

**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:
Natural Resources Conservation Service

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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

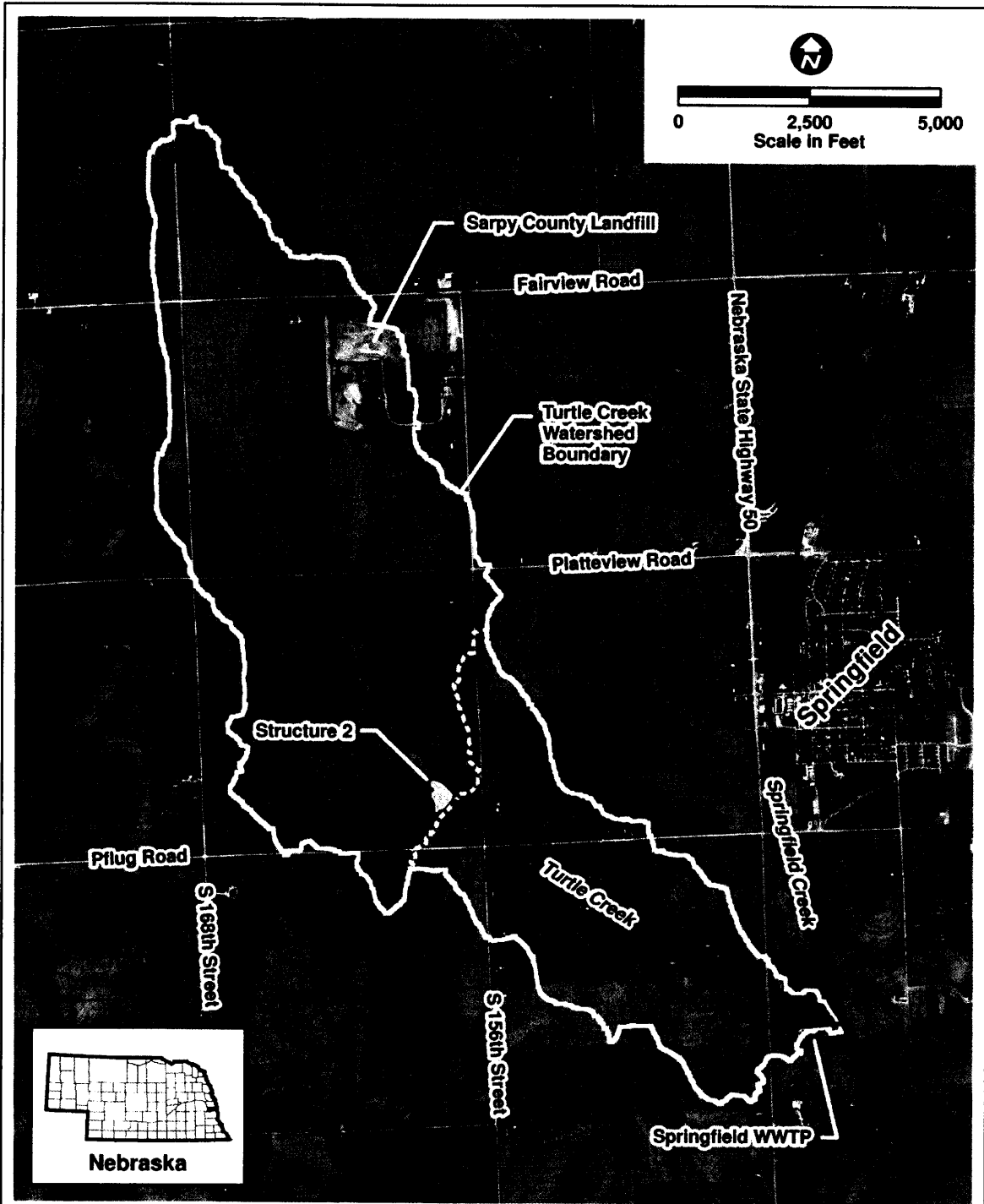
The purpose of this Federal action is to continue to provide grade stabilization protection in a manner that minimizes the risk of loss of human life and is both cost efficient and environmentally acceptable.

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.



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

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



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 \geq 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 \geq 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 Cost ²	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).