
COFFIN ROAD BRIDGE
PRELIMINARY REPAIR PLAN
LONG GROVE, ILLINOIS



100% Report

June 2014

Prepared by:

Johnson Lasky Architects and H.W. Lochner, Inc.

LOCHNER JLA

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
DISCUSSION OF FUNDING	2
ARCHITECTURAL SCOPE	3
GENERAL RECOMMENDATIONS	3
SUBSTRUCTURE RECOMMENDATIONS	4
SUPERSTRUCTURE RECOMMENDATIONS	5
SKETCHES	9
ENGINEERING SCOPE	12
SUMMARY OF ALTERNATE	17
COST ESTIMATE	19
APPENDICES	
A. HYDRAULICS AND PERMITTING STUDY	



Figure 1: Coffin Road Bridge, view northeast, May 2014. (Johnson Lasky Architects)

EXECUTIVE SUMMARY

The Coffin Road Bridge in Long Grove, Illinois, is an important structure in the historical context of bridges and to the Village which it has served for the past 100+ years. The pin-connected pony truss is a rare surviving example of this type and maintains a high level of integrity. In the Architectural and Engineering Feasibility Study, the historical significance of the bridge was evaluated, the structural and architectural condition of the structure was examined, and general recommendations for treatment were made based on the historic significance of the bridge. It was determined that the substructure of the bridge is in poor condition and will need to be reconstructed using improved detailing and techniques. The superstructure of the bridge was found to be in satisfactory condition with minor structural defects and due to the historic significance of the bridge, it should be rehabilitated following historic preservation standards.

Through consultation with the Village of Long Grove, the following recommendation was made for overall treatment of the bridge. It follows: The PREFERRED OPTION as directed by the Village is FULL RESTORATION of the bridge IN PLACE. This includes :

1. Restoration of the bridge in place to improve its current load rating
2. Restoration of critical historic features following the Secretary of the Interior's Standards

This Preliminary Repair Plan will describe potential funding sources, make more detailed recommendations based on the preferred option, and include a cost estimate for the proposed work. It should be used in tandem with the Feasibility Study for a complete understanding of the proposed project and the historic value of the structure.

Note that a complete IDOT Phase 1 and Phase 2 are required prior to commencing construction, regardless of the option chosen.



Figure 2: Coffin Road Bridge, view west showing approach signage, May 2014. (Johnson Lasky Architects)

DISCUSSION OF FUNDING

Federal and state funding is reserved for bridges meeting current width, loading, and other standard requirements. FHWA waivers for lesser requirements may be requested with good reason, but are not likely possible for the Coffin Road Bridge given the severe load restrictions and limitation to one lane. Further, IDOT has reported that there is no federal or state funding specifically for historic bridges, so no preference or extenuating waiver would be given for this project if the bridge were listed on the National Register of Historic Places. From the Architectural and Engineering Feasibility Study completed in February 2014, project funding required for repair of the existing bridge would be non-participatory local funds and is estimated to be in the magnitude of \$350,000.

IDOT has reported that federal/state funding is possible at this location but only in the event that the bridge is replaced with one meeting current requirements for width, loading, etc. Procurement of this funding would be a competitive process and is not guaranteed. The Federal/State portion would be 80% of the project design and construction cost with the remaining 20% to be paid locally.



Figure 3: Coffin Road Bridge, north approach, view north, May 2014. (Johnson Lasky Architects)

ARCHITECTURAL SCOPE

GENERAL RECOMMENDATIONS

- **Painting** -- Before refinishing of any of the structure, paint should be tested for lead. If lead paint exists, abate as necessary. As maintenance requires repainting, remove all paint before refinishing in order to retain detail of original design. Remove paint using means which will not damage the cast iron substrate. Use test panels at concealed locations to determine most appropriate paint removal method. Paint to be applied by brush to retain historical appearance.
- **Replacement of Members**--Retain as much original material as possible. Should replacement of railing, post, or truss members become necessary, replace in kind to match original design. Replacement decking to match material and dimensions of the existing.
- **Bolted Connections**-- Replace bolted connections of truss above deck with rivets to match the originals. Other bolted connections below deck but visible from public right-of-way to be replaced with button-headed bolts. Concealed connections may use modern hexagonal headed bolts.



Figure 4: Coffin Road Bridge, east abutment, May 2014. Note cracked, spalled, and delaminating limestone. (Johnson Lasky Architects)

ARCHITECTURAL SCOPE

SUBSTRUCTURE

- Abutment stones in good condition to be retained, cleaned, and indexed for reinstallation. Cracked stones to be repaired with Dutchman technique.
- Replace deteriorated stones at top course of both abutment walls with new to match original stone in type, dimensions, color, and finish. Assume 10 stones for replacement.
- After abutment work, all stones to be reinstalled to match original configuration.
- Upon reconstruction of the abutments, drainage system to be installed behind the stone face of each abutment.



Figure 5 and 6: Coffin Road Bridge, view east along pedestrian walkway (left). Figure 6: Deteriorated connection between cast iron post and railing (right). May 2014. (Johnson Lasky Architects)

ARCHITECTURAL SCOPE

SUPERSTRUCTURE

- Preserve handrail, end posts, and intermediate railing supports.
- Paint analysis to be performed to record original finish of railings, end posts, and bridge structure.
- Remove paint, clean, and remove rust for refinishing. Once repair work is complete, prime and repaint with finish to match original in color, finish, and texture.
- Make minor repairs at connection between railing and end posts.
- Make minor repairs to holes in end posts. If holes between posts and railings cannot be sealed, replacement of posts may be considered, but not preferable.
- Bent balustrade elements to be straightened. Assume 4 elements.
- Replace deck of road and sidewalk with wood planks to match original.
- Replace broken granite thresholds.



Figure 7: Coffin Road Bridge, wooden cover added in the 1970s. Portions of siding at east and west ends loose or missing. May 2014. (Johnson Lasky Architects)

ARCHITECTURAL SCOPE

SUPERSTRUCTURE

- Replace all roadway tread plates.
- Replace broken roadway bricks at east and west approach. Assume 25%.
- Possible replacement of railings at approaches to be examined under separate contract.
- Remove wood cover for bridge structural work. Wood cover to be examined for structural stability under separate contract. Architectural work to include replacement of damaged exterior siding, full refinishing, and new sheathing and shingles at roof.
- Remove electrical service and lamps at south side of bridge cover during construction. Replace with new.



Figure 8: Falling paint at pedestrian railing showing oxidized cast iron beneath. May 2014. (Johnson Lasky Architects)

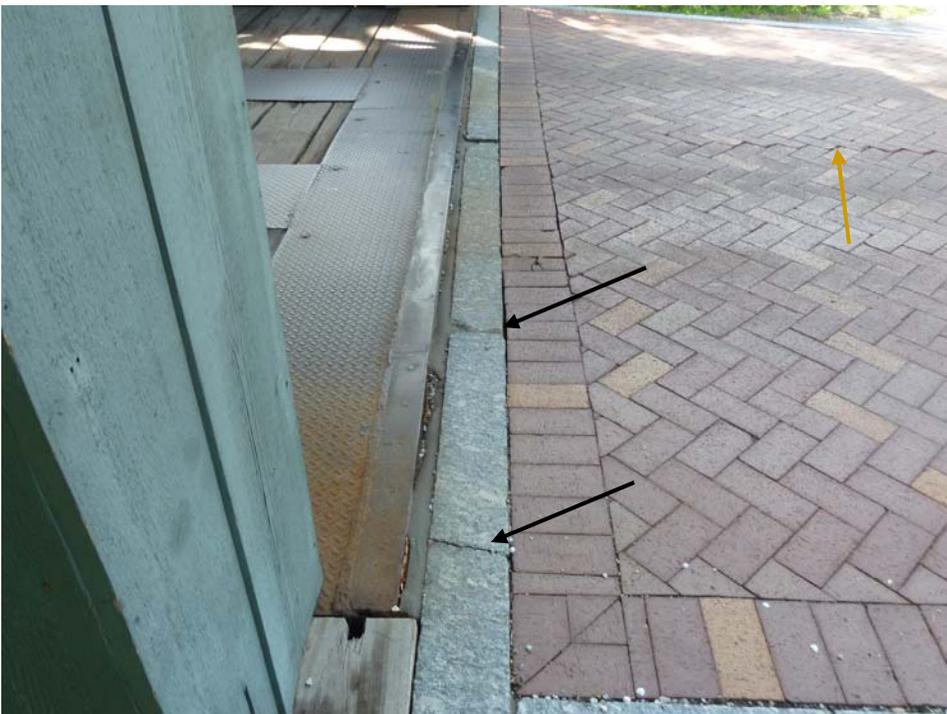


Figure 9: West approach showing cracked granite and deteriorated brick paving. May 2014. (Johnson Lasky Architects)



Figure 10 and 11: Deteriorated roof shingles, soffit, and fascia (left). Electrical service at south elevation of bridge cover (right). May 2014. (Johnson Lasky Architects)



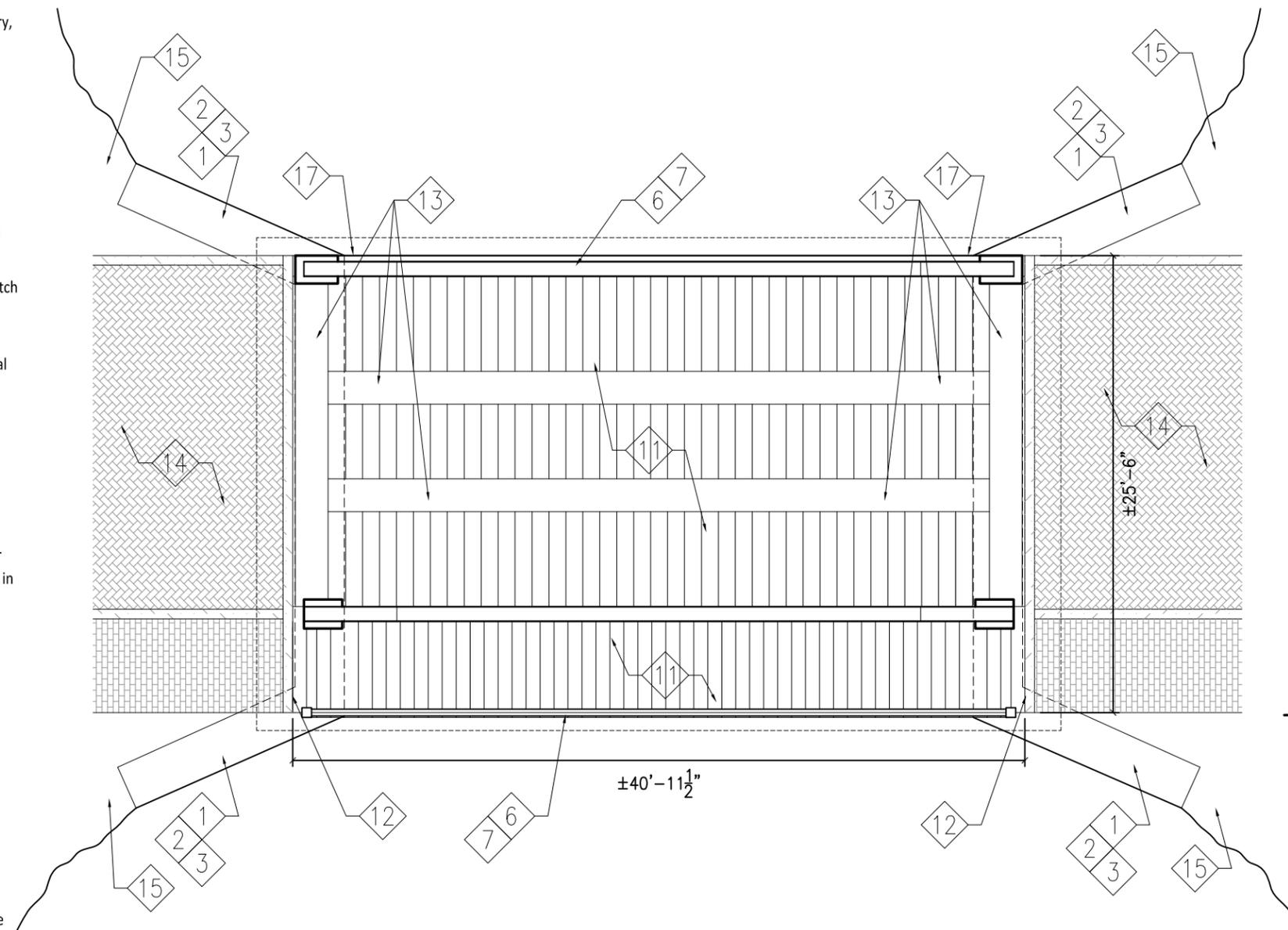
Figure 12: East approach to pedestrian walkway. Note deteriorated wood fencing/railing. May 2014. (Johnson Lasky Architects)

GENERAL NOTES:

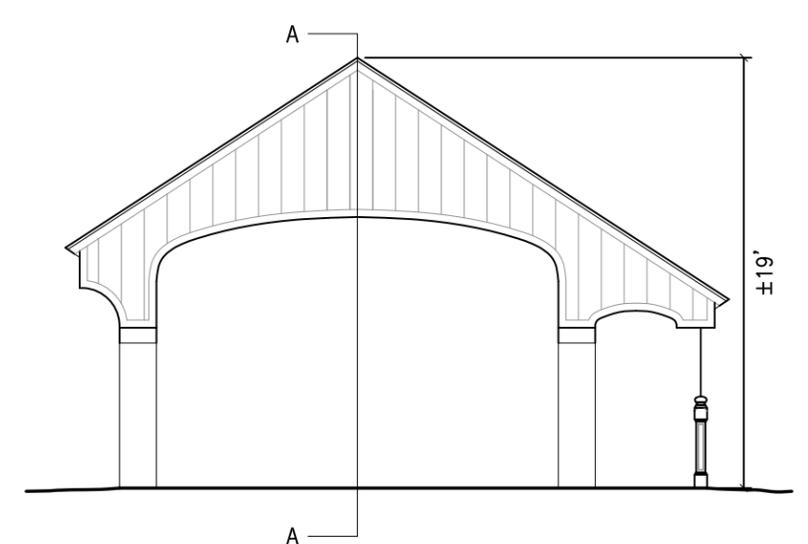
- Painting -- Before refinishing of any of the structure, paint should be tested for lead. If lead paint exists, abate as necessary. As maintenance requires repainting, remove all paint before refinishing in order to retain detail of original design. Paint to be applied by brush to retain historical appearance.
- Replacement of Members--Retain as much original material as possible. Should replacement of truss members become necessary, replace in kind to match original design.
- Bolted Connections-- Replace bolted connections of truss above deck with rivets. Replace other visible bolted connections with button-headed bolts.

KEY NOTES

1. Abutment stones in good condition to be retained, cleaned, and indexed for reinstallation. Cracked stones to be repaired, cleaned and indexed for reinstallation.
2. Deteriorated stones at top course to be replaced with new to match original stone in type of stone, dimensions, color, and finish. Assume 10 stones for replacement.
3. After abutment work, all stones to be reinstalled to match original configuration.
4. Upon reconstruction of the abutments, drainage system to be installed behind the stone face of each abutment.
5. Preserve handrail, end posts, and intermediate railing supports.
6. Paint analysis to be performed to record original finish of railings, end posts, and bridge structure.
7. Remove paint, clean, and remove rust for refinishing. Once repair work is complete, prime and repaint with finish to match original in color, finish, and texture.
8. Make minor repairs at connection between railing and end posts.
9. Make minor repairs to holes in end posts.
10. Bent balustrade elements to be straightened.
11. Replace deck of road and sidewalk with wood planks to match original.
12. Replace broken granite thresholds.
13. Replace all roadway tread plates.
14. Replace broken roadway bricks at east and west approach.
15. Possible replacement of railings at approaches to be examined under separate contract.
16. Remove wood cover for bridge structural work. Wood cover to be examined for structural stability under separate contract. Architectural work to include replacement of damaged exterior siding, full refinishing, and new sheathing and shingles at roof.
17. Remove and replace electrical service and lamps at south side of bridge cover.

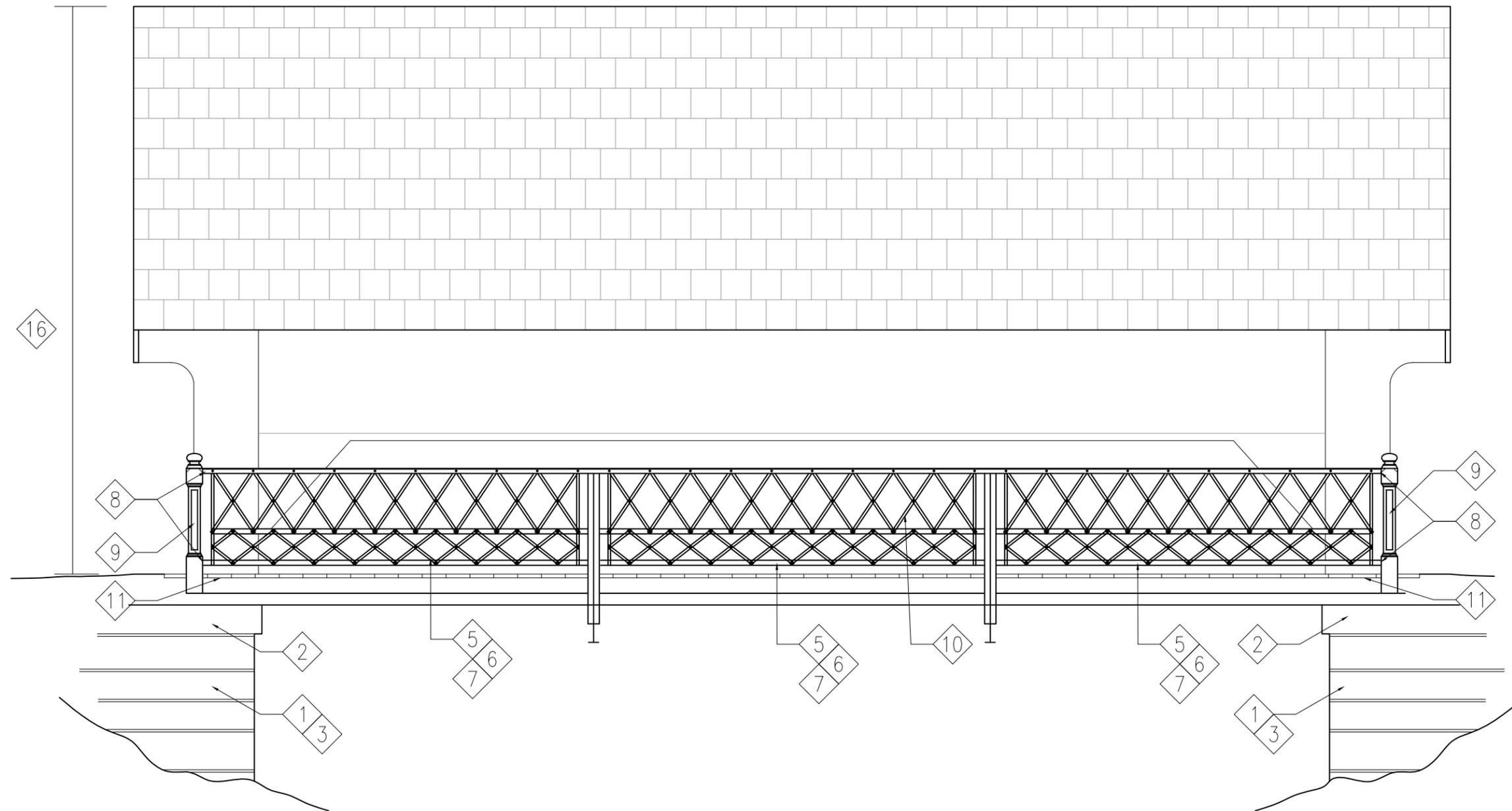


1 ARCHITECTURAL SKETCH PLAN
SCALE: 1/8"=1" N



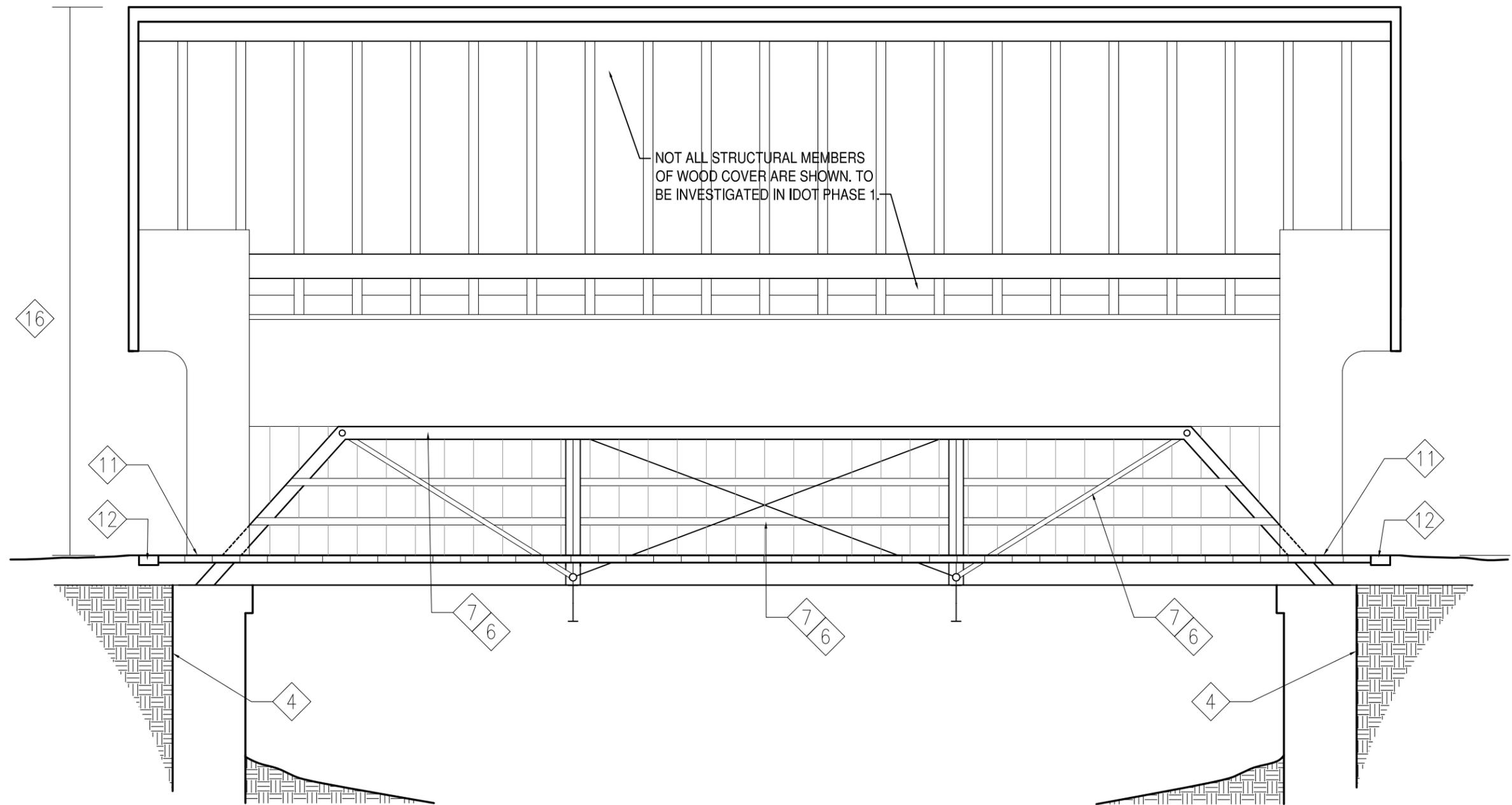
2 EAST ELEVATION
SCALE: 1/8"=1"

REVISIONS			DATE:	JOB NO:
NO.	DATE	DESCRIPTION		
1	06.17.14	PRELIMINARY REPAIR PLAN SKETCHES	6.17.14	13124
			DRAWN BY:	SCALE:
			CEA	1" = 20'-0"
			CHECKED BY:	A-01
			WCJ	
			APPROVED BY:	
			WCJ	



1 NORTH RAILING ELEVATION
SCALE: 1/4"=1'

REVISIONS			DATE:	JOB NO:
NO.	DATE	DESCRIPTION	6.17.14	13124
1	06.17.14	PRELIMINARY REPAIR PLAN SKETCHES	DRAWN BY: CEA	SCALE: 1" = 20'-0"
			CHECKED BY: WCJ	A-02
			APPROVED BY: WCJ	



1 SECTION A-A
SCALE: 1/4"=1'

DRAWINGS ARE SCHEMATIC ONLY.
NOT FOR CONSTRUCTION.
ALL DIMENSIONS AND CONDITIONS
TO BE VERIFIED IN FIELD.

REVISIONS			DATE:	JOB NO:
NO.	DATE	DESCRIPTION	6.17.14	13124
1	06.17.14	PRELIMINARY REPAIR PLAN SKETCHES	DRAWN BY: CEA	SCALE: 1" = 20'-0"
			CHECKED BY: WCJ	A-03
			APPROVED BY: WCJ	



Figure 13: West abutment showing extensive damage to top course of limestone block and widespread cracking, (H.W. Lochner, Inc.)

ENGINEERING SCOPE

SUBSTRUCTURE

- Temporarily remove wood cover and steel truss to accommodate superstructure and substructure repair work.
- Replace top course of limestone blocks with reinforced concrete bearing seat faced with limestone block to match existing.
- Repoint deteriorated mortar joints.
- Repair cracks in limestone blocks with epoxy-based stone repair adhesive.
- Place grout in creek at base of abutment to fill and stabilize scour areas and install stone riprap protection.
- Excavate existing backfill behind abutments and replace with a free-draining system of porous granular backfill, geocomposite wall drain, and pipe underdrain.



Figure 14: Gouge in forged eyebar in north truss, pack rust in stringer bearing angle (inset), bent truss eyebar (inset). (H.W. Lochner, Inc.)

STRUCTURAL SCOPE

SUPERSTRUCTURE

- Repair or replace north truss eyebar with observed gouge in forged area.
- Repair or replace truss eyebars with out-of-plane bending.
- Remove rust pack and repair or replace warped structural elements.
- Clean and repaint structural steel.
- Install strip seal joints at gap between bridge timber planks and approach pavement above each abutment.
- Replace timber plank connection system.

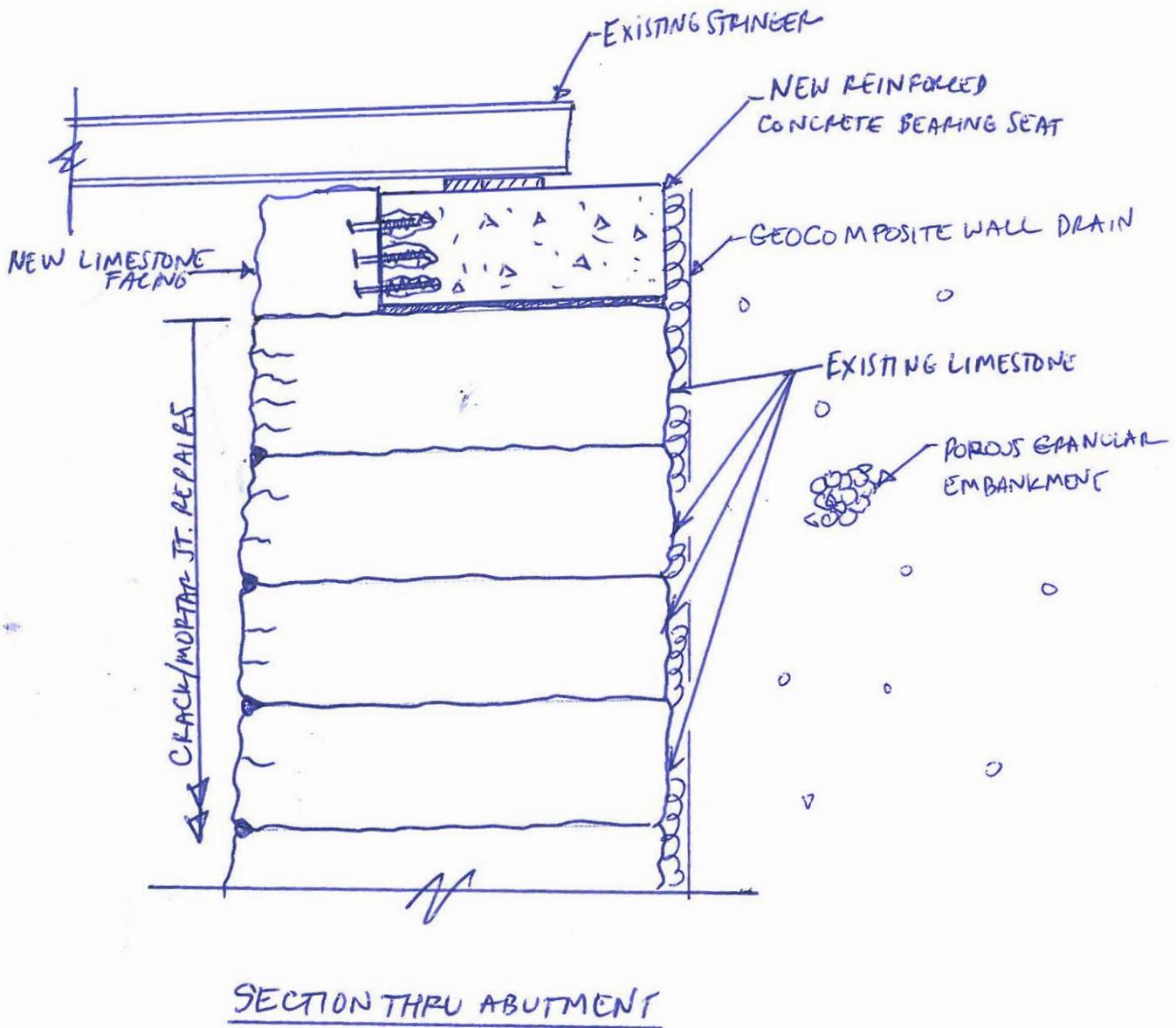


Figure 15: Proposed sketch detail for Coffin Rd. Bridge abutment repairs, top of wall. (H.W. Lochner, Inc.)

Bridge Manual

Section 3 - Design

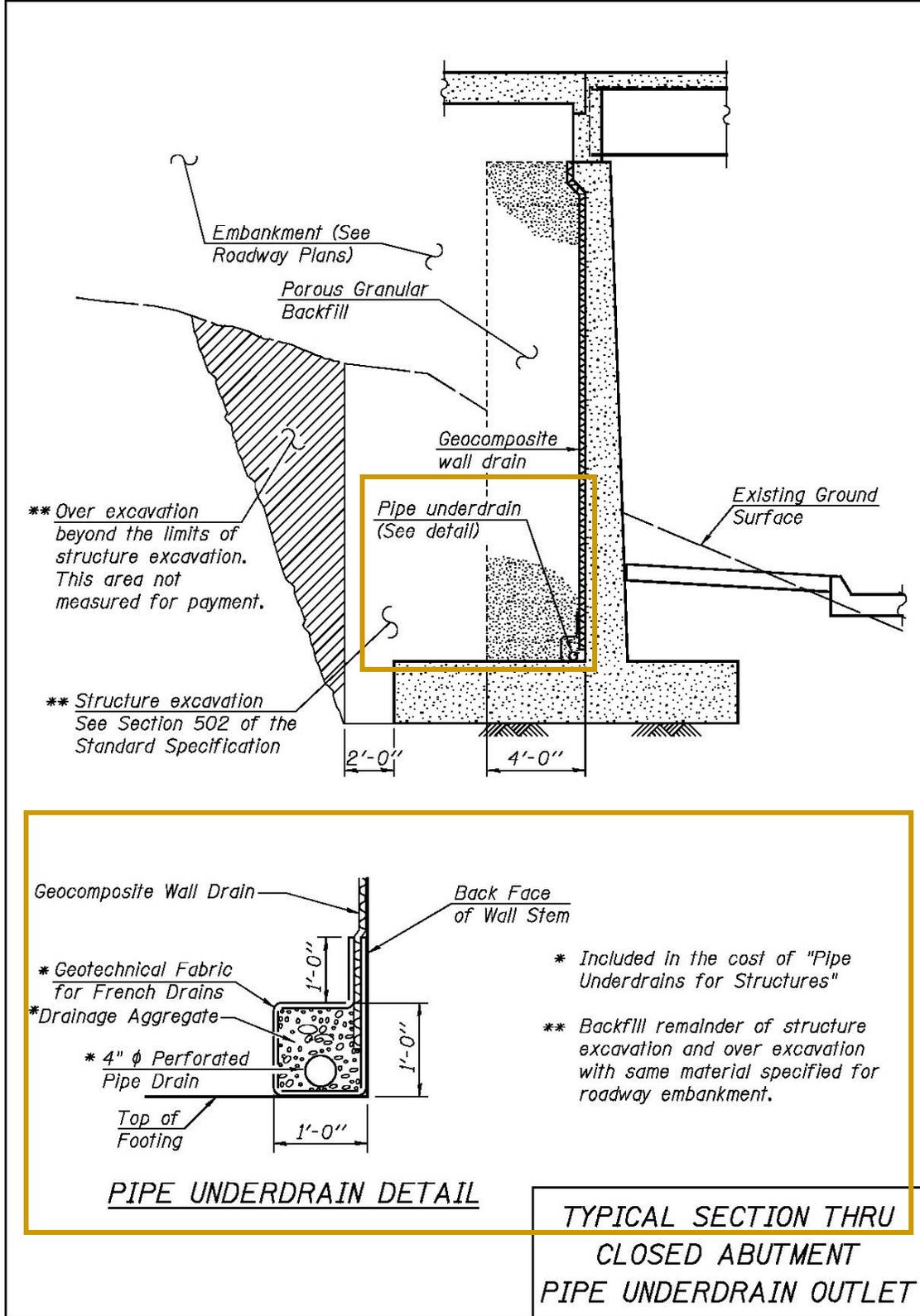
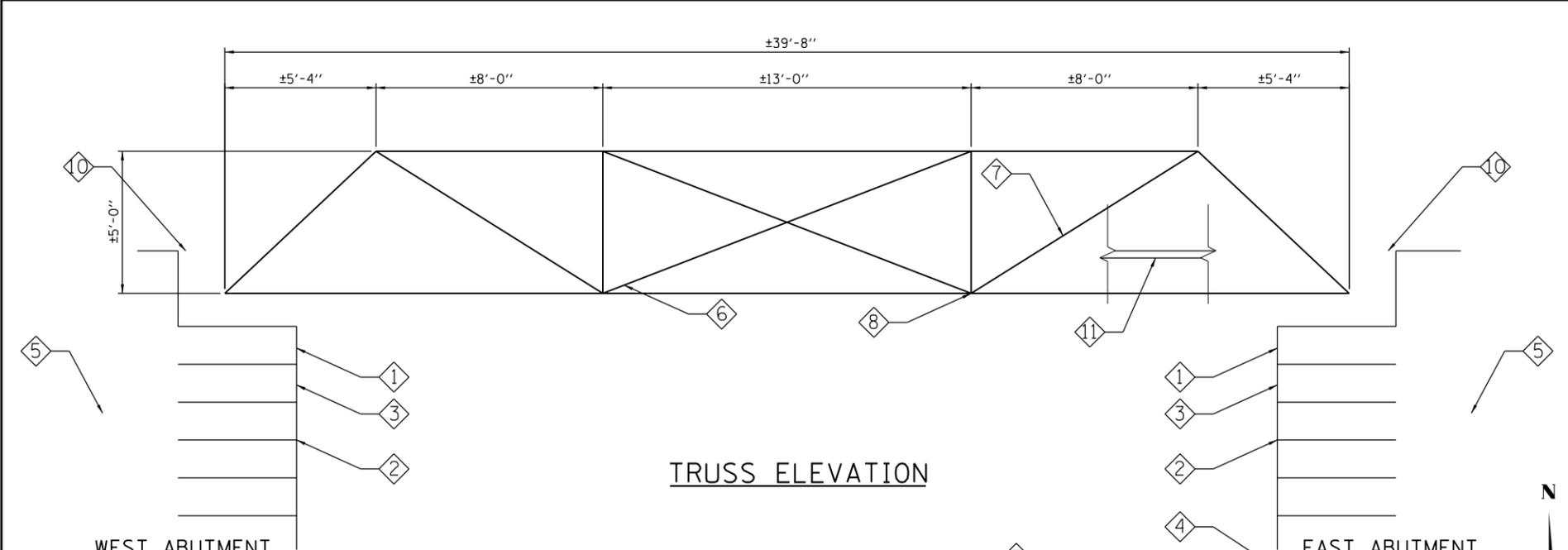
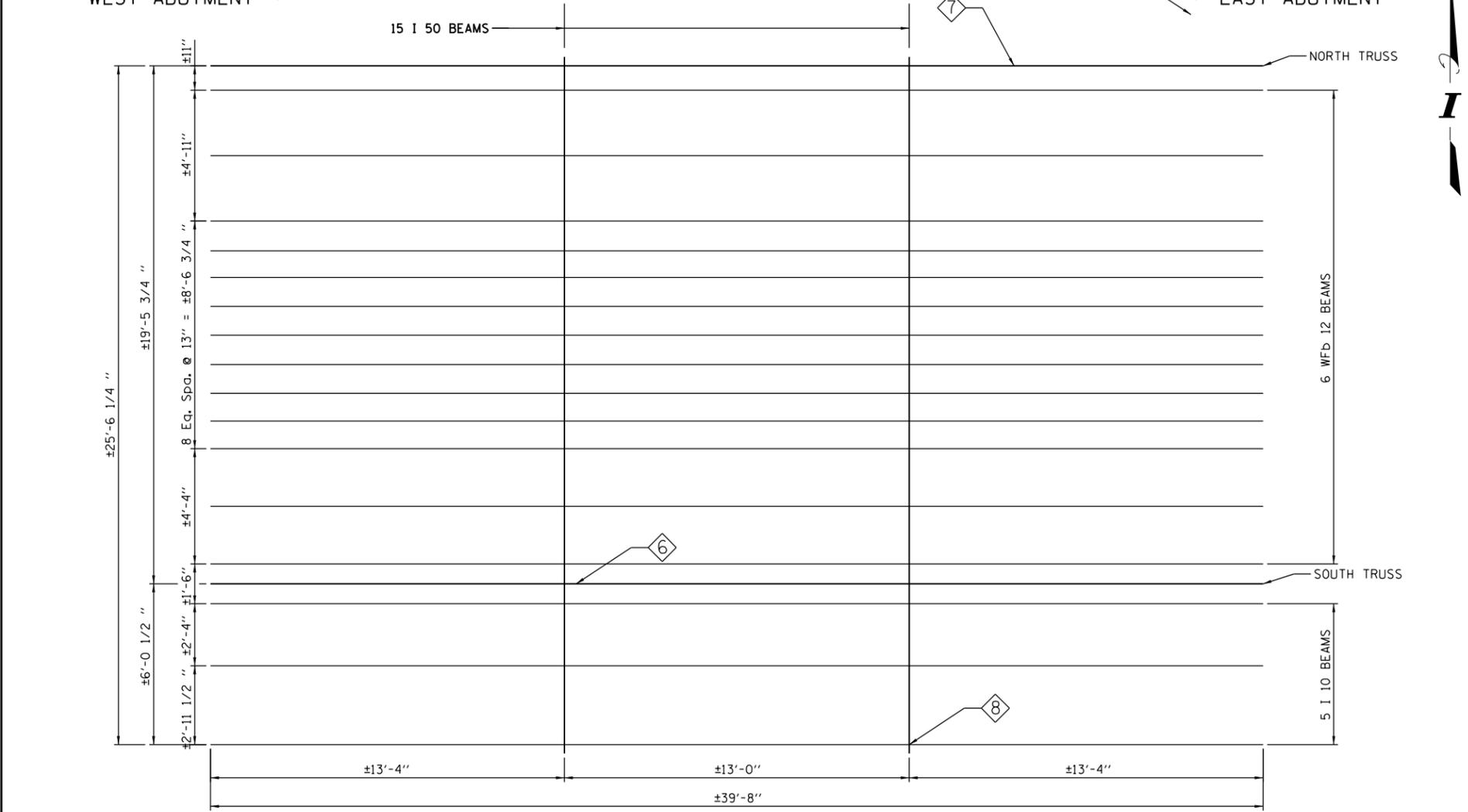


Figure 16: Typical detail for pipe underdrain at bridge abutment. That at Coffin Rd. Bridge to be similar. (IDOT Bridge Manual, January 2012)



TRUSS ELEVATION



FRAMING PLAN

KEY NOTES

1. REPLACE TOP COURSE OF LIMESTONE BLOCKS WITH REINFORCED CONCRETE BEARING SEAT FACED WITH LIMESTONE BLOCK TO MATCH EXISTING.
2. REPOINT DETERIORATED MORTAR JOINTS
3. REPAIR CRACKS IN LIMESTONE WITH EPOXY-BASED STONE REPAIR ADHESIVE.
4. PLACE GROUT TO FILL AND STABILIZE SCOUR AREAS AND INSTALL STONE RIPRAP PROTECTION.
5. EXCAVATE EXISTING BACKFILL BEHIND ABUTMENTS AND REPLACE WITH A FREE-DRAINING SYSTEM OF POROUS GRANULAR BACKFILL, GEOCOMPOSITE WALL DRAIN, AND PIPE UNDERDRAIN.
6. REPAIR OR REPLACE NORTH TRUSS EYEBAR WITH OBSERVED GOUGE IN FORGED AREA.
7. REPAIR OR REPLACE TRUSS EYEBARS WITH NOTED OUT-OF-PLANE BENDING.
8. REMOVE PACK RUST AND REPAIR OR REPLACE WARPED STRUCTURAL ELEMENTS.
9. CLEAN AND REPAINT BRIDGE STRUCTURAL STEEL.
10. INSTALL STRIP SEAL JOINTS.
11. REPLACE TIMBER PLANK CONNECTION SYSTEM.



PLOT DATE = 6/18/2014
 FILE NAME = I:\CH\PRJ\00000000\00000000\Struct\15996_EPE_Sketch.dgn

DRAWN BY	BN	DATE	6/16/14
CHECKED BY	RC	DATE	6/17/14

LOCHNER
 H.W. LOCHNER, INC.
 225 W. WASHINGTON STREET, 12TH FLOOR
 CHICAGO, ILLINOIS 60606

PRELIMINARY REPAIR PLAN
 ROBERT PARKER COFFIN BRIDGE STUDY
 LONG GROVE, IL

REVISIONS		
NO.	DATE	DESCRIPTION

STRUCTURAL SKETCH PLAN

SHEET NO.
 DRAWING NO.
 OF



Figure 17: Standard highway bridge with cover and custom railings, geometry similar to that required for Coffin Road Bridge.

ALTERNATE

An ALTERNATE option is described here for purposes of comparison. This is NOT the PREFERRED option.

- Removal of original structure to new adjacent location as footbridge
- New bridge of simple yet compliant design at site, meeting safety and updated loading standards, with wood/wood substitute cover based on 1970s design

In order to meet current roadway width requirements, the assumed bridge width for this exercise is 32 feet, which includes two 11-foot roadway lanes and a 5-foot sidewalk on the north side of the bridge. The assumed bridge length is 44 feet, slightly longer than the existing bridge, to account for curvature upstream. The most economical bridge meeting current load capacity requirements (HL-93 Truck) for the assumed bridge length/width is a precast prestressed deck beam superstructure with an asphalt overlay and is supported by reinforced concrete closed abutments on concrete spread footings. This bridge type has an expected life span between 50 and 75 years and requires relatively low maintenance. The bridge can be modified to incorporate a new wood cover based on the 1970's design, if desired. A proper IDOT Phase I study for this ALTERNATE is necessary to determine if the replacement bridge concept meets various requirements for right-of-way, environmental impacts, hydraulic capacity, and geotechnical capacity.

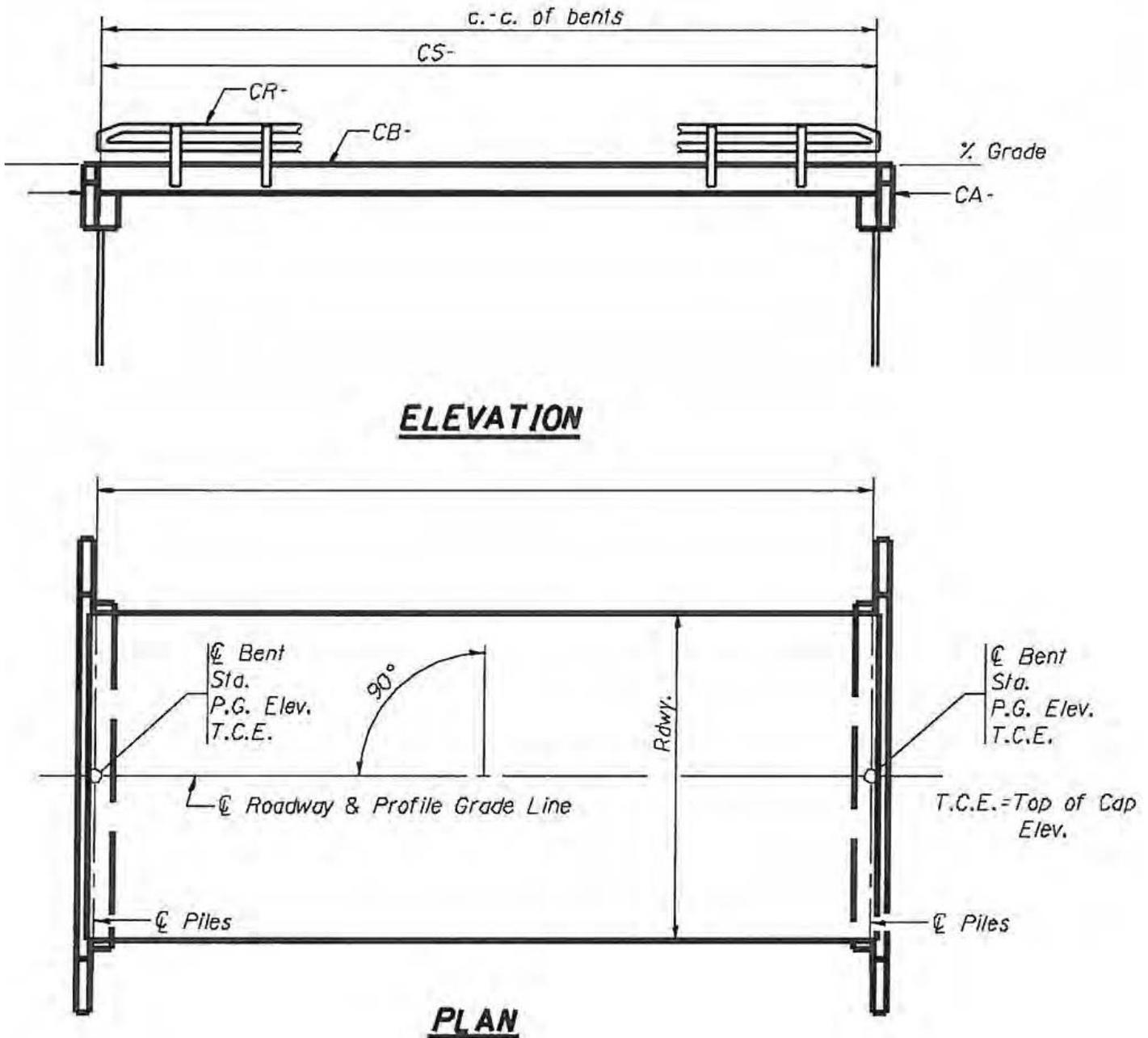


Figure 18: Sketch drawings from 2003 IDOT Standard Plans with dimensions similar to the Coffin Road Bridge.

The drawings above depict example of a typical IDOT standard bridge solution for a site geometry similar to that found at Coffin Road Bridge. The final design would depend on several variables which require further study. All dimensions are subject to change, further investigation is required in proper IDOT Phase 1 Study. The Abutment type would be tall wall abutments on spread footings rather than that shown and is subject to geotechnical and hydraulic findings. A wood cover and custom pedestrian hand rail could be applied to this design.

Regardless of the option chosen, a complete IDOT Phase 1 Study and Phase 2 Design are required prior to commencing construction.

COST ESTIMATE

The following cost estimate is a budgetary number based on recommendations presented in this preliminary repair plan. This number does not include breakout of exact quantities, material costs, or labor rates. The numbers presented are intended to represent the order of magnitude of costs associated with the labor and materials for the recommended repairs. This estimate does not include Architect or Engineer design fees.

SCOPE ITEM	ESTIMATED COST
ABUTMENT REPAIRS	\$ 110,000.00
STEEL SUPERSTRUCTURE REPAIRS	\$ 90,000.00
CLEAN AND REPAINT STEEL/CAST IRON	\$ 75,000.00
STRIP SEAL JOINTS/GRANITE THRESHOLD REPAIRS	\$ 15,000.00
WOOD COVER STABILIZATION	\$ 5,000.00
ROADWAY PAVER BRICK REMOVAL/REPLACEMENT	\$ 15,000.00
TIMBER DECK REPLACEMENT	\$ 25,000.00
ELECTRICAL REMOVAL AND REPLACEMENT	\$ 5,000.00
MOBILIZATION	\$ 20,000.00
	CONSTRUCTION SUB-TOTAL \$ 360,000
	20% CONTINGENCY \$ 72,000
	TOTAL CONSTRUCTION ESTIMATED COST= \$ 432,000

APPENDICES

A. HYDRAULICS AND PERMITTING STUDY

APPENDIX A: HYDRAULICS AND PERMITTING STUDY

See the following pages.

Robert Coffin Road Bridge over Buffalo Creek

Hydraulics and Permitting Study

Village of Long Grove

Lake County

Prepare by:

LOCHNER

H.W. Lochner, Inc.
225 West Washington
Chicago, Illinois 60606

February, 2014

Table of Contents

1. Introduction.....	1
2. Existing Conditions.....	1
3. Proposed Improvements	2
4. Regulatory Environment.....	2
A. Floodway Construction in Northeastern Illinois Permit.....	2
B. General Storm Water NPDES Permit for Construction Activities	5
C. Section 401 Water Quality Certification.....	7
D. Section 404 Permit – Dredged or Filled Material.....	9
E. Coast Guard Bridge Permit	13
F. Section 10 – Structures and Work in Navigable Waters	14
G. Lake County Watershed Development Permit	14
5. Permitting Requirements.....	20
A. Floodway Construction in Northeastern Illinois Permit.....	20
B. General Storm Water NPDES Permit for Construction Activities	21
C. Section 401 Water Quality Certification.....	21
D. Section 404 Permit – Dredged or Filled Material.....	21
E. Coast Guard Bridge Permit	22
F. Section 10 – Structures and Work in Navigable Waters	22
G. Lake County Watershed Development Permit	22
6. Conclusions.....	23

Attachments

1. StreamStats Flow Report and Delineation Map
2. FEMA Floodplain/Floodway Mapping
3. Lake County Floodplain/Floodway Mapping
4. Lake County Contour Mapping
5. Lake County Wetland Mapping
6. IDOT Permit Summary Form
7. IDOT Preliminary Bridge Design and Hydraulic Report Form

1. Introduction

The Village of Long Grove is studying the rehabilitation of the bridge which carries Robert Parker Coffin Road over the Buffalo Creek. The existing structure is a truss bridge supported by limestone abutments. A covering has been added to the bridge but it does not provide any structural capacity. The current sufficiency rating of the bridge is 26.8 and it is posted with a 3 ton limit.

This study explores potential issues related to drainage, hydraulics and permitting associated with the rehabilitation of the bridge.

2. Existing Conditions

According to StreamStats, Buffalo Creek drains an area of 8.96 square miles at the bridge. See Attachment 1 for the Streamflow Statistics Report and drainage boundary delineation which contains peak flow data for various storm events.

According to FEMA and Lake County, Buffalo Creek is mapped as a Zone AE floodplain with a designated (regulated) floodway. See Attachment 2 for the FEMA Mapping and Attachment 3 for Lake County GIS Floodway/Floodplain mapping.

The area around the Buffalo Creek in the vicinity of the bridge is also identified as a wetland by Lake County. Since the wetland north of the bridge is considered an Advances Identification (ADID) site, it also meets the definition of a high-quality aquatic resource as defined by the US Army Corps of Engineers. See Attachment 4 for the wetland mapping.

Since the Buffalo Creek runs constantly, is a tributary of the Des Plaines River system and provides an outlet for upstream wetlands it is almost certain that it will be considered a Waters of the United States (WOUS).

According to the available mapping, the building immediately northeast of the bridge appears to be located within both the floodway and floodplain. However, contour mapping shows the structure is located at an elevation of 724 which is above the reported floodplain elevation of 723 in this area. See Attachment 5 for contour mapping.

The Village of Long Grove is certified to administer the Lake County Watershed Development Ordinance, including the Isolated Waters of Lake County, within the Village limits.

3. Proposed Improvement

Preliminary structural studies have resulted in two feasible alternatives for the rehabilitation of the bridge. One involves coring through the existing limestone abutments with micropiles to provide a new substructure. The existing limestone abutments will remain in place. The second option involves removing the entire superstructure, reconstructing the abutments with new limestone, reinforcing the embankment behind the abutments with an engineered geo-fabric system and placing the superstructure on the new abutments. It is likely that both options can be constructed without narrowing the distance between the faces of the abutments. No restriction of the floodway under the bridge is therefore anticipated.

4. Regulatory Environment

A. Floodway Construction in Northeastern Illinois Permit

Legal Reference: This permit is authorized by 615 ILCS 5/18g; Implementing Rules are in 17 *Illinois Administrative Code*, Part 3708.

Purpose: The purpose of this permit is to regulate construction and backfill in the regulatory floodway of rivers, lakes, and streams of Cook, DuPage, Lake, McHenry, and Will Counties, excluding the City of Chicago, so that periodic inundation will not pose a danger to the general health and welfare of the user; require the expenditure of public funds; require the provision of public resources or disaster relief services; and result singularly or cumulatively in greater flood damages or potential flood damages due to increases in flood stage or velocities or loss of flood storage.

Applicability: A permit is required for construction, including replacement structures, roadway widening, etc., within the designated area listed above.

Permit Criteria for Bridge, Culvert, and Roadway Approaches: The new or reconstructed bridge or culvert may not result in an increase of upstream flood stages greater than 0.1 ft when compared to existing conditions; and for reconstruction, the existing structure is not a source of flood damage. If the existing bridge or culvert and roadway approach is a source of flood damage to buildings or structures, the applicant must evaluate the feasibility of redesigning the structure to reduce the existing backwater. Compensatory storage must be provided for any regulatory floodway storage loss due to the proposed work from the volume of fill or structures placed.

Regional Permits are permits authorizing specific types of projects meeting certain criteria within regulatory floodways of Cook, DuPage, Kane, Lake, McHenry, and Will Counties in Northeastern Illinois without coordination with IDNR.

Regional Permit 1 – Authorizing Bridge and Culvert Reconstruction and Modification Projects That Are Not a Source of Flood Damage.

IDOT's District 1 administers Regional Permit 1. IDOT operates, without coordination with IDNR, under the Memorandum of Understanding between the IDOT and IDNR. Bridge and culvert reconstruction and modifications that are certified by the Regional Engineer as meeting the following criteria are considered authorized by IDNR under Regional Permit 1:

- a. Flow Restriction. The proposed structure, including the approach roads, is no more restrictive to normal and flood flow than the existing structure.
- b. Channel Modification. No channel modification is proposed other than that required for transitions by the rules for Floodway Construction in Northeastern Illinois (17 Illinois Administrative Code, Part 3708).
- c. Navigable Waterways. On publicly navigated waterways, the proposed work is not an obstruction to navigation.
- d. Headwater Increase. The maximum headwater increase due to the proposed modification is no greater than 0.1 ft increase in backwater over the existing flood profile for all flood frequencies up to and including the 100-year event.
- e. Flood Damage. The existing crossing is not a source of flood damage. To show the proposed structure is not a source of flood damage, the IDOT Regional Engineer must adhere to the following procedure:
 - Determine the head loss due to the existing bridge or culvert by calculation, or from the flood study used to delineate the regulatory floodway for all reported flood profiles up to and including the 100-year flood.
 - Determine if there are any buildings or structures located in the 100-year flood plain upstream of the existing bridge or culvert that may be subjected to flooding. The upstream flood plain should be checked for the length of stream required for the backwater impacts due to the existing bridge or culvert to be reduced to 0.1 ft or less.

- Collect the low-opening elevations or lowest damageable elevations of the upstream buildings and structures. Determine if any buildings or structures are subject to flood damage.
 - If the existing structure is determined to be a source of flood damage to buildings or structures in the upstream flood plain, Regional Permit 1 does not authorize the proposed structure.
- f. Compensatory Storage. Effective compensatory storage will be provided for any additional loss of floodway storage due to the proposed work. This means that if flood storage will be lost below the existing 10-year flood elevation, it must be replaced below the 10-year flood elevation and, if flood storage is lost above the existing 10-year flood elevation, it is replaced above the proposed 10-year flood elevation. All effective compensatory storage must be placed above the normal water elevation and below the 100-year elevation. Compensatory storage for up to 200 yd³ of fill material may be placed at a location outside of the project reach without demonstrating hydraulic equivalence and without applying for a floodway map change. Relief from the compensatory storage requirement may be granted with IDNR Office of Water Resources concurrence when extreme hardship is demonstrated and an engineering analysis shows that no increase in flood stage will result. Relief will not be granted for compensatory storage greater than 200 yd³.
- g. Transition Sections. Transition sections must be used in the calculation and design of effective bridge and culvert openings and in the design and construction of effective excavations. Use the following expansion and contraction ratios: when water is flowing from a narrow section to a wider section, the water should be assumed to expand no faster than at a rate of 1 ft horizontal for every 4 ft of the flood stream's length; when water is flowing from a wide section to a narrow section, the water should be assumed to contract no faster than at a rate of 1 ft horizontal for every 1 ft of the flooded stream's length; and when expanding or contracting flows in a vertical direction, use a minimum of 1 ft vertical transition for every 10 ft of stream length.
- h. Downstream Backwater. If the 100-year floodway elevation at the site of the proposed construction is impacted by backwater from a downstream receiving stream with a larger drainage area, document that it meets the requirements of *17 Illinois Administrative Code*, Part 3708, for the flood study profile conditions and conditions with the receiving stream at normal water elevations. However, for bridge and culvert construction or reconstruction, a smaller bridge or culvert may be built if it can be demonstrated that the proposed structure would meet the requirements for the flood study profile and would not be a source of flood

damage to any existing upstream building or structures when analyzed as follows:

- Analyze for a 100-year flood frequency flow on the tributary stream for all tailwater elevations on the receiving stream between and including the normal water elevation and the 10-year flood frequency elevation.
- If, within the next 5 years, a downstream restrictive bridge or culvert is scheduled to be removed, reconstructed, modified, or a government sponsored regional flood control project is scheduled to be built, analyze and document the proposed construction to ensure that it meets the preceding criteria for both the existing conditions and the expected flood profile conditions when the bridge, culvert, or flood control project is built.
- If the bridge or culvert reconstruction or modification would result in a change in the regulatory floodway location or the 100-year frequency flood elevation, submit to the IDNR Office of Water Resources and to the Federal Emergency Management Agency all the information, calculations, and documents necessary to revise the floodway map. The Office of Water Resources Management will issue a conditional approval of the floodway change before authorization is granted.
- All engineering analyses must be performed by or under the supervision of a licensed professional engineer.

A permit summary form (Form D1 PD0024) has been prepared to aid in the design and review of floodway projects and to ensure that designed projects can be permitted according to the rules of the Regional Permit. The summary form identifies the key permit conditions that must be addressed and serves as a check sheet for the reviewer. The licensed professional engineer who performed or supervised the hydraulic design in accordance with the permit rules must sign the form. This form must be completed by the local agency and included with the submittal to District 1 of the Preliminary Bridge Design and Hydraulic Report for all projects utilizing Regional Permit 1. See Attachment 6 for a copy of the permit form and Attachment 7 for a copy of the Preliminary Bridge Design and Hydraulic Report Form.

B. General Storm Water NPDES Permit for Construction Activities

Permit Name: General NPDES Permit No. ILR10 – General NPDES Permit for Storm Water Discharges from Construction Site Activities.

Legal Reference: Section 402 of the Federal Water Pollution Control Act (1972), as amended by the Clean Water Act (1977 & 1987): 33 USC 1251-1376, DOT Order 5660.1A; 23 CFR 650, Subpart B; 40 CFR 121-125, 129-131, 133, 135-136.

Responsible Agency: United States Environmental Protection Agency through the Illinois Environmental Protection Agency.

Purpose: To restore and maintain the chemical, physical, and biological integrity of the nation's waters through prevention, reduction, and elimination of pollution.

Applicability: Required for construction activities involving clearing, grading, and excavation activities that disturb 1 acre (0.4 ha) or more of land area.

Permit Authorization: For storm water discharges from construction sites to be authorized under this General Permit, a Notice of Intent (NOI) must be submitted to IEPA at least 30 days prior to the commencement of construction:

Notice of Intent (NOI): The NOI requires the following information:

- mailing address and location of construction site or, if not available, latitude and longitude of the approximate center of the site;
- the owner's name, address, telephone number, and status as Federal, State, private, public, or other entity;
- the name, address, and telephone number of the general contractor that has been identified at the time of the NOI submittal;
- the name of the receiving water or, if the discharge is through a municipal separate storm sewer, the name of the municipal operator of the storm sewer, and the ultimate receiving water;
- the number of any NPDES permit for any discharge, including non-storm water discharges, from the site that is currently authorized by an NPDES permit;
- a yes or no indication of whether the owner or operator has existing quantitative data that describes the concentration of pollutants in storm water discharges;
- a brief description of the project;
- estimated timetable for major activities;
- estimate of the number of acres (hectares) of the site on which soil will be disturbed; and
- a certification that a Storm Water Pollution Prevention Plan (SWPPP) has been or will be prepared for the facility prior to the start of construction.

The NOI form is available on the IEPA website.

Storm Water Pollution Prevention Plan (SWPPP): A Storm Water Pollution Prevention Plan must be developed for each construction site covered by this permit and completed prior to the start of construction. The SWPPP should include a site description (e.g., map, nature of construction activity, area disturbed), erosion and sediment controls, storm water management plan, maintenance of site, inspection schedule, reports, and identification of the contractors/subcontractors. Unless otherwise specified in the IEPA's Illinois Urban Manual, the SWPPP must be designed for a 24 hour rainfall event for a 25 year storm frequency. It is required that the SWPPP be kept on site during construction activities.

C. Section 401 Water Quality Certification

Responsible Agency: Illinois Environmental Protection Agency (IEPA).

Legal Reference: Section 401 of the Federal Water Pollution Control Act (1972), as amended by the Clean Water Act (1977 & 1987): 33 USC 1251-1376, DOT Order 5660.1A; 23 CFR 650, Subpart B; 33 CFR 209, 320-323, 325, 328, 329; 40 CFR 121-125, 129-131, 133, 135-136, and 230-231.

Purpose: To restore and maintain the chemical, physical, and biological integrity of the Nation's waters through prevention, reduction, and elimination of pollution.

Applicability: State certification is required in conjunction with the authorization by USACE of any activity that may result in any discharge into waters of the United States requiring a Section 404 Permit. Water Quality Certification is also required for Section 9 Permits.

Processing: The Illinois Environmental Protection Agency has issued water quality certification for certain Nationwide Permits without conditions. For certain other Nationwide Permits and for Regional Permits, water quality certification has been issued subject to regional conditions. Generic water quality certification was denied for the other Nationwide Permits. For projects requiring an individual Section 404 Permit or a Nationwide Permit for which generic water quality certification was denied or the conditions required by the generic certification cannot be met, individual certification must be requested from the IEPA. The joint application form (NCR Form 426) along with the IEPA application fee should be sent to the IEPA. The USACE will not issue an individual Section 404 Permit until certification is received. Any Nationwide Permit authorization is subject to obtaining certification from the IEPA.

On October 27, 1999, the IEPA granted Section 401 certification, with conditions, for all Regional Permits except RP13 and activities in certain waterways under RPs 4

and 8. On November 14, 2000, the IEPA determined that the 401 water quality certification issued on October 27, 1999 is valid for the modified and reissued RPP.

The following conditions of the certification are conditions of the RPP:

- a. The permittee shall not cause:
 1. violation of applicable water quality standards of the Illinois Pollution Control Board Title 35, Subtitle C: Water Pollution Rules and Regulations;
 2. water pollution defined and prohibited by the Illinois Environmental Protection Act; or
 3. interference with water use practices near public recreation areas or water supply intakes.
- b. The permittee shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.
- c. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all State statutes, regulations and permit requirements with no discharge to waters of the State unless a permit has been issued by the IEPA. Any backfilling must be done with clean material placed in a manner to prevent violation of applicable water quality standards.
- d. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The permittee shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent soil erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be conducted during zero to low flow conditions. The permittee shall be responsible for obtaining an NPDES Storm Water Permit prior to initiating construction if the construction activity associated with the project will result in the disturbance of five (5) or more acres, total land area. An NPDES Storm Water Permit may be obtained by submitting a properly completed Notice of Intent (NOI) form by certified mail to the IEPA's Division of Water Pollution Control, Permit Section.
- e. The permittee shall implement erosion control measures consistent with the Illinois Urban Manual (IEPA/USDA, NRCS; latest version).
- f. The permittee is advised that the following permits(s) must be obtained from the IEPA: the permittee must obtain permits to construct sanitary sewers, water mains, and related facilities prior to construction.

- g. Backfill used in the stream crossing trench shall be predominantly sand or larger size material, with <20% passing a #230 U.S. sieve.
- h. Channel relocation shall be constructed under dry conditions and stabilized to prevent erosion prior to the diversion of flow. [Applicable only to projects which involve relocating stream channels.]
- i. The work shall be constructed with adequate erosion control measures (i.e., silt fences, straw bales, etc.) to prevent transport of sediment and materials to the adjoining wetlands and/or streams.
- j. Backfill used within trenches passing through surface waters of the State, except wetland areas, shall be clean course aggregate, gravel or other material which will not cause siltation, pipe damage during placement, or chemical corrosion in place. Excavated material may be used only if:
 - 1. particle size analysis is conducted and demonstrates the material to be at least 80% sand or larger size material, using #230 U.S. sieve; or
 - 2. excavation and backfilling are done under dry conditions.
- k. Backfill used within trenches passing through wetland areas shall be clean material that will not cause siltation, pipe damage during placement, or chemical corrosion in place. Excavated material shall be used to the extent practicable, with the upper six (6) to twelve (12) inches backfilled with the topsoil obtained during trench excavation.
- l. Any permittee proposing activities in a mined area or previously mined area shall provide determination on sediment and materials used which are considered "acid-producing material" as defined in 35 II. Adm. Code, Subtitle D. If considered "acid-producing material," the permittee shall obtain a permit to construct pursuant to 35 II. Adm. Code 404.101.

D. Section 404 Permit – Dredged or Filled Material

Section 404 permits, issued by the US Army Corps of Engineers (USACE) are required for activities that involve the discharge of dredged or fill material into waters of the United States, including wetlands. An FHWA publication (FHWA-RE-88-028) titled *Applying the Section 404 Permit Process to Federal-aid Highway Projects* provides useful information for improving interagency coordination. In addition, the publication helps integrate the *National Environmental Policy Act* and the Section 404 requirements.

Legal Reference: Section 404 of the *Federal Water Pollution Control Act* (1972), as amended by the *Clean Water Act* (1977 & 1987): 33 USC 1251-1376, DOT Order

5660.1A; 23 CFR 650, Subpart B; 33 CFR 209, 320-323, 325, 328, 330; 40 CFR 121-125, 129-131, 135-136, and 230- 231.

Purpose: To restore and maintain the chemical, physical, and biological integrity of the Nation's waters through prevention, reduction, and elimination of pollution.

Applicability: Permit required for any discharge of dredged or fill material into waters of the United States, including wetlands.

The USACE Chicago District has issued a Regional Permit (RP) Program that expires on April 1, 2017 to replace the Nationwide Permit (NWP) Program.

RP3 authorizes the construction or replacement of public transportation projects, including roads, bridges, runways and taxiways, and railroads. Authorization under RP3 is subject to the following requirements which shall be addressed in writing and submitted with the notification:

- a. The impact to waters of the U.S. shall not exceed 0.25 acres for any single crossing. For projects that involve multiple crossings of waters of the U.S., the cumulative impact cannot exceed 1.0 acre. For purposes of this RP only, a single crossing is defined as an act or instance of crossing over, or an activity that facilitates transportation from one side to the other.
- b. For projects that impact greater than 0.10 acres of waters of the U.S., the permittee is required to provide compensatory mitigation.
- c. Projects that impact no more than 0.5 acres of waters of the U.S. and do not impact high-quality aquatic resources will be processed under Category I.
- d. Projects that impact over 0.5 acres up to 1.0 acre of waters of the U.S., impact a high quality aquatic resource, or cross a Section 10 Waterway (www.lrc.usace.army.mil/Missions/Regulatory/NavigableWaters.aspx), will be processed under Category II.
- e. The discharge shall be limited to the minimum width necessary to complete the authorized work.
- f. Crossings of waterways and/or wetlands shall be culverted, bridged or otherwise designed to prevent the restriction of expected high water flows. They shall be designed so as not to impede low water flows or the safe passage of fish and aquatic organisms. Additional guidance for the planning and installation of stream crossings can be found at:

www.fws.gov/midwest/Fisheries/StreamCrossings/index.htm. Additional conditions may be required for streams determined to be a high quality fisheries resource such as designing the bottom of the culvert to include “roughness” to reduce flow velocities. “Roughness” can include cemented-in stone, baffles, or the placement of rock along the bottom of the culvert and/or along the culvert wall. Embedding the culvert to a depth of greater than 12 inches may also be required.

1. An alternatives analysis shall be prepared for perennial stream crossings where a culvert is proposed. The analysis shall document why the use of an arch-span, bottomless culvert or bridging would not be a practicable alternative. If use of a multi-barrel pipe culvert is proposed, document why a single box-culvert system cannot be used.
 2. For culverts, the upstream and downstream invert shall be embedded 6 to 12 inches below the streambed elevation. This will allow the natural substrate to colonize the structure’s bottom, encourage fish movement and maintain the existing channel slope. Culvert slope should match adjacent elevations. The width of the base flow culvert shall be approximately equal to the average channel width to promote the safe passage of fish and other aquatic organisms. Culvert(s) shall not permanently widen /constrict the channel or reduce/increase stream depth. Multiple pipe culverts may not be used to receive base flows.
- g. The permittee shall clearly label the construction drawings to include existing and proposed grading contours, all structures associated with the installation of the crossing such as wing walls, rock and concrete protection measures, existing and proposed utilities lines, outfalls and associated structures. A detailed narrative shall accompany the construction plans and describe all work to be performed as indicated on the plans.
- h. All in-stream work, such as the installation of cofferdams or water diversion devices, the removal of accumulated sediments, and any demolition work, shall be clearly labeled on the construction drawings and explained in detail in project narrative.
- i. If dewatering of the site is required in order to perform work in waterways, the site shall be dewatered for work in the dry and dewatering shall be temporary only. No in-stream work will be authorized unless soil erosion and sediment control measures are deemed acceptable by the District.

- j. All temporary construction activities shall adhere to the requirements of items c through i of Regional Permit 7 (Temporary Construction Activities) and shall be addressed in writing and submitted with the notification.
- k. This permit shall not be used to authorize structural bank stabilization methods such as retaining walls, gabion baskets, riprap, etc., other than those structures necessary to assure the integrity of the stream and stream bank immediately adjacent to the crossing.
- l. The permittee shall establish and maintain a protective upland buffer composed of native plants (or other appropriate vegetation approved by the District) within the right-of-way adjacent to all waters of the U.S.
- m. The project shall employ permanent Best Management Practices (BMPs) to protect water quality, preserve natural hydrology and minimize the overall impacts of the project on aquatic resources. BMPs shall be considered at the earliest planning stages of the project. The applicant shall design the project to include the avoidance of natural resource features such as floodplains, streams, lakes, significant wildlife areas, wetlands, and drainageways. To the greatest extent possible, the activity should be designed such that surface water does not directly discharge into waters of the U.S. BMPs may be used independently or in concert to achieve the required water quality enhancement and resource protection. Water should be infiltrated or detained and treated prior to discharging into waters of the U.S. Possible BMPs include, but are not limited to: native vegetated swales, bioswales, rain gardens, filter strips, infiltration trenches, naturalized detention basins, and permeable pavement. A written narrative shall be included with the notification which describes how the water quality protection practices were selected for the project site. The narrative shall thoroughly describe the BMPs that will be utilized. A management and monitoring plan will be required on a case-by-case basis and shall include performance standards such as the BMPs ability to function as designed, percent coverage of vegetation, stabilization of soils, and corrective measures to bring areas into compliance.
- n. This permit specifically excludes discharges into jurisdictional areas for the construction associated with building pads or equipment storage areas.
- o. For a project site adjacent to a conservation area, the permittee shall request a letter from the organization responsible for management of the area. The response letter should identify recommended measures to protect the area from impacts that may occur as a result of the development. A copy of the

request and any response received from the organization shall be submitted to the District with the notification.

- p. This permit cannot be used to authorize the installation of road crossings associated with residential, commercial or institutional developments.

Measures shall be taken to control soil erosion and sedimentation at the project site to ensure that sediment is not transported to waters of the U.S. during construction. Soil erosion and sediment control measures shall be constructed before initiating any clearing, grading, excavating or filling activities. All temporary and permanent soil erosion and sediment control measures shall be maintained during the construction period and until the site is stabilized. All exposed soil and other fills, and any work below the ordinary high water mark shall be permanently stabilized at the earliest practicable date.

Applicants are required to prepare a soil erosion and sediment control (SESC) plan. The plan shall be designed in accordance with the Illinois Procedures and Standards for Urban Soil Erosion and Sedimentation Control ("Green Book", latest version, except chapter 6). Practice standards and specifications for measures outlined in the soil erosion and sediment control plans will follow the latest edition of the "Illinois Urban Manual: A Technical Manual Designed for Urban Ecosystem Protection and Enhancement."

At the District's discretion, an applicant may be required to submit the SESC plan to the Stormwater Management Commission for review. When the District does require submission of a SESC plan an activity may not be commenced until the SESC plan for the project site has been reviewed. The SWCD/SMC will review the plan and provide a written evaluation of its adequacy. A SESC plan is considered acceptable when the SWCD/SMC has found it meets technical standards. Once this determination has been made, the authorized work may commence. The SWCD/SMC may attend pre-construction meetings with the permittee and conduct inspections during construction to determine compliance with the plans. Applicants are encouraged to begin coordinating with the appropriate SWCD/SMC office at the earliest stages of project planning.

E. Coast Guard Bridge Permit

This permit is for the construction of bridges or causeways over navigable waters of the United States required by Section 9 of the *Rivers and Harbors Act of 1899*. Permits for the construction of dams and dikes required by Section 9 are under the authority of the USACE.

Responsible Agency: United States Coast Guard (USCG).

Legal Reference: Section 9 of the *Rivers and Harbors Act of 1899* ; 33 USC 401, et seq, as amended and supplemented; 23 CFR part 650, Subpart H; and 33 CFR 114-115.

Purpose: To ensure that there will be no interference to navigation on the navigable waterways of the United States.

Applicability: A permit is required for the construction, modification, replacement, or removal of bridges or causeways over a navigable waterway. Construction of bridges crossing waters not presently used or susceptible to be used as a means of transporting Interstate or foreign commerce does not require a permit. Removal of an existing bridge without replacing it with another bridge also does not require a permit.

Permit Information Needs: The permit application can be in a letter form. See Section 28-2 of the *BDE Manual* or the US Coast Guard website for a discussion of the required information.

F. Section 10 – Structures and Work in Navigable Waters

Section 10 Permits are required for structures (excluding dikes, dams, bridges, or causeways) and other work in or affecting the navigable capacity of the water body (i.e., course, location, condition). Section 10 Permits are obtained simultaneously with Section 404 Permits (i.e., share a joint application) and are normally valid for one year with possibility for extension.

Responsible Agency: United States Army Corps of Engineers (USACE).

Legal Reference: Section 10 of the *Rivers and Harbors Act of 1899* ; 33 USC 401, et seq, as amended and supplemented; 23 CFR part 650, Subpart H; 33 CFR 320, 322, 323, 325, 326, 327, 329, and 330.

Purpose: To protect and preserve the navigable waterways of the United States against any obstruction to navigation.

Applicability: Permit required for structures (other than bridges or causeways) or certain types of work in or affecting a navigable waterway. Examples of work include dredging, channelization, filling, and construction of pier protection cells.

G. Lake County Watershed Development Permit

A Lake County Watershed Development Permit (WDP) is required for any development that proposes to impact *Waters of the United States (WOUS)* or

Isolated Waters of Lake County (IWLC). The WDP application is reviewed by either the Lake County Stormwater Management Commission (SMC) for “non-certified communities” or the enforcement officer (EO) representing a “certified community.” Some communities are also IWLC-certified and have a Certified Wetland Specialist (CWS) on staff or retain a CWS consultant to review wetland submittals.

This project can be classified as a Public Road Development and as such a Public Road Development Permit will be required according to Article IV, Section F of the Lake County Watershed Development Ordinance:

1. Authority and Enforcement
 - a. The SMC shall be responsible for the review, enforcement, and issuance of all Public Road Development permits.
 - b. The performance standards of this Ordinance shall apply to all public road developments. The release rate performance standard of Article IV, Section B.1.c. shall apply only to additional impervious surface areas or in the case of new road construction, the hydrologically disturbed areas. This release rate requirement shall be used unless watershed specific release rates have been adopted or it is determined by the Enforcement Officer that other site conditions, including analysis of adequate downstream capacity, warrant further analysis and modification from this standard. Detention requirements shall be applied only to those projects described in Article IV, Section A.1.g.
 - c. The fee-in-lieu of on-site detention option shall be authorized for all public road developments on existing alignments provided the downstream drainage system has adequate stormwater capacity and that it will not result in negative impacts to the drainage system.
2. Application Requirements
 - a. A copy of any applicable IDNR/OWR Permit application.
 - b. A copy of any applicable U.S. Army Corps of Engineers permit application.
 - c. A copy of the proposed stormwater management system, including the location and size of all existing and proposed drainage improvements including plan, section, and profile views of storm sewers, field tiles, culverts, channels, and detention areas.

- d. A copy of all calculations supporting the stormwater management system. Materials should be consistent with the submittal requirements of Article IV, Section B.2.b.(5) and the engineering requirements of Article IV, Section B.1.
- e. A soil erosion and sediment control plan consistent with Article IV, Section B.1.j.
- f. A wetland determination report and mitigation plan consistent with Article IV, Section E., if applicable.

For developments with proposed impacts to Waters of the United States (WOUS) (i.e., major lakes, rivers, streams, and associated hydrologically-connected wetlands) that are regulated by the U.S. Army Corps of Engineers (USACE) under the federal Clean Water Act (CWA) or Rivers and Harbors Act (RHA), the applicant must provide a wetland submittal to the SMC (certified community, where applicable) that includes the following:

1. A wetland determination report for the site (see “[Wetland Determinations](#)” section for report requirements),
2. A written jurisdictional determination (JD) from the USACE or SMC documenting which wetlands/waters on the development site are WOUS, and
3. A copy of the USACE permit authorizing the proposed impacts to WOUS or a letter from the USACE stating that a permit is not required for the proposed activity (note: the USACE permit is a separate authorization and is required prior to issuance of the WDP by the SMC or certified community).

The USACE-Chicago District’s current regulatory program requires a minimum mitigation acreage replacement ratio of 1.5:1 for WOUS impacts exceeding 0.1 acre. A higher mitigation ratio is required for proposed impacts to WOUS that qualify as high quality aquatic resources (HQAR). The WDO requires mitigation within Lake County, Illinois, for all WOUS impacts occurring in Lake County that exceed the mitigation threshold of the USACE’s regulatory program, with first priority being within the same major watershed in the county (Des Plaines River, Fox River, North Branch-Chicago River, and Lake Michigan).

Developments with Proposed Impacts to Isolated Waters of Lake County (IWLC)

IWLC are defined in Appendix A of the WDO as “[a]ll waters such as lakes, ponds, streams (including intermittent streams), farmed wetlands, and wetlands that are not under U.S. Army Corps of Engineers jurisdiction.”

If the development site is located within an IWLC-certified community, the wetland submittal should be directed to the community’s CWS.

If the development site is located within a standard certified community (i.e., not IWLC-certified) or in a non-certified community, the wetland submittal may be directed to either of SMC’s principal wetland specialists.

What is Required for the IWLC Impacts Wetland Submittal?

The following items are to be included with the IWLC wetland submittal, at a minimum:

1. A written jurisdictional determination (JD) from the USACE-Chicago District or SMC documenting which wetlands/waters on the development site are IWLC.
2. A cover letter signed by a CWS that provides a clear project purpose and need statement, a description of the proposed activity, area (in acres) of wetland impact, and a statement on the impact category to be used, as follows:

Category-I: Impacts less than or equal to one (1) acre that do not impact high quality aquatic resources (HQARs).
Category-II: Impacts greater than one (1) acre and less than two (2) acres that do not impact HQARs
Category-III: Impacts greater than or equal to two (2) acres or impacts to HQARs (any acreage amount)
Category-IV: Impacts for the restoration, creation and enhancement of wetlands, provided that there are net gains in aquatic resource function. Category-IV activities also may include shoreline and streambank restoration activities described in WDO Article IV, Section C.2.d.(4) .

3. A completed WDP application form signed by a CWS.
4. A wetland determination report for the site.

5. Development site plan(s) showing the boundaries of all existing wetlands, farmed wetlands, or water bodies on the ownership parcel, including the development site, and the areas of proposed wetland impacts.
6. A statement on the occurrence of any HQAR on or adjoining the development site.
7. Documentation that the development is in compliance with the Illinois Department of Natural Resource's (IDNR) Endangered Species Consultation Program and the Illinois Natural Areas Preservation Act [520 ILCS 10/11 and 525 ILCS 30/17].
8. For developments involving State of Illinois funding or pass-through funding, documentation that the development is in compliance with the Interagency Wetland Policy Act of 1989 [20 ILCS 830] as administered by the IDNR.
9. Documentation that the development is in compliance with the U.S. Fish and Wildlife Service's (USFWS) consultation program under the federal Endangered Species Act.
10. A mitigation plan meeting the WDO requirements.
11. A copy of the Natural Resources Information Report (NRI) for the development site from the McHenry-Lake County Soil and Water Conservation District (if required under state statute 70 ILCS 405/22.02).
12. For Category-II impacts only: A narrative of the alternative measures taken to avoid, minimize, or mitigate for IWLC impacts.
13. For Category-III impacts only: A narrative of the measures taken, in sequence, to avoid and minimize wetland impacts to IWLC before mitigation is considered.
14. For Category-IV impacts only: A narrative on the benefits to the aquatic environment of the proposed development.

Is Mitigation Required for IWLC Impacts?

The WDO requires compensatory mitigation (wetland replacement) for IWLC impacts greater than or equal to 0.1 acre to IWLC, including those that are HQARs.

Wetland impacts must be replaced at a minimum ratio of 1.5:1 (i.e., one and one-half acres of mitigation for each acre impacted), unless fully certified credits are purchased from a “wetland mitigation bank” (mitigation ratio of 1:1). Impacts to IWLC-HQAR wetlands require a minimum mitigation ratio of 3:1, or 6:1 for forested HQARs. For wetland impacts to open waters (i.e., waters greater than three feet deep) that are not HQAR under Categories I, II, and III, a minimum 1:1 mitigation ratio is required.

All mitigation must take place within Lake County, Illinois, to maintain no net wetland loss of wetlands in the county, with first priority being within the same major watershed (Des Plaines River, Fox River, North Branch-Chicago River, and Lake Michigan). Mitigation may be achieved in several ways:

1. purchasing acreage credits from a wetland mitigation bank in the same major watershed (note: purchase of credits outside the watershed requires double the replacement acreage). For a map of active USACE-approved wetland mitigation banks in Lake County, Illinois, see [Mitigation Banks](#).
2. creating new wetlands or enhancing degraded wetlands on the development site or on an approved off-site property within the same major watershed as the wetland impacts; or
3. purchasing acreage credit in the SMC Wetland Restoration Fund (WRF), which provides a fee-in-lieu option for mitigation (see WRF section below).

When Can the SMC Wetland Restoration Fund Be Used for Mitigation?

SMC created the WRF as a last option for wetland mitigation, when there are no available wetland mitigation bank credits in the major watershed where the IWLC impacts occur. Note that the WRF can only be used to compensate for impacts to IWLC, not WOUS.

Below are the current WRF in-lieu mitigation fees for each of the four major watersheds in Lake County:

- North Branch-Chicago River Watershed \$129,900 per acre
- Lake Michigan Watershed \$125,400 per acre
- Des Plaines River Watershed \$86,500 per acre
- Fox River Watershed \$81,500 per acre

The mitigation replacement ratios for the WRF are the same as the standard mitigation required for IWLC impacts:

- IWLC that are not HQAR – a minimum ratio of 1.5:1 (i.e., one and one-half acres of mitigation for each acre impacted), unless “fully certified” credits are purchased from a wetland mitigation bank (a minimum 1:1 ratio);
- IWLC that are HQAR – a minimum mitigation ratio of 3:1, or 6:1 for forested HQAR; and
- IWLC open waters (greater than 3 feet deep) that are not HQARs – a minimum ratio of 1:1.

5. Permitting Requirements

The proposed structure will likely include one of two substructure types being considered, neither of which can probably be considered simple maintenance. One involves coring through the existing limestone abutments with micropiles to provide a new substructure. The existing limestone abutments will remain in place. The second option involves removing the entire superstructure, reconstructing the abutments with new limestone, reinforcing the embankment behind the abutments with an engineered geo-fabric system and placing the superstructure on the new abutments. It is likely that both options can be constructed without narrowing the distance between the faces of the abutments. No restriction of the floodway under the bridge is therefore anticipated.

The Permits identified in Section 4 were evaluated based on the assumption that the opening under the bridge will remain at its current size.

A. Floodway Construction in Northeastern Illinois Permit

It is likely that the proposed improvements can be constructed using Regional Permit #1 because:

- a. The proposed structure will not be more restrictive than the existing structure.
- b. No channel modification is likely to be proposed.
- c. The Buffalo Creek is not considered navigable.
- d. It is unlikely that the headwater for the 100-year flood will increase by 0.1’.
- e. It does not appear that any existing structures are at risk for flood damage but this issue will require further investigation to justify use of this Regional Permit.
- f. No loss of floodway storage is anticipated.
- g. Transitional sections are not proposed to be modified.
- h. Downstream backwater is not an issue.

Completion of the IDOT Form D1 PD0024 and the Preliminary Bridge Design and Hydraulic Report form will be required during a future phase of the project once detailed hydraulic and drainage data is known.

B. General Storm Water NPDES Permit for Construction Activities

It is unlikely this permit will be required since the project is not anticipated to disturb more than one acre of land. If required, completion of this form during the design phase of the project will not likely have any impact on the design of the proposed improvements.

C. Section 401 Water Quality Certification

It is likely that the conditions for use of the IEPA Certification of the Chicago District Regional Permit #3 will be met since:

- a. The project is not likely to cause any violations of applicable water quality standards or interference with water use practices
- b. Adequate supervision will be provided during construction for implementing methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.
- c. Spoil material will not be returned to the waterway. Backfilling will be done with clean material placed in a manner to prevent violation of applicable water quality standards.
- d. All areas affected by construction will be mulched and seeded to reduce erosion during construction. All construction within the waterway shall be conducted during zero to low flow conditions.
- e. The permittee shall implement erosion control measures consistent with the Illinois Urban Manual (IEPA/USDA, NRCS; latest version).
- f. No sanitary sewer or water main work is anticipated.
- g. No stream crossing trenches are anticipated.
- h. No channel relocations are anticipated.
- i. The work shall be constructed with adequate erosion control measures (i.e., silt fences, straw bales, etc.) to prevent transport of sediment and materials to the adjoining wetlands and/or streams.
- j. Backfill used within waters of the State, except wetland areas, will be composed of appropriate material.
- k. Backfill used within wetland areas will be composed of appropriate material.
- l. The area has not been previously mined.

D. Section 404 Permit – Dredged or Filled Material

It is likely that the proposed improvements can be constructed using Chicago District Regional Permit #3 because:

- a. Impacts to waters of the U.S will not exceed 0.25 acres.
- b. The project will likely not impact more than 0.10 acres of waters of the U.S.

- c. The project will likely be considered Category I for permit processing.
- d. The project will likely not impact more than 0.5 acres.
- e. The discharge will be limited to the minimum width necessary.
- f. The crossing will be designed so that it won't impede flood flows or the passage of fish or other aquatic resources.
- g. The required documentation will be provided.
- h. In-stream work will be clearly labeled on the plans.
- i. Any necessary dewatering work will be clearly labeled on the plans.
- j. Temporary construction will meet the requirements of Regional Permit #7.
- k. The proposed work will not require any bank stabilization.
- l. Native plants will be used to restore disturbed areas.
- m. BMP's will be employed to protect water quality.
- n. Building pads and storage areas are not included in the proposed improvements.
- o. The project does not border a conservation area.
- p. The bridge is a public roadway.
- q. A Soil Erosion and Sediment Control plan will be developed and reviewed as appropriate.

Use of this permit will likely have no effect on the design of the proposed improvements. However, the adjacent wetlands should be carefully mapped to avoid any impacts.

E. Coast Guard Bridge Permit

Since the Buffalo Creek is not considered navigable this permit is not required.

F. Section 10 – Structures and Work in Navigable Waters

Since the Buffalo Creek is not considered navigable this permit is not required.

G. Lake County Watershed Development Permit

It is likely that a LCWDO permit will be acquired with little impact on the proposed improvements since:

- a. The project will meet the requirements of the IEPA 401 Certification for Chicago District Regional Permit #3.
- b. The project will meet the requirements of the Chicago District Regional Permit #3.
- c. A stormwater management design will be developed in later phases of the project.

- d. Calculations for the design of the stormwater system will be provided
- e. A Soil Erosion and Sediment Control plan will be developed and reviewed as appropriate.
- f. A wetland report will be prepared and submitted which will include a jurisdictional determination.

6. Conclusions

Based on this preliminary analysis, during the planning and design phases of this project it will likely be necessary to:

- a. Delineate the existing wetlands surrounding the bridge.
- b. Coordinate with the U.S. Fish and Wildlife Service to determine if any threatened or endangered species will be impacted by the proposed improvements.
- c. Coordinate with the State Historic Preservation Officer to determine the presence of any cultural resources in the project area.
- c. Perform a detailed topographic survey of the bridge site and the Buffalo Creek north and south of the bridge.
- d. Coordinate PBDHR and Permit requirements with IDOT and perform a detailed hydraulic study of the existing and proposed bridge scenarios if required.
- e. Research historic flooding in the project area and identify any structures that are at-risk for flood damage.
- f. Coordinate with Long Grove to obtain floodway/floodplain certification for structures not at risk for flood damage.
- g. Identify any cofferdams or in-stream work necessary to replace the bridge abutments.
- h. Identify impacts to wetlands and Waters of the U.S.
- i. Prepare a Soil Erosion and Sediment Control plan.
- j. Prepare and coordinate approval of the IDOT Preliminary Bridge Design and Hydraulic Report since the bridge length is greater than 30'.
- k. Complete the IDNR/IEPA/USACE Joint Permit (NCR Form 426, Protecting Illinois Waters) including:
 - 1. A cover letter which provides a clear project purpose and need statement, a brief description of the proposed activity, the Regional Permit(s) to be used for the activity, the area (in acres) of waters of the U.S. to be impacted, and a statement that the terms and conditions of the RPP will be followed;
 - 2. A completed joint application form (NCR Form 426, Protecting Illinois Waters) signed by the applicant or agent. If the agent signs, notification shall include a signed, written statement from the applicant designating the agent as its representative;
 - 3. A delineation of waters of the U.S., including wetlands, for the project area, and for areas adjacent to the project site (off-site wetlands shall be identified through the use of reference materials including review of local wetland inventories, soil surveys and the most recent available photography), shall be

prepared in accordance with the current Corps of Engineers methodology and generally conducted during the growing season. For sites supporting wetlands, the delineation shall include a Floristic Quality Assessment (Swink and Wilhelm. 1994, latest edition, Plants of the Chicago Region). The delineation shall also include information on the occurrence of any high-quality aquatic resources and a listing of waterfowl and amphibian species observed while at the project area.

4. A map showing the location of the project site;
5. Preliminary engineering drawings (full size and 8 ½" x 11" reduced sized for Category II projects only) showing all aspects of the proposed activity and the location of waters of the U.S. to be impacted and not impacted. The plans shall include grading contours; and proposed and existing structures of work such as buildings footprints, roadways, road crossings, stormwater management facilities, utilities, construction access areas and details of water conveyance structures. The drawings shall also buffer areas, outlots or open space designations, best management practices, deed restricted areas, and restoration areas, if required under the specific RP above;
6. A preliminary soil erosion and sediment control plan;
7. Evidence that USFWS was contacted regarding the presence of any Federally listed (or proposed for listing) endangered or threatened species or critical habitat in the area that may be affected by the proposed activity.

The two critical issues most likely to effect the proposed improvements and their construction are the risk of flooding due to the bridge and the proximity of wetlands to the existing abutments.

As an attachment to the IDNR/IEPA/USACE Joint Permit, a certification from Long Grove or Lake County that no structures are within the floodplain or floodway will facilitate approval of the permit even though structures are shown in the floodway and floodplain on the FEMA mapping. If the bridge is found to cause or contribute to flood damage to any structures then the existing waterway opening may not be approved for use and the distance between abutments will need to be widened.

If wetlands are found to be located in close proximity to the existing abutments such that they will be considered impacted by the construction then additional permitting review may be required.



Streamstats Ungaged Site Report

Date: Thu Dec 19 2013 11:33:11 Mountain Standard Time

Site Location: Illinois

NAD27 Latitude: 42.1775 (42 10 39)

NAD27 Longitude: -87.9994 (-87 59 58)

NAD83 Latitude: 42.1775 (42 10 39)

NAD83 Longitude: -87.9995 (-87 59 58)

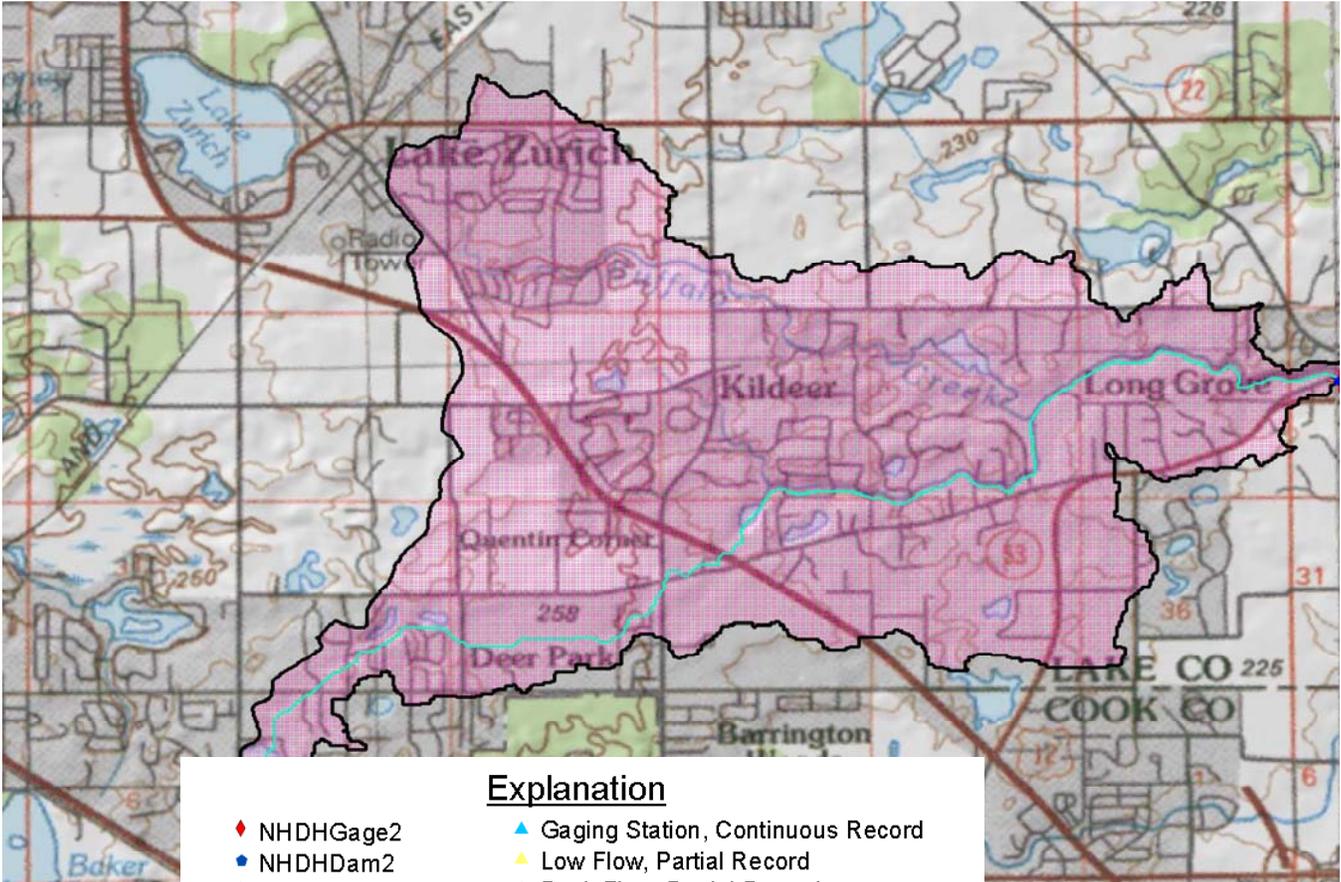
Drainage Area: 8.96 mi²

Peak Flow Basin Characteristics			
100% Region 2 AMS (8.96 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	8.96	0.03	9554
Stream Slope 10 and 85 Method (feet per mi)	21.550	0.81	317
Percent Open Water AND Herb Wetland (percent)	3.291	0	8

Peak Flow Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2	285	40	2.6	150	541
PK5	472	41	3.1	248	901
PK10	605	42	3.8	311	1180
PK25	768	45	4.6	380	1550
PK50	894	47	5.2	428	1870
PK100	1010	49	5.6	468	2170
PK500	1280	55	6.2	549	3000



Coffin Road Bridge



Explanation

- | | |
|------------------------|-------------------------------------|
| ◆ NHDHGage2 | ▲ Gaging Station, Continuous Record |
| ● NHDHDam2 | ▲ Low Flow, Partial Record |
| ★ GlobalWatershedPoint | ▲ Peak Flow, Partial Record |
| ◆ SIp1085Point | ▲ Peak and Low Flow, Partial Record |
| — LongestFlowPath3D | ▲ Stage Only |
| ▭ GlobalWatershed | ▲ Low Flow, Partial Record, Stage |
| ■ IDOT Structures | ▲ Miscellaneous Record |
| ■ Stream Grid | ▲ Unknown |
| ⊠ ExcludePoly | |



6620.



MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0242K

FIRM FLOOD INSURANCE RATE MAP LAKE COUNTY, ILLINOIS AND INCORPORATED AREAS

PANEL 242 OF 295
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
LAKE COUNTY 170357 0242 K
LONG GROVE, VILLAGE OF 170380 0242 K

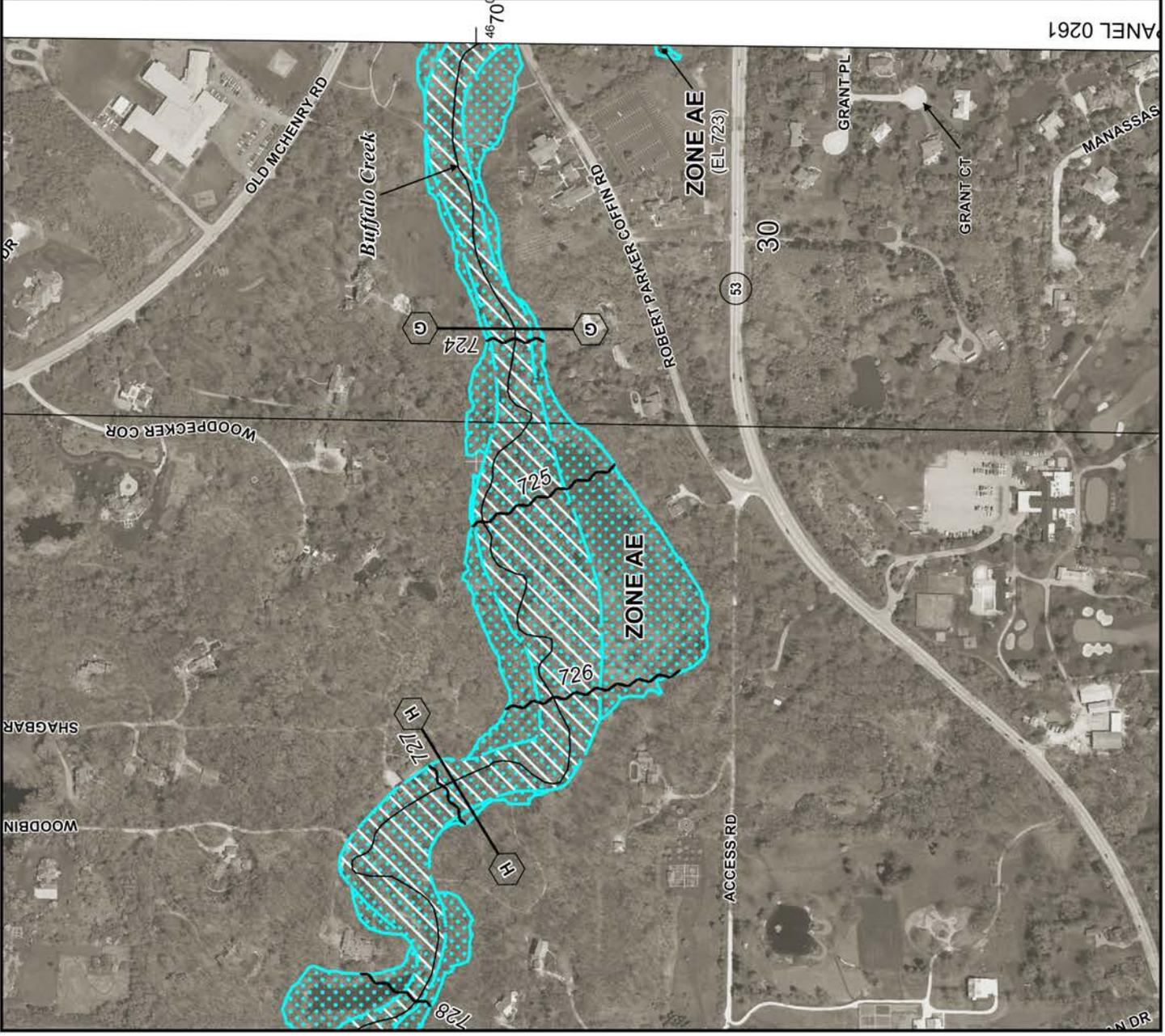
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
17097C0242K
MAP REVISED
SEPTEMBER 18, 2013



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



PANEL 0261

16620.



MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0261K

FIRM FLOOD INSURANCE RATE MAP LAKE COUNTY, ILLINOIS AND INCORPORATED AREAS

PANEL 261 OF 295
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL SUFFIX
	BUFFALO GROVE, VILLAGE OF	170088	0261 K
	LAKE COUNTY	170357	0261 K
	LONG GROVE, VILLAGE OF	170380	0261 K

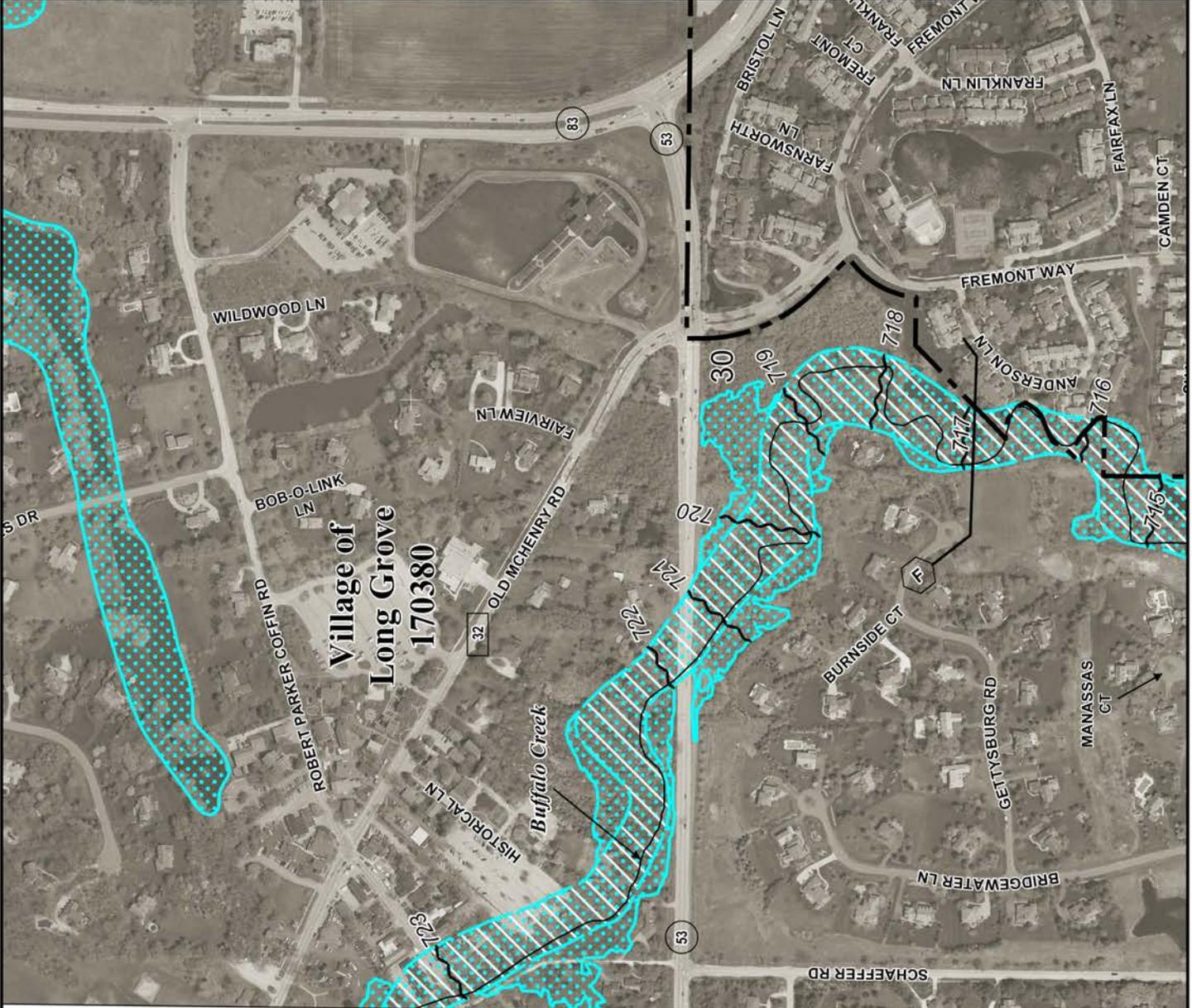
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
17097C0261K
MAP REVISED
SEPTEMBER 18, 2013



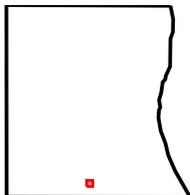
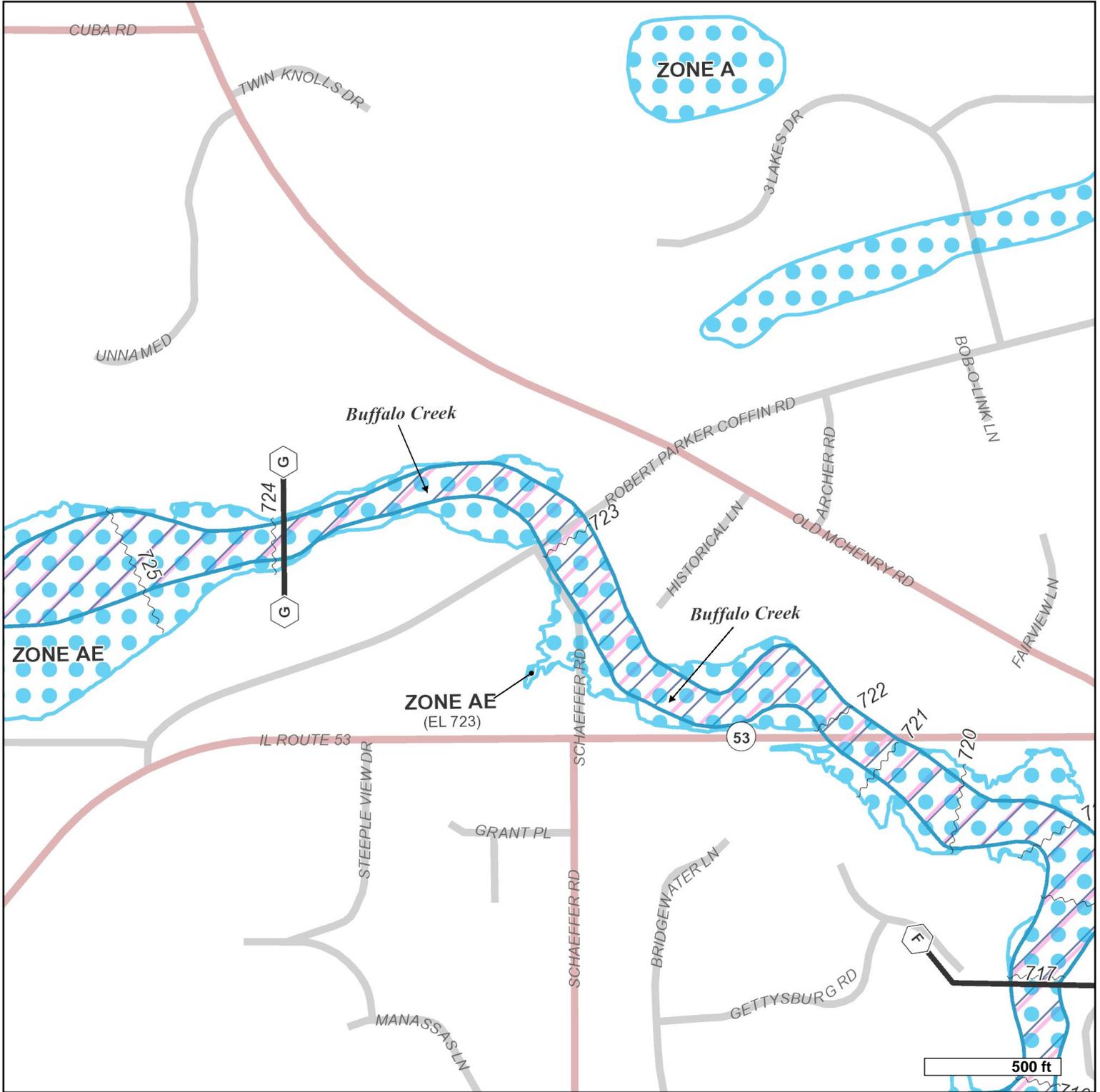
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



JOINS PANEL 0242

Lake County, Illinois



LakeCounty
Geographic Information System

Lake County Department
of Information Technology
18 N County St
Waukegan IL 60085
(847) 377-2373

Map Printed on 01/28/2014

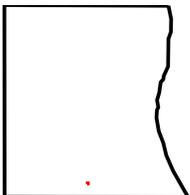


-  Lake County Border
-  Water
-  General Structures
-  FEMA Base Flood Elevation
-  Special Flood Hazard Areas
-  Floodway Areas In Zone AE
-  Other Flood Areas
-  Parcels

Disclaimer

The selected soil feature layer may not occur anywhere in the current map extent. A Registered Land Surveyor should be consulted to determine the precise location of property boundaries on the ground. This map does not constitute a regulatory determination and is not a base for engineering design. This map is intended to be viewed and printed in color.

Lake County, Illinois



LakeCounty
Geographic Information System

Lake County Department
of Information Technology
18 N County St
Waukegan IL 60085
(847) 377-2373

Map Printed on 01/29/2014

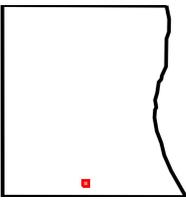
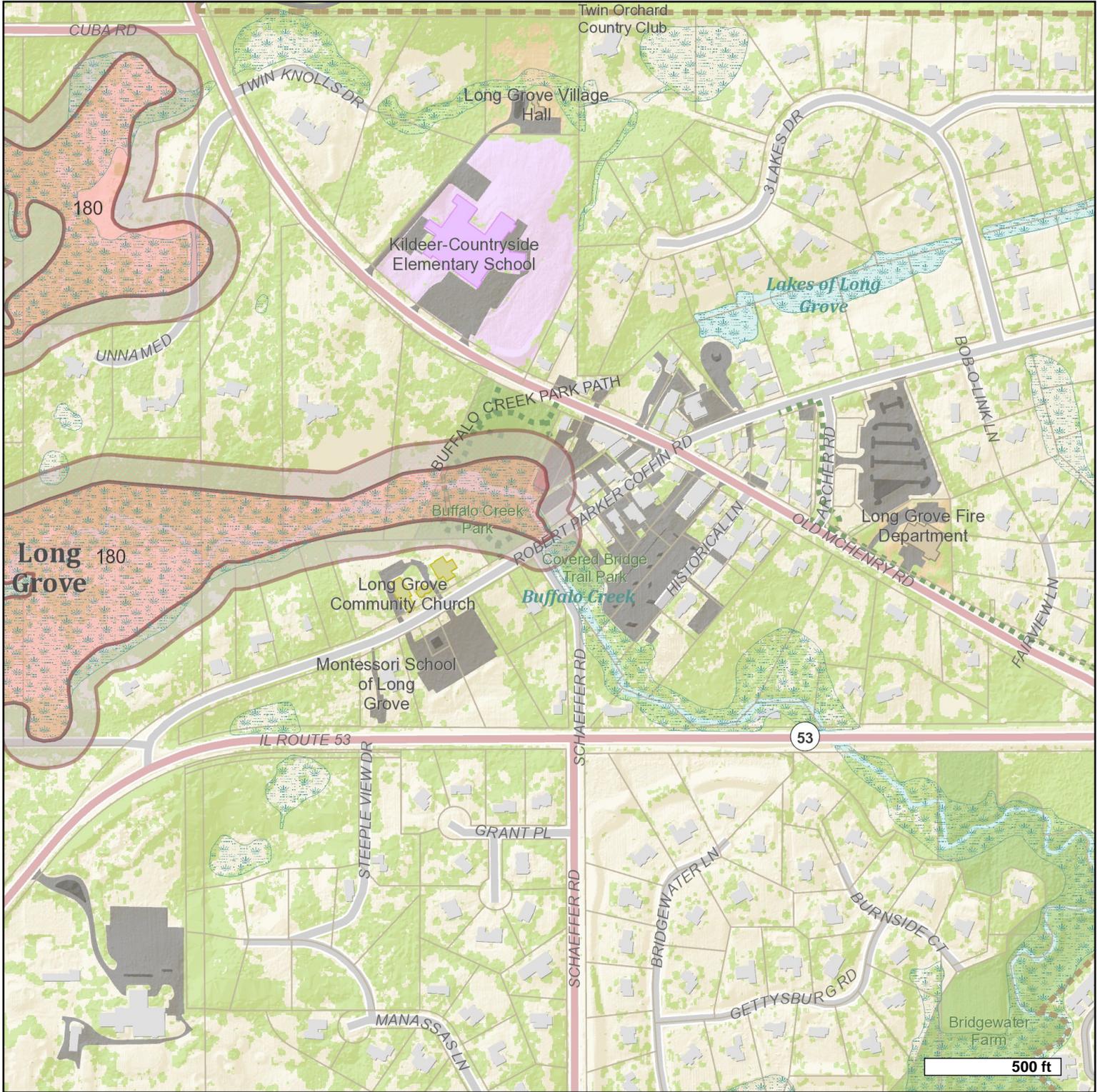


- Major Contour Line
- Minor Contour Line
- Lake County Border

Disclaimer

The selected soil feature layer may not occur anywhere in the current map extent. A Registered Land Surveyor should be consulted to determine the precise location of property boundaries on the ground. This map does not constitute a regulatory determination and is not a base for engineering design. This map is intended to be viewed and printed in color.

Lake County, Illinois



Lake County
Geographic Information System

Lake County Department
of Information Technology
18 N County St
Waukegan IL 60085
(847) 377-2373

Map Printed on 01/28/2014



- ADID with 100ft Buffer
- ADID
- 2011 Buildings
- Lake County Border
- Water
- Wetlands
- Municipalities
- Tax Parcels
- Trails

Disclaimer

The selected soil feature layer may not occur anywhere in the current map extent. A Registered Land Surveyor should be consulted to determine the precise location of property boundaries on the ground. This map does not constitute a regulatory determination and is not a base for engineering design. This map is intended to be viewed and printed in color.



Applicant Agency:	_____	County:	_____
Route:	_____	Stream:	_____
Section:	_____	SN:	_____

General Description (bridge length, bridge width, number of spans, abutment type, proposed scope of work within floodway, etc.):

Existing Facility:

Proposed Improvement:

- 1. Is the proposed work classified as repairs such as deck replacement, pavement resurfacing, or the armoring or filling of a scour hole? Yes No
- 2. Does the proposed work only consist of modifications to the existing structure which will occur above the regulatory 100-year flood profile? Yes No

Note: If the answer to question 1 or 2 is yes, no permit is required and questions 3 through 12 may be omitted.

- 3. Does the proposed work below the regulatory 100-year flood profile consist of widening of the existing structure by 12 feet or less? Yes No

Note: If yes, Regional Permit No. 2 applies and questions 4 through 9 may be omitted.

- 4. Is the proposed improvement, including the approach roadway, more restrictive to normal and flood flows than the existing structure? Yes No

- 5. Is a Channel Modification proposed? Yes No

- 6. Are there any buildings or structures located upstream in the 100-year floodplain within the influence of the structure backwater? Yes No

- 6a. If no, does the backwater of the proposed improvement exceed the backwater of the existing structure by more than 0.1 foot? Yes No

- 6b. If yes, does the proposed backwater exceed the natural high water elevation by more than 0.1 foot? Yes No

- 7. Are transitions required for this project? Yes No

- 8. Is the flood profile at the project site impacted by backwater from a downstream receiving stream? Yes No

If yes, list frequency of starting elevation for analysis:

9. Is backwater from a downstream structure affecting the flood profile at the project site? Yes No
- 9a. Was the existing downstream structure used in the analysis for determining flood profile at the project site? years? (Attach documentation) Yes No
- 9b. Is the downstream structure scheduled for improvement in the next 5 Yes No
- 9c. Was the proposed downstream improvement used in the analysis? Yes No
10. Is a floodway map change required due to the proposed project? Yes No
11. Will fill or material be placed in the floodway due to the proposed work? Yes No
- 11a. If yes, is compensatory storage provided at the project location? (Attach a copy of completed Attachment A) Yes No
- 11b. If the answer to 11a is no, is compensatory storage provided at another location? If yes, give location and attach a copy of completed Attachment A. Yes No
- 11c. Has compensatory storage relief been granted? (Attach Documentation) Yes No
12. Coordination based on Memorandum of Agreement has occurred with Agency(ies) (Attach documentation):. Yes No

All engineering analysis has been performed by me or under my direct supervision.

Signature: _____ IL/P.E. #: _____
 Date: _____ P.E. Expiration Date: _____

FOR DEPARTMENTAL USE ONLY

- Is a permit required for this project? Yes No
- If yes, specify type of permit: Floodway, Regional 1, Regional 2

Municipality _____
County _____
Road District _____
Other Agency _____
Project _____
Section _____



**Illinois Department
of Transportation**

**Preliminary Bridge Design
and Hydraulic Report**

Route _____
Stream _____
Ex. St. No. _____
Pr. St. No. _____
Prepared by _____
Agency/Firm _____
Date _____

Funding Type: HBP STU STR Enhancement
 TBP MFT Non-MFT Other (_____)

Sufficiency Rating _____ Existing clear span length _____
Functionally Obsolete Yes No
Structurally Deficient Yes No

Construction Information

Proposed Letting Date _____

Shop Plan Review by Local Agency Consultant State
Fabrication Inspection by Local Agency Consultant State

Approach Roadway Information

Surface Type: Existing _____ Proposed _____
Surface Width: Existing _____ Proposed _____
Shldr to Shldr Width: Existing _____ Proposed _____
Elevation of Low Point: Existing _____ Proposed _____
Proposed Side Slopes _____
Roadway Functional Classification _____
DHV _____ Current ADT _____ Design Year ADT _____
% Trucks _____ Design Speed _____
3R Design Guidelines Used Yes No

Range _____, _____ PM

Twp. _____

Locate bridge accurately above

Proposed Structure Information

Type of Structure Proposed Bridge Culvert "Standard Plans" Bridge Pedestrian/Bicycle
Vehicle Design Loading _____ Pedestrian/Bicycle Design Loading _____
Superstructure Type _____
Structure Length Back to Back Abutments _____ Span Length _____
Clear Roadway Width _____ Rail Type _____ Crash Tested Rail Required Yes No
Wearing Surface Type _____ Wearing Surface Thickness _____
Deicing Agents Used Yes No
Embankment Slope Under Bridge _____ Proposed Skew Angle _____ Forward on. Rt. Lt.
Pier Type _____ Abutment Type _____
Proposed Pile Type _____
Borings By _____ Expected Submittal Date for Borings _____

Hydraulic Data

Exist. Br. Cr. El. _____ @ Sta. _____ Prop. Br. Cr. El. _____ @ Sta. _____
Exist. Low Beam Elev. _____ Proposed Low Beam Elev. _____
Exist. Freeboard _____ Proposed Freeboard _____ Streambed Elev. _____
Drainage Area _____ Crossing Location Rural Urban
Crossing Located within a Mapped National Flood Insurance Program Area Yes No (Map No. _____)
Crossing Located within a Northeast Region (District #1) FEMA Mapped Floodway Yes No
Crossing Located over designated "Public Bodies of Water" Yes No
Design Flood Data
Design Flood Frequency _____ Design Discharge _____ Design High Water Elev. _____
Exist. Br. Opening _____ Exist. Over-the-Road _____
Prop. Br. Opening _____ Prop. Over-the-Road _____
100 Year Flood Data
100 Year Discharge _____ 100 Year High Water Elev. _____
Exist. Br. Opening _____ Exist. Over-the-Road _____ Exist. Created Head _____
Prop. Br. Opening _____ Prop. Over-the-Road _____ Prop. Created Head _____

If proposed structure and over-the-road area will not carry entire flow, state kind and area of additional waterway

Type of Streambed soil _____ Will drift or ice permit pier in channel? Yes No
Has scour occurred at or near existing structure? Yes No; If yes, reason for scour _____

Comments on hydraulic adequacy of existing structure _____

Has the existing structure been the cause of demonstrable flood damage to adjacent property? Yes No
If yes, describe damage _____

Comments on the hydraulic adequacy of upstream and downstream structures and their comparable relationship to the proposed structure _____

Will houses, places of business or valuable property be affected by backwater from the proposed bridge? Yes No
If yes, describe property and effect of backwater _____

Is any channel excavation beyond that required to construct the substructure required in the channel? Yes No
If yes, describe extent of channel excavation _____

Will a channel realignment be required? Yes No (If yes, attach Channel Change Sketch)
Are stream flow data (gaging station or flood study) available for the stream at or near the proposed site? Yes No
(If yes, attach an analysis of the stream flow data)
Provide information regarding high water from other streams, reservoirs, flood control projects, proposed channel changes, strip mine areas or other controls affecting the hydraulic or hydrologic properties of the crossing site _____

Scour Analysis

Was a HEC-18 scour analysis performed? Yes No
Were all substructure units being utilized evaluated to consider the effect of anticipated scour? Yes No
Will scour protection or corrective actions be required? Yes No
If yes, describe protection or corrective actions. _____

Attachments (Check those items below that are included.)

- Reproduction of applicable portion of USGS quadrangle showing locations of proposed bridge and properties affected by backwater caused by the proposed structure
- Cross sections as required by WSPRO including floodplain above high water elevation
- Streambed profile
- Profile of existing and proposed roadway across floodplain
- Hydraulic calculations
- Joint Application Form for construction permit submittals (Joint Form NCR-426)
- Waterway sketch
- Channel change sketch
- Applicable certification(s)
- Boring data
- Scour analysis/evaluation
- Other _____