

**DRAFT
WATERSHED PLAN
AND
ENVIRONMENTAL ASSESSMENT**

**REHABILITATION OF GRADE STABILIZATION
STRUCTURE 2
TURTLE CREEK WATERSHED
SARPY COUNTY, NEBRASKA
JULY 7, 2006**



**DRAFT WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT
for the
REHABILITATION OF GRADE STABILIZATION STRUCTURE 2
TURTLE CREEK WATERSHED
SARPY COUNTY, NEBRASKA
1ST CONGRESSIONAL DISTRICT**

ABSTRACT

This plan was developed in response to the varied concerns of the Local Sponsoring Organization, Papio-Missouri River Natural Resources District. Project benefits are grade stabilization, maintained existing measures for improved downstream water quality, maintained land values, and maintained existing fish and wildlife habitat resources. The recommended plan, Rehabilitation to Grade Stabilization Structure Alternative would rehabilitate Structure 2 to current NRCS full-flow grade stabilization structure requirements and extend its life for 100 years. The following actions are proposed: the existing principal spillway would be removed, the auxiliary spillway would be abandoned, the top of dam would be lowered to remove storage capacity and a broad-crested weir chute spillway would be built. Existing embankment removed from the structure would be placed in the existing auxiliary spillway and graded to drain. Total project costs are \$552,000, of which \$417,600 (65 percent) is proposed to be paid by Public Law 566 funds and \$134,400 (35 percent) will be paid by the sponsor. This document is intended to fulfill requirements of the National Environmental Policy Act and to be considered for authorization of Public Law 566 funding.

The original work plan was prepared, and works of improvement have been installed, under the Authority of Public Law 83-566 (as amended) - Watershed Protection and Flood Prevention Act of 1954. This supplement is prepared under the Authority of Public Law 83-566 (as amended) - Watershed Protection and Flood Prevention Act of 1954 as further amended by Section 313 of Public Law 106-472 and in accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 43221 et seq).

Prepared by:

Papio-Missouri River Natural Resources District
U.S. Department of Agriculture:
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for the
REHABILITATION OF GRADE STABILIZATION STRUCTURE 2**

**TURTLE CREEK WATERSHED
SARPY COUNTY, NEBRASKA**

Prepared by
**U.S. Department of Agriculture, Natural Resources Conservation Service
Papio-Missouri River Natural Resources District
and
HDR Engineering, Inc.**

Prepared under the Authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended by Section 313 of Public Law 106-472, The Small Watershed Rehabilitation Amendments of 2000, and in accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 43221 et seq.).

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Comments are to be received by August 26, 2006.

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SUMMARY

WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT FOR TURTLE CREEK WATERSHED SARPY COUNTY, NEBRASKA 1ST CONGRESSIONAL DISTRICT

Sponsoring Local Organization (SLO)

Papio-Missouri River Natural Resources District

Proposed Action

The proposed action (the Project) is the rehabilitation of Turtle Creek Watershed Structure 2 (see Exhibit S-1, Project Map) for the SLO under the Natural Resources Conservation Service (NRCS) Watershed Rehabilitation Program.

Purpose and Need for Action

The purpose of this Federal action is to continue to provide grade stabilization protection in a manner that minimizes the risk of loss of human life and is both cost efficient and environmentally acceptable.

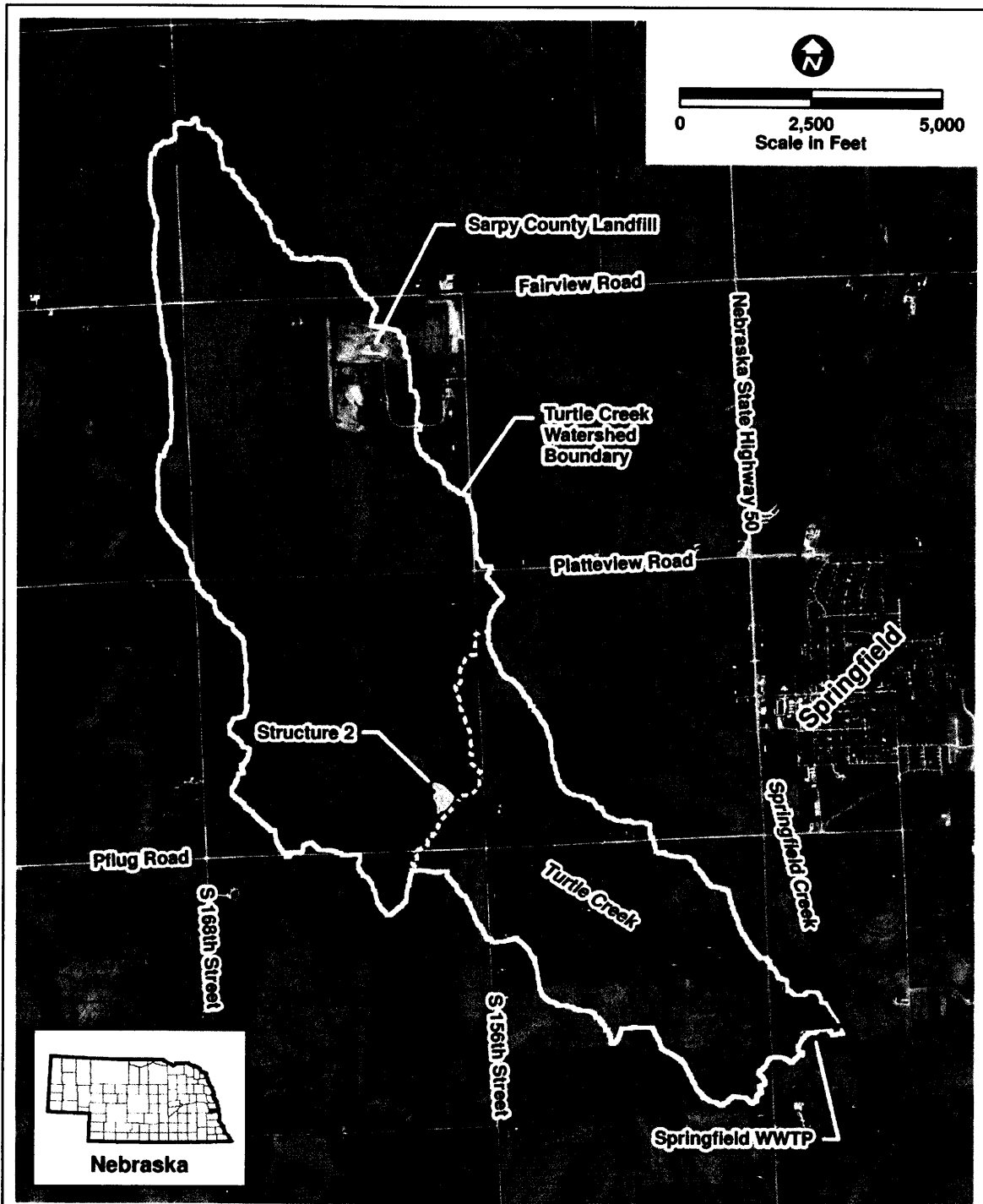
Due to the changes in the State of Nebraska and NRCS dam hazard criteria, the existing structure no longer meets the NRCS safety and performance standards for a High Hazard Class structure. To meet existing High Hazard Class criteria, the principal spillway conduit would need to be enlarged and the auxiliary spillway modified.

Rehabilitation of the structure will provide continuation of grade control for an additional 100 years, minimize the risk of loss of life, and address identified problems.

Description of the Preferred Alternative

The Rehabilitation to Grade Stabilization Structure Alternative would rehabilitate Turtle 2 to a full-flow grade stabilization structure and extend its life for 100 years. The existing principal spillway would be removed, the auxiliary spillway would be abandoned, the top of dam would be lowered to remove storage capacity and a broad-crested weir chute spillway would be built. Existing embankment removed from the structure would be placed in the existing auxiliary spillway and graded to drain.

Z:\NRCS\26886_Dam_Rehab_Task_Order_2\map_docs\arcmap\Turtle_Creek_Project_Location_Map.mxd



Source: Aerial Photography, Metropolitan Area Planning Agency, flown by Horizons Inc. in April 2004.

HDR

**Project Location Map
Turtle Creek Watershed Structure 2**

NRCS Watershed Rehabilitation Program

DATE

JUN 2006

FIGURE

S-1

Resource Information

Table S-1 provides relevant information for the Project.

Table S-1
Resource Information

Resource	Structure 2
Existing Structure Dimensions	Structure Height – 30.3 feet Structure Width – 215 feet at base and 12 feet at top. Width at base is sum of widest upstream toe 120 feet and extent of stilling basin downstream 95 feet. Base at principal spillway cross-section equals 165 feet. Structure Length – Approximately 970 feet Principal Spillway Size and Type – 42-inch-diameter CMP Auxiliary Spillway Width – 70 feet Normal Pool Area – 6.8 acres Maximum Pool Depth – 4.0 feet Floodwater Retarding Capacity (at Auxiliary Spillway Crest) – 126 acre-feet
Latitude and Longitude	96° 9' 34.30" W; 41° 4' 37.08" N
8-Digit Hydrologic Unit Code	10200202 Lower Platte (102300) Lower Platte (06)
Floodplains	Structure and dam breach inundation is not located within a regulatory floodplain.
Climate	Continental and temperate, characterized by hot summers; cold winters; mild, wet springs; and mild, dry falls. Mean temperature: January = 21° F July = 79° F
Annual Precipitation	25 to 36 inches
Topography	Rolling to hilly, with small valleys with narrow floodplains
Watershed Size (acres)	Structure 2 – 1,315 acres Turtle Creek Watershed – 1,922 acres
Land Ownership	100% public, 3.9 acres SLO easement
Population/Demographics (Sarpy County)	Population: 122,595 Demographics: White – 87% Hispanic – 4% African American – 4% American Indian and Alaska Native – 0% Asian – 2% Native Hawaiian and other Pacific Islander – 0% Some other race – 0% Two or more races – 2%

Resource	Structure 2
Beneficiary Profile	Population/Income Profile (Sarpy County) Total Households - 43,500 Households with Income in 1999 Below Poverty Level - 1,720 Percent of Households Below Poverty Level - 4% Median Household Income 1999 - \$54,000 Population/Age (Sarpy County) Total Population - 122,600 Age 17 and under - 37,400 Age 18-64 - 77,070 Age 65 or over - 8,130
Average Farm Size (Sarpy County) Farms Present	296 acres 355

Sources: Douglas/Sarpy County Soil Survey; U.S. Census, 2000; USDA 2002 Census of Agriculture.

Structure 2 is located within the jurisdiction of Sarpy County, but the lower portion of Turtle Creek is located within the planning jurisdiction of the City of Springfield. The 2005 Draft Sarpy County Comprehensive Plan projected that the drainage area above and below Structure 2 would become fully urbanized by 2030. The uppermost portion of the watershed north of Platteview Road is projected to be developed as low density residential (lots ≥ 2 acres). The remainder of the watershed above and below Structure 2 is projected to be developed as medium density residential (0.25-acre lots). Medium density residential land use is planned above Structure 2.

Table S-2
Summary of Land Use

Land Use Classification	Structure 2 (acres ¹)		Turtle Creek Drainage Basin (acres ¹)	
	Exist.	Future	Exist.	Future
Agricultural	1,315	0	1,922	0
Medium Density Residential (0.25-acre lots)	0	538	0	1,145
Low Density Residential (lots ≥ 2 acres)	0	777	0	777
Total (acres)	1,315	1,315	1,922	1,922

Notes:

¹ Rounded to the nearest acre.

Alternative Plans Considered

A range of alternatives to satisfy the purpose of the Project was initially considered and included both structural and non-structural concepts. Table S-3 summarizes the alternatives considered in conjunction with the rehabilitation of Structure 2. A range of sediment storage values, from 50 to 100 years, was evaluated. After consideration of costs, project objectives, and site constraints, the longest reasonable and practical sediment storage period of 100 years was selected.

Table S-3
Range of Alternatives Considered

Alternative	Summary of Alternative	Screening of Alternative	Studied in Further Detail
Rehabilitation to Original Hazard Classification with Downstream Breach Inundation Property Acquisition	This alternative would rehabilitate the structure to its original Low Hazard Class, provide a 100-year design life, secure land and properties within the breach inundation area to remove existing hazards and prohibit development in perpetuity, and remove and replace two existing downstream drainage structures that are overtopped or would likely fail during a breach event.	The total estimated cost for this alternative is \$1,633,000. This alternative would meet the purpose and need for the Project, is technically reliable, but appears cost prohibitive.	No , found not reasonable due to cost. This alternative was not carried forward for detailed study.
Construction of Levee in Downstream Breach Inundation	This alternative would rehabilitate the structure to its original Low Hazard Class with a 100-year design life, construct an earthen levee to contain the breach flows, and upgrade existing roadway drainage structures.	This alternative would include the cost of the Rehabilitation to Original Hazard Class with Downstream Breach Inundation Property Acquisition Alternative (minus purchase of properties protected by the levee), plus the cost to purchase downstream properties not protected by the levee and to construct an earthen levee. A detailed estimate was not developed after initial cost estimates for this alternative were significantly higher than other feasible alternatives.	No , found not reasonable due to cost. This alternative was not carried forward for detailed study.
Improvements to Channel in Downstream Breach Inundation	This alternative would rehabilitate the structure to its original Low Hazard Class with a 100-year design life, improve the downstream channel capacity to convey the breach flows without inundating adjacent houses, and upgrade existing roadway drainage structures.	This alternative would include the cost of the Rehabilitation to Original Hazard Class with Downstream Breach Inundation Property Acquisition Alternative (minus purchase of properties protected by the levee), plus the cost to purchase downstream properties to construct an earthen levee. A detailed estimate was not developed after initial cost estimates for this alternative were significantly higher than other feasible alternatives.	No , found not reasonable due to cost. This alternative was not carried forward for detailed study.
No-Action/Future Without Federal Project	This alternative is the most likely course of action should the SLO receive a short-term legal mandate to fix or remove the dam and should no Federal funding be available for rehabilitation. A "sponsor's breach" would remove the principal spillway riser and conduit and involve the construction of a breach through the embankment to allow unimpeded flow of Turtle Creek.	The total estimated cost for this alternative is \$188,000. This alternative does not meet purpose and need for the Project, but is required to be carried forward.	Yes . This alternative was carried forward for detailed study.

Alternative	Summary of Alternative	Screening of Alternative	Studied in Further Detail
Federal Decommissioning	This alternative would result in the complete removal of the constructed embankment and deposited sediment, reconnection and restoration of the stream and floodplain, construction of concrete drop structures and a drainage channel, and seeding.	The total estimated cost for this alternative is \$1,204,000. This alternative would meet the purpose and need for the Project and is technically reliable.	Yes. This alternative was carried forward for detailed study.
Rehabilitation to High Hazard Classification	This alternative would rehabilitate the structure to High Hazard Class requirements and extend its life for 100 years.	The total estimated cost for this alternative is \$1,092,000. This alternative would meet the purpose and need for the Project and is technically reliable.	Yes. This alternative was carried forward for detailed study.
Rehabilitation to Grade Stabilization Structure	This alternative would rehabilitate the structure to full-flow grade stabilization structure requirements and extend its life for 100 years. Flows would not be stored, but would flow through the structure.	The total estimated cost for this alternative is \$552,000. This alternative would meet the purpose and need for the Project and is technically reliable.	Yes. This alternative was carried forward for detailed study.
National Economic Development (NED) Alternative	The NED Alternative is the alternative or combination of alternatives that reasonably maximizes the net economic benefits consistent with protecting the nation's resources.	The NED Alternative for this Project is Rehabilitation to Grade Stabilization Structure	Yes. This alternative was carried forward for detailed study.

Project Costs

Table S-4 summarizes the cost share allocation of Project construction costs between the SLO and NRCS for the Rehabilitation to Grade Stabilization Structure Alternative.

Table S-4
Cost Share Allocation of Total Estimated Eligible Project Costs,
Rehabilitation to Grade Stabilization Structure Alternative

Works of Improvement	SLO	PL 83-566 Funds	Total Estimated Eligible Project Costs ^{1,2}
Rehabilitation of Structure 2	\$134,400	\$417,600	\$552,000

Notes:

¹ Estimated Project Cost excludes \$168,000 in NRCS Engineering and Project Administration costs.

² Cost share on Structure 2 is 65 percent PL 83-566 funds and 35 percent SLO. The cost share percentages are computed for and administered during construction.

Project Benefits

Project benefits are continued grade stabilization.

Net Beneficial Effects

Economic benefits and impacts associated with Structure 2 were calculated based on the grade stabilization benefits the structure was intended to provide.

The National Economic Development (NED) alternative is the alternative that has the highest net economic benefits while protecting the nation's natural resources. Table S-5 compares each alternative relative to potential benefits derived or reduced for each.

**Table S-5
Economic Benefits¹ and Comparison of Alternatives**

Alternative	Average Annual Cost²	Average Annual Benefits	Benefit-Cost Ratio (Most Probable Value)³
No-Action/Future Without Federal Project	\$9,700	\$0	0
Federal Decommissioning	\$66,500	\$69,000	1.04
Rehabilitation to High Hazard Classification	\$59,900	\$69,000	1.15
Rehabilitation to Grade Stabilization Structure	\$31,300	\$69,000	2.20

Notes:

¹ Average annual values based on a February 2006 price base.

² Average annual cost includes installation, operation and maintenance.

³ The benefit-cost ratio is the benefit of an activity per dollar of cost. The higher the ratio number, the greater the benefits are compared to the cost of the Project.

Period of Analysis

The period of analysis is 100 years.

Project Life

The Project life is based on a 100-year design life for Structure 2.

Environmental Impacts

Table S-6 describes the resource elements that were identified during scoping and summarizes the potential impacts related to the Rehabilitation to Grade Stabilization Structure Alternative.

**Table S-6
Summary of Resource Concerns and Impacts of the
Rehabilitation to Grade Stabilization Structure Alternative**

Identified Resource Concern	Summary of Concern	Effects Summary for Rehabilitation to Grade Stabilization Structure (Preferred/NED) Alternative
Human Health and Safety/Public Health and Safety	Even though the primary purpose of the structure is to provide grade stabilization there are safety concerns associated with a potential breach and downstream inundation.	Human health and safety/public health and safety (health and safety) would increase by removing the threat of a breach inundation. The constructed breach would eliminate the structure's ability to store runoff, eliminating normal and flood storage capabilities of the structure, thereby eliminating the hazard of flooding due to an unexpected failure of the structure. The incidental flood control benefits would also be eliminated. As such, the downstream flooding conditions would be similar to those that existed prior to the construction of the structure.
Existing Structure 2	Current dam safety criteria and the need to meet High Hazard Class dam requirements.	The weir would eliminate the structure's ability for floodwater storage, thereby eliminating the hazard of flooding due to an unexpected failure of the structure. This would no longer be a hazard class dam structure.
Water Quality	Concern regarding urbanization on impact to water quality is outside of the scope of this Project. Water quality as it relates to sedimentation is a potential concern.	Reduces existing water quality enhancement opportunity due to lack of floodwater retarding capacity.

Identified Resource Concern	Summary of Concern	Effects Summary for Rehabilitation to Grade Stabilization Structure (Preferred/NED) Alternative
Erosion and Sedimentation	As the primary purpose of the structure is grade stabilization control, control of erosion and sedimentation is a concern.	The grade stabilization function of the structure would be maintained, thereby preventing gully formation and its associated sediment production. This alternative would continue to provide sediment storage up to the normal pool elevation. The sediment storage function above the normal pool elevation would not be retained and thus the sediment-laden water would be transported directly downstream.
Flood Control	While the primary purpose of the existing structure is grade stabilization control, incidental flood control opportunities also occur.	Provides no incidental flood control opportunities.
Recreation	Structure 2 provides passive recreational opportunities. The surface water acreage is not great enough to support aquatic recreation opportunities.	After construction, the recreational opportunities would be consistent with the current opportunities available.
Transportation	Could have short-term effects on local transportation systems.	Construction-related activities such as ingress and egress to site and disposal of removed principal spillway materials.
NRCS Planning Requirements	Summary of Planning Consideration	Effects Summary for Rehabilitation to Grade Stabilization Structure (Preferred/NED) Alternative
Cultural Resources	The Nebraska State Historic Preservation Office (SHPO) is being contacted. The area of potential effect will be identified and reviewed by the NRCS Cultural Resources Specialist who will coordinate with the State Historic Preservation Officer as needed.	Construction in previously undisturbed areas would need to be evaluated for potential affects. No known cultural resources have been identified through scoping/planning.
Endangered and Threatened Species	The U.S. Fish and Wildlife Service, Mountain-Prairie Region has a listing of potential species and habitat by county. For Sarpy County, the five species listed are: bald eagle (<i>Haliaeetus leucocephalus</i>), interior least tern (<i>Sterna antillarum athalassos</i>), pallid sturgeon (<i>Scaphirhynchus albus</i>), piping plover (<i>Charadrius melodus</i>), and the western prairie fringed orchid (<i>Platanthera praeclara</i>). Also, the impoundment of water due to the Project could result in a potential depletion to Platte River flows.	<u>Bald eagle</u> : No effect. No active nest or winter roost sites are known within 1 mile of the Project area. <u>Western prairie fringed orchid</u> : No effect. No habitat in area of potential effect. Habitat: natively vegetated subirrigated meadow, floodplain, lower stream terraces, and sidehill seep type wetlands in a native tallgrass prairie or subirrigated meadow. <u>Interior least tern and piping plover</u> : No effect. No habitat in area of potential effect. Also see information below regarding effects to Platte River. <u>Pallid Sturgeon and Platte River flows</u> : No effect. The analysis of instream flow depletions of the Platte River was performed and for the critical months of February through July the average monthly depletions to Platte River flow as a result of implementation of this alternative would be net loss of 0.5 acre-feet per year. There are no adverse effects to species as relating to the Platte River flows (as per the July 2001 letter of concurrence from USFWS of "No Adverse Effect" for projects resulting in less than 25 acre-feet per year threshold).

NRCS Planning Requirements	Summary of Planning Consideration	Effects Summary for Rehabilitation to Grade Stabilization Structure (Preferred/NED) Alternative
Fish and Wildlife Resources	Alternatives involving stream modifications will need to have a consultation completed with the U.S. Fish and Wildlife Service and full considerations given to their recommendations. Fish and wildlife habitat and populations are present in the Project area and compliance with the Fish and Wildlife Coordination Act is required.	Effects on wildlife or habitats would be measurable or perceptible but localized within a small area. <u>Aquatic Habitat</u> : There would be no effect to aquatic habitat as a result of this alternative as the normal pool will remain unchanged from existing conditions. <u>Riparian Areas</u> : Approximately 100 feet of existing channel will require stabilization in the form of rip rap as a result of this alternative. However, no long term effects to the associated riparian area would be anticipated as re-vegetation is anticipated to occur.
Migratory Birds	Migratory birds may use the areas surrounding the existing project for nesting.	To avoid impacts, needed vegetation clearing would be proposed to occur outside of the primary nesting period of April 1 to July 15.
Prime and Unique Farmlands	Some prime farmland is present in the Project area. No unique farmland is present.	Impacts are below the threshold of concern as identified by the score on Form AD-1006 "Farmland Conversion Impact Rating".
Riparian Area	Riparian areas exist within the Project area.	See "Fish and Wildlife Resources"
Wetlands - NRCS Policy	Wetlands are present. A total of 14.2 acres of artificial wetlands and 0.15 linear wetlands were identified.	A temporary loss of 0.03 acres linear wetlands would be expected as a result of construction and placement of rip rap along the downstream channel. No long-term loss to wetlands would occur.
Wetlands - Other & Clean Water Act	Wetlands, as waters of the U.S., and other waters of the U.S., such as stream channels, are present. Waters of the U.S., including wetlands, drainages, lakes, natural ponds, and impoundments, are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. Wetlands in the area consist of palustrine systems.	No permanent loss of wetlands or stream channel would occur.

Mitigation

Any mitigation requirements would be determined by the U.S. Army Corps of Engineers (USACE) through the Section 404 Permit process. No mitigation is expected after preliminary review.

Major Conclusions

The Rehabilitation to Grade Stabilization Structure Alternative had the highest benefit-cost ratio, and presented insignificant environmental effects.

Areas of Controversy

None.

Issues to be Resolved

None

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CHAPTER 1

PURPOSE AND NEED FOR ACTION

INTRODUCTION

This Watershed Plan and Environmental Assessment for the Turtle Creek Watershed project are combined into this single document. The purpose of this project is to continue to provide grade stabilization in a manner that minimizes the risk of loss of human life and is cost efficient and environmentally acceptable. Due to the changes in the State of Nebraska and NRCS dam hazard criteria, Turtle Creek Watershed Structure 2 does not meet the NRCS safety and performance standards for High Hazard Class structure.

The Papio Missouri River Natural Resources District, Local Sponsoring Organization (SLO), representing local residents, requested assistance from the United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS) to rehabilitate the dam to meet current criteria.

Structure 2 is located in rural Sarpy County, Nebraska but the area below the structure is within the planning jurisdiction of Sarpy County and the City of Springfield with a population of 1,450. The 2006 Sarpy County Land Use Plan indicates that the drainage area above and below Structure 2 will become fully urbanized with urban and large-lot residential. Two public meetings were held to prioritize concerns and impacts. The SLO was assisted in development of this Plan-EA by NRCS and HDR Engineering, Inc.

This document was prepared under the Authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended by Section 313 of Public Law 106-472, The Small Watershed Rehabilitation Amendments of 2000, and in accordance with the National Environmental Policy Act (NEPA), as amended. Pursuant to the implementing regulations for NEPA (40 CFR parts 1500-1508); the USDA Departmental Policy for the NEPA (7 CFR part 1b); the Natural Resources Conservation Service Regulations (7 CFR part 650); and the Natural Resources Conservation Service policy (General Manual Title 190, Part 410);

All information and data, except as otherwise noted, were collected during watershed rehabilitation investigation by the NRCS and HDR Engineering, Inc.. Portions of these data were included in the Watershed Plan.

This chapter explains the purpose and need for the proposed action based on the objectives set forth by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and the Papio-Missouri River Natural Resources District (Sponsoring Local Organization [SLO]). Sufficient detail is provided to allow for the formulation of alternatives necessary to meet the desired objectives.

1.1 PROJECT OVERVIEW AND NEED FOR SUPPLEMENT

NRCS and the SLO have identified a dam in the Turtle Creek Watershed that is near the end of its design life and needs to be evaluated for potential rehabilitation alternatives. Turtle Creek Watershed Structure 2 (Structure 2) was originally designed in 1961 as a Low Hazard Class structure with a 50-year project life. Due to downstream conditions the structure does not meet the current criteria for Low Hazard Class according to current NRCS Technical Release 60 (TR-60), *Earth Dams and Reservoirs* and State of Nebraska Dam Safety regulations. The intent of this study is to evaluate the grade stabilization Project alternatives to rehabilitate Structure 2 for the SLO under the Natural Resources Conservation Service Watershed Rehabilitation Program

and prepare an Environmental Assessment (EA). The study represents the updated Watershed Plan for the December 1959 Watershed Work Plan for Watershed Protection and Flood Prevention (Watershed Work Plan) for the Turtle Creek Watershed (see Appendix E, Supporting Information).

Structure 2 is located in the Turtle Creek Watershed on the main channel of Turtle Creek. Turtle Creek is a tributary of Springfield Creek in Sarpy County, Nebraska, that joins Springfield Creek near the Springfield Waste Water Treatment Plant. This portion of Sarpy County has experienced urban development pressure and growth since the structure was built. The land use upstream and downstream of the structure is changing from agricultural to rural residential, underscoring the need to evaluate the structure from a safety perspective. The designated original project purpose is grade stabilization but Structure 2 also provides incidental flood retarding benefits. See Appendix F: Project Map, Figure 1, for the relative location of the structure within the Turtle Creek Watershed. Structure 2 is an earthen embankment that is approximately 700 feet long and 30.8 feet high. During non-flood events, the normal pool is 6.8 acres, and during flood events, the pool could enlarge to cover an area of 29.6 acres.

1.2 PURPOSE OF THE PROJECT

The purpose of the Project for this EA is to continue to provide grade stabilization protection in a manner that minimizes the risk of loss of human life and is both cost efficient and environmentally acceptable.

1.3 NEED FOR THE PROJECT

1.3.1 Grade Stabilization and Floodwater Retarding Protection

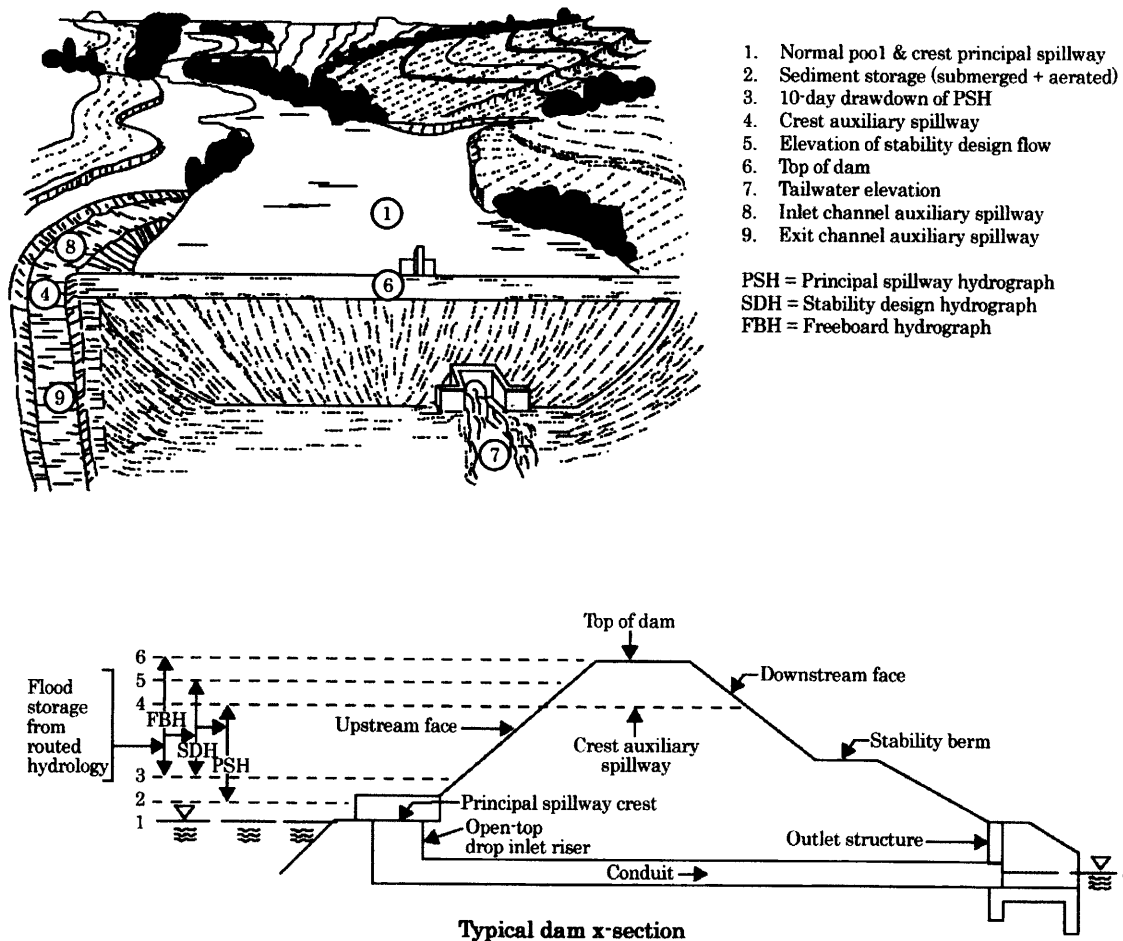
Structure 2 provides grade control on the main channel that it occupies and was designed to arrest channel degradation. Without the structure in place, channel erosion would continue up the watershed, resulting in permanent loss of soil and stream channel. The existing structure also provides some incidental floodwater protection downstream along Turtle Creek. Without this structure in place, property and crops would be exposed to increased risk for flood damages resulting in property losses.

Structure 2 was designed with a 50-year sediment storage life. Sediment is deposited in the normal pool, which is the area below the principal spillway (low flow orifice) crest and the floodwater retarding pool (the area between the proposed spillway crest and the auxiliary spillway crest). The floodwater retarding pool is the area between the principal spillway crest and the auxiliary spillway crest (see Exhibit 1-1 for terminology). If sediment were to fill to the elevation of the principal spillway crest, the pool would no longer have permanent water storage. If the floodwater retarding pool were to lose storage due to sediment deposition, the auxiliary spillway would operate, or flow, more often and would therefore be subject to erosion more often. Increased operation and maintenance costs are likely. A potential mode of failure would exist if the auxiliary spillway were to degrade and the depth and frequency of flow to increase. The structure would ultimately breach, allowing water to flow through, around, or over the structure in areas other than the principal or auxiliary spillways.

Based on a comparison of 2-foot contour intervals between as-built and 2005 survey data, sediment captured in the floodwater retarding capacity occupies up to 28 percent of the original 1961 design storage volume below elevation 1082 feet MSL (mean sea level) and 12 percent at the auxiliary spillway crest elevation, thereby increasing the frequency and likelihood that the auxiliary spillway will operate. Structure 2 does not achieve a 100-year design life for predicted sediment storage requirement, and 41.4 acre-feet of additional sediment storage below the crest of the principal spillway and 19.0 acre-feet above the crest of the principal spillway would be

required. The principal spillway crest would need to be raised to elevation 1082.4 feet MSL to provide sufficient storage volume for the anticipated sediment storage volume needed to provide a 100-year design life. A detailed sedimentation analysis is provided in Appendix D: Investigation and Analysis Report, Section 1.0, Sedimentation.

Exhibit 1-1 Structure Terminology



1.3.2 Dam Hazard Criteria

Structure 2 was originally designed and built as a Low Hazard Class dam. This hazard class is for dams located in rural or agricultural areas where there is not a potential for loss of life and the failure might damage farm buildings, agricultural lands, and county roads. A High Hazard Class is for dams having any potential for loss of life or any serious damage to homes, commercial buildings, important public utilities, main highways, or railroads.

Since Structure 2 was built, some urban development has started to occur downstream from the structure, and low density residential (lots ≥ 2 acres) and medium density residential (0.25-acre lots) development is expected within the 2030 planning horizon. The Nebraska Department of Natural Resources (NDNR) policy classifies all dams within city limits, including the extraterritorial jurisdiction zoning, as High Hazard Class. Because Structure 2 is outside the planning jurisdiction zone of the City of Springfield, Nebraska, a High Hazard Class can not be recognized based on those conditions. See Section 2.5 Existing Hazard Class and Breach

Analysis, for a more detailed discussion.

A breach routing indicated that there is a potential for loss of human life and/or extensive land damage at Structure 2 (see Appendix C: Support Maps, Figure 1). Pflug Road and a house are located within the breach inundation area. See Appendix D: Investigation and Analysis Report, Section 2.0, Breach Routing Analysis, for additional information.

The NRCS State Conservation Engineer has concurred with the High Hazard Class. See Section 2.5, Existing Hazard Class and Breach Analysis, for a more detailed discussion.

1.4 PROBLEMS AND OPPORTUNITIES

1.4.1 Problems

During the last 50 years, the technology of dam design has improved and dam safety has become a more paramount issue. Therefore, though the dam originally met the Low Hazard Class criteria 50 years ago, it has reached its design life. The structure does not have 100-year sediment storage capacity and the corrugated metal riser and discharge conduit has reached its service life. No other problems were noted.

1.4.2 Opportunities

Potential opportunities of the Project are to maintain existing grade stabilization, incidental recreation, flood control, and water quality benefits provided by the existing structure.

In addition, although floodplain mapping does not exist downstream of Structure 2, information developed from the breach or flooding analyses (see Section 2.5) could be used by Sarpy County or the City of Springfield to apply to future land use and zoning changes to promote green space and residential development in the most suitable areas.

CHAPTER 2

AFFECTED ENVIRONMENT

2.1 PROJECT SETTING

2.1.1 Original Project

The Turtle Creek Watershed Plan was prepared under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666). The Watershed Work Plan was completed in December 1959.

2.1.2 Physical Data

Structure 2 is located in the Turtle Creek Watershed. The drainage area of Structure 2 is 1,315 acres (2.1 square miles). The drainage area of Turtle Creek is approximately 1,922 acres (3.0 square miles). Turtle Creek Watershed is located near the middle of the Springfield Creek Watershed, which drains approximately 15.8 square miles in Sarpy County (see Appendix F: Project Map, Figure 1). Specific information regarding the general setting for the structure is located in Section 2.2, Existing Conditions.

Turtle Creek Watershed lies in the Iowa and Missouri Deep Loess Hills Major Land Resource Area (MLRA) in Nebraska. The MLRA is approximately 13,292,000 acres and borders Nebraska, Iowa, Kansas, and Missouri along the Missouri River. Most of this MLRA is in farms, and about 60 percent is cropland. Corn, soybeans, and hay are the principal crops. While land use is mostly agricultural, conversion to housing and other urban uses is occurring around existing communities. The hazard of erosion is severe on the upland soils. Controlling flooding and sedimentation on bottom lands are concerns of management. This rolling to hilly, loess-mantled plain is intricately dissected by small valleys have narrow floodplains and larger valleys have broad floors.

The climate of the area is continental and temperate, characterized by hot summers; cold winters; mild, wet springs; and mild, dry falls. The mean temperature ranges from 21 degrees in January to 79 degrees in July, with maximum daily July temperatures exceeding 100 degrees. The average annual precipitation recorded for the MLRA ranges from 25 to 36 inches. The Sarpy County Soil Survey lists the average annual precipitation of Sarpy County as 28.4 inches. The average length of the growing season is 169 days, from April 24 to October 9 (USDA, 1981¹).

2.1.3 Land Use

Structure 2 is located within the jurisdiction of Sarpy County, but the lower portion of Turtle Creek located east of 156th Street is within the planning jurisdiction of the City of Springfield. The t Sarpy County Comprehensive Plan, dated December 2005, projected that the Turtle Creek Watershed is to be developed as urban residential with typical lot sizes of 1 acre or less. The Springfield Comprehensive Plan, dated October 2001, shows the lower portion of the watershed to be single family residential. Neither of the plans provides a timeline for development to occur. An April 2006 Study Report on Water Quality Issues Related to Water & Wastewater Systems shows a proposed sanitary sewer trunkline along the Turtle Creek valley. The Springfield

¹ U.S. Department of Agriculture, Soil Conservation Service. 1981.
Land Resource Regions and Major Land Resource Areas of the United States.
Agriculture Handbook 296. U.S. Government Printing Office, Washington, D.C.

wastewater treatment plant is located near the confluence of Turtle Creek with Springfield Creek. Where water and wastewater services are provided, development will follow. It was assumed that development above and below Structure 2 would become fully urbanized by 2030. For planning purposes, it was assumed that the uppermost portion of the watershed north of Platteview Road is projected to be developed as low density residential (lots ≥ 2 acres). The remainder of the watershed above and below Structure 2 is projected to be developed as medium density residential (0.25-acre lots). A county landfill located in the upper portion of the watershed is projected to remain grass covered.

Table 2-1 summarizes the land use class for existing and future land use conditions (see Appendix C: Support Maps, Figure 2).

Table 2-1
Summary of Land Use

Land Use Class	Structure 2 (acres ¹)		Turtle Creek Drainage Basin (acres ¹)	
	Exist.	Future	Exist.	Future
Agricultural	1,315	0 ²	1,922	0 ²
Medium Density Residential (0.25-acre lots)	0	538	0	1,145
Low Density Residential (lots ≥ 2 acres)	0	777	0	777
Totals:	1,315	1,315	1,922	1,922

Notes:

¹ Rounded to the nearest acre.

² No agricultural land is anticipated to exist under the future development condition.

2.2 EXISTING CONDITIONS

Structure 2, constructed in 1962, is located on Turtle Creek (see Appendix F: Project Map, Figure 1). The main channel downstream of Structure 2 is generally a narrow-bottom channel (5 to 15 feet in width), moderately incised (5 to 10 feet in depth), with wooded banks and stream slopes of approximately 31 feet per mile. At the time of construction, land use in the drainage area was limited to agricultural use. Residential development has occurred since that time both upstream and downstream of the structure. The normal pool area is 6.8 acres, and the flood storage pool area is 29.6 acres.

2.2.1 Human Health and Safety

This portion of the Turtle Creek Watershed has experienced limited development and growth since Structure 2 was built. Limited development has occurred downstream in the form of acreage developments.

Structure 2 was designed and constructed as a Low Hazard Class structure. Based on breach analyses performed for this Plan/EA, there is one county road is within the breach inundation area.

2.2.2 Flood Control

Although Structure 2 was designed as a grade stabilization structure, it also provides incidental flood control as storm flows are stored and released downstream in a controlled manner. The floodwater retarding capacity of the structure prior to discharge via the auxiliary spillway is 126 acre-feet. 100-year peak flow rate is reduced from 2,170 cfs to 750 cfs.

2.2.3 Water Quality

Structure 2 acts as a trap for sediment and attached nutrients, pesticides, and organic loadings. This results in relatively slow degradation of the water quality of the pool due to the capture and retention of these incoming pollutants (sediment, nutrients, pesticides, and organics) in runoff waters. At the same time, the capture and retention of these pollutants in the pool results in improved water quality in the downstream waters.

Surface Water

None of the water bodies associated with Structure 2 are listed on the Nebraska Department of Environmental Quality (NDEQ) 303(d) list or has an associated listed use class. The 2004 Surface Water Quality Integrated Report published by NDEQ in March 2004 did not identify Turtle Creek or its tributaries as being impaired. No Total Maximum Daily Loads have been established for Turtle Creek or its tributaries.

Groundwater

The underlying geology of the Project area consists of silty alluviums over glacial till of silts and clays with a sandstone bedrock component (USDA, 1975). No groundwater water quality problems have been documented in the Turtle Creek Watershed.

2.2.4 Erosion and Sedimentation

Structure 2 will continue to receive sediment at the estimated present-condition rate. This rate, and the amount of sediment delivered annually, would likely increase when planned development occurs upstream but would be reduced in future years due to permanent lawns and pavement. Planned development within the Turtle Creek Watershed is anticipated to occur by 2030.

2.2.5 Recreation

Structure 2 provides passive recreational opportunities, but the surface water acreage is not great enough to support aquatic recreation. Other recreational opportunities of Structure 2 and its surrounding area include bird watching, hunting, and fishing. Any recreational opportunities associated with Structure 2 are limited by the private property owner.

2.2.6 Transportation

Local county roads South 156th Street and Pflug Road exist immediately downstream of Structure 2. Both are county-maintained gravel roads with no shoulders.

2.2.7 Fish and Wildlife Resources

The Turtle Creek Drainage Basin primarily consists of lands dedicated to agricultural use, with riparian² areas located along the creek. Agricultural practices and limited acreage residential development have altered the natural habitat in various areas within the Turtle Creek Drainage Basin, but some fish and wildlife resources still remain.

The wildlife plant and animal species found near Structure 2 are common for the region. Much of the land within the basin has been disturbed by agricultural practices, making agricultural land one of the primary wildlife habitats in the area. Wildlife species found on the agricultural land in the area are those that feed on crops. Examples are white-tailed deer, rabbits, mice, squirrels, striped skunks, raccoons, and songbirds (such as robins), and avian species such as crows, red-tailed hawks, and pheasants. Migratory birds³ may use the areas surrounding Structure 2 for

² "Riparian" refers to the habitat adjacent to a stream or lake.

³ Migratory birds are protected under the Migratory Bird Treaty Act (16 USC 703-712, as amended).

nesting, which occurs primarily between April 1 and July 15.

Artificial wetland areas have been established in riparian areas around the normal pool associated with Structure 2 as well as in the riparian areas of Turtle Creek both upstream and downstream of the structure. Wildlife species found in wetlands may vary from season to season due to changes in wetland hydrology conditions. The wetlands associated with Structure 2 are likely to support habitat for plains garter snake, map turtle, bullfrog, tiger salamander, and some avian species.

Fish species are not known to exist in the pool area of Structure 2 due to limited water depth.

2.2.8 Water Features

Wetlands

Wetlands in the area were identified via certified determination as performed by the NRCS in accordance with the National Food Security Act Manual. Wetland areas were classified through the NRCS certified determinations as artificial/man-made, and linear/riverine wetlands. The artificial, or man-made, wetlands include the normal pool area and fringe as well as an area on the backside of the structure. A total of 14.2 acres of artificial wetlands were identified. Downstream of the current structure, 0.5 acres of linear wetlands exist adjacent to the creek and the outlet of the structure.

Wetland types consist of palustrine systems which include all nontidal wetlands dominated by trees, shrubs, persistent emergents,⁴ and emergent mosses and lichens. Palustrine system wetlands are generally bounded by uplands or by any other type of wetland system (Cowardin et al, December 1979). A total of 5.8 acres of palustrine emergent, 0.5 acre of palustrine scrub-shrub, and 1.1 acres of palustrine forested wetlands exist at the site. The remaining area of artificial wetland consists of 4.3 acres of deep water habitat and 2.5 acres of vegetated fringe.

Impoundments

Impoundments, or pool areas, are associated with Structure 2. Table 2-2 provides details on the normal pool associated with Structure 2.

Table 2-2
Impoundment Pool Information Summary

Drainage Area (acres)	Normal Pool Area (acres) ¹	Maximum Depth (feet) ²
1,315	6.8	6.2

Notes:

¹ Pool surface area at normal pool obtained from existing topographic mapping surveyed in August/September 2005 measured at the principal spillway crest elevation.

² Maximum depth is measured at the normal pool stage.

Drainages

The main hydrological feature associated with Structure 2 is Turtle Creek and its tributaries. Structure 2 is located on the main channel of Turtle Creek (see Appendix F: Project Map, Figure 1). Turtle Creek immediately downstream of Structure 2 is moderately incised (5- to 10-foot depths) and deeply incised (15- to 20-foot depths) near the confluence with Springfield

⁴ Persistent emergents are emergent hydrophytes that normally remain standing at least until the beginning of the next growing season.

Creek with adjacent riparian areas.

2.3 STATUS OF OPERATION AND MAINTENANCE

The SLO's operation and maintenance (O&M) reports indicate that O&M has been kept current on Structure 2 and has been verified through site assessments. Due to the age of this structure, maintenance of the trash rack, open-top, single-stage drop inlet riser, and conduit will become increasingly expensive.

2.4 SEDIMENTATION

Sheet and rill erosion is the dominant erosion process in eastern Nebraska. Gully erosion and stream bank erosion are also often contributors to sedimentation volumes. Erosion products are delivered by overland flow and channel flow into the reservoir pool. Because of this delivery process, the volume of erosion on the landscape is not the same as the volume of sediment in the pool of the dam. Sediment accumulation is dependent on the sediment yield to the structure and the amount of incoming sediment that is captured or trapped by the reservoir. To reflect effects of varying land use on sedimentation rates, the existing sediment accumulation rate requires conversion to an eroded soil quantity from the watershed.

The estimated soil loss rates and urbanization timelines were used to predict sediment yields over a 100-year time period to assess sediment storage requirements. Table 2-3 illustrates the 2005 surveyed sediment storage capacity as well as the cumulative deposited sediment volume predicted over the next 100 years.

Table 2-3
Predicted 100-year Sediment Accumulations

2005 Surveyed Remaining Sediment Storage Capacity ¹ (acre-feet ²)	100-year Predicted Sediment Storage Requirement (acre-feet)	Structure Status for 100-year Sediment Requirement
17.0	41.4 ³	Has insufficient capacity to accommodate the 100-year predicted sediment storage requirement

Notes:

- ¹ Remaining sediment storage defined between the surveyed reservoir bottom and the principal spillway riser.
- ² Acre-feet is a unit of volume, defined as covering a surface area of 1 acre (43,560 square feet) by a depth of 1 foot of material.
- ³ An additional 19.0 acre-feet of aerated (flood pool) storage is also needed.

Structure 2 will continue to receive sediment at an increased rate during urban development. This rate, and the amount of sediment delivered annually, will gradually reduce in future years due to ongoing land use changes (urbanization). The historical and predicted (fully urban, developed land use condition estimated to occur by year 2030) average annual reservoir sediment rates are presented in Table 2-4. See Appendix D: Investigation and Analysis Report, Section 1.0, Sedimentation, for additional information.

Table 2-4
Historical and Predicted
Average Annual Reservoir Sediment Rates

Historical Sediment Rate (acre-feet per year)	Predicted Sediment Rate ¹ (acre-feet per year)
--	--

Historical Sediment Rate (acre-feet per year)	Predicted Sediment Rate ¹ (acre-feet per year)
1.2	0.6

Note:

¹ Predicted sediment rate is a composite sediment rate for a 100-year service life. During urbanization, sediment rates will be higher than average but will decrease significantly when the area is fully urbanized.

No sediment samples were collected to determine the presence or absence of environmental contaminants in Structure 2.

2.5 EXISTING HAZARD CLASS AND BREACH ANALYSIS

2.5.1 Existing Hazard Class

As discussed briefly in Section 1.3.2, Dam Hazard Criteria, Structure 2 was originally built as Low Hazard Class dam.

2.5.2 Breach Analysis

The breach failure scenario investigated is considered a worst-case condition as the reservoir is at its maximum flood storage elevation volume and there is little to no warning of the potential flows prior to structure failure. It delineates areas potentially inundated in the event that the structure should fail and was conducted using Technical Release 60 (TR-60), *Earth Dams and Reservoirs* criteria and the U.S. Army Corps of Engineer's Hydrologic Engineering Center *River Analysis System* (HEC-RAS) unsteady flow analysis software.

This fair weather breach is evaluated with the reservoir level at the 100-year, 24-hour storm water surface elevation. The water flows resulting from the dam breach were routed downstream until the breach water surface profile was reduced sufficiently to remain within the approximate channel banks. A 100-year floodplain has not been mapped for the reaches downstream of Structure 2.

The structure volume, pool height, and embankment information was input into the TR-60 spreadsheet for use in computing the peak breach discharge according to TR-60 equations. The geometry for the valley cross section at the dam center line, assuming no structure, was taken from the as-constructed drawings. A HEC-RAS computer model provided predicted water surface elevations and cross-sectional flow areas for corresponding flow rates for the downstream reaches. Roadway crossing structures and sections immediately upstream and downstream of the structure were included in the HEC-RAS model input to allow the impacts of the crossing structures to be accurately represented. For detailed information, see Appendix D: Investigation and Analysis Report, Section 2.0, Breach Routing Analysis.

2.5.3 Interpretation of Breach Analysis

No detailed breach analysis was completed for Structure 2 prior to this study. The NRCS State Conservation Engineer has concurred with the High Hazard Class for Structure 2 based on the detailed breach analysis. Pflug Road, an unpaved county road was overtopped and the downstream residences were located outside the breach inundation area. Several on farm buildings, not occupied by people, would be located within the breach inundation area. A plan view and inundation limits are shown in Appendix C: Support Maps, Figure 1.

2.6 POTENTIAL MODES OF DAM FAILURE

Several potential modes of failure were examined, as follows:

- Sedimentation
- Hydrologic capacity
- Seepage
- Seismic
- Material deterioration

2.6.1 Sedimentation

Structure 2 was designed with a 50-year sediment storage life. A reservoir sediment survey conducted in 2005 indicated that sediment has accumulated and Structure 2 does not have significant sediment storage remaining for another 100 years. Future sediment load is expected at the same rate or less as the land use changes from farming to residential. Therefore, in the near future, sedimentation presents a moderate potential mode of failure for Structure 2, but it becomes progressively higher as the dam ages and the sediment pool fills with sediment.

2.6.2 Hydrologic Capacity

Hydrologic failure of a dam can occur by breaching the auxiliary spillway or overtopping the dam during a storm event. The integrity and stability of the auxiliary spillway is dependent on the depth, velocity, and duration of flow; the vegetative cover; and the embankment's resistance to erosion. Structure 2 was originally designed as a Low Hazard Class structure. The current criteria for sizing the auxiliary and principal spillways are found in TR-60.

The auxiliary spillway is 70 feet wide and would need to be widened and the top of dam would need to be raised to provide a combination of storage capacity and auxiliary spillway conveyance to pass the design storm without overtopping the dam.

The principal spillway system consists of a corrugated metal intake structure in the pool (riser) with a corrugated metal pipe through the dam. This system controls the release of floodwater. The riser dimension is 5 feet in diameter. The outlet pipe is a 42-inch corrugated metal pipe. The outlet pipe discharges into an excavated earthen basin with an approximately 12-foot bottom width and 3-foot horizontal and 1-foot vertical (3:1) side slopes.

Current criteria for the principal spillway require Structure 2 to temporarily store the runoff from the 100-year, 10-day precipitation of 10.6 inches. It must also safely route the runoff from a combination of the 100-year, 6-hour precipitation (5.2 inches) and probable maximum precipitation (26 inches) or the 100-year, 24-hour (6.7 inches) and probable maximum precipitation, 24-hour (32.5 inches), whichever yields the highest water surface elevation. The existing structure will not store the required precipitation runoff and would be overtopped by the required 26-inch precipitation runoff. The overall potential for hydrologic failure of Structure 2 is considered to be low to moderate.

2.6.3 Seepage

For earthen dams such as Structure 2, seepage is the primary geotechnical concern. Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material through the embankment or foundation. As the soil material is removed, voids can be created, allowing ever-increasing amounts of water to flow through the embankment or foundation until the dam collapses due to the internal erosion. Seepage that increases with an increase in pool elevation is an indication of a potential problem, as is stained or muddy water. Foundation and embankment drainage systems can alleviate the seepage problem by removing the water without allowing soil particles to be transported away from the dam.

In general, Structure 2 appears to be in very good condition. There were no visible signs of

seepage or sloughing or any other noticeable indications of instability on the embankments. No foundation drains are identified on the as-constructed drawings. Structure 2 is protected with a healthy cover of native grasses, and no trees are present on the embankment sections.

Reed canary grass (hydrophytic) was noted along part of the downstream toe, which may indicate possible seasonal wetness. Seepage provides a low to moderate potential for failure.

2.6.4 Seismic

The integrity and stability of an earthen embankment are dependent on the presence of a stable foundation. Foundation movement through consolidation, compression, or lateral movement can cause the creation of weak zones or voids within an embankment, separation of the principal spillway conduit joints, or in extreme cases, complete collapse of the embankment. Turtle Creek Watershed is located Seismic Zone 2 as described in TR-60, which is not within an area of significant seismic risk; therefore, seismic activity creates only a very small potential for failure for Structure 2.

2.6.5 Material Deterioration

Material deterioration is another concern for Structure 2. The materials used in the principal spillway system, the embankment drains, and the pool drainage systems are subject to weathering and chemical reaction due to natural elements within the soil, water, and atmosphere. The material used for the principal spillway is corrugated metal, which typically has a design life of 50 years.

The intake riser was observed to be fully functional and in good condition. There were no signs of corrosion or damage to any of the galvanized steel components. The exposed portion of the corrugated metal pipe for the principal spillway system was observed to be in good condition with no signs of corrosion or damage. Material deterioration is creating a low potential for failure at Structure 2, but it will increase with time.

2.7 CONSEQUENCES OF DAM FAILURE

The impacts of a catastrophic failure impact motorists traveling on Pflug Road, an unpaved county road, as the roadway would be overtopped. Also, a home is located within the breach inundation area. A catastrophic breach of the dam would cause damages from the breach floodwaters, sediment deposition, and damage to properties currently protected by the dam. With the increasing probability of a dam breach over time, and continued urbanization downstream of the structure, damages would increase. In accordance with NEM 320.20 and TR 60, a High Hazard Class determination was made due to the potential for loss of life or any serious damage to homes or roads.

The exact mode and timing of a dam failure are extremely difficult to predict. Currently, overtopping due to excessive hydrologic loading is the most probable mode of failure identified for Structure 2. If any of the structure were to suddenly fail at a high reservoir stage (auxiliary spillway crest to top of dam), regardless of failure mode, the downstream stages and impacts would be similar to those described previously in Section 2.5.2, Breach Analysis.

CHAPTER 3

SCOPE OF ENVIRONMENTAL ASSESSMENT

The scope of the EA for Structure 2 was based on NRCS and SLO site investigation and meetings followed by other agency and public scoping efforts for the Project as well as best professional judgment. This chapter identifies the issues relevant in defining the problems and formulating and evaluating alternative solutions. This chapter also includes a record of the issues that were considered but not found to require detailed discussion.

Scoping was conducted to determine the objectives and primary concerns of the SLO and to identify other relevant issues and environmental concerns associated with this Project. An information packet was sent to agencies or groups that might have input on the EA (see Appendix D: Investigation and Analysis Report, Section 3.0, Agency Coordination, for a complete list of agencies and groups that were contacted). This packet contained pertinent structural data, an existing conditions evaluation, photos of the site, an invitation to a scoping meeting and tour of the site, and an opportunity to comment on the Project. An agency meeting and a public scoping meeting were held on October 6, 2005 (see Chapter 6, Consultation and Public Participation, for further information regarding the scoping meetings).

Table 3-1 identifies the primary resource concerns. When a resource concern is found to be not relevant and sufficient rationale is provided, then the concern can be eliminated from further consideration. Each of the resource concerns that are noted in Table 3-1 as “Yes” in the “Relevant to the Proposed Action” column is then carried forward to Chapter 4, Alternatives and Table 4-3 Comparison of Alternatives. It is in Table 4-3 that the scoping concerns are further reviewed to see if they are pertinent to the individual alternatives. Those pertinent concerns are then evaluated for that alternative in Chapter 5, Environmental Consequences. Those noted as “No” in the “Relevant to the Proposed Action” column will not be discussed further in this EA.

Table 3-1
Summary of Scoping

Resource Concerns of SLO, Public, and Agencies	Relevant to the Proposed Action?		Rationale
	Yes	No	
Human Health and Safety	X		Under current conditions, a catastrophic event may create a breach with the potential for loss of life.
Existing Structure 2	X		Structure 2 was designed to Low Hazard Class criteria and in order to provide additional 100-years of service needs to be designed to grade stabilization structure criteria. Material used for the principal spillway is corrugated metal, which typically has a design life of 50 years.

Resource Concerns of SLO, Public, and Agencies (continued)	Relevant to the Proposed Action?		Rationale
	Yes	No	
Water Quality	X		Water quality, as it relates to erosion and resultant sedimentation, is a potential concern.
Air Quality		X	The Project area is not in an air quality attainment area (40 Code of Federal Regulations [CFR] 81). Dust emission during construction would be controlled. Open burning of cleared vegetation would not occur without approval from NDEQ.
Economic and Social	X		Depending on the alternatives, the Project may affect the economic and social resources in or around the Project area.
Erosion and Sedimentation	X		As the primary purpose of the structure is grade stabilization control, continued control of erosion and downstream sedimentation is desirable.
Flood Control	X		While the primary purpose of the structure is grade stabilization control, incidental flood control benefits also occur.
Land Use		X	The Project would not affect existing or future land use in or around the Project area.
Recreation	X		The structure has existing passive and future potential recreational value.
Regional Water Resources Plans		X	No watershed management plans exist for the Project area.
Transportation	X		A breach of the existing structure and potential flood damage could have short-term effects on local transportation systems (South 156th Street and Pflug Road).
NRCS Planning Requirements ¹	Relevant to the Proposed Action?		Rationale
	Yes	No	
Cultural Resources	X		The Nebraska State Historic Preservation Office (SHPO) is being contacted. The area of potential effect will be identified for each alternative and reviewed by the NRCS Cultural Resources Specialist who will coordinate with the State Historic Preservation Officer as needed.
Endangered and Threatened Species	X		The U.S. Fish and Wildlife Service, Mountain-Prairie Region has a listing of potential species and habitat by county. For Sarpy County, the five species listed are: bald eagle (<i>Haliaeetus leucocephalus</i>), interior least tern (<i>Sterna antillarum athalassos</i>), pallid sturgeon (<i>Scaphirhynchus albus</i>), piping plover (<i>Charadrius melodus</i>), and the western prairie fringed orchid (<i>Platanthera praeclara</i>). Also, the impoundment of water due to the Project could result in a potential depletion to Platte River flows. Effects will need to be addressed for each alternative carried through.

NRCS Planning Requirements ¹ (continued)	Relevant to the Proposed Action?		Rationale
	Yes	No	
Environmental Justice		X	To comply with the regulations of Title VI of the Civil Rights Act of 1964 (42 United States Code [USC] 2000d, et seq.) and Executive Order 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629), the potential environmental impacts of the alternatives were studied with respect to the demographic and socioeconomic composition of the Project area. No minority or low-income populations would be affected by implementation of any of the alternatives.
Fish and Wildlife Coordination Act	X		Alternatives involving stream modifications will need to have a consultation completed with the U.S. Fish and Wildlife Service and full considerations given to their recommendations.
Floodplain Management	X?	X	None of the areas, within the breach inundation area, have a designated floodplain mapped by Federal Emergency Management Agency (FEMA). It is not anticipated that any of the alternatives would result in an adverse effect or incompatible development within the base floodplain. Issues relating to increased flood hazard will be addressed in the hydrology related sections. True mapping of the 100-year floodplain for FEMA is not part of this project.
Invasive Species	X?	X	Species, such as reed canary grass (<i>Phalaris arundinacea</i>), are already present downstream and surrounding the structure. The SLO manages other invasive species, such as thistle (<i>Carduus sp.</i>), at the structure on an annual basis. No invasive species that would be a risk for future invasions beyond what already exists were identified within or adjacent to the area of potential effect.
Migratory Birds	X		Migratory birds may use the areas surrounding the existing project for nesting.
Natural Areas		X	None are present in or near the planning area.
Prime and Unique Farmlands	X		Some prime farmland and farmland of statewide importance are present in the Project area.
Riparian Area	X		Riparian areas exist within the Project area.
Scenic Beauty		X	Structure 2 has an element of visual resources that can add benefit to the potential development of the area and those affects are related in the economic analysis. In relation to NRCS policy designations, there are no unique or high-quality scenic landscapes present.
Wetlands – NRCS policy	X		Wetlands are present.
Wetlands – Other Clean Water Act etc.	X		Wetlands and other waters of the U.S., such as stream channels, are present.
Wild and Scenic Rivers		X	None are present in the Project area.
National Economic Development	X		This is required by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G).

Note: ¹ Based on NE-CPA-52, "Environmental Evaluation for Conservation Planning," Section J, Special Environmental Concerns.

CHAPTER 4 ALTERNATIVES

4.1 FORMULATION PROCESS AND ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Notwithstanding any other alternatives, the NRCS National Watershed Manual requires the following alternatives to be considered in the development of a rehabilitation plan:

- No action (future without project condition)
- Decommissioning (removal of the dam and stabilizing the site)
- Rehabilitation of the existing dam
- National Economic Development (NED) alternative if not one of the other alternatives or a combination thereof.

A range of both structural and non-structural alternative concepts was initially considered to satisfy the purpose of the Project. Input on the range of alternatives was sought at the agency and public scoping meetings held on October 6 and 13, 2005.

Table 4-1 summarizes the primary alternatives considered and their screening. It also identifies the alternatives eliminated from detailed study and those carried forward.

**Table 4-1
Range of Alternatives and Determination for Detailed Study**

Alternative	Summary of Alternative	Screening of Alternative	Carried Forward for Detailed Study
Rehabilitation to Original Hazard Class with Downstream Breach Inundation Property Acquisition	This alternative would rehabilitate the structure to its original Low Hazard Class, provide a 100-year design life, ¹ secure land and properties within the breach inundation area to remove existing hazards and prohibit development in perpetuity, and remove and replace two existing downstream drainage structures that are overtopped or would likely fail during a breach event.	Construction of the Low Hazard Class dam requires the principal spillway to be replaced, the auxiliary spillway to be widened, and the top of dam to be raised. The dam cost would be slightly less than the Rehabilitation to High Hazard Class Alternative. In addition, approximately 37 acres of land would be acquired and two roadway crossings (South 156th Street and Pflug Road) improved. The total estimated alternative cost is \$1,633,000. Estimated construction and land acquisition costs are greater than other alternatives evaluated.	No. This alternative was not reasonable due to cost.
Construction of Levee in Downstream Breach Inundation	This alternative would rehabilitate the structure to its original Low Hazard Class with a 100-year design life, construct an	Construction of a Low Hazard Class dam requires the principal spillway to be replaced, the auxiliary spillway to be widened, and the top of dam to be raised.	No. This alternative was not reasonable due to cost.

Alternative	Summary of Alternative	Screening of Alternative	Carried Forward for Detailed Study
	earthen levee to contain the breach flows, and upgrade existing roadway drainage structures.	This alternative would include the cost of the Rehabilitation to Original Hazard Class with Downstream Breach Inundation Property Acquisition Alternative (minus purchase of properties protected by the levee), plus the cost to purchase downstream properties not protected by the levee and to construct an earthen levee.	
Improvements to Channel in Downstream Breach Inundation	This alternative would rehabilitate the structure to its original Low Hazard Class with a 100-year design life, improve the downstream channel capacity to convey the breach flows without inundating adjacent houses, and upgrade existing roadway drainage structures.	<p>Construction of a Low Hazard Class dam requires the principal spillway to be replaced, the auxiliary spillway to be widened, and the top of dam to be raised.</p> <p>This alternative would include the cost of the Rehabilitation to Original Hazard Class with Downstream Breach Inundation Property Acquisition Alternative (minus purchase of properties protected by the levee), plus the cost to purchase downstream properties to construct an earthen levee.</p>	No. This alternative was not reasonable due to cost..
No-Action/Future Without Federal Project	The No-Action/Future Without Federal Project Alternative is the most likely course of action should the SLO receive a short-term legal mandate to fix or remove the dam and should no Federal funding be available for rehabilitation. A "sponsor's breach" would involve a controlled breach (cut) through the embankment.	The total estimated cost for this alternative is \$188,000. This alternative does not meet purpose and need for the Project, but is required to be carried forward.	Yes. This alternative was carried forward for detailed study.
Federal Decommissioning	The Federal Decommissioning Alternative would result in the complete removal of the constructed embankment and deposited sediment, reconnection and restoration of the stream and floodplain, construction of concrete	The total estimated cost for this alternative is \$1,204,000. This alternative would meet the purpose and need for the Project and is technically viable.	Yes. This alternative was carried forward for detailed study.

Alternative	Summary of Alternative	Screening of Alternative	Carried Forward for Detailed Study
	drop structures and a drainage channel, and seeding.		
Rehabilitation to High Hazard Class	This alternative would rehabilitate the structure to High Hazard Class requirements and extend its life for 100 years. ¹	The total estimated cost for this alternative is \$1,092,000. This alternative would meet the purpose and need for the Project and is technically viable.	Yes. This alternative was carried forward for detailed study.
Rehabilitation to Grade Stabilization Structure	This alternative would rehabilitate the structure to full-flow grade stabilization structure requirements and extend its life for 100 years. ¹ Flows would not be stored, but would flow through the structure. See Section 4.2.4 and Table 4-3 for site-specific elements.	The total estimated cost for this alternative is \$552,000. This alternative would meet the purpose and need for the Project and is technically viable.	Yes. This alternative was carried forward for detailed study.
National Economic Development (NED) Alternative	The NED Alternative is the alternative or combination of alternatives that reasonably maximizes the net economic benefits consistent with protecting the nation's resources.	The NED Alternative for this Project is Rehabilitation to Grade Stabilization Structure.	Yes. This alternative was carried forward for detailed study.

Note:

¹ Rehabilitation with a 50-year design life was considered but not further pursued because it was possible to plan rehabilitation with a 100-year design life, which better met the objectives of the SLO. In addition, the incremental costs associated with providing an extra 50-years of design life are less than the incremental benefits associated with providing an extra 50-years of design life.

4.2 DESCRIPTION OF ALTERNATIVE PLANS

4.2.1 No-Action/Future Without Federal Project Alternative

This alternative is the most likely future condition if none of the Action Alternatives (Future with Project Plans) is selected. In this alternative the Nebraska Department of Natural Resources (DNR), state dam safety agency, is expected to issue an order to resolve the dam's nonconformance to state safety and performance criteria. Without Federal financial assistance, Structure 2 would continue to deteriorate. The SLO would need to rehabilitate the structure to state standards, remove or relocate the hazard and establish land-use restrictions, or remove the hazard by removing the storage function of the reservoir.

If Federal assistance is not available to rehabilitate the structure, the SLO would likely breach the structure in a controlled manner within 4 years of receiving notice from Nebraska Department of Natural Resources. When breaching the structure, the SLO would remove a portion of the

earthen embankment and would excavate the embankment to remove the principal spillway riser and conduit.

4.2.2 Federal Decommissioning Alternative

This alternative would result in the complete removal of the structure, the reconnection and restoration of the stream and floodplain, the construction of drop spillway structures and a drainage channel, and seeding. There would be a complete removal of the constructed embankment and deposited sediment. When removing the embankment, Federal requirements stipulate that the Project be left in a stable condition. To address grade stabilization, the removal would require constructing a series of two concrete drop spillway structures necessary to control the change in elevation at the structure and provide a stable condition. The principal spillway riser and conduit would be removed, the embankment and deposited sediment removed, a channel across the pond floor to stable side slopes graded, and any disturbed areas seeded. Embankment material removed from the dam and the deposited sediment would be placed in the existing auxiliary spillway and graded to approximate original ground lines. Excess material would be applied to land in suitable upland areas.

4.2.3 Rehabilitation to High Hazard Class Alternative

This alternative rehabilitates Structure 2 to High Hazard Class requirements and extends its life for 100 years. The following actions are proposed: the existing principal spillway would be removed, replaced, and raised 2.2 feet, the auxiliary spillway would be widened, the top of dam would be raised to provide a combination of storage capacity and auxiliary spillway conveyance to pass the design storm without overtopping the dam, and foundation drains would be established. Detailed information for Structure 2 is provided in Table 4-2.

Table 4-2
Structure 2 – Spillway Parameters for
Rehabilitation to High Hazard Class Alternative

Description	Existing Conditions	High Hazard Rehabilitation
Principal Spillway Crest Elevation (feet)	1080.2 ¹	1082.4
Diameter of Conduit (inches)	42 CMP ²	36 RCPP ³
Auxiliary Spillway Crest Elevation (feet)	1087.2 ¹	1092.6
Bottom Width (feet)	70	150
Top of Embankment Elevation (feet)	1092.3 ¹	1101.1

Notes:

¹ Based on topographic survey conducted by HWS in 2005.

² CMP = corrugated metal pipe.

³ RCPP = reinforced concrete pressure pipe

4.2.4 Rehabilitation to Grade Stabilization Structure Alternative

This alternative rehabilitates Structure 2 to grade stabilization structure requirements and extends its life for 100 years. The following actions are proposed: the existing principal spillway would be removed, the auxiliary spillway would be abandoned, the top of dam would be lowered to remove flood storage capacity and a broad-crested weir chute spillway would be built at the principal spillway elevation. Existing embankment removed from the structure would be placed in the existing auxiliary spillway and graded to drain.

The broad-crested weir chute spillway would address the grade stabilization function of the structure. To accommodate the 17.5 foot drop from the weir crest (elevation 1080) to the valley floor (1062.5) and to provide a stable condition, articulated concrete blocks would line the chute

spillway and a riprap lined plunge pool would dissipate the flow.

The floodwater retarding capability of the structure would be eliminated. A channel would be graded across the pond floor to stable side slopes, and any disturbed areas would be seeded. Detailed information for Structure 2 is provided in Table 4-3.

Table 4-3
Structure 2 – Spillway Parameters for
Rehabilitation to Grade Stabilization Structure Alternative

Description	Existing Conditions	Grade Stabilization Structure
Principal Spillway Crest Elevation (feet)	1080.2 ¹	NA
Diameter of Conduit (inches)	42 CMP ²	NA
Broad-Crested Weir Chute Elevation (feet)	NA	1080.0
Auxiliary Spillway Crest Elevation (feet)	1087.2 ¹	NA
Bottom Width (feet)	70	80 ACB ³
Top of Embankment Elevation (feet)	1092.3 ¹	1085.0

Notes:

¹ Based on topographic survey conducted by HWS in 2005.

² CMP = corrugated metal pipe.

³ ACB = articulated concrete block

4.2.5 National Economic Development Alternative

The NED Alternative evaluation was based on the costs and benefits. As relayed in Table 4-1, the NED Alternative for this Project was determined to be Rehabilitation to Grade Stabilization Structure. Refer to that alternative's sections to see the information relative to the NED.

4.3 COMPARISON OF ALTERNATIVES

Table 4-4 includes relevant concerns identified in Chapter 3, Table 3-1, Summary of Scoping, and then adds pertinent economic details. These items are then compared to each of the alternatives carried forward for detail study. Applicable items are identified for a more detailed comparison in Chapter 5, Environmental Consequences. For more detailed information regarding the existing structure and specific details regarding each alternative, see Appendix D: Investigation and Analysis Report, Section 4.0, Alternative Evaluation.

Table 4-4
Comparison of Alternatives for Structure 2

General Information	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Alternative Description	Construction of breach.	Removal of entire embankment and installation of series of drop structures.	Rehabilitate Structure 2 to meet High Hazard Class criteria.	Rehabilitate Structure 2 to meet grade stabilization structure criteria.
Project Cost ¹	\$326,000	\$1,204,000	\$1,092,000	\$552,000

National Economic Development (NED)	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Beneficial, Annual	\$0	\$0	\$69,000	\$69,000
Adverse, Annual	\$18,300	\$66,500	\$59,900	\$31,300
Net Beneficial	(\$18,300)	(\$66,500)	\$9,100	\$37,700
Regional Economic Development	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Beneficial, Annualized	\$0	\$0	\$69,000	\$69,000
Region	\$0	\$0	\$69,000	\$69,000
Rest of Nation	\$0	\$0	\$0	\$0
Adverse, Annualized	\$18,300	\$66,500	\$59,000	\$31,300
Region	\$18,300	\$23,275	\$20,650	\$10,955
Rest of Nation	\$0	\$43,225	\$38,350	\$20,345
Relevant Issues and Concerns				
Resource Concerns of SLO, Public, Agencies	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Human Health and Safety	Removes the threat of a breach. Loss of incidental flood control benefits results in downstream potential for residential and roadway flooding.	Remove the threat of a breach. Loss of incidental flood control benefits results in downstream potential for residential and roadway flooding.	Reduces the threat of a breach. Additional flood control benefits due to increase in flood retarding pool volume.	Loss of incidental flood control benefits results in downstream potential for residential and roadway flooding.
Existing Structure 2	Not applicable	Not applicable	Would address high hazard criteria.	Would address grade stabilization purpose.
Water Quality	Increase in downstream sediment load.	Increase in downstream sediment load.	Would retain existing impoundment and related water quality benefits.	Increase in downstream sediment load.
Economic and Social	See Human Health and Safety and economic related sections.	See Human Health and Safety and economic related sections.	See Human Health and Safety and economic related sections.	See Human Health and Safety and economic related sections.

Resource Concerns of SLO, Public, Agencies	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Erosion and Sedimentation	The lack of impoundment would allow sediment transport to occur downstream. Gully erosion would initiate upstream.	The stream would be left in a stable condition. However, lack of impoundment would allow sediment transport to occur downstream.	Would retain existing erosion and sedimentation benefits.	The stream would be left in a stable condition. However, lack of impoundment would allow sediment transport to occur downstream.
Flood Control	Loss of all incidental flood control benefits.	Loss of all incidental flood control benefits.	Retain/upgrade existing flood control benefits.	Loss of all incidental flood control benefits.
Recreation	No change in recreation opportunities.	No change in recreation opportunities.	No change in recreation opportunities.	No change in recreation opportunities.
Transportation	Construction-related activities such as ingress and egress to site and disposal of removed principal spillway materials. Potential flooding danger.	Construction-related activities such as ingress and egress to site and disposal of removed principal spillway materials. Potential flooding danger.	Construction-related activities such as ingress and egress to site and disposal of removed principal spillway materials.	Construction-related activities such as ingress and egress to site and disposal of removed principal spillway materials. Potential flooding danger.

NRCS Planning Requirements	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Cultural Resources	No change in existing conditions.	No change in existing conditions.	Construction in previously undisturbed areas would need to be evaluated for potential affects.	No change in existing conditions.
Endangered and Threatened Species	Affects on the five species will be analyzed: bald eagle, interior least tern, pallid Sturgeon, piping Plover, and the western prairie fringed orchid. No potential effects identified through scoping. No depletions of a Platte River water source would occur as a result of this alternative, thereby having no effect on Platte River federally listed species.	Affects on the five species will be analyzed: bald eagle, interior least tern, pallid Sturgeon, piping Plover, and the western prairie fringed orchid. No potential effects identified through scoping. No depletions of a Platte River water source would occur as a result of this alternative, thereby having no effect on Platte River federally listed species.	Affects on the five species will be analyzed: bald eagle, interior least tern, pallid sturgeon, piping plover, and the western prairie fringed orchid. The impoundment of water due to the Project could result in a potential depletion to Platte River flows. Affects will need to be analyzed and it will be determined if a consultation with U.S. fish and Wildlife Service is required.	Affects on the five species will be analyzed: bald eagle, interior least tern, pallid sturgeon, piping plover, and the western prairie fringed orchid. No potential effects identified through scoping. No depletions of a Platte River water source would occur as a result of this alternative, thereby having no effect on Platte River federally listed species.
Fish and Wildlife Resources	Consultation needed with U.S. Fish and Wildlife Service. Loss of plant, wildlife, and aquatic habitat.	Consultation needed with U.S. Fish and Wildlife Service. Loss of plant, wildlife, and aquatic habitat.	Consultation needed with U.S. Fish and Wildlife Service. Slight changes in plant, wildlife, and aquatic habitat.	Consultation needed with U.S. Fish and Wildlife Service. Slight changes in plant, wildlife, and aquatic habitat.
Migratory Birds	To avoid impacts, needed vegetation clearing would be proposed to occur outside of the primary nesting period of April 1 to July 15.	To avoid impacts, needed vegetation clearing would be proposed to occur outside of the primary nesting period of April 1 to July 15.	To avoid impacts, needed vegetation clearing would be proposed to occur outside of the primary nesting period of April 1 to July 15.	To avoid impacts, needed vegetation clearing would be proposed to occur outside of the primary nesting period of April 1 to July 15.

NRCS Planning Requirements	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure (NED Alternative)
Prime and Unique Farmlands	No change in existing conditions.	No change in existing conditions.	3.5 acres of prime farmland and 0.5 acres of farmland of statewide importance would be converted. Impacts addressed with Form AD-1006.	No change in existing conditions.
Riparian Area	Loss of fringe habitat around the impoundment.	Loss of fringe habitat around the impoundment and potential loss of downstream riparian areas.	Potential loss of downstream 0.1 acre of riparian habitat due to structure improvements.	Potential long-term increase of approx. 5.5 acres of riparian area where normal pool formerly existed.
Wetlands – NRCS policy	Permanent loss of 14.2 acres of artificial wetlands due to loss of normal pool.	Permanent loss of 14.2 acres of artificial wetlands due to loss of normal pool.	Temporary impact to 0.03 acre (0.02 PEM ² and 0.01 PFO ²) of artificial wetland fringe.	Temporary impact to 0.03 acre (0.02 PEM ² and 0.01 PFO ²) of artificial wetland fringe.
Wetlands – Other Clean Water Act etc.	Loss of impoundment would reduce existing wetland areas.	Loss of 7.4 acres of wetlands (5.8 acres PEM ² , 0.5 acre PSS ² , and 1.1 acre PFO ²) due to loss of normal pool on the upstream side and 0.3 acre of PEM ² wetlands on the downstream side. A total loss of 7.7 acres.	Temporary impact to 0.03 acre (0.02 PEM ² and 0.01 PFO ²) of wetland fringe.	Temporary impact to 0.03 acre (0.02 PEM ² and 0.01 PFO ²) of wetland fringe.

Note:

Project Cost includes NRCS engineering and project administration.

- ² PEM – palustrine emergent
PSS – palustrine scrub shrub
PFO – palustrine forested

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CHAPTER 5

ENVIRONMENTAL CONSEQUENCES

5.1 EFFECTS OF ALTERNATIVE PLANS

5.1.1 Human Health and Safety/Public Health and Safety

No-Action/Future Without Federal Project

Human health and safety/public health and safety (health and safety) would increase by removing the threat of a breach inundation. The constructed breach would eliminate the structure's ability to store runoff, eliminating normal and flood storage capabilities of the structure, thereby eliminating the hazard of flooding due to an unexpected failure of the structure.

The incidental flood control benefits would also be eliminated. As such, the downstream flooding conditions would be similar to those that existed prior to the construction of the structure. There would be flood damage and access restrictions for a 100-year, 24-hour event to due to the depth of flow over Pflug Road.

Federal Decommissioning

See No-Action/Future Without Federal Project.

Rehabilitation to High Hazard Class

The risk of a breach inundation to existing and future downstream property would be reduced. To meet current hazard criteria of this site, special consideration would be taken to ensure the health and safety of existing and future land development. By rehabilitating to current safety criteria, any downstream homes would have additional protection. In addition, this alternative would improve the existing flood control benefits of the structure due to improved flood retarding pool storage.

Rehabilitation to Grade Stabilization Structure

See No-Action/Future Without Federal Project

5.1.2 Water Quality

Comparison of pollutant trends in the downstream waters under normal conditions for each alternative is shown in Table 5-1. Table 5-2 compares the water quality trends in the downstream waters for the alternatives evaluated.

Table 5-1
Pollutant Trends for Alternatives

Pollutant	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure
Sediment	Increase	Increase	No Change	Increase
Nutrients	Increase	Increase	No Change	Increase
Pesticides	Increase	Increase	No Change	Increase
Organic Loading	Increase	Increase	No Change	Increase

Table 5-2
Water Quality Trends for Alternatives

Water Quality Indicators	No-Action/Future Without Federal Project	Federal Decommissioning	Rehabilitation to High Hazard Class	Rehabilitation to Grade Stabilization Structure
Water Transparency	Decrease	Decrease	No Change	Decrease
Aquatic Habitat	Decrease	Decrease	No Change	Decrease

No-Action/Future Without Federal Project

The loss of water retention eliminates the settling of sediment loads and nutrients from storm water runoff. Sediment and nutrients that once were settled and retained in the reservoir of the structure would continue to be suspended in storm water runoff downstream. In addition, if the dam is breached and grade control is not provided, upstream gully extension would be expected to resume as a consequence of the 20-foot drop in the channel from upstream to downstream of the dam. In this situation, additional sediment derived from the eroding gully would also be delivered downstream. Turtle Creek drains to Springfield Creek, located approximately 1.7 miles downstream with a drainage area of 15.8 square miles, and then to the Platte River, located 2.0 miles downstream with an approximate drainage area of 90,000 square miles. Due to the size of the drainage areas of Springfield Creek and the Platte River, sediment and nutrient load amounts would be diluted because of larger water flows within of both of these systems. In addition, any downstream wetland fringe of the channel would provide some filtering benefits for sediment and nutrient removal.

Temporary impacts on surface water quality associated with construction activities would occur due to soil disturbances for the construction of two concrete drop spillway structures, removal of the principal spillway riser and conduit, partial removal of the embankment, and grading activities. Standard best management practices (BMPs) such as silt fence and seeding with sod-forming species on disturbed areas would be implemented to minimize erosion and subsequent temporary effects on surface water quality related to construction activities. These construction activities would not have adverse impacts on groundwater.

Federal Decommissioning

Water quality effects would be similar to that of the No-Action/Future Without Federal Project Alternative due loss of sediment retention from elimination of the reservoir pool. However, because grade control would be provided, thereby preventing gully erosion, overall sediment production would be lower than the No-Action/Future Without Federal Project Alternative. Potential impacts as a result of construction would be greater than for the No-Action/Future Without Federal Project Alternative because of a larger construction footprint due to total removal of the structure, the length of time the ground is in an uncovered (non-vegetated) state, and exposed soil at the spoil location. However, this effect will be relatively small and temporary occurring only during the construction phase.

Rehabilitation to High Hazard Class

This alternative would have no long-term effect on existing water quality either downstream or within the impoundment as the existing structure currently provides the same water quality benefits as would this alternative. There would be approximately a 165 acre-foot increase in the floodwater retarding pool, thereby allowing for some additional storage of storm water runoff and subsequent settling of sediment and nutrients during larger precipitation events.

Temporary effects on surface water quality would result from construction activities. State

permitting requirements would help ensure that surface water quality impacts are kept at an acceptable level. Construction activities would include removal and replacement of the existing principal spillway, placement of embankment to raise the dam (and subsequent widening), widening of the auxiliary spillway, and miscellaneous earthmoving activities. All excavated material not suitable for use in raising the structure would be placed in a suitable upland location. These construction activities would not have adverse effects on groundwater quality.

Standard BMPs such as silt fence and seeding with sod-forming species on disturbed areas would be implemented to minimize erosion and sediment load transfer and the subsequent temporary effects on surface water quality related to construction activities.

Rehabilitation to Grade Stabilization Structure

Water quality effects would be similar to that of the No-Action/Future Without Federal Project Alternative due loss of sediment retention from elimination of the reservoir pool. However, because grade control would be provided, thereby preventing gully erosion, overall sediment production would be lower than the No-Action/Future Without Federal Project Alternative. Potential temporary impacts as a result of construction would be greater than the No-Action/Future Without Federal Project Alternative because of a larger construction footprint due to the removal of a portion of the embankment, the length of time the ground is in an uncovered (non-vegetated) state, and exposed soil in the auxiliary spillway spoil location.

5.1.3 Erosion and Sedimentation

No-Action/Future Without Federal Project

The grade stabilization function of the structure—for which the structure was originally built—would be eliminated, so gully formation would be expected to resume upon breaching of the dam. Additionally, sediment storage would be eliminated due to the removal of all the reservoir pool. Sediment-laden water from the watershed would be transported directly downstream without the pool and its sediment retention function.

Federal Decommissioning

The grade stabilization function of the structure would be maintained, thereby preventing gully formation and its associated sediment production. However, sediment storage would be eliminated due to the elimination of the reservoir pool. Construction of a set of drop structures would not retain the sediment storage function as the sediment-laden water would be transported directly downstream.

Rehabilitation to High Hazard Class

The remaining sediment storage capacity in Structure 2 is insufficient to achieve a 100-year design life. This alternative would maintain the grade stabilization function and continue to protect the existing channel from gully formation as well as increase the sediment storage volume for a 100-year design life for each structure. The riser crest elevation would be raised by 2.2 feet, the auxiliary crest would be raised by 5.4 feet, and the auxiliary spillway width would increase by 80 feet.

Rehabilitation to Grade Stabilization Structure

The grade stabilization function of the structure would be maintained, thereby preventing gully formation and its associated sediment production. This alternative would continue to provide sediment storage up to the normal pool elevation.. Construction of the broad-crested weir structure would not retain the sediment storage function above the normal pool elevation and thus the sediment-laden water would be transported directly downstream.

5.1.4 Flood Control

No-Action/Future Without Federal Project

Flood control opportunities would be eliminated as no flood retarding pool would remain.

Federal Decommissioning

See No-Action/Future Without Federal Project.

Rehabilitation to High Hazard Class

The auxiliary spillway crest elevation would be raised 5.4 feet. Therefore, the additional floodwater benefits would occur in relation to existing conditions.

Rehabilitation to Grade Stabilization Structure

See No-Action/Future Without Federal Project.

5.1.5 Recreation

No-Action/Future Without Federal Project

Although the aesthetic appeal associated with the normal pool would be eliminated, the area surrounding Structure 2 does not currently support aquatic recreation opportunities; therefore, after construction the recreation opportunities would be consistent with the currently available opportunities.

Federal Decommissioning

See No-Action/Future Without Federal Project.

Rehabilitation to High Hazard Class

Effects on recreation would be temporary and related to construction activities. After construction, the recreational opportunities would be consistent with the current opportunities available. Any recreational activities associated with Structure 2 are passive and are currently limited by the private property owner. The normal pool area would increase by 6.9 acres.

Rehabilitation to Grade Stabilization Structure

See No-Action/Future Without Federal Project.

5.1.6 Transportation

No-Action/Future Without Federal Project

Effects on transportation as a result of this alternative are generally related to proposed construction activities. Heavy trucks and other construction-related equipment would use South 156th Street and Pflug Road to access the structure. Any material removed from the existing embankment would be stockpiled on site and used for construction of this alternative or placed on-site in a suitable location.

Federal Decommissioning

Although increased volumes of soil will be excavated as a result of complete removal of the embankment and deposited sediment, no additional impacts beyond those discussed for No-

Action/Future Without Federal Project would be anticipated beyond access to the structure. This is due to wasting all excavated material in a suitable on-site location.

Rehabilitation to High Hazard Class

Construction activities would present the only effects on transportation for this alternative. All fill material for required for Structure 2 would come from on-site excavation. Any excess excavated material from auxiliary spillway construction would be wasted on-site.

Rehabilitation to Grade Stabilization Structure

Although increased volumes of soil will be excavated as a result of partial removal of the embankment, no additional impacts beyond those discussed for No-Action/Future Without Federal Project would be anticipated beyond access to the structure. This is due to wasting all excavated material in the auxiliary spillway.

5.1.7 Cultural Resources

No-Action/Future Without Federal Project

Previously undisturbed terrain would not be disturbed as result of this alternative. In addition, there are no historic or cultural properties listed on or eligible for listing on the National Register of Historic Places, and it is very unlikely that any unknown cultural resources are present that would be affected by the implementation of this alternative.

Federal Decommissioning

See No-Action/Future Without Federal Project.

Rehabilitation to High Hazard Class

The existing auxiliary spillway would be required to be widened by 80 feet, for a total width of 150 feet. Native material would be removed to accommodate the new width of the auxiliary spillway. Approximately 46,300 cubic yards of native material covering 3.4 acres would be removed in an area that is unlikely to contain unknown cultural resources

Rehabilitation to Grade Stabilization Structure

The Nebraska State Historic Preservation Office (SHPO) is being contacted. The area of potential effect has been identified and reviewed by the NRCS Cultural Resources Specialist who will coordinate with the State Historic Preservation Officer as needed.

5.1.8 Endangered and Threatened Species

Western Prairie Fringed Orchid

No effect. While known populations of western prairie fringed orchid exist in Sarpy County, site investigations found the area of potential effect does not include a natively vegetated subirrigated meadow or floodplain and lower stream terraces. Also, within the area of potential effect, there are no sidehill seep type wetlands (identified by the National Wetlands Inventory, an official or certified wetland determination, or identified as a stream on a USGS quadrangle map, NWI or soil survey) and in a native tallgrass prairie or subirrigated meadow.

No-Action/Future Without Federal Project

Bald Eagle

The normal pool of the existing structure lacks suitable depths to maintain fisheries and, in winter months, would likely be ice covered or void of water. A suitable food source for the wintering bald eagle (open water areas of the Platte River) is over 1 mile away from the site. No active nest

or winter roost sites are known within 1 mile of the Project area. Elimination of the normal pool would change the overall habitat associated with the Project area. While the normal pool would be permanently removed, the amount of habitat removed is not anticipated to disturb the bald eagle population to the extent that it would cause an adverse affect. If an excavated breach thru the embankment occurred due to the selection of this alternative, the SLO or lead federal agency would initiate informal consultation with USFWS to seek concurrence on the determination of would affect, "not likely to adversely affect" prior to proceeding with the Project.

USFWS would be contacted if construction were to take place between November 1 through April 1 and an active winter roost site is found within ½ mile of the Project, or if construction were to take place between February 1 through August 15 and an active nest site is found within ½ mile of the Project.

Platte River and associated Endangered and Threatened (E&T) Species:

Interior least tern, piping plover, and pallid sturgeon

No effect. Platte River and associated federally listed species were considered as species that potentially may be affected because Turtle Creek is a tributary to Springfield Creek, a tributary to the Platte River. Potential effects to Platte River E&T species were evaluated on the basis of water source depletions to the Platte River that could ultimately affect habitat for these species.

This alternative would eliminate the normal pool, thereby creating a free-flow condition. No depletions of a Platte River water source would occur as a result of this alternative, thereby having no effect.

Federal Decommissioning

The period of time required to complete construction of this alternative would likely be longer than the No-Action/Future Without Federal Project Alternative due to the additional construction (removal of the entire structure and deposited sediment). However, this alternative would not create any differing long-term conditions that would affect E&T species when compared to the No-Action/Future Without Federal Project Alternative. See No-Action/Future Without Federal Project.

Rehabilitation to High Hazard Classification

Bald Eagle

No effect. The depth of the permanent pool would not change as a result of this Alternative and no bald eagle habitat would be removed as a result of these activities. No active nest or winter roost sites are known within 1 mile of the Project area.

The proximity of the Platte River provides favorable areas during construction for the bald eagles to hunt and roost with ample food sources and without the disturbance of residential development or agriculture practices.

USFWS would be contacted if construction were to take place between November 1 through April 1 and an active winter roost site is found within ½ mile of the Project, or if construction were to take place between February 1 through August 15 and an active nest site is found within ½ mile of the Project.

Platte River and associated Endangered and Threatened (E&T) Species:

Interior least tern, piping plover, and pallid sturgeon

No adverse effect concurrence. Platte River and associated federally listed species were considered as species that potentially may be affected because Turtle Creek is a tributary to Springfield Creek, a tributary to the Platte River. Potential effects to Platte River E&T species

were evaluated on the basis of water source depletions to the Platte River that could ultimately affect habitat for these species.

The quantity of instream flow depletions of the Platte River were analyzed based on pre-structure conditions. Therefore, the analysis for this alternative takes into account the total depletions that would result from implementation of this alternative (not the incremental change between existing and future conditions).

The analysis of instream flow depletions of the Platte River was performed and for the critical months of February through July the average monthly depletions to Platte River flow as a result of implementation of this alternative would be net loss of 0.5 acre-feet per year. There are no adverse effects to species as relating to the Platte River flows (as per the July 2001 letter of concurrence from USFWS of "No Adverse Effect" for projects resulting in less than 25 acre-feet per year threshold).

Rehabilitation to Grade Stabilization Structure

The period of time required to complete construction of this alternative would likely be longer than the No-Action/Future Without Federal Project Alternative due to the additional construction (construction of a chute spillway and removal of a portion of the embankment). However, this alternative would not create any differing long-term conditions that would affect E&T species when compared to the No-Action/Future Without Federal Project Alternative. See No-Action/Future Without Federal Project.

5.1.9 Fish and Wildlife Resources

No-Action/Future Without Federal Project

Plant and Wildlife Habitat

Implementation of this alternative would eliminate the flood storage capacity and normal pool at Structure 2, thereby removing the majority of plant and wildlife habitat associated with the pool and fringe wetland area surrounding the pool. A riparian area would likely develop adjacent to the channel although the long-term nature of this habitat would be in question as gully erosion progresses upstream. An estimated 14.2 acres of fringe wetlands would be impacted. Adequate habitat exists within the Project area and within the Turtle Creek Watershed to accommodate this loss. See Section 5.1.13, Wetlands and Other Waters of the U.S., for additional information regarding wetland impacts.

Limited vegetation-clearing activities would result from implementation of this alternative; therefore, minimal adverse affects on nesting migratory birds would exist. However, avoidance and minimization practices pursuant to the Migratory Bird Treaty Act of 1918, as amended, could be followed as applicable. The Migratory Bird Treaty Act only applies to Federal actions or where there is a Federal nexus. The Federal action for this alternative would be limited by the potential need for USACE permits for construction.

Aquatic Habitat

The existing normal pool does not support fisheries habitat. Therefore, loss of the normal pool would not affect aquatic habitat. However, reduced water quality downstream due to increased sediments and nutrients in the water could decrease aquatic habitat in downstream areas.

Federal Decommissioning

The period of time required to complete construction of this alternative would likely be longer than the No-Action/Future Without Federal Project Alternative due to the additional construction (removal of the entire structure and deposited sediment). Additional vegetation-clearing activities

would be required to remove the entire structure. However, the Federal Decommissioning Alternative would not create any differing long-term conditions that would affect fish and wildlife resources when compared to the No-Action/Future Without Federal Project Alternative.

If the Federal Decommissioning Alternative were selected, avoidance and minimization practices would be required. To the extent possible, vegetation-clearing activities along the riparian corridor would be completed outside of the nesting period (primarily between April 1 and July 15) to avoid or minimize adverse effects on nesting migratory birds. Should clearing activities be required during this time period, a survey of the affected habitats would be conducted to determine if nesting migratory birds are present. This survey would be coordinated with USFWS and the results submitted to USFWS to determine if any migratory birds would be affected.

Rehabilitation to High Hazard Class

Plant and Animal Wildlife

Due to the alteration of the downstream slope face, the embankment toe would extend downstream, and approximately 76 feet of channel and associated wetland area would be permanently lost. This would have a negligible impact on the riparian area on the downstream side of the stilling basin with the removal of no trees to accommodate the 76-foot shift of the toe-of-slope and stilling basin. In addition, due to the presence of substantial riparian areas below the structure and in the tailwater of the impoundment, no conservation needs of riparian areas were identified during scoping. All other existing plant and wildlife resources would not be affected by this alternative. No permanent reductions in upland or wetland habitat would occur.

Disturbance of habitat near Structure 2 would occur as a result of construction activities. However, there is adequate suitable habitat available for wildlife to migrate to during and after construction. Further, disturbed areas would be re-vegetated with grasses compatible with native species to eventually provide some wildlife habitat.

If the Rehabilitation to High Hazard Class Alternative is selected, avoidance and minimization practices would be required. To the extent possible, vegetation-clearing activities along the riparian corridor would be completed outside of the nesting period (primarily between April 1 and July 15) to avoid or minimize adverse effects on nesting migratory birds. Should clearing activities be required during this time period, a survey of the affected habitats would be conducted to determine if nesting migratory birds are present. This survey would be coordinated with USFWS and the results submitted to USFWS to determine if any migratory birds would be affected.

Aquatic Habitat

The Rehabilitation to High Hazard Class Alternative would increase the sediment storage volume to achieve a 100-year design life at Structure 2. Water depths would not be deep enough to support year-round sport fisheries.

Rehabilitation to Grade Stabilization Structure

The period of time required to complete construction of this alternative would likely be longer than the No-Action/Future Without Federal Project Alternative due to the additional construction (construction of a chute spillway and removal of a portion of the embankment). Additional vegetation-clearing activities would be required to a portion of the embankment. However, the Rehabilitation to Grade Stabilization Structure Alternative would not create any differing long-term conditions that would affect fish and wildlife resources when compared to the Rehabilitation to High Hazard Alternative.

If the Rehabilitation to Grade Stabilization Structure Alternative were selected, avoidance and minimization practices would be required. To the extent possible, vegetation-clearing activities along the riparian corridor would be completed outside of the nesting period (primarily between April 1 and July 15) to avoid or minimize adverse effects on nesting migratory birds. Should clearing activities be required during this time period, a survey of the affected habitats would be conducted to determine if nesting migratory birds are present. This survey would be coordinated with USFWS and the results submitted to USFWS to determine if any migratory birds would be affected.

5.1.10 Migratory Birds

No-Action/Future Without Federal Project

To avoid impacts, needed vegetation clearing would be proposed to occur outside of the primary nesting period of April 1 to July 15.

Federal Decommissioning

See No-Action/Future Without Federal Project.

Rehabilitation to High Hazard Class

See No-Action/Future Without Federal Project.

Rehabilitation to Grade Stabilization Structure

See No-Action/Future Without Federal Project.

5.1.11 Prime and Unique Farmlands

No-Action/Future Without Federal Project

No change in existing conditions.

Federal Decommissioning

No change in existing conditions.

Rehabilitation to High Hazard Class

It is estimated that 3.5 acres of prime farmland and 0.5 acres of farmland of statewide importance would be converted. The AD-1006 Farmland conversion Impact Rating was used to indicate the level of concern. The total for Part VI Site Assessment of the form was 68. The form is based on a point system that has 160 points set as the minimum number limit for "Total Points" that triggers additional in-depth site reviews. The NRCS evaluation portion Part V is on a scale of 0 to 100 points and the total for that portion was 69. The overall "Total Points" then being 137 which is well below the 160 "Total Points" level of concern. Thus, NRCS has determined the Project was found to be cleared of Farmland Protection Policy Act concerns for this alternative.

Rehabilitation to Grade Stabilization Structure

No prime farmland or farmland of statewide importance would be converted. Thus, NRCS has determined the Project was found to be cleared of Farmland Protection Policy Act concerns for this alternative.

5.1.12 Riparian Area

“Riparian” refers to various habitats that may OR may NOT meet wetland criteria and are adjacent to a stream or lake.

No-Action/Future Without Federal Project

Existing riparian habitat areas present within tributaries in the lower watershed would be altered as gully erosion progresses upstream after breaching of the dam. In addition, a gully channel through the existing normal pool area would restore 790 feet of stream channel and some riparian area.

Federal Decommissioning

Existing riparian habitat areas present within tributaries associated with the Structure 2 would remain unchanged. In addition, the restored channel through the existing normal pool area would restore 790 feet of stream channel and associated 5.5 acres of riparian area.

Rehabilitation to High Hazard Class

Due to the alteration of the downstream slope face, the embankment toe would extend downstream, and approximately 76 feet of channel and 0.02 wetland area would be permanently lost. This alteration would entail the removal of 0.02 acres of riparian habitat. The removal of this habitat would have an impact on the riparian area on the downstream side of the structure. Adequate habitat exists within the project area and within the turtle Creek Watershed to accommodate this loss. These areas would provide a suitable habitat for any displaced wildlife. A total of 76 feet of stream channel and associated 0.02 acres of PEM wetland riparian area would be impacted. Other existing riparian habitat areas present within tributaries to Turtle Creek would remain unchanged.

Rehabilitation to Grade Stabilization Structure

See Federal Decommissioning

5.1.13 Wetlands and Other Waters of the U.S.

No-Action/Future Without Federal Project

Approximately 14.2 acres of existing artificial fringe wetland areas associated with Structure 2 rely on the pool area as a source of hydrology. Breaching of the dam and gully channel headcutting would eliminate the pool and cause rapid flow of watershed runoff through the area. A direct effect of this change of hydrologic conditions would be the loss of wetland areas associated with the pool fringe. A total of 5.8 acres of palustrine emergent, 0.5 acre of palustrine scrub shrub, 1.1 acre of palustrine forested wetlands and 2.5 acres of vegetative fringe, as well as 4.3 acres of deep water habitat would be lost. A total of 0.3 riparian acres that may meet wetland criteria could develop along the gully channel margin. The 0.5 acres of linear wetlands downstream would not be impacted.

Federal Decommissioning

Similar to the No-Action/Future Without Federal Project Alternative, this alternative would result in a loss of the reservoir pool. A direct effect of the elimination of pool hydrology would be the loss of wetland areas associated with the pool fringe. A total of 5.8 acres of palustrine emergent, 0.5 acre of palustrine scrub shrub, 1.1 acre of palustrine forested wetlands and 2.5 acres of vegetative fringe, as well as 4.3 acres of deep water habitat would be lost. The 0.5 acres of linear wetlands downstream would not be impacted.

Waterways upstream and downstream of the structure would not be affected. The existing channel would reestablish itself as a functioning channel. The channel and flow would be restored upstream of the concrete drop spillway structures. This is not considered an increase in channel length. One concrete drop spillway structure would be constructed at the location of the existing dam footprint and another constructed within the channel to stabilize the accumulated sediment. It is expected that a wetland fringe would redevelop along the channel margins. A total of 0.3 riparian acres that may meet wetland criteria could develop along the channel margin depending on future land use plans.

Rehabilitation to High Hazard Class

Wetland resources would remain relatively unchanged. The principal spillway elevation would increase 2.2 feet, thereby increasing the normal pool area from 6.8 acres to 13.7 acres. This would provide increased deep water habitat and more available hydrology to the associated wetlands. The Rehabilitation to High Hazard Class Alternative would increase the associated fringe and could potentially cause a permanent increase to the existing 5.8 acres of palustrine emergent wetland and 1.1 acre of palustrine forested wetland. There would be a loss of 76 feet of stream channel that averages 5-10 feet in width. Also, 0.02 acres of riverine channel riparian habitat would be lost.

All excavated materials would be placed in suitable upland locations. Dewatering and the resulting effects on any wetland fringe areas surrounding the pool would be temporary due to construction. Waterway effects would be minimal. It is expected that there would be a permanent loss of 76 linear feet of waterway due to increase in width of the structure and extension of the toe of the embankment.

Rehabilitation to Grade Stabilization Structure

All excavated materials would be placed in suitable upland locations. Dewatering and the resulting effects on any wetland fringe areas surrounding the pool would be temporary due to construction. The normal pool elevation would remain the same but a temporary loss of 0.03 acres linear wetlands would be expected as a result of construction and placement of rip rap along the downstream channel. No long-term loss to wetlands would occur. No mitigation requirements are expected to be associated with wetland and/or stream impacts per the requirements of Section 404 of the Clean Water Act.

5.2 CUMULATIVE EFFECTS OF ALTERNATIVES

A cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Cumulative impacts include the direct and indirect effects of a project together with effects from reasonably foreseeable future actions of others. For a project to be reasonably foreseeable, it must have advanced far enough in the planning process that its implementation is likely. Reasonably foreseeable future actions are not speculative, are likely to occur based on reliable sources, and are typically characterized in planning documents.

This assessment of the cumulative effects for Federal, State, and private actions is required by Council on Environmental Quality (CEQ) regulations developed from the National Environmental Policy Act of 1969 (NEPA). Cumulative effects were evaluated in accordance with CEQ guidance (CEQ, January 1997, June 24, 2005).

The methodology for identifying cumulative issues used for this study involved identifying resources affected by the proposed Project, consideration of the types of effects likely for other reasonably foreseeable projects, and a determination of the approximate timeframes and locations of impacts.

The primary cumulative impact issues associated with the Project would be effects on health and human safety, water quality, flood control, and loss of plant and wildlife habitat associated with the No-Action/Future Without Federal Project and Federal Decommissioning Alternatives.

For this Project, cumulative effects on these issues were evaluated within the Turtle Creek Watershed in Sarpy County, Nebraska. For the purpose of this evaluation, health and human safety is linked to flood control and potential flood hazard. Flood control, while not a primary purpose of the Project, is considered due to potential future development of the Turtle Creek Watershed. The effect on water quality and loss of plant and wildlife habitat is collectively important because wildlife species are dependent on wetland and riparian habitats and the associated water quality of the habitat. The following projects, either recently past or reasonably foreseeable future actions, may have cumulative effects with the selection of the No-Action/Future Without Federal Project, Federal Decommissioning, and Rehabilitation to High Hazard Alternatives:

- Widening of State Highway 50 – State Highway 50 is to be widened to four lanes from State Highway 370 to Louisville, Nebraska.
- Improvement of Pflug Road – Pflug Road, from I-80 east to an eventual connection with Platteview Road near 114th Street, is planned to serve Sarpy County as an east-west arterial roadway (Sarpy County Comprehensive Plan, October 2005). An interchange with Pflug Road and I-80 is currently in the NEPA study phase, and a NEPA study for improvements to Pflug Road is anticipated to be underway in 2006.
- Expansion of the urban areas – Additional residential development has been identified to occur within the Turtle Creek Watershed (Sarpy County Comprehensive Plan, 2005). Structure 2 is currently outside of the City of Springfield's planning jurisdiction but could be included within their jurisdiction as city limits expand.
- Construction of the Sarpy County Landfill – Construction of the Sarpy County Landfill began in 1991, and this landfill is currently in operation. The Sarpy County Landfill, through NDEQ, has an existing National Pollutant Discharge Elimination System (NPDES) permit and contains all surface water runoff on-site. An area immediately adjacent to the Sarpy County Landfill is considered a candidate for a future landfill site.

Health and Safety and Flood Control

The existing structure, while not a flood control project, does provide flood control benefits to downstream areas. Currently, no flood mapping exists. While the No-Action/Future Without Federal Project, Federal Decommissioning and Rehabilitation to Grade Stabilization Structure Alternatives limit the potential for threatening human health and safety by eliminating the potential for a catastrophic breach, the flood benefits that the structure currently provides are eliminated. Future projects would need to be considered relative to future potential flood hazards. However, the other projects listed above do not create a health and human safety or flood control risk themselves. However, flood control (or lack thereof) would need to be considered. Further, expansion of urban areas would create a change in the volume and rate of storm water runoff generated from storm events.

The Rehabilitation to High Hazard Class Alternative does provide incidental flood control benefits that would provide some flood protection to downstream areas and could offset changes

in land use in the watershed above the structure.

Overall, cumulative effects on health and human safety are not considered to be significant due to the limited existing flood-related threat below the structure and the ability to accommodate for future flood-related threats through planning measures.

Water Quality

The existing structure provides downstream water quality benefits through sediment and associated contaminant deposition in the reservoir normal pool and by the prevention of gully erosion.

The No-Action/Future Without Federal Project and Federal Decommissioning Alternatives would permanently remove the sediment deposition benefit. The No-Action/Future Without Federal Project would also increase sediment loads due to initiation of gully erosion. The Rehabilitation to Grade Stabilization Structure would maintain the deposition benefits associated with the normal pool. However, reductions in sediment loads due to future residential development (and subsequent reductions in sediment load) would benefit water quality. In addition, due to Turtle Creek's eventual discharge into the Platte River and the size of the drainage area associated with the Platte River, sediment and nutrient load amounts would be diluted because of larger water flows of the Platte River. In addition, the anticipated wetland fringe of the channel would provide some filtering benefits for sediment and nutrient removal.

The Rehabilitation to High Hazard Class Alternative would retain this water quality benefit. Construction of the above-listed past or reasonably foreseeable future projects would present temporary impacts on water quality due to soil disturbance.

The widening of State Highway 50 and Improvement of Pflug Road projects each would be required to prepare a Storm Water Pollution Prevention Plan that is associated with an NPDES permit and would implement best management practices to avoid or minimize the effects of construction on water quality. Future residential development may produce short-term potential for decreases in water quality due to storm water runoff. However, residential development would reduce the potential of soil erosion and resultant sediment loads and related agricultural herbicides and pesticides in storm water runoff due to the replacement of farmland with impervious surfaces and landscaping.

Long-term cumulative effects on water quality associated with the No-Action/Future Without Federal Project, Federal Decommissioning and Rehabilitation to Grade Stabilization Structure Alternatives and other identified projects are not considered to be significant due to reductions in future sediment loads caused by future residential development, eventual dispersion into the Platte River, and future filtering potential of adjacent stream channel vegetation.

Plant and Wildlife Habitat

Lost though implementation of either the No-Action/Future Without Federal Project Alternative, Federal Decommissioning or Rehabilitation to Grade Stabilization Structure Alternative would be the 6.8 acre normal pool and hydrology of wetland areas associated with the pool fringe. A total of 14.2 acres of artificial wetlands are anticipated to be lost. However, the pre-existing channel would be re-established and associated fringe wetlands (approximately .3 acres) would be anticipated to establish.

The Rehabilitation to High Hazard Class Alternative would increase the normal pool to 13.7 acres, thereby impacting of 5.8 acres of PEM wetlands and 76 feet of stream channel due to widening of the structure. Future residential development would eliminate most natural areas from the Turtle Creek Watershed.

The Sarpy County Comprehensive Plan does indicate that stream corridors, such as Turtle Creek, would remain as open space. Most of the existing land use within the Turtle Creek Watershed is in agricultural production, which typically provides a low carrying capacity for wildlife. In addition, areas 0.5 mile south of Pflug Road are not anticipated for high density residential development. For these reasons, cumulative impacts on fish and wildlife resources are not considered to be significant due to adequate plant and wildlife habitat that exists in and near the Turtle Creek Watershed.

5.3 INDIRECT EFFECTS

Indirect effects are project-induced effects (positive or negative) that would affect the human and/or natural environment beyond the construction corridor and would occur later in time or be farther removed in distance from the Project.

One potential indirect effect of the Rehabilitation to High Hazard Class Alternative would be the result of mapping the breach inundation area as part of the emergency action plan required for High Hazard Class structures. The mapping of the breach inundation area would identify areas subject to flooding should Structure 2 breach. These areas could be adopted by Sarpy County (or City of Springfield as an extension of their planning jurisdiction) as areas not suitable for development and preserved as open space. This could minimize the flood hazard associated with these areas and would provide open space and wildlife habitat.

One potential indirect effect of the Rehabilitation to Grade Stabilization Structure Alternative would be the result of mapping the 100-year flood-prone inundation area identifying areas subject to flooding. These areas could be adopted by Sarpy County (or City of Springfield as an extension of their planning jurisdiction) as areas not suitable for development and preserved as open space. This could minimize the flood hazard associated with these areas and would provide open space and wildlife habitat.

Additionally, as residential development increases in the Turtle Creek Watershed, the area, under any alternative, could serve as open space and provide the potential for recreation via a link of a pedestrian trail. Property values would vary based on locations adjacent to the open space and whether a normal pool area exists at the site.

5.4 RISK AND UNCERTAINTY

5.4.1 Engineering

All cost and structural data are based on an additional 100 years of life. Failure of the present dam would most likely occur due to deterioration and failure of the principal spillway conduit and/or breach of the embankment caused by failure of the auxiliary spillway due to loss of detention storage.

The SLO will purchase easements to the auxiliary spillway elevation crest. The auxiliary spillway crest elevation is at or above the 100-year water surface elevation. Land above the auxiliary spillway crest elevation would be subject to the risk of flooding by events occurring less frequent than the 100-year flood.

5.4.2 Economics

In order to account for the grade stabilization benefits associated with the structure, the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G) was used.

The economic benefits contain a moderate degree of uncertainty. This was explicitly recognized throughout the analysis and prompted the development of minimum, most probable, and

maximum estimates of critical assumptions. Uncertainty in calculating the property value gains was incorporated into the random variables: average price of lots in the area, and the expected formation rate of gullies. In attempts to bracket the uncertainty involved, minimum expected values, maximum expected values, and most probable values were assigned to each of the random variables. To address these uncertainties, a Monte Carlo simulation was used to evaluate the statistical properties of a very large number of possible combinations of the minimum, most probable, and maximum variables (50,000 combinations). See Appendix D: Investigation and Analysis Report, Section 5.0, Economic Evaluation, for a detailed analysis.

5.5 CONTROVERSY

No direct areas of controversy were identified during scoping or subsequent public meetings (see Chapter 6, Consultation and Public Participation). In general, the agencies and public supported retaining the structure and associated pool area because of the benefits the structure and pool area provide.

5.6 PRECEDENT FOR FUTURE ACTIONS WITH SIGNIFICANT IMPACTS

The alternatives do not set a precedent for future actions to follow that would be associated with significant impacts. Future watershed rehabilitation projects would be evaluated on their own merits and evaluated for effects based on relevant resources identified during each project's scoping process.

5.7 COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LAWS

5.7.1 Federal

Section 404 Permit

A Section 404 permit from U.S. Army Corps of Engineers (USACE) would be required for impacts on wetlands and other waters of the U.S. USACE requires prior authorization of discharges of dredge or fill material, including those for temporary construction purposes, into waters of the U.S. (33 USC 1344).

Endangered Species Act

The agency taking the action makes a determination if its proposed action may affect a listed species or designated critical habitat. If it determines there is a "may affect" then, Section 7(a)(2) of the Endangered Species Act states that each federal agency shall, in consultation with U.S. Fish and Wildlife Service, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

Based on a review of the potential E&T species within the Project area, the No-Action/Future Without Federal Project Alternative has the potential for a "may affect" on the bald eagle. If an excavated breach thru the embankment occurred due to the selection of this alternative, the SLO or lead federal agency would initiate informal consultation with USFWS to seek concurrence on the determination of "not likely to adversely affect" prior to proceeding with the Project.

Based on a review of the potential E&T species within the Project area, the Rehabilitation to High Hazard Class Alternative has the potential for a "may affect" on the Platte River and associated federally listed species (whooping crane and its designated critical habitat, least tern, piping plover, and pallid sturgeon). The analysis of instream flow depletions of the Platte River was performed and for the critical months of February through July the average monthly depletions to Platte River flow as a result of implementation of this alternative would be net loss of 0.5 acre-

feet per year. There are no adverse effects to species as relating to the Platte River flows (as per the July 2001 letter of concurrence from USFWS of “No Adverse Effect” for projects resulting in less than 25 acre-feet per year threshold).

Based on a review of the potential E&T species within the Project area, the Rehabilitation to Grade Stabilization Alternative has the potential for a “may affect” on the bald eagle. If a chute spillway were to be constructed, the SLO or lead federal agency would initiate informal consultation with USFWS to seek concurrence on the determination of “not likely to adversely affect” prior to proceeding with the Project.

Coordination with Nebraska Game and Parks Commission is required in accordance with the Nebraska Non-game and Endangered Species Act.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to determine whether their undertakings will have an adverse impact on historic properties that are listed on or are eligible for listing on the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. To complete this process, the Nebraska State Historic Preservation Office (SHPO) is being contacted. The area of potential effect has been identified and reviewed by the NRCS Cultural Resources Specialist who will coordinate with the State Historic Preservation Officer as needed. It is unlikely that any unknown cultural resources are present that would be affected by the implementation of these alternatives. NRCS has also completed consultation requirements to the extent required by protocols signed with the four Indian Tribal Governments resident in Nebraska. Detailed consultation is not necessary under any of the four tribal protocols.

5.7.2 State

Nebraska Department of Natural Resources

Since Turtle 2 would no longer be classified as a dam, a Nebraska Department of Natural Resources (NDNR) permit would not be required.

Section 401 Water Quality Certification

As part of the Section 404 permit, Section 401 Water Quality Certification must be obtained from the Nebraska Department of Environmental Quality (NDEQ). This certifies that the proposed action will not violate State water quality standards (33 USC 1341). The certification must be provided or waived before USACE can issue a Section 404 permit for any Project. Any specific permit conditions required for compliance with the State’s water quality standards would be specified in the Section 401 certification and in the permit conditions of the issued Section 404 permit.

Section 402 National Pollutant Discharge Elimination System

NDEQ administers the Federal National Pollutant Discharge Elimination System (NPDES) and issues permits for storm water discharges for construction activities (33 USC 1342). The purpose of the program is to improve water quality by reducing or eliminating contaminants in storm water. Disturbance of more than 1 acre requires an NPDES permit. Because the Project would involve disturbance of more than 1 acre, a storm water discharge permit for construction activities would be obtained from NDEQ prior to construction of the Project.

Nebraska Unmarked Human Skeletal Remains and Burial Goods Protection Act

If human remains are found during construction activities, construction must stop in that area and

procedures set forth by the State must be followed (Nebraska Statute Chapter 12-1201 through 12-1212). The following is Nebraska's law regarding unmarked burials:

Under the provisions of the Nebraska Unmarked Human Skeletal Remains and Burial Goods Protection Act, when human skeletal remains and burial goods are discovered and law enforcement determines a crime is not involved, division staff will be contacted by the appropriate county attorney's office. Staff is required to conduct an onsite investigation to determine the origin and identity of the remains and promptly relate the finding in writing to the county attorney and interested parties, who may include: a descendant Indian Tribe, a descendant family, or the Nebraska Indian Commission. Field evaluations may consist of inspection of disinterred or intact remains or artifacts. Disinterred remains may be collected and turned over to descendent parties or the county attorney for reburial. Intact remains are to be left in place. The only specified exception to this procedure involves intact materials encountered during public highway, road, or street construction. These remains may be excavated and reinterred to allow continuation of construction.

5.7.3 Local

Compliance with local zoning, regulated floodplain, or watershed plans is anticipated. No other construction permits from Sarpy County would be required prior to construction activities.

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CHAPTER 6

CONSULTATION AND PUBLIC PARTICIPATION

Refer to Chapter 3, Table 3-1 Summary of Scoping for a list of primary scoping concerns identified by the SLO, public, and agencies.

6.1 PUBLIC PARTICIPATION

A Site Assessment Report for Turtle Creek Structure 2 was completed by the NRCS in December 2003 and it provided the SLO with information to decide if a formal request for rehabilitation should be pursued. The result of the Site Assessment was the SLOs desire to extend the service life of the aging watershed structure known as Structure 2.

The SLO and NRCS held multiple public meetings to receive input, discuss Project alternatives, and update progress. The meetings held and general comments received at and after the meetings are summarized as follows:

- March 10, 2005 – The SLO's Board of Directors authorized staff to complete a Memorandum of Understanding with NRCS for the rehabilitation of Turtle Creek Structure 2. The Watershed Rehabilitation Program was on the agenda for their meeting, which was open to the public.
- October 6, 2005 – A joint public meeting was held at the Chalco Hills Recreation Center and Offices of the SLO and NRCS – Omaha Office to discuss the Watershed Rehabilitation of Structure 2 as well as the Watershed Rehabilitation of Structure W-3 in the Papillion Creek Watershed. Sixteen people attended the open house meeting. In addition, 9 representatives from the Project team included members from NRCS, the SLO, and HDR Engineering, Inc. A PowerPoint presentation was given; the presentation was segmented into three parts: Opening/Introduction, Watershed Rehabilitation Program Overview, and Existing Conditions and Rehabilitation Alternatives.

Questions were asked regarding the work that the surveyors performed on the project, how improvements to Pflug Road would affect the project, and how and when the breach inundation area would be determined. One person requested a copy of the breach inundation map when it was completed.

- January 26, 2006 – A joint public meeting was held at the Chalco Hills Recreation Center and Offices of the SLO and NRCS – Omaha Office to discuss the Watershed Rehabilitation of Structure 2 as well as the Watershed Rehabilitation of Structure W-3 in the Papillion Creek Watershed. Thirteen people attended the open house meeting. In addition, twelve representatives from the Project team included members from NRCS, the SLO, and HDR Engineering, Inc. A PowerPoint presentation was given that described the alternatives evaluated.

In general, those present were concerned with the distribution and availability of funding and what would happen if funding were not available. Questions were asked concerning the benefits of each alternative and who would be responsible for changes to flood patterns if the structure were removed.

Throughout the course of the Project, information was provided through public information meetings. All public correspondence was logged, and a response was sent to the specific public entity if one was requested.

A draft of this Watershed Plan Supplement and EA will be made available to the general public upon individual request. A 45-day comment period will be provided. Comments received after the comment period would be considered and become part of the administrative record.

6.2 AGENCY CONSULTATION

Various Federal, State, and local agencies as well as other organizations and public citizens were consulted for the Project. A list of these individuals is provided in Appendix D: Investigation and Analysis Report, Section 3.0, Agency Coordination.

On October 6, 2005, a joint agency scoping meeting was conducted to discuss the Watershed Rehabilitation of Turtle Creek Site 2 in Sarpy County, Nebraska; Upper Salt Creek Site 35A in Lancaster County, Nebraska, and Papillion Creek W-3 in Washington County, Nebraska. All agencies identified in Appendix D: Investigation and Analysis Report, Section 3.0, Agency Coordination, were invited to attend and sent an informational packet. Agency representatives from Nebraska Department of Natural Resources (NDNR), U.S. Fish and Wildlife Service (USFWS), Nebraska Department of Roads (NDOR), city of Blair, and Washington County were in attendance. In addition, representatives from the project team included: NRCS, Papio-Missouri River Natural Resources District (P-MRNRD), Lower Platte South Natural Resources District (LPSNRD), and HDR, study contractor. A total of 18 people attended: 7 agency/governmental and 11 project team.

A formal visual presentation was given. The presentation was segmented into 3 parts: Opening/Introduction, Watershed Rehabilitation Program Overview and Existing Conditions and Rehabilitation Alternatives. The agencies had the opportunity to comment on the Project and the effects on their respective resources. Their input aided in determining the resources that would be of concern in relation to the Project. An optional site visit was conducted after the agency meeting.

Comments concerning the new hazard class, flood control (benefits/costs), and endangered and threatened species, were fielded by the project team during the agency meeting.

A draft of this Watershed Plan Supplement and EA will be made available for their review and comment. A 45-day comment period will be provided. Comments received during the comment period would be considered and become part of the administrative record.

CHAPTER 7

PROVISIONS OF THE PREFERRED ALTERNATIVE

7.1 SELECTION OF THE PREFERRED ALTERNATIVE

Based on review of the ability to meet the purpose and need for the Project, the overall impacts on human and natural environmental resources, and consideration of the NED Alternative, the Rehabilitation to Grade Stabilization Structure Alternative is determined to be the preferred alternative for the Project. See Appendix C: Support Maps, Figure 3 for site plan, Figure 4 showing several pool elevations of the preferred alternative, and Figure 5 showing the 100-year flood prone inundation areas. See Appendix A: Tables, Table 3, for structural data pertaining to Structure 2.

7.2 RATIONALE FOR THE PREFERRED ALTERNATIVE

The Rehabilitation to Grade Stabilization Structure Alternative had the highest net economic benefits; therefore, this is the NED Alternative. Structure 2 would have an annualized cost of \$69,000 and an annualized benefit of \$31,300. See Appendix A: Tables, Tables 5 and 6, for additional information. Incidental flood control benefits were identified for the Rehabilitation to High Hazard Classification Alternative. Additional information regarding the economic analysis for the Project can be found in Appendix D: Investigation and Analysis Report, Section 5.0, Economic Evaluation. Table D4-6 in Appendix D provides a comparison between the Structure 2 and the Rehabilitation to Grade Stabilization Structure Alternative.

7.3 PERMITS AND COMPLIANCE

The following permits and compliance actions would be required for construction of the Project to occur:

- If during construction previously unevaluated cultural resource information comes to light, the area of discovery would be avoided, SHPO and NRCS will be notified, and the significance of the resource would be evaluated.
- A Section 404 permit will be obtained from USACE by the SLO before construction.
- A storm water NPDES permit for construction activity would be required from NDEQ because the disturbed area would be greater than 1 acre.

7.4 COSTS

The following sections describe the major components of installation costs and specific costs for each structure, the percentage of cost share of each component, and components of the NED costs. See Appendix A: Tables, Tables 1, 2, and 4, and Appendix D: Investigation and Analysis Report, Section 4.0, Alternative Evaluation, for values for installation costs and NED costs. The Turtle Creek Watershed Supplemental Agreement No. 1 between the SLO and NRCS also details these costs and cost sharing between the SLO and NRCS.

7.4.1 Installation Costs

Construction

Major components of construction costs consist of mobilization; clearing and grubbing; erosion and sediment control; removal of existing structural components such as the riser, conduit, and spillway; site work; construction of a broad crested chute spillway, earthwork; and seeding.

NRCS will pay up to 65 percent of the eligible project costs but not to exceed 100 percent of the total construction cost. The cost share rate for Structure 2 is 65 percent NRCS PL 83-566 funds and 35 percent SLO funds. See Appendix A: Tables, Tables 1 and 2, for a summary of construction costs and cost share and Appendix D: Investigation and Analysis Report, Tables D4-5, for a detailed estimate of construction costs values for Structure 2 for each major construction component.

Engineering

Major components of engineering costs consist of design, surveys, geotechnical investigation, and construction observation. Engineering costs were estimated to be 35 percent of the total construction costs. Costs were allocated at 25% for design and survey, and 10% for construction observation to prepare Table 2 in Appendix A. No geotechnical investigation is anticipated. NRCS would provide 100 percent of funding for the costs of engineering. See Appendix A: Tables, Tables 1 and 2, for a summary of engineering costs and cost share.

Real Property Acquisition and Easements

Permanent land rights would not be needed, but temporary easements for construction would also be required. The SLO would require operation and maintenance access to both sides of the structure. An access easement along the right (south) overbank would be adjacent to Turtle Creek from 156th Street. Since the existing flood storage easement would be reduced with a full-flow grade stabilization structure, and since the same property owner owns the flood storage easement and the land adjacent to Turtle Creek, real property acquisition would not be required. Four acres of temporary easement will be required.

The SLO would be required to provide 100 percent of funding for the land rights acquisition and easement costs. See Appendix A: Tables, Tables 1 and 2, for a summary of real property acquisition and easement costs and cost share.

Project Administration

Project administration primarily consists of legal survey and documentation of new property acquisition and easement areas. Project administration costs were estimated to be 20 percent of the real property and easement costs. The SLO would be required to provide 100 percent of funding for the project administration costs. NRCS project administration includes contract administration and supervision. See Appendix A: Tables, Tables 1 and 2, for summary project administration cost and cost share.

7.4.2 NED Costs

In Appendix A: Tables, Table 4 identifies the average annual NED costs. The average annual cost includes installation costs as well as operation, maintenance, and repair costs.

Amortization of Installation Costs

The amortized installation costs were determined by amortizing the project cost over a period of 100 years at a discount rate of 5.125 percent. See Appendix A: Tables, Table 4, for these costs.

Operation, Maintenance, and Repair Costs

Operation, maintenance, and replacement costs were based on the total cost of construction. See Appendix A: Tables, Table 4, for the annual average operation, maintenance, and repair costs.

7.5 INSTALLATION AND FINANCING

7.5.1 Framework for Carrying out the Plan

Structural measures would be installed during year one of the evaluation period. The SLO would secure all needed permits, easements, and rights for installation, operation, and maintenance. NRCS would provide technical assistance, engineering services, consultation for special environmental concerns, and project administration.

Table 7-1 summarizes the cost share allocation of Project construction costs between the SLO and NRCS for the Rehabilitation to Grade Stabilization Structure Alternative.

Table 7-1
Cost Share Allocation of Total Estimated Eligible Project Costs,
Rehabilitation to Grade Stabilization Structure Alternative

Works of Improvement	SLO	PL 83-566 Funds	Total Estimated Eligible Project Costs^{1,2}
Rehabilitation of Structure 2	\$134,400	\$417,600	\$552,000

Notes:

¹ Estimated Project Cost includes \$168,000 in NRCS Engineering and Project Administration costs.

² Cost share on Structure 2 is 65 percent PL 83-566 funds and 35 percent SLO. The cost share percentages are computed for and administered during construction.

7.5.2 Planned Sequence of Installation

All easements, permits, and installation will be completed in year one of the evaluation period. No mitigation measures are required for construction.

The SLO has taxing authority for Project funding. The SLO has the power of eminent domain and may exercise their authority as needed to acquire any necessary land rights.

7.5.3 Responsibilities

The SLO would obtain the permits and follow the compliance actions as identified in Section 7.3, Permits and Compliance, above. In addition, the SLO is responsible for obtaining land rights and construction easements required for the Project.

The SLO has analyzed their financial needs in consideration of the scheduled installation of the works of improvement and is able to make funds available when needed. Federal funds are to be provided by NRCS for technical assistance, engineering services, project administration, and construction. The availability of Federal funds is contingent upon appropriations available for this purpose.

Prior to entering into agreements that obligate funds of NRCS, the SLO will have a financial management system for control, accountability, and disclosure of PL 83-566 funds received and for control and accountability for property and other assets purchased with PL 83-566 funds.

7.5.4 Contracting

Structure 2 will be rehabilitated through project agreements between NRCS and the SLO by means of Federal contract procedures and resultant contracts.

7.5.5 Real Property and Relocations

No land rights would need to be required, but 4.0 acres of temporary easement would need to be acquired for Structure 2. No relocations would be required.

7.5.6 Financing

This Project would be classified as a maintenance activity by the SLO. All maintenance activities are funded by general tax funds derived from a property tax levee for all individuals within the jurisdiction of the SLO. Annual budgets for maintenance activities range from 14 to 16 million dollars per year. The Project, once approved by the SLO's Board of Director's, would be placed on the fiscal budget for implementation.

Costs for permits and licenses are not eligible for PL 83-566 funds. The financing for these would be provided by the SLO through their maintenance activities fund.

7.5.7 Conditions for Providing Assistance

The cost of construction for rehabilitating Structure 2 is \$384,000 (excluding NRCS engineering and project administration costs). NRCS, under authority of PL 83-566, will provide \$417,600. The SLO, using other authorities, will provide \$134,400. Federal technical assistance, engineering services, project administration, and funds for construction are contingent upon appropriations for these purposes.

7.6 OPERATION, MAINTENANCE, AND REPLACEMENT

Operation includes the administration, management, and performance of non-maintenance actions needed to keep the structure safe and functioning as planned.

Maintenance includes performance of work, preventing deterioration of practices, and repairing damage or replacement of the structure if one or more of its components fail. Damages to a completed structure caused by normal deterioration, droughts, flooding caused by rainfall in excess of design rainfall, or vandalism are considered maintenance.

Measures in this plan will be operated and maintained by the SLO with the technical assistance from Federal, State, and local agencies in accordance with their delegated authority. A specific Operations and Maintenance (O&M) plan will be prepared using the NRCS National Operation and Maintenance Manual.

The SLO's liability for O&M extends throughout the actual life of the structure.

A separate O&M agreement will be developed before construction. The agreement will provide for inspections, reports, and procedures for performing the maintenance items. The agreement will include specific provisions for retention, use, and disposal of property acquired or improved with PL 83-566 assistance. The term of this new O&M agreement will be for a period of 100-years, which is the life expectancy of the project.

The structure is to be inspected annually by the SLO on a regularly scheduled basis and during or immediately following major storms, earthquakes, or other occurrences that may adversely affect the structure and appurtenant works.

7.7 EMERGENCY ACTION PLAN

Since Turtle 2 would be rehabilitated to a grade stabilization structure, an Emergency Action Plan would not be prepared.