APPENDIX H

Stormwater Performance

U.S. Army Corps of Engineers Stormwater Performance Standards Guidance

Best Management Practices Data and Calculations

Stormwater Performance Standards Guidance

The U.S. Army Corps of Engineers, Chicago District (Corps) is adopting the use of numeric standards to address stormwater runoff on project sites.

Under the Regional Permit Program (RPP) , Residential, Commercial and Institutional Developments (Regional Permit 1), Recreational Projects (Regional Permit 2), and Transportation Projects (Regional Permit 3), the applicant is required to employ permanent Best Management Practices (BMPs) to protect water quality, preserve natural hydrology and minimize the overall impacts of development on aquatic resources (Condition g of RP1 and RP2 and condition m of RP3).

Applicants can satisfy this requirement by demonstrating that the project will retain the runoff from a 1-inch rainfall. The Corps will presume that BMPs are sufficient if an applicant meets this standard (although other approaches may also be sufficient). The standards are based on the "Stormwater Performance Standards Recommendations" prepared by the Post Development Stormwater Runoff Standards Workgroup and Association of Illinois Soil and Water Conservation Districts for submission to the Illinois Environmental Protection Agency, dated June 28, 2013.

The purpose of the RPP is to provide a simplified and expeditious means to review activities that meet the specified terms and conditions. The Corps believes the adoption of numeric standards will make the permit program more predictable and decrease permitting review timeframes. These standards are not intended as an additional permit requirement; rather, they are intended to provide clarity on meeting existing requirements.

For Regional Permits 1 and 2, the applicant shall demonstrate the retention of the runoff from a 1-inch rainfall event.

BMPs must be implemented such that the practices will retain a runoff volume equal to 1 inch of rainfall times the new area of the impervious surfaces on-site.

Applicants shall be required to design, construct, and maintain stormwater management practices that manage rainfall on-site, and prevent the off-site discharge of the precipitation from the first 1 inch of rainfall from a 24-hour storm. Discharge volume reduction can be achieved by, but are not limited to, the following practices: soil amendments, engineered infiltration, evaporation, evapotranspiration, or any combination.

The first 1-inch of rainfall shall be 100% managed on-site. For example, a 90th percentile storm in the Chicago area is approximately a 1 inch rain event over a 24 hour period.

Transportation Projects (RP3)

Applicants shall be required to make a reasonable attempt to retain the runoff from the 1 inch rainfall event times the new area of proposed impervious surface on-site. Additional right-of-way (ROW) may need to be obtained in order to incorporate green infrastructure stormwater practices on the project. Applicants are encouraged to engage in pre-application discussions during the planning process and Phase 1 of project design and prior to finalizing right-of-way (ROW) needs as additional ROW for BMPs may be required.

Where site or project constraints make it impracticable to fully meet the stormwater performance standard, applicants shall be allowed to implement practices in accordance with the following hierarchy:

1. Retain the greatest amount of runoff practicable given site/project constraints.
2. Implement measures to filter and slow down the movement of stormwater, such as using bioswales as part of drainage ditches.
3. Implement measures to detain water to the maximum extent practicable, such as in-pipe detention, so that stormwater is released slowly during and after storms to help prevent localized flooding and erosion of downstream water bodies.
4. Utilize catch basins with sumps or other inlet controls to trap sediment, debris, and pollutants.
5. Incorporate runoff design practices for bridge deck runoff crossing waters to minimize stormwater impacts considering alternatives such as:
    a. Conveying the storm water runoff over the surface of the bridge to one or both ends for BMP treatment or discharge.
    b. Conveying the storm water runoff via piping or open troughs over to one or both ends of the bridge for BMP treatment or discharge.
    c. Detaining and treating the storm water under the bridge deck and;
    d. Street sweeping.
6. Create hazardous spill basins to protect surface water quality by detaining hazardous materials accidentally released on roadways near sensitive waters and concentrated truck usage areas.
7. Use treatment devices such as oil/water separators and vortex separators to reduce concentrations of sediment and other pollutants in stormwater discharges. BMPs implemented for linear projects shall be maintained so that they continue to control flow volumes and reduce pollutant loads as originally designed and installed.

Sensitive Aquatic Resources

The Corps may determine that additional protective stormwater performance standards are required if the site drains to high quality aquatic resources (HQARs), as defined in the current RPP.

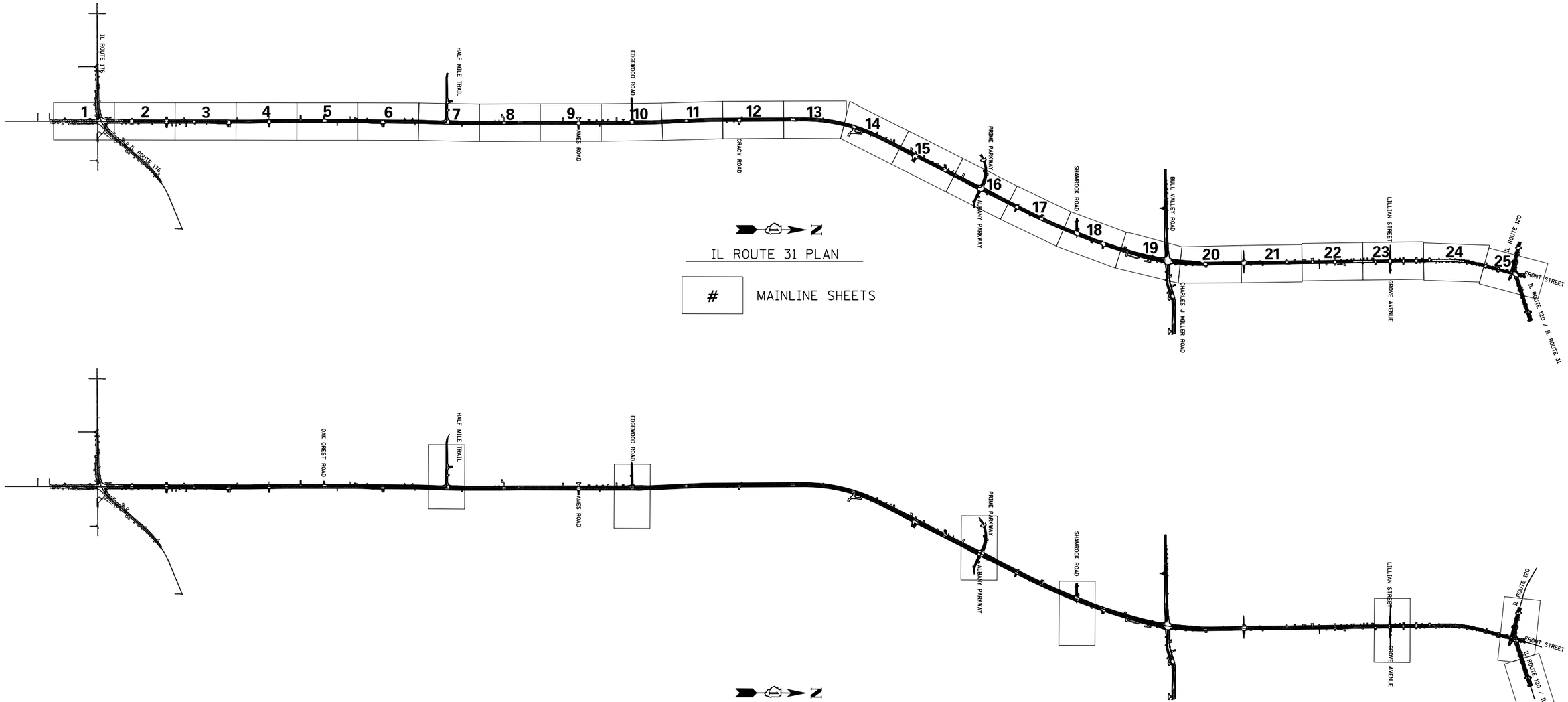
Infiltration

Stormwater 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, infiltration practices should not be implemented in the following circumstances:

1. Areas/sites where vehicle fueling and maintenance occur.
2. Areas/sites with less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
3. Areas where contaminants in soil or groundwater could be mobilized by infiltrating stormwater.
4. Areas within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features.
5. Areas within a delineated source water protection area for a public drinking water supply where the potential for introducing pollutants into the groundwater exists. Infiltration practices should be restricted in areas within 400 feet of a community water supply well if there is not a wellhead protection delineation area, and also in areas within 200 feet of private water supply well(s).
6. Areas where the shallow aquifer drains to/recharges a sensitive ecosystem such as a fen.
7. Areas where soil infiltration rates are more than 8.3 inches per hour.
8. An area of a brownfield site where there are contaminants present in the soil would be an example of an area where infiltration may not be advisable. In such situations, applicant/operators should consult with IEPA Bureau of Land or another appropriate agency to evaluate soil characteristics to determine if there would be risks to groundwater from infiltrating stormwater. In some areas institutional controls are used to reduce health risks.

Management and Monitoring Plan

A management and monitoring plan will be required for all approved BMPs. 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.



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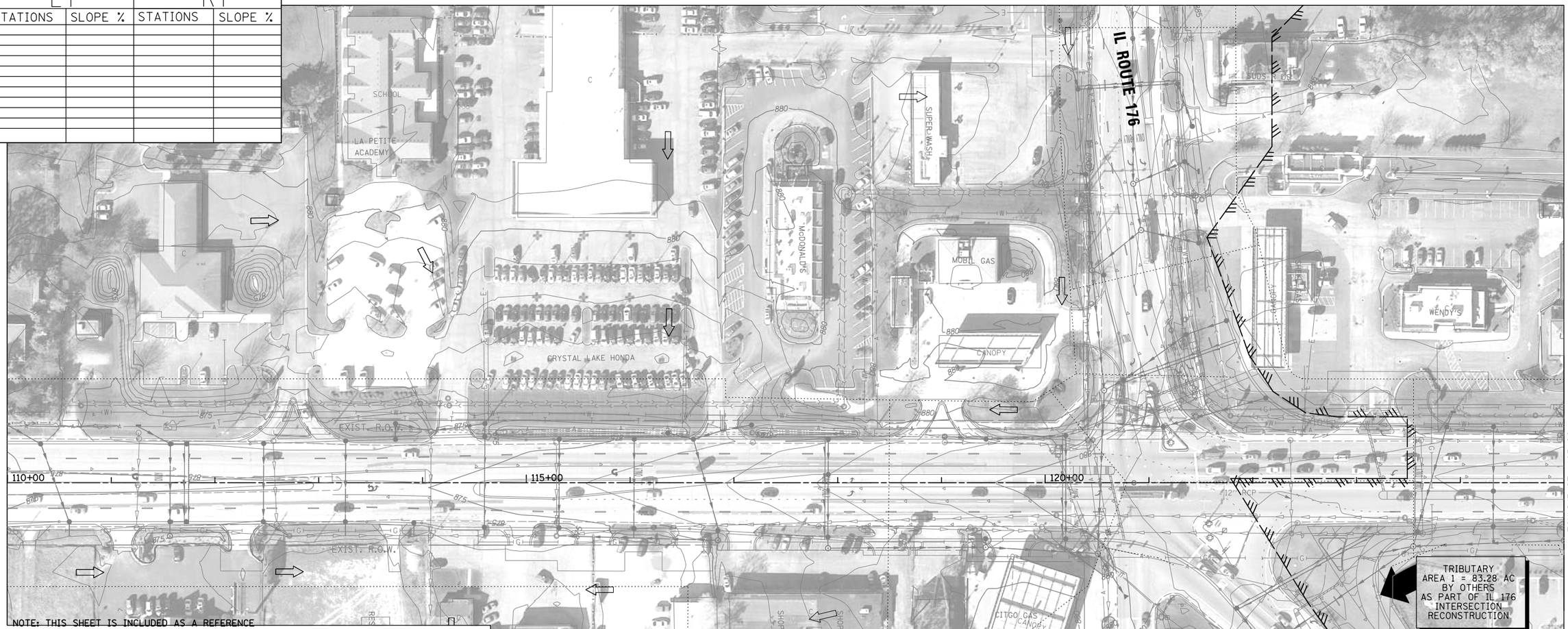
DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %



NOTE: THIS SHEET IS INCLUDED AS A REFERENCE

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50' 100' 150'

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

NOTE:

STORM SEWERS SHOWN FROM IL ROUTE 176 TO OUTLET 3 ARE SHOWN AS DESIGNED IN THE APPROVED PHASE I STUDY FOR IL 31 AND IL 176 INTERSECTION PROJECT. REFER TO PHASE II PLANS FOR STORM DESIGN INFORMATION SOUTH OF OUTLET 3.

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 1
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 110+00 TO STA. 125+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	1
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

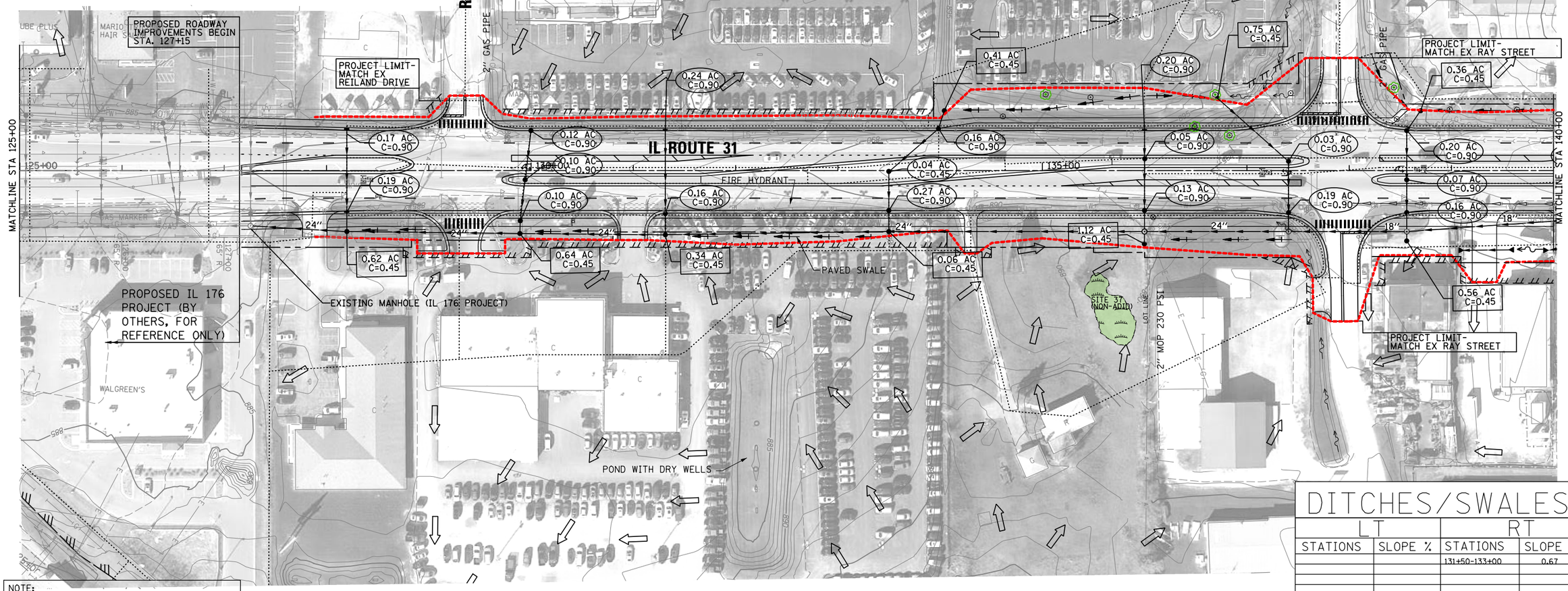
DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

N

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



NOTE:

STORM SEWERS SHOWN FROM IL ROUTE 176 TO OUTLET 3 ARE SHOWN AS DESIGNED IN THE APPROVED PHASE I STUDY FOR IL 31 AND IL 176 INTERSECTION PROJECT. REFER TO PHASE II PLANS FOR STORM DESIGN INFORMATION SOUTH OF OUTLET 3.

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
		131+50-133+00	0.67

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

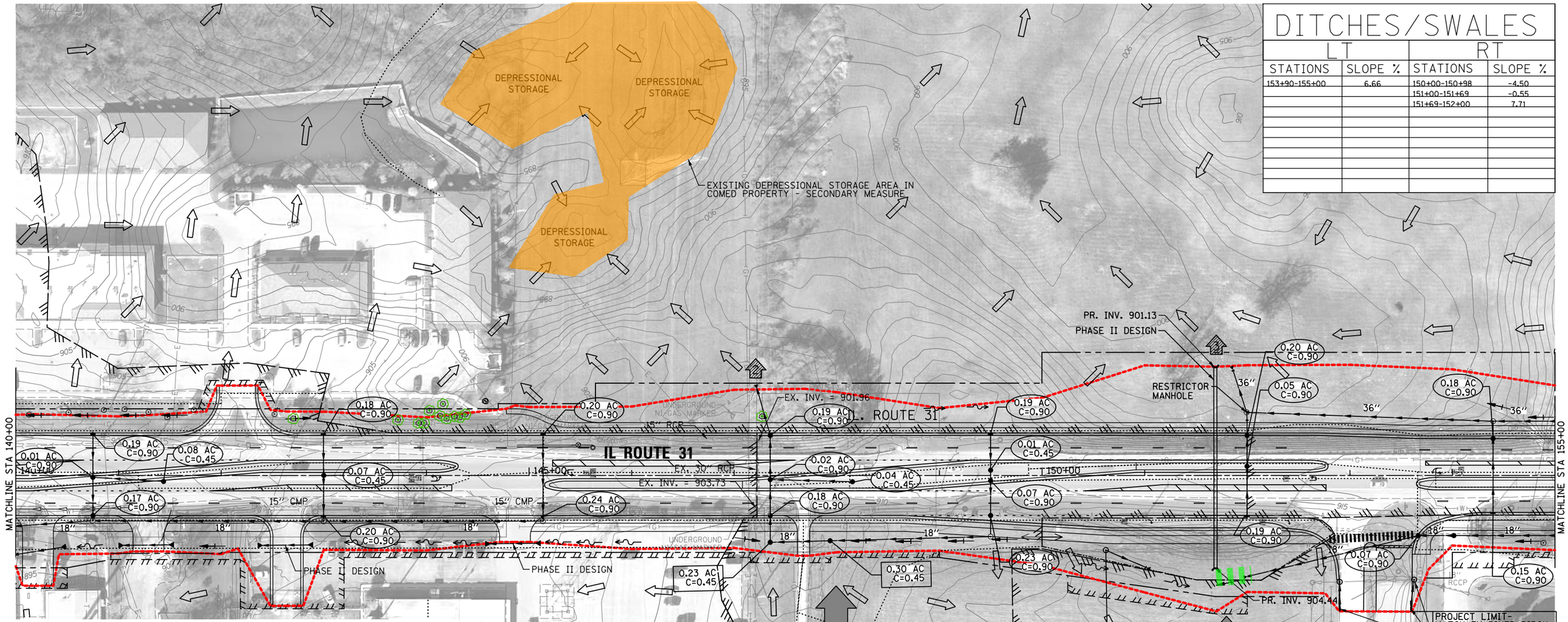
PROPOSED DRAINAGE PLAN 2
ILLINOIS ROUTE 31

SCALE: 1″ = 50′ | SHEET OF SHEETS | STA. 125+00 TO STA. 140+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	2
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
153+90-155+00	6.66	150+00-150+98	-4.50
		151+00-151+69	-0.55
		151+69-152+00	7.71



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
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- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
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- PROPOSED HEADWALL
- PROPOSED STORM SEWER
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- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50' 100' 150'

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

NOTE:

STORM SEWERS SHOWN FROM IL ROUTE 176 TO OUTLET 3 ARE SHOWN AS DESIGNED IN THE APPROVED PHASE I STUDY FOR IL 31 AND IL 176 INTERSECTION PROJECT. REFER TO PHASE II PLANS FOR STORM DESIGN INFORMATION SOUTH OF OUTLET 3.

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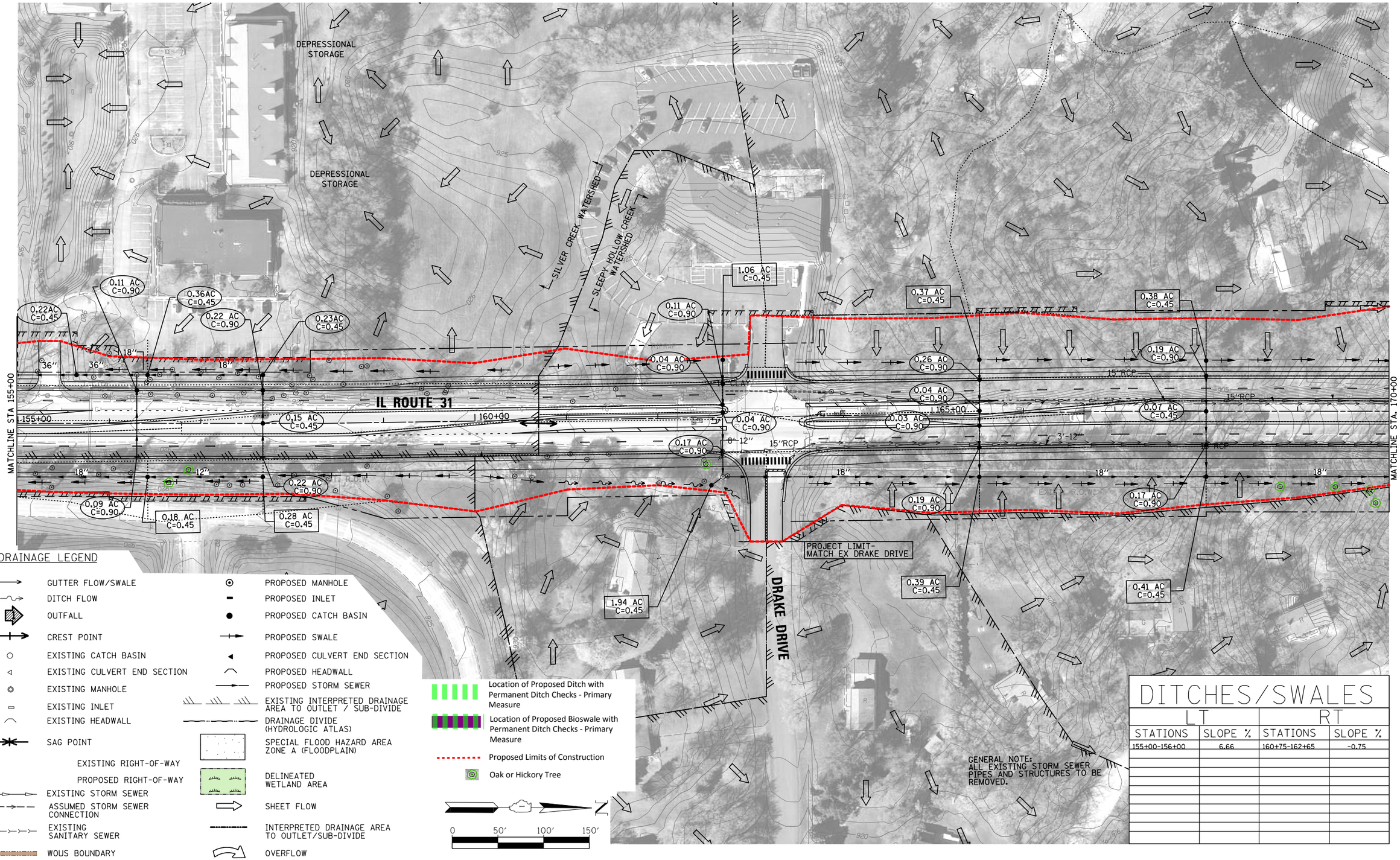
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 3
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 140+00 TO STA. 155+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	3
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		



DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
155+00-156+00	6.66	160+75-162+65	-0.75

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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 4
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 155+00 TO STA. 170+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	4

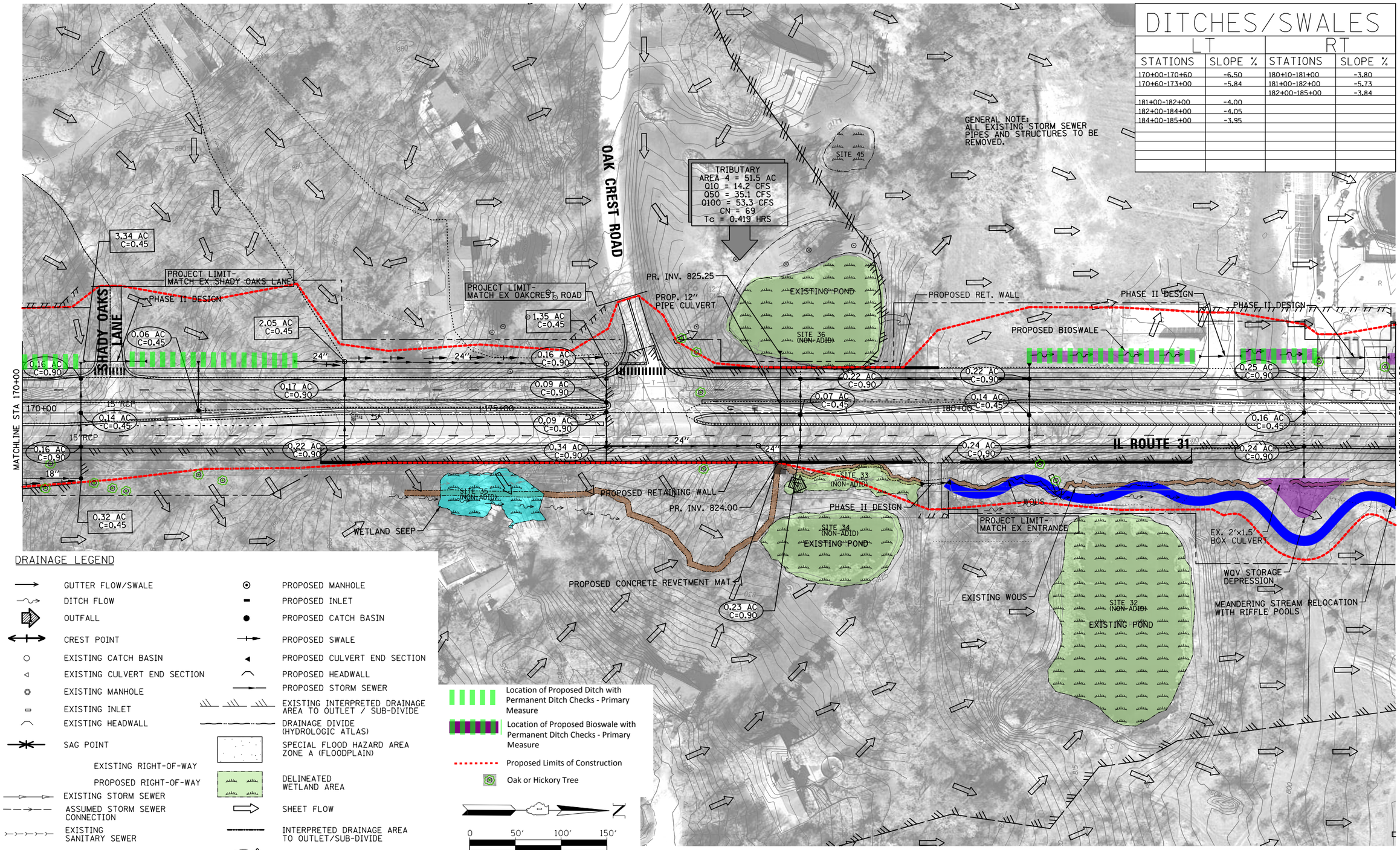
CONTRACT NO.

ILLINOIS FED. AID PROJECT

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
170+00-170+60	-6.50	180+10-181+00	-3.80
170+60-173+00	-5.84	181+00-182+00	-5.73
		182+00-185+00	-3.84
181+00-182+00	-4.00		
182+00-184+00	-4.05		
184+00-185+00	-3.95		

GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

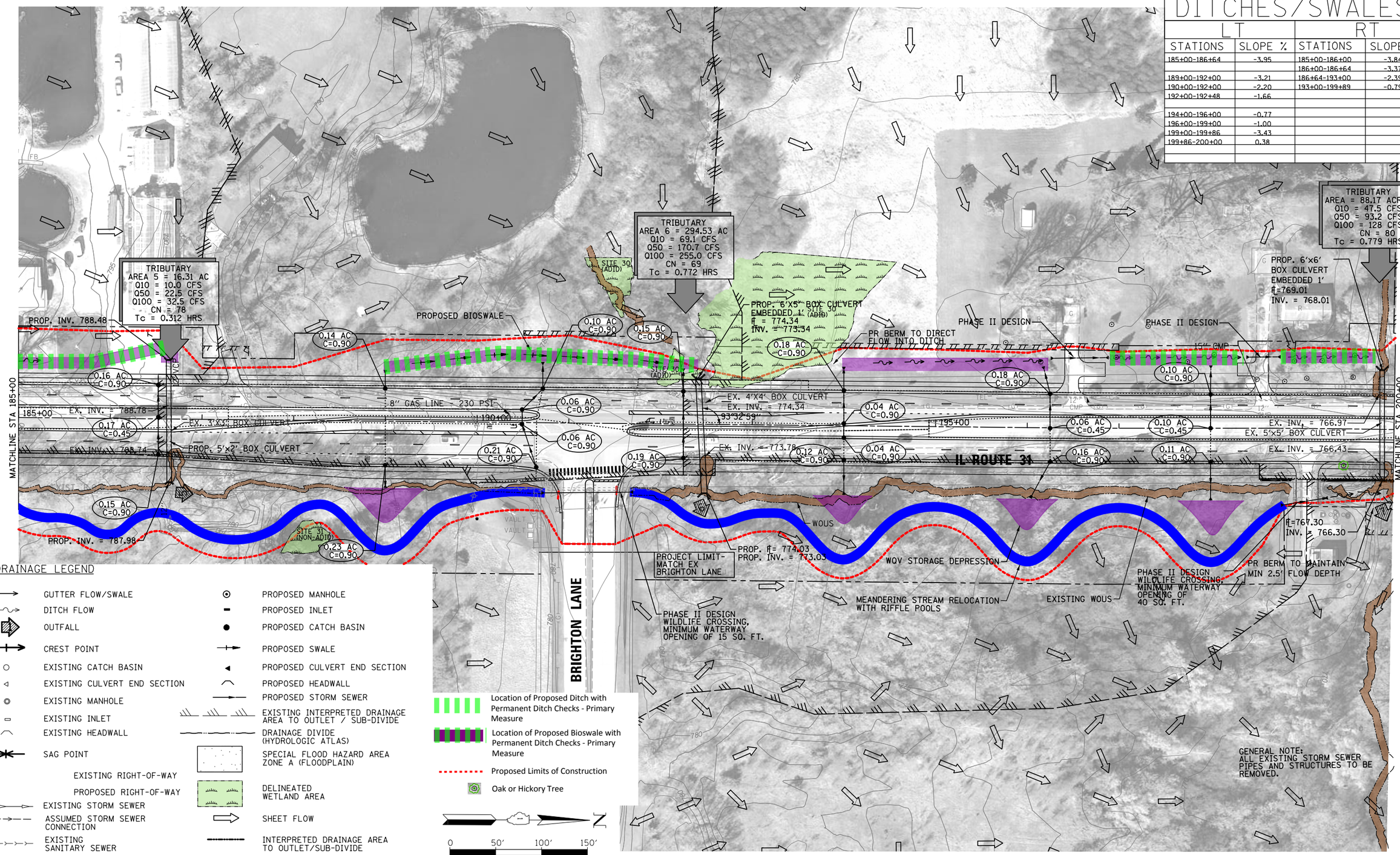
PROPOSED DRAINAGE PLAN 5
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 170+00 TO STA. 185+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	5
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
185+00-186+64	-3.95	185+00-186+00	-3.84
		186+00-186+64	-3.37
189+00-192+00	-3.21	186+64-193+00	-2.39
190+00-192+00	-2.20	193+00-199+89	-0.79
192+00-192+48	-1.66		
194+00-196+00	-0.77		
196+00-199+00	-1.00		
199+00-199+86	-3.43		
199+86-200+00	0.38		



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
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- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 6
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 185+00 TO STA. 200+00

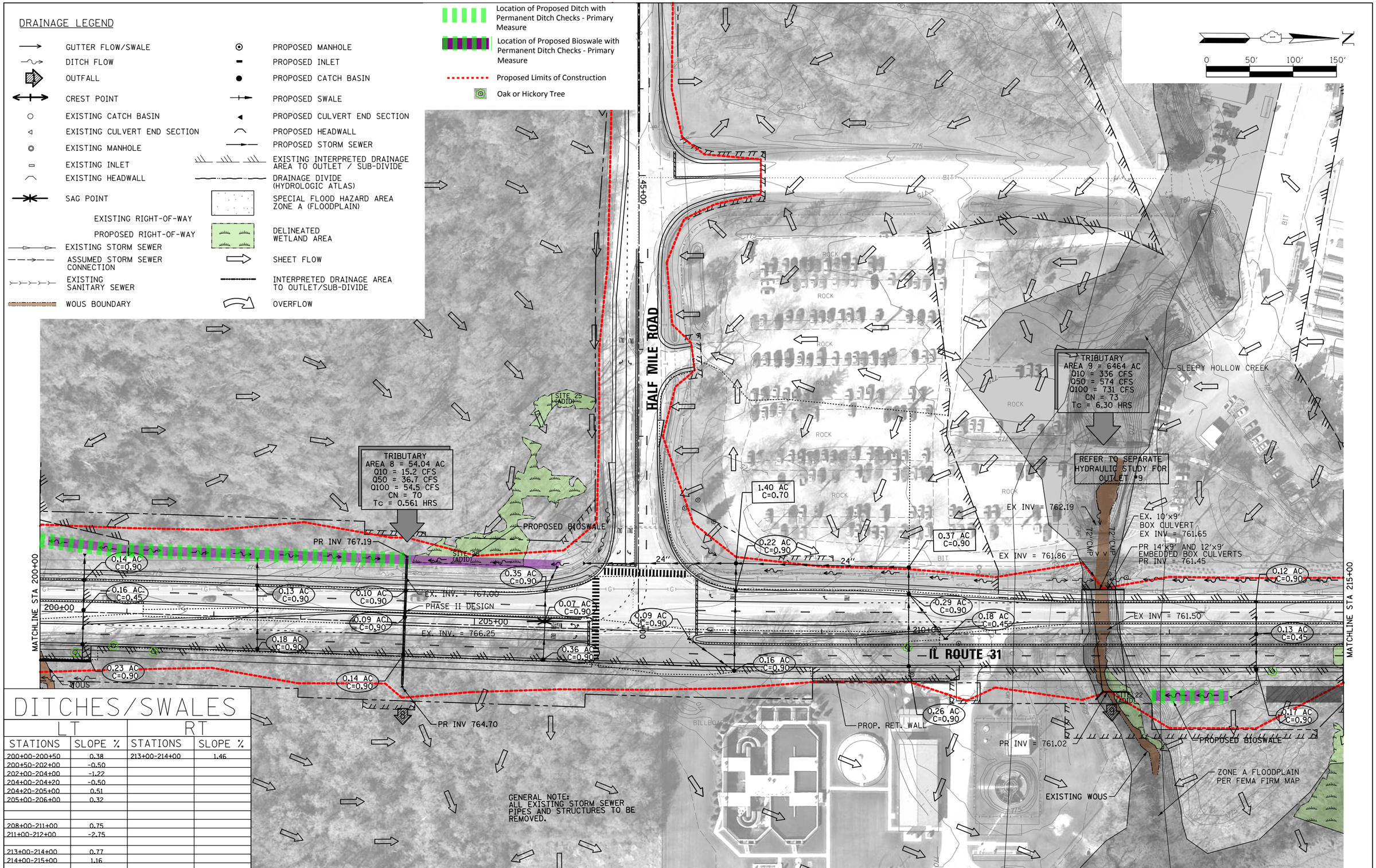
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	6

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW
- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
200+00-200+50	0.38	213+00-214+00	1.46
200+50-202+00	-0.50		
202+00-204+00	-1.22		
204+00-204+20	-0.50		
204+20-205+00	0.51		
205+00-206+00	0.32		
208+00-211+00	0.75		
211+00-212+00	-2.75		
213+00-214+00	0.77		
214+00-215+00	1.16		

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 7
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 200+00 TO STA. 215+00

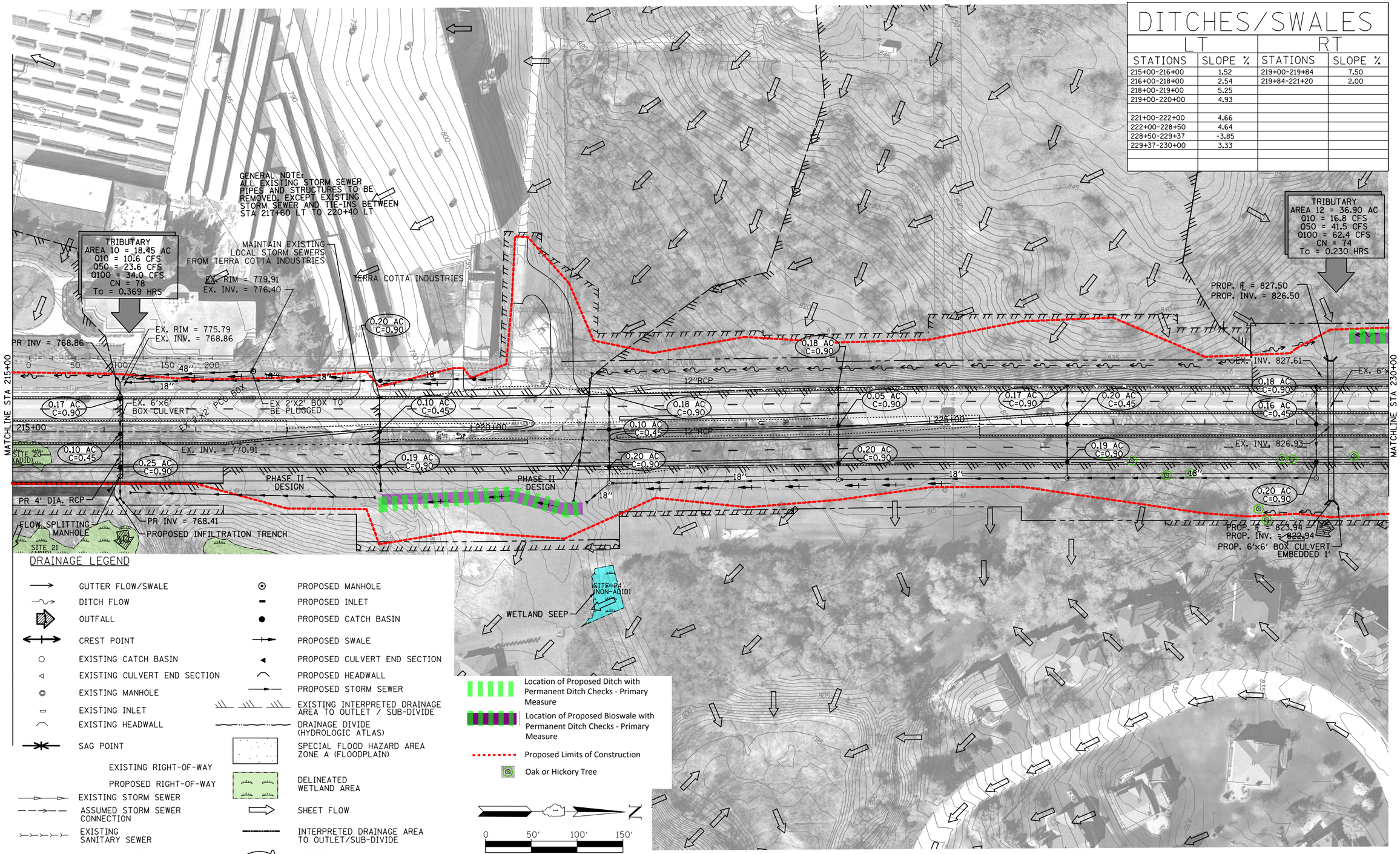
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	7

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
215+00-216+00	1.52	219+00-219+84	7.50
216+00-218+00	2.54	219+84-221+20	2.00
218+00-219+00	5.25		
219+00-220+00	4.93		
221+00-222+00	4.66		
222+00-228+50	4.64		
228+50-229+37	-3.85		
229+37-230+00	3.33		



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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 8
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 215+00 TO STA. 230+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	8

CONTRACT NO.

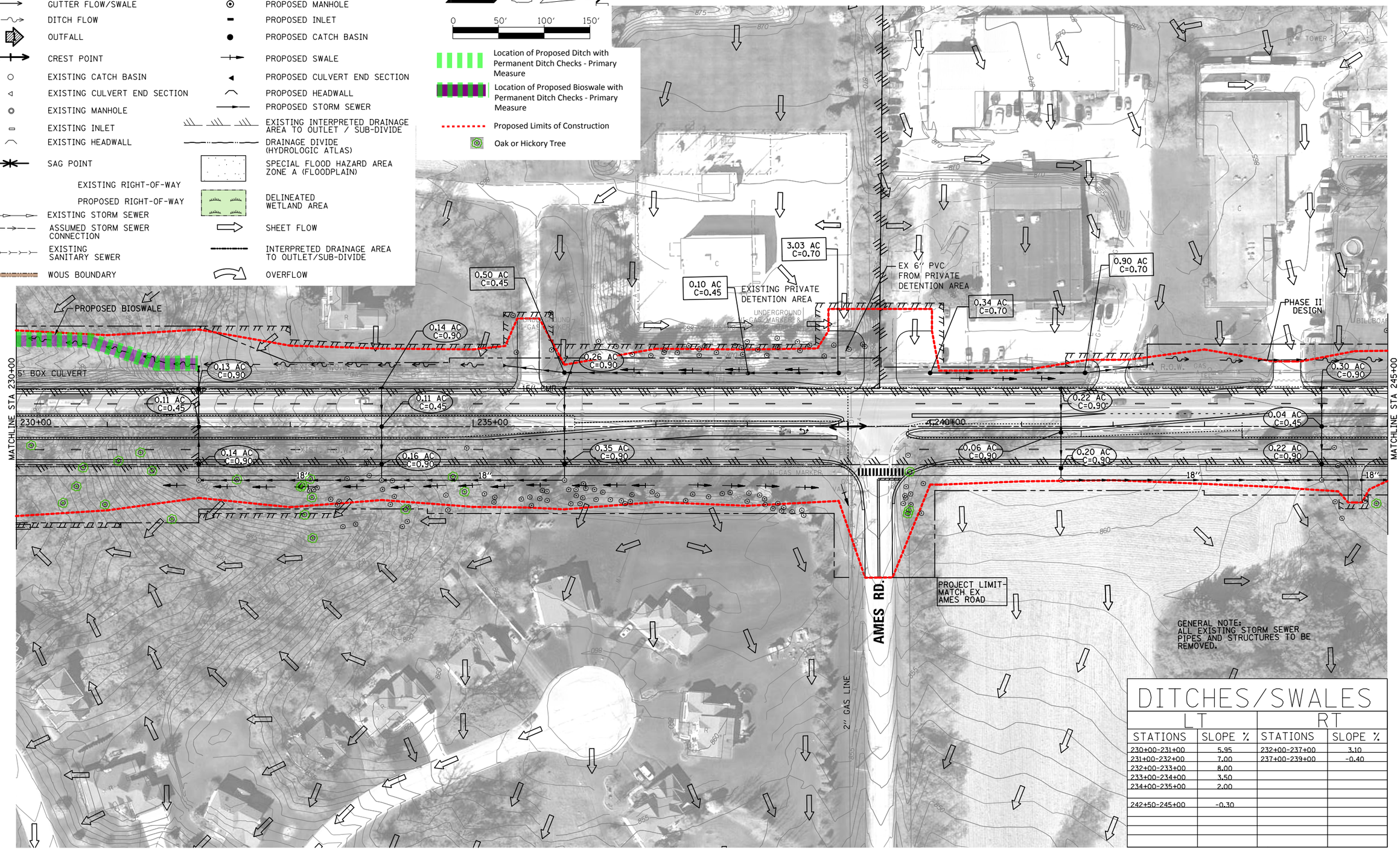
ILLINOIS FED. AID PROJECT

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
230+00-231+00	5.95	232+00-237+00	3.10
231+00-232+00	7.00	237+00-239+00	-0.40
232+00-233+00	8.00		
233+00-234+00	3.50		
234+00-235+00	2.00		
242+50-245+00	-0.30		

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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

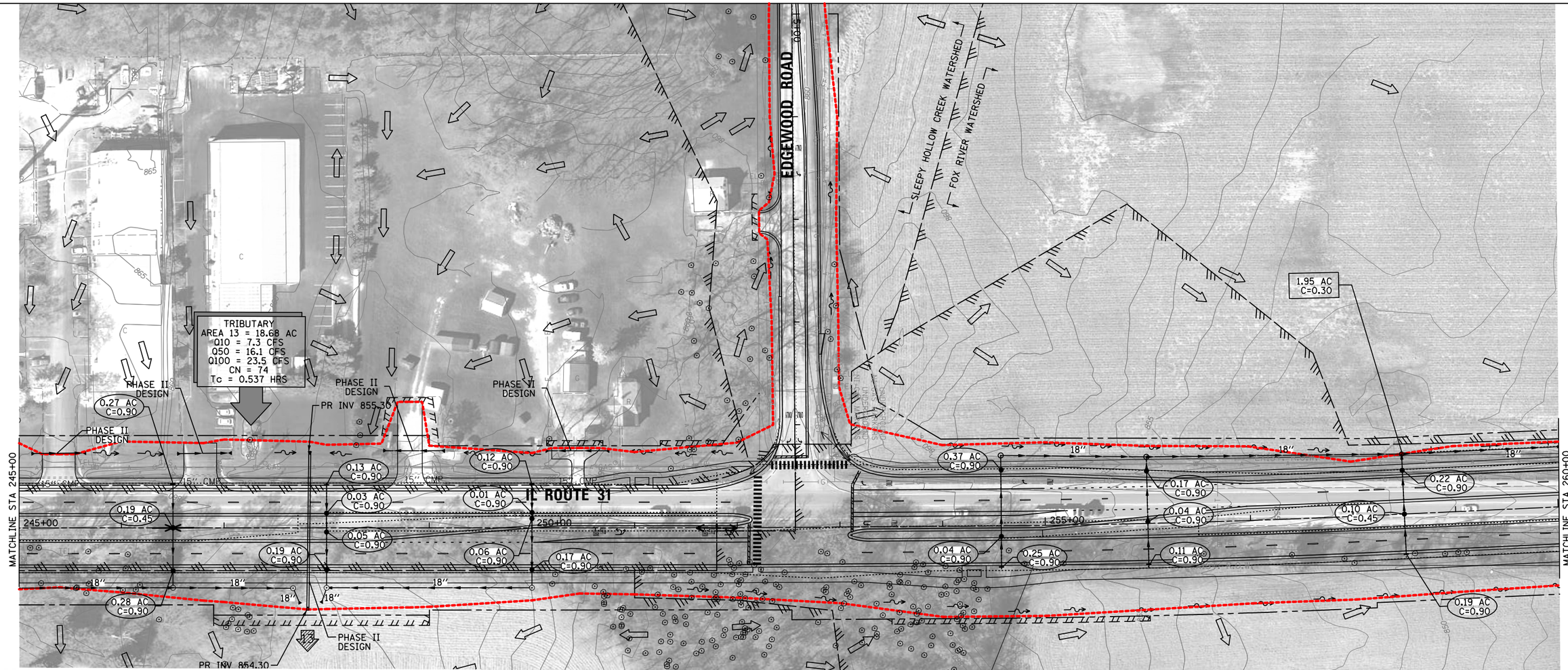
PROPOSED DRAINAGE PLAN 9
ILLINOIS ROUTE 31

SCALE: 1″ = 50′ | SHEET OF SHEETS | STA. 230+00 TO STA. 245+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	9

CONTRACT NO.

ILLINOIS FED. AID PROJECT



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW
- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

0 50' 100' 150'

GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
245+00-246+00	-0.30	251+35-253+00	-1.50
246+00-247+00	-1.45	253+00-254+00	-2.65
247+00-247+83	-0.36	254+00-255+00	-2.55
247+83-249+00	1.71	255+00-260+00	-1.55
249+00-250+00	0.70		
250+00-251+00	2.00		
251+00-252+00	1.00		
252+00-253+00	-1.35		
253+00-255+00	-1.74		
255+00-257+00	-2.13		
257+00-258+00	-0.40		

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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 10
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 245+00 TO STA. 260+00

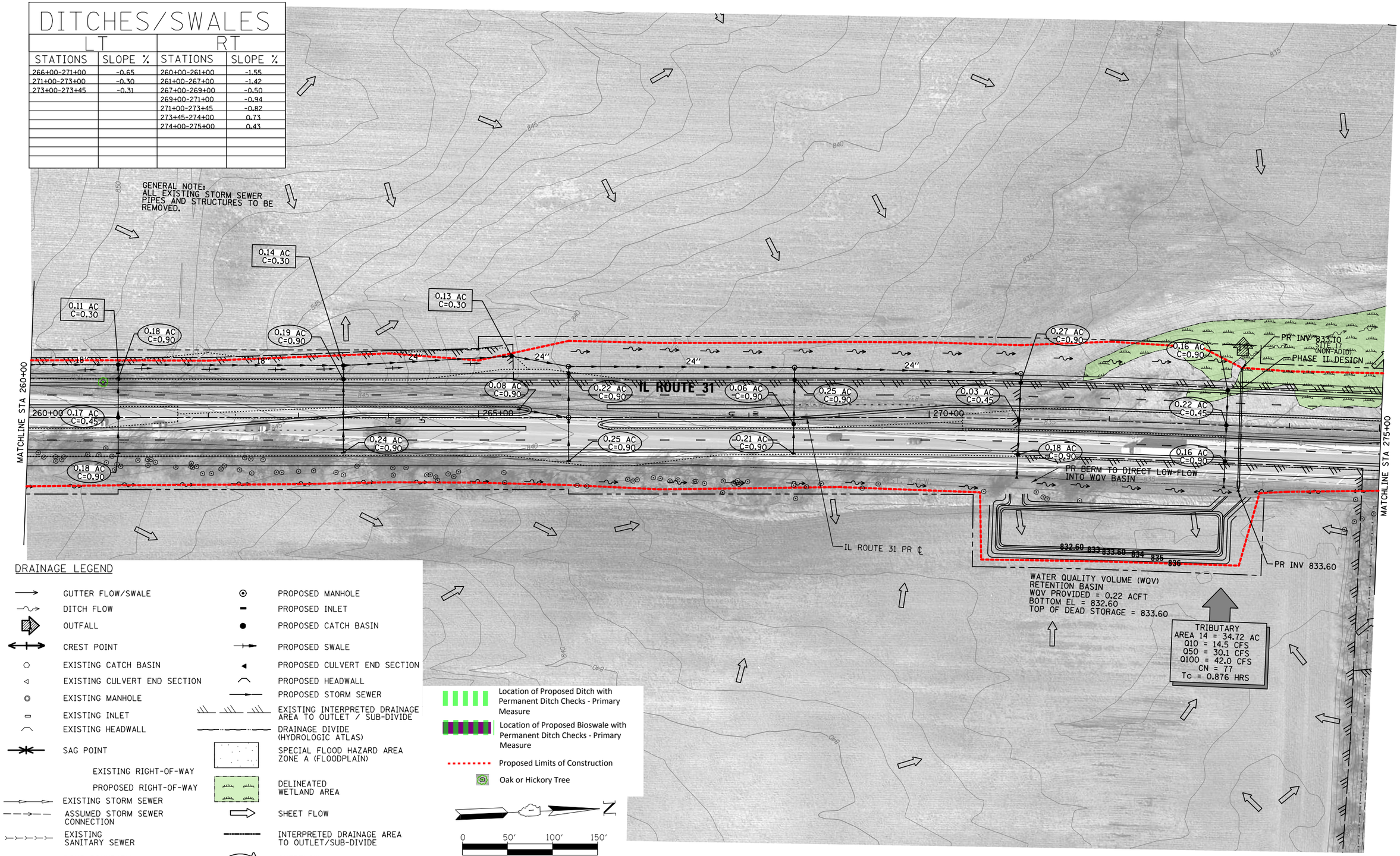
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	10

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
266+00-271+00	-0.65	260+00-261+00	-1.55
271+00-273+00	-0.30	261+00-267+00	-1.42
273+00-273+45	-0.31	267+00-269+00	-0.50
		269+00-271+00	-0.94
		271+00-273+45	-0.82
		273+45-274+00	0.73
		274+00-275+00	0.43



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 11
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 260+00 TO STA. 275+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	11

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DRAINAGE LEGEND

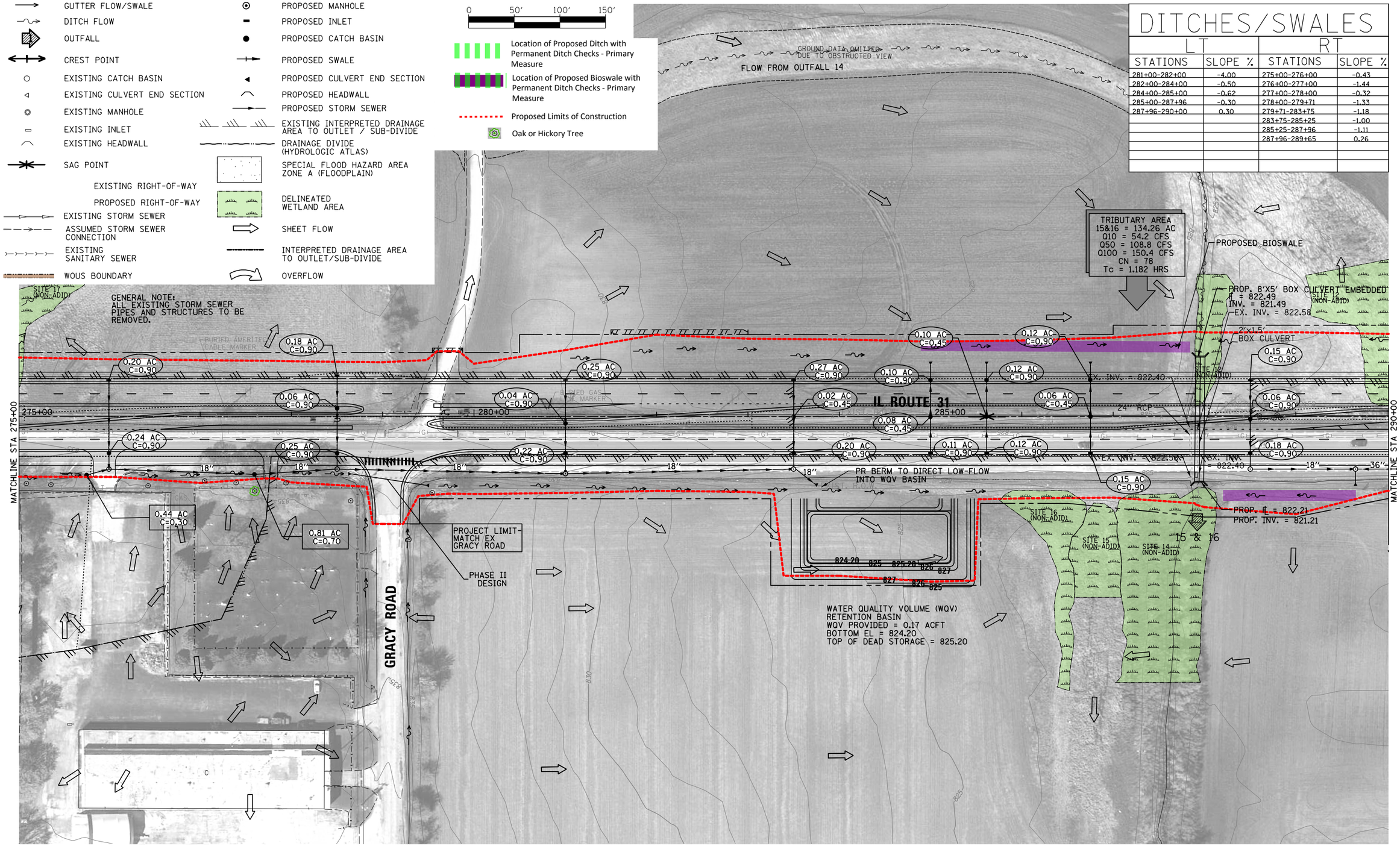
- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
281+00-282+00	-4.00	275+00-276+00	-0.43
282+00-284+00	-0.50	276+00-277+00	-1.44
284+00-285+00	-0.62	277+00-278+00	-0.32
285+00-287+96	-0.30	278+00-279+71	-1.33
287+96-290+00	0.30	279+71-283+75	-1.18
		283+75-285+25	-1.00
		285+25-287+96	-1.11
		287+96-289+65	0.26



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	PLOT SCALE = 100.000 ' / in.	CHECKED - JAC	REVISED -						
	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -		SCALE: 1" = 50' SHEET OF SHEETS STA. 275+00 TO STA. 290+00			ILLINOIS FED. AID PROJECT	

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

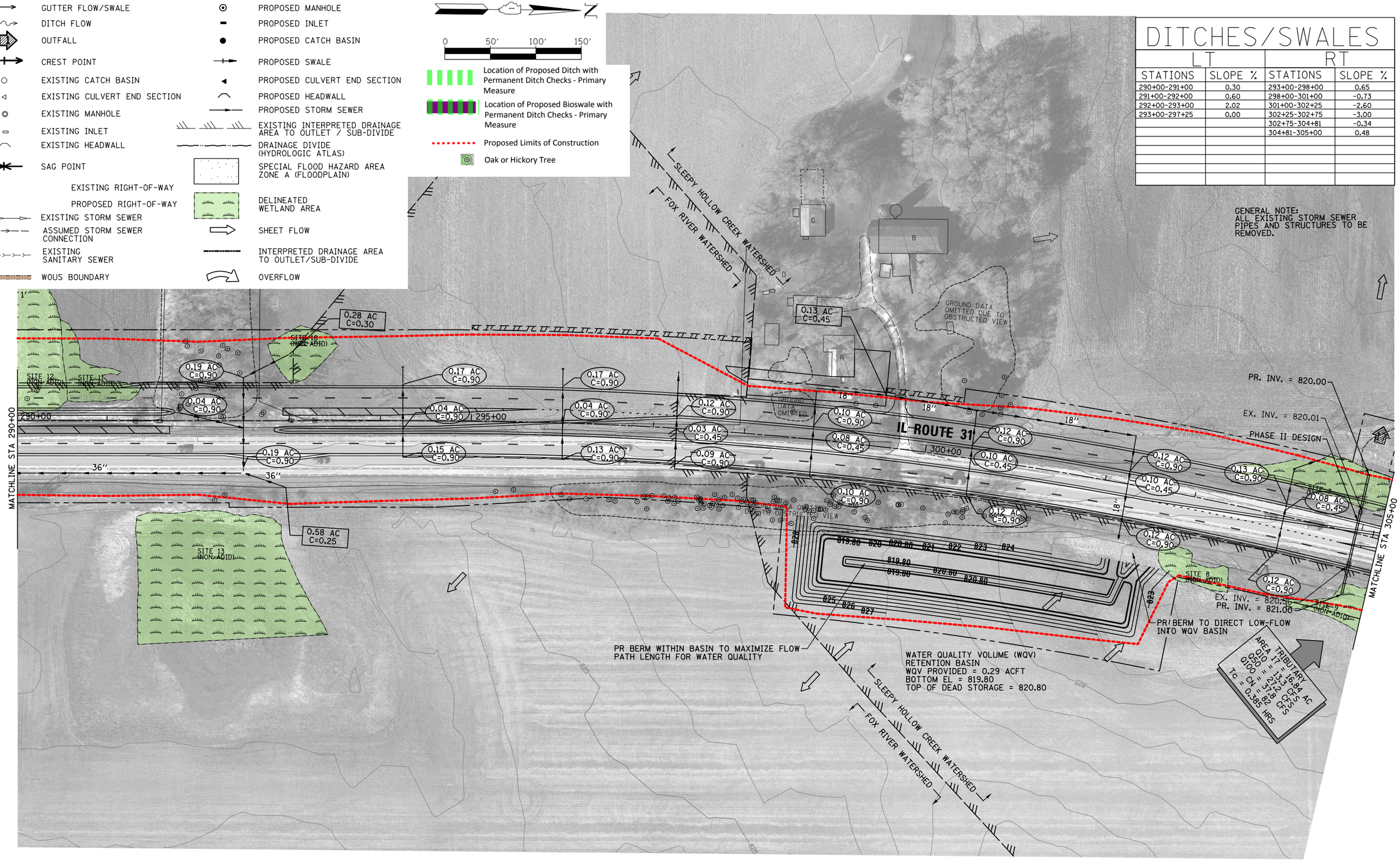
0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
290+00-291+00	0.30	293+00-298+00	0.65
291+00-292+00	0.60	298+00-301+00	-0.73
292+00-293+00	2.02	301+00-302+25	-2.60
293+00-297+25	0.00	302+25-302+75	-3.00
		302+75-304+81	-0.34
		304+81-305+00	0.48

GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.



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		DRAWN - RDT/SDZ	REVISED -			336		MCHENRY	27 / 13
	PLOT SCALE = 100.000 ′ / in.	CHECKED - JAC	REVISED -			CONTRACT NO.			
	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -		SCALE: 1″ = 50′ SHEET OF SHEETS STA. 290+00 TO STA. 305+00	ILLINOIS FED. AID PROJECT			

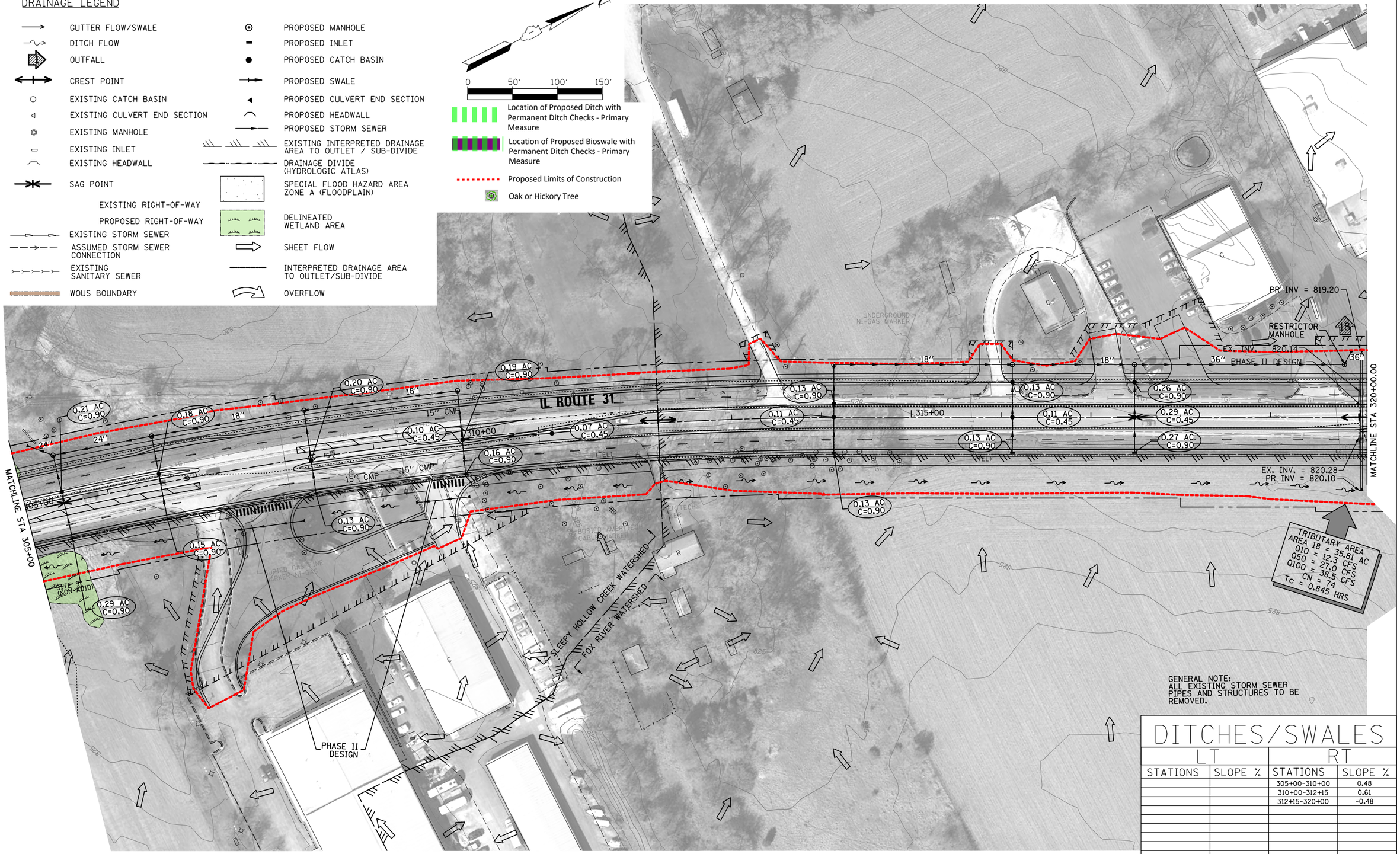
DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

N

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
		305+00-310+00	0.48
		310+00-312+15	0.61
		312+15-320+00	-0.48

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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 14
ILLINOIS ROUTE 31

SCALE: 1″ = 50′ | SHEET OF SHEETS | STA. 305+00 TO STA. 320+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	14

CONTRACT NO.

ILLINOIS FED. AID PROJECT

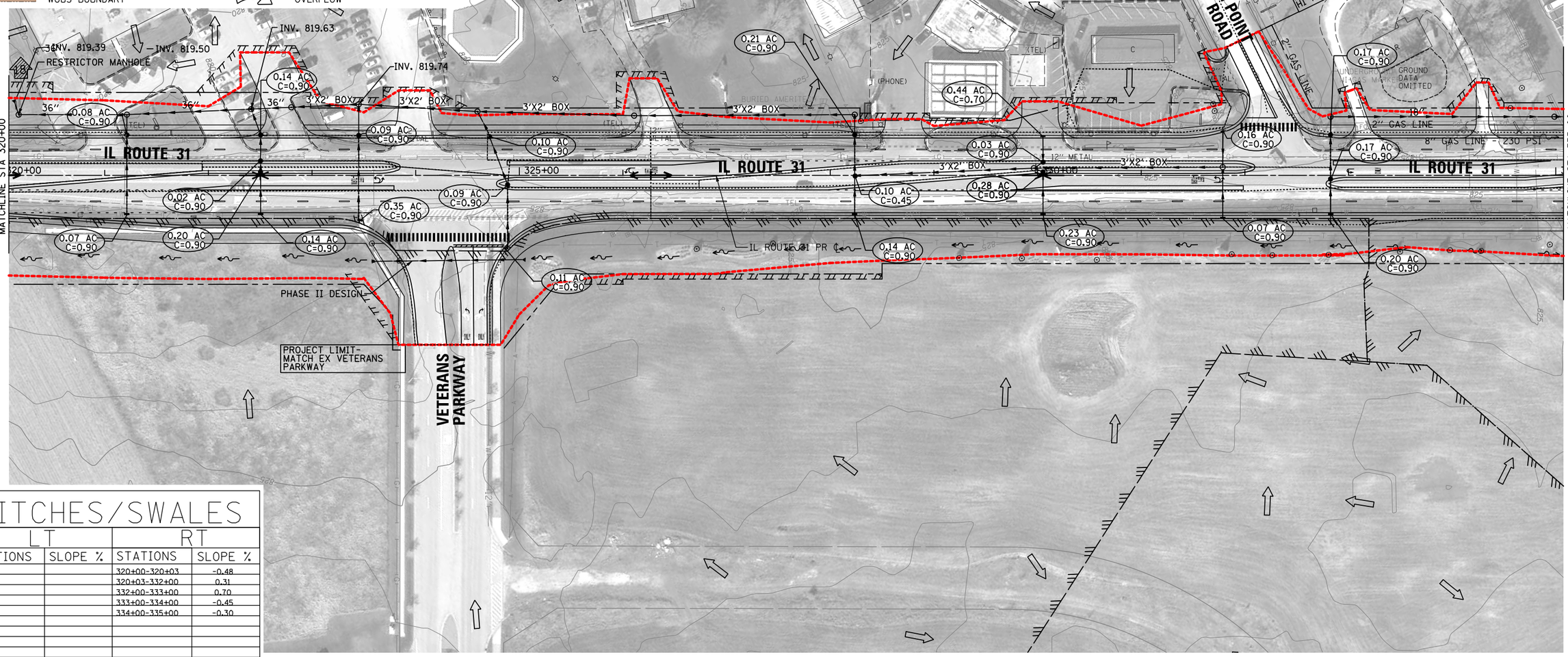
DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

N

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
		320+00-320+03	-0.48
		320+03-332+00	0.31
		332+00-333+00	0.70
		333+00-334+00	-0.45
		334+00-335+00	-0.30

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

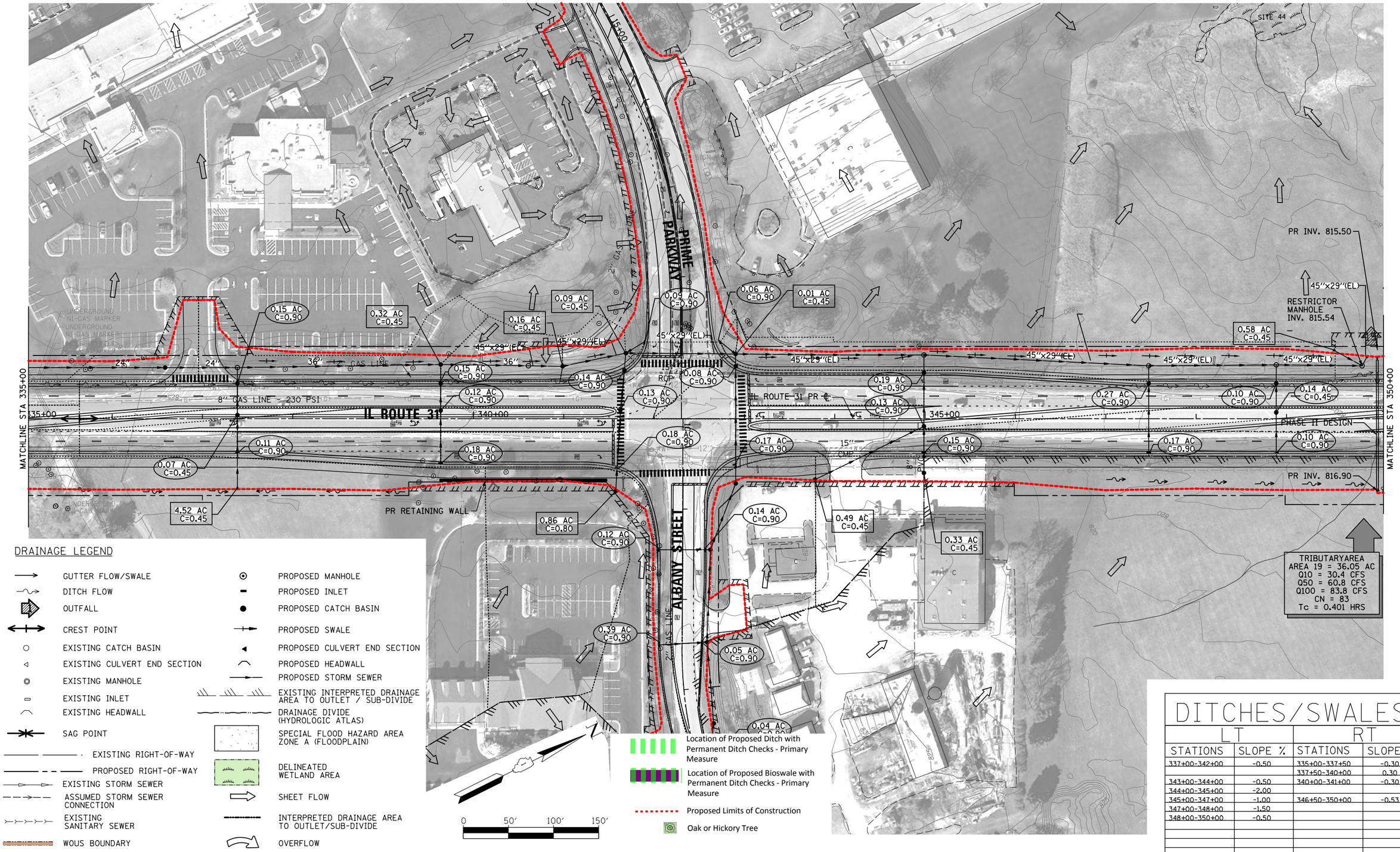
PROPOSED DRAINAGE PLAN 15
ILLINOIS ROUTE 31

SCALE: 1″ = 50′ | SHEET OF SHEETS | STA. 320+00 TO STA. 335+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	15

CONTRACT NO.

ILLINOIS FED. AID PROJECT



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
337+00-342+00	-0.50	335+00-337+50	-0.30
		337+50-340+00	0.30
343+00-344+00	-0.50	340+00-341+00	-0.30
344+00-345+00	-2.00		
345+00-347+00	-1.00	346+50-350+00	-0.53
347+00-348+00	-1.50		
348+00-350+00	-0.50		

FILE NAME = ...\P113599-sht-prdrain16.dgn	USER NAME = eberhaac	DESIGNED - AE/PM	REVISED -
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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 16
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 335+00 TO STA. 350+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	16

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
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- PROPOSED HEADWALL
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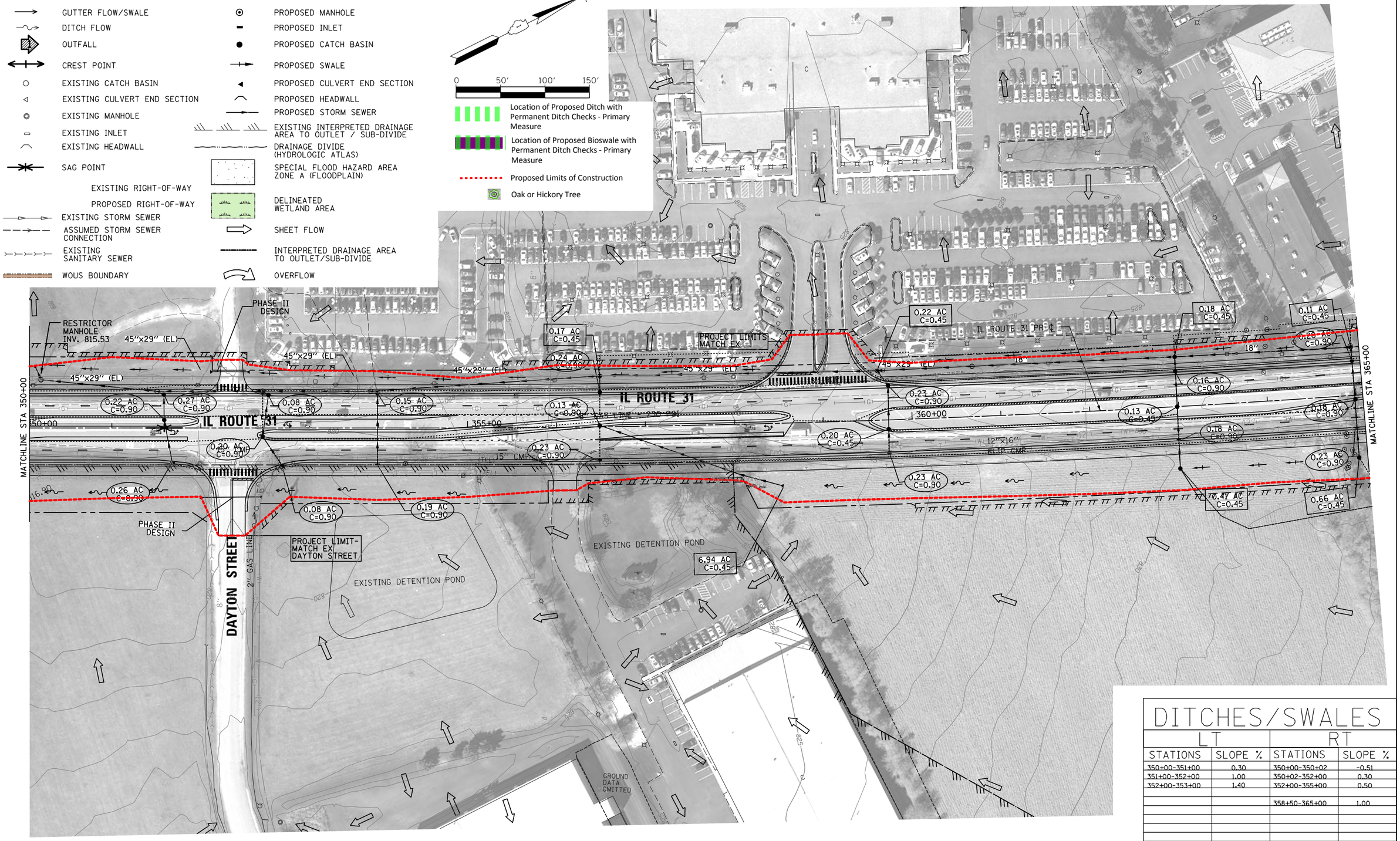
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
350+00-351+00	0.30	350+00-350+02	-0.51
351+00-352+00	1.00	350+02-352+00	0.30
352+00-353+00	1.40	352+00-355+00	0.50
		358+50-365+00	1.00

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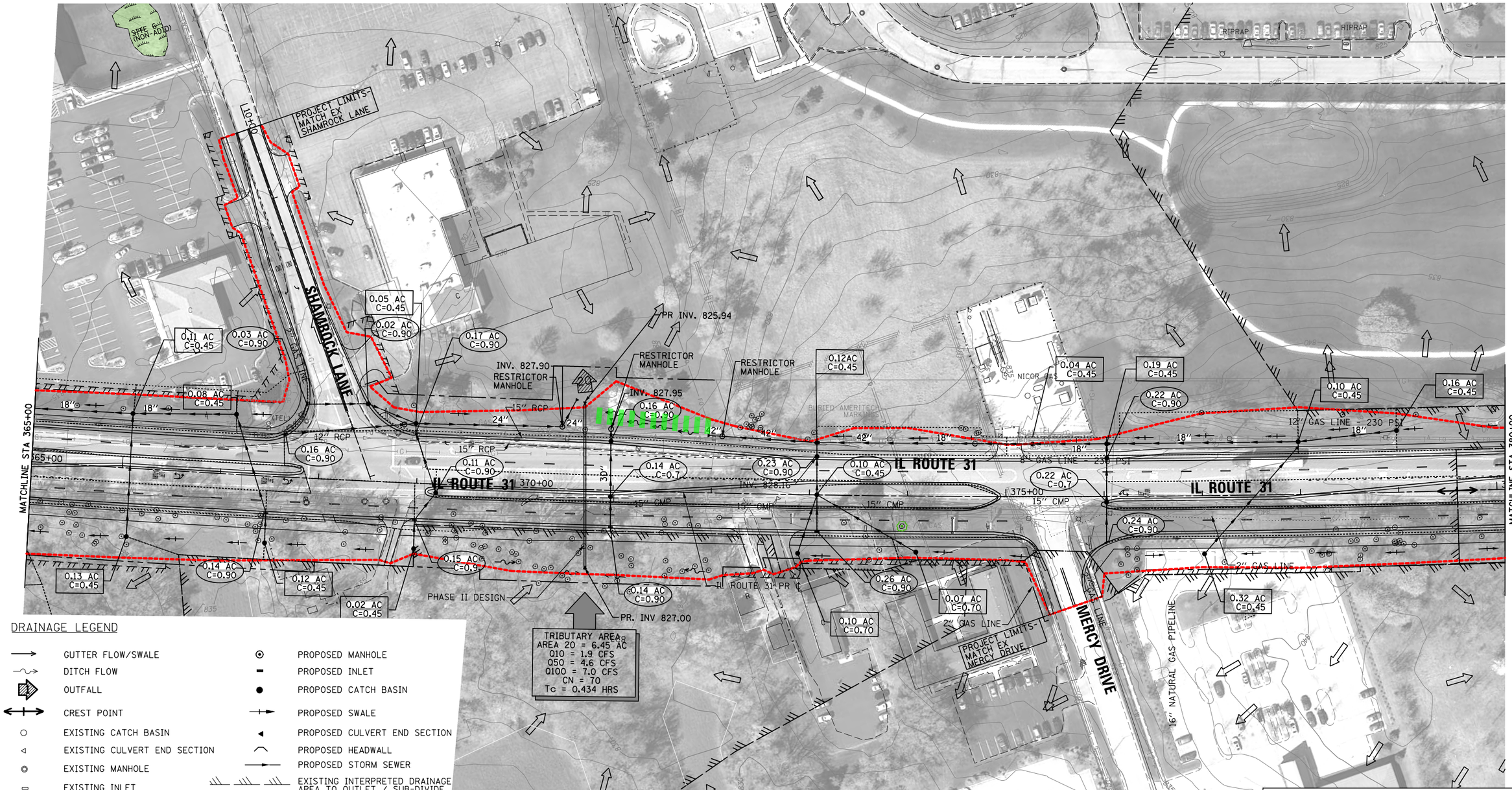
	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 17
ILLINOIS ROUTE 31

SCALE: 1" = 50′ | SHEET OF SHEETS | STA. 350+00 TO STA. 365+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	17
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
370+74-372+00	0.00	365+00-368+00	1.00
		368+00-369+00	0.50
373+00-380+00	1.00		
		370+00-370+74	-0.40
		370+74-371+00	0.53
		371+00-372+00	1.00
		377+00-379+50	1.00
		379+50-380+00	-0.50

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	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 18
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 365+00 TO STA. 380+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	18

CONTRACT NO.

ILLINOIS FED. AID PROJECT

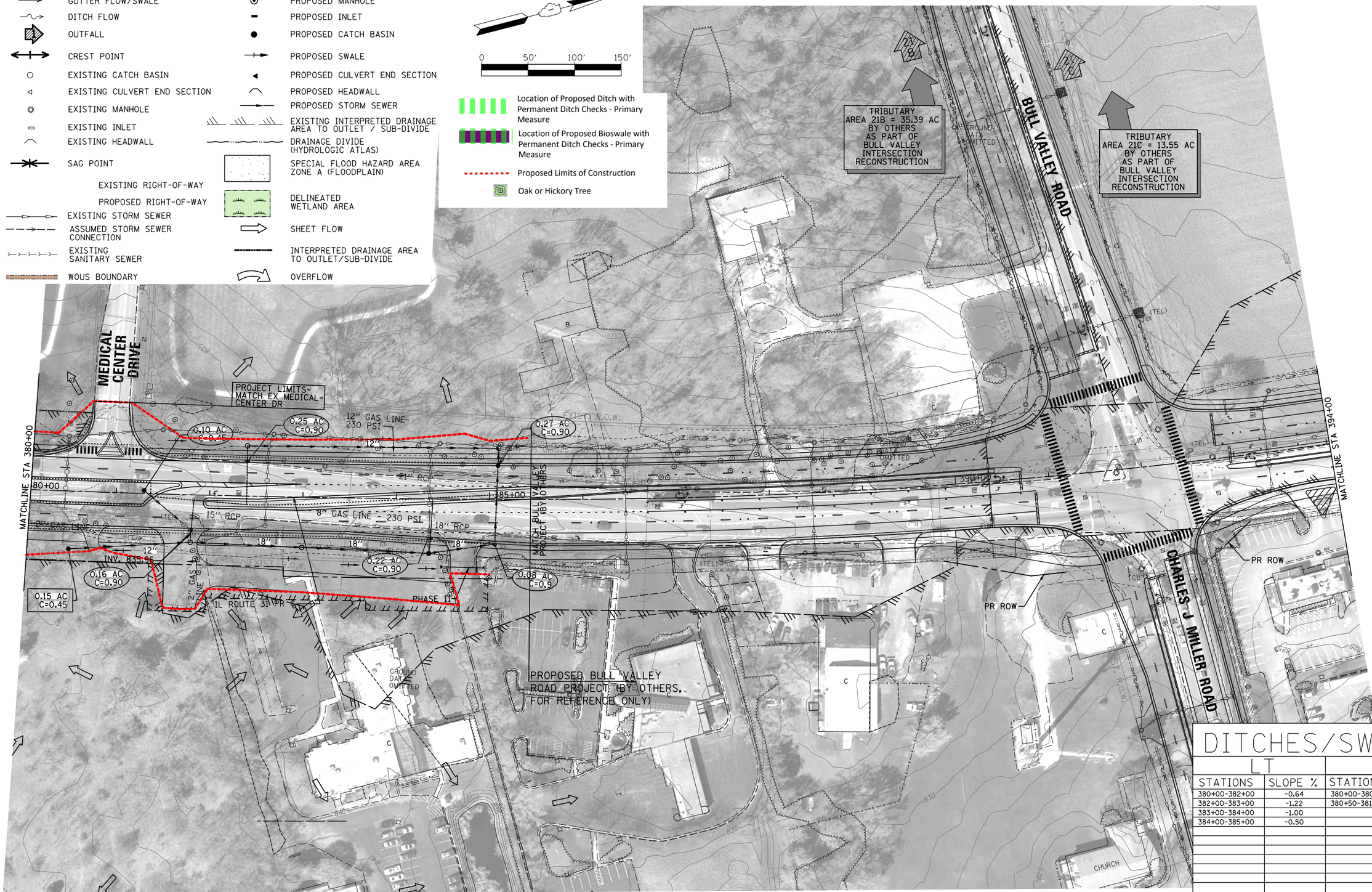
DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

N

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
380+00-382+00	-0.64	380+00-380+50	-0.50
382+00-383+00	-1.22	380+50-381+00	0.50
383+00-384+00	-1.00		
384+00-385+00	-0.50		

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 19
ILLINOIS ROUTE 31

SCALE: 1" = 50′ | SHEET OF SHEETS | STA. 380+00 TO STA. 394+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	19

CONTRACT NO.

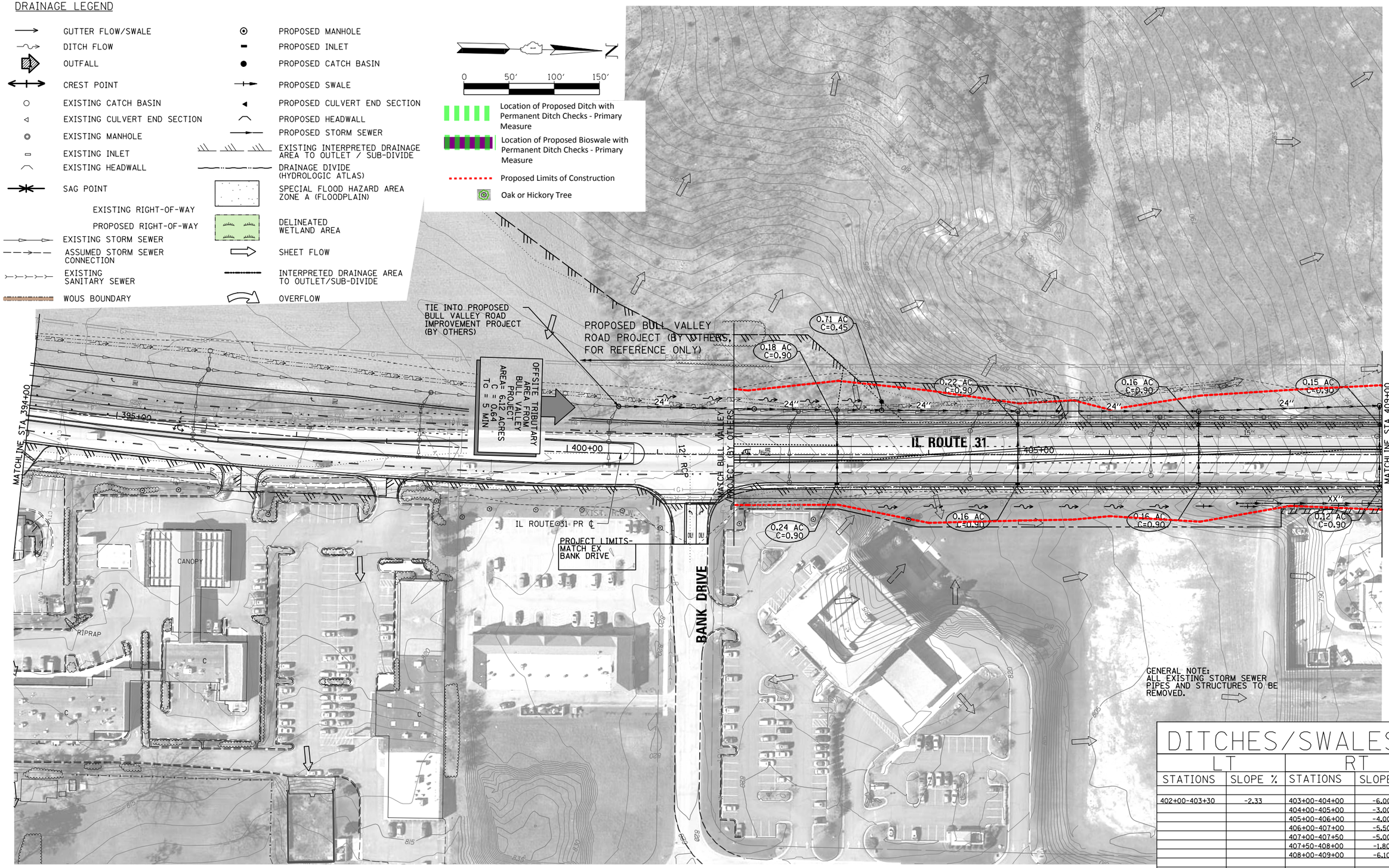
ILLINOIS FED. AID PROJECT

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50′ 100′ 150′

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree



DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
402+00-403+30	-2.33	403+00-404+00	-6.00
		404+00-405+00	-3.00
		405+00-406+00	-4.00
		406+00-407+00	-5.50
		407+00-407+50	-5.00
		407+50-408+00	-1.80
		408+00-409+00	-6.10

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 20
ILLINOIS ROUTE 31

SCALE: 1″ = 50′ | SHEET OF SHEETS | STA. 394+00 TO STA. 409+00

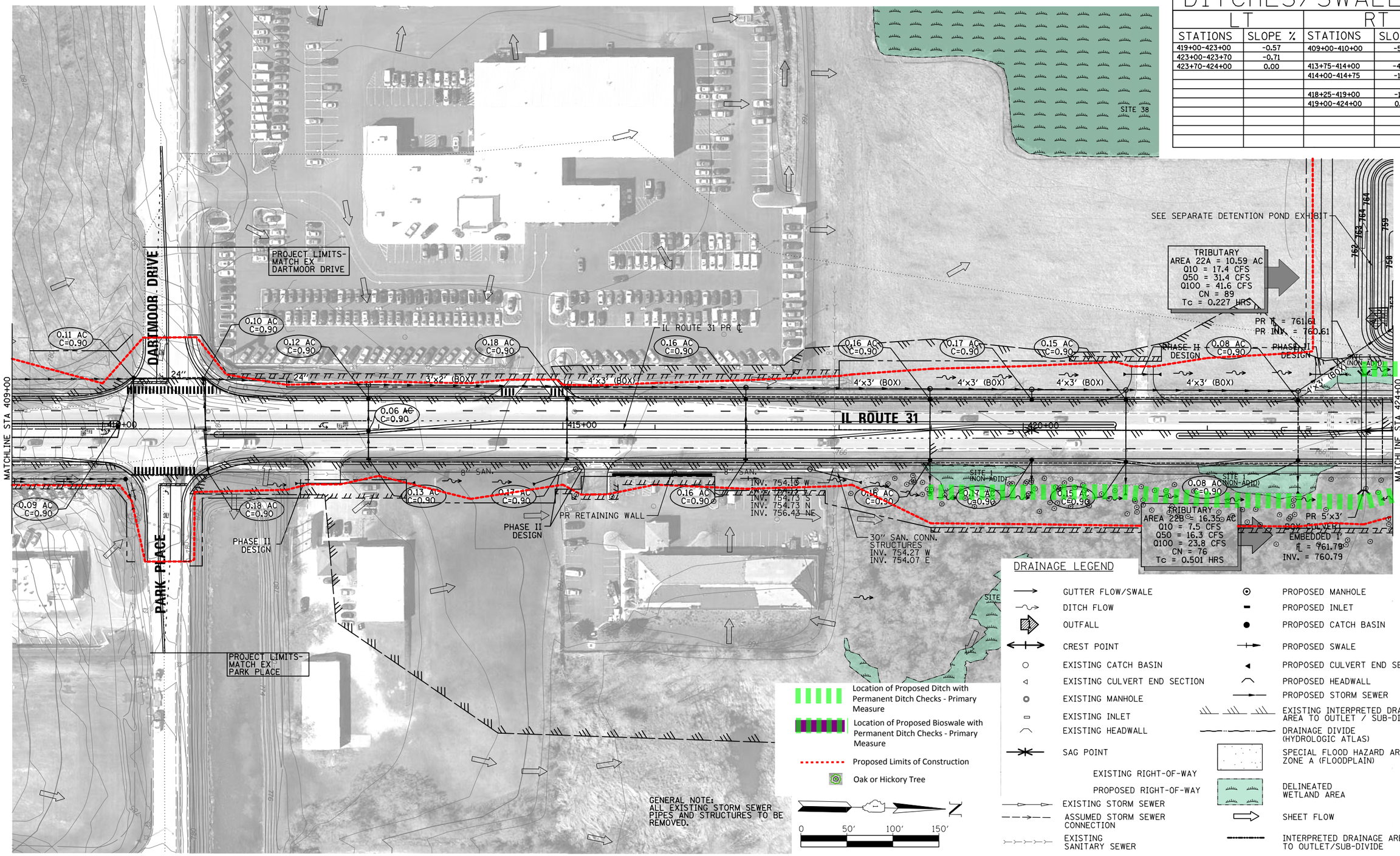
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	20

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
419+00-423+00	-0.57	409+00-410+00	-5.16
423+00-423+70	-0.71		
423+70-424+00	0.00	413+75-414+00	-4.00
		414+00-414+75	-1.33
		418+25-419+00	-1.61
		419+00-424+00	0.00



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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 21
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 409+00 TO STA. 424+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	$TOTAL$	$DRAIN2

CONTRACT NO.

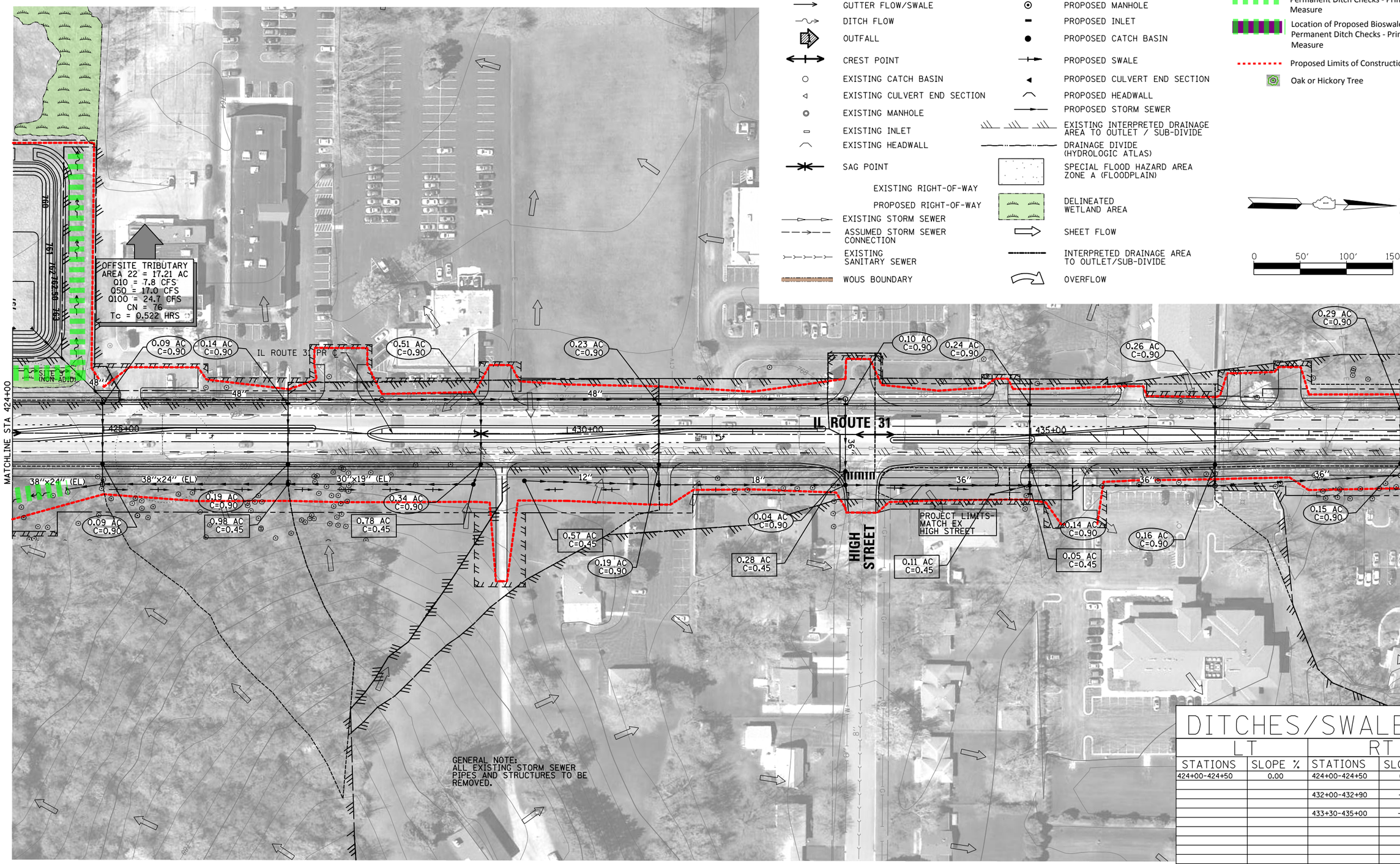
ILLINOIS FED. AID PROJECT

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW
- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

N

0 50′ 100′ 150′



GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
424+00-424+50	0.00	424+00-424+50	0.00
		432+00-432+90	-1.80
		433+30-435+00	-0.30

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 22
ILLINOIS ROUTE 31

SCALE: 1″ = 50′ | SHEET OF SHEETS | STA. 424+00 TO STA. 439+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	22

CONTRACT NO.

ILLINOIS | FED. AID PROJECT

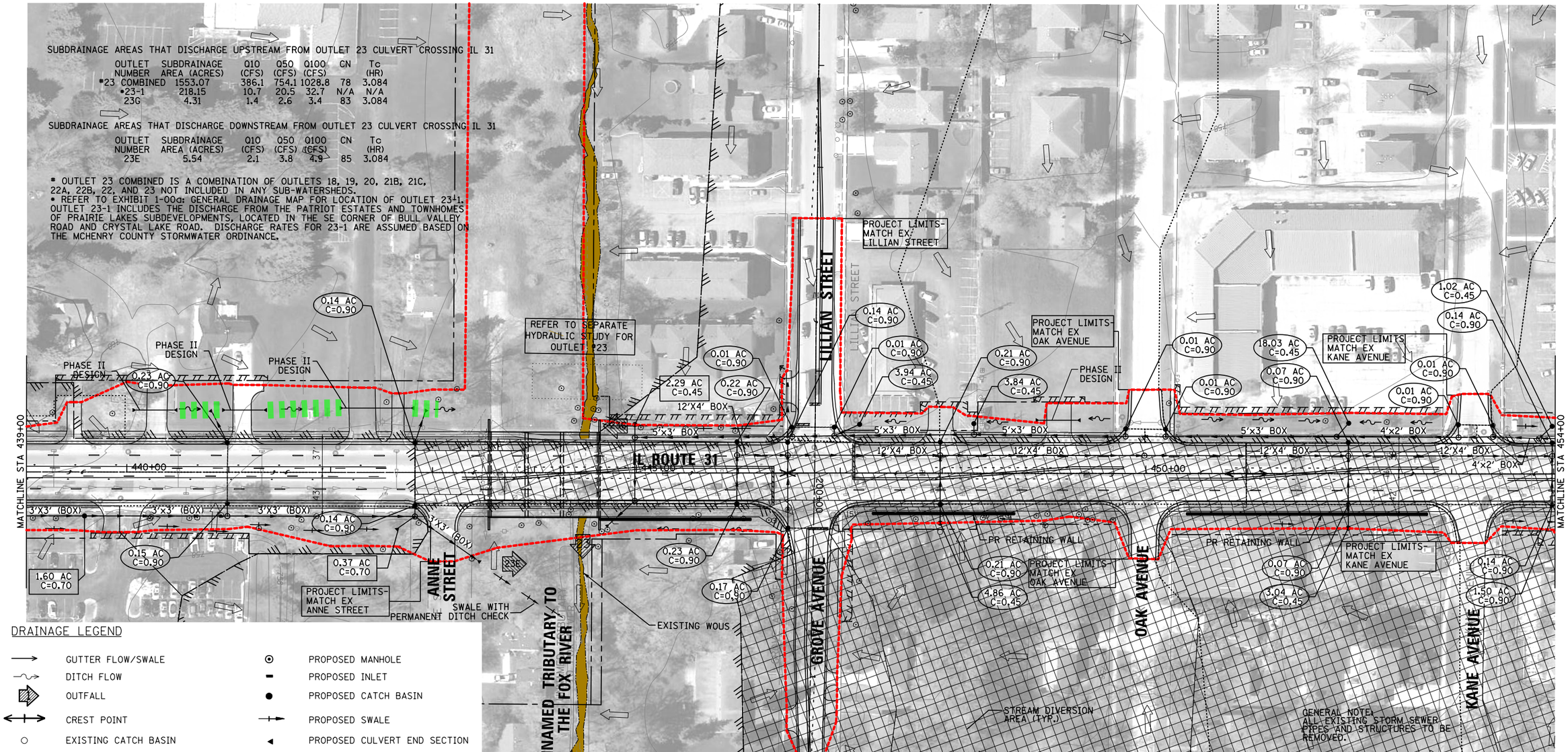
SUBDRAINAGE AREAS THAT DISCHARGE UPSTREAM FROM OUTLET 23 CULVERT CROSSING IL 31

OUTLET NUMBER	SUBDRAINAGE AREA (ACRES)	Q10 (CFS)	Q50 (CFS)	Q100 (CFS)	CN	Tc (HR)
#23 COMBINED	1553.07	386.1	754.1	1028.8	78	3.084
*23-1	218.15	10.7	20.5	32.7	N/A	N/A
23G	4.31	1.4	2.6	3.4	83	3.084

SUBDRAINAGE AREAS THAT DISCHARGE DOWNSTREAM FROM OUTLET 23 CULVERT CROSSING IL 31

OUTLET NUMBER	SUBDRAINAGE AREA (ACRES)	Q10 (CFS)	Q50 (CFS)	Q100 (CFS)	CN	Tc (HR)
23E	5.54	2.1	3.8	4.9	85	3.084

OUTLET 23 COMBINED IS A COMBINATION OF OUTLETS 18, 19, 20, 21B, 21C, 22A, 22B, 22, AND 23 NOT INCLUDED IN ANY SUB-WATERSHEDS.
* REFER TO EXHIBIT 1-00a: GENERAL DRAINAGE MAP FOR LOCATION OF OUTLET 23-1. OUTLET 23-1 INCLUDES THE DISCHARGE FROM THE PATRIOT ESTATES AND TOWNHOMES OF PRAIRIE LAKES SUBDEVELOPMENTS, LOCATED IN THE SE CORNER OF BULL VALLEY ROAD AND CRYSTAL LAKE ROAD. DISCHARGE RATES FOR 23-1 ARE ASSUMED BASED ON THE MCHENRY COUNTY STORMWATER ORDINANCE.



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

0 50' 100' 150'

DITCHES/SWALES

LT STATIONS	LT SLOPE %	RT STATIONS	RT SLOPE %
440+00-441+00	-1.27	441+00-441+20	-0.65
441+00-443+00	-0.50	441+20-442+00	-5.41
443+00-444+50	-0.13	442+00-442+66	-0.52
444+50-445+00	1.00		
445+00-446+25	0.50	443+50-444+46	-0.30
447+10-449+70	0.50	444+50-446+00	1.67
450+20-452+00	-0.50	447+50-448+00	-0.30
452+00-452+80	0.50	448+00-448+50	0.30
		451+00-452+00	-0.50
		452+00-452+10	0.50
		453+50-454+00	-0.30

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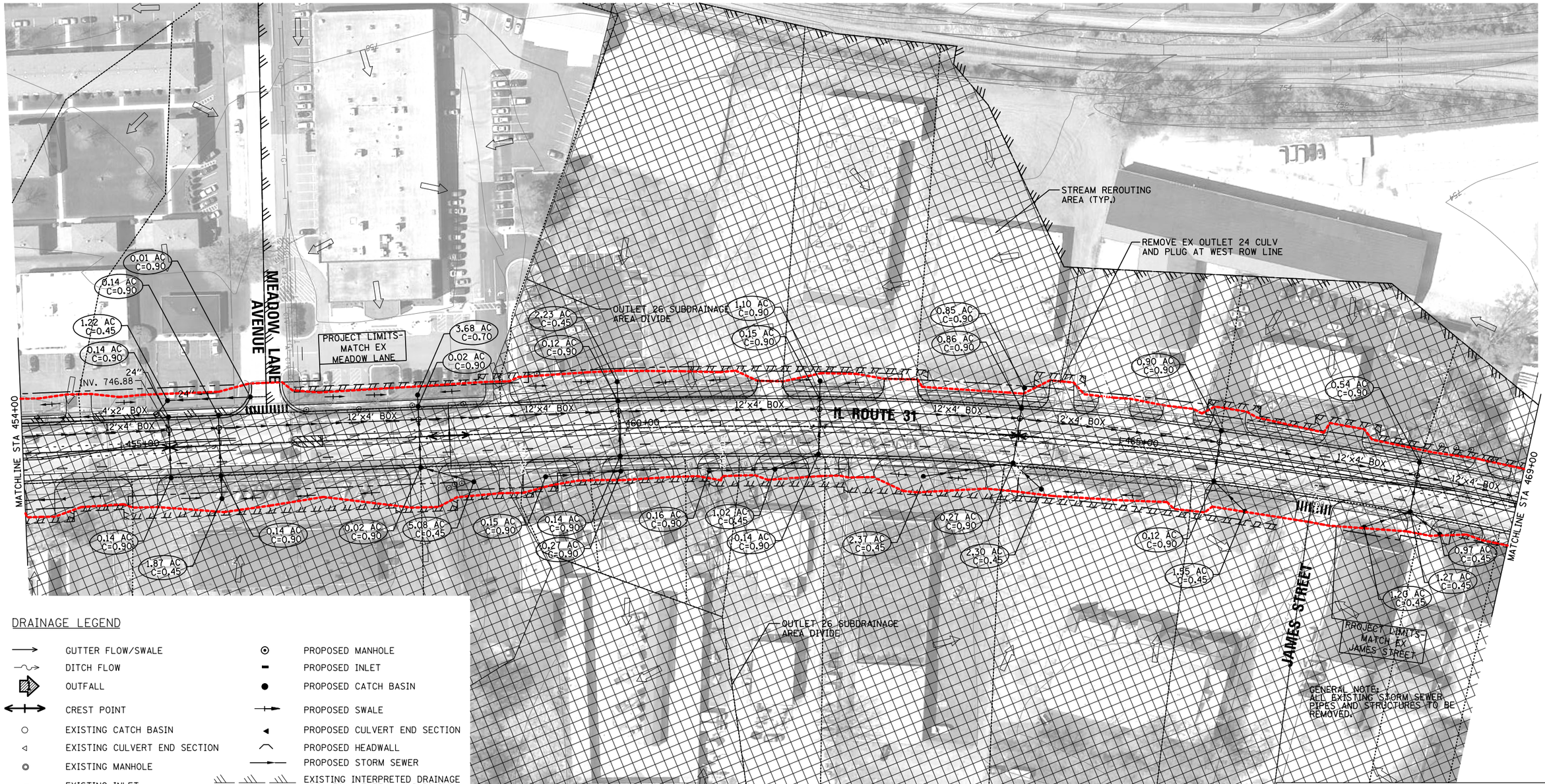
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 23
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 439+00 TO STA. 454+00

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	$TOTAL$	DRAIN23
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

0 50' 100' 150'

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
455+00-455+50	-0.30	454+00-455+00	0.30
455+50-456+00	0.30		
456+00-457+00	1.35		
457+00-458+00	-0.30	455+50-456+00	-0.50
458+00-458+50	0.30	456+00-457+80	0.50
458+50-459+00	-1.86		
459+00-460+00	-0.30		
460+00-461+25	0.30		

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 24
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 454+00 TO STA. 469+00

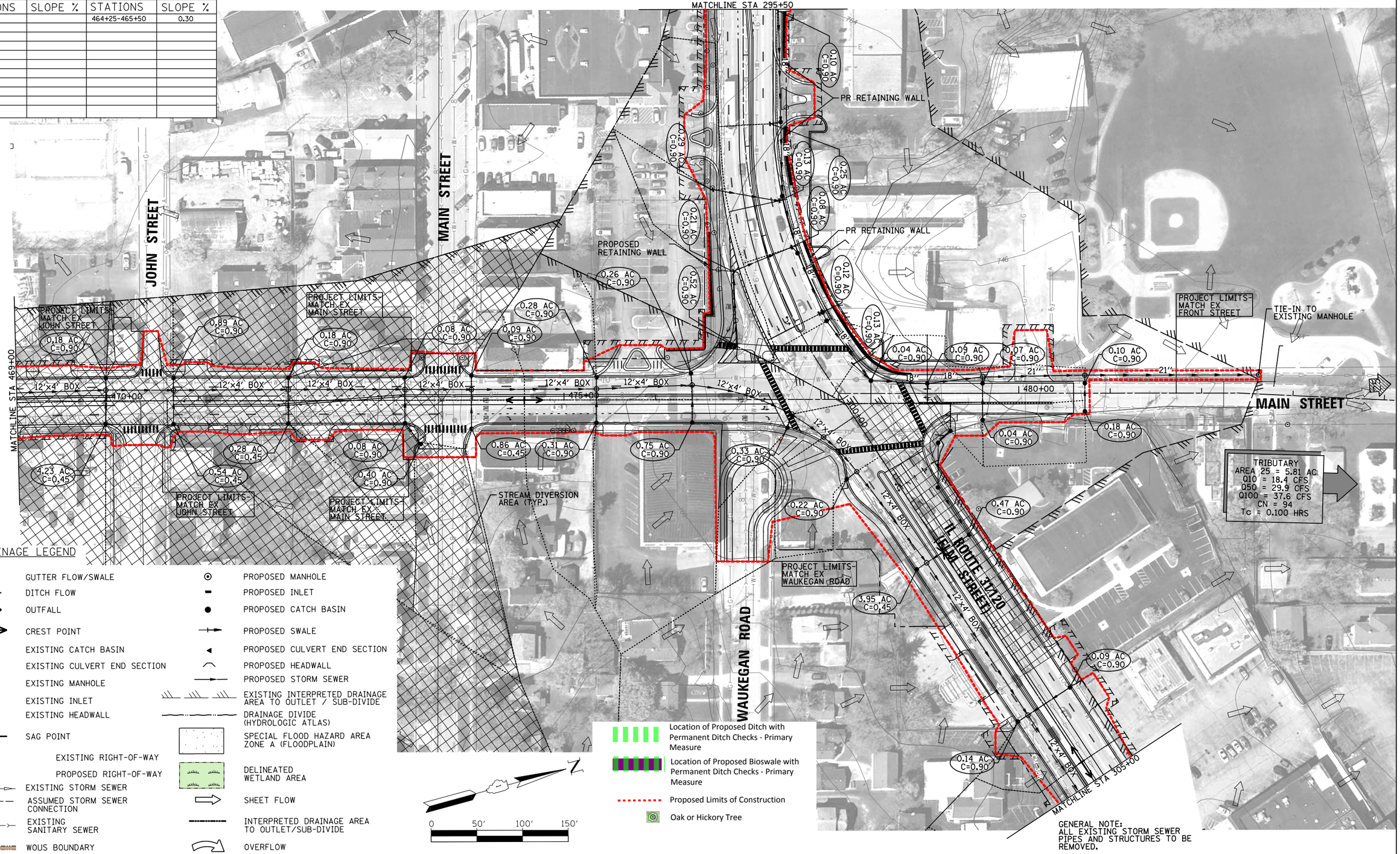
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	24

CONTRACT NO.

ILLINOIS | FED. AID PROJECT

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %
		464+25-465+50	0.30



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
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- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW

- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

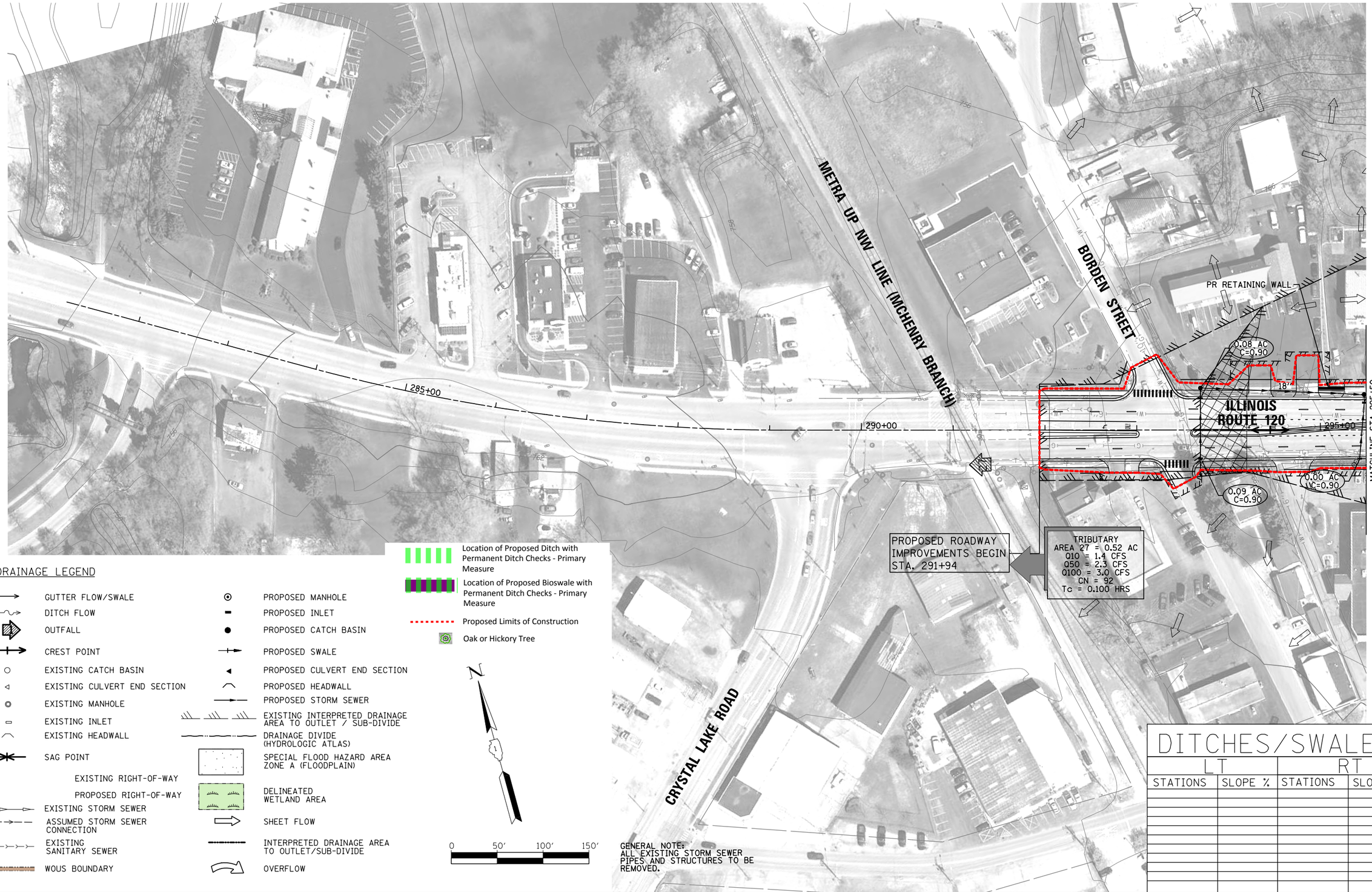
PROPOSED DRAINAGE PLAN 25
ILLINOIS ROUTE 31

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 469+00 TO STA. XXX+XX

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	25

CONTRACT NO.

ILLINOIS FED. AID PROJECT



DRAINAGE LEGEND

- GUTTER FLOW/SWALE
- DITCH FLOW
- OUTFALL
- CREST POINT
- EXISTING CATCH BASIN
- EXISTING CULVERT END SECTION
- EXISTING MANHOLE
- EXISTING INLET
- EXISTING HEADWALL
- SAG POINT
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING STORM SEWER
- ASSUMED STORM SEWER CONNECTION
- EXISTING SANITARY SEWER
- WOUS BOUNDARY
- PROPOSED MANHOLE
- PROPOSED INLET
- PROPOSED CATCH BASIN
- PROPOSED SWALE
- PROPOSED CULVERT END SECTION
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- EXISTING INTERPRETED DRAINAGE AREA TO OUTLET / SUB-DIVIDE
- DRAINAGE DIVIDE (HYDROLOGIC ATLAS)
- SPECIAL FLOOD HAZARD AREA ZONE A (FLOODPLAIN)
- DELINEATED WETLAND AREA
- SHEET FLOW
- INTERPRETED DRAINAGE AREA TO OUTLET/SUB-DIVIDE
- OVERFLOW
- Location of Proposed Ditch with Permanent Ditch Checks - Primary Measure
- Location of Proposed Bioswale with Permanent Ditch Checks - Primary Measure
- Proposed Limits of Construction
- Oak or Hickory Tree

GENERAL NOTE:
ALL EXISTING STORM SEWER PIPES AND STRUCTURES TO BE REMOVED.

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %

FILE NAME = ...\P113599-sht-prdrain26.dgn	USER NAME = eberhaac	DESIGNED - AE/PM	REVISED -
		DRAWN - RDT/SDZ	REVISED -
	PLOT SCALE = 100.000 ' / in.	CHECKED - JAC	REVISED -
	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 26
ILLINOIS ROUTE 120

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 285+00 TO STA. 295+00

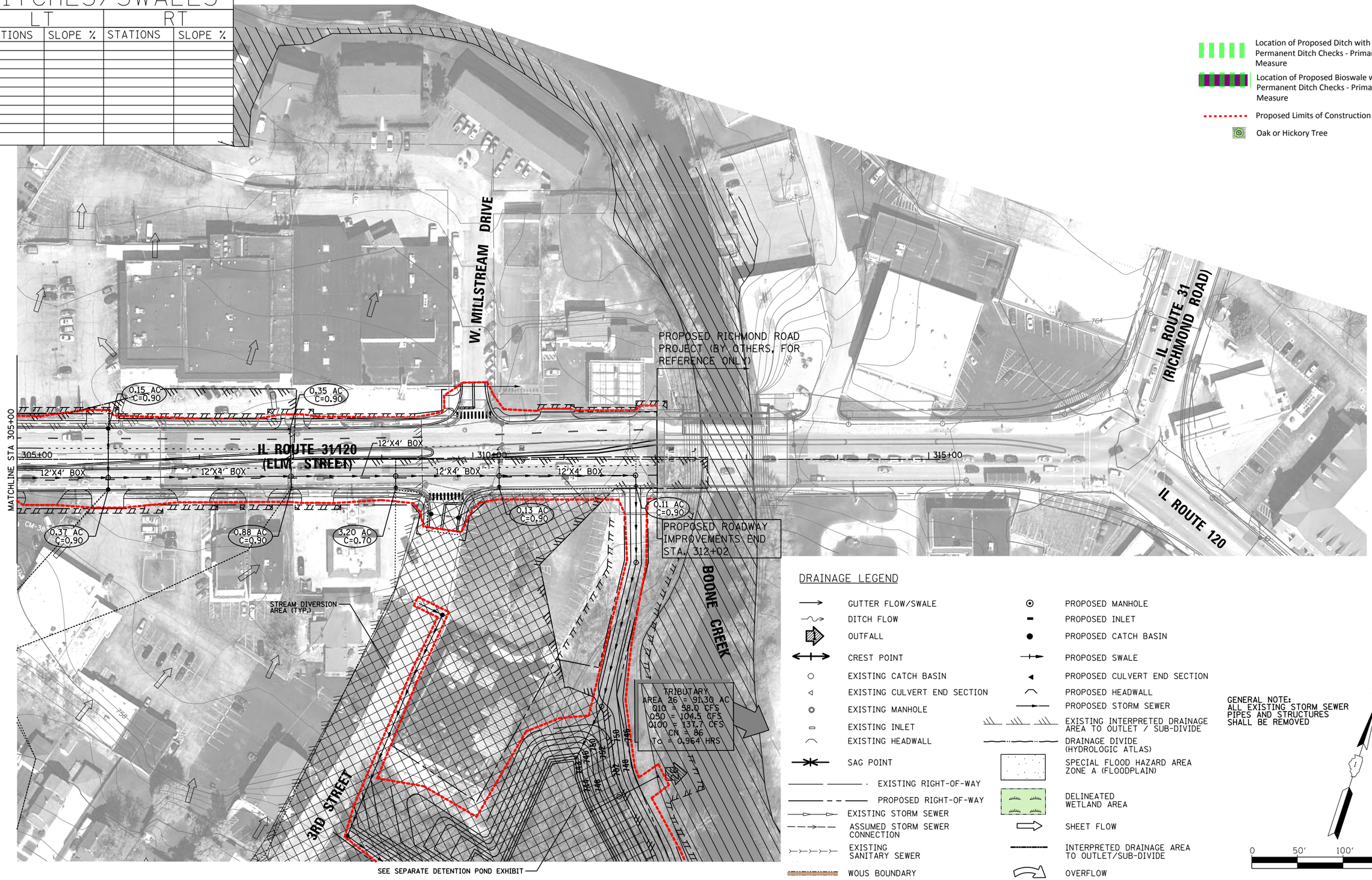
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	26

CONTRACT NO.

ILLINOIS FED. AID PROJECT

DITCHES/SWALES

LT		RT	
STATIONS	SLOPE %	STATIONS	SLOPE %



FILE NAME = ...\P113599-sht-prdrain27.dgn	USER NAME = eberhaac	DESIGNED - AE/PM	REVISED -
		DRAWN - RDT/SDZ	REVISED -
	PLOT SCALE = 100.000 ' / in.	CHECKED - JAC	REVISED -
	PLOT DATE = 12/15/2015	DATE - 8-27-14	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DRAINAGE PLAN 27
ILLINOIS ROUTE 120

SCALE: 1" = 50' | SHEET OF SHEETS | STA. 305+00 TO STA. 312+02

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
336		MCHENRY	27	27

CONTRACT NO.

ILLINOIS FED. AID PROJECT

WATER QUALITY VOLUME REQUIRED FOR 1"/1.25" RAINFALL OF ADDITIONAL PROPOSED IMPERVIOUS AREAS NOT INCLUDING BIKE PATH OR SIDEWALK

ILLNOIS ROUTE 31

ILLINOIS ROUTE 176 TO ILLINOIS ROUTE 120 MCHENRY COUNTY, ILLINOIS

Outlet Number	EX Sidewalk (ac)	EX Roadway (ac)	EX Shoulder (ac)	EX Impervious Area (ac)	PR Roadway (ac)	PR Shoulder (ac)	PR Curb (ac)	PR Conc. Median (ac)	PR Impervious Area (ac)	Difference (ac)	HQAR?	Retained Depth (in)	1"/1.25" Required WQV without Bike/SW (acft)	1"/1.25" WQV By Watershed (acft)
1	0.03	3.23	0.12	3.38	3.12	0.00	0.46	0.12	3.70	0.32	NO	1.00	0.03	
2	0.00	0.36	0.03	0.39	0.65	0.00	0.12	0.02	0.79	0.40	NO	1.00	0.03	Silver Creek
3	0.00	0.82	0.00	0.82	1.14	0.00	0.18	0.04	1.36	0.54	NO	1.00	0.05	0.11
4	0.00	1.48	0.07	1.55	2.20	0.00	0.37	0.08	2.65	1.10	YES	1.25	0.11	
5	0.00	0.75	0.31	1.06	1.12	0.00	0.23	0.00	1.35	0.29	YES	1.25	0.03	
6	0.00	0.70	0.12	0.82	0.91	0.00	0.12	0.04	1.07	0.25	YES	1.25	0.03	
7	0.00	0.90	0.13	1.03	0.92	0.00	0.20	0.02	1.14	0.11	YES	1.25	0.01	
8	0.00	1.38	0.25	1.63	2.00	0.00	0.32	0.03	2.35	0.72	YES	1.25	0.08	
9	0.00	0.24	0.02	0.26	0.22	0.00	0.04	0.00	0.26	0.00	YES	1.25	0.00	
10	0.00	0.29	0.06	0.35	1.88	0.00	0.38	0.06	2.32	1.97	YES	1.25	0.21	
11	EXISTING DRAINAGE AREA 11 HAS BEEN ELIMINATED IN THE PROPOSED DESIGN AND COMBINED WITH DRAINAGE AREA 10. IMPERVIOUS AREA MEASUREMENTS FOR DRAINAGE AREA 11 ARE INCLUDED IN THE DRAINAGE AREA 10 VALUES.													Sleepy Hollow
12	0.00	1.68	0.09	1.77	2.39	0.00	0.46	0.07	2.92	1.15	NO	1.00	0.10	Creek
13	0.00	1.26	0.21	1.47	1.64	0.00	0.29	0.06	1.99	0.52	NO	1.00	0.04	0.68
14	0.00	2.03		2.03	2.46	0.00	0.40	0.03	2.89	0.86	YES	1.25	0.09	
15 & 16	0.00	1.81	0.70	2.51	3.90	0.00	0.55	0.08	4.53	2.02	NO	1.00	0.17	
17	0.00	1.01	0.46	1.47	1.84	0.00	0.36	0.04	2.24	0.77	YES	1.25	0.08	
18	0.07	1.94	0.54	2.55	2.85	0.00	0.54	0.06	3.45	0.90	NO	1.00	0.08	
19	0.00	3.68	0.82	4.50	5.08	0.00	0.79	0.32	6.19	1.69	NO	1.00	0.14	
20	0.00	1.31	0.27	1.58	2.02	0.00	0.24	0.06	2.32	0.74	YES	1.25	0.08	
21A	DRAINAGE AREA 21A DISCHARGES TO THE DOWNSTREAM END OF THE CULVERT AT OUTLET 20. IMPERVIOUS AREA MEASUREMENTS FOR DRAINAGE AREA 21 HAVE BEEN INCLUDED IN THE DRAINAGE AREA 20 VALUES.													
21B	0.00	0.71	0.00	0.71	0.87	0.00	0.14	0.06	1.07	0.36	NO	1.00	0.03	
21C	DRAINAGE AREA 21C DOES NOT INCLUDE NEW IMPERVIOUS AREA. THEREFORE, DRAINAGE AREA 21C HAS BEEN EXCLUDED FROM THESE CALCULATIONS.													
22A	0.00	2.39	0.00	2.39	2.94	0.00	0.38	0.24	3.56	1.17	NO	1.00	0.10	
22B	0.02	0.62	0.00	0.64	0.83	0.00	0.08	0.11	1.02	0.38	NO	1.00	0.03	
22C	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	(0.03)	NO	1.00	0.00	
23	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	(0.01)	NO	1.00	0.00	
23E	0.17	1.07	0.00	1.24	1.58	0.00	0.18	0.01	1.77	0.53	NO	1.00	0.04	
23G	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	(0.04)	NO	1.00	0.00	
24	EXISTING DRAINAGE AREA 24 HAS BEEN ELIMINATED IN THE PROPOSED DESIGN AND COMBINED WITH DRAINAGE AREA 26. IMPERVIOUS AREA MEASUREMENTS FOR DRAINAGE AREA 24 ARE INCLUDED IN THE DRAINAGE AREA 26 VALUES.													
25	0.21	1.13	0.00	1.34	1.08	0.00	0.09	0.01	1.18	(0.16)	YES	1.25	0.00	
26	1.17	5.01	0.00	6.18	5.99	0.00	0.49	0.15	6.63	0.45	NO	1.00	0.04	Fox River
27	0.03	0.30	0.00	0.33	0.29	0.00	0.03	0.01	0.33	0.00	NO	1.00	0.00	0.79
TOTAL	1.78	36.10	4.20	42.09	49.92	0.00	7.45	1.72	59.09	17.00	0.00	30.75	1.58	1.58

TOTALS

NOTES:

1. Proposed impervious areas are those impervious areas within the proposed drainage area not including the proposed bike path and sidewalk.
2. Existing impervious areasd are those existing impervious areas within the proposed drainage area, not the existing impervious areas within the existing drainage area.
3. Existing and proposed impervious areas along sidestreets in proposed drainage areas 23G and 26 were not counted. New pavement, curbs, etc., replace existing and therefore nearly cancel each other out.
4. Existing and proposed impervious areas in drainage area 23 are only those areas outside of proposed drainage areas 23E and 23G.
5. Silver Creek Watershed = Outlet 1-Outlet 3
   Sleepy Hollow Creek Watershed = Outlet 4-Outlet 13 + Outlet 17
   Fox River Watershed = Outlet 14-Outlet 15&16 + Outlet 18-Outlet 27

WATER QUALITY VOLUME CALCULATIONS FOR REVISED DESIGN
IL ROUTE 31
6/29/2015

Special Ditch Bottom Width	Outlet	BEGIN Station	BEGIN Offset	END Station	END Offset	Length (ft)	Slope (ft/ft)	Swale/Ditch Bottom Width (ft)	Ditch Check Height (ft)	WQV Per Ditch Check (cu ft)	Number of Ditch Checks	WQV Storage (cu ft)	Primary or Secondary Ditch Revised Design?	WQV Storage (ac ft)	WQV Primary (ac ft)	WQV Secondary (ac ft)	Total Ditch Primary WQV by Watershed (ac ft)	Total Ditch Secondary WQV by Watershed (ac ft)
	3	150+00	RT	151+00	RT	100	3.58%	10	1	126	1	126	Primary	0.003	0.003			
	3	151+00	RT	151+69	RT	69	0.54%	10	1	833	0	0	Primary	0.000	0.000		Silver Creek	
	3	151+69	RT	151+99	RT	30	4.15%	10	1	108	1	108	Primary	0.002	0.002		0.01	0.00
	4	170+00	LT	172+00	LT	200	6.50%	10	2	349	2	697	Primary	0.016	0.016			
	4	172+00	LT	173+00	LT	100	4.00%	10	2	567	1	567	Primary	0.013	0.013			
	5	181+00	LT	182+00	LT	100	4.00%	10	2	567	1	567	Primary	0.013	0.013			
	5	182+00	LT	186+64	LT	464	3.13%	10	1	144	4	575	Primary	0.013	0.013			
	6	189+00	LT	190+00	LT	100	3.88%	4	1	64	1	64	Primary	0.001	0.001			
	6	190+00	LT	192+00	LT	200	2.50%	4	1	100	2	200	Primary	0.005	0.005			
	6	192+00	LT	192+48	LT	48	1.51%	4	1	166	0	0	Primary	0.000	0.000			
	7	194+00	LT	196+00	LT	200	0.77%	4	1	325	1	325	Primary	0.007	0.007			
	7	196+00	LT	199+00	LT	300	1.00%	4	1	250	3	750	Primary	0.017	0.017			
	7	199+00	LT	199+86	LT	86	3.78%	4	2	388	1	388	Primary	0.009	0.009			
	7	199+86	LT	201+00	LT	114	1.90%	4	1	132	1	132	Primary	0.003	0.003			
	8	201+00	LT	204+00	LT	300	1.07%	10	1	421	2	841	Primary	0.019	0.019			
	8	204+00	LT	204+20	LT	20	5.05%	10	2	449	0	0	Primary	0.000	0.000			
	8	205+50	LT	206+00	LT	50	0.40%	10	1	1125	0.4	450	Primary	0.010	0.010			
	9	213+00	RT	214+00	RT	100	1.46%	10	1	308	1	308	Primary	0.007	0.007			
	10	219+00	RT	220+00	RT	100	7.50%	10	1	60	1	60	Primary	0.001	0.001			
	10	220+00	RT	221+00	RT	100	2.00%	10	1	225	1	225	Primary	0.005	0.005			
	10	221+50	LT	228+50	LT	700	4.64%	4	1	54	7	377	Secondary	0.009		0.009		
	12	229+37	LT	230+00	LT	63	1.74%	10	1	259	0	0	Primary	0.000	0.000			
	12	230+00	LT	231+00	LT	100	5.95%	10	2	381	1	381	Primary	0.009	0.009			
	12	231+00	LT	232+00	LT	100	7.00%	10	2	324	1	324	Primary	0.007	0.007			
	12	232+00	LT	233+00	LT	100	8.00%	4	1	31	1	31	Secondary	0.001		0.001		
	12	233+00	LT	234+00	LT	100	3.50%	4	1	71	1	71	Secondary	0.002		0.002	Sleepy Hollow Creek	
	12	234+00	LT	235+00	LT	100	2.00%	4	1	125	1	125	Secondary	0.003		0.003	0.21	0.01
	14	255+00	RT	261+00	RT	600	1.55%	10	1	290	6	1742	Primary	0.040	0.040			
	14	261+00	RT	267+00	RT	600	1.42%	10	1	317	6	1901	Primary	0.044	0.044			
	14	267+00	RT	269+00	RT	200	0.50%	10	1	900	1	900	Primary	0.021	0.021			
	14	269+00	RT	271+00	RT	200	0.40%	10	1	1125	1	1125	Primary	0.026	0.026			
	14	271+00	RT	273+45	RT	245	0.40%	10	1	1125	1	1125	Primary	0.026	0.026			
	14	273+45	RT	274+00	RT	55	0.55%	10	1	818	0.3	245	Primary	0.006	0.006			
	14	274+00	RT	275+00	RT	100	0.43%	10	1	1047	0	0	Primary	0.000	0.000			
	14	254+00	LT	257+00	LT	300	2.13%	10	1	211	3	634	Primary	0.015	0.015			
	14	257+00	LT	258+00	LT	100	0.40%	10	1	1125	0	0	Primary	0.000	0.000			
	14	266+00	LT	271+00	LT	500	0.65%	10	1	692	3	2077	Primary	0.048	0.048			
	14	271+00	LT	271+50	LT	50	0.30%	10	1	1500	0	0	Primary	0.000	0.000			
	15	275+00	RT	276+00	RT	100	0.43%	10	1	1047	0	0	Primary	0.000	0.000			
	15	279+00	RT	279+71	RT	71	1.33%	10	1	338	1	338	Primary	0.008	0.008			
	15	279+71	RT	283+75	RT	404	1.19%	10	1	378	4	1513	Primary	0.035	0.035			
	15	283+75	RT	285+00	RT	125	1.06%	10	1	425	1	425	Primary	0.010	0.010			
	15	285+00	RT	285+80	RT	80	0.50%	10	1	900	0.5	450	Primary	0.010	0.010			
	15	287+94	RT	289+65	RT	171	0.28%	10	1	1607	0.5	804	Primary	0.018	0.018			
	15	281+00	LT	282+00	LT	100	3.00%	10	1	150	1	150	Primary	0.003	0.003			
	15	282+00	LT	283+00	LT	100	1.00%	10	1	450	1	450	Primary	0.010	0.010			
	15	283+00	LT	284+00	LT	100	0.50%	10	1	900	0.5	450	Primary	0.010	0.010			
	15	284+00	LT	285+00	LT	100	1.05%	10	1	429	1	429	Primary	0.010	0.010			
	15	285+00	LT	287+96	LT	296	0.50%	10	1	900	1	900	Primary	0.021	0.021			
	15	290+75	LT	292+00	LT	125	0.49%	10	1	918	0	0	Primary	0.000	0.000			
	15	292+00	LT	293+00	LT	100	0.30%	10	1	1500	0	0	Primary	0.000	0.000			
	15	293+00	LT	297+00	LT	400	0.60%	10	1	750	1	750	Primary	0.017	0.017			
X	17	298+00	RT	301+00	RT	300	0.73%	11	1	662	2	1324	Primary	0.030	0.030			
X	17	301+00	RT	302+00	RT	100	1.55%	11	1	312	1	312	Primary	0.007	0.007			
X	17	302+00	RT	303+00	RT	100	0.55%	11	1	879	0	0	Primary	0.000	0.000			
X	17	303+00	RT	304+00	RT	100	0.30%	11	1	1611	0	0	Primary	0.000	0.000		Outfall 17 is included in the Sleepy	
X	17	304+00	RT	304+81	RT	81	0.80%	11	1	604	1	604	Primary	0.014	0.014		Hollow Creek Subwatershed	
	18	312+15	RT	313+50	RT	135	0.48%	10	1	938	0.65	608	Primary	0.014	0.014			
X	18	313+50	RT	320+00	RT	650	0.48%	11	1	1007	2	2014	Primary	0.046	0.046			
	18	320+00	RT	320+03	RT	3	0.48%	10	1	938	0	0	Primary	0.000	0.000			
	18	320+03	RT	332+00	RT	1197	0.30%	10	1	1500	3	4500	Primary	0.103	0.103			
	18	332+00	RT	333+00	RT	100	0.80%	10	1	563	1	563	Primary	0.013	0.013			
	19	333+00	RT	334+00	RT	100	0.95%	10	1	474	1	474	Primary	0.011	0.011			
	19	334+00	RT	335+00	RT	100	0.30%	10	1	1500	0.33	495	Primary	0.011	0.011			
	19	335+00	RT	337+50	RT	250	0.30%	10	1	1500	0.66	990	Primary	0.023	0.023			
	19	337+50	RT	340+00	RT	250	0.30%	10	1	1500	0.66	990	Primary	0.023	0.023			
	19	340+00	RT	341+00	RT	100	0.30%	10	1	1500	0	0	Primary	0.000	0.000			
	19	346+50	RT	350+00	RT	350	0.53%	10	1	849	2	1698	Primary	0.039	0.039			
	19	350+00	RT	350+02	RT	2	0.51%	10	1	882	0	0	Primary	0.000	0.000			
	19	350+02	RT	352+00	RT	198	0.30%	10	1	1500	0.50	750	Primary	0.017	0.017			
	19	358+00	RT	359+00	RT	100	0.30%	10	1	1500	0	0	Primary	0.000	0.000			
	19	359+00	RT	361+00	RT	200	1.13%	10	1	398	0	0	Primary	0.000	0.000			
	19	361+00	RT	362+00	RT	100	2.12%	10	1	212	0	0	Primary	0.000	0.000			
	19	362+00	RT	367+50	RT	550	0.60%	10	1	750	3	2250	Primary	0.052	0.052			
	19	346+00	LT	347+00	LT	100	1.00%	10	1	450	1	450	Primary	0.010	0.010			
	19	347+00	LT	348+00	LT	100	2.00%	10	1	225	1	225	Primary	0.005	0.005			
	19	348+00	LT	350+00	LT	200	0.50%	10	1	900	1	900	Primary	0.021	0.021			
	20	370+75	LT	372+00	LT	125	1.65%	10	1	273	1	273	Primary	0.006	0.006			
	22B	404+00	RT	405+00	RT	100	3.00%	10	1	150	0	0	Primary	0.000	0.000			
	22B	405+00	RT	407+00	RT	200	4.50%	10	1	100	2	200	Primary	0.005	0.005			
	22B	407+00	RT	408+00	RT	100	4.90%	10	1	92	1	92	Primary	0.002	0.002			
	22B	413+00	RT	413+50	RT	50	4.03%	10	1	112	1	112	Primary	0.003	0.003			
	22B	413+50	RT	415+50	RT	200	1.09%	10	1	413	2	826	Primary	0.019	0.019			
	22B	418+00	RT	419+00	RT	100	1.09%	10	1	413	1	413	Primary	0.009	0.009			
	22C	419+00	LT	423+70	LT	470	0.36%	10	1	1250	1.7	2121	Primary	0.049	0.049			
	23	444+50	RT	446+00	RT	150	1.67%	10	1	269	0	0	Primary	0.000	0.000		Fox River	
	23	440+00	LT	443+00	LT	300	1.27%	4	1	197	3	591	Primary	0.014	0.014		0.87	0.00

NOTES:
1. MINIMUM DITCH CHECK SPACING IS 100 FEET PER USACE.
2. WQV PER DITCH CHECK CALCULATED USING SEPARATE "DITCH CHECK RETENTION" SPREADSHEET.
3. THE NUMBER OF DITCH CHECKS IS LESS THAN ONE IN AREAS WHERE THE MINIMUM SPACING BETWEEN DITCH CHECKS FOR THE DEFINED LONGITUDINAL SLOPE AND DITCH CHECK HEIGHT IS NOT MET. IN THESE LOCATIONS, IT MAY BE REQUIRED TO PLACE A DITCH CHECK ON THE UPSTREAM AND DOWNSTREAM END OF THE DITCH TO RETAIN AS MUCH STORAGE AS POSSIBLE.
4. NO DITCH CHECKS ARE PROVIDED IN AREAS WHERE THE DITCH IS TOO SHALLOW TO INCORPORATE DITCH CHECKS OR IN AREAS WHERE THE LENGTH OF THE DEFINED DITCH IS NOT LONG ENOUGH TO PROPERLY SPACE THE DITCH CHECKS AT 100 FT INTERVALS MINIMUM.

WATER QUALITY VOLUME CALCULATIONS FOR MEASURES OTHER THAN
IL ROUTE 31

Outlet Number	REVISED DESIGN	
	Primary WQV Storage Other Measures (ac ft)	Secondary WQV Storage Other Measures (ac ft)
1	VARIABLE	
2		2.40
3		
4		
5		
6		
7	0.17	
8		
9		
10	0.05	
11		
12		
13		
14		
15 & 16		
17		
18		
19	0.09	
20		
21A		
21B		
21C		
22A		
22B	0.21	
22C		
23		
23E		
23G		
24		
25		
26	0.45	
27		
TOTAL BY WATERSHED		
Silver Creek	VARIABLE	2.4
Sleepy Hollow Creek	0.22	0
Fox River	0.75	0

NOTES:

1. Primary Measures for Outlet 1 are VARIABLE because it is assumed that the total required WQV for Outlet 1 is stored in the existing IL 176 detention pond. The required WQV varies depending on the rainfall depth and impervious area.
The Variable WQV storage for Outlet 1 is represented in the different WQV Summary Tables.
2. The existing depressional storage area in the ComED property serves as the Secondary WQV Storage for Outlet 2
3. It is assumed that the infiltration trench at Outlet 10 will retain only the runoff tributary to the infiltration trench, 0.05 ac ft.
4. The 3rd Street detention pond at Outlet 26 can be lowered to provide 0.45 ac ft of WQV Storage but it is not designed that way currently.
5. The volume for Outlet 19 is provided as dead storage in a long, narrow pond between
STA 346+00 LT to STA 349+75 LT assumed to be 1' deep and 10' wide.
6. The volume for 22B is provided as dead storage in the long, narrow ponds used in lieu of paved ditch on the LT and RT sides of the road.
7. The volume for 7 is provided as depressions on the inside of meander bends in the proposed meandering section of Squaw Creek.

WATER QUALITY VOLUME COMPARISON
ILLNOIS ROUTE 31
ILLINOIS ROUTE 176 TO ILLINOIS ROUTE 120 MCHENRY COUNTY, ILLINOIS

WATER QUALITY VOLUME REQUIRED FOR 1"/1.25" RAINFALL OF ADDITIONAL PROPOSED IMPERVIOUS AREAS NOT INCLUDING BIKE PATH

Watershed	Required WQV Storage (ac ft)	Provided WQV Storage (ac ft)		Difference = Required - Provided (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
TOTAL	1.58	2.08	2.41	-0.50	-2.92

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.

BIOSWALE LENGTHS
ILLNOIS ROUTE 31
ILLINOIS ROUTE 176 TO ILLINOIS ROUTE 120 MCHENRY COUNTY, ILLINOIS

Watershed	Length of Proposed Bioswales (ft)
Silver Creek (Outfall 1-3)	199
Sleepy Hollow Creek (Outfall 4-13, Outfall 17)	3,526
Fox River (Outfall 14-16, Outfall 18-27)	11,801
TOTAL	15526