Illinois Department of Natural Resources
CONSERVATION PLAN
(Application for an Incidental Take Authorization)
Per 520 ILCS 10/5.5 and 17 Ill. Adm. Code 1080

150-day minimum required for public review, biological and legal analysis, and permitting

SUBMITTED TO:	Incidental Take authorization Coordinator Illinois Department of Natural Resources One Natural Resources Way Springfield, IL 62702 DNR.ITAcordinator@illinois.gov
PROJECT APPLICANT:	McLean County Attn: Jerry Stokes, County Engineer 102 S Towanda Barnes Rd Bloomington, IL 61705 (309) 663-9445
PROJECT NAME:	Baker Bridge Repairs Section 20-00041-06-BR
COUNTY:	McLean County
AMOUNT OF IMPACT AREA:	0.25 Acre construction area.

The incidental taking of endangered and threatened species shall be authorized by the Illinois Department of Natural Resources (IDNR) only if an applicant submits a conservation plan to the IDNR Incidental Take Coordinator that meets the following criteria:

1. A description of the impact likely to result from the proposed taking of the species that would be covered by the authorization, including but not limited to -

A) Identification of the **area to be affected** by the proposed action, include a legal description and a detailed description including street address, map(s), and GIS shapefile. Include an indication of ownership or control of affected property. Attach photos of the project area.

The proposed project involves the removal and replacement of the concrete bridge deck, and scour protection of the substructure, including abutments and all piers. There will be in-stream work in the Mackinaw River. Land cover in the area of the proposed improvement is agricultural lands with wooded areas.

This Incidental Take Authorization (ITA) only covers the bridge repair contract and not the remainder of North 2600 East Road. It's necessary to remove the obstructions surrounding the pier in order to provide riprap to prevent scour around the pier. This includes removing small trees, shrubs and grass from around the pier within the limits of riprap replacement.

The existing bridge is in series on the alignment of N 2600 East Road as it crosses Mackinaw River in McLean County. The two-lane, two-way structure is to have the existing deck replaced with a new eight-inch deck and made composite to the steel beams through shear studs. New deck railing is to be installed upon completion of the deck replacement. Riprap around the abutments will impact nearly 0.10 acres of the Mudpuppies habitat.

The preferred habitat for the Mudpuppy has historically been bottoms of lakes, ponds, rivers, and streams. These have largely been destroyed through agricultural practices and other development, and present habitat consists of river with a suitable environment for the Mudpuppy. A habitat assessment and survey for this project[(1)] indicates that "the Mudpuppy was known to occur in the Mackinaw River downstream of Structure No. 057-4915 carrying North 2600 East Road over the Mackinaw River in McLean County".

Suitable Mudpuppy habitat, consisting largely of silt, sand, and gravel. Similar areas have an abundance of large tree trunks, root balls, and limbs in the river.

B) Biological data on the affected species including life history needs and habitat characteristics. Attach all pre-construction biological survey reports.

The information used to determine the life history needs and habitat characteristics was extracted from Appendix A of the Aquatic Survey Report for this project, included as an attachment to this document (2).

Little is known about the life history of the Mudpuppies due to its secretive nature. Historically, lakes, ponds, and large creeks with clear water, are the preferred habitats for Mudpuppies. The primary threat to the species in Illinois is habitat destruction. Most areas suitable for this species have been destroyed by development.

The portion of the properties impacted by the construction of the project have acquired through Right Of Way acquisition methods, along with Temporary Construction Easements where required. These ROW acquisitions and Temporary Easements have already been acquired, and the shapefiles represent the construction limits of this project in which the ROW/Easements are included within.

The photographs in Appendix 4 shows the terrain within the project limits. Also enclosed are GIS shape files containing the construction limits of the project, which will outline the extents of all land disturbed by the project.

One Mudpuppy was trapped in 21 trap nights. The INHS survey in Appendix 2, states that this species was captured from the Mackinaw River, 3.75 river miles downstream of Structure No. 057-4915 carrying North 2600 East Road. This microhabitat consists mainly of suitable water in the project limits.

Mudpuppies are reported to be most active in late fall / early winter when breeding occurs. They do not enter hibernation. Mudpuppies spend most of their time at the bottom of the water. Mudpuppies breed in cooler weather, mainly September to January. They can breed more than once per season.

C) Description of project activities that will result in taking of an endangered or threatened species, including practices and equipment to be used, a timeline of proposed activities, and any permitting reviews, such as a USFWS biological opinion or USACE wetland review. Please consider all potential impacts such as noise, vibration, light, predator/prey alterations, habitat

alterations, increased traffic, etc.

An Environmental Assessment or FONSI is not required for this project. NEPA will be covered with the Natural and Cultural Resources Review. This process will be performed by the State and has already started with submittal of the Environmental Survey Request (ESR).

This project involves the replacement of the deck slab and railing on the bridge across Mackinaw River in McLean County. This structure is located on North 2600 East Road, which provides 2-lanes of highway. The existing 7" slab will be replaced with a thicker 8" slab in order to increase durability of the bridge deck. In order to compensate for this weight increase, lighter railings will be used as well as the addition of shear studs to the top flange of the rolled steel girders, creating composite action between the slab and the 5 girders for non-composite Dead Loads and for Live Loads, decreasing these stresses on the steel girders. Increased reinforcement will be provided in the slab to limit cracking due to negative moment sections in the beam span. The construction is estimated to take approximately 4 to 5 months to complete. The total roadway construction length on North 2600 East Road is 293', with an additional 100' of guardrail on each side. The microhabitats of concern for impacts to the Mudpuppies consist of riprap along the land-water interface of the abutments.

The proposed facilities will have the same or similar erosion control measures as the existing facilities, consisting primarily of stone dumped A4 riprap as a permanent feature. Where appropriate, the project will also incorporate permanent vegetation including slope seed mix on unmowable slopes that do not require riprap. No causeway will be used in the project.

Once the project is constructed, there will be the more of the same type of created microhabitats as in the existing condition. We estimate that the existing riprap on the site, mostly on the existing embankments adjacent to the river, will remain in place. As part of this project, we will be adding approximately 530 cubic yards of riprap, along the embankments at the water's edge and around the piers. There may be a small difference in this quantity due partly to the different geometries of the embankments. Some of the riprap in the existing condition has degraded and fallen into the river.

Additionally, the land uses of property on and adjacent to the roadway will remain the same as in the existing condition. The threat this project poses to the Mudpuppy is not going to be the long-term destruction of suitable habitat. The threat will be short-term disturbances and impacts inflicted on individuals locally present during the construction period.

Equipment used on the project will be typical earthmoving equipment such as dozers and excavators.

A 404 permit will be required from the USACE and is obtained. All necessary permits or approvals from other state or federal agencies will be obtained prior to construction. Coordination was conducted with the US Fish and Wildlife Service (USFWS).

D) Explanation of the anticipated adverse effects on listed species;

- How will the proposed actions impact each of the species' life cycle stages?

The Mudpuppy spends most of its time at the bottom of a lake, pond, and large creek with clear water. They can survive in alternative habitat if rocky areas are available for reproduction. Females deposit eggs in nests under rocks, logs and other cover objects in May and June. Eggs hatch in one to two months and the larvae do not reach productive age for five years. Their longevity is known to be about 11 years.

This project will temporarily remove microhabitats suitable for cover, nesting, hibernation, and breeding. There is potential of roadkill by heavy machinery, mostly through riprap placement activities. While it is unlikely that take of a Mudpuppy would occur because they live in the water, the possibility exists and has been included.

The construction season is outside the hibernation period, but spring construction may affect the breeding season and impact young and immature individuals. Spring and summer are the least active season for this species. Individual Mudpuppies that may be traversing or utilizing the project area during construction may be directly impacted. However, since the vulnerable period likely covers the entire first five years of the Mudpuppies development, there will be a seasonal adjustment in construction that would mitigate impacts to these individuals during this period. Construction is recommended to work outside of nesting/spawning period of May 1st through August 31st based on life history needs, this time would be the most critical to the species.

- Describe potential impacts to individuals and the population. Include information on the species life history strategy (life span, age at first reproduction, fecundity, recruitment, survival) to indicate the most sensitive life history stages.

The Mudpuppy is the largest of the salamanders, they can exceed 16 inches in length, although the average is closer to 11 inches. Mudpuppies are easily distinguishable by their bushy, red external gills, which they grow as larva and never lose. They have flat heads, wide tails, stubby legs, and feet with four distinct toes. If a Mudpuppy is present in the riprap along this project during the construction period, it will seek cover and hide. It is unlikely that construction personnel will notice and identify that individual, and it is likely to be negatively impacted by construction activities. The construction will not be phased, however, it is anticipated that the methodology of riprap placement would allow for some suitable sheltering microhabitat to always remain undisturbed in the project area during construction and should help mitigate the possibility of negative impacts.

- Identify where there is uncertainty, place reasonable bounds around the uncertainty, and describe how the bounds were determined. For example, indicate if it is uncertain how many individuals will be taken, make a reasonable estimate with high and low bounds, and describe how those estimates were made.

The Illinois Natural Heritage Database contains records for Illinois Natural Area Inventory Sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project. Mackinaw River is an Illinois Natural Areas Inventory Site (INAI #0788).

The habitat assessment for this project was performed by an experienced INHS herpetologist during March, near the end of breeding season for the Mudpuppies. One Mudpuppy was found during the 21 trapping days. The INHS found that it is possible for the Mudpuppy to occur in the project limits due to the previously documented range of the Mudpuppy and the continued presence of suitable habitat and microhabitat in the project

area. This microhabitat consists mainly of suitable cover such as artificial riprap at the water interface in the project limits. Wetlands have been identified in the project area, but it is the impacts to suitable microhabitats that have been implicated in this take.

We estimate that one individual may be taken. That number represents the non-zero chance that at least one individual is present in the project limits, and that that individual was at one time part of a nesting brood in the near vicinity.

The roadway pavement is not suitable, and shoreline riprap are considered low quality habitat. The existing riprap above and in the water is 0.1 acres and should be considered in the identification of suitable habitat within the project construction limits that will be impacted.

Therefore, the existing riprap of 0.15 acres, and the land of .10 acres that may be disturbed, brings the total amount of habitat impacts to .25 acres.

2) Measures the applicant will take to minimize and mitigate that impact and the funding that will be available to undertake those measures, including, but not limited to -

A) Plans to minimize the area affected by the proposed action, the estimated number of individuals of each endangered or threatened species that will be taken, and the amount of habitat affected (please provide an estimate of area by habitat type for each species).

The existing microhabitat impacted by this project are part of the facility to be replaced. There is no way to replace the facility without also replacing the riprap along its length, but similar microhabitat that is not part of the roadway will be left undisturbed. While the riprap microhabitat will be temporarily impacted during construction, the final design plans call for more microhabitat for the Mudpuppies than in the existing condition.

If there are any individual Mudpuppies present in the existing microhabitat during the construction period, there will be no practicable way to find and protect those individuals.

The project footprint and construction limits has been minimized as much as possible and all work will be conducted within the Environmental Survey Request Limits. Minimization includes the entire wetted width of the Mackinaw River will not have riprap placed.

B) Plans for management of the area affected by the proposed action that will enable continued use of the area by endangered or threatened species by maintaining/re-establishing suitable habitat (for example, native species planting, invasive species control, use of other best management practices, restored hydrology, etc.).

The microhabitat to be impacted are part of the man-made structures to be replaced. That facility will continue in operation and will be maintained as it has been for the foreseeable future. No additional special consideration is required. The continued operation of the bridge will continue to provide similar habitat for the Mudpuppy.

In addition, refuge areas associated with the remainder of the Mackinaw River shoreline will continue to be available during construction and into the foreseeable future. Included in those possible refuge areas are the small, delineated wetlands in the project area that will remain undisturbed to the greatest extent practicable, in keeping with the Wetland Policy.

The wetlands must be protected from sediment and siltation from direct runoff from the construction zone, and so will be separated from disturbed areas with standard BMPs such as perimeter erosion barrier (silt fence). While the primary purpose of these measures is to prevent direct runoff and tracking from the site, it is commonly used as simple way to visibly demark the limits over which construction crews do not traverse.

C) Description of all measures to be implemented to avoid, minimize, and mitigate the effects of the proposed action on endangered or threatened species.

- Avoidance measures include working outside the species' habitat.

  The species microhabitat to be impacted is part of a manmade structure to be replaced. In other words, the riprap is part of the bridge. While there is no way to avoid impacting the existing riprap features during construction, this project will result in larger extent of similar stone base and riprap armor as in the existing condition.

  The plans call for the installation of perimeter erosion barrier at the limits of disturbance wherever runoff might track onto adjacent property. The roadway as it approaches the bridge is generally the highest feature in the immediate landscape, and so silt fence is to be installed along the length of the bridge approaches. In addition, the wetlands must specifically be protected from direct runoff and tracking. Impact mitigation such as perimeter barrier is required to be installed before any other construction activities occur. The perimeter barrier generally serves as the demarcation over which construction crews do not traverse and will thus serve as additional protection against the inadvertent disturbance of the wetlands and the primary habitat for the Mudpuppy.

- Minimization measures include timing work when species is less sensitive, reducing the project footprint, or relocating species out of the impact area.

  Since this project uses riprap as the primary method of erosion control at the land/water interface, this project avoids the use of erosion control blankets in those areas. The choice of treatment is primarily driven by the slopes on the proposed construction, but it does have some species conservation benefits.

- Mitigation is additional beneficial actions that will be taken for the species such as needed research, conservation easements, propagation, habitat work, or recovery planning.

  See below proposed mitigation measures.

- It is the applicant's responsibility to propose mitigation measures. IDNR expects applicants to provide species conservation benefits 5.5 times larger than their adverse impact.

  McLean County Highway Department has been notified of a research opportunity to study the Mudpuppy. The research aims to bring about much beneficial knowledge about the population(s) of Mudpuppies surrounding the greater Mackinaw River area in regard to how the species is using the available habitats. The species is suspected to occur at several locations within the area and the study also allows for the use of habitat modeling to identify new locations in the area where the Mudpuppies may occur. The opportunity

exists through the contract that the Illinois Department of Transportation has with the Illinois Natural History Survey Biotic Survey and Assessment Program.

This research is consistent with species needs and IDOT's support of this Mudpuppy research is valued at $9,950.

D) Plans for monitoring the effects of the proposed actions on endangered or threatened species, such as monitoring the species' survival rates, reproductive rates, and habitat before and after construction, include a plan for follow-up reporting to IDNR. Monitoring surveys should be targeted at reducing the uncertainty identified in Section 1.d.

The McLean County Highway Department will conduct or cause to be conducted a 2-yr and 5-yr post construction survey for the Mudpuppies. The County will notify the IDOT Natural Resource Unit when the project construction is complete so that the Illinois Natural History Survey can be tasked with the field work. The post construction survey for the Mudpuppies will utilize the same methodology as the pre-construction survey. A copy of the post construction survey will be provided to IDNR upon completion.

E) Adaptive management practices that will be used to deal with changed or unforeseen circumstances that may affect the endangered or threatened species.

- Adaptive management is a way to make decisions in the face of uncertainty by monitoring the uncertain element over time and adjusting to the new information. Adaptive management requires identifying objectives and uncertainties, thinking through a range of potential outcomes, developing triggers that will lead to different actions being taken, and monitoring to detect those triggers.

  - Routine inspections are an integral part of regularly performed maintenance activities--cleaning, repair, and replacement--necessary to ensure the integrity and effectiveness of BMPs. Construction site activities can damage BMPs. Earthmoving equipment, for example, can easily dislodge an entrenched silt fence. Routine inspection and maintenance minimizes the work required to prepare a site before a rain event, and it helps protect a site from unforeseen rains.
  - To prepare for impending rains, operators should walk the construction site and ensure that BMPs are cleaned out and operating properly. They should verify that dumpsters are covered, paint and other chemicals are covered, and no oil spills are present. Such housekeeping practices are routinely performed in all good inspection and maintenance programs. Operators should also visually inspect all BMPs when the site will be inactive for several days, such as weekends or holidays. This will help to prepare for rains that might occur when workers are off-site. Planning and preparation minimize the risk of on- or off-site property damage occurring because of inoperative or malfunctioning BMPs.
  - After a rain event, prepare the site for the next rain event. Typically within 48 hours after rain, inspect, clean, and repair the site's BMPs. This will keep the site "clean" and minimize complaints from nearby residents. To prevent health and safety hazards, remove mud in traffic areas, and remove mosquito-breeding standing water. Clean mud and debris from silt fences and other BMPs. Clogged BMPs will not prevent pollutant releases during subsequent rain events, so clean, repair, or replace them as quickly as possible.

  This is a construction project that consists entirely of bridge deck replacement and additional riprap along a river. Many of these types of practices are not feasible to implement or do not apply to this project. These typical management practices generally do not apply. For example, there is no controlled burn program that would make sense here. There is no known local

population to monitor. There is no evidence of a roadway mortality problem in this area since Mudpuppies live in the water.

- Consider environmental variables such as flooding, drought, and species dynamics as well as other catastrophes. Management practices should include contingencies and specific triggers. Note: Not foreseeing any changes does not quality as an adaptive management plan.

  Mackinaw River is not a manmade river. With this being stated, there is no flood control placed.

  If a considered environmental variable were to happen during construction, workers will remove all equipment from the site to reduce risk of damage to the habitats.

  The contractor is provided with local and relevant agency contacts (e.g., IEPA spill response, IDNR Conservation Officers, Sheriff, and Fire department) that can respond to an incident. Incidents include the spills of hazardous materials such as oil or fuel.

F) Verification that adequate funding exists to support and implement all minimization and mitigation activities described in the conservation plan. This may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the conservation plan.

This project is funded by all Local County Bridge funds.

3) A description of alternative actions the applicant considered that would reduce take, and the reasons that each of those alternatives was not selected. A "no-action" alternative shall be included in this description of alternatives. Please describe the economic, social, and ecological tradeoffs of each action.

- Consideration of alternative actions is an important tool in conservation planning as it allows for thinking of other options and evaluating the potential outcomes in terms of all relevant objectives. However, to be useful it requires creativity in developing alternatives and systematic analysis in evaluating the alternatives. In evaluating alternatives, describe the economic, social, and ecological tradeoffs of each

  Among the alternatives considered were:

  <u>Do nothing</u>
  This option involves not making improvements to Baker Bridge and allowing the structure to stay in place as is. The concrete bridge deck is in an advanced state of deterioration now, would continue to deteriorate under this option, and would not be able to handle the current projected traffic loads that necessitated the construction of a 2-lane facility at this location. Eventually, by doing nothing at this time, this structure would need to be entirely replaced in kind, which would have a very similar probability of a take as the currently proposed project does.

  <u>Partial Build</u>
  This option involves making improvements as needed. This proposes a full deck slab replacement, shear stud additions, and guardrails replacement. The slab will be replaced with a thicker 8" slab to increase durability of the bridge deck. To compensate with the weight increase, lighter railings will be used. In addition, shear studs will be installed to the top flange of the rolled steel girders to create a composite action between the slab and the girders for non-composite Dead Loads and for

Live loads. This will decrease these stresses on the steel girders. Increased reinforcement will be provided in the slab to limit cracking due to negative moment sections in the beam space.

Complete Rebuild
This option would involve complete demolition and reconstruction of the bridge. This would be the most expensive option, and is not judged to be necessary at this time.

The partial build is the preferred alternative that was picked for this project.

4) Data and information to indicate that the proposed taking will not reduce the likelihood of the survival of the endangered or threatened species in the wild within the State of Illinois, the biotic community of which the species is a part, or the habitat essential to the species existence in Illinois.

The Mudpuppies are mainly found in central North America, mainly in Minnesota and Mississippi. Its total population is unknown, but they likely number at least a few thousand adults. If present, the species will continue to persist at this site because the threat this project poses to the Mudpuppy is not going to be the long-term destruction of suitable habitat. The threat will be short-term disturbances and impacts inflicted on individuals locally present during the construction period.

As noted earlier, the threat of this project does not involve primary habitat destruction. This project does not affect the prevalence and availability of the water that the Mudpuppy requires. This taking is based on the possibility that individuals locally present may be impacted during the construction period because of the temporary disturbance of loose available groundcover. This level of impact is unlikely to reduce the likelihood of the survival of the species.

5) An implementing agreement, which shall include, but not be limited to (on a separate piece of paper containing signatures):

A) Names and signatures of all participants in the execution of the conservation plan;

B) The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities included in the conservation plan and a schedule for preparation of progress reports to be provided to the IDNR;

C) Certification 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;

D) Assurance of compliance with all other federal, State and local regulations pertinent to the proposed action and to execution of the conservation plan;

E) **Copies of any final federal authorizations for a taking already issued to the applicant**, if any.

ENDNOTES:

1 Kuhns, A.R. 2012. Habitat Assessment and Surveys for the Kirtland's Snake, Clonophis kirtlandii, and Mudpuppy, Necturus maculosus, in the Tier Four High Speed Rail Corridor from Pontiac, Illinois to Lincoln, Illinois. INHS/IDOT Statewide Biological Survey and Assessment Program Report 2012(50): 1-10.

2 Chellman, I.C., and D.L. Parrish. 2010. Developing Methods for Sampling Mudpuppies in Vermont Tributaries of Lake Champlain. Final Report. State Wildlife Grants Program,

Vermont Fish and Wildlife, Waterbury. Report narrative accessed at on 05 December 2012.

3 Illinois Endangered Species Protection Board (IESPB). 2015. Checklist of Endangered and Threatened Animals and Plants of Illinois. Illinois Endangered Species Protection Board, Springfield, Illinois. pp. 18. Published online at http://dnr.state.il.us/iespb/index.htm

4 Mankowski, A., editor. 2010. Endangered and Threatened Species of Illinois: Status and Distribution, Volume 4 - 2009 and 2010 Changes to the Illinois List of Endangered and Threatened Species. Illinois Endangered Species Protection Board, Springfield, Illinois. iii + 38 pp.

5 Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press. Washington D.C. 587 pp. 9 Phillips, C.A., R.A. Brandon, and E.O. Moll. 1999. Field Guide to Amphibians and Reptiles of Illinois. Illinois Natural History Survey Manual 8: 1-300.

APPENDICES:

1. Construction Plans
2. Habitat Assessment Report
3. Maps and Location Exhibits
4. Photographs
5. GIS Shape Files of Construction Limits (Digital)
6. IDOT Cultural Clearance Memo
7. USACOE Nationwide Permit #14
8. INHS Research Proposal

PLEASE SUBMIT TO:

Incidental Take Authorization Coordinator,
Illinois Department of Natural Resources,
Division of Natural Heritage,
One Natural Resources Way,
Springfield, IL, 62702

OR

DNR.ITAcoordinator@illinois.gov

May 2022

An **implementing agreement**, which shall include, but not be limited to (on a separate piece of paper containing signatures):

A) Names and signatures of all participants in the execution of the conservation plan;

Jerry Stokes

Jerry Stokes, County Engineer
McLean County Highway Department

B) The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities included in the conservation plan and a schedule for preparation of progress reports to be provided to the IDNR;

The McLean County Highway Department is responsible for securing authorization for incidental take of state-listed species, obtaining and securing all necessary state and local permits, and inspection of the work and contractor's compliance with the design contract documents. A progress report will submitted to the IDNR within 90 days of completion of the project (completion shall be defined as: the first day the new bridge is open for use by the general public).

Project construction is anticipated to begin in the late spring, early summer of 2024, with a completion by late summer, early fall of 2024.

C) Certification 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;

The Illinois Department of Natural Resources shall be responsible for the review of this Conservation Plan and for subsequent issuance of the Incidental Take Authorization.

This project is authorized by the Illinois Department of Transportation, who oversees the use of federal-distributed funding among local agencies.

D) Assurance of compliance with all other federal, State and local regulations pertinent to the proposed action and to execution of the conservation plan;

The McLean County Highway Department, as directed by the Illinois Department of Transportation, exclusively abides by the National Environmental Policy Act and all associated state environmental laws in carrying out its mission of performing the most environmentally sensitive methods of transportation planning and engineering.

E) **Copies of any final federal authorizations for a taking already issued to the applicant**, if any.

Not applicable

Appendix 1

Construction Plans

CH	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
21	20-00041-06-BR	MCLEAN	17	1
	ILLINOIS	CONTRACT NO.		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MCLEAN COUNTY
HIGHWAY DEPARTMENT

PLANS FOR PROPOSED
BRIDGE REPAIR

LEXINGTON ROAD DISTRICT
ROUTE CH 21 (2600 EAST)
SECTION 20–00041–06–BR

INDEX OF SHEETS

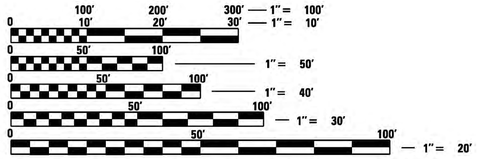
HIGHWAY STANDARDS

000001–06 STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS
280001–07 TEMPORARY EROSION CONTROL SYSTEMS
701901–04 TRAFFIC CONTROL DEVICES
BLR 21–9 TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS

UTILITIES

TELEPHONE: FRONTIER COMMUNICATIONS
104 MULBERRY
NORMAL, IL. 61761
ATTN: TORRIE FRENCH
309–827–1715

ELECTRIC: AMEREN IP (NORTH)
501 EAST LAFAYETTE ST.
BLOOMINGTON, IL 61701



FULL SIZE PLANS HAVE BEEN PREPARED USING STANDARD ENGINEERING SCALES. REDUCED SIZED PLANS WILL NOT CONFORM TO STANDARD SCALES. IN MAKING MEASUREMENTS ON REDUCED PLANS, THE ABOVE SCALES MAY BE USED.

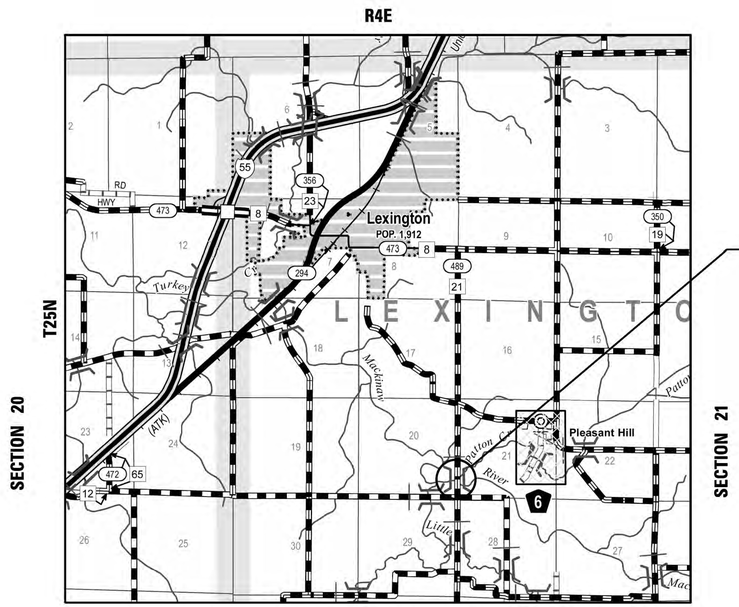
J.U.L.I.E.
JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION
1–800–892–0123
OR 811

CHASTAIN & ASSOCIATES LLC
CONSULTING ENGINEERS
DECATUR (217) 422-8544
SCHAUMBURG (773) 714-0050
ROCKFORD (815) 489-0050
184-001397

CHASTAIN PROJECT NO. 7857
CHASTAIN FIELD BOOK NO. 526

LOCATION OF SECTION INDICATED THUS: –

FUNCTIONAL CLASSIFICATION – LOCAL ROAD
2014 ADT = 150
DESIGN SPEED = 30 MPH



3RD PM
LOCATION MAP

THE PROPOSED IMPROVEMENT CONSISTS OF REPLACING CONCRETE DECK ON THE EXISTING 4–SPAN 293′ X 32′ WIDE BRIDGE ON WIDE FLANGE BEAMS, REPLACE GUARDRAIL, RIPRAP AND OTHER MINOR COLLATERAL WORK

GROSS LENGTH = 650.00 FT. = 0.123 MILE
NET LENGTH = 650.00 FT. = 0.123 MILE

APPROVED _____ 20 ____
COUNTY ENGINEER

APPROVED _____ 20 ____
TOWNSHIP COMMISSIONER

PASSED _____ 20 ____
DISTRICT FIVE ENGINEER OF LOCAL ROADS AND STREETS

Releasing For Bid Based on Limited Review _____ 20 ____
DEPUTY DIRECTOR OF HIGHWAYS
REGION THREE ENGINEER

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GENERAL NOTES

1. WHEREVER IN THE PLANS OR SPECIFICATIONS THE TERM STANDARD SPECIFICATIONS IS USED, IT SHALL BE UNDERSTOOD BY THE CONTRACTOR TO MEAN THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AS PREPARED BY THE DEPARTMENT OF TRANSPORTATION OF THE STATE OF ILLINOIS AND ADOPTED APRIL 1, 2016.

2. EXISTING ROAD SIGNS THAT CONFLICT WITH CONSTRUCTION OPERATIONS SHALL BE COVERED OR REMOVED AS DIRECTED BY THE ENGINEER, THIS WORK WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE CONTRACT PAY ITEMS AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR.

3. EXCEPT WHERE DESIGNATED OTHERWISE, THE LOCATIONS AND/OR DEPTHS OF UNDERGROUND UTILITIES SHOWN HAVE BEEN TAKEN FROM INFORMATION FURNISHED BY THE UTILITY OWNERS & MUST BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES. CONTACT J.U.L.I.E., PHONE 800-892-0123, AND ALL UTILITY COMPANIES PRIOR TO DIGGING.

4. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES 48 HOURS PRIOR TO EXCAVATION OPERATIONS.

5. THE CONTRACTOR SHALL TAKE REASONABLE PRECAUTIONS TO PROTECT PUBLIC AND PRIVATE PROPERTY. IF AT ANY TIME THE CONTRACTOR DAMAGES OR DESTROYS PUBLIC OR PRIVATE PROPERTY, THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, RESTORE SUCH PROPERTY TO A CONDITION EQUAL TO THAT EXISTING BEFORE SUCH DAMAGE.

6. THE CONTRACTOR SHALL NOTIFY THE MCLEAN COUNTY HIGHWAY DEPARTMENT RESIDENT ENGINEER AND THE COUNTY ENGINEER 72 HOURS IN ADVANCE OF CONSTRUCTION WORK.

7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS AND CONDITIONS EXISTING IN THE FIELD PRIOR TO CONSTRUCTION AND ORDERING MATERIALS.

8. A QUANTITY FOR SEEDING HAS BEEN ESTIMATED TO ACCOUNT FOR SLOPED AREAS DISTURBED BY THE CONTRACTORS OPERATIONS. FINAL QUANTITY TO BE DETERMINED BASED ON AREAS TO BE SEEDED ESTABLISHED BY THE ENGINEER IN THE FIELD.

9. THE CONTRACTOR SHALL TAKE CARE TO MINIMIZE DISTURBANCE OF THE EXISTING BITUMINOUS OIL AND CHIP PAVEMENT AT THE TIE-IN OF THE HMA RUNDOWNS. DAMAGED OIL AND CHIP PAVEMENT TO BE REPAIRED TO THE ACCEPTABILITY OF THE ENGINEER.

10. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCE AND PROCEDURES OF CONSTRUCTION.

11. ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). THE PROPOSED GRADE ELEVATIONS SHOWN ON THE PLAN AND PROFILE SHEETS ARE THE ELEVATIONS FOR THE FINISHED SURFACE AT LOCATIONS AS INDICATED.

12. ALL COORDINATES SHOWN ARE BASED ON THE ILLINOIS COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 2011 (NAD1983).

SUMMARY OF QUANTITIES

RATES OF APPLICATION

ITEMS	RATE OF APPLICATION
STONE RIPRAP, CLASS A4	1.5 TONS / CU YD

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CHASTAIN & ASSOCIATES LLC
CONSULTING ENGINEERS

USER NAME = shitzelberger	DESIGNED -	REVISED -
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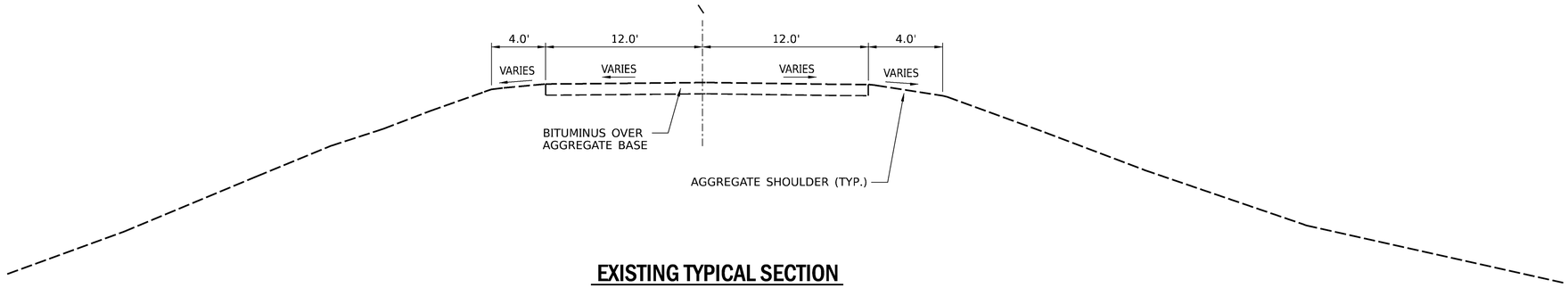
PLOT DATE = 6/23/2022	DATE -	REVISED -

STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

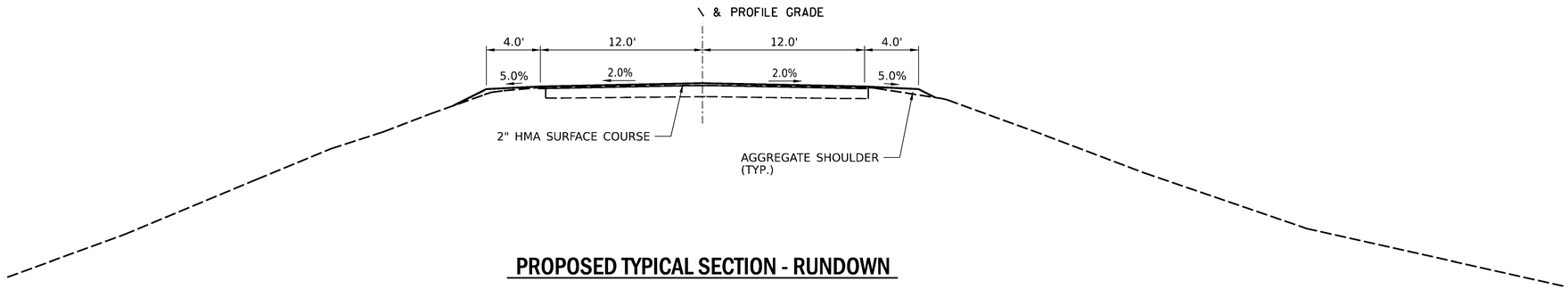
GENERAL NOTES AND SUMMARY OF QUANTITIES
COUNTY HIGHWAY 21 OVER MACKINAW RIVER

SCALE: | SHEET OF SHEETS | STA. TO STA.

CH	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
21	20-00041-06-BR	MCLEAN	17	2
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION - RUNDOWN

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CHASTAIN & ASSOCIATES LLC
CONSULTING ENGINEERS

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PLOT DATE = 5/26/2022	DATE -	REVISED -

STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

TYPICAL SECTIONS
COUNTY HIGHWAY 21 OVER MACKINAW RIVER

SCALE: N.T.S. | SHEET OF SHEETS | STA. | TO STA.

CH	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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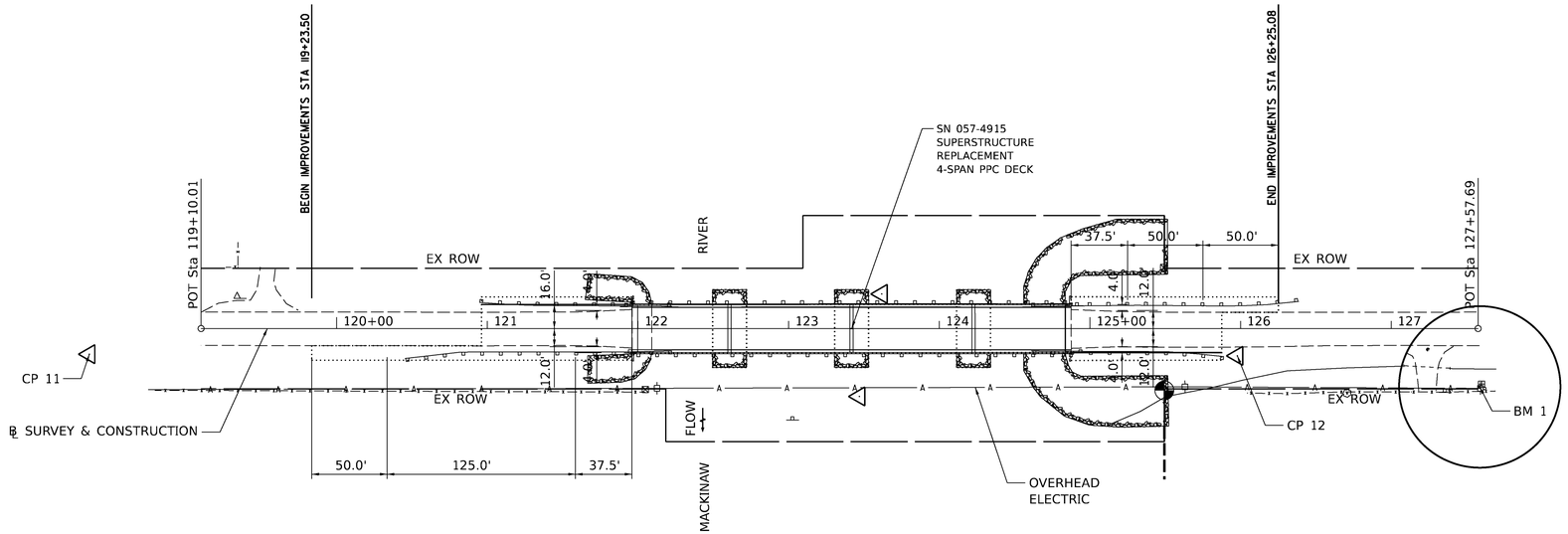
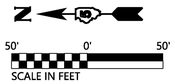
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		





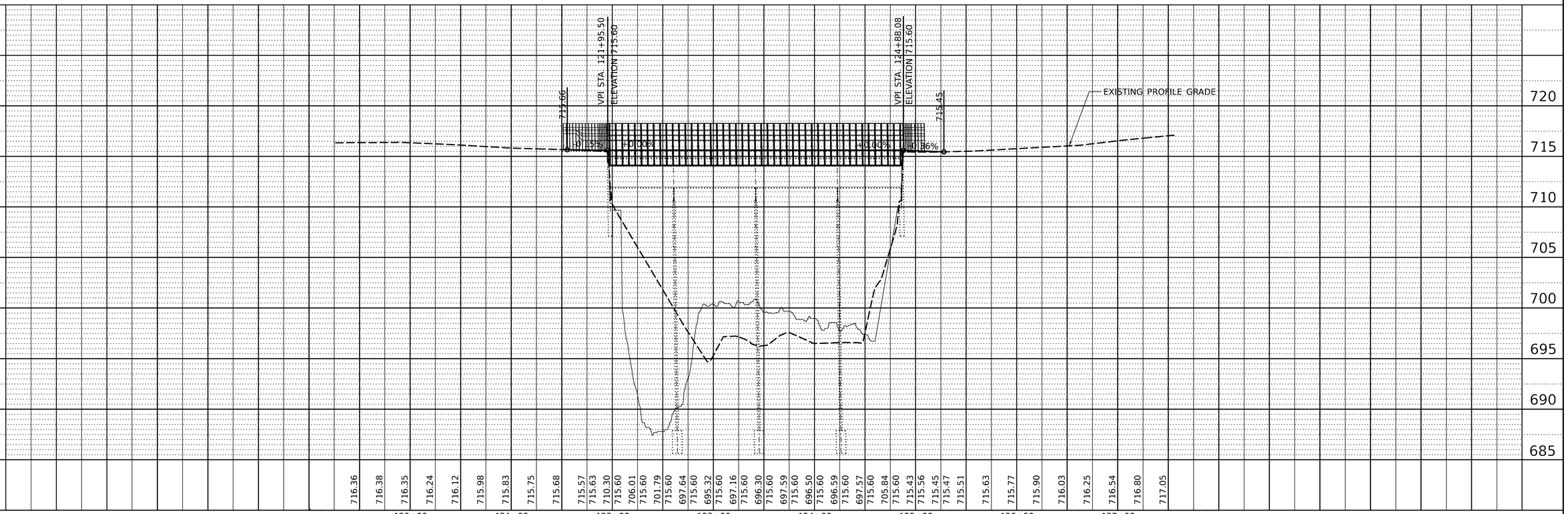
BM1 - RAILROAD SPIKE IN THE POWER POLE
271'± SOUTH OF THE SOUTH BRIDGE ABUTMENT,
27'± WEST OF EDGE OF PAVEMENT.
ELEVATION = 718.45'

HORIZONTAL CONTROL POINTS

POINT	NORTH	EAST
CP11	1,435,383.81	864,519.07
CP12	1,434,621.78	864,516.93

PROPOSED BASELINE CONTROL POINTS

Point PRRD003 N 1,434,461.91 E 864,534.79 Sta 119+25.89
Course from PRRD003 to PRRD004 N 0° 04' 49.5" E Dist 847.68
Point PRRD004 N 1,435,309.59 E 864,535.98 Sta 127+73.57



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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

PLAN AND PROFILE
COUNTY HIGHWAY 21 OVER MACKINAW RIVER

SCALE: | SHEET NO. OF SHEETS | STA. TO STA.

CH	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
21	20-00044-06-BR	MCLEAN	17	

CONTRACT NO.

ILLINOIS | FED. AID PROJECT

PLAN: SURVEYED, PLOTTED, DRAWN, CHECKED, ALIGNMENT CHECKED, RT. OF WAY CHECKED, CADD FILE NAME, NOTE BOOK, NO.

PROFILE: SURVEYED, PLOTTED, DRAWN, CHECKED, B.M. NOTED, STRUCTURE NOTATNS CHKD, NOTE BOOK, NO.

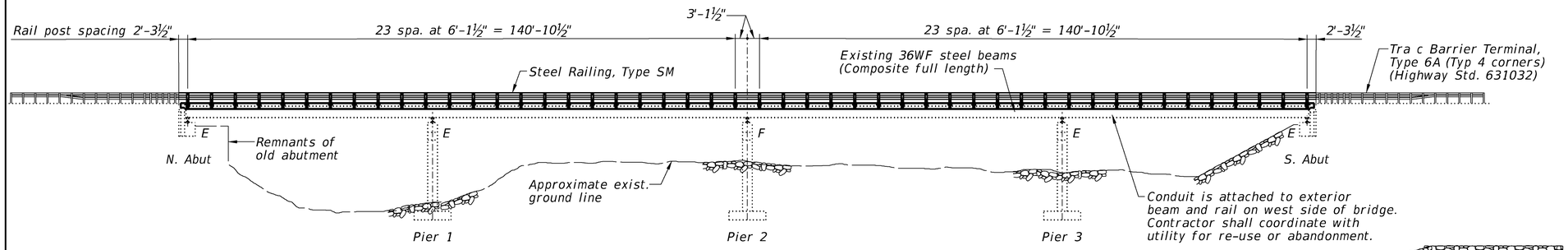
BY | DATE

FILE NAME = I:\Municipalities\McLean County\7857 - Baker Bridge Repairs\CADD\CADD\Civil\7857-sht-planprof.dgn

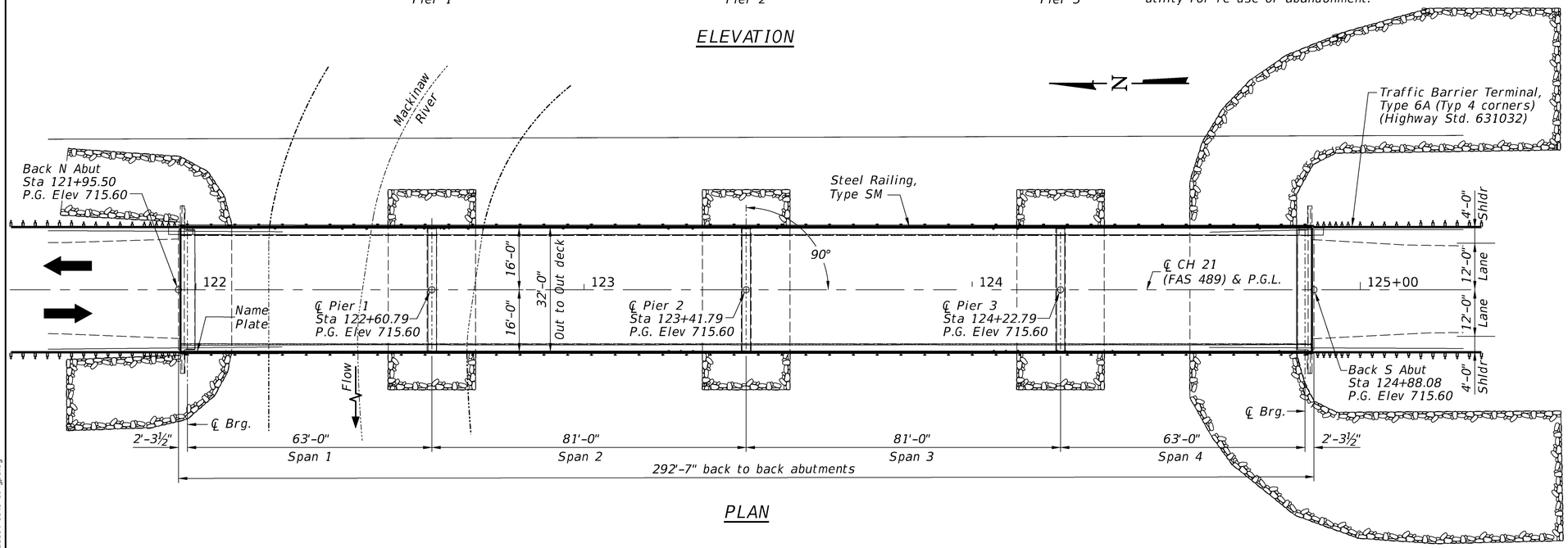
The existing structure is a four span continuous rolled steel girder bridge with pile bent stub abutments and solid wall piers on piles. The piles for the abutments are precast concrete and the piles for the piers are untreated timber. The inner girder spans are 81' and the outer spans are 63'. The total structure length is 292'–7" back to back of abutments with an out–to–out width of 32'–0". The superstructure consists of ve fabricated steel girders with a 7" thick concrete slab.

Road to be closed during construction.

BM1 – Railroad spike in the power pole 271'± south of the south bridge abutment, 27'± west of edge of pavement. Elevation = 718.45'



ELEVATION



PLAN

MACKINAW RIVER
RE–BUILT 20 BY
MCLEAN COUNTY
SEC. 20–00041–06–BR
F.A. RT. 489 STA. 123+41.79
STR. NO. 057–4915 LOADING HL–93

NAME PLATE

See Std. 515001

LOADING HL–93 (NEW CONSTRUCTION)

Allow 50 lb/sq. ft.
for future wearing surface.

DESIGN SPECIFICATIONS (NEW CONSTRUCTION)

2017 AASHTO LRFD Bridge Design
Speci cations, 8th Edition with 2018 Interims

DESIGN STRESSES

FIELD UNITS

f'c = 4,000 psi (Superstructure Concrete)
fy = 60,000 psi (Reinforcement)

EXISTING STRUCTURAL STEEL

fy = 36,000 psi (A–36)

SEISMIC DATA

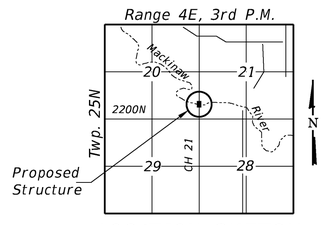
Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec (S_{D1}) = 0.074
Design Spectral Acceleration at 0.2 sec (S_{DS}) = 0.116
Soil Site Class = D

SCOPE OF WORK

Remove and replace existing concrete deck with new 8" thick concrete deck (after grinding) and side–mounted steel railing.

Install steel studs on the existing steel beams to make the superstructure fully composite.

INDEX OF SHEETS



LOCATION SKETCH

LICENSED STRUCTURAL ENGINEER
KEITH E. BRANDAU
081–4905
CHAMPAIGN
STATE OF ILLINOIS

Keith Brandau, P.E., S.E. Date
License Expires 11/30/22

I certify that to the best of my knowledge, information and belief, this bridge design is structurally adequate for the design loading shown on the plans. The design is an economical one for the style of structure and complies with requirements of the current AASHTO Bridge Design Speci cations.

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PLOT DATE = 5/26/2022	DATE 1\12\21	REVISED -	

STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

GENERAL PLAN AND ELEVATION
STRUCTURE NO. 057–4915
SHEET NO. 1OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
489	20–00041–06–BR	MCLEAN		
EXIST SN 057–4915		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

GENERAL NOTES:

Plan dimensions and details relative to existing plans are subject to nominal construction variations. The Contractor shall eld verify existing dimensions and details a ecting new construction and make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensation for a change in scope of the work, however, the Contractor will be paid for the quantity actually furnished at the unit price bid for the work.

The existing structural steel coating contains lead. The Contractor shall take appropriate precautions to deal with the presence of lead on this project.

The Contractor shall test the existing welds by non–destructive methods within 2 ft. of the end of the existing cover plates for cracks after removal of the existing concrete deck. Dye penetrant (PT), magnetic particle (MT), or other approved testing method shall be performed by quali ed personnel approved by the Engineer. If cracks are found, report them to the Bureau of Bridges and Structures for disposition. The cost of testing is included in Removal of Existing Concrete Deck. The cost of crack repair, if necessary, will be paid for according to Article 109.04 of the Standard Speci cations.

Reinforcement bars designated (E) shall be epoxy coated.

Prior to pouring the new concrete deck, all heavy or loose rust, loose mill scale, and other loose or potentially detrimental foreign material shall be removed from the surfaces in contact with concrete. Tightly adhered paint may remain unless otherwise noted. Removal shall be accomplished by methods that will not damage the steel and the cost will be included in the pay item covering removal of the existing concrete.

As directed by the Engineer, existing construction accessories welded to the top ange of beams and girders shall be removed. The weld areas shall be ground ush and inspected for cracks using magnetic particle testing (MT) or dye penetrant testing (PT) by quali ed personnel approved by the Engineer.

Any cracks that cannot be removed by grinding ¼ inch deep shall be identi ed and reported to the Bureau of Bridges and Structures for further disposition. The cost of removing welded accessories, grinding and inspecting weld areas and grinding cracks will be paid for according to Article 109.04 of the Standard Speci cations.

Existing Name Plate shall be cleaned and relocated next to new Name Plate. Cost included with Name Plates.

Removal of existing concrete curb and steel railing included in the cost of Removal of Existing Concrete Deck.

TOTAL BILL OF MATERIAL

ITEM	UNIT	SUPER	SUB	TOTAL
Removal of Existing Concrete Deck	Each	1	--	1
Concrete Superstructure	Cu. Yd.	261.2	--	261.2
Bridge Deck Grooving	Sq. Yd.	1037	--	1037
Protective Coat	Sq. Yd.	1134	--	1134
Stud Shear Connectors	Each	5040	--	5040
Reinforcement Bars, Epoxy Coated	Pound	70,100	--	70,100
Steel Railing, Type SM	Foot	586	--	586
Name Plates	Each	1	--	1
Diamond Grinding (Bridge Section)	Sq. Yd.	1037	--	1037

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CONSULTING ENGINEERS

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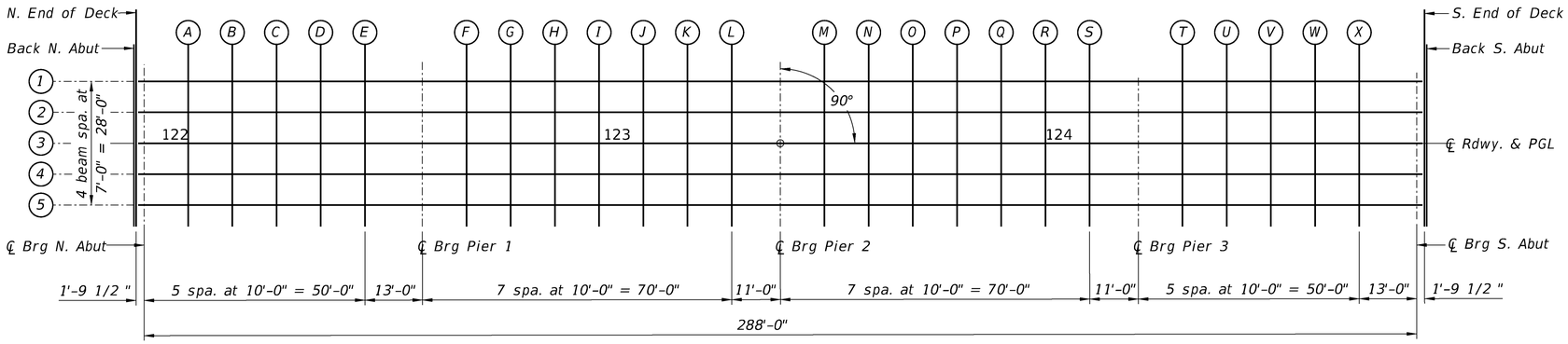
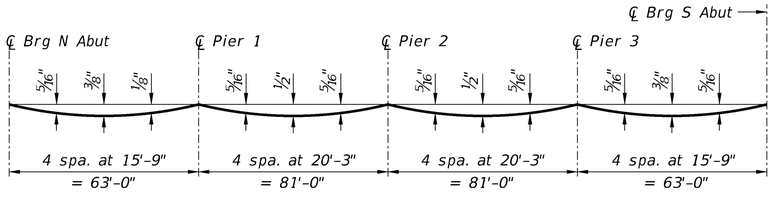
STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

GENERAL NOTES AND BILL OF MATERIAL
STRUCTURE NO. 057–4915
SHEET NO. 20F 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
489	20-00041-06-BR	MCLEAN		
EXIST SN 057-4915		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



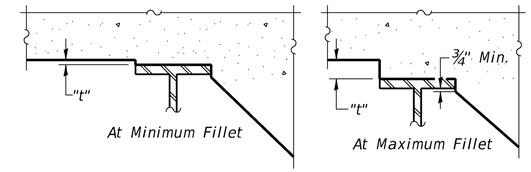
DECK ELEVATION LAYOUT



DEAD LOAD DEFLECTION DIAGRAM

(Includes weight of concrete only.)

Note:
The above de ections are not to be used in the eld if the ENGINEER is working from the grade elevations adjusted for dead load de ections and grinding as shown in the tables on sheet 4 of 9.



To determine "t": After removal of existing deck, elevations of the top anges of the existing beams shall be taken at intervals shown on this sheet. These elevations subtracted from the "Theoretical Grade Elevations Adjusted for Dead Load De ection and Grinding" shown on sheet 4 of 9, minus 8¼" slab thickness, equals the llet heights "t" above top ange of existing beams.

The slab is to be ground after curing to achieve smoothness but the slab is not to be ground to elevations below the "Theoretical Grade Elevations" shown on sheet 4 of 9. For grinding the deck, see Special Provisions.

FILLET HEIGHTS

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CONSULTING ENGINEERS

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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

TOP OF SLAB ELEVATIONS
STRUCTURE NO. 057-4915
SHEET NO. 3OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
489	20-00041-06-BR	MCLEAN		
EXIST SN 057-4915		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

BEAM 1 AND BEAM 5

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION AND GRINDING
Bk. Of N. Abut	121+95.50	14'-0"	715.38	715.40
Cl. N. Abut	121+97.79	14'-0"	715.38	715.40
A	122+07.79	14'-0"	715.38	715.42
B	122+17.79	14'-0"	715.38	715.43
C	122+27.79	14'-0"	715.38	715.43
D	122+37.79	14'-0"	715.38	715.42
E	122+47.79	14'-0"	715.38	715.41
Cl. Pier 1	122+60.79	14'-0"	715.38	715.40
F	122+70.79	14'-0"	715.38	715.41
G	122+80.79	14'-0"	715.38	715.43
H	122+90.79	14'-0"	715.38	715.44
I	123+00.79	14'-0"	715.38	715.44
J	123+10.79	14'-0"	715.38	715.44
K	123+20.79	14'-0"	715.38	715.43
L	123+30.79	14'-0"	715.38	715.41
Cl. Pier 2	123+41.79	14'-0"	715.38	715.40
M	123+51.79	14'-0"	715.38	715.41
N	123+61.79	14'-0"	715.38	715.42
O	123+71.79	14'-0"	715.38	715.44
P	123+81.79	14'-0"	715.38	715.44
Q	123+91.79	14'-0"	715.38	715.44
R	124+01.79	14'-0"	715.38	715.43
S	124+11.79	14'-0"	715.38	715.41
Cl. Pier 2	124+22.79	14'-0"	715.38	715.40
T	124+32.79	14'-0"	715.38	715.41
U	124+42.79	14'-0"	715.38	715.42
V	124+52.79	14'-0"	715.38	715.43
W	124+62.79	14'-0"	715.38	715.43
X	124+72.79	14'-0"	715.38	715.42
Cl. S. Abut	124+85.79	14'-0"	715.38	715.40
Bk. Of S. Abut	124+88.08	14'-0"	715.38	715.40

CL ROADWAY AND PGL AND BEAM 3

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION AND GRINDING
Bk. Of N. Abut	121+95.50	0	715.60	715.62
Cl. N. Abut	121+97.79	0	715.60	715.62
A	122+07.79	0	715.60	715.64
B	122+17.79	0	715.60	715.65
C	122+27.79	0	715.60	715.65
D	122+37.79	0	715.60	715.64
E	122+47.79	0	715.60	715.63
Cl. Pier 1	122+60.79	0	715.60	715.62
F	122+70.79	0	715.60	715.63
G	122+80.79	0	715.60	715.65
H	122+90.79	0	715.60	715.66
I	123+00.79	0	715.60	715.66
J	123+10.79	0	715.60	715.66
K	123+20.79	0	715.60	715.65
L	123+30.79	0	715.60	715.63
Cl. Pier 2	123+41.79	0	715.60	715.62
M	123+51.79	0	715.60	715.63
N	123+61.79	0	715.60	715.64
O	123+71.79	0	715.60	715.66
P	123+81.79	0	715.60	715.66
Q	123+91.79	0	715.60	715.66
R	124+01.79	0	715.60	715.65
S	124+11.79	0	715.60	715.63
Cl. Pier 2	124+22.79	0	715.60	715.62
T	124+32.79	0	715.60	715.63
U	124+42.79	0	715.60	715.64
V	124+52.79	0	715.60	715.65
W	124+62.79	0	715.60	715.65
X	124+72.79	0	715.60	715.64
Cl. S. Abut	124+85.79	0	715.60	715.62
Bk. Of S. Abut	124+88.08	0	715.60	715.62

BEAM 2 AND BEAM 4

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION AND GRINDING
Bk. Of N. Abut	121+95.50	7'-0"	715.49	715.51
Cl. N. Abut	121+97.79	7'-0"	715.49	715.51
A	122+07.79	7'-0"	715.49	715.53
B	122+17.79	7'-0"	715.49	715.54
C	122+27.79	7'-0"	715.49	715.54
D	122+37.79	7'-0"	715.49	715.53
E	122+47.79	7'-0"	715.49	715.52
Cl. Pier 1	122+60.79	7'-0"	715.49	715.51
F	122+70.79	7'-0"	715.49	715.52
G	122+80.79	7'-0"	715.49	715.54
H	122+90.79	7'-0"	715.49	715.55
I	123+00.79	7'-0"	715.49	715.55
J	123+10.79	7'-0"	715.49	715.55
K	123+20.79	7'-0"	715.49	715.54
L	123+30.79	7'-0"	715.49	715.52
Cl. Pier 2	123+41.79	7'-0"	715.49	715.51
M	123+51.79	7'-0"	715.49	715.52
N	123+61.79	7'-0"	715.49	715.53
O	123+71.79	7'-0"	715.49	715.55
P	123+81.79	7'-0"	715.49	715.55
Q	123+91.79	7'-0"	715.49	715.55
R	124+01.79	7'-0"	715.49	715.54
S	124+11.79	7'-0"	715.49	715.52
Cl. Pier 2	124+22.79	7'-0"	715.49	715.51
T	124+32.79	7'-0"	715.49	715.52
U	124+42.79	7'-0"	715.49	715.53
V	124+52.79	7'-0"	715.49	715.54
W	124+62.79	7'-0"	715.49	715.54
X	124+72.79	7'-0"	715.49	715.53
Cl. S. Abut	124+85.79	7'-0"	715.49	715.51
Bk. Of S. Abut	124+88.08	7'-0"	715.49	715.51

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CHASTAIN & ASSOCIATES LLC
CONSULTING ENGINEERS

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PLOT DATE = 5/26/2022	DATE 5/12/22	REVISED -	

STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

TOP OF SLAB ELEVATIONS
STRUCTURE NO. 057-4915
SHEET NO. 4OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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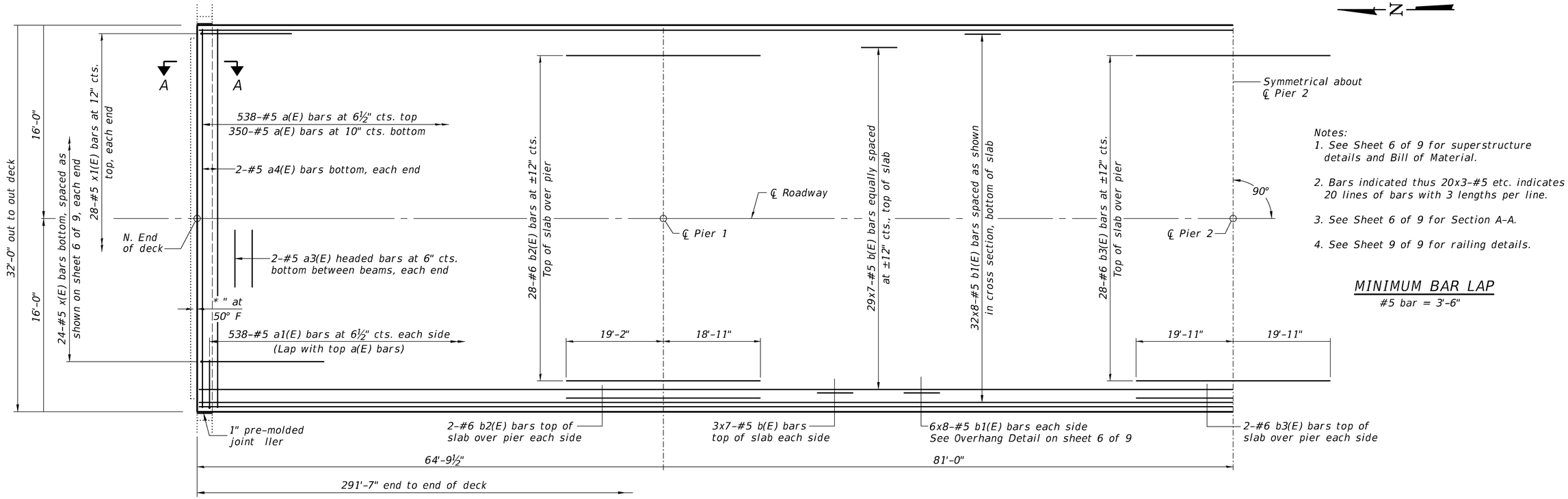
EXIST SN 057-4915		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

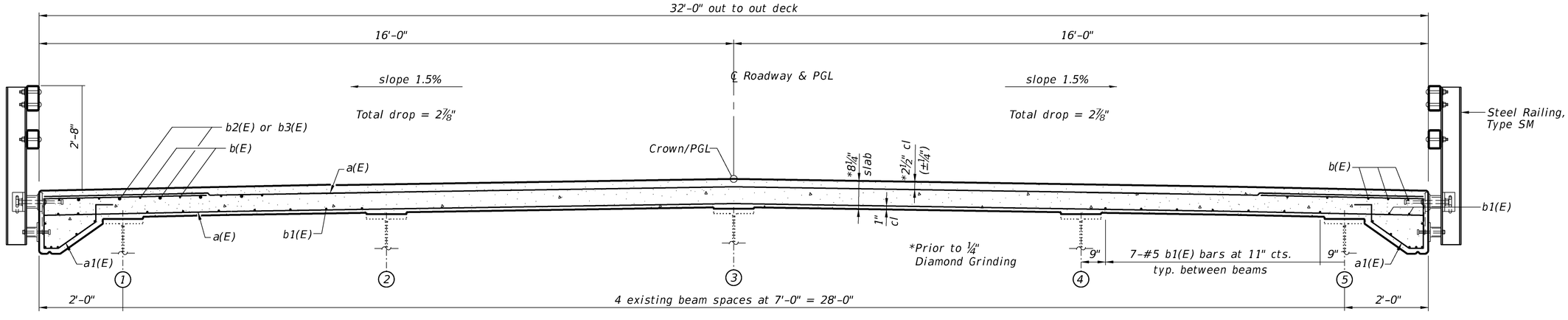


Notes:
1. See Sheet 6 of 9 for superstructure details and Bill of Material.
2. Bars indicated thus 20x3-#5 etc. indicates 20 lines of bars with 3 lengths per line.
3. See Sheet 6 of 9 for Section A-A.
4. See Sheet 9 of 9 for railing details.

MINIMUM BAR LAP
#5 bar = 3'-6"

Dimension showing concrete opening. For joint opening see sheet of .

PARTIAL PLAN



NEAR PIER NEAR MIDSPAN

CROSS SECTION
(Looking South)

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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

SUPERSTRUCTURE
STRUCTURE NO. 057-4915
SHEET NO. 5OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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EXIST SN 057-4915		CONTRACT NO.		
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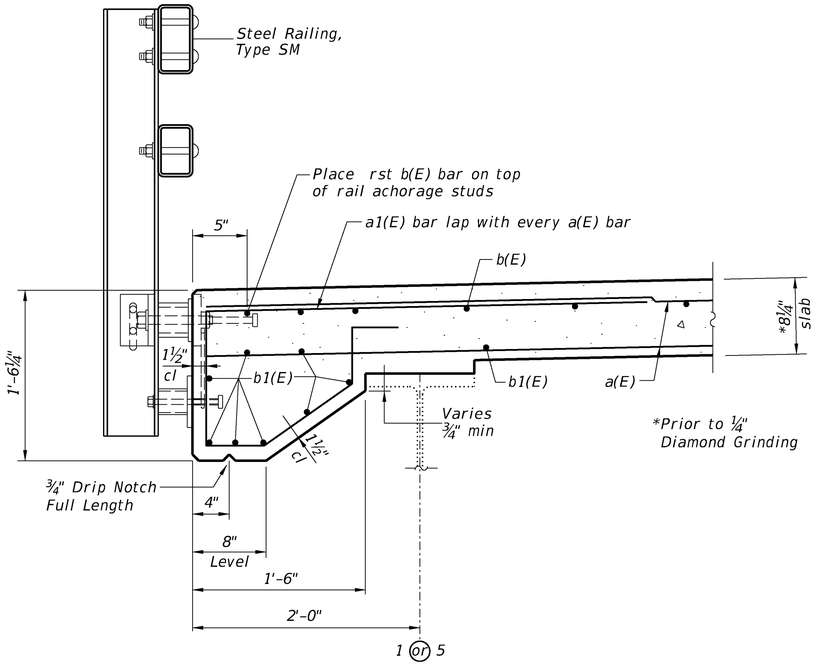
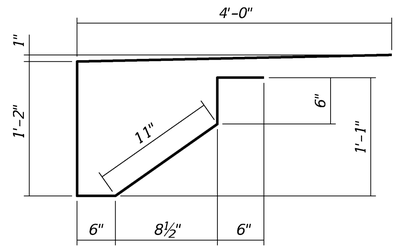
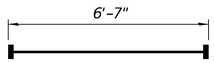


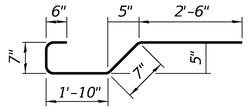
OVERHANG DETAIL



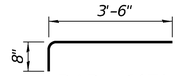
BAR a1(E)



BAR a3(E)
(Headed)



BAR x(E)

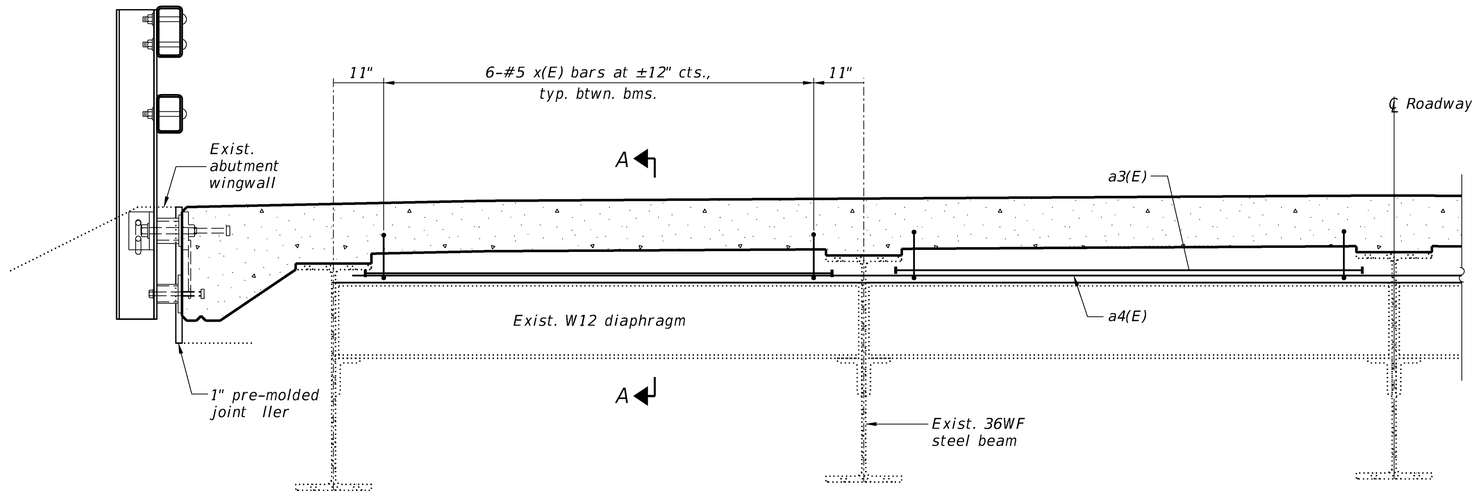


BAR x1(E)

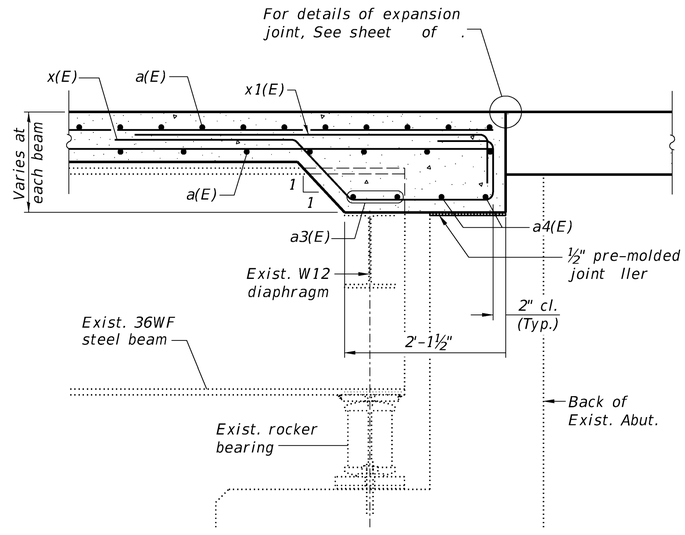
SUPERSTRUCTURE BILL OF MATERIAL

Bar	No.	Size	Length	Shape
a(E)	888	#5	31'-8"	
a1(E)	1076	#5	7'-7"	
a3(E)	16	#5	6'-7"	
a4(E)	4	#5	28'-0"	
b(E)	245	#5	44'-8"	
b1(E)	352	#5	39'-6"	
b2(E)	64	#6	38'-1"	
b3(E)	32	#6	39'-10"	
x(E)	48	#5	6'-0"	
x1(E)	56	#5	4'-2"	
Reinforcement Bars, Epoxy Coated			Pound	70,100
Concrete Superstructure			Cu. Yds.	261.2
Bridge Deck Grooving			Sq. Yd.	1037
Diamond Grinding (Bridge Section)			Sq. Yd.	1037
Protective Coat			Sq. Yd.	1134

Note:
Protective coat shall be applied on surface and sides of slab from end to end of slab.



DIAPHRAGM AT ABUTMENT



SECTION A-A

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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

SUPERSTRUCTURE DETAILS
STRUCTURE NO. 057-4915
SHEET NO. 6OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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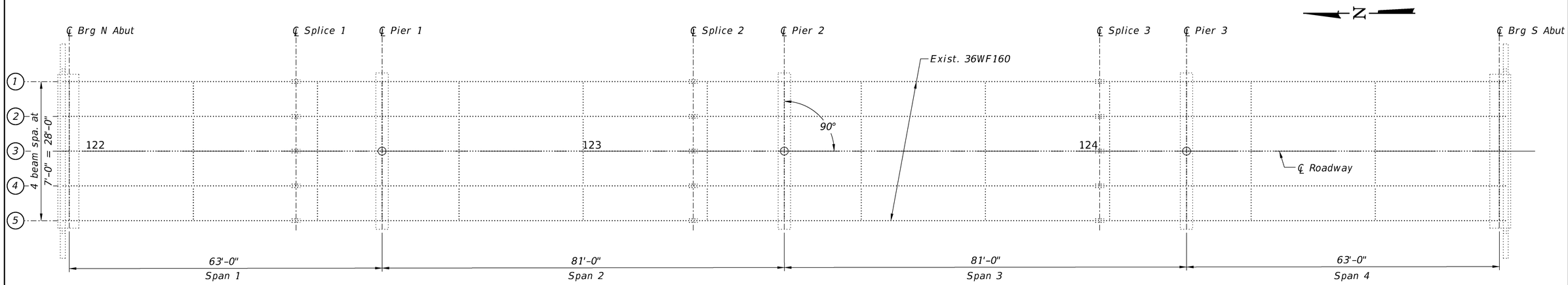
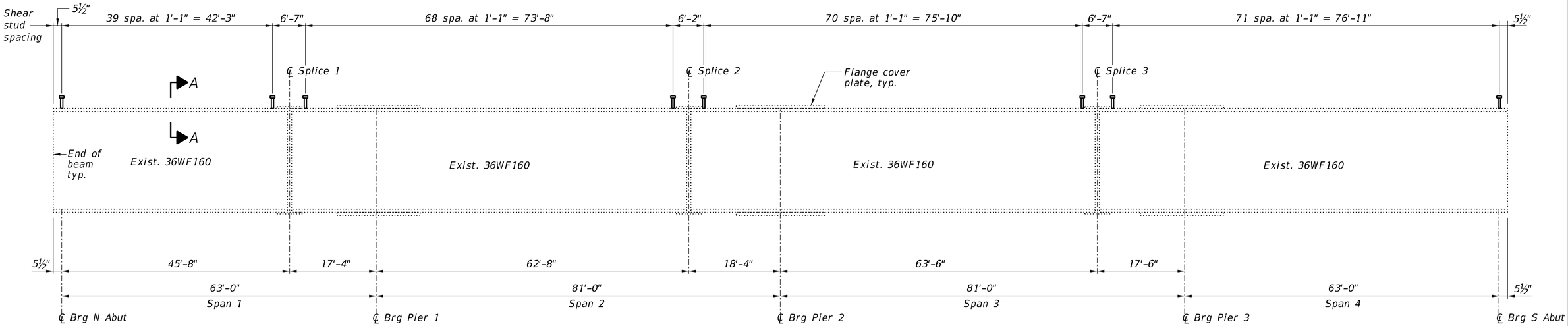
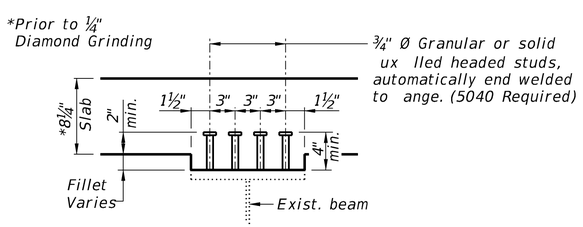
EXIST SN 057-4915		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



EXISTING FRAMING PLAN



EXISTING BEAM ELEVATION



SECTION A-A

Notes:
No studs shall be placed on or against the ange splice plates.

Field adjustment of stud spacings may be required at the tapered ends of the existing cover plates. Coordinate with the Engineer to determine nal locations.

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CHASTAIN & ASSOCIATES LLC
CONSULTING ENGINEERS

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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

EXISTING FRAMING PLAN AND DETAILS
STRUCTURE NO. 057-4915
SHEET NO. 7 OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
489	20-00041-06-BR	MCLEAN		
EXIST SN 057-4915		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

INTERIOR GIRDER MOMENT TABLE					
		0.4 Sp. 1 or 0.6 Sp. 4	Pier 1	0.5 Sp. 2/3	Pier 2/3
Is	(in⁴)	9,750	13,870	9,750	13,870
Ic(n)	(in⁴)	26,029	–	26,029	–
Ic(3n)	(in⁴)	19,361	–	19,361	–
Ic(cr)	(in⁴)	–	17,157	–	17,157
Ss	(in³)	542	759	542	759
Sc(n)	(in³)	790.2	–	790.2	–
Sc(3n)	(in³)	718.5	–	718.5	–
Sc(cr)	(in³)	–	800	–	800
DC1	(k/')	0.875	0.875	0.875	0.875
MDC1	('k)	236.10	455.86	244.94	489.68
DC2	(k/')	0.031	0.031	0.031	0.031
MDC2	('k)	8.36	16.51	8.68	17.35
DW	(k/')	0.35	0.35	0.35	0.35
MDW	('k)	94.44	182.34	97.98	195.87
M_{L+IM}	('k)	705	734	716	782
Mu (Strength I)	('k)	1,610.16	2,011.72	1,643.51	2,149.20
Øf Mn	('k)	2,992.47	2,992.47	2,942.47	2,992.47
fs DC1	(ksi)	5.23	7.20	5.42	7.74
fs DC2	(ksi)	0.14	0.25	0.14	0.26
fs DW	(ksi)	1.58	2.74	1.64	2.94
fs (L+IM)	(ksi)	10.71	11.01	10.87	11.73
fs (Service II)	(ksi)	21.14	24.83	21.66	26.54
0.95Rh Fyf	(ksi)	34.2	34.2	34.2	34.2
fs (Total)(Strength I)	(ksi)	27.25	32.69	28.84	34.94
Øf Fn	(ksi)	36.0	36.0	36.0	36.0
Vf	(k)				

INTERIOR GIRDER REACTION TABLE				
		Abut.	Pier 1 & 3	Pier 2
RDC1	(k)	20.38	66.78	68.65
RDC2	(k)	0.72	2.48	2.54
RDW	(k)	4.07	13.98	14.36
R_{L+IM}	(k)	72.37	111.61	114.59
RTotal	(k)	97.49	194.85	200.14

Is, Ss: Non–composite moment of inertia and section modulus of the steel section used for computing fs(Total–Strength I, and Service II) due to non–composite dead loads (in.⁴ and in.³).

Ic(n), Sc(n): Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing fs(Total–Strength I, and Service II) in uncracked sections due to short–term composite live loads (in.⁴ and in.³).

Ic(3n), Sc(3n): Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing fs(Total–Strength I, and Service II) in uncracked sections, due to long–term composite (superimposed) dead loads (in.⁴ and in.³).

Ic(cr), Sc(cr): Composite moment of inertia and section modulus of the steel and longitudinal deck reinforcement, used for computing fs (Total–Strength I and Service II) in cracked sections, due to both short–term composite live loads and long–term composite (superimposed) dead loads (in.⁴ and in.³).

DC1: Un–factored non–composite dead load (kips/ft.).

MDC1: Un–factored moment due to non–composite dead load (kip–ft.).

DC2: Un–factored long–term composite (superimposed excluding future wearing surface) dead load (kips/ft.).

MDC2: Un–factored moment due to long–term composite (superimposed excluding future wearing surface) dead load (kip–ft.).

DW: Un–factored long–term composite (superimposed future wearing surface only) dead load (kips/ft.).

MDW: Un–factored moment due to long–term composite (superimposed future wearing surface only) dead load (kip–ft.).

M_{L+IM}: Un–factored live load moment plus dynamic load allowance (impact) (kip–ft.).

Mu (Strength I): Factored design moment (kip–ft.).
$1.25\ (MDC1 + MDC2) + 1.5\ MDW + 1.75\ M_{L+IM}$

Øf Mn: Compact composite positive moment capacity computed according to Article 6.10.7.1 or non–slender negative moment capacity according to Article A6.1.1 or A6.1.2 (kip–ft).

fs DC1: Un–factored stress at edge of ange for controlling steel ange due to vertical non–composite dead loads as calculated below (ksi).
MDC1/ Snc

fs DC2: Un–factored stress at edge of ange for controlling steel ange due to vertical composite dead loads as calculated below (ksi).
MDC2/ Sc(3n) or MDC2/ Sc(cr) as applicable.

fs DW: Un–factored stress at edge of ange for controlling steel ange due to vertical composite future wearing surface loads as calculated below (ksi).
MDW/ Sc(3n) or MDW/ Sc(cr) as applicable.

fs (L+IM): Un–factored stress at edge of ange for controlling steel ange due to vertical composite live load plus impact loads as calculated below (ksi).
M_{L+IM} / Sc(n) or M_{L+IM} / Sc(cr) as applicable.

fs (Service II): Sum of stresses as computed below (ksi).
$fsDC1 + fsDC2 + fsDW + 1.3\ fs(L+IM)$

0.95RhFyf: Composite stress capacity for Service II loading according to Article 6.10.4.2 (ksi).

fs (Total)(Strength I): Sum of stresses as computed below on non–compact section (ksi).
$1.25\ (fsDC1 + fsDC2) + 1.5\ fsDW + 1.75\ fs(L+IM)$

Øf Fn: Non–Compact composite positive or negative stress capacity for Strength I loading according to Article 6.10.7 or 6.10.8 (ksi).

Vf: Maximum factored shear range in span computed according to Article 6.10.10.

Note:
M_L and R_L include the e ects of centrifugal force and superelevation.

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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

MOMENT TABLES
STRUCTURE NO. 057–4915
SHEET NO. 8 OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
489	20-00041-06-BR	MCLEAN		
EXIST SN 057-4915		CONTRACT NO.		
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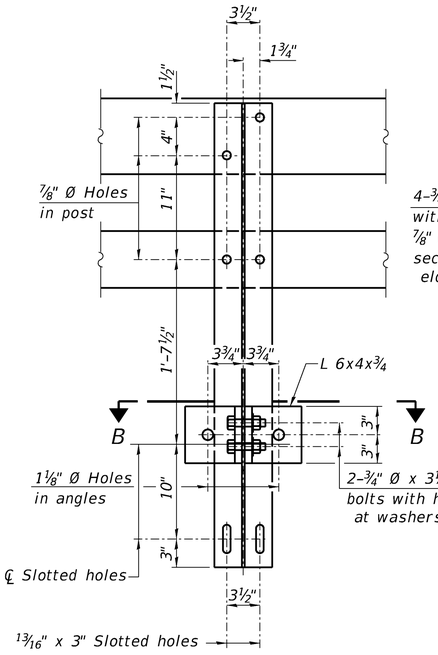
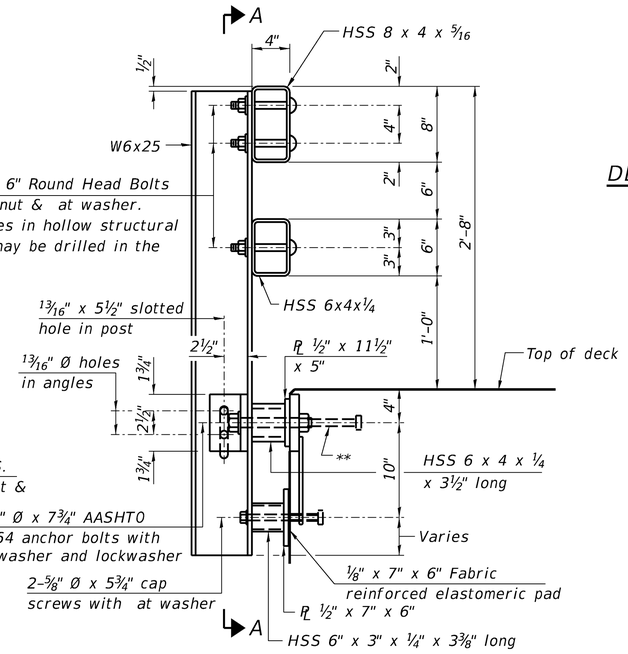
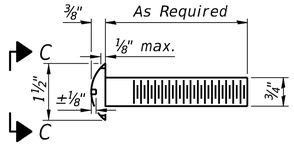


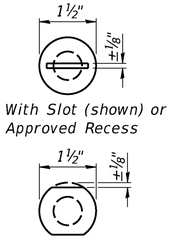
SECTION A-A



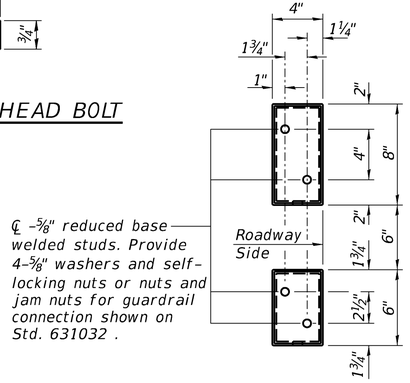
SECTION AT RAIL POST



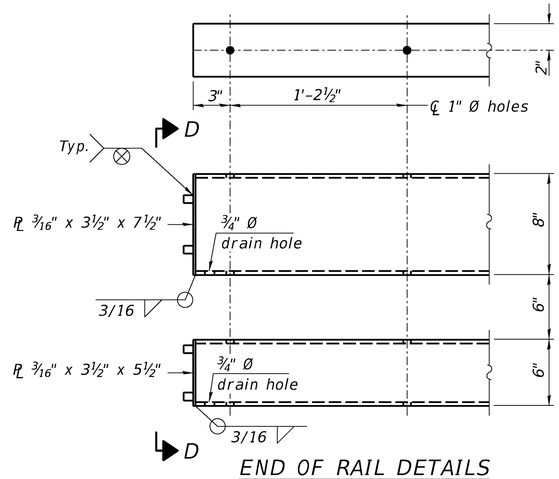
DETAIL OF ¾" Ø ROUND HEAD BOLT



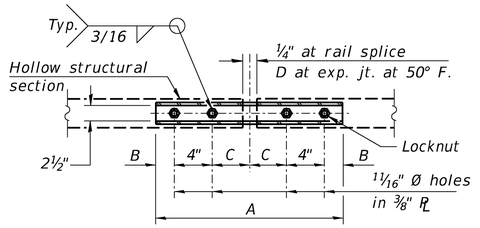
VIEW C-C



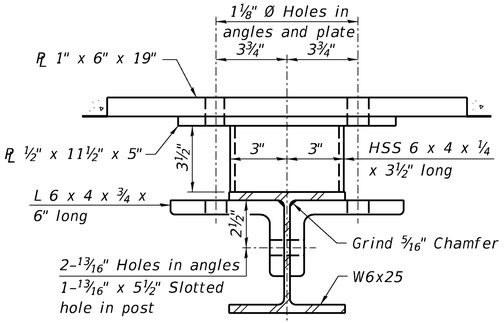
VIEW D-D



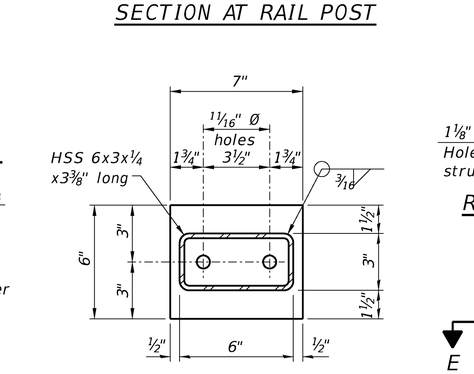
END OF RAIL DETAILS



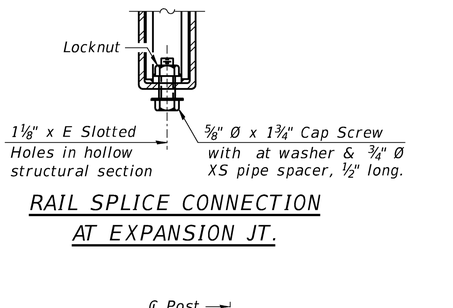
PLAN-BOTT. SPLICE PL TYPICAL



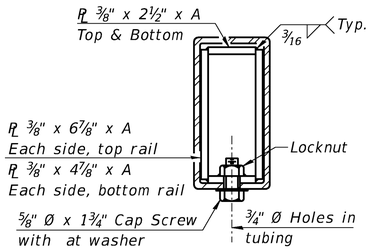
SECTION B-B



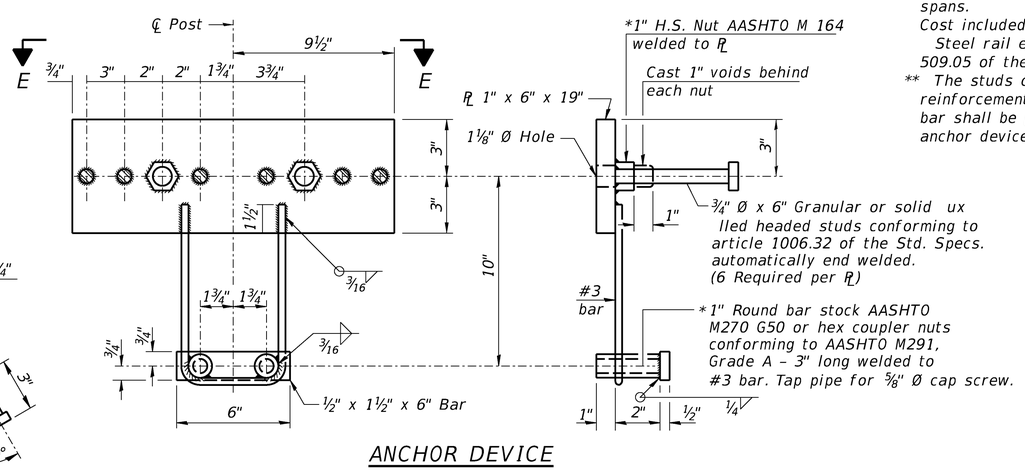
PL ½" x 7" x 6"



RAIL SPLICE CONNECTION AT EXPANSION JT.

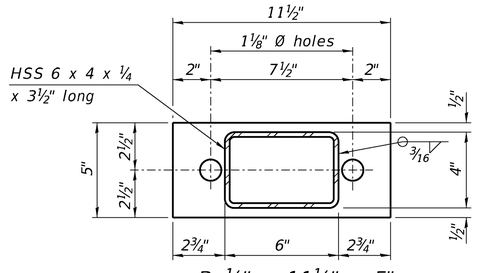


SECTION AT RAIL SPLICE

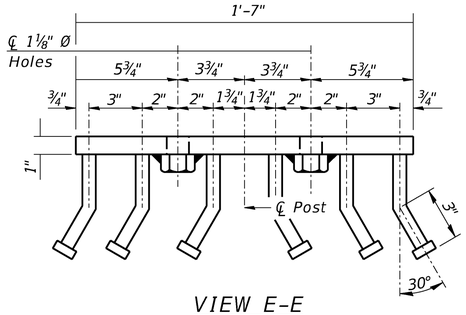


ANCHOR DEVICE

*Threaded areas shall be plugged or blocked o during casting of slab. Galvanized after fabrication.



PL ½" x 11½" x 5"



VIEW E-E

Notes:

For multi-span bridges, su cient ¼" x 6" x 1'-2" galvanized steel shims shall be provided to align rail between adjacent spans.

Cost included with Steel Railing, Type SM.

Steel rail elements shall be galvanized according to Article 509.05 of the Standard Speci cations.

*** The studs of the anchor devices shall be placed below the top reinforcement bars and the outermost longitudinal reinforcement bar shall be placed directly above the studs of the rail post anchor device.*

SPLICE DIMENSIONS

T	D	A	B	C	E
≤ 4"	2½"	1'-8"	2"	4"	2½"
> 4" ≤ 6½"	3¾"	2'-0"	2½"	5½"	3½"
> 6½" ≤ 9"	5"	2'-4"	3½"	6½"	9"
> 9" ≤ 13"	7"	2'-10"	4½"	8½"	11"
Rail Splice	¼"	1'-8"	2"	4"	———

T = Total movement at expansion joint as shown on the design plans.

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type SM	Foot	

2-17-2017 (6'-3" Maximum Post Spacing)

FILE NAME = I:\Municipalities\McLean County\7857 - Baker Bridge Repairs\CADD\CADD_Structure\SMrailing.dgn

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STATE OF ILLINOIS
MCLEAN COUNTY HIGHWAY DEPARTMENT

STEEL RAILING, TYPE SM
STRUCTURE NO. 057-4915
SHEET NO. 9OF 9 SHEETS

FAS RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
489	20-00041-06-BR	MCLEAN		
EXIST SN 057-4915		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

Appendix 2

Habitat Assessment Report

ILLINOIS
Illinois Natural History Survey
PRAIRIE RESEARCH INSTITUTE

Aquatic
Survey Report

Freshwater Mussel Relocation in the Mackinaw River (Illinois River Basin) at the McLean County Highway 21/2600 E (FAS 489) Bridge in McLean County, Illinois

IDOT Sequence Number 23718

Prepared by:
Alison P. Stodola

INHS/IDOT Statewide Biological Survey & Assessment Program
2021:46

15 September 2021

PROJECT SUMMARY

This report is submitted in response to a request from IDOT to INHS for a freshwater mussel relocation in the Mackinaw River (Illinois River drainage) at the McLean County Highway 21/2600 E (FAS 489) bridge (IDOT Sequence No. 23718) in McLean County, Illinois. The mussel relocation was completed by INHS personnel on 8 September 2021.

During this relocation, freshwater mussels were collected by completing 32 multiple-pass 3.28 ft-wide transects over a 105-ft-long stretch of the stream directly under the McLean County Highway 21/2600 E (FAS 489) bridge. Three species of mussels were collected and relocated from the area under the Highway 21/2600 E bridge, and none of the species collected are listed as endangered or threatened at the state or federal level.

Surveys Conducted By: Alison P. Stodola, Assistant Aquatic Field Biologist
Rachel M. Vinsel, Senior Scientific Specialist
Hugo Y. Ruellan, Graduate Research Assistant
Aaron L. Devine, Hourly Assistant
William E. Nixon, Hourly Assistant
Molly C. Carlson, Hourly Assistant

Report Edited By: Mark J. Wetzel

GIS Layers: Janet L. Jarvis, GIS and Remote Sensing Specialist

University of Illinois
Prairie Research Institute
Illinois Natural History Survey
Statewide Biological Survey and Assessment Program
1816 South Oak Street
Champaign, Illinois 61820

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Cover Photo: The Mackinaw River at the McLean County Highway 21/2600 E (FAS 489) bridge, McLean County, Illinois (Latitude 40.60587°N, Longitude 88.7645°W). Photo was taken from downstream (southwest) of the bridge, facing upstream (northeast) on 8 September 2021. Photo by A.P. Stodola, INHS.

INTRODUCTION

This report is submitted in response to a request on 5 February 2021 by Vincent Hamer of the Illinois Department of Transportation (IDOT) to Rachel Vinsel of the Illinois Natural History Survey (INHS) for a freshwater mussel relocation in the Mackinaw River at the McLean County Highway 21/2600 E (FAS 489; Section 20-00041-06-BR; Structure No. 057-4915) bridge in McLean County, Illinois [IDOT Sequence No. 23718, INHS Project No. FS-1514]. This reach of the Mackinaw River is listed on the Illinois Natural Areas Inventory (INAI) by the Illinois Department of Natural Resources (IDNR) Division of Natural Heritage due to presence of a high quality natural community (Category I), specific suitable habitat for state-listed species or state-listed species relocations (Category II), state dedicated Nature Preserves, Land and Water Reserves, and Natural Heritage Landmarks (Category III), and unusual concentrations of flora or fauna and high quality streams (Category VI) (IDNR 2013; INAI 2020). The McLean County highway department proposes removal and replacement of the deck of the existing 4-span 293' long x 32' wide bridge on wide flange beams, replacement of the guardrail on all four quadrants, and adding scour countermeasures (riprap) where needed.

In this report, we summarize the results of the freshwater mussel relocation conducted in the Mackinaw River at the McLean County Highway 21/2600 E (FAS 489) bridge by INHS personnel on 8 September 2021.

PROJECT AREA

The McLean County Highway 21/2600 E project (FAS 489; Section 20-00041-06-BR; Structure No. 057-4915) is located on the Merna Quadrangle U.S.G.S. Topographic map and occurs approximately 1 mile southwest of Pleasant Hill in McLean County, Illinois - in Township 26N, Range 4E, Sections 20 & 21 at Latitude 40.60587°N, Longitude 88.7645°W (**Figure 1**).

Appendix 1 references an Arc-GIS shapefile with sampling point information for the stream crossing discussed in this report.

HABITAT CHARACTERIZATION

During our site visit on 8 September 2021, the Mackinaw River under the McLean County Highway 21/2600 E (FAS 489) bridge was approximately 57 feet wide and 2 feet deep (ranged from 0.25 to 3 feet deep), with a flow of 0.25 feet/second. The entire relocation area was wadeable. Substrates in the relocation area included boulder (2%), cobble (2%), gravel (31%), sand (26%), silt (2%), hardpan clay (15%), and coarse woody debris (22%). Areas of woody debris present during our site visit were primarily in the form of large timbers that had accumulated on the upstream (east) side of the bridge (**Figure 2**) and along the south bank of the river. Most of the area under and directly adjacent to the McLean County Highway 21/2600 E (FAS 489) bridge did not have suitable habitat for freshwater mussels due to scouring around the timber accumulation directly at the bridge and just upstream (east) of the bridge. A large debris dam was present approximately 150 feet upstream (east) of the McLean County Highway 21/2600 E (FAS 489) bridge, and the river is creating an oxbow just upstream of the bridge to route around this debris dam during high flow. This hydrologic event has created areas of scour directly downstream (west) of the debris dam (i.e., under the McLean County Highway 21/2600 E bridge) that has removed most of the finer substrates in this specific stretch of the river. Most

of the substrates on the north side of the river directly under the bridge consisted of hardpan clay (**Figure 3**). Sand and gravel were present underneath the bridge on the south side of the river, but these areas were also heavily scoured and were considered poor habitat for freshwater mussels. Water levels during the relocation effort were at or below baseflow for this stream during this season.

The habitat downstream (west) of the McLean County Highway 21/2600 E (FAS 489) bridge consisted of more stable gravel/sand riffles separated by slow flowing sandy pools with woody debris. An area approximately 300 yards downstream of the McLean County Highway 21/2600 E (FAS 489) bridge was selected to receive the relocated mussels (i.e., recipient area) due to the presence of stable, consolidated sand/gravel and flowing water.

BACKGROUND

The Mackinaw River is a major tributary of the Illinois River in central Illinois. The Mackinaw River flows westerly through Ford, McLean, Woodford, Tazewell, and Mason counties before emptying into the Illinois River at Illinois River mile 147.8, about 8.5 miles WSW of Pekin, Illinois. The primary land use in the Mackinaw River basin is row-crop agriculture, which contributes to significant sedimentation in the watershed, especially in the lower section of the basin (west of Bloomington). This current project at the McLean County Highway 21/2600 E (FAS 489) bridge is situated in upper half of the basin, but this site is located in the portion of the Mackinaw Basin that transitions from channelized stream reaches into a more meandering, forested, stream. The Mackinaw River in the lower half of the basin is comprised of areas unconsolidated sand, woody debris accumulation, and sloughing banks due to accumulated effects from moraine runoff and modifications for intensive agricultural drainage (Price et al. 2011).

Freshwater mussels have not been surveyed at the Mackinaw River near the McLean County Highway 21/2600 E (FAS 489) bridge within the past 20 years (INHS Mollusk Collections Data 2021; **Table 1**). One survey was completed in 2013 at the old U.S. Route 66 bridge, which is approximately 3 miles downstream (northwest) of the McLean County Highway 21/2600 E (FAS 489) bridge. Three live species and nine total species were recorded at that survey in 2013 (**Table 1**; INHS Mollusk Collections Data 2021). Mussels were surveyed in 1987 and 1995 at the McLean County Highway 21/2600 E (FAS 489) bridge; 13 species (two as shell only) and 10 species (all as shell) were recorded in those surveys, respectively (**Table 1**).

This reach of the Mackinaw River is on the Illinois Natural Areas Inventory due to presence of a high-quality natural community (Category I), specific suitable habitat for state-listed species or state-listed species relocations (Category II), state dedicated Nature Preserves, Land and Water Reserves, and Natural Heritage Landmarks (Category III), and unusual concentrations of flora or fauna and high-quality streams (Category VI) (IDNR 2013; INAI 2020). No species listed at the state or federal level have been recorded in this stretch of the Mackinaw River and all species known from this reach of the Mackinaw River are common inhabitants of central Illinois streams (Cummings and Mayer 1992; Cummings and Mayer 1997; Douglass and Stodola 2014; Tiemann et al. 2007; IESPA 2020; U.S. Department of the Interior, Fish and Wildlife Service [USDI, FWS] 2021).

METHODS

A relocation for freshwater mussels was conducted in the Mackinaw River at the McLean County Highway 21/2600 E (FAS 489) bridge on 8 September 2021 by INHS personnel A.P. Stodola, H.Y. Ruellan, M.C. Carlson, W.E. Nixon, A.L. Devine, and R.M. Vinsel.

Mussels were collected using a moving transect method to ensure that most animals were collected and relocated. Transects that were 3.28 feet (1 m) wide and ran perpendicular to stream flow were established within the area of direct impact. The area of direct impact consisted of a 105 foot (35 yards) long stream reach that was centered upon the midpoint of the bridge. During this relocation, 32 transects were established across the stream, and transects were sampled from the downstream-most to the upstream-most transect. Mussels were sampled within each transect using tactile and visual search methods. Substrates were disturbed to a depth of approximately 1.5 inches (4 cm) to uncover buried mussels and transects were searched at a rate that did not exceed 20 seconds/ft^2 (1 min/m^2). Each transect was resampled until the subsequent pass no longer yielded ≥10% of the total individuals collected in that transect. All mussels collected were processed separately for each pass within each transect and were identified to species and measured. Mussels were held in mesh bags in the stream except during processing.

A recipient area approximately 300 yards downstream (west) of the relocation site was selected on 8 September 2021 and was based on the presence of suitable substrate for freshwater mussels (e.g., stable, consolidated sand and gravel with flowing water).

Nomenclature used for freshwater mussels discussed in this report follows Williams et al. (2017). Voucher material of mollusks collected were deposited in the Illinois Natural History Mollusk Collection.

RESULTS AND DISCUSSION

On 8 September 2021, six live mussels representing three live species were collected and relocated by INHS personnel from the Mackinaw River in the relocation area at the McLean County Highway 21/2600 E (FAS 489) bridge (**Table 1; Figure 2; Appendix 2**). Six additional species of freshwater mussels were recorded as shell only. All mussels collected during the present relocation are common inhabitants of central Illinois streams (Cummings and Mayer 1992; Cummings and Mayer 1997; Tiemann et al 2007). None of the species collected during this relocation are listed as threatened or endangered at the state or federal level (IESPA 2020; USDI, FWS 2021).

Thirty-two transects (each 3.28 feet wide) were sampled. Wetted stream widths ranged from 21 to 75 feet and averaged 57 feet long (**Appendix 3**). The total length of transects sampled was 1822.7 feet, which calculates to an area of 5978.4 ft^2. A total of six mussels were collected in the relocation area, thus density of freshwater mussels in the relocation area was approximately 1 mussel for every 1000 ft^2. Though previous surveys have confirmed the presence of unusual concentrations of freshwater mussels at multiple sites in the Mackinaw River, this specific site underneath the McLean County Highway 21/2600 E (FAS 489) bridge on

the Mackinaw River would not meet the criteria listed by the INAI based solely on the freshwater mussel population.

ACKNOWLEDGMENTS

INHS personnel Hugo Y. Ruellan, Rachel M. Vinsel, Aaron L. Devine, Molly C. Carlson, and William E. Nixon assisted with field work. Janet L. Jarvis (INHS) prepared the map in **Figure 1** and the associated shape file referenced in **Appendix 1,** and Mark J. Wetzel edited early drafts of the report.

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Table 1. Freshwater mussel collections from the Mackinaw River in McLean County, Illinois (INHS Mollusk Collections Data 2021) within three miles of the McLean County Highway 21/2600 E (IDOT Sequence No. 23718; Section 20-00041-06-BR; Structure No. 057-4915) project area. Mussels collected by INHS personnel on 8 September 2021 are bounded by a black border.

		-------CR 2600E-------			Route 66
Scientific Name	**Common Name**	**2021**	**1995**	**1987**	**2013**
Amblema plicata	Threeridge	relict	relict	5	relict
Cyclonaias pustulosa	Pimpleback	dead	relict	5	58
Fusconaia flava	Wabash Pigtoe	dead	relict	2	
Lampsilis cardium	Plain Pocketbook	1	relict	14	1
Lampsilis siliquoidea	Fatmucket	4	dead	22	1
Lampsilis teres	Yellow Sandshell			1	relict
Leptodea fragilis	Fragile Papershell	relict	relict	3	dead
Pleurobema sintoxia	Round Pigtoe	1		5	
Potamilus alatus	Pink Heelsplitter		dead		dead
Quadrula quadrula	Mapleleaf			1	
Venustaconcha ellipsiformis	Ellipse	relict	relict	5	dead
Alasmidonta marginata	Elktoe			dead	
Anodontoides ferussacianus	Cylindrical Papershell			1	
Lasmigona complanata	White Heelsplitter	relict	dead	6	
Pyganodon grandis	Giant Floater				relict
Strophitus undulatus	Creeper		relict	dead	
	Total Individuals	**6**	**0**	**70**	**60**
	Live Species	**3**	**0**	**12**	**3**
	Total Species	**9**	**10**	**14**	**9**

Figure 1. Mackinaw River project (IDOT Sequence No. 23718) at the McLean County Highway 21/2600 E (FAS 489) bridge (Section 20-00041-06-BR; Structure No. 057-4915) site in McLean County, Illinois, where a freshwater mussel relocation was conducted by INHS personnel on 8 September 2021.

Figure 2. The McLean County Highway 21/2600 E (FAS 489) bridge project, McLean County, Illinois on 8 September 2021. Top image taken from upstream of the bridge, facing north, and shows coarse woody debris accumulation on bridge pylon. Bottom image taken from downstream of the bridge, facing upstream (east), showing scoured banks and hardpan substrate. Photos by A.P. Stodola, INHS.

Figure 3. Representatives of freshwater mussels collected at the McLean County Highway 21/2600 E (FAS 489) bridge project, McLean County, Illinois on 8 September 2021. Top left, Fatmucket. Top right, Plain Pocketbook. Bottom, Round Pigtoe. Image by A.P. Stodola, INHS.

Appendix 1

Appendix 1: The appendix references an ArcGIS shapefile < 23718_Mussel_Survey_GIS.zip > with sampling point information for the stream crossing of the Mackinaw River at the McLean County Highway 21/2600 E (FAS 489) bridge (IDOT Sequence No. 23718; Bridge Section 20-00041-06-BR; Structure No. 057-4915), McLean County, Illinois (Latitude 40.60587°N, Longitude 88.7645°W), where a freshwater mussel relocation was conducted by INHS personnel on 8 September 2021.

The ArcGIS shapefile and this report were both submitted to IDOT via the IDOT Site Assessment Tracking System extranet website (Frostycap) on 15 September 2021.

Appendix 2

Appendix 2: Raw mussel data associated with freshwater mussels collected in the Mackinaw River at the McLean County Highway 21/2600 E (FAS 489) bridge, McLean County, Illinois, by INHS personnel on 8 September 2021.

Data associated with freshwater mussels collected during transects: mm=total length in mm of mussel; GRC=external growth ring count; Sex=Sex of mussel (if determinable; M=male, F=female).

Transect	Pass	Species	mm	GRC	Sex
1	1	no mussels			
2	1	no mussels			
3	1	no mussels			
4	1	*Lampsilis siliquoidea*	97	13	M
5	1	*Pleurobema sintoxia*	52	8	
6	1	no mussels			
7	1	no mussels			
8	1	*Lampsilis siliquoidea*	80	11	F
9	1	no mussels			
10	1	no mussels			
11	1	no mussels			
12	1	no mussels			
13	1	no mussels			
14	1	no mussels			
15	1	no mussels			
16	1	no mussels			
17	1	no mussels			
18	1	*Lampsilis siliquoidea*	84	17	M
19	1	no mussels			
20	1	no mussels			
21	1	no mussels			
22	1	no mussels			
23	1	no mussels			
24	1	no mussels			
25	1	no mussels			
26	1	no mussels			
27	1	no mussels			
27	2	*Lampsilis cardium*	96	15	M
28	1	no mussels			
29	1	no mussels			
30	1	no mussels			
31	1	no mussels			
32	1	no mussels			
32	2	*Lampsilis siliquoidea*	80	7	M

Appendix 3

Appendix 3: Raw habitat data associated with freshwater mussels collected in the Mackinaw River at the McLean County Highway 21/2600 E (FAS 489) bridge, McLean County, Illinois, by INHS personnel on 8 September 2021.Transects are ordered from downstream-most (1) to upstream-most (32).
Data collected from transects: transect width (ft) and substrate percentages (boulder, cobble, gravel, sand, silt, hardpan [clay], and coarse woody debris [CWD]).

Transect	width (feet)	boulder	cobble	gravel	sand	silt	Hard pan	CWD
1	51.2	0	0	30	30	0	25	15
2	53.5	0	0	30	30	0	30	10
3	55.4	0	0	30	30	0	30	10
4	59.0	0	0	30	30	0	30	10
5	57.4	0	0	50	15	5	15	15
6	54.8	0	5	40	15	0	30	10
7	51.8	5	5	25	20	0	20	15
8	51.5	0	10	25	20	0	15	30
9	51.8	0	0	25	25	0	25	25
10	50.8	0	0	25	25	0	25	25
11	72.2	0	0	25	25	0	25	25
12	73.5	0	5	35	5	0	35	10
13	74.8	0	0	45	20	10	15	10
14	74.8	10	5	25	25	5	10	25
15	74.8	0	5	25	30	0	15	25
16	74.8	0	0	30	30	0	0	40
17	74.8	0	0	30	30	0	0	40
18	74.8	0	10	25	25	0	0	40
19	74.8	20	0	10	20	0	0	50
20	74.8	20	0	10	20	0	0	50
21	63.6	0	5	30	30	0	15	20
22	53.8	0	10	30	15	0	15	30
23	54.1	10	0	0	40	0	0	50
24	55.8	0	0	50	5	0	15	30
25	57.4	0	0	30	30	0	10	30
26	59.0	0	0	30	50	10	10	0
27	60.7	0	0	50	10	10	20	10
28	38.0	0	0	50	15	0	30	5
29	31.5	0	0	40	40	10	0	10
30	24.9	0	0	40	40	10	0	10
31	21.6	0	0	45	40	0	0	15
32	21.0	0	0	40	40	0	5	15

ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

AQUATIC SURVEY REPORT

Survey for the Mudpuppy, *Necturus maculosus*, in the Mackinaw River at North 2600 East Road (FAS 489), McLean County, Illinois

IDOT Sequence No. 23718

Prepared by:
Andrew R. Kuhns

INHS/IDOT Statewide Biological Survey & Assessment Program

2021: 6

PROJECT SUMMARY

This report details results of trapping surveys for the Mudpuppy, *Necturus maculosus*, in the Mackinaw River. IDOT proposes replacing the concrete deck and guardrails on Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). Information on the natural history and ecology of the Mudpuppy, the only threatened or endangered amphibian known from the project area, can be found in **Appendix A**. A survey was conducted by INHS Further Studies Herpetologist A.R. Kuhns from 07 through 10 March 2021 under Illinois Department of Natural Resources (IDNR) State Threatened and Endangered Species Permit 10812 as required under the Illinois Endangered Species Protection Act (520 ILCS 10/4) and IDNR Herptile Scientific and Research Collecting Permit (HSCP 19-04). Survey methods are detailed in **Appendix B** and are approved under University of Illinois IACUC protocol 19038. The project location can be seen in **Figure C.1** of **Appendix C**. Images taken during the survey can be found in **Appendix D**. The spatial data shown in **Figure C.1** of **Appendix C** were digitally uploaded to the Further Studies Illinois Site Assessment Tracking System (http://frostycap.isgs.uiuc.edu/idot_extranet/further_studies) and are herein referenced as **Appendix E.** One Mudpuppy, *Necturus maculosus*, was captured from the reach of the Mackinaw River where the bridge crossing is proposed.

Approved By: Kevin S. Cummings, Further Studies Aquatics Group Coordinator-Malacologist

Surveys Conducted By: Andrew R. Kuhns, Herpetologist

Edited by: Mark J. Wetzel, Oligochaetologist — Emeritus

GIS Layers: Janet L. Jarvis, GIS and Remote Sensing Specialist

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Cover Photo: Mackinaw River under Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR) looking downstream (west); photograph by A.R. Kuhns, INHS.

INTRODUCTION

In a transmittal dated 05 February 2021, Vincent Hamer of the Illinois Department of Transportation (IDOT) Bureau of Design and Environment tasked the Illinois Natural History Survey (INHS) to conduct a survey for the Mudpuppy, *Necturus maculosus*, in the Mackinaw River. The project transmittal from IDOT summarizes the project as consisting of replacement of the concrete deck, replacement of guardrails, and to provide riprap where needed for Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). Information on the natural history and ecology of the Mudpuppy can be found in **Appendix A**.

PROJECT AREA

This project area is 2.5 miles SSE of Lexington, Illinois at WGS 84 coordinates 40.60590 -88.76449 (**Appendix C: Figure C.1**). Land use within the ESR consists of closed canopy floodplain woods and a residence (**Appendix D: Plate 1**). Patton Creek flows into the Mackinaw River 40 feet upstream of Structure No, 057-4915. The substrate of the Mackinaw River within the ESR limit consisting of silt, sand, and gravel. During surveys, the was an abundance of large tree trunks, root balls, and limbs in the river and could serve as potential refugia for Mudpuppy.

METHODS

Database Review

The Illinois Natural Heritage Database maintained by the Illinois Department of Natural Resources (IDNR) was queried for Element Occurrence Records (EOR) of threatened and endangered amphibians and reptiles near the project boundary. Each EOR may be subdivided into multiple Element of Occurrence Identification numbers (EOID) to record separate identification events or sub-locations. Additionally, a search of both vouchered and un-vouchered specimens in the Illinois Natural History Survey (INHS), University of Illinois Museum of Natural History (UIMNH), and non-INHS Illinois Amphibian and Reptile databases – all three of which are maintained by the Illinois Natural History Survey – was conducted. Together these databases are merged and accessed through the All_IL_Herps database at INHS and are updated semi-annually.

Field Methods

The project area was visited on 07 March 2021 by INHS Further Studies Herpetologist A.R. Kuhns to determine site access and assess habitat conditions. I set five 18” x 8” x 8” Frabill Pinfish Traps in the Mackinaw River between coordinates 40.60554 -88.76391 and 40.60602 -88.76471. Traps were baited with canned sardines and placed upstream of potential Mudpuppy refugia such as undercut banks, logjams, and toppled tree trunks and concrete slabs. Traps were tethered to limbs and roots to prevent them from washing downstream. I checked traps on 08 and 09 March and checked and pulled traps on 10 March 2021. Any encountered Mudpuppy were weighed, measured, sexed, tagged, and photographed and I took a tissue

sample as a museum sample. Survey methods are approved under University of Illinois IACUC protocol 16-057 (University of Illinois, Office of the Vice Chancellor for Research, Animal Use Protocol Process 2016).

RESULTS

Database Review

There is an EOR location for the Mudpuppy from the Mackinaw River near U.S. Route 66 in Lexington, IL (Kuhns 2012). The location of the EOR places it approximately 3.75 river mile downstream of Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR).

Field Surveys

I captured one Mudpuppy (**Appendix D: Plate 1**) in 21 trap nights. A thin clip of the tail was taken as a tissue sample and accessioned into the INHS Unvouchered Herpetological Tissue Collection. The individual was released back into the Mackinaw River at its capture locations. No other herpetofauna were encountered during the survey.

DISCUSSION/SUMMARY

The Mudpuppy was known to occur in the Mackinaw River downstream of Structure No. 057-4915 carrying North 2600 East Road over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). Sampling from 07 through 10 March 2021 confirmed their presence in the Mackinaw River at Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). This record was submitted to the IDNR Natural Heritage Database on 11 March 2021 (**Appendix F**).

LITERATURE CITED

Kuhns, A.R. 2012. Habitat Assessment and Surveys for the Kirtland's Snake, *Clonophis kirtlandii*, and Mudpuppy, *Necturus maculosus*, in the Tier Four High Speed Rail Corridor from Pontiac, Illinois to Lincoln, Illinois. INHS/IDOT Statewide Biological Survey and Assessment Program Report 2012(50): 1-10.

APPENDIX A.

Natural History of the Mudpuppy, *Necturus maculosus*, Listed as Threatened in the State of Illinois.

SYNOPSIS

This appendix contains information on the Mudpuppy, *Necturus maculosus*, a species listed as threatened in the State of Illinois. In 2012, this species was captured from the Mackinaw River, 3.75 river miles downstream of Structure No. 057-4915 carrying North 2600 East Road over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). The species account includes: diagnostic characters, range in Illinois, habitat requirements, spatial ecology and activity, reproduction, and the suitable sampling season in Illinois. Standard and scientific names follow Crother (2012).

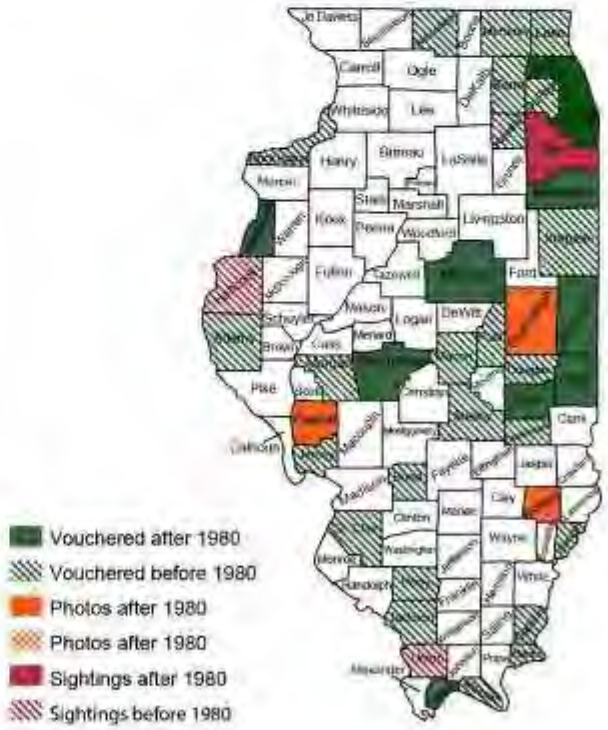
Species range maps were created by Ethan J. Kessler (INHS). Maps were based upon data in the Illinois Natural History Survey's All_IL_Herps Database which contains records of vouchered and un-vouchered specimens in the Illinois Natural History Survey (INHS), University of Illinois Museum of Natural History (UIMNH), and amphibian and reptile specimens from ~30 other scientific museums. The database is maintained by INHS/UIMNH Amphibian and Reptile Curator, Christopher A. Phillips, with records from other institutions updated annually.

LITERATURE CITED

Crother, B.I. 2012. Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. 7th Edition. SSAR Herpetological Circular. 39: 1–101.

MUDPUPPY, *NECTURUS MACULOSUS*

General Description for Identification: The Mudpuppy is a large (up to 19" in length, but averages 12"), fully aquatic salamander distinguished from other salamanders in Illinois by having four toes on the hind feet and large bushy gills. A dark line that bisects the eye terminates at the external gills and the species often has dark blotches on its sides and tail (Petranka 1998).



Range: The Mudpuppy range extends from southern Quebec to northern Alabama, Mississippi, and Georgia. While there are records documenting its occurrence throughout Illinois, these records are spotty, with large areas in the state from which the species has not yet been recorded.

Suitable Habitat: The Mudpuppy occurs in a multitude of habitats including muddy canals, large fast-flowing rivers, and large cool water lakes (Petranka 1998). In Illinois, they primarily inhabit lakes, ponds and large creeks with clear water, but can survive in alternative habitat if rocky areas are available for reproduction (Phillips et al. 1999).

Reproduction: The species is most active in late fall/early winter when breeding occurs, although a second breeding bout may occur in late winter and early spring. Females deposit eggs in nests under rocks, logs and other cover objects in May and June (Petranka 1998). Eggs hatch in one to two months and the larvae do not reach reproductive age for five years.

Activity: Mudpuppy are predatory and will consume what will fit in their mouth. Prey consists mostly of invertebrates (annelids, insects, mollusks, and crayfish) but may also include amphibians and fish. Mudpuppy are primarily nocturnal. During the day they shelter under rocks, logs, bank undercuts, and other cover objects. They primarily forage for food at night but in weedy and muddy habitats they may be active during the day (Petranka 1998). Mudpuppy appear to be most active at cooler water temperatures with most captures occurring at water temperatures around 40° Fahrenheit (Chellman and Parrish 2010). There is some data that suggests that Mudpuppy move into shallower water during the fall and winter to breed, spending the rest of the year in deeper and cooler waters.

Suitable Sampling Seasons: Because mudpuppy are most active at cooler water temperatures, most recommend sampling in the fall and winter months. In Illinois that is late September through early March.

Illinois Status: The Mudpuppy is listed as a threatened species in the state of Illinois due to a decrease in recent observations of the species in the state (Illinois Endangered Species Protection Board 2015). Further, the Mudpuppy is the only known glochidial host of the salamander mussel, *Simpsonaias ambigua* (Mollusca, Unionidae). The salamander mussel is an endangered species in Illinois (IESPB 2015) and a candidate for federal listing by the United States Fish and Wildlife Service and conserving *N. maculosus* may aid in the conservation of *S. ambigua* (Mankowski 2010).

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Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press. Washington D.C. 587 pp.

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APPENDIX B

Sampling methods appropriate for the detection of amphibians and reptiles listed as endangered or threatened in the state of Illinois.

Table B.1. Species of amphibians and reptiles listed as threatened or endangered in Illinois and potential sampling methods for their detection.

		State Listed Herptiles	Threatened	Endangered	Dip-Net	Minnow Trap	Call Survey	Visual Encounter	Hoop Trap	Fyke Net	Seine	Drift Fence	Coverboard
AMPHIBIANS	SALIENTIA	*Ambystoma jeffersonianum*	X		■	■		■				■	
		Ambystoma platineum		X	■	■		■				■	
		Cryptobranchus alleganiensis		X				■					
		Desmognathus conanti		X	■			■					
		Hemidactylium scutatum	X					■				■	
		Necturus maculosus	X		■	■		■			■		
	ANURA	*Hyla avivoca*		X	■	■	■	■					
		Pseudacris streckerii		X	■	■	■	■				■	
		Gastrophryne carolinensis	X		■	■	■	■				■	
REPTILES	TESTUDINES	*Apalone mutica*		X				■	■	■			
		Clemmys guttata		X				■	■				
		Emydoidea blandingii		X				■	■				
		Kinosternon flavescens		X				■	■				
		Macrochelys temminckii		X					■				
		Pseudemys concinna		X				■		■			
		Terrapene ornata	X					■				■	
	SERPENTES	*Clonophis kirtlandii*	X					■				■	■
		Crotalus horridus	X					■				■	
		Pantherophis emoryi		X				■				■	■
		Heterodon nasicus	X					■				■	■
		Masticophis flagellum		X				■				■	■
		Nerodia fasciata		X				■				■	■
		Nerodia cyclopion	X					■				■	■
		Sistrurus catenatus		X				■				■	
		Tantilla gracilis	X					■				■	■
		Thamnophis sauritus	X					■				■	■
		Tropidoclonion lineatum	X					■				■	■

Sampling Methods for the Detection of State Listed Amphibians and Reptiles in Illinois

ACTIVE SAMPLING METHODS

Call Survey**.** This method is only effective for anurans during the breeding season. The researcher either visits wetlands in the evening hours to listen to the frog chorus, or places an audio recording device at the wetland during the day and returns the following morning to retrieve the recording. In either case, the researcher must be familiar with the calls of frogs and toads in the area in order to identify the species based only upon the calls in the chorus. To be effective, the researcher must also be familiar with the ecology of the target species and sample during its breeding season in habitats where it is likely to reside.

Dip Netting. A dip net is useful for sampling aquatic animals and can be used to capture individuals observed or as a means of blindly sampling for aquatic organisms in vegetation choked or turbid water. Typically, a researcher will pull the net along the substrate and through the water column for approximately 3 feet, and then finish the net sweep by pulling the net up and out of the water with the net opening facing upward. The researcher can then remove any substrate or detritus from the net and search for captured animals.

Seine. A seine is a fishing net that hangs vertically in the water column suspended by floats with the bottom edge held down by weights. The net is dragged along the bottom of aquatic habitats and captures aquatic amphibians and reptiles when it is drawn onto shore or scooped out of the water. In many ways, it functions much like a large dip net when used for amphibian and reptile sampling.

Visual Encounter Survey (VES). Visual encounter surveys involve searching appropriate habitat (mainly turning cover items such as logs, rocks and miscellaneous debris and visually scanning open habitats) and recording all species encountered. Surveys can be regimented such as by walking pre-defined grid patterns and time limits, or in a more haphazard wandering pattern. This method is most effective if the researcher is familiar with the target species ecology and can focus on habitat areas where the species is most likely to be encountered, as well as time of day and seasons when the species is most active. A thorough explanation of this technique can be found in Heyer et al. (1994).

PASSIVE SAMPLING METHODS

Drift Fence**.** A drift fence is any object that is placed perpendicular to the ground surface as a way to intercept animals that may be passing through. It is often constructed of hardware cloth or silt fencing buries a few inches into the ground to prevent burrowing; but natural cover items such as large logs or rock formations may also function as a drift fence. Animals are captured by

traveling parallel to the fence until they fall into a receptacle, such as a bucket or coffee can, which has been buried flush with the substrate. Similarly, funnel traps can be placed along the drift fence to capture animals that are walking along the fence. This technique is covered in Heyer et al. (1994) and McDiarmid et al. (2012).

Coverboards**.** Coverboards are essentially any item sitting flush with the substrate under which an amphibian or reptile may seek refuge. Artificial cover boards are often made of plywood or corrugated tin and are placed in areas likely to harbor the species of interest. Coverboards often attract small mammals and invertebrates as well, which may enhance their ability to attract amphibians and reptiles. Well-seasoned artificial cover objects with little vegetation underneath them seem to work better in attracting herptiles, therefore their use most effective for long term projects when they can be set out many months in advance of surveys.

Minnow Trap**.** Traps may be constructed of rope, monofilament, or steel and may have funnels or throats, at one or both ends, which allow the animal to enter the trap body but prevent them from easily exiting the trap. Minnow traps may be cylindrical or rectangular and can be baited or not depending on the target species. If baited, the bait is refreshed every 2 to 4 days. Traps are usually placed so that a portion of the trap placed in water is emergent so that captured animals have access to air and will not drown. However, in riverine environments, where there is little to no probability of capturing non-gilled species, the traps may be fully submerged. Effort is recorded in trap hours (i.e., number of traps multiplied by the number of hours the traps were deployed). Results are reported as the numbers of each species captured.

Hoop Trap**.** These traps work on the same principal as minnow traps but are larger in diameter and have larger throats to allow for the capture of larger animals such as turtles (Legler 1960). All hoop traps are placed such that at least 5cm of the trap is above the surface of the water to ensure captured turtles have access to air. Traps are tied via string or rope to surrounding vegetation to ensure that captured turtles do not roll traps into deeper water and drown. Traps are placed parallel to either the shoreline or potential basking sites. Traps are baited (usually with sardines canned in spring water or oil). Traps are checked daily, and bait is changed every 2 to 4 days. Effort is recorded in trap hours (i.e., number of traps multiplied by the number of hours the traps were deployed). Results are reported as the numbers of each species captured.

Fyke Net**.** This trapping method is essentially a combination of a Drift Fence and a Hoop Trap. It consists of a hoop trap body with a single throat, and long wings and a lead that extend out from the throat in a double V formation (**Figure B.1**). Wings and leads have a lead-line that makes them hang vertically in the water column. This essentially extends the reach of the throat and works well for turtle species that are not attracted to readily available baits. It can be used to intercept turtles entering a cove or attempting to access a popular basking site, by funneling them into the trap body where the throat prevents them from escaping. A description of Fyke Nets can be found in Vogt (1980).

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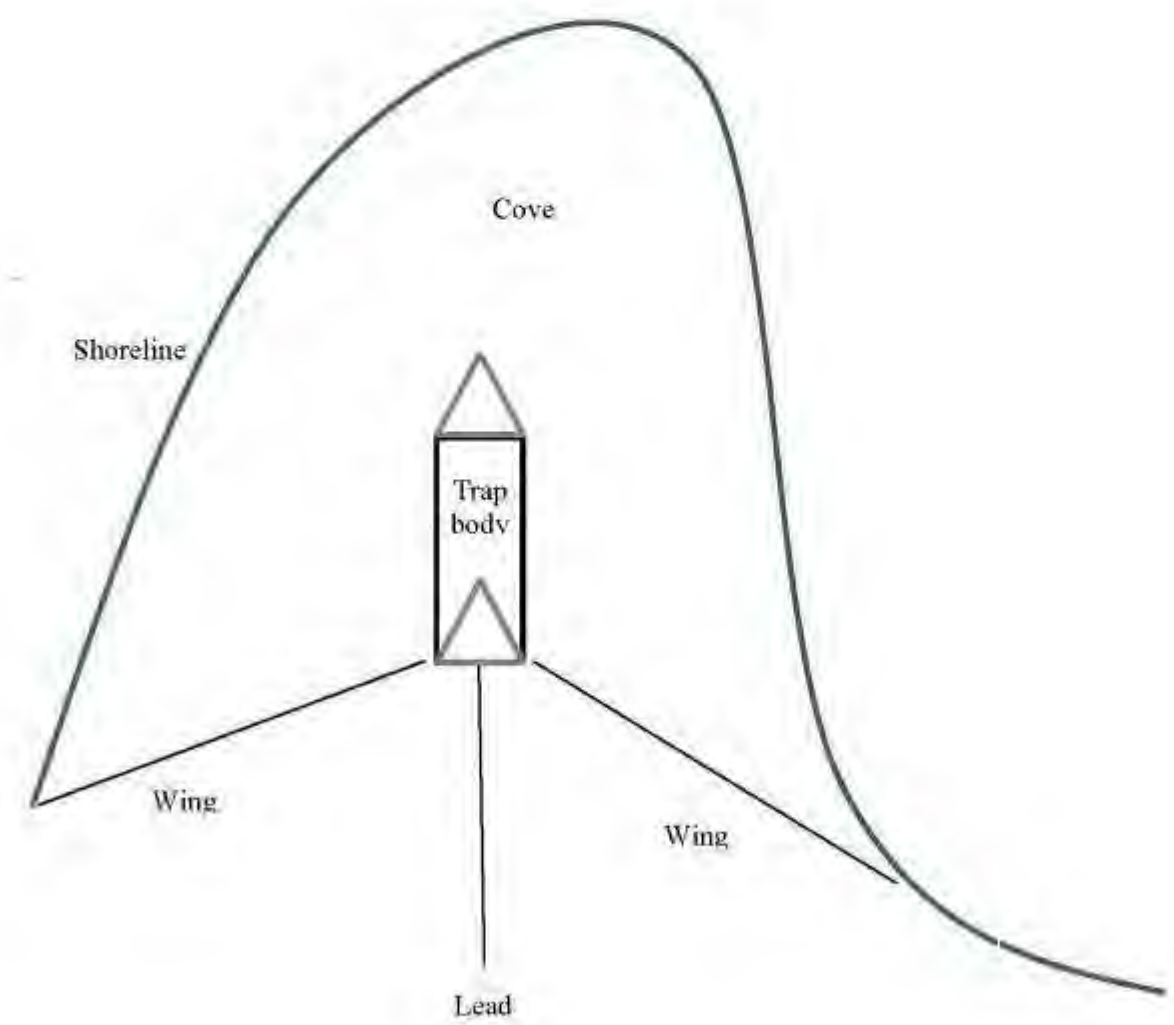
Legler, J.M. 1960. A simple and inexpensive device for trapping aquatic turtles. Proceedings of the Utah Academy of Sciences, Arts and Letters 37**:** 63-66.

McDiarmid, R.W., M.S. Foster, C. Guyer, J.W. Gibbons, and N. Chernoff. Eds. 2012. Reptile Biodiversity: Standard Methods for Inventory and Monitoring. University of California Press. Berkeley. 412 pp.

Vogt, R.C. 1980. New methods for trapping aquatic turtles. Copeia 1980:368-371.

Figure B.1. Fyke Net set to capture turtles attempting to enter a cove (as viewed from above).



APPENDIX C

Figure relevant to the proposed improvements to Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR).

Figure C.1. Area trapped for the Mudpuppy in relation to the Environmental Survey Request for Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR).

APPENDIX D

Plates relevant to the proposed improvements to Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR).

Plate 1. Confluence of Patton Creek and the Mackinaw River directly upstream (west) of Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). Note the large logjam blocking the flow of much of the Mackinaw River. Photographs by A.R. Kuhns, INHS.

Plate 2. Mackinaw River looking downstream (east) of Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). Photographs by A.R. Kuhns, INHS.

Plate 3. Mudpuppy *Necturus maculosus* captured 10 March 2021 in the Mackinaw River during aquatic surveys conducted by INHS herpetologist A.R. Kuhns during a biotic survey assessment for Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR). Photograph by A.R. Kuhns, INHS.

APPENDIX E

Arc-GIS Shapefiles

An ArcGIS folder <23718_Mudpuppy_Survey_GIS.zip > containing an Arc-GIS shapefile of the sampled area constitutes this appendix. The ArcGIS shapefile and this report will be submitted to IDOT via the IDOT Site Assessment Tracking System.

APPENDIX F

Element Occurrence Record submitted to the Illinois Department of Natural Resources on 11 March 2021

Illinois Natural Heritage Database
Endangered /Threatened Species Occurrence and Sighting Report Form

Name of Species: *Necturus maculosus* **Date Last Observed:** 10 Mar 21

New Sighting x or **Update** ____ Entire extent of occurrence is: ____ **known** OR x **not known**

Naturally Occurring x or **Introduced** ____ **When?** ____ **From Where?** ____
Location

Location: (For more accurate mapping, please provide a map showing the exact location, or if available, provide GIS data) Sangamon River, Mahomet, Champaign County, IL

County: McLean **Latitude** 40.60544 **Longitude** -88.76391
40.60602 -88.76471

Direction from Nearest Landmark: Mackinaw R @ N 2600 East Road, near.confluence of Patton Creek and Mackinaw River

Coordinates above are stretch of river sampled w 7 traps

Legal Description: Township ____ Range ____ Section ____ Quad name ____

INAI Site Name: ____ **Survey Site Name (alias)** ____

Observations:

1 female. 21 trap nights of effort from 07–10 March 2021

This record is 3.75 river miles upstream from the EOR from Kuhns 2012 in Mackinaw R at Rt 66 in Lexington, IL

Description of Area: Sand, silt, gravel streambed with log jams and some concrete slabs. Closed canopy overstory

Comments: Permits IDNR HSCP 19-04, IDNR State T&E Permit 6680, survey conducted for IDOT

IDOT Seq. no. 23718; FS-1514

Catch per unit effort (CPUE) = 0.05 Mudpuppy per trap night

Specimen/voucher #(s): Images & tissue only **Where deposited?** INHS unvouchered herp tissue database

Name of Observer: Andrew R Kuhns

Observer's Phone Number (217) 265 - 6707

Return to:
Illinois Natural Heritage Database Program Manager
Illinois Department of Natural Resources
ORC – Division of Natural Heritage
One Natural Resources Way
Springfield IL 62702-1271

Figure 1. Line denotes approximate reach of Mackinaw River sampled for the Mudpuppy, *Necturus maculosus*, using single throated pinfish traps baited with sardines from 07 through 10 March 2021 by INHS herpetologist A.R. Kuhns during a biotic survey assessment for Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR).

Figure 2. Mudpuppy, *Necturus maculosus,* captured in the Mackinaw River on 10 March 2021 by INHS herpetologist A.R. Kuhns during a biotic survey assessment for Structure No. 057-4915 carrying North 2600 East Road (CH 21) over the Mackinaw River in McLean County, Illinois (IDOT Sequence No. 23718, Section 20-00041-06-BR).

Appendix 3

Maps and Location Exhibits

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

MERNA QUADRANGLE
ILLINOIS-MCLEAN CO.
7.5-MINUTE SERIES

88°52'30" 42 000mE 43 44 50' 45 46 47 48 47'30" 49 860 000FEET 50 51 88°45'
40°37'30" 40°37'30"
1 440 000 FEET
44 98 000mN 97 96 95 35' 94 93 92 91 90 32'30" 89 88 87
1 400 000 FEET
44 85 000mN 40°30'
840 000FEET

Makinaw River
DAMERON RD
N 2100 E RD
N 2275 E RD
E 2250 N RD
PLEASANT HILL RD
Pleasant Hill Cem
Patton Cr
N 2400 E RD
P.J. Killian Airport
Middle Crooked Cr
E 2125 N RD
N 2600 E RD
E 2100 N RD
OLD ROUTE 66
Crooked Cr
N 2150 E RD
N 2100 E RD
N 2500 E RD
E 1900 N RD
N 2150 E RD
Smith Grove Cem
Mahomet Cr
N 2300 E RD
E 1800 N RD
N 2075 E RD
Fletcher
Merna
Merna Cem
E 1600 N RD
Blue Mound
N 2400 E RD
N 2600 E RD
165

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 16T
10 000-foot ticks: Illinois Coordinate System of 1983 (east zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, September 2014
Roads.....HERE, ©2013 - 2014
Names.....GNIS, 2015
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 1972 - 2015

MN
2° 36´ 46 MILS
GN
1° 11´ 21 MILS
UTM GRID AND 2015 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100 000-m Square ID
CK
Grid Zone Designation
16T

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1 MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

ILLINOIS
QUADRANGLE LOCATION

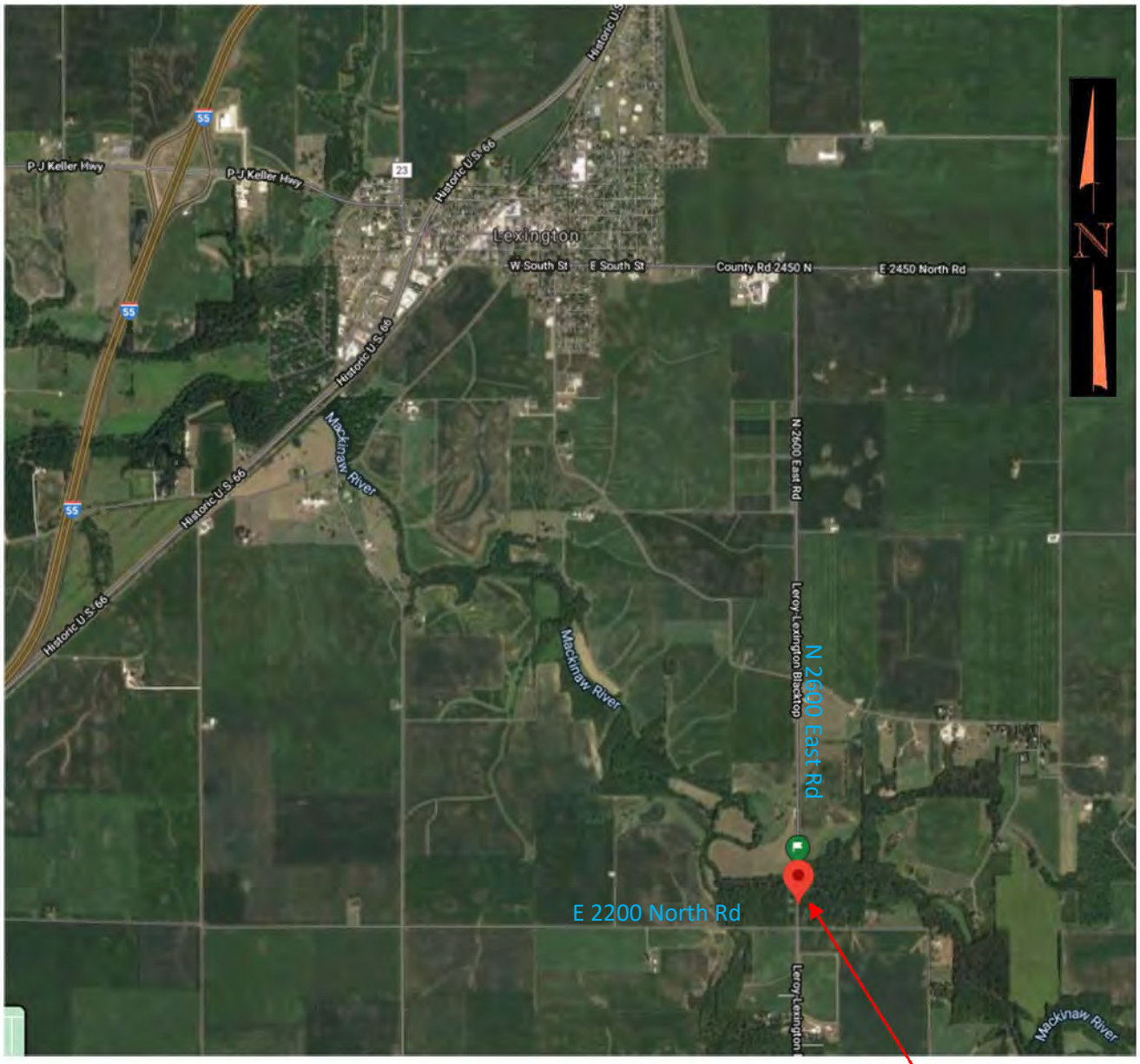
1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Gridley
2 Lexington
3 Chenoa
4 Normal East
5 Cooksville
6 Bloomington East
7 Holder
8 Arrowsmith

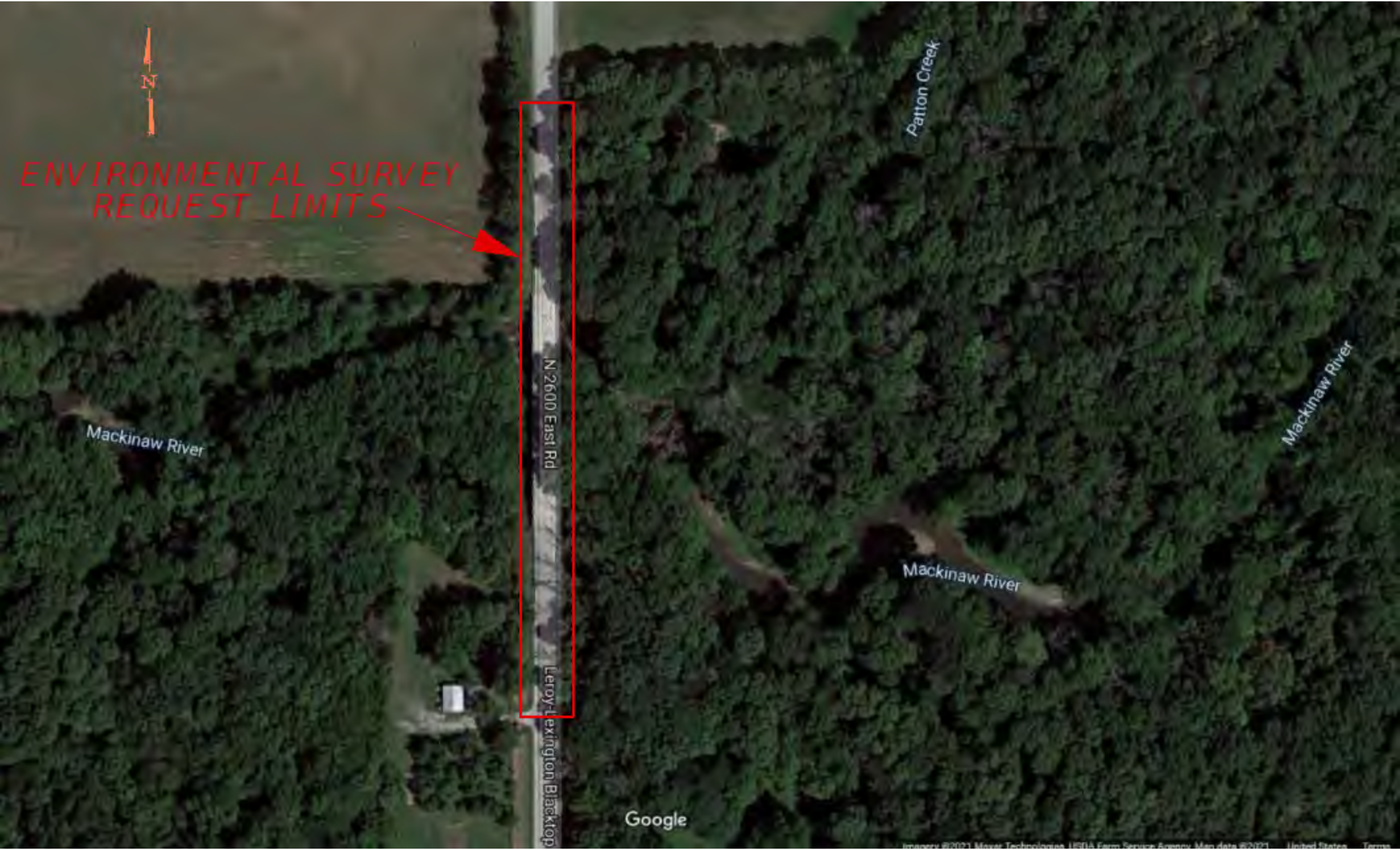
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

MERNA, IL
2015

NSN.
NGA REF NO. USGSX24K28859



Project Location


N
ENVIRONMENTAL SURVEY
REQUEST LIMITS
N 2600 East Rd
Leroy-Lexington Blacktop
Patton Creek
Mackinaw River
Mackinaw River
Mackinaw River
Google

Appendix 4

Photographs

Photograph No. 1 - N 2600 East Rd (Looking North)

Photograph No. 2 - N 2600 East Rd (Looking South)

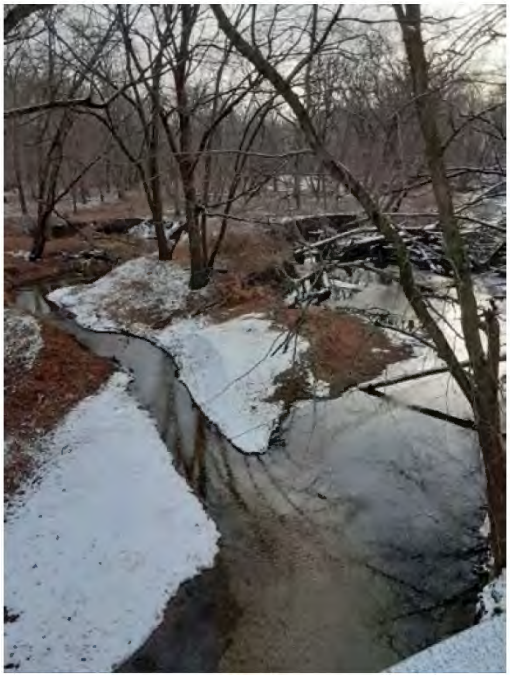
Photograph No. 3 - N 2600 East Road (Looking North)

Photograph No. 4 - N 2600 East Road (Looking South)

Photograph No. 5 – Structure Name Plate

Photograph No. 6 - SW wingwall

Photograph No. 7 - Mackinaw River Looking West



Photograph No. 8 - Mackinaw River Looking East

Photograph No. 9 - North Side of Pier 3

Photograph No. 11 – SE Guardrail Connection

Photograph No. 10 – Bridge West Side

Photograph No. 12 – East Side Surrounding Area

Photograph No. 13 – East Side Surrounding Area

Photograph No. 14 – East Side Looking North

Appendix 5

GIS Shape Files of Construction Limits (Digital)


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

Appendix 6

IDOT Cultural Clearance Memo

Illinois Department of Transportation

Memorandum

To:	Bureau of Local Roads	Attn: Doug DeLong
From:	Jack Elston	By: Brad Koldehoff
Subject:	Cultural Resources - No Historic Properties Affected Clearance	
Date:	April 19, 2021	

McLean County
FAS 489, CH 21, 2600 East Road
Southwest of Pleasant Hill
Sec. 20-00041-06-BR
Seq. 23718

For the above referenced undertaking, IDOT's qualified Cultural Resources staff hereby make a **"No Historic Properties Affected"** finding pursuant to Section 106 of the National Historic Preservation Act.

This finding concludes the Section 106 process in accordance with the stipulations of the Programmatic Agreement Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Illinois, executed March 6, 2018 by FHWA, Illinois SHPO, IDOT and the Advisory Council on Historic Preservation.

No further cultural resources coordination is required for this undertaking, unless design modifications or new information indicate that historic properties may be affected. After coordination with Local Roads any potential site impacts have been avoided. However, if archaeological sites cannot be avoided, then, additional coordination with my office is required.

Brad H. Koldehoff
Cultural Resources Unit Chief
Bureau of Design & Environment

BK:km

Appendix 7

USACOE Nationwide Permit #14

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, ROCK ISLAND DISTRICT
PO BOX 2004 CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

February 10, 2021

Regulatory Division

SUBJECT: CEMVR-RD-2021-0186

Mr. Jerry Stokes
McLean County
102 South Towanda-Barnes Road
Bloomington, Illinois 61705

Dear Mr. Stokes:

Our office has reviewed your application received February 1, 2021, concerning the proposed rehabilitation of the bridge carrying County Highway 21 (Baker Bridge) over the Mackinaw River located in Section 21, Township 25 North, Range 4 East, McLean County, Illinois.

Your project is authorized under Nationwide Permit No. 14, provided you meet the Nationwide Permit terms and conditions which are contained in the enclosed Fact Sheet No. 8(IL) including the Illinois Regional Conditions, the Section 401 Water Quality Certification issued by the Illinois Environmental Protection Agency which is included in the Fact Sheet, and any special conditions that have been included in this nationwide permit verification letter. The Corps has made a determination of no effect to threatened and endangered species. The decision regarding this action is based on information found in the administrative record, which documents the District's decision-making process, the basis for the decision, and the final decision.

Please contact our office if the project plans change and there are different impacts caused by dredged or fill material into Corps' regulated waters. This may require modification of your Department of the Army 404 authorization.

This verification is valid until March 18, 2022, unless the nationwide permit is modified, reissued or revoked. It is your responsibility to remain informed of changes to the nationwide permit program. We will issue a public notice announcing any changes if and when they occur. Furthermore, if you commence or are under contract to commence this activity before the date the nationwide permit is modified or revoked, you will have twelve months from this date to complete your activity under the present terms and conditions of this nationwide permit.

This authorization does not eliminate the requirement that you must still obtain other applicable Federal, state, and local permits. If you have not already coordinated your project with the ILDNR, please contact them by telephone 217/782-6302 to determine if a floodplain development permit is required for your project. Also contact the IDNR at 217/785-5500 or https://dnr2.illinois.gov/EcoPublic/ to consult on potential impacts to state listed species or other state protected natural resources. You may contact the IEPA Facility Evaluation Unit at 217/782-3397 to determine whether additional authorizations are required from the IEPA. Please send any electronic correspondence to EPA.401.bow@illinois.gov.

You are required to complete and return the enclosed "Completed Work Certification" form upon completion of your project in accordance with General Condition No. 30 of the nationwide permits.

Should you have any questions, please contact our Regulatory Division by letter, or telephone Wendy Frohlich at 309/794-5674.

Sincerely,

James C. Kelley
Acting Chief, Eastern Branch
Regulatory Division

When the structure(s) or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s), of the property. To validate the transfer of this nationwide permit and the liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

Transferee Date

Copies Furnished:

w/o enclosures:

Mr. William Milner, P.E.
Section Chief - Downstate Regulatory Programs
Illinois Department of Natural Resources
Office of Water Resources
1 Natural Resources Way
Springfield, Illinois 62702
bill.milner@illinois.gov (email)

Mr. Keith Brandau
Chastain and Associates
100 North Chestnut Street
Champaign, Illinois 61820
kbrandau@chastainengineers.com (email)

Mr. Darin LeCrone, P.E.
Division of Water Pollution Control
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276
darin.lecrone@Illinois.gov (email)

COMPLETED WORK CERTIFICATION

Permit Number: CEMVR-RD-2021-0186

Name of Permittee: Jerry Stokes (McLean County)

County/State: McLean / Illinois

Date of Issuance: February 10, 2021

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S. Army Engineer District, Rock Island
ATTN: Regulatory Division
Clock Tower Building
Post Office Box 2004
Rock Island, Illinois 61204-2004

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above reference permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee Date

WF

Appendix 8

INHS Research Proposal

A Proposed Plan to Compensate for Potential Adverse Impacts to Mudpuppy from Proposed Improvements to Structure No. 057-4915 carrying North 2600 East Road (CH21) over the Mackinaw River in McLean County, Illinois

Prepared by:
Andrew Kuhns, Herpetologist
Biotic Survey and Assessment Program
Illinois Natural History Survey
Prairie Research Institute
University of Illinois at Urbana Champaign

Scope: The Illinois Department of Transportation (IDOT) is preparing a Conservation Plan per 17 Ill Adm Code Part 1080 for the potential take of Mudpuppy from proposed improvements to Structure No. 057-4915 carrying North 2600 East Road (CH21) over the Mackinaw River in McLean County, Illinois. Surveys instigated through review and coordination for this project documented the presence of Mudpuppy at the structure (Kuhns 2021). This is the furthest upstream record for the Mudpuppy in the Mackinaw River.

To compensate for the potential take of Mudpuppy from the Mackinaw River at Structure No. 057-4915 and to aid in the conservation of the species, IDOT proposes to fund a survey for Mudpuppy in the upper reaches of four rivers in east-central Illinois.

Most Mudpuppy, *Necturus maculosus*, records in Illinois are the result of chance encounters or targeted sampling of specific locations or stream reaches. While these records are valuable in determining a general distribution of the species in the state, they do not afford great insight into the distribution of the species within basins. Specifically, it is unknown how far upstream Mudpuppy occur within most river basins. Understanding the upstream distribution and habitat characteristics of occupied Mudpuppy would be valuable to both IDNR and IDOT. To partially address this question, we propose sampling the headwaters of four rivers in east-central Illinois (Mackinaw, Sangamon, Embarras, Salt Fork) to determine the upstream distribution of Mudpuppy in each basin.

Methods: At each site, we will record habitat characteristics such as canopy cover, riparian habitat type, riparian zone width, stream width, substrate type, and presence of potential refugia. Sites will be selected as follows…the first sample will occur at the farthest known upstream record for Mudpuppy in each basin. We then sample the farthest upstream location deemed to have potentially suitable habitat for the Mudpuppy. Unsuitable habitat would consist of a narrow riparian corridor with no canopy cover, the stream becomes shallow or intermittent, or the average width drops below 8'. The three additional sites will occur at river crossings between the upper and lower sites. The distance between samples will vary depending on the length of the river between the Mudpuppy record and the upstream location near the river headwaters.

We will sample mudpuppies using two methods. First, we will collect water samples for environmental DNA (eDNA) analysis. Samples will be taken in triplicate (to allow for detection estimates) at each site and tested for Mudpuppy DNA. We will subsequently (or concurrently) trap for Mudpuppy at each sampling location. We will use standard Mudpuppy sampling techniques and set six traps, baited with

canned sardines, for 3 nights (18 trap nights per site). We will measure, weigh, determine sex, and collect a tissue sample from each captured salamander before releasing it at its point of capture. By using both eDNA and trapping we hope to accomplish two goals, 1. Increase the likelihood of detecting Mudpuppy, 2. Cross-validate the two sampling methodologies.

Schedule: The tasking will be sent to INHS upon issuance of the ITA by the Illinois Department of Natural Resources (IDNR). Surveys will occur in the winter of 2022-2023 (?), and the final report will be submitted to the IDOT BDE for coordination with the IDNR.

Deliverables: All EORs will be submitted to IDNR within 10 days of observation as required by the State of Illinois Endangered and Threatened Species Special Use Permit issued to A. R. Kuhns. Within 90 days of the completion of the surveys, INHS will submit an INHS/IDOT Statewide Biological Survey & Assessment Program Aquatic Survey Report to IDOT detailing the finding of the surveys including updated EOR records of any newly discovered populations at the novel sites, and an increased understanding of the distribution of Mudpuppy in river headwaters.

Budget: IDOT's support of this Mudpuppy research is valued at **$9,950.** The value of support is estimated based on personnel effort to complete this mitigation, supplies, and includes estimated travel expenses based on current state mileage rates to complete the fieldwork survey sites (**Table 1**).

Table 1. Estimated value of the Illinois Department of Transportation's contribution towards Mudpuppy surveys as mitigation for the proposed improvements at Structure No. 057-4915 carrying North 2600 East Road (CH21) over the Mackinaw River in McLean County, Illinois.

CATEGORY		RATE	EXPENSE
PERSONNEL - HERPETOLOGIST	Salary	15 days	$ 4,140
	Fringe	40.30%	$ 1,668
PERSONNEL-HOURLY	Salary	80 hrs/$15/hr	$ 1,200
	Fringe	7.78%	$ 92
IN-STATE MILEAGE		1850 mi	$ 1,850
EDNA SUPPLIES & TESTS			$ 1,000
TOTAL			**$ 9,950**

Figures