

# Environmental Assessment

## Illinois Route 31 Phase I Study

Illinois Route 176 to Illinois Route 120  
McHenry County, Illinois

Project No: P-91-135-99  
PTB No: 155-015, 170-007



Prepared  
For:



Illinois Department  
of Transportation

Illinois Department of Transportation  
Region One/District One  
201 W. Center Court  
Schaumburg, IL 60196

November 2016



**Illinois Department  
of Transportation**

Illinois Route 31  
Illinois Route 176 to Illinois Route 120  
McHenry County, Illinois  
Job No. P-91-135-99

**ENVIRONMENTAL ASSESSMENT**

Submitted Pursuant to 42 USC 4332 (2)(c)  
by the

U. S. Department of Transportation  
Federal Highway Administration

and

Illinois Department of Transportation

Cooperating Agencies

U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency,  
Illinois Department of Agriculture, Illinois Historic Preservation Agency, and  
Illinois Department of Natural Resources

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The purpose of the proposed project is to provide an improved transportation facility along IL Route 31 from the intersection of IL Route 176 to the intersection of IL Route 120 in McHenry County. This will be accomplished by improving safety, addressing roadway capacity and mobility, correcting existing geometric deficiencies, and encouraging multi-modal transportation. The project extends 6.8 miles along IL Route 31 and 0.4 miles along IL Route 31/IL Route 120. The proposed action includes pavement reconstruction and widening along the existing alignment to provide two through lanes in each direction separated by a median, as well as bicycle and pedestrian accommodations, and intersection and drainage improvements. The project footprint (including all proposed right-of-way and temporary easements) will require 70.82 acres of land from 144 parcels, and acquisition of two commercial and one residential property. There are 1.53 acres of wetlands anticipated to be impacted, and 14.19 acres of farmland anticipated to be converted to non-agricultural uses. No cultural resources or threatened or endangered species are anticipated to be impacted. Individual Section 401 and 404 permits will be required.



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Exhibit 2 - Local Jurisdiction Map

Exhibit 3 – Wetland Impact Exhibits

Exhibit 4 - Environmental Resource Map

Exhibit 5 – Best Management Practices

## **COORDINATION**

### Environmental Resources

- Biological Resources Clearances
- Wetland Clearance
- Cultural Resources Clearances
- Special Waste Clearances

### Agency Coordination

- Cooperating Agency Request Letters
- Tribal Invitation Letters (Section 106 Consulting Party Request)
- NEPA/404 Merger Meeting Summaries and Concurrences
  - Introduction – June 27, 2011
  - Purpose and Need – March 1, 2012
  - Range of Alternatives – June 25, 2013
  - Preferred Alternative – June 25, 2014
- FHWA Coordination Meeting Summaries
- U.S. Army Corps of Engineers Meeting Summaries
- Other Agency Coordination
  - Letter from Prairie Grove on Preferred Alternative – April 5, 2013
  - City of McHenry Meeting – April 11, 2013
  - City of McHenry Meeting – October 15, 2013
  - Environmental Interest Group Meeting – January 15, 2014
  - City of McHenry Public Works Committee – March 12, 2014
  - City of Crystal Lake Meeting – January 20, 2015
  - Village of Prairie Grove Meeting – January 20, 2015
  - City of McHenry, McHenry County, and Nunda Township Meeting – January 20, 2015
  - Letter from Illinois Department of Agriculture – July 15, 2016

### Public Involvement

- Stakeholder Involvement Plan
- Context Audit Forms
- Public Meeting Summaries, Attendance Roster, Comments and Responses
  - Public Meeting #1 – June 9, 2011
  - Public Meeting #2 – November 15, 2011
- Community Advisory Group (CAG) Meeting Summaries
  - CAG #1 – September 1, 2011
  - CAG #2 – September 22, 2011
  - CAG #3 – November 3, 2011
  - CAG #4 – May 22, 2012
  - CAG #5 – November 20, 2014

## **APPENDICES AND TECHNICAL REPORTS (Provided on CD in back of this document)**

Appendix A	Social and Economic Resources
Appendix B	Farmland Impacts
Appendix C	Traffic Noise Analysis
Appendix D	Biological Surveys (Eastern Prairie Fringed Orchid, Blanding's Turtle, and Avian)
Appendix E	Stream Data
Appendix F	Wetland Delineation (August 2011 and November 2014)
Appendix G	NEPA/404 Merger Meeting Materials
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## ACRONYMS

ADID	Advanced Identification (wetland classification)
ADT	Average Daily Traffic
AST	Aboveground Storage Tank
BDE	IDOT Bureau of Design and Environment
BMPs	Best Management Practices
BRR	Biological Resources Review
CAG	Community Advisory Group
CFR	Code of Federal Regulations
CMAP	Chicago Metropolitan Agency for Planning
CMP	Congestion Management Process
CNE	Common Noise Environment
CO	Carbon Monoxide
COSIM	Carbon Monoxide Screening for Intersection Modeling
CRP	Conservation Reserve Program
CSS	Context Sensitive Solutions
dB(A)	A-weighted Decibel
DCP	Dust Control Plan
EA	Environmental Assessment
EcoCAT	Ecological Compliance Assessment Tool
ESA	Endangered Species Act
ESR	Environmental Survey Request
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
HQAR	High Quality Aquatic Resource
HUC	Hydrologic Unit Code
IAC	Illinois Administrative Code
IDNR	Illinois Department of Natural Resources
IDOA	Illinois Department of Agriculture
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency
ILCS	Illinois Compiled Statutes
INAI	Illinois Natural Areas Inventory
INHS	Illinois Natural History Survey
ISAS	Illinois State Archaeological Survey
ISGS	Illinois State Geologic Survey
LAWCON	Land and Water Conservation
LESA	Land Evaluation and Site Assessment
LOS	Level of Service
LUST	Leaking Underground Storage Tank
MPH	Miles per Hour
MSAT	Mobile Source Air Toxic
NAAQS	National Ambient Air Quality Standard
NAC	Noise Abatement Criteria
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
OSLAD	Open Space Lands Acquisition and Development

PESA	Preliminary Environmental Site Assessment
PM <sub>2.5</sub>	Particulate Matter with particles smaller than 2.5 micrometers in diameter
PM <sub>10</sub>	Particulate Matter with particles smaller than 10 micrometers in diameter
REC	Recognized Environmental Condition
ROW	Right-of-Way
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SOV	Single Occupancy Vehicles
SWPPP	Stormwater Pollution Prevention Plan
TIP	Transportation Improvement Program
TWLTL	Two-Way Left Turn Lane
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Act
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USNRCS	Natural Resource Conservation Service
VMT	Vehicle Miles Traveled
VPH	Vehicles per Hour
WHPA	Wellhead Protection Recharge Areas
WWTP	Waste Water Treatment Plant



## 1. INTRODUCTION

This environmental assessment evaluates the alternatives to improve Illinois Route 31 (IL Route 31) from IL Route 176 to IL Route 120, a distance of 6.8 miles, while minimizing impacts to the environment of the project study area. IL Route 31 is a Strategic Regional Arterial (SRA 104) and a Class II truck route that extends north-south through the City of Crystal Lake, the Village of Prairie Grove, unincorporated McHenry County, and the City of McHenry. These project termini are logical in that IL Route 176 is an east-west arterial and IL Route 120 is an east-west Strategic Regional Arterial (SRA 510). South of IL Route 176, IL Route 31 has been widened to a four lane roadway to Rakow Road. IL Route 31 currently carries 17,500 to 23,500 vehicles per day (vpd). These traffic volumes are projected to increase to between 21,000 to 32,000 vpd in 2040 without any highway improvements (see Figure 2-1). The project area omits the intersection area at Bull Valley Road and the north leg of the IL 176 intersection, as these areas are either planned for improvements or have been recently improved.

IL Route 31, along with IL Route 47 and IL Route 23, is one of three continuous north-south regional routes in McHenry County. IL Route 31 extends through eastern McHenry County and provides access to Interstate 90 in Elgin, south of the project, and connects to U.S. Route 12 in Richmond, near Wisconsin. This road is vital to the local and regional transportation system and to the area's economic development (see Figure 1-1 and Exhibit 1).

Land use in the project study area is diverse. Near IL Route 176 in Crystal Lake, land is urban and primarily commercial. In Prairie Grove, land is primarily agricultural, with scattered residential and industrial areas. In McHenry, land is urban with a downtown district near IL Route 120. Land use maps are in Appendix A.

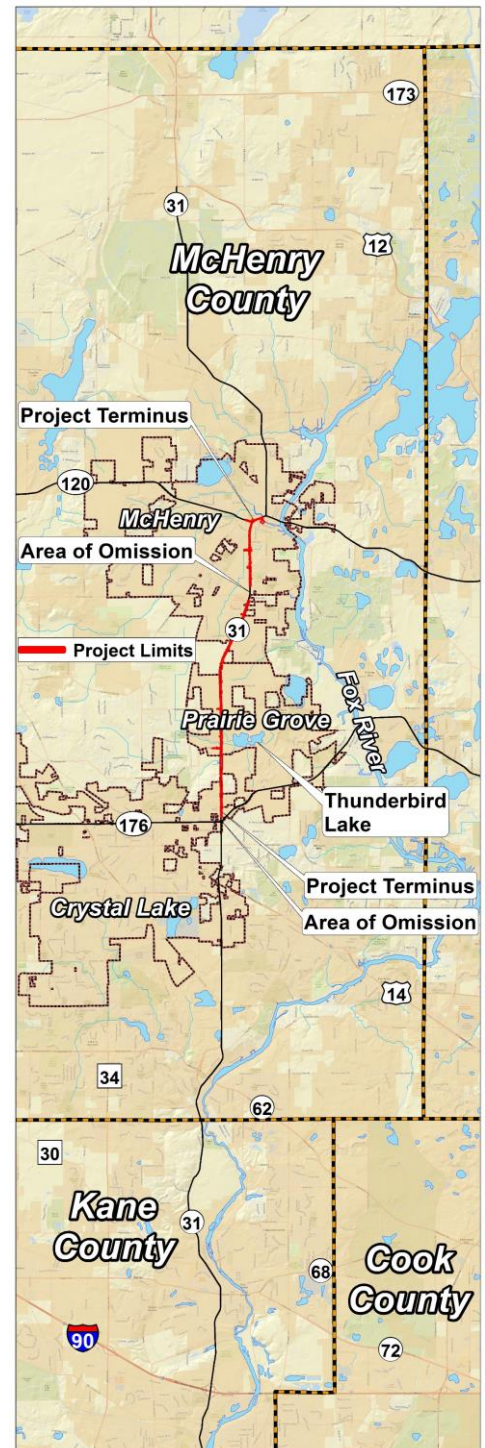
### What is an Environmental Assessment?

An environmental assessment (EA) assists decision makers evaluate if a Federal project's impacts are significant. If impacts are found to be significant, an Environmental Impact Statement (EIS) is prepared.

Otherwise, a Finding of No Significant Impact (FONSI) is prepared.

IL Route 31 is adjacent to three natural areas, including a valley with ADID (Advanced Identification) wetlands and Thunderbird Lake (1,300 feet east of IL Route 31). See Environmental Resource Map (ERM), Exhibit 4. IL Route 31 crosses several creeks, including Squaw Creek, Sleepy Hollow Creek, and an unnamed tributary to the Fox River south of Lillian Street/Grove Street. Squaw Creek parallels IL Route 31 for nearly half a mile, and was relocated from its original path when the road was originally constructed in the 1930s.

Figure 1-1 Regional Map



## 2. PURPOSE AND NEED

### 2.1 PURPOSE OF THE PROJECT

The purpose of the proposed project is to improve safety, address roadway capacity and mobility, correct existing geometric deficiencies and encourage multi-modal transportation along IL Route 31 from the intersection of IL Route 176 to the intersection of IL Route 120, in eastern McHenry County.

### 2.2 NEED FOR THE PROJECT

Increased travel demands on IL Route 31 are creating safety and operational deficiencies along the immediate roadway and adjacent arterials and intersections. The insufficient capacity of the roadway to manage travel demands creates congestion, limits mobility, hinders safe access of adjacent properties and businesses, and leads to safety issues of motorists, bicyclists, and pedestrians. Both pedestrian access to adjacent land uses, and bicycle accessibility through and across the corridor are limited. In addition, existing facilities do not encourage the use of multi-modal forms of transportation.

#### Corridor

While the “project study area” includes all proposed project improvements, “corridor” is used in this document to describe the general traveled way within the project study area, which may include the roadway, sidewalks, and trails. “Corridor” is frequently used to describe traffic flow and the transportation network.

#### 2.2.1. Safety Deficiencies

A crash analysis was prepared for the years 2006 through 2009.

The total number of crashes for the study period was 913. The predominant crash types for the study period were rear-end (53.6 percent) and turning (20.8 percent). Other types of crashes included angle, sideswipe, and fixed objects. Seventy-eight percent of crashes occurred during the day, 80.9 percent occurred during clear weather and 72.1 percent on dry pavement. This indicates that lighting conditions, weather, and wet pavement do not appear to contribute substantially to crashes.

Of the total crashes, 223 (24.4 percent) were injury crashes, resulting in 350 injuries. There were six fatalities recorded during the study period. Two of these fatalities occurred at the intersection of IL Route 31 at Half Mile Trail. These two fatalities were a result of two separate incidents that included a head-on collision and a turning collision. Both occurred during clear and dry conditions. One fatality occurred on the roadway section between Shady Oaks and Half Mile Trail and was a result of an overturned vehicle during snowy conditions. Another fatality occurred on the roadway section between Half Mile Trail and Ames Road was a result of a head-on collision. This collision occurred during clear and dry conditions. The two remaining fatalities occurred on the roadway section between Gracy Road and Veterans Parkway. Both occurred during clear and dry conditions. One was a head-on collision and another was a fixed-object collision.

Two general trends can be gleaned from the crash data in regard to fatalities within the IL Route 31 project study area. First, the most common crash resulting in fatalities on IL Route 31 are head-on type collisions. Second, the roadway section between Shady Oaks and Veterans Parkway is where the most fatalities occurred. This also happens to coincide with the location of the longest and steepest vertical curves (or ‘hills’) within this section of IL Route 31; three out of four of the existing vertical curve deficiencies are located within this section (see Section 2.2.3 for further discussion).

There were 54 incapacitating type ‘A’ injuries, which are the most severe injury type that is not a fatality. Overall, five crashes involved pedestrians and one crash involving a bicyclist. Three of the five crashes involving pedestrians were during dark roadway conditions. The crash involving the bicyclist occurred during daylight conditions in the early evening and was a result of the bicyclist ignoring a red traffic signal. The bicyclist was issued a citation for illegal operation of a bicycle.

The predominant crash types, rear-end and turning crashes, are usually caused by several factors, such as deficiency in the capacity of the roadway, signal timing issues because of lack of signal modernization, improper design of the roadway leading to incomplete channelization of traffic, lack of barrier medians, and insufficient drainage of the pavement. The lack of capacity on this two-lane roadway, coupled with the numerous entrances, leads to conflicts that result in crashes.

The intersection of IL Route 31 and Bull Valley Road is one of the busiest in the corridor, and experienced an elevated number of crashes. There were 74 crashes within the four-year study period. The vast majority of crashes at this location were rear-end crashes (60.8%). The McHenry County Department of Transportation has taken the lead on developing engineering plans to improve this intersection. The improvements will include the construction of dual left turns, right turn lanes, and two through lanes on all four approaches.

The southern section of the project study area from IL Route 176 to Gracy Road is in the top 5% crash locations for roadway sections within the State of Illinois in 2009. The high incidence of crashes in the study period indicates that safety is an issue in the corridor. The number of rear end crashes demonstrates that high traffic volumes, insufficient roadway capacity, and poor access management may be contributing to crashes.

Supplemental crash data was reviewed from 2010 through 2013. There were 846 total crashes of which 219 crashes (25.9%) were injury crashes, resulting in 291 injuries. During this period, there were zero fatalities and 30 type 'A' injuries. Crash types, conditions, and contributing causes for the 2010-2013 study period are consistent with the 2006-2009 study period. Updated crash information is provided in Appendix I.

#### **5% Crash Location**

As part of Federal transportation legislation, each state must develop a Highway Safety Improvement Program (HSIP) to reduce traffic-related fatalities and serious injuries. A state's HSIP includes a listing of the top five percent of its highways having the most severe safety needs, and an assessment of potential solutions.

### **2.2.2. Capacity and Mobility Deficiencies**

This project is also needed to address capacity deficiencies in the corridor. The existing (2009) Average Daily Traffic (ADT) varies through the corridor from 23,500 vpd at the south end of the project at IL Route 176 to 17,500 vehicles per day (vpd) south of IL Route 120.<sup>1</sup> Projected traffic volumes were generated by the Chicago Metropolitan Agency for Planning (CMAP) for the 2040 design year. The projected no-action conditions take into account the construction of the south section of the proposed West McHenry bypass project from south of Gracy Road to IL Route 120. Future traffic volumes are expected to range from 32,000 vpd at IL Route 176 to 21,000 vpd south of IL Route 120. The existing and projected 2040 ADT at each section can be found in Table 2-1. Updates to traffic information are provided in Appendix I and Appendix J.

The project is also needed to address mobility deficiencies within the corridor, especially within the urbanized sections near the north project limits in downtown McHenry. Most of the intersections within this section are two-way stop controlled. Due to the high traffic volumes on IL Route 31 and on IL Route 120, drivers on adjacent side streets experience long delays at these intersections, especially during rush hour. Vehicles attempting to access IL Route 31 and IL Route 120 from commercial and residential driveways in this northern section of the project also experience this delay. In fact, from 2006-2009, a total of 330 crashes were reported along the section of IL Route 31 and IL Route 120 between High Street and Millstream Drive/3<sup>rd</sup> Street. This represents 36% of the total crashes reported within the project study area, yet only accounts for 15.4% of the total length of the project. Hence, this section of the project study area experiences more crashes due to the higher volumes of turning vehicles and greater number of intersections and driveways.

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<sup>1</sup> Year 2009 traffic volumes were used as the existing condition for the capacity analysis

Most of the project study area lacks continuous pedestrian and bike facilities, which discourages use of more environmentally sustainable transportation modes and creates safety concerns for pedestrians and bicyclists. Pedestrian and bicycle accommodations with accessibility to public transit facilities, including the existing Metra train station in Downtown McHenry, planned Metra station in Prairie Grove, and future planned bus stops along IL Route 31, will help promote bicycle and pedestrian travel and enhance safety for all modes.

**Table 2-1**  
**IL Route 31 Traffic Volumes**

Section	Average Daily Traffic (ADT) (vpd)		
	Existing (2009)	Current (2015) <sup>2</sup>	Future No-Action (2040) <sup>3</sup>
South of IL Route 176	33,500	31,800	46,000
IL Route 176 to Half Mile Tr.	23,500	25,300	32,000
Half Mile Tr. to Ames Rd.	19,100	17,600	32,000
Ames Rd. to Edgewood Rd.	19,100	17,600	32,000
Edgewood Rd. to Gracy Rd./McHenry Bypass	19,100	17,600	31,000
Gracy Rd./McHenry Bypass to Albany St./Prime Pkwy	19,100	17,600	22,000
Albany St./ Prime Pkwy to Shamrock Ln.	19,100	17,600	22,000
Shamrock Ln. to Bull Valley Rd.	19,100	17,600	22,000
Bull Valley Rd. to Lillian St./Grove Ave.	17,500	17,600	21,000
Lillian St./Grove Ave. to IL Route 120	17,500	17,600	21,000
Front St., north of IL Route 120	1,750	2,200	4,000
IL Route 120, Front St. to 3 <sup>rd</sup> St.	32,700	31,100	43,000

Increasing traffic volumes as shown in Table 2-1 will lead to traffic congestion and delay. A schematic of the IL Route 31 corridor showing the relationship between these daily traffic volumes and the operational characteristics of the roadway can be seen in Appendix J.

Appendix J also shows the ADT of the corridor for various roadway sections for both the 2009 Existing Conditions and 2040 Projected No-Action Conditions. The Level of Service (LOS) of an intersection rates the operational characteristics of traffic volumes to give a measure of traffic flow. The LOS rating is a scale from A to F, with A being optimal free-flow conditions and F indicating the intersection no longer operates properly because demand exceeds capacity. This figure shows high congestion in the 2040 design year throughout the corridor, especially the section from IL Route 176 to Edgewood Road.

#### **Level of Service (LOS)**

The Level of Service (LOS) of an intersection rates its operational characteristics. LOS is a scale from A to F, with A indicating optimal free-flow conditions and F indicating the intersection demand exceeds capacity.

<sup>2</sup> See Appendix I for additional discussion regarding Year 2009 and Year 2015 traffic data.

<sup>3</sup> Source: Chicago Metropolitan Agency for Planning, 2011; the 2040 No Build traffic volumes in this table assume the construction of the West McHenry Bypass. CMAP later updated the 2040 volumes to not include the West McHenry Bypass; Appendix I provides additional data on the updated future condition without the bypass.



**Table 2-2**  
**AM and PM Existing Future No-Action (2040) Level of Service and Delay by Intersection**

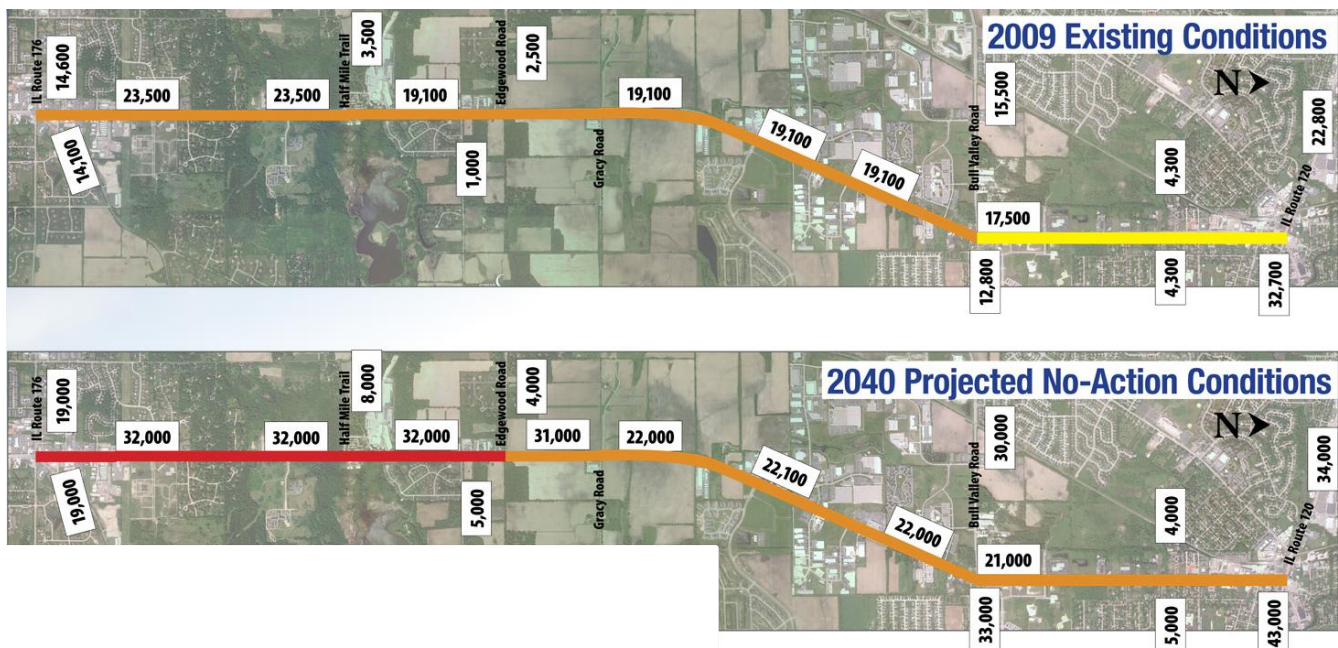
	AM Peak Hour				PM Peak Hour			
	Existing		No-Action (2040)		Existing		No-Action (2040)	
Intersection	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS	Delay (seconds/vehicle)	LOS
Half Mile Tr. (*)	767.8	F	137.4	F	761.7	F	132.8	F
Edgewood Rd. (*)	126.4	F	87.3	F	70.5	F	110.6	F
Prime Pkwy./Albany St.	16.2	B	24.9	C	27.5	C	48.2	D
Shamrock Ln.	18.0	B	39.4	D	11.8	B	18.9	B
Bull Valley Rd. (**)(***)	65.3	E	43.2	D	83.0	F	42.0	D
Lillian St./Grove Ave.	32.3	C	37.9	D	37.1	D	39.5	D
IL Route 120	44.3	D	105.3	F	78.1	E	174.9	F

(\*) Three legged intersections list the stop controlled approach LOS for existing conditions. Proposed signal for future conditions.

(\*\*) Future delay & LOS assumes completion of intersection build-out as part of separate projects.

(\*\*\*) Bull Valley Road projections based upon 2030 data shown on latest Intersection Design Study provided by MCDOT.

**Figure 2-1**  
**Existing and Projected IL Route 31 ADT and LOS**



Overall, the existing intersection geometry and traffic volumes result in intersection LOS ranges from A to F. The 2040 future no-action scenario intersection LOS ranges from B to F. A summary of the AM and PM LOS, and delay for the existing and future no-action scenarios at each signalized (current or future planned) intersection can be seen in Table 2-2.

In the AM peak hour, four of the seven intersections currently experience LOS D or worse. By 2040, six of the seven intersections experience LOS D or worse, with three signalized intersections with LOS F. As a result, the future No-action AM peak hour queues and delays become excessive. In the PM peak hour, five of the seven intersections currently experience LOS D or worse. By 2040, six of the seven intersections experience LOS D or worse, with three signalized intersections with LOS F. As a result, the future No-action PM peak hour queues and delays become excessive. This decrease in LOS for both the AM and PM conditions is indicative of excessive traffic congestion and travel times.

### 2.2.3. Geometric Deficiencies

Geometric and design deficiencies along IL Route 31 contribute to safety deficiencies and also to reduced roadway capacity. The overall horizontal and vertical geometrics fall within IDOT standards except as noted in this section.

There are several substandard vertical curves within the project study area. These vertical curves include the following locations:

#### Geometric Deficiencies

Roadway geometric deficiencies refer to roadway elements that do not meet current IDOT design standards. Roadway elements may include but are not limited to lane width, road grade, curve radii, or intersection spacing.

**Table 2-3**  
**Existing Geometric Deficiencies (Vertical Curves)**

Location	Type	K Value Req. Max/Min	K Value Actual
IL 31 at Drake Drive	Crest	167/84	79
470 feet south of Brighton Lane on IL 31	Sag	167/96	78
970 feet north of Half Mile Trail on IL 31	Sag	167/96	79
350 feet south of Ames Road on IL 31	Crest	167/84	71

Table 2-3 indicates the locations where the roadway profile does not meet the current design standards for stopping sight distance. At crest locations, a low K-value implies that the vertical curve is sharp and restricts sight distance at that location.

Several sections of IL Route 31 have had reports of poor drainage. One of these areas includes the section of IL Route 31 between intersections of Lillian Street/Grove Avenue and Anne Street. Anne Street and properties near this intersection have been known to flood during heavy rain events. There is an unnamed tributary to the Fox River that drains the southwest section of the City of McHenry that crosses IL Route 31 at this location. Information of updated drainage deficiencies is provided in Appendix H.

### 2.2.4. Multi-Modal Transportation

#### Pedestrian and Bicycle Accommodations

The presence of pedestrian facilities varies throughout the project study area. There are no existing bike paths or bicycle accommodations within the corridor. Bicyclists who use the corridor have to travel on IL Route 31 at the existing edge of pavement. Pedestrians travelling along the alignment have to walk



**Pedestrians Walking on Roadway Shoulder due to Lack of Sidewalks**

within the roadway shoulder.

In the south section, there is a 5-foot wide sidewalk on the west side of IL Route 31 that extends approximately 500 feet north of the intersection of IL Route 176 and IL Route 31. There is no sidewalk this point northward until the intersection of IL Route 31 and Veterans Parkway. At this point, there is a small, isolated section of 5-foot wide sidewalk on the east side of IL Route 31 that extends approximately 300 feet south of the intersection. North of Veterans Parkway, there are no existing sidewalks on either side of IL Route 31 until the intersection at Bull Valley Road. North of Bull Valley, a sidewalk continues north on the east side of the road to Knox Drive. At Knox Drive, a sidewalk on the west side of IL Route 31 continues north approximately 700 feet until it stops altogether. Scattered sidewalk accommodations exist on either side of IL Route 31 from Knox Drive to Kane Avenue, but lack any continuity with adjacent sections. North of Kane Avenue, sidewalks are present on both the east and west sides of IL Route 31 up to IL Route 120.

The discontinuous nature of pedestrian facilities in the corridor means pedestrians must walk through parking lots, along grass terraces, and even on roadway shoulders. The use of sidewalk accommodations in these discontinuous areas also requires that pedestrians cross the roadway multiple times to continue using the sidewalk on the other side of the street. The intersections of IL Route 120 and Lillian Street/Grove Avenue are the only two locations within the project study area that have both a striped pedestrian crossing and pedestrian signals. The intersection at Main Street in McHenry has a striped pedestrian walkway but does not have any traffic and pedestrian signals.

There are several bicycle and pedestrian generators located along or near the corridor. In addition to the residential and commercial properties immediately adjacent to the roadway, there are several land uses within the project study area that generate pedestrian traffic. Examples include the downtown McHenry area (immediately south of the intersection of IL Route 31 and IL Route 120), a Metra train station (approximately 0.12 miles west of IL Route 31 in downtown McHenry), and Edgebrook Elementary School and McCracken Athletic Field (approximately 0.32 miles east of IL Route 31 in McHenry on Kane Avenue). The McHenry County Prairie Trail is located parallel to and west of the IL Route 31 alignment. This trail is a major regional attraction to bicycle riders in this area. In addition to this bicycle trail, the Moraine Hills Park bicycle trails east of IL Route 31 near Bull Valley Road/Charles Miller Road are also large generators of bicycle traffic within the region.

#### Modal Interrelationships

The McHenry Branch of the Metra Union Pacific Northwest (UP-NW) line commuter railroad is located approximately 1 mile west of this project. This branch line runs between the City of McHenry and the City of Crystal Lake and connects with the UP-NW main line that runs between Ogilvie Transportation Center in Chicago and Harvard. Currently, area commuters board the train at one of three nearby stations: McHenry, Crystal Lake (downtown), or Crystal Lake (Pingree Road). As part of a proposed UP-NW Upgrade project, a new station is planned in Prairie Grove along the McHenry Branch, approximately one mile west of the intersection of IL Route 31 and Gracy Road. This new station will become an integral part of the planned Prairie Grove Town Center and Transit Oriented Development. The proposed station site will be initially built as a Park-and-Ride commuter lot with bus service to Metra Stations in Crystal Lake and McHenry, then later converted to a separate Prairie Grove Metra Station as a part of the UP-NW Upgrade project.

With the planned development of residential subdivisions on the east side of IL Route 31 and the future development of a Metra train station west of IL Route 31, there exists a need to provide provisions for future bicycle and pedestrian accommodations along the IL Route 31 corridor to accommodate future multi-modal connections to these transportation facilities.

Public bus service along the IL Route 31 corridor includes Pace Bus Routes 806 and 807. Route 806 provides rush hour service between Crystal Lake and Fox Lake, via McHenry. This route runs along IL Route 31 for a majority of the project limits, and service is provided to several commercial and light industrial area in McHenry, including the Pioneer Center and Centegra Medical Center. In addition, Route 806 serves

the Metra stations in Crystal Lake and McHenry, with future service planned for the Prairie Grove Town Center. Route 807 provides rush hour service between Woodstock and McHenry, servicing various areas in downtown McHenry and the Metra station. IL Route 31 currently does not have bus turnouts or shelters, since there are no existing bus stops directly on IL Route 31.

IL Route 31 currently lacks bus shelters and pull out lanes for bus service within the project study area. In order to improve safety within the corridor, provisions for safe bus access within the project study area should be considered.

Updates to safety, capacity, and geometric deficiencies completed since the approval of the Purpose and Need are included in Appendix I.



### 3. ALTERNATIVES

*This chapter describes alternatives considered for the project. The alternatives were developed and evaluated based on the Purpose and Need Statement, capacity and safety needs, environmental impacts, and public input. The project follows a Context Sensitive Solutions (CSS) approach, with frequent opportunities for public input.*

#### 3.1 NO-ACTION ALTERNATIVE

The No-Action Alternative is the current road configuration with no improvements other than routine maintenance and minor rehabilitation. It is the future base condition, against which the effects of the build alternatives will be measured.

Selection of the No-Action Alternative would result in:

- continued high crash potential (resulting from inadequate roadway capacity and traffic controls such as traffic signals and barrier medians, and compounded by frequent driveway accesses)
- continued traffic congestion
- continued design deficiencies, resulting in poor sight distance and poor drainage conditions
- continued substandard access for all users (including vehicles, cyclists, and pedestrians)

With the No-Action Alternative, IL Route 31 is expected continue to experience poor vehicle mobility and high crash potential. The No-Action Alternative does not meet the Purpose and Need of the project.

#### 3.2 CONGESTION MANAGEMENT PROCESS ALTERNATIVE

A Congestion Management Process (CMP)<sup>4</sup> is a regionally-accepted approach for managing congestion that provides information on system performance and assessing alternative congestion management strategies. A CMP is required in areas with greater than 200,000 persons (Transportation Management Areas, or TMAs). If TMAs are designated as ozone or carbon monoxide non-attainment areas (such as the Chicago area), projects that significantly increase single occupancy vehicle (SOV) capacity must have analysis of travel demand reduction and operational management strategies. If these CMP strategies cannot satisfy the need for additional warranted SOV capacity, the CMP must instead identify ways to effectively manage the transportation facility.

In the Chicago area, projects adding SOV capacity were evaluated and prioritized during development of the Fiscal Year 2010-2015 Transportation Improvement Program (TIP) and the long range 2040 Regional Transportation Plan (RTP) for Northeastern Illinois.<sup>5</sup> These documents constitute the CMP for the Chicago area, and show that Transportation Demand Management (TDM) measures, High Occupancy Vehicle (HOV) measures, Transit Capital Improvements, Congestion Pricing, Growth Management, and Incident Management would not remove the need to add SOV capacity. For the IL Route 31 project, CMP alternatives alone would not satisfy the project Purpose and Need; therefore, this undertaking is a warranted project for adding SOV capacity.

Reasonable CMP strategies have been incorporated into this project where practical, including increased turn lane storage capacities, traffic signal modernization, consolidation of access points, street and driveways, channelized intersections with left and right turn lanes, and barrier medians.

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<sup>4</sup> 23 CFR 450.320

<sup>5</sup> Congestion Management System for Northeastern Illinois, Technical Supplement, October 1997; Congestion Management Handbook, September, September 1998; Congestion Management System for Northeastern Illinois, July 2006 Status Report

### 3.3 RANGE OF ALTERNATIVES

The IL Route 31 range of alternatives were identified using existing roadway characteristics, future traffic demand, land use, available right-of-way (ROW), and the CSS process. All build alternatives include shared-use paths and sidewalks. Due to the land use patterns, and density within the corridor, alternatives were identified within three sections of the project study area (Figure 3-1). The IL Route 31 alternatives areas do not include the roadway improvement area at Bull Valley Road/Miller Road that is being completed by MCDOT.<sup>6</sup>

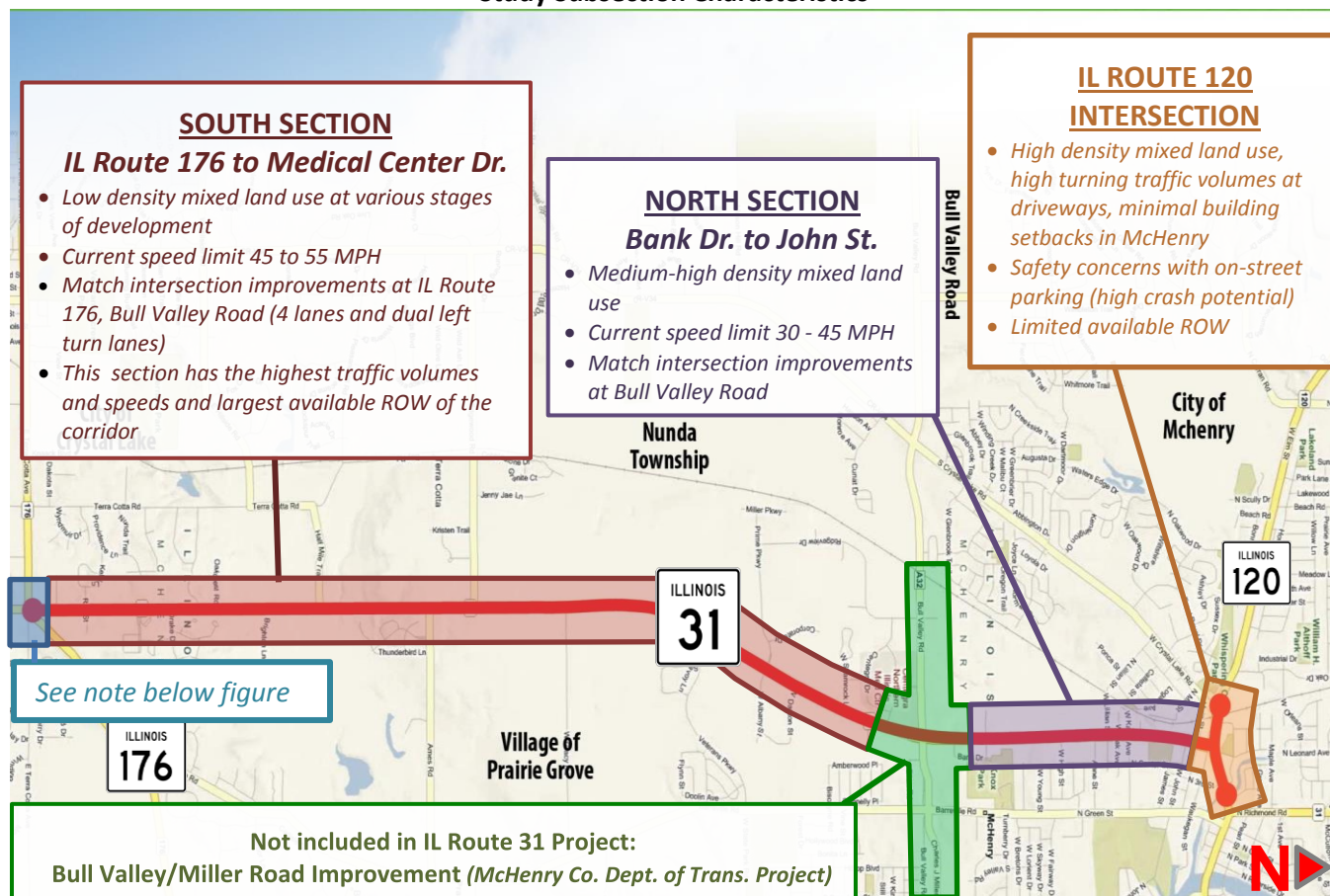
#### Context Sensitive Solutions (CSS)

Context Sensitive Solutions (CSS) is a project approach whose goal is to plan and design transportation projects that “fit” into their surroundings, or context. CSS:

- Balances cost, safety, mobility, community needs, and the environment
- Involves stakeholders “early and often”
- Addresses all transportation modes
- Uses all appropriate disciplines to plan and design
- Applies flexibility inherent in design standards to fit the project into its context
- Considers aesthetics basic “good design”

Project Website: <http://ilroute31.com>

Figure 3-1  
Study Subsection Characteristics



Note: The intersection of IL Route 176 and IL Route 31 was not included in this study, as the intersection was reconstructed in 2014.

<sup>6</sup> During the alternatives analysis, the IL Route 31 alternatives were revised to include bicycle and pedestrian improvements (no roadway improvements) through the Bull Valley Road intersection.

The Range of Alternatives studied is shown below. Project alternatives are uniquely identified by their roadway characteristics. Differentiating roadway characteristics may include a road's number of lanes, lane width, median type and width, roadway shoulder type, traffic control devices, alignments, and/or grade separations (such as bridges). Alternatives carried forward are highlighted in orange (see Section 3.5), and alternatives selected for the Preferred Alternative are highlighted in yellow (see Section 3.6).

#### South Section Alternatives: IL Route 176 to Medical Center Drive

The South Section was historically rural use, but developing urban uses are changing the area's character. Prairie Grove and Crystal Lake both plan development in this area, with Prairie Grove planning a Town Center development adjacent to IL Route 31. South Section alternatives must support planned future uses.

#### Median Type Considerations

*Raised medians* have barrier curbs, which limit turning vehicles and provide safety benefits. These medians can be paved or planted; raised medians for the IL Route 31 project would be planted medians.

*Depressed medians* are designed to accommodate roadway runoff through their slope; runoff drains to pipes typically located in the center of the median. These medians are typically planted with turf, used for higher-speed roads, and wider than raised medians.

Alternative	Description
S-1	6-lane with 30' & 50' Depressed Median and 10' Outside Shoulders
S-2	6-lane with 18'-22' Raised Median
S-3	4-lane with 18'-22' Raised Median
S-4	4-lane with 18'-22' Raised Median and 10' Outside Shoulders
S-5	4-lane with 30' Raised Median
S-6	4-lane with 30' Depressed Median and 10' Outside Shoulders
S-7	5-lane with Bi-directional Two-Way Left Turn Lane

#### North Section Alternatives: Bank Drive (North of Bull Valley Road / Charles J. Miller Road) to John Street

The North Section is within McHenry, in an area with existing residential and commercial uses and newly developing commercial uses. Vacant land on the west side of IL 31 in this area is planned for future development. North Section alternatives must support planned future land uses.

Alternative	Description
N-1	4-lane with 6' Landscaped/Planter Median
N-2	4-lane with 18' Raised Median
N-3	4-lane with 30' Raised Median
N-4	5-lane with Bi-directional Two-Way Left Turn Lane
N-5	One-way Arterial Pair with Green Street

### IL Route 120 Intersection Alternatives

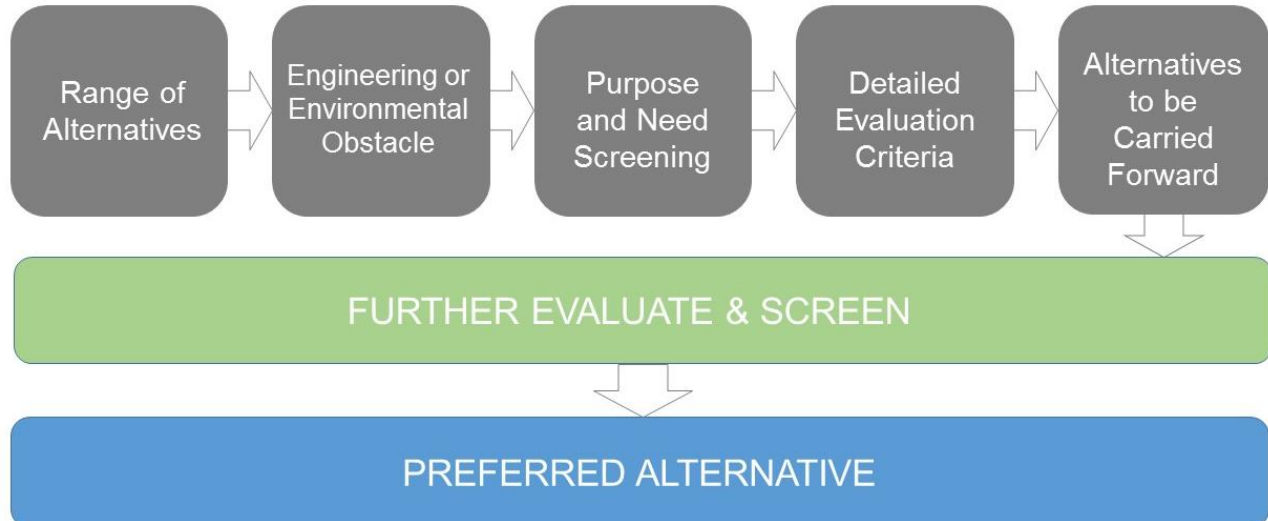
IL Route 31 intersects IL Route 120 in downtown McHenry. The area has limited available ROW due to existing building setbacks. Safety and operational issues have been observed here due to a lack of roadway capacity, obsolete traffic signalization, on-street parking, and frequent driveway entrances.

Alternative	Description
120INT-1 <sup>7</sup>	5-10' lanes for South Leg
120INT-2	4-lane with 18' Raised Median (Single Left) for South Leg
120INT-3 <sup>8</sup>	4-lane with 30' Raised Median (Dual Left) for South Leg
120INT-4	Traditional signalized intersection, cul-de-sac north leg of intersection
120INT-5	Roundabout with 4 legs
120INT-6	Roundabout with 3 legs (cul-de-sac north leg of intersection)
120INT-7	Various Alternatives with Free Flow Right Turn lane for South Leg

### 3.4 EVALUATION PROCESS AND SCREENING

The screening process used to evaluate the identified range of IL Route 31 alternatives is shown in Figure 3-2, and described in the following sections.<sup>9</sup> The goal of the evaluation process is to narrow the range of alternatives to several “Alternatives Carried Forward,” which will be studied in detail to identify the Preferred Alternative.

**Figure 3-2**  
**Alternatives Evaluation Process**



<sup>7</sup> Later renamed Build Alternative A in the Alternatives Carried Forward analysis.

<sup>8</sup> Later renamed Build Alternative B in the Alternatives Carried Forward analysis.

<sup>9</sup> Please reference Appendix G for detailed information regarding the alternatives evaluation criteria and analyses.

### 3.4.1 Engineering or Environmental Obstacles

The screening process began with determining if the project had an engineering or environmental obstacle, which is a high level review to identify alternatives that would not be feasible. No build alternatives were determined to have an engineering or environmental obstacle.

### 3.4.2 Purpose and Need Screening

The Range of Alternatives was next evaluated against the project's Purpose and Need Statement. The alternatives that passed the Purpose and Need screening improved roadway safety, increased roadway capacity, corrected design deficiencies, and improved multimodal connectivity. Four of the nineteen alternatives did not meet the Purpose and Need of the project, and were eliminated. Table 3-1 is a summary of the Purpose and Need and Detailed Evaluation screenings. For additional information, see Appendix G.<sup>10</sup>

### 3.4.3 Detailed Evaluation Screening

Detailed evaluation of the remaining alternatives was conducted next to determine optimal alternatives based on roadway capacity and safety needs.

Ten of the remaining fifteen alternatives were eliminated as described on the following pages. Table 3-1 is a summary of the Purpose and Need and Detailed Evaluation screenings. Alternatives Carried Forward are highlighted in orange in the far left column of the table. For additional information, see Appendix G.



Purpose and Need Evaluation Criterion	Measures of Effectiveness
Improve Roadway Safety	Reduced predicted crash rates/fatalities?
Increase Roadway Capacity and Mobility	Increased roadway capacity and less delay? Supports planned future development?
Correct Design Deficiencies	Correct geometric, sight distance, and drainage issues?
Encourage Multimodal Transportation	Improve pedestrian and bicycle accommodations? Maintain/improve connectivity to existing transit?

<sup>10</sup> The EA document includes current data that was not available during development of the Alternatives Carried Forward and Preferred Alternative analyses.

**Table 3-1**  
**Summary of Purpose and Need, Detailed Evaluation Screenings<sup>11</sup>**

Alternative		Alternative Meets Purpose and Need?			Alternative Meets Detailed Evaluation?			Alternatives Carried Forward
		Yes	No	If No, Why?	Yes	No	If No, Why?	
South Section	S-1	✓		Alternatives with an 18-22' median do not match the proposed geometry at IL Route 176 and Bull Valley Road (28' median), and cannot accommodate dual left turn lanes needed with planned area development.		X	6-lane road more costly, greater impacts than 4-lane alternatives	
	S-2		X					
	S-3 <sup>12</sup>		X					
	S-4		X					
	S-5	✓			✓			✓
	S-6	✓			✓			✓
	S-7	✓				X	TWLTL have higher crash rates than medians, will not accommodate needed dual left turn lanes	
North Section	N-1		X	The planter median included in Alternative N-1 would decrease safety and roadway capacity, and would not allow for channelized left turn lanes at intersections.				
	N-2	✓			✓			✓
	N-3	✓				X	30' median not necessary; no dual left turn lanes needed here	
	N-4	✓				X	TWLTL have higher crash rates than medians	
	N-5	✓				X	Requires reconstruction of Green Street and major traffic flow changes. Distance between parallel one-way streets exceeded design standards.	
IL Route 120 Intersection	120INT-1 <sup>13</sup>	✓		n/a	✓			✓
	120INT-2	✓				X	Does not provide operational benefits compared to 120INT-1, has similar impacts to 120INT-3.	
	120INT-3 <sup>14</sup>	✓			✓			✓
	120INT-4	✓				X	Converting Front Street to a cul-de-sac at IL Route 120 would restrict neighborhood access	
	120INT-5	✓				X	Signalized intersections had better operations than roundabouts at the IL Route 120 intersection	
	120INT-6	✓				X	Signalized intersections had better operations than roundabouts at the IL Route 120 intersection; converting Front Street to a cul-de-sac at IL Route 120 would restrict neighborhood access	
	120INT-7	✓				X	A free-flow NB right turn lane provided no operational benefit but impacted property and pedestrians.	

<sup>11</sup> Please reference Appendix G for detailed information regarding the alternatives evaluation criteria and analyses.

<sup>12</sup> Alternative did not meet Purpose and Need, but its impacts were studied with the 28' Raised Median Option in the Alternatives Analysis (for comparison purposes).

<sup>13</sup> Later renamed Build Alternative A in the Alternatives Carried Forward analysis.

<sup>14</sup> Later renamed Build Alternative B in the Alternatives Carried Forward analysis.

### **Alternatives S-7 and N-4: Two Way Left Turn Lane (TWLTL) Alternatives for the South Section and North Section**

The detailed evaluation of these two alternatives focused on more in-depth capacity analysis and safety analysis as outlined in the Highway Safety Manual (HSM). The safety analysis compared alternatives with a Two Way Left Turn Lane (TWLTL) to alternatives with a divided median (Raised Curb or Depressed). The anticipated crash rate for median options is 66% lower than TWLTL options. Analysis of the TWLTL alternatives through the HSM described a distinct decline in the level of safety these alternatives provide compared to alternatives with medians. Additionally, the projected traffic volumes described a roadway saturation that would offer little opportunity for a turning vehicle to complete a turning maneuver. In both safety and capacity analysis, alternatives involving a TWLTL median were less effective than non-traversable or divided median alternatives in meeting the Purpose and Need of this project.

Additionally, for the South Section of the project, a TWLTL will not accommodate dual left turn lanes at intersections. The South Section includes plans for development that may require dual left turn lanes in the future. Also for the North Section of the project, the construction of a 4-lane roadway with a center TWLTL will result in similar impacts to the 18' Raised Median option. Based on safety benefits of alternatives with a divided median, it was determined that any options involving the use of a TWLTL median along IL Route 31 should be eliminated when a barrier median could be provided.

### **Alternative N-3: 30' Median Alternative for North Section**

A 30' median in the North Section was not necessary throughout this section and was eliminated, since intersections in this area do not require dual left turn lanes. Lillian Street / Grove Avenue is the only signalized intersection in this section, and traffic volumes at this intersection only require a single left turn lane. Additionally, the land use in the North Section is primarily already built-up with adjacent commercial and residential properties. Plans for future development in the area will not likely require dual left turn lanes.

### **Alternatives S-1: 6-Lane Alternative for South Section**

Any 6-lane alternative will meet the Purpose and Need but has considerably greater costs and impacts to construct compared to the 4-lane alternatives which also meet the Purpose and Need. Hence, the 6-lane alternatives were eliminated from further consideration.

### **Alternative N-5: One-way Arterial Pair Alternative for North Section**

The One-way Arterial Pair alternative involves providing one-direction traffic flow along IL Route 31 and the opposite one-way traffic flow along Green Street, one-third of a mile to the east. The changes in traffic flow, required reconstruction of Green Street, and large distance between the parallel streets has eliminated this alternative.

### **Alternatives 120INT-5 and 120INT-6: Roundabout Alternatives at the IL Route 120 Intersection**

Additional considerations were given to roundabout alternatives for the intersection of IL Route 31 with IL Route 120, paired with a roundabout at the intersection of IL Route 31 with Lillian Street / Grove Avenue. The roundabout alternatives required detailed modeling of the surrounding roadway network. Several alternatives were modeled with both two or three lane roundabout configurations at IL Route 120, and one or two lane roundabout configurations at Lillian Street / Grove Avenue. All roundabout alternatives failed at the IL Route 120 intersection due to heavy projected traffic volumes involving high percentages of left turning movements, combined with the proximity of the at-grade railroad crossing immediately to the west of the intersection and the IL Route 120 and IL Route 31 (Richmond Road) intersection to the east of this intersection. Traditional signalized intersections at both of the intersections provide a better operational efficiency and improved Level of Service (LOS) when



compared to roundabouts at these intersections. Therefore, roundabouts were eliminated from further evaluation.

#### **Alternatives 120INT-4 and 120INT-6: Cul-de-sac Alternatives for the IL Route 120 Intersection**

Three concept level alternatives were investigated for converting the north leg of the IL Route 120 intersection (Front Street) to a cul-de-sac. All three concepts had improved LOS, but the modified traffic patterns and displaced traffic movements to the surrounding roadway network were considered to be less desirable to the network as a whole. The Union Pacific Railroad to the west of the intersection and Boone Creek to the east serve as barriers to access for the residential neighborhood to the north of intersection. Converting the north leg (Front Street) to a cul-de-sac would restrict access to this neighborhood, from the west and from the south. Therefore, the concept alternatives involving cul-de-sacs were also not carried forward.

#### **Alternatives 120INT-2 and 120INT-7: 18' Raised Median Alternative and Free Flow Right Turn Lane Alternatives for the South Leg of the IL Route 120 Intersection**

Due to limited ROW on the south leg of the IL Route 31 and IL Route 120 intersection, various lane configurations were considered. Roadway widening alternatives that provide a 18' Raised Median (with a single left turn lane) on the south leg of this intersection provided a substantially worse LOS than 30' Raised Median alternatives (with dual left turn lanes), while providing no difference in the number of properties impacted. The failure of this alternative in meeting acceptable operational efficiency without the benefit of lesser impacts has categorized it as one that would not be carried forward.

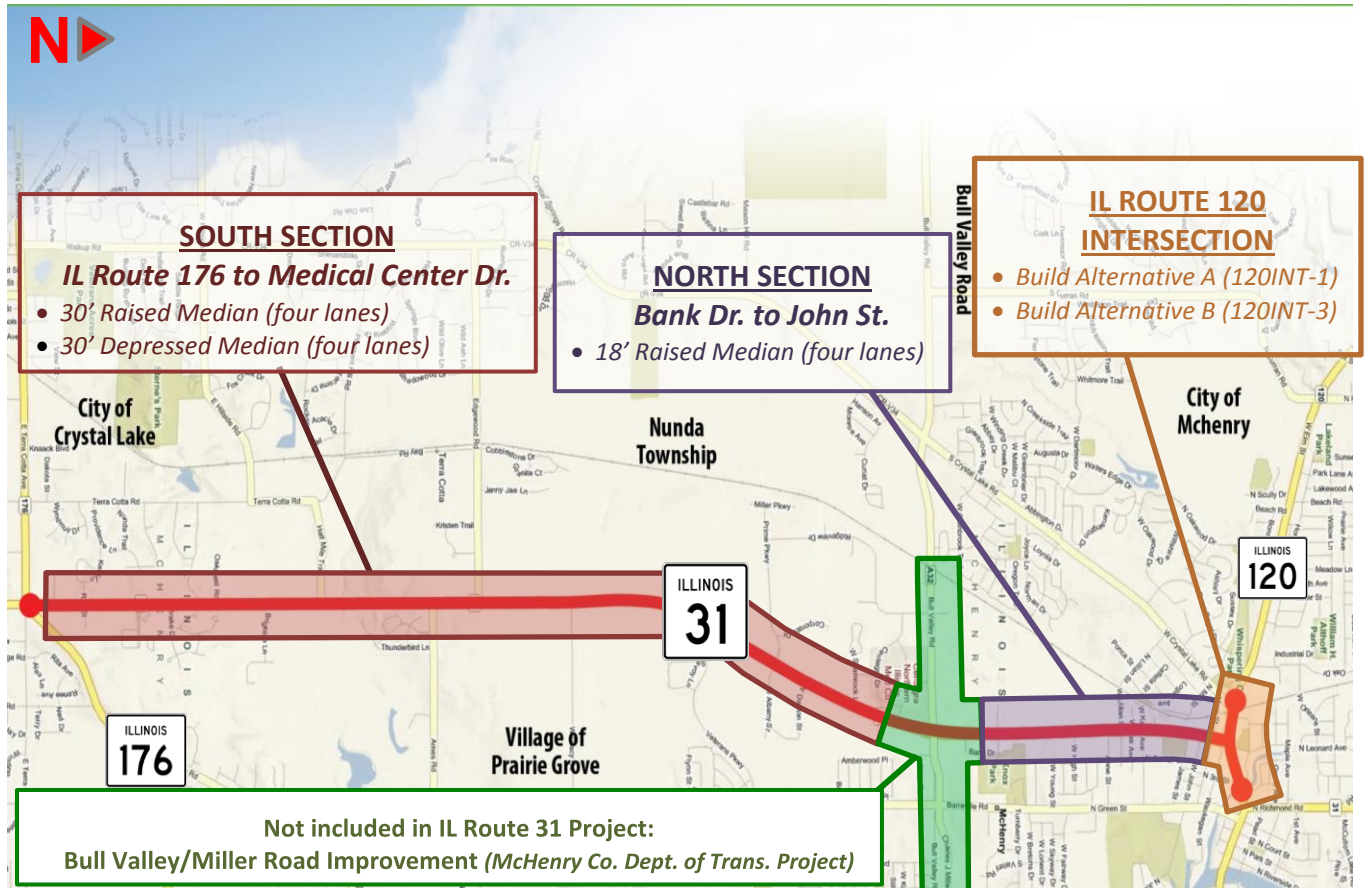
Similarly, alternatives modeling a Free-Flow Right turn lane on the south leg provided no operational improvement in LOS but would generate additional property and pedestrian impacts. A crosswalk across the south leg of the intersection would either have to be omitted, or if it was provided, the free-flow right turn operations would be disrupted (and intersection LOS worsened) when pedestrians activated the pedestrian phase for the traffic signal. Free-Flow right turn lane alternatives were also eliminated from further consideration.



### 3.5 ALTERNATIVES CARRIED FORWARD

The Range of Alternatives evaluation eliminated 14 of the 19 Build Alternatives (see Table 3-1). The results of the alternatives screening were reviewed at CAG Meeting #4 and Public Meeting #2. The five Build Alternatives Carried Forward are shown in Figure 3-3.

Figure 3-3  
Alternatives Carried Forward



Two Build Alternatives carried forward were in the South Section, one was in the North Section, and two were at the IL Route 120 intersection. A description of the alternatives and key elements to select the Preferred Alternative follows; for more detailed information, see Appendix G.

#### 3.5.1 South Section Alternatives Carried Forward

Two alternatives were carried forward in the south section: Alternative S-5: 4-Lane with 30-foot Raised Median and Alternative S-6: 4-lane with 30-foot Depressed Median and 10-foot Wide Paved Shoulders.

#### CAG

The Community Advisory Group (CAG) for the IL Route 31 project was developed to provide public and agency input on the project. The CAG consists of community leaders, residents, and other stakeholders with technical or other interests in the project. IDOT held meetings with the CAG throughout the project to inform them of progress and alternatives and to solicit input on the project.

### Alternative S-5: 4-Lane with 30-foot Raised Median

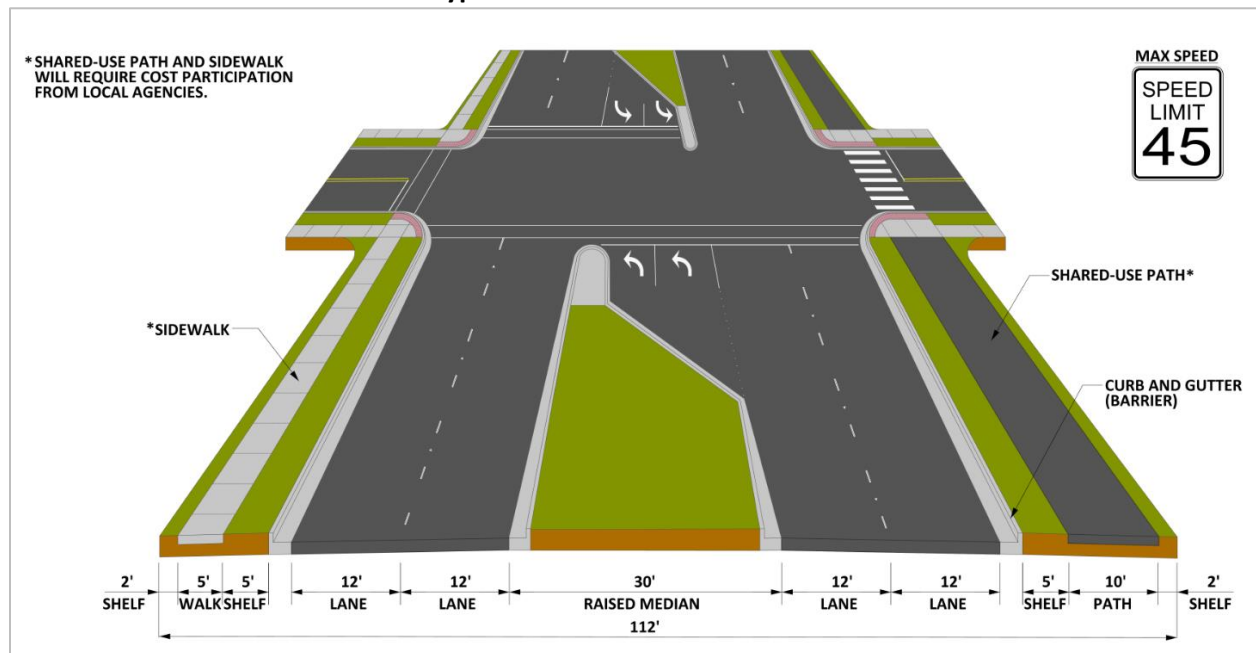
The 30-foot Raised Median<sup>15</sup> Alternative includes two 12-foot through lanes in each direction, separated by a 30-foot raised curb median that may accommodate dual left turn lanes at intersections. This generally matches the recently constructed improvements at the IL Route 176 intersection, as well as proposed improvements at the Bull Valley / Charles J.

Miller Road intersection. The 30-foot Raised Median Alternative includes raised curb and gutter and a maximum posted speed limit of 45 MPH. This alternative matches IDOT's recommendation for this corridor in the Strategic Regional Arterial (SRA) study<sup>16</sup> and Prairie Grove's Town Center and Transit-Oriented Development Plan.<sup>17</sup> A typical section of Alternative S-5 is shown in Figure 3-4.

#### **Strategic Regional Arterial (SRA)**

The Strategic Regional Arterial (SRA) system carries large traffic volumes at high speeds as a complement to the Chicago region's expressway system. SRA routes are identified by IDOT, in cooperation with CMAP.

**Figure 3-4**  
**Typical Section of Alternative S-5**



<sup>15</sup> All raised median alternatives for IL Route 31 are proposed as grass medians. Alternatively, medians may be landscaped if the landscaping is agreed to be locally maintained.

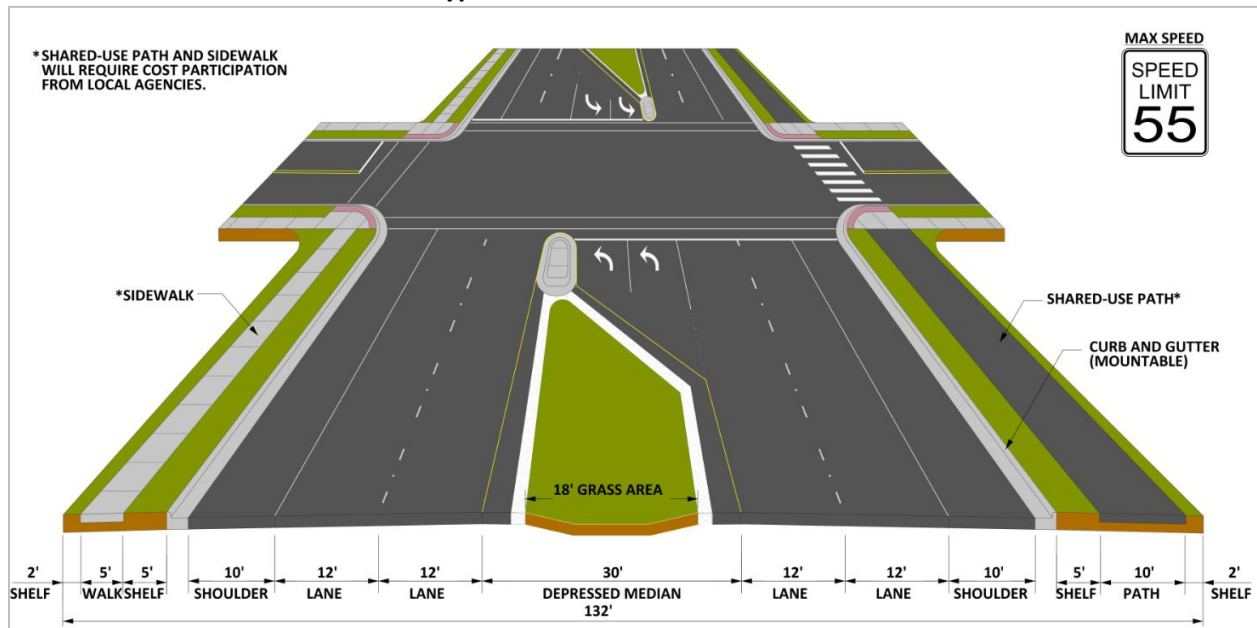
<sup>16</sup> Illinois Department of Transportation, Strategic Regional Arterial Report Orchard/Randall/Illinois 31, April 1998.

<sup>17</sup> Prairie Grove Town Center and Transit-Oriented Development Plan. June 15<sup>th</sup>, 2010.

### Alternative S-6: 4-lane with 30-foot Depressed Median and 10-foot Wide Paved Shoulders (Drake Drive to Veterans Parkway)

The 30-foot Depressed Median Alternative is similar to the 30-foot Raised Median Alternative, but between Drake Drive and Veterans Parkway would incorporate a section of depressed median to maintain the existing 50-55 MPH speed limit and rural character. The depressed median section provides a 30-foot depressed median with paved outside shoulders and mountable curb and gutter. The depressed median and paved shoulders increase the width of the alternative by 20 feet compared to the 30-foot Raised Median Alternative, increases the ROW width required, and increases impervious pavement area by 58%. A typical section of Alternative S-6 is shown in Figure 3-5.

**Figure 3-5**  
**Typical Section of Alternative S-6**



### Key Elements of the South Section Preferred Alternative Selection

A comparison of key elements used to select the South Section Preferred Alternative is in Table 3-2.<sup>18</sup> Cells shaded in green indicate lower/fewer impacts (as well as impacts that don't differentiate between the alternatives) as compared to cells shaded in red, which indicate higher/worse impacts. The Preferred Alternative is highlighted in yellow.

<sup>18</sup> Please reference the Preferred Alternative analysis in Appendix G for a full listing of all qualitative and quantitative impacts of these alternatives.

**Table 3-2**  
**Key Elements of the South Section Preferred Alternative Selection**

Key Element	30' Raised Median	30' Depressed Median
<b>Impact Area Size</b>	<u>Smaller footprint size</u> <ul style="list-style-type: none"> <li>• 53.84 acres of ROW required</li> </ul>	<u>Larger footprint size</u> <ul style="list-style-type: none"> <li>• 59.09 acres of ROW required</li> </ul>
<b>Acquisitions</b>	<u>None</u>	<u>One Business Acquisition</u>
<b>Water Resources</b>	<u>Less Impact to Water Resources</u> <ul style="list-style-type: none"> <li>• Less impact to Sleepy Hollow Creek and Boone Creek watersheds</li> <li>• Less impact to sensitive aquifer recharge areas</li> </ul>	<u>Greater Impact to Water Resources</u> <ul style="list-style-type: none"> <li>• Greater impact to Sleepy Hollow Creek and Boone Creek watersheds</li> <li>• Greater impact to sensitive aquifer recharge areas</li> </ul>
<b>Wetlands</b>	<u>Less Impact to Wetlands</u> <ul style="list-style-type: none"> <li>• Impacts 1.73 acres of 23 total wetlands</li> <li>• Impacts 0.35 acres of 6 HQAR wetlands</li> <li>• Impacts 1 seep wetland</li> </ul>	<u>Greater Impact to Wetlands</u> <ul style="list-style-type: none"> <li>• Impacts 2.08 acres of 23 total wetlands</li> <li>• Impacts 0.5 acres of 6 HQAR wetlands</li> <li>• Impacts 1 seep wetland</li> </ul>
<b>Oak Trees</b>	<u>Less Impact to Oak Trees</u> <ul style="list-style-type: none"> <li>• Impacts 0.04 acres of oak tree stands</li> </ul>	<u>Greater Impact to Oak Trees</u> <ul style="list-style-type: none"> <li>• Impacts 0.06 acres of oak tree stands</li> </ul>

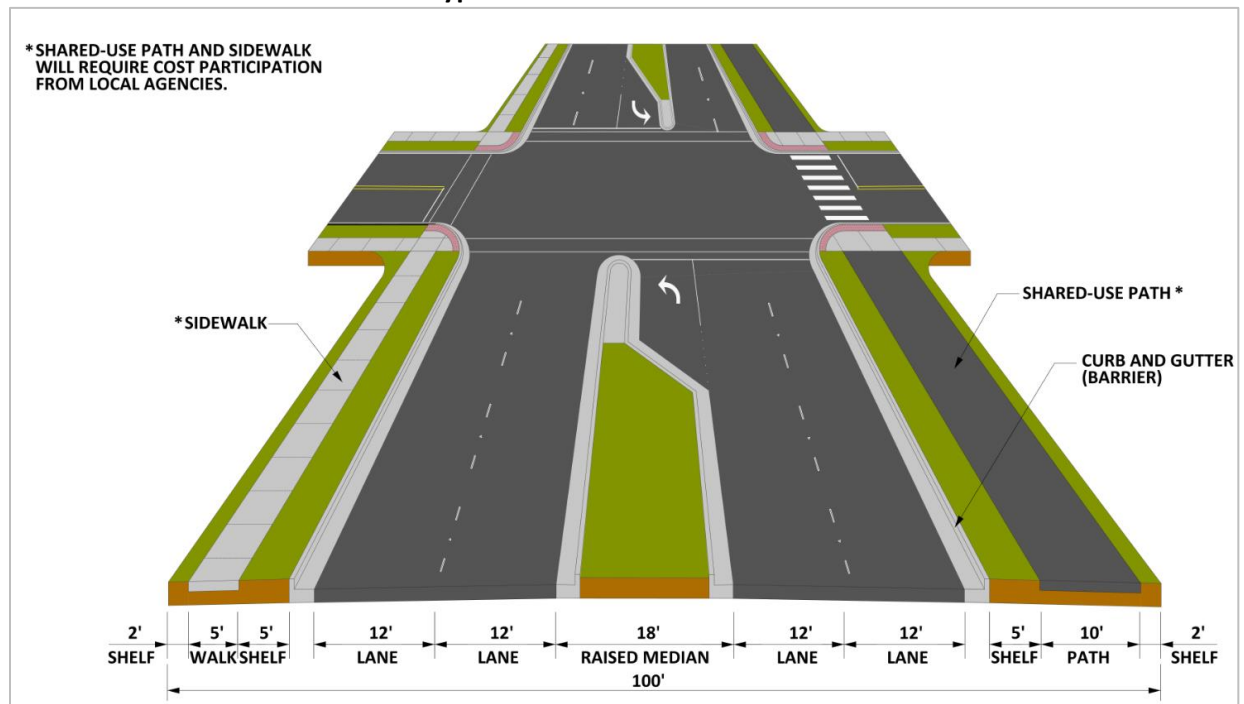
The two South Section alternatives have similar roadway capacity and traffic operations. Both improve traffic operations from IL Route 176 to Gracy Road from LOS F (No-Action Alternative) to LOS D. Both improve traffic operations from Gracy Road to Bull Valley Road/Miller Road to LOS B from LOS E (No Build Alternative). The 30-foot Raised Median Alternative was selected as the Preferred Alternative for the South Section as it minimizes impacts to water resources, wetlands, and oak trees.

### 3.5.2 North Section Alternatives Carried Forward

#### North Section 18-foot Raised Median Alternative (Alt. N-2)

One alternative for the North Section was carried forward. It includes two 12-foot through lanes in each direction separated by an 18-foot raised curb median. The alternative will include a transition section to match the MCDOT Bull Valley Road / Charles J. Miller Road improvements (4-lanes with 28-foot Raised Median). Channelized left turn lanes will also be included on IL Route 31 for all intersections and median openings to improve safety and operations. A typical section of Alternative N-2 is shown in Figure 3-6.

**Figure 3-6**  
**Typical Section of Alternative N-2**





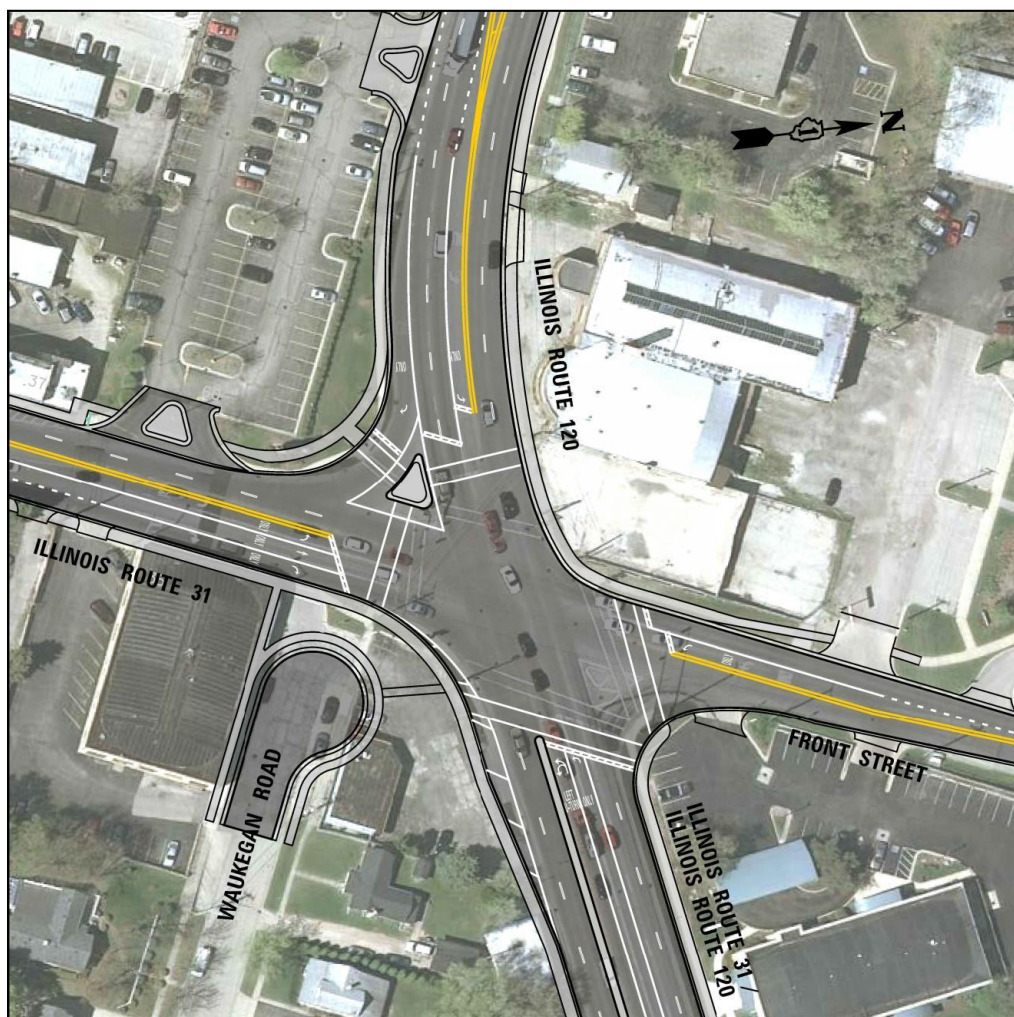
### 3.5.3 IL Route 120 Intersection Alternatives Carried Forward

The Alternatives Carried Forward for the IL Route 120 intersection included 120INT-1 and 120INT-3. The alternatives were renamed for the Alternatives Carried Forward analysis (based on agency comments) to Build Alternative A (formerly 120INT-1) and Build Alternative B (formerly 120INT-3).

#### IL Route 120 Build Alternative A (120INT-1)

Build Alternative A widens pavement at the IL Route 120 intersection to provide additional capacity. The existing three-lane cross-section would be widened to a five-lane cross section alternative (two lanes in each direction with a two way left turn lane (TWLTL), replaced by channelized left turn lanes at the John Street and IL Route 120 intersections) would make a transition from the 18-foot Raised Median (North Section Alternative) 600 feet south of John Street and end at the IL Route 120 intersection. The Waukegan Road intersection would be converted from a right-in access to a cul-de-sac with no access from IL Route 31, due to its close proximity to IL Route 120. On-street parking on IL Route 31 would be eliminated. A shared-use path could not be included in this alternative without incurring building impacts, but sidewalks would be provided through the IL Route 120 intersection area. A plan view of IL Route 120 Build Alternative A is shown in Figure 3-7.

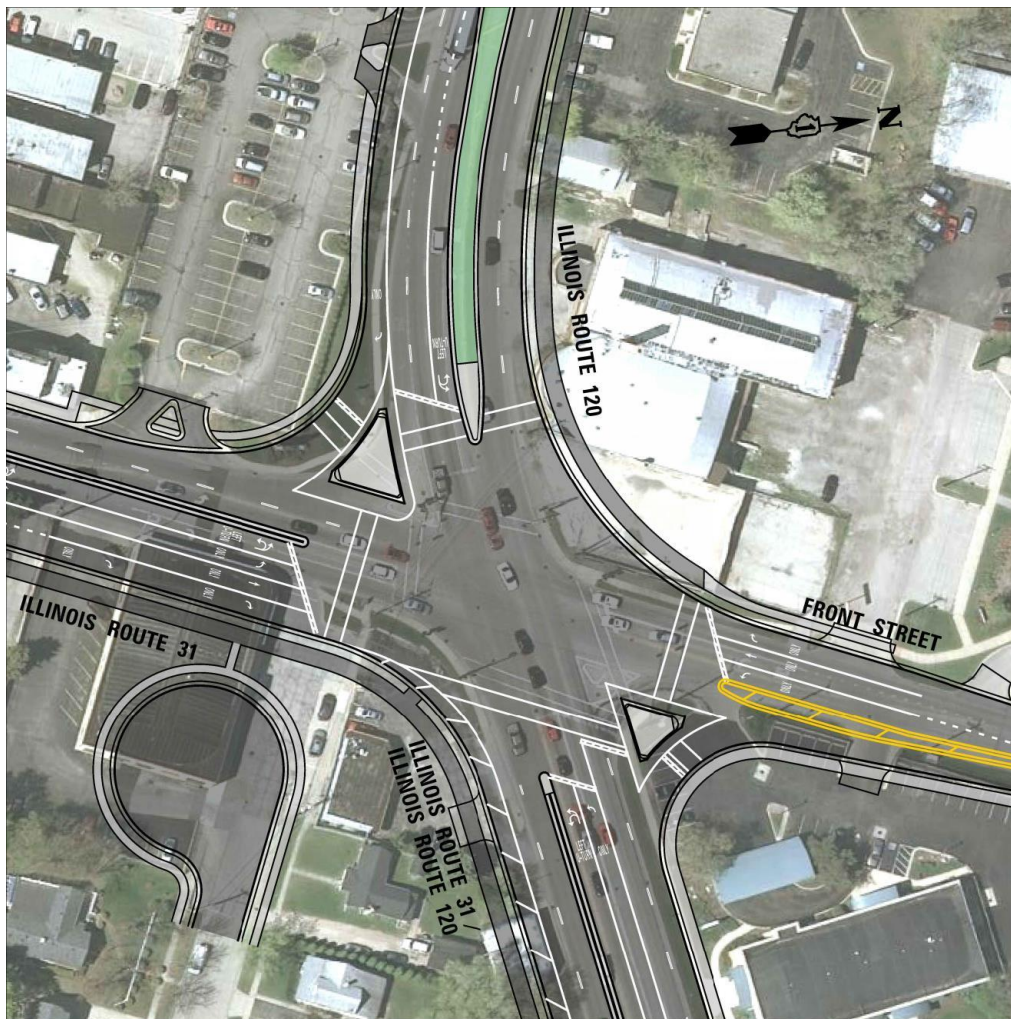
**Figure 3-7**  
**Plan View of IL Route 120 Build Alternative A**



### IL Route 120 Build Alternative B (120INT-3)

Build Alternative B widens the IL Route 120 intersection for additional capacity, and provides more road capacity than Build Alternative A. The alternative would make a transition from the 18-foot Raised Median (North Section Alternative) 2,000 feet south of John Street to become a 30-foot Raised Median with two 12-foot through lanes in each direction. The 30-foot median can accommodate two 12-foot left turn lanes and a 6-foot wide raised median on the south leg of the IL Route 120 intersection. Due to its proximity to IL Route 120, the Waukegan Road intersection would be converted from a right-in access to a cul-de-sac at IL Route 31. On-street parking would be eliminated and provisions for multimodal accommodations would be provided on IL Route 31 and IL Route 120. A plan view of IL Route 120 Build Alternative B is shown in Figure 3-8.

**Figure 3-8**  
**Plan View of IL Route 120 Build Alternative B**



**Key Elements of the North Section and IL Route 120 Intersection Preferred Alternative Selection**



Impacts from the one North Section Alternative were quantified and combined with impacts from the two IL Route 120 Intersection alternatives for a comparative analysis between two build alternatives.<sup>19</sup> A comparison of key elements used to select the North Section and IL Route 120 intersection Preferred Alternative is in Table 3-3.<sup>20</sup> Cells shaded in green indicate lower/fewer impacts (as well as impacts that don't differentiate between the alternatives) as compared to cells shaded in red, which indicate higher/worse impacts. The Preferred Alternative is highlighted in yellow.

**Table 3-3**  
**Key Elements of the North Section/IL Route 120 Intersection Preferred Alternative Selection**

Key Element	18' Raised Median + Build Alternative A	18' Raised Median + Build Alternative B
<b>Impact Area Size</b>	<u><b>Smaller footprint size</b></u> <ul style="list-style-type: none"> <li>• 10-11' wide lanes at IL Route 120 intersection</li> <li>• IL Route 120 west and north legs unchanged</li> <li>• Minimal ROW required for east and south intersection legs</li> <li>• 19.28 acres of ROW required</li> </ul>	<u><b>Larger footprint size</b></u> <ul style="list-style-type: none"> <li>• 12' wide lanes at IL Route 120 intersection</li> <li>• ROW required to widen west and north legs</li> <li>• Greater ROW needs for east and south intersection legs</li> <li>• 22.65 acres of ROW required</li> </ul>
<b>Acquisitions</b>	<ul style="list-style-type: none"> <li>• No residential acquisitions</li> <li>• Two businesses removed due to parking loss</li> <li>• 25 businesses have parking/other impacts</li> </ul>	<ul style="list-style-type: none"> <li>• 22 residential units (four buildings) would be displaced (20 multi-family units, 2 single family)</li> <li>• 15 businesses in 12 buildings removed</li> <li>• 29 businesses have parking/other impacts</li> </ul>
<b>Roadway Capacity</b>	<u><b>Provides Less Capacity at IL Route 120</b></u> <ul style="list-style-type: none"> <li>• Additional through lane for northbound</li> <li>• Single northbound left turn lane, dual left turns for westbound</li> <li>• Maintain existing north leg capacity</li> <li>• Intersection LOS E compared to No-Action intersection LOS F</li> </ul>	<u><b>Provides More Capacity at IL Route 120</b></u> <ul style="list-style-type: none"> <li>• Additional through lane for northbound</li> <li>• Dual northbound and westbound left turn lanes</li> <li>• Add channelized left and right turn lanes to north leg</li> <li>• Intersection LOS C compared to No-Action intersection LOS F</li> </ul>
<b>IL Route 120 Intersection Traffic Safety/ Access Management</b>	<u><b>Some Safety Advantages</b></u> <ul style="list-style-type: none"> <li>• Barrier median, east intersection leg</li> <li>• On-street parking is eliminated</li> <li>• Waukegan Road becomes cul-de-sac at IL Route 31</li> <li>• Main Street becomes right-in, right-out access</li> <li>• At IL Route 120 intersection, some driveways convert to right-in/right-out</li> </ul>	<u><b>More Safety Advantages</b></u> <ul style="list-style-type: none"> <li>• Barrier median, all intersection legs</li> <li>• On-street parking is eliminated</li> <li>• Waukegan Road becomes cul-de-sac at IL Route 31</li> <li>• Main Street becomes right-in, right-out access</li> <li>• At IL Route 120 intersection, all driveways converted to right-in, right-out</li> </ul>
<b>IL Route 120 Intersection Multimodal Access</b>	<u><b>Continuous Access via Sidewalk</b></u> <ul style="list-style-type: none"> <li>• Multimodal access provided throughout</li> <li>• Sidewalks, not shared-use paths, will be used to avoid building impacts</li> <li>• Crosswalks and pedestrian signals provided at IL Route 120 intersection</li> </ul>	<u><b>Continuous Access via Shared-Use Path and Sidewalk*</b></u> <ul style="list-style-type: none"> <li>• Multimodal access provided throughout</li> <li>• Multimodal facilities are a mix of shared-use paths and sidewalk</li> <li>• Crosswalks and pedestrian signals provided at IL Route 120 intersection</li> </ul>

<sup>19</sup> The two Alternatives Carried Forward for the North Section and IL Route 120 Intersection were 18-foot Raised Median + IL Route 120 Build Alternative A and 18-foot Raised Median + Build Alternative B.

<sup>20</sup> Please reference the Preferred Alternative analysis in Appendix G for a full listing of all qualitative and quantitative impacts of these alternatives.



Key Element	18' Raised Median + Build Alternative A	18' Raised Median + Build Alternative B
<b>Water Resources</b>	<u><b>Smaller Footprint, Fewer Impacts</b></u> <ul style="list-style-type: none"> <li>• Impacts 6.5 acres of highly erodible soils</li> <li>• Smaller footprint, generates less runoff to Fox River and Boone Creek tributaries</li> <li>• 15.7 acres of sensitive aquifer recharge area impacts</li> </ul>	<u><b>Larger Footprint, More Impacts</b></u> <ul style="list-style-type: none"> <li>• Impacts 8.9 acres of highly erodible soils</li> <li>• Larger footprint, generates more runoff to Fox River and Boone Creek tributaries</li> <li>• 18.5 acres of sensitive aquifer recharge area impacts</li> </ul>
<b>Parklands</b>	<u><b>No Parkland Impacts</b></u>	<u><b>Impacts to Freund Field</b></u>
<b>REC Sites</b>	<u><b>31 REC Impacts</b></u>	<u><b>33 REC Impacts</b></u>

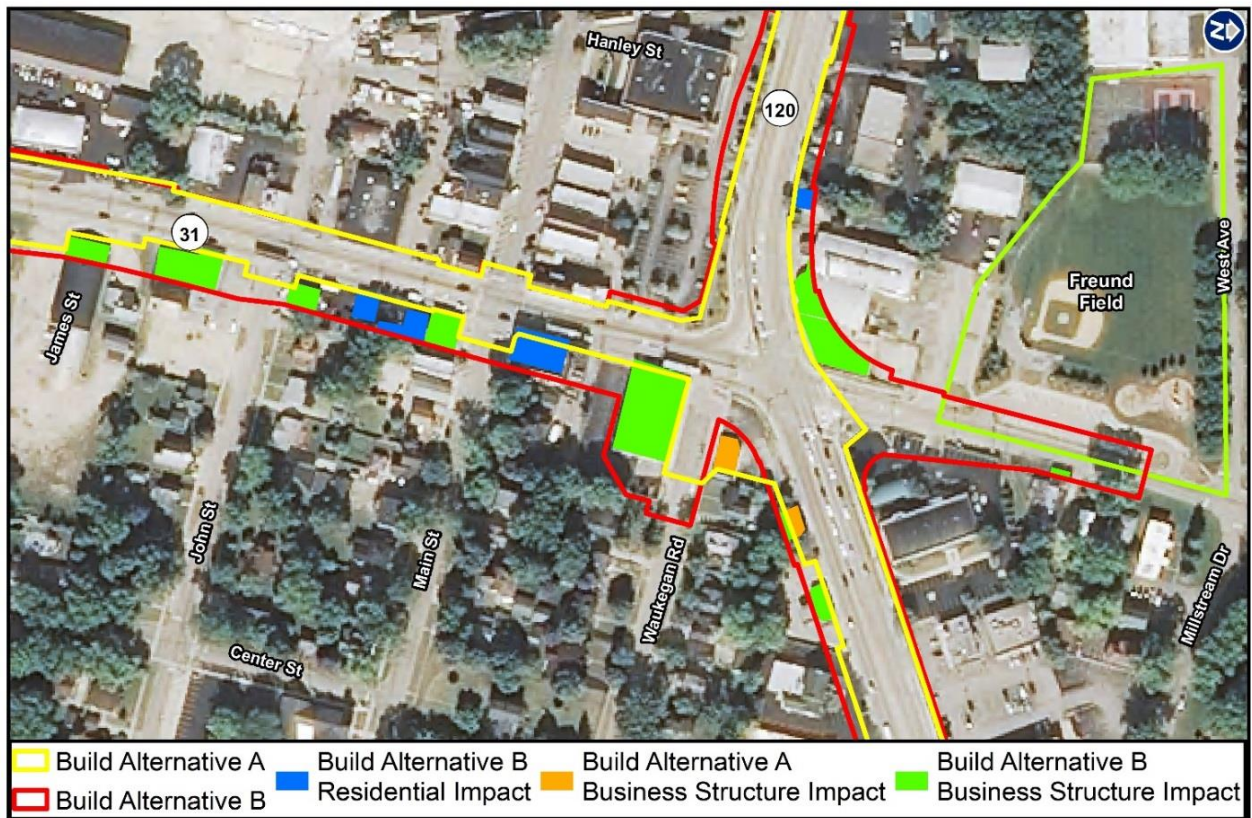
\*Sidewalks are typically 5 feet wide constructed of concrete. Shared use paths are typically 10 feet wide.

Both alternatives have similar geometry, with two lanes in each direction, a barrier median, and access management from Bull Valley Road to John Street. Impacts are similar in this area for both alternatives.

The difference between the alternatives is at the IL Route 120 intersection. Build Alternative A has a smaller footprint than Build Alternative B. Build Alternative A provides less roadway capacity and results in less efficient roadway operations than Build Alternative B. Both alternatives provide multimodal access throughout the section, however only Alternative B provides a shared-use path throughout. While Build Alternative B may be preferable from a capacity and operations standpoint, it has greater impacts to residences, businesses, water resources, and parkland, as shown in Figure 3-9, and for that reason Build Alternative A was selected as the Preferred Alternative for the North Section.

**Recognized Environmental Conditions (RECs)**, as defined by IDOT, are sites that have the presence or likely presence of any regulated substances on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any regulated substances into structures on the property or into the ground, groundwater, or surface water of the property.

**Figure 3-9**  
**Residential, Business, and Parkland Impacts of Build Alternatives A and B**



### 3.6 PREFERRED ALTERNATIVE AND REFINEMENTS

The IL Route 31 alternatives assessment identified the 30-foot Raised Median Alternative as the South Section Preferred Alternative, the 18-foot Raised Median as the North Section Preferred Alternative, and Build Alternative A as the IL Route 120 Intersection Preferred Alternative. The following sections detail how these alternatives were refined to reduce impacts and incorporate agency comments. Additional documentation, including a comparison of impacts, is available in Appendix G.<sup>21</sup> The resource impacts from the resulting refined Preferred Alternative will be discussed in Chapter 4.

#### 3.6.1 South Section Preferred Alternative and Refinements

The South Section Preferred Alternative, the 30-foot Raised Median Alternative, required refinements to avoid and minimize impacts.

##### Roadway Width Reductions

The US Army Corps of Engineers (USACE) requested reduced width options for the South Section 30-foot Raised Median alternative be considered to minimize wetland impacts.

From River Birch Boulevard to Medical Center Drive (south of Bull Valley Road), two options to the 30-foot Raised Median Alternative were compared. This location has many adjacent wetlands, including a seep wetland. Resource impacts from an 18-foot Raised Median Option<sup>22</sup> and a 28-foot Raised Median Option were compared. These two raised median options would include:

- A 30-foot raised median from IL Route 176 to River Birch Boulevard
- Either an 18-foot or 28-foot raised median from River Birch to Ames
- A 28-foot raised median from Ames to Medical Center Drive

These options also reduced travel lane widths from 12-foot-wide to 11-foot-wide.

A comparison of key elements used to select the refinement of the 30-foot Raised Median Alternative for the Preferred Alternative is in Table 3-4. Cells shaded in green indicate lower/fewer impacts (as well as impacts that don't differentiate between the alternatives) as compared to cells shaded in red, which indicate higher/worse impacts. The Preferred Alternative is highlighted in yellow.



**Wetland Site 35, a seep**

##### Seep Wetland

A spring or groundwater-fed herbaceous or thinly wooded wetland with saturated soil or inundation resulting from the diffuse flow of groundwater to the surface. Often times seep wetlands are situated on or near the base of a slope.

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<sup>21</sup> The EA document includes current information that was not available during development of the Alternatives Carried Forward and Preferred Alternative analyses.

<sup>22</sup> Alternative S-3, used for comparison purposes as that alternative was found to not meet the project Purpose and Need.

**Table 3-4**  
**Key Elements of the 18' Raised Median Option/28' Raised Median Option Selection**

Key Element	18' Raised Median Option	28' Raised Median Option
Impact Area Size	<u>Smaller footprint size</u> <ul style="list-style-type: none"> <li>• 11' wide lanes</li> <li>• 18' raised green median</li> <li>• 45.28 acres of ROW required</li> </ul>	<u>Larger footprint size</u> <ul style="list-style-type: none"> <li>• 11' wide lanes</li> <li>• 28' raised green median</li> <li>• 46.18 acres of ROW required</li> </ul>
Acquisitions	<ul style="list-style-type: none"> <li>• No residential acquisitions</li> <li>• 12 businesses have parking/other impacts (no building impacts)</li> </ul>	<ul style="list-style-type: none"> <li>• No residential acquisitions</li> <li>• 12 businesses have parking/other impacts (no building impacts)</li> </ul>
Future Planned Traffic Demand	<u>Inadequate Capacity for Planned Development</u> <ul style="list-style-type: none"> <li>• Dual left turn lanes cannot be provided at the IL Route 31/Half Mile Trail intersection as required for the planned Prairie Grove Town Center</li> </ul>	<u>Adequate Capacity for Planned Development</u> <ul style="list-style-type: none"> <li>• Dual left turn lanes can be provided at the IL Route 31/Half Mile Trail intersection as required for the planned Prairie Grove Town Center</li> </ul>
Wetlands	<u>Similar Impacts</u> <ul style="list-style-type: none"> <li>• Impacts 16 wetlands (1.47 acres)</li> <li>• Impacts 4 High Quality Aquatic Resources (0.22 acres)</li> <li>• Avoids impacts to seep wetlands</li> </ul>	<u>Similar Impacts</u> <ul style="list-style-type: none"> <li>• Impacts 16 wetlands (1.54 acres)</li> <li>• Impacts 4 High Quality Aquatic Resources (0.29 acres)</li> <li>• Avoids impacts to seep wetlands</li> </ul>
Water Resources	<u>Similar Impacts</u> <ul style="list-style-type: none"> <li>• Crosses five streams</li> <li>• Impacts one private well and located within one non-CWS well setback zone</li> <li>• Located within five wellhead protection areas</li> <li>• Affects 71 acres of sensitive aquifer recharge areas</li> <li>• Affects 0.83 acres of highly erodible soils</li> </ul>	<u>Similar Impacts</u> <ul style="list-style-type: none"> <li>• Crosses five streams</li> <li>• Impacts one private well and located within one non-CWS well setback zone</li> <li>• Located within five wellhead protection areas</li> <li>• Affects 71 acres of sensitive aquifer recharge areas</li> <li>• Affects 0.84 acres of highly erodible soils</li> </ul>
REC Sites	<u>21 REC Impacts</u>	<u>21 REC Impacts</u>

The 18-foot and 28-foot Raised Median design options successfully reduced overall wetland impacts and avoided impacts to seep wetlands. Most environmental resources were equally impacted by the 18-foot and 28-foot Raised Median Options; where impacts differed, the 28-foot Raised Median Option had slightly higher impacts for most resources compared to the 18-foot Raised Median Option.

#### Alignment Shift

In addition to the roadway width reductions, the proposed South Section centerline was shifted west by 13 feet near Oak Crest Road to avoid impacting a seep wetland. Other proposed alignment shifts for IL Route 31 occurred prior to the Preferred Alternative refinements, and include:

- Near Half Mile Trail, IL Route 31 was shifted east by 28 feet to avoid Terra Cotta Industries factory buildings.



- Between Terra Cotta Industries and Edgewood Road, IL Route 31 was shifted east by 20 feet to avoid impacting residential and commercial buildings on the west side of the roadway.
- South of Gracy Road, IL Route 31 was shifted west by 38 feet to avoid McMillan Cemetery.
- South of Shamrock Drive, IL Route 31 was shifted 21 feet east to avoid the NICOR gas transmission facility.
- South of Medical Center Drive, the proposed centerline was shifted from the existing centerline to match the proposed MCDOT improvements at the Bull Valley Road / Charles J. Miller Road intersection.



**Terra Cotta Industries**



**McMillan Cemetery**

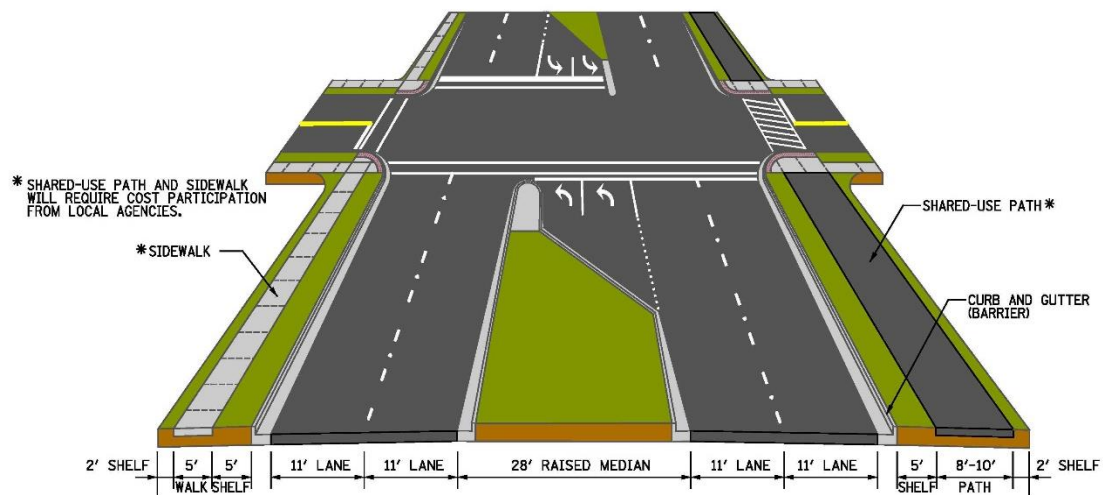
### **Recommended South Section Preferred Alternative Design**

The 28-foot Raised Median Option was the recommended design for the South Section rather than the 30-foot Raised Median Alternative, because the narrower median design and the alignment shift avoids seep wetlands and reduces overall wetland impacts. The 18-foot Raised Median Option is not recommended for the following reasons:

- *Traffic Demand and Planned Future Capacity:* A median that could accommodate future dual left turn lanes supports Prairie Grove's Town Center and Transit Oriented Development Plan, which requires dual left turn lanes at the Half Mile Trail/IL Route 31 intersection. Dual left turn lanes could not be constructed with the 18-foot Raised Median Option, but could be constructed for the 28-foot Raised Median Option.
- *Safety:* Without dual left turn lanes at the Half Mile Trail/IL Route 31 intersection, turning vehicle queues blocking through lane traffic would result in traffic delays and increased potential for collisions.
- *Environmental Impacts Comparison:* The 28-foot Raised Median Option has 0.07 additional acres of wetland impacts compared to the 18-foot option. Both options avoid impacting seep wetlands.

The South Section Preferred Alternative cross section is shown in Figure 3-10.

### South Section Refined Preferred Alternative, Typical Section



### 3.6.2 North Section and IL Route 120 Intersection Preferred Alternative and Refinements

The North Section and IL Route 120 intersection Preferred Alternatives required several refinements after its selection due to detailed drainage work and local agency comments.

#### Median Width and Type

The North Section Preferred Alternative had an 18-foot-wide raised median south of the IL Route 120 intersection. The City of McHenry requested that two-way left turn lanes rather than raised medians be used where businesses are adjacent to IL Route 31, because the raised median alternative could not accommodate U-turns. The two-way left turn lanes would preserve existing full access to businesses. Using the City of McHenry's recommendation, the North Section Preferred Alternative was modified to include an 18-foot-wide raised median from Bank Drive to High Street, and a two-way left turn lane from High Street to the IL Route 120 intersection.

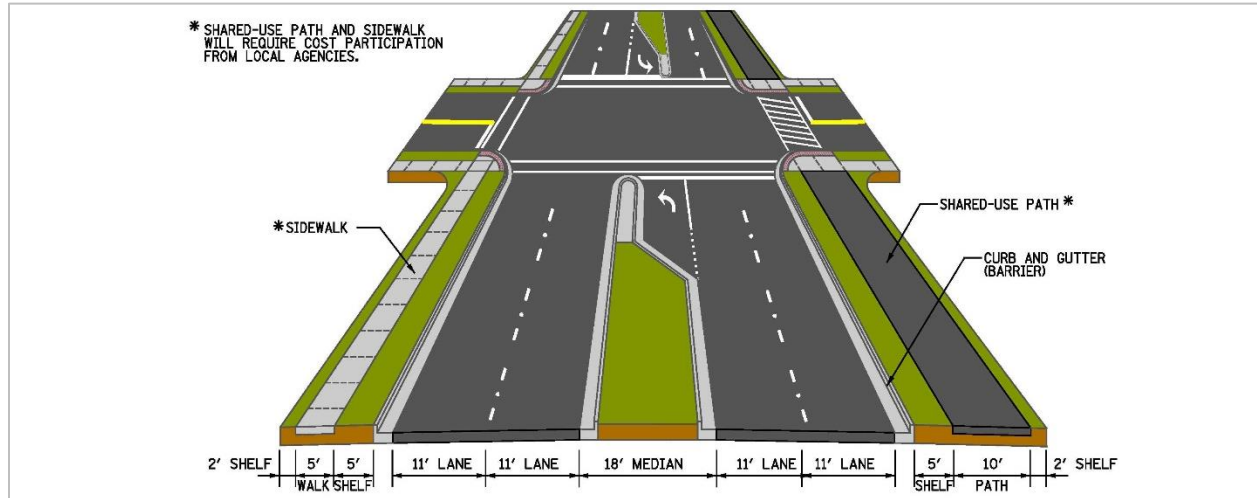
Travel lane widths were reduced in the North Section (from 12-foot-wide to 11-foot-wide), as requested by USACE to minimize environmental impacts.

#### Drainage Refinements

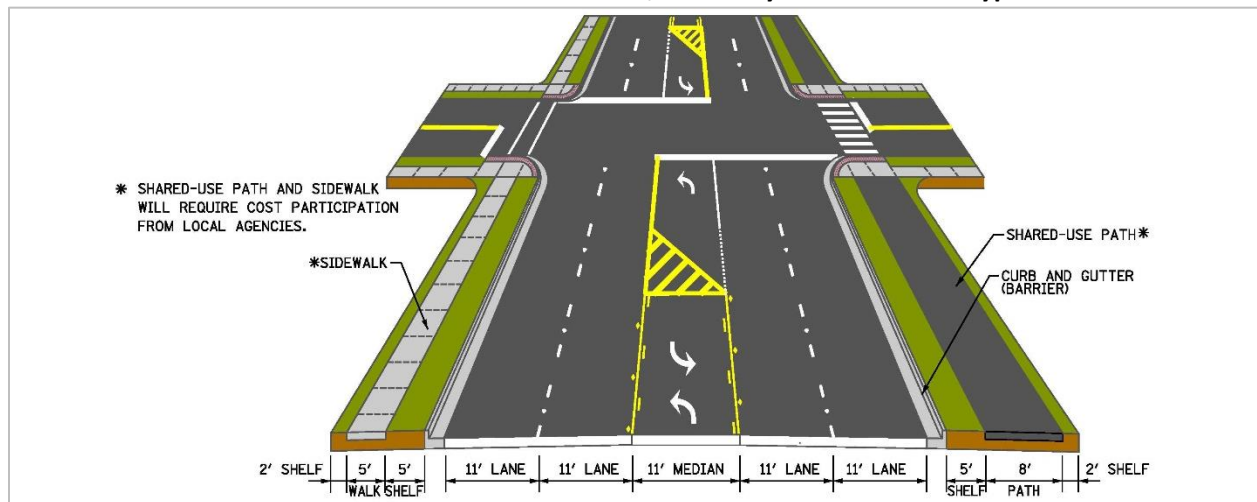
The refinement of the project's drainage plan resulted in the acquisition of one residence on Anne Street that previously was not anticipated to be impacted. The residential impact was necessary to regrade the unnamed tributary to the Fox River south of Lillian/Grove Street.

The North Section Preferred Alternative is shown in Figure 3-11 (Bank Drive to High Street), Figure 3-12 (High Street to John Street), and Figure 3-13 (IL Route 120 intersection).

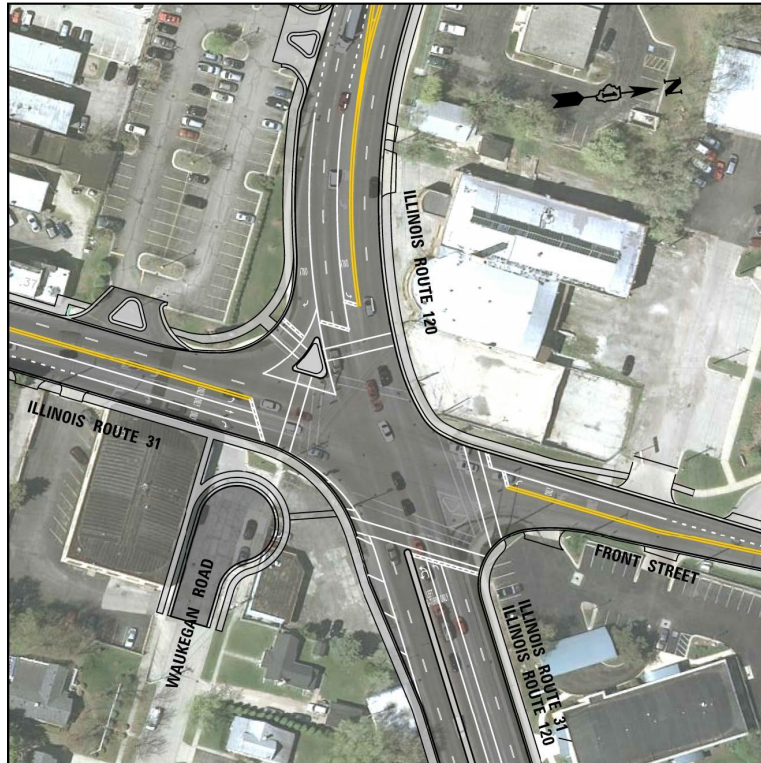
**Figure 3-11**  
**North Section Refined Preferred Alternative, 18' Median Typical Section**



**Figure 3-12**  
**North Section Refined Preferred Alternative, Two-Way Left Turn Lane Typical Section**



**Figure 3-13**  
**IL Route 120 Intersection Preferred Alternative, Plan View**



### 3.6.3 Preferred Alternative Summary

In summary, the Preferred Alternative for IL Route 31 includes two travel lanes in each direction, with the following design details:

- 30-foot-wide raised median from IL 176 to River Birch Boulevard
- 28-foot-wide raised median (with 11-foot lanes) from River Birch Boulevard to Medical Center Drive (south of Bull Valley Road)
- The Bull Valley Road intersection is a separate project currently being constructed by MCDOT.
- 18-foot-wide raised median from Bank Drive (north of Bull Valley Road) to High Street
- A five-lane road with a two-way left turn lane from High Street to John Street
- IL Route 120 intersection improvements:
  - South Leg: Five total lanes (two 10-foot-wide wide through lanes in each direction and a single northbound left turn lane)
  - East Leg: Six total lanes (two through lanes in each direction and westbound dual left turn lanes (10-foot and 11-foot-wide lanes))
  - West and North Legs: No changes from existing geometry

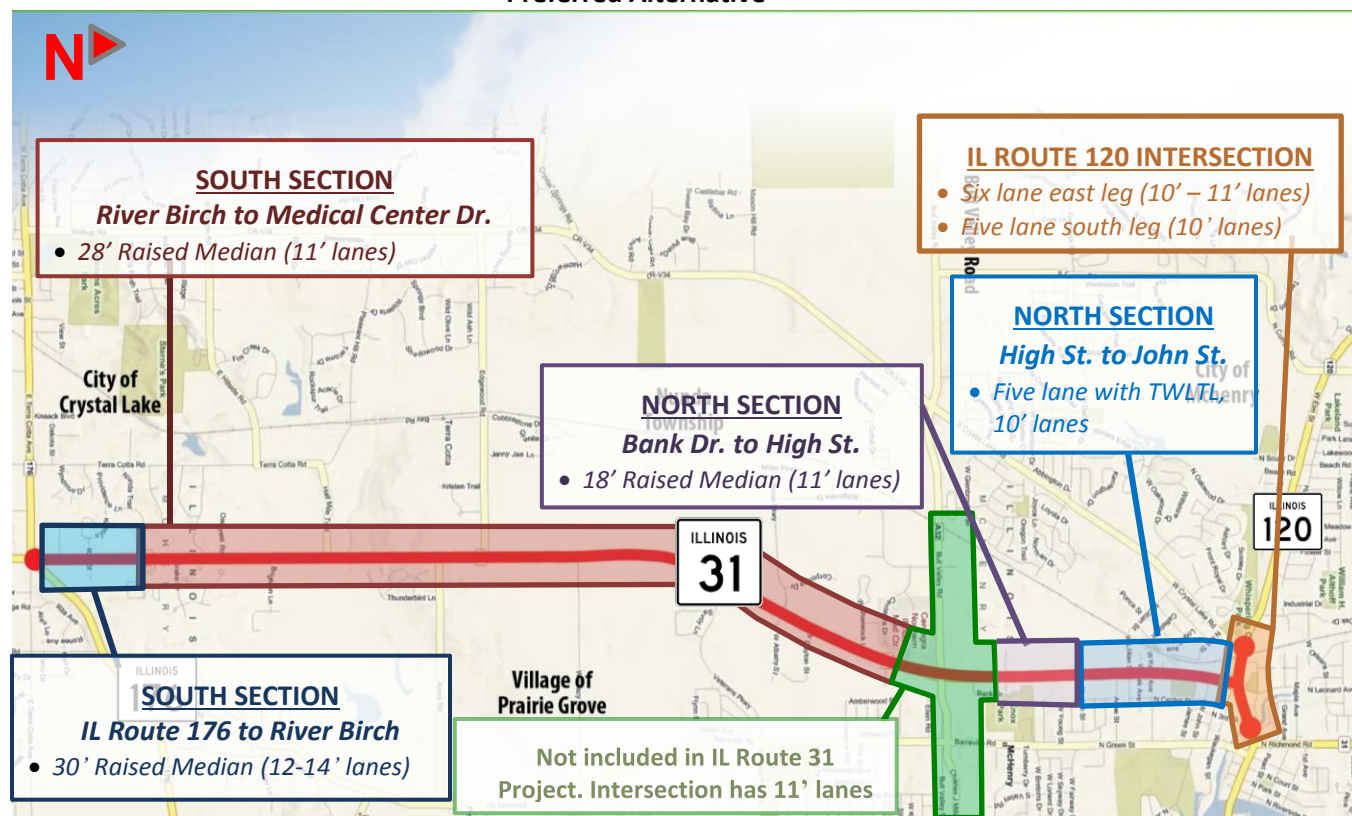
Figure 3-14 is a summary of the IL Route 31 Preferred Alternative. The Preferred Alternative minimized resource impacts and incorporated agency comments to reduce wetland and business impacts. The Preferred Alternative meets the Purpose and Need because corridor capacity, operations, and safety will be improved, and bicycle and pedestrian access will be provided.<sup>23</sup>

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<sup>23</sup> If the local agency agrees to cost participation and long-term maintenance of bicycle and pedestrian facilities, the facilities can be included in construction. If no agreement is made, a graded shelf will be provided and the local agency can construct the bicycle and pedestrian facilities fully at their own cost.



Figure 3-14  
Preferred Alternative



### 3.7 BEST MANAGEMENT PRACTICES (BMPs) FOR THE PREFERRED ALTERNATIVE

In December 2014, the Chicago District USACE adopted the use of numeric standards to address stormwater runoff on project sites<sup>24</sup>. Under the Regional Permit Program (Transportation Projects - Regional Permit 3, condition m), projects need to incorporate permanent BMPs to protect water quality, preserve natural hydrology and minimize the overall impacts of development on aquatic resources. Projects can satisfy this requirement by demonstrating the ability to retain the runoff from a 1-inch rainfall over the added impervious area (1.25-inch rainfall for High Quality Aquatic Resources – HQAR). The USACE will presume that BMPs are sufficient if an applicant meets this standard (although other approaches may also be sufficient). Additional ROW may need to be obtained in order to incorporate green infrastructure stormwater practices on the project.

The USACE has identified various practices which can be implemented on a project to meet these goals. These practices and the entire guidance document are included in Appendix H. A summary of the project drainage analysis relative to the USACE guidance is provided in Table 3-5.

The guidance document also identifies the importance and constraints of stormwater infiltration. Infiltration practices reduce stormwater runoff and increase groundwater recharge by facilitating processes for stormwater to soak into the ground. Care must be taken in siting and designing infiltration practices to ensure that they do not adversely affect groundwater quality. In order to protect groundwater and local property, the USACE has identified instances in which infiltration practices should

<sup>24</sup> This guidance has been suspended by USACE after the development of the project's BMP plan. Requirements will be outlined in the next update to the USACE Regional Permit Program in April 2017.

not be implemented. These are provided in Appendix H.

A management and monitoring plan will be required for all approved BMPs by the USACE during permitting which typically occurs in Phase II, design. The plan shall be designed on a case-by-case basis and shall include performance standards such as the BMPs ability to function as designed, percent coverage of vegetation, soil stabilization, and corrective measures to bring areas into compliance.<sup>25</sup>

As refinement of the Preferred Alternative occurred, BMPs for water quality protection including and in addition to the numeric standards for stormwater retention were incorporated, as shown on Exhibit 5 in the Exhibits section. BMPs have been conceptualized for the corridor, in cooperation with local, state, and federal agencies and local environmental groups. The BMP concepts for the IL Route 31 Preferred Alternative are listed below. Approximately nine acres of additional proposed ROW was added to meet the USACE guideline.

- Realignment of over 1,800 feet of Squaw Creek along IL Route 31 to include meanders, riffles and pools, and to restore and stabilize the stream bank.
- Approximately 7,000 feet of bioswales are planned in the Sleepy Hollow Creek and Fox River watersheds.<sup>26</sup>
  - Bioswales are proposed due to the soils present in the project study area. Nearly eighty percent of soils in the Silver Creek/Sleepy Hollow watershed have moderately low runoff potential when wet. These soils typically include 10 to 20% clay, 59-90% sand.<sup>27</sup> Figure 14 of the Silver Creek/Sleepy Hollow Creek Watershed Action Plan depicts zones of soils along IL Route 31 with well-draining properties. These well-draining soils are conducive to implementing infiltration through the bioswales in sensitive water resource/wetland locations.
- Infiltration trench
  - Chloride concentrations are expected to remain below the General Use Water Quality standard for all receiving streams without the use of stormwater BMPs, except for the unnamed tributary to Thunderbird Lake. The implementation of an infiltration trench will be investigated at the unnamed tributary to Thunderbird Lake (Outfall 10) and included as part of the stormwater treatment plan, if feasible.
- Detention basins included in the project are anticipated to include naturalized areas. Naturalized detention basins are included as a recommended urban BMP for this watershed in the Silver Creek and Sleepy Hollow Creek Watershed Group plan (see Section 4.7).

In addition to BMPs for water quality protection, other BMPs are proposed including those for the consideration of wildlife. This includes:

- Inclusion of wildlife crossings at nine potential locations in the project study area. The wildlife crossings would use either a bridge with a shelf or a reinforced concrete pipe for small mammal crossings or would use an embedded (natural stream bottom) box culvert for a terrestrial and/or aquatic wildlife crossing. Culvert crossings with perennial flow will utilize multiple cells, at least one of which is designed to be dry under normal conditions or in some cases a separate reinforced concrete pipe solely for wildlife crossings. Guidance for the design and siting of proposed wildlife crossings was obtained from the FHWA Wildlife Crossing Structure Handbook (FHWA-CFL/TD-11-003). The locations proposed for land and/or aquatic wildlife crossings are

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<sup>25</sup> Coordination is on-going with the USACE concerning resolution and plans for the proposed retention of the 1" storm runoff guidance.

<sup>26</sup> It is anticipated that the currently listed bioswales for this project will be extended through continued coordination with the USACE.

<sup>27</sup> Silver Creek/Sleepy Hollow Watershed Action Plan, p. 27, December 2011

shown on the Best Management Practices map (Exhibit 5) and include:

- Brighton Lane, east of IL Route 31: Natural bottom culvert (embedded box culvert) for aquatic wildlife crossings only, as it is a perennial flow stream
- Stream Outfall 6 (Squaw Creek): Natural bottom culvert (embedded box culvert) with separate wildlife crossing culvert (reinforced concrete pipe)
- Squaw Creek south of Stream Outfall 7: Natural bottom culvert (embedded box culvert)
- Stream Outfall 7: Natural bottom culvert (embedded box culvert) with separate wildlife crossing culvert (reinforced concrete pipe)
- Stream Outfall 9 (Sleepy Hollow Creek): Natural bottom culvert (embedded box culvert) with separate wildlife crossing culvert (reinforced concrete pipe)
- Stream Outfall 12: Natural bottom culvert (embedded box culvert)
- Stream Outfall 15/16: Natural bottom culvert (embedded box culvert)
- Stream Outfall 22: Natural bottom culvert (embedded box culvert)
- Stream Outfall 23 (Unnamed Tributary to the Fox River): Three-span slab bridge with terrestrial wildlife crossing shelf

As part of the Section 401 Water Quality permitting for this project, an anti-degradation assessment will be completed, incorporating BMPs and other modifications as necessary to ensure water quality standards are maintained.

**Table 3-5**  
**Water Quality Volume Comparison**  
**USACE Recommended Storage For 1"/1.25" Rainfall Of Additional Proposed Impervious Areas Not**  
**Including Bike Path/Sidewalk**

Watershed	1"/1.25" WQV Storage (ac ft.)	Provided WQV Storage (ac ft.)		Difference = Provided – Guidance Recommended (ac ft.)	
		Primary Measures Revised Design	Secondary Measures Revised Design	Primary Measures	Primary & Secondary Measures
Silver Creek (Outfall 1-3)	0.11	0.03	2.40	-0.07	2.33
Sleepy Hollow Creek (Outfall 4-13, Outfall 17)	0.68	0.43	0.01	-0.25	-0.24
Fox River (Outfall 14-16, Outfall 18-27)	0.79	1.62	0.00	0.83	0.83
<b>TOTAL</b>	<b>1.58</b>	<b>2.08</b>	<b>2.41</b>	<b>0.50</b>	<b>2.92</b>

**Notes:**

1. Primary measures include permanent ditch checks in bioswales that retain on-site runoff, over-excavation in detention basins at Outfall 1 and Outfall 26, and an infiltration trench at Outfall 10.
2. Secondary measures include permanent ditch checks in ditches that retain off-site runoff throughout the project and an off-site depressional storage area at Outfall 2.

## 4. ENVIRONMENTAL RESOURCES, IMPACTS AND MITIGATION

The environmental resource map (ERM) (Exhibit 4) and Table 4-1 identify environmental resources in the project study area. This chapter summarizes environmental resource impacts and mitigation.

**Table 4-1**  
**Environmental Impacts of the Preferred Alternative**

Criterion	Unit of Measure	Preferred Alternative
Water Quality/ Water Resources	Floodplain (acres affected)	9.88
	Streams (number of crossings)	7
	Drinking Water Supplies - Private Wells within ROW (number affected)	1
	Number of Non-Community Water Supply well setback zones	5
	Wellhead Protection Areas (number affected)	7
	Highly Erodible Soils (acres affected)	9.78
	Sensitive Aquifer Recharge Area (acres affected)	110.30
Wetlands	Wetlands (number affected)	20
	Wetlands (acres affected)	1.53
	High Quality Aquatic Resources ADID (number affected)	4
	High Quality Aquatic Resources ADID (acres affected)	0.26
	Waters of the U.S. (number affected)	6
	Waters of the U.S. (acres affected)	0.65
Threatened & Endangered Species	State and Federal Threatened and Endangered Species (number affected)	0
Trees	Oak/Hickory Trees (number affected)	84 / 17
Residential	Homes displaced	1
Businesses	Businesses with Site Impacts Only (no structure acquisition)	41
	Businesses with Structure Acquisition (tenants acquired)	2
Parklands	Number affected	0
Traffic Noise	Representative Receptors with Predicted Noise Impacts	22
	Locations with Reasonable and Feasible Noise Barriers	0
Cultural Resources	Number affected	0
Cemeteries	Cemeteries (number affected)	0
Special Waste	Recognized Environmental Conditions (RECs) (number affected)	82
Farmland	Farmland (acres affected)	5.26 within Urban Areas, 14.19 outside Urban Areas
Farmland Owners	Farmland Owners (number affected)	10 within Urban Areas, 4 outside Urban Areas
Centennial/ Sesquicentennial Farms	Centennial/Sesquicentennial Farms (number affected)	0
Right-of-Way	Proposed Right-of-Way/Temporary Easements (acres)	61.2 / 9.62

## 4.1 SOCIAL AND ECONOMIC RESOURCES

### 4.1.1 Community Characteristics and Cohesion

McHenry County is part of the seven-county Chicago metropolitan area (Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will counties). Table 4-2 summarizes U.S. Census Bureau population data for the project study area compared with data for McHenry County and the State of Illinois.

**Table 4-2**  
**Project Study Area Population Growth**

Location	2000 Population	2010 Population	% Growth
McHenry County	260,077	308,760	18.7
Crystal Lake	38,000	40,743	7.2
McHenry	21,501	26,992	25.5
Prairie Grove	960	1,904	98.3
State of Illinois	12,419,293	12,830,632	3.3

Source: U.S. Census Bureau

The project is anticipated to support continued population growth in McHenry County. As the project would not change IL Route 31 from its existing location, it is not anticipated to disrupt community cohesion and would not further divide the community.

### 4.1.2 Title VI and Other Protected Groups

It is the policy of the FHWA and IDOT to ensure nondiscrimination under Title VI of the 1964 Civil Rights Act, designed to ensure that no person in the United States is excluded from participation in, or denied the benefits of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the basis of race, color, national origin, age, sex, disability, or religion.

No groups of ethnic, racial or religious minorities or elderly or disabled people would be adversely affected by the proposed improvement. The Preferred Alternative is not expected to disrupt the availability of public and private facilities and services, nor is expected to disrupt community cohesion or economic vitality. The project will not isolate or separate any Title VI, minority, or low-income individuals within the community, as the proposed improvement is along an existing roadway. Public outreach in languages other than English was not needed for this project. There is a senior living community near the project study area (The Fountains at Crystal Lake on Brighton Lane), but it is not anticipated to be relocated nor adversely affected by the project. No groups or individuals have been or were excluded from participation in public involvement activities, denied the benefit of the project, or subjected to discrimination in any way on the basis of race, color, age, national origin, disability, or religion.

### 4.1.3 Environmental Justice

Environmental Justice (Executive Order 12898) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The IL Route 31 project study area was studied to ensure minority and low-income populations would not bear a disproportionate share of high and/or adverse environmental impacts from the project.

The majority of the six project study area census tracts had minority and race populations similar to surrounding cities, McHenry County, and the state. People of Hispanic or Latino origin comprise the largest ethnic or racial minority group in the project study area (11.4% of residents in McHenry County).

The majority of the project study area census tracts had similar levels of those living in poverty<sup>28</sup> as defined by the US Census. Based upon US Census tract data, the project study area contains two minority populations and one low-income population that are located between Dartmoor Drive and IL Route 120

- **Minority Populations:** Two census tracts in the project study area (Census Tracts 8706.05 and 8706.06, as shown in Exhibit 4) contain an above average concentration of people with Hispanic or Latino origin.
- **Low-Income Populations:** Census Tract 8706.06 had a higher percentage of families in poverty (17.2%) compared to McHenry County (5.8%) in 2012.

The Preferred Alternative will not result in disproportionately high or adverse impacts to these identified minority and low-income populations. One single-family residence would be acquired within Census tract 8706.06. Two business acquisitions (Boost Mobile at 3817 W. Elm Street and The Vape Shop at 3815 W. Elm Street) would be acquired within Census tract 8706.06. The owner of these two properties, who is not from a minority population, verified that the two building tenants are both from a minority population (Hispanic or Latino). These two businesses were recently opened. Letters will be sent to the tenants from IDOT inviting them to the public hearing and identifying the building displacement, as well as information about relocation assistance.

Web search investigations identified available comparable housing<sup>29</sup> for sale and for rent, as well as available commercial properties,<sup>30</sup> in McHenry. Appendix A contains additional information on the area's minority and income characteristics. General populations adjacent to the IL Route 31 project study area, including the identified environmental justice populations, received mailers with public meeting notifications, and public notification of project activities also occurred through local newspapers, e-mail, and the project website.

Two residents currently living within the identified minority and low-income population areas provided comments on the project. One of the comments was from a property owner whose home and business were directly adjacent to the project; this commenter supported the No Build alternative. The second commenter would not have property impacted by the project. This commenter supported a raised median build alternative with bicycle facilities included.

The project will benefit minority and low-income populations by improving roadway safety, providing continuous sidewalk and trail through the corridor, and safer bicycle and pedestrian crossings of IL Route 31 at signalized intersections. The project impacts do not represent a disproportionately high and adverse impact on minority or low income populations.

#### **4.1.4 Public Facilities and Services**

The project is within the municipalities of Crystal Lake, McHenry, Prairie Grove, and unincorporated McHenry County. Police protection is provided by Crystal Lake, Prairie Grove, McHenry, and the McHenry County Sheriff's office. Fire service is provided by Crystal Lake, the Nunda Rural Fire Protection District, and the McHenry Township Fire Protection District. Centegra Hospital/Northern Illinois Medical Center, the only hospital in the project study area, is located at 4201 W. Medical Center Drive. The Pioneer Center for Human Services, a non-profit charitable organization providing rehabilitation, health services, counseling, and homeless services, has several facilities in the project

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<sup>28</sup> US Census. Poverty Thresholds. <http://www.census.gov/hhes/www/poverty/data/threshld/index.html>

<sup>29</sup> [www.realtor.com](http://www.realtor.com). Accessed January 28, 2016

<sup>30</sup> [www.commercial.century21.com](http://www.commercial.century21.com). Accessed January 28, 2016

study area between Veterans Parkway and Bull Valley Road.

The McHenry County Conservation District (MCCD) manages 29 facilities throughout the county, as well as hiking, biking, and horse trails. MCCD facilities near the project study area include Stickney Run and the Prairie Trail. The Crystal Lake Park District has two facilities located west of IL Route 31, Veterans Park and Sterne's Woods and Fen. The City of McHenry Park District has several facilities located near the project study area, including Knox Park, Center Street Park, and Freund Field. A private park, the Kiwanis Tot Lot, is located along the Prairie Trail in McHenry. The IL Route 31 Preferred Alternative will not impact any park or recreation areas, and is anticipated to improve access to these facilities for cyclists and pedestrians.

The project study area includes several local school districts, including Districts 15 and 156 in McHenry, District 46 in Prairie Grove, as well as Districts 47 and 155 in Crystal Lake. There are two Crystal Lake School District 47/155 schools near IL Route 31, Chauncey H. Duker School, and Edgebrook Elementary School (on Kane Avenue). Additionally, Columbia College is located near Ray Street, and McHenry County College Workforce and Business Development Center is located on Shamrock Lane. These schools will benefit from the improved bicycle and pedestrian facilities on IL Route 31. The transportation departments for the public school districts noted above were contacted to collect their comments, and to determine how each district uses IL Route 31; none of the school districts replied.

The IL Route 31 project study area is served by two Pace bus routes (see Appendix A for maps).

- Pace Route 807 connects the cities of Woodstock and McHenry via IL Route 120, with some service to IL Route 31 in McHenry and select service to the Pioneer Center facility on Dayton Street. Pace Route 807 provides access to the Metra stations at Woodstock and McHenry.
- Pace Route 806 extends along IL Route 31 for most of the project study area (from IL Route 176 to Medical Center Drive, from Lillian to Main in McHenry, and through the IL Route 120 intersection). Pace Route 806 provides service between Crystal Lake and Fox Lake, via Prairie Grove, Centegra Hospital, McHenry, and Johnsburg. Pace Route 806 provides access to the Metra stations at Crystal Lake, McHenry, and Fox Lake.

The Preferred Alternative will not impact public facilities nor negatively affect community access to the facilities. The project is expected to include a traffic maintenance plan allowing continued access on IL Route 31 during construction. Individual properties may temporarily lose access to IL Route 31; if access is temporarily restricted for Centegra Hospital, alternate access from Bull Valley Road or Ridgeview Drive is available. This may result in temporary changes to emergency response routes and times.

#### **4.1.5 Change in Travel Patterns**

The proposed project will increase IL Route 31 capacity and improve operations. However, travel patterns are not expected to change post-construction. The project would maintain most existing access points, but would convert Waukegan Road in McHenry to a cul-de-sac, and would convert several intersections to right-in, right-out access. The proposed raised median in areas south of John Street in McHenry may require travel pattern changes, as left turning traffic would be prohibited. Eliminating left turning traffic reduces turning and rear-end collisions. The Preferred Alternative includes provisions for U-turn movements at approximately ¼-mile intervals to maintain access to these properties.

#### **4.1.6 Relocations**

The IL Route 31 Preferred Alternative will require two business relocations and one residential relocation. The properties requiring relocation are shown in Exhibit 4. All property acquisitions will be conducted in accordance with the Uniform Relocation Assistance and Real Property Policies Act of 1970,



as amended, and relocation resources are available without discrimination. Advisory services will be given to those eligible. All ROW acquisitions will also be conducted in accordance with the IDOT Land Acquisition Procedures Manual.

### **Business Relocations**

The project will require the acquisition of two commercial structures, as summarized below and shown in Exhibit 4.

1. Boost Mobile building at 3817 W. Elm Street (IL Route 120 in McHenry)
2. The Vape Shop building at 3815 W. Elm Street (IL Route 120 in McHenry)

The two businesses listed above must be relocated due to the proposed IL Route 31/IL Route 120 intersection widening, and converting the Waukegan Road intersection with IL Route 31 to a cul-de-sac. These improvements impact much of the off-street parking for these businesses. Web search investigations identified available comparable commercial properties<sup>31</sup> in McHenry.

### **Residential Relocations**

The Preferred Alternative will require the acquisition of one single-family residence, located at 3905 Anne Street in McHenry, as shown in Exhibit 4. The residential acquisition could not be avoided, as drainage improvements are required at the nearby stream to reduce flooding potential. The owners/tenants of the property will be assisted with locating comparable replacement housing and homes are available in this area. Web search investigations identified available comparable decent, safe, and sanitary housing<sup>32</sup> for sale and for rent in the area.

#### **4.1.7 Economic Impacts**

In addition to business relocations (see Section 4.1.6.1) and maintenance of business access during construction (see Section 4.1.5), the Preferred Alternative will require the removal of off-street business parking or other (non-structure) business amenities at 41 parcels. Parking impacts were minimized through roadway and site design as much as possible. South of Bull Valley Road, the Preferred Alternative impacts the outdoor display areas for four business sites. The project will also impact the outdoor display areas of two car dealerships, a greenhouse, and an outdoor products retailer. North of Bull Valley Road, business site impacts are confined to private business parking. The two businesses that must be acquired due to the project (see Section 4.1.6) must be acquired because the project would remove much of the off-street parking for these businesses. Web search investigations identified available comparable commercial properties<sup>33</sup> in McHenry. The Preferred Alternative will impact approximately 199 parking stalls along IL Route 31 and IL Route 120, based on a review of the proposed ROW and aerial imagery. IDOT has minimized parking impacts at certain locations with the use of retaining walls. A total of 11 on-street parking stalls will be lost on the west side of IL Route 31 south of the IL Route 120 intersection. Within the project study area, there are four on-street parking stalls on IL Route 120; the proposed IL Route 31 project will require removing all four parking stalls. There is available parking in adjacent lots to balance this loss. Both of the businesses displaced by the project are displaced due to unavoidable parking lot impacts from the reconstruction of the IL Route 31/IL Route 120 intersection. The remainder of businesses in the project study area will have sufficient remaining parking, even if some parking is impacted by the project. Other than the loss of business parking and the acquisition of several businesses, the Preferred Alternative is not expected to disrupt

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<sup>31</sup> [www.commercial.century21.com](http://www.commercial.century21.com). Accessed January 28, 2016

<sup>32</sup> [www.realtor.com](http://www.realtor.com). Accessed January 28, 2016

<sup>33</sup> [www.commercial.century21.com](http://www.commercial.century21.com). Accessed January 28, 2016

the economic vitality of the community.

#### **4.1.8 Land Use**

Land use planning in McHenry County is a mix of municipal comprehensive planning areas and McHenry County planning for unincorporated areas. The IL Route 31 project is consistent with comprehensive plans for the City of Crystal Lake, the Village of Prairie Grove, the City of McHenry, and McHenry County. Future land use changes along IL Route 31 relate to economic development initiatives, and are discussed in Section 4.1.9. Existing and future planned land use information for the project study area is in Appendix A.

#### **4.1.9 Growth and Economic Development**

McHenry County is projected to grow to nearly 500,000 residents by 2030, a 60% increase from the 2010 population. To accommodate this population increase, McHenry County anticipates a maximum increase of nearly 69,000 people could be added within existing municipalities, while the remaining 120,000 people would be located in currently unincorporated areas.<sup>34</sup> Individual municipal comprehensive plans for the area encourage contiguous and denser development to accommodate the expected growth.

The IL Route 31 project study area contains several of McHenry County's major or notable employers.<sup>35</sup> Additional economic development is needed to support the expected population growth. In 2009, residential properties comprised 85% of the County's total tax base. McHenry County plans to increase the commercial/industrial portion of the tax base to 35% by 2030.<sup>36</sup> Several areas near IL Route 31 are planned for future commercial or industrial development. It is expected that the majority of unincorporated land adjacent to IL Route 31 would become incorporated in the future through planned development.

The City of McHenry expects much of its surrounding agricultural and vacant lands to develop into urban use by 2030. The IL Route 31 corridor is planned for continued mixed use development in McHenry.

The City of Crystal Lake plans for the corridor to fully develop before 2030.<sup>37</sup> Planned land use is primarily residential, with some office and commercial areas.

The Village of Prairie Grove's comprehensive plan includes future development of much of the vacant land adjacent to IL Route 31. Prairie Grove plans for a Town Center and Transit-Oriented Development adjacent to IL Route 31 (see Exhibit 4). The Town Center would contain civic uses, a new Metra station on the Union Pacific/Northwest Line, and mixed land uses.<sup>38</sup> The Town Center's main access from IL Route 31 would be at Gracy Road.

The IL Route 31 Preferred Alternative is consistent with these local plans and would improve access to planned development in the project study area.

#### **4.1.10 Pedestrian and Bicycle Facilities**

The Preferred Alternative will allow for the construction of a shelf for a 10-foot shared-use path along the east side of IL Route 31, and a shelf for a 5-foot sidewalk along the west side of IL Route 31, for the

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<sup>34</sup> McHenry County 2030 Comprehensive Plan

<sup>35</sup> McHenry County Economic Development Corporation

<sup>36</sup> McHenry County 2030 Comprehensive Plan

<sup>37</sup> City of Crystal Lake 2030 Comprehensive Plan

<sup>38</sup> Prairie Grove Town Center and TOD Plan

extent of the proposed improvements. Construction of shared-use paths and sidewalks on these shelves will require 20 percent cost participation and permanent maintenance from the local municipalities. Existing sidewalk will be replaced where impacted by the proposed project, without local participation. The path and sidewalk will extend south of the proposed IL Route 31 roadway improvements to connect to pedestrian facilities at the IL Route 176/IL Route 31 intersection (see Exhibit 4). The project will also extend the shared-use path and the sidewalk through the IL Route 31/Bull Valley Road intersection, which is being improved as part of a separate project), and to provide continuous pedestrian and bicycle access along IL Route 31 from IL Route 176 to IL Route 120. A shared-use path could not be included in the IL Route 120 intersection area due to building setbacks; however, a 7-foot wide sidewalk will be constructed throughout the IL Route 120 intersection.

The planned IL Route 31 bicycle and pedestrian facilities do not connect to the Prairie Trail, due to its distance from IL Route 31 (the trail is as close as 430 feet to IL Route 31). However, the paths and sidewalks do connect to similar improvements at IL Route 176. As the corridor continues to develop, it is hoped that additional local bicycle and pedestrian improvements are included that would connect the IL Route 31 system to the Prairie Trail. All bicycle and pedestrian accommodations proposed as a part of this project will be ADA-compliant.

## **4.2 AGRICULTURAL RESOURCES**

The majority of the IL Route 31 project study area is developed with urban uses, but there are several agricultural land tracts remaining. Existing farming operations are predominately located in the middle of the corridor between Half Mile Road and just north of Knox Drive.

Although active farming operations in the project study area are limited, much of the project study area contains prime and important farmland soils. Prime farmland has the best combination of physical and chemical characteristics for producing crops, and is available for other uses. Farmland of statewide importance is not prime farmland, but has been deemed of statewide importance for food, feed, fiber, forage, and oil seed crops.

Eighteen farm parcels, owned by 14 different entities, will be within the Preferred Alternative footprint. Of these 18 farm parcels, 19.45 acres would be impacted by the Preferred Alternative footprint. Most agricultural parcel impacts are outside US Census Urbanized Areas (14.19 ac), while the remaining 5.26 acres are inside Urbanized Areas<sup>39</sup>. No landlocked parcels, severed parcels, adverse travel, rural residences/farm buildings or uneconomical remnants will be created by the project. No centennial or sesquicentennial farms will be impacted by the project. There are no protected agricultural areas in the project study area. The Illinois Department of Agriculture reviewed the project, and in July 2016 determined the project complies with IDOT's Agricultural Land Preservation Policy and Illinois' Farmland Preservation Act. Coordination with the Natural Resource Conservation Service (NRCS) and the Illinois DOA, including the AD-1006 form and DOA response, is provided in Appendix B.

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<sup>39</sup> While farmland is important, according to the Federal Farmland Protection Policy Act Manual, Section 523.10, farmland within incorporated areas are exempt from this Federal policy.

### 4.3 CULTURAL RESOURCES

An archaeological and historic properties survey and report for the IL Route 31 project study area was completed by the University of Illinois. There are no historic properties affected by this project. Concurrence from the Illinois State Historic Preservation Officer (SHPO) is included in the Coordination section.

The building in the northwest corner of IL Route 31 and Main Street (3902 West Main Street, formerly known as Geiseler Dry Goods) was placed on the McHenry County Comprehensive Landmark List by the City of McHenry Landmark Commission (see the Coordination section) and is not considered a “historic property” as defined by Section 106 of the National Historic Preservation Act. It is designated as an “honorary historic” building by the City of McHenry Landmark Commission. The existing curb line along the west side of IL Route 31 is maintained to avoid direct impacts to adjacent buildings, particularly the locally designated building at 3902 Main Street.



**3902 West Main Street**

### 4.4 AIR QUALITY

A summary of air quality conformity, carbon monoxide microscale analysis, and particulate matter analysis for the project is below.

#### 4.4.1 Air Quality Conformity

The National Ambient Air Quality Standards (NAAQS), established by the US Environmental Protection Agency, set maximum allowable concentration limits for six criteria air pollutants. Areas in which air pollution levels persistently exceed the NAAQS may be designated as “nonattainment.” States where a nonattainment area is located must develop and implement a State Implementation Plan (SIP) containing policies and regulations that will bring about attainment of the NAAQS. Areas that had been designated as nonattainment, but that have attained the NAAQS for the criteria pollutant(s) associated with the nonattainment designation, will be designated as maintenance areas.

Air quality is protected by the Clean Air Act and air quality standards called the National Ambient Air Quality Standards (NAAQS), established by the USEPA. Predicted air quality resulting from a roadway project is compared to the NAAQS established by the USEPA for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), and sulfur dioxide. These standards are set at levels designed to protect public health. If any of the standards are not met, the area is called “non-attainment” and air quality is required to be improved.

All areas of Illinois currently are in attainment of the standards for four of the six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. For the eight-hour ozone and PM<sub>2.5</sub> standards, Cook, DuPage, Kane, Lake, McHenry, and Will Counties, as well as Aux Sable and Goose Lake Townships in Grundy County and Oswego Township in Kendall County, have been designated as nonattainment areas. The Lake Calumet area and Lyons Township in Cook County have been designated as a maintenance area for the particulate matter (PM<sub>10</sub>) standard.

This project is included in the FY 2014-2019 Transportation Improvement Program (TIP) endorsed by the Metropolitan Planning Organization Policy Committee of the Chicago Metropolitan Agency for Planning (CMAP) for the region in which the project is located. Projects in the TIP are considered to be consistent

with the 2040 regional transportation plan endorsed by CMAP. The project is within the fiscally constrained portion of the plan.

On October 9, 2014, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) determined that the 2040 regional transportation plan conforms with the State Implementation Plan (SIP) and the transportation-related requirements of the 1990 Clean Air Act Amendments. On October 9, 2014, the FHWA and the FTA determined that the TIP also conforms with the SIP and the Clean Air Act Amendments. These findings were in accordance with 40 CFR Part 93, "Determining Conformity of Federal Actions to State or Federal Implementation Plans."

The project's design concept and scope are consistent with the project information used for the TIP conformity analysis. Therefore, this project conforms to the existing State Implementation Plan and the transportation-related requirements of the 1990 Clean Air Act Amendments.

The TIP number for this project is 11-00-0001. In order for a project to be conformed, elements beyond a Phase I study need to have funding identified. The project is conformed in the 2014-2019 TIP and includes funding for Phase II Engineering.

#### **4.4.2 Mobile Source Air Toxics**

This project has been determined to generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special Mobile Source Air Toxic (MSAT) concerns. Although the 2040 Build traffic condition is predicted to have higher daily traffic volumes than the 2040 No Build condition due to the increase in roadway capacity, the same diesel truck percentages would be expected to use the corridor, resulting in minimally increased amounts of diesel trucks. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the non-build alternative.

Moreover, USEPA regulations for vehicle engines and fuels will cause overall MSATs emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with USEPA's MOBILE6.2 model forecasts a combined reduction of 72 percent in the total annual emission rate for the priority MSAT from 1999 to 2050 while vehicle-miles of travels are projected to increase by 145 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

#### **4.4.3 Carbon Monoxide Microscale Analysis**

In accordance with the IDOT-IEPA "Agreement on Microscale Air Quality Assessments for IDOT Sponsored Transportation Projects," projects are exempt from project-level carbon monoxide air quality analysis if the highest design-year approach-volume on the busiest leg of the intersection is less than 5,000 vph or 62,500 ADT. The traffic volumes for the project fall below this criterion and therefore a project-level carbon monoxide air quality analysis is not required.

### **4.5 TRAFFIC NOISE**

This section summarizes the traffic noise analysis completed for the IL Route 31 Preferred Alternative (the full analysis is available in Appendix C). Per FHWA policy<sup>40</sup>, potential traffic noise impacts must be evaluated, and noise abatement measures be studied to determine if they would be feasible<sup>41</sup> and

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<sup>40</sup> Federal Highway Administration. Procedures for Abatement of Highway Traffic Noise and Construction Noise; 23 CFR 772: Highway Traffic Noise Analysis and Abatement – Policy and Guidance

<sup>41</sup> To be feasible, noise abatement must achieve a 5 dB(A) reduction for at least one impacted receptor and meet constructability requirements.

reasonable<sup>42</sup> to implement. IDOT noise policies and guidance<sup>43</sup> incorporate FHWA noise analysis procedures. Traffic noise impacts are defined by IDOT where design-year traffic noise levels approach, meet, or exceed the FHWA Noise Abatement Criteria (NAC) or when design-year traffic noise levels are a substantial increase (more than 14 dB(A)) over existing traffic generated noise levels. In the IL Route 31 project study area, NAC range from 67 to 72 dB(A).

Noise receptors are outdoor areas of frequent human use studied for noise impacts. Traffic noise receptors are the worst-case noise location identified within common noise environments (CNEs). These “representative” receptors represent the worst-case noise location among all other receptors in that CNE. One representative noise receptor is assigned per CNE (in a residential development, the representative receptor would be a single home that has the worst-case noise condition). The 42 representative noise receptors associated with the Preferred Alternative are shown in Exhibit 4. Of these, residential areas accounted for 23 receptors. Ten receptors are medical offices, two receptors are parks or recreation areas, two receptors are schools, and two receptors are offices.

Traffic noise modeling uses the FHWA Traffic Noise Model (TNM), Version 2.5. Noise monitoring of existing ambient noise conditions was used to validate TNM models; for this project, monitoring occurred in August 2014 for a portion of the studied receptors. Traffic noise model results found traffic noise impacts (as defined by the NAC) at 22 of the 42 representative receptors (See Appendix C, Table 4).

IDOT noise policy requires that a noise abatement measure must be feasible and reasonable to be implemented. It was determined that noise abatement (in the form of noise barriers) would not be constructible for seven of the 22 CNEs because their construction would result in building impacts. Thirteen noise barriers were studied for the remaining 15 CNEs that had impacted receptors.

Six of the analyzed barriers did not achieve a 5 dB(A) reduction to the impacted receptors in their respective CNEs, so these were not considered feasible. Five of the analyzed barriers were considered feasible, but did not achieve the IDOT noise reduction design goal of 8 dB(A) for benefitted receptors, so these were not considered reasonable. The two remaining barriers (B4 and B5) provided the 5 dB(A) and 8 dB(A) noise reductions, but were not reasonable because the cost to build each barrier exceeds the IDOT allowable cost per benefitted receptor.

Based on the evaluation, there were no noise barriers that would be considered both feasible and reasonable; therefore, highway traffic noise abatement measures are not likely to be implemented for the IL Route 31 project, based on preliminary design. Appendix C summarizes the results of the noise and noise abatement analysis.

Construction trucks and machinery produce noise that may affect some land uses and activities during construction. Mitigation measures have been incorporated into IDOT’s Standard Specifications for Road and Bridge Construction to minimize construction noise along the alignment.

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<sup>42</sup> To be reasonable, a noise abatement measure must achieve the IDOT noise reduction goal of 8 dB(A) for at least one benefitted receptor, must be cost effective (per IDOT policy) and a majority of benefitted receptors must approve of the noise abatement measure. For the cost effectiveness determination, the allowable noise abatement base cost (per benefitted receptor) is \$24,000. This base allowable cost can increase to up to \$37,000 if other conditions are met, such as a high absolute noise level, the increase in noise from existing to the build conditions, and if the receptor existed prior to original roadway construction.

<sup>43</sup> IDOT Highway Traffic Noise Abatement Manual, 2011

## 4.6 NATURAL RESOURCES

Reference information regarding natural resources in the project area can be found in the Coordination section as well as the Appendices and Technical Reports section.

### 4.6.1 Upland Plant Communities

The project study area is contained within the Northeastern Morainal Division<sup>44</sup>. This Natural Division's principal natural features include forest, prairie, fen, marsh, sedge meadow, bog, glacial landforms (i.e. moraines, kames, eskers, drumlines, kettle-holes), and aquatic habitats (i.e. rivers, creeks, glacial lakes, sloughs).

#### **Northeastern Morainal Division**

McHenry County is within the Northeastern Morainal Division (Schwegman et al., 1973), a diverse assemblage of wetlands, prairie, forest, savanna, lakes, and streams that hosts the greatest biodiversity in Illinois (IDNR, 2005). The Northeastern Morainal Division has many large, potentially good quality habitats protected by public and private landowners.

The primary goal of management in the Northeastern Morainal Division (as stated in the Illinois Wildlife Action Plan) is the increase of forest, savannas, grasslands, and wetlands and the protection of glacial lakes, beaches, and lakeshores. Best management practices to allow for wildlife movement to maintain access to habitat (natural bottom culverts and bioswales) are discussed in Section 3.7.4.

### **Trees**

#### **Existing Conditions**

Surveys to identify tree resources within the project study area were conducted in March and May 2014 and March 2016. The tree survey followed the IDOT Departmental Policies (D&E – 18) *Preservation and Replacement of Trees*. The majority of the project study area contains scattered trees associated with commercial and developed areas as well as forested areas associated with floodplains and upland forests. There are two forested areas (Forest 1 and Forest 2) greater than 20 acres located adjacent to the project, south of Ames Road near Thunderbird Lake.

The total number of trees within the project study area was estimated as 6,729 (4,873 trees estimated by subplots in heavily wooded areas, and 1,856 individually surveyed trees).

#### **Exceptional trees are:**

- Native trees of average to high quality based on their age, coefficient of conservatism (C-value, Swink and Wilhelm, 1994), large sized, and good health and structure.
- Landscaped trees that provide visual aesthetics, have large size, and have good health and structure.

***Specimen trees*** are listed on the 2013 Illinois Big Tree Register, and are outstanding examples possessing exceptional size, form, etc. or have recognized historical importance.

Oak-hickory forests are an important feature of the environment within McHenry County. The McHenry County Conservation District has been active in identifying and protecting oak tree stands within the county. To help minimize the potential impact of the project on oak (*Quercus* spp.) and hickory (*Carya*

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<sup>44</sup> Schwegman et al., 1973

spp.) trees, all oaks and hickories were identified within the project study area. A total of 289 oaks and hickories are present within the project study area.

### **Specimen and Exceptional Trees**

Ninety-seven (97) exceptional trees were identified within the project study area; no specimen trees were identified in the project study area.

### **Tree Impacts**

Based on the tree survey and final roadway alignment, an estimated 6,217 trees will be removed by the project (see Exhibit 4).

Two forested areas (Forest 1 and Forest 2) greater than 20 acres located adjacent to the project, will be impacted as a result of the improvements. Forest 1 will incur an impact of approximately 1.7 acres and Forest 2 will incur an impact of approximately 1.3 acres. The proposed project will remove the edge of one side of both the forests, and would not bisect or fragment the forests.

The Preferred Alternative will impact a total of 84 oak trees (see Exhibit 4), 17 shagbark hickories, and 16 exceptional trees. The exceptional trees are four bur oaks, two white oaks, two red oaks, two honey locust, one sugar maple, one black walnut, one white pine, one Austrian pine, one Norway maple, and one Norway spruce. The impacts will be mitigated according to IDOT policy.

#### **4.6.2 Special Lands**

Special lands for natural resources in the project study area include Nature Preserves, Illinois Natural Areas Inventory (INAI) sites (see 4.6.5), publicly owned parks, and recreational areas (see 4.1.3). There are three INAI sites within one mile of the project study area: Thunderbird Lake INAI, Wheeler Fen INAI and Land and Water Reserve Site, and Sterne's Fen Nature Preserve. These INAI sites (and Stickney Run Conservation Area, which is over a mile away from the project study area) are shown in the following sidebar map.

#### **IDOT Tree Mitigation Policy**

- If bare root or balled and burlapped trees are used for replacement plantings, a minimum ratio of 1:1 is recommended for the number of trees planted to the number of trees impacted.
- If seedlings are used, a minimum ratio of 3:1 is recommended for the number of trees planted to the number of trees impacted.
- Replacement trees should be planted in suitable locations as close as practical to the removal site.

The **Illinois Natural Areas Inventory (INAI)** provides a set of information about high quality natural areas, habitats of endangered species, and other significant natural features. Information from the INAI is used to guide and support land acquisition and protection programs by all levels of government as well as by private landowners and conservation organizations.



The Land Conservancy of McHenry County is a not-for-profit private corporation that protects prairies, wetlands, and woodlands through direct land preservation, oak conservation, and land restoration. The property's frontage at IL Route 31 is 30 feet wide and the proposed project would constitute an impact of 0.018 acres to the Land Conservancy parcel, but no impact would occur to the Thunderbird Lake INAI site. This impact represents less than one percent of the 21.3-acre parcel. This impact is the only type of special lands impact from the IL Route 31 project. This impact does not constitute a Section 4(f) entity, as the Land Conservancy of McHenry County is not a public entity. The land was not purchased using the Land and Water Conservation Fund, so this impact would not be a Section 6(f) impact. No native prairies will be impacted at any location within the project study area, including the Land Conservancy of McHenry County site.

The Wheeler Fen INAI and Land and Water Reserve site is located within 0.3 mile east of IL Route 31, north of Charles Miller Road. The Wheeler Fen site is located at the northeast corner of Charles Miller Road and Barreville Road. The land between IL Route 31 and the Wheeler Fen is commercially developed and includes the City of McHenry Municipal complex. Due to the distance involved and the current land use, the IL Route 31 project will not impact the Wheeler Fen INAI site and Land and Water Reserve site.

Sterne's Fen Nature Preserve is located approximately 0.5 mile west of IL Route 31, west of Pingree Road and south of Hillside Road. The area between the project area and Sterne's Fen is estate residential development (near Shady Oaks Lane) or a mix of forest and farmland (near Hillside Road). Due to the distance from the project area, the IL Route 31 project will not impact Sterne's Fen Nature Preserve.

No state-designated Land and Water Reserves, forest preserves, or Nature Preserves are located within the project footprint. No other INAI sites, Nature Preserves, or Land and Water Reserves occur within one mile of the project study area. Based on a Memorandum of Understanding between IDOT and the IDNR, IDOT will continue to coordinate with the IDNR as there will be excavation outside the existing ROW within one-mile of a designated Nature Preserve and Land and Water Reserve.

#### 4.6.3 Wildlife Resources

##### Existing Conditions

Habitats within the Preferred Alternative area include roadside, residential, commercial, and agricultural land with wetlands of low to high natural quality and upland forest areas. Streams are bridged or contained within culverts. Wildlife within the project study area are species tolerant of disturbance and human presence. The species listed as critical for the Northeastern Morainal Division by the Illinois Wildlife Action Plan require habitat that is not found within the Preferred Alternative study area.

An avian survey was conducted for the project, including the areas near Thunderbird Lake. A total of 60 different species of birds were identified within the project study area, most of which are more common species. Ten species are considered Species in Greatest Need of Conservation (SGNC). Six of the SGNC



**Nearby INAI Sites  
Not Impacted by Project**

were observed in the project study area with the remaining four species observed in the marsh habitat near Thunderbird Lake.

Herpetological surveys were conducted within the project study area. Only one frog and turtle were captured, none of which were listed species. These individuals were captured near the tributary feeding Thunderbird Lake.

No specific surveys were conducted for mammals. As the project study area includes mostly urban and suburban land uses, with occasional farm fields, mammal species within the project study area are species tolerant of human disturbance.

## **Impacts**

Impacts to wildlife habitat can occur where undeveloped (non-urban lands) are impacted in areas including wetlands, forests, tree stands, and streams. Impacts from stormwater discharges, changes to local hydrology, noise, and air emissions can degrade habitat beyond the road ROW. Operational impacts with vehicle/animal collisions currently occur along the roadway and are expected to continue with the proposed improvement. The addition of wildlife crossings near more natural areas may reduce some of these vehicle/animal collisions where they are installed. The project will include wildlife crossings at nine potential locations. The wildlife crossings would use either a bridge with a shelf beneath the bridge deck or a reinforced concrete pipe for small mammal crossings or would use an embedded (natural stream bottom) box culvert for a terrestrial and/or aquatic wildlife crossing. Culvert crossings with perennial flow will utilize multiple cells, at least one of which is designed to be dry under normal conditions or in some cases a separate reinforced concrete pipe solely for wildlife crossings. See Section 3.7 and Exhibit 5, the Best Management Practices map, for more information.

### **4.6.4 Threatened and Endangered Species**

#### **Federally Listed Species**

The USFWS identifies the following federally listed species as potentially occurring in McHenry County: the northern long-eared bat (*Myotis septentrionalis*, threatened [NLEB]), eastern prairie fringed orchid (*Platanthera leucophaea*, threatened), and prairie bush clover (*Lespedeza leptostachya*, threatened). Because there are wetlands with potential habitat for the eastern prairie fringed orchid within the project study area, surveys were completed for this species during the appropriate blooming dates in 2012. The eastern prairie fringed orchid was not found and it was concluded that the plant is not located in the project study area. Prairie bush clover requires dry to mesic prairies with gravelly soils. There is no such habitat in the project study area.

The proposed project is located within the NLEB white nose syndrome buffer zone as defined by the USFWS. Caves and mines are not present in the vicinity of the project; however, scattered trees and emergent wetlands that may serve as flight corridors are located within the project study area.

The 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS, 2015), which may be used for the NLEB, states that suitable habitat for this species includes “a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags at least 3 inches in diameter at breast height that have exfoliating bark, cracks, crevices, and/or cavities), as well

#### **Riparian Areas**

Natural communities near or adjacent to rivers and streams.

as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested/wooded habitat. NLEB has also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses.”

Based on the 2015 Range-wide Indiana Bat Summer Survey Guidelines, which may be used for the NLEB, the USFWS requires an assessment of the potential for adverse effects to the NLEB when suitable habitat is present. Approximately 1,500 trees providing some level of suitable habitat for the NLEB are located within the project study area. Approximately 1,300 of these trees are proposed for removal. A “may affect, not likely to adversely affect” determination has been made for the NLEB. To conserve the species, tree removal will be restricted from April 1 to September 30. Documentation on the coordination is in the Coordination Section. Turtle and avian surveys were completed for the project study area, and are presented in Appendix D.

### **State Listed Species**

INHS conducted surveys for state-listed species, including the Blanding’s turtle<sup>45</sup> (see Appendix D). No suitable habitat for the Blanding’s turtle was found within the project footprint. No state-listed species were found in the project study area. A state threatened, Least Bittern (*Ixobrychus exilis*) was observed in the marsh areas west of Thunderbird Lake which is near, but outside the project study area. The Least Bittern breeds within the marsh and typically does not venture to habitat outside the marsh into the project study area. Therefore, the Least Bittern is not expected to be impacted by the preferred alternative.

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<sup>45</sup> INHS, 2014

## 4.7 WATER RESOURCES AND AQUATIC HABITATS

Water resources are important environmental resources for maintaining fish, mussels, and other stream species, as well as for recreational purposes. The project study area contains seven streams of varying sizes, and one lake, Thunderbird Lake, which is an INAI site. All rivers and streams in the project study area ultimately drain to the Fox River.

### 4.7.1 Local Conservation and Watershed Groups

The sidebar identifies local conservation and watershed groups that participated in the project's CSS process, provided additional monitoring data and local perspectives, and identified environmentally sensitive areas within the project study area. These groups are working to restore, protect, and manage the streams and the natural resources in the surrounding areas of McHenry County.

The Fox River Ecosystem Partnership (FREP) and the Environmental Defenders of McHenry County (EDMC), along with CMAP, organized a steering committee to address watershed planning and promote recommendations. The result of the partnership was the Silver Creek and Sleepy Hollow Creek Watershed Action Plan, which summarized watershed resource inventory, baseline water quality, and environmental recommendations for the watershed. The plan was the impetus for the Silver Creek and Sleepy Hollow Watershed Coalition, which promotes watershed planning and public awareness of water resource issues.

### 4.7.2 Dams and Wastewater Discharge

There is one dam on the Fox River. The Stratton Dam is 1.5 miles east of IL Route 31. Project study area streams discharge into the Fox River both above and below this dam. Dams can affect the dissolved oxygen levels in streams, as the dam retards the stream velocity.

The Illinois American Water wastewater treatment plant that serves the Terra Cotta Industries area, discharging into Sleepy Hollow Creek is the only Waste Water Treatment Plant (WWTP) in the project study area (see Exhibit 4). The City of Crystal Lake WWTP #3 (discharges into Squaw Creek) is located at 400 N. Knaack Boulevard, approximately 0.75 miles west of the project study area. Neither WWTP would be impacted by the project.

### 4.7.3 Surface Water Resources

Water quality data are limited for project study area streams, as many of the small streams have an upstream watershed area of less than one square mile. The unnamed tributary to the Fox River and Sleepy Hollow Creek both have upstream watershed areas greater than one square mile. Appendix E contains detailed stream data for the project study area. Streams are described by their biological and physical characteristics, such as flow or stream bottom where data was available.

#### Stream Physical Characteristics

There are seven streams crossed by the project. All seven streams ultimately flow into the Fox River.

Water resources are protected by the Clean Water Act, with a goal to “restore and maintain the physical, chemical, and biological components of the waters of the United States.”

Water resources are also protected by the Illinois Environmental Protection Act.

#### **Local Conservation and Watershed Groups**

Fox River Ecosystem Partnership (FREP)

Environmental Defenders of McHenry County (EDMC)

Silver and Sleepy Hollow Creeks Watershed Coalition

Boone Creek Watershed Alliance (BCWA)

The Land Conservancy of McHenry County

McHenry County Conservation District

Sleepy Hollow Creek and the unnamed Tributary to the Fox River have drainage areas greater than one mile. The remaining streams are associated with the drainage areas less than one square mile. Sleepy Hollow Creek is the largest stream crossed by IL Route 31. The remaining tributaries are small streams with sand, gravel, and silt stream bottoms and riparian areas consisting of trees and grasses. A summary of the project study area's streams is below.

- Squaw Creek is a perennial stream, flowing into Thunderbird Lake and crossed by IL Route 31 near Brighton Lane. A portion of Squaw Creek flows parallel to IL Route 31 and has been channelized. There is moderate stream bank erosion east of IL Route 31; however, the stream substrate is very stable.<sup>46</sup> The IEPA has not rated this stream for uses. No chemical water quality data or biological data are available for Squaw Creek.
- Sleepy Hollow Creek is a perennial stream, flowing to Thunderbird Lake, which then flows to the Fox River. Biological survey information for Sleepy Hollow Creek was described in the *Silver Creek and Sleepy Hollow Watershed Action Plan* (2011). Dominant species in the creek were bluegills, green sunfish, and fathead minnows. Two pollution intolerant fish species were identified, the spotfin shiner and the golden shiner. The presence of pollution intolerant fish is an indicator of good water quality. IEPA has not assessed use designations of Sleepy Hollow Creek. No water quality data are available for Sleepy Hollow Creek.
- No biological or chemical water quality data were available for the other streams crossed by the project due to their small size.

### Special Designation Streams

Special designations include navigable waters, streams that have “outstandingly remarkable” natural or cultural values, streams that are listed on the Nationwide Rivers Inventory, Illinois Natural Areas, Biological Stream Rating System (BSRS) High Quality Streams, or impaired streams. Thunderbird Lake, which is downstream of the project study area, is an INAI site. There are no special designation streams crossed by the proposed project. Area streams drain to the Fox River, identified as a 303(d) impaired stream 1.3 miles east of the project study area.

### Lakes

Thunderbird Lake is the only lake near the project study area, and is located 1,300 feet east of IL Route 31. Thunderbird Lake is part of the Sleepy Hollow Watershed. Sleepy Hollow Creek and Squaw Creek are both tributaries to Thunderbird Lake, which ultimately discharges to the Fox River via Sleepy Hollow Creek. Thunderbird Lake is designated as an INAI area (INAI number 1558) due to its high quality natural community and suitable habitat for state-listed species or state-listed species relocations.

Environmental goals for Thunderbird Lake established in the watershed action plan include wetland restoration and streambank stabilization. The IL Route 31 improvements are west of Thunderbird Lake, and the project will have no direct impact on streambank quality or wetlands immediately adjacent to Thunderbird Lake. Roadway runoff from IL Route 31 is discharged to Thunderbird Lake via Squaw Creek, Sleepy Hollow Creek, and associated tributaries. The incorporation of BMPs (see Exhibit 5) to treat runoff will help maintain or improve the overall water quality of Thunderbird Lake through removal of suspended solids and other chemicals in runoff before reaching the lake.

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<sup>46</sup> Silver Creek/Sleepy Hollow Watershed Action Plan 2011, prepared by the Silver Creek/Sleepy Hollow Watershed Coalition

#### 4.7.4 Impacts

Water resource impacts are discussed below by highway life cycle phases: construction, operation, and maintenance.

##### Construction

The greatest concern for water resources during construction is the realignment of Squaw Creek and possible siltation while constructing bridges and box culverts at the stream crossings. Due to Squaw Creek's proximity to IL Route 31, the project requires the relocation of Squaw Creek. Squaw Creek is currently a straight linear alignment adjacent to IL Route 31, with eroded streambanks. The realignment of the creek to include meanders, riffles, and pools will slow water velocities, and therefore improve water quality by reducing siltation and erosion, and improving stream/streambank habitat (See Exhibit 5). The relocation is necessary to avoid impacts to ADID wetlands west of IL Route 31. Direct impacts would result from grading, excavation, placement of fill, and vegetation removal to construct the Squaw Creek realignment. Mitigation for Squaw Creek realignment will be needed per 33 CFR Part 332 (Compensatory Mitigation for Losses of Aquatic Resources); impacts to Squaw Creek will be mitigated in-kind on site.

Culverts at stream crossings will be extended along existing IL Route 31 to accommodate the proposed improvements. Thirteen culverts (see Exhibits 4 and 5) are planned and all but five are embedded culverts, adding to available stream substrate over existing box culverts and improving wildlife movement paths. A three-span slab bridge with a terrestrial wildlife crossing shelf is proposed at Outfall 23.

##### Operation

Studies indicate that pollutants in highway runoff are not present in amounts that threaten surface water or groundwater quality when the Annual Average Daily Traffic (AADT) is less than 30,000 vehicles per day (vpd).<sup>47</sup> The predicted 2040 Build traffic volumes for IL Route 31 range from 21,000 to 38,000 vpd; for this reason, water quality impacts to receiving waters from stormwater runoff are variable. Future traffic volumes are predicted to be greater than 32,000 for the section of IL Route 31 between IL Route 176 and Bull Valley Road, as well as for IL Route 120 between Front Street and Richmond Road.

Stream impacts were determined by comparing the Illinois General Use Water Quality standards (where applicable) to a calculated water quality stream concentration for the primarily heavy metals associated with highway runoff based upon expected AADT and other factors. The stream concentrations were

***Construction impacts*** may involve the clearing of vegetation, grading, and building of structures over, within, and adjacent to water resources.

***Operational impacts*** are those that occur after a roadway is open to traffic and include the effects of storm water runoff on adjacent water resources.

***Maintenance impacts*** are those that occur as part of normal highway operations such as snow/ice removal, mowing/spraying and ditch cleaning.

##### **Implementing Watershed Group Recommendations**

In their watershed plan, the Silver Creek and Sleepy Hollow Creek Watershed Group recommended urban BMPs to improve water quality. Several of their recommended BMPs are proposed for the IL Route 31 project:

- Naturalized detention basin
- Bioswales
- Naturalized Stream

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<sup>47</sup> Driscoll, et al., 1990

estimated utilizing the methodology established by Driscoll, et al (1990) and Driver (1990)<sup>48</sup>. The pollutant loading analysis with the implementation of BMPs, indicated the water quality of the unnamed Tributary to the Fox River will achieve General Use Water Quality Standards. The chloride concentrations were estimated using the USGS method developed by Frost et al (1981). BMPs will be used to further improve water quality of Sleepy Hollow Creek and to further minimize pollutant concentrations (see Section 3.7).

## **Maintenance**

Salt applied to roads during the winter months is the most common source of potential maintenance impacts. Calculations for potential chloride impacts from salt use were based upon USGS methodology,<sup>49</sup> and salt application data was obtained from IDOT District 1. Chloride concentrations are expected to remain below the General Use Water Quality standard for all receiving streams without the use of stormwater BMPs, except for the unnamed tributary to Thunderbird Lake.

An infiltration trench provides additional stormwater capacity and retains snow melt containing chlorides. This process reduces potential peaks of chloride-containing snow melt or runoff discharging to adjacent streams by reducing, retarding, holding, and infiltrating chloride-containing runoff. A proposed infiltration trench will be installed near Outfall 13 (south of Edgewood Road) that is anticipated to reduce chloride concentrations in the unnamed Tributary to Thunderbird Lake to an acceptable level (See Section 3.7).

### **4.7.5 Avoidance and Measures to Minimize Effects to Surface Water Resources and Quality**

Design, construction, and operational features are included in the project to minimize impacts upon receiving streams. These measures include bioswales, infiltration trenches, bridge and embedded box culverts, and erosion control features.

Erosion control is an important factor in protecting water quality. Areas with highly erodible soils represent the greatest potential for soil loss. There are 9.78 acres of highly erodible soils within the project footprint. IDOT specifications for soil erosion control practices will be followed, which will limit sediment reaching the streams. Any construction in an existing waterway would be conducted to minimize disturbance and limit impacts.

## **4.8 GROUNDWATER**

Drinking water in the project study area is primarily from groundwater. The City of McHenry operates eight public water supply wells, the City of Crystal Lake operates 11 public water supply wells, and the Village of Prairie Grove provides water through five privately owned wells for public drinking water. These Community Water Supply (CWS) wells vary in depth between 60 and 1,400 feet deep.

Water wells for McHenry and Prairie Grove exist within 1,000 feet of the project. Three wells owned by Terra Cotta Realty providing water to Prairie Grove are located near Half Mile Trail, and two water supply wells for the City of McHenry are located north of Bull Valley Road (see Exhibit 4).

There are five additional wellhead protection areas (assuming 1,000-foot buffers) associated with non-community water supply (non-CWS) wells crossed by the project. Wellhead protection areas for non-CWS wells are shown in Exhibit 4.

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<sup>48</sup> Driver, et al., 1990

<sup>49</sup> Frost, et al., 1981



Illinois EPA designates “Special Resources Groundwater” classifications for areas that are unique, vital for a sensitive ecological system, or where there is groundwater present that contributes to a dedicated nature preserve.<sup>50</sup> A Class III designation subjects an area to more stringent water quality standards. There are no Class III Special Resources Groundwater areas identified within the IL Route 31 project study area.<sup>51</sup> There are three Class III resources located within watersheds in the IL Route 31 project study area (Boone Creek Fen and Julie M. and Royce L. Parker Fen in the Boone Creek watershed and Oakwood Hills Fen Nature Preserve in the Sleepy Hollow Creek watershed); however, the IL Route 31 project study area is not within the recharge area of the fens.

The majority of private wells within the project study area are between IL Route 176 and Drake Drive; other wells are scattered throughout the project study area. As shown in Exhibit 4, one private well is located within the proposed footprint for the Preferred Alternative. This well is associated with a home on Drake Drive and is 169 feet in depth. This well is anticipated to be replaced in kind within the impacted property and no residential displacements are anticipated to occur as a result of this well impact.

USEPA regulates potential impacts to sole-source aquifers. According to the USEPA's list of designated sole-source aquifers, there are no sole-source aquifers as defined by Section 1424(E) of the Safe Drinking Water Act within the project study area. In addition, there are no Karst formations in the project study area.

#### **Groundwater Impacts**

No impacts to public water supplies are anticipated. There are no sole source designated aquifers in the project study area. No measurable change to the available water supply is expected for the proposed improvements. The additional impervious area represents a small reduction in recharge area of approximately 27 acres or less than one percent of the recharge area.

There are CWS wells within 1,000 feet of the Preferred Alternative and five non-community water supply wells within 200 feet of the Preferred Alternative. One private well located within the Preferred Alternative will be removed for the project.

The Build Alternative will not create any potential new “routes”<sup>52</sup> for groundwater pollution movement, such as drainage wells or injection wells, or any new “sources,”<sup>53</sup> such as waste treatment or storage facilities, as defined in the Illinois Environmental Protection Act (415 ILCS 5/3, et seq.). Groundwater quality is not expected to be measurably affected by the Build Alternative; however, wells within 200 feet of the roadway that are shallow, improperly cased, or hydraulically connected directly to highway runoff could show increased levels of deicing chemicals.

#### **Karst**

Karst describes land that has caves and sinkholes, formed by decades of water dissolving the underlying rock. This project area has no karst formations; thus, the potential the project could introduce groundwater contamination is insignificant.

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<sup>50</sup> Ill. Admin Code Title 35, Subtitle F, Chapter I, Part 620, Section 620.230

<sup>51</sup> Interagency Coordinating Committee on Groundwater. Illinois Groundwater Protection Program. 2012.

<sup>52</sup> “Routes” are defined as abandoned and improperly plugged wells of all kinds, drainage wells, all injection wells, including closed loop heat pump wells, and any excavation for the discovery, development, or production of stone, sand, or gravel.

<sup>53</sup> “Primary Sources” are units used for handling hazardous or special wastes, landfilling of municipal wastes and storage of large amounts of hazardous substances, either above or below ground.

## 4.9 FLOODPLAINS

The 100-year floodplains within the project study area are shown in Exhibit 4. Three areas of the Preferred Alternative impact floodplains: the unnamed tributary to Thunderbird Lake (near Half Mile Trail, as shown in Sheet 2 of Exhibit 4), the unnamed tributary to the Fox River (between Anne Street and Lillian Street/Grove Avenue, as shown in Sheet 6 of Exhibit 4), and the unnamed Tributary to Boone Creek (at IL Route 120, as shown in Sheet 6 of Exhibit 4). The Preferred Alternative footprint impacts 9.88 acres of 100-year floodplain in the project study area; impacts are transverse at each floodplain crossing. The proposed culverts will keep water surface elevations at or below those that currently exist.

Floodplains benefit water resources through natural flood and erosion control, water quality maintenance, and groundwater recharge.

Floodplains can reduce flood velocities and peak, process organic waste, and provide infiltration and aquifer recharge.

Floodplains add biodiversity and provide breeding and feeding grounds for wildlife.

The proposed improvement will involve fill in the floodplain of Sleepy Hollow Creek and the unnamed tributary to the Fox River. However, neither of the floodplain encroachments is considered a significant encroachment. There is no potential for interruption of the roadway that is needed for emergency vehicles or provides a community's only evacuation route. There are no significant impacts on natural and beneficial floodplain values because the culvert replacements do not change the current configuration of the streams. There is not an increased risk of flooding because the proposed culvert and bridge are designed to lower stormwater elevations. The project will not support and/or result in incompatible floodplain development because these culvert replacements do not increase access to the floodplain. This project does not involve any significant encroachments.

## 4.10 WETLANDS

Executive Order 11990, "Protection of Wetlands," and Section 404 of the Federal Clean Water Act requires Federal agencies to avoid, to the extent practicable, short and long-term impacts associated with the destruction or modification of wetlands. Impacts to wetlands that cannot be avoided will be mitigated according to the Interagency Wetland Protection Act (IWPA) of 1989 and the Clean Water Act, and permitting will be conducted with relevant agencies.

### Wetlands

Areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

### 4.10.1 Existing Wetland Conditions

Based on the field delineations, a total of 33 wetland sites totaling 4.58 acres were identified by the INHS (see Exhibit 4). Individual wetlands range in size from 0.01 to 0.49 acre. Several of the identified wetlands extend beyond the boundaries of the IL Route 31 project limits. The wetland delineations for the project are included in Appendix F.

### Wetland Characteristics

Wetlands within the project study area generally have low to moderate floristic quality. Nine wetlands within the project study area are considered High Quality Aquatic Resources (HQAR), including two (Sites 24 and 35) that are seep communities. In addition to sites 24 and 35, wetland sites 20, 21, 22, 25,

27, 28, and 30 are ADID wetlands. Seep communities are considered unmitigatable and therefore avoidance of these sites is critical.

### **Floristic Quality Assessment**

The floristic quality of each wetland is determined using the FQA methodology in Plants of the Chicago Region (Swink and Wilhelm, 1994) and a numerical rating, Floristic Quality Index (FQI), was assigned to each plant community. The numerical rating describes the natural quality of plant communities with a low FQI indicating disturbance and low natural quality; whereas, a high FQI indicates low disturbance and high natural quality.

Once a comprehensive plant species list has been compiled for an area, its FQI is calculated. An FQI below 10 suggests a site of low natural quality. An FQI between 10 and 20 indicates moderate natural quality. An FQI above 20 suggests that a site has evidence of native character and may be an environmental asset.

### **High Quality Aquatic Resources**

The USACE defines High Quality Aquatic Resources (HQARs) as *“aquatic areas considered to be regionally critical due to their uniqueness, scarcity, and/or value, and other wetlands considered to perform functions important to the public interest, as defined in 33 CFR Part 320.4(b)(2). These resources include Advanced Identification (ADID) sites, bogs, ephemeral pools, fens, forested wetlands, sedge meadows, wet meadows, seeps, streams rated Class A or B in the Illinois Biological Stream Characterization study, streamside marshes, wet prairies, wetlands supporting Federal or Illinois endangered or threatened species, and wetlands with a floristic quality index of 20 or greater or mean C-value\* of 3.5 or greater. These areas are generally considered unsuitable for dredge or fill activities.”* Each native plant in the Chicago area has been assigned a coefficient of conservatism or C-value.

\*The C-value of a site is calculated by taking the mean value of all the plants in the community. The higher the mean C-value, the higher quality of the site. C-values of 0 are common or weedy species whereas a C-value of 10 is considered a rare or unique native plant that requires high quality habitat to survive.

#### **4.10.2 Wetland Impacts**

The Preferred Alternative directly impacts 20 wetland sites totaling 1.53 acres of impact. Table 4-3 summarizes impacted wetlands. Table 4-4 summarizes impacts to waters of the US. Wetlands and waters of the US within the existing and proposed ROW and easements are assumed to be impacted due to grading and construction access. Wetland and waters of the US impacts will be refined during the Phase II contract plan preparation.

**Table 4-3**  
**Summary of Wetlands Impacted by the Preferred Alternative**

Site	Wetland Type	FQI	Mean C	ADID	HQAR <sup>3</sup>	Total Area of Wetland Site (Acres) <sup>1</sup>	Total Area of Impact (Acres)
1	Wet Meadow	6.8	2.6	No	No	0.14	0.14
3	Wet Meadow	3.5	1.8	No	No	0.07	0.07
7	Wet Meadow	8.4	2.5	No	No	0.12	0.12
8	Wet Meadow	5.5	1.6	No	No	0.05	0.05
9	Farmed Wetland	4.8	1.3	No	No	0.13	0.08
10	Farmed Wetland	1.8	0.6	No	No	0.07	0.07
11	Farmed Wetland	2.6	1.0	No	No	0.07	0.07
12	Wet Meadow	9.2	2.2	No	No	0.28	0.21
14	Shrub-scrub Wetland	9.8	2.1	No	No	0.26	0.05
15	Marsh	8.1	2.5	No	No	0.11	0.001
16	Farmed Wetland	4	1.3	No	No	0.11	0.03
17	Wet Meadow	7.3	1.8	No	No	0.49	0.25
20	Wet Floodplain Forest	8.6	2.4	Yes	No	0.03	0.03
22	Wet Meadow	13.9	2.7	Yes	No	0.03	0.03
25	Wet Floodplain Forest	6.3	2.0	Yes	No	0.19	0.08
30	Wet Meadow	12.9	2.6	Yes	No	0.40	0.12
31	Wetland Pond	3	3.0	No	No	0.03	0.03
33	Wet Meadow	10	2.8	No	No	0.07	0.07
34	Wetland Pond	9.8	3.1	No	No	0.20	0.02
36	Wetland Pond	8.4	2.5	No	No	0.04	0.01
<b>Total<sup>2</sup></b>						<b>2.89</b>	<b>1.53</b>

<sup>1</sup> Size of delineated wetland within the IL Route 31 Environmental Survey Limits

<sup>2</sup> Total does not match due to rounding Source: Marcum et al., 2011, Marcum et al, 2014

<sup>3</sup> Column represents wetlands that are HQAR not due to being an ADID wetland

**Table 4-4**  
**Summary of Waters of the US Impacted by the Preferred Alternative**

Site	Type	Total Area of Impact (Acres)
W1	Waters of the US	0.17
W2	Waters of the US	0.01
W3	Waters of the US	0.01
W4	Waters of the US	0.31
W5	Waters of the US	0.08
W6	Waters of the US	0.07
<b>Total<sup>1</sup></b>		<b>0.65</b>

<sup>1</sup> Total does not match due to rounding

Source: Marcum et al., 2011, Marcum et al, 2014

### 4.10.3 Wetland Avoidance and Measures to Minimize Harm

The Clean Water Act and the Interagency Wetlands Policy Act require IDOT to demonstrate avoidance and minimization of wetland impacts. Applicants proposing to dredge or fill wetlands must show avoidance and minimization of wetland impacts. Any impacts to wetlands must be mitigated and replaced at an equal or higher ratio such that there is no net loss to the total area and function of wetlands.

A stormwater treatment system was designed to capture, treat, and infiltrate stormwater, as well as to minimize potential deicing impacts to wetlands.

Executive Order 11990 (US EPA, Protection of Wetlands) states that new construction should not be located in wetlands unless there is no practicable alternative to such construction, and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.<sup>54</sup> There are no practicable alternatives to the proposed action, as the No Build Alternative or another alternative with one travel lane in each direction would not provide adequate traffic operations or safety. The proposed action includes all practicable measures to minimize harm to wetlands. Section 3 details how various roadway width and alignments were studied in order to avoid or reduce wetland impacts, and Section 4 details how the Preferred Alternative was modified to minimize wetland impacts. Throughout the analysis of each alternative considered, potential impacts to wetlands were assessed, and minimization and avoidance measures were studied. The project will not impact the calcareous seep and seep wetland (Sites 24 and 35) in the project study area. Direct impacts have been minimized through design and construction modifications to the extent practical. The only wetland in the project study area with an FQI over 20 is site 35, which will not be impacted by the project.

Based upon the above considerations, it is determined that there is no practical alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

### 4.10.4 Cumulative and Indirect Impacts to Wetlands

#### Indirect Impacts of Wetlands

The indirect impacts assessment includes reasonably foreseeable impacts to resources through 2030.

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<sup>54</sup> US Environmental Protection Agency. Protection of Wetlands. Executive Order 11990

Wetlands and water resources are evaluated in the context of the project study area and relevant watersheds.

The IL Route 31 project study area is within a developing area. Most undeveloped land within the IL Route 31 project study area is planned for development, and commercial uses have followed major roadway corridors. Therefore, indirect impacts to wetlands directly adjacent to the IL Route 31 project study area are anticipated to occur from induced growth due to the widening of IL Route 31.

#### **Cumulative Impacts of Wetlands**

The cumulative impacts analysis considered reasonably foreseeable actions other than the proposed improvement to IL Route 31.

The McHenry County 2030 Comprehensive Plan indicated that McHenry County has grown approximately 75 percent from 1990 to 2010 and predicts an annual growth rate of 2 percent through 2030. This growth rate will increase development pressure to wetlands in McHenry County and the Upper Fox River Watershed. Infrastructure, road improvements, and conversion of land are associated with continued suburban development in McHenry County.

Wetlands once covered more than 23 percent of Illinois.<sup>55</sup> An estimated 90 percent of these wetlands have been destroyed by human modification of the environment. In 1980 McHenry County had approximately 24,095 acres of wetlands. It is expected that the continued net reduction in wetland acreage in McHenry County will slow or be eliminated in the future. This is due to the protection granted wetlands under Section 404 of the Clean Water Act and IWPA. Under Section 404 impacts to wetlands greater than 0.10 acre must be mitigated at a minimum ratio of 1.5:1. IPWA requires mitigation for all impacts to wetlands regardless of the size or jurisdictional status. Private and locally funded projects are also required to follow the McHenry County Stormwater Management Ordinance, which also requires a minimum mitigation ratio of 1.5:1.

#### **4.10.5 Mitigation for Wetland Impacts**

The Preferred Alternative impacts 1.53 acres of wetlands. As such, wetland mitigation will be required. Table 4-5 shows the compensatory mitigation required for wetland impacts. Mitigation is assumed to take place in-basin and off-site, and since this project is on existing and contiguous alignment, the minimal alteration rates in Table 4-5 apply. A mitigation ratio of 1.5:1 will be applied to all non-ADID wetlands.

The USACE has identified wetlands that are HQAR as requiring elevated compensatory wetland mitigation as well. Mitigation ratios for impacts to HQAR wetlands is 3:1. Since HQARs include ADID wetlands, impacts to wetland sites 20, 22, 25, and 30 require this higher mitigation ratio. In total, 3.05 acres will be required to mitigate the anticipated wetland impacts.

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<sup>55</sup> Suloway and Hubbell, 1994

**Table 4-5**  
**Summary of Wetland Compensatory Mitigation for the Preferred Alternative**

Site	Wetland Type	FQI	Mean C	IWPA Mitigation Ratio	USACE Mitigation Ratio	Total Area of Impact (Acres)	Mitigation Required <sup>1</sup>
1	Wet Meadow	6.8	2.6	1.5:1	1.5:1	0.14	0.21
3	Wet Meadow	3.5	1.8	1.5:1	1.5:1	0.07	0.11
7	Wet Meadow	8.4	2.5	1.5:1	1.5:1	0.12	0.18
8	Wet Meadow	5.5	1.6	1.5:1	1.5:1	0.05	0.08
9	Farmed Wetland	4.8	1.3	1.5:1	1.5:1	0.08	0.12
10	Farmed Wetland	1.8	0.6	1.5:1	1.5:1	0.07	0.11
11	Farmed Wetland	2.6	1.0	1.5:1	1.5:1	0.07	0.11
12	Wet Meadow	9.2	2.2	1.5:1	1.5:1	0.21	0.32
14	Shrub-scrub Wetland	9.8	2.1	1.5:1	1.5:1	0.05	0.08
15	Marsh	8.1	2.5	1.5:1	1.5:1	0.001	0.002
16	Farmed Wetland	4	1.3	1.5:1	1.5:1	0.03	0.05
17	Wet Meadow	7.3	1.8	1.5:1	1.5:1	0.25	0.38
20	Wet Floodplain Forest	8.6	2.4	1.5:1	3:1	0.03	0.09
22	Wet Meadow	13.9	2.7	1.5:1	3:1	0.03	0.09
25	Wet Floodplain Forest	6.3	2.0	1.5:1	3:1	0.08	0.24
30	Wet Meadow	12.9	2.6	1.5:1	3:1	0.12	0.36
31	Wetland Pond	3	3.0	1.5:1	1.5:1	0.03	0.05
33	Wet Meadow	10	2.8	1.5:1	1.5:1	0.07	0.11
34	Wetland Pond	9.8	3.1	1.5:1	1.5:1	0.02	0.03
36	Wetland Pond	8.4	2.5	1.5:1	1.5:1	0.01	0.02
Total						1.53	2.74

<sup>1</sup> Highest mitigation ratio applied

## 4.11 SPECIAL WASTE

### Screening

IDOT routinely acquires property for new road construction and improvement to existing alignments. Several state and federal laws require IDOT to be aware of the environmental condition of property they own or need to acquire. IDOT conducts site investigations, such as a preliminary environmental site assessment (PESA) and Preliminary Site Investigation (PSI), to assess environmental risks and liabilities with properties in order to protect worker and public safety, to reduce IDOT's liability of purchasing contaminated properties, and to minimize construction delays caused by the need to remediate contaminated properties.

Preliminary Environmental Site Assessment (PESA) was prepared for the project study area by Illinois State Geological Survey (ISGS) in 2012 and 2015 to screen for potential environmental hazards. The PESA identified sites with potential RECs. RECs identified for the sites include evidence of chemical use, chemical storage, dumping, pipelines, transformers, potential asbestos containing material and lead paint, monitoring wells, underground storage tanks, above ground storage tanks, and drums. Many of these RECs are known sites that are listed on regulatory databases. Sites may have more than one REC and may appear in more than one Federal or state database depending on the activities present. A total



of 109 sites with RECs were identified in the project study area containing 404 potential RECs and appearing in 184 database entries.

### Impacts

IDOT will make an avoidance determination at a future date pertaining to the identified RECs. If the project cannot avoid the identified RECs, then a PSI would be prepared for the applicable locations to determine the nature and extent of contamination. Additional environmental studies will be conducted if the proposed improvements require excavation adjacent to a property identified with a REC or requires excavation, including subsurface utility relocation, on a property with easement. A PSI will be conducted before acquisition of any contaminated parcel, and/or required temporary or permanent easements. In some cases, the portion of the project that involves the REC can be risk managed and not require additional assessment. If the affected property containing the REC is a full take, then the property is ineligible to be risk managed. If risk managing is not possible, further environmental study is required, specifically, a PSI, to determine the nature and extent of possible contamination.

The majority of REC sites were commercial properties. The Preferred Alternative is anticipated to affect 82 of the identified sites. No CERCLIS sites will be affected by the project. Sites with RECs are distributed throughout the project study area, with a cluster of sites occurring at the northern terminus, both along IL Route 120 and IL Route 31. The proposed project will require the purchase of ROW from parcels containing RECs, and the use of these parcels cannot be avoided.

IDOT special waste clearance documentation is in the Coordination section. Preliminary Site Investigations should be conducted at impacted REC sites. Once the nature and extent of involvement are known and contamination areas are determined, contaminated soils will be managed and disposed of in accordance with applicable Federal and state laws and regulations in a manner that will protect human health and the environment. The quantities anticipated for disposal are not expected to have a substantial effect on landfill capacity. The PESA indicates many buildings in the project study area may contain asbestos-containing materials (ACM). ACM testing on removed buildings will be completed.

Pre-demolition building surveys prior to building demolition to ensure proper abatement (including appropriate regulatory notifications) will be completed to estimate the amount of materials that would need to be removed and placed in permitted landfills. Special waste issues encountered during construction will be managed in accordance with the IDOT "Standard Specifications for Road and Bridge Construction and Supplemental Specifications and Recurring Special Provisions." Examples of such special provisions include:

- Hazardous Materials/Wastes - Accidental spills of hazardous materials and wastes during construction or operation of the transportation system require special response measures. Occurrences will be handled in accordance with local government response procedures. Refueling, storage of fuels, or maintenance of construction equipment should not be allowed within 100 feet of wetlands or water bodies to avoid accidental spills impacting these resources. Additional protection measures for equipment and machinery operating on the river will be investigated and planned during the design phase.
- Special Waste Investigations – A Preliminary Site Investigation (PSI) will be conducted during the design phase to determine the nature and extent of contamination for any REC site involving new ROW or easement, railroad ROW, or building demolition/modification. A PSI also will be conducted if excavation or subsurface utility relocation will occur on existing ROW adjacent to these sites. IDOT will manage and dispose of any contaminated materials in accordance with applicable federal and state regulations.

## **4.12 SPECIAL LANDS**

### **4.12.1 Section 6(f) Lands**

There are no Section 6(f) lands within the project study area.

### **4.12.2 OSLAD Act Lands**

No public parks or recreation areas will be impacted by the project, therefore no OSLAD lands are affected by the project.

### **4.12.3 Section 4(f) Lands**

The project will not impact Section 4(f) lands.

## **4.13 PERMITS**

### **Section 404 Permit**

Permits for impacts to jurisdictional wetlands and Waters of the US will be issued through the USACE, Chicago District. Wetlands and associated buffers that are classified as jurisdictional wetlands are under the regulatory jurisdiction of the USACE, in compliance with Section 404 of the Clean Water Act.

A jurisdictional determination (JD) will be required to establish the jurisdictional status of onsite wetlands that will be impacted as a result of the proposed project. Because the anticipated impact to wetlands exceeds one acre and HQAR wetlands will be impacted, the USACE will likely require an Individual Permit (IP) for the IL Route 31 project. An IP will also require an Individual Section 401 Water Quality Certification from the IEPA. Section 404 coordination for this project is documented in the Coordination section. All permits for wetland impacts will be obtained in Phase II design (final design after NEPA).

### **Section 401 Water Quality Certification**

The project will require a Section 401 Water Quality Certification from the Illinois EPA. This Certification will be obtained in Phase II design (final design after NEPA).

### **Section 402 National Pollutant and Discharge Elimination System Permit (NPDES)**

A Section 402 NPDES permit will be required for this project, as the project disturbance area exceeds one acre. This permit is issued by the IEPA upon completion of the Stormwater Pollution Prevention Plan (SWPPP) and the submittal of the Notice of Intent just prior to construction.

## 5. COMMITMENTS

- Emerald Ash Borer – Ash trees that are to be removed shall be disposed of in accordance with the current Illinois Department of Agriculture quarantine requirements.
- Water Wells - All water wells that are within the project footprint or within 200 feet of the project will be properly capped and abandoned unless it can be demonstrated that the well is sufficiently deep, properly cased, and not hydraulically connected to the surface. If the dwelling will remain after construction is completed, the water well will be replaced or other suitable alternative will be provided. Any new water wells that will need to be constructed such that susceptibility to surficial contamination is minimized, for example, by constructing the well in a deeper aquifer.

## **6. COMMENTS AND COORDINATION**

The IL Route 31 project is coordinated by the Project Study Group (PSG), consisting of FHWA, IDOT, and members of the consultant team. FHWA and IDOT are the Joint Lead Agencies for the project, responsible for managing the environmental review process and decision-making.

### **6.1 ENVIRONMENTAL COORDINATION**

Environmental Survey Requests (ESRs) were developed for project study area surveys.

Environmental coordination is contained in the Coordination section. Concurrence with the Section 106 determinations was obtained from the Illinois State Historic Preservation Officer (SHPO).

Documentation for special waste and natural resources coordination was completed by IDOT. Natural resource coordination includes wetland and biological reviews.

Coordination has been initiated with the Natural Resource Conversation Service (NRCS) and the Illinois Department of Agriculture (IDOA). The project has been evaluated using the Land Evaluation and Site Assessment (LESA) system to assess the viability of agricultural land for continued agricultural production. The results of the LESA evaluation are provided on the NRCS's "Farmland Conversion Impact Rating," Form AD-1006 (Appendix B).

### **6.2 PUBLIC AND AGENCY COORDINATION**

Public and agency coordination materials and minutes referenced in this section are in the Coordination section.

The IL Route 31 project was developed using the Context Sensitive Solutions (CSS) process. The project team utilized a collaborative approach involving key stakeholders (including local public officials, local agencies, local interest groups, and residents) to develop a facility that fits into its surroundings or context and preserves key human and natural resources.

Public and agency coordination occurred through meetings, the project website, and written correspondence. A Stakeholder Involvement Plan (see Coordination section) was used to manage the coordination process.

Public involvement activities for the IL Route 31 project are ongoing and will continue for the duration of the project development process.

#### **6.2.1 Cooperating Agencies**

Several agencies were invited to be cooperating agencies for the project. Cooperating agencies are Federal or state agencies that have jurisdiction by law or expertise needed for the project. IDNR, IDOA, IHPA, USACE, USEPA, and USFWS were invited to be cooperating agencies (see Coordination section). Of these agencies, the USACE accepted the invitation to be cooperating agencies.

#### **6.2.2 Public Meetings**

Two public meetings have been held to date for the IL Route 31 project. Summary documents, sign-in sheets, and written comments from the meetings are included in the Coordination section. The public was notified of meetings via e-mail, mailed postcards, and newspaper advertisements.

The first meeting was held on June 9, 2011 from 4 to 7 PM at Crystal Lake City Hall. The meeting was attended by 55 people. The first public meeting offered the opportunity to sign up for the project Community Advisory Group (CAG), provided basic information about the project, asked attendees to complete a context audit for the project study area, and solicited comments on the project and the project study area from the public. The comments included congestion/safety concerns, noise

mitigation, immediate need for improvements at the IL Route 31/Edgewood Road intersection, mountable medians for commercial access, dedicated turn lanes on IL Route 31, and the perceived need to widen IL Route 31 to four lanes of traffic.

The second public meeting was held on November 15, 2012 from 4 to 7 PM at the McHenry County College Shah Center. The meeting was attended by 69 people. The second public meeting presented the Alternatives Carried Forward. Public comments from the meeting focused on property impacts, building removals, land acquisition procedures, barrier median impacts to businesses, median openings, pedestrian accommodations, tree impacts (especially avoid oak tree impacts), driveway access, and design for specific properties.

Responses to public comments received at Public Meetings 1 and 2 are included in the Coordination section.

### 6.2.3 Community Advisory Group

The CAG represented the views of the project study area communities and McHenry County and consisted of 27 stakeholders. CAG meetings were developed to encourage timely and meaningful opportunities for input, and to encourage information sharing and collaboration between the CAG and the Project Study Group. Five CAG meetings have been held to date, including:

- CAG Meeting #1: September 1, 2011. The initial CAG meeting introduced the CAG members to the CAG ground rules, reviewed the project development and public involvement processes, summarized findings from Public Meeting #1, and developed a list of key transportation concerns and a project problem statement:  
“The transportation problems along Illinois Route 31, from Illinois Route 176 to Illinois Route 120, to be solved by this project are: congestion (existing and future), safety for multimodal users, accessibility for all users, and existing design deficiencies; in addition, minimize overall environmental impacts (e.g. stormwater runoff and water quality).”
- CAG Meeting #2: September 22, 2011. The second CAG meeting introduced the project Purpose and Need and the alternative development process, identified project constraints, and introduced the engineering toolbox (design elements and strategies for problem solving).
- CAG Meeting #3: November 3, 2011. The third CAG meeting introduced design alternatives for roadway sections, discussed regional development, and conducted a workshop to identify

#### Represented Stakeholders on CAG

- Alfred Benesch Engineering
- Alliant Bible Church
- Village of Cary
- Centegra Hospital
- City of Crystal Lake
- Crystal Lake Residents
- Environmental Defenders of McHenry County
- First Midwest Bank
- The Greenhouse of Crystal Lake
- Illinois Trails Conservancy
- City of McHenry
- McHenry Businesses
- McHenry Residents
- McHenry County Bicycle Advocates
- McHenry County Board
- McHenry County College
- McHenry County Council of Mayors
- McHenry County Division of Transportation
- Nunda Township Highway Department
- P.J.R. Connections
- Village of Prairie Grove
- Prairie Grove Businesses
- Prairie Grove Residents
- Terra Cotta Industries
- USACE
- USEPA
- USFWS

design improvements.

- CAG Meeting #4: May 22, 2011. The fourth CAG meeting introduced the alternatives to be carried forward for the project and also identified locations of potential median breaks, U-turn locations, planned access locations, and consolidated driveway entrances.
- CAG Meeting #5: November 20, 2014. The fifth CAG meeting identified the project's Preferred Alternative and an overview of its benefits and impacts.

Minutes of all CAG meetings are available on the project website, <http://www.ilroute31.com>

#### **6.2.4 NEPA/404 Merger Agencies**

Four meetings with agencies in the NEPA and Section 404 processes were held at concurrence points for Purpose and Need, Alternatives Carried Forward, and Preferred Alternative.

##### **Meeting 1: Project Introduction. June 27, 2011**

The project was introduced to the NEPA/404 agencies with a presentation outlining history, existing conditions, traffic and crash data, environmental resources, and planned public involvement activities were discussed.

##### **Meeting 2: Purpose and Need. March 1, 2012**

The Purpose and Need Statement was presented. At the request of the USACE, the Purpose and Need was modified to include the need for greater mobility and to remove drainage needs. The agencies provided electronic concurrences on the Purpose and Need Statement with the last received June 5, 2012.

##### **Meeting 3: Alternatives Carried Forward. June 25, 2013**

Design and environmental information for the Alternatives Carried Forward were provided at the third NEPA/404 merger meeting.

Concurrence on the Alternatives Carried Forward was received from IDNR and IDOA on June 25, 2013. Conditional concurrence from USACE, USEPA, and USFWS was received provided additional resource avoidance and wildlife crossings would be investigated.

##### **Meeting 4: Preferred Alternative. June 25, 2014**

Design and environmental information for the Preferred Alternative were provided at the fourth NEPA/404 merger meeting.

During the meeting, verbal comments were provided by USACE, USFWS, and USEPA. No comments were provided by IDNR or IDOA. The agencies asked that the Preferred Alternative documentation be updated to include a 28-foot raised median from River Birch Boulevard to Bull Valley Road, and the documentation be provided with more detail of the BMPs proposed. Upon receipt of the updated documentation, the agencies would review and provide concurrence electronically.

USACE provided electronic concurrence on the Preferred Alternative on September 23, 2014. USEPA provided electronic concurrence on the Preferred Alternative on September 29, 2014. USFWS provided electronic concurrence on the Preferred Alternative on December 15, 2014.

#### **NEPA/404 Merger Process**

The NEPA/Section 404 Permit Merger process streamlines project decision-making on Federal-aid projects. The process merges formal reviews for FHWA NEPA and Section 404 permits. Concurrence on the project may be given from these NEPA/404 agencies:

USEPA	IDOA
USACE	IEPA
USFWS	IDNR
IHPA	

### **6.2.5 Environmental Interest Groups**

A meeting was held on January 15, 2014 with local, state, and Federal agencies and environmental groups who expressed interest in the IL Route 31 project (see Coordination section). Groups and agencies represented included McHenry County, Chicago Metropolitan Agency for Planning, Silver and Sleepy Hollow Creeks Watershed Coalition, IDOT, Land Conservancy of McHenry County, the Village of Prairie Grove, Nunda Township, McHenry County Conservation District, Sierra Club, and the City of Crystal Lake. Federal agencies represented included the U.S. Fish and Wildlife Service, the USACE, and USEPA. Private businesses in attendance included Terra Cotta Realty Company.

The meeting attendees reviewed the project alternatives, minimization options, and potential BMPs for the IL Route 31 corridor. The need to avoid the seep (Site 35) was discussed and the minimization options were presented that illustrated how the seep will be avoided. The attendees confirmed their concern that the project could increase salt splash and spray of chlorides from roadway runoff and therefore increase impacts to groundwater and surface water. Various BMPs were discussed that would potentially reduce the chloride impact. The anti-degradation assessment that will take place as part of the Section 401 Water Quality permitting for the project was discussed in tandem with BMP performance. The proposed meandering of Squaw Creek, and the addition of riffles and pools was discussed. The attendees stated that oak tree stands should be avoided as much as possible. Those in attendance discussed bicycle travel patterns in the project study area, and compared the potential usage of bicycle facilities as part of the project to the nearby Prairie Trail. The project team discussed the comments received from the environmental interest groups during the meeting, and incorporated applicable comments into the project.

### **6.2.6 Local Agencies**

The project team held four meetings with Crystal Lake, Prairie Grove, McHenry, Nunda Township, and McHenry County. The purpose of the meetings was to update local agencies on the status of the project, discuss the CSS process and Public Meeting #1, solicit feedback, and invite the agencies to join the CAG. Minutes of these meetings (held April 1 and 4, 2011) are in the Coordination section, as are minutes of the meetings discussed in this section. The local agencies were also members of the CAG.

#### **City of McHenry**

An additional meeting was held with the City of McHenry and IDOT on October 15, 2013 to review and collect comments from the City on the proposed IL Route 31 alternatives within McHenry. At this meeting, the City of McHenry expressed their support for Build Alternative A for the IL Route 120 intersection. The City of McHenry requested that the PSG evaluate a five lane flush median alternative for the North Study Section, due to the change in access to existing driveways that a barrier median would impose. During a prior meeting with the City (April 11, 2013), the City stated it would not support Build Alternative B for the IL Route 120 intersection because it would impact buildings, area character, and could impact future business.

A presentation to the City of McHenry Board of Trustees was held on March 12, 2014. Modifications to the North Study Section were presented to the public, as requested by the City, which included an 18-foot raised barrier median north of Bull Valley Road to High Street, and a five lane section with a bi-directional turn lane north of High Street. The City was receptive to this alternative. The five lane flush section footprint is smaller than the 18-foot raised barrier median alternative and resulted in a small reduction in impacts.

Presentations to the McHenry Board were open to the public, as requested by the City.



### **Village of Prairie Grove**

The Village of Prairie Grove issued a formal letter of support on April 5, 2013 for the 30-foot Raised Median Alternative for the South Section of IL Route 31. The Village Board and the public supported the 30-foot Raised Median Alternative in part because it would impact fewer natural areas and businesses, and it matches recommendations for their Town Center plan.

The project team held three separate meetings with representatives from the five local agencies on January 20 and 22, 2015. The purpose of the three meetings was to update the agencies on the status of the project and review the proposed geometric and drainage design for the Preferred Alternative in preparation for the public hearing. IDOT also reviewed the cost participation and maintenance requirements for various proposed project elements, including traffic signals, pedestrian accommodations, and lighting. Minutes from these meetings are in the Coordination section.

## **7. NEXT STEPS**

The EA documents the IL Route 31 alternatives analysis and the rationale for the selection of the Preferred Alternative. The next steps for the IL Route 31 project development process are listed below.

### **Public Availability Period**

The EA will be made available for public comment after approval, and for a minimum of 15 days in advance of the public hearing. The public availability period will begin with the publication of public notice of EA availability. The public can review paper or electronic copies of the EA and submit comments to the project team. Paper copies of the EA will be available at the Prairie Grove Village Hall and the McHenry Public Library. An electronic version of the EA will be available on the project website.

### **Public Hearing**

The public hearing is the last public meeting that will be held prior to the conclusion of the NEPA process for the project. Public hearings explain the options considered for the project, disclose the impacts of the Preferred Alternative, and receive public comments on the project. Written comment forms will be available at the meeting, as well as a court reporter to document verbal comments.

Specifically, the public hearing is required to contain the following components:

- The project's purpose, need, and consistency with the goals and objectives of any local urban planning.
- The project's alternatives, and major design features.
- The social, economic, environmental, and other impacts of the project.
- The relocation assistance program and the ROW acquisition process.
- The State highway agency's procedures for receiving both oral and written statements from the public.

The public hearing will be announced 15 days in advance, and public comments will be collected for 30 days following the publication of the public notice. The public hearing comments and public hearing transcript will be included in the EA Errata.

### **EA Errata**

Following the public availability period, an Errata is prepared in order to reflect changes in the project, including the following:

- Reflect changes in the Proposed Action or mitigation measures resulting from comments revised on the EA or at the public hearing, and the effect of the changes;
- Include any necessary findings, agreements, or determinations; or
- Incorporate pertinent comments received on the EA and the responses to those comments.

The EA Errata would be posted for public availability upon the conclusion of the NEPA process.

### **Finding of No Significant Impact (FONSI)**

If FHWA determines the project would not have significant impacts, a Finding of No Significant Impact (FONSI) will be prepared. Upon FHWA approval, the FONSI will be posted to the project website.

Issuance of a FONSI concludes the NEPA process and allows the project to advance to the next stages of

project development, including detailed design, right-of-way acquisition, and construction. The FONSI is posted for public availability, along with the EA Errata, at the conclusion of the NEPA process.

If it is determined the project involves significant impacts, IDOT and FHWA must initiate the process for an Environmental Impact Statement.

### **Phase II Contract Plan Preparation and Land Acquisition**

Phase II begins at the conclusion of Phase I studies, contingent upon funding availability. In Phase II detailed design is completed, contract plans are prepared, and land is acquired. The TIP number for this project is 11-00-0001. In order for a project to be conformed, elements beyond a Phase I study need to have funding identified. The project is conformed in the 2014-2019 TIP and includes funding for Phase II Engineering. The IL Route 31 project has been assigned \$5,800,000 for contract plan preparation (Phase II Engineering) in IDOT's FY 2017-2022 Proposed Highway Improvement Program. Land acquisition funding has not been identified.

### **Permitting**

Permits that may be required for this project include Section 404 (Clean Water Act), Section 401 Water Quality Certification, Section 402 National Pollutant Discharge Elimination System (NPDES), and Section 402 NPDES Construction permits. If permits are required for a project, coordination typically begins during Phase I studies, permits are secured during Phase II, and agency coordination may occur during Phase III Construction.

### **Phase III Construction**

In Phase III, project construction commences, along with project monitoring, permitting, and agency coordination as needed to complete the project. During construction, traffic will be managed on IL Route 31 to maintain traffic flow as much as possible given the current construction activities. Construction of the IL Route 31 project is not included in IDOT's FY 2017-2022 Proposed Highway Improvement Program.

## 8. GLOSSARY OF TERMS

**Advanced Identification (ADID) High Habitat Value or High Functional Value wetlands** - ADID wetlands are high quality wetlands based upon three functional values: habitat, stormwater storage, and water quality.

**Average Daily Traffic (ADT)** - Average Daily traffic is the average number of two-way vehicles passing a specific point in a 24-hour period.

**Chicago Metropolitan Agency for Planning (CMAP)** - CMAP is the metropolitan planning organization for northeastern Illinois which includes Cook, DuPage, Kane, Kendall, Lake, McHenry and Will counties. It is responsible for overseeing land use and transportation planning for the region.

**Context Sensitive Solutions (CSS)** - Context Sensitive Solutions is an interdisciplinary approach that seeks effective, multimodal transportation solutions by working with stakeholders to develop, build and maintain cost-effective transportation facilities which fit into and reflect the project's surroundings (its "context") while maintaining safety and mobility.

**Community Advisory Group** - The Community Advisory Group is a stakeholder groups who met with the project team on a one-on-one basis throughout the project.

**Federal Endangered Species Act** - This is the 1973 law, later amended in 1978 and 1982 that was enacted to protect species of plants and animals that were threatened with extinction if their protection was not granted. The U.S. Fish and Wildlife Service determines which species should be considered as threatened or endangered. The law requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife.

**The Federal Highway Administration (FHWA)** - The Federal Highway Administration (FHWA) is a division of the United States Department of Transportation that specializes in highway transportation. The agency's major activities are grouped into two "programs," the Federal-aid Highway Program and the Federal Lands Highway Program. FHWA's role in the Federal-aid Highway Program is to oversee Federal funds used for constructing and maintaining the National Highway System (primarily Interstate Highways, U.S. Routes and most State Routes). This funding mostly comes from the Federal gasoline tax and mostly goes to state departments of transportation. FHWA oversees projects using these funds to ensure that Federal requirements for project eligibility, contract administration and construction standards are adhered to.

**Five percent Crash Studies** - There are FHWA reports in which the states prepare lists of at least 5 percent of locations exhibiting the most severe safety needs should be primarily based on fatalities and serious injuries.

**Hazardous Waste** - Sites having potential, suspected, or known hazardous waste or hazardous substances present. Federal and state regulations define hazardous wastes as ignitable, corrosive, reactive, or toxic wastes. These sites are subject to both USEPA and Illinois EPA regulation. Sites that generate or handle hazardous waste are regulated under the Resource Conservation and Recovery Act (RCRA). Sites that have had historical releases are listed in the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS), also known as the Federal Superfund Program. The CERCLIS database includes all sites nominated for investigation under the Superfund Program.

**Illinois Department of Agriculture (IDOA)** - The Illinois Department of Agriculture is a department in the Illinois state government that regulates various facets of the agriculture industries of Illinois, oversees Illinois soil and water conservation, supervises the weights and measures of various commodity products, including gasoline, and supervises the Illinois State Fair. Agriculture industries that are supervised include the production of livestock, the growing of commodity crops such as corn and soybeans, and the regulation of grain elevators.

**Illinois Department of Natural Resources (IDNR)** - The Illinois Department of Natural Resources (IDNR) is a department in the Illinois state government that operates the state parks and state recreation areas, enforces the fishing and game laws of Illinois, regulates Illinois coal mines, operates the Illinois State Museum system, and oversees scientific research into the soil, water, and mineral resources of the state.

**Illinois Department of Transportation (IDOT)** - The Illinois Department of Transportation (IDOT) is a department in the Illinois state government that is responsible for sustaining, strengthening, expanding, and maintaining a multi-modal transportation system that includes roads, railways, airways, waterways, canals, and terminals such as airports, railway stations, bus stations, warehouses, and intermodal facilities.

**Illinois Natural Areas Inventory (INAI)** - The Illinois Natural Areas Inventory (INAI) provides a set of information about high quality natural areas, habitats of endangered species, and other significant natural features. Information from the INAI is used to guide and support land acquisition and protection programs by all levels of government as well as by private landowners and conservation organizations.

**Illinois Nature Preserves Commission (INPC)** - The Illinois Nature Preserves Commission (INPC) is to assist private and public landowners in protecting high quality natural areas and habitats of endangered and threatened species in perpetuity, through voluntary dedication or registration of such lands into the Illinois Nature Preserves System. The Commission promotes the preservation of these significant lands and provides leadership in their stewardship, management and protection. The INPC actively helps defend nature preserves to ensure these precious areas are not threatened by improper or illegal use.

**Land and Water Reserve (L&WR)** - The Register of Land and Water Reserves is a voluntary land and water protection program that provides protection and management for lands and waters supporting significant natural heritage or archaeological resources. Registered Reserves may be in public or private ownership. The agreement to register an area as a Registered Reserve is similar to a conservation easement and is between the landowner and the Department of Natural Resources and the Illinois Nature Preserves Commission jointly. The agreement may be for a term of years or permanent. The landowner continues to own the registered property, except certain rights as specified in the registration agreement are given up. The property can be sold or passed on to heirs subject to the agreement.

**McHenry County Conservation District (MCCD)** – The McHenry County Conservation District exists to preserve, restore, and manage natural areas and open spaces for their intrinsic value and for the benefits to present and future generations. Conservation districts are special districts with specific purposes established under Illinois statutes following a favorable public referendum.

**McHenry County Division of Transportation (MCDOT)** – The McHenry County Division of Transportation is the agency responsible for transportation in McHenry County, Illinois.

**National Environmental Policy Act (NEPA)** - The Federal law, NEPA, requires the Department to take a hard look at the environmental consequences of a project in order to make a fully informed decision. NEPA prescribes three milestones during a project's study: (1) Purpose and Need, (2) Alternatives to be

Carried Forward, and (3) Preferred Alternative.

**National Register of Historic Places (NRHP)** - The National Register of Historic Places (NRHP) is the United States Federal government's official list of districts, sites, buildings, structures, and objects deemed worthy of preservation. A property listed in the National Register, or located within a National Register Historic District, may qualify for tax incentives derived from the total value of expenses incurred preserving the property.

**NEPA/404 Merger Process** - The federally funded roadway projects are required to comply with the National Environmental Policy Act (NEPA) which requires the federal agencies to consider the environmental effects of the proposed actions. The Federal Highway Administration (FHWA) is the NEPA lead Federal agency for federally funded roadway projects. A proposed action that involves placement of fill material into the waters of the United States including wetlands also requires a Section 404 permit from the USACE under the Clean Water Act. The integrated NEPA/404 merger process streamlines the interagency cooperation and expedites the project decision-making. It ensures that the concerns of the regulatory and resource agencies are given timely and appropriate consideration, and that those agencies are involved at key decision points in the project development.

**Non-Hazardous Waste** - Sites with RECs not directly related to hazardous waste that still have the potential to impact the environment. These would include sites with above-ground storage tanks (ASTs), underground storage tanks (USTs), leaking underground storage tanks (LUSTs), chemical spills, non-hazardous waste generation, or other conditions that could potentially impact the environment. These sites are typically regulated by the IEPA.

**Project Study Group (PSG)** - PSG is a multi-disciplinary team organized to develop this project and has primary oversight responsibility for the overall project development process to ensure that all applicable Federal, state and local requirements are being met. The primary objectives of the PSG are: expediting the project development process, identifying the project development issues, providing guidance for developing solutions to identified issues, and promoting partnership with all involved parties to address the identified project needs. The PSG consists of personnel from IDOT, FHWA and Consultants having expertise and knowledge of policies and procedures involved with the project development.

**Recognized Environmental Condition (REC):** ASTM Standard E 1527-13 defines REC as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.”

**Right-of-Way (ROW)** - A ROW is a type of easement granted or reserved over the land for transportation purposes, this can be for a highway, public footpath, bike trail, railway, canal, as well as electrical transmission lines, oil and gas pipelines. In the case of an easement, it may revert to its original owners if the facility is abandoned.

**Special Waste** - defined by the Illinois Environmental Protection Act (415 ILCS 5/3.45) and includes hazardous waste, potentially infectious medical waste, and industrial process waste, or pollution control waste, subject to certain exceptions. The IDOT BLRS Manual and ASTM Standard E 1527-13 uses the term Recognized Environmental Condition (REC) to assess risk. ASTM specifically defines REC as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.”

**Stakeholder** - A "stakeholder" is someone whom the project may affect - stakeholders can be local businesses, schools, elected officials, public agencies, land owners, or the general public.

**State of Illinois Endangered Species Act** - This Illinois law protects, in addition to federally listed endangered species or threatened species, other species that the Illinois Endangered Species Protection Board lists as in danger of extinction, or likely to become endangered.

**Strategic Regional Arterial (SRA)** - The SRA network is a regional arterial system that carries high volumes of long-distance traffic, supplementing the regional expressway and transit systems.

**Transportation Improvement program (TIP)** – The TIP is a short-term implementation tool for a long-range plan. The TIP lists all federally funded projects and regionally significant, non-federally funded projects that are programmed for implementation in the next four years. CMAP develops the TIP for the Chicago area, including the IL Route 31 project study area.

**United States Army Corps of Engineers (USACE)** - The USACE is a U.S. Federal agency under the Department of Defense and a major Army command. The USACE environmental mission has two major focus areas: restoration and stewardship. The USACE supports and manages numerous environmental programs, that run the gamut from cleaning up areas on former military installations contaminated by hazardous waste or munitions to helping establish/reestablish wetlands that helps endangered species survive.

The Regulatory Program is authorized to protect the Nation's aquatic resources. The USACE evaluates permit applications for essentially all construction activities that occur in the Nation's waters, including wetlands. Two primary authorities granted to the USACE by Congress fall under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

**United States Environmental Protection Agency (USEPA)** - The United States Environmental Protection Agency (USEPA) is an agency of the U.S. Federal government which was created for the purpose of protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress. The agency conducts environmental assessment, research, and education. It has the responsibility of maintaining and enforcing national standards under a variety of environmental laws, in consultation with state, tribal, and local governments. It delegates some permitting, monitoring, and enforcement responsibility to U.S. states and the federal recognized tribes. EPA enforcement powers include fines, sanctions, and other measures. The agency also works with industries and all levels of government in a wide variety of voluntary pollution prevention programs and energy conservation efforts.

**United States Fish and Wildlife Services (USFWS)** - The United States Fish and Wildlife Service (USFWS) is a Federal government agency within the U.S. Department of the Interior dedicated to the management of fish, wildlife, and natural habitats. Among the service's responsibilities are enforcing Federal wildlife laws, protecting endangered species, managing migratory birds, restoring fisheries, conserving and restoring wildlife habitat, such as wetlands, helping foreign governments with their international conservation efforts, and distributing money to states' fish and wildlife agencies through the Wildlife Sport Fish and Restoration program



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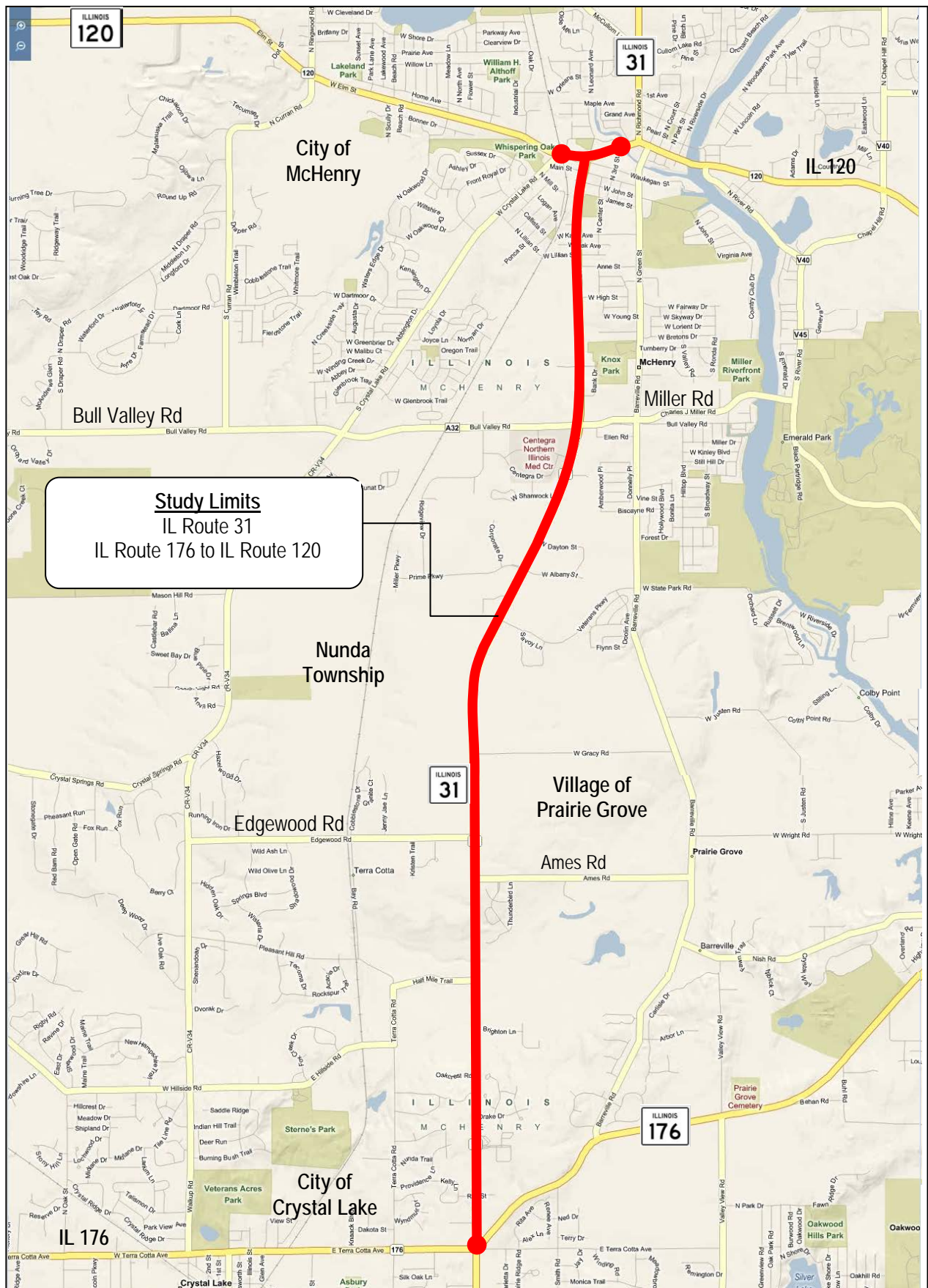
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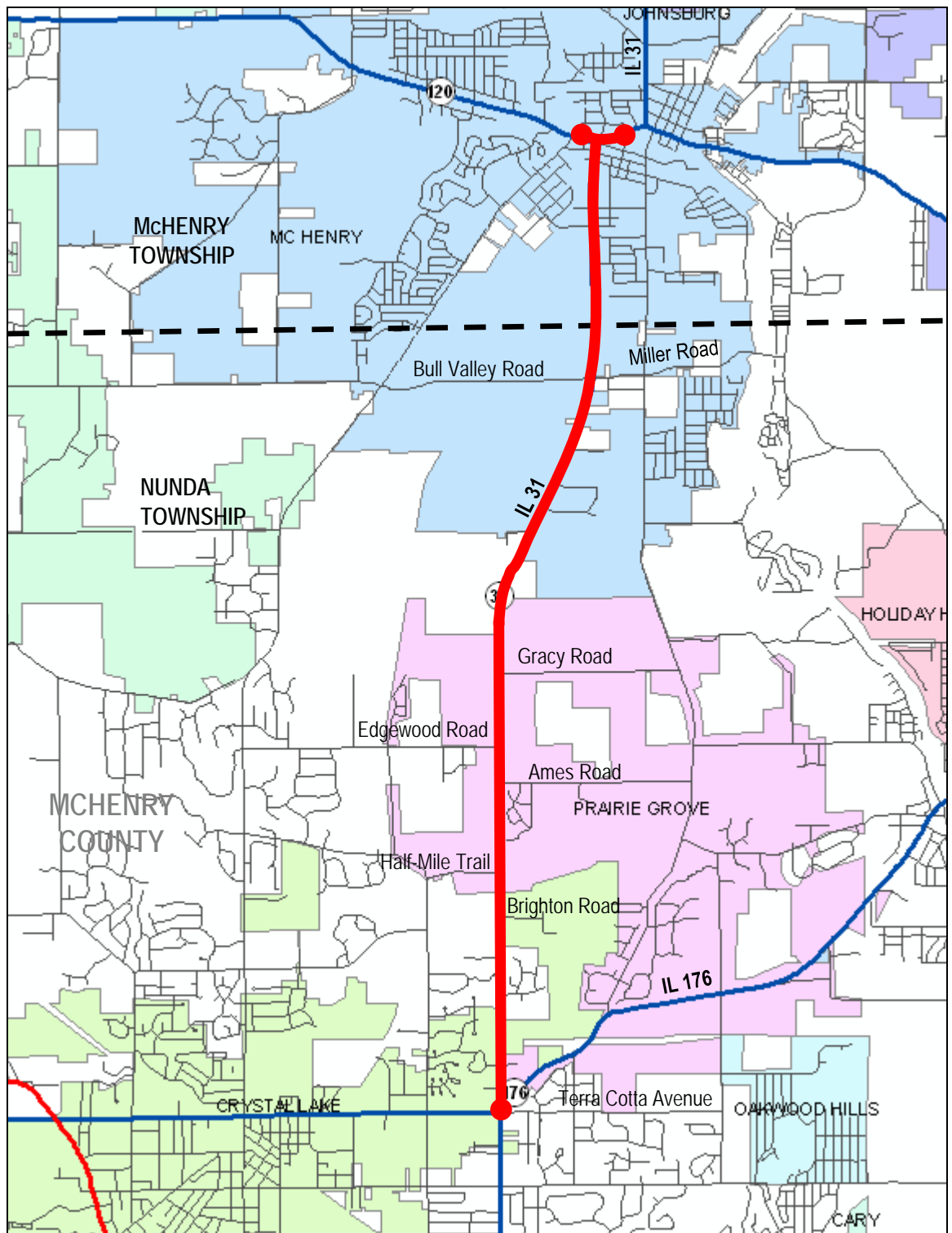
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**Legend**

 Study Limits

**EXHIBIT 1**  
**LOCATION MAP**  
 IL Route 31  
 IL Route 176 to IL Route 120  
 McHenry County  
 P-91-135-99



# Legend



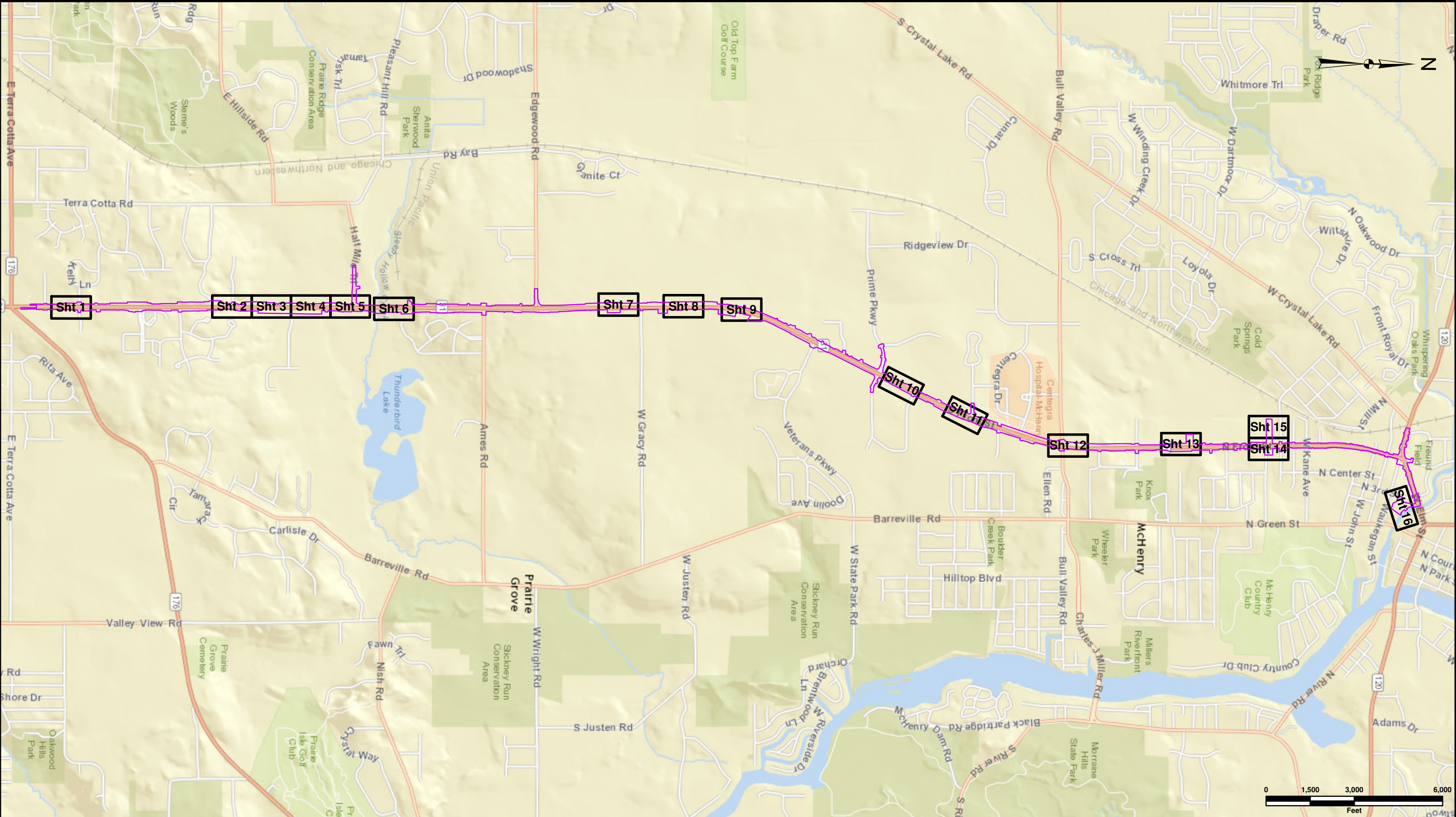
Study Limits



Township Boundary

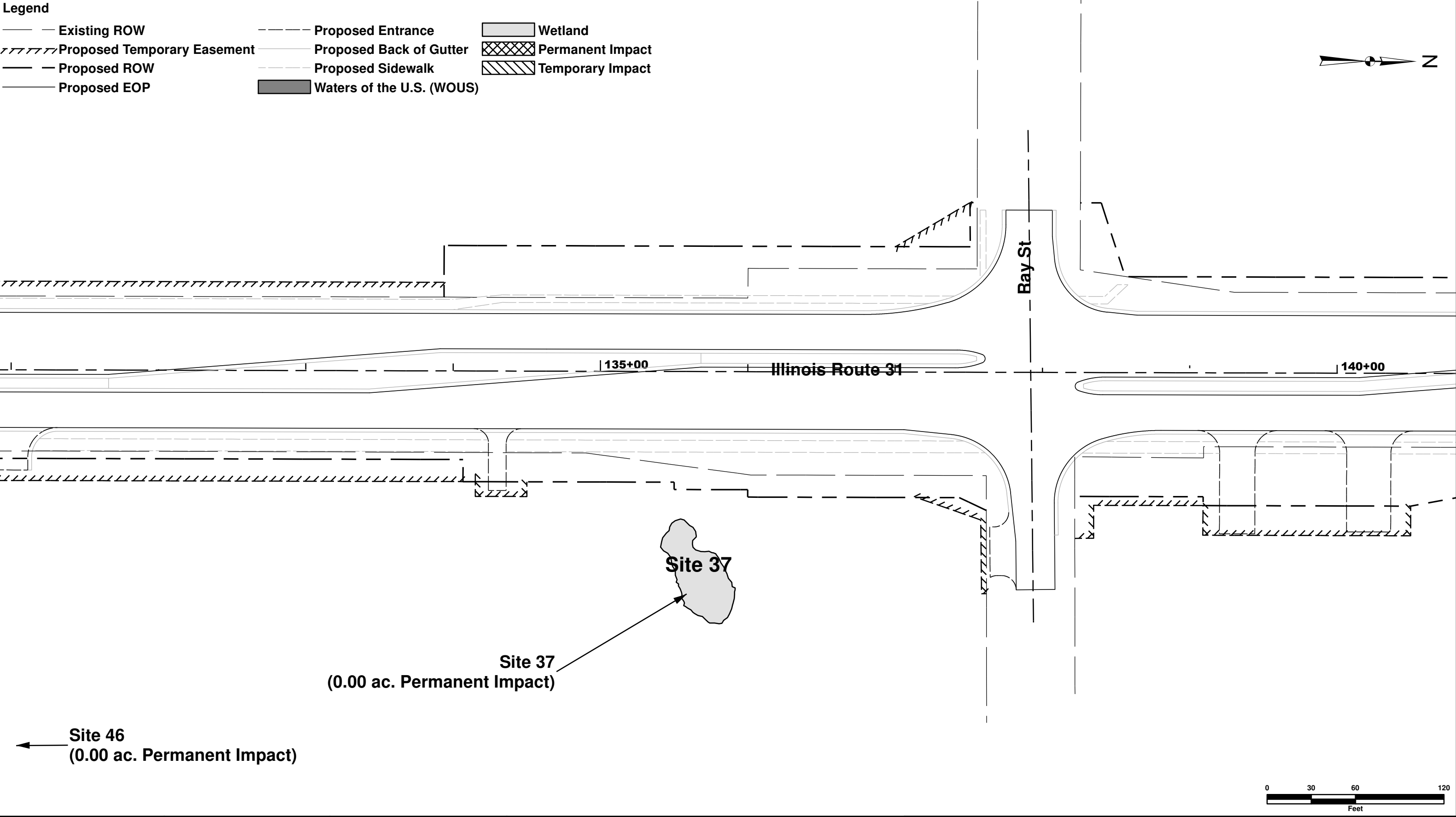
**EXHIBIT 2**  
**LOCAL JURISDICTION MAP**  
 IL Route 31  
 IL Route 176 to IL Route 120  
 McHenry County  
 P-91-135-99



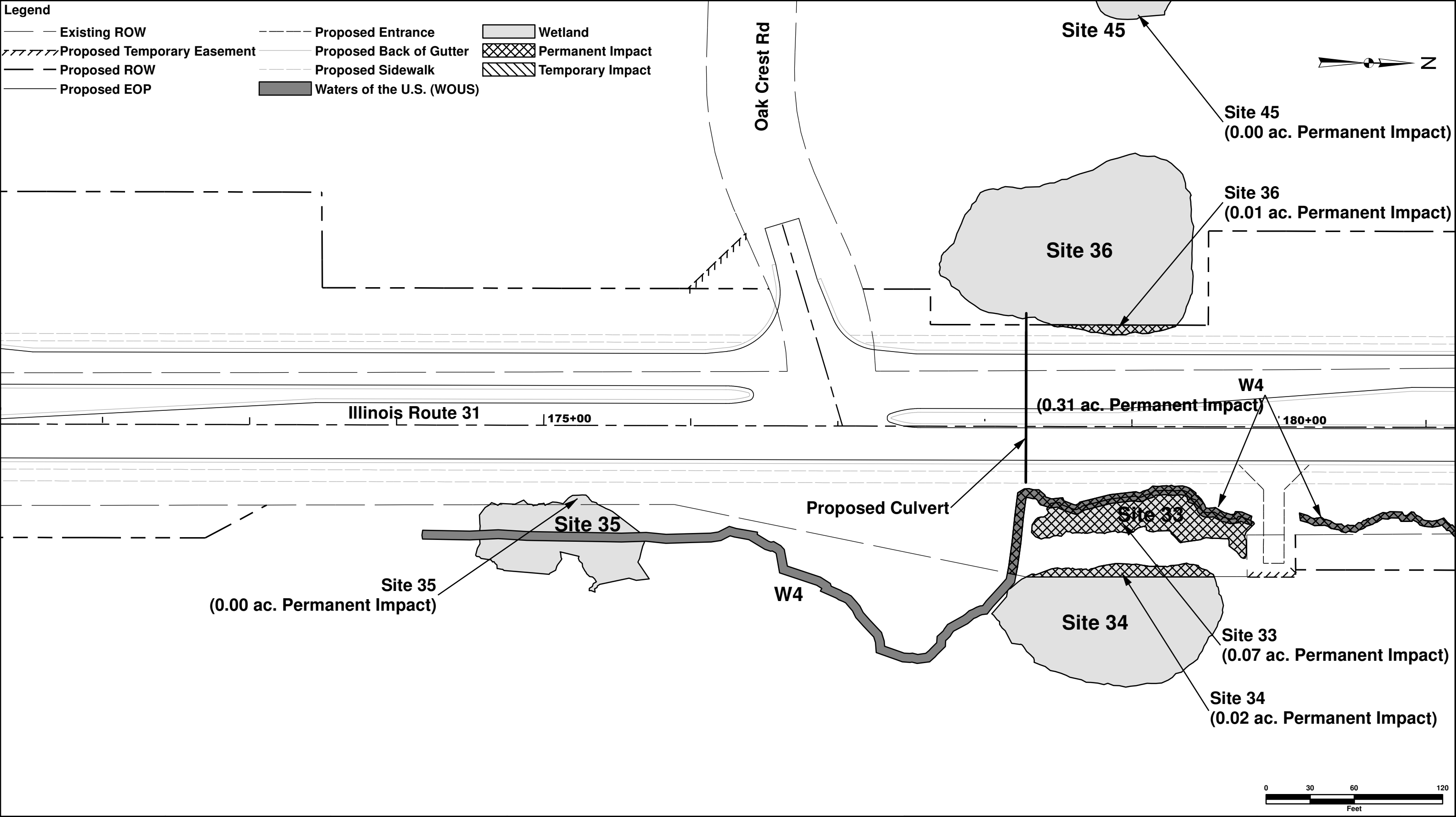


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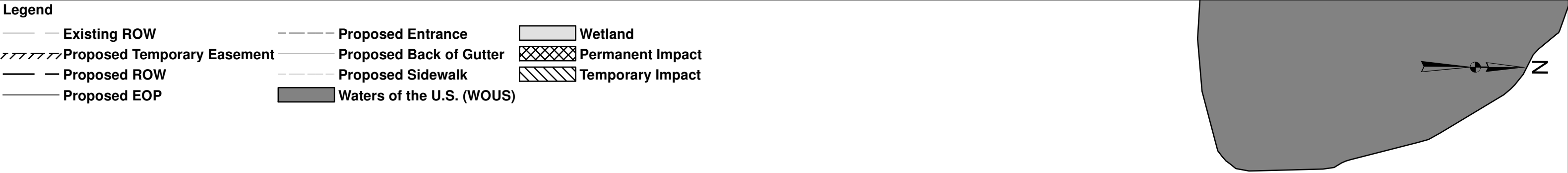


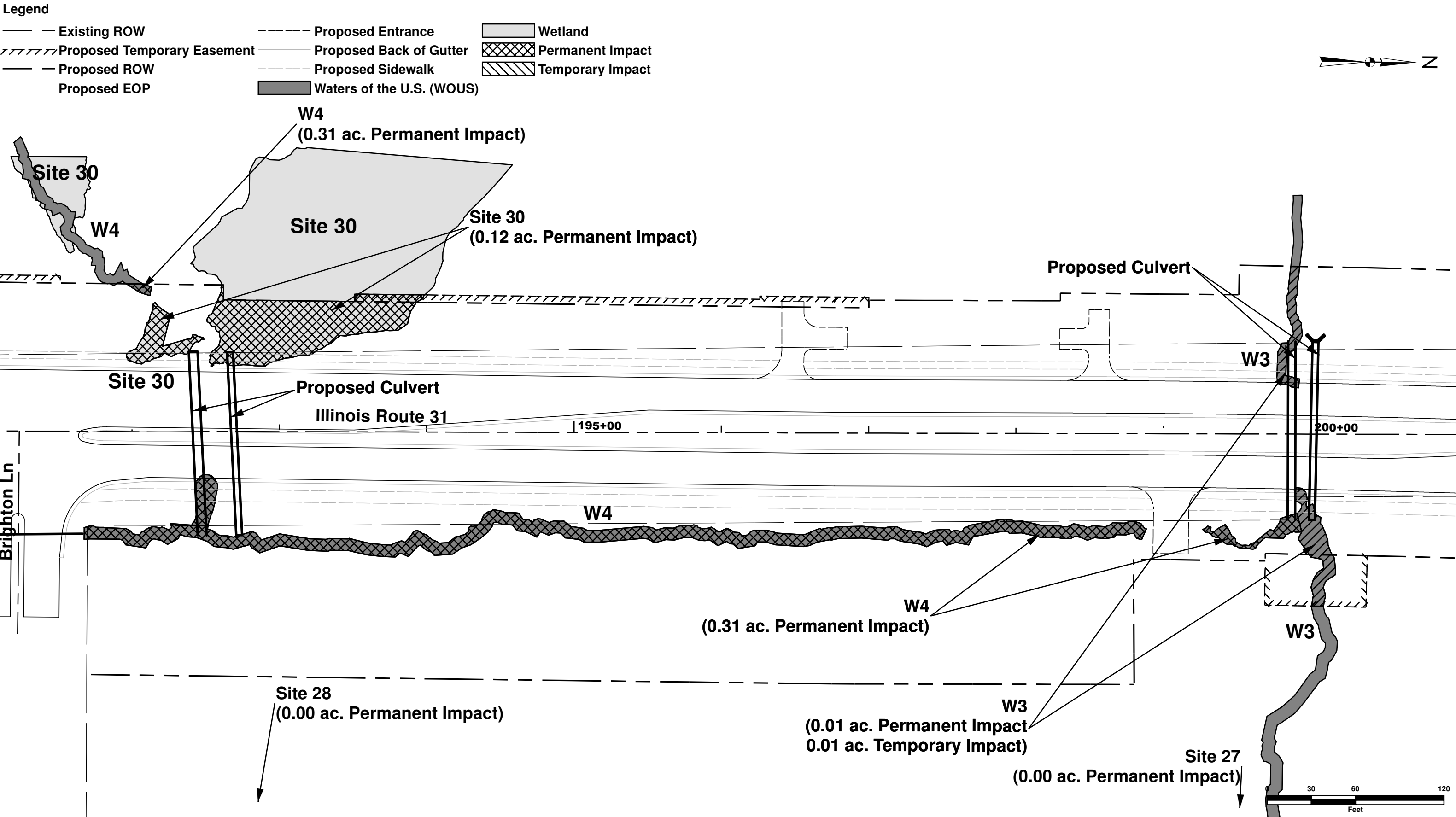
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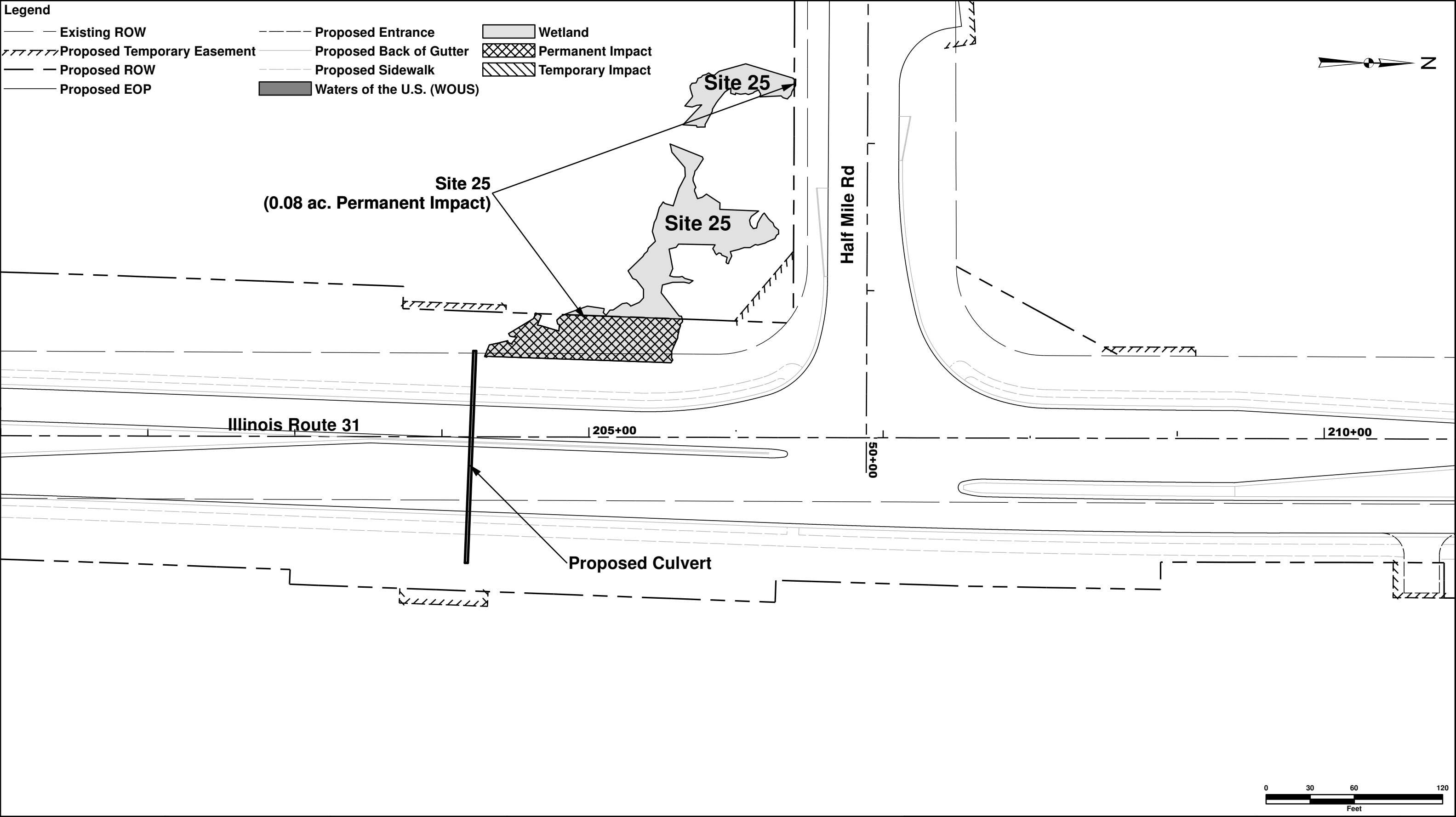
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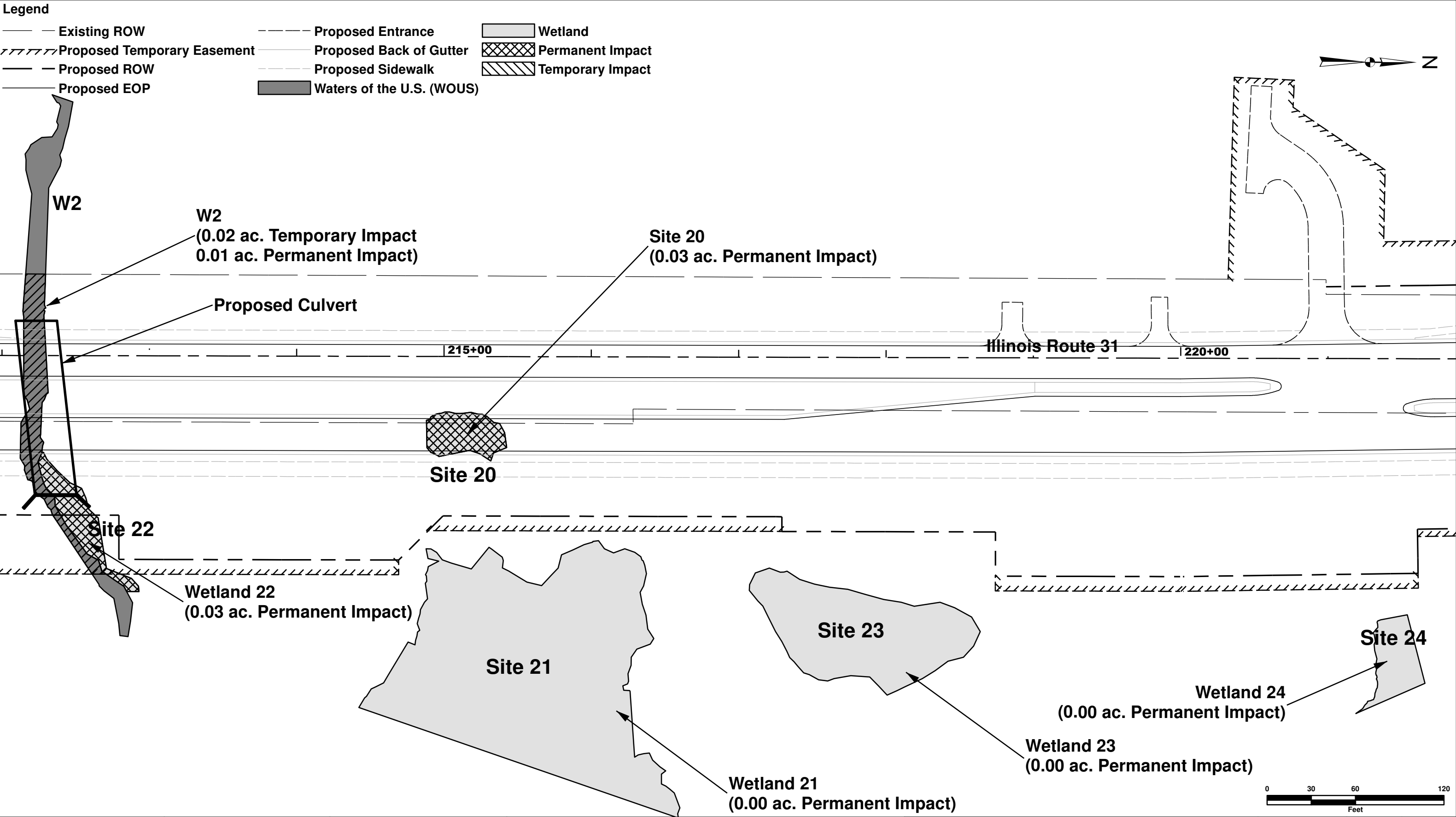




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Plote Date:	Date:	Revised:					



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Plote Date:	Date:	Revised:					

Legend

Existing ROW

Proposed Temporary Easement

Proposed ROW

Proposed EOP

Proposed Entrance

Proposed Back of Gutter

Proposed Sidewalk

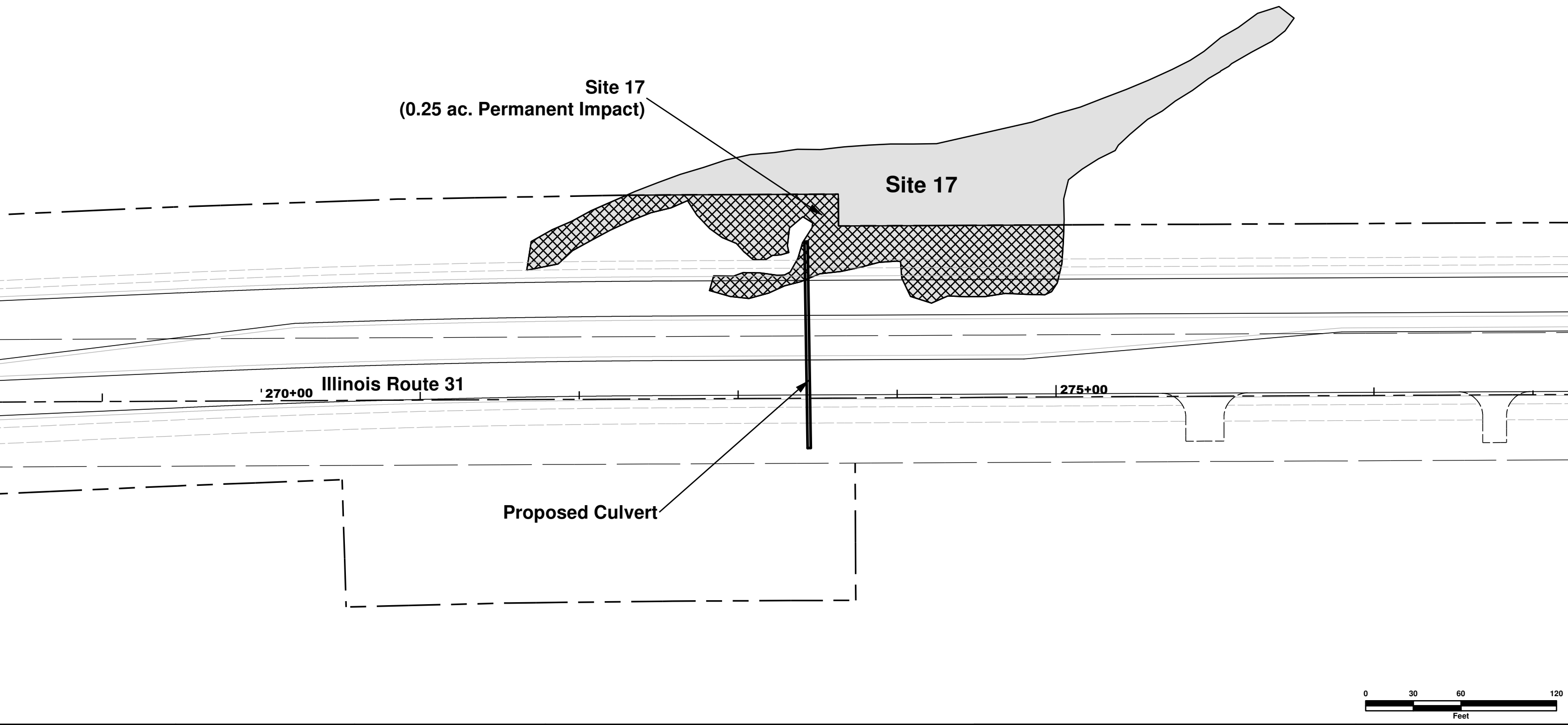
Waters of the U.S. (WOUS)

Wetland

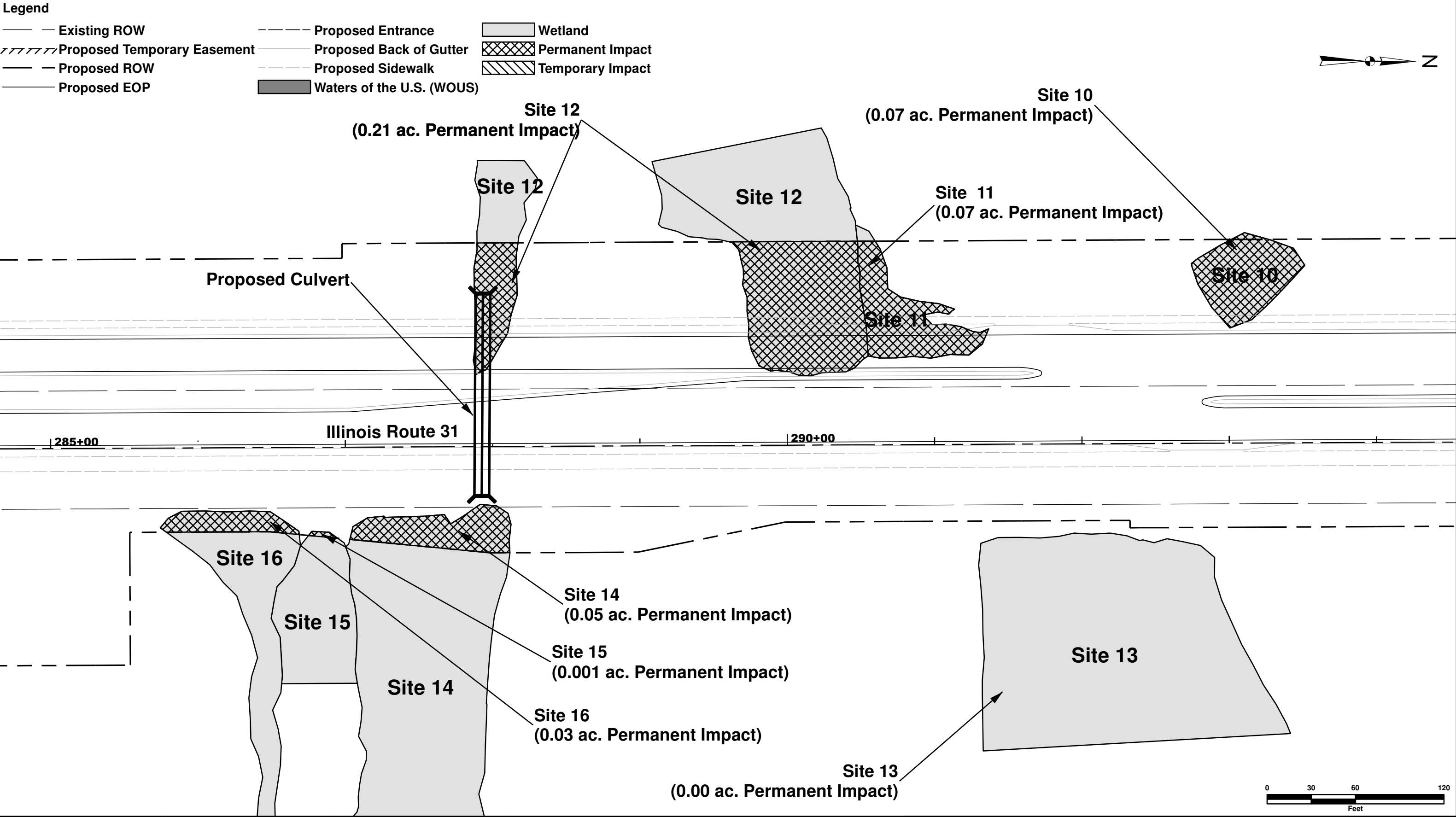
Permanent Impact

Temporary Impact

N



Date:	Designed:	Revised:	State of Illinois Department of Transportation	Illinois Route 31 Wetlands Impact Exhibit Wetland 17		Total Sheets	Sheet No.
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Plot Scale:	Checked	Revised:			Scale: 1" = 60'		
Plote Date:	Date:	Revised:		EXHIBIT 3			



Date:	Designed:	Revised:	State of Illinois Department of Transportation	Illinois Route 31 Wetlands Impact Exhibit Wetland 10, 11, 12, 14, 15, 16		Total Sheets	Sheet No.
	Drawn:	Revised:				16	8
Plot Scale:	Checked	Revised:		EXHIBIT 3	Scale: 1" = 60'		
Plote Date:	Date:	Revised:					

Legend

Existing ROW

Proposed Temporary Easement

Proposed ROW

Proposed EOP

Proposed Entrance

Proposed Back of Gutter

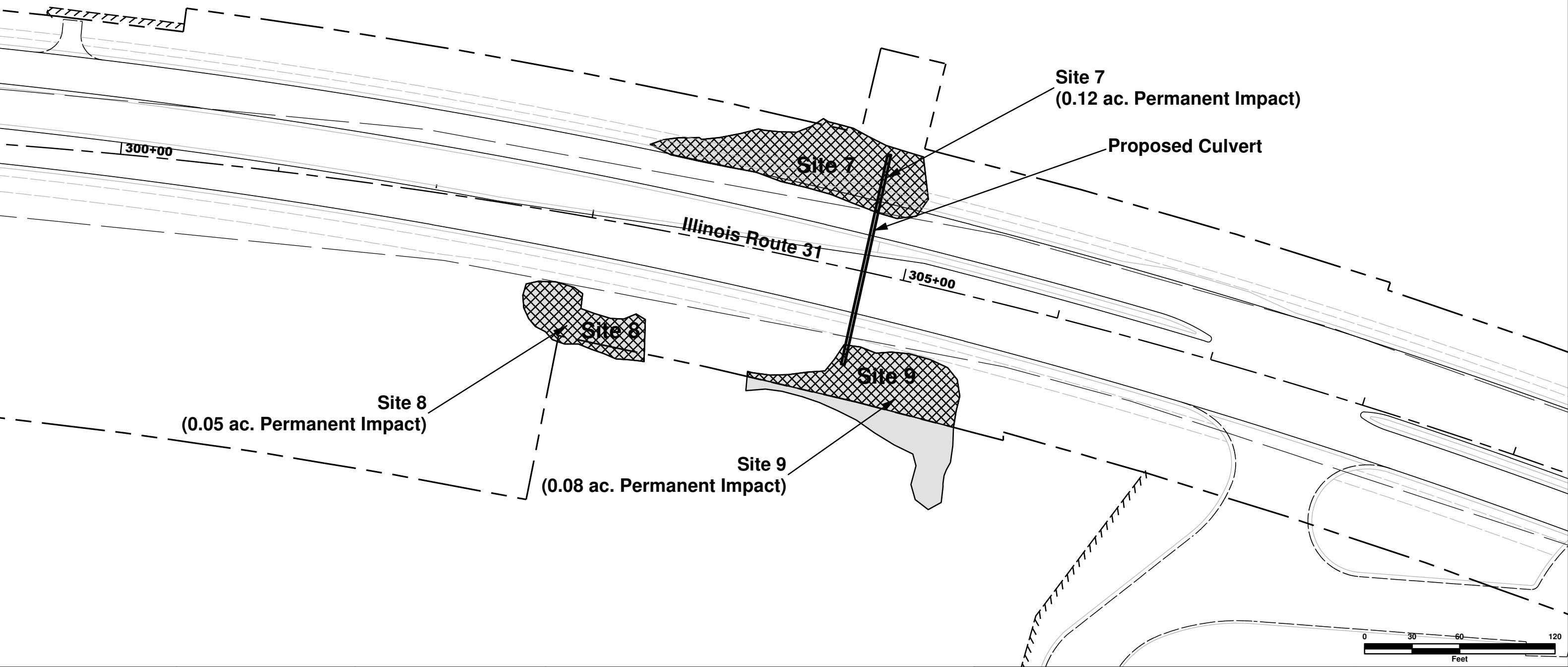
Proposed Sidewalk

Waters of the U.S. (WOUS)

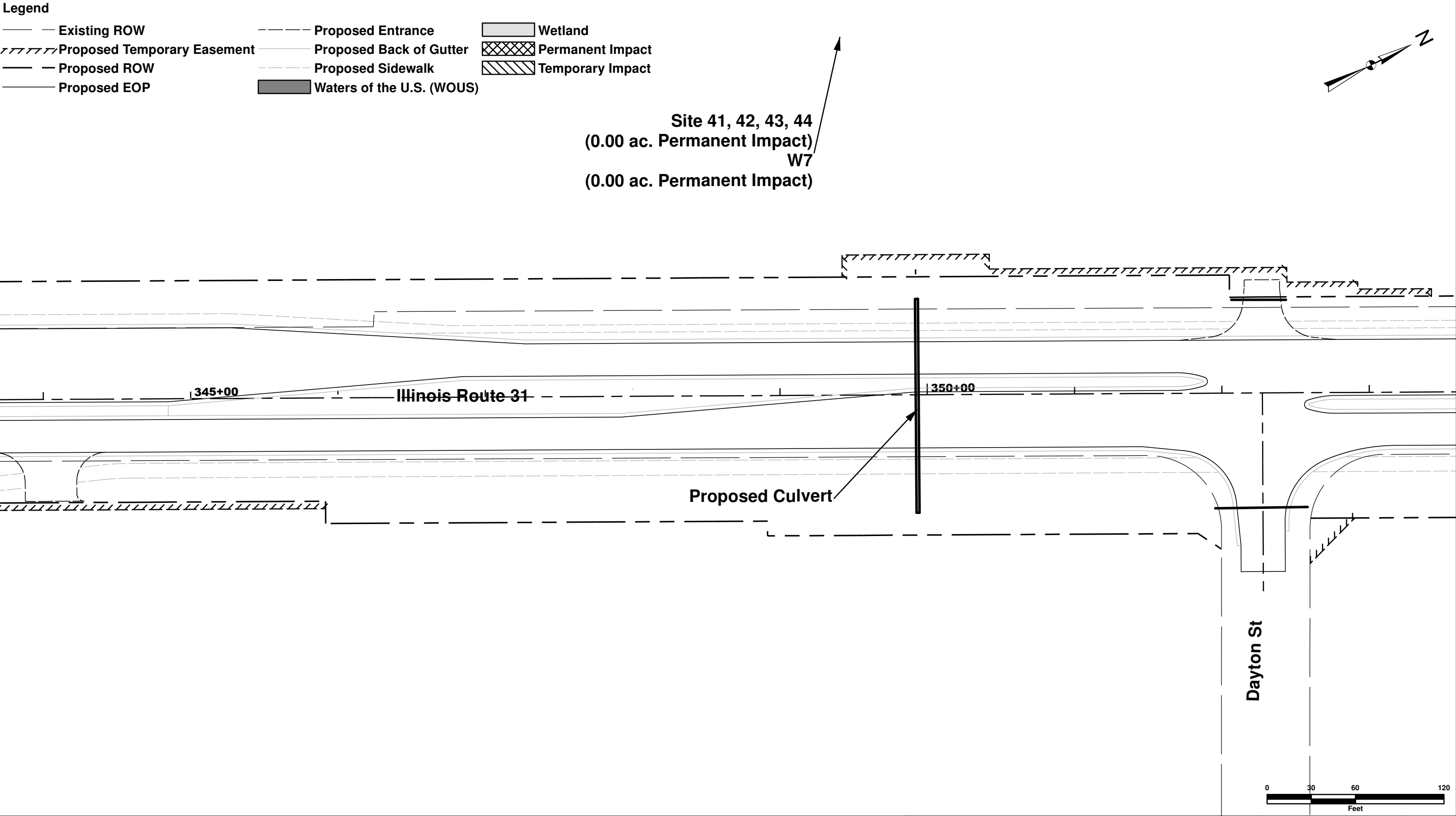
Wetland

Permanent Impact

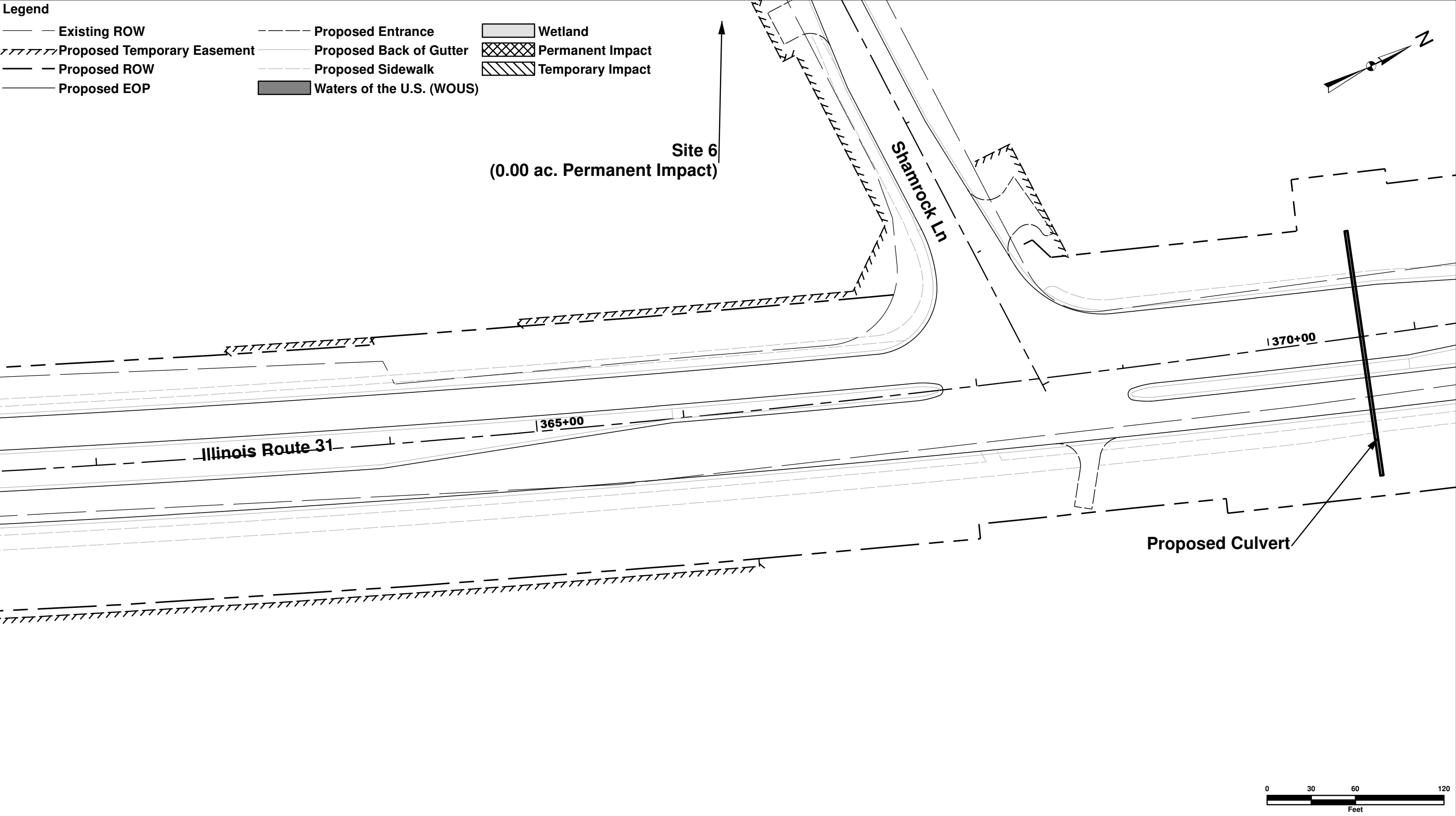
Temporary Impact



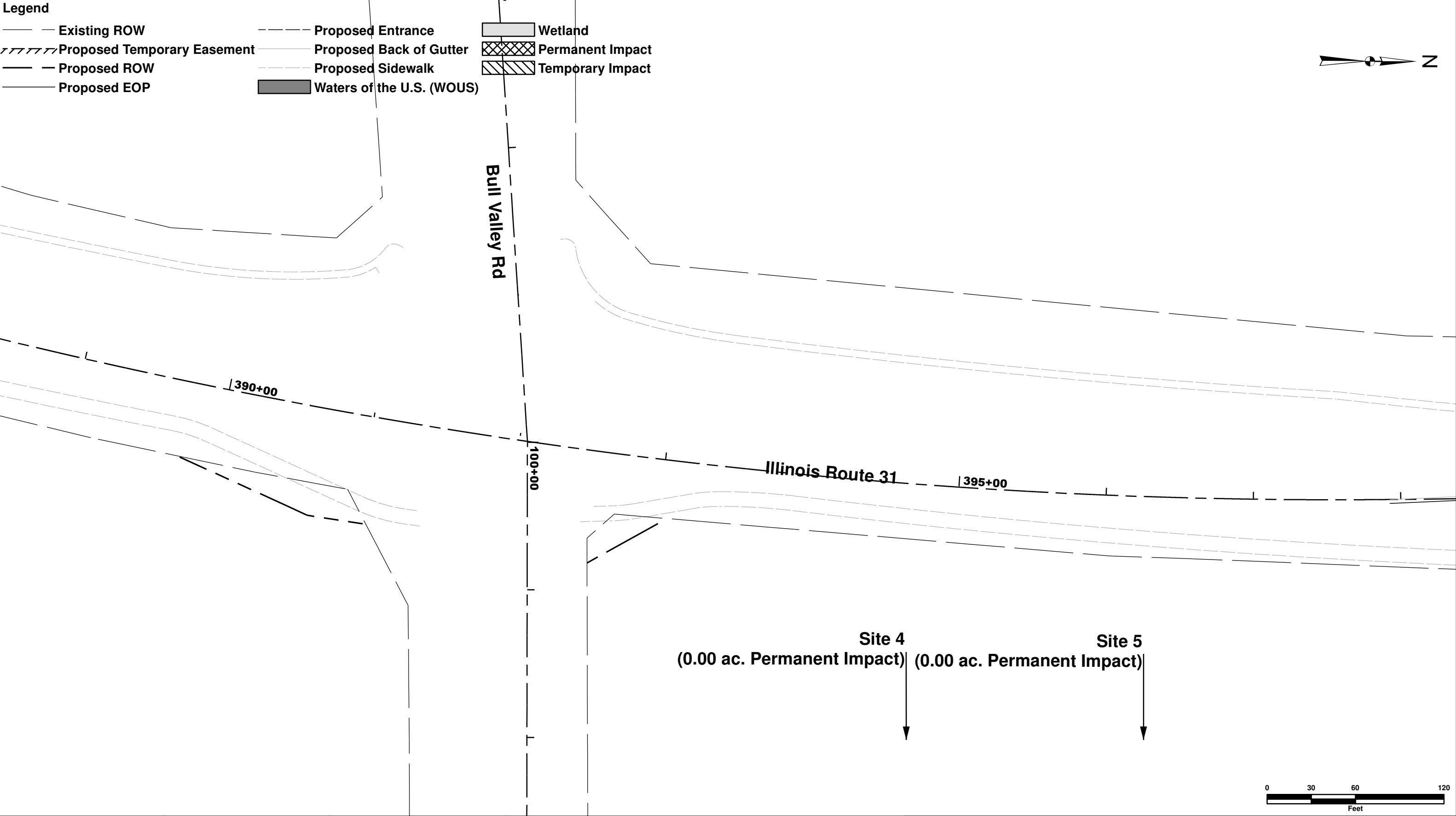
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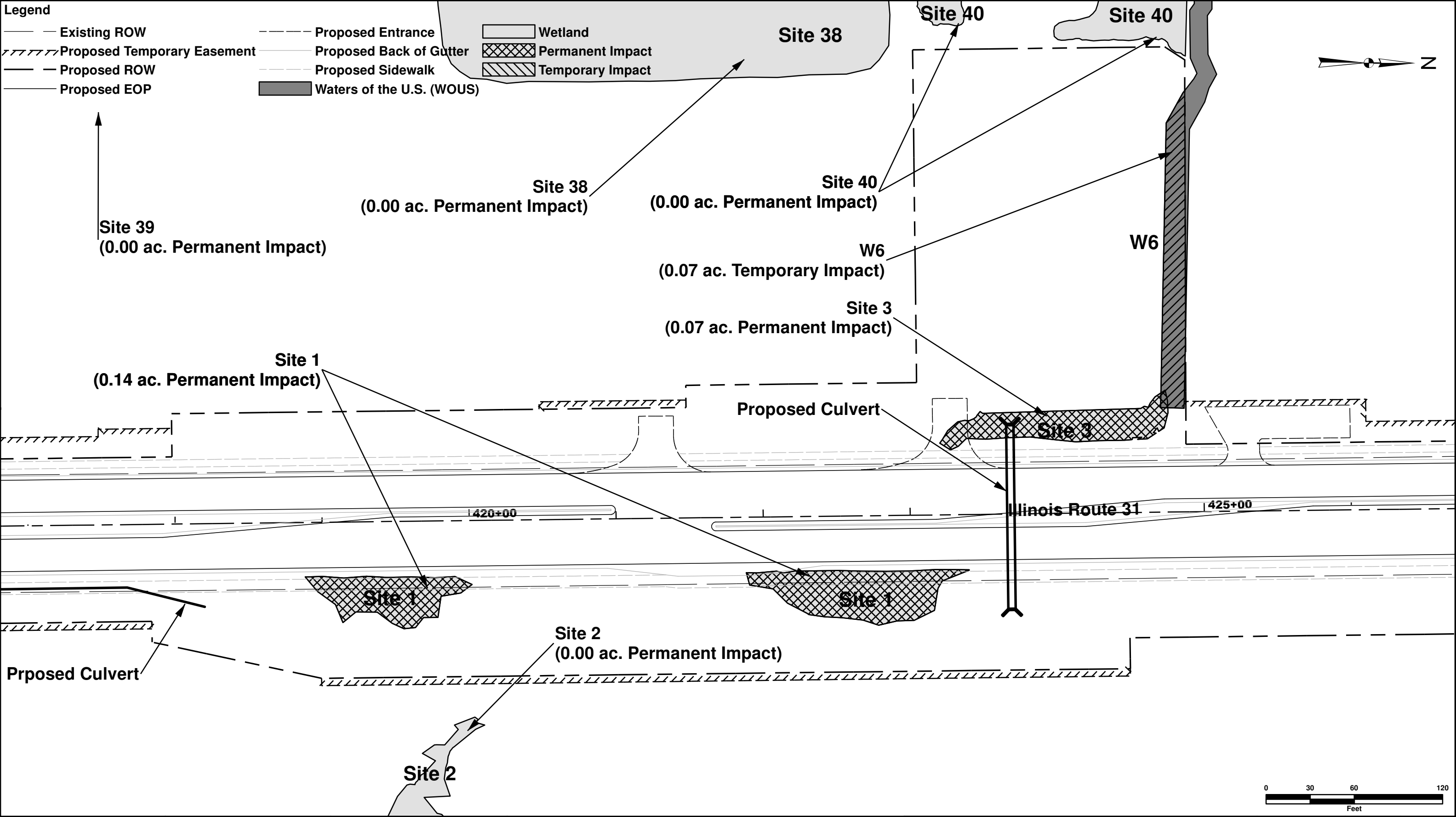




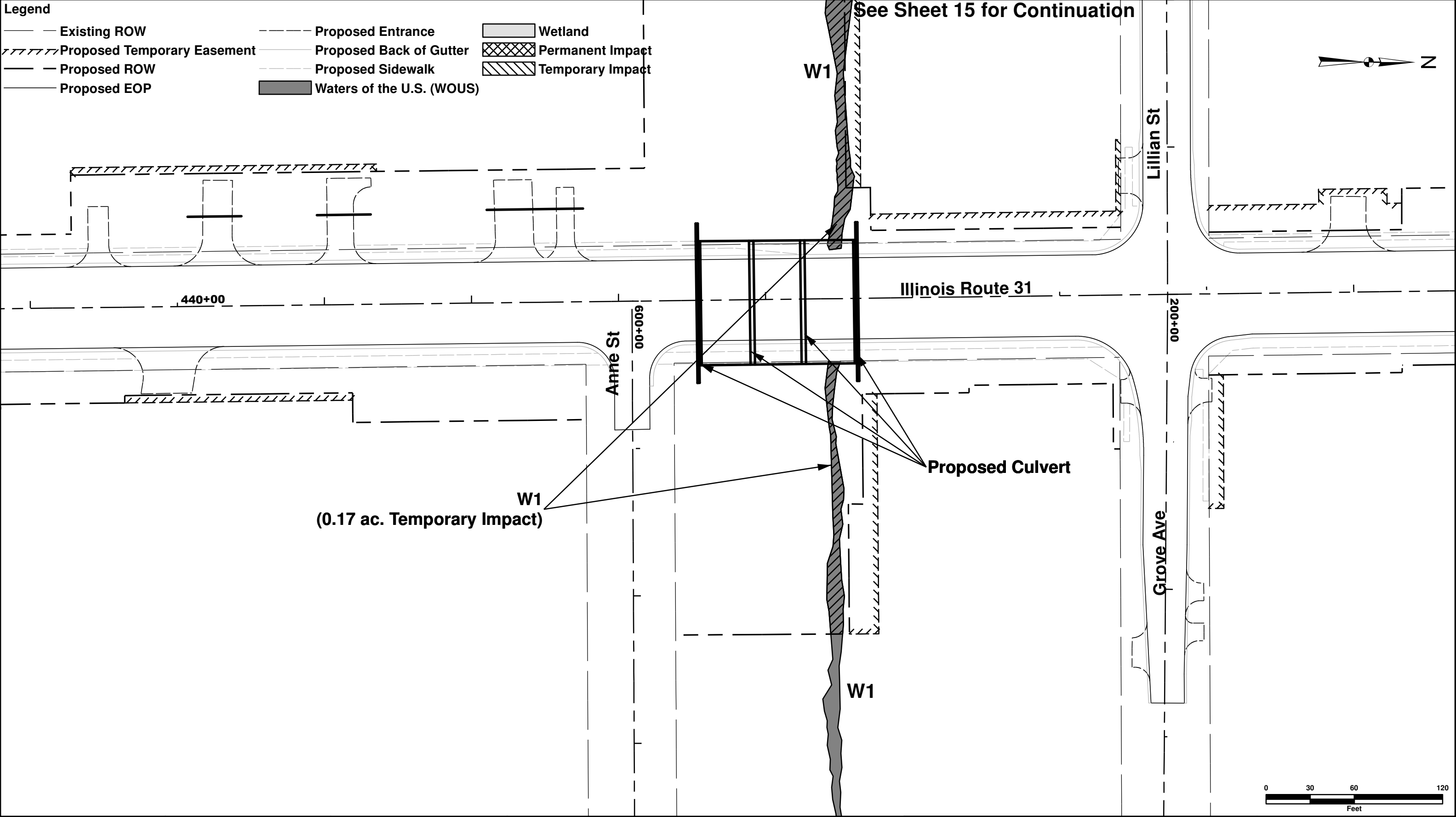


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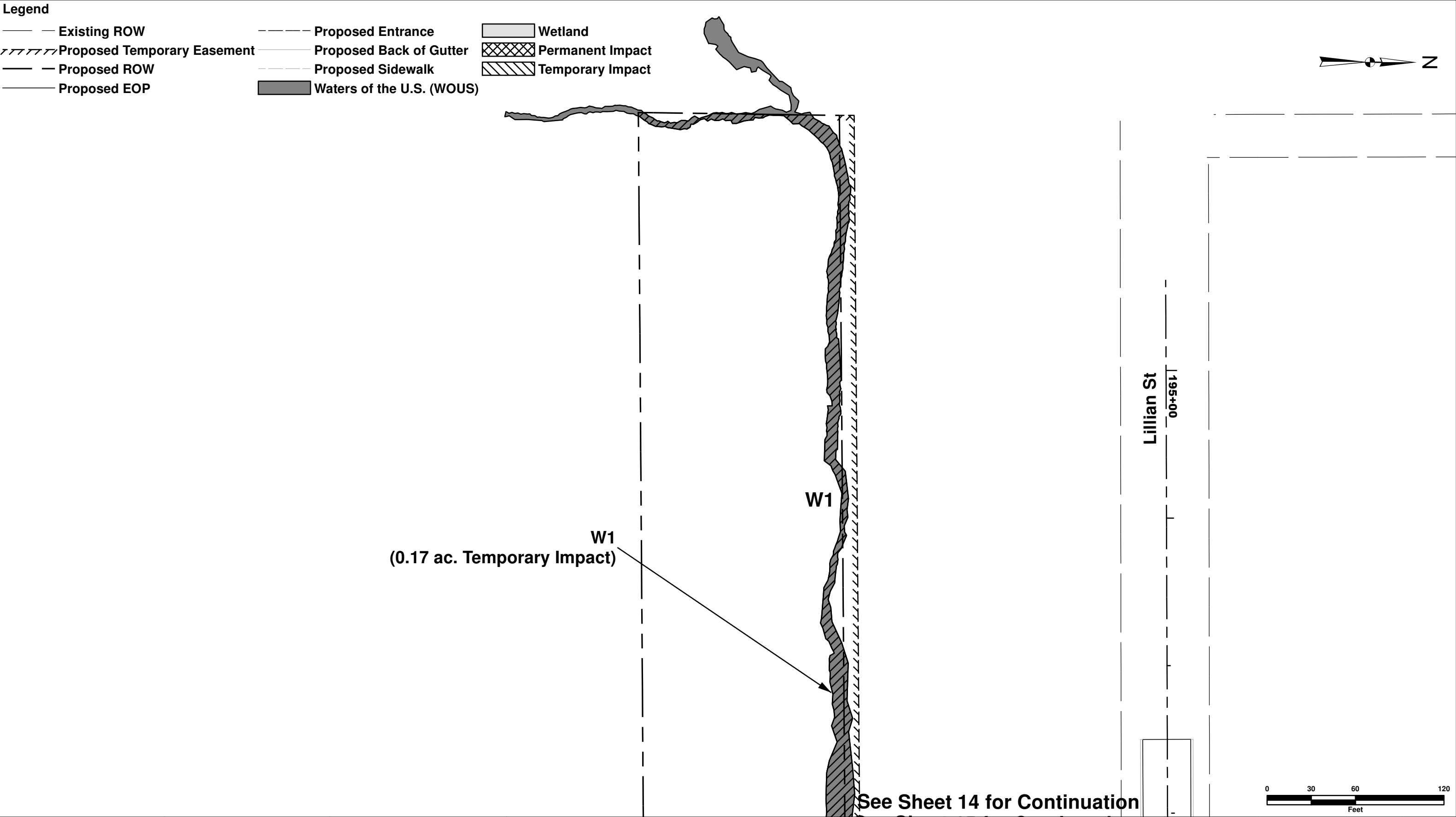




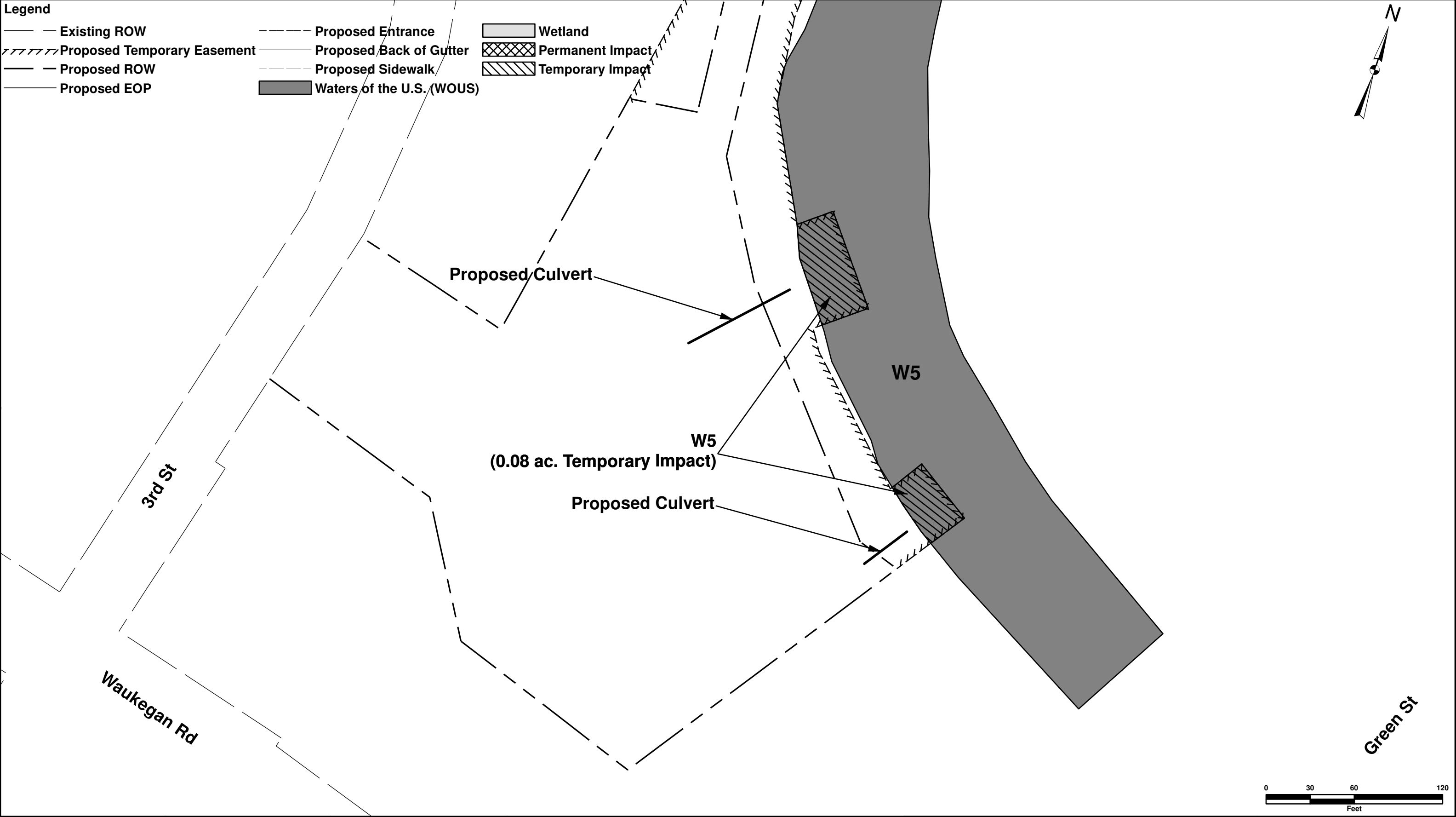
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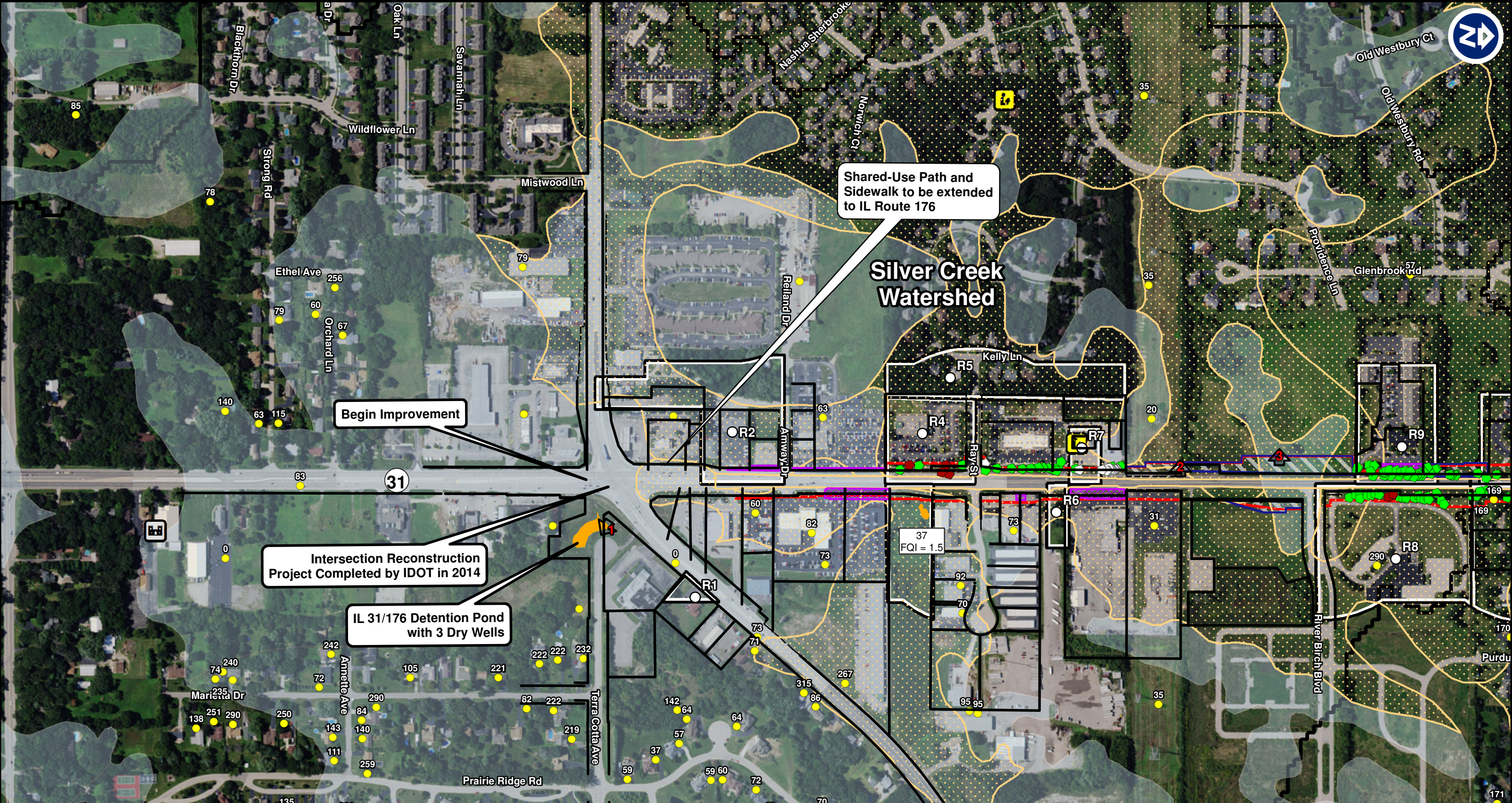


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Plote Date:	Date:	Revised:		EXHIBIT 3			



Date:	Designed:	Revised:	State of Illinois Department of Transportation	Illinois Route 31 Wetlands Impact Exhibit WOUS W5			Total Sheets	Sheet No.
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Plote Date:	Date:	Revised:						





**Exhibit 4**

**Environmental Resources Map**

**Illinois Route 31**

**Illinois Route 176 to Illinois Route 120**

**McHenry County, Illinois**

**Sheet 1 of 6**

0 200 400 800

Feet

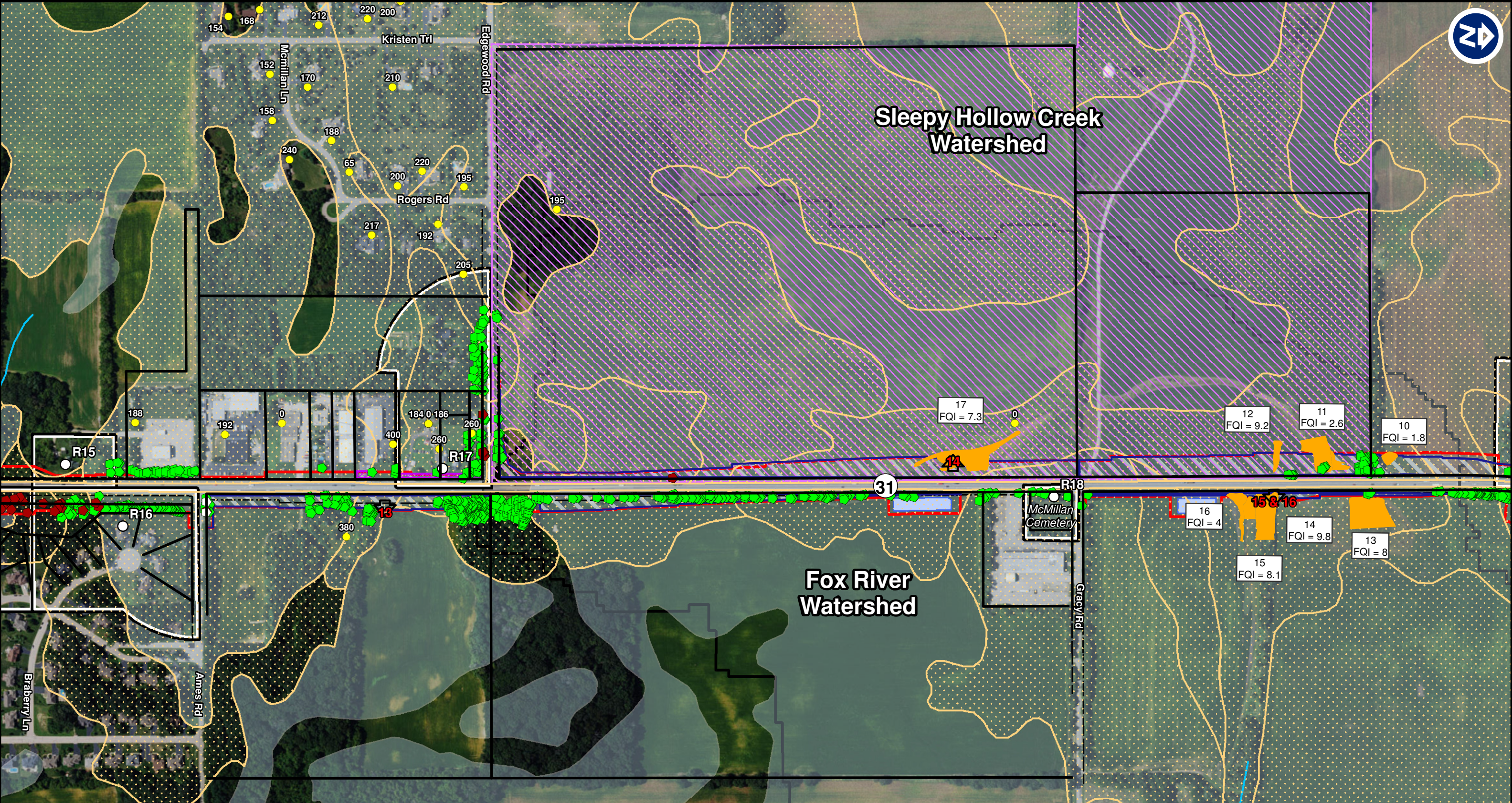
**Legend**

Wastewater Treatment Plant	All Community Wells	Tree Impact	Traffic Noise Receptor	Outfall	Stream	Impacted Farm Parcel
Existing ROW	All Non Community Wells	Oak Tree Impact	Common Noise Environment	WOUS (INHS)	Floodplain	Prime & Important Farmland Soil
Proposed ROW	Non Community Well Impact	Shagbark Hickory Tree Impact	Business Site Impact	Lakes and Rivers	Floodway	Prairie Grove Town Center
Prairie Trail	School	Residential Acquisition	Highly Erodible Soil	Proposed Detention Pond / Proposed Retention Basin	ADID Wetland	Census Tracts 8706.05 and 8706.06
Proposed Retaining Wall	Place of Worship	Business Structure Acquisition	Park	Sensitive Aquifer Recharge Area	NON-ADID Wetland	
		Owned by Land Conservancy of McHenry County				









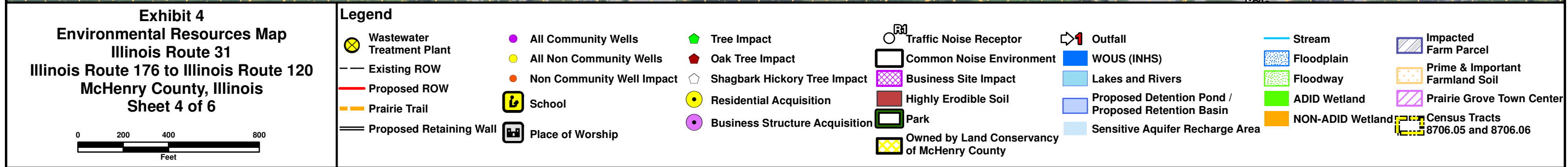
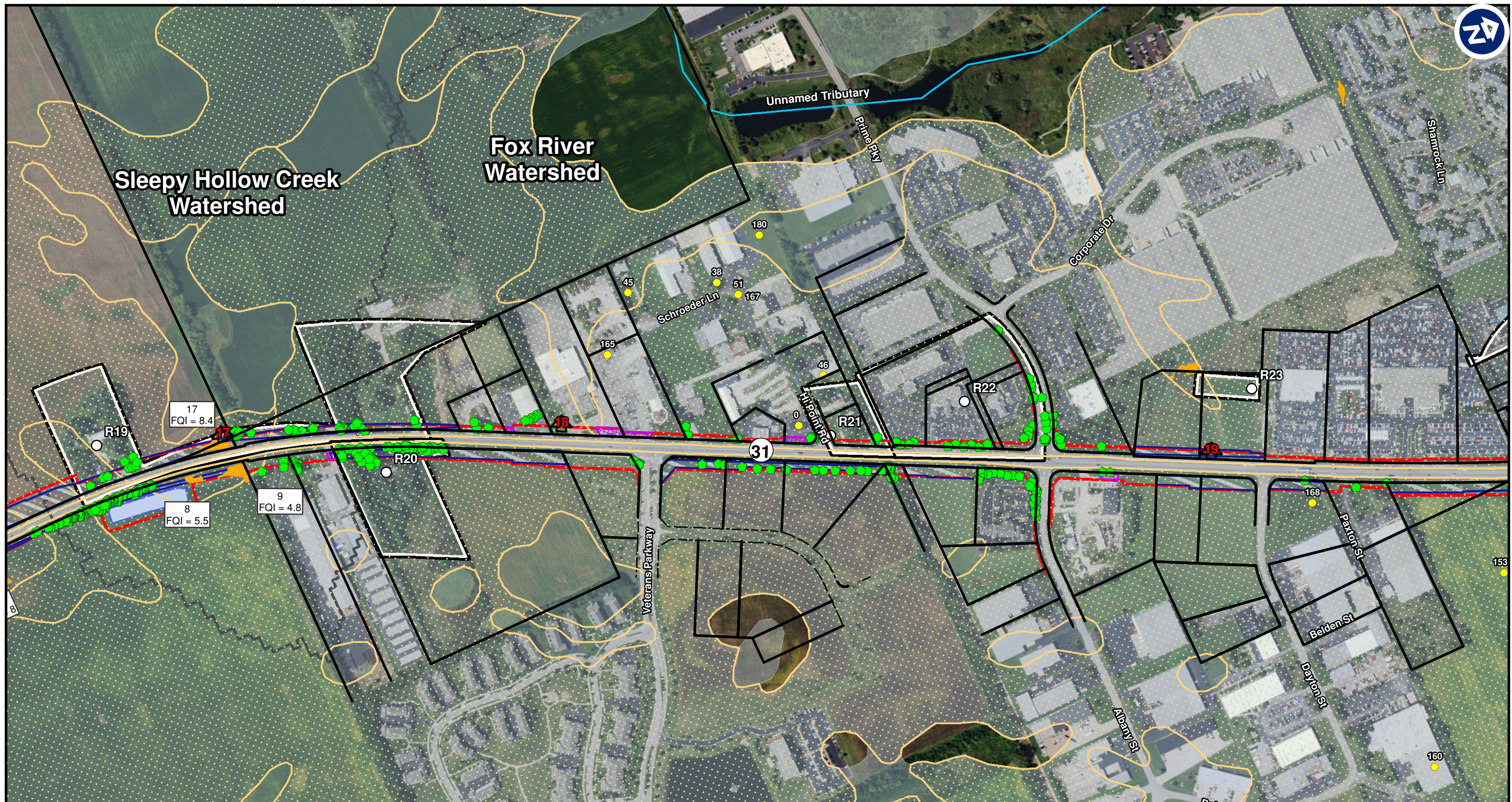
**Exhibit 4**  
**Environmental Resources Map**  
**Illinois Route 31**  
**Illinois Route 176 to Illinois Route 120**  
**McHenry County, Illinois**  
**Sheet 3 of 6**



**Legend**

- |                            |                           |   |                          |  |                  |                                   |
|----------------------------|---------------------------|---|--------------------------|--|------------------|-----------------------------------|
| Wastewater Treatment Plant | All Community Wells       | Tree Impact                                 | Traffic Noise Receptor   | Outfall  | Stream           | Impacted Farm Parcel              |
| Existing ROW               | All Non Community Wells   | Oak Tree Impact                             | Common Noise Environment | WOUS (INHS)  | Floodplain       | Prime & Important Farmland Soil   |
| Proposed ROW               | Non Community Well Impact | Shagbark Hickory Tree Impact                | Business Site Impact     | Lakes and Rivers                                   | Floodway         | Prairie Grove Town Center         |
| Prairie Trail              | School                    | Residential Acquisition                     | Highly Erodible Soil     | Proposed Detention Pond / Proposed Retention Basin | ADID Wetland     | Census Tracts 8706.05 and 8706.06 |
| Proposed Retaining Wall    | Place of Worship          | Business Structure Acquisition              | Park                     | Sensitive Aquifer Recharge Area                    | NON-ADID Wetland |                                   |
|                            |                           | Owned by Land Conservancy of McHenry County |                          |  |                  |                                   |

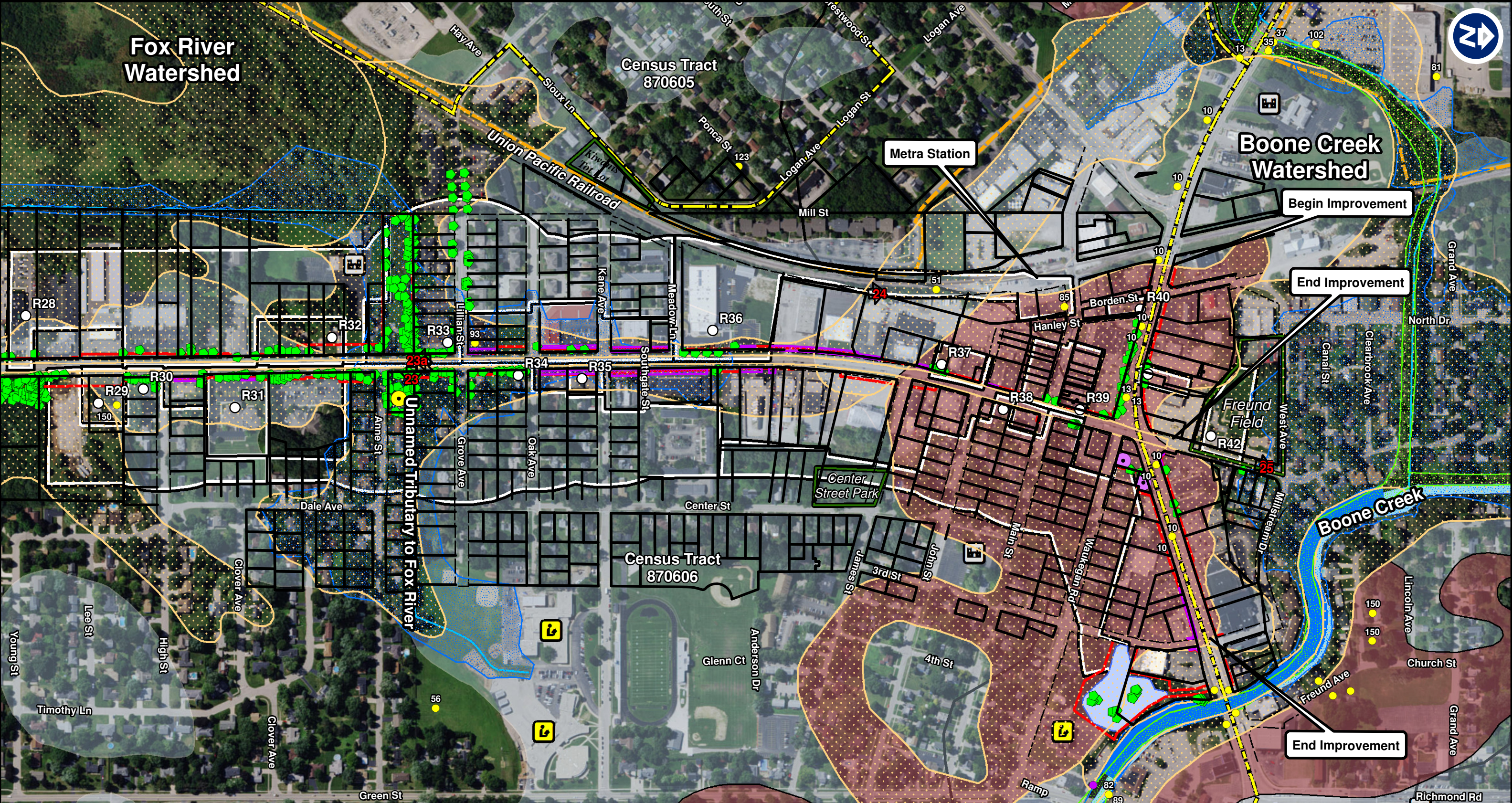












**Exhibit 4**

**Environmental Resources Map**

**Illinois Route 31**

**Illinois Route 176 to Illinois Route 120**

**McHenry County, Illinois**

**Sheet 6 of 6**

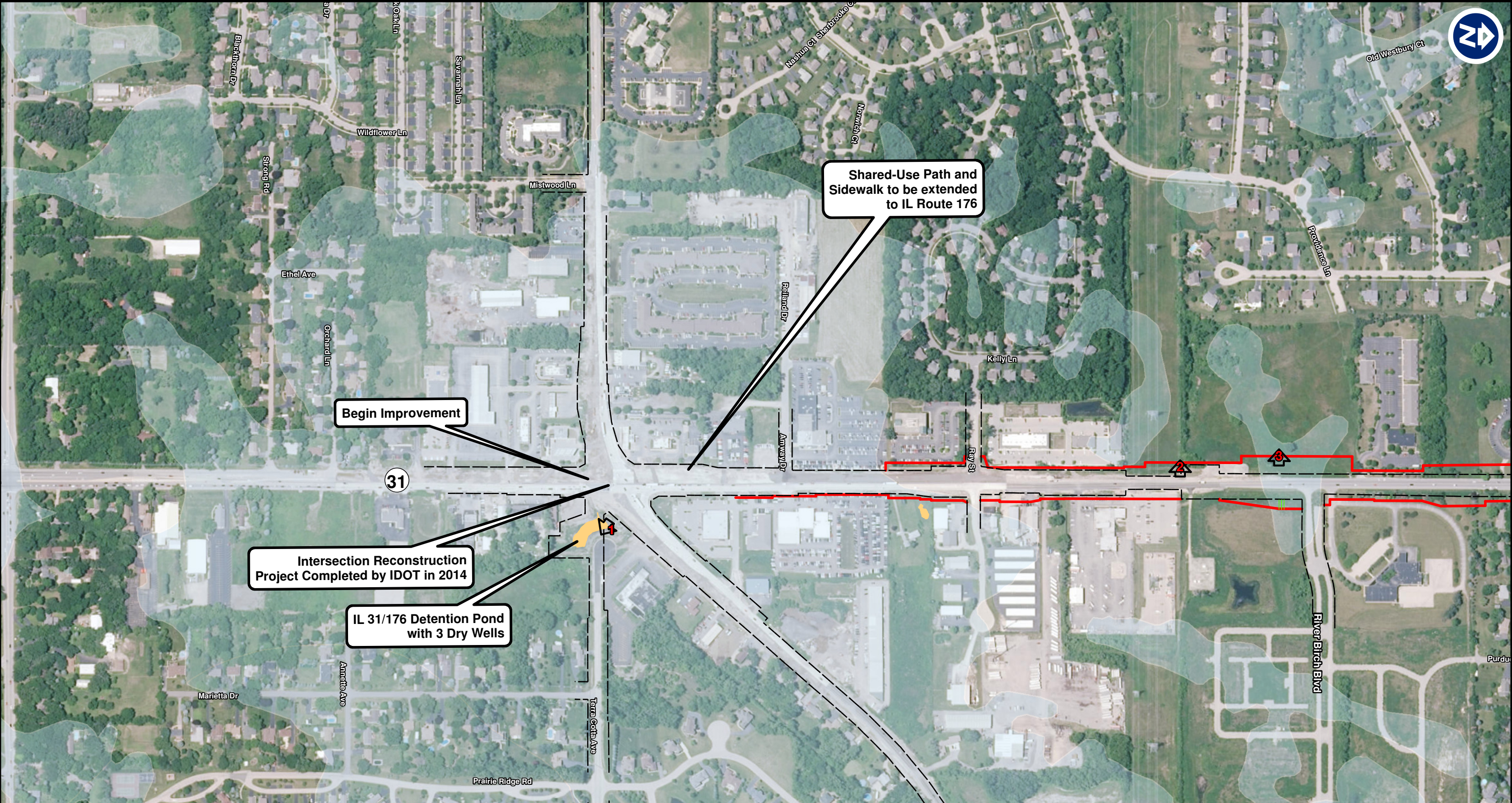
0 200 400 800

Feet

**Legend**

Wastewater Treatment Plant	All Community Wells	Tree Impact	Traffic Noise Receptor	Outfall	Stream	Impacted Farm Parcel
Existing ROW	All Non Community Wells	Oak Tree Impact	Common Noise Environment	WOUS (INHS)	Floodplain	Prime & Important Farmland Soil
Proposed ROW	Non Community Well Impact	Shagbark Hickory Tree Impact	Business Site Impact	Lakes and Rivers	Floodway	Prairie Grove Town Center
Prairie Trail	School	Residential Acquisition	Highly Erodible Soil	Proposed Detention Pond / Proposed Retention Basin	ADID Wetland	Census Tracts 8706.05 and 8706.06
Proposed Retaining Wall	Place of Worship	Business Structure Acquisition	Park	Sensitive Aquifer Recharge Area	NON-ADID Wetland	
		Owned by Land Conservancy of McHenry County				





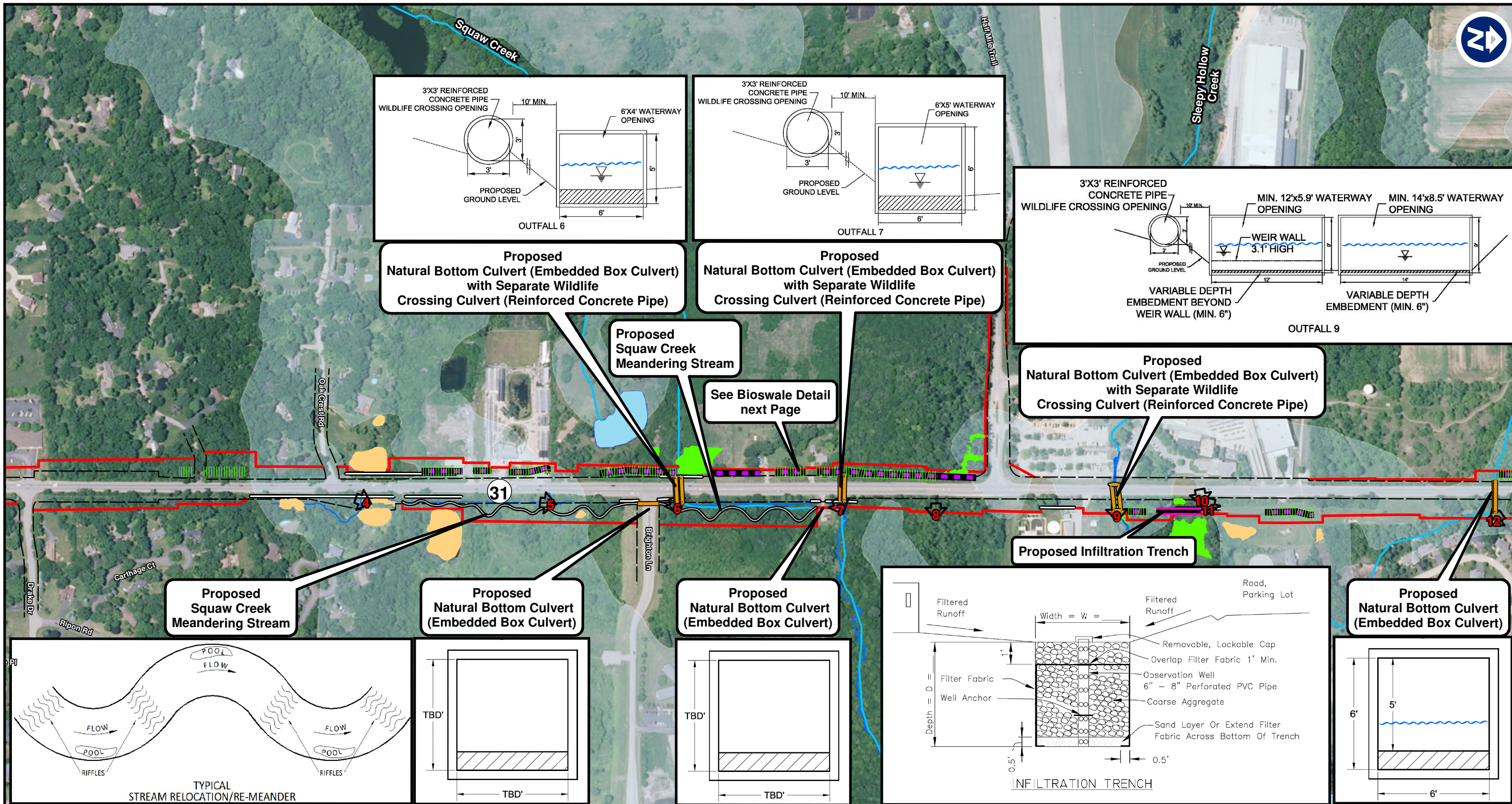
**Exhibit 5**  
**Best Management Practices Map**  
**Illinois Route 31**  
**Illinois Route 176 to Illinois Route 120**  
**McHenry County, Illinois**  
**Sheet 1 of 6**

0 265 530 1,060  
Feet

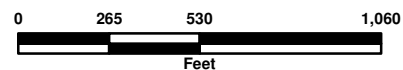
**Legend**

--- Existing ROW	Meandering Stream	Perennial Stream	Ditch Check	Stream
Proposed ROW	Proposed Bioswale	ADID Wetland	WOUS (INHS)	Outfall
Proposed Retaining Wall	Proposed Infiltration Trench	NON-ADID Wetland	Lakes and Rivers	Embedded Culvert - Typical 1' Depth
Water Level	Proposed Natural Bottom Culvert/Bridge	Sensitive Aquifer Recharge Area	Proposed Detention Pond/Proposed Retention Basin	





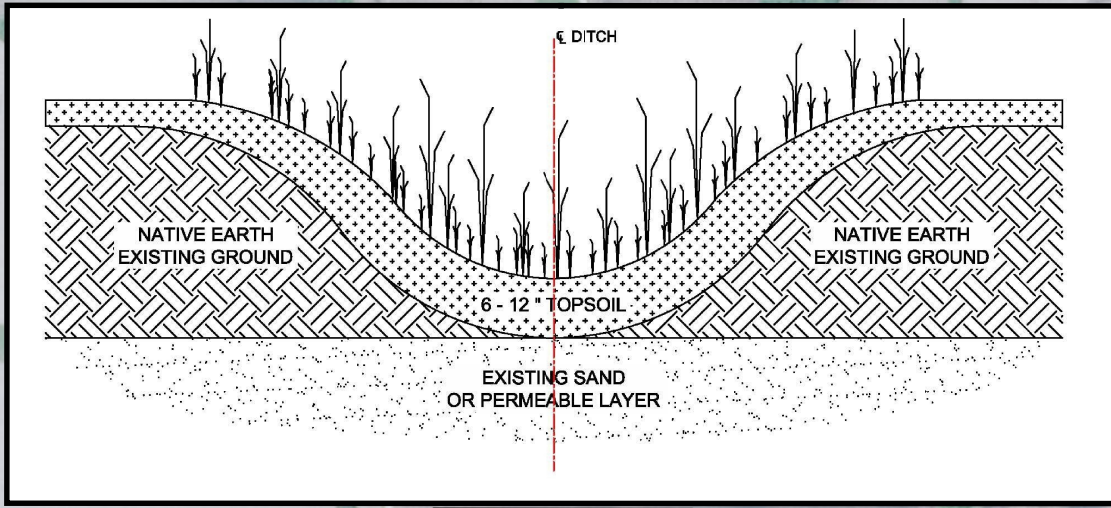
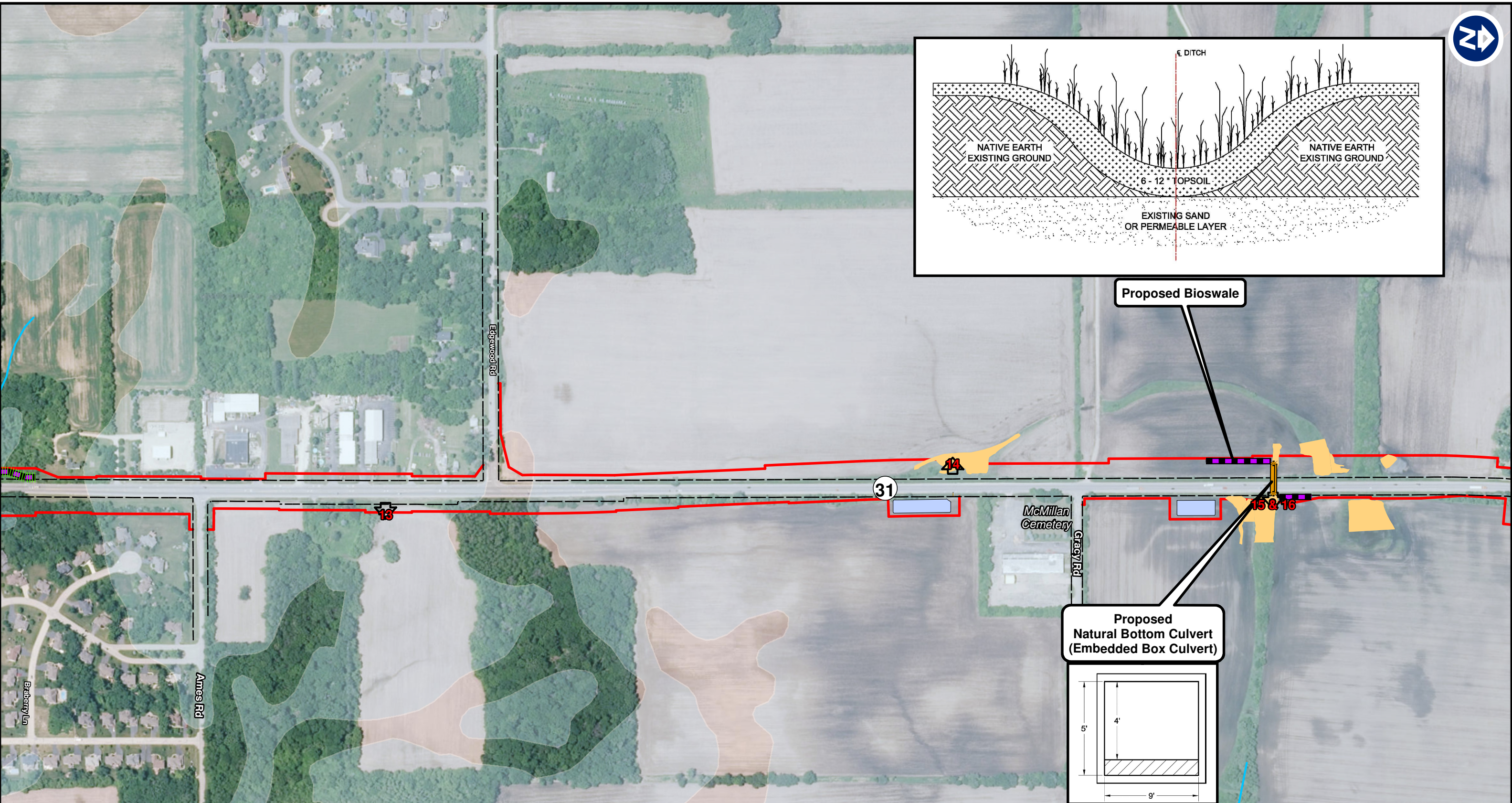
**Exhibit 5**  
**Best Management Practices Map**  
**Illinois Route 31**  
**Illinois Route 176 to Illinois Route 120**  
**McHenry County, Illinois**  
**Sheet 2 of 6**



**Legend**

- |                         |  |                                 |  |                                     |
|-------------------------|--|---------------------------------|--|-------------------------------------|
| --- Existing ROW        | Meandering Stream                      | Perennial Stream                | Ditch Check                                      | Stream                              |
| Proposed ROW            | Proposed Bioswale                      | ADID Wetland                    | WOUS (INHS)                                      | Outfall                             |
| Proposed Retaining Wall | Proposed Infiltration Trench           | NON-ADID Wetland                | Lakes and Rivers                                 | Embedded Culvert - Typical 1' Depth |
| Water Level             | Proposed Natural Bottom Culvert/Bridge | Sensitive Aquifer Recharge Area | Proposed Detention Pond/Proposed Retention Basin |                                     |





Proposed Bioswale

Proposed Natural Bottom Culvert (Embedded Box Culvert)

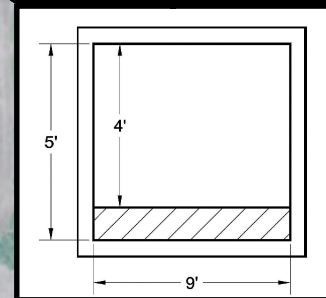


Exhibit 5  
Best Management Practices Map  
Illinois Route 31  
Illinois Route 176 to Illinois Route 120  
McHenry County, Illinois  
Sheet 3 of 6



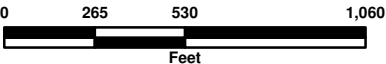
### Legend

- |                         |  |                                 |  |                                     |
|-------------------------|--|---------------------------------|--|-------------------------------------|
| --- Existing ROW        | Meandering Stream                      | Perennial Stream                | Ditch Check                                      | Stream                              |
| Proposed ROW            | Proposed Bioswale                      | ADID Wetland                    | WOUS (INHS)                                      | Outfall                             |
| Proposed Retaining Wall | Proposed Infiltration Trench           | NON-ADID Wetland                | Lakes and Rivers                                 | Embedded Culvert - Typical 1' Depth |
| Water Level             | Proposed Natural Bottom Culvert/Bridge | Sensitive Aquifer Recharge Area | Proposed Detention Pond/Proposed Retention Basin |                                     |





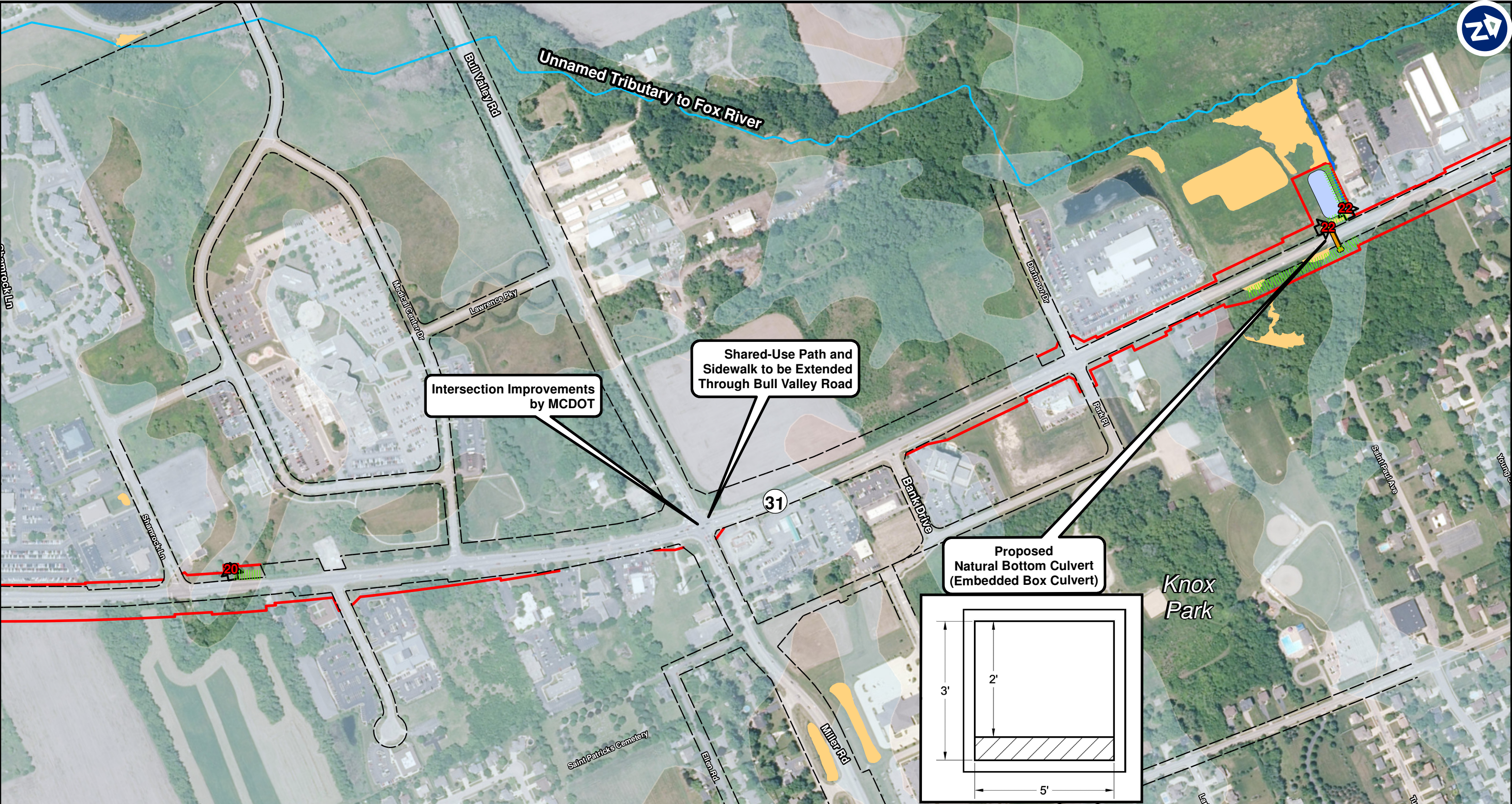
**Exhibit 5**  
**Best Management Practices Map**  
**Illinois Route 31**  
**Illinois Route 176 to Illinois Route 120**  
**McHenry County, Illinois**  
**Sheet 4 of 6**



**Legend**

- |                           |  |                                 |   |                                     |
|---------------------------|--|---------------------------------|---|-------------------------------------|
| --- Existing ROW          | Meandering Stream                      | ▽ Perennial Stream              | Ditch Check                                       | Stream                              |
| — Proposed ROW            | Proposed Bioswale                      | ADID Wetland                    | WOUS (INHS)                                       | Outfall                             |
| — Proposed Retaining Wall | Proposed Infiltration Trench           | NON-ADID Wetland                | Lakes and Rivers                                  | Embedded Culvert - Typical 1' Depth |
| Water Level               | Proposed Natural Bottom Culvert/Bridge | Sensitive Aquifer Recharge Area | Proposed Detention Pond/ Proposed Retention Basin |                                     |





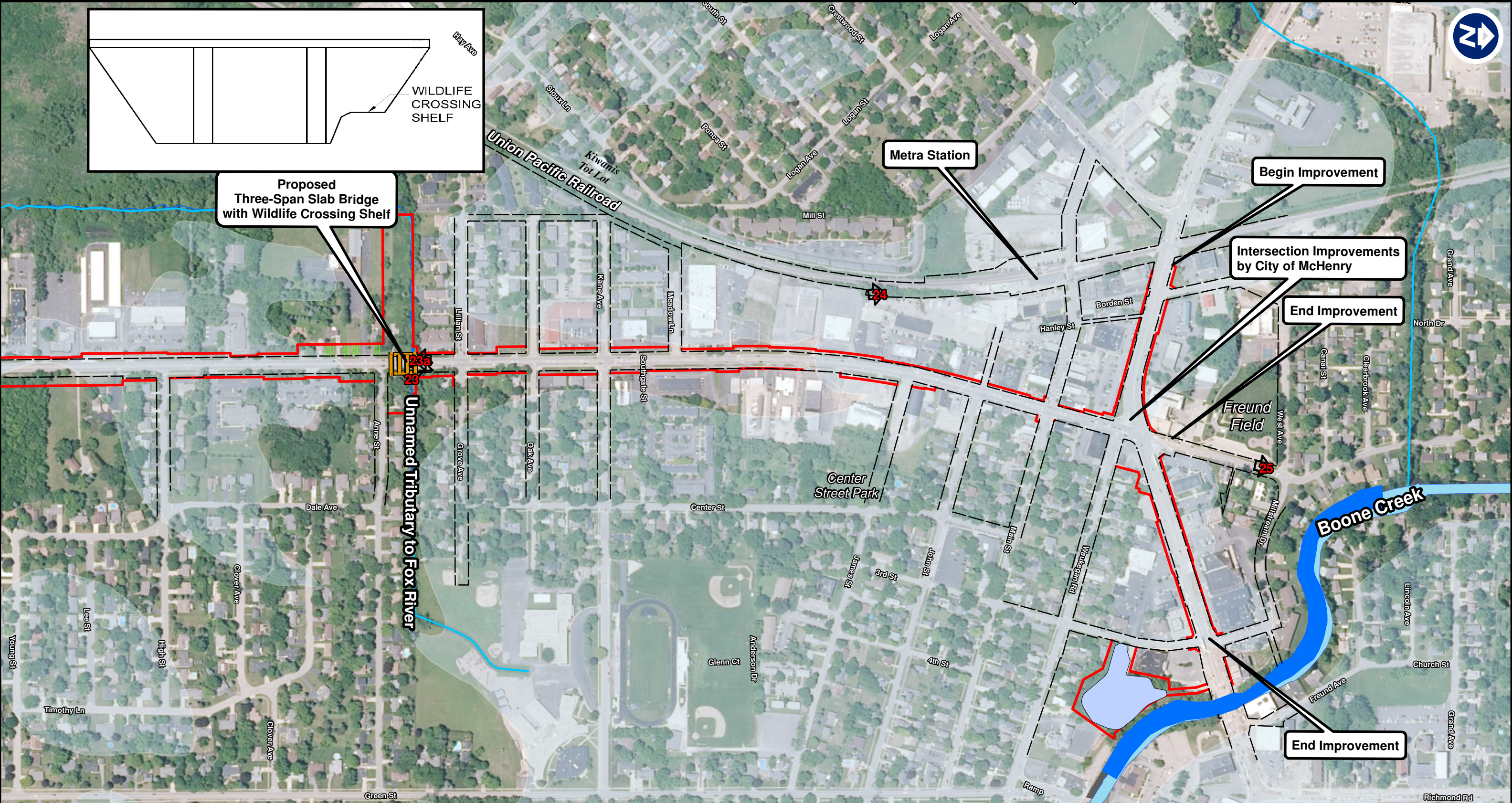
**Exhibit 5**  
**Best Management Practices Map**  
**Illinois Route 31**  
**Illinois Route 176 to Illinois Route 120**  
**McHenry County, Illinois**  
**Sheet 5 of 6**

0 265 530 1,060  
Feet

**Legend**

--- Existing ROW	Meandering Stream	Perennial Stream	Ditch Check	Stream
— Proposed ROW	Proposed Bioswale	ADID Wetland	WOUS (INHS)	Outfall
— Proposed Retaining Wall	Proposed Infiltration Trench	NON-ADID Wetland	Lakes and Rivers	Embedded Culvert - Typical 1' Depth
Water Level	Proposed Natural Bottom Culvert/Bridge	Sensitive Aquifer Recharge Area	Proposed Detention Pond/Proposed Retention Basin	





**Exhibit 5**  
**Best Management Practices Map**  
**Illinois Route 31**  
**Illinois Route 176 to Illinois Route 120**  
**McHenry County, Illinois**  
**Sheet 6 of 6**

0 265 530 1,060  
Feet

**Legend**

--- Existing ROW	Meandering Stream	Perennial Stream	Ditch Check	Stream
— Proposed ROW	Proposed Bioswale	ADID Wetland	WOUS (INHS)	Outfall
— Proposed Retaining Wall	Proposed Infiltration Trench	NON-ADID Wetland	Lakes and Rivers	Embedded Culvert - Typical 1' Depth
Water Level	Proposed Natural Bottom Culvert/Bridge	Sensitive Aquifer Recharge Area	Proposed Detention Pond/Proposed Retention Basin	