DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

MEMORANDUM

TO: Construction Commission

THRU: Joe Dulin, Community Development Director

FROM: Julie Schmidt, PE, In-House Consultant, City of Peoria
Andrea Klopfenstein, PE, Deputy Director – City Engineer, City of Peoria

DATE: November 9, 2021

RE: Request for Variance from Floodplain Ordinance

The City received a variance request for 2322 S Darst Street, which is located within the levee surrounding the Greater Peoria Sanitary District's (GPSD's) facility. The levee is part of the USACE PL 84-99 program, but it has not been certified by FEMA; therefore, it is still considered to be in the floodplain. GPSD is currently working with State and Federal agencies to obtain FEMA certification. The certification process identified several improvements that could make the levee perform better and require less maintenance. GPSD obtained a Conditional Letter of Map Revision (CLOMR) from FEMA, which confirms that these improvements would meet Federal regulations to revise the flood map showing that the area inside the levee is not in the floodplain.

One of the improvements identified is to remove an existing maintenance building which is located in a low area that needs to be raised approximately eight feet to increase slope stability of the levee. Due to the nature of GPSD's work and the public benefit of their service, a new maintenance building needs to be constructed before the existing one is removed. Since the levee has not been certified, the proposed building will be located in the floodplain. Site constraints do not allow the building to be constructed above the flood protection elevation (FPE), so they are requesting a variance for it to be constructed below the FPE. Once FEMA's certification process is complete, the area inside the levee will be removed from the floodplain, and the building will no longer require floodproofing measures.

Public Works staff recommends approval of the variance from the floodproofing requirements.

Additional information is contained in the attached memo from GPSD.

Encl.

Floodplain Variance Request Memo from GPSD

3505 N Dries Ln
Peoria, IL 61604
Phone: (309) 494-8800
FAX: (309) 494-8855

GREATER PEORIA SANITARY DISTRICT

MEMORANDUM

Date: September 21, 2021

To: City of Peoria Public Works Department: Permits Section

From: Josh L. Auxier, PE, LEED® AP – Greater Peoria Sanitary District

Subject: Follow Up to Floodplain Development Permit Request for Clarification

GPSD Project Number: 2689 – Maintenance Building Relocation Project

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Distribution: Julie Schmidt, PE - City of Peoria; Andrea Klopfenstein, PE (City Engineer) – City of Peoria; Tim Leach, PE (Director of Planning and Construction), Greater Peoria Sanitary District; Josh Auxier, PE, Greater Peoria Sanitary District; File

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This memorandum is written to provide commentary on pertinent aspects of the Project regarding evaluation of applicable permit criteria and to aid the Reviewer in their evaluation of the enclosed supporting submittal documentation, to formally request a variance in accordance with Section 12-9 of the Peoria Illinois Code of Ordinances, and to continue the dialogue on this important project that began on July 6, 2021.

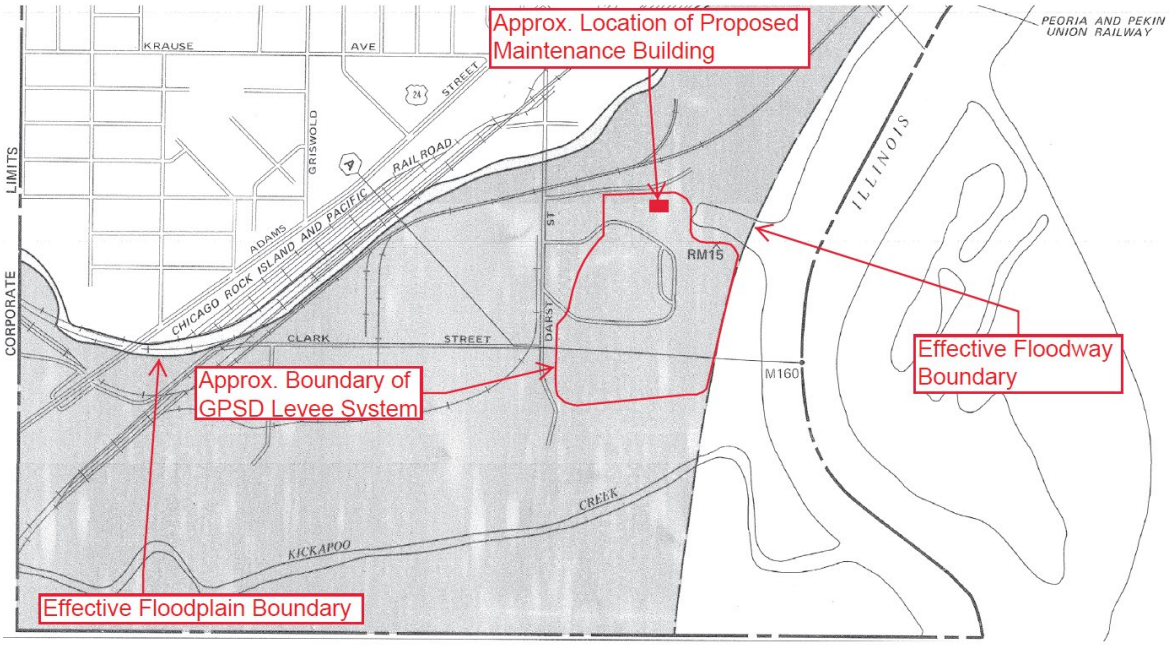
Background and Project History

The District's levee system is currently a Federally recognized levee system and is part of the USACE PL 84-99 program; however, it has never been FEMA certified. To remedy this, the District has been working with State and Federal Agencies towards said FEMA certification of the District's levee system and the corresponding Letter of (Flood) Map Revision (LOMR) to formally remove the District's wastewater treatment plant from the mapped floodplain/floodway. Through that process the District requested and obtained a Conditional Letter of Map Revision (CLOMR) from FEMA, which essentially gives confirmation that should the levee be constructed as designed in the FEMA CLOMR submittal, FEMA found that the work would meet Federal Requirements and could then revise the existing flood map accordingly.

MEMORANDUM

Post receipt of the CLOMR, the District coordinated with USACE regarding inclusion of the District's levee system in the Federal 205 program, which would have allowed for a cost share with the Federal government for the levee system given the critical importance of the infrastructure being protected by the levee. Ultimately, that process never came to fruition, but during engineering coordination with USACE several additional improvement methodologies to the levee were discussed that could reduce maintenance to the levee, provide better construction economics, and require less mechanical equipment to maintain the levee in good working order. Based on this the District has been working on revising the CLOMR to incorporate these revised plan details. One of the most important revisions consists of eliminating any low areas within the boundary of the existing levee system. In order to do this, the existing maintenance building must be demolished and the area raised approximately eight feet. It is this need that brings the requirement for the floodplain development permit.

The District has been in coordination with Farnsworth Group to develop plans for a new maintenance building to replace the existing building to be demolished as part of the work with FEMA. The new building will be placed on higher ground (i.e. higher than the minimum design elevation that needs to be filled as part of the levee design currently under review at FEMA) within the existing levee system, but lower than the prescribed flood protection elevation (FPE). That said, even though the existing levee system protects the District's buildings and infrastructure from floods, the area is currently mapped as floodplain on the effective flood maps. Thus, we are requesting a Floodplain Development Permit be issued for this Project.



Code Review and Permit Justifications

In regards to the floodplain requirements, City Code Chapter 12 requires that the District obtain a development permit for work in the floodplain. Further, the chapter defines the Base Flood Elevations (BFE) as those provided by FEMA contained in the Flood Insurance Study dated August of 1979 and Flood Protection Elevation (FPE) as the BFE plus 2.0 feet for all areas outside the Riverfront Development area.

The scope of work for this Project only includes work to be performed outside of the Riverfront Development area and within the flood fringe (area between the regulatory Floodway and regulatory Floodplain) and not in the floodway. Thus section 12-6 (1) is not applicable. Section 12-6 (2) is not applicable because (a) the work is not located within a floodway (or a SFHA where a floodway has not been designed) and therefore not subject to review by IDNR, (b) does not meet one of the listed exemptions, and (c) since it is not contained in the floodway and the floodway is defined as the limit on which further development may cause an increase in the base flood of more than 0.1 foot for the hydraulic reach of the stream or river, the proposed improvements would not (when combined with other development meeting local and State regulations) contribute to an unaccounted for increase (i.e. greater than 0.1 foot) in the base flood elevations for the hydraulic reach of the stream or river. Additionally, since the proposed building would be contained within the existing levee system any space occupied by the proposed building was never available for floodplain storage due to the presence of the existing levee system.

This point spurred some confusion during our conference call held on September 10, 2021 and as a follow up to that conversation the District has enclosed Exhibit A, which shows the existing levee flood protection heights as color bands of the bare earth elevations. As shown on the exhibit, elevations from 0.5 feet below the BFE to the BFE are shaded in red, elevations from the BFE to 1.0 feet above the BFE are shaded in green, elevations from 1.0 feet above the BFE to 2.0 feet above the BFE are shaded in blue, elevations between 2.0 feet above the BFE and 465.0 are shaded in purple, and elevations outside of the specified ranges are not shaded.

This exhibit is included to illustrate the levels of protection from the levee system as it currently exists. The levee currently provides protection from flooding up to the BFE and thus no volume within the levee footprint has been or is available for floodplain storage. Further, the levee provides flood protection to nearly the entire levee (except for the entrance roads and one isolated spot of less than five feet) of 1.0 feet above the BFE. These locations are temporary vertically extended during time of substantial flooding

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as part of the District's flood fighting program. In addition, approximately eighty percent of the levee is protected to a flood protection level of BFE plus 2.0 feet. Please refer to the Appendix for Exhibit A.

Section 12-7 requires that all proposed buildings shall be protected from flood damage by one of the methods outlined in section 12-7 (b). Of the floodproofing methods listed, methods 1 through 3 are not applicable due to site constraints.

Method 4 is applicable in spirit as the existing levee system which surrounds the proposed building was designed and built to protect all buildings within the levee limits from flooding to the BFE and to the FPE for the majority of the levee as illustrated on Exhibit A.

Section 12-7 (b) (4)(b.) further requires that the floodproofing measure shall be operable without human intervention. While the vertical portion of the levee cannot be temporarily raised to meet the FPE without specific human intervention, the District maintains pump works and open channel outlets (when applicable based upon flood path) to manage all flows directed to the WWTP within the levee. This includes the site storm water system which is directed through the treatment works hydraulic circuit, and other overland flow through the internal road network to the effluent channel and ultimately to the pump works. These systems have a rated capacity of approximately 230 CFS (one pump in reserve) and a theoretical capacity of approximately 300 CFS. The pumps are maintained in an active running condition at all times when floodwaters encroach upon the levee and do not need specific human intervention to become active upon floodwater entering the levee protection area – as the system is already active. The District also maintains a central backup power system capable of maintaining the power requirements of the entire facility in the event of a power supply disruption.

In addition to the specific protection afforded by the levee system and the flow management systems that do not require human intervention, the District has a comprehensive flood fighting plan to mitigate the effects of flooding and potential collateral damage. Refer to the Appendix for GPSD Flood Plan.

If the City does not find our system to be sufficient to meet Section 12-7, then the District requests a variance be granted under Section 12-9.

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MEMORANDUM

Information Related to a Request for Variance, if Applicable

Response to Section 12-9(1)a. – Development Cannot Be Located Outside of SFHA

The District cannot undertake the Project of reconstructing the plant's maintenance facility outside of the SFHA due to the fact that the entire GPSD plant is located within a levee protected portion of the SFHA and for operational requirements must have a secured, onsite maintenance facility. It should be noted that the plant predates both FEMA and the Flood Insurance Act of 1968 by nearly 40 years.

Removal of the maintenance facility from plant may result in the inability for GPSD to perform its State and Federally mandated requirements during times of natural disasters and result in environmental impairment to the greater Peoria area.

Response to Section 12-9(1)b. – An Exceptional Hardship Will Result of the Variance is not Granted

The District is in the process of improving the existing levee system to become FEMA certified and to meet floodplain development criteria for the City. The relocation of the maintenance facility is an integral part of the overall plan currently being reviewed by FEMA – refer to Appendix for FEMA Submittal. Failure to approve the variance will result in the inability for the District to meet FEMA certification standards in an economically feasible way, which will result in placing the sanitary treatment facility for the City of Peoria and other surrounding Communities in jeopardy of destruction due to potential future flooding.

Furthermore, removing of the maintenance facility from the plant to an alternate location outside of the SFHA would isolate the facility from the treatment works during times of major flooding and thus limiting the District's ability to maintain the plant at critical times.

Response to Section 12-9(1)c. – The Relief Requested is the Minimum Necessary

As previously discussed, the District is in the process of improving its levee system which should ultimately remove the entire facility from the SFHA in the future. Moreover, within this submittal the District has demonstrated that it currently provides flood protection for the entire facility up to the BFE and floodwater management beyond that and approaching the FPE. Thus, it is the District's opinion that it is requesting the minimum relief necessary.

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Response to Section 12-9(1)d. – There Will be No Additional Threat to Public Health or Safety or Creation of a Nuisance

As mentioned previously, allowing this Project by granting this request will not create a threat due to flooding since the volume within the levee has not been in the past and is not available now for floodplain storage. In regards to public health and safety, granting this request will contribute to public health and safety as it allows the District to maintain its ability to treat wastewater during times of natural disaster. Likewise, failure to grant this variance may increase the likelihood for treatment equipment failure during times of substantial flooding without the ability to make onsite plant repairs and therefore contributing to an additional threat to public health and environmental calamity.

From an alternate view, the District is simply removing the existing maintenance facility that has exceeded its original design life and replacing it with new, modern maintenance building that will meet current building codes (thus improving worker safety) which has the additional benefit of allowing for work to be performed on the existing levee to comply with current FEMA certification standards. This project will have essentially no impact to any person or entity located outside of the existing levee footprint that surrounds the existing treatment plant.

Response to Section 12-9(1)e. – There Will be No Additional Public Expense for Flood Protection, Rescue or Relief Operations, Policing or Repair of Roads, Utilities or other Public Facilities

No additional public expense for flood protection, rescue or relief operations, policing or repairs of roads, utilities or other public facilities will result from the granting of this request and construction of the proposed maintenance facility. The District understands this to be the case because (1) the District has a comprehensive plan for all stages of flooding and flood mitigation (2) the District is a local government Agency with a dedicated funding stream and trained staff to both maintain their flood mitigation measures and actively perform flood fighting activities as needed, (3) the project location is relatively small and wholly contained within the surrounding wastewater treatment plant and is protected as part of the overall operation, (4) access roads to the new building are existing and part of the District's internal road network and their repair and maintenance are not paid for by City funds, and (5) the creation of the maintenance facility reduces the likelihood of catastrophic damage to District owned utilities and the public facilities.

Response to Section 12-9(1)f. – The Provisions of Subsection 12-5(3) are Met

The District acknowledges that prior to the issuance of the development permit, the District must first obtain any required State and Federal permits. The District does not believe that any State or Federal permits are required to complete this work as the work to be performed is wholly outside of the regulatory floodway and thus a waterway alteration permit under the Part 3700 rules is not required and Section 404 of the Cleanwater Act does not apply since we are within the limits of a treatment facility authorized by an NPDES permit. Further the location of work is above the ordinary highwater mark/normal pool of the Illinois River.

Response to Section 12-9(1)f. – The Provisions of Subsection 12-6(1) are Met

Provisions of Subsection 12-6(1) do not apply to this Project as the entire Project limits are located outside of the Regulatory Floodway.

Response to Section 12-9(2). – Acknowledgement of Additional Risks to the Development

The District recognizes and acknowledges that additional risk exists for developments contained within the floodplain. Specifically the concerns listed in Section 12-9(2) a-c.

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Appendix

Appendix Contents

Exhibit A – Existing Levee Flood Protection Exhibit

GPSD Flood Plan

Excerpts from CLOMR Revision Submittal

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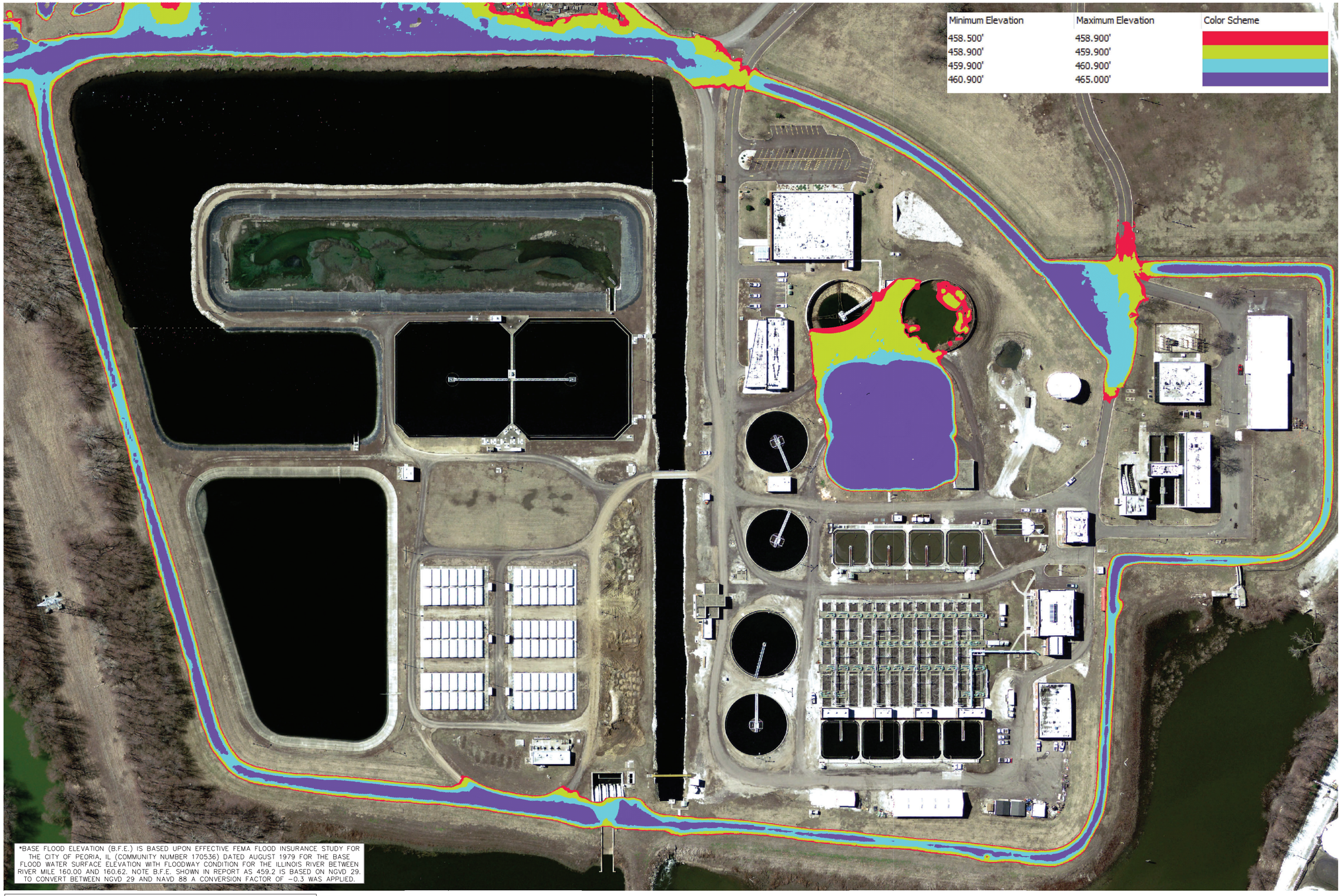


*BASE FLOOD ELEVATION (B.F.E.) IS BASED UPON EFFECTIVE FEMA FLOOD INSURANCE STUDY FOR THE CITY OF PEORIA, IL (COMMUNITY NUMBER 170536) DATED AUGUST 1979 FOR THE BASE FLOOD WATER SURFACE ELEVATION WITH FLOODWAY CONDITION FOR THE ILLINOIS RIVER BETWEEN RIVER MILE 160.00 AND 160.62. NOTE B.F.E. SHOWN IN REPORT AS 459.2 IS BASED ON NGVD 29. TO CONVERT BETWEEN NGVD 29 AND NAVD 88 A CONVERSION FACTOR OF −0.3 WAS APPLIED.

ELEVATIONS ARE REFERENCED TO NAVD 88 DATUM UNLESS SPECIFIED OTHERWISE

EXISTING LEVEE FLOOD PROTECTION PLAN

SCALE: 1" = 80'

B.F.E. = 458.9*

REVISIONS

NO.	DATE	DESCRIPTION

SHEET TITLE
GPSD LEVEE FLOOD PROTECTION EXHIBIT

PROJECT TITLE
MAINTENANCE GARAGE RELOCATION
GPSD PROJECT 2689

Greater Peoria Sanitary District
2322 S. Darst Street, Peoria, IL 61607
Phone: (309) 637-3511 Fax: (309) 637-4614
http://www.gpsd.dst.il.us/

DESIGNED BY:	-	
DRAWN BY:	JLA	
CHECKED BY:	JLA	
APPROVED BY:	TFL	

PROJECT NO.
2689

DRAWING
EX A

E:\PROJECTS\2689 - MAINTENANCE BUILDING RELOCATION\600 CAD\603 EXHIBITS\FLOODPLAIN DEVELOPMENT PERMIT EXHIBIT.DWG 9/20/2021 4:12 PM

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE
ILLINOIS RIVER							
A	160.00	3954	86,774	1.13	459.2	459.1	0.1
B	160.62	1420	34,776	2.82	459.2	459.1	0.1
C	160.72	1207	33,964	2.89	459.2	459.1	0.1
D	161.60	861	22,050	4.44	459.3	459.2	0.1
E	162.22	994	28,079	3.49	459.6	459.5	0.1
F	162.28	1015	26,116	3.75	460.0	459.9	0.1
G	162.80	2300	50,733	1.93	460.2	460.1	0.1
H	164.00	6903	188,087	0.49	460.3	460.2	0.1
I	165.00	6025	166,224	0.55	460.3	460.2	0.1
J	165.75	4952	119,214	0.77	460.3	460.2	0.1
K	166.00	5900	128,429	0.71	460.3	460.2	0.1
L	167.00	5046	97,121	0.94	460.3	460.2	0.1
M	169.00	8340	215,811	0.42	460.4	460.3	0.1
N	170.00	10,080	251,396	0.36	460.4	460.3	0.1
O	171.00	11,754	287,083	0.32	460.4	460.3	0.1

[1]MILES ABOVE MOUTH
[2]THIS WIDTH EXTENDS BEYOND CORPORATE LIMITS

TABLE 2

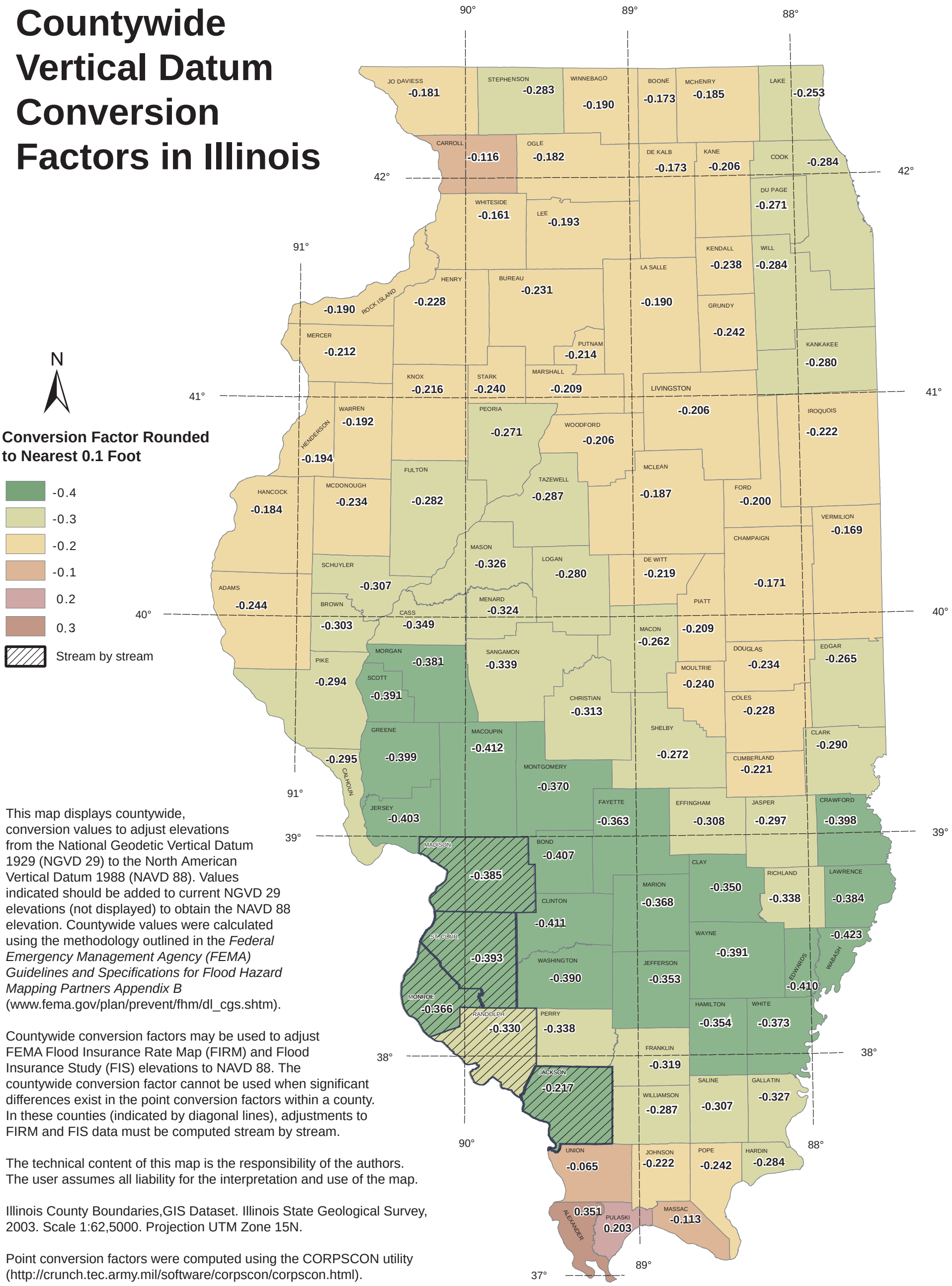
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF PEORIA, IL
(PEORIA CO.)

FLOODWAY DATA

ILLINOIS RIVER

Countywide Vertical Datum Conversion Factors in Illinois



This map displays countywide, conversion values to adjust elevations from the National Geodetic Vertical Datum 1929 (NGVD 29) to the North American Vertical Datum 1988 (NAVD 88). Values indicated should be added to current NGVD 29 elevations (not displayed) to obtain the NAVD 88 elevation. Countywide values were calculated using the methodology outlined in the *Federal Emergency Management Agency (FEMA) Guidelines and Specifications for Flood Hazard Mapping Partners Appendix B* (www.fema.gov/plan/prevent/fhm/dl_cgs.shtm).

Countywide conversion factors may be used to adjust FEMA Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) elevations to NAVD 88. The countywide conversion factor cannot be used when significant differences exist in the point conversion factors within a county. In these counties (indicated by diagonal lines), adjustments to FIRM and FIS data must be computed stream by stream.

The technical content of this map is the responsibility of the authors. The user assumes all liability for the interpretation and use of the map.

Illinois County Boundaries,GIS Dataset. Illinois State Geological Survey, 2003. Scale 1:62,5000. Projection UTM Zone 15N.

Point conversion factors were computed using the CORPSCON utility (http://crunch.tec.army.mil/software/corpscon/corpscon.html).

SCALE 1:1,900,800 (1 inch=30 miles)

0 15 30 60 Miles

Illinois State Water Survey (1895)

Map Series 2007-01

Phillip Graff and Jane Li
Illinois State Water Survey
http://www.sws.uiuc.edu
217-333-8844

Illinois Department of Natural Resources
http://dnr.state.il.us

University of Illinois
http://www.uiuc.edu

Greater Peoria Sanitary District

Flood Plan

Adopted: October 2008

Revised: May 2017; July 2019; November 2019; July, 2020; September 2021

Contents

Introduction

The Greater Peoria Sanitary District is located in the floodplain of the Illinois River. The potential for flooding is dependent on the levee constructed, owned and operated by the Sanitary District. Through continuing maintenance and monitoring of the levee, the risk of physical damage to the facilities can be managed.

The success of even the best designed and maintained levee system cannot be fully guaranteed during a major flood. A flood of the 100-year magnitude on the Illinois River would be of long duration, possibly resulting in flood water on the system for months. The Corp of Engineers monitors Illinois River stage and models events that may result in floods. This modeling will provide a few days of advance warning of predicted crest elevations. It is likely that much of the earthen levee will be saturated by the time the flood water reaches the system's design level, where it could stay steady with little drop for days. During a flood of this magnitude, success for a system in even the best of conditions would require emergency response to unpredicted problems. If the levee protection is compromised, the facility could experience flood waters very quickly, with limited time to react and the water could be on site for weeks.

Objectives

The Sanitary District's primary purpose is to protect the environment from the release of partially or untreated sewage. This Flood Emergency Response Plan is developed to serve as an outline of actions to be taken leading up to and after possible flooding. Through planning, both property and environmental damage can be minimized.

This plan will be reviewed and updated as needed. This will help assure that effective action can be taken if needed.

Flood Data

Basic Information

Flood stage on the Illinois River at Peoria is considered to be 18.0 feet, 446.1 feet MSL (NAVD88). The reference point for Illinois River elevation is the Corps of Engineers Grant Street gauge.

- Darst Street floods at 26.8 feet. This prohibits vehicular access to the plant.
    - Can use military truck up to 28' but after that, use boat entry.
- The crest of the levee is 33.0 feet.
- The 100-year flood level is 32.2 feet.
- The highest recorded flood level is 29.35 feet, on April 23, 2013.

Flood Scenarios

Treatment Plant operations could be compromised from flooding through a number of scenarios, primarily related to flooding of the Illinois River. One known scenario is related to flooding of Kickapoo Creek. A partial list of the causes is summarized as follows:

- Failure of effluent flow control gate. This risk is minimized by regular inspection and operation and by redundant gates SG-19 and SG-76.
- Failure of Effluent Pumps and Plant Drainage Pumps. This risk is minimized by redundant equipment, regular exercise programs and on-site standby power.
- Breach of the levee. The Treatment Plant is protected by a levee at an elevation greater than a 100-year flood elevation.
- On April 18, 2013, at 10:00 P.M. Kickapoo Creek experienced a flash flood that temporarily closed Darst Street. Conditions included area-wide rainfall of 5" to 7" on top of completely saturated ground. The flash flood occurred when the Illinois River was just reaching flood stage and was rising rapidly. Although the flash flood quickly subsided, access to the treatment plant was shut down for several hours. The treatment plant itself was not threatened.

Operational issues are impacted at lower river stages, primarily from limited or no vehicular access. This relates to delivery of supplies, personnel access to the plant, and conducting business with the public. Impact on these activities can be predicted and planned in advance to minimize the disruption to business activities.

The reference point for Illinois River elevation is the Corps of Engineers Grant Street gauge.

Grant Street River Gauge	**Grant Street Mean Sea Level (NAVD 88)**	**Action or Activity *See Note 1**
0.0'	428.1	Zero gauge reference elevation.
11.6'	439.7	Normal Pool
13.9'	442.0	Water elevation outside the levee matches the ground elevation at the Vactor Solids Dump Pad and the Maintenance/Storage Garages. (442.0) No impacts anticipated.
18.0'	446.1	Flood Stage at Peoria (445.3)
20.0'	448.1	At the Galena Rd. Pumping Station, "River Flooding Lag Pump Alarm" needs to be turned to "ON" position.
22.7'	450.8	Water elevation outside the levee matches the remaining ground elevations inside the levee. (450.0) No impacts anticipated.
23.6'	451.7	At the Galena Rd. Pumping Station, close valve on west-side of the pumping station
23.6'	451.7	At the Galena Rd. Pumping Station, to prevent water migration into building, on the door interior, place steel plates and seal using caulking materials.
23.8'	451.9	At the Galena Rd. Pumping Station, to maintain pumping cycle times between three to five minutes, begin the adjustment and the monitoring of the valve north of the pumping station.
24.3'	452.4	Working Sludge Beds are protected to elevation 453.6. The stated elevation allows 2.0 feet of freeboard.
26.3'	454.4	Working Sludge Bed levee elevation. (453.6)
26.8'	454.9	Darst Street floods.

30.7'	458.8	Sludge Test Beds are protected to elevation 460.0. The stated elevation allows 2.0 feet of freeboard.
31.9'	460.0	Elevation of southern road entrance. (459.2)
31.9'	460.0	Base Flood Elevation (100-year flood). USACE river profile and effective Flood Insurance Study, between River Mile 160.0 and 160.6. (458.9)
32.4'	460.5	Elevation of northern road entrance (459.7)
32.5'	460.6	For eminent overtopping, implement Utility Interruption Plan
33.0'	461.1	Highest continuous contour on the levee. (460.3) Excluding entrance roadways.

*Note 1: Depending on the flood event the actual river elevation at the WWTP will be between 6 inches and 13 inches lower than at Grant Street. For the table above the WWTP elevations are assumed to be 9 inches lower than Grant Street during flood stage.

Authority to Activate Plan/Contact Information

The Executive Director has full authority to activate the Plan. In the absence of this person the Director of Operations will be responsible for initiating the Plan.

Pertinent Contact Information is as follows:

Brian Johnson, Executive Director – (309) 472-8143

James E. Sloan, P.E., Director of Operations – (309) 678-9046

Local Authorities

Peoria Police Department (Non-emergency)	(309) 673-4521
Peoria Fire Department (Non-emergency)	(309) 674-3131
Peoria Emergency Services & Disaster Agency	(309) 494-8036
Peoria County Emergency Services & Disaster Agency	(309) 691-3111
R. Jason Marks, Director of Emergency Management & Preparedness, Peoria City/County Health Department, Emergency Management Agency	(309) 679-6020 jmarks@peoriacounty.org

Operations

Ongoing Safety Training

Employees shall be properly trained on an annual basis as to the contents of this Plan and what to do in the event of a flood emergency.

The Executive Director's designee for carrying out this Plan safety training is the Director of Administration.

Ongoing Monitoring

River levels shall be monitored on a daily basis. The Executive Director's designee for carrying out this Plan is the Director of Operations. A summary of how the daily readings are monitored and reported to the Executive Director is as follows:

The Director of Operations, and the Operations Department supervisory staff, monitors the river gauge on a daily basis throughout the year. The first significant gauge forecast is the river predicted to reach 17 feet at Grant Street in Peoria. At 17 feet, SG-19 must be closed and the effluent screw pumps turned on. If the river continues to rise, Operations Department will communicate with the Executive Director, and department directors, to implement the Phased Operations as outlined below.

Phased Operations

Phase 1 – High Water/Pre-Flooding and Early Flooding (17 – 18 Feet)

What to Expect During this Phase:

Action Items: The following Actions are to be taken by the corresponding Responsible Person. When complete, the Responsible Person shall notify the corresponding Verification Person

River Gauge	Action	Purpose	Person Responsible	Verification Person
17.0'	Close SG-19	Isolate the effluent channel and prevent cross contamination with the river	Process Control Supervisor	Director of Operations

Notes of importance are:

- 17.0' is the Action Stage for the river. If the river is predicted to continue to rise above 17.0', then the following actions must be taken.

Phase 2 – Minor Flooding (18 – 22 Feet)

What to Expect During this Phase:

Action Items: The following Actions are to be taken by the corresponding Responsible Person. When complete, the Responsible Person shall notify the corresponding Verification Person

River Gauge	Action	Purpose	Person Responsible	Verification Person
18.0'	Inspect Sanger and South flap gates	Ensure functioning such that river waters don't flood Riverfront Interceptor	Collection System Supervisor	Director of Operations
19.0'	Close SG-76	Provide a second layer of flood protection through the levee	Process Control Supervisor	Director of Operations
20.0'	At the Galena Rd. Pumping Station, "River Flooding Lag Pump Alarm" needs to be turned to "ON" position.	Notify when the lead pump cannot keep up with pumping increases caused by increased infiltration.	Process Control Supervisor	Director of Operations

Notes of importance are:

- Shutting SG-76 is critical. The river will push SG-19 away from the headwall and the gate will leak as the river continues to rise. Closing SG-76 is pushed closed by the river. Both gates are needed to protect the treatment plant.
- The regulator flap gates need to operate to protect the Riverfront Interceptor as the river flooding increases

Phase 3 – Moderate Flooding (22 – 28 Feet)

What to Expect During this Phase:

Action Items: The following Actions are to be taken by the corresponding Responsible Person. When complete, the Responsible Person shall notify the corresponding Verification Person

River Gauge	Action	Purpose	Person Responsible	Verification Person
23.3’	Begin routine seepage inspection for Vactor Dump Pad and Maintenance Garage Areas	Flooding can occur from water through the ground table. Seepage must be monitored.	Facilities Supervisor and P&C staff	Director of Operations and Director of Planning & Construction
23.6’	At the Galena Rd. Pumping Station, close valve on west-side of the pumping station	Protect the pumping station from river inflow from Main R23D009300.	Collection System Supervisor	Director of Operations
23.6’	At the Galena Rd. Pumping Station, to prevent water migration into building, on the door interior, place steel plates and seal using caulking materials.	Protect the pumping station from river flooding.	Facilities Supervisor	Director of Operations
23.8’	At the Galena Rd. Pumping Station, to maintain pumping cycle times between three to five minutes, begin the adjustment and the monitoring of the valve north of the pumping station	Protect the pumping station from inflow from Main R23D009301.	Collection System Supervisor	Director of Operations
25.9’	Begin routine seepage inspection for all other areas	Flooding can occur from water through the ground table. Seepage must be monitored	Facilities Supervisor and P&C staff	Director of Operations and Director of Planning & Construction

26.0’	Call Peoria Metro to secure offsite location for vehicle parking	If Darst floods, will want to ensure access to parking for staff vehicles and collection system/engineering vehicles	Director of Planning & Construction	Executive Director, Director of Operations
26.3’	Move equipment from heavy equipment building	Working sludge bed will flood	Facilities Supervisor	Director of Operations
26.8’	Notify Staff of need to use military truck to access plant	Alert employees of change in routine, new procedure, and to dress appropriately	Director of Operations	Executive Director
26.8’	Move vehicles to Peoria Metro	Ensures collection system/engineering vehicles are accessible	Director of Planning & Construction	Executive Director, Director of Operations

Notes of importance are:

- If the forecast is for Moderate Flooding, Operations Staff must make sure chemicals have been delivered. In addition, at a minimum, fuel must be available to run the Solar Turbine generators for 2½ days. This is a volume of 20,000 gallons of diesel fuel.
- During moderate flooding, check the condition of the boat, the boat motor and the boat docks.

Phase 4 – Major Flooding (28 – 30 Feet)

What to Expect During this Phase:

Action Items: The following Actions are to be taken by the corresponding Responsible Person. When complete, the Responsible Person shall notify the corresponding Verification Person

River Gauge	Action	Purpose	Person Responsible	Verification Person
28.0’	Notify Staff of need to use boat to access plant	Alert employees of change in routine, new procedure, and to dress appropriately	Director of Operations	Executive Director
29.0’	Begin planning for records and equipment removal	Should plant flood, District needs to ensure protection of records and equipment, such as computers	Director of Administration, Director of Finance	Executive Director, Director of Operations, Director of Planning & Construction
29.0’	Ensure availability of off-site command post	Ensure availability of customer service and administrative functions	Director of Administration, Executive Director	All Directors

Notes of importance are:

- Prior to 28.0', when access is still possible with large trucks, prepare the boat docks and set them in place.

Phase 5 – Emergency Flooding (>30 Feet)

What to Expect During this Phase:

Action Items: The following Actions are to be taken by the corresponding Responsible Person. When complete, the Responsible Person shall notify the corresponding Verification Person

River Gauge	Action	Purpose	Person Responsible	Verification Person
30.0'	Move essential staff to off-site command post	Ensure availability of customer service and administrative functions	Director of Administration, Executive Director	All Directors, Board of Trustees
32.5' (or in discretion)	Cut off power to WWTP	Prevent live electricity in flood waters	Executive Director	All Directors, Board of Trustees

Notes of importance are:

- If a power cut-off is expected, the Solar Turbine generators will need to be in operation and the treatment plant must be disconnected from Ameren. When the levee is being topped, and the treatment plant actually starts to flood, the generators will be shut down and the treatment plant will go dark. This prevents live electricity in the flood waters.
- If the levee is being topped and the plant is dark, if at all possible, SG-19 should be opened. SG-76 can be opened after the flood drops below the top of the levee. This will allow the plant to drain by gravity after the flood subsides.

Phase 6 – Recovery

In this phase, floodwaters will crest and start to recede, and response will transition into recovery. Depending on the level of damage, recovery may include:

- Initial damage assessment in anticipation of a federal disaster declaration
- Deployment of damage assessment teams and FEMA
    - Coordinate with Jason Marks of Peoria County EMA (contact information is above)
- Power to effluent screw pumps to drain plant
- Debris removal
- Repairs by private property owners
- Repairs to District-owned facilities or systems
- Road repairs
- After-action review and reporting

Insurance Summary

The Director of Administration is responsible for ensuring the District maintains adequate flood insurance protection, as directed with policy input from the Board of Trustees. As of the date of this Plan, the following is a summary of existing flood insurance coverage:

National Flood Insurance Program (NFIP)

- $500,000 for buildings ($50,000 deductible) and $500,000 for contents ($50,000 deductible)
  - Ad/Lab building
  - Electrical building
  - Operations building
  - Pump and Blower building
  - Intermediate Pump Station building

- $500,000 for buildings ($1,250 deductible) and $500,000 for contents ($1,250 deductible)
  - Centrifuge building

Property Insurance Package ($250,000,000 aggregate)

- Flood Zones A and V
  - $5,000,000 per occurrence ($500,000 deductible)

- Flood Zones Excluding A and V
  - $10,000,000 per occurrence ($100,000 deductible)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
170536	Peoria, City of	IL	N/A	0020B	02/01/80
170536	Peoria, City of	IL	17143C	0336A	00/00/00

2. a. Flooding Source: Illinois River

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
   ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Greater Peoria Sanitary District (GPSD) Levee Improvement & Certification Project

4. FEMA zone designations affected: A13 (0020B), AE (0336A) (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

   a. The basis for this revision request is (check all that apply)

   ☒ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
   ☐ Coastal Analysis ☐ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☒ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
   ☐ New Topographic Data ☐ Other (Attach Description)

   Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: ☐ Channelization ☒ Levee/Floodwall ☐ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $7,250 +

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Brian Johnson	Company: Greater Peoria Sanitary District	
Mailing Address: 2322 S. Darst Street Peoria, IL 61607	Daytime Telephone No.: 309-637-3511	Fax No.: 309-637-6614
	E-Mail Address: bjohnson@gpsd.org	
Signature of Requester (required):	Date: 4/5/2021	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Bill Lewis, Deputy Director of Engineering	Community Name: City of Peoria	
Mailing Address: Public Works Department 3505 N Dries Lane, Peoria, IL 61604-1210	Daytime Telephone No.: 309-494-8800	Fax No.: 309-494-8655
	E-Mail Address: blewis@peoriagov.org	
Community Official's Signature (required): Bill Lewis	Date: 3/26/21	

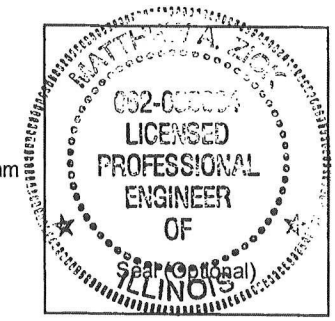
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Matthew A. Zick, P.E.	License No.: 062-055034	Expiration Date: 11/30/2021
Company Name: Crawford, Murphy, & Tilly, Inc.	Telephone No.: 309-680-1304	Fax No.: 309-637-1891
Signature: Matthew A. Zick	Date: 3-26-21	E-Mail Address: mzick@cmtengr.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Illinois River

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☒ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	Illinois River	160.17	459.09	459.09
Upstream Limit*	Illinois River	159.95	459.08	459.08

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: GPSDduplEffective	Plan Name: DuplEffectiveModel	File Name: GPSDFloodCorModel	Plan Name: CorEffectiveModel	NGVD 29
Corrected Effective Model*	File Name: GPSDCorrEffective	Plan Name: CorrEffectiveModel	File Name: GPSDFloodCorModel	Plan Name: CorEffectiveModel	NGVD 29
Existing or Pre-Project Conditions Model	File Name: GPSD No Levee	Plan Name: NO LEVEE	File Name:	Plan Name:	NGVD 29
Revised or Post-Project Conditions Model	File Name: GPSD Proposed	Plan Name: Plan 04	File Name: GPSDFloodAnalysis	Plan Name: FloodwayTrial	NGVD 29
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☐ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: Peoria County GIS Data (Datum NAVD 88)

Source: Tri-County Regional Planning Commission Date: 2011

Accuracy: 2' contours

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☒ No

   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☒ Yes ☐ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Illinois River

Note**:** Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization.....complete Section B
Bridge/Culvert.....complete Section C
Dam.....complete Section D
Levee/Floodwall.....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: Greater Peoria Sanitary District (GPSD) Treatment Plant Levee

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☒ Levee/Floodwall ☐ Dam

   Location of Structure: Right descending bank from M160.2 to M159.9

   Downstream Limit/Cross Section: Section at M159.40

   Upstream Limit/Cross Section: Section at M160.50

2. Name of Structure: _____

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: _____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

3. Name of Structure: _____

   Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: _____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: _____

Name of Structure: _____

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): _____
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☐ Dimensions (height, width, span, radius, length)
☐ Shape (culverts only)
☐ Material
☐ Beveling or Rounding
☐ Wing Wall Angle
☐ Skew Angle
☐ Distances Between Cross Sections
☐ Erosion Protection
☐ Low Chord Elevations – Upstream and Downstream
☐ Top of Road Elevations – Upstream and Downstream
☐ Structure Invert Elevations – Upstream and Downstream
☐ Stream Invert Elevations – Upstream and Downstream
☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☐ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

D. DAM/BASIN

Flooding Source: _____
Name of Structure: _____

1. This request is for (check one): ☐ Existing dam/basin ☐ New dam/basin ☐ Modification of existing dam/basin

2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

   Name of the agency or organization: _____

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number _____ Permitting Agency or Organization _____

   a. ☐ Local Government Dam ☐ Private Dam

      Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

   Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

   ☐ Yes, provide supporting documentation with your completed Form 2.

   ☐ No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	_____	_____
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one): ☒ upgrading of an existing levee/floodwall system ☐ a newly constructed levee/floodwall system ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☒ earthen embankment, dike, berm, etc. Station 0+00 to 66+25.66
☐ structural floodwall Station _____ to _____
☐ Other (describe): Station _____ to _____

c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling ☐ Other (describe): _____

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☒ No

If Yes, by which agency? _____

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers: A1-A2
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: B1-B11
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers: B1-B11
4. A layout detail for the embankment protection measures. Sheet Numbers: A2
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, Floodwall structure, closure structures, and pump stations. Sheet Numbers: R1-R80

2. Freeboard

a. The minimum freeboard provided above the BFE is:

3.6 ft

Riverine

3.0 feet or more at the downstream end and throughout	☒ Yes	☐ No
3.5 feet or more at the upstream end	☒ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☒ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☒ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☒ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device
See Attached				

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope land side is: 3.3 (h) to 1 (v)

b. The maximum levee slope flood side is: 3 (h) to 1 (v)

c. The range of velocities along the levee during the base flood is: 1.1 fps (min.) to 1.5 fps (max.)

d. Embankment material is protected by (describe what kind): vegetative cover

e. Riprap Design Parameters (check one): ☒ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☒ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Refer to the Geotechnical Investigation Report (GIR), Appendix J

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:
See attached application narrative and Geotechnical Investigation Report (GIR).

☒ Overall height: Sta.: _____, height _____ ft.

☒ Limiting foundation soil strength:

Strength ϕ = _____ degrees, c = _____ psf

Slope: SS = _____ (h) to _____ (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):
The method used is Morgan Stern-Price - see GIR Appendix K

c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction	Refer to application narrative	1.3
II	Sudden drawdown	Refer to application narrative	1.0
III	Critical flood stage	Refer to application narrative	1.4
IV	Steady seepage at flood stage	Refer to application narrative	1.4
VI	Earthquake (Case I)	Refer to application narrative	1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☒ Yes ☐ No

If Yes, describe methodology used: Finite element anaylsis

e. Was a seepage analysis for the foundation performed? ☒ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☒ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☒ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is N/A hours.

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _____

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding If not, explain: _____

c. Loading included in the analyses were: ☐ Lateral earth @ P_A = _____ psf; P_p = _____ psf

☐ Surcharge-Slope @ _____, ☐ surface _____ psf

☐ Wind @ P_w = _____ psf

☐ Seepage (Uplift); _____ ☐ Earthquake @ P_{eq} = _____ %g

☐ 1%-annual-chance significant wave height: _____ ft.

☐ 1%-annual-chance significant wave period: _____ sec.

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☒ Yes ☐ No

b. The computed range of settlement is 0.025 ft. to 0.075 ft.

c. Settlement of the levee crest is determined to be primarily from : ☒ Foundation consolidation ☐ Embankment compression ☐ Other (Describe): _____

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: 47.5 acres
Draining to ponding area: 10.5 acres

b. Relationships Established

Ponding elevation vs. storage	☒ Yes	☐ No
Ponding elevation vs. gravity flow	☒ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☒ No

c. The river flow duration curve is enclosed: ☐ Yes ☒ No

d. Specify the discharge capacity of the head pressure conduit: 241.4 cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☒ Yes	☐ No
• Common storm (River Watershed)	☒ Yes	☐ No
• Historical ponding probability	☐ Yes	☒ No
• Coastal wave overtopping	☐ Yes	☒ No

If No for any of the above, attach explanation.

e. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☒ Yes ☐ No If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is 0.126 cfs

h. The length of levee system used to drive this seepage rate in item g: 6625 ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☒ Yes ☐ No

If Yes, include the number of pumping plants: 1 For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps	3 & 1 Pump in Reserv	
The ponding storage capacity	17.6 Ac-ft	
The maximum pumping rate	241.5 cfs (156 MGD)	
The maximum pumping head	NA	
The pumping starting elevation	River Elev. 447.10	
The pumping stopping elevation	NA	
Is the discharge facility protected?	Yes	
Is there a flood warning plan?	Yes	
How much time is available between warning and flooding?	7 Days	

Will the operation be automatic? ☐ Yes ☒ No

If the pumps are electric, are there backup power sources? ☒ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☒ is not a problem

Hydrocompaction ☐ is ☒ is not a problem

Heave differential movement due to soils of high shrink/swell ☐ is ☒ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:
See attached application narrative

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☒ No Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☒ No
If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☒ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☒ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☒ Yes ☐ No If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the fomal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

CERTIFICATION OF THE LEVEE DOCUMENTION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Matthew A. Zick, P.E. License No.: 062.055034 Expiration Date: 11.30.21

Company Name: Crawford, Murphy, & Tilly, Inc. Telephone No.: 309.680.1304 Fax No.: 309.637.1891

Signature: Date: 6.29.21 E-Mail Address: mzick@cmtengr.com

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume _____ acre-feet

Debris load associated with the base flood discharge: Volume _____ acre-feet

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition: _____

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: _____

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Appendix A
MT-2 Application Narrative

Contents

List of Tables

1. System Elements

This levee analysis is based on the upgrade of an existing levee system; the Greater Peoria Sanitary District's treatment plant levee, which lies along the right descending bank of the Illinois River near Mile 160 in Peoria, Illinois. The levee consists of a semi-circular earthen embankment approximately 6,625' in length. This levee has not been certified by a federal agency as providing protection from the base flood, but a prior submittal did result in a Conditional Letter of Map Revision for proposed levee improvements. This updated CLOMR request seeks to establish a plan for levee certification that does not involve groundwater relief well pumping; otherwise, submitted information is largely the same.

2. Freeboard

The proposed minimum freeboard to be provided above the Base Flood Elevation (BFE) is 3.6 feet along the southern segment of the levee; 4 feet or more is provided on the remainder. The table below summarizes the BFE and target elevations for the project in both NGVD 29 and NAVD 88 elevations.

Critical Factor	NGVD 29 Elevation	NAVD 88 Elevation
Base Flood Elevation	459.20	458.90
Minimum Overtopping Elevation	462.70	462.40

Table 1 - Target NGVD 29 and NAVD 88 Elevations

The elevations shown above are based on a conversion between the datums at latitude 40.66006637963 and longitude 89.61897611618. Since the NAVD 88 datum was used for this project, the elevations reported herein will be based on the 88 datum unless otherwise noted. The facility is not within 100 feet of structures or constrictions that would require the minimum 4.0 feet of freeboard for riverine structures and the Flood Insurance Study does not indicate that ice-jamming affects the BFE.

3. Closures

Since the levee protects a sewage treatment plant, openings through the levee exist. There are no large openings for vehicles or railways that require closure; all of the openings are related to plant effluent. Table 2 lists openings and information pertinent to them. In addition, Part IV of the GPSD Levee Operations and Maintenance Manual provides detailed information and inspection reports on the plant closures.

Penetrations

In addition to the noted closures, there are several locations where utilities pass under the levee. As part of the proposed improvements leading up to levee certification, these utility trenches will be exposed for approximately 10 feet at the exterior toe of the levee and the trench filled with flowable fill to reduce the chance the utility trench can serve as a preferential flow path for infiltration. At several locations under the expanded levee at the north end of the plant, load relief platforms were constructed where the new levee was built over existing large diameter sewers. As part of the proposed

improvements, these penetrations will be exposed and a specific plan developed to seal them, most likely by pumping the void space full of grout or flowable fill.

Structure Designation	Levee Station	GPSD Location Coordinates	Channel Station	Channel Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device
Water Level Control Structure (Outfall 001)	7+22	4+00 E/4+00 S	160.1	Right Bank	60" Pipe and Outfall Structure	447.00 446.00 442.00	Sluice Gates: S.G.-19 72"x72" S.G.-76 72"x72" S.G.-77 24"x24"
Levee Manhole (Outfall 002)	1+50	4+70 E/1+77 N	160.2	Right Bank	72" Outfall Pipe	428.25	Sluice Gate: S.G.-78 72"x72"
Control Chamber 1	58+83	0+00 /6+25 N	160.2	Right Bank	54" Pipe to WWTP 48" Pipe to River	441.38 445.50	Sluice Gates: S.G.-2 54"x54" to WWTP S.G.-87 72"x48" to Illinois River
Control Chamber 1 (Bypass Flows)	61+35	0+00 /6+25 N	160.2	Right Bank	84" Pipe to Bypass Pump	444.75	Sluice Gate: S.G.-1 84"x84" to bypass pump
Administration and Laboratory Building Sanitary Sewer Valve Vault	41+49	8+10 W/2+50 S	160.1	Right Bank	8" Sanitary Sewer	445.79	Motor Controlled Plug Valve
Drainage Pump	4+60	2+00 E/1+65 S	160.1	Right Bank	12" Forcemain	427.75	12" forcemain has been disconnected and capped. Drainage pump discharges directly into the treatment process.
Effluent Pump Station	8+32	4+00 E/5+00 S	160.1	Right Bank	20' wide Outfall Spillway	463.00	Closure for internal drainage only, Sluice Gates: S.G.-17 72"x72" S.G.-18 72"x72"

Table 2 - GPSD Levee Closure Table

4. Embankment Protection

The existing maximum land side levee slope is roughly 3.3 (H) to 1 (V) while the maximum flood side levee slope is 3 (H) to 1 (V). Cross sections showing the existing and proposed levee are included with the application as sheets B13 to B41. The September 17, 2004 version of the Peoria County Flood Insurance Study lists a mean velocity of 1.1 ft/sec for the Illinois River at Section Y (Mile 160.0). The existing levee is a vegetated earthen embankment and such cover is well suited to the low velocities exhibited by the Illinois River. Additional discussion on this topic is provided in the included Geotechnical Investigation Report (GIR) with support calculations provided in Appendix J.

As noted in the GIR, there is some history of erosion occurring in the NE corner of the levee during a flood event in 1974, and repairs thereafter seem to have been successful. In addition, the same area sustained erosion damage during the 2019 flood event (subsequently repaired under PL84-99 program). The duration of the 2019 flood event was sufficiently long that the grass cover on the riverside slope was completely damaged, and erosion appeared to occur from wave action against the bare earth slope. The proposed levee improvements include hard armor protection in this area. Properly bedded riprap or ArmorFlex revetment mat (or similar) is proposed from station 65+50 to 66+25.66/0+00 and from 0+00 to 2+50 and will extend from the toe of the flood side levee slope to the crest.

Embankment erosion has not been an issue with the remainder of the levee, however, after experiencing prolonged flooding in recent years, there has been an increase in noted erosion on the river side of the embankment. It is possible that the prolonged flooding killed vegetated cover, which left the embankment more susceptible to erosion. The District's O&M Manual has been updated to include post-flood review of the impacts to vegetated cover and procedures for re-establishing vegetated cover sooner rather than later.

5. Embankment & Foundation Stability

The embankment and foundation stability analysis was a significant part of the GIR prepared in support of this CLOMR application and a complete discussion and presentation of the analysis and results can be found within the report. The Geotechnical Investigation included extensive field sampling, laboratory testing, and piezometer monitoring. The investigation indicated the uppermost native soils (Cahokia Formation) to consist primarily of fine grained silts and clays with some sand and gravel. This material is geologically recent alluvium. The underlying material is outwash material consisting mainly of sand and gravel with a mixture of silts and clays (Henry Formation). Both formations are heterogeneous given the complex depositional environment of the Illinois River and the confluence of Kickapoo Creek. Bedrock is at least 100 feet below the ground surface. The embankments were constructed from nearby borrow areas (adjoining the levees), and therefore consist of reworked Cahokia material, including sand and gravel lenses. Similarly, lagoon excavations penetrate well into the Cahokia formation. Piezometer data clearly indicates the strong connectivity between the Illinois River and the granular Henry Formation.

The tables below summarize the analysis information and results that are pertinent to Section E5 of the MT-2 Form.

Cross Section Station	Cross Section Location	Embankment Height (ft)	Slope (H:V)	Description
Station 1+70N	North End of East Levee	16	3.8:1	Landside Toe el. 441-442
Station 1+70S	North End of East Levee	11	3:1	Landside Toe el. 450 ft
Station 9+15	South Central Portion of East Levee	10	4.4:1	Near Screw Pumps with Access Ramp
Station 10+00	South Central Portion of East Levee	10	3.6:1	Near Screw Pumps but with Access Ramp
Station 18+35	East Portion of South Levee	12	3:1	Southeast Lagoon
Station 24+00	West Portion of South Levee	11	3:1	Southwest Lagoons
Station 45+00	Central Portion of West Levee	21	4:1	Low-lying Area, Landside Toe el. 441
Station 47+00	Central Portion of West Levee	17	4:1	Low-lying Area, Landside Toe el. 441, Location of Observed Seepage
Station 53+00	Central Portion of North Levee	9	3:1	Driveway at Landside Toe
Station 56+00	Central Portion of North Levee	10	3.5:1	1974 Levee Expansion Area
Station 59+00	Central Portion of North Levee	10	3.5:1	Seepage Comparison

Table 3 - Critical Section Locations for Analysis

It should be noted that berms and pervious fills along with controls on the interior water levels in the lagoons are a part of the proposed improvements to the levee system to ensure adequate factors of safety.

	Tested Condition	Recommended Value	
		Cohesion (psi)	Phi (degrees)
Fill Materials	Unconsolidated-Undrained Triaxial Test	8.6	0.0
	Consolidated-Undrained Triaxial Test (Total Stress)	1.8	16.4
	Consolidated-Undrained Triaxial Test (Effective Stress)	0.0	31.0
Cahokia Material	Unconsolidated-Undrained Triaxial Test	7.2	0.0
	Consolidated Undrained Triaxial Test (Total Stress)	3.0	14.0
	Consolidated-Undrained Triaxial Test (Effective Stress)	0.5	27.0
Henry Material	Estimated Value	0	30

Table 4 - Design Values for Embankment and Foundation Materials

Table 5 summarizes the calculated critical safety factors for each required case and at each identified station. A full discussion and presentation of these results is available in the GIR, pages 29 to 38. Because of the slow rise and fall of the Illinois River, it was assumed that Case III and Case IV would be the same for this levee system. The Peak Ground Acceleration (PGA) value for this site is 0.009g. Since this value is less than 0.10g, no seismic analysis is required for liquefaction potential under USACE EC 1110-2-6067.

Table 5 - Slope Stability Safety Factors by Condition & Station

Critical Sections by Station	Factors of Safety at Critical Sections		
	Case I End of Construction (Min. FS = 1.3)	Case II Sudden Drawdown (Min. FS = 1.0)	Case III and IV Steady Seepage at Flood Stage (Min. FS = 1.4)
Station 1+70N	3.24	1.48	1.45
Station 1+70S	4.42	1.50	1.40
Station 9+15	4.39	1.58	1.67
Station 10+00	5.00	1.54	1.42
Station 18+35	2.98	1.09	1.41
Station 24+00	2.11	1.26	1.93
Station 45+00	2.83	2.58	1.59
Station 47+00	3.20	4.79	1.57
Station 53+00	5.23	1.93	1.90
Station 56+00	4.03	2.15	1.44
Station 59+00	4.04	2.26	1.44

Seepage analyses for the embankment and the embankment foundation were performed using finite element analysis. In addition, uplift pressures at the embankment landside toe and seepage exit

pressure gradients were checked. The following table presents seepage exit gradients at the landside levee toe and berm toe where applicable.

Table 6 - Exit Gradient by Station

Critical Sections by Station	Existing Exit Gradient at Levee Toe	Exit Gradient at Modified Levee Toe	Exit Gradient at Modified Levee Berm Toe
Station 1+70N	0.64	0.47	0.77
Station 1+70S	0.33	0.28	0.33
Station 9+15	0.09	NA	NA
Station 10+00	0.11	NA	NA
Station 18+35	0.28	0.22	NA
Station 24+00	0.20	0.18	NA
Station 45+00	1.00	0.28	0.28
Station 47+00	0.71	0.46	0.73
Station 53+00	0.20	0.20	NA
Station 56+00	0.17	0.17	NA

6. Floodwall and Foundation Stability

Floodwalls are not part of the existing or proposed flood protection of the Greater Peoria Sanitary District and therefore no information is provided in this section of the report.

7. Settlement

The existing levee has been in place for approximately 80 years and the maximum thickness of fill to be added to the levee to bring the crest to an acceptable elevation for certification is approximately 4.0 feet. Settlement Considerations were included in the GIR analysis (Page 47 with calculations in GIR Appendix M) and determined that foundation consolidation is the primary mode of settlement. The estimated total settlement range is approximately 0.7 to 1.3 inches and will occur rapidly with the placement of the additional fill load. The crest elevation will be closely monitored during and after placement of the fill material to ensure the target elevation is achieved. Since floodwalls are not part of the protection scenario, differential settlement of floodwalls is not applicable.

8. Interior Drainage

Included with this CLOMR application is a report by Crawford, Murphy, & Tilly, Inc. that considers the interior watersheds and how rainfall within the plant levee is handled. The interior was broken down into separate watersheds and the relationships between ponding elevations, storage, and the capacity for gravity flow evaluated. We requested flow duration curves for the Illinois River from the US Army Corps of Engineers and were told that none were available. When gravity discharge from the plant to the Illinois River is not possible, three large Archimedes screws (1 reserve screw pump) elevate the effluent and discharge it over a spillway into the river. As such, differential head based on the exterior

water level is not a factor in the pumping capacity of the primary means of evacuating water from the interior of the levee. Historical ponding and coastal wave overtopping were not determined to be conditions of concern for the purposes of this application. The existing and proposed interceptor flow control structures provide the District with the ability to throttle sanitary sewer flow (wastewater) into their treatment process, thereby giving them flexibility to allow more storm water into the treatment process from internal tributary areas and vary the ratio of effluent to storm water being evacuated by the screw pumps. Wave heights tend to be very limited on the Illinois River and, given its inland location, are the result of wind action on the surface of the water. The plant's location on the west side of the river and predominate winds from the west-northwest put the levee on the windward side of the Illinois River.

Seepage Considerations appear in the GIR document (Pages 39-44) with a discussion of the factors affecting the seepage rate. Seepage through the levee is not a significant concern and the rates determined in the investigation represent 0.05% of the total capacity of the effluent screw pumps. In the "worst case scenario" investigated in the drainage analysis, the river is at or near its Base Flood Elevation during a 1% rainfall event, causing significant interior storm water to be conveyed by the internal drainage system. Under this scenario, the aforementioned throttling of wastewater through the treatment process may or may not be necessary, depending on the volume carried by the interceptor sewers.

Our analysis shows that short duration, high intensity rainfall events could overwhelm the inlet collection and conveyance system in the northeast part of the facility and cause water to pond within a foot of the finished floor elevation (FFE) of some buildings in the area. To reduce the risk of damage from higher than anticipated ponding, the levee improvement plan calls for setting overflow inlets with rims sized and set to limit the ponding depth in these areas below the existing FFE's.

The plant's screw pumps are not operated automatically, but they are an essential part of the plant's operation when gravity discharge is not possible. The plant is staffed 24 hours a day, 7 days a week, 365 days per year, so the screw pumps can be activated whenever the need arises. Electricity to the plant is fed from two separate parts of the electrical grid, providing redundancy for plant operation. In addition, the plant also has backup diesel generators should the redundant power feeds fail.

9. Other Design Criteria

Liquefaction, hydro compaction, and differential movement due to shrink/swell potential are not significant factors for the purposes of this application per the Geotechnical Investigation Report. The in-situ soils are non-collapsible soil types that are not susceptible to shrink/swell.

10. Riverine Hydraulics and Hydrology

The proposed improvements to the GPSD levee will not adversely impact flood levels or the flow velocities. HEC-RAS models of the Illinois River were prepared and submitted to IDNR for review and approval, along with annotated FIRM and FBFM mapping and flood boundary exhibits. Copies of these

documents are provided as part of the Regulatory Data Documentation, along with copies of notice to adjacent property owners and the City's notification of floodway revision for the Illinois River. We re-coordinated with IDNR in April 2021 and the email below indicated that a resubmittal of hydraulics information was not required for this updated CLOMR submittal. Overview & Concurrence forms signed by Peoria County and Bartonville are also included within this section as communities with map panels adjacent to the proposed change. Documentation from the communities of Creve Coeur and East Peoria (opposite side of the river) are also included.

RE: GPSD Levee Improvements - Coordination

MB

Milner, Bill <Bill.Milner@Illinois.gov>
To Matt Zick

4/7/2021

External Message: This email was sent from someone outside of CMT. Please use caution with links and attachments from unknown senders or receiving unexpected emails.

Good Morning Matt,

I have talked with Paul, and since the ponds are lower (incised), the embankments were considered just levees and the Dam Safety Section did not need to comment.

Based on the information provided to IDNR/OWR, the modifications to the levee system (minor fill) appear to be very minimal and will likely have no impacts to the floodway analysis determined previously. Therefore IDNR/OWR does not need a new submittal of the hydraulic analysis.

Let me know if you have any other questions, or need a formal written letter.

William Milner Jr, P.E., CFM
Section Chief, Downstate Regulatory Program
Illinois Department of Natural Resources
Office of Water Resources
One Natural Resources Way
Springfield, IL 62702-1271
(217) 524-1458
bill.milner@illinois.gov

GREATER PEORIA SANITARY DISTRICT
LEVEE IMPROVEMENT & CERTIFICATION PROJECT

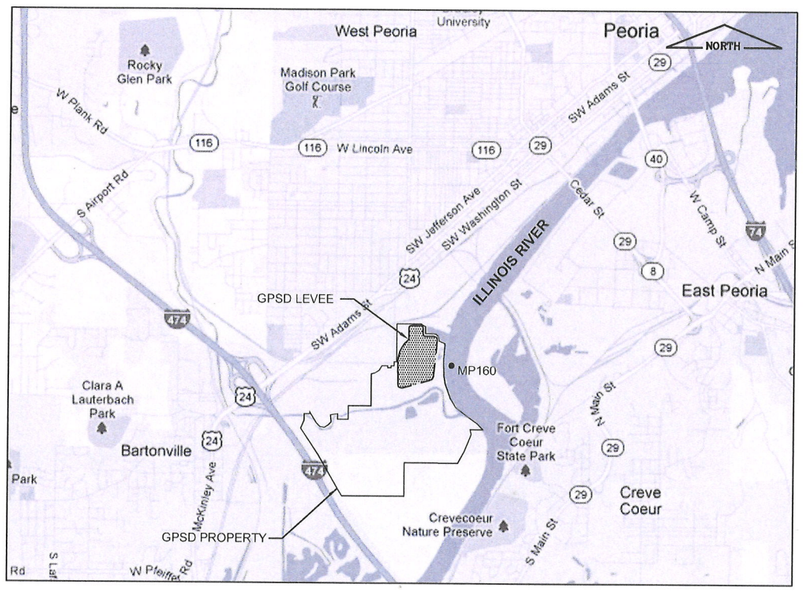
MT-2 APPLICATION & SUPPORT DOCUMENTATION
PRELIMINARY PLAN SHEETS & RECORD DRAWINGS

JUNE 2021
PEORIA, IL

APPENDIX B

INDEX TO SHEETS

PROJECT AREA



SITE LOCATION MAP
NTS

STATE LOCATION MAP

GPSD
2322 S. DARST STREET
PEORIA, IL 61607-2008

RECORD DRAWINGS

TIMOTHY F. LEACH
062-050847
LICENSED PROFESSIONAL ENGINEER
OF
ILLINOIS

6-29-2021
DATE

11/30/2021
RENEWAL DATE

A & B SHEETS

MATTHEW A. ZICK
062-055034
LICENSED PROFESSIONAL ENGINEER
OF
ILLINOIS

MATTHEW A. ZICK

06/29/2021
DATE

11/30/2021
RENEWAL DATE

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PEORIA, IL 61602
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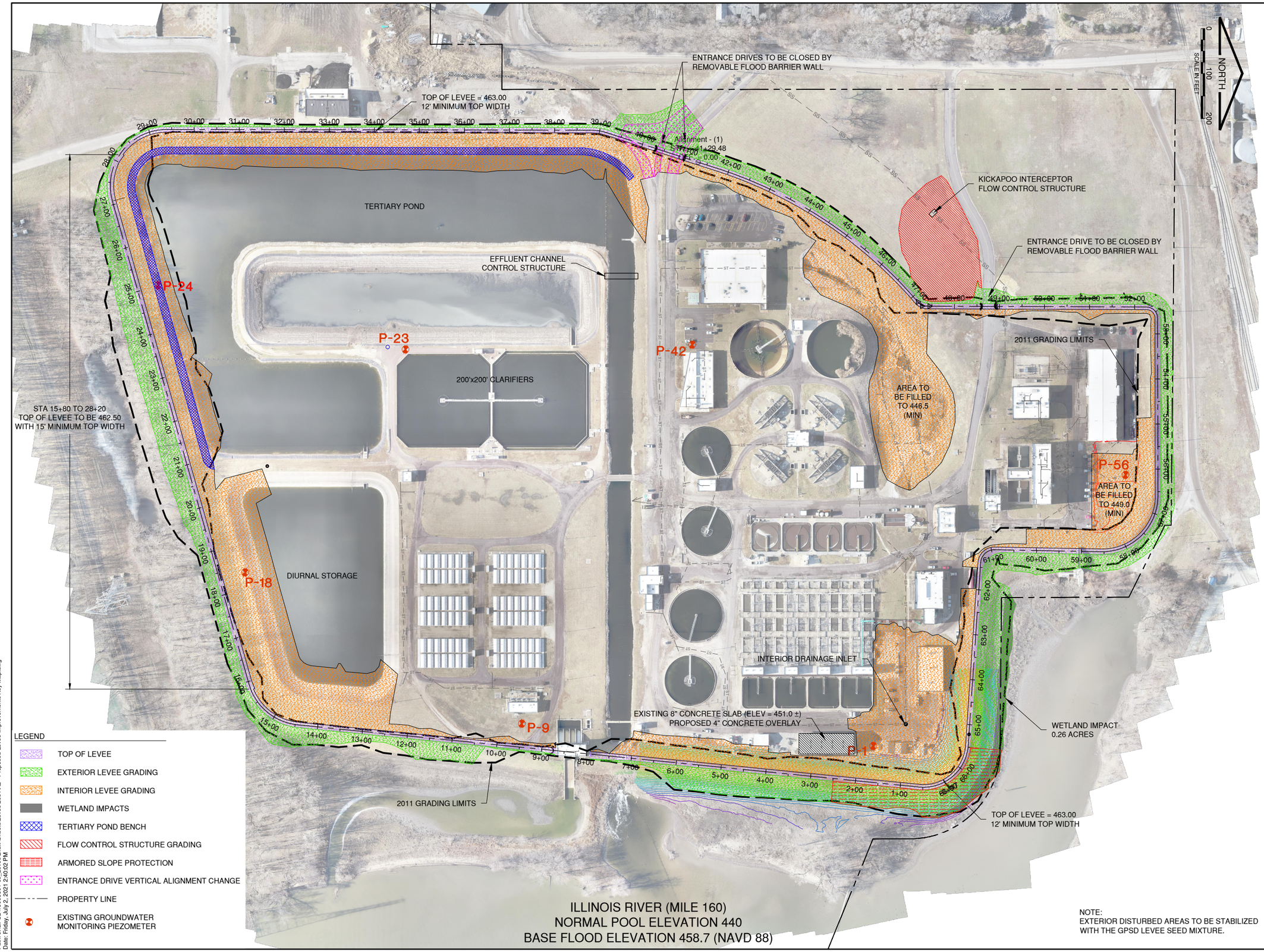
INDIANAPOLIS, IN ▪ COLUMBUS, OH ▪ PEORIA, IL ▪ EDWARDSVILLE, IL



LEGEND

- TOP OF LEVEE
- EXTERIOR LEVEE GRADING
- INTERIOR LEVEE GRADING
- WETLAND IMPACTS
- TERTIARY POND BENCH
- FLOW CONTROL STRUCTURE GRADING
- ARMORED SLOPE PROTECTION
- ENTRANCE DRIVE VERTICAL ALIGNMENT CHANGE
- PROPERTY LINE
- EXISTING GROUNDWATER MONITORING PIEZOMETER

NOTE:
EXTERIOR DISTURBED AREAS TO BE STABILIZED WITH THE GPSD LEVEE SEED MIXTURE.

Path: J:\GPSD\19005801-00_Levee\Draw\Sheets\Levee 2631\A2 - Proposed Levee Improvements Key Map.dwg
Date: Friday, July 2, 2021 2:40:02 PM

CMT
Crawford, Murphy & Tilly

License No. 184-000613

CONSULTANTS

PROPOSED CLOMR IMPROVEMENTS JUNE 2021

GPSD PROJECT 2631

OWNER

GREATER PEORIA SANITARY DISTRICT

PEORIA, ILLINOIS

MARK	DATE	DESCRIPTION

PROJECT NO:	19005801-00
CAD DWG FILE:	A2 - PROPOSED LEVEE IMPROVEMENTS KEY MAP.DWG
DESIGNED BY:	JC
DRAWN BY:	ANB
CHECKED BY:	MAZ
APPROVED BY:	MAZ
COPYRIGHT:	CRAWFORD, MURPHY & TILLY, INC. 2020

SHEET TITLE

PROPOSED LEVEE IMPROVEMENTS KEY MAP

A2

SHEET 3 OF 51