

**BOWER ELEMENTARY SCHOOL
LEVEE DESIGN AND CERTIFICATION
DUPAGE COUNTY, IL**



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Jamie.Lock@dupageco.org

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Special Thanks To Project Partners:

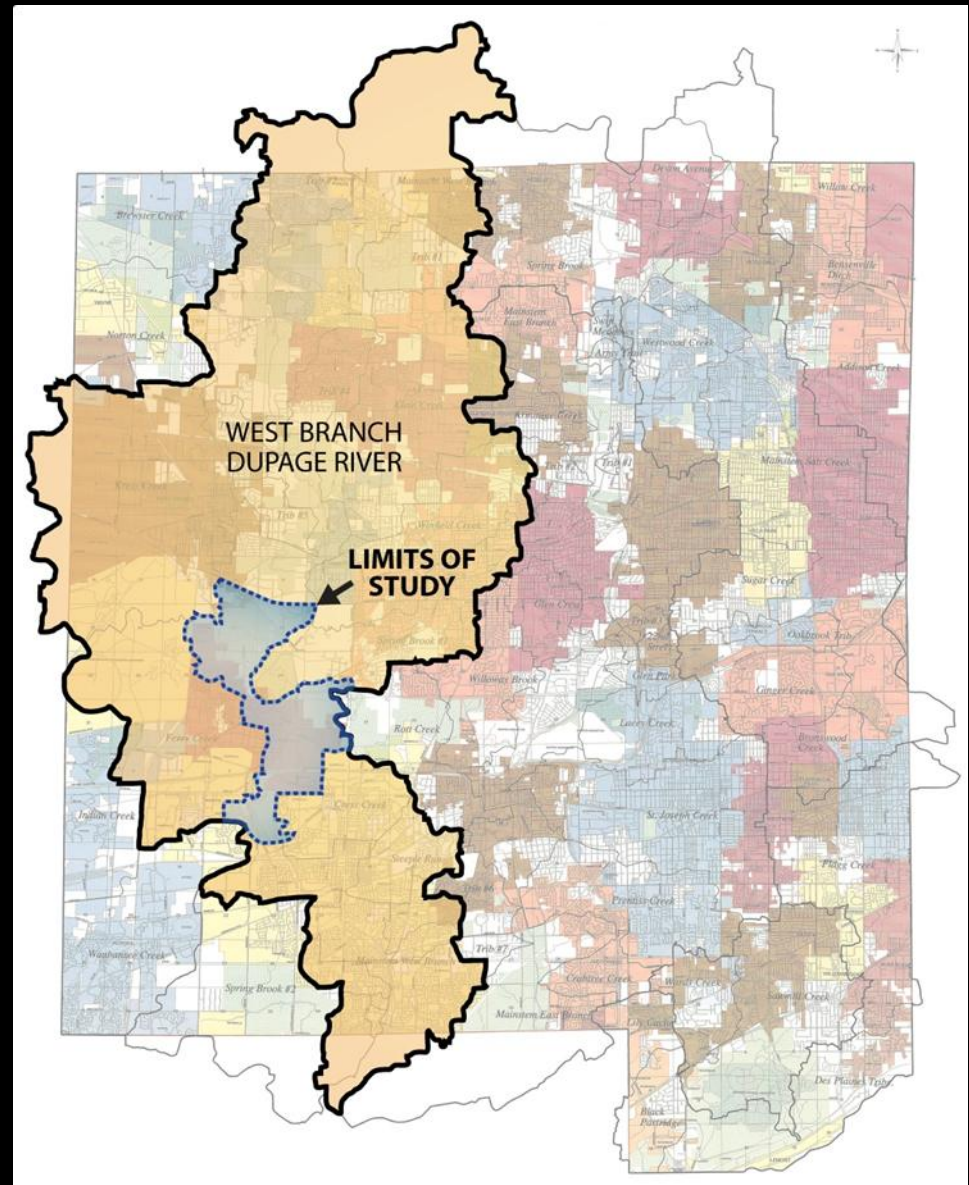


PRESENTATION OUTLINE

- General Overview
- Bower School Levee
- Levee Certification
- River Road Levee
- Questions



Project Location

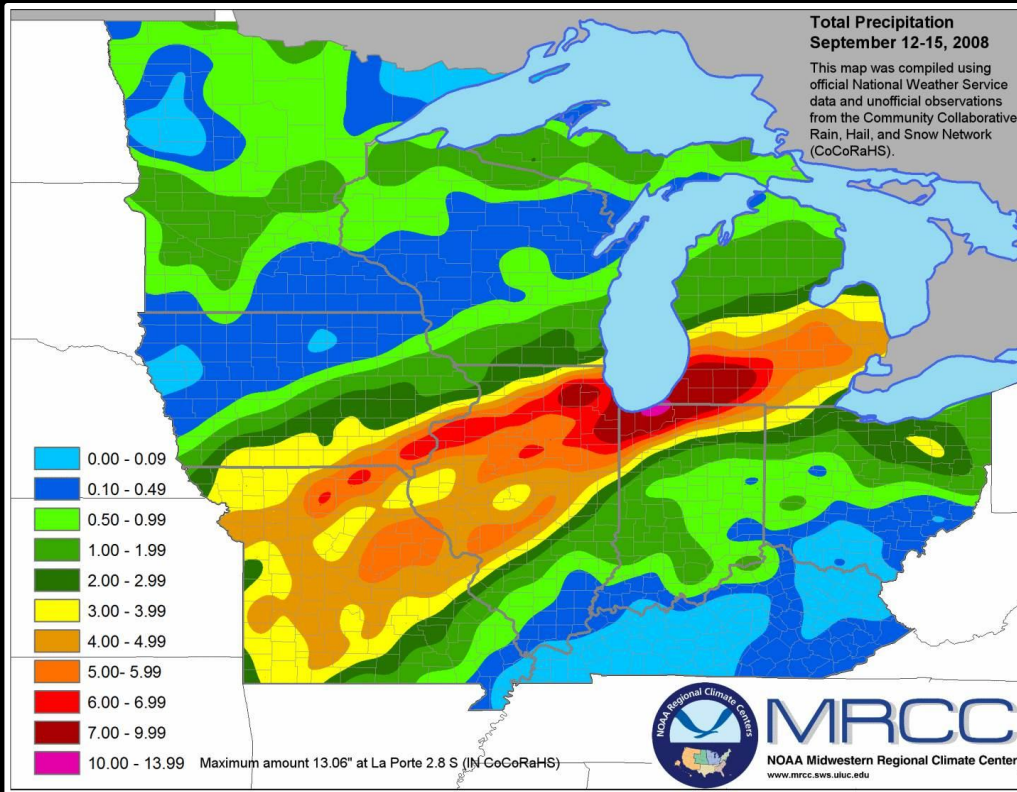


West Branch DuPage River Watershed

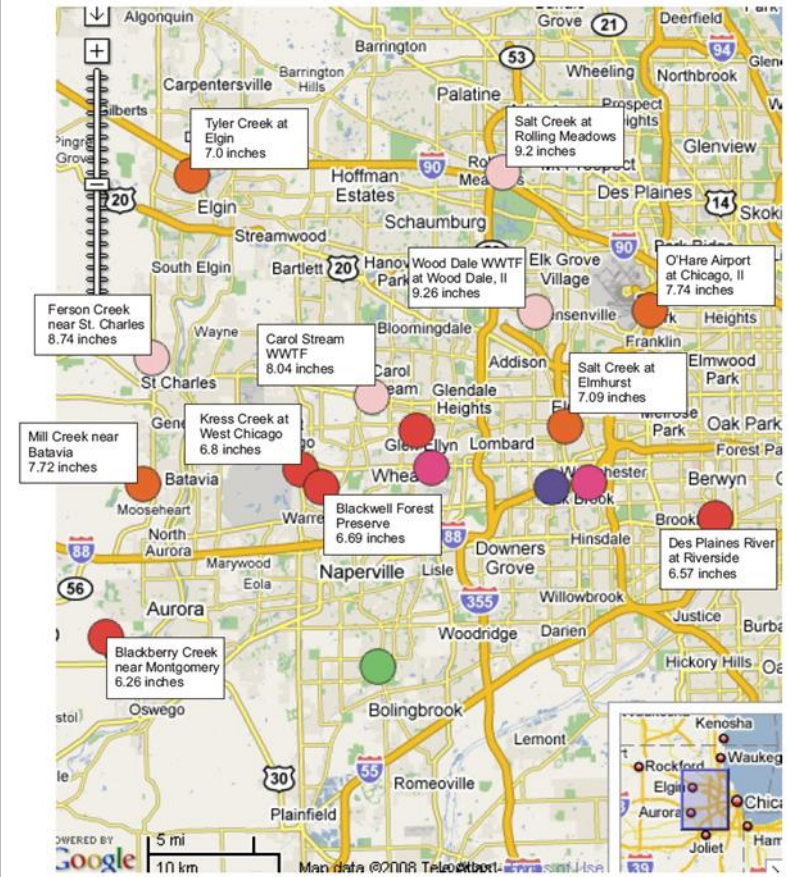
- 128 square miles
- 17 Tributaries
- 14 Communities & Unincorporated DuPage

September 2008 Storm

DuPage County experienced six to ten inches of rain



Precipitation totals (September 12-14, 2008) PROVISIONAL DATA SUBJECT TO REVISION



Note: Real-time screen capture annotated with gage values with 95% or greater transmission rate. Back-up data will likely increase the values at the sites that are not annotated.

2008 Flooding in Warrenville



2008 Flooding in Warrentville

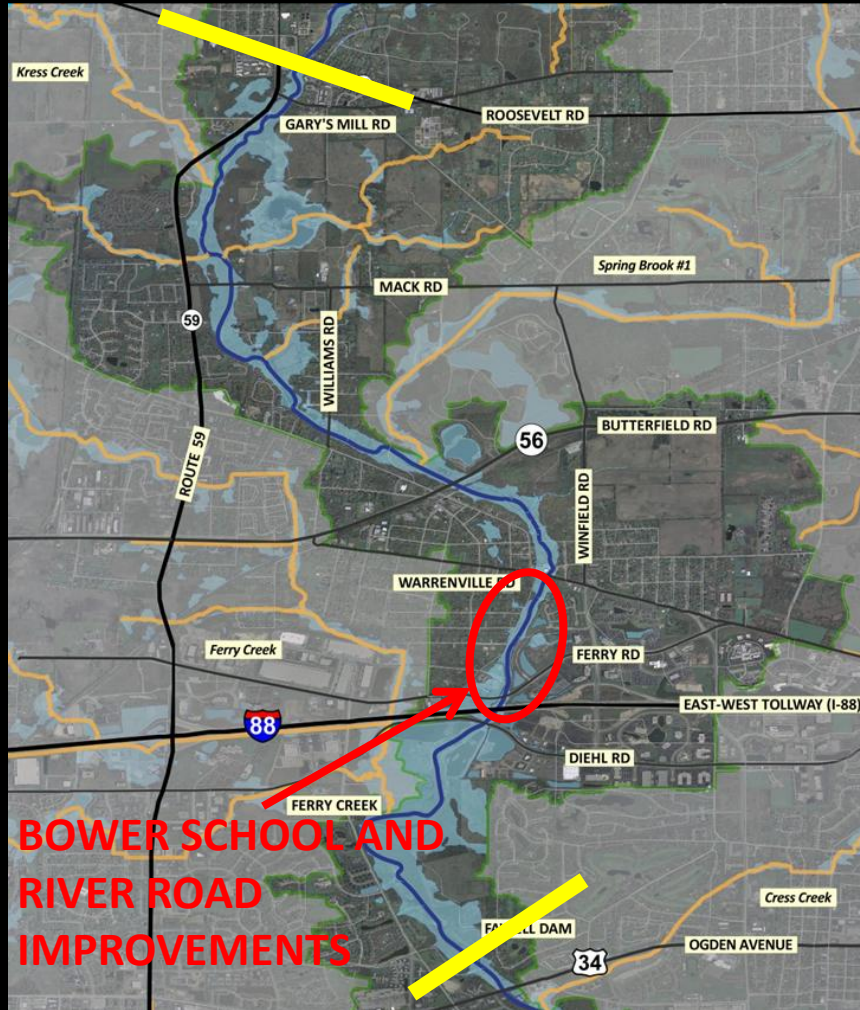


2008 Flooding in Warrentville



Bower Elementary School

West Branch Watershed Plan Addendum



County's Response to September 2008 Storm

Study Limits: Roosevelt Road to Upstream of Fawell Dam

Total Reach Length: 7.0 Miles

Preferred Alternatives Included:

Bower Berm Berm

Raising River Road

2nd Street Corridor Restoration

Williams Road Bridge Replacement

Warrenville Rd Bridge Replacement

Flood Control Berms N. of Williams Road

Approved by Stormwater Management Committee & DuPage County Board - 2010

BOWER SCHOOL – EXISTING CONDITIONS



Bower School Berm and Levee Certification

❖ Stakeholders

- Bower Elementary School
- DuPage County
- City of Warrenville
- EPA

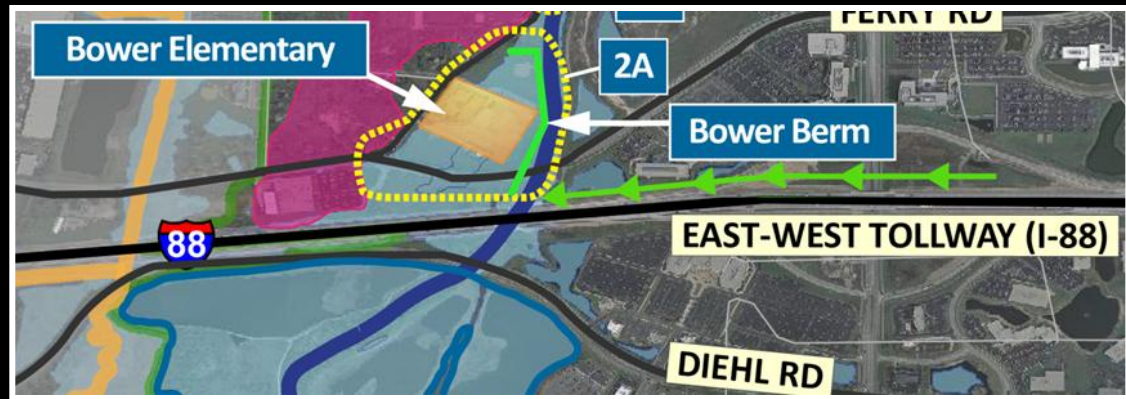
❖ Objective: Protect School

❖ Overlapping Projects

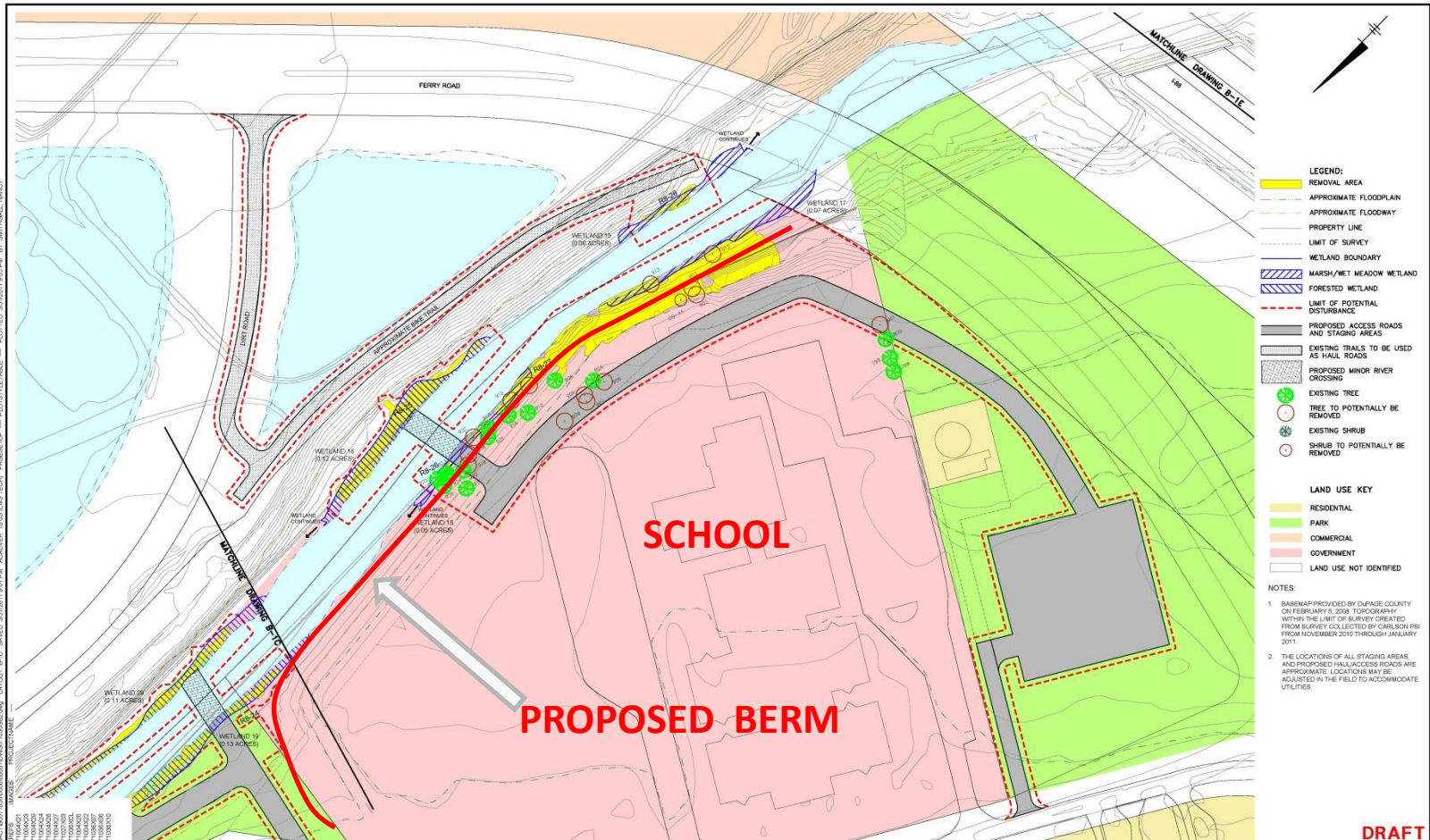
- Berm and Superfund cleanup

❖ Coordination

- Cost Share (County, School, City)
- FEMA
- EPA Superfund Cleanup
- Permits
- Intergovernmental Agreements



OVERLAPPING PROJECTS – BERM AND SUPERFUND CLEANUP



DRAFT

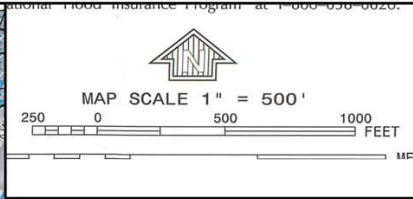
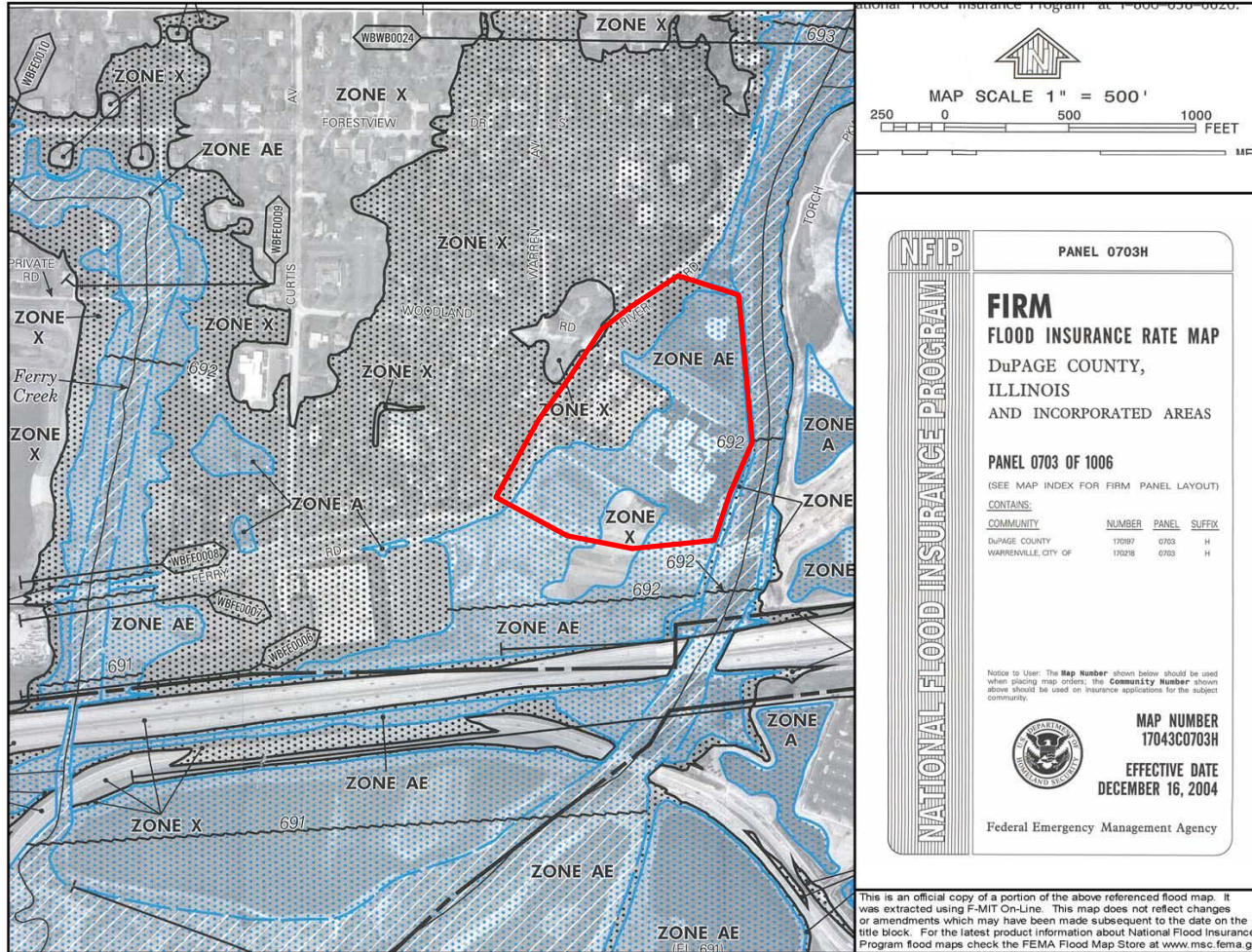
CITY: SPRINGFIELD, ILLINOIS COUNTY: COOK COUNTY PROJECT: BRANCH DAPAGE RIVER SITE - REACH 8 DRAWING: B-1D		PROFESSIONAL ENGINEER'S NAME: MARK OWEN GRAVELDING LICENSE NO.: 0820559378		DATE: []/ []/ [] DESIGNED BY: [] DRAWN BY: [] CHECKED BY: []	
THIS DRAWING IS THE PROPERTY OF ARCADIS U.S. INC. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED WITHOUT THE EXPRESS WRITTEN PERMISSION OF ARCADIS U.S. INC.		SCALE: 1" = 40' NORTH ARROW: []		PROJECT NO.: [] SHEET NO.: []	

ARCADIS
ARCADIS U.S. INC.

TRONOX LLC - KRESS CREEK/WEST BRANCH DAPAGE RIVER SITE
 FINAL DESIGN/REMEDIAL ACTION WORK PLAN - REACH 8
SITE PLAN WITH EXISTING CONDITIONS - REACH 8

ARCADIS Project No.: 30077036.0000.0001 DATE: MARCH 2011 ARCADIS 8723 Towson Road Suite 200 Towson, MD 21286	B-1D
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Current Regulatory Floodplain



NFIP PANEL 0703H

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

PANEL 0703 OF 1006
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DUPAGE COUNTY	170187	0703	H
WARRENVILLE, CITY OF	170278	0703	H

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

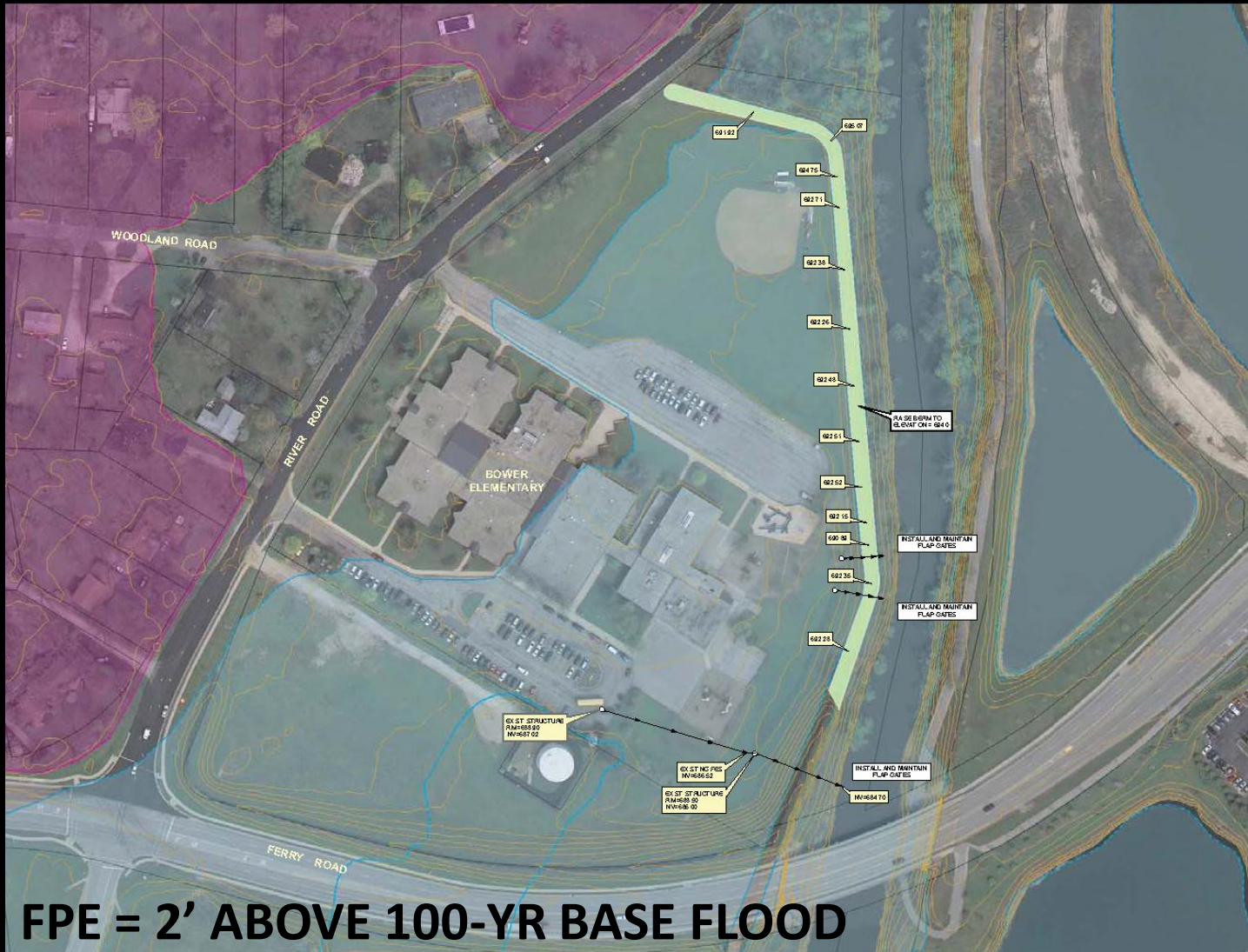
MAP NUMBER
 17043C0703H

EFFECTIVE DATE
 DECEMBER 16, 2004

Federal Emergency Management Agency

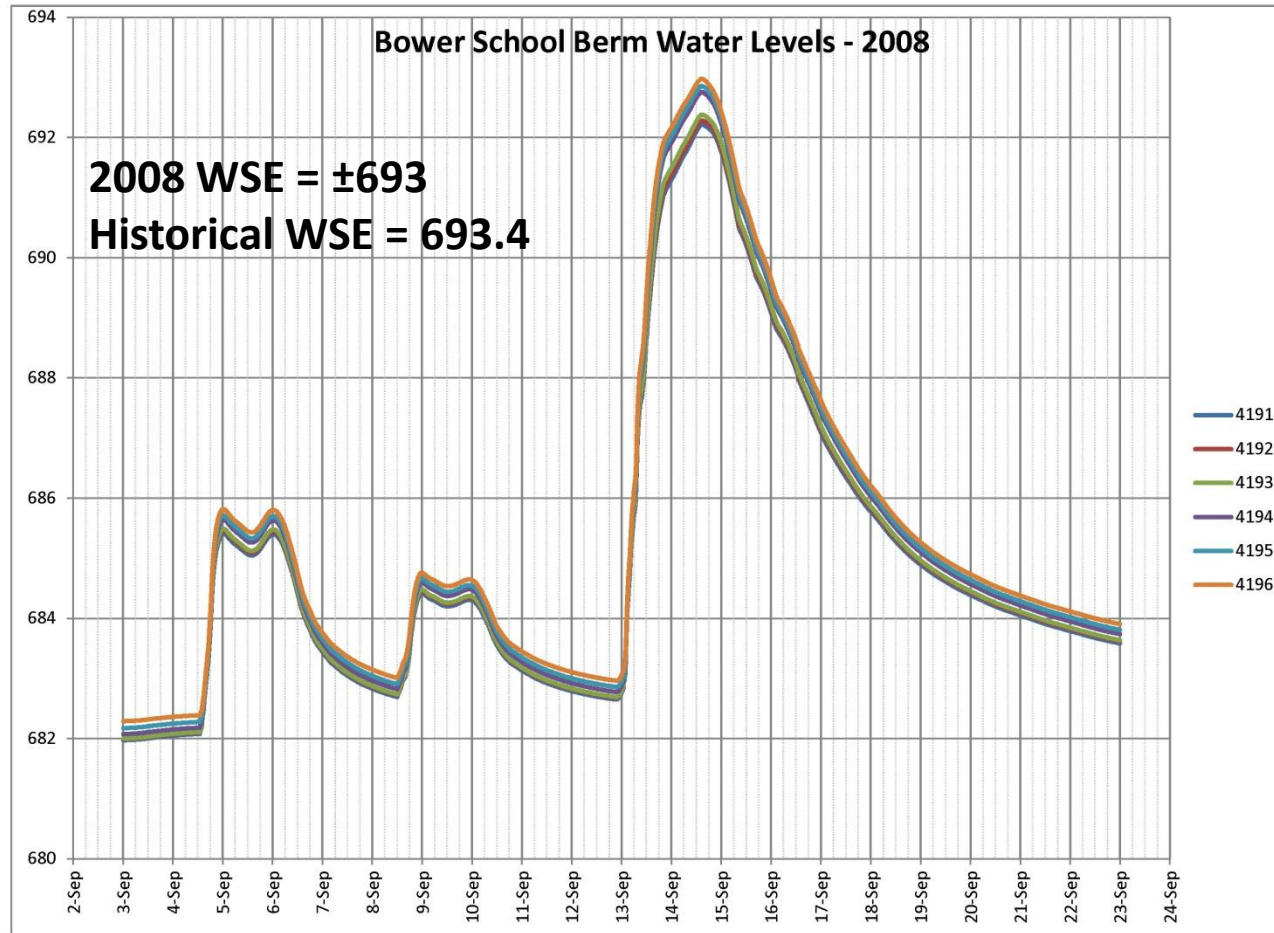
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program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

Bower Elementary Flood Control Improvements West Branch Watershed Plan Addendum



FPE = 2' ABOVE 100-YR BASE FLOOD

2008 Peak Water Levels at Bower School



What Should be the Flood Protection Elevation?

County's commitment is to protect to 2' above BFE i.e. top of berm at 694'?

Possibility to raise berm to meet FEMA levee certification criteria is discussed

Berm would need to be raised to a minimum of 695' to meet freeboard requirements for levee certification.

Freeboard Requirements for Levee Certification

Min. 3' above the 100-yr BFE

An additional 1' above the minimum is required within 100 feet in either side of structures

An additional 0.5' foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

BOWER BERM

School Opts for Certified Levee

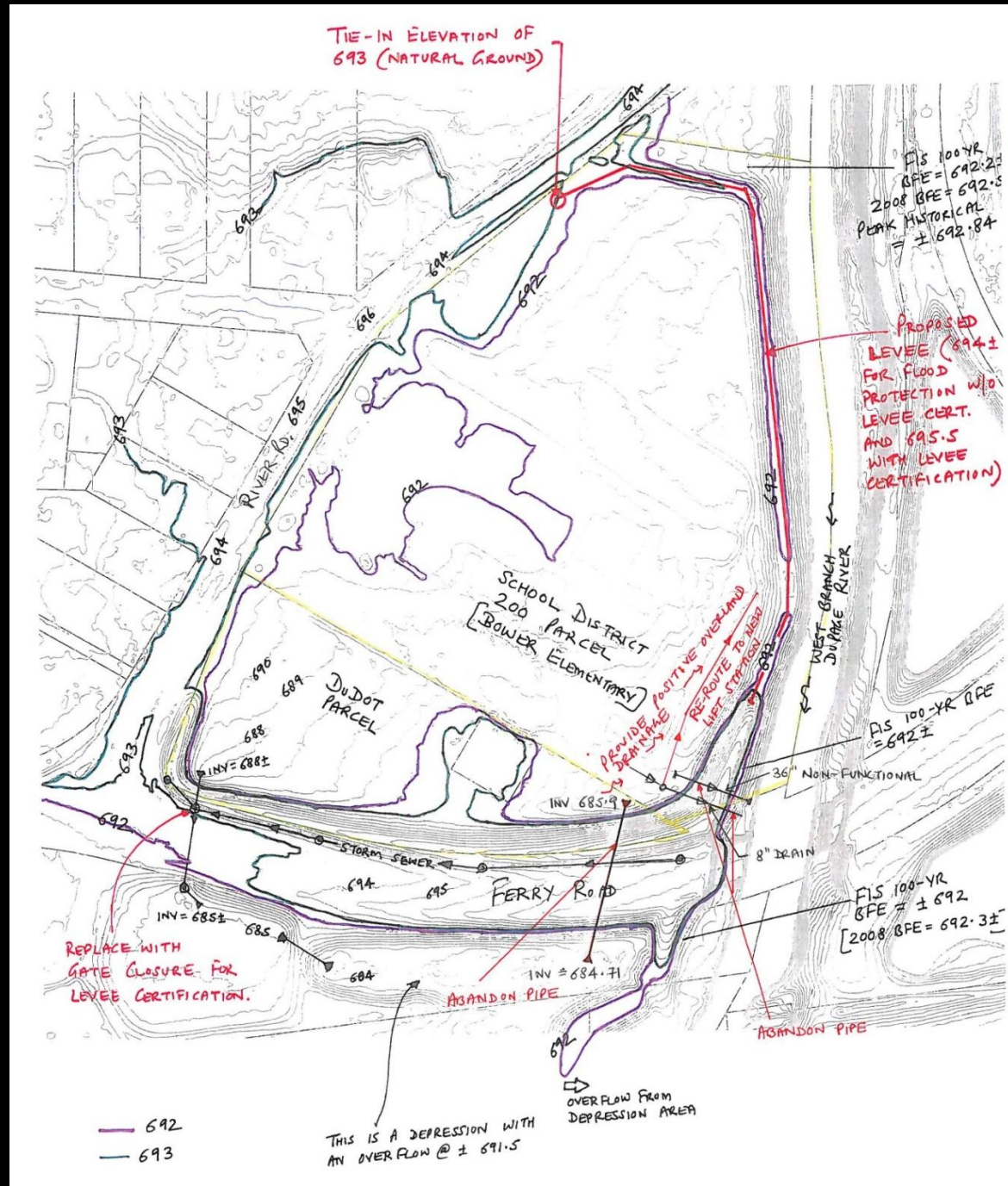
FPE of 695.5 is chosen

County/School Cost Participation. Need an Intergovernmental Agreement

Would the levee need to meet freeboard requirements on all sides?

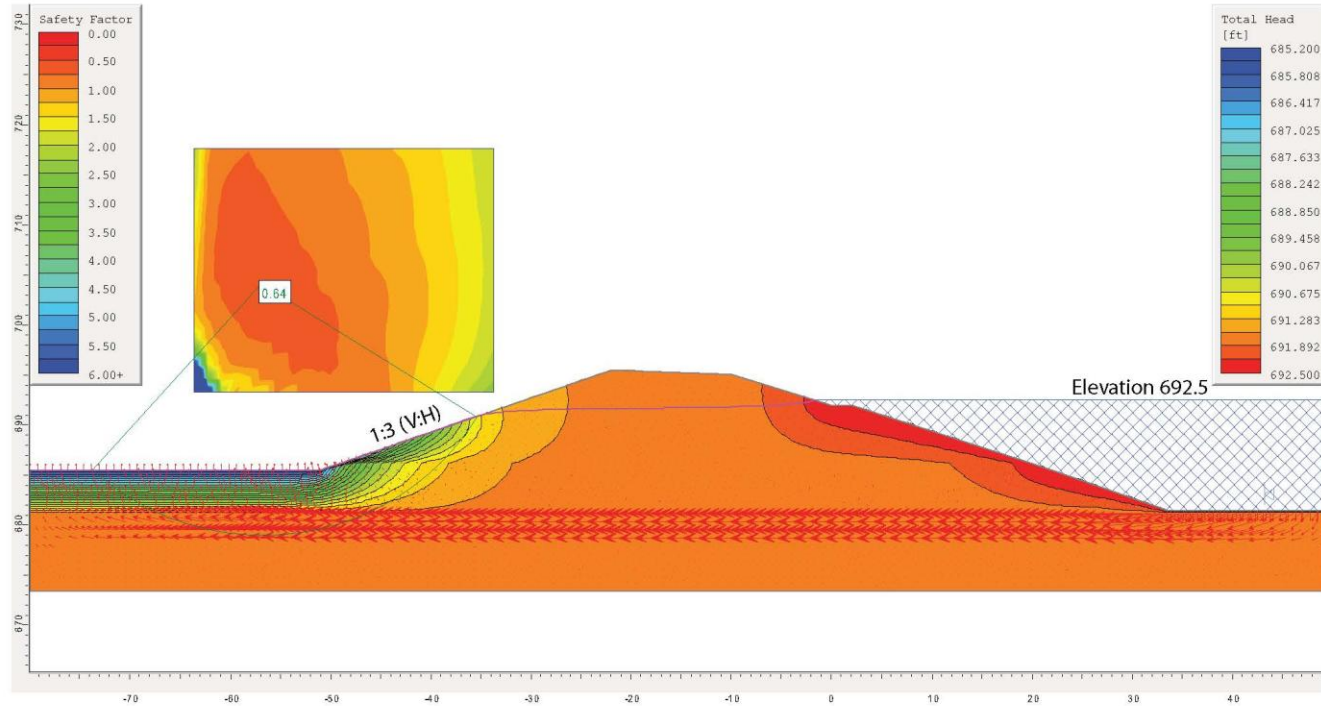
Can a School Own/Operate a Levee? Apply for Levee Certification?

Early coordination with FEMA completed



Seepage Analysis - Existing Conditions

Steady Seepage from Full Flood Stage
Station 202+75



Soil Parameters

Soil ID	Soil Type	Unit Weight (pcf)	Drained Parameter C' (psf)	Drained Parameter ϕ (deg.)	Coefficient of Permeability, K	
					(ft/sec)	/(cm/sec)
Fill	IDOT Cohesive FILL	125	100	29	$3 \cdot 10^{-7}$	10^{-5}
1	Hard LEAN CLAY FILL	125	100	31	$3 \cdot 10^{-7}$	10^{-5}
2	Medium Stiff CLAY	120	25	27	$3 \cdot 10^{-6}$	10^{-4}
3	Medium Dense WELL-GRADED SAND	120	0	32	$3 \cdot 10^{-2}$	1
4	Hard LEAN CLAY	125	300	32	$3 \cdot 10^{-7}$	10^{-5}

GLOBAL STABILITY ANALYSIS: BOWER SCHOOL LEEVE
WARRENVILLE, DuPAGE COUNTY IL

SCALE: GRAPHICAL

EXHIBIT 5-3A

DRAWN BY: A. Kurnia
CHECKED BY: S. Sugianto

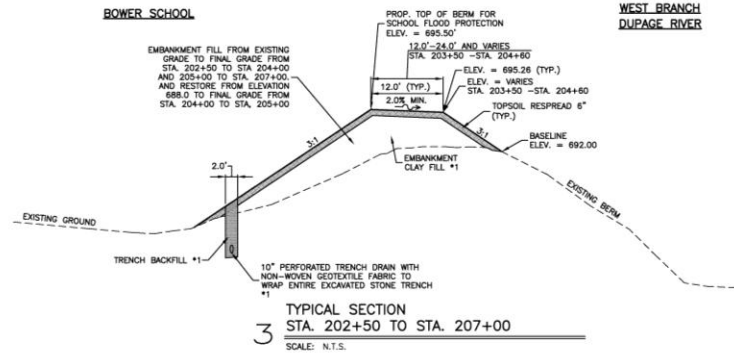
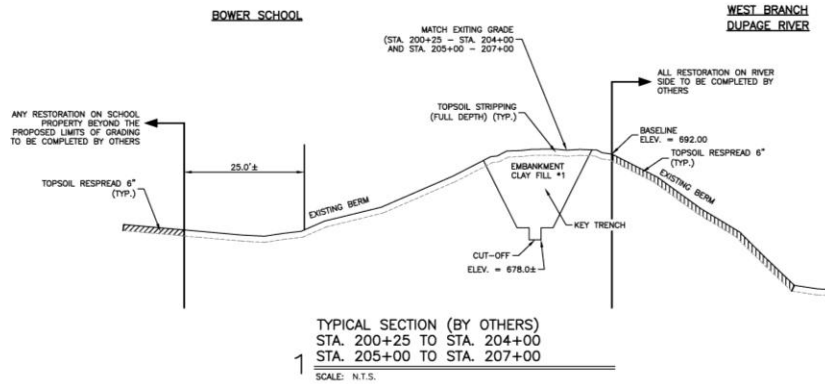


1145 N. Main Street
Lombard, IL 60148
www.wangeng.com

FOR HR GREEN, INC.

811-01-01

BOWER LEVEL – TYPICAL SECTIONS



Levee Certification

Example Embankment Specifications

The material shall consist of approved materials that are free of organic matter and debris. The soil shall be of classification CL in accordance with the Unified Soil Classification System obtained from glacial till deposits. The soil shall have a liquid limit greater than 30 and less than 50, a plasticity index of greater than 15 and less than 30, the fines content (percent passing sieve #200) greater than 30% and a hydraulic conductivity of less than 1×10^{-6} cm/sec or less.

The Owner will employ the professional services of a qualified geotechnical firm at Owner's expense to provide material sampling, material testing, quality assurance and field quality control. Material used for embankment fill including embankment soil compaction shall be per the direction of the Owners geotechnical engineer.

Levee Certification

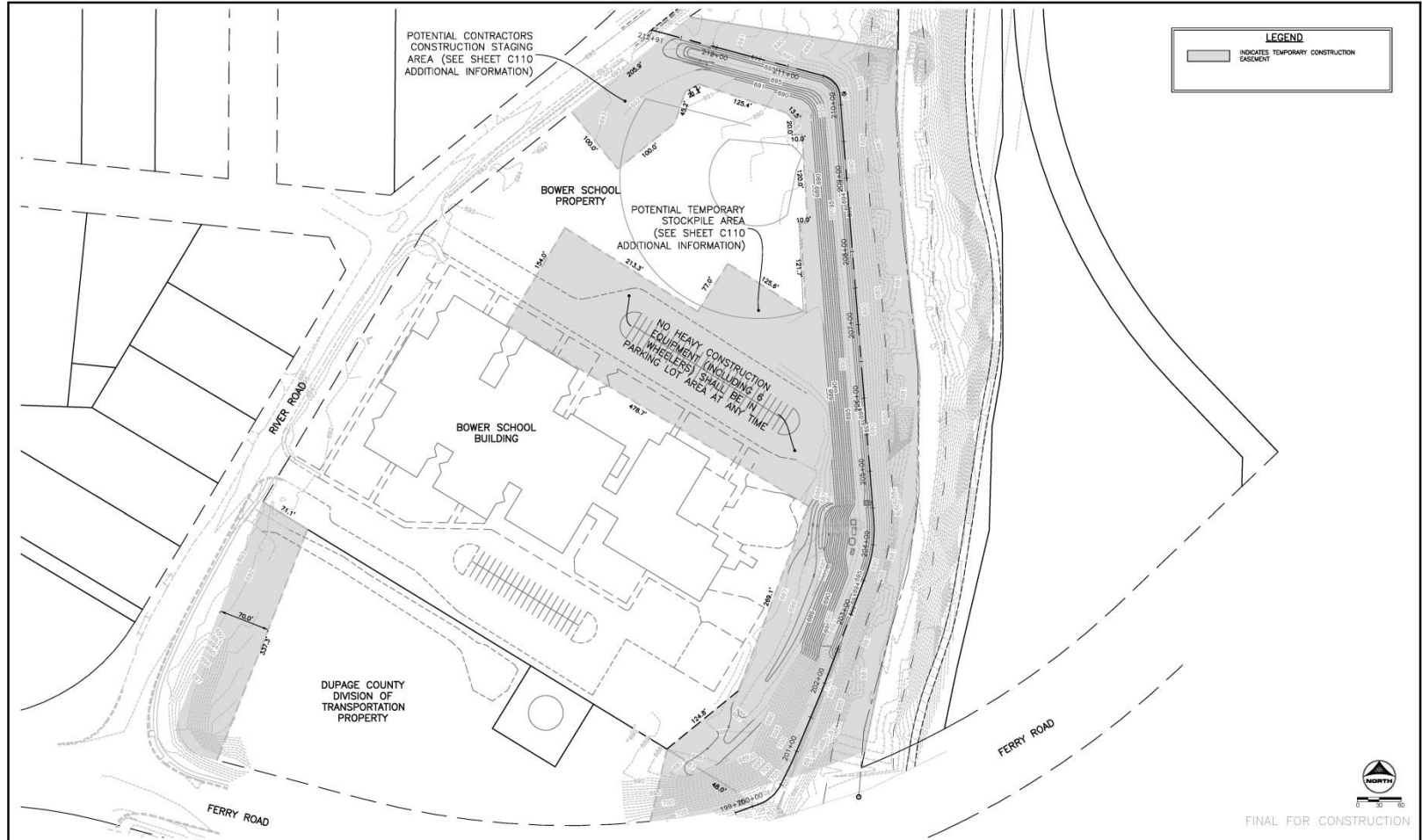
Example Embankment Specifications

Embankment Soils Compaction: Embankment compaction shall be done in accordance with the applicable portions of Article 205.06 of the Standard Specifications. Density and moisture content shall be as specified below: Field density test frequency shall be at least one test per each 10 cubic yards placed within areas adjacent to structures, a minimum of two tests shall be performed for each structure located within the embankment. Field density test frequency shall be at least one test per 100 cubic yards in open areas of the embankment. A minimum of three tests shall be completed for any lift of fill. Locations of field density tests shall be subject to approval by the Owner's geotechnical engineer. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet (46 m) or less of trench length, but no fewer than 2 tests.

Moisture Content: The clay fill shall be brought to a moisture content between +2% and +4% greater than the optimum moisture content and compacted to a minimum 95% of the maximum dry unit weight according to ASTM D 698

Method A. After compacting each lift, the surface should be scarified for bonding between successive lifts. Contractor must maintain moisture content until acceptance by Owner. If the hydraulic conductivity is not met, Contractor shall re-compact or replace at the Contractor expense

BOWER LEVEE – OVERALL PLAN



DRAWN BY: MFL JOB DATE: 2012
 APPROVED: AJ JOB NUMBER: 86110056
 CAD DATE: 5/17/2012 4:25:40 PM
 CAD FILE: D:\86110056\CAD\Bower_School_Level\Phase_1\Drawn\Overall.dwg

NO.	DATE	BY	REVISION DESCRIPTION

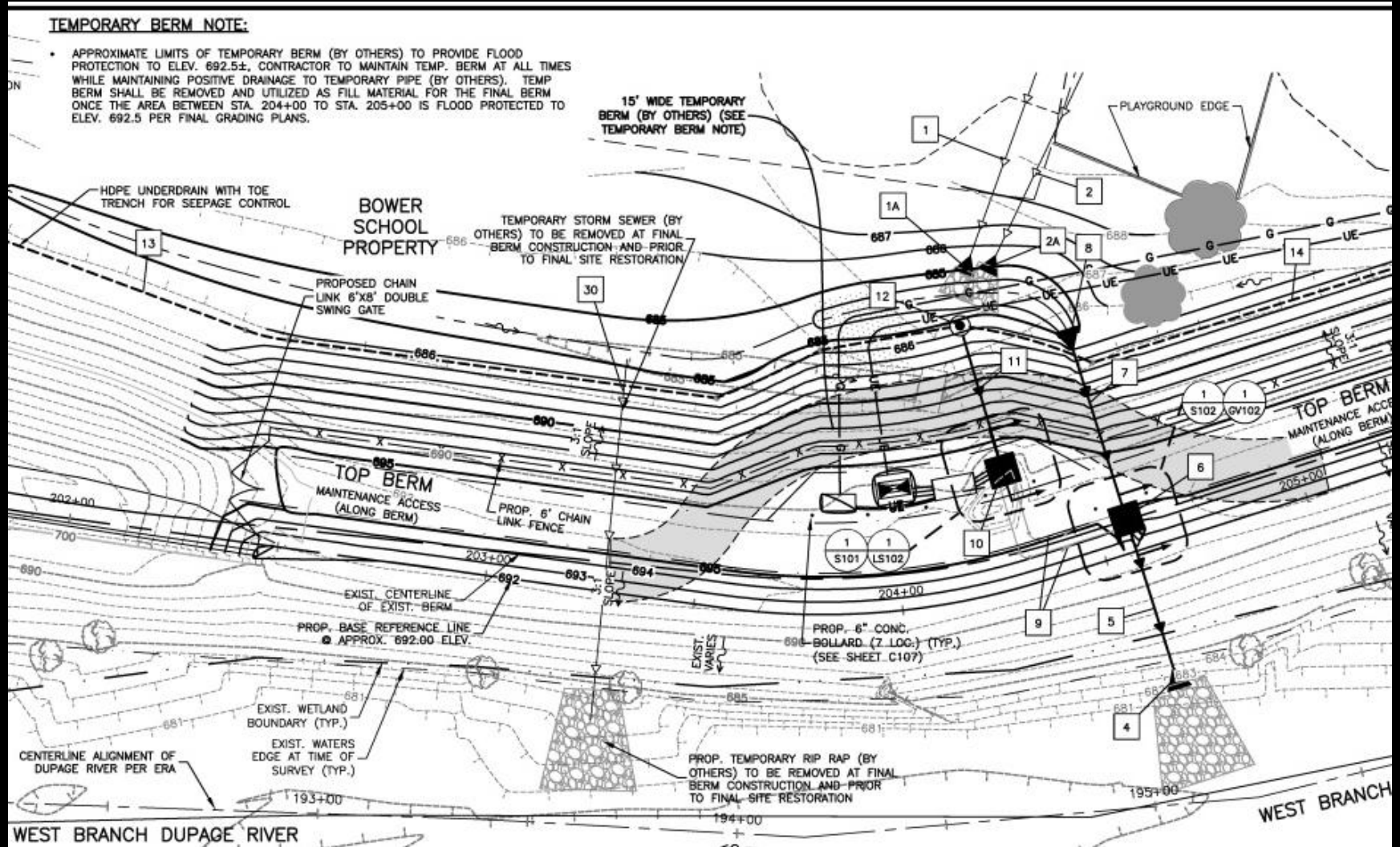
HRGreen
 14400E DESIGN DRIVE # 104 061 002
 402 W. FRONT STREET, SUITE 100
 WARRENVILLE, ILLINOIS 60090
 PHONE: 815.380.1778 | TOLL FREE: 800.328.7800
 FAX: 815.380.1781 | info@hrgreen.com

BOWER SCHOOL BERM RESTORATION PROJECT
 CITY OF WARRENVILLE
 DUPAGE COUNTY, IL

CIVIL
 OVERALL AND ACCESS EASEMENT PLAN

SHEET NO:
 C108

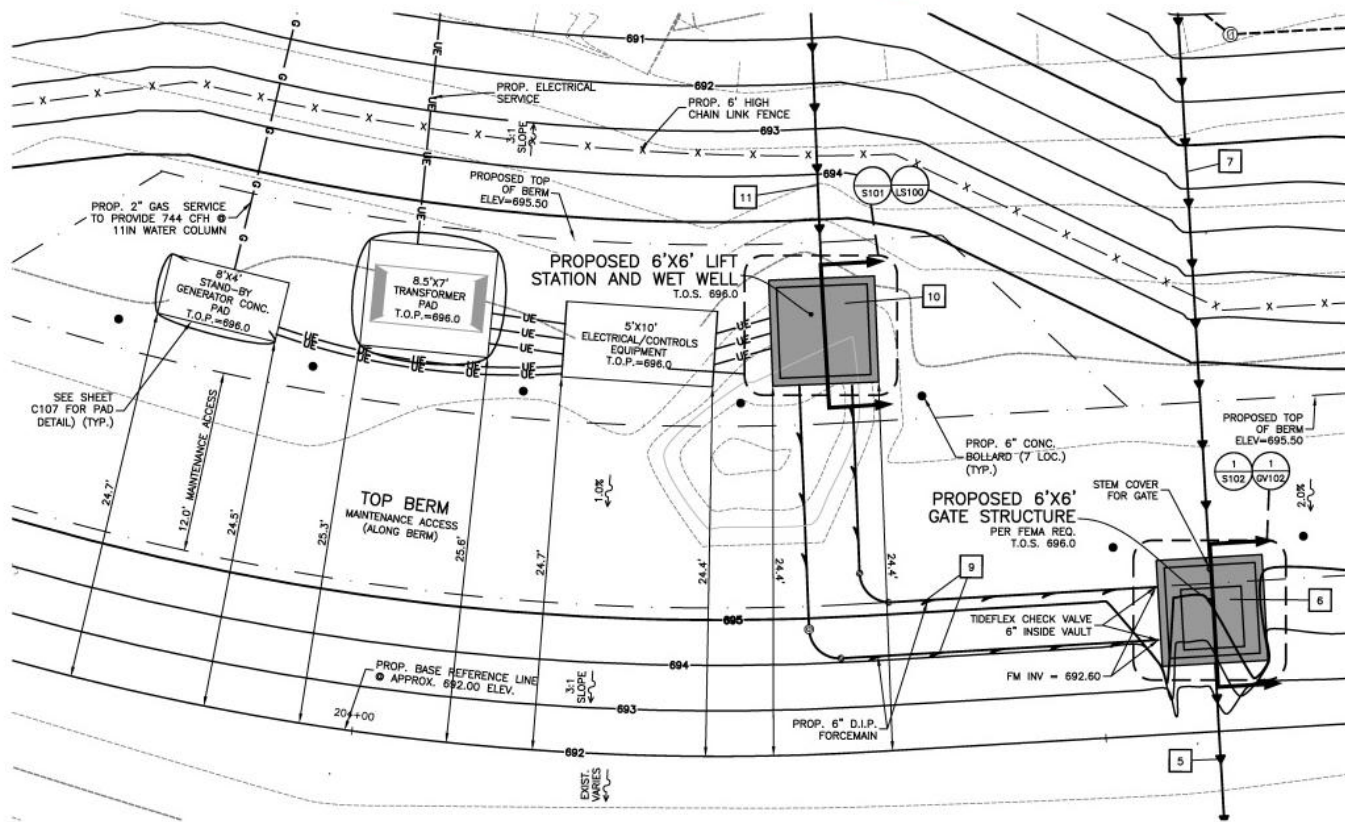
BERM CONSTRUCTION COORDINATION



LIFT STATION, GATES, GENERATOR AND TRANSFORMER

2 ELECTRICAL AND GAS CONNECTIONS

SCALE: 1" = 10"



SEE SHEET C107 FOR PAD DETAIL (TYP.)

REVISED PLAN SHEET

3 LIFT STATION SITE / GRADING PLAN

SCALE: 1" = 5"



FINAL FOR CONSTRUCTION

REVISION	DESCRIPTION



ILLINOIS DESIGN FIRM # 194.001322
 420 N. FRONT STREET, SUITE 100
 MAHENRY, ILLINOIS 60050
 PHONE: 815.395.1778 | TOLL FREE: 800.728.7805
 FAX: 815.395.1791 | HRGreen.com

BOWER SCHOOL BERM RESTORATION PROJECT
 CITY OF WARRENVILLE
 DUPAGE COUNTY, IL

LIFT STATION
 LIFT STATION SITE PLAN

SHEET NO.
 LS101

Bower School

County Contractor



08 02 2012



USEPA Contractor



07 09 2012



07 10 2012

Bower School



Bower School



Now that the levee passed the test in April 2013!



Levee Certification

DESIGN, OPERATION AND MAINTENANCE PLAN REQUIREMENTS
PER 44 CFR SECTION 65.10 :

DESIGN CRITERIA

- ❖ FREEBOARD DESIGN REQUIREMENTS
- ❖ CLOSURE
- ❖ EMBANKMENT PROTECTION
- ❖ EMBANKMENT AND FOUNDATION STABILITY ANALYSES
- ❖ SETTLEMENT ANALYSES
- ❖ INTERIOR DRAINAGE

OPERATION PLAN

- ❖ FLOOD WARNING SYSTEM
- ❖ PLAN OF OPERATION
- ❖ PERIODIC OPERATION OF CLOSURES
- ❖ INTERIOR DRAINAGE

MAINTENANCE PLAN

Levee Certification Report

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- VI. CLOSURE ASSESSMENT
- VII. EMBANKMENT PROTECTION ASSESSMENT
- VIII. GEOTECHNICAL- EMBANKMENT AND FOUNDATION STABILITY
- IX. GEOTECHNICAL- SETTLEMENT
- X. INTERIOR DRAINAGE
- XI. OPERATIONS AND MAINTENANCE
- XII. SUPPLEMENTAL INFORMATION
 - AS-BUILT PLANS
 - PRE AND POST FLOODPLAIN MAPS

Levee Certificate Engineer's Certificate

HR Green, Inc.
Project No.: 86120243

Levee Certification Report
Bower School Berm
DuPage County, IL

44 CFR 65.10(b) Tab

For levees to be recognized by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists is provided here forth in this submission.

Note: According to 44 CFR 65.2, "(b) For the purpose of this part, a certification by a registered professional engineer or other party does not constitute a warranty or guarantee of performance, expressed or implied. Certification of data is a statement that the data is accurate to the best of the certifier's knowledge. Certification of analyses is a statement that the analyses have been performed correctly and in accordance with sound engineering practices. Certification of structural works is a statement that the works are designed in accordance with sound engineering practices to provide protection from the base flood. Certification of "as built" conditions is a statement that the structure(s) has been built according to the plans being certified, is in place, and is fully functioning.

(c) For the purposes of this part, "reasonably safe from flooding" means base flood waters will not inundate the land or damage structures to be removed from the SFHA and that any subsurface waters related to the base flood will not damage existing or proposed buildings."

Signature: Michael J. Ryan 6/12/2014

Name: Michael J. Ryan, P.E.

License Number and State: 062.040694 Expires 11/30/2015

Levee Certification Freeboard Certificate

HR Green, Inc.
Project No.: 86120243

Levee Certification Report
Bower School Berm
DuPage County, IL

44 CFR 65.10(b) (1) (i) Tab

(1) *Freeboard.* (i) Riverine levees must provide a minimum freeboard of three feet above the water-surface level of the base flood. An additional one foot above the minimum is required within 100 feet in either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional one-half foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

P.E. Signature: _____

Michael J. Ryan June 12, 2014

P.E. Name: Michael J. Ryan

P.E. License Number and State: No. 062.040694, State of Illinois, Expires 11/30/2015

Levee Certification Closure Certificate

HR Green, Inc.
Project No.: 86120243

Levee Certification Report
Bower School Berm
DuPage County, IL

44 CFR 65.10 (b) (2) Tab

(2) *Closures*. All openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice.

P.E. Signature: Michael J. Ryan June 12, 2014

P.E. Name: Michael J. Ryan

P.E. License Number and State: No. 062.040694, State of Illinois, Expires 11/30/2015

Levee Certification

Embankment Protection Certificate

HR Green, Inc.
Project No.: 86120243

Levee Certification Report
Bower School Berm
DuPage County, IL

44 CFR 65.10 (b) (3) Tab

(3) *Embankment protection.* Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability. The factors to be addressed in such analyses include, but are not limited to: Expected flow velocities (especially in constricted areas); expected wind and wave action; ice loading; impact of debris; slope protection techniques; duration of flooding at various stages and velocities; embankment and foundation materials; levee alignment, bends, and transitions; and levee side slopes.

P.E. Signature: Michael J. Ryan June 12, 2014

P.E. Name: Michael J. Ryan

P.E. License Number and State: No. 062.040694, State of Illinois, Expires 11/30/2015

Levee Certification

Embankment and Foundation Stability Certificate

44 CFR 65.10 (b) (4) Tab

(4) *Embankment and foundation stability.* Engineering analyses that evaluate levee embankment stability must be submitted. The analyses provided shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability. An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in the U.S. Army Corps of Engineers (COE) manual, "Design and Construction of Levees" (EM 1110-2-1913, Chapter 6, Section II), may be used. The factors that shall be addressed in the analyses include: Depth of flooding, duration of flooding, embankment geometry and length of seepage path at critical locations, embankment and foundation materials, embankment compaction, penetrations, other design factors affecting seepage (such as drainage layers), and other design factors affecting embankment and foundation stability (such as berms).

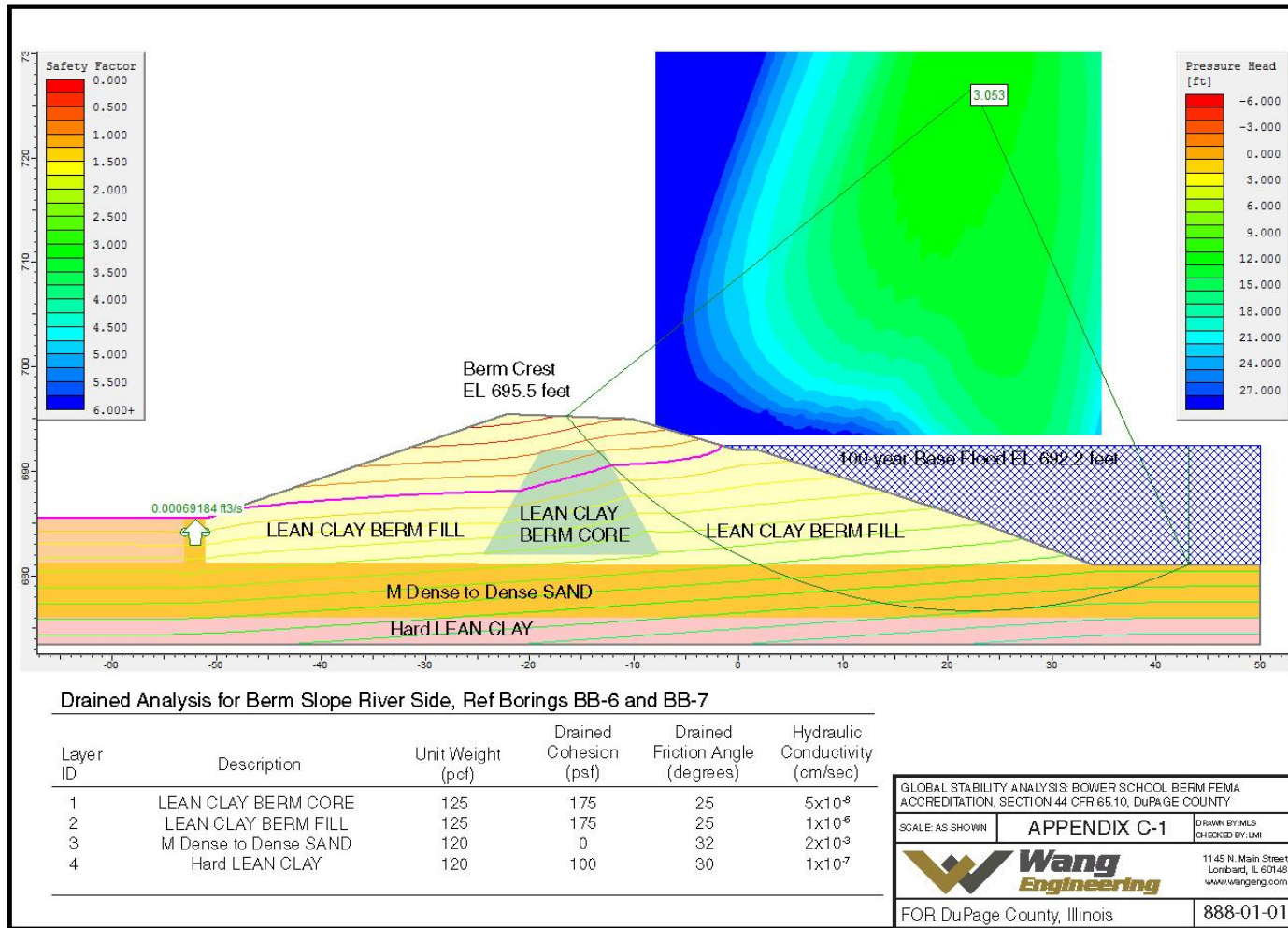
P.E. Signature: M. L. Snider

P.E. Name: Mickey Snider

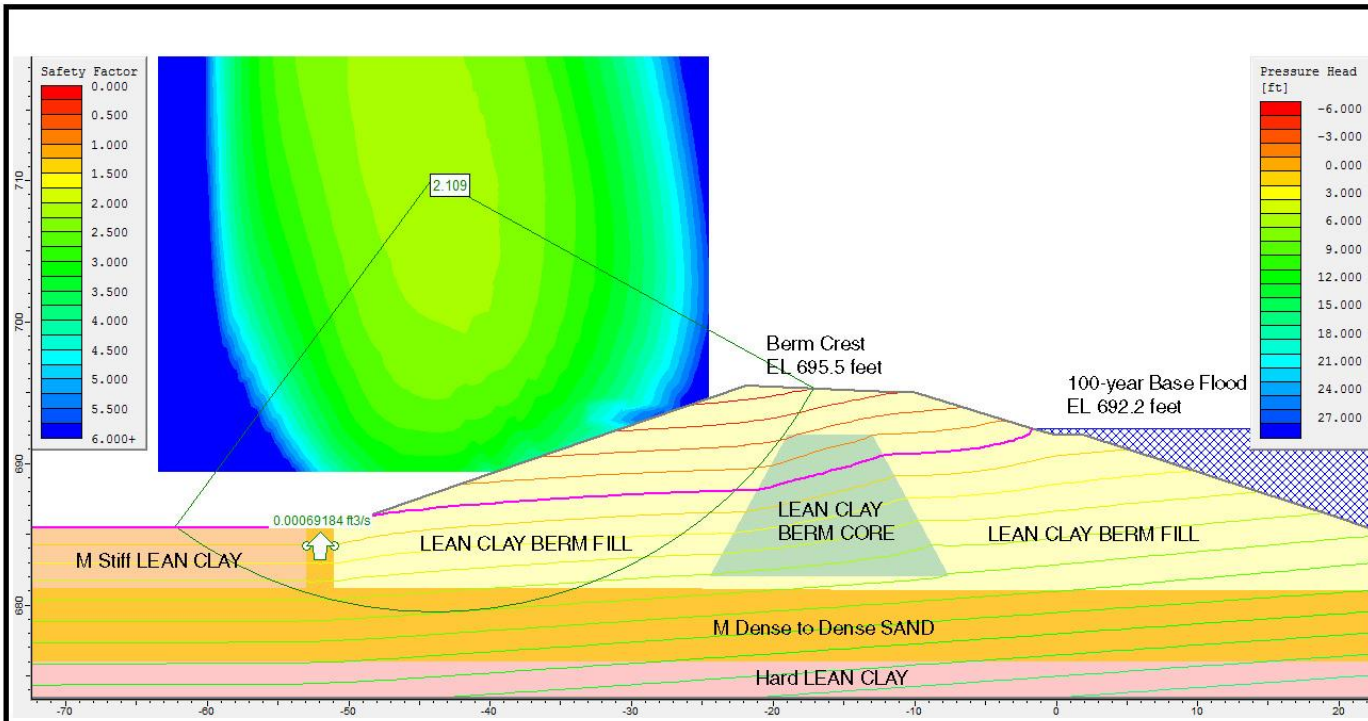
P.E. License Number and State: No. 062-058045 Illinois



Levee Accreditation Embankment and Foundation Stability Analyses



Levee Accreditation Embankment and Foundation Stability Analyses



Drained Analysis for Berm Slope Protected Side, Ref Borings BB-6 and BB-7

Layer ID	Description	Unit Weight (pcf)	Drained Cohesion (psf)	Drained Friction Angle (degrees)	Hydraulic Conductivity (cm/sec)
1	LEAN CLAY BERM CORE	125	175	25	5×10^{-8}
2	LEAN CLAY BERM FILL	125	175	25	1×10^{-6}
3	M Stiff LEAN CLAY	120	50	28	NA
4	M Dense to Dense SAND	120	0	32	2×10^{-3}
5	Hard LEAN CLAY	120	100	30	1×10^{-7}

GLOBAL STABILITY ANALYSIS: BOWER SCHOOL BERM FEMA ACCREDITATION, SECTION 44 CFR 65.10, DuPAGE COUNTY

SCALE: AS SHOWN

APPENDIX C-2

DRAWN BY: MLS

CHECKED BY: LMI



1145 N. Main Street
Lombard, IL 60148
www.wangeng.com

FOR DuPage County, Illinois

888-01-01

Levee Certification

Interior Drainage Certificate

HR Green, Inc.
Project No.: 86120243

Levee Certification Report
Bower School Berm
DuPage County, IL

44 CFR 65.10 (b) (6) Tab

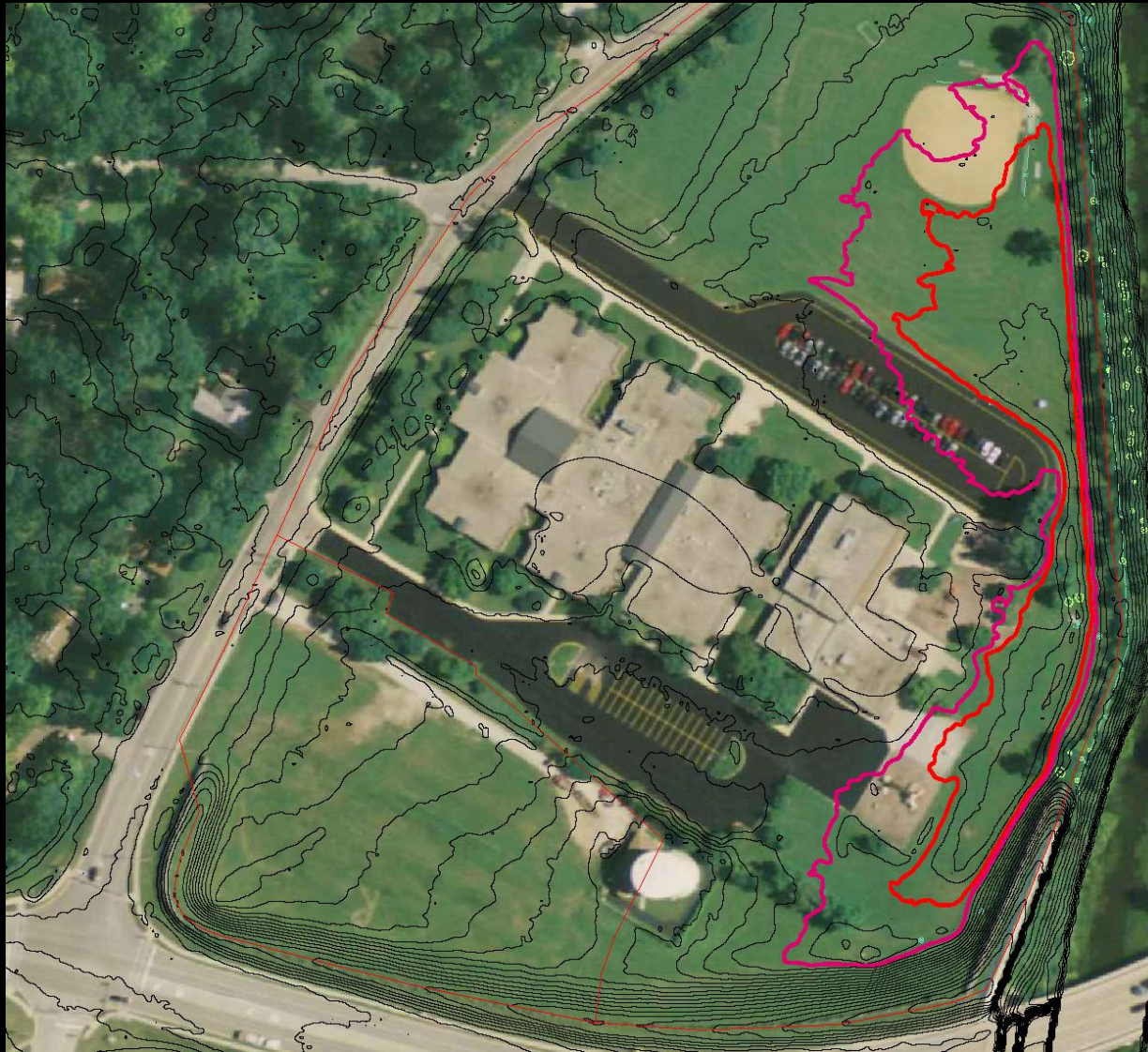
(6) *Interior drainage.* An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than one foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.

P.E. Signature: Michael J. Ryan June 12, 2014

P.E. Name: Michael J. Ryan

P.E. License Number and State: No. 062.040694, State of Illinois, Expires 11/30/2015

INTERIOR DRAINAGE DESIGN



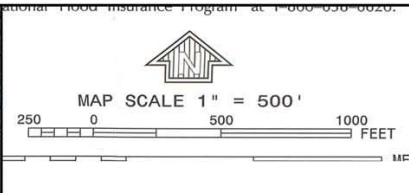
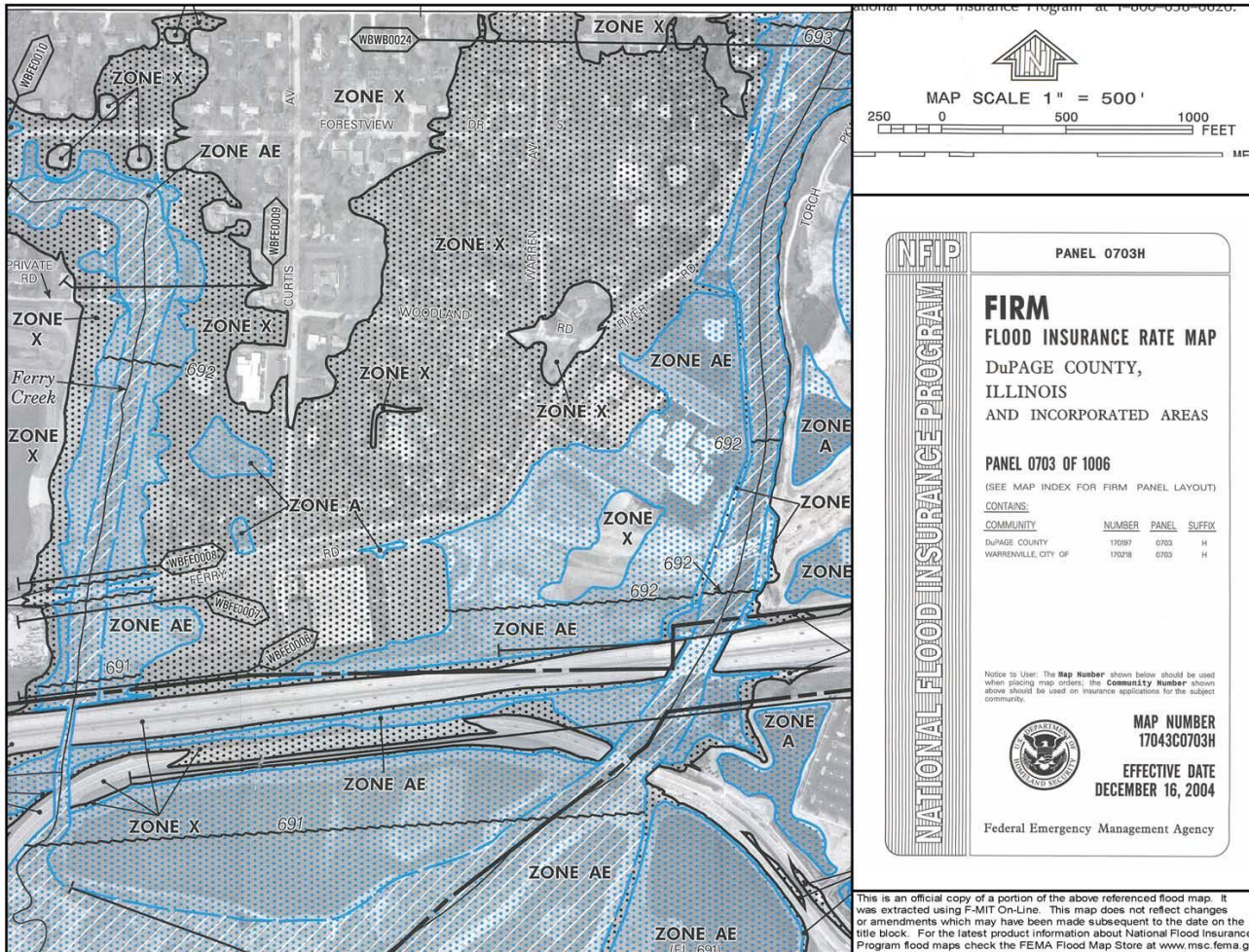
INTERIOR DRAINAGE WORKED AS DESIGNED IN APRIL 2013 FLOOD



INTERIOR DRAINAGE WORKED AS DESIGNED IN APRIL 2013 FLOOD



BOWER LEVEE LETTER OF MAP REVISION – REGULATORY



NFP PANEL 0703H

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

PANEL 0703 OF 1006
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DUPAGE COUNTY	170187	0703	H
WARRENVILLE, CITY OF	170278	0703	H

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17043C0703H

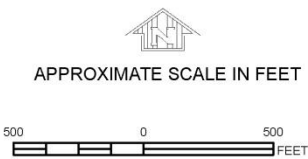
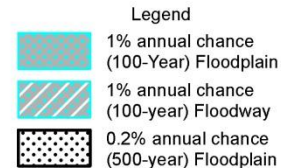
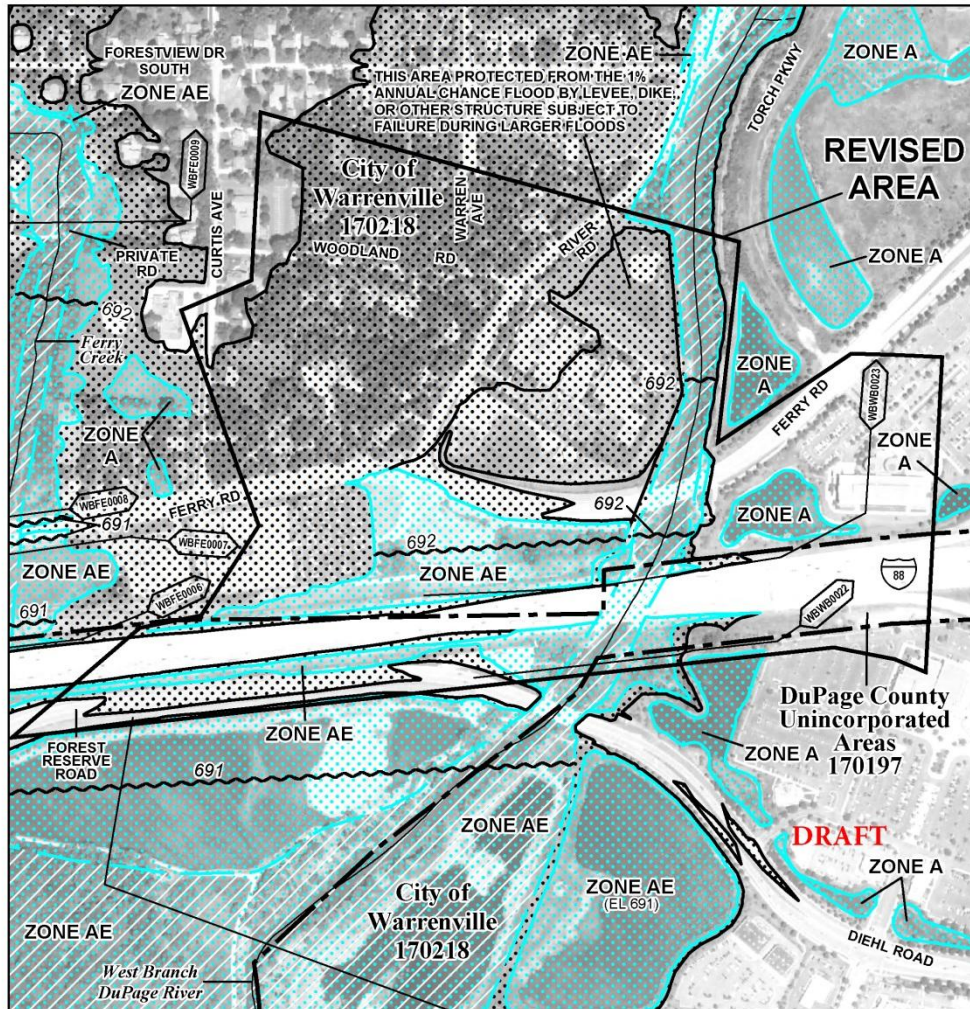
EFFECTIVE DATE
DECEMBER 16, 2004

Federal Emergency Management Agency

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BOWER LEVEL

LETTER OF MAP REVISION – REVISED 2015



PANEL 0703H

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

PANEL 0703 OF 1006
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

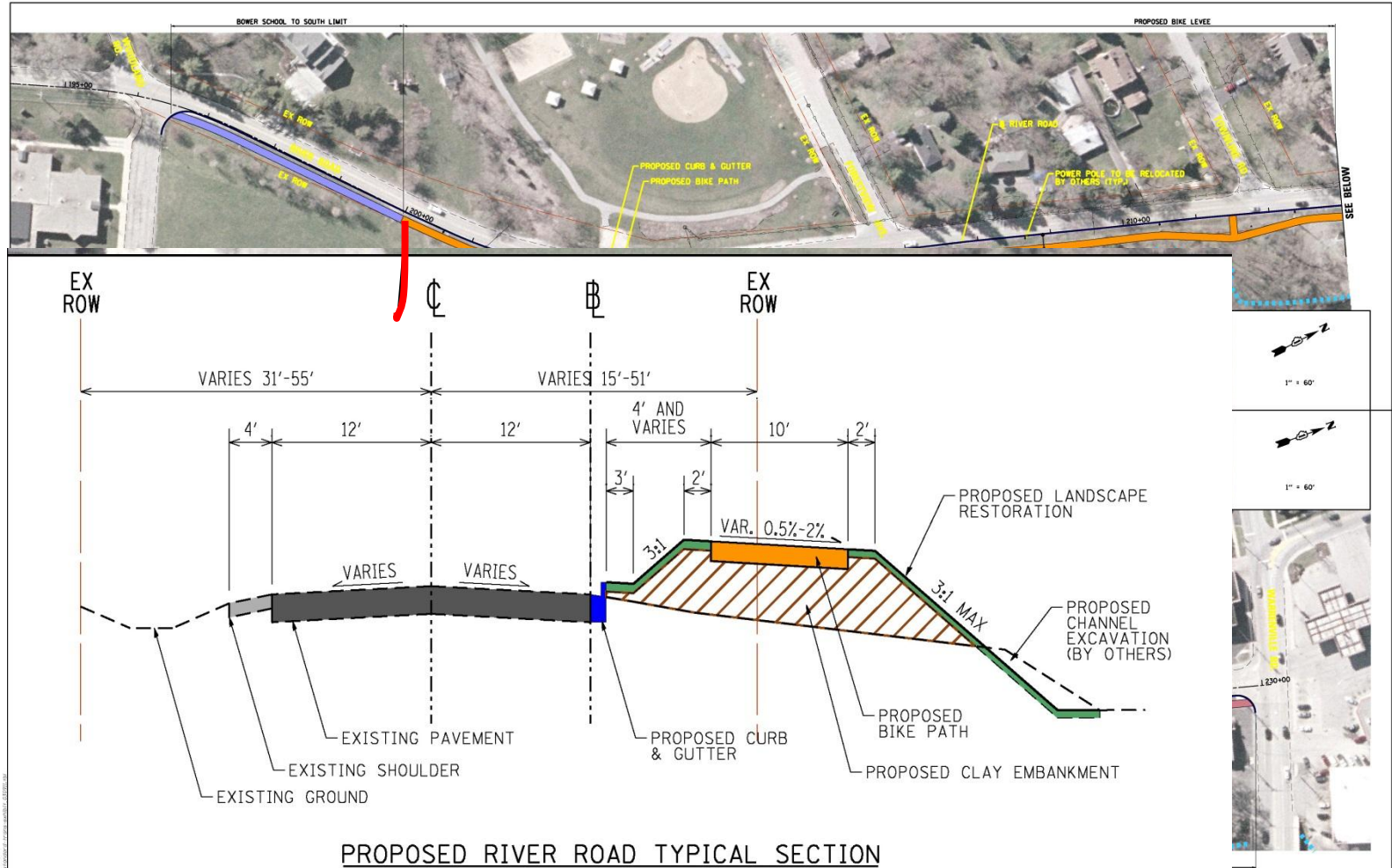
COMMUNITY	NUMBER	PANEL	SUFFIX
DuPAGE COUNTY	170197	0703	H
WARRENVILLE, CITY OF	170218	0703	H

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MAP NUMBER
17043C0703H
EFFECTIVE DATE
DECEMBER 16, 2004

Federal Emergency Management Agency

RIVER ROAD LEVEE



PROPOSED RIVER ROAD TYPICAL SECTION

COMPANY NAME: HFC Green
 PROJECT NUMBER: 1488
 PROJECT NAME: RIVER ROAD
 PROJECT LOCATION: RIVER ROAD, ILLINOIS
 PROJECT DATE: 3/20/12

DESIGNED - SMP	REVISIONS -
DRAWN - SMP	REVISIONS -
CHECKED - DCJ	REVISIONS -
DATE - 3/20/12	REVISIONS -

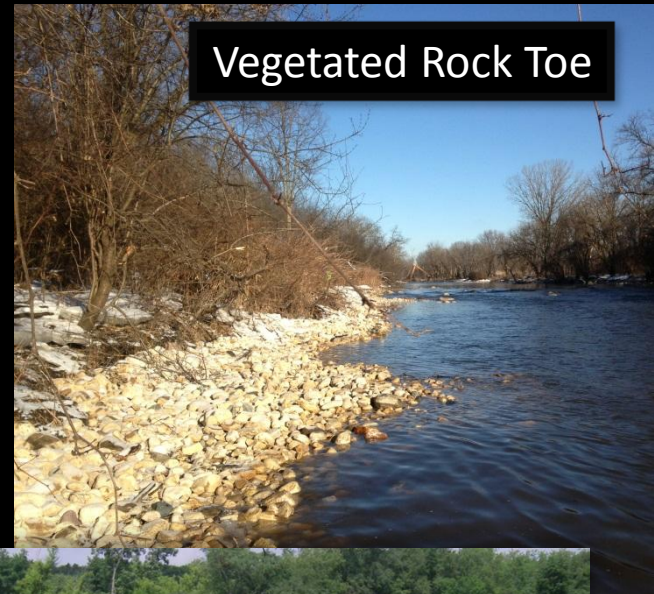
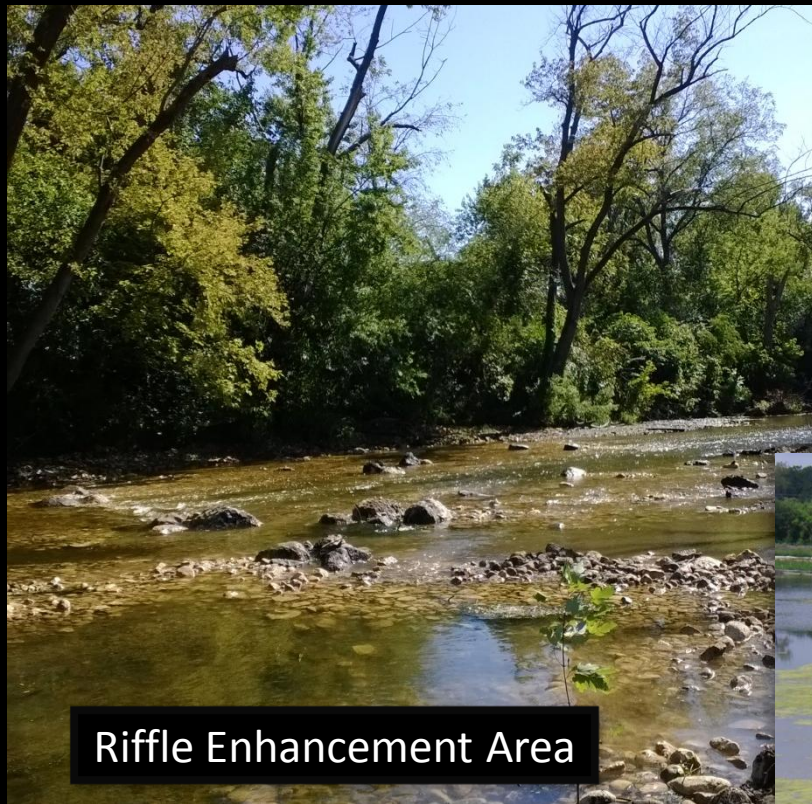
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

60 PERCENT EXHIBIT
RIVER ROAD

SCALE: 1"=60' SHEET NO. 1 OF 1 SHEETS STA. BEG. TO STA. END

SECTION	COUNTY	SHEET NO.
1488	DUPAGE	1
CONTRACT NO.		

In-River Enhancements/ Restoration



Closing

- **What to take away from this**
 - Review and first obtain concurrence with all parties on flood protection elevation.
 - If the levee is to be certified, ensure all requirements for certification can be addressed.
 - Find a good geotechnical consultant who can take it from design through certification.
 - Coordinate early with FEMA
- **Multiple Alternatives/ Designs**
 - Required to satisfy all stakeholders
- **Costs**
 - Conscientious of all stakeholders needs while keeping budget on track
 - Cost Sharing contributes to successful completion and satisfied stakeholders
- **Keep big picture / goals in mind**

Questions/ Discussion



Ajay Jain, PE, CFM

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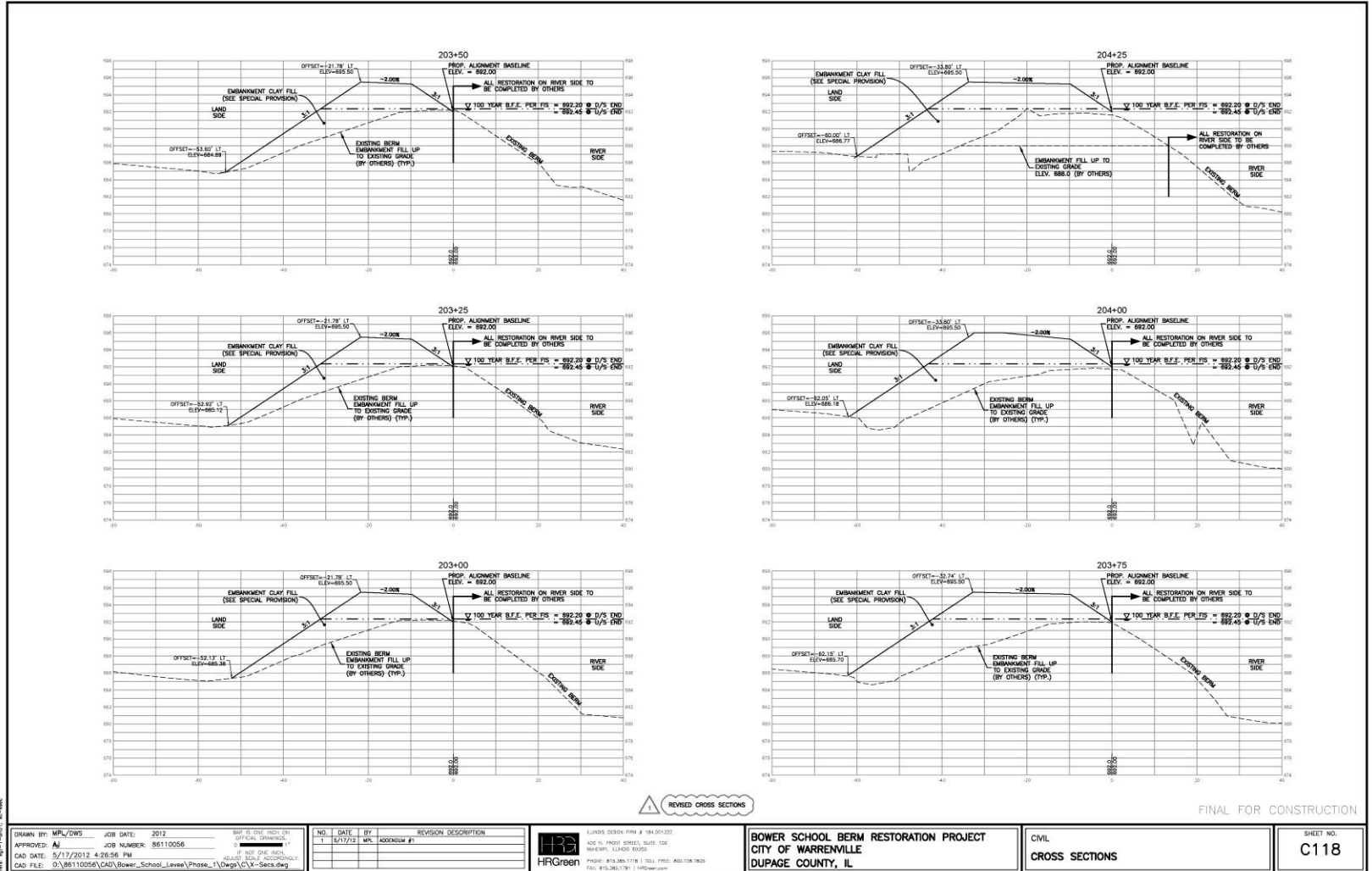
Jamie Lock, PE, CFM

Jamie.Lock@dupageco.org

Office: (630) 407-6705

Cell: (630) 417-2212

BOWER LEVEE



REVISD CROSS SECTIONS

FINAL FOR CONSTRUCTION

DRAWN BY: MPL/DWS JOB DATE: 2012 800' E ONE FOOT ON OFFICIAL DRAWINGS
 APPROVED: AJ JOB NUMBER: 88110056 0 1/8" = 1' SCALE
 CAD DATE: 5/17/2012 4:26:56 PM QUALITY SCALE ACCORDINGLY
 CAD FILE: G:\86110056\CAD\Bower_School_Levee\Phase_1\Drawn\CV-SECS.dwg

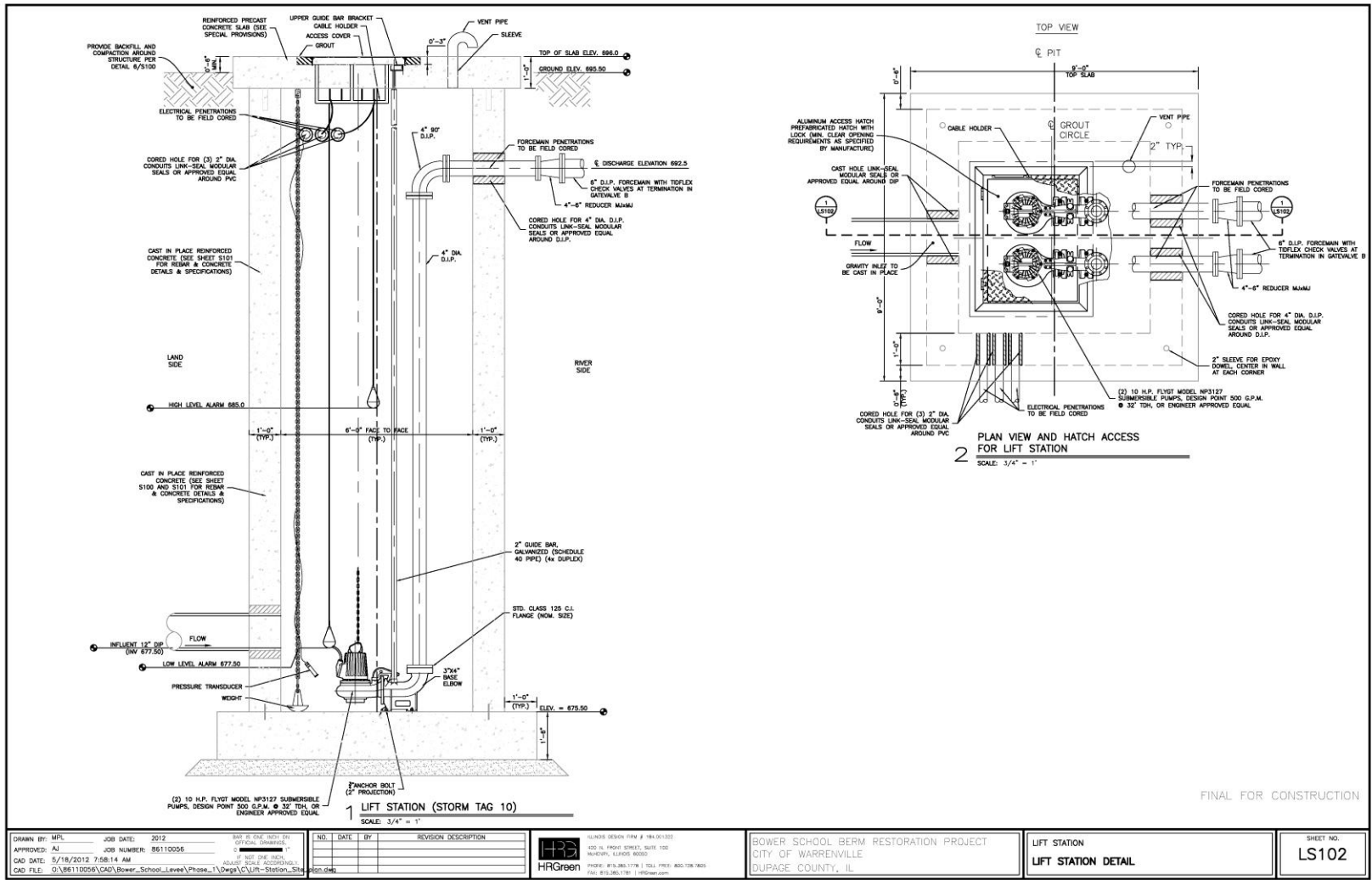
NO.	DATE	BY	REVISION DESCRIPTION
1	5/17/12	MPL	ADDITION #1

LAND DESIGN FIRM # 184.00102
 402 N. PROSPER DRIVE, SUITE 100
 WARRENVILLE, ILLINOIS 60091
 PHONE: 815.385.1718 | TOLL FREE: 800.338.7825
 FAX: 815.385.1781 | HRGreen.com

BOWER SCHOOL BERM RESTORATION PROJECT
 CITY OF WARRENVILLE
 DUPAGE COUNTY, ILL.

CIVIL
 CROSS SECTIONS
 SHEET NO.
C118

BOWER LEVEL LIFT STATION = 2 - 500 GPM PUMPS CAPACITY



DRAWN BY: MPL	JOB DATE: 2012	REV. P. ONE, NOT ON 0 (SEE SPECIAL PROVISIONS)	NO.	DATE	BY	REVISION DESCRIPTION
APPROVED: AJ	JOB NUMBER: 86110055	0 (SEE SPECIAL PROVISIONS)				
CAD DATE: 5/18/2012 7:58:14 AM						
CAD FILE: G:\86110055\CAD\Bower_School_Level\Phase_1\08p1\CON-Station_S101.dwg						

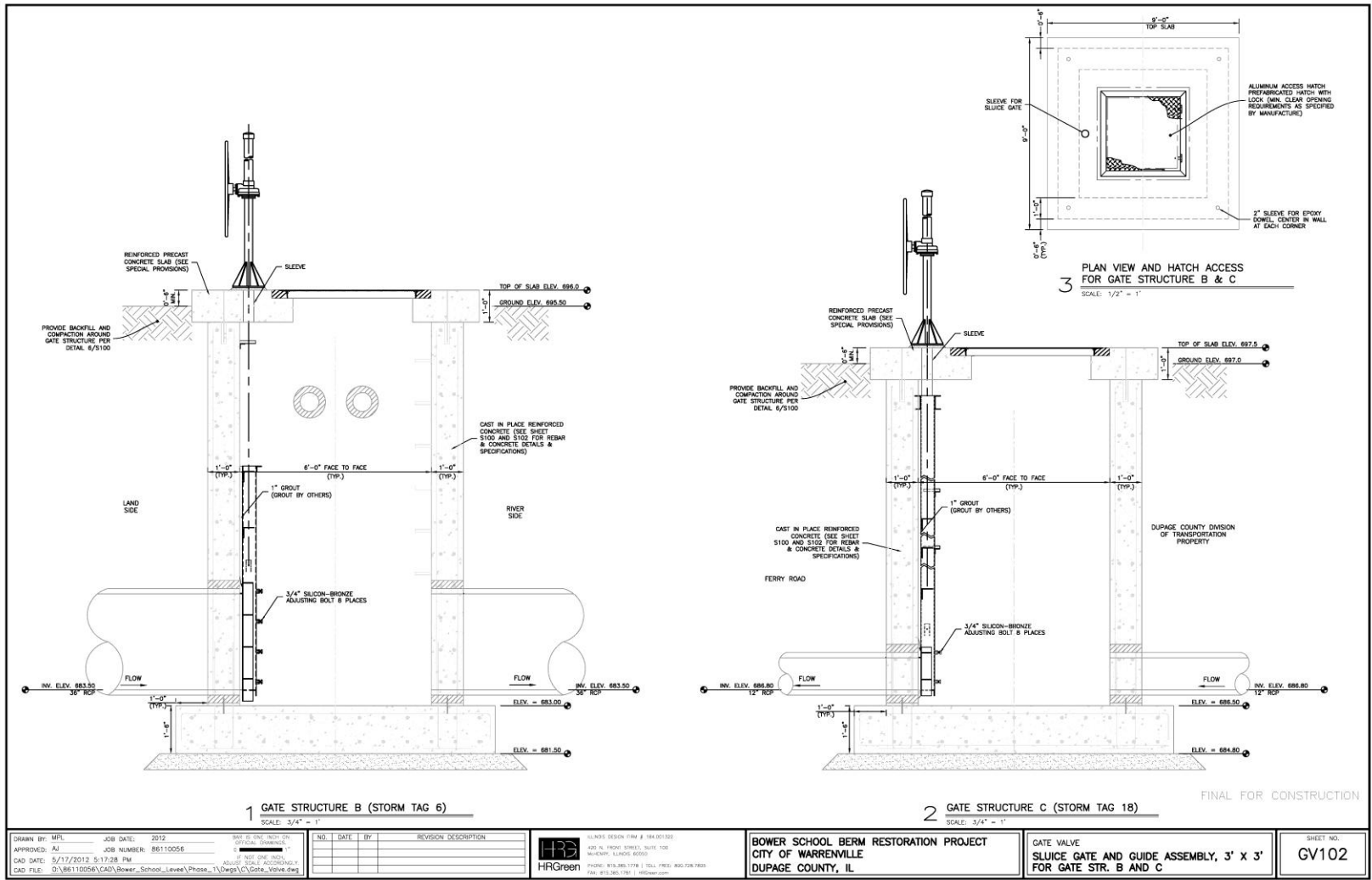
HRGreen
 CONSULTING ENGINEERS
 400 N. FIRST STREET, SUITE 100
 WARRENVILLE, ILLINOIS 60089
 PHONE: 815.385.1700 | TOLL FREE: 800.738.7600
 FAX: 815.385.1781 | www.hrgreen.com

BOWER SCHOOL BERM RESTORATION PROJECT
CITY OF WARRENVILLE
DUPAGE COUNTY, IL

LIFT STATION
LIFT STATION DETAIL

SHEET NO.
LS102

BOWER LEVEE - CLOSURE GATE



DRAWN BY: MFL	JOB DATE: 2012	REV. # (DATE, REVISION)	NO.	DATE	BY	REVISION DESCRIPTION
APPROVED: AJ	JOB NUMBER: 86110056	0 (DATE, REVISION)				
CAD DATE: 5/17/2012 5:17:28 PM		1 (DATE, REVISION)				
CAD FILE: D:\86110056\CAD\Bower_School_Levee\Phase_1\Design\CGate_V098.dwg		2 (DATE, REVISION)				

NO.	DATE	BY	REVISION DESCRIPTION

14-001 DESIGN FIRM # 084.001303
 400 N. PERRY STREET, SUITE 100
 WAREHOUSING, LAKEVIEW, ILLINOIS 60090
 PHONE: 815.385.1778 | TOLL FREE: 800.728.7800
 FAX: 815.385.1787 | WWW.HRGREEN.COM

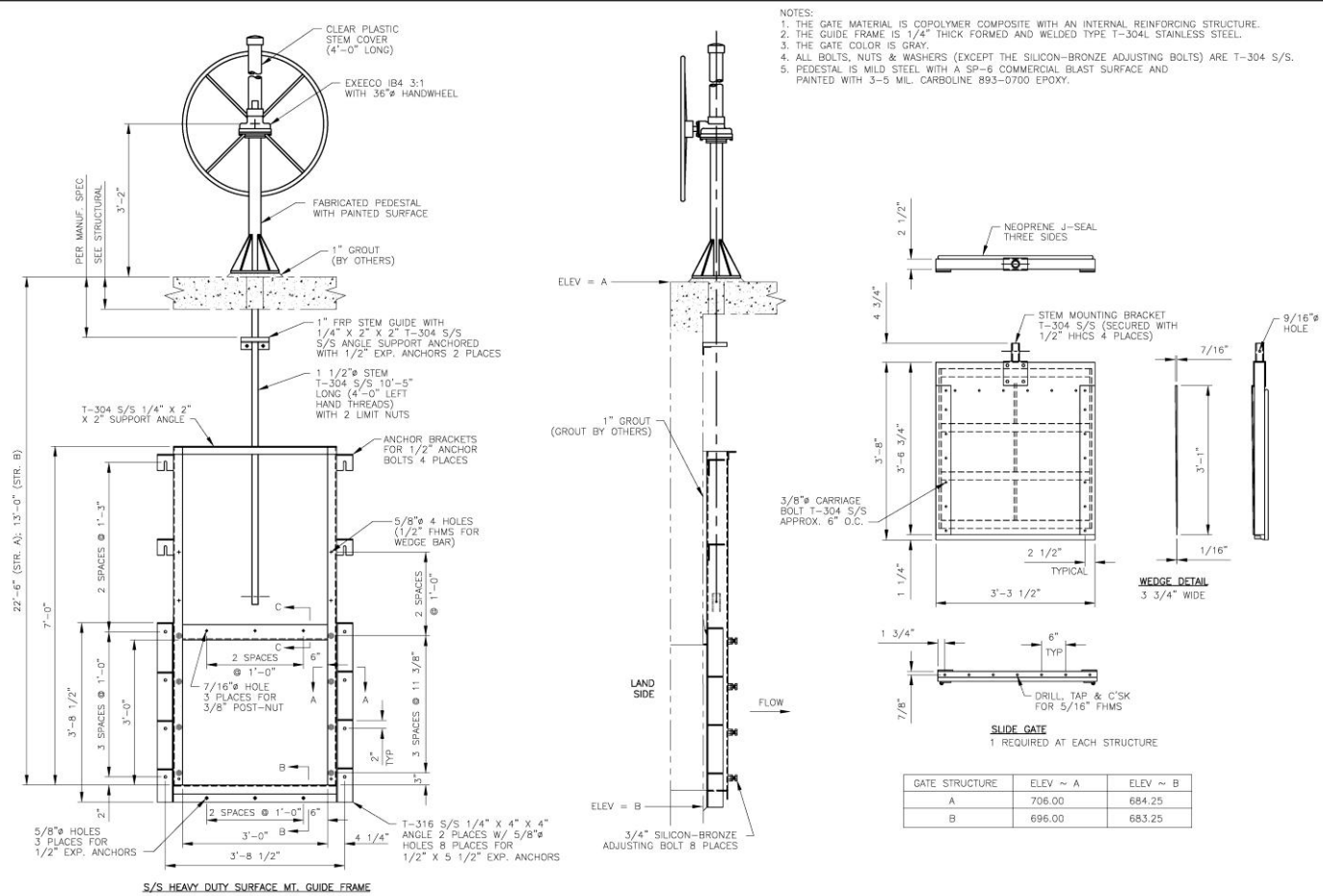
BOWER SCHOOL BERM RESTORATION PROJECT
 CITY OF WARRENVILLE
 DUPAGE COUNTY, IL

GATE VALVE
 SLUICE GATE AND GUIDE ASSEMBLY, 3' X 3'
 FOR GATE STR. B AND C

SHEET NO.
GV102

FINAL FOR CONSTRUCTION

BOWER LEVEE - CLOSURE GATE



- NOTES:
1. THE GATE MATERIAL IS COPOLYMER COMPOSITE WITH AN INTERNAL REINFORCING STRUCTURE.
 2. THE GUIDE FRAME IS 1/4" THICK FORMED AND WELDED TYPE T-304L STAINLESS STEEL.
 3. THE GATE COLOR IS GRAY.
 4. ALL BOLTS, NUTS & WASHERS (EXCEPT THE SILICON-BRONZE ADJUSTING BOLTS) ARE T-304 S/S.
 5. PEDESTAL IS MILD STEEL WITH A SP-6 COMMERCIAL BLAST SURFACE AND PAINTED WITH 3-5 MIL CARBOLINE 893-0700 EPOXY.

GATE STRUCTURE	ELEV ~ A	ELEV ~ B
A	706.00	684.25
B	696.00	683.25

SLIDE GATE
1 REQUIRED AT EACH STRUCTURE

FINAL FOR CONSTRUCTION

DRAWN BY: MFL
 APPROVED: AJ
 CAD DATE: 5/17/2012 5:17:28 PM
 CAD FILE: C:\B1110056\CAD\Bower_School_Levee\Phase_1\Drawings\Gate_Valve.dwg

NO.	DATE	BY	REVISION DESCRIPTION

HRGreen
 14-7001 DESIGN FIRM # 084.001300
 400 N. FRONT STREET, SUITE 100
 WILMINGTON, ILLINOIS 60090
 PHONE: 815.385.1778 | TOLL FREE: 800.328.7800
 FAX: 815.385.1787 | WWW.HRGREEN.COM

BOWER SCHOOL BERM RESTORATION PROJECT
 CITY OF WARRENVILLE
 DUPAGE COUNTY, IL

GATE VALVE
 SLUICE GATE AND GUIDE ASSEMBLY DETAILS,
 FOR GATE STR. B

SHEET NO.
GV103

River Road

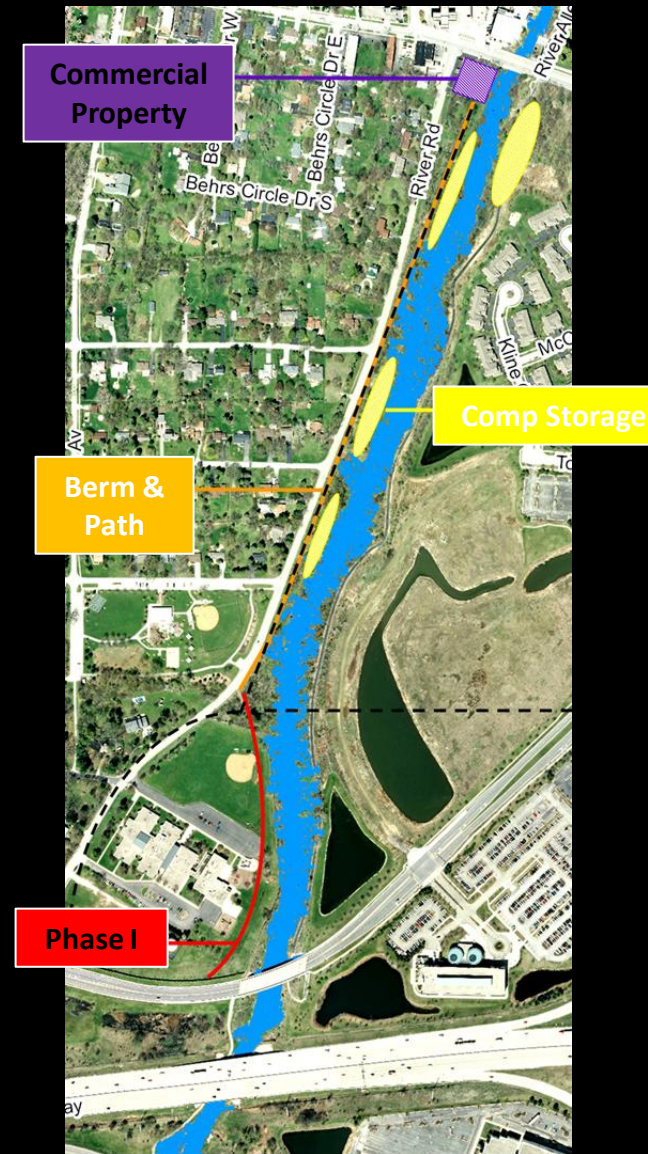
❖ Stakeholders

- Residents
- City of Warrenville
- DuDOT
- DuPage County

❖ Objective: Protect Business/Residents from Flooding

❖ Coordination

- Cost Share (County, City)
- Business and Residents for Property Impacts
- DuDOT for Jurisdictional Transfer
- County Consultant (ERA) for River Restoration One bid package (2 consultants!)



Commercial Property Improvements



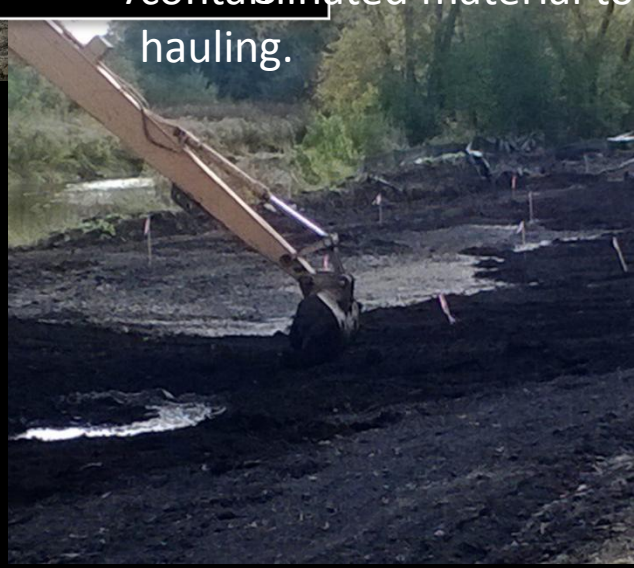


Some of the construction pictures.

Compensatory Storage

contains

some of the construction pictures. During the construction of the berm, lime being mixed to the excavated and stockpiled material to dry it out before hauling.



Temporary River Crossing



Curb & Gutter