




APPLICATION PREPARED BY:



PAPIO
MISSOURI RIVER
NATURAL RESOURCES DISTRICT

 **HOUSTON**
engineering, inc.

**Water Sustainability Fund Application
West Branch Papillion Creek
Regional Detention Structures 2 and 4
(WP-2 and WP-4)
March 31, 2023**

Enclosed in this document, in its entirety, is an application for the Nebraska Natural Resources Commission's (NRC) Water Sustainability Fund that has been divided into four categories.

The **Cover Letter** introduces the project and states the Applicant's intent.

The **Application** follows the format in the Application Form provided by the NRC answering all questions and requests for information in Sections A, B, and C. The responses and information provided are intended to address the information requested as directly as possible.

The Application references the **Supplemental Information Attachment (SIA)** where supporting documentation and additional information is contained. The SIA provides additional data and references to support the responses offered in the Application. The information in the SIA is provided in the same order and is numbered the same manner as in the Application. Note that not all sections of the Application will have information included in the SIA.

At the end of the SIA is a **Bibliography** for all external reports, design guidance or other material referenced in the Application. This Bibliography provides the reviewer with additional references relevant to the Application. The combined size of these references prohibits the inclusion of the references within the SIA. Digital copies of the references can be obtained by contacting Kent Zimmerman at NDNR (kent.zimmerman@nebraska.gov) or Mike Sotak at FYRA Engineering (msotak@fyraengineering.com). The information provided in the Bibliography is alphabetical, but each entry is cross referenced back to the Application/SIA section to which it pertains and is referenced.

COVER LETTER

APPLICATION


SUPPLEMENTAL
INFORMATION
ATTACHMENT

BIBLIOGRAPHY

COVER LETTER



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March 22, 2023

Mr. Tom Riley

Director, Nebraska Department of Natural Resources

via Electronic Submission

Re: West Branch Papillion Creek Regional Detention Structures WP-2 and WP-4
Application for Water Sustainability Fund Grant

Director Riley and members of Natural Resources Commission:

In accordance with the rules, regulations and guidelines for Nebraska's Water Sustainability Fund Grant Program, please accept this grant application on behalf of the Papio-Missouri River Natural Resources District (Papio NRD) for the above-referenced project. This project is important because it is part of a larger project designed to maximize flood control as a system. The majority of the other watershed components have already been constructed. Our NRD is constructing the few remaining parts of this project, which include the WP-2 and WP-4 Regional Detention Structures.

Through this application, and more so in the supporting materials, the benefits of this dam working within the system is detailed. As is often the case in flood control projects, the value of the system is greater than the sum of the individual components. For that reason, this project is looked at as an individual contributor to a system of multiple dams. The costs and benefits of this system are assessed together, and prorated out to each site by its individual contribution. The commitment of multiple past funding partners on all governmental level provides a great foundation to the commitment of our NRD to complete this watershed project, hopefully including the Water Sustainability Fund and therefore all Nebraskans.

In addition to the application form posted on the NDNR website, which has been copied verbatim into this grant application, there is also an attachment referenced as the Supplemental Information Attachment (SIA) to this application. Contained within the SIA is a bibliography of technical documents related to the project that contain additional information that can be reviewed if desired. In an effort to keep this application as concise as possible, Kent Zimmerman at NDNR will be provided an electronic copy of all of the documents referenced in the bibliography and therefore, copies of said information can be obtained through Mr. Zimmerman. The goal of this application structure was to first provide reviewers with the information required to directly answer the questions in the official application form at a concise level, second to provide additional maps, charts and supporting documents to address the required information in the SIA, and then finally to provide the overall documents that any information provided originates from (assuming it is from another document.) We trust that this allows you to quickly review the information you desire and gather additional data as each individual reviewer sees fit.

“Water Sustainability” is defined in Nebraska Title 264 as *when water use is sustainable when current use promotes healthy watersheds, improves water quality, and protects the ability of future generations to meet their needs.*

Recognizably, sustainability has varied meanings across the State, in Eastern Nebraska, watershed health is related to reducing the threat of flood damage first and foremost. Nearly every watershed plan in this region addresses flood control first. And as argued above, finding any project that would protect the ability of future generations to meet their needs would be difficult, given the protection this project provides to one of Nebraska’s thriving communities and contributor to the State economy.

We thank you for your acceptance of this application and stand ready to provide any clarification on any information provided during your review.

Sincerely,

A handwritten signature in black ink, appearing to read 'John Winkler', with a large loop at the start and a long, sweeping tail that extends to the right.

John Winkler

General Manager, Papio NRD

COVER LETTER

APPLICATION

SUPPLEMENTAL
INFORMATION
ATTACHMENT

BIBLIOGRAPHY

APPLICATION



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NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: West Branch Papillion Creek Regional Detention Structures WP-2 and WP-4

SPONSOR'S PRIMARY CONTACT INFORMATION (Not Consultant's)

Sponsor Business Name: Papio-Missouri River Natural Resources District (P-MRNRD)

Sponsor Contact's Name: John Winkler, General Manager

Sponsor Contact's Address: 8901 S. 154th Street, Omaha, NE 68138

Sponsor Contact's Phone: 402.444.6222

Sponsor Contact's Email: jwinkler@papionrd.org

1. **Funding** amount requested from the Water Sustainability Fund:

Grant amount requested. \$ 4,898,104 (see SIA Table A-1.1 for breakdown)

- If requesting less than 60% cost share, what %? N/A

If a loan is requested amount requested. \$ N/A

- How many years repayment period? N/A
- Supply a complete year-by-year repayment schedule. N/A

2. **Neb. Rev. Stat. § 2-1507 (2)**

Are you applying for a **combined sewer overflow project**? YES NO

If yes:

- Do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality? YES NO
- Attach a copy to your application. Click here to enter text.
- What is the population served by your project? Click here to enter text.
- Provide a demonstration of need. Click here to enter text.
- Do not complete the remainder of the application.

3. **Permits Required/Obtained** Attach a copy of each that has been obtained. For those needed, but not yet obtained (box “NO” checked), 1.) State when you will apply for the permit, 2.) When you anticipate receiving the permit, and 3.) Your estimated cost to obtain the permit.

(N/A = Not applicable/not asking for cost share to obtain)
 (Yes = See attached)
 (No = Might need, don't have & are asking for 60% cost share to obtain)

G&P - T&E consultation (required)	N/A <input type="checkbox"/>	Obtained: YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
DNR Surface Water Right	N/A <input type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
USACE (e.g., 404/other Permit)	N/A <input type="checkbox"/>	Obtained: YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
FEMA (CLOMR)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Local Zoning/Construction	N/A <input type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Cultural Resources Evaluation	N/A <input type="checkbox"/>	Obtained: YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
Other (provide explanation below)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>

WP-2 is currently in final design and WP-4 is in the construction phase. USACE 404 permit and NDEE 401 Water Quality Certification have been obtained for both projects. Coordination required for Threatened and Endangered Species and Cultural Resources was performed by the US Army Corps of Engineers (USACE) as part of the 404 permitting process. The T&E CERT Environmental Review with NGPC and FWS and consultation with NeSHPO for Cultural Resources was completed, and the documentation is provided in the SIA. The NPDES from NDEE, Grading Permit from the Papillion Creek Partnership, Dam Safety plan approval and Permit to Impound Water from NDNR have been obtained for WP4 and are still required for WP-2. The WP-2 applications are planned to be submitted in April-June 2023 and are anticipated to be obtained by

September 2023. The documentation required for these is complete and the costs for submitting the application and any coordination required to obtain the permits is approximately \$8,000. These permits are marked “NO” above and the costs to obtain these permits is included in the remaining budget line items listed as Engineering, Planning and Permitting in the costs table that is being requested for 60% cost share. Permits for both projects are attached in the bibliography (P-MRNRD 2021a, 2022a).

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:

Identify the roles and responsibilities of each Partner / Co-sponsor involved in the proposed project regardless of whether each is an additional funding source.

PCWP: This partnership has been involved from the beginning in identifying this project site as a need to reduce flood control. They have maintained their involvement with monthly meeting updates and monitoring to track the progress of projects in the watershed. Watershed Fees are collected via ordinance from development communities at the time of a building permit that help support the PCWP and ultimately the projects they support.

Nebraska Game and Parks Commission (NGPC): The NGPC regularly attends coordination meetings to provide input and help make decisions regarding the project design, specifically related to the recreational opportunities. The NGPC is a funding source, as it uses its ability to apply for Federal Sport Fish Restoration Program grant funding and contribute obtained funds toward projects. See the SIA for letters of support.

City of Gretna (City): The sites are located within the City’s ETJ that is intended for annexation. The City regularly attends coordination meetings to provide input and help make decisions regarding the design of the site. The City will manage the recreational facilities located at the site upon completion of the project. The City is a funding partner related to long-term maintenance and operation of the site. See the SIA for letters of support.

Sarpy County (County): Both sites are located outside current City boundaries within Sarpy County. The County provides input and helps make decisions regarding the design of the site within the County’s current transportation infrastructure. They currently maintain the roadways around site WP-2 and WP-4 and a large portion of the watershed drainage is currently located outside of the in the County. The County is not a funding partner. See the SIA for letters of support.

5. **Other Sources of Funding**

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

A complete summary of the capital costs detailed out for the project during the economic analysis is provided in the following table. Federal funding was pursued in coordination with state agencies, and cost sharing from local project partners will go towards this project, which is summarized in Table A-1.1 in Section A-1 of the SIA. The City of Gretna's commitment to long-term maintenance is confirmed in their letter of support included in the SIA. NGPC's commitment to applying for the funds for these projects is confirmed in their letter of support. Confirmation of award from the U.S. Fish and Wildlife Services (USFWS) was received for WP-4 on June 1, 2022 and confirmation is anticipated for WP-2 in October 2022. The projects are not reliant on these funds and if they are not received, the P-MRNRD is capable of funding this portion of the project.

NGPC: The NGPC can apply obtained grant funds through the USFWS's SportFish Restoration Fund towards the construction costs of the fisheries portion of the recreational facilities at the sites. The NGPC applied for \$325,000 for WP-2 and \$350,000 for WP-4 in order to support the construction of the eligible fisheries features at the sites.

FEMA: Building Resilient Infrastructure and Communities (BRIC) funds were applied for and granted by FEMA to assist in the construction of WP-4 with an award of \$5,335,650.

City of Gretna: The City will manage the recreational facilities located at the site upon completion of the project. The City is a funding partner related to long-term maintenance and operation of the site.

	Total Costs	Spent to Date	Remaining Costs	USFWS SRF	FEMA BRIC	Remaining Eligible Costs	Grant Request	Local Cost Share
WP-2								
Engineering, Planning and Permitting	\$1,729,700	\$1,050,000	\$679,700			\$679,700	\$407,800	\$271,900
Professional Services (Administrative, Legal, Fiscal)	\$50,000	\$25,000	\$25,000			\$25,000	\$15,000	\$10,000
Land Rights	\$4,406,365	\$4,406,365	\$0			\$0	\$0	\$0
<u>Capital Improvement Costs</u>								
Dam and Spillway								
Fishery Enhancements								
Water Quality Basins/Improvements	\$6,932,850	\$360,510	\$6,572,341	\$325,000		\$6,247,341	\$3,748,404	\$2,498,936
Recreation Facilities								
Stream Mitigation								
WP-4								
Engineering, Planning and Permitting	\$1,499,000	\$1,016,000	\$483,000			\$483,000	\$289,800	\$193,200
Professional Services (Administrative, Legal, Fiscal)	\$50,000	\$50,000	\$0			\$0	\$0	\$0
Land Rights	\$4,339,378	\$4,339,378	\$0			\$0	\$0	\$0
<u>Capital Improvement Costs</u>								
Dam and Spillway								
Fishery Enhancements								
Water Quality Basins/Improvements	\$10,997,156	\$4,583,000	\$6,414,156	\$350,000	\$5,335,650	\$728,506	\$437,100	\$291,406
Recreation Facilities								
Sanitary Sewer Relocation Mitigation								
Stream Mitigation								
Totals	\$30,004,449	\$15,830,253	\$14,174,196	\$675,000	\$5,335,650	\$8,163,546	\$4,898,104	\$3,265,442

6. Overview

In 1,000 words or less, provide a brief description of your project including the nature/purpose of the project and its objectives. Do not exceed one page!

The P-MRNRD is proposing construction of two regional detention basins within the West Papillion Creek watershed that was identified in the PCWM Plan (HDR 2009). The report identified the best remaining options available for providing flood control and lake and stream water quality benefits within the 402 square-mile watershed. The plan was developed to address a long history of flooding within the watershed, which extends from the upper reaches in Washington County, across Douglas County, and ending in Sarpy County at the confluence with the Missouri River. The plan includes 14 storm water detention basins and associated water quality basins, as well as a prioritization based on flood risk reduction.

The WP-2&4 structures will provide regional detention in the West Papillion Creek sub-watershed, located in Douglas and Sarpy Counties, NE on the tributaries shown on the location map in Section B-1(a) of the SIA. This is one of the most rapidly developing watersheds in the metropolitan area and the sites were selected to maximize flood control, given what open ground remains in the area in a rapidly developing watershed area. The sites are at the top of the list of the NRD's current prioritization list due to impending development and funding received from NRCS.

The primary purpose of the proposed dam structures is flood control, and several ecologic and recreation benefits are realized with the implementation of the reservoirs. The earthen dams will have a principal spillway outlet pipe that controls

the permanent pool elevation in the reservoir. The auxiliary spillway is set at the modeled 500-yr storm elevation, which will provide flood storage and reduced discharge for all events up to the 500-yr storm. The 14 sites in the PCWM Plan (HDR 2009) combined will control 5,055 acres of drainage area and provide 2,386 acre-ft of flood storage. A breakdown of the data for WP-2&4 projects included in this application is provided in Table 1 below.

Table 1. Site Data

Dam Site	Drainage acres	Permanent Pool (acre)	Flood Storage (AF)
WP-2	679	21	530
WP-4	563	16	263
Total	1,242	37	792.7

According to the Papillion Creek HMS model created for FEMA floodplain remapping, the sites collectively reduce the 100-yr peak flood discharge on the West Papillion Creek by 9-13%, which reduces the elevation raise required to meet FEMA requirements on average by 0.6 ft.

The ecological benefits include large improvements to water quality. Not only is there a planned water quality basin upstream of the site to protect the reservoir, but the reservoir also protects and improves the water quality discharged downstream into the West Papillion Creek. The water quality basin will trap sediment and prevent accumulation in the main reservoir. Of the sediment that reaches the reservoir, the majority will settle in the large reservoir and will not be transported downstream. This plays a large role in the reduction of *E.coli* transported to the West Papillion Creek, since *E.coli* is attached to sediment particles. The reservoir and water quality basin will also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. The increase in water surface area provided by the project also provides more ultraviolet light exposure that kills bacteria. Collectively the project should provide substantial reductions in *E.coli*, for which the West Papillion Creek is currently listed as impaired, and will be highly beneficial in helping meet the goals listed in the TMDL Report (NDEQ 2009). Additionally, nutrient load reductions will be achieved through settling from increased detention time, as well as biological update from the increased wetland area created by this project.

Aquatic and wildlife habitat improvements will all be experienced as part of this project. The WP-4 stream assessment found that the stream channel reaches in the project area are degraded, are becoming deeply incised and are disconnected from the floodplain. They have heavily eroded streambanks and appear to be frequently disturbed. Future conditions provided by the dams will create grade stability and prevent continued erosion. The reservoir creates both deep and shallow water habitats providing diversity to the habitat found in an urban setting.

Open green space in a highly urban setting has numerous benefits. Ecosystems benefits from the park areas surrounding the reservoirs have filtration benefits for water quality and provide wildlife habitat in the tall grasses. Open space has a social and mental health benefits, as well as opportunities for physical activities through the recreational features. Recreation opportunities are increased with the activities associated with the reservoir, as well as park features that are included in the recreation plan. The open water provides fishing, non-wake boating and canoeing/kayaking opportunities. Trails and angler access features, as well as boat ramps and picnic facilities create unique recreational opportunities in the urban area.

7. **Project Tasks and Timeline**

Identify what activities will be conducted to complete the project, and the anticipated completion date.

For multiyear projects please list (using the following example):

<u>Tasks</u>	<u>Year 1\$</u>	<u>Year 2\$</u>	<u>Year 3\$</u>	<u>Remaining</u>	<u>Total \$ Amt.</u>
Permits	\$18,000				\$18,000
Engineering		\$96,000			\$96,000
Construction		\$87,000	\$96,000		\$183,000
Close-out				\$8,000	\$8,000
				TOTAL	\$305,000

- What activities (Tasks) are to be completed.
- An estimate of each Tasks expenditures/cost per year.
- Activities in years 4 through project completion under a single column.

The tasks have been broken down into the following:

Engineering, Planning, Permitting: Includes all the data collection, testing, modeling/analysis, design, engineering, coordination and permitting of the dam and all associated features. The site has roadway design/considerations, recreational facilities and a water quality basin included as part of the project. Also

Professional Services: included is administrative and legal services required to facilitate land purchase and handle project coordination.

Land Rights: Includes the costs obtaining the property required for the project.

Capital Improvement Costs: Includes construction of the dam and all associated features.

Below is the timeline associated with these tasks. The years provided in this table correlate with the years in the cash flow stream located in Table 6 in Section 3.

Pre-2023 expenditures have been lumped into one column for Years 0-5 and all capital costs will be spent by Year 8, therefore no remaining cost column was required to reflect to total cost amount.

Table 2. Anticipated Tasks and Schedule

Tasks	Year 0-5\$ (pre-2023)	Year 6\$ (2023)	Year 7\$ (2024)	Year 8\$ (2025)	Total \$ Amt.
Engineering, Planning, Permitting	\$1,688,567	\$799,033	\$563,067	\$178,033	\$3,228,700
Professional Services	\$75,000	\$25,000	\$0	\$0	\$100,000
Land Rights	\$7,865,743	\$880,000	\$0	\$0	\$8,745,743
Capital Improvement Costs	\$360,510	\$9,890,952	\$6,035,459	\$1,643,085	\$17,930,006
Totals	\$9,989,820	\$11,594,985	\$6,598,526	\$1,821,118	\$30,004,449

8. **IMP**

Do you have an **Integrated Management Plan** in place, or have you initiated one? YES NO Sponsor is not an NRD

Section B.

DNR DIRECTOR'S FINDINGS

Prove Engineering & Technical Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 004)

1. Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?
YES NO

If you answered "YES" you must answer all questions in section 1.A.
If you answer "NO" you must answer all questions in section 1.B.

If "YES", it is considered mostly structural, so answer the following:

- 1.A.1 Insert a feasibility report to comply with Title 261, Chapter 2, including engineering and technical data;

This project will include the structural components (dams) at sites WP-2 & 4. A preliminary design of this site was completed for the P-MRNRD in May 2018. The plans, preliminary design reports and accompanying geotechnical report are included as attachments in the SIA (FYRA 2018a,b, 2022 and JEO 2018).

- 1.A.2 Describe the plan of development (004.01 A);

Sites WP-2 & 4 were identified in the PCWP's Plan to provide regional detention of storm water during flood events and water quality improvements in the watershed. The Plan was developed to address a long history of flooding within the watershed, which extends from the upper reaches in Washington County, across Douglas County, and ending in Sarpy County at the confluence with the Missouri River. The Plan includes 14 storm water detention basins and associated water quality basins, as well as an implementation prioritization based on flood risk reduction and pressure of impending development.

The West Papillion Creek Watershed, where sites WP-2 & 4 are located, is the most rapidly developing watershed in the metropolitan area and in Nebraska, and these sites were selected at the time the Plan was developed to maximize flood control, given what open ground remains in the area. These two sites were at the top of the list of a re-prioritization study recently conducted by the P-MRNRD. WP-2 & 4 lie within the extraterritorial jurisdiction (ETJ) of the City of Gretna.

- 1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B);

On-site investigations at WP-2 & 4 were conducted by the owner and design engineers to collect visual observations and gain an understanding of the proposed

dam locations. Coordination with NDNR Dam Safety personnel was performed as needed to discuss all safety-related aspects of the dam design, including auxiliary spillway design related to the existing and proposed adjacent roadways, and project hydrology. Site surveys were performed to collect locations of any visible utility markers, drainage structures, and topographical data. Legal boundary surveys were performed to develop land purchase documents.

A wetland delineation was completed in July and August 2017 to identify the location of jurisdictional water bodies located on the project sites. This information will be used to determine project impacts and develop design alternatives and/or modifications to reduce potential impacts. Stream assessments were also completed for each site to document current and future channel conditions potentially impacted by the project. The findings from the assessments are documented in the following reports:

- *Wetland Delineation Report – WP-2 Detention Basin, Sarpy County, NE* (FYRA 2018c)
- *Wetland Delineation Report – WP-4 Detention Basin, Sarpy County, NE* (JEO 2017)
- *Stream Assessment for WP-2 Detention Basin, Sarpy County, NE* (FYRA 2018d)
- *Stream Assessment for WP-4 Detention Basin, Sarpy County, NE* (JEO 2018b)

Sub-surface geotechnical investigations are required for design and analysis of WP-2 & 4. Soil borings and Cone Penetrometer Tests (CPTs) were taken for the dam and borrow areas in 2017. After tree clearing in 2021, access to WP-2 auxiliary spillway was feasible and additional boring were obtained. Soil samples were obtained at selected intervals and the necessary laboratory test were performed for the geotechnical analysis and design of the dam embankments. The soil boring locations are included in the SIA in Figures B-1(a).1 and B-1(a).2.

1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C);

A location map has been inserted into the SIA as Figure B-1(a).4.1. There are numerous maps, charts, tables, etc. that help to define the project, show design intent and label site features. They are included throughout this application, in the SIA, and within the documents listed in the Bibliography.

1.A.5 Describe any necessary water and/or land rights including pertinent water supply and water quality information (004.01 D);

As per State statute, a Permit to Impound Water application has been submitted for WP-4 and will be submitted to NDNR upon completion of the final design of the WP-2 site. Said water right is to permanently store water in the dam's reservoir. Water rights in the Papillion Creek Watershed are typically uncontended and very few senior water rights exist downstream of the proposed dams.

Land Rights will be required for the construction, operation and maintenance of these sites. The P-MRNRD intends to obtain the land rights fee-title and does not anticipate any resistance, as the sites have been identified in the master planning efforts by the City and are included in the development plan. The local planning jurisdiction (City of Gretna) supports the implementation of these sites.

1.A.6 Discuss each component of the final plan (004.01 E);

- Flood Control – The reservoirs will attenuate flood flows through 48” diameter principal spillway pipes. WP-2 will create a 17.4-acre permanent pool with a volume of 84.8 AF, and a storage volume 295.5 AF. WP-4 will create a 16.0-acre permanent pool with a volume of 66.2 AF, and a storage volume 263.0 AF.
- Water Quality Basin – Both projects include water quality basins. Their primary function is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This will prevent reduction of the water volume in the reservoir and reduce dissolved pollutant loads in the pool through biological uptake of wetland vegetation. A water quality basin also provides additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria
- Public Access Area – Both projects include a public access area. This includes a parking lot, a picnic shelter, boat and shore launch areas, latrines, and open park space for sledding and exploration.
- Fishery Enhancements – The WP-2 and WP-4 reservoirs will include aquatic habitat enhancements as coordinated with the NGPC Fisheries Division Staff.
- Trail – WP-2 includes a 1-mile long concrete surface trail circumnavigating the reservoir. WP-4 includes a 1.8-mile long concrete surface trail circumnavigating the reservoir. Neither project will include future connections to Gretna’s trails and sidewalks.
- Sanitary Sewer – An existing sanitary sewer lift station and associated gravity sewers and force mains will be abandoned and relocated as part of this project. Additionally, a sanitary sewer stub will be installed through the west water quality basin to connect future development into the Lakeview Subdivision’s infrastructure.
- Stream Mitigation – Mitigation is a requirement to receive the necessary permits for this project. Downstream of the WP-2 dam embankment 1,950 ft of stream will be regraded for stable bank slopes and in stream structure will be constructed for stream stability and habitat.

1.A.7 When applicable include the geologic investigation required for the project (004.01 E 1);

Data collected in the sub-surface investigation described above will be analyzed and used to perform a complete geotechnical analysis required for the dam design.

A series of models were developed to assess settlement/stability and determine the specific embankment/foundation design requirements, design the downstream seepage berm, identify viable borrow site locations, and to develop a construction instrumentation and monitoring plan. This completed analysis is included in the geotechnical report included in the SIA (FYRA 2022, JEO 2018).

1.A.8 When applicable include the hydrologic data investigation required for the project (004.01 E 2);

A hydrologic analysis of the contributing area to sites WP-2 and WP-4 was completed during the preliminary design TM (FYRA 2018b and JEO 2018a). Table 1 below summarizes the design storms that were modeled for WP-2 and are used to hydraulically size the sites in accordance with NDNR dam design criteria. Table 2 below summarizes the design storms modeled for WP-4.

Table 2. WP-2 Design Storm Information

Design Storm	Duration	Frequency	Rainfall (in)
(PSH)	12 hours	1.0% (100-year)	6.52
(PSH)	24 hours	1.0% (100-year)	7.07
(PSH)	12 hours	0.2% (500-year)	8.99
(PSH)	24 hours	0.2% (500-year)	9.82
(SDH)	24 hours	$P_{100} + 0.26(PMP - P_{100})$	11.4
(FBH)	6 hours	PMP	20.32
(FBH)	12 hours	PMP	22.29
(FBH)	24 hours	PMP	23.79

Table 3. WP-4 Design Storm Information

Design Storm	Duration	Frequency	Rainfall (in)
(PSH)	12-hr Local Storm	100 YR	6.63
(PSH)		500 YR	8.93
(FBH)		PMP/FBH Peak	22.5
(PSH)	24-hr Hybrid Storm	100 YR Peak	7.06
(PSH)		500 YR Peak	9.45
(FBH)		PMP/FBH Peak	24.0
(FBH)	5-PT 24-hr	PMP/FBH Peak	24.0
(SDH)	6-hr NRCS	SDH Peak	9.8
(FBH)	6-hr NRCS	FBH Peak	20.5

Future land use was applied to the hydrologic models (assumed fully developed conditions) in order to produce the most conservative results.

- 1.A.9 When applicable include the criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3).

Its

As reported in the Technical Memorandum (TM) prepared during preliminary design (FYRA 2018b and JEO 2018a), different precipitation models were used for the design storms. For the hydraulic analysis during preliminary design, the most conservative result from the different precipitation models was applied to set the auxiliary spillway and top of dam elevations. The dam design will adhere, as a minimum, to the requirements in the NRCS TR-60 Earth Dam and Reservoirs guidance.

The permanent pool elevations were selected as a function of a reservoir sustainability analysis and are described in detail in the Preliminary Design Study. Sites WP-2 & 4 have relatively small pool area/storage capacities (compared to other Papillion Creek sites), and a significant emphasis was placed to select a pool elevation that would not compromise the water quality and sustainability of the reservoir.

Water quality basins are proposed on the upstream end of the reservoirs to capture and store nutrients and sediments delivered to the sites. Efforts were made to size the basins to trap the anticipated heavy sediment load transported during the development of the watersheds.

If “NO”, it is considered mostly non-structural, so answer the following:

- 1.B.1 Insert data necessary to establish technical feasibility (004.02); Click here to enter text.

- 1.B.2 Discuss the plan of development (004.02 A); [Click here to enter text.](#)
- 1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B); [Click here to enter text.](#)
- 1.B.4 Describe any necessary water and/or land rights (004.02 C); [Click here to enter text.](#)
- 1.B.5 Discuss the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D). [Click here to enter text.](#)

Prove Economic Feasibility

[\(Applicant must demonstrate compliance with Title 261, CH 2 - 005\)](#)

- 2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

Flood reduction in the Papillion Creek watershed has been studied extensively through efforts undertaken by the PCWP. The *PCWM Plan* (HDR 2009) developed an integrated approach to address peak flow reduction using a combination of Low Impact Development (LID) and regional detention structures in the watershed. Even with incorporating LID techniques in the watershed, it was concluded that the regional detention structures are still required to reduce flood flows and prevent associated damage. Multiple structure locations and combinations were analyzed for their flood reduction and water quality potential, yielding these three sites as the most favorable in this watershed.

This project will provide flood control benefits specifically on the West Branch of the Papillion Creek and its tributaries. As a result of watershed development currently, segments of the downstream levee system no longer contain the 100-yr flood and required freeboard in accordance with FEMA criteria. The P-MRNRD performed two studies, the *West Papillion Creek Levee Restoration – Summary of Previous Analyses* (HDR 2006) and the *West Papillion Creek Levee Restoration Evaluation* (HDR 2008), to assess flood control measures to restore the required levee freeboard. Like the PCWM Plan, these studies also studied various alternatives to reduce flooding in the watershed and the net result of both plans is that these sites are vital to providing flood control in the overall watershed and this sub-watershed. Site locations within the watershed were not studied. These sites represent the maximum drainage area that can be controlled in the watershed, given the current development and infrastructure in the area. A detailed description of the alternatives studies are in the studies referenced in the SIA Bibliography.

3. Document all sources and report all **costs** and **benefit data** using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies is the project life, up to fifty (50) years; or, with prior approval of the Director up to one hundred (100) years, (Title 261, CH 2 – 005).

See questions below for numerous tables detailing project costs and benefits, data, sources, and methodologies. Additional details and supporting documentation are included in section B-3 of the SIA, and within the documents listed in the Bibliography.

- 3.A Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).

Costs

A summary of all initial capital costs related to the project area presented in the tables below, and a more detailed breakdown of the land purchase and construction costs are provided in the SIA. They include all of the items listed above. Detailed cost estimates are included in the SIA.

Table 4. Capital Cost Summary

Summary of Costs	WP-2	WP-4	Total
Engineering, Planning and Permitting	\$1,729,700	\$1,499,000	\$3,228,700
Professional Services (Administrative, Legal, Fiscal)	\$50,000	\$50,000	\$100,000
Land Purchase	\$4,406,365	\$4,339,378	\$8,745,743
Construction	\$6,932,850	\$10,997,156	\$17,930,006
Total	\$13,118,915	\$16,885,534	\$30,004,449

- 3.B Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe intangible or secondary benefits (if any) separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, in a way that justifies economic feasibility of the project such that the finding can be approved by the Director and the Commission (005.02).

Benefits

The costs are weighed against the primary tangible benefits as described in the *Title 264 – Rules Governing the Administration of the Water Sustainability Fund* (NDNR 2015a). For this project, those benefits include flood reduction benefits, recreation benefits, and land improvement values. A detailed discussion of the quantified benefits and the computation tables are located in SIA Tables B-3.4 through B-3.7 with supporting Figure B-3.2. Additional justification for flood damage reduction values is contained in the WP 6&7 2016 WSF Application (FYRA 2016) included in the bibliography as the methodology for the valuation of the benefits is contained within that document. Flood damage reduction benefits for Sites WP-2&4 were indexed from that information as shown below with WP-2&4 possessing just short of 75% of the drainage acres controlled as Sites WP-6&7 together. The calculated benefits were then indexed from 2016 to 2022 values.

Benefit:Cost

The benefit:cost ratio computed from the total annual costs and benefits reported above for the project is 1.77:1 for the 50-year project life. **Under direction from the NDNR staff, an internal rate of return (IRR), also known as a “discount rate” to calculate present day values for all future benefits was not required.**

Table 5. Benefit to Cost Calculation Table

Benefit:Cost Analysis							
Benefit Category	Calculated Benefit	# of Occurrences Over Lifetime	Lifetime Benefits	Cost Category	Calculated Costs	# of Occurrences Over Lifetime	Total Costs
Land Value Improvements				Engineering, Planning, Permitting	\$3,228,700	1	\$3,228,700
WP-2	\$1,586,400	1	\$1,586,400	Professional Services	\$100,000	1	\$100,000
WP-4	\$3,428,144	1	\$3,428,144				
Flood Damage Reduction				Land Rights	\$8,745,743	1	\$8,745,743
WP-2	\$91,416	41	\$3,748,076	Capital Improvement Costs	\$17,930,006	1	\$17,930,006
WP-4	\$75,799	42	\$3,183,556				
Environmental Benefits				OMR&R			
WP-2	\$492,526	41	\$20,193,563	WP-2	\$51,997	41	\$2,131,877
WP-4	\$374,782	42	\$15,740,852	WP-4	\$57,961	42	\$2,434,362
Recreation							
WP-2	\$77,633	41	\$3,182,966				
WP-4	\$94,179	42	\$3,955,507				
Total Benefits:			\$55,019,064	Total Costs:			\$34,570,688

Benefit:Cost Ratio = 1.59:1

The period of analysis shown for this project is 50 years. Three primary factors were considered regarding project life of the project and therefore, its ability to provide project benefits:

1. The reservoir volume was designed to trap incoming sediments as efficiently as possible. This means maximizing the pool volume, given the land rights available at the site. The watersheds are urban or transitioning from agricultural to urban, which have relatively low sediment loading rates comparable to agricultural lands. Sustainability ratios of 2.5% were used to select the permanent pool. This would indicate that the area of the planned reservoir was no less than 2.5% of the area of the contributing watershed. This corresponds to a 40:1 watershed to lake ratio, which is a rule used in planning for sizing reservoirs to have good water quality and sustainable lifetimes. Additionally, water quality basins are designed upstream of the sites to provide 50-yr of sediment storage capacity to protect the reservoirs from sedimentation. The reservoirs are anticipated to last in excess of 200 years, given the urban setting and low sediment loading anticipated for the sites.
2. The materials used in the dam design are of the highest quality. The principal spillway is a lined steel cylinder concrete pressure pipe. All other non-native materials are reinforced concrete designed to convey a probable maximum flood (PMF), and therefore have extremely conservative design requirements. Dams designed 100 years ago that were not designed anywhere near this level of conservatism are still around today and functioning as intended.
3. NDNR Dam Safety Requirements require that dams be designed to high hazard potential criteria within metropolitan areas. This requires that the dam safely passes a PMF event and that all engineering design of the embankment uses factors of safety in the design that are highly conservative. Very few engineered projects anywhere use such a conservative design. This, and the closely monitored maintenance inspections conducted through the life of the project required by State law, contributes to the above factors in ensuring that this project will function as intended into the future for years to come.

Collectively, the three justifications explained above detail why, if any project would last for 50 years, these projects are built to last like very few others would.

In addition to these tangible benefits, there are multiple intangible ways in which the project enhances water and environmental sustainability. These intangible benefits cannot be expressed in monetary terms, but collectively help promote healthy watersheds and protect the ability of future generations to meet their needs. Many intangible benefits are directly related to our quality of life as a society. Although difficult or impossible to measure, they are fundamental to human well-being, making them invaluable in many regards. Creating opportunities to interact with the natural world in sustainable ways near population bases elevates the quality of life of the region. This project will result in the establishment and protection of much needed natural areas for future generations and will create opportunities for natural world discovery, wildlife viewing, hiking, enjoyment of scenic beauty, picnicking, family unit enhancement, environmental education and environmental appreciation. In addition, these intangible benefits include our responsibility to create and preserve valuable habitat to ensure the enjoyment of wildlife and the natural world for generations to come.

3.C Present all cost and benefit data in a table to indicate the annual cash flow for the life of the project (005.03).

The costs and benefits have been assessed over a 50-year lifetime as shown in the cash flow stream below.

Table 6. Cash Flow Stream

Project Year(s)	Calendar Year(s)	Cash Flow Categories	Costs	Benefits	Details	
0	2017	Engineering, Planning, Permitting	\$380,126		WP-2,4 Preliminary Design	
		Professional Services				
		Land Rights				
		Capital Improvement Costs				
		Total Costs:	\$380,126			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		
1	2018	Engineering, Planning, Permitting	\$429,771		WP-2,4 Preliminary Design	
		Professional Services				
		Land Rights	\$1,650,998			WP-2 Outlots G and M, WP-4 Lot 9
		Capital Improvement Costs				
		Total Costs:	\$2,080,769			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		
2	2019	Engineering, Planning, Permitting	\$13,474		WP-2,4 Preliminary Design	
		Professional Services				
		Land Rights				
		Capital Improvement Costs				
		Total Costs:	\$13,474			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		
3	2020	Engineering, Planning, Permitting	\$148,492		WP-2,4 Final Design	
		Professional Services				
		Land Rights	\$629,911			WP-2 Lot 10
		Capital Improvement Costs				
		Total Costs:	\$778,402			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		
4	2021	Engineering, Planning, Permitting	\$483,933		WP-2,4 Final Design, WP-2 Water Quality Basin Construction Services	
		Professional Services	\$25,000			Land Rights Assistance and Legal Services
		Land Rights	\$2,255,456			
		Capital Improvement Costs	\$360,510			WP-2 Outlot K and Lots 6A & 6B & 7 WP2 Water Quality Basin Construction
		Total Costs:	\$3,124,899			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		

5	2022	Engineering, Planning, Permitting	\$232,771		WP-2 Final Design, WP-4 Final Design
		Professional Services	\$50,000		Land Rights Assistance and Legal Services
		Land Rights	\$3,329,378		WP-2, WP-4 Remaining Land
		Capital Improvement Costs	\$0		
		OMR&R			
		Total Costs:	\$3,612,149		
		Flood Damage Reduction Benefits			
		Recreation Benefits			
		Total Benefits:		\$0	
6	2023	Engineering, Planning, Permitting	\$799,033		WP-2,4 Construction Services
		Professional Services	\$25,000		Land Rights Assistance and Legal Services
		Land Rights	\$880,000		WP-2 (One Remaining Parcel to be Purchased)
		Capital Improvement Costs	\$9,890,952		WP-4 (March), WP-2 (October) Construction Begins
		OMR&R			
		Total Costs:	\$11,594,985		
		Flood Damage Reduction Benefits			
		Recreation Benefits			
		Total Benefits:		\$0	
7	2024	Engineering, Planning, Permitting	\$563,067		WP-2,4 Construction Services
		Professional Services			
		Land Rights			
		Capital Improvement Costs	\$6,035,459		WP-2,4 Construction
		OMR&R			
		Total Costs:	\$6,598,526		
		Flood Damage Reduction Benefits			
		Recreation Benefits			
		Total Benefits:		\$0	
8	2025	Engineering, Planning, Permitting	\$178,033		WP-2 Construction Services
		Professional Services			
		Land Rights			
		Capital Improvement Costs	\$1,643,085		WP-2 Construction
		OMR&R			
		Total Costs:	\$1,821,118		
		Land Value Benefits		\$3,428,144	WP-4
		Flood Damage Reduction Benefits		\$75,799	
		Environmental Benefits		\$374,782	
		Recreation Benefits		\$94,179	
		Total Benefits:		\$3,972,904	
9-49	2026-2066	OMR&R	\$4,566,239		WP-2,4 @ 0.75%
		Total Costs:	\$4,566,239		
		Land Value Benefits		\$1,586,400	WP-2
		Flood Damage Reduction Benefits		\$6,855,833	WP-2, 4
		Environmental Benefits		\$35,559,633	WP-2, 4
		Recreation Benefits		\$7,044,294	WP-2 Benefits begin, WP-4 Benefits begin
		Total Benefits:		\$51,046,160	

*Funding assistance was not requested for money spent prior to the grant approval estimated August 2023

- 3.D In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, demonstrate the economic feasibility of such proposal by such method as the Director and the Commission deem appropriate (005.04). (For example, show costs of and describe the next best alternative.)

Not applicable. Primary tangible benefits have been calculated and presented above.

Prove Financial Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 – 006)

4. Provide evidence that sufficient funds are available to complete the proposal.

The P-MRNRD has planned for and budgeted the cost of the design and majority of the land rights acquisition for these sites in their current (FY22) budget, as report in their *P-MRNRD FY 2022 Tax Levy and Adoption Budget Memorandum* (P-MRNRD 2021b). They have a proven record of planning their budgets on an annual basis to account for the costs required for their upcoming projects. In 2019 the P-MRNRD's bonding authority was extended solely for the implementation of the remainder of the *PCWM Plan* (HDR 2009). These bonds may be used as needed to pay costs of design and construction for the planned flood control and water quality structures planned throughout the district.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

The P-MRNRD includes maintenance costs in their annual budget every year for the maintenance of the dams that they operate. The budgeted amount is reviewed in detail every year by assessing annual maintenance costs and any special project needs. A budget statement from the NRD on funds available for this project is provided in the SIA (PMRNRD 2021b). For fiscal year 2022 and beyond, the operating budget levy will be adjusted to increase funding available.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.

N/A

7. Describe how the plan of development minimizes impacts on the natural environment (i.e. timing vs nesting/migration, etc.).

Numerous design alternatives were screened in the *PCWM Plan* (HDR 2009) but were refined in the Section 404 permitting process to avoid and minimize environmental impacts. The permitting process is underway and on-going and the impacts are considered relatively small. Stream assessments of waterways within the project area were also conducted according to the methodologies and procedures outlined in the U.S. Army Corps of Engineers Nebraska Stream Condition Assessment Procedure (NeSCAP). The procedure involved the review of available published resources combined with field assessments to evaluate the physical and biological attributes of a stream reach. The studies found that stream channel reaches degrade moving downstream as they become deeply incised, disconnected from the floodplain, heavily eroded streambanks and appear to be frequently disturbed (FYRA 2018d, JEO 2018b).

The same assessment methodology was applied to future (post project) conditions to determine stream health and function impacts related to the project. This analysis found that the project will increase stream function within the project area. Specifically, there will be an overall increase in habitat stability, improvements to riparian buffer communities and decreases in erosion will increase aquatic functions. The reservoirs will create both deep and shallow open water habitat, inundated wetlands, and emergent wetland/mesic tallgrass prairie transition zones. Tree and shrub dominated areas may also develop with the buffer zone by natural colonization or promoted with plantings in designated areas.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

The P-MRNRD is a regional government agency that focuses on protecting ground and surface water, reducing flood threats, slowing the effect of soil erosion, creating and enhancing wildlife habitat and more. These flood control sites directly align with the types of projects they have a history of successful implementation, operation and maintenance. Land Rights will be acquired so that the project will not take place on private property, and all permits will be acquired to ensure all legal facets of the project have been covered.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

In the NDNR's *Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process* (hereafter referred to as the *Annual Report*) (NDNR 2020), the Statewide activities describe Water Sustainability Fund goals. This project fits multiple goals stated in the document:

d.) Contribute to multiple water supply management goals including flood control, reducing threats to property damage, agricultural uses, municipal and industrial uses, recreational benefits, wildlife habitat, conservation and preservation of water resources

The benefits of this project and how it achieves these goals are described in detail below:

Flood Control

The primary purpose of these dam sites is flood control and water quality improvements as identified in the *PCWM Plan* (HDR 2009). The reservoirs will attenuate flood flows through a 48" diameter principal spillway pipe, storing flood flows in the reservoir. They are designed to maximize flood reduction benefits in a rapidly developing watershed. The dams will provide significant flood reduction within the sub-watershed and contribute to a reduction in the West Branch Papillion Creek, which currently inundates portions of the City of Papillion and Bellevue from the 100-yr flood event. Without the reservoirs identified in the *PCWM Plan* (HDR

2009), costly levee modifications and bridge raises would be required to bring the West Branch levees into FEMA compliance.

Recreation

The proposed project components provide numerous recreational, wildlife habitat, water resource conservation and preservation benefits (FYRA 2018a, JEO 2018a). Reservoirs create multiple recreational opportunities near Nebraska's largest population base including fishing, boating, canoeing, wildlife viewing, hiking and picnicking. While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-2 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-2 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-2:

- Paved access to stabilized shoreline landing/launch area
- Aggregate shore launch pad
- One day use picnic shelter with associated table and grill provisions.
- Waterless toilet facility with single male and female stalls.
- 1 mile concrete multi-use trail – single loop circumnavigating reservoir.
- Concrete parking area.
- Open park space for sledding and exploration

While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-4 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-4 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-4:

- Paved access to stabilized shoreline landing/launch area.
- One universally accessible floating kayak and canoe launch.
- One day use picnic shelter with associated table and grill provisions – fully accessible.
- Waterless accessible toilet facility with single male and female stalls.
- 1.8 mile concrete multi-use trail – single loop circumnavigating reservoir.
- 5 stabilized shore fishing extensions into the lake (5 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Paved parking lot with 5 boat trailer parking stalls.
- Open park space for sledding and exploration

Water Quality

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

Wildlife Habitat

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

10. Are land rights necessary to complete your project? YES NO

If yes:

10.A Provide a complete listing of all lands involved in the project.

Site WP-2 will encompass an estimated 87.5 acres and Site WP-4 will encompass an estimated 80.31 acres. See Section B-3 of the SIA for maps associated with tables below. The P-MRNRD currently owns all this ground save for Parcel #010465111 in the WP-2 project site. All landowners are aware of the projects and at this time, and the remaining parcel will be purchased in Spring of 2023.

Table 7. WP-2 Land Rights

Tract Number	Parcel ID	Total Project Area (AC)
1	10973656	7.7
2	10465316	7.0
3	10465022	36.8
4	11602666	5.2
5	11602660	14.8
6	10465111	16.0
Total Project Area		87.5

Table 8. WP-4 Land Rights

Tract Number	Parcel	Total Project Area
1	11114622	58.24
2	10394664	
3	10411003	1.80
4	11588188	20.27
Total Project Area		80.31

- 10.B Attach proof of ownership for each easements, rights-of-way and fee title currently held.

The NRD has purchased all but one of the properties. Copies of these purchase agreements are included in the bibliography (P-MRNRD 2022b,c).

- 10.C Provide assurance that you can hold or can acquire title to all lands not currently held.

The P-MRNRD owns portions of the land and is currently undergoing negotiations with the remaining landowners for acquisition of the parcels required for construction. All landowners are anticipating the sale and to

date have not indicated unwillingness to sell. The P-MRNRD has the power of eminent domain that could be applied if necessary.

11. Identify how you possess all necessary authority to undertake or participate in the project.

This project falls directly in line with the roles and responsibilities of the P-MRNRD. The P-MRNRD will obtain all necessary permits and land rights to complete the project to obtain the authority needed to perform work on their own property.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed.

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the

magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

Numerous design alternatives were screened in the *PCWM Plan* (HDR 2009), but were refined in the Section 404 permitting process to avoid and minimize environmental impacts. The permitting process is well underway and ongoing. Although the impacts are considered relatively small, the project will require Section 404 permits and will result in some unavoidable impacts that are documented in FYRA (2018e) and JEO(2018c). A summary of these impacts include:

- Construction of the WP-2 dam and spillway would require fill in an estimated 0.20 acres of PEMA/PEMC wetlands and 530 linear ft of channel. An estimated 2.80 acres of PEMA/PEMC wetlands and 2,000 linear feet of channel would be inundated within the permanent pool.
- Construction of the WP-4 dam and spillway would require fill in an estimated 0.01 acres of PEMA/PEMC wetlands and 840 linear ft of channel. An estimated 0.10 acres of PEMA/PEMC wetlands and 3,000 linear feet of channel would be inundated within the permanent pool.
- In total, the project would impact an estimated 0.21 acres of PEMA/PEMC wetlands and 1,400 linear feet of perennial stream channel for earth fill for the dam and spillway at both sites. An estimated total of 2.90 acres of PEMA/PEMC wetlands and 5,000 linear feet of perennial stream channel inundated below the normal pool elevation at both sites.

However, the project overall will significantly improve stream health and function. Specifically, there will be an overall increase in habitat stability, improvements to riparian buffer communities and decreases in erosion will increase aquatic functions. Tree and shrub dominated areas may also develop with the buffer zone by natural colonization or promoted with plantings in designated areas.

Section C.

NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

Notes:

- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.
- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted above. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.
- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;
 - Describe the specific threats to drinking water the project will address.
 - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
 - Provide a history of issues and tried solutions.
 - Provide detail regarding long-range impacts if issues are not resolved.

By virtue of trapping sediments, nutrients and bacteria in an urban area, these reservoirs will improve downstream water quality of raw water drawn for potable use. This includes improvements to Plattsmouth, Nebraska City and all other

communities currently drawing water from the Missouri River and those communities that have taking water from the Missouri River planned in their future.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;
 - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
 - Provide the history of work completed to achieve the goals of this plan.
 - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

The P-MRNRD and Nebraska Department of Natural Resources (NDNR) jointly adopted a voluntary Integrated Management Plan (IMP) in August of 2014. Actions to meet the goals and objectives of this IMP are underway. Goal 1 is to develop and implement water use policies and practices which better protect existing surface and groundwater uses while allowing for future development. The P-MRNRD and NDNR have adopted rules and regulations restricting the amount of groundwater and surface water development each year and the P-MRNRD is beginning the process of updating its existing Groundwater Management Plan (circa March 1994) to be more consistent with the IMP. Much like Groundwater Management Plans can have direct ties to IMP goals and objectives, Watershed Management Plans can be considered existing policies and authorities used to address water quality and quantity issues of an IMP. The project proposed under this application is part of the Papillion Creek Watershed Partnership (PCWP) Management Plan and does help achieve Goal 1, Objective 1.1 of the P-MRNRD IMP. Regional Detention Structures along with other components of the PCWP plan strive to maintain or restore natural watershed hydrology and reduce peak discharge. The effects of this regional detention and stormwater management system not only help curb flooding, but help restore more natural base flows to receiving streams or rivers by increasing groundwater infiltration and subsequent seepage, store and slowly release surface water runoff, and remove some pollutants and contaminants not naturally found in the surface or ground water.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

List the following information that is applicable:

- The location, area and amount of recharge;
- The location, area and amount that aquifer depletion will be reduced;
- The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
- Provide a detailed listing of cross basin benefits, if any.

The P-MRNRD and Nebraska Department of Natural Resources (NDNR) jointly adopted a voluntary Integrated Management Plan (IMP) in August of 2014. Actions to meet the goals and objectives of this IMP are underway. Goal 1 is to develop and implement water use policies and practices which better protect existing surface and groundwater uses while allowing for future development. The P-MRNRD and NDNR have adopted rules and regulations restricting the amount of groundwater and surface water development each year and the P-MRNRD has updated their existing Groundwater Management Plan (circa March 1994) and adopted changes in February 2018 to be more consistent with the IMP. Much like Groundwater Management Plans can have direct ties to IMP goals and objectives, Watershed Management Plans can be considered existing policies and authorities used to address water quantity issues of an IMP. The project proposed under this application is part of the Papillion Creek Watershed Partnership (PCWP) Management Plan and does help achieve Goal 1, Objective 1.1 of the P-MRNRD IMP. The Papillion Creek Aquifer is located at varying depths throughout the watershed. In the vicinity of dams WP-2 and WP-4, the aquifer is at depths of 40 to 120 feet. These dams will provide recharge for any draws on the aquifer. Low level drawdown conduits will be installed on each of the reservoirs as well, as required by NDNR Dam Safety Regulations. These drawdowns can be operated to provide increased streamflow downstream for any senior water rights or future demands on the stream. The above points address recharge, aquifer depletion and streamflow enhancement, but with regards to contributing to sustainability goals, “Water Sustainability” is defined in Nebraska Title 264 as when water use is sustainable when current use promotes healthy watersheds, improves water quality, and protects the ability of future generations to meet their needs. Recognizably, sustainability has varied meanings across the State. In Eastern Nebraska, watershed health is related to reducing the threat of flood damage first and foremost. Nearly every watershed plan in this region addresses flood control first. And as argued above, finding any project that would protect the ability of future generations to meet their needs would be difficult, given the protection this project provides to one of Nebraska’s thriving communities and contributor to the State’s economy. Regional Detention Structures along with other components of the PCWP plan (HRD 2009) strive to maintain or restore natural watershed hydrology and reduce peak discharge. The effects of this regional detention and stormwater management system not only help curb flooding, but help restore more natural base flows to receiving streams or rivers by increasing groundwater infiltration and subsequent seepage, store and slowly release surface water runoff, and remove some pollutants and contaminants not naturally found in the surface or ground water.

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

- List the goals the project provides benefits.
- Describe how the project will provide these benefits
- Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

Flood Control

The primary purpose of these dam sites is flood control and water quality improvements as identified in the *PCWM Plan* (HDR 2009). The reservoirs will attenuate flood flows through a 48" diameter principal spillway pipe, storing flood flows in the reservoir. They are designed to maximize flood reduction benefits in a rapidly developing watershed. The dams will provide significant flood reduction within the sub-watershed and contribute to a reduction in the West Branch Papillion Creek, which currently inundates portions of the City of Papillion and Bellevue from the 100-yr flood event. Maps detailing the flood reduction benefits and tables quantifying the overall flood reduction are included in SIA Figures B-3.5 through B-3.7

Flood control benefits are maximized when protection can be achieved in high value areas. No other place in the State is the value of land and improvements as high, on average in this watershed due to the rate of development (also the highest in the State) occurring around these reservoirs. Without the reservoirs identified in the *PCWM Plan* (HDR 2009), costly levee modifications and bridge raises would be required to bring the West Branch levees into FEMA compliance.

Recent studies have shown the socioeconomic impact of flooding on communities is extensive. Projects such as these reduce the threats to the general security, health and safety of the public by reducing the threat of the impacts of flooding. This benefit can be seen in a reduced need for emergency operations and rescue services during flooding and with a reduction in health hazards such as odor, insects and other negative impacts of flooding. Lost production time for businesses (income losses) has also been quantified and plays a significant role in tabulating total losses.

Recreation

The proposed project components provide numerous recreational, wildlife habitat, water resource conservation and preservation benefits (FYRA 2018a, JEO 2018a). Reservoirs create multiple recreational opportunities near Nebraska's largest population base including fishing, boating, canoeing, wildlife viewing, hiking and picnicking. While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-2 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-2 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-2:

- Paved access to stabilized shoreline landing/launch area

- Aggregate shore launch pad
- One day use picnic shelter with associated table and grill provisions.
- Waterless toilet facility with single male and female stalls.
- 1 mile concrete multi-use trail – single loop circumnavigating reservoir.
- Concrete parking area.
- Open park space for sledding and exploration

While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-4 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-4 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-4:

- Paved access to stabilized shoreline landing/launch area.
- One universally accessible floating kayak and canoe launch.
- One day use picnic shelter with associated table and grill provisions – fully accessible.
- Waterless accessible toilet facility with single male and female stalls.
- 1.8 mile concrete multi-use trail – single loop circumnavigating reservoir.
- 5 stabilized shore fishing extensions into the lake (5 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Paved parking lot with 5 boat trailer parking stalls.
- Open park space for sledding and exploration

Water Quality

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

Wildlife Habitat

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

- Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
- Describe the beneficial uses that will be reduced, if any.
- Describe how the project provides a beneficial impact to the state's residents.

In highly urbanized areas, flood control remains the top focus of Nebraskans within the urban area. This project addresses that need directly as part of a well-developed plan. While providing flood control benefits, this project offers secondary beneficial uses to Nebraskans including recreation, habitat improvement, water quality improvements and opportunities for education regarding all of the above. There will be no reduced beneficial uses. Impacts to existing resources are detailed throughout the environmental permitting process and mitigation measures are planned to more than offset the impacts. This project provides a beneficial impact by reducing the threat of flooding and enhancing the opportunity for Nebraskans to enjoy the water resources of the State in a highly urbanized area.

6. Is cost-effective;

- List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
- Compare these costs to other methods of achieving the same benefits.
- List the costs of the project.
- Describe how it is a cost effective project or alternative.

A cost summary table detailing all the costs for the proposed project is provided in a summary table in SIA Section A-1. All detailed costs are shown in the SIA Section B-3 along with the benefits, cash flow stream and economic comparison. The comparison shows the cost effectiveness of the plan with an overall B:C ratio of 1.77:1

Sites WP-2 & 4 were identified in the *PCWM Plan* (HDR 2009) to provide regional detention of storm water during flood events and water quality improvements in the watershed. This was developed to address a long history of flooding within the watershed, which extends from the upper reaches in Washington County, across Douglas County, and ending in Sarpy County at the confluence with the Missouri River. The *PCWM Plan* includes 14 storm water detention basins and associated water quality basins, as well as an implementation prioritization based on flood risk reduction and pressure of impending development. The report provides detailed information on the alternatives studies and their costs.

Flood reduction in the Papillion Creek watershed has been studied extensively through efforts undertaken by the PCWP. The *PCWM Plan* developed an integrated approach to address peak flow reduction using a combination of Low Impact Development (LID) and regional detention structures in the watershed. Even with incorporating LID techniques in the watershed, it was concluded that the regional detention structures are still required to reduce flood flows and prevent associated damage.

This project will provide flood control benefits specifically on the West Branch of the Papillion Creek. As a result of watershed development currently, this levee system no longer contains the 100-yr flood and required freeboard in accordance with FEMA criteria. The P-MRNRD performed two studies, the *West Papillion Creek Levee Restoration – Summary of Previous Analyses* (HDR 2006) and the *West Papillion Creek Levee Restoration Evaluation* (HDR 2008), to assess flood control measures to restore the required levee freeboard. Like the PCWM Plan, these studies also studied various alternatives to reduce flooding in the watershed and the net result of both plans is that these sites are vital to providing flood control in the overall watershed and this sub-watershed. Site locations within the watershed were not studied. These sites represent the maximum drainage area that can be controlled in the watershed, given the current development and infrastructure in the area. A detailed description of the alternatives studies are in the studies which are in the SIA Bibliography.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- Identify the interstate compact, decree, state contract or agreement or federal law.
- Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
- Describe current deficiencies and document how the project will reduce deficiencies.

Section 303(d) of the EPA's Clean Water Act is required to maintain the integrity of the Nation's waters, and requires states to establish a list of impaired that do not meet water quality standards. Once on the 303(d) of impaired waters, it is required that a Total Maximum Daily Load (TMDL) report is developed to set goals and pollutant load reductions required for the water body to meet water quality standards. The entire Papillion Creek system, which includes the Little Papillion Creek, Cole Creek, Big Papillion Creek, West Papillion Creek tributaries, is on the 303(d) list of impaired waters for *E.coli* and the *TMDL for the Papillion Creek Watershed Report* (hereafter referred to as the *TMDL Report*) (NDEQ 2009) was developed.

The water quality benefits improvements from these projects will help contribute to reductions in the *E.coli* load, specifically to the West Papillion Creek downstream of the sites. This is achieved by increasing the surface area exposed to sunlight and extending the detention time of the water, allow for additional bacteria die off prior to discharging through the dam spillway system and transported downstream to the Papillion Creek system.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;

- Identify the property that the project is intended to reduce threats to.
- Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
- Identify the potential value of cost savings resulting from completion of the project.
- Describe the benefits for public security, public health and safety.

This project reduces (nearly eliminates) the threat to the lands between the dams and the West Branch Papillion Creek. That land is shown in the SIA Section B-3 and includes the existing facilities labeled on the figure that will be protected by this project, in addition to future development for projects to come (some already in the planning stage). The project contributes much needed flood reduction within the West Branch and downstream Papillion Creek system and the transportation corridors, utilities and other infrastructure that runs along or through the Papillion

Creek system. Flood reduction benefits are shown in aerial and tabular formats in the SIA Section B-3. Flood damage reductions are computed in the economic analysis, so the reduction in threats to critical infrastructure including roadways, etc. are detailed there. The project also provides a significant flood reduction threat to utilities along the Papillion Creek system, although quantifying that threat is technically difficult to impossible. The elimination of the threat is the benefit provided to Nebraskans.

9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.
- Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- Describe other possible solutions to remedy this issue.
- Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

The water quality improvements from this project are substantial. Water quality basins upstream of the reservoirs and the reservoirs themselves will have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

In addition, downstream water quality is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion, sediment deposition and pollutant loading. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life

and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

The City of Gretna has been an avid supporter of this project and participated in numerous costs for WP-2 & 4. They have been an active participant in the planning process of WP-2 & 4 to date and are significant contributors to costs through the Papillion Creek Watershed Partnership The Nebraska Game and Parks Commission (NGPC) has also been an active participant in the planning process and is a funding partner. This support is shown in the letters of support in Section D-3 of the SIA. There is no other outside funding for this project.

All anticipated funding sources for the project are shown in the cost summary in the SIA Table A-1.1. The P-MRNRD currently taxes at a levy rate of \$0.035669 per \$100 of valuation to obtain a property tax income of nearly \$28.2 million. Because the P-MRNRD is not in a fully or over-appropriated basin, any remaining tax levy up to a \$0.045 levy rate will be required to pay the local share of the costs for this project and others that are currently being planned or designed. Because the P-MRNRD taxing authority will be completely utilized without being able to implement the projects vital to the P-MRNRD's mission, there has been new legislation introduced to generate additional tax dollars through the ability to finance capital improvement projects with a new bonding authority.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.
- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

“Water Sustainability” is defined in Nebraska Title 264 as when water use is sustainable when current use promotes healthy watersheds, improves water quality, and protects the ability of future generations to meet their needs. Recognizably, sustainability has varied meanings across the State, in Eastern Nebraska, watershed health is related to reducing the threat of flood damage first and foremost. Nearly every watershed plan in this region addresses flood control first. And as argued above, finding any project that would protect the ability of future generations to meet their needs would be difficult, given the protection this project provides to one of Nebraska’s thriving communities and contributor to the State economy. The primary sustainable practices for this project are flood control, water quality improvements, managing floodplain regulations and habitat improvement which all contribute to healthy watersheds. No other place in the State is the value of land and improvements as high, on average in this watershed due to the rate of development (also the highest in the State) occurring around these reservoirs. Not only are those that are protected downstream of these sites benefitting from the projects, but all Nebraskans due as the area continues to grow, sustainably, and help fuel Nebraska’s economy. The local jurisdiction that manages and enforces these practices are the individual municipalities that participate within the Papillion Creek Watershed Partnership. The City of Gretna and of course the Papio-Missouri River NRD are all among the participants in the Partnership. The P-MRNRD and Nebraska Department of Natural Resources (NDNR) jointly adopted a voluntary Integrated Management Plan (IMP) in August of 2014. Actions to meet the goals and objectives of this IMP are underway. Goal 1 is to develop and implement water use policies and practices which better protect existing surface and groundwater uses while allowing for future development. The P-MRNRD and NDNR have adopted rules and regulations restricting the amount of groundwater and surface water development each year and the P-MRNRD has updated their Groundwater Management Plan (circa March 1994) and adopted changes in February 2018 to be more consistent with the IMP. Much like Groundwater Management Plans can have direct ties to IMP goals and objectives, Watershed Management Plans can be considered existing policies and authorities used to address water quantity issues of an IMP. The project proposed under this application is part of the PCWM Plan and does help achieve Goal 1, Objective 1.1 of the P-MRNRD IMP.

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.
- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

Flooding is the number one threat to Nebraskans in highly urbanized areas. The real threat of flooding in the Papillion Creek Watershed is well documented in the *PCWM Plan* (HDR 2009). This project will address that issue by providing flood control in the West Branch of Papillion Creek and downstream throughout the system. The total number of acres, structures, etc. protected is based on the prorated values listed in the WP-6&7 WSF application (FYRA 2016) and identified in Section B-3 of the SIA. The benefits have also been quantified and are detailed in Section B-3 of the SIA.

The project would also provide a benefit to the state by increasing the recreation opportunities with the amenities that will be installed at the site, which can lure tourists and visitors that would increase economic development.

13. Contributes to the state's ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
- Describe how each source of funding is made available if the project is funded.
- Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
- Describe how you will proceed if other funding sources do not come through.

There are multiple partners identified for this project. From the Federal level, a funding application is being coordinated from the U.S. Fish and Wildlife Service's Sportfish Restoration Fund for fish habitat construction and angler access at both project sites. The fund is administered locally by the Nebraska Game and Parks Commission and coordination on the design of these enhancements has been ongoing. On the local level, both Sarpy County and the City of Gretna are assisting in the planning for transportation and utility infrastructure surrounding the project. The City of Gretna will be taking over the long-term maintenance of the park area (the NRD remains responsible for the dam), and therefore, they will assume future operation and maintenance costs. Lastly, synergies identified with the grading of the project and surrounding developments and in the development of watershed management practices above the reservoir that will increase excavation from the pool and help maintain a sustainable, high quality lake. These partnerships at all levels saves the NRD money that will go towards additional structures that provide a safe watershed to Nebraskans. An updated cost-share schedule is provided in SIA Table A-1.1.

14. Contributes to watershed health and function;

- Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

A stream assessment of waterways within the project area was conducted according to the methodologies and procedures outlined in the U.S. Army Corps of Engineers Nebraska Stream Condition Assessment Procedure (NeSCAP). The procedure involved the review of available published resources combined with field assessments to evaluate the physical and biological attributes of a stream reach. The study found that stream channel reaches degrade moving downstream as they become deeply incised, disconnected from the floodplain, heavily eroded streambanks and appear to be frequently disturbed (FYRA 2018d, JEO 2018b).

The same assessment methodology was applied to future (post project) conditions to determine stream health and function impacts related to the project. This analysis found that the project will increase stream function within the project area. Specifically, there will be an overall increase in habitat stability, improvements to riparian buffer communities and decreases in erosion will increase aquatic functions. The reservoirs will create both deep and shallow open water habitat, inundated wetlands, and emergent wetland/mesic tallgrass prairie transition zones. Tree and shrub dominated areas may also develop with the buffer zone by natural colonization or promoted with plantings in designated areas.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

The *Annual Report* (NDNR 2020), lists the following objectives as related to the Water Sustainability Fund;

- Provide financial assistance to programs, projects, or activities that increase aquifer recharge, reduce aquifer depletion, and increase streamflow;
- Remediate or mitigate threats to drinking water;
- Promote the goals and objectives of approved integrated management plans or groundwater management plans;
- Contribute to multiple water supply management goals including flood control, reducing threats to property damage, agricultural uses, municipal and industrial uses, recreational benefits, wildlife habitat, conservation, and preservation of water resources;
- Assist municipalities with the cost of constructing, upgrading, developing, and replacing sewer infrastructure facilities as part of a combined sewer overflow project;
- Provide increased water productivity and enhance water quality;
- Use the most cost-effective solutions available; and
- Comply with interstate compacts, decrees, other state contracts and agreements and federal law.

The objectives of the fourth, sixth, and seventh goals are met as follow;

Flood Control

The primary purpose of these dam sites is flood control and water quality improvements as identified in the *PCWM Plan* (HDR 2009). The reservoirs will attenuate flood flows through a 48" diameter principal spillway pipe, storing flood flows in the reservoir. They are designed to maximize flood reduction benefits in a rapidly developing watershed. The dam will provide significant flood reduction within the sub-watershed and contribute to a reduction in the West Branch Papillion Creek, which currently inundates portions of the City of Papillion and Bellevue from the 100-yr flood event. Without the reservoirs identified in the PCWM Plan (HDR 2009), costly levee modifications and bridge raises would be required to bring the West Branch levees into FEMA compliance.

Recreation

The proposed project components provide numerous recreational, wildlife habitat, water resource conservation and preservation benefits (FYRA 2018a, JEO 2018a). Reservoirs create multiple recreational opportunities near Nebraska's largest population base including fishing, boating, canoeing, wildlife viewing, hiking and picnicking. While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-2 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-2 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-2:

- Paved access to stabilized shoreline landing/launch area
- Aggregate shore launch pad
- One day use picnic shelter with associated table and grill provisions
- Waterless toilet facility with single male and female stalls
- 1 mile concrete multi-use trail – single loop circumnavigating reservoir
- Concrete parking area
- Open park space for sledding and exploration

While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-4 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-4 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-4:

- Paved access to stabilized shoreline landing/launch area
- One universally accessible floating kayak and canoe launch

- One day use picnic shelter with associated table and grill provisions – fully accessible
- Waterless accessible toilet facility with single male and female stalls
- 1.8 mile concrete multi-use trail – single loop circumnavigating reservoir
- 5 stabilized shore fishing extensions into the lake (5 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters
- Paved parking lot with 5 boat trailer parking stalls
- Open park space for sledding and exploration

Water Quality

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

Wildlife Habitat

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering

the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles upstream of the reservoir and the reservoir itself will have a major impact on reservoir sustainability.

The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria. A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance. In addition, downstream water quality is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoir causes a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion, sediment deposition and pollutant loading. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.

- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

The P-MRNRD maintains a responsibility with FEMA under their P-MRNRD Mapping Activity Statement (FEMA). Under this agreement, the P-MRNRD agrees, as a Cooperating Technical Partner (CTP) to provide FEMA with updated mapping information within the project area and other areas in the P-MRNRD's jurisdiction. In order to do so, FEMA guidelines on mapping and the map modernization process must be followed. This process requires levee certification for any levee systems that will continue to show protection from the 1% chance of occurrence ("100-year") flood. This must be done in accordance with CFR, Title Section 65.10 (Federal Government of the United States 2015a). This project is designed to minimize changes to the downstream floodplains that are mandated to be updated by FEMA. Additionally, this project contributes to mitigation plans that will minimize certification efforts that will be required on the West Branch levee system through Papillion.

The P-MRNRD also has a responsibility to meet Total Maximum Daily Loads (TMDLs) in the Papillion Creek Watershed which are for bacteria in the streams. These reservoirs help to reduce bacteria from agricultural and even more so, urban, areas by increasing travel time for the water while in the reservoirs and allowing the bacteria to die off longer.

"Water Sustainability" is defined in Nebraska Title 264 as when water use is sustainable when current use promotes healthy watersheds, improves water quality, and protects the ability of future generations to meet their needs. Recognizably, sustainability has varied meanings across the State, in Eastern Nebraska, watershed health is related to reducing the threat of flood damage first and foremost. Nearly every watershed plan in this region addresses flood control first. Finding any project that would protect the ability of future generations to meet their needs would be difficult, given the protection this project provides to one of Nebraska's thriving communities and contributor to the State economy. By protecting the population and providing so many benefits, this project is a perfect fit for furthering the goals of water sustainability.

COVER LETTER

APPLICATION

SUPPLEMENTAL
INFORMATION
ATTACHMENT

BIBLIOGRAPHY

SUPPLEMENTAL INFORMATION ATTACHMENT



PAPIO
MISSOURI RIVER
NATURAL RESOURCES DISTRICT

 **HOUSTON**
engineering, inc.

SECTION A

A-1 Project Cost and Funding Breakdown

Table A-1.1 – Project Cost and Funding Breakdown

	Total Costs	Spent to Date	Remaining Costs	USFWS SRF	FEMA BRIC	Remaining Eligible Costs	Grant Request	Local Cost Share
WP-2								
Engineering, Planning and Permitting Professional Services	\$1,729,700	\$1,050,000	\$679,700			\$679,700	\$407,800	\$271,900
(Administrative, Legal, Fiscal)	\$50,000	\$25,000	\$25,000			\$25,000	\$15,000	\$10,000
Land Rights	\$4,406,365	\$4,406,365	\$0			\$0	\$0	\$0
<u>Capital Improvement Costs</u>								
Dam and Spillway								
Fishery Enhancements								
Water Quality Basins/Improvements	\$6,932,850	\$360,510	\$6,572,341	\$325,000		\$6,247,341	\$3,748,404	\$2,498,936
Recreation Facilities								
Stream Mitigation								
WP-4								
Engineering, Planning and Permitting Professional Services	\$1,499,000	\$1,016,000	\$483,000			\$483,000	\$289,800	\$193,200
(Administrative, Legal, Fiscal)	\$50,000	\$50,000	\$0			\$0	\$0	\$0
Land Rights	\$4,339,378	\$4,339,378	\$0			\$0	\$0	\$0
<u>Capital Improvement Costs</u>								
Dam and Spillway								
Fishery Enhancements								
Water Quality Basins/Improvements	\$10,997,156	\$4,583,000	\$6,414,156	\$350,000	\$5,335,650	\$728,506	\$437,100	\$291,406
Recreation Facilities								
Sanitary Sewer Relocation Mitigation								
Stream Mitigation								
Totals	\$30,004,449	\$15,830,253	\$14,174,196	\$675,000	\$5,335,650	\$8,163,546	\$4,898,104	\$3,265,442

Notes: City of Gretna is a funding partner related to long-term maintenance and operation of WP-2 and WP-4

SECTION B

B-1(a) Field Investigations

Figure B-1(a).1 – WP-2 Soil Boring Locations

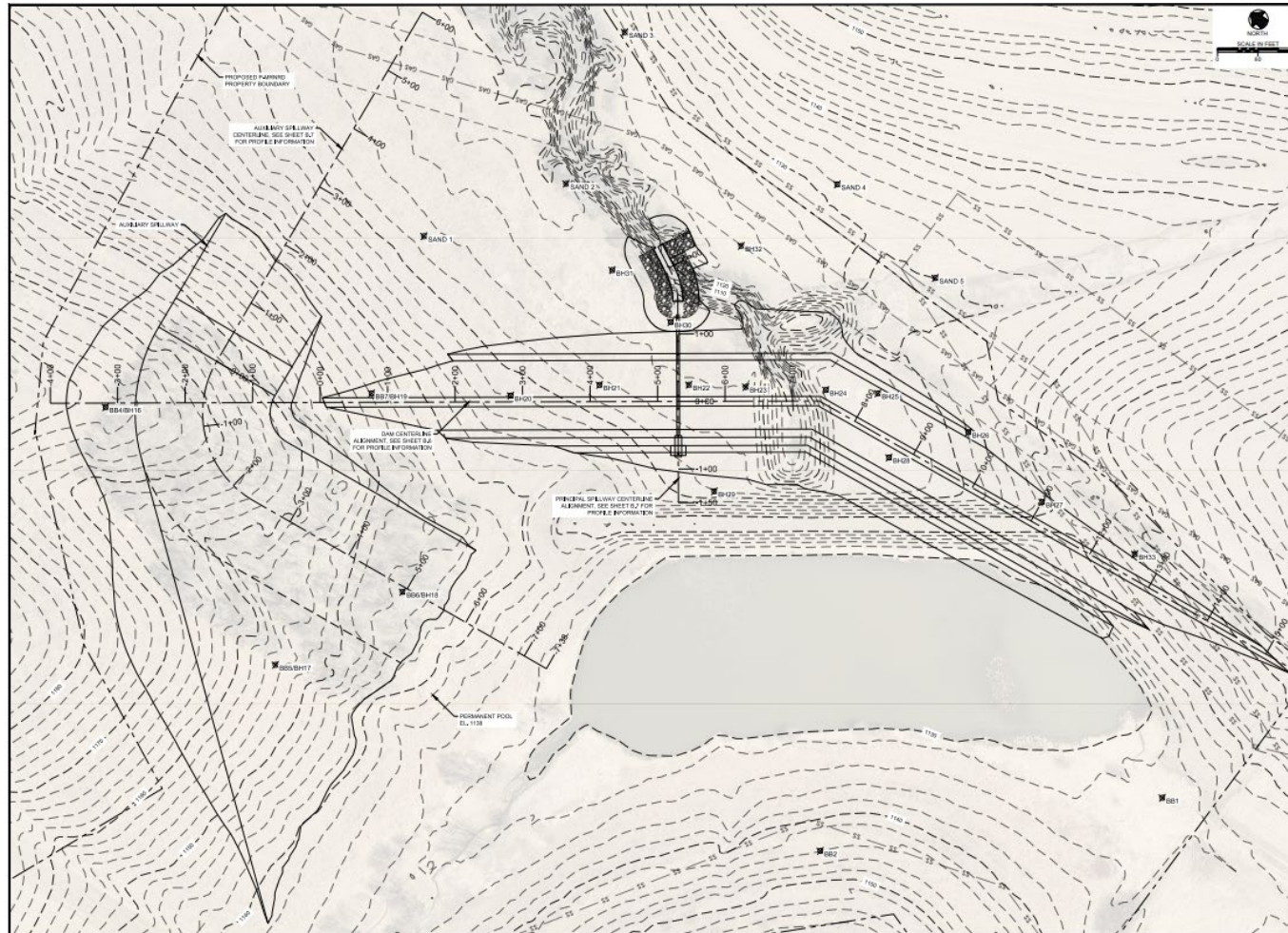
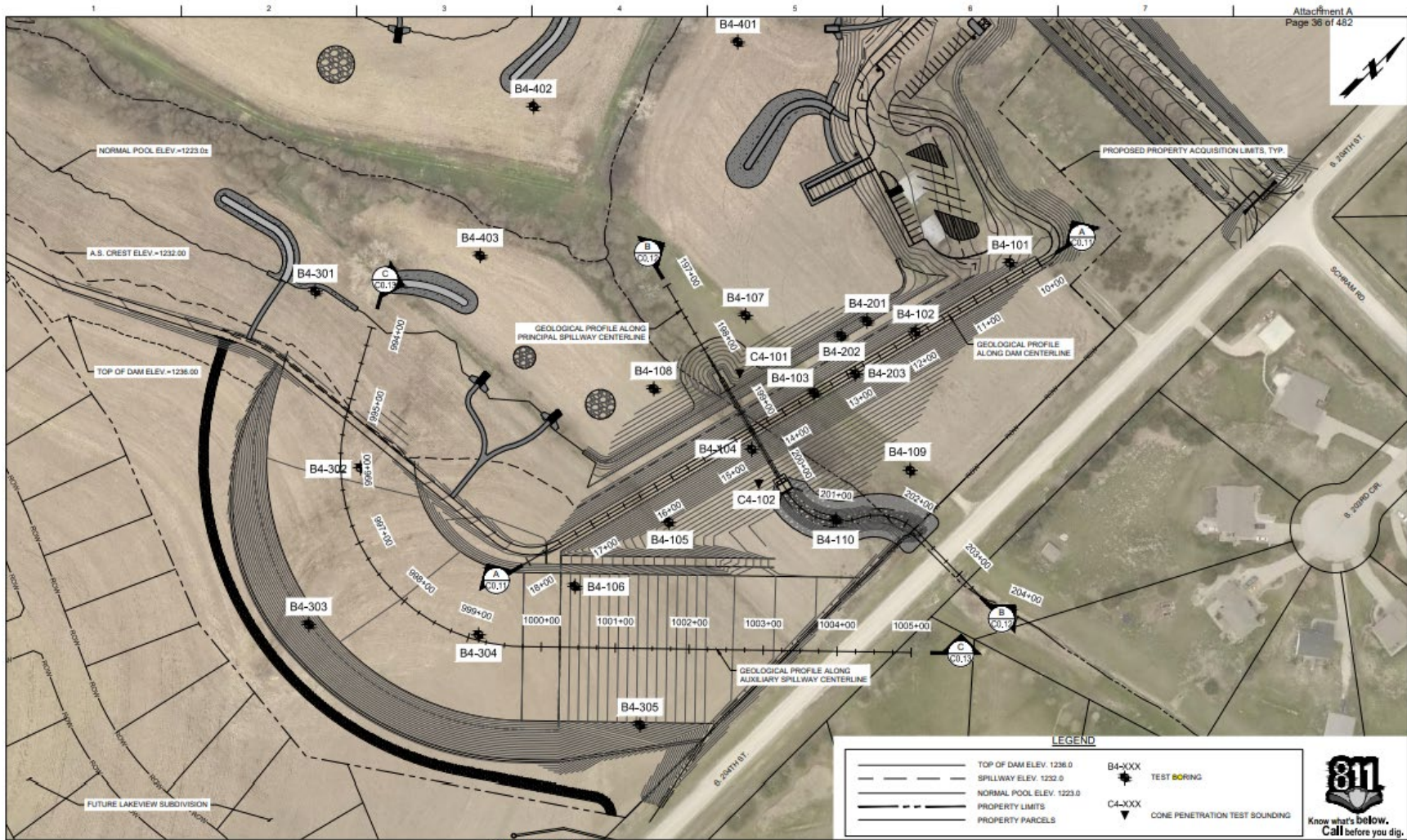
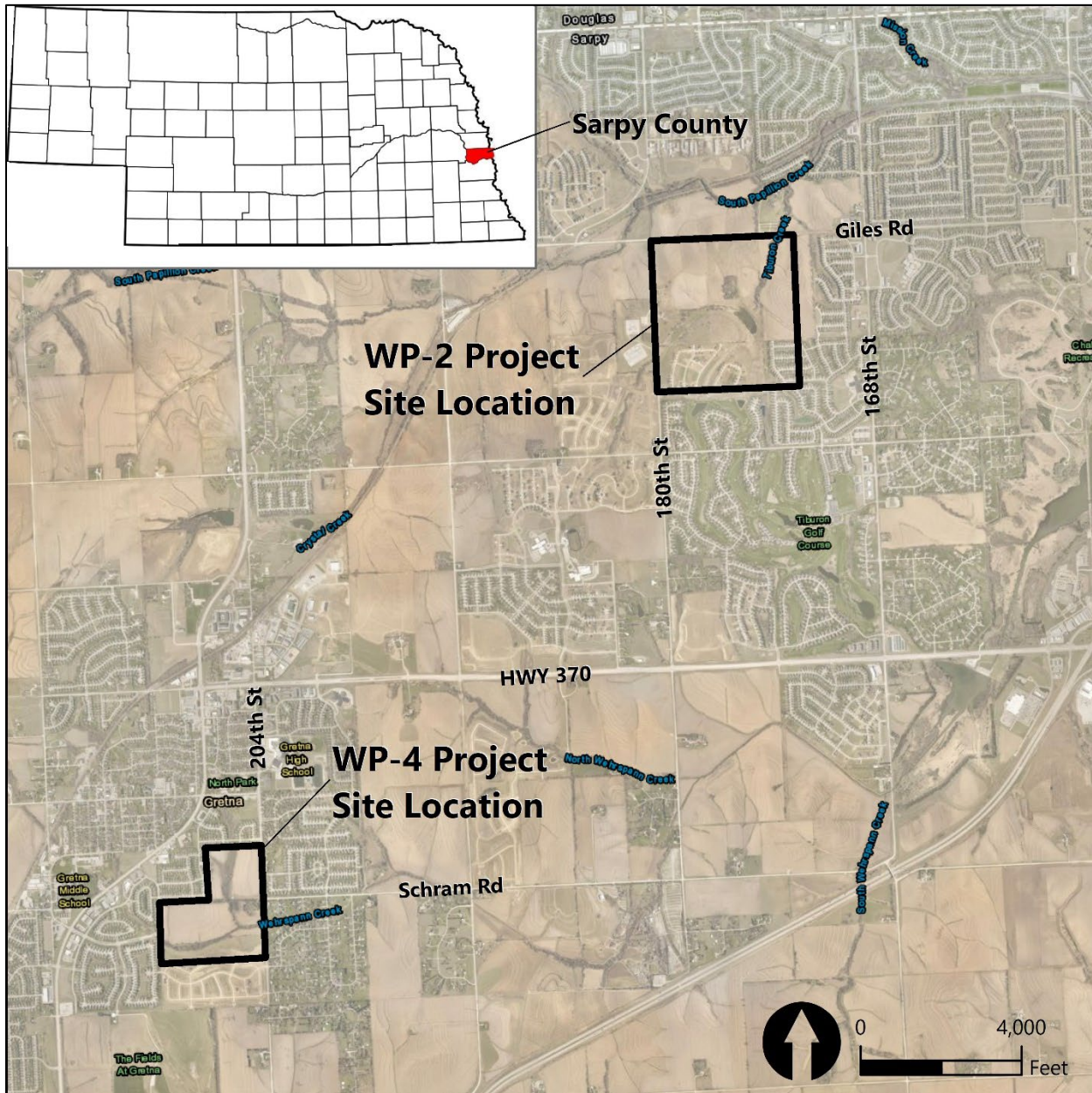


Figure B-1(a).2 – WP-4 Soil Boring Locations



B-1(a).5 Location Map 1



B-1(a).6 WP-2 Preliminary Design and Project Area

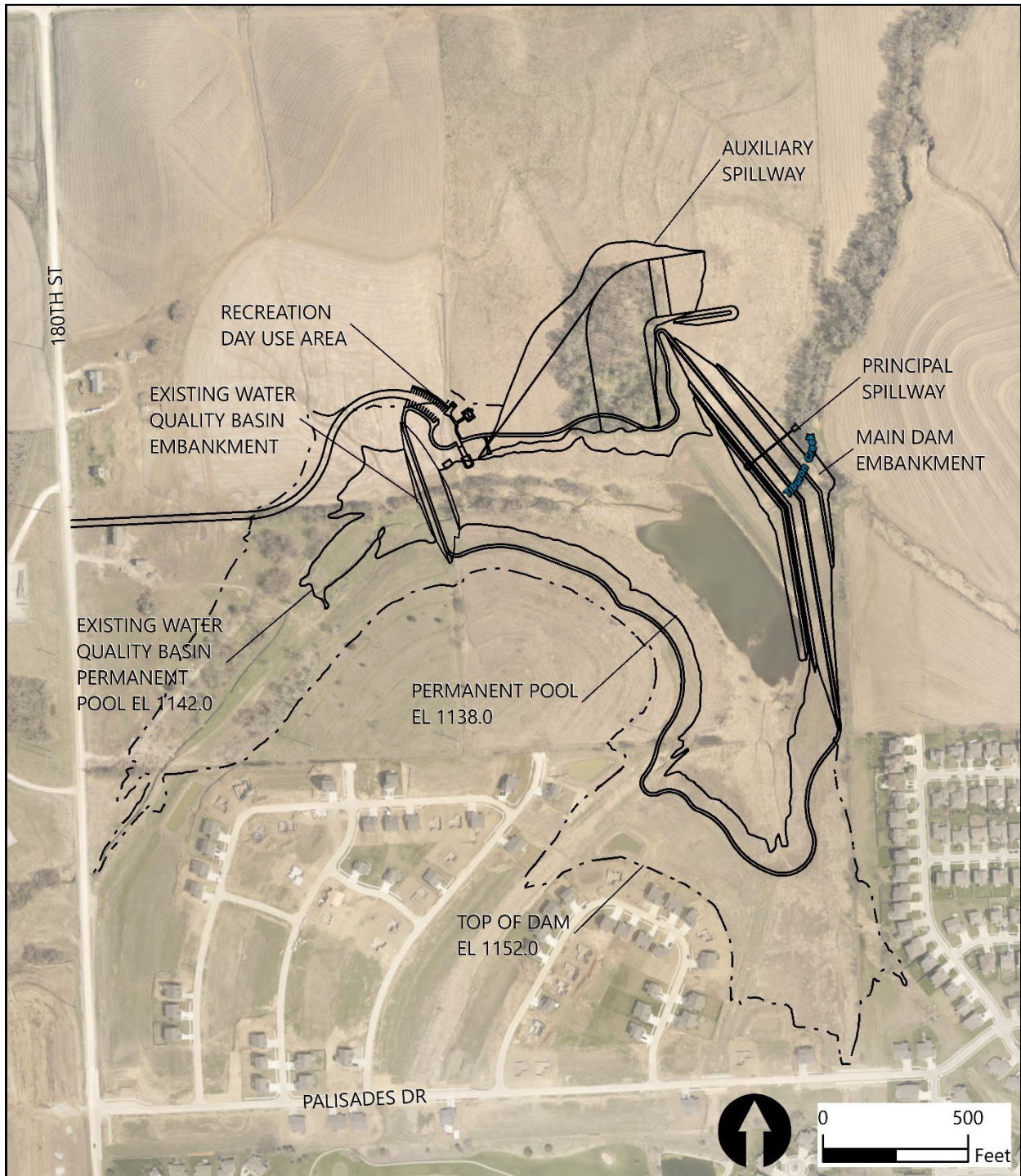
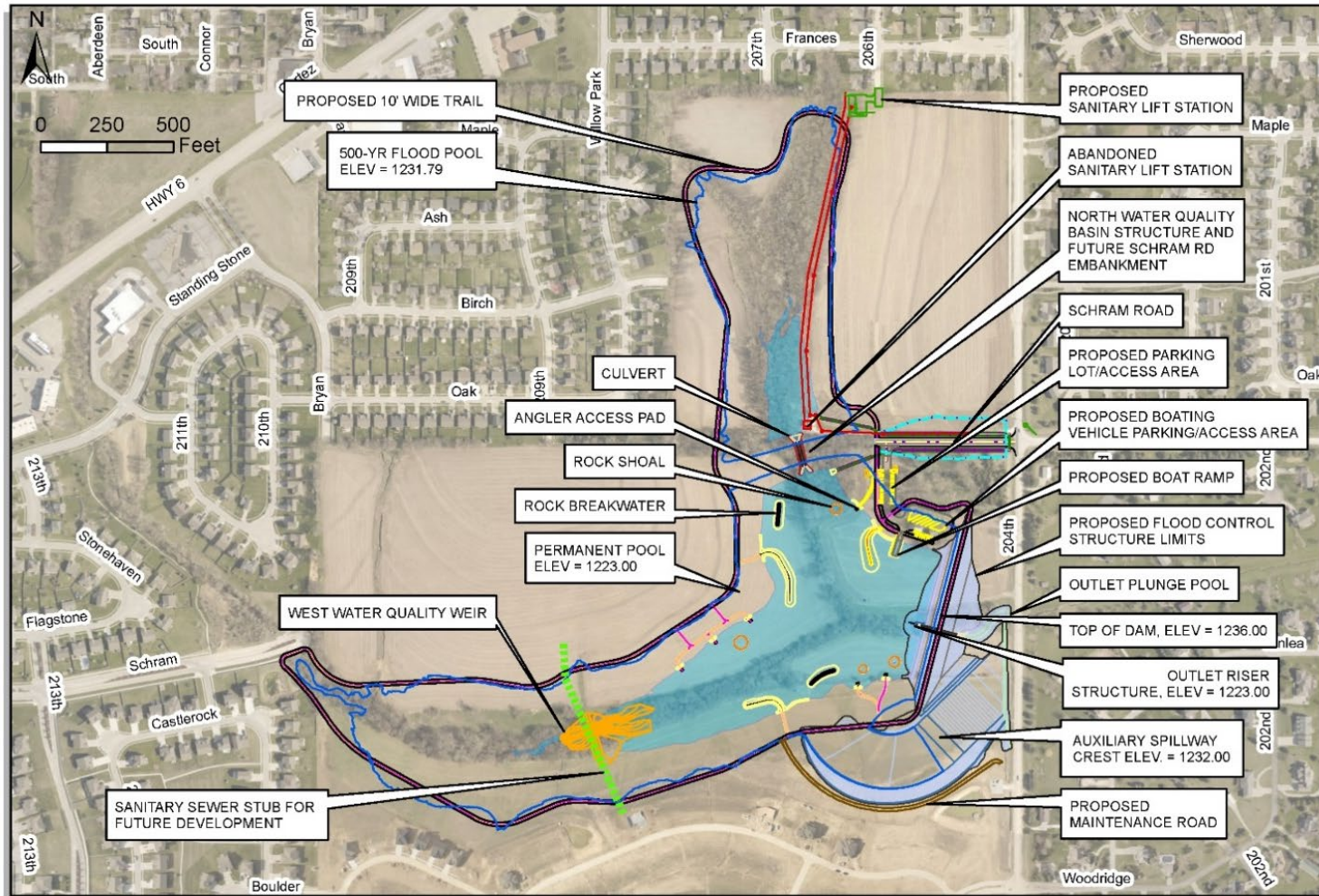


Figure B-1(a).7 – WP-4 Preliminary Design and Project Area



B-3 Project Costs & Benefits

Table B-3.1 – Project Cost Summary

Summary of Costs	WP-2	WP-4	Total
Engineering, Planning and Permitting	\$1,729,700	\$1,499,000	\$3,228,700
Professional Services (Administrative, Legal, Fiscal)	\$50,000	\$50,000	\$100,000
Land Purchase	\$4,406,365	\$4,339,378	\$8,745,743
Construction	\$6,932,850	\$10,997,156	\$17,930,006
Total	\$13,118,915	\$13,616,436	\$30,004,449

Land Purchase

Since construction has begun in WP-2, all but one of the necessary plots have already been acquired by the PMR-NRD. All but one of the required plots for WP-4 have been acquired. The costs of these acquisitions are presented below. A detailed breakdown of the anticipated land requirements for WP-2 & 4 has been provided as justification for costs used in this analysis. Tables and corresponding figures are presented below.

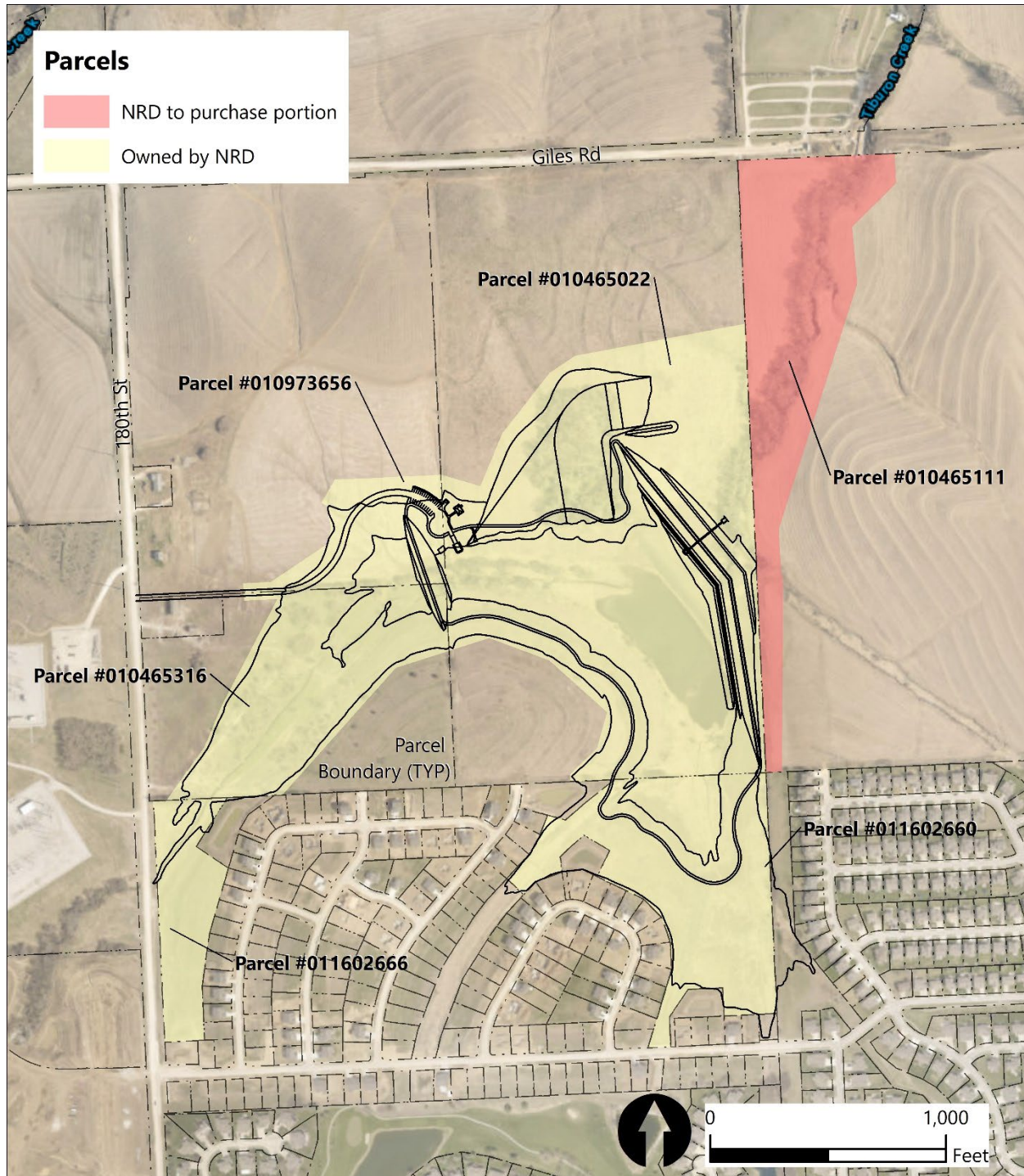
Table B-3.2 – WP-2 Land Purchased by PMR-NRD Breakdown

Parcel	Purchased Area (AC)	Purchase Price	Resold Area (AC)	Resale Price	Project Area Purchase
10973656	7.70	\$1,383,275.47			\$1,146,960.33
10465316	12.90		5.88	\$236,315.14	
10465022	44.20	\$2,034,202.36	7.36	\$295,795.83	\$1,738,406.53
11602666	5.15	\$640,998.16			\$640,998.16
11602660	14.76				
10465111	16.00	\$880,000			\$880,000.00
TOTAL	100.71	\$4,938,475.99	13.24	\$532,110.97	\$4,406,365.02

Table B-3.3 – WP-4 Land Purchased by PMR-NRD Breakdown

Parcel	Purchased Area (AC)	Unit	Cost
11588188	20.27	AC	\$1,010,000.00
11114622	33.92	AC	\$1,835,167.52
10394664	24.32	AC	\$1,315,780.48
10411003	1.80	AC	\$178,430.00
TOTAL	80.31		\$4,339,378.00

Figure B-3.1 – WP-2 Land Rights Map



Construction

Detailed breakdowns of the engineer’s estimates of the construction at WP-2 and WP-4 have been provided below as justification for costs used in this analysis.

Table B-3.5 – WP-2 Cost Estimate

GENERAL	UNIT	QUANTITY	UNIT COST	COST
MOBILIZATION	LS	1	10%	\$572,962.84
CLEARING AND GRUBBING	LS	1	\$50,000.00	\$50,000.00
HANDLING OF WATER	LS	1	\$30,000.00	\$30,000.00
EROSION CONTROL (SWPPP)	LS	1	\$40,000.00	\$40,000.00
EROSION CONTROL MATTING	SY	43,800	\$2.00	\$87,600.00
INSTALL SEEDING - TURF MIX	AC	4	\$2,500.00	\$10,000.00
INSTALL SEEDING - UPLAND SEED MIX	AC	12	\$3,200.00	\$38,400.00
INSTALL SEEDING - CONSERVATION BUFFER SEED MIX	AC	5	\$3,800.00	\$17,100.00
MAIN DAM	UNIT	QUANTITY	UNIT COST	COST
INSTRUMENTATION	LS	1	\$60,000.00	\$60,000.00
EARTHEN DAM EMBANKMENT	CY	114,860	\$7.00	\$804,020.00
COMMON EXCAVATION	CY	30,596	\$5.00	\$152,978.31
STRIP, STOCKPILE, REPLACE/WASTE TOPSOIL	CY	39,581	\$10.00	\$395,810.56
REMOVE 36" DIA. CMP	LF	58	\$50.00	\$2,900.00
REMOVE EXISTING RISER, TRASH RACK, AND PIPE SUPPORT	LS	1	\$1,000.00	\$1,000.00
REMOVE CATHODIC PROTECTION SYSTEM BOXES	LS	1	\$1,000.00	\$1,000.00
REMOVE AND STOCKPILE/RE-USE RIPRAP	TN	1,089	\$30.00	\$32,670.00
REPLACE MANHOLE COVERS WITH BOLTED WATERTIGHT COVERS	EA	11	\$1,500.00	\$16,500.00
PRINCIPAL SPILLWAY PIPE- 48"	LF	180	\$752.00	\$135,360.00
24" PVC - DRAWDOWN PIPE	LF	200	\$100.00	\$20,000.00
FORMED CONCRETE	CY	138.2	\$1,000.00	\$138,200.00
STEEL REINFORCEMENT - FORMED CONCRETE	LBS	26,947.0	\$2.50	\$67,367.50
METAL FABRICATION - IMPACT BASIN	LS	1	\$15,000.00	\$15,000.00
METAL FABRICATION - RISER STRUCTURE	LS	1	\$20,000.00	\$20,000.00
KNIFE GATE AND APPURTENANCES - RISER STRUCTURE	EA	1	\$18,000.00	\$18,000.00
SLIDE GATE AND APPURTENANCES - RISER STRUCTURE	EA	1	\$20,000.00	\$20,000.00
UNFORMED CONCRETE - PRINCIPAL SPILLWAY BEDDING	CY	26.0	\$350.00	\$9,100.00
FINE SAND	CY	216	\$50.00	\$10,800.00
ROCK RIPRAP TYPE "B"	TN	5,007	\$95.00	\$475,665.00
ROCK RIPRAP TYPE "C"	TN	2,601	\$95.00	\$247,095.00
GEOTEXTILE FILTER FABRIC	SY	15,244	\$2.50	\$38,110.00
AGGREGATE EMBANKMENT	CY	17,190	\$45.00	\$773,550.00
STONE FILTER	CY	5,387	\$45.00	\$242,415.00
AGGREGATE SURFACING	TN	371	\$45.00	\$16,695.00
INTERNAL DRAINAGE PIPE - 8" PVC SOLID WALL	LF	1,134	\$15.00	\$17,010.00
INTERNAL DRAINAGE PIPE - 8" PVC SLOTTED WALL	LF	593	\$13.00	\$7,709.00
INTERNAL DRAINAGE PIPE - 12" PVC SOLID WALL	LF	1,033	\$20.00	\$20,660.00
INTERNAL DRAINAGE PIPE - 12" PVC SLOTTED WALL	LF	808	\$18.00	\$14,544.00
COBBLES	TN	12	\$150.00	\$1,800.00
RECREATION FACILITIES	UNIT	QUANTITY	UNIT COST	COST
RECREATION FACILITIES	LS	1	\$1,233,880.00	\$1,233,880.00
FISHERIES	UNIT	QUANTITY	UNIT COST	COST
FISHING PIER	LS	1	\$60,000.00	\$60,000.00
GRAVEL	TN	55	\$80.00	\$4,400.00
LIMESTONE CHIPS	TN	60	\$45.00	\$2,700.00
FISHING PIER	LS	1	\$55,000.00	\$55,000.00
ROCK RIPRAP TYPE "A"	TN	541	\$95.00	\$51,395.00
ROCK RIPRAP TYPE "B"	TN	541	\$95.00	\$51,395.00
COMMON EXCAVATION	CY	34,000	\$5.00	\$170,000.00
STREAM MITIGATION	UNIT	QUANTITY	UNIT COST	COST
EARTHEN EMBANKMENT	CY	257	\$7.00	\$1,799.00
COMMON EXCAVATION	CY	10000	\$5.00	\$50,000.00
ROOT WAD PLACEMENT	EA	34	\$500.00	\$17,000.00
ROCK RIPRAP TYPE "B"	TN	227	\$95.00	\$21,565.00
TOTAL				\$6,302,591.21
TOTAL WITH 10% CONTINGENCY				\$6,932,850.33

Table B-3.6 – WP-4 Cost Estimate

Item No	ITEM	UNIT	QTY.	Engineer's Estimate	
				UNIT PRICE	EXTENSION
0.1	Mobilization/Demobilization	1	LS	\$660,000.00	\$660,000.00
0.2	Survey	1	LS	\$165,000.00	\$165,000.00
0.3	Construction Quality Control Material Testing	1	LS	\$110,000.00	\$110,000.00
0.4	Clearing & Grubbing	1	LS	\$165,000.00	\$165,000.00
0.5	Demolition & Removals	1	LS	\$165,000.00	\$165,000.00
0.6	Stripping & Topsoiling	1	LS	\$165,000.00	\$165,000.00
0.7	Right of Way Fence	12000	LF	\$11.00	\$132,000.00
0.8	Migratory Bird Nest Surveys	1	LS	\$27,500.00	\$27,500.00
0.9	All Other Work Not Covered by A Bid Item	1	LS	\$55,000.00	\$55,000.00
	Series 0 - General Subtotal				\$1,644,500.00
1.1	Additional Overexcavation	1000	CY	\$0.00	\$0.00
1.2	Main Dam	1	LS	\$839,669.60	\$839,669.60
1.3	Dewatering	1	LS	\$440,000.00	\$440,000.00
1.4	Rock Riprap, NDOT Type C	3100	TNS	\$85.16	\$264,000.00
	Series 1 - Main Dam Subtotal				\$1,543,669.60
2.1	Schram Road (Sta. 34+85 to Sta. 40+27)	1	LS	\$101,062.50	\$101,062.50
2.2	North Water Quality Basin (Sta. 28+75 to Sta. 34+85)	1	LS	\$354,062.50	\$354,062.50
2.3	Rock Riprap, NDOT Type B	160	TNS	\$55.00	\$8,800.00
	Series 2 - Scram Road & N. Water Quality Basin Subtotal				\$463,925.00
3.1	Trail	1	LS	\$597,300.00	\$597,300.00
3.2	Pedestrian Bridge (Trail Sta. 151+44)	1	LS	\$198,000.00	\$198,000.00
3.3	Rock Riprap, NDOT Type B	35	TNS	\$0.00	\$0.00
	Series 3 - Trail Subtotal				\$795,300.00
4.1	Schram Lift Station	1	LS	\$520,459.50	\$520,459.50
4.2	Covington Lift Station	1	LS	\$520,459.50	\$520,459.50
4.3	Dewatering	1	LS	\$38,500.00	\$38,500.00
	Series 4 - Sanitary Sewer & Lift Station Subtotal				\$1,079,419.00
5.1	Access Area	1	LS	\$917,235.00	\$917,235.00
5.2	Fishery Enhancements	1	LS	\$110,550.00	\$110,550.00
5.3	West Water Quality Basin	1	LS	\$137,500.00	\$137,500.00
5.4	Channel Mitigation	1	LS	\$27,500.00	\$27,500.00
5.5	Rock Riprap, NDOT Type B	3500	TNS	\$80.46	\$281,600.00
	Series 5 - Access Area, Fishery Enhancements, & Other Site Improvements Subtotal				\$1,474,385.00
6.1	SWPPP, Erosion & Sediment Control	1	LS	\$215,433.90	\$215,433.90
6.2	Seeding, Type 'A' - Upland Mix	38	AC	\$3,850.00	\$146,300.00
6.3	Seeding, Type 'B' - Wetland Mix	10	AC	\$3,850.00	\$38,500.00
6.4	Seeding, Type 'C' - Mesic Mix	20	AC	\$3,850.00	\$77,000.00
6.5	Shrub Planting Allowance	1	LS	\$11,000.00	\$11,000.00
	Series 6 - SWPPP & Landscaping Subtotal				\$488,233.90
1.4	Rock Riprap, NDOT Type C - Main Dam	3000	TNS		
2.3	Rock Riprap, NDOT Type B - Schram Road & N. Water Quality Basin	160	TNS		
3.3	Rock Riprap, NDOT Type B - Trail	35	TNS		
5.5	Rock Riprap, NDOT Type B - Fishery Enhancements	3500	TNS		
	Alternate Bid Deduction - Quartzite Riprap Subtotal				
	Bid Alternate - Limestone Rock Riprap Subtotal				
	TOTAL BASE BID:				\$7,489,432.50
	TOTAL BID WITH ALTERNATES:				

Benefits

Table B-3.7 – Benefits Summary Table

Project Item	Occurrence	Project		Total
		WP-2	WP-4	
Flood Reduction	Annual	\$87,760	\$72,767	\$160,527
Environmental Benefits	Annual	\$492,526	\$374,782	\$867,308
Recreation	Annual	\$77,633	\$94,179	\$171,812
Land Value	One-Time	\$1,586,400	\$3,428,144	\$5,014,544

Flood Damage Reduction

Additional justification for flood damage reduction values is contained in the WP 6&7 2016 WSF Application (FYRA 2016) included in the bibliography as the methodology for the valuation of the benefits is contained within that document. Flood damage reduction benefits for Sites WP-2&4 were indexed from that information as shown below with WP-2&4 each possessing about a third of the drainage acres controlled as Sites WP-6&7 together. The calculated benefits were then indexed from 2016 to 2022 values.

Table B-3.8 – WP-2&4 Flood Damages Indexed from 2016 WP-6&7 Detailed Study

	Occurrence	WP-6&7	D.A. Ratio	WP-2&4 Benefits	2016-23 CPI Index	2023 Indexed Benefits
WP-2	Annual	\$186,872	0.391	\$73,133	1.250	\$91,416
WP-4			0.324	\$60,639		\$75,799
TOTAL						\$167,215

Environmental Benefits

These projects will provide ecosystem service benefits by preserving a significant amount of land above the normal pool of the WP-2&4 structures. This preserved riparian area will be owned by the NRD and provides the ecosystem benefits. This area will benefit the environment as well as the surrounding human population by providing habitat protection, increased air quality, water filtration, and recreational space.

Figures B-3.3 and B-3.4 below show the ecosystem benefit area of each site. Ecosystem benefits were calculated using the FEMA BCA Toolkit V6.0, which values green open space at \$8,308 per acre per year (FEMA 2022). This open green space excludes the existing riparian corridor. Total annual ecosystem benefits are shown in Table B-3.9 below.

Table B-3.9 – WP-2&4 Environmental Benefits

	Project	
	WP-2	WP-4
Area Preserved by Project (AC)	67	56
Existing Riparian Area (AC)	8	11
Ecosystem Benefit Area (AC)	59	45
Benefit	\$492,526	\$374,782

Figure B-3.3 – WP-2 Ecosystem Benefit Area

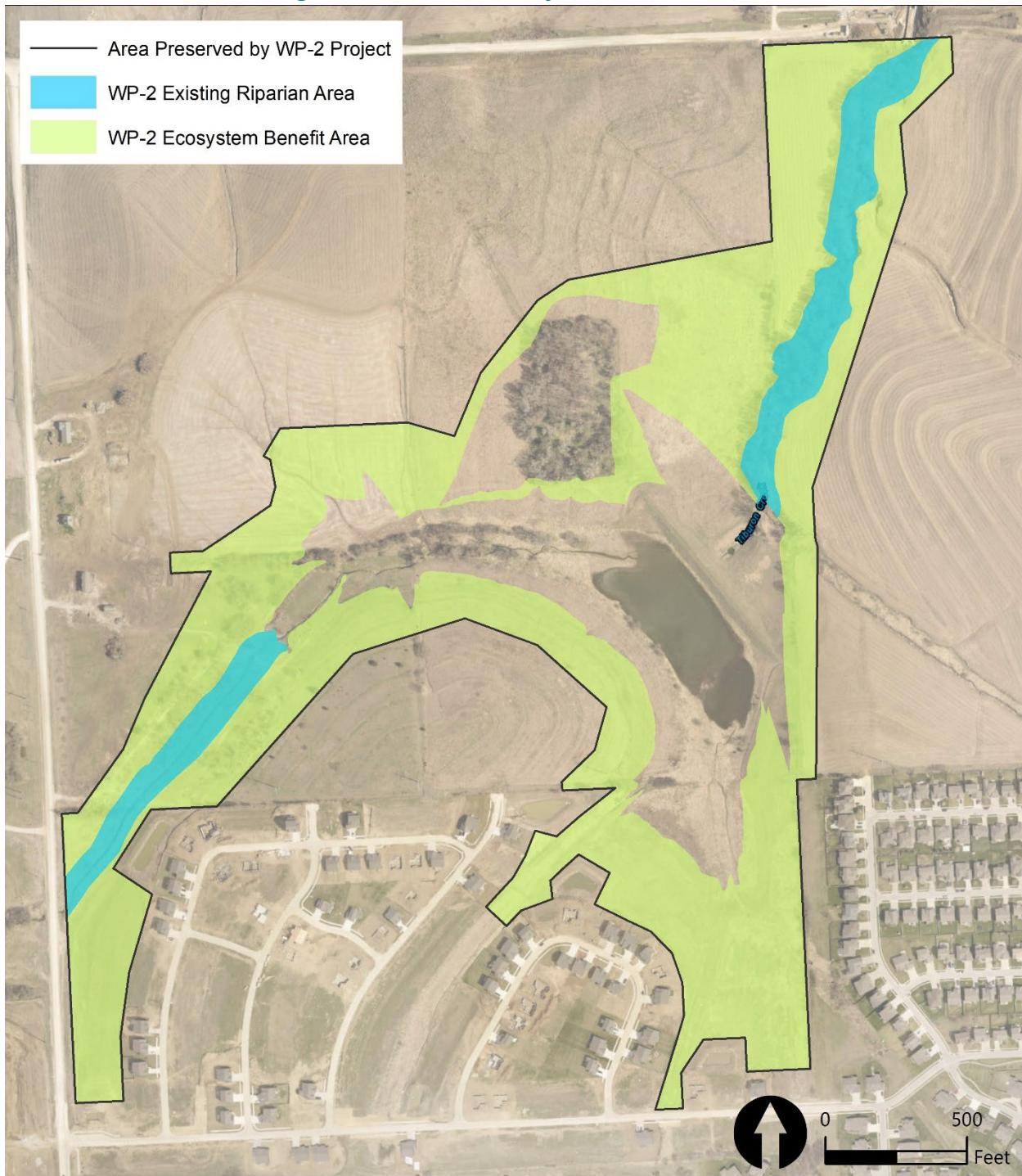


Figure B-3.4 – WP-4 Ecosystem Benefit Area



Recreation Benefits

Recreation benefits were calculated in accordance with Nebraska Resources Development Fund Guidelines. A recreation day value of \$8.33 was used in accordance with information provided by NRD for the WSF grant application, indexed to today's values. Many studies and other methodologies exist that suggest that this value is low, but since an overall positive benefit:cost comparison was achieved, additional effort was not expended to develop a justification for a higher number. Given the urban location and value of the land, the opportunity costs alone of the area would suggest the \$8.33 value is very low.

The Nebraska Game and Parks Commission, in their commitment of resources and funding to this project, along with their most recent State Comprehensive Outdoor Recreation Plan (SCORP - <http://outdoornebraska.ne.gov/parks/programs/scorp/>) has identified Omaha as a major recreation area deficit. This is driven by the high population density and the demand generated by the population of course, but also lends credibility to the argument that the value of the recreation should be higher. Planned recreation facilities are shown in the WP-2 design and WP-4 construction plans (FYRA 2018a, JEO 2022). A detailed breakdown of the benefit calculations is provided below.

Table B-3.10 – WP-2 Project Recreation Benefits

Recreational Activity	Units	Supply	Recreation Days	Value Per Rec Day	Recreation Benefits
Hiking	Miles	1.0	1308.6	\$8.33	\$10,901
Fishing	Acres	17.4	293.6	\$8.33	\$2,446
Canoeing	Acres	17.4	224.9	\$8.33	\$1,873
Bicycling	Miles	1.0	1308.6	\$8.33	\$10,901
Picnicking	Tables	6	680.0	\$8.33	\$5,664
Ice Fishing	Acres	17.4	146.8	\$8.33	\$1,223
Sledding	Area	1	5357.1	\$8.33	\$44,625
Total					\$77,633

Table B-3.11 – WP-4 Project Recreation Benefits

Recreational Activity	Units	Supply	Recreation Days	Value Per Rec Day	Recreation Benefits
Hiking	Miles	1.8	2340.0	\$8.33	\$19,492
Fishing	Acres	15.4	259.9	\$8.33	\$2,165
Canoeing	Acres	15.4	199.0	\$8.33	\$1,658
Bicycling	Miles	1.8	2340.0	\$8.33	\$19,492
Picnicking	Tables	6	680.0	\$8.33	\$5,664
Ice Fishing	Acres	15.4	129.9	\$8.33	\$1,082
Sledding	Area	1	5357.1	\$8.33	\$44,625
Total					\$94,179

Land Improvement Values

Upstream - The added value of land adjacent to the lake property, increasing the value of the land from a “developable” value to a “lakefront developable” value. The value of the improved land is approximated at \$45,000 (from WP-6&7 WSF Application (FYRA 2016) where development values had already reached the project area. The approximate average of all upland WP-2&4 tracts as shown in the table below represents pre-development values, but not necessarily appraisals) minus \$32,670 (parcels 11539003-11539005 from WP-6&7) which represents the difference of the appraised value of a lake lot with the assessed value of a developed lot. A value of \$12,000 was included in the table below detailing these benefits. These tracts surround the top of dam elevation limits of WP-2 and WP-4 only and can be seen in Figures B-3.5 and B-3.6 in the following pages.

Downstream – The removal of land from the floodplain, increasing the value of the land from a “floodplain” value to a “developable” value. To be conservative, an improved value of only \$12,000 per acre of land improved downstream of the dams is used in the Land Improvement Values table below. Along with the table calculating the values, a map showing both the parcel locations and the with- and with-out project 100-year flooding extents is provided. Downstream land improvements are only shown for WP-4 in Figure B-3.7 in the following pages. The WP-2 site already contained a dam, and no model was created to determine with- and with-out project flood extents.

Table B-3.12 – WP-2 and WP-4 Upstream Land Value Improvement Summary

Dam	Parcel ID/ Subdivision	Pre-Project Acreage	Acres Purchased	Acres Benefitting	Improved Value per Acre	Land Improvement Value
WP-2						
Upstream						
	Giles Pointe			31.83	\$12,000	\$381,960
	10465316			5.13	\$12,000	\$61,560
	Palisades Pointe			12.14	\$12,000	\$145,680
	Palisades West			48.33	\$12,000	\$579,960
	Palisades			34.77	\$12,000	\$417,240
WP-4						
Upstream						
	11114622	58.47	33.86	24.61	\$12,000	\$295,349
	10394664	38.54	24.02	14.52	\$12,000	\$174,294
	10411003	2.86	1.76	1.10	\$12,000	\$13,200
	Lakeview			75.55	\$12,000	\$906,600
	Highlands Ridge			37.46	\$12,000	\$449,520
	Standing Stone			35.59	\$12,000	\$427,080
	Willow Park			60.28	\$12,000	\$723,360
Upstream Total						\$4,575,803

Table B-3.13 – WP-4 Downstream Land Value Improvement Summary

Dam	Parcel ID	Without Project Inundated Acres	With Project Inundated Acres	Inundated Acres Removed	Improved Value per Acre	Land Improvement Value
WP-4						
Downstream						
	10403345	15.0	8.9	6.1	\$12,000	\$73,714
	10431535	2.3	2.0	0.4	\$12,000	\$4,263
	10431578	13.1	12.9	0.3	\$12,000	\$3,443
	10431616	9.2	8.7	0.5	\$12,000	\$5,636
	10764232	103.3	103.1	0.2	\$12,000	\$2,775
	10928928	1.8	1.3	0.5	\$12,000	\$6,541
	10928952	0.8	0.6	0.2	\$12,000	\$2,039
	10929029	2.3	2.2	0.2	\$12,000	\$1,929
	10973060	7.0	5.2	1.7	\$12,000	\$20,949
	11061421	6.7	4.5	2.2	\$12,000	\$26,364
	11067667	0.8	0.6	0.1	\$12,000	\$1,749
	11067675	2.0	1.9	0.1	\$12,000	\$616
	11181710	4.8	3.0	1.8	\$12,000	\$21,276
	11229187	1.4	0.7	0.7	\$12,000	\$8,371
	10928936	2.2	1.9	0.3	\$12,000	\$3,999
	10928952	0.8	0.6	0.2	\$12,000	\$2,039
	10929029	2.3	2.2	0.2	\$12,000	\$1,929
	10973060	7.0	5.2	1.7	\$12,000	\$20,949
	11061421	6.7	4.5	2.2	\$12,000	\$26,364
	11067667	0.8	0.6	0.1	\$12,000	\$1,749
	11067675	2.0	1.9	0.1	\$12,000	\$616
	11181710	4.8	3.0	1.8	\$12,000	\$21,276
	11229187	1.4	0.7	0.7	\$12,000	\$8,371
	11229195	0.3	0.1	0.2	\$12,000	\$2,377
	11229446	0.4	0.0	0.4	\$12,000	\$4,404
	11229454	1.1	0.4	0.7	\$12,000	\$8,523
	11276304	1.5	0.6	0.9	\$12,000	\$11,321
	11276312	1.4	0.8	0.7	\$12,000	\$7,838
	11276320	0.7	0.2	0.4	\$12,000	\$5,122
	11276339	0.2	0.0	0.2	\$12,000	\$2,885
	11301244	0.6	0.4	0.2	\$12,000	\$2,526
	11301252	0.7	0.3	0.4	\$12,000	\$4,663
	11301260	0.4	0.0	0.4	\$12,000	\$4,444
	11301295	0.6	0.0	0.6	\$12,000	\$6,836
	11301309	0.8	0.4	0.4	\$12,000	\$4,313
	11301317	0.8	0.5	0.3	\$12,000	\$3,370
	11301325	0.1	0.0	0.1	\$12,000	\$1,230
	11325909	0.4	0.2	0.2	\$12,000	\$2,602
	11325917	0.4	0.2	0.2	\$12,000	\$2,501
	11325925	0.3	0.2	0.2	\$12,000	\$2,071
	11325933	0.4	0.2	0.2	\$12,000	\$2,368
	11325941	0.3	0.0	0.3	\$12,000	\$3,326
	11325968	0.3	0.0	0.3	\$12,000	\$3,084
	11325976	0.3	0.0	0.3	\$12,000	\$3,673
	11351462	0.5	0.0	0.5	\$12,000	\$5,419
	11574127	9.1	8.8	0.3	\$12,000	\$3,370
	11575739	1.5	1.3	0.1	\$12,000	\$1,764
	11575740	1.9	1.6	0.3	\$12,000	\$3,100
	11580425	5.1	5.0	0.1	\$12,000	\$1,262
	11580427	10.5	9.9	0.6	\$12,000	\$7,105
	11600580	3.9	1.7	2.2	\$12,000	\$26,534
	11600581	3.0	2.2	0.7	\$12,000	\$8,531
	11600582	3.0	1.1	1.9	\$12,000	\$22,280
	11601188	3.2	3.1	0.1	\$12,000	\$1,215
	11605675	0.9	0.7	0.1	\$12,000	\$1,728
Downstream Total						\$438,741
Land Improvement Total						\$5,014,544

Figure B-3.5 – WP-2 Upstream Adjacent Tracts

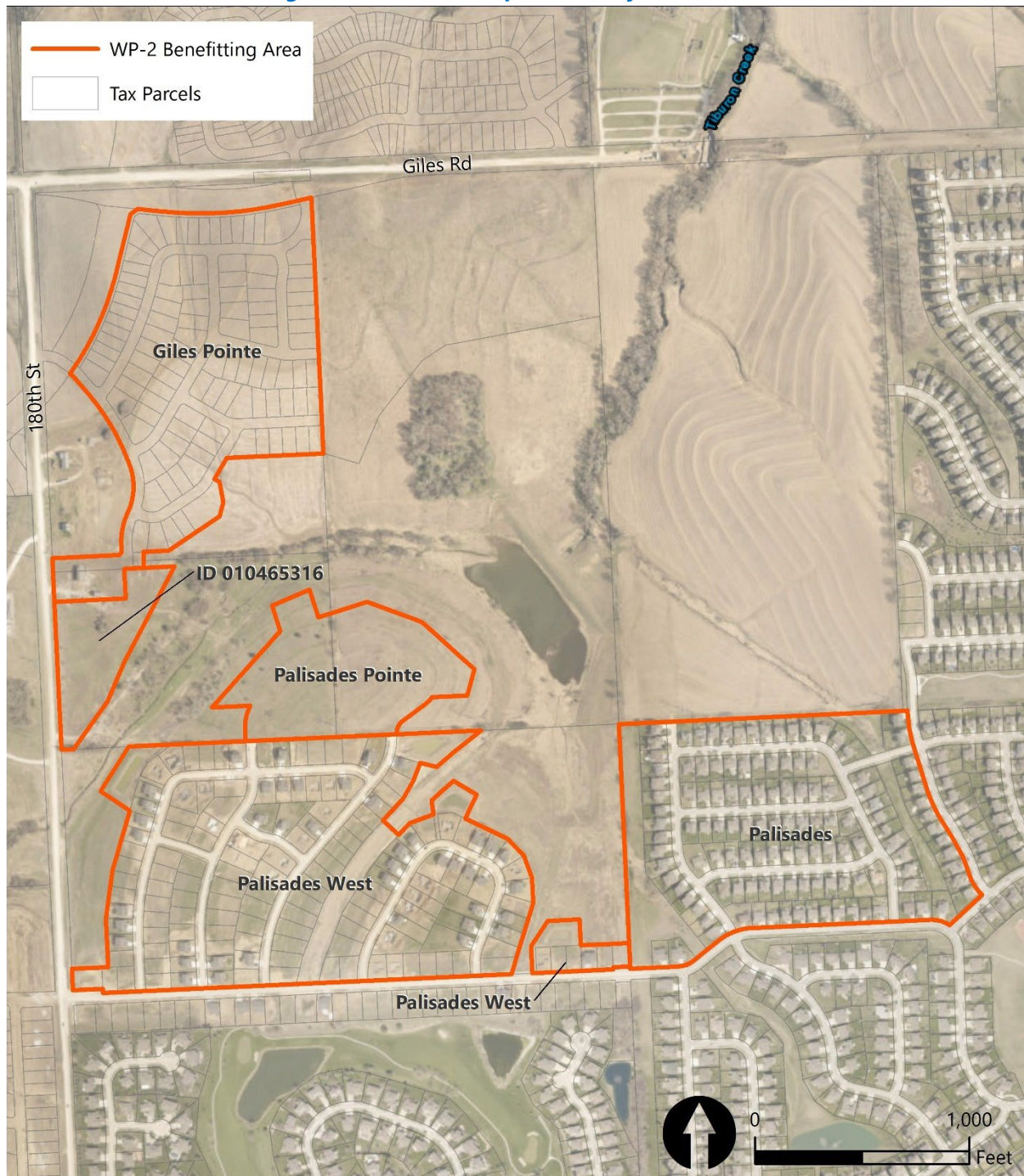


Figure B-3.6 – WP-4 Upstream Adjacent Tracts

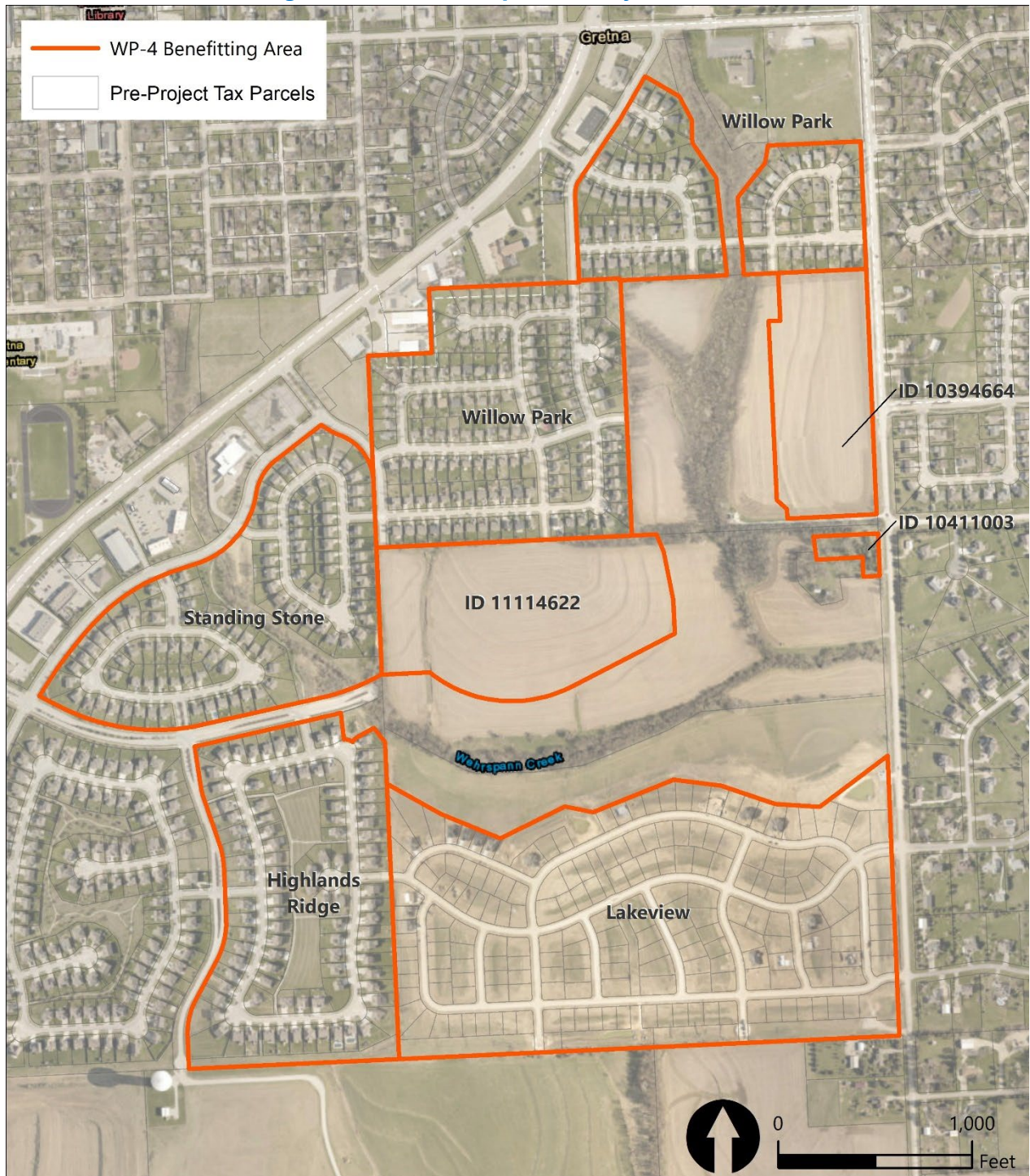


Figure B-3.7 – WP-4 Downstream Adjacent Tracts

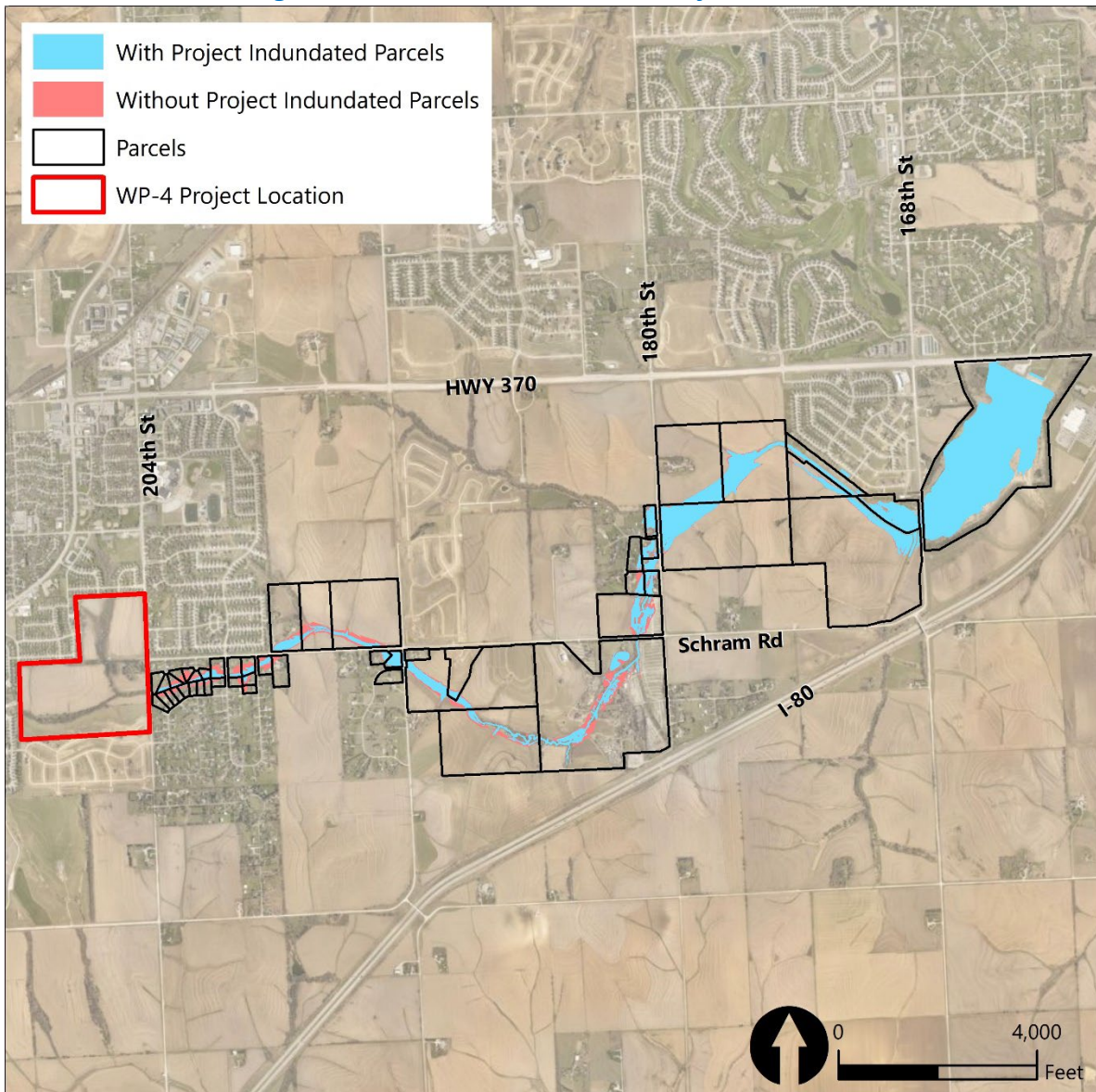


Table B-3.14 – Cash Flow Stream

Project Year(s)	Calendar Year(s)	Cash Flow Categories	Costs	Benefits	Details	
0	2017	Engineering, Planning, Permitting	\$380,126		WP-2,4 Preliminary Design	
		Professional Services				
		Land Rights				
		Capital Improvement Costs				
		Total Costs:	\$380,126			
		Flood Damage Reduction Benefits		\$0		
		Recreation Benefits		\$0		
		Total Benefits:		\$0		
1	2018	Engineering, Planning, Permitting	\$429,771		WP-2,4 Preliminary Design	
		Professional Services				
		Land Rights	\$1,650,998			WP-2 Outlots G and M, WP-4 Lot 9
		Capital Improvement Costs				
		Total Costs:	\$2,080,769			
		Flood Damage Reduction Benefits		\$0		
		Recreation Benefits		\$0		
		Total Benefits:		\$0		
2	2019	Engineering, Planning, Permitting	\$13,474		WP-2,4 Preliminary Design	
		Professional Services				
		Land Rights				
		Capital Improvement Costs				
		Total Costs:	\$13,474			
		Flood Damage Reduction Benefits		\$0		
		Recreation Benefits		\$0		
		Total Benefits:		\$0		
3	2020	Engineering, Planning, Permitting	\$148,492		WP-2,4 Final Design	
		Professional Services				
		Land Rights	\$629,911			WP-2 Lot 10
		Capital Improvement Costs				
		Total Costs:	\$778,402			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		
4	2021	Engineering, Planning, Permitting	\$483,933		WP-2,4 Final Design, WP-2 Water Quality Basin Construction Services	
		Professional Services	\$25,000			Land Rights Assistance and Legal Services
		Land Rights	\$2,255,456			
		Capital Improvement Costs	\$360,510			WP-2 Outlot K and Lots 6A & 6B & 7 WP2 Water Quality Basin Construction
		Total Costs:	\$3,124,899			
		Flood Damage Reduction Benefits				
		Recreation Benefits				
		Total Benefits:		\$0		

5	2022	Engineering, Planning, Permitting	\$232,771		WP-2 Final Design, WP-4 Final Design
		Professional Services	\$50,000		Land Rights Assistance and Legal Services
		Land Rights	\$3,329,378		WP-2, WP-4 Remaining Land
		Capital Improvement Costs	\$0		
		OMR&R			
		Total Costs:	\$3,612,149		
		Flood Damage Reduction Benefits			
Recreation Benefits					
		Total Benefits:		\$0	
6	2023	Engineering, Planning, Permitting	\$799,033		WP-2,4 Construction Services
		Professional Services	\$25,000		Land Rights Assistance and Legal Services
		Land Rights	\$880,000		WP-2 (One Remaining Parcel to be Purchased)
		Capital Improvement Costs	\$9,890,952		WP-4 (March), WP-2 (October) Construction Begins
		OMR&R			
		Total Costs:	\$11,594,985		
		Flood Damage Reduction Benefits			
Recreation Benefits					
		Total Benefits:		\$0	
7	2024	Engineering, Planning, Permitting	\$563,067		WP-2,4 Construction Services
		Professional Services			
		Land Rights			
		Capital Improvement Costs	\$6,035,459		WP-2,4 Construction
		OMR&R			
		Total Costs:	\$6,598,526		
		Flood Damage Reduction Benefits			
Recreation Benefits					
		Total Benefits:		\$0	
8	2025	Engineering, Planning, Permitting	\$178,033		WP-2 Construction Services
		Professional Services			
		Land Rights			
		Capital Improvement Costs	\$1,643,085		WP-2 Construction
		OMR&R			
		Total Costs:	\$1,821,118		
		Land Value Benefits		\$3,428,144	WP-4
		Flood Damage Reduction Benefits		\$75,799	
		Environmental Benefits		\$374,782	
		Recreation Benefits		\$94,179	
		Total Benefits:		\$3,972,904	
9-49	2026-2066	OMR&R	\$4,566,239		WP-2,4 @ 0.75%
		Total Costs:	\$4,566,239		
		Land Value Benefits		\$1,586,400	WP-2
		Flood Damage Reduction Benefits		\$6,855,833	WP-2, 4
		Environmental Benefits		\$35,559,633	WP-2, 4
		Recreation Benefits		\$7,044,294	WP-2 Benefits begin, WP-4 Benefits begin
		Total Benefits:		\$51,046,160	

*Funding assistance was not requested for money spent prior to the grant approval estimated August 2023

Table B-3.15 – Benefit:Cost Ratio

Benefit:Cost Analysis							
Benefit Category	Calculated Benefit	# of Occurrences Over Lifetime	Lifetime Benefits	Cost Category	Calculated Costs	# of Occurrences Over Lifetime	Total Costs
Land Value Improvements				Engineering, Planning, Permitting	\$3,228,700	1	\$3,228,700
WP-2	\$1,586,400	1	\$1,586,400	Professional Services	\$100,000	1	\$100,000
WP-4	\$3,428,144	1	\$3,428,144				
Flood Damage Reduction				Land Rights	\$8,745,743	1	\$8,745,743
WP-2	\$91,416	41	\$3,748,076	Capital Improvement Costs	\$17,930,006	1	\$17,930,006
WP-4	\$75,799	42	\$3,183,556				
Environmental Benefits				OMR&R			
WP-2	\$492,526	41	\$20,193,563	WP-2	\$51,997	41	\$2,131,877
WP-4	\$374,782	42	\$15,740,852	WP-4	\$57,961	42	\$2,434,362
Recreation							
WP-2	\$77,633	41	\$3,182,966				
WP-4	\$94,179	42	\$3,955,507				
Total Benefits:			\$55,019,064	Total Costs:			\$34,570,688
Benefit:Cost Ratio = 1.59:1							

SECTION D

Letters of Support

P-MRNRD Letter of Support for WP-2&4



July 28, 2022

Nebraska Natural Resources Commission
301 Centennial Mall South
P.O. Box 94676
Lincoln, NE 68509-4676

RE: Water Sustainability Fund Application - Basin WP-2 and WP-4 Project

Dear Commissioners,

The Papio-Missouri River Natural Resources District (District) and the Papillion Creek Watershed Partnership have worked together since 2001 to manage both water quantity and water quality of the streams in the Papio Watershed.

The Basin WP-2 and WP-4 projects are part of a larger system of flood control reservoirs, levees, channel improvements, and development policies to protect people and property from the devastating effects of flooding. Located in Gretna, Nebraska, these projects will protect existing homes, businesses, and public infrastructure from damage, loss, and costly repairs.

The District is requesting \$9,787,462 in financial assistance from the Water Sustainability fund for final design, permitting, land acquisition, and construction of the projects.

The District's Board of Directors approved the implementation plan for the Papillion Creek Watershed which includes this project on September 3, 2021 and is committed to funding the local share of this project. The Board also approved the submission of this application on July 14, 2022. It is anticipated that construction will begin in Fiscal Year 2022 and these funds will be available for the duration of the project.

If you have any questions or require further information, please contact me at (402) 444-6222.

Sincerely,

John Winkler
General Manager

City of Gretna Letter of Support for WP-2&4



City of Gretna
204 N McKenna Avenue
P.O. Box 69
Gretna, NE 68028

July 26, 2022

Nebraska Natural Resources Commission
301 Centennial Mall South
P.O. Box 94676
Lincoln, NE 68509-4676

RE: Papio Watershed Basin WP-2 & WP-4 Lake and Recreation Area, Gretna, Nebraska

Dear Commissioners and Scoring Committee Members,

The Papio-Missouri River Natural Resources District (NRD) is implementing a multi-year flood damage reduction strategy program for the Papillion Creek Watershed. The strategies include the implementation of reservoirs, levees, channel stabilization, drainage improvements, and low impact development along with community outreach and other educational opportunities.

The City of Gretna (City) partnered with the NRD on the WP-4 project to operate the area as a recreation site (reference the Interlocal Cooperative Agreement approved by Gretna City Council on June 7, 2022). The City's involvement includes input during the design phase and financial contribution for the construction of the road extension that is a part of the overall WP-4 project. The City is also participating in the construction administration and observation of said road extension. The WP-4 project is vital to the community's flood reduction, community enhancement, long-term sustainability, and economic benefit. The City is in full support of the WP-4 project and requests approval of this Water Sustainability Fund application.

Additionally, the NRD has another project (WP-2) that is only recently absorbed into the City's Extraterritorial Jurisdiction (ETJ) from an annexation effective in August of 2021. Although within the ETJ of the City, there is no agreement for the City's financial or operational participation with this project. Nonetheless, the City supports the WP-2 project and requests approval of this Water Sustainability Fund application.

Sincerely,

A handwritten signature in blue ink, appearing to read "Paula J. Dennison", is written over a light blue circular stamp.

Paula J. Dennison, AICP
City Administrator
City of Gretna, NE

Sarpy County Letter of Support for WP-2&4

Sarpy County Board of Commissioners

1210 GOLDEN GATE DRIVE #1250
PAPILLION, NE 68046-2895
402-593-4155
www.sarpy.gov
ADMINISTRATOR Dan Hoins
DEPUTY ADMINISTRATOR Scott Bovick
CHIEF FINANCIAL OFFICER Bill Conley



COMMISSIONERS
Don Kelly District 1
David Klug District 2
Angi Burmeister District 3
Gary Mixan District 4
Jim Warren District 5

July 27, 2022

Nebraska Natural Resources Commission
301 Centennial Mall South
P.O. Box 94676
Lincoln, NE 68509-4676

RE: Papio Watershed Basin WP-2 and WP-4 Lake and Recreation Area, Gretna, Nebraska

Dear Commissioners and Scoring Committee Members,

For years, the Papio-Missouri River Natural Resources District has been implementing a flood damage reduction strategy for the Papillion Creek Watershed. These strategies include the use of reservoirs, levees, channel improvements, low impact development, community outreach and other projects.

As part of the Papillion Creek Watershed Partnership, Sarpy County supports the construction of two new flood control reservoirs identified as WP-2 and WP-4. These projects are vital to the area's safety, long-term sustainability and economic prosperity.

We encourage you to approve the Water Sustainability Fund application for these projects.

Sincerely,

Don Kelly,
District 1 Commissioner and Chairman
Sarpy County Board of Commissioners

NGPC Letter of Support for WP-2&4



2200 N. 33rd St. • P.O. Box 30370 • Lincoln, NE 68503-0370 • Phone: 402-471-0641

July 27, 2022

John Winkler, General Manager
Papio-Missouri River NRD
8901 S. 154th Street
Omaha, NE 68138-6222

Mr. Winkler,

We have received your letter requesting technical assistance & funding support through the Federal Sport Fish Restoration and Boating Access Programs for the proposed WP-4 reservoir in Gretna and WP-2 reservoir in Sarpy County, Nebraska. I understand that our Fisheries Division staff (Jordan Katt & Aaron Blank) have been working with your staff members Amanda Grint & Lori Ann Laster along with HDR Engineering, Inc, JEO Consulting Group & FYRA Engineering in planning the recreational components of these future public reservoirs.

The NGPC is excited to see additional public waters being developed in the Omaha area and serving eastern Nebraska. The Papio NRD and NGPC has developed a strong partnership on new reservoir construction, and as in our previous collaborations we expect these reservoirs and their recreational features to be heavily utilized by all our constituents. A Boating Access & Sportfish Restoration Grant has been awarded for site WP-4 in the amount of \$350,000. In addition, a Boating Access Grant in the amount of \$325,000 has been submitted for review for site WP-2.

If you should have any questions, please contact Jordan Katt, Boating Access Coordinator at 402-405-4582 jordan.katt@nebraska.gov or Aaron Blank, SE District Fisheries Manager 402-471-7647 aaron.blank@nebraska.gov in our Lincoln offices.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tony Barada". The signature is stylized and includes a large flourish at the end.

Tony Barada
Assistant Fisheries Division Administrator
Nebraska Game and Parks Commission

cc: Dean Rosenthal, Fisheries Division Administrator
Jordan Katt, Boating Access Coordinator
Aaron Blank, SE District Fisheries Supervisor

COVER LETTER

APPLICATION

SUPPLEMENTAL
INFORMATION
ATTACHMENT

BIBLIOGRAPHY

BIBLIOGRAPHY



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 **HOUSTON**
engineering, inc.

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Referenced in Application:

Section B-3, C-12

Referenced in SIA:

Section B-3

FYRA Engineering (FYRA). 2018a. 60% Design Report for Papillion Creek Regional Detention Site WP-2 Dam and Associated Improvements. Omaha, NE.

Referenced in Application:

Section B-1(a), B-9, C-4, C-15

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Section B-3

FYRA Engineering (FYRA). 2018b. Dam Site WP-2 Hydrology and Hydraulics Technical Memorandum. Omaha, NE.

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Section B-1(a)

FYRA Engineering (FYRA). 2018c. Wetland Delineation Report – WP-2. Omaha, NE.

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Section B-1(a), B-12

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Referenced in Application:

Section B-1(a), B-7, C-14

FYRA Engineering (FYRA). 2018e. Final Mitigation Plan Report– WP-2. Omaha, NE.

Referenced in Application:

Section B-12

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Section B-1(a)

HDR. 2009. Papillion Creek Watershed Management Plan.

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JEO. 2017. Wetland Delineation Report – Retention Basin WP-4. Gretna, NE.

Referenced in Application:
Section B-1(a), C-13

JEO. 2018a. 60% Design Report for Papillion Creek Regional Detention Site WP-4 Dam and Associated Improvements. Omaha, NE.

Referenced in Application:
Section B-1(a), B-9, C-4, C-15

JEO. 2018b. Stream Assessment – WP-4. Omaha, NE.

Referenced in Application:
Section B-1(a), B-7, C-14

JEO. 2018c. 404 Permit Application – WP-4. Omaha, NE.

Referenced in Application:
Section B-1(a), B-12

JEO. 2022. WP-4 Reservoir and Associated Improvements

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Papio-Missouri River Natural Resources District (P-MRNRD). 2021a. P-MRNRD WP-2 Permits

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[Referenced in Application:](#)
[Section B-4, B-5](#)

Papio-Missouri River Natural Resources District (P-MRNRD). 2022a. P-MRNRD WP-4 Permits

[Referenced in Application:](#)
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Papio-Missouri River Natural Resources District (P-MRNRD). 2022b. P-MRNRD WP-2 Proof of Ownership

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[Section B-10.B](#)

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