area of coverage for data presented in this table includes the eastern 60 percent of the Permit Area and also extends about 1500 feet to the south. (Modified from Mierzwa and Webb 2011). Observations noted in Table 1 are from transect density estimates led by Mierzwa and include most but possibly not all of the points shown on Appendix A, Figure 4. The USFWS dataset may include a few additional observations by others.

HED adult activity in 2021 is mapped separately (Appendix A, Figure 3) because it is based on point counts, because of the 10-year interval between surveys, and extensive habitat changes to parts of the Permit Area during that interval. Adult activity persisted where sedge-dominated openings remain along the northern and eastern edges of the northeast sedge meadow; essentially the only portions of the formerly extensive sedge meadow that has not been encroached by dense common reed or dense cattail; and at widely scattered locations across the remainder of Com Ed Parcel.

The most recent 5-year review of the HED identified two verified breeding areas within Critical Habitat Unit 7 (CHU7), but none in the Permit Area. One of these known breeding sites is a well-documented rivulet 147 yards in length within Long Run Seep Nature Preserve, located east of New Avenue and outside of the Permit

Area, about 0.6 miles to the south-southeast of the Permit Area (Kay et al. 2018, Soluk and Satyshur 2009, Soluk and Mierzwa 2012). The other breeding area is located further away from the proposed excavations and is just south (within 100 feet) of the Permit Area and within the Long Run Parcel; it includes a small number of crayfish burrows associated with seasonal rivulets where three HED larvae were found in 2011 (Brown and Soluk 2012). Surveys conducted in summer 2021 verified two newly discovered breeding sites within the Permit Area (ERM 2021a); these are discussed below and are shown on Appendix A, Figure 2.

The first of the newly documented breeding sites is associated with rivulet 5 (RIV5) and is 375 feet west of the WPL pipeline. RIV4 and RIV5 are hydrologically connected, but are separated by a man-made pond which is non-habitat for HED larvae. The entire RIV4/5 system is characterized here. West of the CNRR, the water for the breeding site appears to originate in part at or through the base of rail ballast where the well-defined rivulet (RIV4) emerges about 330 feet south of the northern Permit Area boundary. The upper reach of RIV4 is entirely within dense common reed habitat, eventually flowing into a pond, which is non-habitat for HED. RIV4 maintained visible slow flow in summer 2021 and appears to be perennial. At the lower (western) end of the pond, the water overtops a rock dam and becomes RIV5, flowing for an additional 230 feet in a meandering pattern before diffusing. West of the pond, RIV5 is also fed by water from adjacent wetlands and possibly by local groundwater sources, although no specific information is available. RIV5 retained water in July 2021 although there was no visible flow and a few small gaps in visible surface water. The upper half of RIV5 is in common reed and the lower half is within mixed sedge meadow and cattail marsh. Two larvae (17 and 18mm) were captured in a crayfish burrow immediately adjacent to the rivulet in open sedge/cattail habitat.

The second newly documented breeding site is in rivulet 9 (RIV9) about 190 feet west of the WPL pipeline and to the south of the RIV4/5 system. Two small (5 and 6mm) larvae were captured in a crayfish burrow within RIV9, in marginal habitat with little water in mid-summer and encroaching common reed close on three sides. Flow into this area probably originates where RIV2 enters through the eastern portion of the Permit Area via a culvert. RIV2 flows entirely within dense common reed, and during the 2021 survey, the water within RIV2 had a petroleum sheen and associated odor. The petroleum sheen is of unknown origin but begins somewhere upstream of where RIV2 crosses the WPL CU-LK pipeline. RIV2 diffuses to the southwest into a mixed sedge/cattail/reed canary grass meadow. RIV9 is just west of this meadow, and is presumably fed in part by lateral groundwater movement through the shallow overburden. The northeast portion of the Com Ed Parcel also reportedly has localized upwelling of groundwater through the underlying bedrock (Kay et al. 2018), and this could contribute to both breeding sites. Hydrology can be complex and locally variable within a site.

No other HED larvae have been documented within the Permit Area, and there is little available habitat in other parts of the Permit Area. Most crayfish burrows are in several clusters in the northeast part of the Permit Area, and shallow soils may limit crayfish abundance in most of the rest of the Permit Area. RIV2 and RIV4 appear to be perennial or nearly so, and RIV5 remains well saturated, with scattered intermittent pools, in July. As rivulets extend further to the west across the Permit Area, in the summer of 2021 ERM staff noted that they became increasingly flashy, flowing after rainfall and then drying within several days. Some are thought to be dry for at least parts of a typical late summer (also noted by Brown and Soluk 2012). Exceptions include the lowermost parts of a few rivulets close to the I&M Canal, which function as perennial stagnant backwaters; similar habitat features on River South and other HED sites have not produced larvae (K. Mierzwa pers obs).

RIV2 and RIV4 may have once provided good quality larval habitat, although in recent years, encroachment of common reed has greatly limited habitat value. Mierzwa (2008) did not include common reed in a detailed discussion of invasive species on the Long Run/Com Ed site; there were dense stands in the western part of Long Run Parcel at that time but it was not noted within areas with frequent HED activity. During 2011 larval surveys a relatively small patch of dense common reed was noted at the upper end of what is now known as RIV2, just below the culvert under the railroad, but it was not yet extensive (Mierzwa field notes). Common

reed has spread rapidly over the subsequent decade. Appendix A, Figure 5 utilizes a combination of previous vegetation mapping and field observations made during 2021 fieldwork to characterize the current location and extent of common reed within the Permit Area. By the summer of 2021 common reed was a dominant community type in the former northeast sedge meadow. A transect walked along the west edge of the pipeline corridor on July 21, 2021 noted that nearly half of the pipeline segment consisted of dense common reed marsh, including areas around both rivulets and most of the PR-01 and FR-02 workspaces.

For a variety of reasons documented in the survey report (ERM 2021a), dense common reed monocultures offer poor habitat (root lattices restrict crayfish burrowing ability and reduce number and size of burrows; simplified habitat structure; creation of gallic acid resulting in reduced pH; increased evapotranspiration; in dense stands, tall canopies limit adult HED access to rivulets). Past sampling at other lower Des Plaines River Valley sites has not found HED larvae in dense common reed (K. Mierzwa pers obs).

Since the onset of quantitative HED surveys in 2004, the size of the HED population at Long Run/Com Ed Parcel has been thought to be quite small (Soluk and Mierzwa 2012). During summer 2021 surveys for HED, ERM sampled almost every known crayfish burrow in the Permit Area, considerably exceeding the standard protocol. Sampling only square meter plots every five meters along rivulets would have missed most burrows. Rather, as suggested by USFWS, we mapped burrows by walking transect grids throughout the Com Ed Parcel after spring prescribed burns when bare ground was exposed. This method has been effective for identifying burrows at North Parcel (Mierzwa and Webb 2014) even when burrows are capped in early spring and late fall.

We determined that within the Permit Area, crayfish burrows tend to occur in dense clusters, with very few burrows away from these clusters (see Appendix A, Figure 5). Large expanses of the site, especially the central portions known to have been previously scraped or where there are very thin soils over bedrock, had no burrows. Although it is unlikely that every individual crayfish burrow was located, the use of a grid search pattern and the near absence of post-burn vegetation cover means it is unlikely that any large clusters were overlooked.

Subsequent sampling results confirm that HED larvae were not abundant in 2021. As shown in Table 3, relatively high larval densities are known from some Lockport Prairie and River South locations, as well as from Long Run Seep Nature Preserve. Densities in the Permit Area and just to the south are considerably lower. The Permit Area densities do not include prior (2010, 2011) unsuccessful sampling events, because these were limited and conducted when dense vegetation cover made burrows more difficult to locate. Including these earlier results would have lowered the mean density.

No larvae were captured in rivulets, and most rivulets within the Permit Area appear to be of marginal to poor habitat quality as a result of either dense invasive vegetation, or water temperatures (in July 2021) toward the high end of the acceptable range for HED larvae.

Table 2. HED Larval Density per Burrow for Selected Illinois Locations

Location	Larvae per Burrow (Mean)	Larvae per Burrow (Range)	Number of Years Sampling
Lockport 2N	1.55	0.41-3.25	6
Lockport 2S	0.98	0.41-1.24	5
River South 2.0	0.50	0-0.50	3
River South 2.5	0.25	0-0.50	3
River South 3.0	0.72	0.67-0.76	3
River South 6.0	0.15	0-0.29	3
River South Emerald Meadow	0.74	0.67-0.74	3
Long Run Seep	1.33	0.50-2.43	5
Permit Area	0.10	0.10	1
Long Run Parcel	0.05	0.05	1

Source: Adapted from Soluk and Mierzwa (2012), ERM (2021b) and Brown and Soluk (2012).

Notes: Does not include seven Permit Area burrows pumped in 2011, with no larvae found.

The most recent 5-year review (USFWS 2013) stated, "...it is currently assumed that the Long Run/Com Ed Parcel makes only a small contribution to the Illinois HED population (Soluk and Mierzwa 2012)." Although the 2021 field surveys provide two additional points where larvae are present in small numbers, results of these surveys support the statement in USFWS (2013). Within the Permit Area, the northeastern part of the site has in the past consistently supported territorial HED behavior (Mierzwa 2008). Adult HED density is more variable from year to year than at some other sites, but was relatively high in some years (Mierzwa and Webb 2010). One of the past "hot spots" for territorial behavior is about 100 to 300 feet west of the pipeline and north of what is now defined as RIV5, where larvae were captured in 2021. Several adult HED foraging observations were made in this same area in 2021 and it is one of the few parts of the northeast corner which retains sedge meadow habitat and has not been completely invaded by common reed in recent years. The other 2021 larval location, at RIV9, is close to where a teneral adult HED was observed in 2010 (Mierzwa and Webb 2010); this teneral adult is not illustrated on Figure 4, Appendix A, HED adult observation data provided by USFWS. Because all documented larval occurrences to date are within the historic northeast sedge meadow area (defined as very roughly 450 feet east-west and 1,200 feet north-south), this area is considered important to HED even though at present much of it has been degraded by recent (about the past 10 years) invasive species encroachment. The only territorial HED behavior observed in 2021 was in sedge meadow habitat in the northwest part of the Permit Area (Figure 3).

Soluk and Mierzwa (2012) estimated the Long Run Seep Nature Preserve/Long Run/Com Ed Parcel mean subpopulation size at nine adults (of a population estimate of 86-313, or 3-10% of the LDRV population). This number was arrived at by applying the estimate from Foster and Soluk (2004) that 8% of larvae are F-0 (or pre-emergent). By assuming all F-0 instars successfully emerge as adults, it is theoretically possible to roughly estimate the mean total larval population size for the combined Long Run Seep Nature Preserve/Long Run/Com Ed Parcel at about 112 larvae of all age classes. The majority of these larvae would be expected to be outside of the Permit Area in the nature preserve rivulet, which has much higher mean larval densities. At all locations, there would be very low natural survival of early instars (Soluk and Mierzwa 2012).

Adult HED observations within the Permit Area further corroborates that the HED population at Long Run/Com Ed Parcel is likely quite small (Soluk and Mierzwa 2012). In 2021, most adult observations during point counts were along the northeast edges of the Permit Area. An additional two observations were made at

a sedge meadow opening in the northwest part of the Permit Area and scattered observations were made along the southern boundary, where a right-of-way corridor appears to provide an east-west dispersal pathway. Earlier quantitative monitoring documented similar patterns within the Com Ed Parcel (Mierzwa and Webb 2011).

During more intensive surveys in 2010, along the CNRR railroad at the eastern portion of the Permit Area, three “hot spots” were identified. One of these “hot spots” was at the northeast corner, another near the southeast corner of the Permit Area where the above-referenced possible dispersal pathway ends, and the third further to the south and near the Long Run Seep Nature Preserve breeding site (Mierzwa et al. 2010).

Some dispersal is known to occur to/from other subpopulation 1 sites west of the Des Plaines River (Mierzwa pers obs), and more frequent movement is believed to occur between areas on either side of New Avenue via the rail corridor. The Permit Area may be important in maintaining a dispersal pathway between sites east and west of the river, as well as providing foraging habitat and limited breeding habitat to supplement the higher quality and actively managed habitat in Long Run Seep Nature Preserve.

No recent (post-2011) quantitative trend data are available for the Permit Area for either larvae or adults. On nearby better-studied sites (River South), it is known that HED adult abundance was generally higher from 1995-2002 with numbers reduced since that time. At Long Run Seep Nature Preserve, in 1994 adults were often observed in parts of the upper preserve where they have not been seen recently (Mierzwa et al. 1995), suggesting that at that time numbers east of the river may also have been higher than today.

Although annual variation in adult HED presence is typical and expected, 2021 adult numbers do not appear to vary greatly from mean abundance documented in the period 2004-2011 (Mierzwa and Webb 2011). Adult point count results in 2021 were within ranges documented on the adjacent rail line in 2010 (Mierzwa et al. 2010), although that earlier study had a larger sample size. It is likely that larval habitat within the Permit Area makes a small contribution to local recruitment, with larger numbers originating in the nature preserve not far from the Permit Area. For example, the two larger larvae captured and released in the Permit Area in 2021 would be likely to emerge as adults in summer 2022, if they survive another year.

1.3.1.6 Permit Area Conservation Needs and Threats

The following factors have been identified as potential threats to the species at Long Run Seep/Long Run/Com Ed Parcel (USFWS 2013):

- Fragmentation (barriers to movement or loss of corridors for movement);
- Hydrology degradation (impacts to quantity or quality of surface and subsurface hydrology);
- Contaminants (habitat-altering chemicals, including road salt and petrochemicals);
- Vehicle mortality (cars, trucks, trains); and
- Invasive plants (vegetation that impacts habitat features such as common reed, or encroaches on habitat such as woody vegetation)

Recent common reed encroachment is thought to represent one of the greatest threats to future successful larval recruitment within the Permit Area, although habitat restoration appears to be feasible. During July 2021 fieldwork, common reed was abundant within the Permit Area and much more extensive than what had been observed as recently as six years ago (K. Mierzwa pers obs.). Common reed has encroached to within 30 feet of the RIV5 larval location and it now essentially surrounds the RIV9 site. Historic breeding locations may have been lost to invasive species encroachment.

Hanson Material Service has submitted an HCP, which includes proposed habitat restoration within most of the WPL Permit Area and at several other locations. The HCP was approved in November 2021. Treatment prior to pipeline repair work of a linear strip of common reed in the areas of proposed Project workspaces and

access routes in the eastern portion of the Permit Area as part of the WPL Project would provide a first step toward control of common reed and compliment HCP activities.

Hydrology is another limiting factor within the Permit Area. The eastern portion of the Permit Area has relatively reliable groundwater and surface water hydrology, with conditions gradually becoming drier and flashier to the west. In the western half of the Permit Area, ERM staff noted that in summer 2021 many rivulets filled after summer rains and then dried again within several days. Some of this is unavoidable because of the flat gradient of the Permit Area and historic alteration of the groundwater table by construction of the two canals over 120 years ago. However, various invasive species, including buckthorn and common reed, likely contribute to the problem by increasing evapotranspiration. Re-establishment of historic sedge-dominated wetlands would be expected to contribute to improved hydrologic conditions.

Although an inventory of vehicle mortality has not been conducted recently, in 2010 incidental observations were made of a few dead *Aeshna* sp. and individuals of several smaller and weaker flying species along the shoulder of New Avenue (Mierzwa et al. 2010). *Aeshna* sp. are of similar size and flight ability to HED. No HED were observed, but it is reasonable to assume that occasional mortality events occur from fast moving cars and trucks. The effect of trains is unknown.

1.3.2 Blanding's Turtle

1.3.2.1 Federal and State Status

The Blanding's Turtle (*Emydoidea blandingii*) was petitioned for federal listing by the Center for Biological Diversity in 2012 (CBD 2012) and a 90-day finding that listing may be warranted was published on 1 July 2015 (80 FR 37568). Illinois listed the Blanding's Turtle as threatened in 1999, with uplisting to endangered in 2009 (IESPB 2012).

1.3.2.2 Life History

In northeastern Illinois, nesting occurs in late May or June (Rowe and Moll 1991), with females depositing three to 22 eggs usually at night (Ernst et al. 1994). Rowe and Moll (1991) documented female movements of 2,100 to 3,000 feet to nest sites. In Wisconsin, nests are in grasslands with well-drained, sandy loam soils or sand; mean distance from water was 550 feet (Ross and Anderson 1990). Incubation time is variable, with most hatchlings emerging from mid-August to October (Ernst et al. 1994).

Blanding's Turtles are diurnal, and are especially active in the morning. Well-defined and widely separated activity centers are occupied; locations may change over time (Ross and Anderson 1990). In Illinois, individuals occupied two to four activity centers with 84.5 percent of activity confined to the activity centers (Rowe and Moll 1991). Movements between activity centers of 0.25 to 0.6 mile are not uncommon. For example, during a radiotelemetry study in Lake County Illinois, an adult female Blanding's Turtle moved over 2,500 feet between two activity centers in a few days, while another individual remained in the same activity center for 2 months and moved only short distances (Mierzwa and Thiele 1996). Anthony (2012) documented long-distance movements in and near the Des Plaines River not far from the Permit Area.

1.3.2.3 Biological Requirements

Ernst et al. (1994) describe habitat requirements as "productive, eutrophic habitats, with clean shallow water, a soft but firm, organic bottom, and abundant aquatic vegetation. It is found in lakes, ponds, marshes, creeks, wet prairies, and sloughs." A known activity center west of the Des Plaines River and directly west of the Permit Area includes a small and deep (greater than 4 feet) open water pond surrounded by extensive shallow cattail marshes and grassland openings (Banning and Dreslik 2010; K. Mierzwa pers obs). At River South Parcel, a large, shallow pond bordered by sedge meadow and marsh and with a direct connection to the Des Plaines River supports a breeding population (K. Mierzwa pers obs). In Lake County Illinois, activity

centers included interdunal ponds with open centers and bulrush/cattail borders grading into wet prairie (Mierzwa and Thiele 1996). At Chain O' Lakes State Park near the Lake/McHenry County line, large populations inhabited extensive shallow marshes and ponds (Rowe and Moll 1991). In northern McHenry County, at least 10 adults were captured in a pond within a vast sedge meadow (Mierzwa 1990).

1.3.2.4 Factors of Decline and Rangewide Status

Several studies have shown that in many parts of the range, Blanding's Turtle recruitment is not sufficient to maintain viable populations (Congdon et al. 1993). Contributing factors include high rates of egg mortality especially from over-abundant omnivores, and road mortality of normally long-lived adults.

1.3.2.5 Permit Area Numbers, Reproduction, and Distribution

Although Blanding's Turtle is moderately common at some nearby locations such as Lockport Prairie and the HMS North Parcel complex (Banning et al. 2006, Banning and Dreslik 2010), there are only six reports from within the Permit Area (Appendix A, Figure 7). In spring 2015, Illinois Natural History Survey reported three adults and one juvenile on Com Ed Parcel (Feng and Dreslik 2015). There have been two other reports, one in April 2012 (J. Mengler pers comm cited in HMS 2021) and one in April 2021 (RES 2021) (Appendix C). Both of these observations were along the open utility corridor dividing Long Run and Com Ed Parcels. The number of observations is not sufficient to allow any estimate of local population size. Most reports have been of adults; however, one juvenile reported in 2015 suggests a breeding presence in at least the western end of the Permit Area. Searches of embankments on the north and east edges of the Permit Area have not thus far revealed any evidence of nesting such as fresh excavations or eggshell fragments after predation (RES 2021) although such evidence is plentiful at other nearby localities such as River South (K. Mierzwa pers. obs.). Our working assumption is that a relatively small adult population is present and that population size is limited by fragmentation (New Avenue, rail lines, nearby development), the relatively small size of individual sites, and the availability of relatively few deep perennial wetlands suitable as activity centers (there are no ponds within the proposed workspace). It is assumed that at least some reproduction is taking place at a thus far undetermined location in the west of Com Ed Parcel near where one juvenile was reported in 2015 (Feng and Dreslik 2015).

1.3.2.6 Permit Area Conservation Needs and Threats

The greatest threats to Blanding's Turtle in the Permit Area are believed to include habitat fragmentation, limited availability of suitable activity center and nesting habitat, and encroachment of invasive vegetation. The HMS HCP mapped habitat quality of Blanding's Turtle (HMS 2021, Appendix A, Figure 12 in the HCP). The largest area of good quality habitat is in the western part of Com Ed Parcel, where two-thirds of the known observations have been made (Feng and Dreslik 2015), and smaller areas in the southern and eastern portions of the site. However, these latter two areas include very few perennial marshes or ponds suitable as activity centers, and as a result only two adult turtles have been observed; both near the southeast corner of the site in a maintained utility corridor which likely serves as dispersal habitat (RES 2021).

From the likely activity centers in the western part of the site, arrayed along a generally north-south drainage, potential movement corridors do not extend more than 2,000 feet (and usually much less) in any direction before encountering a barrier to movement. The exception is the I&M Canal at the western limit of the Permit Area, which likely facilitates north-south aquatic movement. However, there are few other accessible habitat areas along the I&M Canal, and the much larger and steep-sided Sanitary and Ship Canal effectively isolates populations east of the Des Plaines River from the larger ones to the west. To the north, developed land is a barrier. To the south, part of Long Run Parcel is suitable but this quickly grades into dense young woodland and then to developed land to the south. To the east, the CNRR and New Avenue may be passable in some locations but pose mortality risk, and there is a limited amount of undeveloped open habitat to the east. These

barriers likely contribute to the apparent small size of the Permit Area population (only six reported observations to date, despite focused surveys in 2015 and 2021 and years of other field work).

Activity centers are mostly in the west of Com Ed Parcel, along a drainage way and associated marshes and ponds (Appendix A, Figure 7; and Feng and Dreslik 2015). A marsh in the north-central part of the Permit Area also appears to be suitable. Only a few very small ponds are present in the eastern half of the Permit Area (for example, a small pond between Rivulet 4 (RIV4) and RIV5, which mostly dries in late summer) and none within the proposed workspace. While the western activity centers are structurally suitable, they are increasingly being degraded by invasive vegetation such as common reed. Blanding's Turtles will utilize common reed habitat to some extent, as evidenced by captures of juveniles in a ditch at the edge of common reed at Middle Parcel; however, Feng and Dreslik (2015) stated that dense common reed "seems to prevent adults from persisting."

An oil spill on Long Run Parcel in 2010 (West Shore Pipeline) may have adversely impacted Blanding's Turtles since some suitable habitat was contaminated, although the site has since been remediated. The 2012 and 2021 observations were just north of this area. The site includes potential Blanding's Turtle habitat and is just outside the Permit Area. Proposed restoration and enhancement activities under the HMS HCP are expected to benefit Blanding's Turtles on the Com Ed Parcel. Removal of dense buckthorn thickets and spoil piles will remove some barriers to movement, and control of invasive species may improve some areas within or adjacent to activity centers.

1.3.3 American Bittern

1.3.3.1 Federal and State Status

The American Bittern was listed as endangered in the state of Illinois effective 31 December 1977 (IESPB 2012). The species has no protected status at the federal level.

1.3.3.2 Life History

American Bitterns have a large breeding range, encompassing much of sub-arctic Canada, and the intermountain, Midwest, and northeastern United States. The species can be found on southeastern and western United States coastal plains during the winter, and in parts of coastal west, mid and south Atlantic states, and central Mexico year-round. American Bitterns are well-known for their cryptic plumage, solitary nature, and characteristic foraging strategy. They engage in "stealth" foraging behavior—staying motionless, hidden at the edge of vegetation, to capture prey such as amphibians, crustaceans, small fish, mammals, and insects. American bitterns are primarily active during periods of low light (i.e., crepuscular). There is some evidence that bitterns can implement varied reproductive strategies (monogamous or polygynous), with males defending breeding territories. Overall, however, the species primarily engages in solitary behaviors (i.e., minimal pair bonding behaviors, and the species does not establish nesting or roosting rookeries, as is the case with several other North American members of the Ardeidae family; however, solitary nesting may be common within the genus). Nesting occurs in dense, emergent vegetation over water, frequently in cattails (*Typha spp.*) or bulrush (*Scirpus spp.*), with females selecting nest sites and conducting nest building (Lowther et al. 2020). The nesting season varies based on latitude, but generally occurs from April through July. Females lay four to five eggs (Kleen et al. 2004). Young fledge at approximately one to 2 weeks and receive supplemental feeding from adults for up to 4 weeks (Lowther et al. 2020).

1.3.3.3 Biological Requirements

The species occurs in palustrine emergent wetlands dominated by tall vegetation such as cattails. They are rarely found in other habitat types (e.g., tidal marshes or brackish marsh). There is evidence that bitterns prefer larger wetlands overall, shallow waters, high cover-water interspersions, and less-densely vegetated

sites. Occupied habitat is similar on the breeding and wintering ranges, with the one distinction that wintering habitat is typically located in coastal, temperate environments (i.e., where open water foraging habitat will not freeze during the winter; Lowther et al. 2020).

1.3.3.4 Factors of Decline and Rangewide Status

At a global level, the species' conservation status is considered to be of Least Concern by the International Union for Conservation of Nature (Lowther et al. 2020). However, in areas where the species has experienced significant habitat loss (including Illinois, Pennsylvania, and Connecticut, among others), American Bittern populations are considered to be critically endangered (IESPB 2012, Pennsylvania Game Commission 2014, Connecticut Department of Energy and Environmental Protection 1999). Due to the species cryptic nature and generally low density across the landscape, few studies have investigated the species' natural history let alone population trends. This being the case, information on rangewide status is lacking (Lowther et al. 2020). However, there is some evidence for a northward range shift to Canada (general trend from Breeding Bird Survey data), which is postulated to be related to significant wetland habitat loss in the United States over the last hundred years (Kleen et al. 2004, Lowther et al. 2020).

1.3.3.5 Permit Area Numbers, Reproduction, and Distributions

One American Bittern was identified on April 27, 2021 in potential nesting habitat of dense common reed (a known nesting substrate used by the species and other members of the genus; Lowther et al. 2020) in the southwestern quadrant of the Permit Area (Appendix A, Figure 7). Suitable prey species that would support American Bitterns are also present within the Permit Area (e.g., Northern Leopard Frog [*Lithobates pipiens*], Western Chorus Frog [*Pseudacris triseriata*], Blanchard's Cricket Frog [*Acris blanchardi*], Northern Green Frog [*Lithobates clamitans melanota*], American Toads [*Anaxyrus americanus*], and American Bullfrogs [*Lithobates catesbeianus*]) (RES 2021). This species had never been detected in the Permit Area during any previous surveys, and no individuals were detected during any subsequent surveys in 2021. However, any and all surveys conducted within the Permit Area were not designed to detect or focused on detecting secretive marsh birds. No other information is available regarding species numbers, reproduction, or distribution in the Permit Area. As such, a summary of species occurrence information within the Project vicinity (i.e. Will County) is provided below, which serves as the best scientific information available for the purposes of this analysis.

According to the Illinois Breeding Bird Atlas (Kleen et al. 2004), the American Bittern had not been confirmed as a state breeder in recent years. However, the Atlas notes the species as a "probable" infrequent breeder, particularly in northern Illinois and including Will County. Specifically, the American Bittern is listed by the Illinois Ornithological Records Committee as a species "which ha[s] been confirmed as breeding in the state, but never regularly, and with no confirmed records of breeding in the past 50 years" (Illinois Ornithological Society 2021).

Based on information from the Illinois Breeding Bird Atlas, there is no evidence to suggest population recovery or expansion of this species in Illinois (i.e., in line with the reasoning behind listing the species in 1977, due to the fact that it was "formerly widespread, but nearly extirpated from I[llinois] due to habitat destruction, collecting, or other development pressures"; IESPB 2012). The species is considered to have "low relative abundance" in the state, which hampers sampling efforts and limits analysis of any population trends (Kleen et al. 2004). However, Breeding Bird Survey data indicate a general population decline in the Midwest from 1966 to 2000 (Kleen et al. 2004).

The species is considered to be a "summer resident" in Illinois by the Illinois Breeding Bird Atlas (Kleen et al. 2004) and the IDNR (IDNR 2021b), with species occurrences in the region also during spring and fall migration (eBird 2021). While there are no American Bittern records in Will County on iNaturalist (citizen science database; iNaturalist 2021), there are over 30 recent (within the last 10 years) occurrences from the

adjacent Cook County and one record from neighboring Grundy County. However, there are over 38 recent records (within the last 10 years) in Will County on eBird (citizen science database; eBird 2021). The majority of these occurrence records are from the spring through fall months (eBird 2021, iNaturalist 2021).

1.3.3.6 Permit Area Conservation Needs and Threats

Common reed dominates wetland habitat within the Permit Area, resulting in a monotypic and densely vegetated environment that likely does not provide high quality foraging or breeding habitat for the species (i.e., the wetland habitat lacks the high degree of vegetation-open water interspersion preferred by the species). This and the fact that the Permit Area has experienced considerable land disturbance over the last several hundred years (including deposition of ecological contaminants) likely serve as limiting factors for species presence. Based on eBird data, species occurrences appear sporadic and solitary, with a general trend of more occurrences at protected areas within the region (i.e., nature preserves and sanctuaries, with more records at locations along Lake Michigan) (eBird 2021).

1.3.4 Leafy Prairie Clover

1.3.4.1 Federal and State Status

Leafy Prairie Clover (LPC) was listed as federally endangered effective May 1, 1991 (56 FR 19953) and Illinois state endangered on May 20, 1980 (IESPB 2012).

1.3.4.2 Life History

LPC is a short-lived herbaceous perennial herb that does not spread vegetatively (Baskin and Baskin 1973). New stems begin to grow from buds on the root crown below the soil surface in March, and a single stem will develop one or more inflorescence buds in late June. Flowering begins in late July, peaks in mid-August, and can continue until late August. Flowers are hermaphroditic and protandrous (Wemple 1970, USFWS 2015a). LPC seeds ripen by early October and disperse from the erect dead ramets from late fall to early spring (Baskin and Baskin 1973). Potential dispersal vectors include wind, gravity, birds, and small mammals. Seed germination occurs in April.

Spring fires appear to stimulate germination and establishment of LPC, possibly by the removal of accumulated duff and subsequent creation of more openings in which buried seeds can germinate and survive (USFWS 1996, Com Ed 2013), and/or by breaking down the water impermeable (“hard”) seed coat without killing the seed (Baskin and Baskin 1998). Dormant seeds are capable of forming a persistent seed bank.

1.3.4.3 Biological Requirements

LPC is primarily found in open limestone cedar glades, limestone barrens, and dolomite prairies that have shallow, silt to silty-clay loam soils over flat, and often highly fractured, limestone or dolomite with frequent expanses of exposed bedrock (Com Ed 2013). These habitats experience high surface and soil temperatures, generally have low soil moisture, are wet in the spring and fall, and become dry in summer (Com Ed 2013). There currently are 14 extant LPC populations in Illinois (USFWS 2015a). Seven of these populations are located in northeastern Illinois, including one on Midewin National Tallgrass Prairie (USFWS 2020). Extant LPC populations in Illinois occur exclusively in dolomite prairie (USFWS 1996) with minimal encroachment of woody species (USFWS 2020).

1.3.4.4 Factors of Decline and Rangewide Status

Where present at unprotected sites, LPC and its habitat are threatened by land development (USFWS 1997). LPC is especially vulnerable to commercial and residential development and to road construction (USFWS

1996). Other threats include off-road vehicle use and grazing by rabbits and deer (USFWS 1996). Fire suppression practices have eliminated the wildfires that once regularly cleared prairie grasslands of the encroaching woody material. Currently, the expansion of shrubs and trees threaten this clover, which requires hot, sunny sites to survive (USFWS 1996). The main threat to protected sites comes from the potential for either exotic or native, invasive plant species to displace LPC from otherwise suitable habitat (USFWS 2015a). LPC is also known to occur in Kentucky, Tennessee, and Alabama. Most known LPC occurrences are ranked as either low or moderate viability using the Population Viability Index from the recovery plan, which illustrates the fact that many threats are still acting upon this species across its range (USFWS 2015a).

1.3.4.5 Permit Area Numbers, Reproduction, and Distribution

LPC is known to occur on areas of exposed dolomite pavement and very shallow soils within the Permit Area west of the Wolverine CU-LK pipeline; however, no known occurrences are located within the potential workspace or excavation areas that would be impacted by the Project (AES 2018b). Previous surveys within the Permit Area west of the CNRR estimated the population to be 290 plants in 2003 and counted 3,345 plants in 2004 (Radke et al. 2004a, 2004b). USFWS collected LPC seed within the Permit Area in 2006 and 2007 and estimated the population to be greater than 1000 plants in both years (Com Ed 2013). Additional LPC populations have been found within the Permit Area during 2006-2010 surveys (AES 2012, AES 2018b), and one has been found at the far north end of Long Run Parcel (Com Ed 2013) with no estimate of population size.

The closest known occurrence of LPC in the Permit Area is approximately 450 feet west of the Wolverine CU-LK pipeline, with most occurrences more than 700 feet away (AES 2018b). Although the most recent known population estimates date from 2007, qualitative observations as recently as 2015 suggest that overall cover of LPC within the Permit Area was little changed (K. Mierzwa pers obs). Within the Permit Area, the LPC population is believed to be stable, and possibly expanding (Bill Stoll, pers comm).

1.3.4.6 Permit Area Conservation Needs and Threats

Encroachment of woody vegetation and taller, denser herbaceous vegetation is perhaps the greatest threat to this population in the absence of active management.

1.4 Description of the Project Activities

1.4.1 Project Elements

1.4.1.1 Introduction and Description of Work

As part of its ongoing integrity and maintenance program, WPL proposes to excavate, expose, inspect, and repair four distinct locations along their CU-LK pipeline segment located in Lockport (Will County), Illinois, in response to three identified pipeline integrity issues that could require excavation of up to 112 feet of pipeline in total (workspace illustrated on Appendix A, Figures 3 through 8). The CU-LK pipeline segment is currently in operation and is used to transport a variety of refined petroleum products, including gasoline, diesel, and jet fuel. The Project is required to maintain pipeline integrity and safety, in accordance with PHMSA enforced regulations, which require pipeline operators to take prompt action to address all anomalous pipeline conditions that are discovered through integrity assessment or information analysis (Amdt. 195-22, 46 FR 38360). The repair work planned by Wolverine would minimize the likelihood of more extensive and impactful work in this area in the future.

The Project involves the temporary excavation, inspection, and repair of three identified anomalies or pipeline integrity issues, herein referred to as anomalies. WPL assigns unique identifiers to each anomaly. From north to south the anomalies included in this Project are PR-01, FR-04, and FR-02 (illustrated on Figures 3, through

8 in Appendix A). Repairs required at the three anomaly locations may require excavation of up to 112 feet of pipeline (35 feet for PR-01, 35 feet for FR-04, and 42 for FR-02), 102 feet of which would be within HED critical habitat. Excavations for pipeline repairs would impact approximately 0.03 acres in total. In addition to excavation, temporary impacts for access routes to the three locations and establishing temporary staging areas for equipment, and workspace from which equipment would be positioned to excavate these locations would involve temporary disturbance of up to 1.4 acres of land, of which approximately 0.49 acres are wetlands (Appendix A, Figure 3). Work would occur approximately between November 1 and March 1, when HED are not surface active and when freezing temperatures typically occur.

Two small streams, or rivulets, designated rivulet 4/rivulet 5 system (RIV4/5 system or RIV4 and RIV5 separately) and rivulet 2 (RIV2), run through the area where the Project is planned; these are further defined below. The upper portion of RIV4 would be impacted by excavation at anomaly PR-01. WPL would attempt to gain approval for access to PR-01 and FR-04 from the north, by accessing the Project area from the Romeoville Metra Station just north of the two anomaly locations, which would prevent need to access from the south and thereby avoid crossing the second rivulet, RIV2. However, even if access to PR-01 and FR-04 must occur from the south, RIV2 would not be impacted by excavation. Crossing of RIV2, if necessary, would be done to avoid impacts within the rivulet by establishing an air bridge crossing (Appendix D). No soil disturbance is anticipated within or around RIV2, should this crossing be necessary. Other small streams, or rivulets, that are adjacent to the Project work area would not be disturbed during Project activities. All planned impacts to wetlands and waterbodies would be permitted according to Section 404 of the Clean Water Act, in coordination with the USACE, and impacts would be considered temporary. There would be no permanent loss of wetlands or waterbodies to complete the pipeline repairs.

Temporary excavation is proposed on both the east and west sides of the Canadian National Railroad (CNRR) and New Avenue. However, the majority of excavation and proposed Project impacts would occur on the west side of the railroad and New Avenue. WPL would first expose the pipeline on the west side of the CNRR to evaluate the pipeline that is installed in a casing that runs below both the CNRR and New Avenue to determine additional steps necessary for the repair. If the repair can be completed from the west side only, WPL may not need to excavate the east side of New Avenue.

After initial excavation of the pipeline and preparation of the pipeline at the anomaly location (i.e., coating removal, sandblasting, etc.), inspection and repairs to the pipeline would occur. Specific pipeline repair activities that may be performed as part of the Project include:

- pipeline coating repair/replacement,
- removal of metal in close proximity to the pipe (e.g., this is expected to be steel fencepost buried near the pipeline),
- welding of a protective sleeve,
- testing/replacement of casing end seals,
- repairing/replacing casing vents,
- casing wax-fill, and
- possible cut-out and replacement of pipeline segments, if identified.

In addition, depending on the conditions of soils during backfill (e.g., abundance of rocks present within the native soil, size of rocks present, etc.) and the proximity of the pipe to bedrock, Tuff-N-Nuff ® Pipeline Rock Shield or similar pipeline padding material may be installed around the pipeline to provide additional abrasion protection and prevent pipeline damage. Additional details regarding work activities anticipated at each of the three anomaly locations is provided in the sections below.

Equipment and machinery planned for use during the Project would likely include the following:

- Excavator with attachment
- Wheel loader
- Jackhammers
- Skid-steer
- Welding truck (i.e., grinder, welding machine, etc.)
- Dewatering pumps
- Pickup trucks
- Steel trench boxes
- Job trailers (i.e., t-post driver, hand tools, etc.)
- Light plants and generators
- Air compressor

1.4.1.2 Access and Staging

Access to the west side of the CNRR and New Avenue for the Project would occur from the south via an existing gravel road that intersects New Avenue, or if access can be gained from the north directly from the Metra Station WPL would utilize this alternative access route to the PR-01 and FR-04 excavations (Appendix A, Figures 3 through 8). The access road from the south would primarily follow paths previously cleared of large woody vegetation and leading into the land tract, but a minor amount of clearing of woody vegetation greater than 3-inches diameter at breast height (DBH) may be required for safe access to the Project work area. Access roads would be approximately 14 feet wide, and all areas of the proposed access road that do not overlap with the existing gravel road would be matted with timber or composite mats to protect the ground surface and minimize rutting.

As previously noted, if agreements can be obtained, access to the two northernmost anomaly locations (PR-01 and FR-04) would utilize an access route originating from the Metra Station located to the north of the Project. In this scenario approximately 800 feet (approximately 0.25 acre) of access would not be needed between FR-04 and FR-02, which would minimize temporary impacts to HED critical habitat due to laying mats along the access route from the south and avoid the need to construct an air bridge across RIV2.

Access to the east side of the railroad and New Avenue would proceed directly from New Avenue to the Project workspace using the WPL right-of-way at the point where it crosses New Avenue (Appendix A, Figures 3 through 8). The proposed access route will require crossing a small roadside ditch. Mats will be placed in the ditch to minimize disturbance. Temporary staging on the east side of New Avenue, if required, would use the shoulder of New Avenue.

An approximately 150-foot wide by 100-foot long temporary staging area would be constructed adjacent to the access road leading in from New Avenue. The temporary staging area would be situated just south of a third party's existing meter station. All areas used for staging would be matted. In addition, an approximately 25-foot wide by 25-foot long matted temporary turnaround area would be constructed south of location FR-02 to facilitate vehicle access to the FR-02 anomaly location. All mats used for access and staging would be cleaned prior to use on the Project. As previously noted, WPL would attempt to secure approval to access PR-01 and FR-04 from the north. However, if access to PR-01 and FR-04 must occur from the south, matting would not be laid within mapped rivulets. Equipment crossings at the rivulets would occur using air bridges, which consist of timber mat landings on each side of the rivulets that are set back from the rivulets by a minimum of 5 feet. Then a section of timber matting would be laid on top of the landings to span the rivulets (Appendix D). By spanning the in-water habitat, impacts within the rivulets due to equipment access would be

avoided within the non-excavated portions of the rivulets that would need to be crossed for access to the Project work area.

Heavy equipment working in wetlands would be placed on mats to minimize soil compaction and rutting.

1.4.1.3 Workspace, Excavation, Spoil Storage, and Backfill

PR-01 – Mechanical excavation at location PR-01 would begin with an initial 10-foot long by 10-foot wide by 5-foot deep excavation. Once exposed, as necessary a trench box will be placed inside the trench to stabilize the trench walls and the 10-foot section of pipe would be inspected and repairs made as needed. If inspection of the initial 10-foot section requires performing additional excavation to address identified pipeline integrity concerns, excavation would then proceed as necessary for a maximum of an additional 10-foot on either side of the initial 10-foot-long excavation. Installation of trench boxes end to end may require slightly more than 30 feet total, so WPL is assuming excavation at location PR-01 would have maximum dimensions of 35-foot long by 10-foot wide by 5-foot deep. Temporary workspace adjacent to the excavation would include the maximum dimensions of 100-foot long by 50-foot wide, with two additional 15-foot long by 15-foot wide matted dewatering pads located just west of the workspace. Temporary workspace would be matted and would not overlap with RIV4. Temporary workspace matting would not be placed within a 5-foot buffer from either side of RIV4 to minimize impacts.

FR-04 – Initial excavation at FR-04 would be completed by hand using shovels and accessed via foot traffic only. Maximum dimensions of initial hand excavation would be 2-foot long by 5-foot wide by 3-foot deep. The purpose of this initial hand digging would be to identify the metal in close proximity to the pipeline that was noted during an in-line tool inspection. Locating the metal and then inspecting the pipeline for any damage that may have occurred to the exterior of the pipeline would occur via the hand digging approach. Once the pipe is exposed, if damaged coating or other pipeline integrity concerns are observed, mechanical excavation would then be required and would proceed in the same stepwise fashion as described for location PR-01, starting first with an area 10-foot long by 10-foot wide by 5 feet deep and then expanding, if necessary. The maximum excavation dimensions at location FR-04 would also be 35-foot long by 10-foot wide by 5-foot deep, and trench boxes would be used if necessary. Temporary workspace adjacent to the excavation would be matted and would include a workspace with maximum dimensions of 100-foot long by 50-foot wide with an additional 15-foot long by 15-foot wide matted dewatering pad located just west of the workspace.

FR-02 – Mechanical excavation at location FR-02 west of the CNRR would require a maximum excavation of an L-shaped trench that will be centered on the pipeline such that it runs 12 feet by 20 feet long, 10 feet wide, by 10-foot deep. The deeper excavation depth for location FR-02 west of the CNRR reflects the pipeline being located within upland and within a rise in ground elevation due to the RR grade. This location is in upland and the top of the pipeline is approximately 6-feet below ground surface. Temporary workspace adjacent to the excavation west of the CNRR would include a maximum dimension of 100-foot long by 30-foot wide, with an additional 15-foot long by 15-foot wide matted dewatering pad located just west of the workspace. Pending the results of excavation and inspection of the pipeline west of the CNRR, an additional excavation east of New Avenue may also be required. Maximum dimensions for the excavation east of New Avenue would be 10-foot long by 10-foot wide by 12-foot deep, and installation of trench boxes are likely at this location due to the depth of the excavation. The increased excavation depth east of New Avenue reflects a rise in ground elevation from the adjacent bluff. The excavation east of New Avenue is also within upland. Temporary workspace adjacent to the excavation would include the maximum dimensions of 30-foot long by 60-foot wide, with an additional 15-foot long by 15-foot wide matted dewatering pad located just south of the workspace.

Excavated soil at each of the three anomaly locations would be temporarily stockpiled adjacent to the excavation. At locations PR-01 and FR-04, temporarily excavated soils would be stockpiled on matting within the temporary workspace. For excavation in wetlands, topsoil (top 12 inches) would be stockpiled separately

from subsoils. Backfilling the trench would occur so that the original stratification of soil is retained by first replacing the subsoil and then replacing the topsoil as the upper-most layer. Temporarily excavated soils at the PR-01 excavation would remain on mats and thereby would not be stockpiled within RIV4. For excavation across RIV4, soils excavated from the rivulet would be stockpiled separately and placed back within the rivulet during backfill.

Excavated soils would be utilized for backfill unless the native soil material contains rocks that are too abundant or too large to be placed against the pipeline as backfill. If present, large rocks (>3 inches) would be removed from proximity to the pipeline. Rocks greater than 3 inches in diameter in close proximity to the pipeline present a risk to the pipeline coating. Seasonal freeze-thaw events that result in frost-heave dynamics in the soil can force rocks along or into contact with the pipeline, which can cause damage to the pipeline coating or the pipeline itself. Therefore, during backfill the native materials would be inspected and rocks would be removed as necessary and soil volume that needs to be supplemented would come from the source identified as outlined below. In addition, while WPL does not anticipate contaminated soils in the excavations, to comply with requests by agency staff, WPL will complete pre-work sampling of soils as outlined in later sections of this document. Should contaminated soils be identified, WPL will replace the soil with backfill material similar to the native soils removed. If additional material is needed during backfill to restore grade or to support and pad the pipe from adjacent bedrock, a soil with similar textural characteristics to native substrate would be used. WPL would identify suitable source materials for alternative backfill substrate and provide the sourcing information to the USACE and USFWS prior to mobilizing to the site.

WPL intends to avoid bedrock removal if possible, and limit bedrock removal if avoidance is not possible. WPL completed probing to assess bedrock depth on March 3, 2022. Results indicate that bedrock removal will likely be required in some locations along the excavations. At PR-01 probing encountered rock at depths ranging from 0.8 foot to over 8 feet in depth, generally trending shallower east of the pipeline than west of the pipeline. At FR-04 probing encountered rock at depths ranging from 0.1 foot to 3.4 feet in depth, with no clear pattern of depth variation along or across the pipeline. At FR-02 west of the CNRR probing was not feasible as the area is covered in a rock pile that prevented probing at the surface, whereas east of New Avenue rock was encountered at depths ranging from 0.2 foot to 5.6 feet. Probing results were not able to discern between individual rocks within the middle or upper soil profile versus actual bedrock. Photos of the four locations where probing occurred are provided in Appendix B. It appears bedrock removal will not be required throughout each excavation, but minor bedrock excavation (18-inches deep maximum) to facilitate pipeline inspection and repair cannot be ruled out at the locations where the pipeline would be excavated. Once excavated, if the pipeline is either resting on or too close to bedrock to allow for pipeline repairs then a minor amount of chipping of bedrock may be necessary to allow sufficient space around the pipeline for the repairs. The maximum excavation depth described above for each excavation location includes any bedrock excavation that may be required.

1.4.1.4 Soil Erosion and Sediment Control

For the Project work areas west of the railroad and New Avenue, silt fence or straw wattle/straw bales (Appendix D) would be installed along the northern, western, and southern boundaries of the workspaces as illustrated on Appendix A, Figure 3 through 8 to prevent soil materials from moving outside work areas if precipitation events occur during the work. Silt fence or straw wattle/straw bales would also be installed between the temporary workspaces for PR-01 and RIV4. Workspaces and RIV4 are illustrated on Appendix A, Figures 3 through 8. Temporary straw bales that can be removed and replaced as equipment passes across the air bridge would be utilized across the travel lane at RIV4 to minimize potential for soil materials to migrate along the travel lane. For the Project work area east of New Avenue, silt fence or straw wattle/straw bales would be installed on the downslope side of the work area.

1.4.1.5 Trench Dewatering and Rivulet Flow Bypass

For Project work areas west of the CNRR and New Avenue, groundwater accumulation within the excavated trench would be removed from the trench utilizing the smallest pump practical. Based on assumed volumes of groundwater inflows to the trench WPL estimates that a 5-10 horsepower pump with a 2-inch outlet would be sufficient to move the water within the trench (pumps such as made by a wide range of manufacturers such as Honda, DUROMAX, Generac, NorthStart to name a few, and have pumping rates ranging from 130 to 185 gallons per minute). It is expected that the pumps will be run only as necessary and may be cycled on and off as needed to remove water from the trench. Discharged trench water would be directed to well-vegetated areas west of the trench (downgradient) through a filter bag placed on matting. Filter bags would not be placed directly within rivulets or within five feet of rivulets, and discharge locations would be approved by a biologist in the field prior to the start of dewatering. Discharge of water to the surface downgradient from the trench, but within approximately 50 feet of the trench would allow water to infiltrate back into the soil to minimize the potential for downgradient drawdown impacts. Intake hoses within the trench would be placed in perforated buckets on the bottom of the trench to minimize sediment from entering the hose. Dewatering of the excavated trench would be continuous while it is open for the repair work. Once the work is completed, pumping would cease and the trench would be backfilled.

When excavating across RIV4, rivulet flow when present would be maintained throughout the excavation and repair activities by implementing a “dam and pump” method. This method sets up a bypass of rivulet flow around the excavation area by pumping water from the rivulet on the upstream side of the excavation and then returning the surface water to the rivulet downstream of the excavation, thereby maintaining flow within the rivulet (Appendix D). Up to a maximum of about 35 feet of rivulet length would be bypassed, including the excavation, intake, and discharge areas. To achieve this a small dam made of non-erodible materials (e.g., aqua barriers, stacked sandbags, riprap and geotextile liner, etc.) would be installed across the upstream side of the trench to stop water flow while simultaneously setting up a pump to begin moving water through a hose from the upstream water that is dammed around the area to be excavated and the discharged downstream of the excavation area (Appendix D). A block net would likely be placed above the dam to exclude animals from the vicinity of the pump intake. A second dam may be established on the downstream side of the excavation to prevent water from moving back toward the excavation. The rivulet water bypassing the trench through the pump and hose would be discharged onto a non-erodible, energy-dissipating surface (e.g. geotextile fabric, plastic sheeting, riprap, etc.) prior to reentering the rivulet (Appendix D). The discharge location would be located just outside of the matted workspace, and selected so that water returns to the rivulet without scouring the bed or banks of the rivulet. The pump intake hose on the upstream side of the excavation would be screened (max 10 mesh (2mm)) and would be placed on a stable surface or if there is sufficient depth within the rivulet, the intake would be floated off the bottom of the rivulet to prevent sediment from entering the hose and to avoid or minimize entrainment of small aquatic organisms. The smallest pump practical (approximately 2-inch, 5-10hp) would be utilized for the bypass. During installation and startup, the bypass would be monitored by a biologist. Dragonfly nymphs of any species and crayfish would be collected and translocated out of the workspace. Other aquatic organisms captured would be moved around the bypass downstream and released. Filtering of bypass water upon discharge would not be performed unless the bypass water becomes sediment-laden as a result of the Project activities.

If encountered, groundwater within the excavation area east of New Avenue would be discharged with a small pump as described above and directed to a well-vegetated upland area within Wolverine’s right-of-way south of the trench through a filter bag so that discharged water would not flow back into the work area or access path.

1.4.1.6 Restoration

Areas disturbed by excavation would be restored to original contours to match adjacent undisturbed areas and seeded with an appropriate native and locally sourced seed mix as soon as practical after backfill. Disturbed areas would be temporarily stabilized with straw mulch that would be free of any invasive species.

RIV4 morphology (width and depth), substrate, and crayfish burrow presence/absence would be documented pre-project and used to inform restoration such that this feature would be returned to its pre-existing conditions. Soil excavated from RIV4 would be stockpiled separately and returned to the location it was excavated from during backfill. Cattail detritus/thatch would be collected and placed within RIV4 following backfill.

1.4.1.7 Timing

Ground disturbing work would be limited to approximately November 1 through March 1, when freezing temperatures typically occur and HED is not surface active. Work would only begin once required permits and authorizations have been received. It is anticipated that the Project would require up to eight weeks to complete the work. It is anticipated that each separate excavation would take a maximum of two weeks from the start of excavation to backfill. Trench dewatering at each excavation location would occur within the two week window but likely would not occur for the full duration. Temporary bypass of RIV4 would be required for a maximum of two weeks.

2. EFFECTS ANALYSIS ON LISTED SPECIES

2.1 Overview

Effects of the Project are all consequences to listed species that are caused by the proposed Project, including consequences of other activities that are caused by the proposed Project. The analysis of effects of the Project considers stressors from Project actions, exposure to stressors, and finally the response to exposure to stressors to determine consequences. The effects of the Project are used to make determinations for each listed species.

2.2 Hine’s Emerald Dragonfly

2.2.1 Temporary Habitat Loss

The proposed Project would result in the temporary disturbance of up to 1.4 acres within the Permit Area; of this amount, approximately 0.03 acre would be impacted by excavation (Table 3). Temporary impacts are generally defined as excavation impacts, which occur for pipeline repair for a duration of no more than two weeks and that are then restored to pre-construction contours when pipeline repair activities are complete. Where vegetation is covered with mats for access, stockpile, or staging temporary impacts are defined as a duration of less than one year.

Disturbance would be the result of excavation along the existing pipeline corridor, placement of mats followed by equipment access adjacent to the excavation area and on an access road, and temporary stockpiling of topsoil. The maximum excavation at each location would be 35 feet long by 10 feet wide (PR-01), 35 feet long by 10 feet wide (FR-04), and an L-shaped trench that will be centered on the pipeline such that it runs 12 feet by 20 feet long, 10 feet wide, by 10-feet deep (FR-02 west of New Avenue). Particularly for FR-04, the excavation area may be less depending on initial findings. Once work is complete, the excavation would be backfilled, mats and stockpiles removed, and the ground returned to pre-disturbance contours. The disturbed Project footprint would be seeded with an herbaceous native seed mix to re-establish vegetation within one growing season after Project activities conclude, and dense revegetation is anticipated within two years. Baseline information would be collected pre-construction to facilitate return to pre-disturbance conditions (or better, in the case of currently invasive species dominated areas). Limits of common reed will be documented prior to construction in the vicinity of each excavation and observations of vegetation species and their visual cover estimate will be documented at each anomaly prior to the repair.

Table 3. Area of Impact, by Habitat Type ^a

Community Type ^b	Excavation	Temporary Workspace and Dewatering Pads (ac)	Temporary Access Road and Turnaround (ac)	Staging (ac)
Shrubland upland	0.006	0.016	0.160	0.027
Wet prairie		-	0.024	-
Marsh–cattail		-	0.043	-
Marsh–Phragmites	0.016	0.234	0.134	-
Wet meadow–reed canary		-	0.065	-
Marsh–bulrush/sweet flag		-	0.015	-
Old field–wet		-	0.112	0.005

Community Type ^b	Excavation	Temporary Workspace and Dewatering Pads (ac)	Temporary Access Road and Turnaround (ac)	Staging (ac)
Old field—upland grassland	0.002	0.100	0.104	0.196
Shrubland bottomland		-	0.021	0.025
Developed		-	-	0.091
Subtotal ^c	0.025	0.355	0.676	0.344
Total	1.40			

^a Acreages associated with existing permanent gravel access road are not included as this road is existing and there will be no impact.

^b Community type determination and boundaries taken from AES 2019 and shown on Appendix A—Figure 8

^c Addends may not sum to total due to rounding.

There would be a disturbance of a rivulet (RIV4), which may have provided historic HED breeding habitat. Anticipated disturbance of RIV4 would include temporarily bypassing up to a maximum of about 35 feet of length and excavating about 10 feet of length. No excavation is planned within RIV2 or within other rivulets within the Permit Area. All of the planned disturbance within RIV4 would occur within dense common reed marsh. The rivulet, where disturbed, would be returned as closely as practical to the original size, location, and configuration based on pre-construction measurements and characterization. There are no known crayfish burrows within the excavation areas although some are present downstream (see 5.2.2 below for a more detailed explanation).

Rivulets and crayfish burrows were mapped in April 2021 (ERM 2021a), and a qualitative habitat assessment was conducted in July 2021 along the northern 1,450 feet of the pipeline just west of the centerline (ERM 2021a). These reports are included in Appendix E, and results of the 2021 surveys are illustrated on Figures 3 and 5 in Appendix A. Two areas along the pipeline corridor but outside of excavation areas, a larger opening at the north end and a smaller opening further south, consisted of mixed sedge meadow and forbs; several HED adults were observed in these areas. Based on 2021 observations, these two areas are considered to be adult foraging habitat. The most extensive vegetation community along the transect was dense near-monotypic common reed; rivulets RIV2 and RIV4 were within this habitat type, and many of the crayfish burrows were along the rivulets. The only other extensive habitat types along the habitat assessment corridor were a reed canary grass meadow with some remnant sedge and cattail and scattered purple loosestrife, and upland successional field at the edge of buckthorn and other shrub encroachment.

Along the 1,520-foot long pipeline corridor within the Permit Area, approximately 300 linear feet near the north end was determined to be adult HED foraging habitat. Once the Project is complete and restoration of vegetation is complete, an area of low vegetation would be present at each excavation and access area, which is usually bounded by taller vegetation to the west. HED adults sometimes use low, open areas bounded by taller vegetation for foraging. Transient adult use may become possible within this corridor after pipeline repair activities, although this is not assured. Adult HED use of the adjacent rail corridor was documented by Mierzwa et al. (2010). Removal of tall, dense common reed along a portion of RIV4 would potentially allow adult HED access to a section of rivulet that was not readily accessible in summer 2021 because there was almost no gap in the tall common reed canopy.

Potential larval habitat that would be impacted includes the RIV4 crossing. There were no known crayfish burrows within the proposed excavation areas in 2021, although some are present downstream. If permission is obtained for access from the north, then no currently mapped crayfish burrows would be impacted. If access is entirely from the south, then two mapped crayfish burrows may be temporarily covered by matting

along the access path. The RIV4 segment in the excavation area is entirely within dense common reed, which is currently considered poor quality larval habitat. Although no HED have been recorded within or near this rivulet segment, occasional presence of individual larvae or newly constructed crayfish burrows prior to construction cannot be conclusively ruled out. Presence of HED within the planned temporary habitat loss area associated with pipeline repair activities is believed to be a low probability but not impossible. If a larva were present in the temporary habitat loss area during pipeline repair activities, there would be a high risk of injury or mortality.

During July 2021 surveys conducted by, or in the presence of Ken Mierzwa, mean HED larval density across the entire Permit Area was 0.10 larvae per burrow (ERM 2021a). Methods exceeded protocol, in that all observed burrows were sampled and not only those in plots every five meters; methods were otherwise consistent with those used for reporting compiled in Soluk and Mierzwa (2012). No larvae were captured within the minimized workspace limits in 2021. Two of the four larvae in July were captured in better than average quality habitat, the other two were in a small remnant opening not yet fully encroached by invasive species, and all were west of the workspace disturbance footprint.

2.2.2 Crayfish Mortality

Excavation could result in some crayfish mortality through direct contact with equipment as well as by destruction of burrows. None of the 62 known crayfish burrows documented in the Permit Area during April 2021 fieldwork are within the planned excavation or workspace areas. If access is from the north, none of the known crayfish burrows would occur within the access routes. If access is required from the south, due to inability to gain permission to access from the Metra Station at the north end, then two known burrows would be temporarily covered by matting (calculated from data in ERM 2021a). Most known burrows are in several clusters in the eastern quarter of the site. While location of some burrows had changed by July, there appeared to be little difference in abundance or general location. Many burrows are concentrated close to rivulets, but those on the RIV4/5 system are well downstream (beginning approximately 75 feet) from the access route, excavation area, and temporary workspace. However a few crayfish were present in RIV4 in 2021, and individual animals are capable of mostly nocturnal, short-distance dispersal through wetlands (Animal Diversity Web 2022). Thus we assume that some impacts to crayfish could occur.

Crayfish excavate burrows that are essential to the long-term survival of HED larvae; although crayfish are potential predators on odonate larvae, the burrows are essential to escape drought or extreme temperatures (Pintor and Soluk 2006). Thus, loss of crayfish would result in a temporary reduction in the number of HED larval refugia within the immediate ground disturbance area beyond the immediate destruction of burrows, because fewer crayfish would be present in the short term to excavate new burrows.

At most well studied Illinois localities, HED use burrows of *Lacunicambarus nebrascensis* (formerly *Cambarus diogenes*) (Pintor and Soluk 2006). Within the Permit Area, *Procambarus acutus* is reportedly the common native burrowing crayfish (Brown and Soluk 2012) although no attempt we know of has been made to date to verify which species of crayfish is responsible for burrows in HED habitat on Long Run/Com Ed parcels. *P. acutus* has relatively high fecundity (Taylor and Schuster 2004) with females depositing up to 556 eggs per spawning event (Mazlum and Eversole 2004). Fecundity is somewhat less, about 200 eggs per female, for devil crayfish (Animal Diversity Web 2022). In either case recovery of the crayfish population would be expected to occur relatively quickly because of high fecundity. Initial pipeline repair-related crayfish mortality would be reduced by a conservation measure to relocate any observed crayfish to the outside of silt fences. Relocated crayfish would be expected to excavate fresh burrows. Devil crayfish burrows average 22 to 24 inches in depth (Animal Diversity Web 2022), which may be deeper than the available soil column over bedrock in many parts of the Permit Area. Past construction monitoring experience at the nearby I-355 bridge and at other sites indicates that displaced crayfish are easily observed on bare soil within excavations (K. Mierzwa pers obs). However, not all crayfish would be observed and some could be injured or killed by direct

contact with equipment, resulting in a short-term anticipated reduction in numbers in the immediate pipeline repair area.

July 2021 surveys did not locate any HED larvae in crayfish burrows within the proposed excavation area, much of which is dominated by dense common reed, and only two within potential access routes. Most of the crayfish captured were small and the burrows found were relatively small or shallow because the dense common reed root lattice presumably did not allow enough room for successful burrowing by larger crayfish. However once excavation removes common reed, the temporary reduction in crayfish may result in a temporal lag before crayfish recolonize the newly open substrate. Removal of common reed would improve habitat and destruction of the dense root lattice within the pipeline repair excavation may allow larger crayfish to successfully burrow where the common reed has been removed.

2.2.3 Sedimentation

The Project includes erosion and sediment control best management practices (BMPs) and other measures designed to minimize erosion and sedimentation, enhance revegetation, and minimize impacts on waterbodies and associated aquatic resources (see Section 3.1.2). These measures would likely prevent Project activities from spreading sediment beyond the area of temporary habitat loss described above in Section 2.2.1. If such measures fail to prevent sediment from spreading into other portions of wetlands and streams within the Permit Area, then HED eggs, larvae, or prey could be affected. Sediment deposition atop individual HED larvae could affect feeding and respiratory behaviors of HED larvae (USFWS 2019), possibly resulting in increased energy expenditure, decreased growth, and mortality (Henley et al. 2000). Sediment deposition in larval HED habitat but not atop individual larvae has not been identified as a significant stressor and flood-related sediment deposition is an occasional natural occurrence on parts of Lockport Prairie and River South. However, such a change could potentially alter the invertebrate community, possibly reducing the prey base of larval HED (Culp et al. 1986, Henley et al. 2000, Relyea et al. 2012). Larval HED prey upon a variety of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms (USFWS 2001). Although mayflies and caddisflies are typically sensitive to sedimentation, no similar generalization can be made for midge larvae and aquatic worms (Relyea et al. 2012). Considering the variety of prey types used by HED larvae, suitable prey is likely to remain present even under conditions of increased sediment loading. Depending on time of year, sedimentation could also bury HED eggs.

Sedimentation would be unlikely during excavation, because clean rivulet water would be bypassed, storm event runoff would tend to flow into the excavation, and water pumped from the excavation would be discharged into densely vegetated areas. A brief pulse of sediment would be most possible immediately after backfill when the dam is removed and streamflow re-established within the restored rivulet. Erosion controls will remain in place until vegetation has become established sufficiently to limit further sedimentation from the soils exposed during excavation.

2.2.4 Impingement and Entrainment

Whenever a water pump is actively engaged in dewatering and pump-around activities, HED larvae and other aquatic invertebrates may be subject to impingement upon the intake screen and entrainment into the water pump and discharge hose, potentially leading to injury or mortality. The majority of the literature on impingement and entrainment is related to large water intake structures, and especially to studies of fish at power plant cooling intakes (EPRI 2000). In studies of large water intakes, aquatic macroinvertebrates generally experienced survival rates in the range of 70 to 90 percent (EPRI 2000). Impingement and entrainment by smaller intake devices, such as the equipment needed for the Project, are less well studied (Harvey and Lisle 1998), although one study reported approximately 99 percent survival of benthic invertebrates entrained by a suction dredge in Idaho streams (Griffith and Andrews 1981). Therefore, it seems unlikely that impingement and entrainment in the course of the Project would affect the prey base or the aquatic community in general. However, it is possible that an HED larva could suffer impingement or

entrainment, possibly resulting in injury or mortality. Likewise, juvenile crayfish might suffer similar effects, possibly leading to a temporary reduction in the number of future crayfish burrows that could serve as HED refugia. It is worth noting that HED larvae, crayfish, and a variety of smaller macroinvertebrates are intentionally entrained through hand operated bilge pumps as part of crayfish burrow pumping for permitted population surveys, and that no HED or other mortality has been reported as a result (K. Mierzwa pers obs).

Information on intake screen types is provided above in Section 3.2.1. Pump size and type and bypass methods are also described above in Section 1.4.1.5. While these general expectations can be stated, in practice equipment and methods need to be field fit, especially in constrained locations such as the small, shallow, and low flow rivulets within wetland habitat in the Permit Area. Relatively small pumps are anticipated because of these constraints. However, sometimes it is necessary to change the specified pump or design at installation in order to minimize habitat impacts or facilitate effective water intake. It is typical practice to have a biologist present at pump installation and startup to verify that effects are minimized.

2.2.5 Excavation Dewatering

Removing water within an open excavation is required to establish safe working conditions within a temporary trench where groundwater is present within the trench. There is potential that removal of water from the excavation would temporarily reduce surface and near-surface groundwater elevations in wetlands and streams in the immediate vicinity of the excavation due to actively using a sump pump to drain the excavation. The lowering of water levels within and in the immediate vicinity of the excavation would be intermittent, occurring only during sump operation.

Groundwater elevation in proximity of the Permit Area is noted as moving from east to west, perpendicular to the Illinois and Michigan Canal (Kay et al. 2018; Figures 8 and 9). Additional monitoring data indicate water levels are lower during summer months, higher in the winter (Kay et al. 2018; Table 1). This is further supported with groundwater monitoring data from 2005 to 2019 indicating levels within the Permit Area typically range between approximately 0.1 foot in the early growing season and two feet below the ground surface later in summer and fall. Seasonal and inter-annual variation in groundwater elevation at monitoring wells near the work area typically vary by a range of approximately one foot. Within the Permit Area, groundwater flows generally from east to west (Hanson Material Service 2021).

The maximum depth of excavation during pipeline repairs is not expected to exceed five feet at the two northern anomalies, and 10 feet at the southern anomaly, which occurs within upland at slightly higher elevation. A trench excavation dewatering analysis was performed to predict how much groundwater may flow into the excavation and the potential Radius of Influence (ROI) that would propagate while operating a water pump (described in Section 2.2.5.3) to remove water from the open excavation. The analysis used the following assumptions:

2.2.5.1 Hydraulic Conductivity

The Permit Area is located within alluvial deposits over Silurian Dolomite (Kay et al. 2018; Figure 8).

Based on Kay et al, local alluvial deposits consist of sand and gravel, but also can contain clay, silt and gravel. To represent potential horizontal hydraulic conductivities in this heterogeneous alluvial environment, values between 10 and 50 feet/day (ft/d) were used from literature representative of silty to clean sand (Freeze and Cherry 1979). A maximum hydraulic conductivity of 50 ft/d was selected as the value allowing a conservative upper bound based on collected soil samples at the excavation sites showing clayey-muck, mucky-sandy-loam, and silty-clay.

2.2.5.2 Excavation Elevation

Monitoring well CEP-3S was used to estimate ground elevation at excavations PR-01 and FR-04, which was at approximately 592 feet AMSL. Additionally elevation at excavation FR-02 was estimated using monitoring wells CEP-10S and CEP-12S at approximately 588 feet AMSL. Monitoring well completion information is provided in Table 1 of Kay, et al. 2018.

For dewatering analysis, excavations were assumed to be completely saturated such that excavations PR-01 and FR-04 have 5 feet of water and FR-02 has 10 feet for removal.

2.2.5.3 Dewatering

Using the above information, a method to simulate linear unconfined flow into a trench was used (Neville 2017, Part 1, Model 2), which is based on the solution presented in Mansur and Kaufman, 1962. The solution is as follows:

$$Q = -K \frac{(H^2 - h_d^2)}{A} L$$

where:

Q = solving for estimated groundwater flow into the trench;

K = hydraulic conductivity. As discussed above, ranging between 10 and 50 ft/d for this analysis. Note, a sensitivity analysis respective of potential ROIs with hydraulic conductivity range previously discussed was completed and further discussed below;

H = water level at a constant head boundary based on a potentiometric map representative of winter conditions measured in feet above mean sea level (ft AMSL) (Kay et al. 2018, Figure 10);

h_d = water level in the trench set representative to the excavation depth. Note, the difference between H and h_d are set to equate to excavation depth measured in ft AMSL;

A = distance to constant head boundary (where the boundary resides signifying water level elevation controlling the degree of trench inflow). This was set at a distance of one (unity) assuming water delivered to the excavation is directly from the sidewall; and

L = width of the aquifer transverse to groundwater flow, set as the excavation width.

Parameters for each trench application are presented in Table 4.

Table 4: Parameters Used to Calculate Groundwater Flow into a Trench

Variable	PR-01 and FR-04 Excavations	FR-02 Excavation
K (ft/day)	10, 30, 50	10, 30, 50
H (ft AMSL)	590	589
h_d (ft AMSL)	585	579
A (ft)	1	1
L (ft)	10	12 ^a
Excavation Depth (ft)	5	10

Notes: ft/d - feet per day, ft – feet. Excavations PR-01 and FR-04 reside in proximity to each other and exhibit similar properties respective of excavation dimensions.

^a Value 12 feet was used for the L-shaped excavation at FR-02 to acknowledging the wider hole due to the L-shaped configuration of the excavation.

A ROI was also calculated to assess potential dewatering influence due to operating a sump pump in the open trench, which was calculated according to Louwyck et al, 2022. The solution is as follows:

$$\sqrt{\frac{0.0896 Qt}{s_{max}S}}$$

where:

Q = predicted trench inflow rate, based on calculated inflow rate as discussed above, ranging from 25 gallons per minute (gpm) for excavations PR-01 and FR-04, to 374 gpm for excavation FR-02;

t = sump operational time, conservatively set at 14 days of continuous use (actual operational time is expected to be less);

s_{max} = maximum allowable drawdown, set to excavation depth as described above for trench dewatering constraints; and

S = storage, set at 15%, being representative of shallow unconfined lithology (Fetter 2001).

Using the above parameters the distances from excavations PR-01 and FR-04 to the nearest documented HED larval presence are approximately 369 and 390 feet, compared to the projected ROI's for these excavations which were approximated at 90 feet (Appendix A, Figure 5). Excavation FR-02 had a projected ROI of 245 feet; however, this excavation is approximately 520 feet from the nearest documented HED larval presence (Appendix A, Figure 5). No mapped burrows were identified within the respective ROI distances for the excavations. Note, at these distances, the ROI effectively relates to changes in groundwater level such that there would be little to no measurable change. Additionally, this analysis used the highest approximate hydraulic conductivity at 50 ft/d under assumed rates equated to projected trench inflows. Other projected ROI's are depicted in Table 5 for a sensitivity analysis respective of different hydraulic conductivity values. Lastly, these results assume continuous sump pump operation over a course of 14 days and use projected trench inflow rates for ROI calculations; however, in reality the actual sump pump extraction rate would be less for trench dewatering and as a result projected ROI's would be less. Again, this analysis is conservative and considered worst-case such that actual field-influence during dewatering would be less.

Table 5: Hydraulic Conductivity Sensitivity on Predicted ROI

Excavation	Hydraulic Conductivity (ft/d)	ROI (ft)
PR-01 and FR-04	10	40
	30	69
	50	90
FR-02	10	110
	30	190
	50	245

Notes: ft/d - feet per day, ft – feet. Excavations PR-01 and FR-04 reside in proximity to each other and exhibit similar properties respective of excavation dimensions such that resulting ROI calculations are similar.

Based on the analysis above, the ROI does not intersect any known crayfish burrows. The nearest mapped burrow is about 27 feet outside the ROI. The area in proximity to the proposed excavations was searched very thoroughly for burrows after the spring prescribed burn, when there was very little vegetative cover. If

any crayfish excavate new burrows within the ROI prior to the start of work, then those burrows may be influenced by pumping. HED larvae would be potentially affected only if present within the ROI.

2.2.6 Rivulet Bypass

A total of up to 35 feet on one rivulet (RIV4) would be temporarily altered by the proposed Project. A 10 foot segment would be excavated for up to a maximum of two weeks, and then re-established after backfill based on width, depth, and location measurements taken prior to the start of construction. Dewatering the rivulet prior to excavation would require placement of a small dam and pump intake upstream of the excavation where limited space is available, and discharge of the bypass would occur a short distance downstream of the excavation to prevent backflow into the hole. The 35 foot maximum length allows some flexibility to accommodate field conditions, and may be less. Details of the rivulet bypass are provided above in Section 1.4.1.5. In summary, a small pump with a screened intake would pass rivulet water through a flexible hose over or around the excavation, discharging near the bank of the rivulet downstream. Given the short length of bypass, there would be no expected change in water quantity or quality. Stream bypasses are common on construction projects, and considerable experience has been gained in listed salmonid habitat on the west coast. This Project differs primarily in the very small size and typically low flow rate of the rivulet. Entrainment and impingement risk are addressed separately above in Section 2.2.4.

Effects from excavation are addressed above in Section 2.2.1. Within the remaining up to 25 feet of dewatered rivulet, most water would be removed from the channel for up to a maximum of two weeks. All of the affected channel length is within dense common reed habitat, no HED larvae were captured there during protocol-level sampling in 2021, and HED larvae are generally not present in common reed habitat based on years of larval sampling at other locations. If a larvae were present on the formerly wetted but otherwise intact surface, it would either shelter in place in damp substrate, or attempt to move to wetter conditions. For this reason, block nets are recommended above and below the excavation and extending a short distance either side of the rivulet channel. Larval surface activity would be very unlikely in winter, with animals expected to be in refugia such as crayfish burrows that have been addressed separately. Cessation of surface activity has been observed as early as mid-September in unusually dry years, or could extend to the first frost (about late October) during otherwise mild and wet conditions.

HED generally require calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets, and/or sheet flow within fens (72 FR 51101), HED larvae are able to survive temporary drought and drying of their habitat (USFWS 2019). Seasonal drying may be an important element of the habitat, helping to exclude competitors and predators that cannot tolerate drought (USFWS 2019, Soluk et al. 2003). HED larvae are not only able to survive drought by sheltering in crayfish burrows, but are also able to move around in terrestrial environments (USFWS 2019). The limit of an HED larva's ability to survive drought is unknown, but is at least several weeks (K. Mierzwa pers obs). Finke (1994) monitored survival of giant damselfly (*Megaloprepus coerulatus*) larvae and documented that most larvae in pooled tree hollows were able to survive two weeks of desiccation, but none survived more than four weeks of dry conditions. Mean survival without water was 23.9 days. Subterranean crayfish burrows would be more likely to remain moist in the absence of standing water than elevated tree hollows. In general, increased duration of drying increases risk to odonate larvae including HED.

HED larval presence is believed to be low probability in the common reed dominated segment of RIV4 to be bypassed; none were found there in 2021 protocol-level samples and no crayfish burrows were located in the bypass segment. By reducing the maximum duration of dewatering to two weeks, the Project as updated would minimize risk to HED larvae in bypassed portions of RIV4 in the unlikely event of presence during construction.

2.2.7 Contamination

Project activities would have the possibility to contaminate soil and/or groundwater, or encounter existing contamination within the Permit Area. Specifically, application of the pipeline protective coating and sandblasting could result in residue from the sandblasting activities remaining within the trench if appropriate conservation measures were not employed. Excavation within and adjacent to RIV2, where a presumed petroleum sheen and odor were anecdotally observed, would not occur; however, sampling is being done along the pipeline to determine whether any of the previously observed sheen and odor within RIV2 could have migrated north or south along the pipeline. Any existing contamination, if disturbed without proper safeguards, could potentially spread contamination to locations of the Permit Area that are not currently contaminated. Finally, inadvertent spills or leaks of fuel, oil, or hydraulic fluids during Project execution could contaminate soil and/or groundwater. Contamination of soil and/or groundwater as a result of Project activities could further limit habitat suitability for HED larvae, as well as crayfish within the Permit Area.

Pipeline coating repair and application completed during pipeline repair would follow the manufacturer's instructions and the guidance included on the product specific Safety Data Sheet (Appendix F). The pipeline coating would consist of Polyguard RD-6®. Polyguard RD-6®, which consists of a geotextile backed protective pipeline coating tape applied over a companion liquid adhesive along with an outerwrap applicable to the installation. Per the manufacturer's instructions, once the pipe surface is exposed and prepared via sandblasting, a thin even coat of liquid adhesive would be applied to the pipeline utilizing a brush or roller. Once the liquid adhesive has dried, approximately one hour after application, the geotextile backed protective coating tape would be wrapped around the pipe in the area where liquid adhesive was applied utilizing a coating wrapping machine, or by hand if use of the wrapping machine is not practical. Finally, if needed, an additional outerwrap would be installed on top of the geotextile backed protective coating tape to improve soil stress resistance.

The OSHA Hazard Communication Standard considers the liquid adhesive used in this system to be hazardous; however, once the liquid is dry, it is understood to no longer be hazardous. Several components of the liquid adhesive (toluene and methyl ethyl ketone) do have measured ecotoxicity to aquatic organisms (*Gammarus Pseudolimnaeus*, *Daphnia magna*) (Appendix F). Odonate larvae are important organisms in aquatic ecosystems but have been rarely studied in laboratory toxicity tests (Tollett et al. 2009). A search of the literature did not identify any specific ecotoxicity data for odonate larvae or analogous organisms in relation to the components of the liquid adhesive.

The liquid adhesive would be applied to the pipe such that there would be no release to the environment. Furthermore, dewatering would be maintained and excavations would not be backfilled until the coating has had adequate time to dry (minimum of one-hour post application) and the protective coating and companion outerwrap has been applied, dried, and inspected. Neither the geotextile backed protective coating or outerwrap are understood to be hazardous to the environment and ecological toxicity data are not provided on the product specific Safety Data Sheet (SDS). A literature search did not identify any specific ecotoxicity data for odonate larvae in relation to geotextile backed tape such as the protective coating or outerwrap.

Sandblasting would utilize a chemically inert and environmentally friendly product, such as Black Beauty® Glass or equivalent (product SDS included in Appendix F). This product is not understood to be hazardous to the environment and ecological toxicity data are not provided on the product specific Safety Data Sheet.

As stated above, excavation near RIV2 is no longer included in the scope of work for the pipeline repair activities, and samples were collected to assess the extent of potential petroleum contamination at the excavation sites. The compounds listed in Appendix G were assessed and screened against the applicable USEPA Resource Conservation and Recovery Act Region 5 ecological screening levels for soil. Results show background contaminants were present within some samples, but not at levels that exceed regulatory

standards requiring removal of the material. Storing soil in a manner to prevent spread during excavation and backfill and providing training and gloves to workers will be sufficient to prevent unnecessary exposure that could result in ingestion of the soil material during the repair work. Based on review of results additional sampling was requested by the USACE. A plan for conducting the additional sampling will be developed, approved, and conducted prior to mobilizing to the site. The compounds listed in Appendix G would be assessed and screened against the applicable USEPA Resource Conservation and Recovery Act Region 5 ecological screening levels for soil. If needed, WPL would identify suitable source materials for alternative backfill substrate and provide the sourcing information to the USACE and USFWS prior to mobilizing to the site. Contaminated soils meeting regulatory standards for clean-up would be removed and disposed of appropriately, and replaced by clean backfill identified in coordination with the USACE and USFWS.

Refueling of equipment would occur off site or within uplands in staging areas, away from wetlands. The exception would be generators for dewatering pumps, which must remain in proximity to the work area. These would be placed within appropriate secondary containment to prevent spills. A spill prevention plan would be prepared in advance and necessary spill kit materials would be available to workers on-site to respond quickly to any inadvertent spills or leaks. In addition, hydraulic fluid used on-site would be eco-friendly or bio-based.

Project activities would have the possibility to contaminate soil and/or groundwater, or encounter existing contamination within the Permit Area, which could affect HED larvae. However, in light of the conservation measures that would be implemented, adverse impacts are not expected to occur.

2.2.8 Bedrock Excavation and Backfill

Due to the shallow depth to bedrock within the Permit Area, exploratory probing was completed on March 3, 2022. Results indicate that bedrock removal will likely be required in some locations along the excavations. At PR-01 probing encountered rock at depths ranging from 0.8 foot to over 8 feet in depth, generally trending shallower east of the pipeline than west of the pipeline. At FR-04 probing encountered rock at depths ranging from 0.1 foot to 3.4 feet in depth, with no clear pattern of depth variation along or across the pipeline. At FR-02 west of the CNRR probing was not feasible as the area is covered in a rock pile that prevented probing at the surface, whereas east of New Avenue rock was encountered at depths ranging from 0.2 foot to 5.6 feet. Probing results were not able to discern between individual rocks within the middle or upper soil profile versus actual bedrock. Photos of the four locations where probing occurred are provided in Appendix B. It appears bedrock removal will not be required throughout each excavation, but minor bedrock excavation (18-inches deep maximum) to facilitate pipeline inspection and repair cannot be ruled out at the locations where the pipeline would be excavated. Rock removal will be attempted through use of excavation equipment to achieve adequate depth. However, if needed, bedrock excavation would be conducted with a jackhammer or equivalent. Excavated bedrock would be hauled to an upland location on the site for disposal. If additional soil is needed during backfill to restore grade or to support and pad the pipe from adjacent bedrock, a soil with similar textural characteristics to native substrate would be used. WPL would identify suitable source materials for alternative backfill substrate and provide the sourcing information to the USACE and USFWS prior to mobilizing to the site.

Bedrock excavation, if required, may temporarily affect groundwater elevation within the Permit Area, which could impact crayfish burrow distribution and larval HED habitat availability. Excavation of bedrock may temporarily lower groundwater elevation within the area immediately above the pipeline. Furthermore, removal of bedrock could expose new bedrock fractures that could further alter groundwater elevation or change groundwater flow patterns in either positive or negative ways.

Considering the maximum depth of bedrock excavation that may be required, the small area of excavation, and the measured groundwater elevation in the Permit Area, impact to groundwater elevation would be minor and likely of brief duration, returning to local equilibrium after pipeline repair activities are complete and the trench is backfilled. The surface of bedrock in the ground disturbance area is likely weathered. It is unlikely

that bedrock excavation would expose additional fractures to water flow that were not already present and possibly exposed, and if it does this would not alter the existing regional patterns of bedrock groundwater flow. However bedrock conditions cannot be precisely known until excavation occurs.

2.2.9 Noise and Vibration

Potential effects on larval (aquatic) HED are assessed because work would occur after the adult flight season.

Very little is known about the effects of noise and vibration on invertebrates, with most research focused on marine mammals and terrestrial vertebrates. Tillyard (1917) identified chordotonal organs as the probable mechanism of vibration detection for aquatic dragonfly larvae, citing *Aeshna* sp. as an example with “three sets of these organs on each leg, two on the trochanter and one on the tibia close to the knee joint. Each set consists of a number of minute organs called otaria.” Literature that is more recent states that chordotonal organs are sensitive to rapid oscillations and able to detect vibrations with sensitivities and frequency ranges similar to vertebrate hearing (French 2008).

According to Hawkins and Popper (2017), “many aquatic invertebrates appear to use hydrodynamic receptors to detect, localize and identify predators, prey, conspecifics, submerged objects, and food falling to the seabed. Several crustaceans appear to be sensitive to sound transmitted through the substrate.” Particle motion within the water column and at frequencies well below 1 kHz may be a key factor.

Crayfish are also difficult to assess. According to Breithaupt and Tautz (1990), crustaceans do not have clear counterparts to vertebrate auditory receptors, have no structures which could be stimulated by the pressure component of sound, and do not appear to react to sound stimuli. However, aquatic crustaceans are known to be sensitive to water vibrations, and devil crayfish reportedly detect predators and prey by sensing water movements (Animal Diversity Web 2022). Sensory hairs on the body surface and organs can be stimulated by mechanical disturbances of water (Breithaupt and Tautz 1990). In laboratory experiments, sensitivity was greatest at frequencies below 150 Hz.

The Permit Area is located in a heavily developed industrial area, with many sources of ambient noise and vibration. Existing sources of noise and vibration within and immediately adjacent to the Permit Area include roadways, railways, refineries, and power generation facilities. Typical maximum noise levels (dBA) for freight trains, passenger trains, and roadway traffic are 88, 76, and 80 dBA, respectively (SLRT 2015, USDOT 2003). The eastern part of the Permit Area near the pipeline location is characterized by nearly continuous daytime noise of moderate intensity from road traffic, with intermittent higher levels of noise and vibration from slow moving freight and high-speed passenger trains. High-speed passenger trains at 65 mph have been documented at 100 dBA at 50 feet and 95 dBA at 100 feet (Hatano1984). These fast moving trains would typically be brief but recurring events through the course of the day and early evening.

The Project would generate temporary noise and vibration within the Permit Area during pipeline excavation and repair activities from heavy machinery such as excavators, skid-steers, generators, and air compressors. Bedrock excavation, if needed, would require the use of a hand-held jackhammer. The typical noise level (dBA) 50 feet from the source for Project activities would range from approximately 74-93 dBA (USDOT 2017). Peak particle velocity from jackhammer activities at a distance of 25 feet is understood to be 0.035 in/sec (USDOT 2006).

To determine the potential effects of construction noise on aquatic invertebrates, typical sound levels associated with the various construction equipment that would be used for project construction was aggregated to assess maximum potential noise associated with construction activities.

Project execution is anticipated to occur in the fall/winter; therefore, potential effects would only be anticipated for eggs and HED larvae. July 2021 surveys did not identify any HED larvae in crayfish burrows within 190 feet of the pipeline. However, any HED larvae present within the Permit Area and close to the pipeline could be temporarily impacted by noise and vibration generated by the Project. The effect of noise and vibration on

freshwater invertebrates is largely unknown; however, it is possible that increased noise and vibration as a result of the Project could temporarily affect HED feeding rates (Villalobos- Jiménez et al 2017) or other behaviors. Increased noise and vibration as a result of the Project could also cause HED larvae to move to other areas of suitable habitat further away from Project activities.

Noise associated with construction activities would be airborne noise and would be transmitted into water. While a variety of different factors would contribute to the amount of airborne noise transmitted into the water, including the angle of the noise source and disturbances in the water surface, the calculation of noise transmission was based on maximum sound transmission from air to water. Due to the very shallow water depth, no additional distance attenuation of sound under water is assumed. The nearest known larval HED presence is approximately 190 feet to the west of the pipeline. Sound pressure level was calculated for airborne noise at 50 feet, and for underwater noise at 170 feet. Aggregate construction sound level for airborne noise at 50 feet is 96.4 (L_{max} dBA), and at 170 feet it is 85.7 (L_{max} dBA). Aggregate construction sound level for underwater noise at 170 feet is 91.7 dBA. These sound levels are well below published reference injury and behavioral thresholds of 183 (SEL_{cum}; dB re 1 µPa) and 150 (RMS; dB re 1 µPa), respectively for small fish under two grams, the most reasonable surrogate we were able to identify (NOAA 2021).

We conclude that noise and vibration from Project activities may affect HED larvae or aquatic crayfish in close proximity, but that noise and vibration would not approach injury or behavioral response thresholds. Further, construction-related noise is only slightly above typical existing ambient daytime levels, and noise levels associated with occasional high-speed passenger trains exceed construction-related noise levels. This is corroborated by the baseline presence in July 2021 of crayfish, *Aeshna* sp. larvae, and other aquatic macroinvertebrates within the future work area. Given the relatively short time period that noise and vibration impacts would be anticipated, the level of construction-related noise, the existing comparable ambient sources of noise and vibration within the Permit Area, and the apparent absence of HED larvae identified closer than 190 feet of the pipeline, and the continued presence of more common aquatic invertebrate species in rivulets close to the rail line, adverse noise and vibration impacts are not expected to occur. Inferences should however be drawn with caution, because conventional methods of assessing noise sensitivity are generally intended for use with vertebrate species, which perceive sound and vibration in very different ways than invertebrates do.

2.2.10 Invasive Species

The Permit Area has been modified by a variety of past activities within its defined boundary and as a result of surrounding development. Invasive species including common reed, reed canary grass, cattail, and European buckthorn are present in high densities throughout the Permit Area and within the proposed ground disturbance area. Purple loosestrife is present at low density. It is possible that Project activities could increase the spread of invasive species within the disturbance footprint beyond where they are already present. Increases in invasive species within the Permit Area could further limit habitat suitability for HED adults and larvae, as well as crayfish.

To minimize potential impacts of invasive species, the excavation area would be pretreated with herbicides as described in Section 3.1.2.3. Application methods would be consistent with those included in the recently approved Hanson Material Service HCP. Mats and equipment with the potential to contact bare or disturbed soils would be cleaned prior to transport to and use within the Permit Area in order to avoid the spread of invasive species.

Furthermore, all areas disturbed by excavation would be restored to original contours and seeded with an appropriate native and locally sourced seed mix after backfill as described in the Mitigation and Monitoring Plan (Appendix H). These activities would likely reduce the amount of invasive species within the Permit Area. However, it is likely that invasive species would recolonize areas where they were located previously over

time, after Project completion unless invasive species individuals in adjacent areas are eradicated, otherwise seed source and vegetative spread will continue to occur.

Invasive species distribution within the Permit Area may be affected by Project activities, which may affect HED larvae. However, given the conservation measures that have been proposed in addition to the current condition of the Permit Area, adverse impacts to HED larvae are less likely. The Project would result in at least temporary and probably, in conjunction with HCP activities, longer term removal of invasive species within the work area.

2.2.11 *Crushing*

The operation of heavy equipment and vehicles and the use of timber matting within the temporary workspace in wetlands could potentially result in localized mortality of HED larvae, if any are present, either through crushing or through smothering by displaced sediment. Timber matting is generally understood to minimize soil compaction and ground disturbance when used. Within wetlands all vehicles and equipment would operate from matting placed adjacent to the area of excavation.

No HED larvae were collected from rivulets or crayfish burrows within the temporary workspace during July 2021 field surveys, and habitat within the temporary workspace is generally understood to be poor quality for HED larvae. No crayfish burrows are known to be present within the proposed excavation and workspace areas. No burrows are present in the northern access route, while two are present on the southern access route. Pre-construction surveys would occur. If HED larvae or eggs are present within the temporary workspace, it is possible that short-term adverse effects to a small number of larvae could occur. However, considering the results of the July 2021 survey, the dominance of invasive species such as common reed within the temporary workspace, and the recommended pre-construction clearance surveys, the likelihood of presence of or harm to larval HED presence within this area is estimated to be low.

Other vehicle-HED interactions are not expected. Work would be conducted outside of the adult flight season, and vehicles would be limited to 8 mph; adult HED have been observed easily evading 15 mph trains west of the river (Mierzwa et al. 2000; Mierzwa and Radke 2004). Vehicle-related injury of adult HED is not expected to occur as part of the Project.

2.2.12 *Lighting*

Wolverine is currently anticipating that night work would be required due to the 24-hour nature of dewatering and associated pump watch. Lighting would only be required in specific locations around the pumps to facilitate safe inspection and operation of the dewatering pumps during nighttime hours. The use of lights during the Project could affect adult and larval HED behavior within the Permit Area. Analysis of larval behavior in the lab indicates that the larvae are more active at night than during the day (Pintor and Soluk 2006; INHS, unpublished data). Other workers (Mierzwa et al. 1998) have also reported larval movement during the night in the field. Adult HED are generally not understood to be active at night; however, additional lighting could affect circadian rhythms of this species. Significant sources of artificial light are already present within and surrounding the Permit Area.

Project execution would take place approximately between November 1 and March 1 when freezing temperatures are typical and when HED are not surface active. Any impacts would occur only when larvae are potentially surface active, exiting burrows or within rivulets (up to about late September to late October depending on weather conditions, or after about April 1). During the winter months larvae are presumed to be in burrows which are often capped with mud by crayfish. Lighting in the dormant period is not expected to be of concern to HED. Lighting would be shrouded and directed to the immediate work area around the pump to limit the extent of illumination beyond the work area around the pump. Outside of the temporary workspace, impacts from artificial light are anticipated to be minor to none depending on exact location. With the seasonal work window, impacts to HED larvae from artificial light as a result of the Project are not expected to occur.

2.3 Blanding's Turtle

Blanding's Turtle occurs within the Permit Area at low density; despite years of summer field work on other species and two focused surveys for Blanding's Turtles (Feng and Dreslik 2015; RES 2021), only six individuals have been reported to date. Four of these including the only juvenile were in the west end of the Permit Area, while two were within about 200 feet west of the staging area and existing gravel access road.

Potential Project-related effects on Blanding's Turtles include direct damage resulting in harm or mortality from earth moving equipment or vehicles within the excavation area, on the access road or in the staging area; sub-lethal effects related to noise/vibration or dewatering which are unlikely to injure animals but could force movement or otherwise disrupt behavior; and post-project changes in habitat structure, which in this case are more likely to be positive than negative because of the removal of invasive vegetation. Of these potential effects, vehicle or equipment interactions are of greatest concern.

Effects would potentially occur to adults, subadults, and possibly juveniles (if any are present on the east end of the site). There is no suitable nesting habitat within the ground disturbance area, which is densely vegetated, level, and for the most part seasonally wet. The well-drained, loose soils needed for nesting are not present.

Most work would occur outside the Blanding's Turtle active season. No potential hibernating areas are present within or adjacent to the ground disturbance area, so winter impacts are considered extremely unlikely. Surface activity could occur in September and October, or in early spring although construction is not expected to continue for that long. No suitable activity center wetlands are present in the workspace. Given the timing of construction activities, the resulting short duration of potential surface interactions, the absence of activity center wetlands in the workspace, and the avoidance, minimization, and mitigation measures detailed elsewhere in this document, there is a low risk of negative effects on Blanding's Turtle.

2.4 American Bittern

Given the general rarity of American Bitterns on the landscape in Will County, and only one incidental record of the species from the Permit Area, the potential for species occurrence is thought to be low. American Bitterns are only present in Illinois during spring and fall migration and the breeding season. As the Project will occur completely outside the breeding season (generally April through July), there will be no temporal overlap between potential nesting and any effects of the Project. Therefore, no effects to breeding adults, nests, or chicks would occur.

Based on eBird records from Will County (i.e., migrating individuals), adult and juvenile bitterns could potentially occur in spring and fall within the Permit Area. While potential for occurrence is low within the Permit Area, presence cannot be completely ruled out. However, given the fact that any potential activities which could impact the species (e.g., noise disturbance, clearing, and grubbing) will be limited to the far eastern portion of the Permit Area, and the only species occurrence (and marginally suitable habitat) is located on the far western side of the Permit Area (allowing for considerable vegetation screening and noise attenuation), potential for exposure to any effects of the Project would be insignificant. Further, it is assumed that if any individuals were present within the Permit Area near active construction, they would rapidly disperse. Because construction would be limited to the winter months, no effects to migrating adults or juveniles are expected.

Given the considerable amount of invasive vegetation present within the Permit Area, proposed habitat enhancement associated with this Project is anticipated to generally result in a beneficial effect to the species overall. As no negative effects to the species are anticipated as a result of this Project, no take is requested. The species is not considered further herein.

2.5 Leafy Prairie Clover

The closest known occurrence of LPC in the Permit Area is approximately 450 feet west of the Wolverine CU-LK pipeline, and habitat within the temporary workspace is generally not appropriate to support this species. The limits of the Project workspace would be delineated with silt fence, which would further limit the potential for impacts to LPC outside of the workspace by vehicles or equipment. The Project would not permanently affect groundwater or surface water flow in a way that could alter the nature of distant down-gradient habitat where this species is currently present. LPC grows on shallow soils over bedrock, which are not generally influenced by groundwater. Although the LPC population is west/down gradient of the work area, there would be no siltation because of distance, BMPs, and dense intermediate herbaceous vegetation. No other potential effects have been identified.

3. CONSERVATION, AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

3.1 Conservation, Avoidance and Minimization Measures

The conservation measures in Section 3.1.1 below were provided by USFWS and USACE, and reviewed by IDNR during agency input on the Biological Assessment. BMPs and avoidance/minimization measures in Section 3.1.2 generally are sourced or modified from the Com Ed low impact Habitat Conservation Plan (HCP; Com Ed, 2013). Due to the differences in type of work described between the Project and the Com Ed HCP, modification of certain measures was required to ensure relevancy and feasibility. Measures that were modified have been clearly designated as such (see Com Ed, 2013 - Modified). Additional measures have been proposed for ground disturbing activities not covered by the Com Ed low impact HCP.

3.1.1 Conservation Measures

These conservation measures apply to the first reach of the disturbed system indicated as Rivulet 4 except for conservation measure “c”, which also applies to all other areas excavated or disturbed by the proposed project (stockpile locations, access locations, etc.). These other areas may provide habitat for the adult stage of the dragonfly and the measures set forth under conservation measure “c” will meet the requirements for adult habitat. Some monitoring activities in conservation measure “e” would occur in Rivulet 5.

Within the first reach of the disturbed system indicated as Rivulet 4 the essential features for egg deposition and larval growth and development will be restored based on the criteria below:

(a) Organic soils overlying calcareous substrate (predominantly dolomite and limestone bedrock).

Conservation Measure: Replace excavated and other disturbed soil with native materials maintaining the existing soil horizon. If contaminated soil is found work should be suspended until contamination can be contained and replacement native soil is identified.

(b) Calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets, and/or sheet flow within fens.

Conservation Measure: Groundwater levels may not be reduced below average levels recorded for that time of year in any of the existing immediate nearby wells unless the Palmer Drought Severity index reports a drought in the prior three months. Collect baseline data on depth, width, flow rate, and temperature every five meters. Restore streamlet within the first reach of the disturbed system based on baseline data and replace detritus with native cut foliage.

(c) Emergent herbaceous and woody vegetation for emergence facilitation and refugia.

Conservation Measure: Applicant will coordinate vegetation restoration with Hanson Material Service. Note: This Conservation Measure will most likely be implemented by Hanson Material Service under their current 404 permit, ITP and ITA. Wolverine shall coordinate with HMS to achieve these performance standards:

- Less than 10% cover by non-native and/or weedy native trees or shrubs (e.g., green ash, box elder, or gray dogwood) in both the ground layer and the woody canopy layer within three years after the start of restoration. This standard must be met again at the end of year 5.
- At least 70% native cover in the ground layer at the end of year 3 after restoration. This standard must be met again at the end of year 5.
- None of the three most dominant ground layer plant species may be non-native species (according to Swink and Wilhelm 1994) or common reed (*Phragmites australis*) within three years after the start of restoration. This standard must be met again at the end of year 5.

(d) Occupied burrows maintained by crayfish for refugia.

Conservation Measure: Pre-construction salvage of Hine's emerald dragonfly larvae and crayfish (*Lacunicambarus nebrascensis*) from Rivulet 4 will be conducted by the applicant. Fate of salvaged organisms will be determined and handled by USFWS. Crayfish will be restored based on a burrow density of 0.223 m². Note: The average crayfish burrow density in the Lower DesPlaines River Valley as recorded in 16 separate Hine's emerald dragonfly larval habitat areas is 0.3375m² (average density). The density of 0.223m² is the most common density or mode – 3 of 16 streamlets in the Lower DesPlaines River Valley. If crayfish density is not achieved by year two, acquire crayfish for onsite augmentation to advance restoration. Crayfish may be acquired from local areas outside of Hine's emerald dragonfly habitat or funds could be contributed to an existing captive rearing program. Continue annual monitoring.

(e) Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms.

Conservation Measure: Monitor to determine preconstruction growth rates of caged larvae in the second reach of the system, indicated as Rivulet 5, where larvae were found during preconstruction surveys and at 5 meters and 10 meters past the documented locations. Monitor to determine post construction growth rates. Prey base will be considered restored when caged larvae can survive and maintain preconstruction growth rates in Rivulet 5 in the locations where larvae were found in previous surveys and at 5 meters past and 10 meters past documented locations. In year one, if caged larvae do not survive, fund an existing captive rearing program for Hine's emerald dragonfly and continue to restore and monitor the system. By year three, if caged larvae do not survive or maintain preconstruction growth rates, fund an existing captive rearing program for the Hine's emerald dragonfly for an additional 5 years and continue to restore and monitor the system.

Monitoring and Contingency

The Corps will require a minimum 10 years of Hine's emerald dragonfly larval habitat monitoring post excavation and disturbance contingent on the success of post construction restoration. Monitoring will be recorded on a monthly, from May 1 to August 31, and reported annually by the following December 31, or earlier, if or when measures are not being achieved.

If after 3 years all measures are achieved and caged larvae survive or maintain preconstruction growth rates, monitoring will continue for 7 more years (for a total of 10 years). If monitoring indicates that any of the measures (a through e) are not being achieved in any year within the 7 year period (years 4 through 10), adaptive management will be implemented, as determined by the USFWS Chicago Field Office, to continue to restore the system. If by year 10, all measures are achieved, then monitoring will end by year 10. However, if after 3 years all measures are not achieved (e.g., caged larvae do not survive or maintain preconstruction growth rates), restoration efforts and monitoring will still continue for an additional 7 years. In addition, the permittee will implement the additional conservation measures of captive rearing of Hine's emerald dragonflies and *L. nebrascensis*, stated above, for 5 years based on a 5-year Hine's emerald dragonfly life history and temporal loss of reproduction. If monitoring indicates that measures are not being achieved in any year within the 7 year period (years 4 through 10), adaptive management will be implemented to continue to restore the system and monitoring will continue to be required. If adaptive management is successful within the 7 year period and measures are being achieved, funding for the captive rearing program would cease (unless measures are not being met again). If by year 10, all measures are not achieved, an additional 5 years of captive rearing will be required (years 11 through 15), based on a 5-year Hine's emerald dragonfly life history and temporal loss of reproduction. Therefore, contingent upon monitoring results, the conservation measures may be completed within 10 years or up to 15 years.

- Monitor habitat to make sure Soil Erosion & Sediment Control measures are working.

- Monitor water quality parameters (already in the BA) and include groundwater monitoring.
- Timing – all pipeline work shall occur in frozen conditions to minimize impacts to designated critical habitat.
- Post project monitoring – RIV 4 & RIV 5 for 10 years to ensure geomorphology, larvae, and crayfish (translocated or caged) meet baseline conditions/ survive.
- Surveys and salvage of larvae and crayfish will be performed by Service and IDNR approved, qualified personnel who are thoroughly trained on the techniques to be used.
- Any T&E species accidentally killed, or that are moribund or fresh dead and contain soft tissues, will be reported immediately to the Service and IDNR and preserved according to standard museum practices, properly identified, or indexed (date of collection, complete scientific and common name, latitude and longitude of collection site, description of exact location in collection site), and submitted to a recognized museum or scientific repository as determined by the Service and IDNR.
- Notification will be made to the following Service offices and IDNR at least two weeks prior to beginning salvage and monitoring activities:
 - Chicago Field Office,
230 South Dearborn St.
Suite 2938, Chicago, Illinois 60604,
Phone: (847) 366-2345, Attention: Shawn Cirton
Incidental Take Authorization Coordinator
One Natural Resources Way
Springfield, IL 62702
Phone: (217) 782-2456, Attention: Heather Osborn
- A report documenting the salvage effort will be prepared and submitted to the Service's Chicago Field Office and the IDNR within three months of completion of the translocation. A preliminary electronic draft summary (email) including number of listed species encountered will be submitted within 5 working days following the completion of fieldwork. The final report will include an introduction, GIS mapping, methods section, results section, conclusion and/or summary, and any relevant supplementary information (e.g., names and qualification of surveyors, E&T permit numbers). The methods section will detail the protocols used for surveying, holding, handling, and translocating larvae; and establishment and location of the relocation site. The results section will include; the total number of individuals collected and relocated; date collected; water and air temperatures; total number of live and dead listed species collected; condition, size, and approximate age of live listed species; and GIS maps or figures showing the project features and Permit Area. Electronic files including GIS data (shapefiles or database with coordinates) of species locations will be provided to the Service and IDNR.

3.1.2 *Best Management Practices and Avoidance Measures*

3.1.2.1 *Soil Erosion and Sedimentation Control*

Silt fence or straw wattle/straw bales would be installed along the boundary of areas where temporary excavation and spoils stockpiling would take place. Silt fence or straw wattle/straw bales would at a minimum be installed on the downslope side of the workspace and between RIV4 and the associated excavation workspace for location PR-01. Straw wattles/straw bales, if used, would be certified weed-free.

Proposed access roads that do not overlap with the existing gravel road would be matted with timber or composite mats. All areas of the approximately 150-foot wide by 100-foot long temporary staging area and 25-foot wide by 25-foot long matted temporary turnaround area would be matted.

Groundwater discharged from trench excavation west of the CNRR would be directed to well-vegetated areas west of the trench through a filter bag placed on matting. Filter bags would not be placed in or within five feet of rivulets. Intake hoses would be screened (max 10 mesh (2mm)) and placed in perforated buckets on the bottom of the trench to minimize sediment from entering the hose and to minimize entrainment of small aquatic organisms. The smallest pump practical (approximately 2-inch, 5-10 hp; types previously noted in Section 1.4.1.5) would be utilized for trench dewatering.

3.1.2.2 Wetland and Rivulet Impact Minimization and Restoration

To minimize rutting and soil disturbance in wetlands, equipment working in wetlands would be placed on mats. Topsoil (top 12 inches) would be stockpiled separately from subsoils during trench excavation. Topsoil and subsoil would be returned to the trench in the same stratification in which they were removed during backfill.

3.1.2.3 Invasive Species Spread Minimization

Mats and equipment with the potential to contact bare or disturbed soils would be cleaned prior to transport to the Project work area in order to avoid the spread of invasive species (Com Ed, 2013 - Modified).

The temporary workspace, excavation areas, and access routes would be pretreated with herbicides to minimize the spread and regrowth of invasive species upon backfill. An accepted herbicide formulated for aquatic use would be utilized. Herbicide would be applied according to manufacturer label specifications and USEPA requirements. Application near rivulets would be conducted in a direct application method with areas away from rivulets applied by spray application, according to an approach to be verified with USFWS. Some of this work may occur in advance as part of the Hanson Material Service HCP.

3.1.2.4 Federally Listed Species Avoidance and Minimization Measures

The Project would be performed between November 1 and March 1 when freezing temperatures are typical, to avoid periods when HED and Blanding's Turtle are most active and to avoid the American Bittern nesting season in Illinois.

Vehicles used within the Permit Area would be limited to 8 mph during the Project minimize impact to adult HED and Blanding's Turtle (Com Ed, 2013).

Blanding's Turtles would be excluded from the work area by appropriate barriers installed to control sediment as described above. In the event that a Blanding's Turtle is observed on the access road or otherwise within the work area, nearby activity would be halted and the turtle allowed to move away on its own. If the turtle does not quickly move to a safer area, the standby biologist would relocate the animal to nearby suitable habitat.

Matting would not be laid within mapped rivulets. Air bridges would be installed across mapped rivulets utilizing landings placed at least five feet from the rivulet to span the habitat and prevent impacts within the non-excavated portions of the rivulets (Com Ed, 2013 - Modified).

Temporarily excavated soils would not be stockpiled within mapped rivulets.

Vehicle use would be limited outside of existing or pre-determined access pathways and workspaces. Access would be allowed only by foot outside of existing and pre-determined pathways and workspaces (Com Ed, 2013 - Modified).

Workers would adhere to the Wolverine Safety, Health, and Environmental (SHE) Department's internal Emergency Response Plan (Wolverine 2022) and associated spill containment documents and procedures (Job Loss Assessments and Equipment Inspection Checklist) and take precautions with all fuels used in operations to avoid spills and provide proper spill cleanup. Except for stationary equipment (i.e. pumps,

generators, etc.), refueling would be performed at the staging area within secondary containment. Stationary equipment would be refueled in place using secondary containment. Furthermore, all hydraulic fluid used on-site would be eco-friendly or bio-based.

Environmental awareness training would be provided to all workers at the start of pipeline repair work. Training would discuss the specific species of concern for the Project and protocol for approaching work in sensitive habitats. Informational materials and species photos would be provided to workers.

A qualified biologist would be on standby for the duration of the Project in the event that WPL encounters unanticipated conditions, with a goal of mobilization to the site within 24 hours or less.

To minimize the duration of drawdown of groundwater in the immediate area of the excavation, dewatering would occur a maximum of two weeks in duration at each of the excavation locations. If additional time is needed past two weeks, the USFWS would be contacted and additional conservation measures would be considered if needed (i.e., cease pumping for a period of time before resuming, assessment of down-gradient groundwater elevation).

When excavating across RIV4, rivulet flow would be maintained via a dam and pump method to isolate the excavation area from flow within each rivulet while also maintaining flow within the remainder of the rivulet (Appendix D). To achieve this, a dam made of non-erodible materials (aqua barriers, sandbags, riprap and geotextile liner, etc.) would be installed between the excavation and the upstream section of the rivulet. For the rivulet bypass, the intake hose would be screened (max 10 mesh (2mm)) and would be placed on a stable surface or floated to prevent sediment from entering the hose as well as avoid or minimize entrainment. The smallest pump practical (approximately 2-inch, 5-10 hp; types previously noted in Section 1.4.1.5) would be utilized for the pump at the rivulet bypass. The bypass discharge water would be released onto a non-erodible, energy-dissipating surface prior to reentering the rivulet. Filtering of bypass water upon discharge would not be performed unless the bypass water becomes sediment-laden as a result of the Project activities.

3.1.2.5 Contamination Avoidance

To address agency staff concerns about the potential presence of petroleum contamination, soil samples were collected to assess the extent of potential petroleum contamination within the areas that are proposed to be excavated within HED critical habitat. Eight samples were collected in total. Samples were collected using a 3.25-inch diameter hand auger to minimize impacts. Samples for location PR-01 were collected south of RIV4. Samples were tested for volatile organic compounds and semi-volatile organic compounds relevant to potential petroleum contamination. The compounds listed in Appendix G were assessed and screened against the applicable USEPA Resource Conservation and Recovery Act Region 5 ecological screening levels for soil. Results show background contaminants were present within some samples, but not at levels that exceed regulatory standards requiring removal of the material. Storing soil in a manner to prevent spread during excavation and backfill and providing training and gloves to workers will be sufficient to prevent unnecessary exposure that could result in ingestion of the soil material during the repair work. Based on review of results additional sampling was requested by the USACE. A plan for conducting the additional sampling will be developed, approved, and conducted prior to mobilizing to the site. If needed, WPL would identify suitable source materials for alternative backfill substrate and provide the sourcing information to the USACE and USFWS prior to mobilizing to the site.

Except for stationary equipment (i.e. pumps, generators, etc.), refueling would be performed at the staging area within secondary containment. Stationary equipment would be refueled in place using secondary containment.

Coating would be removed from the pipeline per Wolverine SHE procedures and disposed of at an approved facility. Subsequent sandblasting would be performed using a chemically inert and environmentally friendly product such as Black Beauty® Glass blasting media or equivalent. Sandblast media and any abraded

material would be collected to the extent possible and disposed of; however, some blasting media and abraded material would likely remain within the temporary work area due to the nature of sandblasting operations.

Workers would adhere to the Wolverine SHE Department's internal spill containment procedures and necessary spill kit materials would be available on-site to respond to spills.

Monarch Butterfly

Although not currently listed and not a covered species in this Conservation Plan, the Monarch is being considered for federal listing and is a species of conservation concern. During summer 2021 HED surveys, a high density of Monarch was noted in the Permit Area (ERM 2021b) and spring prescribed burns conducted for the Project resulted in higher milkweed density. WPL voluntarily includes the following conservation measures to further avoid/minimize Monarch effects.

While a small number of milkweed plants would likely be removed during pipeline repair activities, any large (more than 20 clustered plants) occurrence of milkweed within 50 feet west of the work area limits would be identified with a short section of orange exclusion fence or other visually distinctive identifier to reduce risk of accidental damage.

Milkweed would be included in the revegetation seed mix.

3.2 Mitigation Measures

As part of the ITA process, impacts are expected to be mitigated at a conservation value ratio of 5.5:1 (IDNR 2021a). Temporary impacts total up to 1.40 acres, mostly workspace and access but including 0.03 acre of excavation and backfill. The 1.40-acre total assumes south access. If north access is approved, then total impact is reduced to about 1.15 acre.

Target mitigation credit required for south access at 5.5:1 equates to 7.70 acres. For north access, required mitigation is 6.49 acres. Note that both numbers are based on maximum potential ground disturbance, and it is possible that the impact area would be less depending on the results of inspection during initial excavation.

As part of the proposed Project, at least 0.38 acre of invasive common reed would be treated with herbicides, removed, and replanted post-impact with native species. Some purple loosestrife, reed canary grass, and buckthorn) may also be removed. At 100 percent restoration credit, this equates to at least 0.38 acre of mitigation credit not including treatment of invasive species other than common reed. The area of invasive species is based on 2017 mapping performed by others, and may currently be more extensive based on qualitative examination in 2021. The limits of invasive species within the workspace and access routes would be mapped prior to the start of construction to determine a precise baseline.

As part of the proposed Project, all 103 acres of the Com Ed Parcel were managed with prescribed fire in March/April 2021. The prescribed burns, conducted on two burn units, were completed at the request of USFWS. The objective of the prescribed burns was 1) to facilitate mapping of crayfish burrows for subsequent HED larval surveys, and 2) to enhance overall habitat on Com Ed Parcel. Both objectives were met; for example, post-burn milkweed abundance increased, contributing to a high number of Monarch Butterfly observations in summer 2021. The burns also removed accumulated cattail thatch and opened up marsh habitat facilitating access to breeding rivulets for adult HED. At 10 percent enhancement credit of 103 acres, this equates to 10.3 acres of mitigation credit.

Also as part of the proposed Project, surveys were conducted in spring 2021 for Blanding's Turtle, and in summer 2021 for HED. The former consisted of six site visits in total, three focused on basking turtle observations and three focused on basking turtle observations as well as physical searches of suitable nesting habitat, and documented presence of one turtle. The latter included 3 weeks of intensive adult HED

point counts and larval HED protocol-level sampling which for the first time documented precise locations of long-suspected HED breeding on Com Ed Parcel. This information is expected to be of considerable value for proposed future habitat restoration and enhancement under the HMS HCP. Both of these surveys covered the entire 103 acres of Com Ed Parcel, and they also resulted in one incidental American Bittern observation. Assuming 10 percent mitigation credit for conservation-related surveys for 103 acres, this equates to 10.3 acres of mitigation credit.

The total of 20.98 acres conservation credit greatly exceeds the required 7.70 or 6.49 acres, depending on access direction. Additional conservation measures recently added as part of consultation with USFWS and included as part of this conservation plan may qualify for additional credit, but have not been quantified here.

3.3 Monitoring

The objective of monitoring would be to track progress as applicable portions of the Permit Area (the area of excavation impacts and the adjacent workspace) are restored to suitable natural habitat for the covered species. Hydrology would ideally be within pre-Project ranges, and revegetation would ideally be on a trajectory to dense herbaceous native cover with a lesser presence of invasive vegetation than baseline, based on realistic past experience with successful habitat mitigation in the Midwest. Performance standards and monitoring requirements are outlined in detail in the conservation measures in section 3.1.1 above. The Mitigation and Monitoring Plan (Appendix H) outlines monitoring requirements by year according to the conservation measures. An annual monitoring report would be provided to USACE, USFWS, and IDNR by December 31 of each year beginning in the year after completion of pipeline repairs, for the duration of the monitoring period.

3.4 Adaptive Management

The National Research Council defines adaptive management as follows (NRC 2004):

“Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a ‘trial and error’ process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.”

In the context of the current Project, adaptive management applies during ground disturbing work, as well as during the subsequent monitoring period.

During Construction: The construction approach and the avoidance and minimization measures described above are based on years of experience and anticipated seasonal conditions in the Permit Area. In the event that unexpected conditions are encountered, or if initial work identifies more effective methods to achieve goals and reduce impacts, and if the proposed changes generally fall within the avoidance and minimization measures described in this document, then such changes would be made and documented. If the changes fall outside the conditions outlined in this document then a conference call would be scheduled with IDNR, USFWS, WPL, ERM, and any other relevant parties. Modifications would be implemented only if consensus is reached that the proposed change is an improvement or a better way of approaching a given issue.

After Completion: Upon completion of ground disturbing activities, the WPL and ERM core Project team will hold an internal call to review site conditions to date and any new knowledge would be documented for Project wrap-up and subsequent monitoring. This would include any unexpected conditions encountered during work, any unusual weather conditions (flood, drought, extreme weather events) experienced or anticipated, any new information on covered species, and any new information learned from communication with entities conducting HCP-related work on adjacent lands including possible synergies between the parallel efforts. If new information is substantial or has potential consequences for the outcome, then a call would be scheduled with IDNR, USFWS, WPL, ERM, and other relevant entities, if appropriate. Changes from what is proposed in this Conservation Plan would occur only upon consensus of stakeholders. IWR (2013) is a useful reference for review of changed conditions and adaptive management.

Unforeseen circumstances that negatively affect the defined restoration, such as an extreme weather event or severe site damage, would trigger a stakeholder call at any time as needed prior to completion of monitoring and reporting.

3.5 Funding

Avoidance, minimization, and mitigation measures are anticipated to be completed as part of the proposed Project which is required by federal regulations and would be implemented as described in this conservation plan, with most mitigation (prescribed burns and HED/turtle surveys) already completed and other mitigation (habitat enhancement) occurring on site. In addition, WPL will be required to monitor according to the conservation measures outlined above and in the USFWS Biological Assessment, which will occur over a minimum of 10 years after the repairs are made. WPL will fund this work out of their operational budget. An implementing agreement is included as Appendix I.

4. ALTERNATIVES CONSIDERED

4.1 Preferred Alternative

The Preferred Alternative involves temporary excavation, inspection, and possible repair of up to approximately 112 feet of Wolverine's existing 18-inch CU-LK pipeline and associated impacts to state-listed species. Avoidance and minimization measures would be utilized throughout the Project to minimize impacts to the extent practicable. Under the Preferred Alternative, the pipeline would first be excavated at the known pipeline repair feature locations, coating would be removed, and any anomalies would be evaluated utilizing various measurement tools, visual inspection, and nondestructive testing protocols. If the feature(s) excavated meet the repair criteria defined in regulations and/or Wolverine's Integrity Management Program, repairs will be made using an approved repair method (typically installation of a pressure containing sleeve over the feature location). The excavated portion of the pipeline would also be properly coated per regulations prior to backfilling.

Under the Preferred Alternative, Wolverine would maintain compliance with PHMSA regulations which require pipeline operators to take prompt action to address all anomalous pipeline conditions that are discovered through integrity assessment or information analysis (Code of Federal Regulations [CFR] 195.452 and 49 CFR Appendix C to Part 195). The Preferred Alternative will also allow Wolverine to perform a minor amount of additional excavation, inspection, and possible repair of the pipeline pending inspection of the known anomalies and evaluation of the overall pipeline condition at those locations (e.g., coating condition, additional anomalies identified by inspection). Pipeline inspection and required repairs (hazard identification and associated mitigations) are required to maintain the long-term integrity of the pipeline to allow continued safe operations and compliance with the Code of Federal Regulations as enforced by PHMSA. The Preferred Alternative would enhance pipeline integrity and safety, and will minimize the likelihood of more extensive and impactful work in this area in the future on state-listed species and their associated habitat.

The preferred alternative has been scaled back from an earlier Project proposal and greatly reduces the extent of potential impacts. WPL has been able to reduce the length of pipeline excavation impact from a total of 1520 feet down to a maximum of 112 feet. As a result of the changes, WPL has reduced the overall Project footprint from 2.62 acres to 1.40 acres, eliminated the potential excavation of RIV2, and concentrated much of the remaining excavation disturbance within areas dominated by common reed.

4.2 Additional Considered Alternatives

Two alternatives that were considered but ultimately rejected include reroute scenarios (short and long) to replace the section of pipeline where investigation is needed and avoid impacts to HED federally designated critical habitat. These alternatives were ultimately rejected due to excessive costs, environmental impact, the need to negotiate with numerous additional landowners, and feasibility.

Costs associated with the short reroute alternative (0.87 mile), which only involved the 1,520-foot section of pipe west of New Avenue within HED critical habitat was estimated at approximately \$5.5M. Under this alternative a portion of the CU-LK pipeline south of the Project would still overlap with critical habitat for HED. Costs associated with the long reroute alternative (3.55 miles) which would reroute the CU-LK pipeline such that there would be no overlap with critical habitat for HED was estimated at approximately \$17M. Both replacement scenarios would also require shutting down the line segment, which would have a significant economic impact on the Midwest region by reducing the supply of gasoline and diesel fuels to the Lockport, Illinois area as well as portions of Indiana and Michigan, in addition to substantial lost revenue to Wolverine.

In addition to the considerable costs and interruption of fuel supply associated with the reroute alternatives, the environmental impact associated with a reroute, assuming a temporary workspace width of 75 feet, would involve approximately 8 acres for the short alternative and approximately 32 acres for the long alternative.

Although the short and long reroute alternatives would minimize or avoid impacts to critical habitat for HED, respectively, they would involve significant disturbance and environmental impacts to greenfield areas and potential impacts to other State-listed species that may be present.

Finally, the presence of a large number of other above and below-ground utilities and the developed nature of the general area create a route-constrained environment that limits alternative options. Specifically, utility congestion near the intersection of New Avenue and W. 135th street, where a crossing would be needed for both reroute scenarios, severely diminished the feasibility of performing a reroute as rights would need to be granted by all utilities already present and sufficient workspace would be needed to perform a boring beneath the roadway. Overall, the practicality of performing a reroute as compared to excavating, inspecting and repairing the existing pipeline in place was determined to be unreasonable in light of the costs, similar or greater overall impacts associated with the alternatives, and existing constraints associated with each alternative.

Wolverine also considered an alternative to replace the line segment along a similar alignment of the existing pipeline utilizing the horizontal directional drill (HDD) method of pipeline installation. This alternative would have replaced the section of pipe west of New Ave where it intersects critical habitat for HED, but this option was also ultimately rejected for the following reasons. Although this alternative would avoid excavation impacts to RIV4, it would involve a significant amount of impact to HED critical habitat due to the need for a large amount of temporary workspace and excavation for drilling activities. The HDD would raise potential for impacts to bedrock and associated groundwater flow patterns due to the deep installation of the pipe via the HDD and uncertain impacts that could result to groundwater feeding the HED habitat downgradient from the HDD. Finally, HDD replacement of the pipe section west of New Avenue would result in the creation of a large, unserviceable asset for Wolverine. In the event that an anomaly would be noted in the section of pipe replaced by HDD during future ILI tool runs, Wolverine would have no feasible way to address these conditions outside of performing another HDD pipe replacement. As such, an HDD replacement of the section of pipe west of New Avenue was also determined to be impractical.

4.3 No Action Alternative

Under the No Action Alternative, there would be no excavation, inspection, and possible repair of Wolverine's CU-LK pipeline. None of the known anomaly locations would be evaluated, there would be no additional excavation, inspection, and possible repair of the pipeline pending evaluation of the known anomaly locations. As such there would be no impact to State-listed species.

The No Action alternative would result in Wolverine shutting down the CU-LK segment. WPL is bound to comply with the CFR as enforced by PHMSA and therefore WPL must inspect/repair the line or shut down the line. Shutting down the line would impact the petroleum industry through disruption of regional refineries and result in lack of supply of gasoline and diesel fuels to the Midwest region, which would have significant economic impacts.

5. ANALYSIS OF TAKE ON SPECIES SURVIVAL OR RECOVERY

This Conservation Plan was prepared to identify and analyze the potential effects of the proposed Project on Illinois-listed species, and to identify measures to avoid, minimize, and mitigate take of those species. Take is defined in the Illinois Endangered Species Protection Act as to “harm, hunt, shoot, pursue, lure, wound, kill, destroy, harass, gig, spear, ensnare, trap, capture, collect [an endangered or threatened species], or an attempt to engage in such conduct” (520 Illinois Compiled Statutes 10/2). Four listed species were determined to be present within the Permit Area that could potentially be affected and/or taken by the proposed Project: the Hine’s Emerald Dragonfly, Blanding’s Turtle, American Bittern, and the LPC. A biological assessment has also been prepared and submitted to USFWS as part of Federal Section 7 consultation and covers some of the same species.

The proposed project may affect and is likely to adversely affect the HED. There would be temporary disturbance of up to about 35 linear feet of potential and possibly historic breeding rivulet, which is currently dominated by invasive common reed. With the minimized workspace, there would no longer be an expected loss of any associated crayfish burrows from excavation. North access, if granted, would avoid all known crayfish burrows. South access would temporarily cover two burrows. No known crayfish burrows are within the projected groundwater ROI from the excavations. In both cases it is possible that new burrows could be constructed prior to construction even though they were not present in summer 2021. Pre-construction clearance surveys of RIV4 and associated burrows, if any, are recommended along with translocation of HED larvae, if any, to further reduce effects. Although larval presence in RIV4 is believed to be low probability, it is possible, and current breeding habitat exists approximately 370 feet to the west. There would be temporary disturbance of up to 1.4 acres of habitat, most of it dominated by invasive common reed with small areas of higher quality known or potential adult HED foraging habitat nearby. Limiting construction activity to the winter months along with other conservation measures described above would further reduce or offset potential effects.

The proposed project may affect the Blanding’s Turtle. Although Blanding’s Turtles have been reported within a few hundred feet of the workspace, are quite mobile, and could occasionally move through the workspace, there is no core wetland habitat or known suitable nesting habitat within or adjacent to the workspace. Limiting construction to the winter months greatly reduces the risk of surface activity. If any Blanding’s Turtles are encountered they would be allowed to leave on their own or relocated out of the work area by a qualified and permitted biologist. The proposed Project is not expected to result in any direct take of Blanding’s Turtle because of avoidance and minimization measures, and only a temporary and minor loss of peripheral habitat. However, as a conservative precaution we acknowledge a small risk of take of a Blanding’s Turtle. The requested take is not anticipated to reduce the likelihood of the survival or recovery of the species in Illinois.

There is potential marginal foraging and nesting habitat within the work area for American Bittern. However, the species’ potential to occur within the Permit Area at any given time is low; the only observation after years of biological surveys was on the opposite end of the 103-acre Com Ed Parcel. Because no work would occur during nesting season, with avoidance and minimization measures there would be no take of American Bittern as part of the proposed Project.

LPC occurs in the central portion of the Com Ed Parcel, about 450 feet west of the work area. The proposed Project would have no effect on LPC.

The above findings assume maximum worst case impacts to the 112-foot long area of pipeline that could be excavated. It is possible that pending initial subsurface inspection early in the project, a lesser length would need to be excavated. If so, impacts would be reduced from those analyzed above. The worst case scenario was analyzed to prevent the need for additional future consultation on the proposed Project and reduce the risk of delays.

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7. LIST OF CONTACTS MADE AND PREPARERS

7.1 List of Contacts

Randall Boisvert, Hanson Material Service, 21 July 2021 during site visit.

Bill Stoll, Regional Manager/Senior Ecologist, Resource Environmental Solutions (RES), 24 September 2021, email.

Clint Pogue, U.S. Fish and Wildlife Service Arcata Field Office, 8 July 2021, email.

Troy Enright, ERM, provided technical review and interpretation to address noise effects analysis, completed 30 September 2021, email.

Michael LeFrancois, ERM, provided technical review and interpretation to address groundwater drawdown analysis, completed 4 October 2021, email.

7.2 Preparers

Authors

Ken Mierzwa, Principal Consultant, ERM (lead author).

Mr. Mierzwa has extensive experience with Hine's Emerald Dragonfly from 1994 to present, and holds a Federal 10(a)(1)(a) permit (TE38793A-2) and Illinois endangered species permit (12075) for the species. He led quantitative monitoring for the species in the lower Des Plaines River Valley from 1995 through 2014, including within the present Permit Area from 2007 to 2014. He has also monitored or visited localities in Door County, Wisconsin and Reynolds County, Missouri as well as the now extirpated type locality in Logan County, Ohio. Mr. Mierzwa has extensive Section 7 consultation experience in Illinois, Indiana, Florida, Texas, California, and other states. Selected specific examples of consultation experience include the I-355 South Extension Tollway Bridge in Lemont, Illinois (2006); the CNRR acquisition of EJ&E Railroad in northeast Illinois and northwest Indiana (2009); a combined USFWS/NMFS BA for the Netflix movie Birdbox, filmed in part on the wild and scenic Smith River in northwestern California (2017); and a programmatic BA for the State of Florida's assumption of Section 404 authority which covered the entire state of Florida and 236 listed and proposed species (2019).

Genevieve Rozhon, Principal Consultant, ERM (author)

Genevieve Rozhon is a Principal Scientist and Project Manager at ERM with over 15 years of experience in her field. As a technical lead, she is frequently involved in all stages of a project, from initial planning and biological investigations to post-construction monitoring. This involves meeting a wide variety of client needs such as managing field efforts and budgets, coordinating with regulatory agencies and stakeholders, writing technical reports, and serving as an expert advisor on environmental regulations. Genevieve has managed environmental contracts and projects (municipal, federal, and private clients) throughout Northern California and the Midwest and has served in key technical roles on over 70 projects. Her expertise includes project and team management, migratory birds, endangered species, impact analysis, environmental compliance, and biological monitoring.

Michael LeFrancois, Principal Consultant, ERM

Mike is a geologist/hydrogeologist that works on environmental and water resource projects. Within this role, he provides technical guidance related to site strategy development, site investigation and assessment, hydrogeologic investigations, and hydraulic well testing and analysis. His project experience encompasses quantitative and qualitative hydrogeology, field geology, and groundwater modelling. He has directed and designed dozens of hydraulic investigations ranging from pumping test design, implementation and analysis,

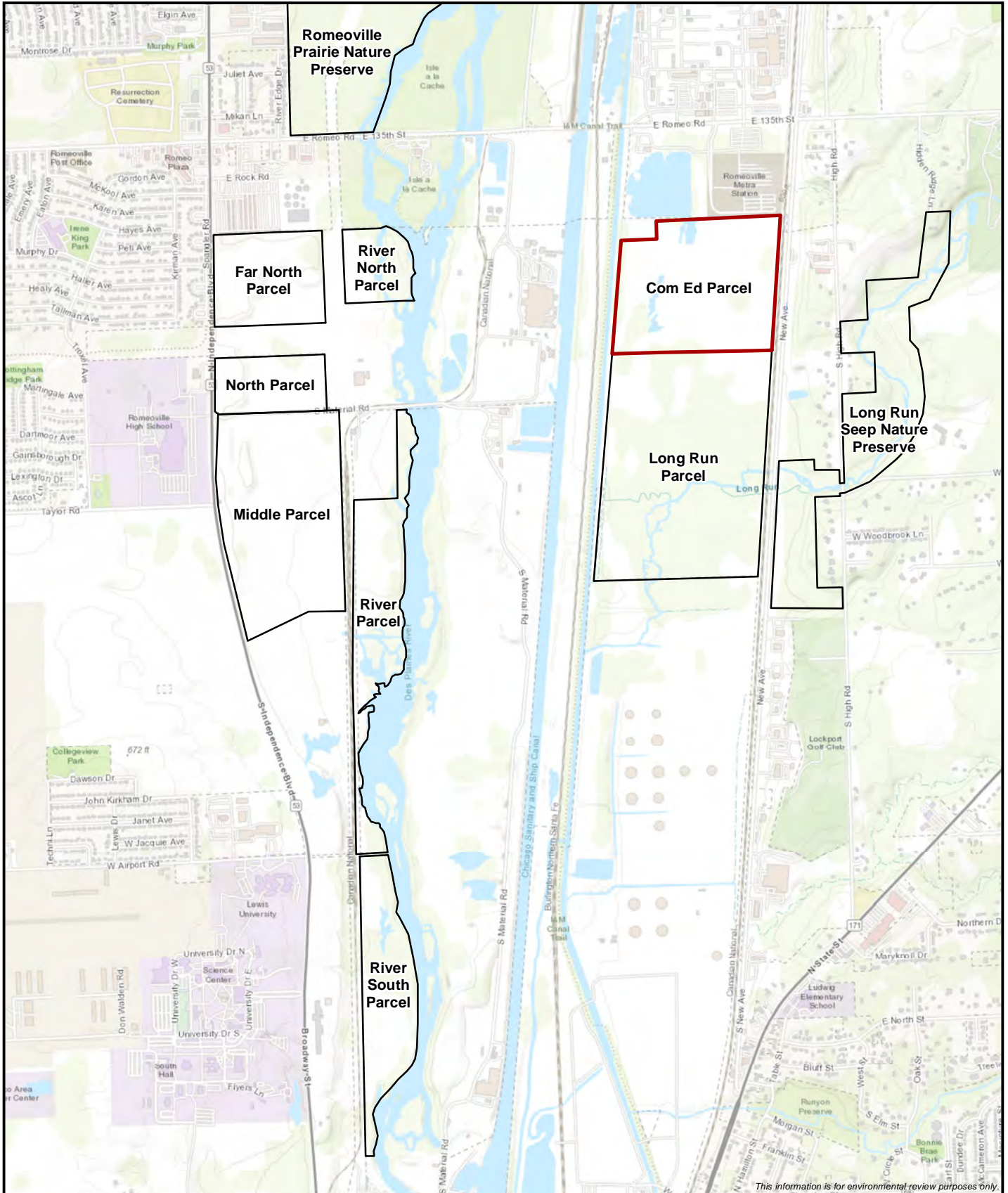
capture zone analyses, and downhole geophysical testing. He has developed/overseen numerous local and regional groundwater models, including contaminant fate and

Reviewers

Wade Hammer, Principal Consultant

Wade is an experienced project manager, permitting lead, biological resource lead, and field survey coordinator on large linear facilities projects. He has been project manager for the Wolverine project since May 2021. Wade has over 15 years of pipeline-related experience ranging from large natural gas transmission, to local distribution company work across the United States. He has worked extensively with U.S. Army Corps of Engineers permitting and coordinated with the U.S. Fish and Wildlife Service on projects across numerous regions of the United States. Wade served as a technical reviewer for the project biological assessment.

APPENDIX A FIGURES



This information is for environmental review purposes only.



 Permit Area
 Other Listed Species Parcel

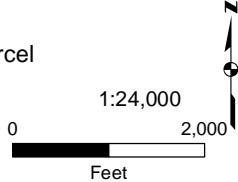
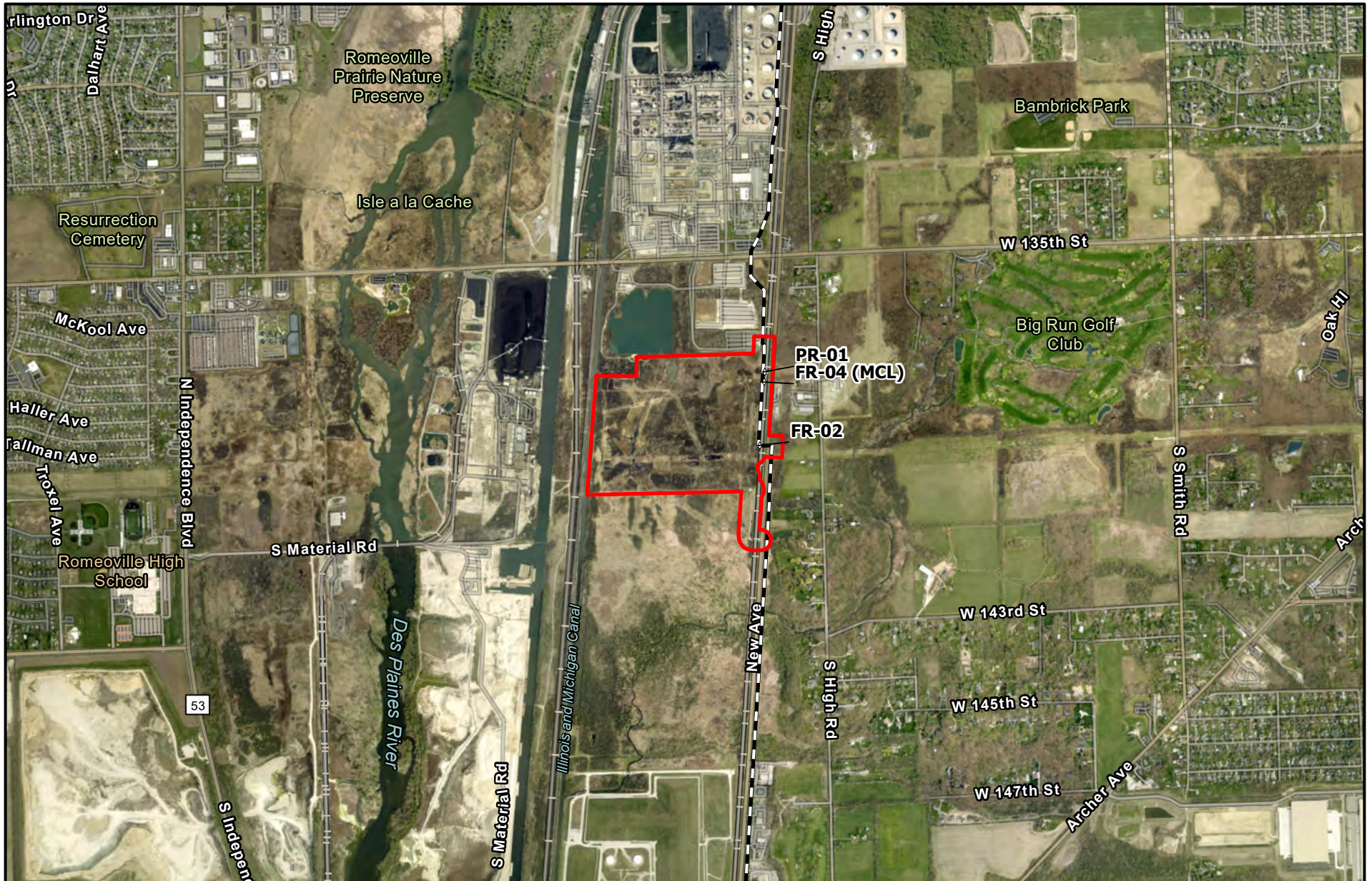


Figure 1
Vicinity Map
 WPL CU-LK Repairs
 Will County, Illinois





- ◆ Dig Locations
- Lemont to Lockport 18"
- ▭ Permit Area

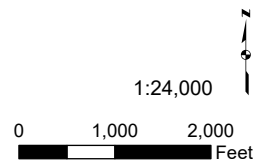
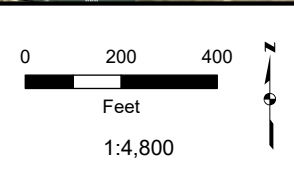


Figure 2
Permit Area
 WPL CU-LK Repairs
 Will County, Illinois



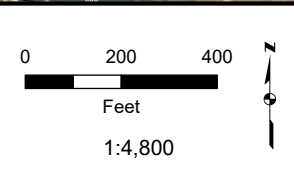
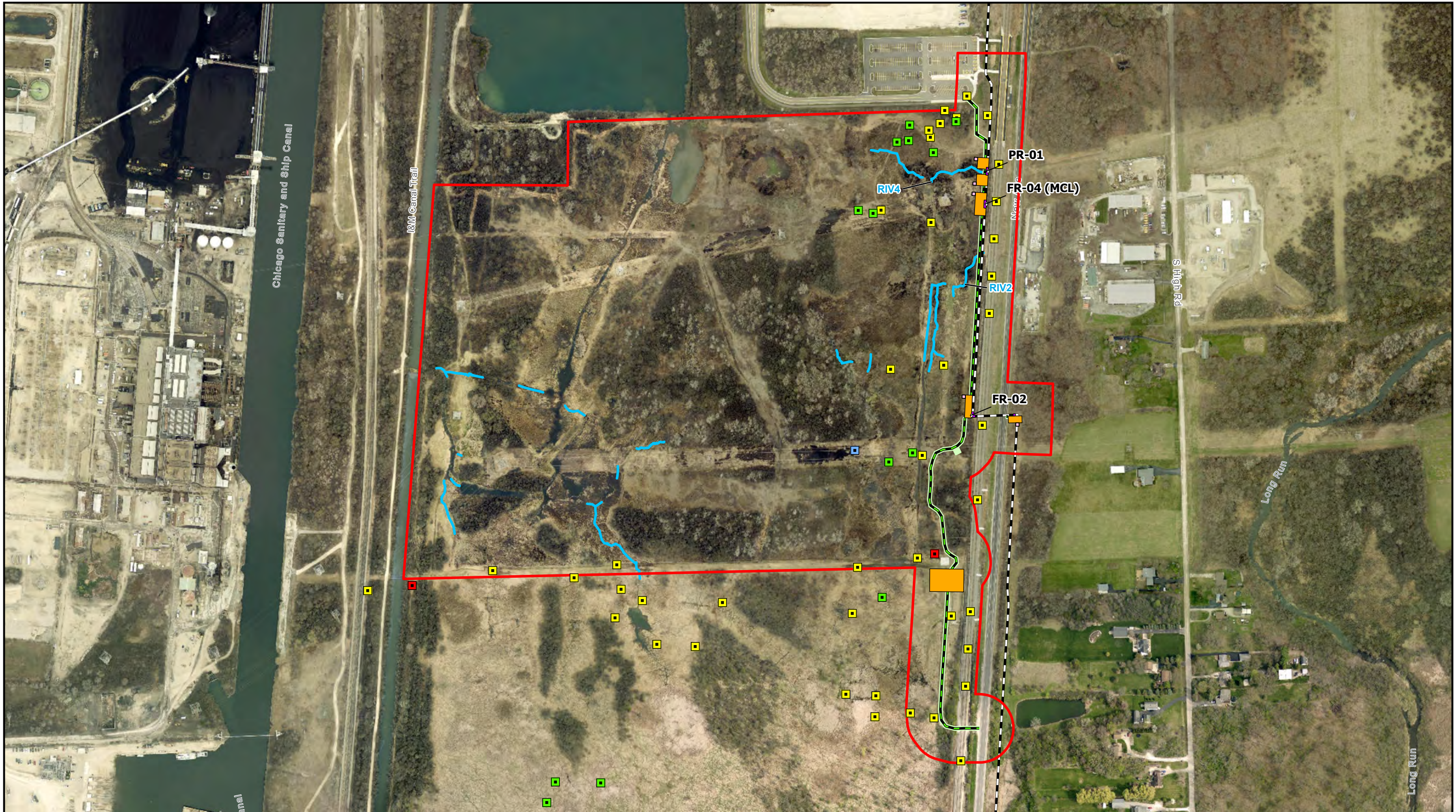


2021 HED Adult Point Count and Incidental Observations

- Point Count Adult Observation
- Incidental Adult Observation
- ◇ Dig Locations
- ~ Rivulet
- Lemont to Lockport 18"
- Access Road
- Delineated Wetlands
- Permit Area
- Access
- Dewatering
- Excavation
- Temporary Workspace

Figure 3
2021 HED Adult Survey Results
 WPL CU-LK Repairs
 Will County, Illinois





- Dig Locations
- Access Road
- Lemont to Lockport 18"
- Rivulet

- Permit Area
- Access
- Dewatering
- Excavation
- Temporary Workspace

2006-2016 HED Behavioral Observations *

- Flight
- Perched
- Territorial Patrol
- Teneral

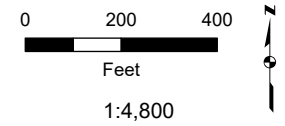
* Data provided by USFWS

Figure 4
2006-2016 HED Presence and Behavior Data,
HED Adult Observation Data Provided by USFWS
 WPL CU-LK Repairs
 Will County, Illinois





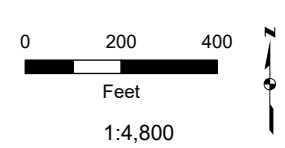
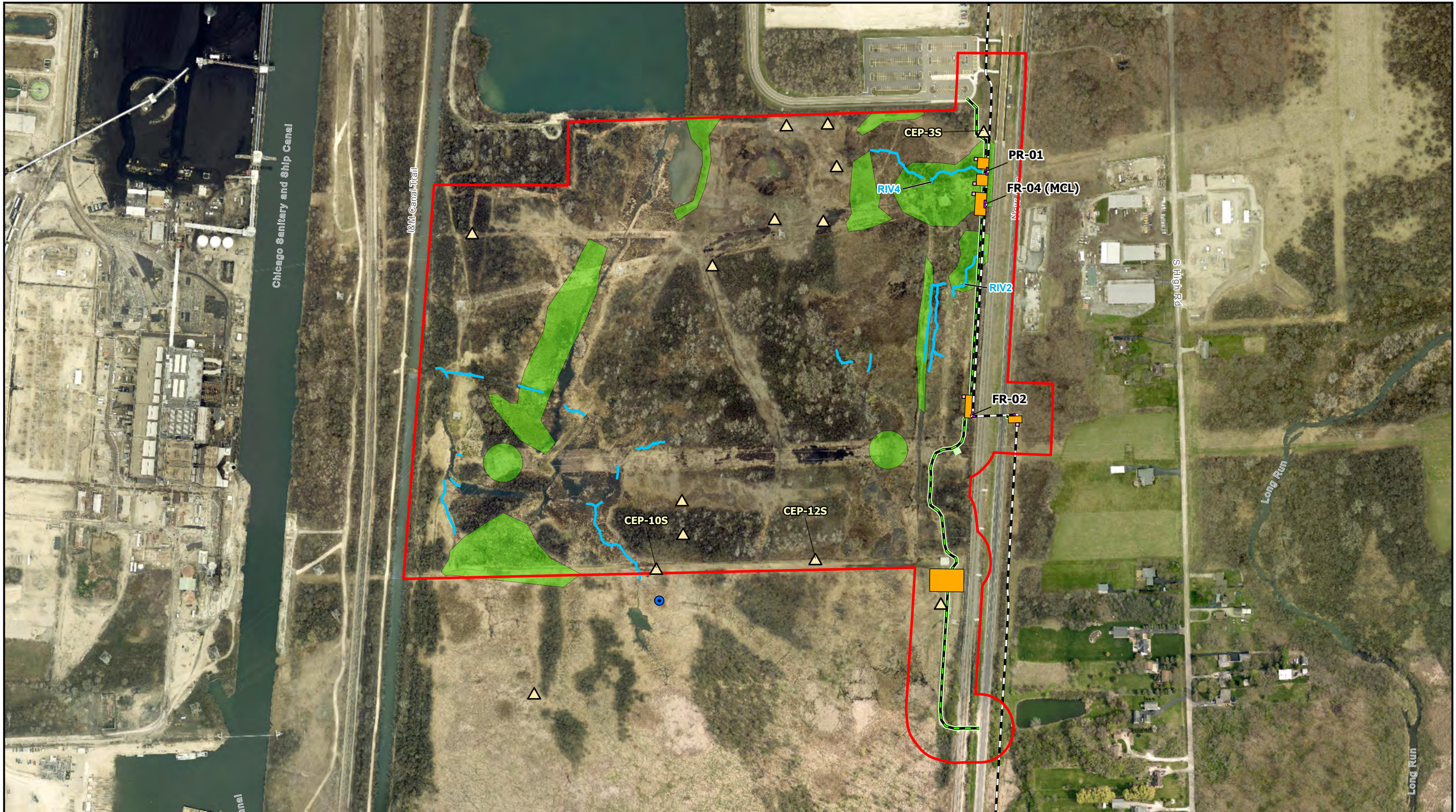
Radius of influence calculation assumes projected inflow rates are equated to sump pump operation for conservatism. However, actual sump pump rates will be smaller in magnitude during trench dewatering



2021 HED Crayfish Burrow Sampling Results	
●	Crayfish Burrow - Larvae Captured 2021
○	Crayfish Burrow
◇	Dig Locations
~	Rivulet
—	Access Road
—	Lemont to Lockport 18"
□	Projected Conservative Radius of Influence
□	Delineated Wetlands
□	Permit Area
□	Access
□	Dewatering
□	Excavation
□	Temporary Workspace

Figure 5
2021 Crayfish Burrow and HED Larval Sampling Results
 WPL CU-LK Repairs
 Will County, Illinois





- | | | | | | |
|---|--|---|------------------------|---|---------------------|
| △ | Approximate Groundwater Monitoring Well Location | ◇ | Dig Locations | ■ | Access |
| ● | HED Survey Larval Detection - 2011 | — | Access Road | ■ | Permit Area |
| ■ | Approximate Location of Phragmites | — | Lemont to Lockport 18" | ■ | Dewatering |
| | | ~ | Rivulet | ■ | Excavation |
| | | ■ | | ■ | Temporary Workspace |
- Phragmites locations approximated utilizing remote sensing, site notes, and RES landcover mapping data.

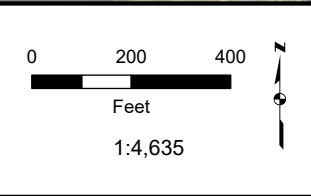
Figure 6
Background and Ancillary Data
 WPL CU-LK Repairs
 Will County, Illinois





Species

- Known Leafy Prairie Clover Occurrences
- ◆ Hine's Emerald Dragonfly Larval Occurrences
- ▲ 2021 American Bittern Observation
- 2021 Blanding's Turtle Observation
- 2015 Blanding's Turtle Observation



- ◇ Dig Locations
- Dewatering
- Permit Area
- Excavation
- Access Road
- Temporary Workspace
- Lemont to Lockport 18"
- Access
- ~ Rivulet

Figure 7
State-Listed Species Observations
 Wolverine Pipe Line Company CU-LK Repairs
 Will County, Illinois

Existing Landcover Description

- Developed
- Marsh-Cattail
- Marsh-Phragmites
- Shrubland Upland
- Wet Prairie



Romeoville
Metra Station

PR-01

FR-04 (MCL)

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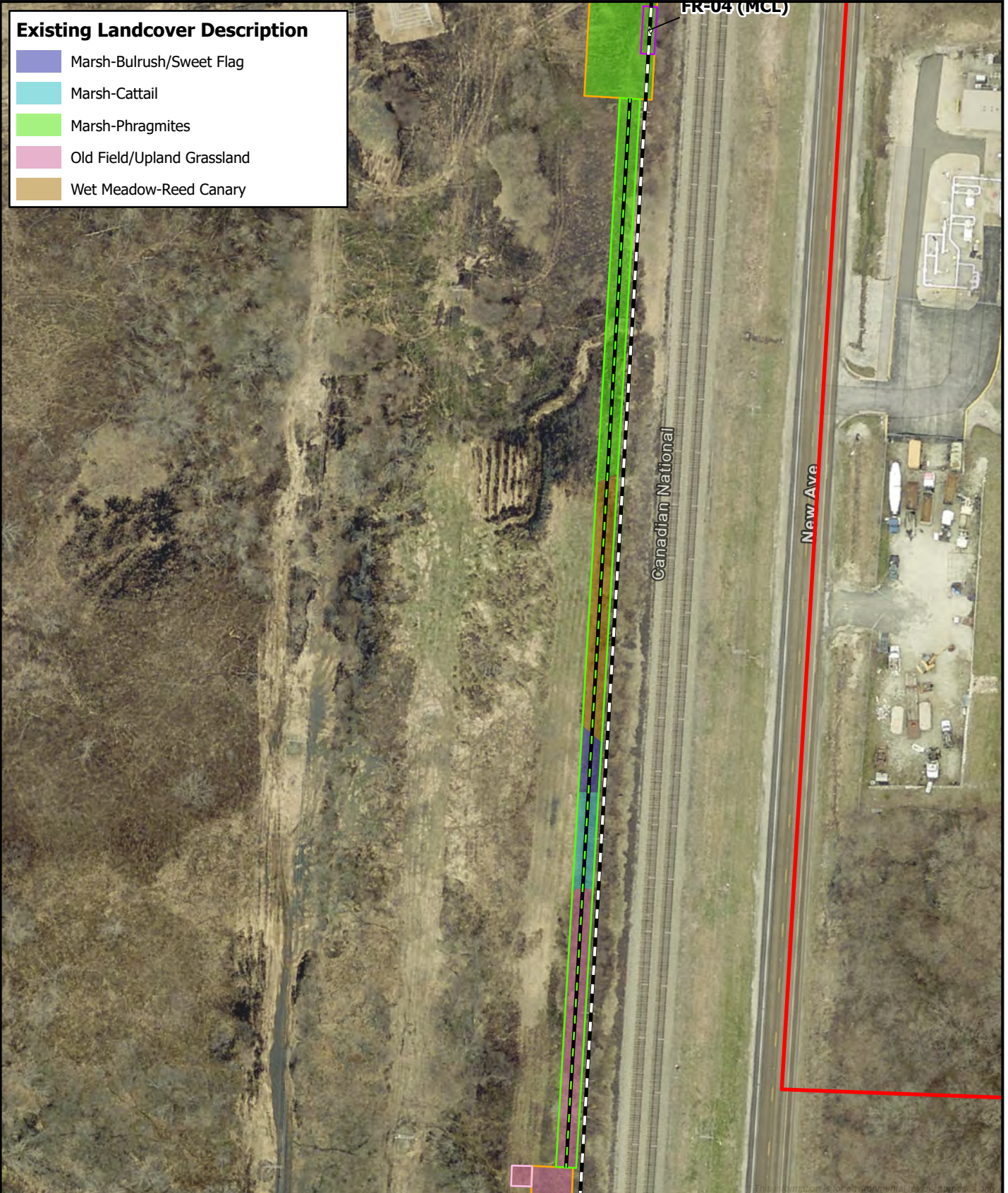
- ◇ Dig Locations
 - Access
 - ▭ Permit Area
 - Dewatering
 - Access Road
 - Excavation
 - Lemont to Lockport 18"
 - Temporary Workspace
- 1:1,200 Feet

Figure 8
Vegetative Communities Boundaries
Wolverine Pipe Line Company
 CU-LK Repairs Project
 Will County, Illinois
 Page 1 of 4



Existing Landcover Description

- Marsh-Bulrush/Sweet Flag
- Marsh-Cattail
- Marsh-Phragmites
- Old Field/Upland Grassland
- Wet Meadow-Reed Canary



This information is for environmental review purposes only.



- Dig Locations
- Permit Area
- Access Road
- Lemont to Lockport 18"
- Access
- Dewatering
- Excavation
- Temporary Workspace

1:1,200 Feet

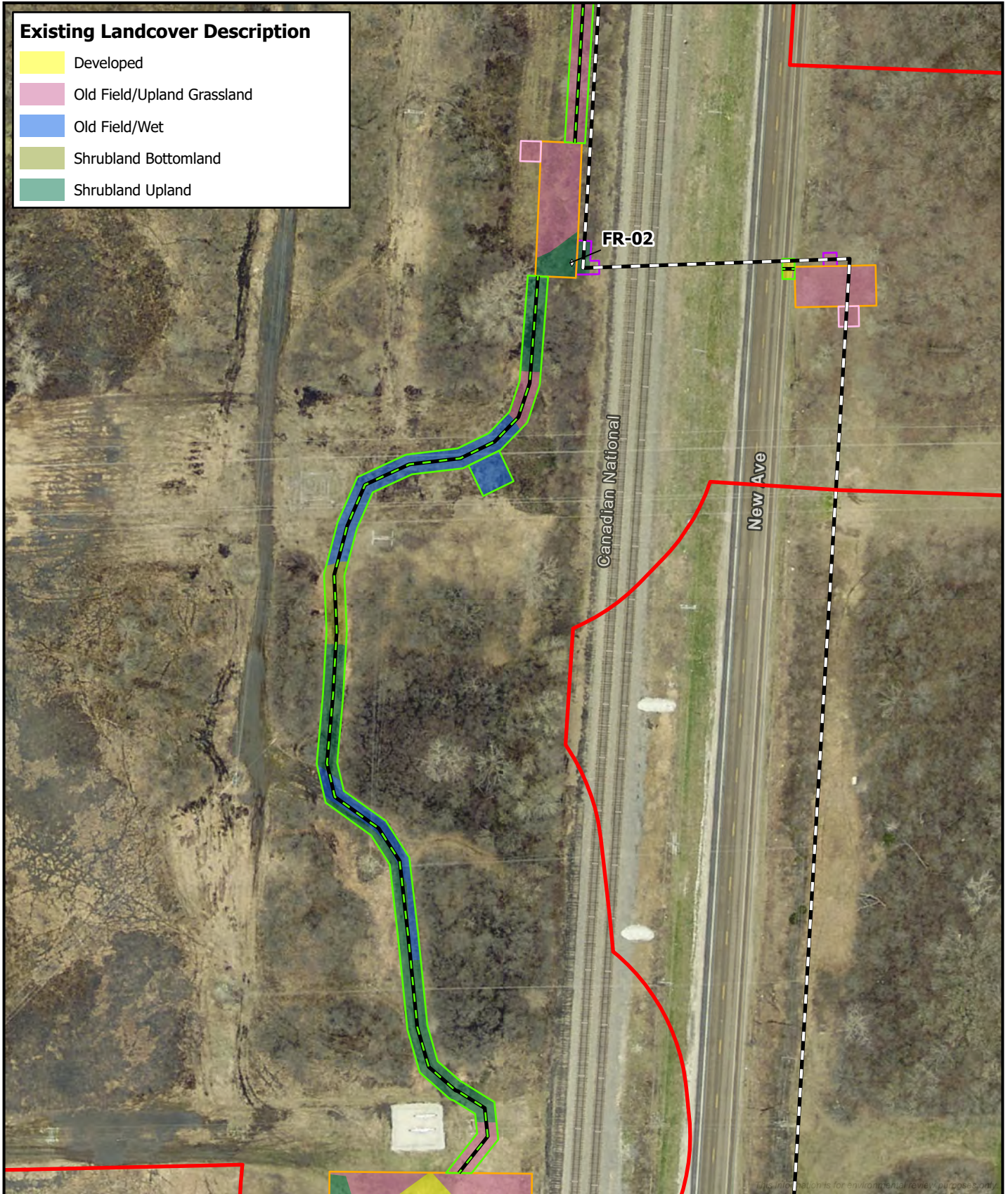


Figure 8
Vegetative Communities Boundaries
Wolverine Pipe Line Company
 CU-LK Repairs Project
 Will County, Illinois
 Page 2 of 4



Existing Landcover Description

- Developed
- Old Field/Upland Grassland
- Old Field/Wet
- Shrubland Bottomland
- Shrubland Upland



This information is for environmental review purposes only.



- Dig Locations
- Permit Area
- Access Road
- Lemont to Lockport 18"
- Access
- Dewatering
- Excavation
- Temporary Workspace

1:1,200
0
50
100
 Feet

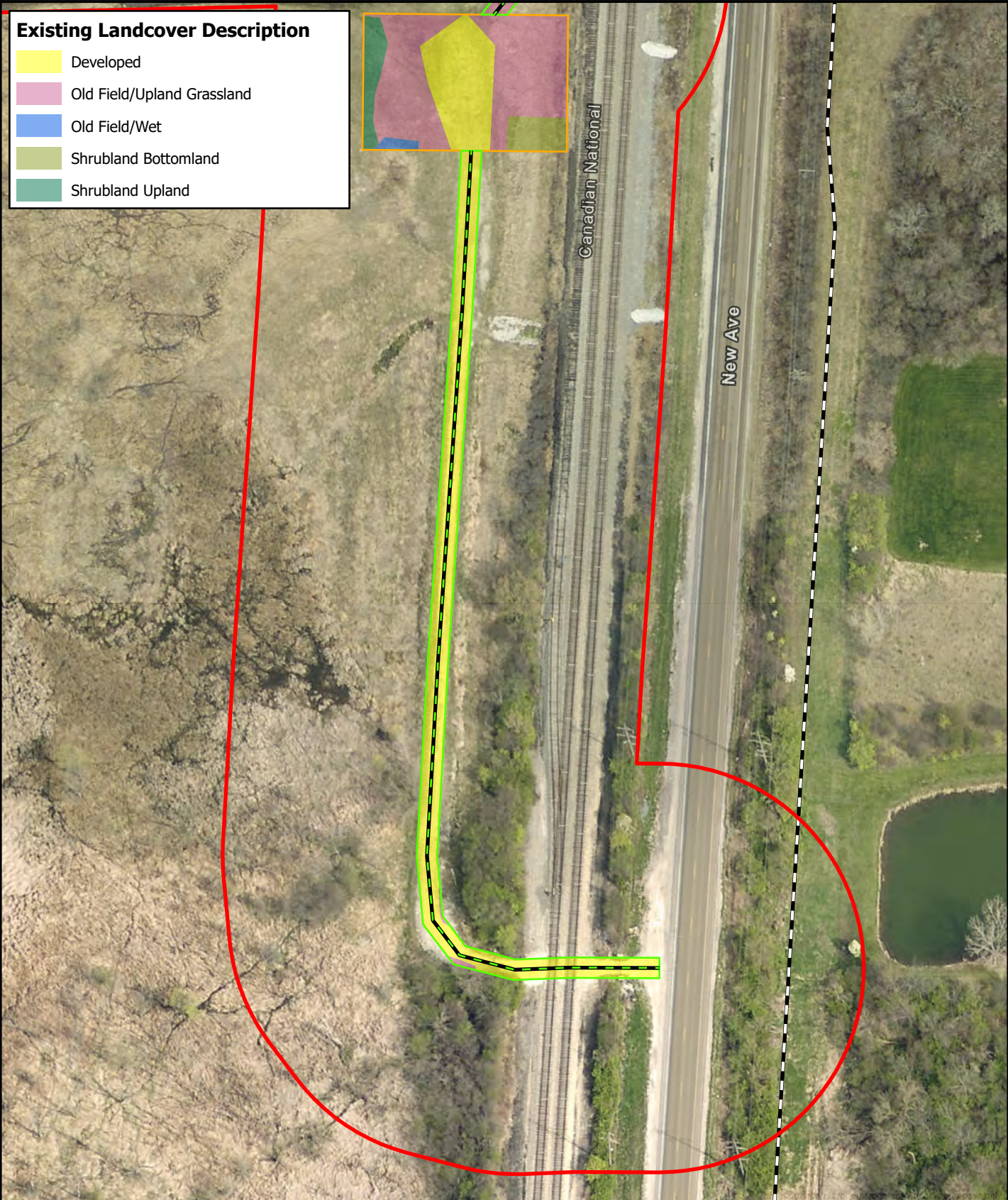


Figure 8
Vegetative Communities Boundaries
Wolverine Pipe Line Company
 CU-LK Repairs Project
 Will County, Illinois
 Page 3 of 4



Existing Landcover Description

- Developed
- Old Field/Upland Grassland
- Old Field/Wet
- Shrubland Bottomland
- Shrubland Upland



 Permit Area	 Access
 Access Road	 Temporary Workspace
 Lemont to Lockport 18"	

1:1,200
0
50
100
 Feet

Figure 8
Vegetative Communities Boundaries
Wolverine Pipe Line Company
 CU-LK Repairs Project
 Will County, Illinois
 Page 4 of 4

APPENDIX B SITE PHOTOS

ERM

PHOTOGRAPHIC LOG

Photographer: James Smit, Sam Guffey

Project Name:
CU-LK Pipeline Repairs

Site Location:
Lockport, IL

Project No.
0597915

Photo No.
1

Date:
4/9/21

Direction Photo Taken:

NA

Description:

RIV1 origin.
Groundwater observed upwelling from crayfish burrow or spring.



Photo No.
2

Date:
4/9/21

Direction Photo Taken:

South

Description:

RIV1. Less than 10' in total length. Less than 1' wide and 1' deep.



ERM**PHOTOGRAPHIC LOG**

Photographer James Smit, Sam Guffey

Project Name:

CU-LK Pipeline Repairs

Site Location:

Lockport, IL

Project No.

0597915

Photo No.
3**Date:**
4/9/21**Direction Photo Taken:**

Southeast

Description:

Area of interest near multiple rivulets (RIV1, RIV2, RIV6, RIV9, RIV10). General area with multiple crayfish burrows and areas of GW upwelling.

**Photo No.**
4**Date:**
4/9/21**Direction Photo Taken:**

East

Description:

RIV2. Feature is surrounded by phragmites.




ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	Project No. 0597915
Photo No. 5	Date: 4/9/21		
Direction Photo Taken: East			
Description: RIV2 origin at site.			

Photo No. 6	Date: 4/9/21		
Direction Photo Taken: West			
Description: RIV4. Feature is surrounded by phragmites.			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	Project No. 0597915
Photo No. 7	Date: 4/9/21		
Direction Photo Taken: East			
Description: RIV4.			

Photo No. 8	Date: 4/9/21		
Direction Photo Taken: Northeast			
Description: Origin of RIV4. GW observed upwelling at base of RR slope.			

ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	Project No. 0597915
Photo No. 9	Date: 4/8/21		
Direction Photo Taken: Northwest.			
Description: RIV5. Feature originates from an onsite pool.			

Photo No. 10	Date: 4/8/21		
Direction Photo Taken: East			
Description: RIV5			

ERM**PHOTOGRAPHIC LOG**

Photographer: James Smit, Sam Guffey

Project Name:
CU-LK Pipeline Repairs**Site Location:**
Lockport, IL**Project No.**
0597915**Photo No.**
11**Date:**
4/9/21**Direction Photo Taken:**

West

Description:

RIV6.

**Photo No.**
12**Date:**
4/9/21**Direction Photo Taken:**

NA

Description:

RIV6




ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	Project No. 0597915
Photo No. 13	Date: 4/9/21		
Direction Photo Taken: South			
Description: RIV6. Portion of feature is bounded by berm.			

Photo No. 14	Date: 4/9/21		
Direction Photo Taken: North			
Description: RIV7. Short feature with flowing water connecting two larger wetland areas.			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 15	Date: 4/9/21		
Direction Photo Taken: Southeast			
Description: RIV8. Short flowing feature that connects a forested and emergent wetland.			

Photo No. 16	Date: 4/9/21		
Direction Photo Taken: South			
Description: RIV9. Feature flows along east side of earthen berm.			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 17	Date: 4/8/21		
Direction Photo Taken: North			
Description: RIV51. Feature originates offsite and flows south to north through a cattail marsh.			

Photo No. 18	Date: 4/8/21		
Direction Photo Taken: East			
Description: RIV52. Feature flows through a cattail marsh.			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 19	Date: 4/8/21		
Direction Photo Taken: South			
Description: RIV53.			

Photo No. 20	Date: 4/8/21		
Direction Photo Taken: West			
Description: RIV54. Feature originates from a pooled area onsite and flows north to south.			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 21	Date: 4/8/21		
Direction Photo Taken: South			
Description: RIV56.			

Photo No. 22	Date: 4/8/21		
Direction Photo Taken: Northwest			
Description: RIV57. Feature originates at a ponded area that is partially dammed.			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 23	Date: 4/8/21		
Direction Photo Taken: West			
Description: RIV58. Feature flows through wet meadow.			

Photo No. 24	Date: 4/8/21		
Direction Photo Taken: East			
Description: RIV59.			

ERM	PHOTOGRAPHIC LOG
Photographer: James Smit, Sam Guffey	

Project Name: CU-LK Pipeline Repairs	Site Location: Lockport, IL	Project No. 0597915
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Photo No. 25	Date: 4/8/21	
Direction Photo Taken: West		
Description: RIV60		

Photo No. 26	Date: 4/8/21	
Direction Photo Taken: East		
Description: Area of interest west of RIV60. Multiple potential flow paths in a concentrated area.		



ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 27	Date: 4/8/21		
Direction Photo Taken: West			
Description: RIV62.			

Photo No. 28	Date: 4/8/21		
Direction Photo Taken: Northwest			
Description: RIV63 and surrounding area of interest. Small area with multiple channels and some flow.			

ERM	PHOTOGRAPHIC LOG
Photographer: James Smit, Sam Guffey	

Project Name: CU-LK Pipeline Repairs	Site Location: Lockport, IL	Project No.: 0597915
--	---------------------------------------	--------------------------------

Photo No.: 29	Date: 4/8/21
Direction Photo Taken: NA	
Description: Crayfish burrow example photo	



Photo No.: 30	Date: 4/8/21
Direction Photo Taken: NA	
Description: Crayfish burrow example photo	




ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	
		Project No. 0597915	
Photo No. 31	Date: 4/8/21		
Direction Photo Taken: NA			
Description: Cluster of crayfish burrows along RIV56.			

Photo No.	Date:	
Direction Photo Taken:		
Description:		

Description:

Location PR-01.
Standing at northern
excavation extent
facing south.



Description:

Location FR-04.
Standing at northern
excavation extent
facing south.



Description:

Location FR-02 west of New Avenue. Large rocks covering ground surface near existing casing vent.



Description:

Location FR-02 west of New Avenue. Large rocks covering ground surface.



Description:

Location FR-02 east of New Avenue. Located on upland bluff.



APPENDIX C BLANDING'S TURTLE SURVEY REPORT

**WPL CU-LK REPAIRS PROJECT
TURTLE SURVEY (LRC-2018-293)**

**Romeoville
Will County, Illinois**

(RES Project # 21-0077)

Prepared for:

**Environmental Resources Management
On behalf of
Wolverine Pipe Line Company**

Prepared by:

Resource Environmental Solutions, LLC.
120 West Main Street
West Dundee, Illinois 60118
(847) 844-9385



July 30, 2021

Contents

1.0 Introduction	2
2.0 Methodology	2
3.0 Habitat	2
4.0 Results	3
4.1 Basking Surveys	3
4.2 Nesting Surveys	3
5.0 Conclusions	3
6.0 References	4

Exhibit 1 Blanding’s and Spotted Turtle Survey Map

Appendix A Photos

Appendix B Incidental Species

Appendix C Turtle Survey Data Sheets

Appendix D IDNR Endangered and Threatened Species Permit

1.0 Introduction

Resource Environmental Solutions LLC. (RES) conducted Spotted (*Clemmys guttata*) and Blanding's (*Emys blandingii*) turtle surveys for Environmental Resources Management on behalf of Wolverine Pipe Line Company from April 27 through July 1, 2021, as a part of authorizations required for pipeline inspection and repairs. Three one-day basking surveys were conducted during the spring basking period (April 15- May 31) and three one-day nesting surveys were conducted during peak nesting season (May 31-June 30) to assess the presence of Blanding's and Spotted turtles within the ComEd parcel owned by Hanson Material Service (HMS) in Romeoville, Illinois. Turtles were handled under the Illinois Department of Natural Resources (IDNR) Endangered and Threatened Species Permit (permit # 10924).

2.0 Methodology

Basking surveys were performed on April 27, May 7, and May 21, 2021 when water temperatures were still cold enough that turtles must bask extensively, thus increasing their visibility. At the same time, vegetation had generally not yet leafed-out to obscure the turtles. During the initial mobilization, the RES survey team identified observation points (Exhibit 1) located in upland margins to search basking sites using a high-powered spotting telescope and binoculars. Following documentation of basking turtles from each fixed location, wetlands were approached and the margins were carefully searched for flushing turtles in attempts to locate and identify individuals. Visual surveys are best suited to quickly determine presence/not-detected status in large numbers of wetlands. As a standalone method, this cannot confirm absence within a habitat but can aid greatly in determining presence as well as relative distribution and relative abundance at the site when the effort is standardized per area (time- and area-constrained). All weather conditions during survey events were within the parameters for survey suitability (Appendix C).

Similar methods were utilized during nesting season surveys. Physical searches of suitable nesting habitat (south and west facing sandy slopes and sparsely vegetated areas throughout the site) which were identified during spring basking surveys were added and emphasized during this time to locate foraging and actively nesting females. One-day nesting surveys were performed on June 4, June 22, and July 1, 2021.

During both basking and nesting season surveys, incidental observations of non-target animal species were also noted and recorded (Appendix C).

3.0 Habitat

The Blanding's turtle is a semi-aquatic species that spends most of its time in wetlands but is also known to travel long distances over land to reach nesting locations or to move between wetland complexes. Suitable Blanding's turtle habitat includes the clean waters of marshes, ephemeral wetlands, vegetated ponds, wet prairies, sedge meadows, oxbows, fens, and slow-moving waters in sloughs and rivers. Adjacent uplands containing open grasslands or old fields in sandy soils are commonly used as nesting habitat. Blanding's turtles are primarily carnivorous, feeding on crayfish, snails, insects, crustaceans, worms, small fish, frogs, and aquatic plants. These turtles winter most often underwater, partially buried in soft substrate.

The spotted turtle is a semi-aquatic species that spends most of its time in wetlands, but also moves into uplands as it travels between wetland complexes or to aestivate. Spotted turtles are known to aestivate on land or in aquatic habitats for long periods during times of drought and during the warmest times of the summer. Spotted turtles are known to inhabit shallow vegetated wetlands with a soft substrate, including shallow marshes, sedge meadows, cattail marshes, and wet dolomite prairies. Females nest in open, sunny locations with moist, well-drained soils in sedge meadows and wet prairies. Turtles winter in muskrat or other small mammal burrows or in shallow water in the soft organic substrate. Spotted turtles are omnivorous, feeding on crayfish, worms, snails, insects, crustaceans, aquatic plants, and algae.

The ComEd Parcel includes a large wetland complex (Exhibit 1), which contains areas of open water ponds, wet dolomite prairie, sedge meadows, and bullrush, *Phragmites*, and cattail marshes (Appendix A, Photos 6-12). Due to low rainfall during the survey period, many of the emergent wetlands lacked suitable hydrology for Blanding's and spotted turtles during the June 4 and June 22 surveys, which likely pushed turtles to open water areas in the northwestern and southwestern quadrants. Wetlands at the site support a variety of invertebrates, small fish and frogs, and aquatic plants. Additionally, site wetlands contain soft substrate and muskrat dens necessary for overwintering Blanding's and spotted turtles. On-site nesting habitat availability however, is generally poor. Upland areas consist of rock and compacted fill, and are heavily vegetated with common buckthorn (*Rhamnus cathartica*) and other invasive plant species offering little opportunities for nesting turtles (Appendix A, Photos 13-14).

4.0 Results

4.1 Basking Surveys

Spring basking surveys were conducted April 27, May 7, and May 21 of 2021. Basking surveys were also conducted during the nesting survey period on June 4, June 22, and July 1. Survey data sheets and photos can be found in Appendix A and C. In total, one mature male Blanding's turtle was observed in an area of shallow water along the cleared access two-track located on the southern boundary and adjacent to a sedge meadow and bullrush marsh (Exhibit 1) (Appendix A, Photos 1-5). Non-target turtle species were observed in the open water ponds located in the northwestern quadrant of the site during most surveys. A complete list of incidental fauna species is located in Appendix B. Non-target turtle species observed generally included red-eared slider (*Trachemys scripta*), eastern painted (*Chrysemys picta*), common snapping (*Chelydra serpentina*), and spiny soft-shelled (*Apalone spinifera*). There were no sightings of spotted turtles within the ComEd Parcel.

4.2 Nesting Surveys

Potential nesting areas were identified during the basking surveys and pedestrian meander searches were conducted during the peak nesting period. Nesting surveys were conducted on June 4, June 22, and July 1. Nesting habitat was generally observed to be poor with on-site uplands primarily containing densely vegetated rock with shallow soils and compacted fill. Upland areas including spoil piles around electricity poles and fill area along the northern border of the site were searched for turtles and evidence of nesting. No evidence of nesting from the Blanding's or spotted turtle was observed within the ComEd parcel.

5.0 Conclusions

No spotted turtle individuals were identified within the ComEd parcel during the April-July 2021 surveys. The site contains suitable habitat for spotted turtles, but due to the rarity of the species, presence is unlikely. However, absence cannot be verified without live trapping.

One Blanding's turtle was observed on April 27 indicating the presence of Blanding's within the ComEd parcel. Overall the site provides overwintering, basking, and foraging opportunities. Due to the lack of sandy, upland soil, any Blanding's turtle nesting likely takes place outside of the ComEd parcel.

6.0 References

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- Ernst, C.H., R.W. Barbour, and J.E. Lovich. 1994. Turtles of the United States and Canada. Washington, DC: Smithsonian Institution Press
- Hamernick, M.G. 2000. Home ranges and habitat selection of Blanding's turtles (*Emydoidea blandingii*) at the Weaver Dunes, Minnesota. Final report submitted to the Nongame Wildlife Program, Minnesota Department of Natural Resources. 18 pp.
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- Wisconsin Department of Natural Resources. Blanding's Turtle Fact Sheet. (Online). Updated February 1, 2006. Accessed November 14, 2007 at <http://www.dnr.state.wi.us/org/land/er/wwap/explore/profiles.asp>.

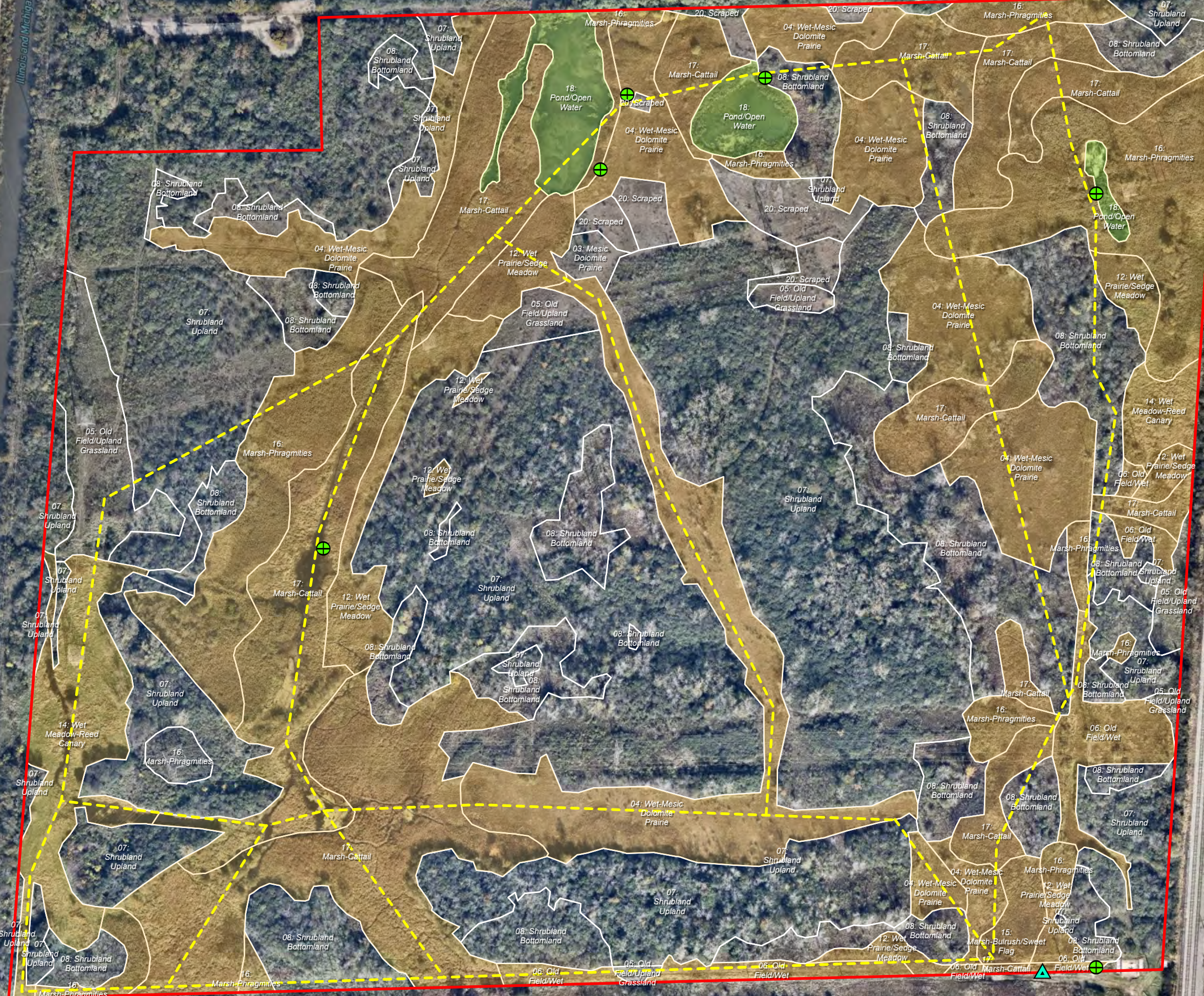
EXHIBITS

LEGEND

- ComEd Parcel Boundary
- Survey Path
- Vegetation Community
- ⊕ Fixed Observation
- ▲ Blanding's Turtle Sighting

HABITAT TYPE

- Basking
- Potential Habitat



APPENDIX A

PHOTOS

Blanding's Turtle



Photo 1- Adult Male Blanding's Turtle; April 27, 2021



Photo 2- Adult Male Blanding's Turtle; April 27, 2021



Photo 3- Adult Male Blanding's Turtle; April 27, 2021



Photo 4- Adult Male Blanding's Turtle; April 27, 2021



Photo 5- Adult Male Blanding's Turtle; April 27, 2021

Habitat Photos



Photo 6- Bullrush Marsh



Photo 7- Sedge Meadow



Photo 8- Dolomite Wet Prairie



Photo 9 Open Water & Cattail Marsh; Northeast Quadrant



Photo 10- Open Water & Cattail Marsh; Northeast Quadrant



Photo 11- Open Water Pond; Northwest Quadrant



Photo 12- Open Water & Cattail Marsh; Dry Conditions; Southwest Quadrant.

Potential Nesting Habitat



Photo 13- Potential Nesting Habitat; Upland Fill



Photo 14- Potential Nesting Habitat; Upland Fill

APPENDIX B

INCIDENTAL SPECIES

Birds		Birds		Reptiles	
Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
American Bittern	<i>Botaurus lentiginosus</i>	Great Blue Heron	<i>Ardea herodias</i>	Blanding's turtle	<i>Emys blandingii</i>
American Goldfinch	<i>Spinus tristis</i>	Great Crested Flycatcher	<i>Great Crested Flycatcher</i>	American Bullfrog	<i>Lithobates catesbeianus</i>
American Kestrel	<i>Falco sparverius</i>	Great Egret	<i>Ardea alba</i>	Northern Leopard Frog	<i>Lithobates pipiens</i>
American Robin	<i>Turdus migratorius</i>	Green Heron	<i>Butorides virescens</i>	Chorus Frog	<i>Pseudacris triseriata</i>
American Woodcock	<i>Scolopax minor</i>	House Wren	<i>Troglodytes aedon</i>	Garter Snake	<i>Thamnophis sirtalus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Indigo Bunting	<i>Passerina cyanea</i>	Eastern Painted Turtle	<i>Chrysemys picta</i>
Baltimore Oriole	<i>Icterus galbula</i>	Killdeer	<i>Charadrius vociferus</i>	Common Snapping Turtles	<i>Chelydra serpentina</i>
Barn Swallow	<i>Hirundo rustica</i>	Lark Sparrow	<i>Chondestes grammacus</i>	Red-eared Slider	<i>Trachemys scripta</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>	Mallard	<i>Anas platyrhynchos</i>	Spiny Softshelled Turtle	<i>Apalone spinifera</i>
Blue Jay	<i>Cyanocitta cristata</i>	Marsh Wren	<i>Cistothorus palustris</i>	American Toad	<i>Anaxyrus americanus</i>
Brown Thrasher	<i>Toxostoma rufum</i>	Merlin	<i>Falco columbarius</i>	Northern Green Frog	<i>Lithobates clamitans melanota</i>
Brown-headed Cowbird	<i>Molothrus ater</i>	Mourning Dove	<i>Zenaida macroura</i>	Northern Watersnake	<i>Nerodia sipedon</i>
Canada Goose	<i>Branta canadensis</i>	Northern Cardinal	<i>Cardinalis cardinalis</i>	Blanchard's Cricket Frog	<i>Acris blanchardi</i>
Chimney Swift	<i>Chaetura pelagica</i>	Northern Flicker	<i>Colaptes auratus</i>	Other	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Osprey	<i>Pandion haliaetus</i>	Coyote	<i>Canis latrans</i>
Common Grackle	<i>Quiscalus quiscula</i>	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	Crayfish	<i>Orconectes species</i>
Common Yellowthroat	<i>Geothlypis trichas</i>	Red-tailed Hawk	<i>Buteo jamaicensis</i>	Asian Carp	<i>Cyprinus carpio</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	White-tailed Deer	<i>Odocoileus virginianus</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Ring-billed Gull	<i>Larus delawarensis</i>	Muskrat	<i>Ondatra zibethicus</i>
Downy Woodpecker	<i>Dryobates pubescens</i>	Sandhill Crane	<i>Antigone canadensis</i>		
Eastern Bluebird	<i>Sialia sialis</i>	Sora	<i>Porzana carolina</i>		
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Swamp Sparrow	<i>Melospiza georgiana</i>		
Eastern Wood Pewee	<i>Contopus virens</i>	Tree Swallow	<i>Tachycineta bicolor</i>		
European Starling	<i>Sturnus vulgaris</i>	Turkey Vulture	<i>Cathartes aura</i>		
Field Sparrow	<i>Spizella pusilla</i>	Wilson's Snipe	<i>Gallinago delicata</i>		
Gray Catbird	<i>Dumetella carolinensis</i>	Wood Duck	<i>Aix sponsa</i>		
		Yellow Warbler	<i>Setophaga petechia</i>		

APPENDIX C

TURTLE SURVEY DATA SHEETS

Project Name ComEd Parcel Blanding's Turtle Survey Date 4/27/2021

Quadrat NE

Surveyors MM, KC, WS, WO, PD, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
0850	84.7	77.2
End Time	Air Temp End	Ground Temp End
1040	76.8	81.4
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	50.1%	47.9%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
25%	65.3%	46.7%
	Wind (Beaufort)	Precipitation
	1	N/A

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Tree Swallow	Brown-headed Cowbird	Crayfish Burrows	Eastern Painted Turtle	
Red-winged blackbird	Northern Cardinal	Bullfrog	Common Snapping Turtle	
Great Egret	European Starling	Northern Leopard Frog		
American Robin	Common Grackle	Chorus Frogs		
Turkey Vulture	Blue Jay	Garter Snake		
Swamp Sparrow	Bald Eagle	Coyote Scat		

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 4/27/2021

Quadrat NW

Surveyors MM, KC, WS, WO, PD, RT Photo #s _____

Start Time 1040	Air Temp Start 76.8	Ground Temp Start 81.3
End Time 1130	Air Temp End 78.2	Ground Temp End 82.4
Search Duration	Air Relative Humidity Start 47.9%	Ground Relative Humidity Start 46.7%
Cloud Cover 20%	Air Relative Humidity End 49.7%	Ground Relative Humidity End 59%
	Wind (Beaufort) 1	Precipitation N/A

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Tree Swallow	Snapping Turtle			
Red-winged blackbird	Red-eared Slider-2			
Wilson's Snipe				
Asian Carp				
Softshelled Turtle- 2				
Painted Turtle- 12				

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 4/27/2021

Quadrat SE

Surveyors MM, KC, WS, WO, PD, RT Photo #s 1-5

Start Time 0750	Air Temp Start 66.9	Ground Temp Start N/A
End Time 0850	Air Temp End 70.9	Ground Temp End 72.1
Search Duration	Air Relative Humidity Start 63%	Ground Relative Humidity Start N/A
Cloud Cover 80%	Air Relative Humidity End 55.6%	Ground Relative Humidity End 62%
	Wind (Beaufort) 1	Precipitation N/A

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes
41.631600	88.050631		0810	In Shallow Water	Adult/Male		

Incidental Observations of Other Species or Important Habitat Features

American Kestrel	Common Grackle	Marsh Wren	Coopers Hawk	Eastern Meadow Lark
Red-winged blackbird	Tree Swallow	Canada Goose	Merlin	
Chorus Frogs	European Starling	Eastern Bluebird	Brown Thrasher	
Turkey Vulture	Red-tailed Hawk	Northern Leopard Frog	American Toad	
Swamp Sparrow	Blue Jay	Isopod species	Downy Woodpecker	
American Robin	White-tailed Deer	Mosquito Larvae	Lark Sparrow	

General Comments (habitat notes, invasive species, potential threats)

Northern portion of quadrat spotted turtle habitat
No recent participation
Beaver or muskrat lodge in woody area
Suitable overwinters

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 4/27/2021

Quadrat SW

Surveyors MM, KC, WS, WO, PD, RT Photo #s _____

Start Time 1130	Air Temp Start 78.2	Ground Temp Start 82.4
End Time 1230	Air Temp End 1230	Ground Temp End N/A
Search Duration	Air Relative Humidity Start 49.7%	Ground Relative Humidity Start 59%
Cloud Cover 50%	Air Relative Humidity End N/A	Ground Relative Humidity End N/A
	Wind (Beaufort) 1	Precipitation N/A

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

American Toad	Muskrat Lodge	American Bittern		
Northern Leopard Frog	Snapping Turtle	Great Blue Heron		
Song Sparrow	Ring-billed Gull	Northern Green Frog		
Red-winged blackbird	Blue Jay	Sandhill Crane		
Chorus Frogs	White-tailed Deer	Sora		
Tree Swallow	Painted Turtle			

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/07/2021

Quadrat NE

Surveyors KC, WS, WO, PD, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
830	77.0	77.2
End Time	Air Temp End	Ground Temp End
900	60.6	71.2
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	57.7	75.0%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
100	37.1	44.5
	Wind (Beaufort)	Precipitation
	1	N/A

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Leopard Frog						
Garter Snake						
Red-winged Blackbird						
Baltimore Oriole						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 05/07/2021

Quadrat NW

Surveyors KC, WS, WO, PD, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
0900	66.5	68.7
End Time	Air Temp End	Ground Temp End
1030	68	71.2
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	36.2%	37.1%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
N/A	44.8%	44.5%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Baltimore Oriole	Norther Water Snake	Northern Flicker		
Red-winged blackbird	Mallard	Muskrat		
Song Sparrow	Softshell Turtle	Cliff Swallow		
Osprey	Turkey Vulture	Great Blue Heron		
American Robin	Blue Jay	Painted Turtle		
Canada Goose	Sora			

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/07/2021

Quadrat SE

Surveyors KC, WS, WO, PD, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
0730	74.2	74.5
End Time	Air Temp End	Ground Temp End
0830	77.3	77.2
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	58.1%	60.6%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
100%	57.7%	75.0
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged blackbird						
Song Sparrow						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

- 0 = calm, smoke rises vertically (0-2km/hr)
- 1 = Light air movement, smoke drifts (3-5)
- 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
- 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
- 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
- 5 = Fresh breeze, small trees begin to sway (31-39)
- 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/07/2021

Quadrat SW

Surveyors KC, WS, WO, PD, RT Photo #s _____

Start Time 1030	Air Temp Start 68	Ground Temp Start 71.2
End Time 1200	Air Temp End 66.5	Ground Temp End 68.7
Search Duration	Air Relative Humidity Start 44.6%	Ground Relative Humidity Start 44.5%
Cloud Cover N/A	Air Relative Humidity End 36.2%	Ground Relative Humidity End 37.1
	Wind (Beaufort) 1	Precipitation N/A

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged blackbird	Red-bellied Woodpecker	Northern Flicker		
White-tailed Deer	Great Egret	Northern Leopard Frog		
American Robin	Tree Swallow	Great Blue Heron		
Double-crested Cormorant	Barn Swallow			
Marsh Wren	Canada Goose			
Common Yellowthroat	Northern Cardinal			

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/21/2021

Quadrat NE

Surveyors KC, WS, WO, CB, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
0805	75.4	75.7
End Time	Air Temp End	Ground Temp End
0900	83.0	83.2
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	68.5%	66.6%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
40%	49.0%	76.0%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Barn Swallow	Northern Leopard Frog	Northern Leopard Frog		
Common Grackle	Song Sparrow	Eastern Wood Peewee		
Red-winged blackbird	Indigo Bunting			
American Robin	Canada Goose			
Downy Woodpecker	Northern Flicker			
Common Yellowthroat	Great-crested Flycatcher			

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/21/2021

Quadrat NW

Surveyors KC, WS, WO, CB, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
0900	83.0	83.2
End Time	Air Temp End	Ground Temp End
0935	82.3	80.7
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	49.0%	76.0%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
60%	46.9%	70.3%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird	Double-crested Cormorant			
Common Yellowthroat	American Robin			
Killdeer	Blue Jay			
Tree Swallow	Baltimore Oriole			
Barn Swallow	Gray Catbird			
Turkey Vulture	Garter Snake			

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/21/2021

Quadrat SE

Surveyors KC, WS, WO, CB, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
727	72.2	72.9
End Time	Air Temp End	Ground Temp End
805	75.4	75.7
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	67.5%	75.0%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
30%	68.5%	66.6%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged blackbird	Double-crested Cormorant	Northern Leopard Frog		
Song Sparrow	Tree Swallow	Eastern Wood Peewee		
Ring-billed Gull	Baltimore Oriole	American Goldfinch		
American Robin	European Starling			
Yellow Warbler	Gray Catbird			
Sandhill Crane	Blue Jay			

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 5/21/2021

Quadrat SW

Surveyors KC, WS, WO, CB, RT Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
0935	82.3	80.7
End Time	Air Temp End	Ground Temp End
1100	81.0	N/A
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	46.9%	70.3%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
60%	41.0%	N/A
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Cedar waxwing						
Northern Green Frog						
Painted Turtle						
Snapping Turtle						
Northern Flicker						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/4/2021

Quadrat NE

Surveyors KC, WS, CB, GB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
900	80.9	78.7
End Time	Air Temp End	Ground Temp End
1005	85.0	85.1
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	50.4%	46.6%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
75%	42.9%	58.9%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Great Egret						
Red-winged Blackbird						
Double-crested Cormorant						
Great Blue Heron						
Muskrat						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/4/2021

Quadrat NW

Surveyors KC, WS, CB, GB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
815	73.6	82.8
End Time	Air Temp End	Ground Temp End
900	80.9	78.7
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	28.5%	46.5%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
50%	50.4%	46.6%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Northern Flicker	Marsh Wren			
Baltimore Oriole				
Song Sparrow				
White-tailed Deer				
American Robin				
Double-crested Cormorant				

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/4/2021

Quadrat SE

Surveyors KC, WS, CB, GB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
1005	85.0	85.1
End Time	Air Temp End	Ground Temp End
1247	88.0	95.0
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	42.9%	58.9%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
25%	N/A	N/A
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird						
White-tailed Deer						
Woodcock						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/4/2021

Quadrat SW

Surveyors KC, WS, CB, GB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
715	64.5	67.6
End Time	Air Temp End	Ground Temp End
815	73.6	82.8
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	38.9%	68.9%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
100%	28.5%	46.5%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Painted turtle						
Red-winged Black Bird						
Rose-Breasted Grosbeak						
Eastern Kingbird						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/22/21

Quadrat NE

Surveyors KC, WS, RT, GB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
740	63.5	62.6
End Time	Air Temp End	Ground Temp End
830	67.5	63.4
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	73.1	80.9%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
0%	82.8	90.7%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

- 0 = calm, smoke rises vertically (0-2km/hr)
- 1 = Light air movement, smoke drifts (3-5)
- 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
- 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
- 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
- 5 = Fresh breeze, small trees begin to sway (31-39)
- 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/22/21

Quadrat NW

Surveyors KC, WS, RT, GB Photo #s _____

Start Time 615	Air Temp Start 57.6	Ground Temp Start 56.7
End Time 740	Air Temp End 63.5	Ground Temp End 88.8
Search Duration	Air Relative Humidity Start 72.1%	Ground Relative Humidity Start 62.6%
Cloud Cover 0%	Air Relative Humidity End 73.1%	Ground Relative Humidity End 82.8%
	Wind (Beaufort) 1	Precipitation 0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Killdeer	Great Egret	Northern Flicker		
Red-winged Blackbird	Great Blue Heron	Downy Woodpecker		
Song Sparrow	Eastern Kingbird	Chimney Swift		
Common Yellowthroat	Common Grackle	Green Heron		
Wood Duck	American Robin	Tree Swallow		
Double-crested Cormorant	Field Sparrow	Painted Turtles- 3		

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/22/21

Quadrat SE

Surveyors KC, WS, RT, GB Photo #s _____

Start Time 830	Air Temp Start 67.5	Ground Temp Start 63.4
End Time 945	Air Temp End 67.0	Ground Temp End N/A
Search Duration	Air Relative Humidity Start 80.9%	Ground Relative Humidity Start 90.7%
Cloud Cover 0%	Air Relative Humidity End 39%	Ground Relative Humidity End N/A
	Wind (Beaufort) 1	Precipitation 0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged blackbird				
Song Sparrow				
Swamp Sparrow				

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 6/22/21

Quadrat SW

Surveyors KC, WS, RT, GB Photo #s _____

Start Time 515	Air Temp Start 51.6	Ground Temp Start 52.2
End Time 615	Air Temp End 57.6	Ground Temp End 56.7
Search Duration	Air Relative Humidity Start 74.8	Ground Relative Humidity Start 55.2%
Cloud Cover 0%	Air Relative Humidity End 72.1	Ground Relative Humidity End 88.8
	Wind (Beaufort) 1	Precipitation 0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird					
Tree Swallow					
Song Sparrow					
Common Yellowthroat					
Northern Leopard Frog					

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

- 0 = calm, smoke rises vertically (0-2km/hr)
- 1 = Light air movement, smoke drifts (3-5)
- 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
- 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
- 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
- 5 = Fresh breeze, small trees begin to sway (31-39)
- 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 7/1/2021

Quadrat PE

Surveyors KC, WS, PD, CB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
1:00	11.5	11.5
End Time	Air Temp End	Ground Temp End
1:00	11.5	11.5
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	11.5%	11.5%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
10%	11.5	11.5%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird	Blanchard's Cricket Frog					
Brown Thrasher	Painted Turtle 3-5					
European Starling	Snapping Turtle					
American Robin						
Green Heron						
Eastern Kingbird						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 7/1/2021

Quadrat pw

Surveyors KC, WS, PD, CB Photo #s _____

Start Time 1:00	Air Temp Start 76.2	Ground Temp Start 66.5
End Time 1:00	Air Temp End 77.9	Ground Temp End 83.3
Search Duration	Air Relative Humidity Start 70.8%	Ground Relative Humidity Start 77.9%
Cloud Cover 0 %	Air Relative Humidity End 81.2%	Ground Relative Humidity End 76.3%
	Wind (Beaufort) 1	Precipitation 0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird						
Asian Carp						
House Wren						
Common Yellow Throat						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 7/1/2021

Quadrat SE

Surveyors KC, WS, PD, CB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
608	69.8	68.4
End Time	Air Temp End	Ground Temp End
707	71.2	71.6
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	69.3%	84.4%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
75%	88.2	92.4%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird				
European Starling				
American Robin				
Gray Catbird				
Northern Leopard Frog				

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

Project Name ComEd Parcel Blanding's Turtle Survey Date 7/1/2021

Quadrat PE

Surveyors KC, WS, PD, CB Photo #s _____

Start Time	Air Temp Start	Ground Temp Start
902	77.9	6.2
End Time	Air Temp End	Ground Temp End
1000	79.5	86.0
Search Duration	Air Relative Humidity Start	Ground Relative Humidity Start
	81.2%	83.3%
Cloud Cover	Air Relative Humidity End	Ground Relative Humidity End
10%	78.7%	84.5%
	Wind (Beaufort)	Precipitation
	1	0

Blanding's Turtle Observations

Easting	Northing	Accuracy (m)	Time	Behavior	Age/Sex	Photo#s	Notes

Incidental Observations of Other Species or Important Habitat Features

Red-winged Blackbird						
Great Egret						
Song Sparrow						
Swamp Sparrow						
Great Blue Heron						

General Comments (habitat notes, invasive species, potential threats)

Beaufort Wind Scale:

0 = calm, smoke rises vertically (0-2km/hr)
 1 = Light air movement, smoke drifts (3-5)
 2 = Slight breeze, wind felt on face; leaves rustle (6-11)
 3 = Gentle breeze, leaves & twigs in constant motion (12-19)
 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30);
 5 = Fresh breeze, small trees begin to sway (31-39)
 6 = Strong breeze, large branches in motion (40-50)

APPENDIX D

**IDNR ENDANGERED AND THREATENED
SPECIES PERMIT**



Illinois Department of Natural Resources Endangered and Threatened Species Permit

Permit Number: **10924**

Issued Date: 3/19/2021

Expiration Date: 12/31/2021

This permit is valid for the following Counties in Illinois:

Will

Pursuant to 520 ILCS 10/5 and 17 Ill. Adm. Code 1070.10-1070.80, this permit is issued to:

**Michael McGraw
467 East Church Road
King of Prussia, PA 19406**

and covers the following additional personnel:

**Kasey Clark
William Stoll
Ry Thompson
William Overbeck**

from:

Resource Environmental Solutions/Applied Ecological Services

for the purpose of SCIENTIFIC RESEARCH involving the following specimens and/or products:

<i>Species</i>	<i>Item</i>	<i># Specimens/ Products</i>	<i>Collection Method</i>	<i>Action</i>	<i>Disposition</i>
Reptiles and Amphibians - Blanding's Turtle - <i>Emydoidea blandingii</i>	Live Individual	Zero - all individuals will be	Hand Capture	Photograph	Catch and Release Live Specimen
Reptiles and Amphibians - Spotted Turtle - <i>Clemmys guttata</i>	Live Individual	Zero - all individuals will be	Hand Capture	Photograph	Catch and Release Live Specimen

If the research project covered by this permit will involve propagation, the permit holder and additional personnel listed above are required to possess an IDNR endangered and threatened species permit Propagation Addendum.

Possession of federally listed species is covered by:

**USDA Exhibitor Permit #
U.S. Fish and Wildlife Service Permit #**

The research project covered by this permit will address:

- | | |
|---|--|
| <input type="checkbox"/> <i>Distribution or status of the listed species</i> | <input type="checkbox"/> <i>Threats to the listed plants and animals and/or their habitats</i> |
| <input type="checkbox"/> <i>Life history of the listed species</i> | <input type="checkbox"/> <i>Effects of exotic species on native populations</i> |
| <input checked="" type="checkbox"/> <i>Ecological needs of the natural populations of the species</i> | <input type="checkbox"/> <i>Genetic diversity within population</i> |
| <input type="checkbox"/> <i>Supplementing existing populations</i> | <input type="checkbox"/> <i>Wildlife disease vectors and transmission</i> |
| <input type="checkbox"/> <i>Captive rearing</i> | <input type="checkbox"/> <i>Translocation to unoccupied locations within species' historic range</i> |
| <input checked="" type="checkbox"/> <i>Effects of management actions on animals or plants</i> | <input type="checkbox"/> <i>Impact of wind turbines on listed species</i> |
| <input type="checkbox"/> <i>Movement or habitat use</i> | <input type="checkbox"/> <i>Propagation for release into the wild</i> |

Questions about this permit should be directed to DNR.ETPermit@Illinois.gov

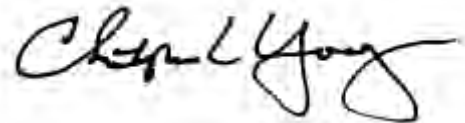
Other:

The specific locations where this research will be conducted are:

<i>Research Location</i>	<i>Nearest City</i>
HMS ComEd Parcel	Romeoville

**ITEMS LISTED ON THIS PERMIT MAY BE SOLD,
GIVEN AWAY, OR OTHERWISE DISPOSED OF ONLY
WITH PERMISSION OF THE ILLINOIS
DEPARTMENT OF NATURAL RESOURCES.**

Signed:



Christopher Young
Office Director

IDNR Office of Resource Conservation
As designee of IDNR Director, Wayne A. Rosenthal

Special Conditions (IF APPLICABLE):

Please note that this permit is not valid unless accompanied by any and all Federal/USFWS permits and/or provisions. Before any research is conducted within a State owned and/or operated site, permission from the Site Superintendent must be granted. Permittee must apply for and receive a Permit for Research in Illinois State Parks, Forests and Conservation Areas. Research within a Nature Preserve cannot occur unless written authorization/special use permit is granted from the Illinois Nature Preserves Commission.

Please note that any movement/translocation of any and all listed species within the State of Illinois is prohibited unless such activities are specifically covered under an official, approved IDNR Incidental Take Authorization (ITA). Without an ITA, all animals shall be returned unharmed at or near their original capture/discovery location immediately after photographing the specimen(s), recording location information, and data has been humanely collected if applicable. The Department shall be notified within 48 hours of discovery of any such listed species. Please contact Joe Kath via email with such information: Joe.Kath@illinois.gov

Conditions:

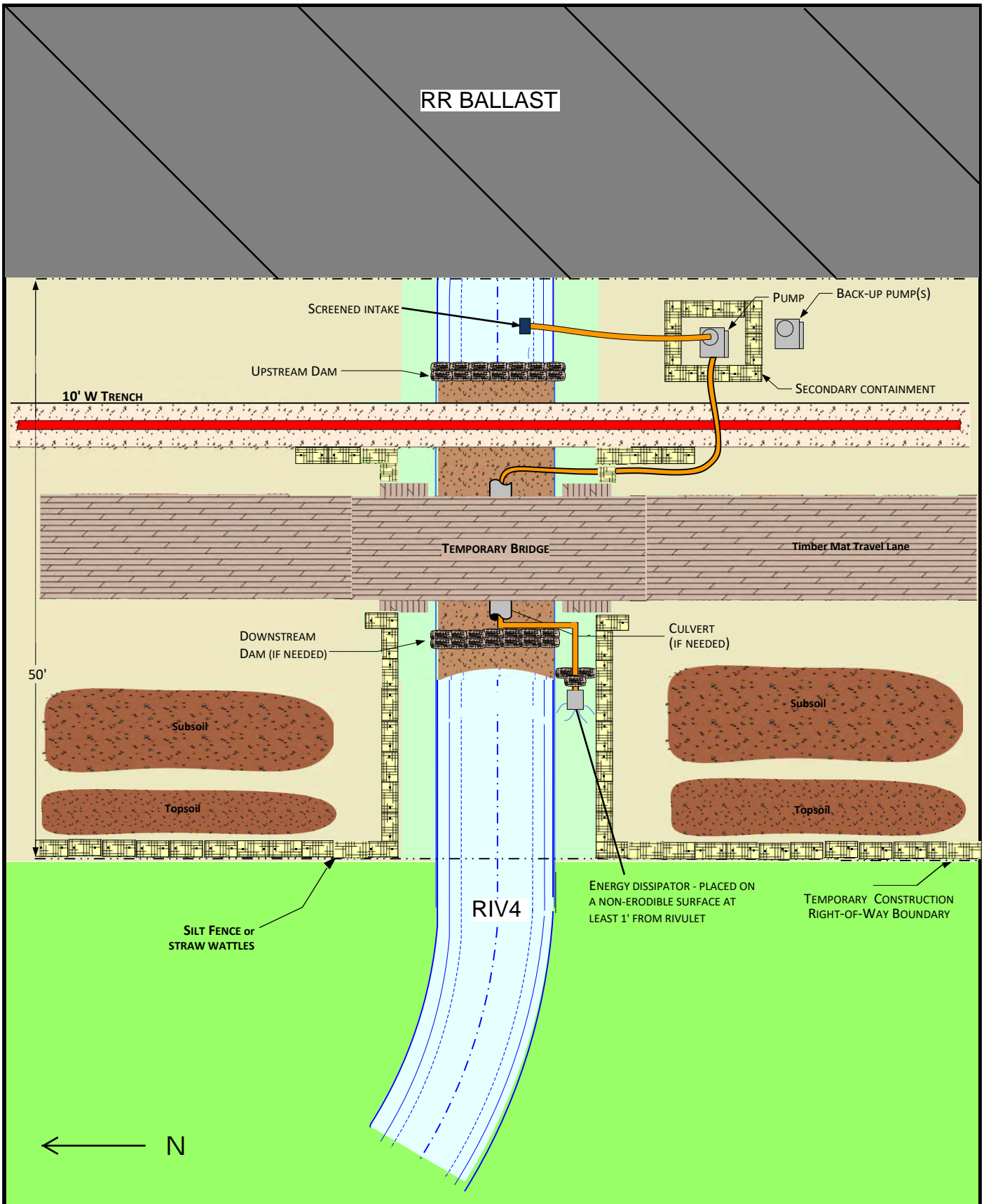
- A copy of this permit must be in the possession of the permit holder when engaged in activities involving endangered or threatened species.
- There shall be no propagation of or attempt to propagate any endangered or threatened species covered by this permit unless a signed IDNR addendum approving propagation is attached. In addition, the Propagation Addendum must be in the possession of the permit holder when engaged in all activities involving propagation of an Illinois listed species.
- Permit holder cannot move/transport/translocate any endangered or threatened species outside of a designated project area/zone of impact without expressed written consent of the Director of the Illinois Department of Natural Resources.
- Permit holder shall notify IDNR of any changes to personal information within 10 days of making such changes.
- Permit holder shall notify IDNR of any changes to inventory of specimens through escape, theft, death or other unanticipated events within five working days of the discovery of loss.
- Permit holder must provide the Department with an electric copy or two hard copies of any reports, technical papers, or technical notes that result from studies conducted under the auspices of this permit.
- An annual report must be submitted to IDNR by January 31st of each year.

The holder of this permit may:

- Dispose of specimens or products covered by this permit through transfer or scrapping only after a permit/written permission has been applied for and received from the Department.
- Allow temporary possession of the items covered by this permit by a licensed taxidermist for the purpose of providing taxidermic services.

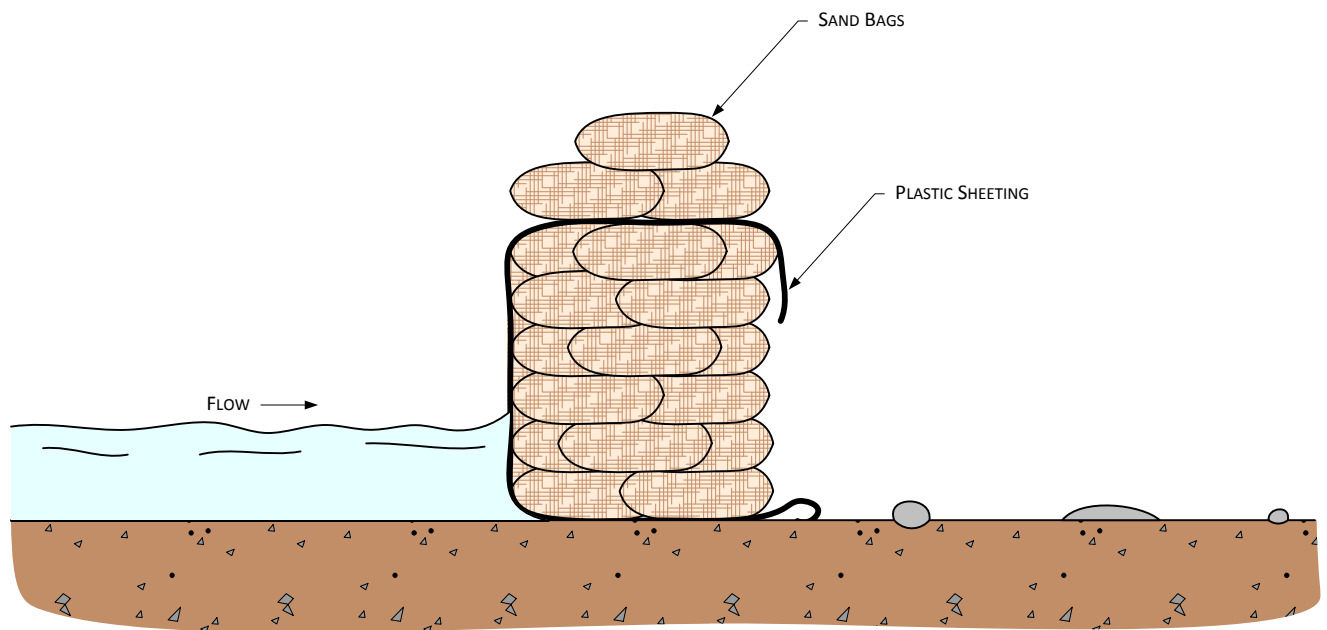
This permit may be revoked if the Department finds that a permittee has falsified information on the application, failed to comply with facilities standard or animal welfare standards established in 17 Ill. Adm. Code 1070.60 and 1070.70, or violated state or federal laws.

**APPENDIX D CONSTRUCTION TYPICAL DRAWINGS AND
REPRESENTATIVE PHOTOS**



Typical Waterbody Crossing - Dam and Pump Method





NOTE:

1. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN.

For environmental review purposes only.

Detail of Dam with Sheeting



Example Photos

Description:

Sandbag cofferdam, screened intake, and pump on a small stream. Pump placed in secondary containment.



Description:

Sandbag cofferdam and screened intake on a small stream.



Example Photos

Description:

Stream bypass discharge to non-erodible surface (geotextile).



Description:

Stream bypass discharge to non-erodible surface (plastic sheeting).



Example Photos

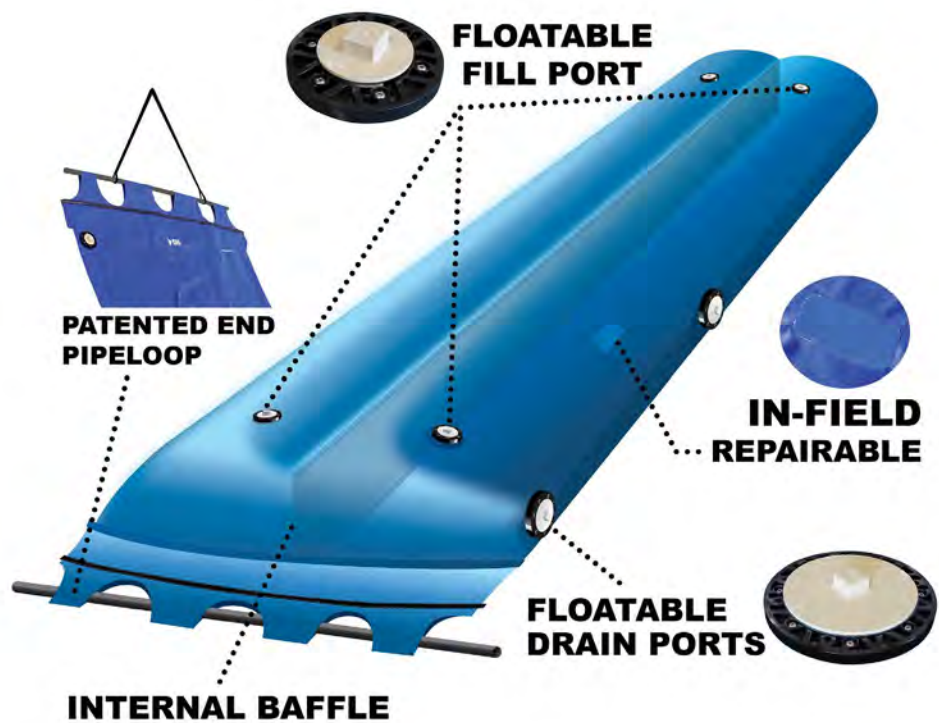
Description:

Steel/wood sheet
temporary dam



Description:

Temporary aqua-dam



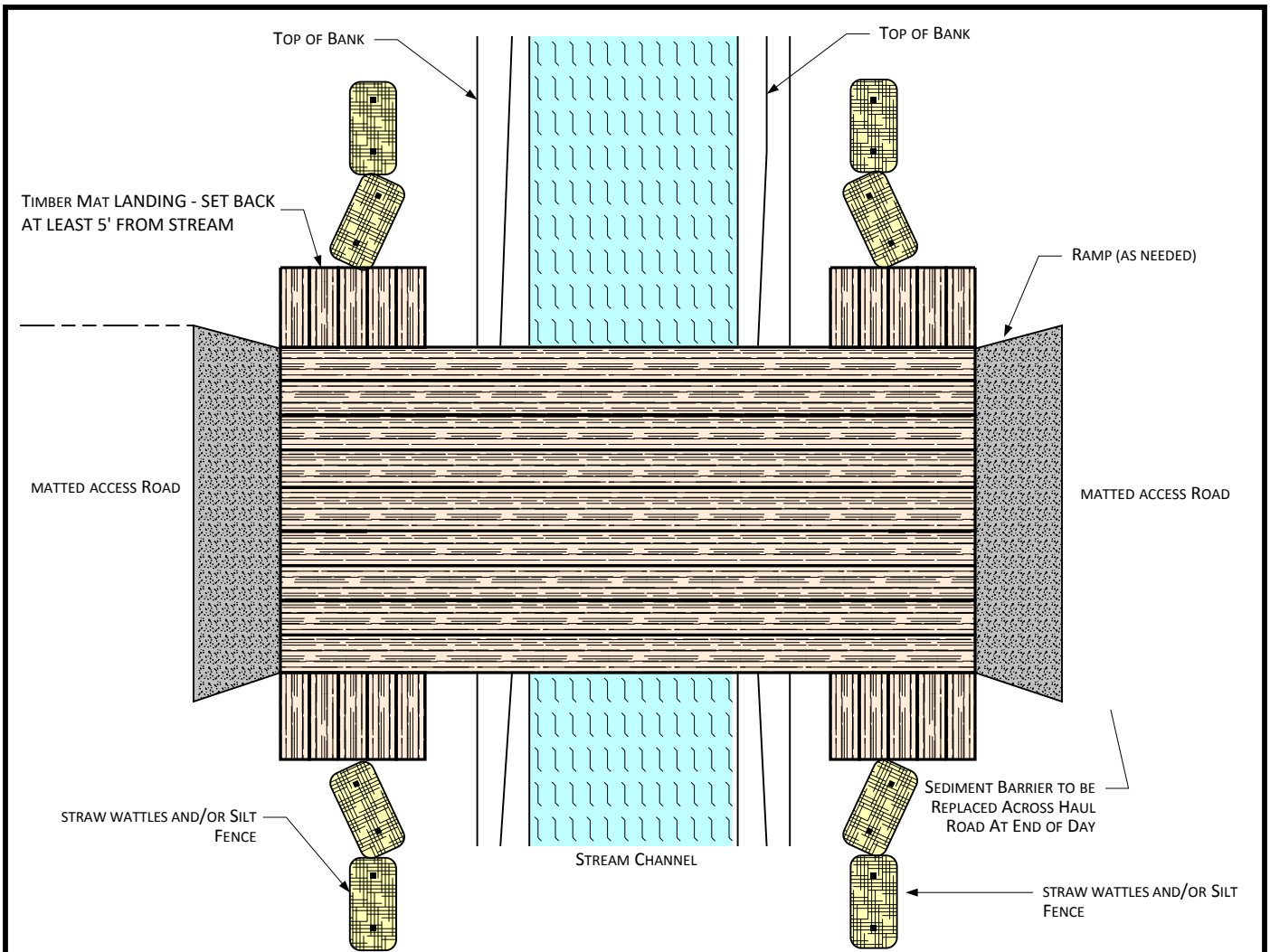
Example Photos

Description:
Floated Intake

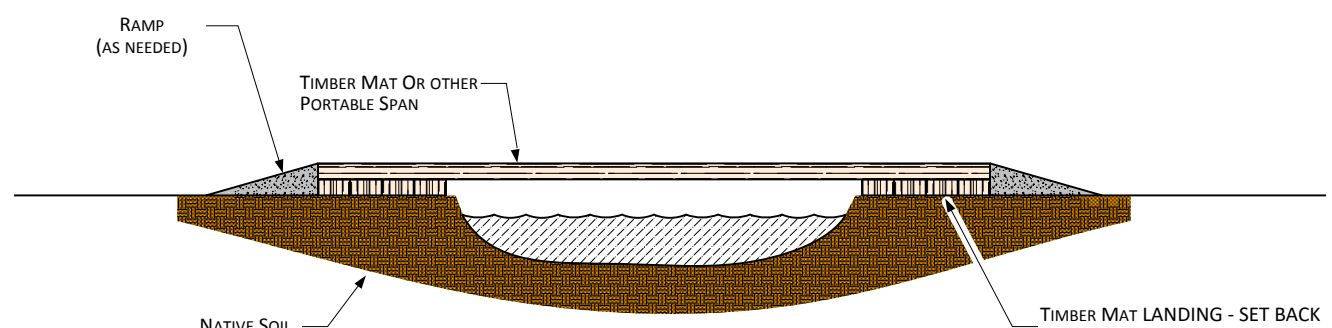


Description:
Trench box





PLAN VIEW
(NOT TO SCALE)

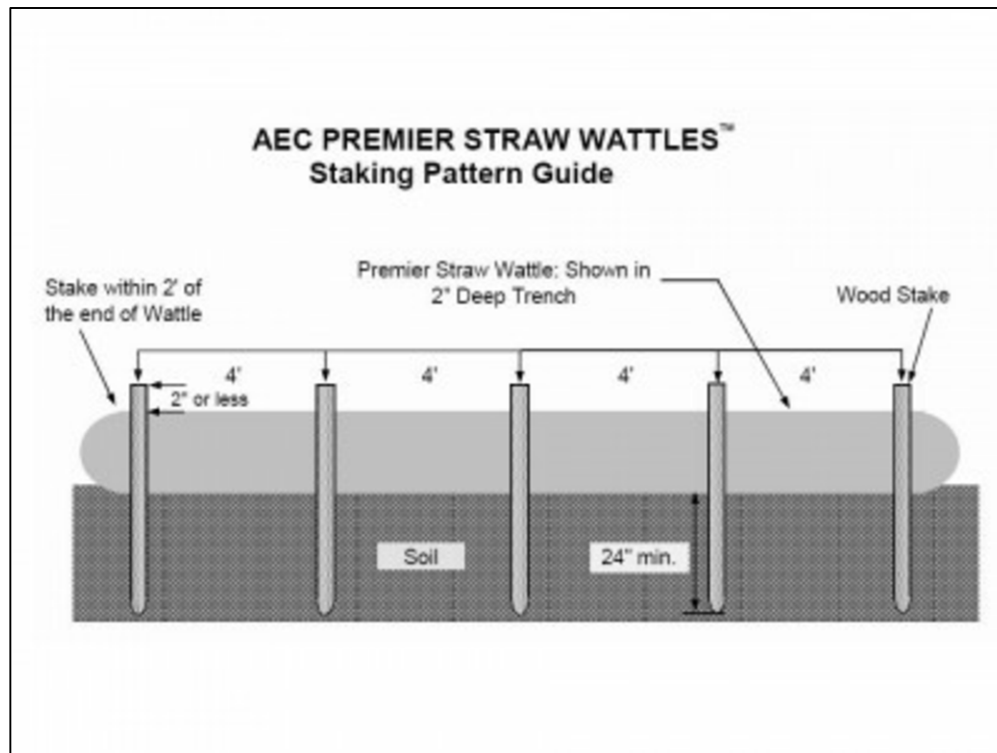
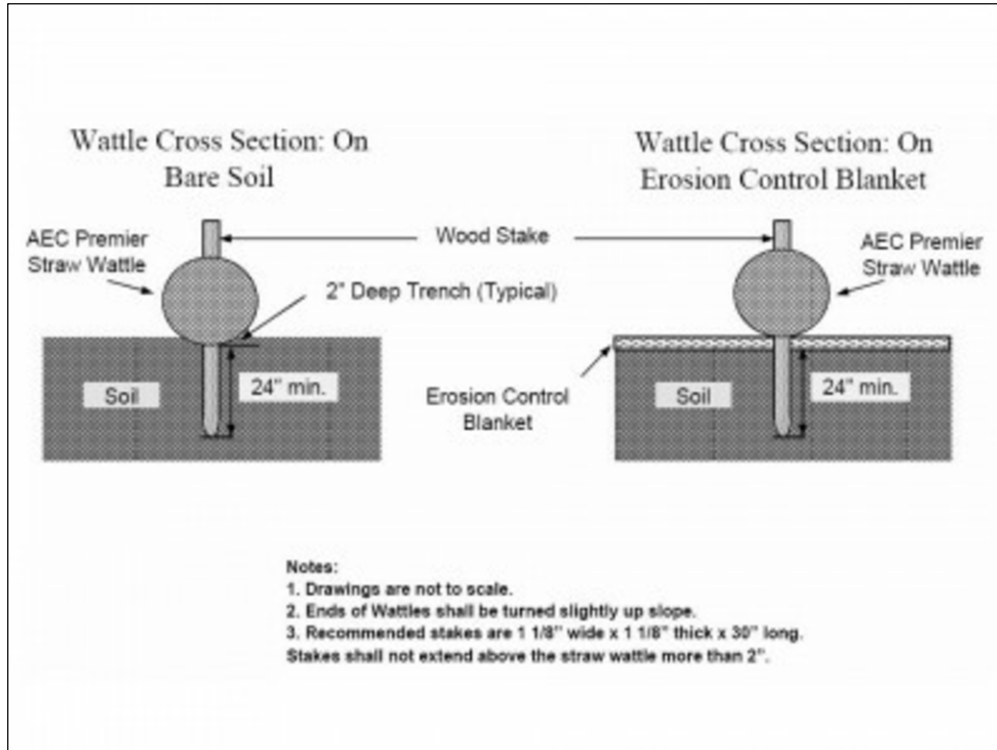


PROFILE VIEW
(NOT TO SCALE)

For environmental review purposes only.

Typical Timber Mat Air Bridge

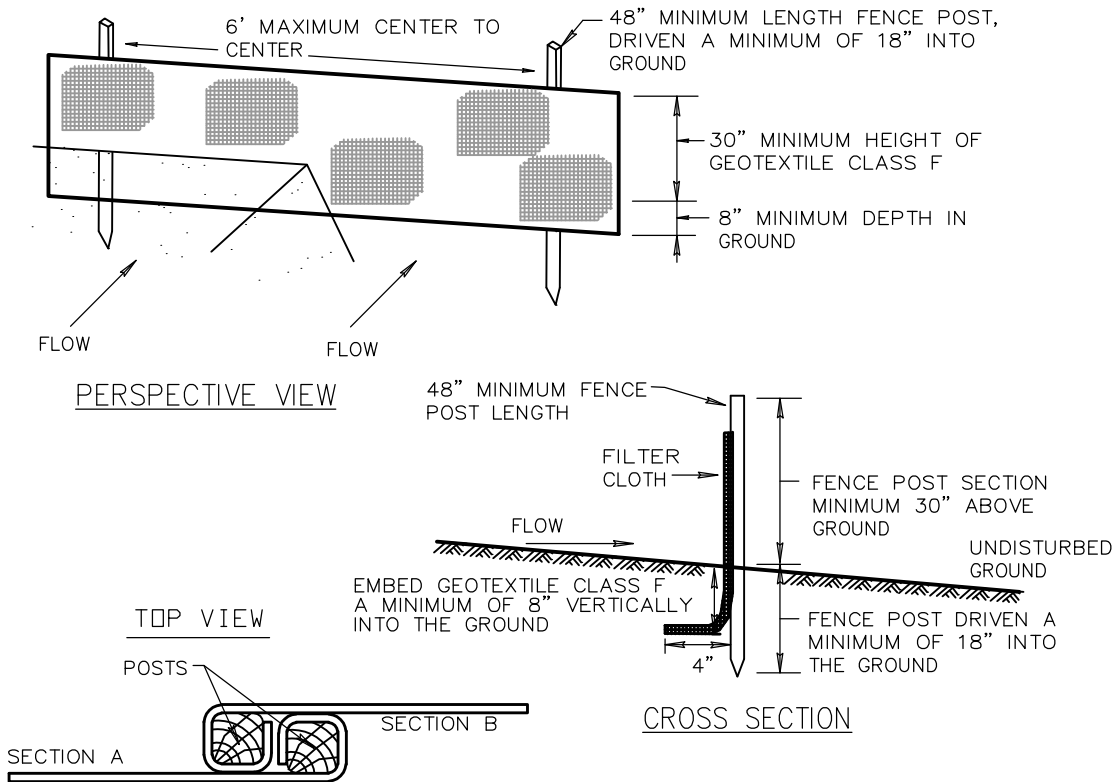




STRAW WATTLES

Environmental Resources Management

R:\Codd\CintU-Z\Wolverine Gas&Oil\SiltFence.dwg-SLIT FENCE - ANSI A (8.50 x 11.00 Inches) - 3/10/2015 - robert.keen



JOINING TWO ADJACENT SILT FENCE SECTIONS

CONSTRUCTION SPECIFICATIONS

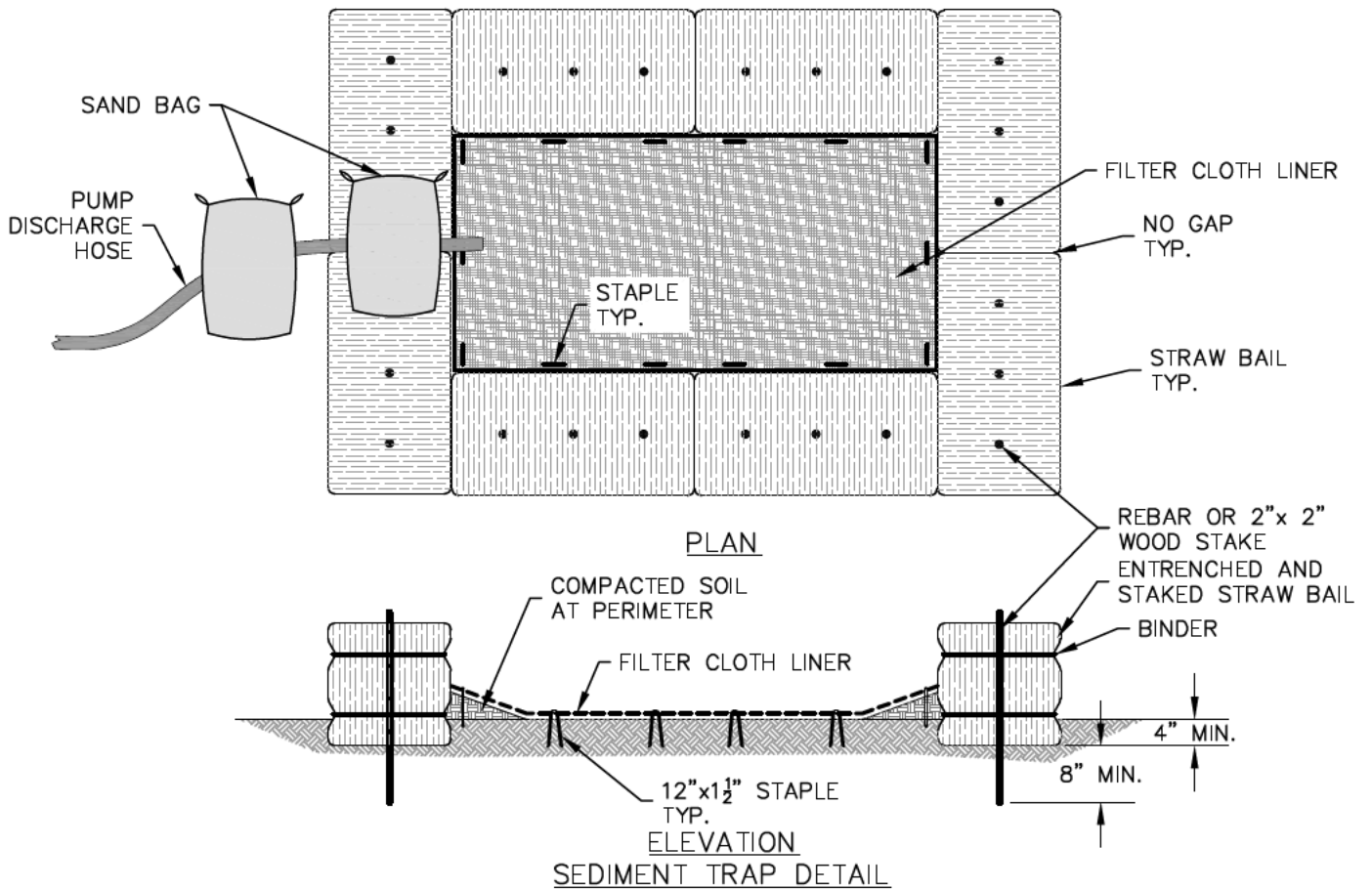
1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST, OR OVERLAP 2 INCH X 2 INCH POSTS AND ATTACH AS SHOWN ON DETAIL.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 18 INCHES.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 8 INCHES. ALL EXCAVATED MATERIAL FROM FILTER FABRIC FENCE INSTALLATION, SHALL BE BACKFILLED AND COMPACTED, ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY FILTER FABRIC FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2 INCH X 2 INCH POST INSTALLATION. STITCHED LOOPS SHALL BE INSTALLED ON THE UP HILL SIDE OF THE SLOPED AREA.
5. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. FILTER FABRIC FENCES SHALL BE INSPECTED BY CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.



SILT FENCE

Environmental Resources Management

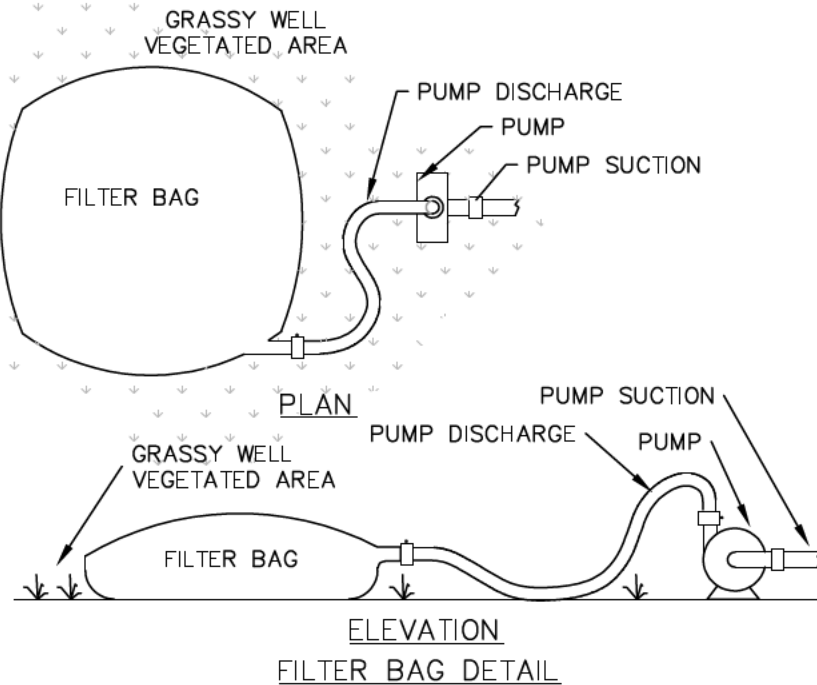
R:\Cadd\ChitU-z\Wolverine Gas&Oil\156579-03.dwg - Meridian Rd\10156579-03.dwg - JR-SEDIMENT TRAP, 4/17/2012 8:54:43 AM, RMK - HOLLAND



SEDIMENT TRAP DETAIL

NOTES

1. FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
2. A SUTIALBE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT FOR THOSE THAT HAVE FAILED OR ARE FILLED.
3. BAGS SHALL BE LOCATED IN A WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.
6. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED



FILTER BAG DETAIL

SEDIMENT TRAP/FILTER BAG DETAIL



Environmental Resources Management

**APPENDIX E PREVIOUS HED RIVULET MAPPING AND ADULT/LARVAL
SURVEY MEMOS**

**Memo**

To	Nicole Sell, Project Manager, Wolverine Pipe Line Company
CC	Kris Lah (USFWS), Shawn Cirton (USFWS), Julie Rimbault (USACE), Nathan Grider (IDNR), Bradley Hayes (IDNR), Randy Boisvert (HMS)
From	Ken Mierzwa, Principal Consultant, ERM; James Smit, Consultant II, ERM; Wade Hammer, Principal Consultant, ERM
Date	9 August 2021
Reference	0537915
Subject	HED Larval and Adult Field Survey Summary

Introduction

The purpose of this memo is to summarize the Hine's Emerald Dragonfly, *Somatochlora hineana*, (HED) larval and adult surveys that took place from July 7 through July 22, 2021 in support of the Wolverine Pipe Line Company (WPL or Wolverine) CU-LK pipeline repairs project. Field surveys were conducted within the area indicated on Figure 1 through Figure 5 in Attachment 1. The Survey Area includes the northern portion of a site known as the Long Run/Com Ed Parcel (USFWS, 2013).

The described field surveys were performed in support of permitting and consultation efforts related to a proposed pipeline inspection and repair excavation on approximately 1,450 feet of Wolverine's Lemont to Lockport pipeline segment.

Methods

Potential HED rivulet and habitat mapping field surveys were conducted by ERM ecologists (James Smit and Sam Guffey) under the direction of Ken Mierzwa during April 2021. The rivulet mapping report was provided in a previous memorandum (ERM 2021); the map generated as part of the rivulet mapping effort provided the basis of the HED surveys completed in July 2021 (Figure 1 in Attachment 1).

HED surveys completed within the Survey Area during July 2021 involved three major components, described below.

Larval Sampling, Crayfish Burrows

Sampling of larvae in crayfish burrows generally followed Soluk (2006) and Pintor and Soluk (2006) except that sampling was not limited to plots along rivulets. All potentially suitable crayfish burrows identified and mapped in April 2021, as well as any new burrows located during July 2021 field work, were sampled. Adjacent and connected burrows were counted as one burrow.

Burrows were pumped with a Jabsco Amazon bilge pump. Each burrow was pumped three times, passing water through a D-ring net and sorting the collected material in light-colored trays. Larvae

were measured and photographed in the field, and returned to the burrow of origin as quickly as practical.

Larval Sampling, Rivulets

Sampling of larvae in rivulets also followed the methods described by Soluk (2006) and Pintor and Soluk (2006). Where rivulets were mapped in April 2021, sampling points were established and flagged at five-meter intervals. If visible water flow within a rivulet was observed, sampling was conducted from downstream to upstream. Each sampling point was recorded by GPS.

At each point, in-channel samples were taken by disturbing water and substrate with a D-ring net within a one-square foot (930 cm²) area, and sweeping loose substrate into the net. Three passes of the net were made at each sample location and material captured in the dip-net was then transferred to a light-colored pan for sorting. All dragonfly larvae, regardless of species, were removed from the collected organic material and identified to family at a minimum. Other organisms (macroinvertebrates, insects, amphibians, fish, etc.) observed in the samples were generally noted.

Adult Sampling, Point Counts

The goal of adult monitoring was to determine patterns of adult dragonfly presence across the Survey Area, with a rough measure of relative abundance. To maximize the probability of observations, point counts were conducted across the site, following methods similar to those used by Mierzwa et al (2010) along the CN and BNSF rail lines adjacent to the Survey Area. Points were placed on a 50-meter grid across the entire Survey Area. Because the maximum practical observation distance for a Hine's emerald dragonfly in flight is about 30 meters under good conditions (Mierzwa pers obs; Mierzwa et al. 1995) the 50-meter grid provides sufficient coverage of the Survey Area. Points were not sampled if they were located in unsuitable habitat (dense buckthorn, open water ponds) or in locations where poor sightlines made observation impractical (e.g., two-meter tall dense *Phragmites*).

Point counts were made between 0800 and 1300 hours, during the morning activity period. Although dragonfly activity can also be high in late afternoon and evening, it tends to be more variable (Mierzwa et al. 2010) and thus observations were limited to the more consistent morning interval. Observations were made only under suitable conditions, generally mostly sunny skies, temperatures above 22° C, and with light to moderate winds.

Observers remained at each point for 15 minutes and recorded all relevant observations. Time, distance in meters and direction from the observer, habitat, and behavior (foraging, territorial patrol, other) were recorded for each HED observation noted.

Other Observations

Additional data were also opportunistically collected. In response to observing the presence of monarch butterflies (*Danaus plexippus*) on site, monarch observations were also noted during point counts. Milkweed plant occurrence within the immediate work area for the proposed pipeline inspection and repair excavation was also mapped. Finally, general habitat conditions within the proposed work area and correlated habitat breaks to the easternmost line of point locations were noted and described.

Results

Field work was completed from July 7 through 22, 2021. The majority of larval sampling was completed in the first half of the field work during which weather conditions were cloudy, with four of six days of adult point counts performed in the final week when skies were clear. Several rain events during the first week of field work provided adequate water in most locations for efficient larval sampling.

Larval Sampling – Crayfish Burrows

Crayfish burrow sampling locations are shown on Figure 2 in Attachment 1. A total of 39 burrows were pumped from July 13 to 15. Four HED larvae were captured in total within two different burrows. Two larger (17 and 18 mm) individuals were captured in a burrow immediately adjacent to a wetted rivulet (RIV5), and two small (5 and 6 mm) individuals were captured in a burrow within the lowest part of a dry rivulet (RIV9) where groundwater was present very near the surface. Water temperature measured in RIV5 near the occupied burrow was 22.7°C. Average larval density per burrow within the Survey Area was 0.10.

All sampled crayfish burrows were located in the northeast quarter of the Survey Area. Four burrows were observed in the southwest corner of the Survey Area; however, these were not sampled because they were in shallow soils over bedrock and were adjacent to poor quality habitat in RIV56 (warm stagnant water close to the Illinois & Michigan Canal, HED predators/competitors typical of pond habitat observed).

Larval Sampling – Rivulets

Dip net sampling points within rivulets are shown on Figure 3 in Attachment 1. A total of 103 locations were sampled in rivulets and no HED larvae were captured. Several Aeshnidae and Libellulidae larvae were captured, in addition to individuals from various other macroinvertebrate families (Gammaridae, Asellidae, Corydalidae). Sampling did not take place in a few rivulets that were dry or were otherwise unsuitable (i.e., too deep, poorly defined channel, presence of predator species, etc.) when assessed during the survey period. Almost all rivulets identified during the rivulet mapping effort in April 2021 were sampled.

Adult Point Counts

A total of 21 adult HED were observed at point count locations, with the majority of observations in the northeast part of the Survey Area (Figure 4 in Attachment 1). Several incidental and untimed observations were made between points and off the clock while traversing the site. No territorial patrols or teneral dragonflies were observed, although one HED with partially green and partially brown eyes and strong flight ability was seen in the extreme northeast corner.

Other Observations

Numerous observations were made of monarchs, with clusters in herbaceous habitat widely dispersed throughout the Survey Area. The host plants common milkweed (*Asclepias syriaca*) and swamp milkweed (*Asclepias incarnata*) were mapped only in and near the pipeline repair project's proposed ground disturbance area (Figure 5 in Attachment 1). Milkweed plants were also observed elsewhere throughout the Survey Area but were not mapped.

In addition, a sheen and odor suggestive of petrochemical presence was observed in RIV2 during April 2021 and July 2021 field sampling. The source of this sheen is not definitively known at this time.

Discussion

July 2021 field sampling documented four HED larvae at two locations within the northeastern part of the Survey Area, which represents the third and fourth known areas of HED breeding east of the Des Plaines River. Larval presence has been known for some time at Long Run Seep Nature Preserve just east of New Avenue (Kay et al. 2018; Soluk and Mierzwa 2012). In 2011, three larvae were collected in crayfish burrows near the northern edge of the Long Run Parcel, immediately south of the present Survey Area. All HED larvae identified during the July 2021 field sampling were found in crayfish burrows, and average larval density per burrow was 0.10 within the Survey Area. In comparison, the 2011 River South burrow density ranged from 0.07 to 0.80 larvae per burrow (Mierzwa and Webb, 2011) depending on location (mean = 0.49 larvae per burrow, n = 74 burrows). At other occupied lower Des Plaines River Valley sites, mean larval density per burrow ranged from 0.16 to 1.55 (Soluk and Mierzwa 2012). Thus, larval density in the Survey Area is at the lower end of the range. Because all identified suitable burrows were sampled for the current effort, this suggests that the larval population within the Survey Area is currently quite small.

One of the occupied crayfish burrows was located in a cattail-dominated marsh adjacent to RIV5. The water source for this area appears to originate from high-volume seepage through an adjacent railroad ballast to the east that first flows through RIV4 and adjacent areas before flowing west into a ponded area created in part by a rock dam. Downstream from the pond, RIV5 flows for about 75 m generally to the west. Although the western half of RIV5 is within relatively good quality habitat with open cattail and a sedge understory, water within the rivulet is relatively warm in summer, standing water is discontinuous, and there was no visible flow at the time of sampling. Furthermore, invasive *Phragmites* was observed encroaching this area from the east and is within 15 m of the crayfish burrow where larvae were captured. Although there are only a few crayfish burrows associated with RIV5, the presence of these burrows is likely important to HED survival as they provide important refugia from temperature extremes and variable hydrology. The size of the larvae captured (17-18 mm) suggests multi-year survival within this habitat.

The other crayfish burrow where HED larvae were captured is located immediately adjacent to RIV9 in what appears to be lower quality habitat with variable hydrology and in close proximity to invasive vegetation. RIV9 is within an apparently man-made or man-modified feature running north-south in a straight line adjacent to a berm, and in a small opening at the edge of encroaching *Phragmites*. No surface water was present in RIV9 or in the area surrounding the burrow at the time of sampling; however, groundwater was encountered just below the surface at the lowest point of the rivulet where the burrow with larvae was located. The larvae captured at this location were small, 5-6 mm, and multi-year survival is less certain in this lesser quality habitat.

Based on the July 2021 sampling, HED larvae are present at low density within portions of the Survey Area. Previous larval sampling efforts within the Survey Area in 2011 did not yield observations of larvae (Mierzwa and Webb, 2011). Crayfish burrow and rivulet locations were largely unknown prior to 2021 as burrows and rivulets are difficult to locate in dense herbaceous vegetation in summer. 2011 HED larval sampling efforts within the Survey Area included 7 crayfish burrows and 15 rivulet dip net sample locations as compared to 39 burrows and 103 dip net sample locations in 2021. The prescribed burn conducted in spring 2021 and subsequent rivulet and crayfish

burrow mapping was crucial to sampling success, because marking and GPS mapping of burrow and rivulet locations when they were most visible, post-fire, allowed efficient summer sampling of a larger numbers of these features. Crayfish burrows are dynamic features on the landscape; *Cambarus diogenes* which is associated with HED at nearby Illinois sites can live up to three years in the wild; however, over 200 species are known to be predators and fecundity is relatively high (Animal Diversity Web, 2021), and thus individual mortality is assumed to be high. These factors, as well as individual dispersal, can contribute to the abandonment of burrows and construction of new burrows over relatively short (weeks to months) timespans. The species of burrowing crayfish within the Long Run-ComEd Parcel is reportedly *Procambarus acutus* (Brown and Soluk 2012), which is assumed to have similar mortality and has higher fecundity (up to 300 eggs deposited per female). Crayfish are also dependent on certain habitat features, which tends to concentrate burrows in suitable areas. Within the Survey Area these factors include suitable hydrology and adequate soil depth. Because of past scraping and other disturbance, soils are quite shallow on parts of the site, especially the central and western portions of the site, which limits the ability of crayfish to burrow below the frost line. Where clusters of burrows were mapped in spring 2021, reconnaissance during the July sampling found that some burrows were abandoned and filled in, while other, newer burrows had been constructed within a meter or two of the abandoned burrows.

Limiting factors for HED larval survival on the ComEd parcel are likely driven by hydrology, soils, and habitat structure. The site is relatively flat, ranging from 591 feet NAVD 88 in the northeast corner to 584 feet near the Illinois and Michigan Canal at the west boundary; most of the site is between 587 and 584 feet, with one to two feet of alluvial soils over dolomite bedrock (Kay et al. 2018). Thus there is little gradient across the site. We observed continuous visible flow in RIV2 and RIV4 in the northeast part of the site throughout our July field work. Rivulets to the west were much more variable, holding water for a few days after rain events and then quickly drying. Rivulets in the interior and western parts of the site also tended to be warmer (generally above 22.6°C in mid-July) and lacked visible flow. Under these seasonally warm, “flashy” conditions, HED larvae may require presence of crayfish burrows as refugia. However, these burrows are absent from many parts of the site where soil over bedrock is very shallow, or where groundwater is not present close to the surface. Groundwater from the underlying dolomite bedrock can locally and seasonally rise above the bedrock surface with documented upwelling in the northeast part of the Survey Area (Kay et al. 2018), resulting in areas with surface water temperatures which are less variable and cooler in summer.

A small number of mapped rivulets in the westernmost part of the site were eliminated as potential HED larval habitat and thus not sampled because they were wide, stagnant, within very shallow soils over bedrock, and supported HED predators (fish) or competitors (warm water pond-associated odonates). Rivulets located at the easternmost edge of the site were generally sampled but are subject to different limiting factors. RIV2 and RIV4 have apparently suitable flow rates and water temperature; however, they are entirely or almost entirely within monotypic stands of common reed, *Phragmites australis*. HED adults and larvae are generally not present within dense *Phragmites* monocultures (Soluk pers. Comm.; K. Mierzwa pers. obs). While these rivulets are almost certainly restorable with effort, due to the presence of *Phragmites* they are unlikely to support HED larvae at present for reasons described below.

- The dense rhizome mat characteristic of *Phragmites* discourages burrowing by at least larger crayfish. During 2021 sampling, numerous crayfish burrows less than 10 cm deep and ending at impenetrable rhizome mats were encountered. This suggests that crayfish attempted to burrow and moved elsewhere after a lack of success. The largest crayfish

seemed to be the most impacted. Several successful burrows were observed and sampled; however, they tended to be small in diameter and were likely created by juvenile crayfish that were able to fit through the small available openings.

- Phragmites generates abundant litter which can reportedly impair mobility of juvenile fish and other smaller organisms (Sturtevant et al. 2021).
- Phragmites displaces native sedges, rushes, and other vegetation resulting in degradation of wildlife habitat and a reduction in food and shelter for native wildlife (Avers et al. 2014). Increased shading in dense monocultures likely results in decreased productivity.
- Phragmites releases gallic acid, which when degraded by ultraviolet light produces mesoxallic acid which is toxic to many native plants (Rudrappa et al. 2009). Invaded areas experience significant changes in soil and water chemistry, including reduced pH (Uddin et al. 2017). The effect on wildlife is unknown; however, it may be a negative factor for small invertebrates dependent on calcareous native wetland habitat.
- Phragmites can alter wetland hydrology through increased evapotranspiration and trapping of sediments, drying out marsh soils (Avers et al. 2014; Swearingen and Saltonstall 2010).
- Dense stands of Phragmites may limit the ability of adult HED, especially ovipositing females, to access rivulets.

Phragmites can encroach at a rate of 3-10 m per year into adjacent habitat and appears to be rapidly expanding within the Survey Area. Chemical control can be effective when herbicides are applied after late summer when the plant has flowered, (Avers et al. 2014) followed by fall or winter prescribed burning to remove dead biomass and encourage re-establishment of native vegetation (Saltonstall 2005). Burning in fall or winter is recommended over spring or early summer to not stimulate growth (Getsinger et al 2007).

Adult HED presence was highest along portions of the northeastern edge of the Survey Area, with multiple observations on a few points in sedge meadow or other low, open herbaceous habitat. As is often the case, adult observations were frequent in proximity to areas with larval presence. Although adult abundance appears to be generally within recent historic ranges for this area (Mierzwa et al. 2010; Mierzwa and Webb 2011b), it is increasingly concentrated in shrinking areas of low, open native habitat. There were no observations over monotypic dense Phragmites stands or dense exotic shrub cover. On a 350 m long north to south line just west of the pipeline, about 40% of the available habitat consisted of Phragmites-dominated cover with no adult HED observations, while about 30% was native wet meadow habitat where adult HED were observed.

Conclusion

The presence of *Somatochlora hineana* larvae in crayfish burrows was documented at two locations within the Survey Area. No larvae were captured in rivulet dipnet surveys. Crayfish burrows are heavily clustered in the northeast quarter of the Survey Area, and appear to be absent or rare in most of the rest of the site.

Both larval detections were at considerable distance from the pipeline (114 and 58 meters, respectively, for the RIV5 and RIV9 occurrences). Crayfish burrows are present within or immediately adjacent to the proposed work area, and larvae may have been present historically but were not recorded near the pipeline repair proposed work area during the July 2021 surveys. Based on lack of observed larvae within the proposed work area and due to presence of dense Phragmites monocultures, there is a low probability of larval presence within the proposed work area.

Adult dragonfly foraging activity was relatively common in the northeastern portion of the site, including immediately adjacent to two portions of the proposed work area where low herbaceous habitat remains intact. Lesser activity was noted along the southern boundary, and at one sedge meadow opening in the central part of the site. No territorial patrols or teneral dragonflies were observed, although one HED with partially green and partially brown eyes and strong flight ability was seen in the extreme northeast corner.

Enclosures: **Attachment 1 – Figures**
 Attachment 2 – Photo Log
 Attachment 3 – Field Data (point counts)

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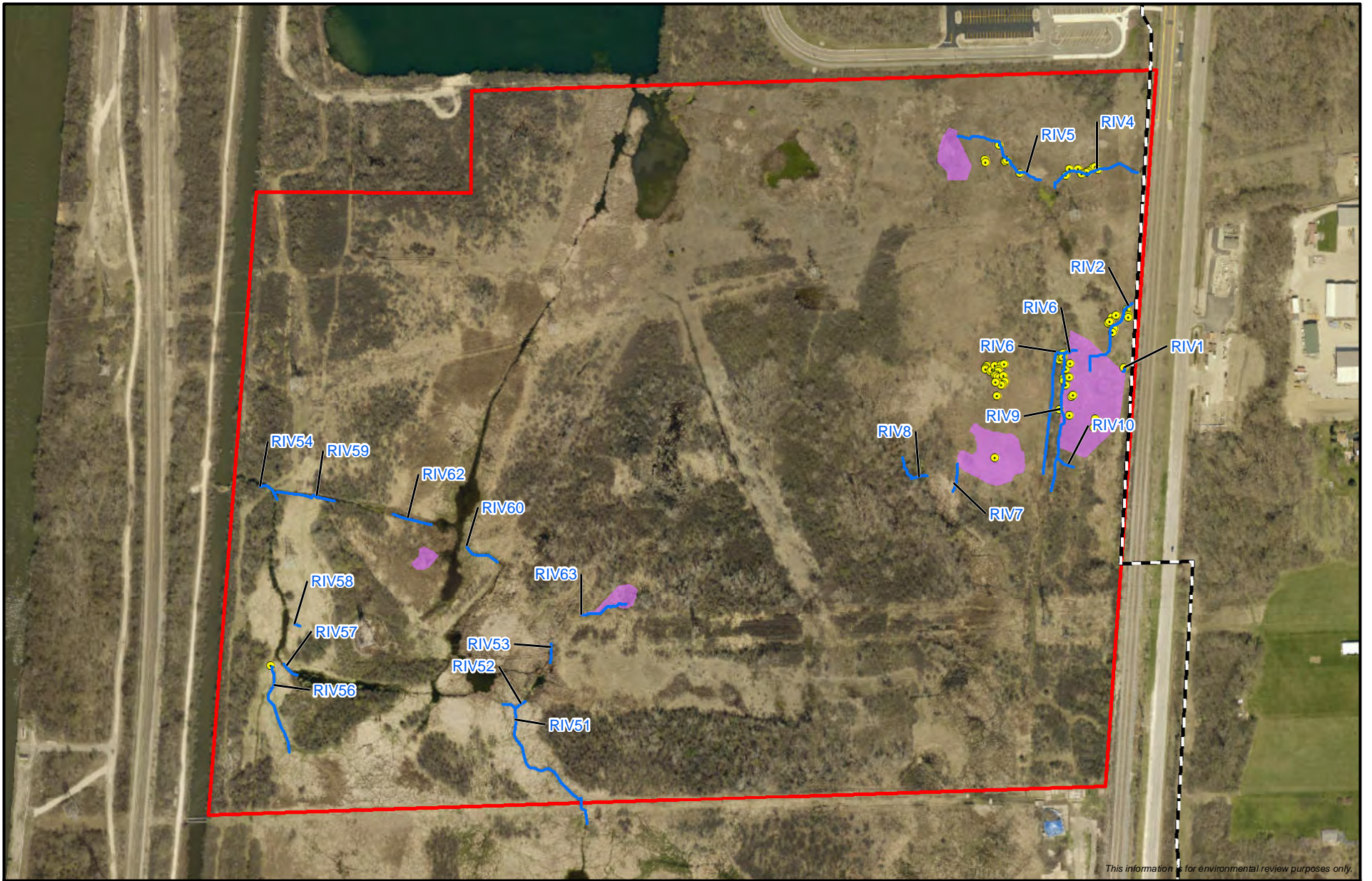
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Attachment 1 – Figures



This information is for environmental review purposes only.

- Crayfish Burrow
- Rivulet
- Lemont to Lockport 18"
- Area of Interest
- Survey Area

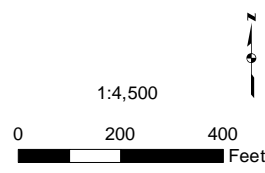
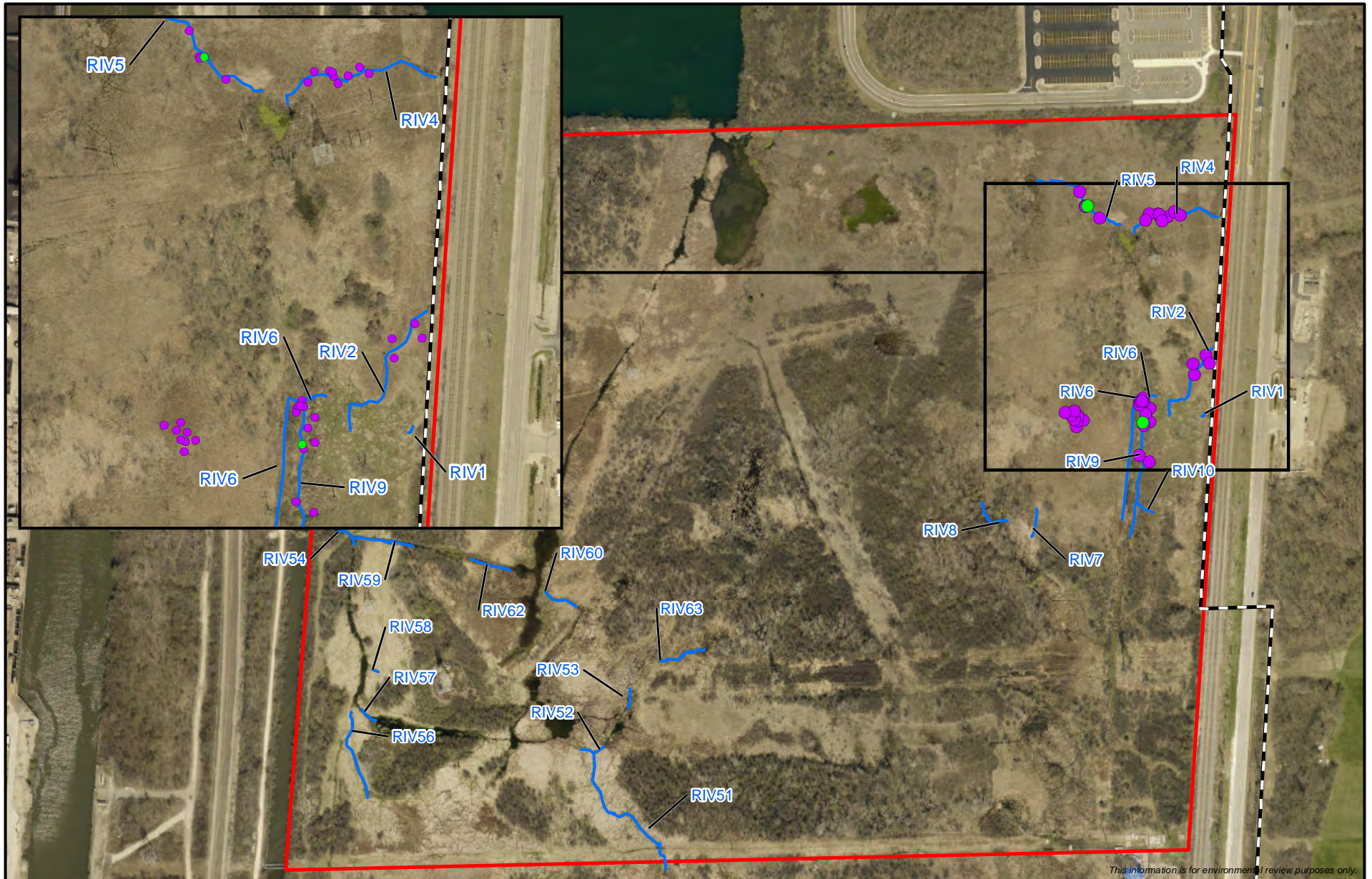


Figure 1
Potential Hine's Emerald Dragonfly Habitat Survey Results
Wolverine Pipe Line Company CU-LK Repairs Project
 Will County, Illinois



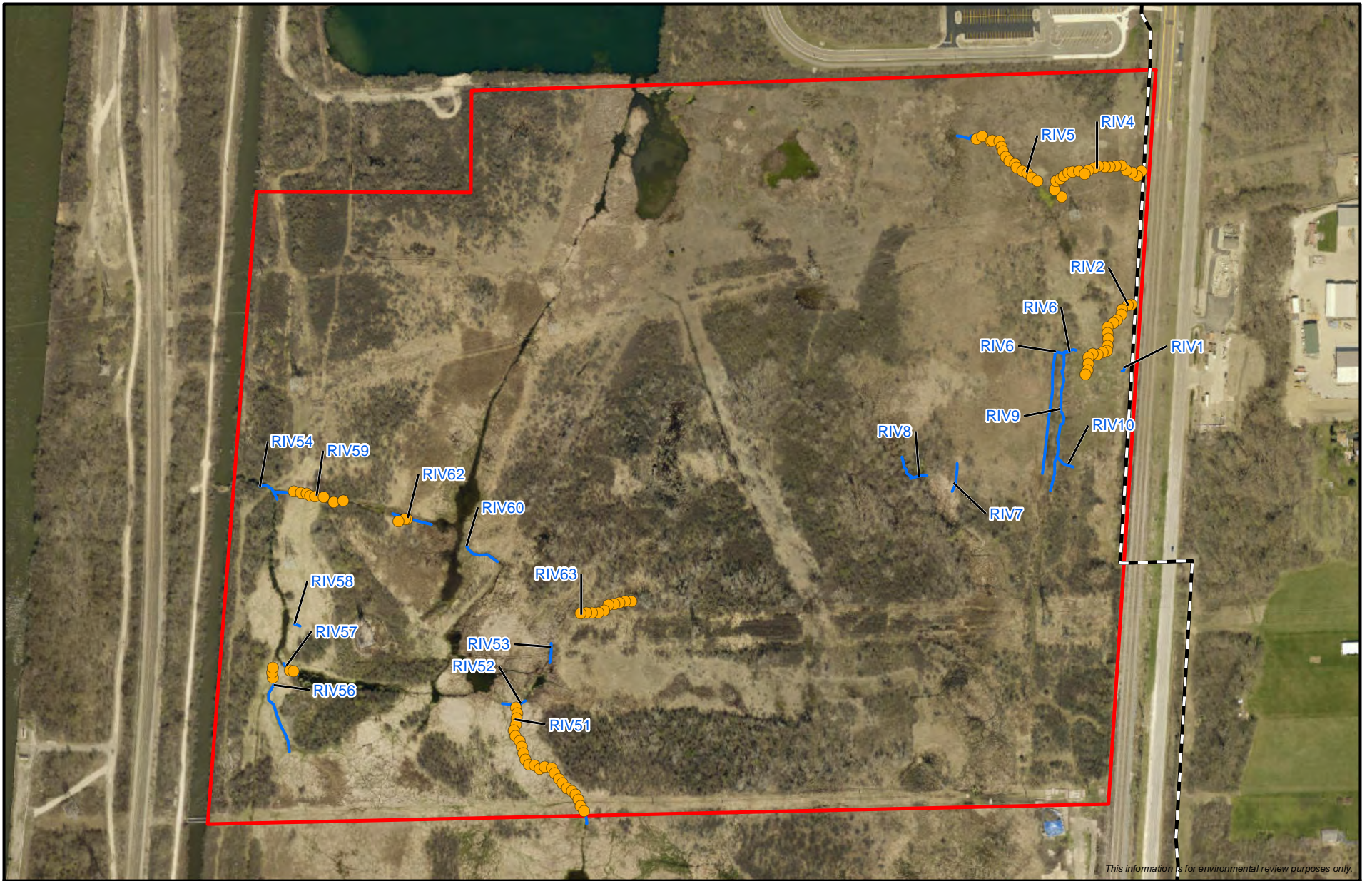


This information is for environmental review purposes only.

<ul style="list-style-type: none"> ● Crayfish Burrow Sampling Location - No Detections ● Crayfish Burrow Sampling Location - Detections — Rivulet 	<ul style="list-style-type: none"> Lemont to Lockport 18" Survey Area 	<p>1:4,500</p> <p>0 200 400 Feet</p>
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Figure 2
Hine's Emerald Dragonfly Crayfish Burrow Sampling Results
Wolverine Pipe Line Company CU-LK Repairs Project
 Will County, Illinois

ERM



- Dip Net Sampling Location - 0 Detections
- ~ Rivulet
- Lemont to Lockport 18"
- Survey Area

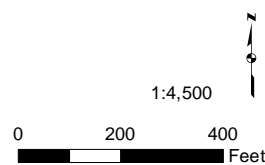


Figure 3
Hine's Emerald Dragonfly Dip Net Sampling Results
Wolverine Pipe Line Company CU-LK Repairs Project
 Will County, Illinois





This information is for environmental review purposes only.

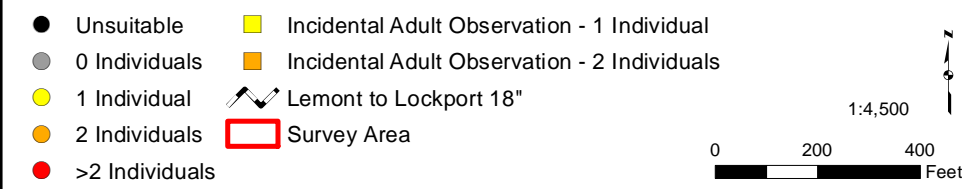
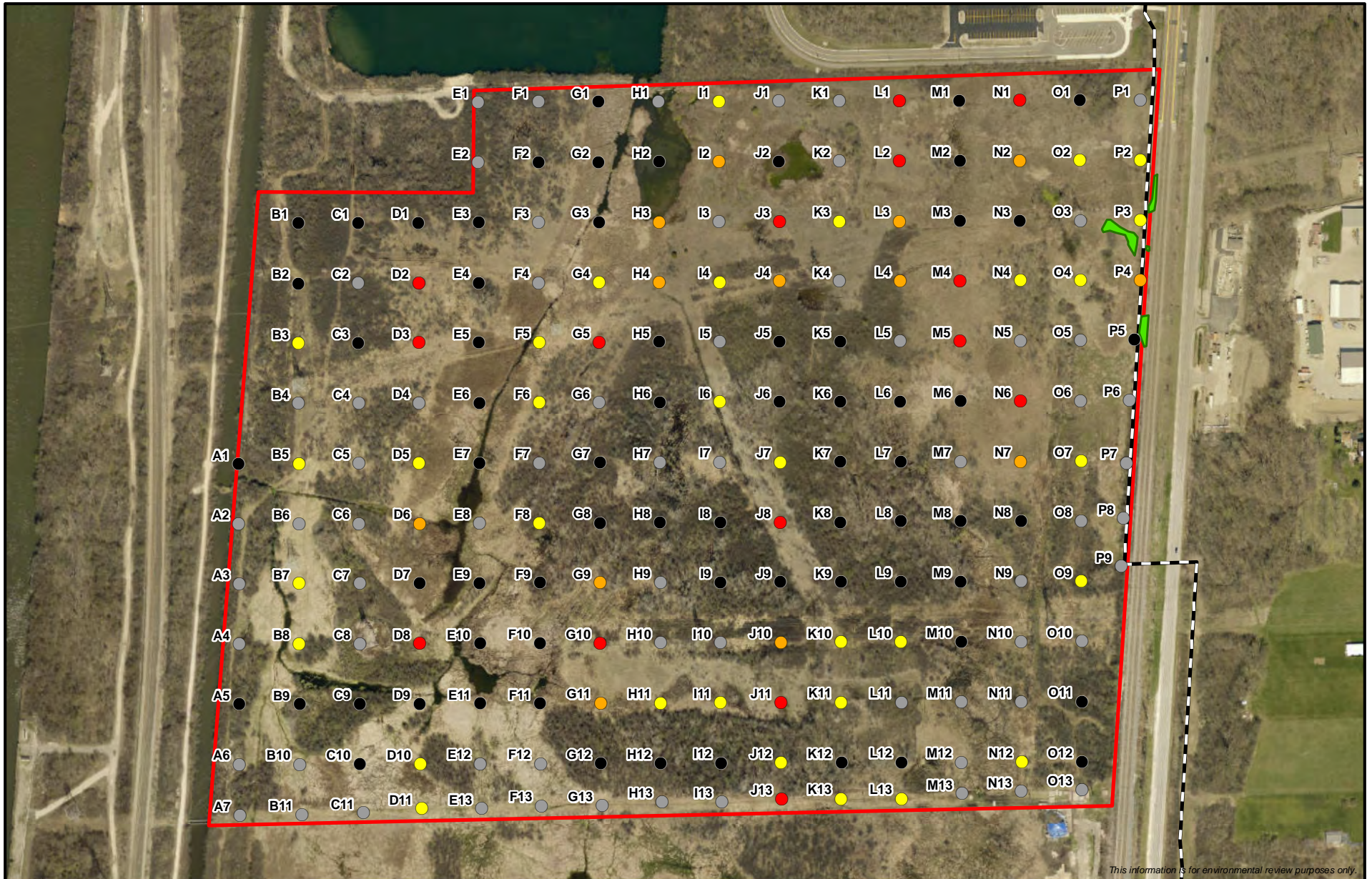


Figure 4
Hine's Emerald Dragonfly Adult Point Count and
Incidental Observation Results
Wolverine Pipe Line Company CU-LK Repairs Project
 Will County, Illinois





This information is for environmental review purposes only.

- Unsuitable
- 0 Individuals
- 1 Individual
- 2 Individuals
- >2 Individuals
- Lemont to Lockport 18"
- ▭ Survey Area
- ▭ Milkweed Plants Observed

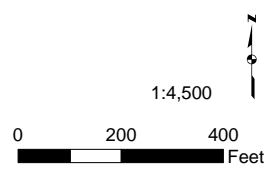


Figure 5
Monarch Butterfly Adult Point Count Observation
and Milkweed Notes
Wolverine Pipe Line Company CU-LK Repairs Project
 Will County, Illinois



Attachment 2 – Photo Log

ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey, Ken Mierzwa, Richard Novy, Ryan Lisson	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	Project No. 0597915
Photo No. 1	Date: 7/7/21		
Direction Photo Taken: East			
Description: Rivulet surrounded by phragmites. Common condition of most rivulets sampled with dip nets.			

Photo No. 2	Date: 7/7/21		
Direction Photo Taken: NA			
Description: Sorting during dip net sampling			


ERM		PHOTOGRAPHIC LOG	
		Photographer: James Smit, Sam Guffey, Ken Mierzwa, Richard Novy, Ryan Lisson	
Project Name: CU-LK Pipeline Repairs		Site Location: Lockport, IL	Project No. 0597915
Photo No. 3	Date: 7/13/21		
Direction Photo Taken: NA			
Description: HED larvae observed in crayfish burrow near RIV5 on 7/13/21			

Photo No. 4	Date: 7/13/21		
Direction Photo Taken: NA			
Description: Vegetation surrounding crayfish burrow near RIV5 where HED larvae were observed			

ERM	PHOTOGRAPHIC LOG
Photographer: James Smit, Sam Guffey, Ken Mierzwa, Richard Novy, Ryan Lisson	

Project Name: CU-LK Pipeline Repairs	Site Location: Lockport, IL	Project No.: 0597915
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Photo No. 5	Date: 7/15/21
Direction Photo Taken: NA	
Description: HED larvae observed in crayfish burrow near RIV9 on 7/15/21	



Photo No. 6	Date: 7/14/21
Direction Photo Taken: Northwest	
Description: Adult HED individual observed on 7/14/21.	



Attachment 3 – Field Data (point counts)

All sampled points						
Date	Point ID	Start Time	# of Individuals Observed			Habitat
			Hine's Emerald Dragonfly	Monarch Butterfly	Viceroy Butterfly*	
9-Jul	M4	1149	0	4	0	sedge meadow
9-Jul	M5	1206	0	3	0	sedge meadow
9-Jul	M7	1226	0	0	0	buckthorn-old field transition
9-Jul	N1	1154	2	3	0	sedge meadow w 20% cattail
9-Jul	N11	1007	0	0	0	cattail W, buckthorn E
9-Jul	N12	946	0	1	1	old field E, buckthorn W
9-Jul	N13	925	0	0	0	bulrush-sedge meadow transition
9-Jul	N2	1136	0	2	0	cattail (tall, monotypic)
9-Jul	N4	1115	0	1	0	reed canary grass, scattered small trees
9-Jul	N6	1050	0	3	0	sedge meadow
9-Jul	N7	1029	1	2	0	sedge meadow
9-Jul	O10	930	0	0	0	old field ROW, buckthorn S
9-Jul	O13	905	0	0	0	sedge-old field adjacent to buckthorn and reg station
9-Jul	O2	1220	0	1	0	cattails-Joe pye weed
9-Jul	O3	1200	0	1	0	old field-phragmites-10% willow
9-Jul	O4	1140	0	1	0	old field-reed canary grass-phragmites
9-Jul	O5	1120	0	0	0	reed canary grass-phragmites
9-Jul	O6	1100	0	0	0	cattail marsh-reed canary grass
9-Jul	O7	1040	0	1	0	cattails-reed canary grass-bulrush
9-Jul	O8	1015	0	0	0	sedges-old field corridor through buckthorn
9-Jul	O9	950	0	1	0	old field/mowed corridor through buckthorn
9-Jul	P1	1119	4	0	0	sedge meadow
9-Jul	P2	1101	1	1	0	phragmites (tall, monotypic)
9-Jul	P3	1045	0	1	0	phragmites (tall, monotypic)
9-Jul	P4	1026	4	2	0	phragmites -old field transition
9-Jul	P6	1001	0	0	0	reed canary grass
9-Jul	P7	942	0	0	0	buckthorn-cattail/phragmites marsh
9-Jul	P8	925	0	0	0	buckthorn-old field transition
9-Jul	P9	908	0	0	0	buckthorn-old field transition
14-Jul	J1	942	0	0	0	dolomite prairie

All sampled points						
Date	Point ID	Start Time	# of Individuals Observed			Habitat
			Hine's Emerald Dragonfly	Monarch Butterfly	Viceroy Butterfly*	
14-Jul	J10	1116	0	2	0	re-sprouting buckthorn
14-Jul	J11	1133	0	3	0	dolomite prairie
14-Jul	J12	1150	0	1	0	mixed meadow
14-Jul	J13	1206	0	3	0	mixed meadow
14-Jul	J3	1002	0	6	0	dolomite prairie
14-Jul	J4	1020	1	2	0	mixed prairie and buckthorn
14-Jul	J7	1041	0	1	0	edge of forest
14-Jul	J8	1058	0	3	0	dolomite prairie
14-Jul	K1	940	0	0	0	mowed, low grass and dirt
14-Jul	K10	1106	0	1	0	herbaceous upland
14-Jul	K11	1125	0	1	0	grass, mud, with buckthorn about 15 yards immediately to the south and north
14-Jul	K13	1145	1	1	0	upland herbaceous, with about 13 milkweed nearby
14-Jul	K2	1005	0	0	0	cattails with buckthorn wall immediately to the north
14-Jul	K3	1024	0	1	0	open rock and grass, w/ short buckthorn nearby
14-Jul	K4	1042	0	0	0	open grass w/ rocks, short buckthorn dispersed with a buckthorn wall ~20 yards to the south
14-Jul	L1	942	1	5	0	sedge meadow w/ cattail
14-Jul	L10	1121	0	1	0	successional field
14-Jul	L11	1140	0	0	0	sedge meadow, buckthorn
14-Jul	L13	1158	0	1	0	successional field
14-Jul	L2	1001	1	3	0	dolomite prairie
14-Jul	L3	1017	0	2	0	sedge meadow w encroaching Phragmites
14-Jul	L4	1034	0	2	1	sedge meadow
14-Jul	L5	1054	0	0	0	sedge meadow, buckthorn
19-Jul	A2	1006	0	0	0	buckthorn/successional field opening
19-Jul	A3	949	0	0	0	buckthorn opening
19-Jul	A4	932	0	0	0	buckthorn/successional field opening
19-Jul	A6	913	0	0	0	reed canary grass
19-Jul	A7	855	0	0	0	reed canary grass
19-Jul	B10	913	0	0	0	Scirpus marsh

All sampled points						
Date	Point ID	Start Time	# of Individuals Observed			Habitat
			Hine's Emerald Dragonfly	Monarch Butterfly	Viceroy Butterfly*	
19-Jul	B11	855	0	0	0	reed canary grass
19-Jul	B3	1058	0	1	0	successional field
19-Jul	B4	1042	0	0	0	successional field
19-Jul	B5	1026	0	1	0	low sedge corridor between buckthorn
19-Jul	B6	1007	0	0	0	reed canary grass
19-Jul	B7	950	0	1	0	reed canary grass
19-Jul	B8	934	0	1	0	reed canary grass
19-Jul	C2	1115	0	0	0	successional field
19-Jul	C4	1134	0	0	0	successional field
19-Jul	C5	1151	0	0	0	reed canary grass
19-Jul	C8	1228	0	0	0	successional field
19-Jul	D10	1218	0	1	0	buckthorn/cattail opening
19-Jul	D11	1234	0	1	0	reed canary grass
19-Jul	D2	1027	0	4	0	buckthorn/sedge meadow
19-Jul	D3	1045	0	3	0	buckthorn/successional field opening
19-Jul	D4	1104	0	0	0	buckthorn opening
19-Jul	D5	1121	0	1	0	low phragmites
19-Jul	D6	1138	0	2	0	phragmites/sedge meadow
19-Jul	D8	1200	0	1	0	successional field
19-Jul	E13	1252	0	0	0	reed canary grass
20-Jul	C11	851	0	0	0	cattail/reed canary grass
20-Jul	E1	1021	0	0	0	buckthorn opening
20-Jul	E12	910	0	0	0	reed canary grass/forested wetland opening
20-Jul	E2	1004	0	0	0	buckthorn opening
20-Jul	E8	938	0	0	0	cattail/sedge meadow
20-Jul	F1	1150	0	0	0	buckthorn/successional field opening
20-Jul	F12	910	0	0	0	cattails
20-Jul	F13	850	0	0	0	reed canary grass, cattails
20-Jul	F3	1130	0	0	0	successional field and sedges
20-Jul	F4	1110	0	0	0	cattails, sedges

All sampled points						
Date	Point ID	Start Time	# of Individuals Observed			Habitat
			Hine's Emerald Dragonfly	Monarch Butterfly	Viceroy Butterfly*	
20-Jul	F5	1050	0	1	0	sedges, bulrush
20-Jul	F6	1030	0	1	0	successional field and sedges
20-Jul	F7	1010	0	0	0	open buckthorn, sedges, old field
20-Jul	F8	945	0	1	0	successional field
20-Jul	G10	926	1	3	0	successional field/ROW
20-Jul	G11	910	0	2	0	willow/sedge meadow
20-Jul	G13	848	0	0	0	cattail
20-Jul	G4	1043	0	1	0	sedge meadow/cattail
20-Jul	G5	1024	2	5	0	sedge meadow
20-Jul	G6	1007	0	0	0	successional field
20-Jul	G9	946	0	2	0	sedge meadow/willow
20-Jul	H1	1045	0	0	0	cattail/open water
20-Jul	H3	1110	1	2	0	cattail/sedge meadow
20-Jul	H4	1127	0	2	0	scraped low prairie
20-Jul	H7	1148	0	0	0	forested wetland/sedge meadow opening
20-Jul	H9	1208	0	0	0	scrub-shrub wetland/sedge meadow opening
20-Jul	I4	1220	0	1	0	successional field
20-Jul	I5	1240	0	0	0	buckthorn/successional field opening
21-Jul	H13	1035	0	0	0	successional field
21-Jul	I13	1035	0	0	0	successional field; ROW corridor
21-Jul	M13	1031	0	0	0	successional field
22-Jul	H10	902	0	0	0	low buckthorn
22-Jul	H11	844	0	1	0	sedge meadow
22-Jul	I1	927	0	1	0	scraped low prairie
22-Jul	I10	905	0	0	0	low buckthorn; successional field
22-Jul	I11	845	0	1	0	successional field; cattails
22-Jul	I2	945	0	2	0	scraped low prairie
22-Jul	I3	1001	0	0	0	scraped low prairie
22-Jul	I6	945	0	1	0	successional corridor through buckthorn
22-Jul	I7	925	0	0	0	low buckthorn; successional field

All sampled points

Date	Point ID	Start Time	# of Individuals Observed			Habitat
			Hine's Emerald Dragonfly	Monarch Butterfly	Viceroy Butterfly*	
22-Jul	M11	858	0	0	0	sedge meadow
22-Jul	M12	842	0	0	0	sedge meadow
22-Jul	P1	931	1	0	0	sedge meadow

Footnotes

* Viceroy Butterfly observations performed to show distinction between Monarch and other similar butterflies.

Target species sightings								
Date	Point ID	Time	Species Observed	Distance (m)	Bearing	Habitat	Behavior*	Observer
9-Jul	N12	954	Monarch Butterfly	10		old field E, buckthorn W		KM
9-Jul	N7	1030	Monarch Butterfly	15		sedge meadow		KM
9-Jul	N7	1038	Hine's Emerald Dragonfly	18		sedge meadow	F	KM
9-Jul	N7	1041	Monarch Butterfly	5		sedge meadow		KM
9-Jul	N6	1050	Monarch Butterfly	20		sedge meadow		KM
9-Jul	N6	1053	Monarch Butterfly	5		sedge meadow		KM
9-Jul	N6	1102	Monarch Butterfly	22		sedge meadow		KM
9-Jul	N4	1124	Monarch Butterfly	8		reed canary grass, scattered small trees		KM
9-Jul	N2	1137	Monarch Butterfly	3		cattail (tall, monotypic)		KM
9-Jul	N2	1143	Monarch Butterfly	5		cattail (tall, monotypic)		KM
9-Jul	N1	1156	Monarch Butterfly	10		sedge meadow		KM
9-Jul	N1	1156	Hine's Emerald Dragonfly	4		sedge meadow	F	KM
9-Jul	N1	1200	Monarch Butterfly	20		sedge meadow		KM
9-Jul	N1	1203	Hine's Emerald Dragonfly	16		sedge meadow	F	KM
9-Jul	N1	1204	Monarch Butterfly	12		sedge meadow		KM
9-Jul	P1	1122	Hine's Emerald Dragonfly			sedge meadow	F	JTS
9-Jul	P1	1123	Hine's Emerald Dragonfly			sedge meadow	F	JTS
9-Jul	P1	1126	Hine's Emerald Dragonfly			sedge meadow	F	JTS
9-Jul	P1	1128	Hine's Emerald Dragonfly			sedge meadow	F	JTS
9-Jul	P2	1113	Hine's Emerald Dragonfly			phragmites (tall, monotypic)	F	JTS
9-Jul	P2		Monarch Butterfly			phragmites (tall, monotypic)		JTS
9-Jul	P3		Monarch Butterfly			phragmites (tall, monotypic)		JTS
9-Jul	P4	1028	Hine's Emerald Dragonfly			phragmites -old field transition	F	JTS
9-Jul	P4	1030	Hine's Emerald Dragonfly			phragmites -old field transition	F	JTS

Target species sightings								
Date	Point ID	Time	Species Observed	Distance (m)	Bearing	Habitat	Behavior*	Observer
9-Jul	P4	1033	Hine's Emerald Dragonfly			phragmites -old field transition	F	JTS
9-Jul	P4	1035	Hine's Emerald Dragonfly			phragmites -old field transition	F	JTS
9-Jul	P4		Monarch Butterfly			phragmites -old field transition		JTS
9-Jul	P4		Monarch Butterfly			phragmites -old field transition		JTS
9-Jul	M4		Monarch Butterfly			sedge meadow		JTS
9-Jul	M4		Monarch Butterfly			sedge meadow		JTS
9-Jul	M4		Monarch Butterfly			sedge meadow		JTS
9-Jul	M4		Monarch Butterfly			sedge meadow		JTS
9-Jul	M5		Monarch Butterfly			sedge meadow		JTS
9-Jul	M5		Monarch Butterfly			sedge meadow		JTS
9-Jul	M5		Monarch Butterfly			sedge meadow		JTS
9-Jul	O9	950	Monarch Butterfly			old field		RL
9-Jul	O7	1040	Monarch Butterfly			cattails-reed canary grass-bulrush		RL
9-Jul	O4	1140	Monarch Butterfly			old field-reed canary grass-phragmites		RL
9-Jul	O3	1200	Monarch Butterfly			old field-phragmites-10% willow		RL
9-Jul	O2	1220	Monarch Butterfly			cattails-Joe pye weed		RL
14-Jul	J3	1004	Monarch Butterfly	25	E	Dolomite prairie		SG
14-Jul	J3	1005	Monarch Butterfly	10	NW	Dolomite prairie		SG
14-Jul	J3	1007	Monarch Butterfly	30	NW	Cattails		SG
14-Jul	J3	1007	Monarch Butterfly	30	NW	Cattails		SG
14-Jul	J3	1015	Monarch Butterfly	20	NW	Phragmites		SG
14-Jul	J3	1017	Monarch Butterfly	20	WNW	Dolomite prairie		SG
14-Jul	J4	1027	Monarch Butterfly	10	WNW	Mixed prairie & buckthorn		SG
14-Jul	J4	1032	Monarch Butterfly	10	E	Mixed prairie & buckthorn		SG
14-Jul	J4	1034	Hine's Emerald Dragonfly	5	W	Mixed prairie & buckthorn	F	SG
14-Jul	J7	1052	Monarch Butterfly	4	W	Buckthorn		SG
14-Jul	J8	1102	Monarch Butterfly	5	S	Dolomite prairie		SG
14-Jul	J8	1109	Monarch Butterfly	15	N	Dolomite prairie		SG
14-Jul	J8	1111	Monarch Butterfly	15	SW	Dolomite prairie		SG
14-Jul	J10	1119	Monarch Butterfly	30	E	Prairie		SG

Target species sightings								
Date	Point ID	Time	Species Observed	Distance (m)	Bearing	Habitat	Behavior*	Observer
14-Jul	J10	1131	Monarch Butterfly	5	W	Re-sprouting buckthorn		SG
14-Jul	J11	1140	Monarch Butterfly	7	N	Dolomite prairie		SG
14-Jul	J11	1141	Monarch Butterfly	25	W	Dolomite prairie		SG
14-Jul	J11	1147	Monarch Butterfly	35	E	Dolomite prairie		SG
14-Jul	J12	1200	Monarch Butterfly	39	S	Mixed meadow		SG
14-Jul	J13	1206	Monarch Butterfly	20	W	Mixed meadow		SG
14-Jul	J13	1208	Monarch Butterfly	40	E	Mixed meadow		SG
14-Jul	J13	1219	Monarch Butterfly	7	NW	Mixed meadow		SG
14-Jul	K3	1027	Monarch Butterfly	4	S	Open rock w/ grass and short buckthorn nearby		RRN
14-Jul	K10	11:08	Monarch Butterfly	10	SE	Herbaceous upland-ish		RRN
14-Jul	K11	11:25	Monarch Butterfly	6	S	Grass, mud, and buckthorn immediately south and North (open path E/W)		RRN
14-Jul	K13	11:45	Hine's Emerald Dragonfly	2	S	Upland herbaceous	F	RRN
14-Jul	K13	11:50	Monarch Butterfly	8	SW	Upland herbaceous		RRN
14-Jul	L1	943	Monarch Butterfly	12	SE	cattail		KM
14-Jul	L1	951	Monarch Butterfly	11	NE	sedge meadow		KM
14-Jul	L1	953	Monarch Butterfly	20	SE	cattail		KM
14-Jul	L1	953	Monarch Butterfly	20	SE	cattail		KM
14-Jul	L1	956	Hine's Emerald Dragonfly	13	NE	sedge meadow	F	KM
14-Jul	L1	956	Monarch Butterfly	5	W	sedge meadow		KM
14-Jul	L2	1002	Monarch Butterfly	4	SE	dolomite prairie		KM
14-Jul	L2	1004	Hine's Emerald Dragonfly	15	W	dolomite prairie		KM
14-Jul	L2	1015	Monarch Butterfly	2	S	dolomite prairie		KM
14-Jul	L2	1015	Monarch Butterfly	13	W	dolomite prairie		KM
14-Jul	L3	1024	Monarch Butterfly	5	S	sedge meadow		KM
14-Jul	L3	1029	Monarch Butterfly	6	W	sedge meadow		KM
14-Jul	L4	1040	Monarch Butterfly	15	SE	sedge meadow		KM
14-Jul	L4	1042	Monarch Butterfly	2	E	sedge meadow		KM
14-Jul	L10	1131	Monarch Butterfly	10	N	successional field		KM
14-Jul	L13	1210	Monarch Butterfly	7	SE	successional field		KM

Target species sightings								
Date	Point ID	Time	Species Observed	Distance (m)	Bearing	Habitat	Behavior*	Observer
19-Jul	D2	1030	Monarch Butterfly	7	E	buckthorn/sedge meadow		JTS
19-Jul	D2	1033	Monarch Butterfly	7	E	buckthorn/sedge meadow		JTS
19-Jul	D2	1036	Monarch Butterfly	3	N	buckthorn/sedge meadow		JTS
19-Jul	D2	1040	Monarch Butterfly	3	N	buckthorn/sedge meadow		JTS
19-Jul	D3	1047	Monarch Butterfly	1	E	buckthorn/successional field opening		JTS
19-Jul	D3	1048	Monarch Butterfly	5	E	buckthorn/successional field opening		JTS
19-Jul	D3	1054	Monarch Butterfly	7	SW	buckthorn/successional field opening		JTS
19-Jul	D5	1122	Monarch Butterfly	1	S	phragmites		JTS
19-Jul	D6	1145	Monarch Butterfly	5	E	phragmites/sedge meadow		JTS
19-Jul	D6	1147	Monarch Butterfly	2	W	phragmites/sedge meadow		JTS
19-Jul	D8	1212	Monarch Butterfly	1	N	successional field		JTS
19-Jul	D10	1225	Monarch Butterfly	3	NW	buckthorn/cattail opening		JTS
19-Jul	D11	1240	Monarch Butterfly	7	W	reed canary grass		JTS
19-Jul	B8	941	Monarch Butterfly	7	NE	reed canary grass		KM
19-Jul	B7	954	Monarch Butterfly	12	NW	reed canary grass		KM
19-Jul	B5	1037	Monarch Butterfly	10	NW	sedge/buckthorn		KM
19-Jul	B3	1109	Monarch Butterfly	5	NW	successional field		KM
20-Jul	H3	1110	Hine's Emerald Dragonfly	3	E	cattail/sedge meadow	F	JTS
20-Jul	H3	1112	Monarch Butterfly	7	S	cattail/sedge meadow		JTS
20-Jul	H3	1121	Monarch Butterfly	3	E	cattail/sedge meadow		JTS
20-Jul	H4	1129	Monarch Butterfly	7	SE	scraped low prairie		JTS
20-Jul	H4	1139	Monarch Butterfly	5	W	scraped low prairie		JTS
20-Jul	F8	945	Monarch Butterfly	4	S	successional field		RL
20-Jul	F6	1030	Monarch Butterfly	5	NW	successional field and sedges		RL
20-Jul	F5	1050	Monarch Butterfly	3	E	sedges, bulrush		RL
20-Jul	I4	1220	Monarch Butterfly	3	S	successional field		RL
20-Jul	G11	910	Monarch Butterfly	1	N	willow		KM
20-Jul	G11	913	Monarch Butterfly	5	N	successional field		KM
20-Jul	G10	927	Monarch Butterfly	8	SW	successional field		KM
20-Jul	G10	930	Monarch Butterfly	30	S	sedge meadow		KM
20-Jul	G10	935	Hine's Emerald Dragonfly	9	W	sedge meadow	F	KM

Target species sightings								
Date	Point ID	Time	Species Observed	Distance (m)	Bearing	Habitat	Behavior*	Observer
20-Jul	G10	936	Monarch Butterfly	9	W	sedge meadow		KM
20-Jul	G9	956	Monarch Butterfly	10	SW	cattail		KM
20-Jul	G9	1000	Monarch Butterfly	5	W	sedge meadow		KM
20-Jul	G5	1024	Hine's Emerald Dragonfly	11	NW	sedge meadow	F	KM
20-Jul	G5	1028	Hine's Emerald Dragonfly	4	N	sedge meadow	F	KM
20-Jul	G5	1028	Monarch Butterfly	5	N	sedge meadow		KM
20-Jul	G5	1030	Monarch Butterfly	21	NW	cattail		KM
20-Jul	G5	1032	Monarch Butterfly	15	W	sedge meadow		KM
20-Jul	G5	1032	Monarch Butterfly	15	W	sedge meadow		KM
20-Jul	G5	1036	Monarch Butterfly	18	N	cattail		KM
20-Jul	G4	1057	Monarch Butterfly	1	N	sedge meadow		KM
22-Jul	P1	948	Hine's Emerald Dragonfly	5	SW	sedge meadow	F	KM
22-Jul	H11	855	Monarch Butterfly	7	W	sedge meadow		JTS
22-Jul	I1	936	Monarch Butterfly	5	SW	scraped low prairie		JTS
22-Jul	I2	954	Monarch Butterfly	5	S	scraped low prairie		JTS
22-Jul	I2	956	Monarch Butterfly	3	N	scraped low prairie		JTS
22-Jul	I11	845	Monarch Butterfly	5	W	successional field; cattails		RL
22-Jul	I6	945	Monarch Butterfly	6	N	successional corridor through buckthorn		RL
Footnotes								
* Behavior: F = Foraging								

APPENDIX F COATING AND SANDBLASTING MEDIA SDS

Material Safety Data Sheet

600 Liquid Adhesive Quick Dry

1. Product and company identification

Product name	: 600 Liquid Adhesive Quick Dry
Synonym	: Not available.
Trade name	: Not available.
Material uses	: Adhesive used to promote adhesion of Polyguards' pipeline coatings and tapes.
Code	: Not available.
Supplier/Manufacturer	: Polyguard Products Inc. 3801 South Interstate 45 Ennis, TX 75119 Tel: (800)541-4994
MSDS authored by	: KMK Regulatory Services Inc.
In case of emergency	: CHEMTREC, U.S. : 1-800-424-9300 International: +1-703-527-3887

2. Hazards identification

Emergency overview

Physical state	: Liquid.
Color	: Black.
Odor	: Hydrocarbon. [Strong]
Signal word	: DANGER!
Hazard statements	: EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
Precautionary measures	: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep away from heat, sparks and flame. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects	
Inhalation	: No known significant effects or critical hazards.
Ingestion	: Harmful if swallowed. Aspiration hazard if swallowed. Can enter lungs and cause damage.
Skin	: Irritating to skin. May cause sensitization by skin contact.
Eyes	: Irritating to eyes.
Potential chronic health effects	
Chronic effects	: Contains material that can cause target organ damage. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.



2. Hazards identification

- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : Contains material which may cause damage to the following organs: kidneys, lungs, the reproductive system, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

Over-exposure signs/symptoms

- Inhalation** : No known significant effects or critical hazards.
- Ingestion** : Adverse symptoms may include the following:
nausea or vomiting
- Skin** : Adverse symptoms may include the following:
irritation
redness
- Eyes** : Adverse symptoms may include the following:
pain or irritation
watering
redness

- Medical conditions aggravated by over-exposure** : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

Name	CAS number	%
Toluene	108-88-3	60 - 100
Methyl ethyl ketone	78-93-3	1 - 5
Solvent naphtha (petroleum), medium aliphatic	64742-88-7	1 - 5
Carbon black (Non-respirable)	1333-86-4	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 20 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.



4. First aid measures

- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : Extremely flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Extinguishing media**
- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet or water-based fire extinguishers.
- Special exposure hazards** : Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Not available.

6. Accidental release measures

- Personal precautions** : Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.



7. Handling and storage

Handling

: Put on appropriate personal protective equipment (see Section 8). Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. **Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.**

Storage

: Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

<u>Occupational exposure limits</u>		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	Notations
Toluene	US ACGIH 3/2012	20	-	-	-	-	-	-	-	-	
	AB 4/2009	50	188	-	-	-	-	-	-	-	[1]
	BC 4/2012	20	-	-	-	-	-	-	-	-	
	ON 7/2010	20	-	-	-	-	-	-	-	-	
	QC 9/2011	50	188	-	-	-	-	-	-	-	[1]
Methyl ethyl ketone	US ACGIH 3/2012	200	590	-	300	885	-	-	-	-	
	AB 4/2009	200	590	-	300	885	-	-	-	-	
	BC 9/2011	50	-	-	100	-	-	-	-	-	
	ON 7/2010	200	590	-	300	885	-	-	-	-	
	QC 9/2011	50	150	-	100	300	-	-	-	-	
Carbon black	US ACGIH 3/2012	-	3	-	-	-	-	-	-	-	[a]
	AB 4/2009	-	3.5	-	-	-	-	-	-	-	
	BC 4/2012	-	3	-	-	-	-	-	-	-	[b]
	ON 7/2010	-	3.5	-	-	-	-	-	-	-	
	QC 9/2011	-	3.5	-	-	-	-	-	-	-	

[1]Absorbed through skin.

Form: [a]Inhalable fraction. [b]Inhalable

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures

: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Use explosion-proof ventilation equipment.



8. Exposure controls/personal protection

Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.
Personal protection	
Respiratory	: Use a properly fitted, air-purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Hands	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Eyes	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
Skin	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.
Other protection	: Not available.

9. Physical and chemical properties

Physical state	: Liquid.
Flash point	: Open cup: -8.33°C (17°F) [Cleveland.]
Burning time	: Not applicable.
Burning rate	: Not applicable.
Auto-ignition temperature	: Not available.
Flammable limits	: Lower: 1.2% Upper: 9%
Color	: Black.
Odor	: Hydrocarbon. [Strong]
Taste	: Not available.
Molecular weight	: Not applicable.
Molecular formula	: Not applicable.
pH	: Not applicable.
Boiling/condensation point	: 41°C (105.8°F)
Melting/freezing point	: Not applicable.
Critical temperature	: Not available.
Relative density	: 0.9
Vapor pressure	: 20.3 kPa (152 mm Hg) [room temperature]
Vapor density	: 3.5 [Air = 1]
Volatility	: Not available.
Odor threshold	: Not applicable.



9. Physical and chemical properties

Evaporation rate	: 4.5 (ether (anhydrous) = 1)
SADT	: Not available.
Viscosity	: Not available.
Ionicity (in water)	: Not available.
Dispersibility properties	: Not available.
Solubility	: Partially soluble in the following materials: cold water and hot water.
VOC = Volatile Organic Compound	: 718 g/L
Physical/chemical properties comments	: Not available.

10. Stability and reactivity

Chemical stability	: The product is stable.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatible materials	: Highly reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Toluene	LC50 Inhalation Vapor	Rat	49 g/m ³	4 hours
	LD50 Oral	Rat	636 mg/kg	-
Methyl ethyl ketone	LD50 Dermal	Rabbit	6480 mg/kg	-
	LD50 Oral	Rat	2737 mg/kg	-
Carbon black	LD50 Oral	Rat	>15400 mg/kg	-

Chronic toxicity

There is no data available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Toluene	Eyes - Mild irritant	Rabbit	-	0.5 minutes 100 mg	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 mg	-
	Eyes - Mild irritant	Rabbit	-	870 µg	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 mg	-
	Skin - Mild irritant	Pig	-	24 hours 250 µL	-
	Skin - Mild irritant	Rabbit	-	435 mg	-
	Skin - Moderate irritant	Rabbit	-	500 mg	-
Methyl ethyl ketone	Skin - Mild irritant	Rabbit	-	24 hours 14 mg	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 mg	-

Sensitizer

There is no data available.



11. Toxicological information

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP	ACGIH	EPA	NIOSH
Toluene	-	3	-	A4	-	-
Carbon black	-	2B	-	A3	-	+

Mutagenicity

There is no data available.

Teratogenicity

There is no data available.

Reproductive toxicity

There is no data available.

Synergistic products : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Toluene	Acute EC50 433 ppm Marine water	Algae - Skeletonema costatum	96 hours
	Acute EC50 12500 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 11600 µg/l Fresh water	Crustaceans - Gammarus pseudolimnaeus - Adult	48 hours
	Acute EC50 6000 µg/l Fresh water	Daphnia - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 5500 µg/l Fresh water	Fish - Oncorhynchus kisutch - Fry	96 hours
	Chronic NOEC 500000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
Methyl ethyl ketone	Chronic NOEC 1000 µg/l Fresh water	Daphnia - Daphnia magna	21 days
	Acute EC50 >500000 µg/l Marine water	Algae - Skeletonema costatum	96 hours
	Acute LC50 520000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 400 ppm Marine water	Fish - Cyprinodon variegatus - Juvenile (Fledgling, Hatchling, Weanling)	96 hours

Persistence/degradability

There is no data available.

Partition coefficient: n-octanol/water : Not available.

Bioconcentration factor : Not available.

Mobility : Not available.

Toxicity of the products of biodegradation : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed to the sewer. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed



13. Disposal considerations





out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Waste stream : Not available.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1139	COATING SOLUTION	3	II		-
IMDG Class	UN1139	COATING SOLUTION	3	II	 	The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg. Emergency schedules (EmS) F-E, S-E
IATA-DGR Class	UN1139	COATING SOLUTION	3	II		The environmentally hazardous substance mark may appear if required by other transportation regulations.

PG* : Packing group

Exemption to the above classification may apply.

AERG : 127

15. Regulatory information

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Toluene; Methyl ethyl ketone; Solvent naphtha (petroleum), medium aliph.

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations



15. Regulatory information

International lists	: Australia inventory (AICS) : All components are listed or exempted. China inventory (IECSC) : All components are listed or exempted. Japan inventory : Not determined. Korea inventory : All components are listed or exempted. Malaysia Inventory (EHS Register) : Not determined. New Zealand Inventory of Chemicals (NZIoC) : All components are listed or exempted. Philippines inventory (PICCS) : All components are listed or exempted. Taiwan inventory (CSNN) : Not determined.
Chemical Weapons Convention List Schedule I Chemicals	: Not listed
Chemical Weapons Convention List Schedule II Chemicals	: Not listed
Chemical Weapons Convention List Schedule III Chemicals	: Not listed

16. Other information

WHMIS (Canada)	:	 
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History

Date of issue	: 09/15/2013
Date of previous issue	: 05/15/2011
Version	: 3
Revised Section(s)	: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Polyguard RD-6® Pipeline Tape, 600 UV 350, 600, 610, 606 membranes

Section 1. Identification

Product identifier	: Polyguard RD-6® Pipeline Tape, 600 UV 350, 600, 610, 606 membranes
Other means of identification	: Not available.
Product type	: Solid.
Identified uses	: Polymer modified bitumen tape used to protect pipes from exterior corrosion.
Supplier/Manufacturer	: Polyguard Products Inc. 4101 South Interstate 45 Ennis, TX 75119 Tel: 214-515-5000
Supplier's details	: IN-LINE PIGGING SOLUTIONS LTD. 220-40TH Avenue NE Calgary, AB T2E 2M7 Canada
Emergency telephone number (with hours of operation)	: CHEMTREC, U.S. : 1-800-424-9300 International: +1-703-527-3887 24/7

Section 2. Hazard identification

Classification of the substance or mixture	: Not classified. This product is an Article under the Hazardous Products Regulations (HPR) in Canada. Therefore it is EXEMPTED from the regulatory requirements under WHMIS 2015.
GHS label elements	
Signal word	: No signal word.
Hazard statements	: No known significant effects or critical hazards.
Precautionary statements	
Prevention	: Not applicable.
Response	: Not applicable.
Storage	: Not applicable.
Disposal	: Not applicable.
Other hazards which do not result in classification/ HHNOC/PHNOC	: None known.



Section 3. Composition/information on ingredients

Substance/mixture : Mixture
Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.
Product code : Not available.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Not a likely route of exposure.

Skin contact : Flush contaminated skin with plenty of water. Get medical attention if symptoms occur.

Ingestion : Not a likely route of exposure.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No special protection is required.

See toxicological information (Section 11)



Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : No specific fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : No special measures are required.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Not applicable.

Methods and materials for containment and cleaning up

Spill : Not applicable.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink.



Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin protection

Hand protection : Gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Not required under normal conditions of use.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Solid. [Tape.]
- Color** : Black.
- Odor** : Asphalt. [Slight]
- Odor threshold** : Not available.
- pH** : Not applicable.
- Melting point** : Not applicable.
- Boiling point** : Not applicable.
- Flash point** : Open cup: >273.89°C (>525°F)
- Evaporation rate** : Not applicable.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not applicable.
- Vapor density** : Not applicable.
- Relative density** : 1.09
- Solubility** : Insoluble in water.
- Partition coefficient: n-octanol/water** : Not available.



Section 9. Physical and chemical properties

Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Not applicable.
Volatility	: Not applicable.
VOC (w/w)	: <1g/L

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: Reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

There is no data available.

Irritation/Corrosion

There is no data available.

Sensitization

There is no data available.

Mutagenicity

There is no data available.

Carcinogenicity

There is no data available.

Reproductive toxicity

There is no data available.

Teratogenicity

There is no data available.

Specific target organ toxicity (single exposure)

There is no data available.

Specific target organ toxicity (repeated exposure)

There is no data available.

Aspiration hazard

There is no data available.



Section 11. Toxicological information

Information on the likely routes of exposure : Routes of entry anticipated: Dermal contact.
Routes of entry not anticipated: Oral, Inhalation

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : No known significant effects or critical hazards.
Potential delayed effects : No known significant effects or critical hazards.

Long term exposure

Potential immediate effects : No known significant effects or critical hazards.
Potential delayed effects : No known significant effects or critical hazards.

Potential chronic health effects

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

There is no data available.

Section 12. Ecological information

Toxicity

There is no data available.

Persistence and degradability

There is no data available.

Bioaccumulative potential

There is no data available.



Section 12. Ecological information

Mobility in soil

Soil/water partition coefficient (K_{oc}) : There is no data available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way.

Section 14. Transport information

	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

AERG : Not applicable.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

Canadian lists

Canadian NPRI : None of the components are listed.

CEPA Toxic substances : None of the components are listed.

Canada inventory : Not determined.



Section 16. Other information

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

- Date of issue** : 09/15/2016
Date of previous issue : 09/15/2013
Version : 4
Prepared by : KMK Regulatory Services Inc.
Key to abbreviations : ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 UN = United Nations
 HPR = Hazardous Products Regulations

Notice to reader

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Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: November 05, 2020

1 Identification

- **Product identifier**
- **Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA**
- **Recommended use and restriction on use**
- **Recommended use:** Abrasives
- **Restrictions on use:** No relevant information available.
- **Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
Harsco Corporation
Harsco Environmental
350 Poplar Church Road
Camp Hill, PA 17011
Phone: 717-763-7064
E-Mail: reedcs@harsco.com
- **Emergency telephone number:**
Emergency Contact: Verisk 3E
Emergency Phone: 855-393-9889 (Access Code: 13793)
Manufacturer Contact: Customer Service Department
Manufacturer Emergency Phone: 888-733-3646 ext. 2

2 Hazard(s) identification

- **Classification of the substance or mixture**
Classification references product both as delivered and as a fine dust generated during use.
Skin Irrit. 2 H315 Causes skin irritation.
Eye Dam. 1 H318 Causes serious eye damage.
Carc. 1B H350 May cause cancer. Route of exposure: Inhalation.
STOT SE 3 H335 May cause respiratory irritation.
STOT RE 2 H373 May cause damage to organs through prolonged or repeated exposure. Route of exposure: Inhalation.

- **Label elements**
- **GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms:**



GHS05 GHS07 GHS08

- **Signal word:** Danger
- **Hazard statements:**
H315 Causes skin irritation.
H318 Causes serious eye damage.
H350 May cause cancer. Route of exposure: Inhalation.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure. Route of exposure: Inhalation.

(Cont'd. on page 2)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: November 05, 2020

Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA

(Cont'd. of page 1)

· **Precautionary statements:**

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352	If on skin: Wash with plenty of soap and water.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P314	Get medical advice/attention if you feel unwell.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Other hazards** There are no other hazards not otherwise classified that have been identified.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**

· **Components:**

60676-86-0	Silica, fused	60-80%
1313-59-3	Sodium oxide	10-20%
	Skin Corr. 1A, H314; Eye Dam. 1, H318	
1305-78-8	Calcium oxide	10-20%
	Eye Dam. 1, H318	
	Skin Irrit. 2, H315; STOT SE 3, H335	
1344-28-1	Aluminum oxide	<5%
	STOT RE 2, H373	
1309-37-1	Iron oxides (Includes CAS No.'s 1345-25-1 and 1309-38-2)	0.1-1%
1309-48-4	Magnesium oxide	0.1-1%
12136-45-7	Dipotassium oxide	0.1-1%
	Met. Corr. 1, H290; Skin Corr. 1A, H314; Eye Dam. 1, H318	
14808-60-7	Quartz (SiO ₂)	<1%
	Carc. 1A, H350	
13463-67-7	Titanium dioxide	<0.1%
	Carc. 2, H351	
7440-43-9	cadmium (non-pyrophoric)	<0.001%
	Acute Tox. 3, H301; Acute Tox. 2, H330	
	Muta. 2, H341; Carc. 1B, H350; Repr. 2, H361; STOT RE 1, H372	
7440-41-7	beryllium	≤0.0005%
	Acute Tox. 3, H301; Acute Tox. 2, H330	

(Cont'd. on page 3)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: November 05, 2020

Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA

(Cont'd. of page 2)

	<p>☠ Carc. 1B, H350; STOT RE 1, H372</p> <p>⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; Skin Sens. 1, H317; STOT SE 3, H335</p>	
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· **Additional information:** For the wording of the listed Hazard Statements, refer to section 16.

4 First-aid measures

- **Description of first aid measures**

- **After inhalation:**

Supply fresh air.

Provide oxygen treatment if affected person has difficulty breathing.

If experiencing respiratory symptoms: Call a doctor.

- **After skin contact:**

Brush off loose particles from skin.

Wash with soap and water.

If skin irritation continues, consult a doctor.

- **After eye contact:**

Protect unharmed eye.

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. Then consult a doctor.

- **After swallowing:**

Rinse out mouth and then drink plenty of water.

Do not induce vomiting; immediately call for medical help.

- **Most important symptoms and effects, both acute and delayed:**

Coughing

Breathing difficulty

Mechanical irritation to eyes and skin.

Strong irritant with the danger of severe eye injury.

Irritating to respiratory system and skin.

- **Danger:**

Danger of impaired breathing.

Causes serious eye damage.

May cause cancer. Route of exposure: Inhalation.

May cause damage to organs. Route of exposure: Inhalation.

- **Indication of any immediate medical attention and special treatment needed:**

Medical supervision for at least 48 hours.

If necessary oxygen respiration treatment.

If medical advice is needed, have product container or label at hand.

5 Fire-fighting measures

- **Extinguishing media**

- **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.

- **For safety reasons unsuitable extinguishing agents:** No relevant information available.

- **Special hazards arising from the substance or mixture** No relevant information available.

- **Advice for firefighters**

- **Protective equipment:**

Wear self-contained respiratory protective device.

(Cont'd. on page 4)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: November 05, 2020

Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA

Wear fully protective suit.

(Cont'd. of page 3)

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Isolate area and prevent access.
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
For large spills, use respiratory protective device against the effects of fumes/dust/aerosol.
- **Environmental precautions** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up**
Sweep up and place into an appropriate container.
Pick up mechanically.
Send for recovery or disposal in suitable receptacles.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling**
- **Precautions for safe handling:** Use only in well ventilated areas.
- **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:**
Store away from foodstuffs.
Do not store together with alkalis (caustic solutions).
Do not store together with acids.
- **Further information about storage conditions:**
Keep containers tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
- **Specific end use(s)** No relevant information available.

8 Exposure controls/personal protection

- **Control parameters**
- **Components with limit values that require monitoring at the workplace:**

60676-86-0 Silica, fused

PEL (USA)	20mppcf or 80mg/m ³ /%SiO ₂
TLV (USA)	TLV withdrawn
EV (Canada)	Long-term value: 0.1 mg/m ³ respirable
LMPE (Mexico)	Long-term value: 0.1 mg/m ³

(Cont'd. on page 5)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: November 05, 2020

Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA

(Cont'd. of page 4)

(j)

1305-78-8 Calcium oxide

PEL (USA)	Long-term value: 5 mg/m ³
REL (USA)	Long-term value: 2 mg/m ³
TLV (USA)	Long-term value: 2 mg/m ³
EL (Canada)	Long-term value: 2 mg/m ³
EV (Canada)	Long-term value: 2 mg/m ³
LMPE (Mexico)	Long-term value: 2 mg/m ³

1344-28-1 Aluminum oxide

PEL (USA)	Long-term value: 15*; 5** mg/m ³ *Total dust; ** Respirable fraction
REL (USA)	Long-term value: 10* 5** mg/m ³ as Al*Total dust**Respirable/pyro powd./welding f.
TLV (USA)	Long-term value: 1* mg/m ³ as Al; *as respirable fraction
EL (Canada)	Long-term value: 1.0 mg/m ³ respirable, as Al
EV (Canada)	Long-term value: 10 mg/m ³ total dust
LMPE (Mexico)	Long-term value: 1* mg/m ³ A4, *fracción respirable

14808-60-7 Quartz (SiO₂)

PEL (USA)	Long-term value: 0.05* mg/m ³ *resp. dust; 30mg/m ³ /%SiO ₂ +2
REL (USA)	Long-term value: 0.05* mg/m ³ *respirable dust; See Pocket Guide App. A
TLV (USA)	Long-term value: 0.025* mg/m ³ *as respirable fraction
EL (Canada)	Long-term value: 0.025 mg/m ³ ACGIH A2; IARC 1
EV (Canada)	Long-term value: 0.10* mg/m ³ *respirable fraction
LMPE (Mexico)	Long-term value: 0.025* mg/m ³ A2, *fracción respirable

1309-37-1 Iron oxides (Includes CAS No.'s 1345-25-1 and 1309-38-2)

PEL (USA)	Long-term value: 10* mg/m ³ *Fume
REL (USA)	Long-term value: 5 mg/m ³ Dust & fume, as Fe
TLV (USA)	Long-term value: 5* mg/m ³ *as respirable fraction
EL (Canada)	Short-term value: 10** mg/m ³ Long-term value: 5* 10*** 3**** mg/m ³ *dust & fume**fume; Rouge: ***total dust****resp.

(Cont'd. on page 6)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

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Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA

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EV (Canada)	Long-term value: 5* 10** mg/m ³ *respirable, including Rouge;**total dust
LMPE (Mexico)	Long-term value: 5* mg/m ³ A4, *fracción respirable
1309-48-4 Magnesium oxide	
PEL (USA)	Long-term value: 15* mg/m ³ fume; *total particulate
TLV (USA)	Long-term value: 10* mg/m ³ *as inhalable fraction
EL (Canada)	Short-term value: 10** mg/m ³ Long-term value: 10* 3** mg/m ³ *inhalable fume;**respirable dust and fume
EV (Canada)	Long-term value: 10 mg/m ³ inhalable
LMPE (Mexico)	Long-term value: 10* mg/m ³ A4, *fracción respirable
13463-67-7 Titanium dioxide	
PEL (USA)	Long-term value: 15* mg/m ³ *total dust
REL (USA)	See Pocket Guide App. A
TLV (USA)	Long-term value: 10 mg/m ³
EL (Canada)	Long-term value: 10* 3** mg/m ³ *total dust;**respirable fraction; IARC 2B
EV (Canada)	Long-term value: 10 mg/m ³ total dust
LMPE (Mexico)	Long-term value: 10 mg/m ³ A4

- **Exposure controls**

- **General protective and hygienic measures:**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

- **Engineering controls:** Provide adequate ventilation.

- **Breathing equipment:**

Suitable respiratory protective device recommended.

A NIOSH approved dust respirator should be used for operations generating dust.

- **Protection of hands:**



Protective gloves

Wear gloves for protection against thermal and mechanical hazards according to OSHA and NIOSH rules.

- **Eye protection:**

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Safety glasses

Follow relevant national guidelines concerning the use of protective eyewear.

- **Body protection:** Protective work clothing
- **Limitation and supervision of exposure into the environment**
No relevant information available.
- **Risk management measures** No relevant information available.

9 Physical and chemical properties

· Information on basic physical and chemical properties

· Appearance:

Form: Granular or powdered solid.
Color: According to product specification

- **Odor:** Odorless
- **Odor threshold:** Not determined.

- **pH-value:** Not applicable.
- **Melting point/Melting range:** Not determined.
- **Boiling point/Boiling range:** Not determined.

- **Flash point:** The product is not flammable.

- **Flammability (solid, gaseous):** Not determined.

- **Auto-ignition temperature:** Not determined.

- **Decomposition temperature:** Not determined.

- **Danger of explosion:** Product does not present an explosion hazard.

· Explosion limits

Lower: Not determined.
Upper: Not determined.

- **Oxidizing properties:** Non-oxidizing.

- **Vapor pressure:** Not determined.

- **Density:** 2.5 g/cm³ (20.86 lbs/gal)
- **Relative density:** Not determined.
- **Vapor density:** Not applicable.
- **Evaporation rate:** Not applicable.

· Solubility in / Miscibility with

Water: Insoluble.

- **Partition coefficient (n-octanol/water):** Not determined.

· Viscosity

Dynamic: Not applicable.
Kinematic: Not applicable.

- **Other information** No relevant information available.

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10 Stability and reactivity

- **Reactivity:** No relevant information available.
- **Chemical stability:** Stable under normal temperatures and pressures.
- **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
- **Possibility of hazardous reactions** Reacts with hydrogen fluoride / hydrofluoric acid.
- **Conditions to avoid** No relevant information available.
- **Incompatible materials** No relevant information available.
- **Hazardous decomposition products**
Under fire conditions only:
Possible in traces.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:** Based on available data, the classification criteria are not met.
- **LD/LC50 values that are relevant for classification:** None.
- **Primary irritant effect:**
- **On the skin:** Irritant to skin and mucous membranes.
- **On the eye:** Strong irritant with the danger of severe eye injury.
- **Sensitization:** Based on available data, the classification criteria are not met.

· IARC (International Agency for Research on Cancer):

14808-60-7	Quartz (SiO ₂)	1
1309-37-1	Iron oxides (Includes CAS No.'s 1345-25-1 and 1309-38-2)	3
13463-67-7	Titanium dioxide	2B
7440-43-9	cadmium (non-pyrophoric)	1
7440-41-7	beryllium	1
60676-86-0	Silica, fused	3

· NTP (National Toxicology Program):

14808-60-7	Quartz (SiO ₂)	K
7440-43-9	cadmium (non-pyrophoric)	K
7440-41-7	beryllium	K

· OSHA-Ca (Occupational Safety & Health Administration):

7440-43-9	cadmium (non-pyrophoric)
-----------	--------------------------

· Probable route(s) of exposure:

Ingestion.
Inhalation.
Eye contact.
Skin contact.

· Acute effects (acute toxicity, irritation and corrosivity):

Causes serious eye damage.
Irritating to respiratory system and skin.

· Repeated dose toxicity: Possible risk of irreversible effects.

· Germ cell mutagenicity: Based on available data, the classification criteria are not met.

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Trade name: BLACK BEAUTY® GLASS AND BRIGHTLINE® FILTER MEDIA

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- **Carcinogenicity:** May cause cancer. Route of exposure: Inhalation.
- **Reproductive toxicity:** Based on available data, the classification criteria are not met.
- **STOT-single exposure:** May cause respiratory irritation.
- **STOT-repeated exposure:**
May cause damage to organs through prolonged or repeated exposure. Route of exposure: Inhalation.
- **Aspiration hazard:** Based on available data, the classification criteria are not met.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity** No relevant information available.
- **Persistence and degradability** No relevant information available.
- **Bioaccumulative potential:** No relevant information available.
- **Mobility in soil:** No relevant information available.
- **Additional ecological information**
- **General notes:**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- **Other adverse effects** No relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.
- **Uncleaned packagings**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- | | |
|---------------------------------------|-----------------|
| · UN-Number | |
| · DOT, ADR/RID/ADN, IMDG, IATA | Not regulated. |
| · UN proper shipping name | |
| · DOT, ADR/RID/ADN, IMDG, IATA | Not regulated. |
| · Transport hazard class(es) | |
| · DOT, ADR/RID/ADN, IMDG, IATA | |
| · Class | Not regulated. |
| · Packing group | |
| · DOT, ADR/RID/ADN, IMDG, IATA | Not regulated. |
| · Environmental hazards | Not applicable. |

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- **Special precautions for user** Not applicable.
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

· Section 302 (extremely hazardous substances):

None of the ingredients are listed.

· Section 313 (Specific toxic chemical listings):

1344-28-1	Aluminum oxide
-----------	----------------

· TSCA (Toxic Substances Control Act)

All ingredients are listed or exempt.

· Proposition 65 (California)

· Chemicals known to cause cancer:

14808-60-7	Quartz (SiO ₂)
13463-67-7	Titanium dioxide
7440-43-9	cadmium (non-pyrophoric)
7440-41-7	beryllium

· Chemicals known to cause developmental toxicity for females:

None of the ingredients are listed.

· Chemicals known to cause developmental toxicity for males:

7440-43-9	cadmium (non-pyrophoric)
-----------	--------------------------

· Chemicals known to cause developmental toxicity:

7440-43-9	cadmium (non-pyrophoric)
-----------	--------------------------

· EPA (Environmental Protection Agency):

None of the ingredients are listed.

· IARC (International Agency for Research on Cancer):

60676-86-0	Silica, fused	3
14808-60-7	Quartz (SiO ₂)	1
1309-37-1	Iron oxides (Includes CAS No.'s 1345-25-1 and 1309-38-2)	3
13463-67-7	Titanium dioxide	2B
7440-43-9	cadmium (non-pyrophoric)	1
7440-41-7	beryllium	1

· Canadian Domestic Substances List (DSL):

All ingredients listed on DSL or NDSL.

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16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Abbreviations and acronyms:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

CAS: Chemical Abstracts Service (division of the American Chemical Society)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

OSHA: Occupational Safety & Health Administration

Met. Corr. 1: Corrosive to metals – Category 1

Acute Tox. 3: Acute toxicity – Category 3

Acute Tox. 2: Acute toxicity – Category 2

Skin Corr. 1A: Skin corrosion/irritation – Category 1A

Skin Irrit. 2: Skin corrosion/irritation – Category 2

Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A

Skin Sens. 1: Skin sensitisation – Category 1

Muta. 2: Germ cell mutagenicity – Category 2

Carc. 1A: Carcinogenicity – Category 1A

Carc. 1B: Carcinogenicity – Category 1B

Carc. 2: Carcinogenicity – Category 2

Repr. 2: Reproductive toxicity – Category 2

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1

STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2

· Sources

Website, European Chemicals Agency (echa.europa.eu)

Website, US EPA Substance Registry Services (ofmpub.epa.gov/sorinternet/registry/substreg/home/overview/home.do)

Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)

Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6

Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN: 978-0-07-176923-5.

Safety Data Sheets, Individual Manufacturers

APPENDIX G CONTAMINATION TESTING COMPOUNDS

Test Name	Analyte	CAS
Semi-Volatile Organic Compounds	1,1`-Biphenyl	92-52-4
Semi-Volatile Organic Compounds	1,2,4,5-Tetrachlorobenzene	95-94-3
Semi-Volatile Organic Compounds	1,4-Dioxane	123-91-1
Semi-Volatile Organic Compounds	2,2`-Oxybis(1-chloropropane)	108-60-1
Semi-Volatile Organic Compounds	2,3,4,6-Tetrachlorophenol	58-90-2
Semi-Volatile Organic Compounds	2,4,5-Trichlorophenol	95-95-4
Semi-Volatile Organic Compounds	2,4,6-Trichlorophenol	88-06-2
Semi-Volatile Organic Compounds	2,4-Dichlorophenol	120-83-2
Semi-Volatile Organic Compounds	2,4-Dinitrotoluene	121-14-2
Semi-Volatile Organic Compounds	2-Chloronaphthalene	91-58-7
Semi-Volatile Organic Compounds	2-Chlorophenol	95-57-8
Semi-Volatile Organic Compounds	2-Methylnaphthalene	91-57-6
Semi-Volatile Organic Compounds	2-Methylphenol	95-48-7
Semi-Volatile Organic Compounds	2-Nitroaniline	88-74-4
Semi-Volatile Organic Compounds	2-Nitrophenol	88-75-5
Semi-Volatile Organic Compounds	3&4-Methylphenol	34METPH
Semi-Volatile Organic Compounds	3,3`-Dichlorobenzidine	91-94-1
Semi-Volatile Organic Compounds	3-Nitroaniline	99-09-2
Semi-Volatile Organic Compounds	4,6-Dinitro-2-methylphenol	534-52-1
Semi-Volatile Organic Compounds	4-Bromophenyl phenyl ether	101-55-3
Semi-Volatile Organic Compounds	4-Chloro-3-methylphenol	59-50-7
Semi-Volatile Organic Compounds	4-Chloroaniline	106-47-8
Semi-Volatile Organic Compounds	4-Chlorophenyl phenyl ether	7005-72-3
Semi-Volatile Organic Compounds	4-Nitroaniline	100-01-6
Semi-Volatile Organic Compounds	4-Nitrophenol	100-02-7
Semi-Volatile Organic Compounds	Acenaphthene	83-32-9
Semi-Volatile Organic Compounds	Acenaphthylene	208-96-8
Semi-Volatile Organic Compounds	Acetophenone	98-86-2
Semi-Volatile Organic Compounds	Anthracene	120-12-7
Semi-Volatile Organic Compounds	Atrazine	1912-24-9
Semi-Volatile Organic Compounds	Benzaldehyde	100-52-7
Semi-Volatile Organic Compounds	Benzo(a)anthracene	56-55-3
Semi-Volatile Organic Compounds	Benzo(a)pyrene	50-32-8
Semi-Volatile Organic Compounds	Benzo(b)fluoranthene	205-99-2
Semi-Volatile Organic Compounds	Benzo(g,h,i)perylene	191-24-2
Semi-Volatile Organic Compounds	Benzo(k)fluoranthene	207-08-9
Semi-Volatile Organic Compounds	Bis(2-chloroethoxy)methane	111-91-1
Semi-Volatile Organic Compounds	Bis(2-chloroethyl)ether	111-44-4
Semi-Volatile Organic Compounds	Bis(2-ethylhexyl)phthalate	117-81-7
Semi-Volatile Organic Compounds	Butyl benzyl phthalate	85-68-7
Semi-Volatile Organic Compounds	Caprolactam	105-60-2
Semi-Volatile Organic Compounds	Carbazole	86-74-8
Semi-Volatile Organic Compounds	Chrysene	218-01-9
Semi-Volatile Organic Compounds	Dibenzo(a,h)anthracene	53-70-3
Semi-Volatile Organic Compounds	Dibenzofuran	132-64-9
Semi-Volatile Organic Compounds	Diethyl phthalate	84-66-2
Semi-Volatile Organic Compounds	Dimethyl phthalate	131-11-3
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	84-74-2
Semi-Volatile Organic Compounds	Di-n-octyl phthalate	117-84-0

Test Name	Analyte	CAS
Semi-Volatile Organic Compounds	Fluoranthene	206-44-0
Semi-Volatile Organic Compounds	Fluorene	86-73-7
Semi-Volatile Organic Compounds	Hexachlorobenzene	118-74-1
Semi-Volatile Organic Compounds	Hexachlorobutadiene	87-68-3
Semi-Volatile Organic Compounds	Hexachlorocyclopentadiene	77-47-4
Semi-Volatile Organic Compounds	Hexachloroethane	67-72-1
Semi-Volatile Organic Compounds	Indeno(1,2,3-cd)pyrene	193-39-5
Semi-Volatile Organic Compounds	Isophorone	78-59-1
Semi-Volatile Organic Compounds	Naphthalene	91-20-3
Semi-Volatile Organic Compounds	Nitrobenzene	98-95-3
Semi-Volatile Organic Compounds	N-Nitrosodi-n-propylamine	621-64-7
Semi-Volatile Organic Compounds	N-Nitrosodiphenylamine	86-30-6
Semi-Volatile Organic Compounds	Pentachlorophenol	87-86-5
Semi-Volatile Organic Compounds	Phenanthrene	85-01-8
Semi-Volatile Organic Compounds	Phenol	108-95-2
Semi-Volatile Organic Compounds	Pyrene	129-00-0
Volatile Organic Compounds	1,1,1,2-Tetrachloroethane	630-20-6
Volatile Organic Compounds	1,1,1-Trichloroethane	71-55-6
Volatile Organic Compounds	1,1,2,2-Tetrachloroethane	79-34-5
Volatile Organic Compounds	1,1,2-Trichloroethane	79-00-5
Volatile Organic Compounds	1,1,2-Trichlorotrifluoroethane	76-13-1
Volatile Organic Compounds	1,1-Dichloroethane	75-34-3
Volatile Organic Compounds	1,1-Dichloroethene	75-35-4
Volatile Organic Compounds	1,2,3-Trichloropropane	96-18-4
Volatile Organic Compounds	1,2,4-Trichlorobenzene	120-82-1
Volatile Organic Compounds	1,2,4-Trimethylbenzene	95-63-6
Volatile Organic Compounds	1,2-Dibromo-3-chloropropane	96-12-8
Volatile Organic Compounds	1,2-Dibromoethane	106-93-4
Volatile Organic Compounds	1,2-Dichlorobenzene	95-50-1
Volatile Organic Compounds	1,2-Dichloroethane	107-06-2
Volatile Organic Compounds	1,2-Dichloropropane	78-87-5
Volatile Organic Compounds	1,3,5-Trimethylbenzene	108-67-8
Volatile Organic Compounds	1,3-Dichlorobenzene	541-73-1
Volatile Organic Compounds	1,4-Dichlorobenzene	106-46-7
Volatile Organic Compounds	2-Butanone	78-93-3
Volatile Organic Compounds	2-Hexanone	591-78-6
Volatile Organic Compounds	2-Methylnaphthalene	91-57-6
Volatile Organic Compounds	4-Methyl-2-pentanone	108-10-1
Volatile Organic Compounds	Acetone	67-64-1
Volatile Organic Compounds	Acrylonitrile	107-13-1
Volatile Organic Compounds	Benzene	71-43-2
Volatile Organic Compounds	Bromochloromethane	74-97-5
Volatile Organic Compounds	Bromodichloromethane	75-27-4
Volatile Organic Compounds	Bromoform	75-25-2
Volatile Organic Compounds	Bromomethane	74-83-9
Volatile Organic Compounds	Carbon disulfide	75-15-0
Volatile Organic Compounds	Carbon tetrachloride	56-23-5
Volatile Organic Compounds	Chlorobenzene	108-90-7
Volatile Organic Compounds	Chloroethane	75-00-3

Test Name	Analyte	CAS
Volatile Organic Compounds	Chloroform	67-66-3
Volatile Organic Compounds	Chloromethane	74-87-3
Volatile Organic Compounds	cis-1,2-Dichloroethene	156-59-2
Volatile Organic Compounds	cis-1,3-Dichloropropene	10061-01-5
Volatile Organic Compounds	Dibromochloromethane	124-48-1
Volatile Organic Compounds	Dibromomethane	74-95-3
Volatile Organic Compounds	Dichlorodifluoromethane	75-71-8
Volatile Organic Compounds	Diethyl ether	60-29-7
Volatile Organic Compounds	Ethylbenzene	100-41-4
Volatile Organic Compounds	Hexachloroethane	67-72-1
Volatile Organic Compounds	Isopropylbenzene	98-82-8
Volatile Organic Compounds	m,p-Xylene	136777-61-2
Volatile Organic Compounds	Methyl iodide	74-88-4
Volatile Organic Compounds	Methyl tert-butyl ether	1634-04-4
Volatile Organic Compounds	Methylene chloride	75-09-2
Volatile Organic Compounds	Naphthalene	91-20-3
Volatile Organic Compounds	n-Propylbenzene	103-65-1
Volatile Organic Compounds	o-Xylene	95-47-6
Volatile Organic Compounds	Styrene	100-42-5
Volatile Organic Compounds	Tetrachloroethene	127-18-4
Volatile Organic Compounds	Toluene	108-88-3
Volatile Organic Compounds	trans-1,2-Dichloroethene	156-60-5
Volatile Organic Compounds	trans-1,3-Dichloropropene	10061-02-6
Volatile Organic Compounds	trans-1,4-Dichloro-2-butene	110-57-6
Volatile Organic Compounds	Trichloroethene	79-01-6
Volatile Organic Compounds	Trichlorofluoromethane	75-69-4
Volatile Organic Compounds	Vinyl acetate	108-05-4
Volatile Organic Compounds	Vinyl chloride	75-01-4
Volatile Organic Compounds	Xylenes, Total	1330-20-7

APPENDIX H MITIGATION AND MONITORING PLAN



Habitat Mitigation and Monitoring Plan

Wolverine CU-LK Pipeline Repairs Project

September 2, 2022

Project No.: 0537915

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
Document title	Habitat Mitigation and Monitoring Plan
Project No.	0537915
Date	September 2, 2022
Version	1.0
Client Name	Wolverine Pipe Line Company

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Acronyms and Abbreviations

Acronym	Description
AMSL	Above mean sea level
BA	Biological Assessment
C.F.R.	Code of Federal Regulations
CNRR	Canadian National Railroad
CU-LK	Lemont to Lockport pipeline segment
ESA	Endangered Species Act
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HED	Hine's Emerald Dragonfly
HMS	Hanson Material Service
I&M Canal	Illinois and Michigan Canal
IDNR	Illinois Department of Natural Resources
ITA	Incidental Take Authorization
LPC	Leafy prairie clover
MMP	Habitat Mitigation and Monitoring Plan
PBF	Physical and biological feature
PHMSA	Pipeline and Hazardous Materials Safety Administration
Project	Wolverine CU-LK Pipeline Repairs Project
RIV2	Rivulet 2
RIV4	Rivulet 4
RIV5	Rivulet 5
RIV9	Rivulet 9
Service	U.S. Fish & Wildlife Service
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish & Wildlife Service
WPL or Wolverine	Wolverine Pipe Line Company

1. INTRODUCTION

- **Project Applicant:** Wolverine Pipe Line Company
- **Project Name:** Wolverine CU-LK Pipeline Repairs Project
- **County and State:** Will County, Illinois
- **Area of Impact:** Up to 1.4 acres total including temporary access and staging, within which there will be 0.03 acre excavation

1.1 Brief description of proposed compensatory mitigation project and proposed source of compensatory mitigation.

Wolverine Pipe Line Company (Wolverine or WPL) proposes to excavate, expose, inspect, and repair up to 112 feet of their existing 18" diameter Lemont to Lockport (CU-LK) pipeline segment located in Lockport (Will County), Illinois, as part of its ongoing integrity and maintenance program. The Wolverine CU-LK Pipeline Repairs Project (Project) is required to maintain pipeline integrity and safety, in accordance with Pipeline and Hazardous Materials Safety Administration (PHMSA) enforced regulations, Title 49 Code of Federal Regulations (C.F.R) Parts 190-199. The Project site includes known presence of the federal and state endangered Hine's Emerald Dragonfly (*Somatochlora hineana*, HED) and Leafy Prairie Clover (*Dalea foliosa*, LPC), as well as the state endangered Blanding's Turtle (*Emydoidea blandingii*), and American Bittern (*Botaurus lentiginosus*). The following Habitat Mitigation and Monitoring Plan (MMP) has been developed in support of Wolverine and the proposed Project.

As part of the Illinois Department of Natural Resources (IDNR) Incidental Take Authorization (ITA) process, impacts are expected to be mitigated at a conservation value ratio of 5.5:1 (IDNR 2021). Target mitigation credit required is 1.4 acres of potential habitat impacts at 5.5:1, which equates to 7.7 acres. Note that this is based on maximum potential ground disturbance, excavation would not exceed 0.03 acre and it is possible that the impact area would be less depending on the extent of the anomalies based on inspection during initial excavation.

The United States Army Corps of Engineers (USACE) may also require mitigation for projects that involve permanent wetland impacts. Project impacts to waters of the U.S. are proposed as temporary impacts and the USACE has not thus far requested mitigation under Section 404. Any mitigation required under the Section 404 authorization anticipated to date will be based on compliance with permit conditions to restore temporary impacts in place and comply with additional measures according to those required in consultation with the U.S. Fish & Wildlife Service (USFWS or Service) and IDNR.

Mitigation is not applicable to Endangered Species Act (ESA) Section 7 consultation; however, the USFWS may include "conservation recommendations" in the Biological Opinion. These are defined as "suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information." According to 50 C.F.R. 402.02 of the ESA "reasonable and prudent measures" are defined as "those actions the Director believes necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take." Conservation measures are included in the Biological Assessment (BA) document. Some of the measures described in this MMP qualify as conservation measures. Some activities such as baseline surveys and pre-construction clearance surveys are included to provide a reference for biologists conducting future fieldwork.

In summary, the MMP is a companion document for both the Conservation Plan being prepared for the Project for submittal to the IDNR and the Biological Assessment prepared in support of the USACE formal consultation with the USFWS.

1.2 Objectives

The purpose of this plan is to establish a framework for offsetting potential project-related effects on HED, Blanding's Turtle, and HED critical habitat; and for characterization of baseline conditions and monitoring of post-project conditions.

We used physical and biological features (PBFs) (at the time of the 2010 HED critical habitat publication, primary constituent elements; 75 FR 21408) to identify relevant targets. These include:

For egg deposition and larval growth and development:

- Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate (predominantly dolomite and limestone bedrock);
- Calcareous water from intermittent seeps and springs and associated shallow, slow flowing streamlet channels, rivulets, and/or sheet flow within fens;
- Occupied burrows maintained by crayfish for refugia; and
- Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms.

For adult foraging, reproduction, dispersal, and refugia necessary for roosting, resting, refuge for adult females to escape from male harassment, and predator avoidance (especially during the vulnerable teneral stage):

- Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 feet) of bordering shrubby and forested areas with open corridors for movement and dispersal; and
- Prey base of small flying insect species (e.g., dipterans).

These PBFs are further discussed in the baseline, performance standard, and monitoring sections below.

2. BASELINE INFORMATION

Baseline information provided here was gathered as part of field efforts in the spring and summer of 2021, or taken from literature review and cited below as appropriate. It is anticipated that some additional baseline information will be gathered as part of pre-activity surveys, as described in the monitoring section below.

2.1 Hydrology

In general, the Action Area slopes downward from east to west. Groundwater on the site is complex and may include localized upwelling, although flow direction in the Action Area is generally from east to west (AECOM 2013, Kay et al. 2018), and surface water flow has been observed to follow a similar pattern (ERM 2021a). Groundwater elevations across the Action Area generally range from 587.5 to 581.5 AMSL (AECOM 2013). Boring logs from previous surveys reveal typical depth to bedrock of one to two feet across the Action Area, and dolomite bedrock was observed at all boring locations (AECOM 2011). Water infiltration in the Action Area is limited by the shallow bedrock and groundwater seeps and rivulets have been observed as a result of the underlying geology (ERM, 2021a).

2.2 Soils

Per the USDA web soil survey, soil types within the Action Area generally consist of Joliet silt loam, 0 to 2 percent slopes and Romeo silt loam, 0 to 2 percent slopes (USDA 2020). Kay et al. (2018) report that alluvial sands are present, presumably deposited as the much larger post-glacial river receded.

Soil depths to bedrock are relatively shallow. At excavation site PR-01 soil probing during spring 2022 rock was encountered at depths ranging from 0.8 foot to over 8 feet in depth, generally trending shallower east of the pipeline than west of the pipeline. At FR-04 probing encountered rock at depths ranging from 0.1 foot to 3.4 feet in depth, with no clear pattern of depth variation along or across the pipeline. At FR-02 west of the CNRR probing was not feasible as the area is covered in a rock pile that prevented probing at the surface, whereas east of New Avenue rock was encountered at depths ranging from 0.2 foot to 5.6 feet; soil depths are believed to be deeper at this upland location with slightly higher elevations.

2.3 Vegetation

Approximately 24 distinct land cover or habitat classifications have been identified within the Action Area (AES 2019). Upland shrubland, cattail marsh, bottomland shrubland, and wet-mesic dolomite prairie represent the four most common habitat types (AES 2019). Habitat within the Action Area is known to include dolomite prairie, which is a globally rare habitat that has almost completely disappeared from the Midwest (Suloway et al. 1996). Dolomite prairie wetlands specifically are wet prairie ecosystems, sitting over shallow bedrock, that support a high diversity of plant and animal species, including federally threatened and endangered species that are found in few other areas (ComEd 2013, Molano-Flores et al. 2015). Due to the history of development within and surrounding the Action Area, undesirable species, including common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), cattail (*Typha* sp.), and European buckthorn (*Rhamnus cathartica*), have begun to proliferate within the Action Area (AES 2018, AES 2019). Common reed has expanded considerably since 2011, when it was first noted along upper RIV2 (Mierzwa field notes). A transect walked in July 2021 by ERM documented common reed along almost half of the pipeline segment within the Action Area, including most of the PR-01 and FR-02 workspaces. A site assessment performed in May 2022 to further describe the extent of common reed proliferation noted common reed presence overtop and immediately adjacent to the CU-LK pipeline over an even larger area. Excavation and workspace locations for excavation locations PR-01 and FR-04 wholly overlapped with areas dominated by common reed (Figure 1). Excavation and workspace for location FR-02 is upland in an area dominated by European buckthorn.

2.4 Baseline Physical and Biological Features

This sub-section summarizes baseline HED PBFs to the extent they are currently known for the Action Area. Some additional information is expected to be gathered as part of pre-activity clearance surveys. Each PBF is repeated, and the following italicized text summarizes local conditions.

For egg deposition and larval growth and development:

- Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate (predominantly dolomite and limestone bedrock). *In general, organic soils are present within the proposed workspace and are known to overlie dolomite bedrock. Depth to bedrock appears to be variable over short distances.*
- Calcareous water from intermittent seeps and springs and associated shallow, slow flowing streamlet channels, rivulets, and/or sheet flow within fens. *RIV4 flows through the workspace, and is within a larger emergent wetland feature. Soil samples collected in summer 2022 ranged from 7.0 to 7.5 pH, within the range of 7.0 to 8.0 documented at River South and Lockport Prairie rivulets during early*

samples (Mierzwa et al 1995). Flow was present in all of RIV4 and intermittent in RIV5 in July 2021 (ERM 2021); the lower half of RIV4 and all of RIV5 was dry in August 2022 (ERM in prep).

- Occupied burrows maintained by crayfish for refugia. *Although no crayfish burrows were noted within the proposed excavation areas during 2021 fieldwork, some are present a short distance downgradient (west). Two burrows were noted within the proposed southern access route. Numerous burrows are present in several localized areas within a few hundred feet of the excavation areas. Burrows are mapped and shown in Figure 2; exact burrow locations can vary from year to year although they tend to occur in the same general areas with suitable conditions.*
- Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms. *A variety of aquatic macroinvertebrates were noted during 2021 sampling of RIV4. Abundance was not quantified; densities were not unusually high possibly because of the relatively simple habitat structure of common reed dominated rivulets. However most samples included at least some macroinvertebrates suggesting that presence of prey may not currently be a limiting factor.*

For adult foraging, reproduction, dispersal, and refugia necessary for roosting, resting, refuge for adult females to escape from male harassment, and predator avoidance (especially during the vulnerable teneral stage):

- Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 feet) of bordering shrubby and forested areas with open corridors for movement and dispersal. *Natural plant communities (sedge meadow) were present around the RIV5 larval capture location, with invasive species encroachment within 30 feet. Natural plant communities were smaller and more degraded near the RIV9 capture location, which is at the edge of common reed encroachment. Within the proposed excavation areas, most vegetation is currently non-native. This PBF is currently absent from the excavation areas, although small remnants are present within 150 feet.*
- Prey base of small flying insect species (e.g., dipterans). *No attempt was made in 2021 to monitor flying invertebrates other than HED and Monarch Butterfly. However, the presence of foraging adult HED implies presence of prey, and field staff incidentally noted various small flying invertebrates.*

In summary, while not all PBFs are present within the relatively small, proposed excavation areas (no crayfish burrows or intact natural plant communities were noted), all of the PBFs were present within a few hundred feet of the excavation areas. Several of the features appear to be small and somewhat degraded by invasive species encroachment but may be restorable.

These PBFs are further discussed in the performance standard and monitoring sections below.

3. MITIGATION WORK PLAN

3.1 Types of Mitigation Proposed

This plan includes two general types of mitigation:

- Returning areas disturbed by excavation, including a short segment of RIV4, to approximate pre-project conditions, primarily addressing temporary impacts as defined by USACE; and
- Additional enhancement, conservation measures, or activities of conservation value for the listed species, to offset temporal lag and to address the requirements of USFWS and IDNR under the federal and state endangered species acts, respectively. These include some information gathering activities.

Activities are described in temporal sequence: 1) conservation measures already completed; 2) pre-construction measures to be completed within a relatively short time prior to start of work; 3) activities to be completed as part of construction; and 4) post-construction maintenance and monitoring.

3.2 Conservation Measures Already Completed

3.2.1 Prescribed Burn

As part of the proposed Project, all 103 acres of the ComEd Parcel were managed with prescribed fire in March/April 2021. The prescribed burns, conducted on two burn units, were completed at the request of USFWS as a prerequisite to performing HED field surveys (see below). The objective of the prescribed burns was 1) to facilitate mapping of crayfish burrows for subsequent HED larval surveys, and 2) to enhance overall habitat on ComEd Parcel. Both objectives were met; for example, post-burn milkweed abundance increased, contributing to a relatively high number of Monarch butterfly observations in summer 2021. The burns also removed accumulated cattail thatch and opened up marsh habitat facilitating access to breeding rivulets for adult HED. At 10 percent enhancement credit of 103 acres, this equates to 10.3 acres of mitigation credit toward ITA requirements.

3.2.2 HED and Blanding's Turtle Surveys

Surveys were conducted in spring 2021 for Blanding's turtle and in summer 2021 for HED. The former consisted of six site visits and documented presence of one turtle. The latter included three weeks of intensive adult HED point counts and larval HED protocol-level sampling which for the first time documented precise locations of long-suspected HED breeding on ComEd Parcel. This information is expected to be of considerable value for proposed future habitat restoration and enhancement under the Hanson Material Service (HMS) Habitat Conservation Plan (HCP). Both of these surveys covered the entire 103 acres of ComEd Parcel. Assuming 10 percent mitigation credit for conservation-related surveys for 103 acres, this equates to 10.3 acres of mitigation credit.

3.3 Construction Work Plan

3.3.1 Pre-construction Coordination

Some restoration or enhancement activities (e.g., mowing and treatment of common reed) may be occurring prior to WPL work on areas adjacent to the WPL project as part of the Hanson Material Service HCP. WPL would coordinate closely with HMS and their contractors as necessary to schedule activities appropriately, avoid redundancy, and avoid or minimize effects on HED and Blanding's Turtle.

3.3.2 Baseline Monitoring

Prior to construction, proposed conservation measures require additional baseline monitoring. These are described in detail in the Biological Assessment. Pending final Biological Opinion issuance, these may qualify for additional ITA mitigation credit.

3.3.3 Construction Clearance

The Biological Assessment and the proposed conservation measures detail specific requirements to avoid or minimize impacts during construction. These measure include pre-construction clearance surveys, which would likely occur near the end of growing season to relocate crayfish and HED larvae, if any, away from excavation areas; presence of a qualified biologist during pump placement and dewatering; and seasonal restrictions limiting ground disturbing work to the winter months when frozen conditions are likely.

3.3.4 Pre-construction Herbicide Application

Prior to the start of work, invasive vegetation within the WPL workspace (access roads, excavation areas, temporary workspaces, staging) would be treated with herbicide. Treatment methods would be consistent with that described in the HMS HCP, and areas within 65 feet of rivulets would be hand treated.

3.3.5 Excavation Area Re-establishment

After completion of pipeline repairs, the three excavation areas would be backfilled and returned to original surface elevations using an excavator and skid-steer. Topsoil would be stockpiled separately and returned in the proper sequence such that the existing soil horizons are maintained. The excavation areas would be relatively small, and after backfilling, elevations would be matched to surrounding terrain. If contaminated soil is encountered during excavation, the work would be suspended until contamination can be contained and replacement native soil is identified. This activity addresses BA conservation measure (a).

At the northern most excavation area, the rivulet segment (RIV4) disturbed by excavation would be re-established in its original location and size based on pre-activity global positioning system (GPS) mapping and measurements (width, depth). Contour re-establishment would be completed with care, and where necessary hand tools may be used to refine the physical profile to match the pre-activity width and depth. The channel profile would be verified with frequent measurements and comparison to pre-excavation measurements. Since the excavation would be only about 10 feet wide, it is assumed that with meanders and transitions into adjacent segments the area of channel re-establishment would be slightly longer than 10 feet. Cattail thatch collected elsewhere on the site would be placed in the re-established rivulet channel with some pressed into the substrate to help stabilize the rivulet and provide enough cover and habitat structure to support small aquatic macroinvertebrates. The temporary dam and pump bypass of RIV4 would remain in place until the rivulet is fully re-established in its original location and the cattail thatch has been placed. A biologist would be present when bypassed water is returned to the new rivulet segment to verify that the channel remains stable and does not excessively erode; and that sedimentation does not occur downstream of the new segment. Erosion controls will remain in place until vegetation has become established sufficiently to limit further sedimentation from the soils exposed during excavation. These activities address BA conservation measure (b).

The entire excavated and backfilled area would be planted with native species described in Section 4.3.5 below. Performance standards for vegetation are provided below to address BA conservation measure (c).

3.3.6 Workspace Re-establishment

The majority of the linear workspace would be used for access, staging, and stockpiling of soil. This includes a narrow access route, and wider areas around each excavation for soil stockpiling and equipment use. All workspace within wetlands would utilize timber matting to minimize soil disturbance. Once excavation and backfilling are completed, the matting would be removed and the area checked for ground disturbance. Any uneven ground due to the work would be leveled to match the surrounding areas, and any bare soil resulting from the work would be revegetated as described in Section 4.3.5 below. HMS is completing long-term management of vegetation in the access corridor as a HCP condition.

3.3.7 Planting Plan

Areas where soils are disturbed by excavation or other associated pipeline repair activities would be restored to original contours to match adjacent undisturbed areas and seeded with an appropriate native and locally sourced seed mix as soon as practical after backfill (Table 1-3). Seed mixes will be used during restoration as appropriate per the restoration zones defined in the HMS HCP and site reconnaissance. Seed mixes would be spread at the rate recommended by the supplier. Substitution of some species may be necessary due to

availability limitations at the time of restoration. Disturbed areas would be temporarily stabilized with straw mulch that would be free of any invasive species.

Excavations at locations PR-01 and FR-04 occur in habitat that is currently mapped during pre-activity surveys as common reed marsh and areas of disturbed soils would likely be reseeded with the emergent wetland seed mix. Excavation at location FR-02 is located within habitat that is mapped as shrubland upland and old field/upland grassland and would likely be reseeded with the mesic/wet-mesic prairie seed mix pending assessment of ground conditions and elevation above the surrounding wetland.

Vegetation restoration would be coordinated with HMS and their ongoing efforts at the site.

Table 3.3.5-1: Emergent Wetland Habitat Seed Mix

Grasses and Sedges	Common Name	% of mix
<i>Carex lacustris</i>	Lake sedge	0.48%
<i>Juncus nodosus</i>	Joint rush	0.28%
<i>Juncus torreyi</i>	Torrey's rush	1.67%
<i>Eleocharis elliptica</i>	golden seeded spikerush	0.14%
<i>Eleocharis erythropoda</i>	bald spikerush	1.03%
<i>Glyceria septentrionalis</i>	floating manna grass	0.03%
<i>Scirpus acutus</i>	Hard-stemmed bulrush	18.12%
<i>Scirpus validus</i>	softstem bulrush	0.76%
<i>Scirpus atrovirens</i>	Dark green rush	3.76%
<i>Scirpus fluviatilis</i>	River bulrush	22.46%
<i>Scirpus pendulus</i>	Red bulrush	4.40%
Forbs	Common Name	% of mix
<i>Acorus calamus/americanus</i>	Sweet flag	0.25%
<i>Asclepias incarnata</i>	Swamp milkweed	0.10%
<i>Aster puniceus</i>	Swamp aster	0.42%
<i>Aster simplex</i>	Panicled aster	0.48%
<i>Caltha palustris</i>	Marsh marigold	0.62%
<i>Chelone galbra</i>	Turtlehead	0.06%
<i>Iris virginica shrevei</i>	Blue flag iris	2.24%
<i>Lycopus americanus</i>	Water horehound	1.07%
<i>Lythrum alatum</i>	Winged loosestrife	0.09%
<i>Mentha arvensis villosa</i>	Wild mint	0.20%
<i>Cephalanthus occidentalis</i>	Buttonbush	0.15%
<i>Cicuta maculata</i>	Water hemlock	1.87%
<i>Penthorum sedoides</i>	ditch stonecrop	0.16%
<i>Ludwigia polycarpa</i>	False loosestrife	0.94%
<i>Mimulus ringers</i>	Monkey flower	0.15%
<i>Polygonum amphibium stipulaceum</i>	Water knotweed	0.01%
<i>Lycopus uniflorus</i>	Northern bugleweed	0.09%
<i>Polygonum hydropiperoides</i>	Mild water pepper	0.72%
<i>Oxypolis rigidor</i>	Cowbane	0.06%
<i>Polygonum punctatum</i>	Dotted smartweed	13.65%
<i>Proserpinaca palustris</i>	Marsh mermaid	0.06%
<i>Rumex orbiculatus</i>	Great water dock	0.47%

<i>Sagittaria latifolia</i>	Arrowhead	0.42%
<i>Sium suave</i>	Water parsnip	0.21%
<i>Phyla lanceolata</i>	lance leaf fog fruit	0.14%
<i>Sparganium eurycarpum</i>	Bur reed	22.22%

Table 3.3.5-2: Wet/Wet-Mesic Prairie Seed Mix

Grasses and Sedges	Common Name	% of mix
<i>Andropogon gerardii</i>	Big bluestem grass	2.36%
<i>Carex pellita</i>	Wooly sedge	9.40%
<i>Carex molesta</i>	Field oval sedge	0.14%
<i>Carex scoparia</i>	lance fruited oval sedge	0.14%
<i>Carex stipata</i>	Prickly sedge	2.77%
<i>Carex vulpinoidea</i>	Brown fox sedge	0.40%
<i>Juncus dudleyi</i>	Dudley's rush	2.64%
<i>Deschampsia caespitosa glauca</i>	Tufted hair grass	20.59%
<i>Dichanthelium acuminatum</i>	tapered rosette grass	4.22%
<i>Elymus riparius</i>	river bank rye	1.17%
<i>Panicum flexile</i>	Wiry panic grass	1.86%
<i>Muhlenbergia mexicana</i>	Leafy satin grass	2.06%
<i>Spartina pectinata</i>	Prairie cord grass	21.09%
Forbs	Common Name	% of mix
<i>Allium cernuum</i>	Nodding wild onion	9.25%
<i>Asclepias syriaca</i>	Common milkweed	1.21%
<i>Hypoxis hirsuta</i>	Yellow star grass	0.03%
<i>Helianthus grosseserratus</i>	sawtooth sunflower	0.28%
<i>Physostegia virginiana</i>	False dragonhead	0.03%
<i>Rudbeckia laciniata</i>	wild golden glow	0.20%
<i>Pycnanthemum virginianum</i>	Mountain mint	3.69%
<i>Satureja arkansana</i>	Low calamint	6.44%
<i>Sisyrinchium albidum</i>	Blue-eyed grass	0.17%
<i>Verbena hastata</i>	Blue vervain	9.71%
<i>Vernonia fasciculata</i>	Ironweed	0.12%

Table 3.3.5-3: Mesic/Wet-Mesic Prairie Seed Mix

Grasses and Sedges	Common Name	% of mix
<i>Andropogon scoparius</i>	Little bluestem grass	11.27
<i>Carex bicknellii</i>	Copper-shouldered oval sedge	15.99
<i>Juncus dudleyi</i>	Dudley's rush	4.28
Forbs	Common Name	% of mix
<i>Allium cernuum</i>	Nodding wild onion	14.97
<i>Aster ericoides</i>	Heath aster	0.03
<i>Aster laevis</i>	Smooth blue aster	15.97
<i>Trichostema bractiatum</i>	Fluxweed	5.03

<i>Liatris spicata</i>	Marsh blazing star	0.42
<i>Hypericum sphaerocarpium</i>	Round-fruited St. John's wort	32.02

4. DETERMINATION OF CREDITS

All mitigation areas and credits discussed in this document are quantified in acres.

5. PERFORMANCE STANDARDS

Performance standards are identified below and are tied directly to each PBF and to each BA conservation measure. Standards are intended to identify when the Project is on a trajectory to meet objectives.

For egg deposition and larval growth and development:

PBF 1: Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate (predominantly dolomite and limestone bedrock).

Conservation Measure: Replace excavated and other disturbed soil with native materials maintaining the existing soil horizon. If contaminated soil is found work should be suspended until contamination can be contained and replacement native soil is identified.

Performance Standard: Post-project elevations within excavated areas shall be similar to adjacent elevations, with no abrupt changes in topography or subsidence as measured one year after completion of repairs.

PBF 2: Calcareous water from intermittent seeps and springs and associated shallow, slow flowing streamlet channels, rivulets, and/or sheet flow within fens.

Conservation Measure: Groundwater levels may not be reduced below average levels recorded for that time of year in any of the existing immediate nearby wells unless the Palmer Drought Severity index reports a drought in the prior 3 months. Collect baseline data on depth, width, flow rate, and temperature every 5 meters. Restore streamlet within the first reach of the disturbed system based on baseline data and replace detritus with native cut foliage.

Performance Standard: During the repair work groundwater levels may not be reduced below recent average levels recorded for that time of year in any of the existing immediate nearby wells unless the Palmer Drought Severity index reports a drought in the prior 3 months.

Performance Standard: Post project RIV4 shall maintain a stable physical and hydrologic condition, with no substantial departure from baseline location, width, or depth; and flow rates within expectations based on recent precipitation trends.

PBF 3: Occupied burrows maintained by crayfish for refugia.

Conservation Measure: Pre-construction salvage of Hine's emerald dragonfly larvae and crayfish (*Lacunicambarus nebrascensis*) from Rivulet 4 will be conducted by the applicant. Fate of salvaged organisms will be determined and handled by USFWS. Crayfish will be restored based on a burrow density of 0.223m². Note: The average crayfish burrow density in the Lower DesPlaines River Valley as recorded in 16 separate Hine's emerald dragonfly larval habitat areas is 0.3375m² (average density). The density of 0.223m² is the most common density or mode – 3 of 16 streamlets in the Lower DesPlaines River Valley. If crayfish density is not achieved by year two, acquire crayfish for onsite augmentation to advance restoration. Crayfish may be acquired from local areas outside of Hine's emerald dragonfly habitat or funds could be contributed to an existing captive rearing program. Continue annual monitoring.

Performance Standard: Crayfish burrow density near RIV4 of at least 0.223m² two years after completion of pipeline repairs.

PBF 4: Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms.

Conservation Measure: Monitor to determine preconstruction growth rates of caged larvae in the second reach of the system, indicated as Rivulet 5, where larvae were found during preconstruction surveys and at 5 meters and 10 meters past the documented locations. Monitor to determine post construction growth rates. Prey base will be considered restored when caged larvae can survive and maintain preconstruction growth rates in Rivulet 5 in the locations where larvae were found in previous surveys and at 5 meters past and 10 meters past documented locations. In year one, if caged larvae do not survive, implement captive rearing program for dragonfly and continue to restore and monitor the system. By year three, if caged larvae do not survive or maintain preconstruction growth rates, contribute funds to existing captive rearing program for the Hine's emerald dragonfly and continue to restore and monitor the system.

Performance Standard: Caged HED larvae shall survive and maintain pre-construction growth rates as measured in years one through three post-construction, at three locations in RIV5.

For adult foraging, reproduction, dispersal, and refugia necessary for roosting, resting, refuge for adult females to escape from male harassment, and predator avoidance (especially during the vulnerable teneral stage):

PBF 5: Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 feet) of bordering shrubby and forested areas with open corridors for movement and dispersal.

Conservation Measure: Applicant will coordinate vegetation restoration with HMS. Note: This Conservation Measure will most likely be implemented by HMS under their current 404 permit, ITP and ITA. Wolverine shall coordinate with HMS to achieve these performance standards.

Performance Standard: Less than 10% cover by non-native and/or weedy native trees or shrubs (e.g., green ash, box elder, or gray dogwood) in both the ground layer and the woody canopy layer within three years after the start of restoration. This standard must be met again at the end of year five.

Performance Standard: At least 70% native cover in the ground layer at the end of year 3 after restoration. This standard must be met again at the end of year five.

Performance Standard: None of the three most dominant ground layer plant species may be non-native species (according to Swink and Wilhelm 1994) or common reed (*Phragmites australis*) within three years after the start of restoration. This standard must be met again at the end of year five.

PBF 6: Prey base of small flying insect species (e.g., dipterans).

Conservation Measure: This PBF is addressed by restoration of disturbed areas and thus the above vegetation standards.

Performance Standard: No additional standards; this PBF is addressed by the above vegetation standards.

6. MONITORING

6.1 Baseline Characterization

Conservation measures in the BA require baseline monitoring of RIV4 and associated crayfish burrows, and of survival and growth of caged HED larvae in RIV5. See below and the BA conservation measures for details.

6.1.1 Rivulets

Prior to the beginning of work, rivulet (RIV4/5) baseline conditions would be characterized. Both rivulets would be mapped, with GPS points every 5 meters within RIV4 (within the excavation footprint, every one meter) and a minimum of three points within RIV5, including the location where larvae were detected during summer 2021 surveys. At each point physical channel dimensions (width and depth) would be measured, and temperature and flow would be recorded.

6.1.2 Burrows

All crayfish burrows within one meter on either side of RIV4 would be mapped based on GPS data collected as part of baseline monitoring. Crayfish burrow density would be calculated for RIV4.

6.1.3 Larval Growth

BA conservation measure (e) requires monitoring of HED larval survival and growth rates. Methods would follow Satyshur and Soluk (Satyshur 2008, Soluk et al. 2011); larvae, likely from a captive rearing program, would be placed in cages within RIV5 at the 2021 larval capture location and at points 5m and 10m downstream. Monitoring would occur for a 30-day interval in late spring or early summer when water and flow levels are near typical ranges. Only the early protocol window would be monitored, because RIV5 ceased to flow by mid-July and dried completely by early August in 2021-2022. Larvae would be returned to the captive rearing program at the end of monitoring unless specified otherwise by USFWS.

6.2 Pre-construction HED and Crayfish Clearance Survey

Prior to start of work, clearance surveys would be conducted. The survey would occur after the end of the normal HED adult flight season (after about August 30) but before the end of the larval active season and before all crayfish burrows have been capped; assuming reasonably normal weather conditions, late September sampling is anticipated although timing may be adjusted depending on weather. Continuous D-ring net sampling would occur for the entire length of RIV4. A detailed search would be conducted for crayfish burrows near RIV4 and within all workspace areas that may be disturbed in any way, including temporary access routes. All crayfish burrows encountered would be sampled using standard protocol methods (Pintor and Soluk 2006) except for full area coverage rather than sub-samples. Pre-construction clearance surveys would be conducted under the direct supervision of a federally permitted biologist for HED.

Disposition of HED larvae and crayfish encountered would be determined by USFWS. Animals may be relocated to known areas of suitable habitat away from the workspace (for example, the central portion of RIV5), or held and delivered to an existing captive breeding program if requested by USFWS, agreed to by the captive breeding program, and pickup or delivery can be arranged in a reasonably safe and efficient manner.

The number of HED larvae and crayfish encountered would be reported to USFWS, USACE, and IDNR each day during surveys, with more detailed documentation following completion of fieldwork.

6.3 Construction Monitoring

Because pipeline repair work is expected to occur during months when the ground may be frozen and/or under snow cover, it is unlikely that HED larvae, Blanding's turtles, or crayfish would be encountered. However to minimize potential impacts a qualified biologist would be present at the beginning of each excavation, and remaining onsite until dewatering of the excavation is complete. The biologist would be responsible for approving pump and outfall placement and verifying that erosion or sedimentation is not occurring. At other times, a biologist would be on-call and able to respond to the site within six hours or less in the event that a special status species is encountered or a related issue is discovered. If a HED or Blanding's Turtle is found, USFWS and IDNR would be notified immediately for guidance on whether to relocate or hold the animal. Although no crayfish burrows were noted within excavation areas in prior surveys, if any burrows are noted at the start of construction they would be carefully hand excavated by the biologist and checked for crayfish or HED presence.

Prior to the beginning of work, the biologist would conduct environmental awareness training for all personnel participating in on-site activities. The training will include identification of special status species, avoidance and minimization measures, and contact/communication protocols. The biologist will keep copies of all relevant permit and authorizations available for reference, as well as contact information for USACE, USFWS, IDNR, and appropriate WPL and ERM subject matter experts and decision makers.

6.4 Post-construction Monitoring

Post-construction monitoring would occur annually, within the growing season and at about the same time each year. Monitoring would be conducted to track progress toward each of the performance standards identified above.

PBF 1: Monitoring of PBF 1 (substrate) would consist of visual inspection of the three excavation areas. If elevations visibly differ from immediately adjacent areas that were not excavated, then the difference would be measured and described. Substrate monitoring would occur once per year for the 10-year duration of monitoring.

PBF 2: Monitoring of PBF 2 (water) would include documentation of measurement of width, depth, temperature, and flow rate in RIV4 including within the excavation area and at points downstream. Water monitoring would occur once per year, for the 10-year duration of monitoring.

PBF 3: Monitoring of crayfish burrows would occur along the entire length of RIV4, with all burrows within one meter either side of the rivulet being mapped by GPS. Monitoring would occur once per year during the crayfish surface active season, and is required for at least the first two years post-construction.

PBF 4: Monitoring of PBF 4 (prey base) involves monitoring of HED larval survival and growth in cages placed within RIV5. Methods follow Satyshur (2008 and Soluk et al. (2011). Larvae obtained from a captive rearing program would be placed in cages within the rivulet after careful measurement of total length, checked periodically for survival, and removed after 30-days. Larvae would be measured again and then returned to the captive breeding program unless USFWS specifies other disposition. Monitoring is expected to occur in late spring or early summer when water is present in the rivulet at near normal depths and flow rates and temperatures, and exact timing may be adjusted if necessary to avoid atypical conditions. Monitoring is required once per year for the first three years post-construction.

PBF 5: Monitoring of PBF 5 (vegetation) includes quantification of woody trees and shrubs, native vegetation cover, and invasive species cover. Methods would be coordinated with and be consistent with those utilized for HCP monitoring on immediately adjacent lands. Monitoring would occur once per year in growing season for the duration of the 10-year monitoring period.

As a means of summary, Appendix B includes a table outlining the monitoring requirements on an annual basis starting with the pre-construction activities in Year 0 and then for each subsequent year until monitoring is complete.

For each year of monitoring local climate data (Romeoville NWS station) would be referenced in annual reports, with discussion of normal/above normal/below normal precipitation or any other noteworthy deviations from “normal” conditions.

In addition to required monitoring, field biologists may record other observations such as crayfish species observed, general characterization of macroinvertebrate presence, and any observations deemed to be of relevance or interest.

6.5 Reporting

Results of baseline monitoring would be reported prior to the start of pipeline repair work.

If any HED or Blanding’s turtles are observed during actual repairs agencies would be notified immediately, although this is considered unlikely because of the winter work window.

An annual monitoring report would be provided to USACE, USFWS, and IDNR by December 31 of each year beginning in the year after completion of pipeline repairs, for the duration of the monitoring period.

7. SITE PROTECTION

Most of the Action Area is owned by HMS and is within the HCP Plan Area. HMS is required to place the land under a deed restriction to limit or prevent development during the life of the HCP. Because the land is owned by others, WPL has no control over activities on that land except as agreed or authorized by HMS.

8. MAINTENANCE PLAN

Erosion control measures would be installed at the time of ground disturbance and reseeding and vegetation reestablishment would occur the first growing season after completion of pipeline repair work.

All erosion and sedimentation control measures are to be inspected on a routine basis to ensure they are working properly and can be repaired or modified as needed. During construction activities, the site will be inspected at least once per week. All erosion control measures shall also be inspected within 24 hours after each runoff-producing rainfall (1/2” or more) or significant snow-melt event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately.

Following construction, inspections of the site to verify the effectiveness of soil erosion controls and initial revegetation will take place on a bi-weekly basis for the first month and then monthly after that. Inspections will be documented utilizing the GoCanvas mobile application and associated Wolverine Pipe Line Company environmental inspection form. A copy of the form is included in Attachment 3 for reference; however, the form and representative site photos recording during each inspection will be collected utilizing the mobile application.

9. LONG TERM MANAGEMENT PLAN

WPL would be responsible for management of the immediate project footprint as required by permit conditions for the 10-year monitoring period, subject to authorization by the landowner for access and specific

activities. Longer-term management (beyond 10 years) is the responsibility of HMS under the terms of the 30-year HCP.

10. ADAPTIVE MANAGEMENT PLAN

The National Research Council defines adaptive management as follows (NRC 2004):

“Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a ‘trial and error’ process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.”

In the context of the current Project, adaptive management applies during ground disturbing work, as well as during the subsequent monitoring period.

During Construction: The construction approach and the avoidance and minimization measures described above are based on years of experience and anticipated seasonal conditions in the Permit Area. In the event that unexpected conditions are encountered, or if initial work identifies more effective methods to achieve goals and reduce impacts, and if the changes fall within the conditions outlined in this document, then such changes would be documented and reported. If the changes fall outside the conditions outlined in this document then a conference call would be scheduled with IDNR, USFWS, Wolverine Pipeline, HMS, ERM, and any other relevant parties. Modifications would be implemented only if consensus is reached that the proposed change is an improvement or a better way of approaching a given issue.

After Completion: Upon completion of ground disturbing activities, the WPL and ERM core Project team will hold an internal call to review conditions to date and ensure that any new knowledge is incorporated into Project wrap-up and subsequent monitoring. This would include any unexpected conditions encountered during work, any unusual weather conditions (flood, drought, extreme weather events) experienced or anticipated, any new information on covered species, and any new information learned from communication with entities conducting HCP-related work on adjacent lands including possible synergies between the parallel efforts. If new information is substantial or has potential consequences for the outcome, then a call would be scheduled with IDNR, USFWS, HMS, WPL, ERM, and other relevant entities, if appropriate. Changes from what is proposed in this Conservation Plan would occur only upon consensus of stakeholders. IWR (2013) is a useful reference for review of changed conditions and adaptive management.

During the monitoring period, instability or failure of the RIV4 restoration in a way that could potentially result in adverse effects to HED (channel migration, ongoing erosion, headcutting) for any length of time; or clearly deviates from performance standards for two consecutive annual monitoring periods; would trigger adaptive management through the process described above.

Unforeseen circumstances such as an extreme weather event or severe site damage observed during monitoring would be documented and reported to USACE, USFWS, and IDNR.

WPL would be responsible only for events or effects related to the Project. For example, rivulet changes caused by actions of others such as offsite hydrology alteration, chemical use, spills, development or

construction, or other activities beyond the control of WPL would be documented and reported to USACE, USFWS, and IDNR.

11. FINANCIAL ASSURANCES

WPL would budget to support the required mitigation and monitoring work for the 10-year duration of this plan. Overlapping and adjacent HCP activities are separate, longer-term (30 years), and are the responsibility of HMS. In addition, off-site changes or impacts that negatively affect the attempts to restore the disturbed areas (e.g., impacts from nearby railroad or New Avenue, or up-gradient hydrology changes) that are outside the control of Wolverine will not be the responsibility of Wolverine.

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APPENDIX A FIGURES



- ◆ Dig Locations
- Lemont to Lockport 18"
- Phragmites Extent
- Excavation

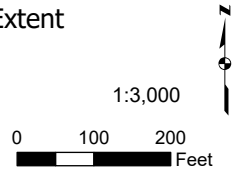
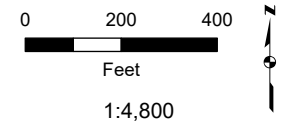


Figure 1
Phragmites Extent
 WPL CU-LK Repairs
 Will County, Illinois





Radius of influence calculation assumes projected inflow rates are equated to sump pump operation for conservatism. However, actual sump pump rates will be smaller in magnitude during trench dewatering.



2021 HED Crayfish Burrow Sampling Results	
●	Crayfish Burrow - Larvae Captured 2021
○	Crayfish Burrow
◇	Dig Locations
~	Rivulet
—	Access Road
—	Lemont to Lockport 18"
□	Projected Conservative Radius of Influence
□	Delineated Wetlands
□	Action Area
□	Access
□	Dewatering
□	Excavation
□	Temporary Workspace

Figure 2
2021 Crayfish Burrow and HED Larval Sampling Results
 WPL CU-LK Repairs
 Will County, Illinois



APPENDIX B MONITORING REQUIREMENTS BY YEAR

Appendix B – Monitoring Requirements By Year

Year 0 (Year of Repair)	Year 0 (Time or Repair)	Year 1 (1 st Growing Season After Repair)	Year 2	Year 3	Year 4 – 10
Pre-Repair: Baseline Rivulet 4 (RIV 4) recording of width and depth dimensions and water temperature and flow. (May or June).	Time of Repair: Observe for HED/crayfish/Blanding's turtles.	Annual: Within RIV 4 & 5 observe water flow, temperature, reestablishment of rivulet channel width and depth. Monthly May-Aug.	Annual: Within RIV 4 & 5 observe water flow, temperature, reestablishment of rivulet channel width and depth.	Annual: Within RIV 4 & 5 observe water flow, temperature, reestablishment of rivulet channel width and depth.	Annual: Within RIV 4 & 5 observe water flow, temperature, reestablishment of rivulet channel width and depth.
Pre-Repair: Baseline cage monitoring of HED larvae 4 weeks in RIV5. (May or June).	Time of Repair: Monitor available near-by well(s), interpreted as those on the ComEd parcel, during repair dewatering.	Annual: Monitor vegetation; woody vegetation encroachment, native vegetation cover, invasive plant species present in disturbed footprint. Once in growing season.	Annual: Monitor vegetation; woody vegetation encroachment, native vegetation cover, invasive plant species present in disturbed footprint. Once in growing season.	Annual: Monitor vegetation; woody vegetation encroachment, native vegetation cover, invasive plant species present in disturbed footprint. Once in growing season.	Annual: Monitor vegetation; woody vegetation encroachment, native vegetation cover, invasive plant species present in disturbed footprint. Once in growing season.
Pre-Repair: Baseline Crayfish Burrow Density within 1 meter of RIV 4.	Time of repair: Biological monitor present during dewatering	Prey Base: Monitor cage growth of caged HED larvae 4 weeks in RIV5. (May or June)	Prey Base: Monitor cage growth of caged HED larvae 4 weeks in RIV5. (May or June)	Prey Base: Monitor cage growth of caged HED larvae 4 weeks in RIV5. (May or June)	
Pre-Repair: HED & crayfish clearance surveys in RIV4. (September)		Burrow Density: Measure burrow density along RIV4.	Burrow Density: Measure burrow density along RIV4. If goals are not met, translocate crayfish.		
Pre-Repair: Herbicide treatment of workspaces with Phragmites (or coordinate with HMS)					

APPENDIX I IMPLEMENTING AGREEMENT

An implementing agreement, which shall include:

- A. Names of all participants in the execution of the conservation plan, including public bodies, corporations, organizations, and private individuals.**

Wolverine Pipe Line Company
Mr. Kurt Barclay
President
8075 Creekside Drive, Suite 210
Portage, MI 49024

- B. The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of the activities in the conservation plan and a schedule for preparation of progress report to be provided to the Department.**

The Illinois Department of Natural Resources (“DNR”) is responsible for the review of the enclosed Conservation Plan and for subsequent issuance of the Incidental Take Authorization, prior to Wolverine Pipe Line Company’s execution of work.

Wolverine Pipe Line has completed pre-construction surveys that recorded species as outlined in the Conservation Plan, and will address avoidance, minimization, and mitigation measures as outlined in the Conservation Plan. Monitoring of post-construction restoration success will be required by Wolverine Pipe Line Company, with a report of monitoring being provided to the Illinois DNR, as outlined in the conservation measures and monitoring section of the Conservation Plan.

- C. Assurances that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan.**

Wolverine Pipe Line Company is the owner of the existing Lemont to Lockport (CU-LK) pipeline and is required to maintain compliance with the Code of Federal Regulations as enforced by the Pipeline and Hazardous Materials Safety Administration, which require pipeline operators to take prompt action to address all anomalous pipeline conditions that are discovered through integrity assessment or information analysis (CFR 195.452 and 49 CFR Appendix C to Part 195). Wolverine Pipe Line Company maintains an easement to operate the Lemont to Lockport pipeline, which will be the subject of the Project repairs. Wolverine Pipe Line Company will be executing temporary work authorization to utilize land adjacent to the pipeline easement from Hanson Material Services. Wolverine Pipe Line Company acknowledges through this implementing agreement that measures outlined in the Conservation Plan are the responsibility of Wolverine Pipe Line Company to carry out and complete, utilizing applicable permits and land agreements required to achieve the activities outlined in the Conservation Plan.

- D. Assurances of compliance with all other federal, state, and local regulations pertinent to the proposed action and to execution of the conservation plan.**

Wolverine Pipe Line Company abides by all associated state and federal environmental regulations in operating its assets for distribution of refined petroleum products to the Great Lakes region. The Project is being permitted through the U.S. Army Corps of Engineers – Chicago District, and to complete the work Wolverine Pipe Line Company will acquire applicable state and local permits, where required.

E. Copies of any federal authorizations for taking already issued to the applicant.

Wolverine Pipe Line Company has submitted an applicant prepared Biological Assessment to the U.S. Army Corps of Engineers, Chicago District. As the lead federal agency for the Project, the Army Corps will be engaged in agency-to-agency consultation with the U.S. Fish and Wildlife Service. Wolverine Pipe Line Company anticipates conclusion of the consultation process via execution of a final Biological Opinion during Q1 2023, and subsequent execution of the Conservation Plan is contingent on execution of the Biological Opinion by the U.S. Fish and Wildlife Service.

F. For projects that will result in the taking of endangered or threatened species of plants, copies of expressed written permission of the landowner.

Not applicable since the Hine's emerald dragonfly and Blanding's turtle are both considered animals under the Illinois Endangered Species Act.

CERTIFICATION: Wolverine Pipe Line Company hereby certifies that it has the authority and funding to complete the project and to address the issues proposed in the Incidental Take Conservation Plan for the state-listed Hine's emerald dragonfly and Blanding's turtle. Wolverine Pipe Line Company is in charge of the pipeline repair project and will acquire and implement applicable state, federal, and local regulations during the completion of the Project.

Kurt Barclay

Kurt Barclay – President

 Digitally signed by Kurt Barclay
Date: 2022.11.11 13:47:48 -05'00'

Date