

**SUPPLEMENTAL WATERSHED WORK PLAN NO. 2
AND
ENVIRONMENTAL ASSESSMENT**

**REHABILITATION OF
FLOODWATER RETARDING DAM NO. 24
WAKARUSA WATERSHED
DOUGLAS COUNTY, KANSAS**

NOVEMBER 2010



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ENVIRONMENTAL ASSESSMENT**

for the

REHABILITATION OF FLOODWATER RETARDING DAM NO. 24

WAKARUSA WATERSHED

DOUGLAS COUNTY, KANSAS

Prepared by

**U.S. Department of Agriculture, Natural Resources Conservation Service
Kirkham Michael and Associates, Inc.
and
Terracon, Inc.**

for

**Wakarusa Watershed Joint District No. 35
Douglas County Soil Conservation District
Wakarusa – KAW Drainage District**

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.).

Comments on this plan must be received by December 28, 2010. For submitting comments or requesting additional information, contact:

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Natural Resources Conservation Service
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**SUPPLEMENTAL WATERSHED WORK PLAN NO. 2
AND ENVIRONMENTAL ASSESSMENT
FOR THE REHABILITATION OF FLOODWATER RETARDING DAM NO. 24
WAKARUSA WATERSHED
DOUGLAS COUNTY, KANSAS
2nd CONGRESSIONAL DISTRICT**

ABSTRACT

The Wakarusa Watershed Joint District No. 35, the Wakarusa-KAW Drainage District, and the Douglas County Conservation District signed the Work Plan agreement (plan of work-POW) with the Soil Conservation Service (now the Natural Resources Conservation Service) in 1967. Federal participation in carrying out the POW was authorized by the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat 666, as amended). Floodwater Retarding Dam No. 24 (Site 24) is a flood control dam originally constructed with federal funds under the authority of PL-566. Site 24 was one of eight flood control dams originally planned for construction as part of the Lower Wakarusa Watershed Work Plan. These impoundments were formulated to reduce the damaging effects of floods, reduce erosion, and stabilize grades along the tributaries and mainstream of the Wakarusa River. As part of the approved plan, six flood control dams in the Lower Wakarusa Watershed plan received federal funding for construction and were built. Dam site #24 was one of these six and was constructed in 1974 as a low hazard structure. The economic life of these structures was planned for 100 years. An Operation and Maintenance (O&M) Agreement was signed in 1970 that detailed responsibilities for O&M for structures within this plan.

In 1998, the dam was reclassified as a high hazard structure due to the development of ball fields immediately below the dam, increased downstream development, and new roadways. At time of the hazard class change, this structure would be required to pass a flood event generated by 40% of the 6-hour probable maximum precipitation (PMP) storm, with three feet of freeboard in the auxiliary spillway. The Chief Engineer of the Division of Water Resources (DWR) waived the freeboard requirement and required the district to raise the top of dam elevation in order to pass the flood event generated by 50% of the PMP storm with zero freeboard. The Chief Engineer subsequently required the District to raise the top of the dam by 1.7 feet. Modifications to the dam were completed in 1998.

In a letter dated July 15, 2008, DWR stated that a January, 2001 inspection found 375 feet of the top of dam did not meet the minimum dam height as required in 1998. The top of the dam was apparently not raised adequately when the dam was modified. An April, 2007 inspection of the dam by DWR found the dam to be hydraulically inadequate to meet state standards for high hazard class dams. The letter also stated that if development continued upstream, DWR could require additional dam modifications. Upstream land area continues to be developed, and the entire drainage area is in proposed development areas for the City of Lawrence, Kansas. This development will continue to increase peak runoff volumes into the dam.

The Wakarusa Watershed District, the Douglas County Soil Conservation District, and the Wakarusa-KAW Drainage District, as sponsors of the Lower Wakarusa Watershed Plan, applied to NRCS for technical assistance to address the issues pertaining to the change in hazard class of the dam. A dam safety inspection was completed by the Kansas Department of Agriculture, Division of

Water Resources, on April 26, 2007. The Dam Safety Inspection Report was completed on July 15, 2008. The inspection report indicated that the emergency action plan should be updated, and noted several maintenance recommendations.

The sponsor submitted an application to NRCS in February, 2009 for federal assistance to provide rehabilitation planning to address concerns associated with Site 24. Federal Rehabilitation Program funding for planning was made available to NRCS in 2009.

This supplemental document was developed in response to the rehabilitation application submitted by the sponsors to NRCS.

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SUPPLEMENTAL WATERSHED AGREEMENT No. 2

between

WAKARUSA WATERSHED JOINT DISTRICT NO. 35

DOUGLAS COUNTY CONSERVATION DISTRICT

(Referred to herein as Sponsors)

State of Kansas

and the

**Natural Resources Conservation Service
(formerly Soil Conservation Service)
U.S. Department of Agriculture**

(Referred to herein as NRCS)

Whereas, the Watershed Work Plan for Lower Wakarusa Watershed (the Plan), State of Kansas, executed by the Sponsors named therein and NRCS, became effective on the 23rd day of February 1967; and

Whereas, an unnumbered supplemental agreement for said watershed, executed by the Sponsors named therein and NRCS, became effective on the 21st day of July 1971; and

Whereas, a supplemental agreement No.1 for said watershed, executed by the Sponsors named therein and NRCS, became effective on the 15th day of October 1973; which modified the Plan; and

Whereas, six floodwater retarding structures (FRS) have been installed within the watershed boundaries; and

Whereas, the Wakarusa-Kaw Drainage District is no longer a sponsor of said watershed; and

Whereas, it has become necessary to upgrade one of the installed FRS (Lower Wakarusa Site No. 24) to meet current High Hazard Class (C) dam safety criteria due to downstream vehicular traffic and development; and

Whereas, the rehabilitation of said FRS No.24 has been authorized by Section 14 of P.L. 83-566 (enacted by Section 313 of P.L. 106-472), otherwise known as the "The Small Watershed Rehabilitation Amendments of 2000"; and

Whereas, modifying FRS No.24 to bring it up to current performance and safety

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standards necessitates supplementing the Plan; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the NRCS; and

Whereas, a Supplemental Watershed Plan/Environmental Assessment which modifies the watershed plan dated the 23rd day of February 1967, for said watershed has been developed through the cooperative efforts of the Sponsors and the NRCS, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture through the NRCS and the Sponsors hereby agree upon the following modifications of the terms, conditions, and stipulations of the Plan;

- 1. Term.** The term of this agreement is for the installation period and evaluated life of the project (100 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life unless agreed to by all parties.
- 2. Costs.** The costs shown in this plan are preliminary estimates. Final costs to be paid by the parties hereto will be based on actual costs incurred for the installation of works of improvement and the cost-share percentages stated in this agreement. The Sponsors assume all responsibility for the entire Sponsors' share of the costs of rehabilitating FRS No. 24.
- 3. Real property.** The Sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsors and NRCS are as shown in Section 5 hereof. The Sponsors acknowledge the potential risk of flood damages for the real property between the flowage rights elevation and the top of dam elevation.
- 4. Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The sponsors hereby agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring new real property interests for this federally assisted project. If the sponsor is legally unable to comply with the real property acquisition requirements, it agrees that, before any Federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.
- 5. Cost-share for Watershed Project Plans.** The estimated amount and percentages of the total rehabilitation project cost to be paid by the Sponsors and the NRCS are as follows:

Works of Improvement	NRCS	Sponsors	Total
Cost Sharable Items			
Rehabilitation of Lower Wakarusa Site 24 (Construction Costs)	\$969,400	\$203,100	\$1,172,500
Relocation	\$0	\$20,000	\$20,000
Sponsors Planning Costs	NA	\$0	\$0
Sponsors Engineering Costs	NA	\$0	\$0
Sponsors Project Administration	NA	\$59,000	\$59,000
Land Rights Acquisition Cost	NA	\$239,900	239,900
Subtotal: Cost-Share Costs	\$969,400	\$522,000	\$1,491,400
Cost-Share Percentages^{a/}	65.0%	35.0%	100.0%
Non Cost-Sharable Items^{b/}			
NRCS Engineering & Project Administration	\$497,200	NA	\$497,200
Natural Resource Rights	NA	\$0	\$0
Federal, State and Local Permits	NA	\$0	\$0
Real Property	NA	\$0	\$0
Subtotal: Non Cost-Share Costs	\$497,200	\$0	\$497,200

^{a/} Maximum NRCS cost-share is 65 percent of cost-sharable items not to exceed 100 percent of construction costs (including replacement-in-kind; required decent, safe, sanitary, and flood proofing of downstream properties).

^{b/} If actual non cost-sharable item expenditures vary from these figures, the responsible party will bear the change.

6. Land treatment agreements. The sponsors will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the Watershed Project Plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. Floodplain Management. Before construction of any project for flood prevention, the sponsors shall agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. For plans approved as of the date of this revised manual the sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS/sponsor entering into a construction contract.

8. Water and mineral rights. The sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement. Any costs incurred shall be borne by the sponsor and these costs are not eligible as part of the sponsors cost-share.

9. Permits. The sponsors will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement. These costs are not eligible as part of the sponsors' cost-share.

10. NRCS assistance. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. Additional agreements. A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

The Wakarusa Watershed Joint District No. 35 will assume all responsibility for the entire Sponsors' share of the costs of rehabilitating FRS No. 24.

12. Amendments. This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS shall promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsors having specific responsibilities for the measure involved.

13. Prohibitions. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

14. Operation and Maintenance (O&M). The sponsors will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be entered into before Federal funds are obligated and will continue for the project life (100 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. Emergency Action Plan. Prior to construction, the sponsors shall prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may

cause loss of life or as required by state and local regulations. The EAP shall meet the minimum content specified in Part 500.52 of the NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. EAPs shall be reviewed and updated by the sponsors annually.

16. Nondiscrimination provisions. The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW., Washington, DC 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

By signing this agreement the recipient assures the Department of Agriculture that the program or activities provided for under this agreement will be conducted in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

17. Certification Regarding Drug-Free Workplace Requirements (7 CFR Part 3021). By signing this Watershed Agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers,

even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsors certify that they will or will continue to provide a drug-free workplace by—

- (1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.
- (2) Establishing an ongoing drug-free awareness program to inform employees about—
 - (a) The danger of drug abuse in the workplace;
 - (b) The grantee's policy of maintaining a drug-free workplace;
 - (c) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
- (3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).
- (4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will—
 - (a) Abide by the terms of the statement; and
 - (b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.
- (5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees shall provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification numbers of each affected grant.
- (6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted—
 - (a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
 - (b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The sponsors may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

C. Agencies shall keep the original of all disclosure reports in the official files of the agency.

18. Certification Regarding Lobbying (7 CFR Part 3018) (for projects > \$100,000)

A. The sponsors certify to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The sponsors shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by U.S. Code, Title 31, Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

19. Certification Regarding Debarment, Suspension, and Other Responsibility Matters—Primary Covered Transactions (7 CFR Part 3017).

A. The sponsors certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph A(2) of this certification; and

(4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

20. Clean Air and Water Certification.

(Applicable if this agreement exceeds \$100,000, or a facility to be used has been subject of a conviction under the Clean Air Act (42 U.S.C. Section 7413(c)) or the Federal Water Pollution Control Act (33 U.S.C. Section 1319(c)) and is listed by EPA, or is not otherwise exempt.)

A. The project sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (), is not () listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

B. The project sponsoring organization(s) signatory to this agreement agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution

Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317).

(5) The term "facility" means any building, plan, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plan, installation, or structure, the entire location shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

State, Local, and Indian Tribal Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Non-Profit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

21. Assurances and Compliance.

As a condition of the grant or cooperative agreement, the sponsor assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State, Local, and Indian Tribal Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

22. Examination of Records.

The sponsors shall give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

The Sponsors and NRCS further agree to all other terms, conditions, and stipulations of said watershed agreement, as supplemented, not modified herein.

23. Signatures

The signing of this agreement was authorized by a resolution of the Wakarusa Watershed Joint District No. 35 Board adopted at a meeting held on _____.

Wakarusa Watershed Joint District No. 35
Sponsoring Local Organization

Larry Butel
PRESIDENT

10/26/10
DATE

Wayden Wood
SECRETARY

10-28-10
DATE

The signing of this agreement was authorized by a resolution of the District Board of Supervisors adopted at a meeting held on 11/3/10.

Douglas County Conservation District
Sponsoring Local Organization

Lee Wiley
CHAIRMAN

11 15 10
DATE

Seunde Fishbein
SECRETARY

11-3-10
DATE

U.S. Department of Agriculture
Natural Resources Conservation Service

Eric B. Banks
ERIC B. BANKS
State Conservationist

12-21-10
DATE

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SUMMARY

SUPPLEMENTAL WATERSHED PLAN NO. 2 AND ENVIRONMENTAL ASSESSMENT FOR WAKARUSA WATERSHED DOUGLAS COUNTY, KANSAS 3rd CONGRESSIONAL DISTRICT

Sponsoring Local Organizations (SLOs)

Wakarusa Watershed Joint District No. 35
Douglas County Soil Conservation District
Wakarusa-KAW Drainage District

Proposed Action

The proposed action (Project) is the rehabilitation of Wakarusa Watershed Flood Retarding Dam No. 24 (Site 24) under the Natural Resources Conservation Service (NRCS) Public Law 83-566 (PL-566) Watershed Program and Section 14 of the Watershed Protection and Flood Prevention Act.

Purpose and Need for Action

The purpose of the federal action is to meet current state and NRCS high hazard class criteria so that Site 24 will continue to provide flood damage reduction benefits to rural and urban areas within Douglas County and the City of Lawrence.

Site 24 was constructed in 1974 as a low hazard class dam. In 1998, the dam was reclassified as a high hazard class structure due to the development of ball fields immediately below the dam, increased downstream development, and new roadways. Modifications were made to the dam in 1998. State regulatory standards were updated in 2007. DWR found the dam to be hydrologically inadequate in a 2008 inspection the dam. Additionally, urban development in the drainage area continues to increase peak inflow volumes. To meet current hydrologic criteria, Site 24 will be upgraded to meet the current safety standards of a High Hazard Class structure.

Rehabilitation of this impoundment will allow continued flood prevention and floodwater damage reduction for an additional 100 years, reduce risk of loss of human life, and address identified problems.

Description of the Recommended Alternative

The rehabilitation of Site 24 to the NRCS High Hazard Class criteria would extend the life of the structure 100 years. Rehabilitation activities would include replacement of the principal spillway, increasing the height of the embankment, reconstruction of the stilling basin, and widening and armoring the auxiliary spillway. With these modifications, Site 24 will continue to provide flood damage reduction to agricultural lands, roads and bridges, and flood protection to commercial/recreation facilities such as municipal softball and youth sports complex, Pat Dawson Billing Native Area, Kanza Southwind Native Preserve, and Sport 2 Sport One LLC. These modifications will also allow over 100-years of sediment storage volume below the crest of the principal spillway. The modified embankment will be a High Hazard Class structure approximately 45 feet in height and 1400 feet in length.

Resource Information

Table S-1 provides relevant resource information for the Project.

Table S-1 Resource Information

Resource	Site 24
Latitude and Longitude	Latitude 38.9444 Longitude -95.3183
12-Digit Hydrologic Unit Code	102701040202 - Yankee Tank Creek Wakarusa River
Climate	Continental and temperate, cold winters, warm and hot summers, low to moderate humidity, light precipitation in the winter, pronounced rainfall peak late in spring and early in summer, and moderate amount of wind. Average Daily Maximum temperature: July = 88.2 degrees F Average Daily minimum temperature: January = 15.8 degrees F
Annual Precipitation	37.1 inches
Topography	Rolling to hilly, gently sloping to nearly level; with small valleys and narrow floodplains
Watershed Size (acres)	Drainage Area – 2179 acres Lower Wakarusa Watershed Drainage Area – 94,977 acres
Land ownership	90% private 10% State Local and Federal
Population/Demographics (Douglas County)	Population: 114,748 Demographics: White persons – 87.0% Black persons – 4.3% American Indian and Alaska Native persons – 2.4% Asian persons– 3.8% Native Hawaiian and Pacific Islander - 0.1% Persons reporting two or more races– 2.4% Persons of Hispanic or Latino origin – 4.0% White persons not Hispanic – 83.6%
Average Farm Size (Douglas County)	230 acres
Number of farms	No farms within immediate Project area for construction activities
Prime and important farmland	Approximately 5 acres temporarily impacted by short-term construction activities
Number of minority farmers	None
Number of limited resource farmers	None
Wetlands	Approximately 58.2 acres of wetlands were identified by the NRCS as OW/W (Other Waters/Wetlands) in the original permanent pool/streams/areas immediately adjacent to streams, and an additional 0.4 acres were identified by the NRCS as OW/W below the dam. The 58.2 acres of wetlands were identified as generally L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded) and as PEMCh (Palustrine, Emergent, Seasonally Flooded, Diked/Impounded), and the 0.4 acres were identified as generally PEMC (Palustrine, Emergent, Seasonally Flooded) on the NWI map.
Floodplains	No floodplain acres impacted by construction activities, however, floodplains are located in the inundation area.

Highly erodible cropland	Approximately 5 acres temporarily impacted by short-term construction activities
Threatened and endangered species	None
Cultural resources	None known
Environmental values changed or lost	None

Sources: Douglas County Soil Survey; U.S. Census Bureau, 2000, 2005, 2006; 2002 Census of Agriculture, WETS tables

Table S-1A Project Beneficiary Profile

	For the Site 24 project area identified by Block Number (200450008011) on the EPA Environmental Justice Geographic Assessment Tool website (inundation area near urban area)	For the Site 24 project area identified by Block Number (200450006021) on the EPA Environmental Justice Geographic Assessment Tool website (urban area around lake and upstream)	City	County	State	Nation
Per Capita/Median Household Income	\$19,944 (Per Capita only)	\$36,698 (Per Capita only)	\$19,378/\$34,669	\$19,952/\$44,580	\$20,506/\$47,341	\$21,587/\$50,740
Education Level	High School Diploma: 15.36% Bachelor degree or up: 50.78%	High School Diploma: 15.36% Bachelor degree or up: 48.81%	High School Diploma: 92.8% Bachelor degree or up: 47.7%	High School Diploma: 92.4% Bachelor degree or up: 42.7%	High School Diploma: 86.0% Bachelor degree or up: 25.8%	High School Diploma: 80.4% Bachelor degree or up: 24.4%
Poverty Level	Percent Below Poverty: 17.62%	Percent Below Poverty: 5.89%	Percent Below Poverty: 18.9%	Percent Below Poverty: 15.4%	Percent Below Poverty: 11.2%	Percent Below Poverty: 13.0%
Unemployment Rate	NA	NA	5.4%	5.0% to 5.9%	6.8%	10.2%
Home Values	NA	NA	\$118,400	\$117,800	\$83,500	\$119,600
Median Age	NA	NA	25.3	28.3	36.1	36.7
Population	NA	NA	88,605	114,748	2,802,134	304,059,724
Age 65 and over	NA	NA	7.2%	9.2%	13.1%	12.8%
Minority population	17.29%	6.22%	8.43%	13%	19.71%	34%

Notes:

NA: Not available

Sources: US Census Bureau: <http://quickfacts.census.gov/qfd/index.html>

CNN: http://money.cnn.com/pf/features/lists/state_unemployment/

Bureau of Labor Statistics: <http://www.bls.gov/lau/maps/twmcort.pdf>, <http://www.bls.gov/web/laummtrk.htm>

The Wakarusa Drainage area has experienced significant land use change in the Project area since the original plan was approved. Land cover was analyzed from the National Land Cover Dataset (NLCD) and the Kansas Applied Remote Sensing Program's 2005 Kansas Land Cover Patterns Map. Table S-2 provides existing land use classification and acreages for the Site 24 drainage area.

Table S-2 Summary of Land Use

Land Use Description	Acres ¹
Cultivated Crops	169
Deciduous Forest	306
Mixed Forest	24
Woody Wetlands	3
Shrub/Scrub	5
Pasture, Tame	445
Developed, Low Intensity	334
Developed, Medium Intensity	61
Developed, High Intensity	1
Developed, Open Space	315
Herbaceous	451
Water	65
Total	2179

¹ Rounded to the nearest acre.

Alternative Plans Considered

Table S-3 summarizes the alternative plans considered for this project.

Table S-3 Alternative Plans Considered

Alternative	Summary of Alternative	Studied in Further Detail
No Federal Action High Hazard	This alternative rehabilitates Site 24 to meet state hazard criteria only. This alternative would involve increasing the height of the embankment and armoring the auxiliary spillway.	Yes
Federal Decommissioning	Remove the embankment, stabilize the grade, reconnect the channel, and vegetate bare and denuded areas. Mitigate downstream hazards by raising roadways, constructing bridges, and protecting downstream properties.	No
Federal Reconstruction (Rehabilitation of Site 24)	This alternative rehabilitates Site 24 to meet current state and NRCS design criteria. The structure would control flooding caused by the 100-year, 24-hour rainfall event and be designed to provide a 100-year design life. This alternative would involve replacing the existing principal spillway pipe and inlet, add fill to the embankment and constructing an armored auxiliary spillway.	Yes
No Federal Action Hazard Removal	Remove downstream hazards and maintain dam as a low-hazard dam. Hazard removal includes raising roadways, constructing bridges, and protecting downstream properties.	No
National Economic Development (NED) Alternative	To maximize net economic gain.	Yes

Project Costs

Table S-4 summarizes the allocation of Project construction costs between the SLO and NRCS for the Project.

Table S-4 Allocation of Total Estimated Eligible Project Costs

Works of Improvement	SLO	PL 83-566 Funds	Total Estimated Eligible Project Costs
Rehabilitation of Site 24 ¹	\$522,000	\$969,400 ¹	\$1,491,400

Note:
¹ Estimated Project Cost excludes \$497,200 in NRCS Engineering and Project Administration costs. Construction cost share on Site 24 is 65 percent PL 83-566 Watershed Rehabilitation funds and 35 percent SLO funds.

Project Benefits

Project benefits include meeting state and federal dam safety criteria for a high hazard class structure, increased sediment storage, flood reduction, and flood damage reduction.

Net Beneficial Effects

The economic benefit estimate for this EA is based on the 1966 Watershed POW for the Lower Wakarusa Watershed economic analysis (including a 1973 Supplemental Work Plan) and some 1977 updates to Tables 5 and 6. In that analysis, flood reduction benefit categories included crop and pasture, other agricultural, flood scour, and non-agricultural benefits (road and bridges). In the 1966 plan, Site 24 was originally a multipurpose structure, but in the 1973 supplemental, it was reduced to principally a floodwater retarding structure.

The original plan analysis did not identify intensive use benefits associated with flood protection. Indexing was the procedure used to update original plan benefits to 2009 dollars.

Although indexing of original values is appropriate for much of the agricultural benefits provided in the 1966 POW, the areas both upstream and downstream of Site 24 have developed since constructed in 1974. Therefore, additional benefits are now present and discussed within, including non-agricultural commercial, roads and bridges, and lakefront property values.

Table S-5 Economic Benefits and Comparison of Alternatives

Alternative	Average Annual Cost	Average Annual Benefits	Net Benefits	Benefit-Cost Ratio (Most Probable Value)
No Federal Action – High Hazard	\$67,500	\$249,600	182,000	3.7
Federal Reconstruction	\$96,200	\$249,600	153,500	2.6

Note:
 The recommended plan (Federal Reconstruction) has the same average annual flood damage reduction benefits as the Future Without project (No Federal Action) with a net \$0.0 annual benefit between them. The recommended plan has a cost avoidance of the annual construction cost of the non-federal (FWOP) avoided by proceeding with the recommended plan (Federal Action) of \$67,500. The benefit to cost ratio of the recommended plan is then 0.7 relative to unity/scale of 1.0.

Period of Analysis

The period of analysis is 101 years, which includes 1 year for installation and 100 years for the design life of the structure.

Project Life

The Project life is based on a 100-year design life for this structure.

Environmental Considerations and Effects

Table S-6 describes all resource elements that were identified during scoping and summarizes the potential impacts related to the Project.

**Table S-6 Summary of Resource Concerns and Impacts
of the Federal Reconstruction Alternative**

Identified Resource Concerns	Summary of Concern	Effects Summary for Federal Reconstruction (Recommended Plan)
Human Health and Safety	The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk of loss of human life if the design flood event should occur, and the dam has not been reconstructed to current design standards. Federal Reconstruction Alternative will upgrade the dam to meet current NRCS and state high hazard class criteria; The No Federal Action alternative will upgrade the dam to meet current state hazard criteria, but Federal High Hazard criteria will not be met.	Would protect human populations from flooding events and provide flood protection in a manner that minimizes the risk of loss of human life.
National Economic Development	Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G) must be followed.	P&G must be applied to any watershed project to determine the alternative that has the greatest net benefit.
Erosion and Sedimentation	Primary purpose is flood control, sedimentation life not specifically evaluated. Sedimentation life does not change as principal spillway remains at current elevation.	Would retain existing erosion and sedimentation levels.
Water Quality	Erosion and resultant sedimentation is a potential concern. The capture and retention of this sedimentation in the pool results in improved water quality in the downstream waters.	Would retain existing impoundment and related long term water quality benefits. Note, the surface water level of the impoundment was manually lowered at the time of this study. It will be allowed to return to designed water level.
Economic and Social	The Project is not anticipated to affect the economic and social resources in or around the Project area as both alternatives protect downstream populations from flooding.	Would protect human populations and property from flooding events and provide flood protection in a manner that minimizes the risk of loss of human life.
Flood Control	The primary purpose of the structure is flood control and meeting current safety criteria.	Retain/upgrade existing flood control benefits.
Land Use	Minor land use changes in the area of the dam/spillway would occur with either alternative from modifications to the structure.	Limited loss of land (recreational ball fields) due to dam expansion and no loss of agricultural land.
Transportation	Clinton Parkway exists approximately 380 feet downstream (south) of the Site 24 dam within the breach inundation area. Highway K-10 exists approximately 600 feet downstream (south) of the Site 24 dam within the breach inundation area. Several local streets as defined in Section 2.5.3 exist within 5 miles downstream of the Site 24 dam within the inundation area. A potential catastrophic dam breach will impact downstream roads located in the inundation area.	Would protect downstream populations and transportation systems from flooding.

Identified Resource Concerns	Summary of Concern	Effects Summary for Federal Reconstruction (Recommended Plan)
Floodplain Management	Site 24 is located outside the 500-year flood plain. However, the majority of the inundation area is located in the 500-year floodplain, 100-year floodplain, and the Wakarusa River floodway as depicted on the City of Lawrence interactive maps website. The floodplains on the City of Lawrence interactive maps website appear to correspond to the Federal Emergency Management Agency (FEMA) floodplain maps website.	Would protect downstream populations from flooding.
Riparian Area	Riparian areas exist within the Project area.	Approximately 100 feet of riparian area along with 50 feet of stream channel will be filled and covered by the dam extension, adjacent to the current toe of the dam. As a result, approximately 0.11 acres would be permanently filled and covered. As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact.
Wetlands	Wetlands are present. Approximately 58.2 acres of wetlands were identified by the NRCS as OW/W (Other Waters/Wetlands) in the original permanent pool/streams/areas immediately adjacent to streams, and an additional 0.4 acres were identified by the NRCS as OW/W below the dam. The 58.2 acres of wetlands were identified as generally L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded) and as PEMCh (Palustrine, Emergent, Seasonally Flooded, Diked/Impounded), and the 0.4 acres were identified as generally PEMC (Palustrine, Emergent, Seasonally Flooded) on the NWI map.	<p>Above the top of the dam, no permanent loss of wetlands is anticipated to occur as pool level will remain the same.</p> <p>However, due to the extension of the toe of the dam, approximately 0.05 acres of PEMC would be filled and covered by the dam extension. This is below the USACE regulatory trigger of 0.1 acres of wetland disturbance allowed by the USACE. As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact.</p>
Waters of the U.S.	Waters of the U.S., stream channels and the impoundment, are present in the Project area. Wetlands, as a Water of the U.S., are present in the Project area. Waters of the U.S. are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act.	<p>Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. Approximately 100 feet of riparian area along with 50 feet of stream channel below the current dam will be filled and covered by the dam extension.</p> <p>A Nationwide Permit is anticipated for re-construction. Nationwide Permit 3 (Maintenance) does not have a stipulation as to the linear feet of stream that can be altered or removed by this action. As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact.</p>

A complete list of the scoping items (resource concerns and NRCS planning requirements), such as cultural resources and threatened/endangered species (a no effect determination was made), is listed and discussed in Table 3-1. Only the identified resource concerns that required additional discussion are listed in the table above (Table S-6).

Short-term effects to water, air quality, erosion and sedimentation associated with construction will be minimal with the recommended plan. Rehabilitation activities would include enhancement of the existing structure rather than removal of the structure, and best management practices (such as silt fences, mulching, seeding, wetting construction roads/paths, etc.) will be used during construction activities. These short-term effects will be generally restricted to the immediate construction area.

Mitigation

Approximately 5 acres of prime and important farmland and highly erodible cropland may be temporarily impacted by the construction activities in the area of Site 24. Best management practices through the preparation of a storm water pollution prevention plan will be employed during construction activities to minimize and/or avoid impacts to water quality. These construction areas will be restored by excavating and stockpiling the topsoil, then replacing the topsoil in the impacted area after construction activities are complete. These areas will be reseeded with similar species as were present minimizing impact to the environment.

All alternative borrow areas are located outside of the riparian system. Borrow material will be taken from the current pool area upstream of the dam. Impacts due to borrow will be minimal, since this area will be under the pool area.

Due to an increase in width of the structure and extension of the toe of the embankment, there would be a loss of approximately 50 feet of stream channel that averages 36 feet in width. Approximately 100 feet of riparian area along with 50 feet of stream channel will be filled and permanently covered by the extension of the dam. There are no regulatory agencies requiring mitigation of these losses. In context, there are miles of stream and riparian areas below the current dam and some above the current dam and pool area. Therefore, the areas filled in associated with the recommended plan are negligible.

Efforts will be taken to limit the loss or damage to the stream and riparian area by limiting construction traffic activity in the area of the stream and by keeping the construction staging area away from the stream. Because the impact to the riparian area will be negligible, compensatory mitigation is not anticipated. The preliminary borrow area will be in the impoundment area upstream of the dam.

The current pool level is not changing and the planned change in downstream flow is negligible. Therefore, long term impacts appear to be avoided and/or minimized.

Major Conclusions

In this analysis, two alternative plans were studied in detail – No Federal Action – High Hazard plan and the Federal Reconstruction plan – that met the purpose and need for the federal action. The benefits and costs of these alternative plans were compared. There is no net difference in flood reduction benefits between the No Federal Action and Federal Reconstruction plans.

Section 602.2 of the National Watershed Manual, released in January 2010, states that for watershed rehabilitation program plans where human life is at risk in the event of a catastrophic failure of an existing dam, and the dam does not meet current safety and performance standards, the National Economic Development (NED) plan is defined as the federally assisted alternative with the greatest net benefits. In the event of catastrophic failure of Site 24, human life would be at risk.

Furthermore, the dam does not meet current safety and performance standards for a high hazard class structures. Therefore, the NED alternative for this rehabilitation plan is the federal alternative.

Not all project considerations or benefits can be quantified and monetized when it comes to some ecological system and social effects. The existing dam does not meet current State and Federal design criteria for High Hazard structures. A risk of loss of human life exists if the design storm should occur. Federal funding is available to quickly implement the Federal Reconstruction alternative. The No Federal Action alternative would need to be funded solely by the Sponsor, and funding could take years to acquire. Therefore, the Federal Reconstruction alternative is the Recommended Plan.

Areas of Controversy

None known.

Issues to be Resolved

None known.

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CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 Changes Requiring Preparation of a Supplement

This supplement is prepared to address changes in major features of Site 24. Modifications to the embankment, principal spillway, and auxiliary spillway are required to meet current state and federal high hazard class criteria.

Site 24 was permitted in 1973 as a low hazard dam and construction was completed in 1974. In 1998, the dam was reclassified as high hazard due to the ball fields located immediately below the dam, downstream development, and roadways. The structure does not meet the current regulatory guidelines for a high hazard class structure. The rationale for the current hazard classification is also due to the traffic count on Kansas Highway 10, with an Average Annual Daily Traffic (AADT) of 6050 (as shown on the "2009 TRAFFIC FLOW MAP KANSAS STATE HIGHWAY SYSTEM" map). Additionally, there are also 8 structures (5 recreational related ball fields, including 2 baseball fields at the toe of the dam, 1 residence, and 2 unknown), 5 parking lots, 10 baseball fields, 19 soccer fields, 8 ponds, the Pat Dawson Billings Nature Area, the Kanza Southwind Nature Preserve, 1 high tension overhead power line, and a small portion of 1 electrical substation downstream of Site 24 that would be flooded in the event of a catastrophic breach. Clinton Parkway and Highway K-10 are located below the site, which will be affected by such a breach. Clinton Parkway and Highway K-10 are major thoroughfares and serve as key routes to hospitals and for emergency vehicles.

The Sponsors' request to rehabilitate Site 24 was initiated due to the hydrologic inadequacy of the dam. DWR issued a written statement (memo dated July 15, 2008) to the watershed district, which provided recommendations to address issues identified in an inspection report (April 26, 2007).

1.2 Purpose of the Project

The purpose of the federal action is to meet current state and NRCS high hazard class criteria so that Site 24 will continue to provide flood damage reduction benefits to rural and urban areas within Douglas County and the City of Lawrence.

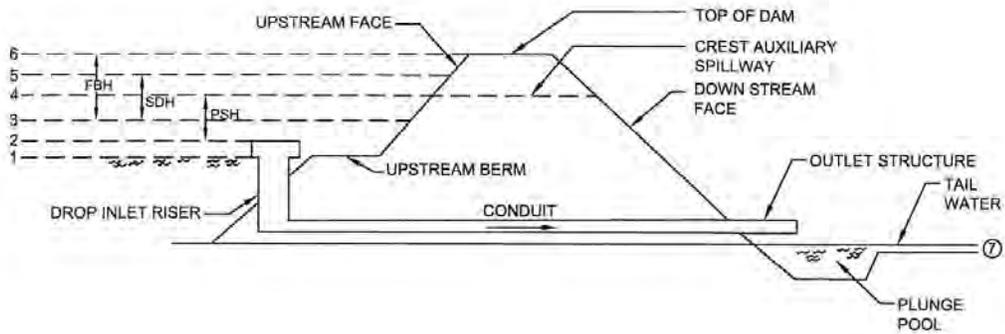
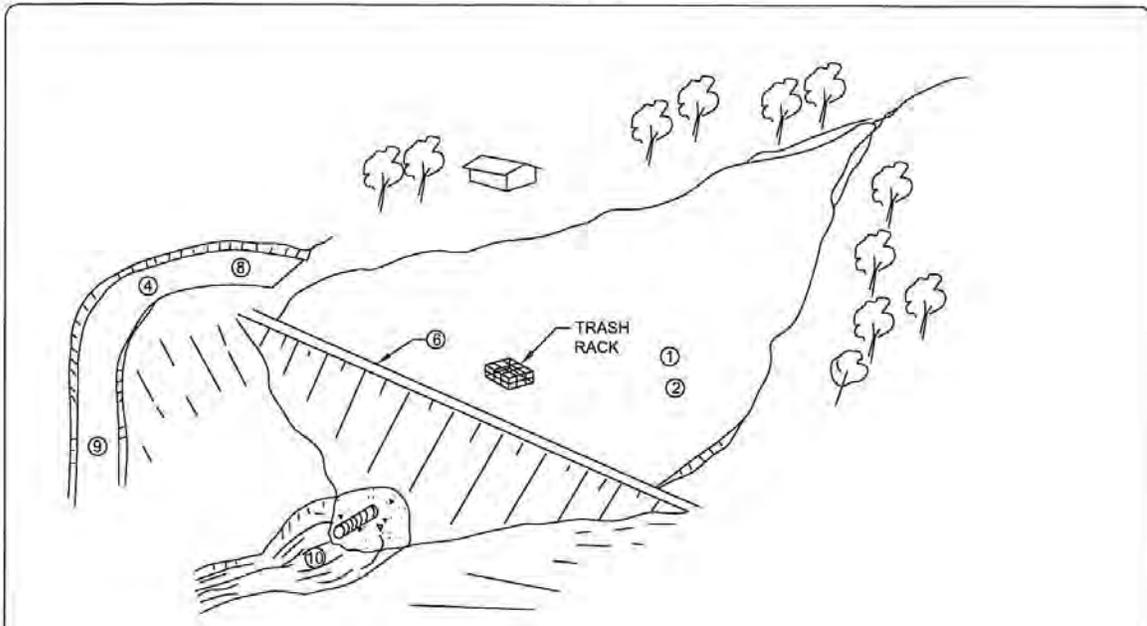
1.3 Need for the Project

In 1998, the Kansas Department of Agriculture, Division of Water Resources (DWR) reclassified the dam to a high hazard dam due to ball fields located immediately below the dam, downstream development, and roadways. In 1998, DWR approved plans to raise the dam to Elevation 897.0, and construction was completed in September, 1998. A safety inspection and survey conducted on January 10, 2001 by the DWR revealed that approximately 375 feet of the embankment was 0.4 feet lower than the approved top of dam elevation. The DWR issued a Safety Inspection Report to the District on July 15, 2008. The inspection report indicated several deficiencies at Site 24 including hydrologic inadequacy as a high hazard class dam.

1.3.1 Flood Control Protection

Exhibit 1-1 Structure Terminology

See the following page for relevant structure terminology.



LEGEND

- 1 NORMAL POOL AND CREST
- 2 PRINCIPAL SPILLWAY
- 3 SEDIMENT STORAGE
- 4 10-DAY DRAW DOWN OF PSH
- 5 CREST AUXILIARY SPILLWAY
- 6 STABILITY DESIGN WATER ELEVATION
- 7 TOP OF DAM
- 8 TAIL WATER ELEVATION
- 9 INLET CHANNEL AUXILIARY SPILLWAY
- 10 EXIT CHANNEL AUXILIARY SPILLWAY
- 10 PLUNGE POOL STILLING BASIN

PSH = PRINCIPAL SPILLWAY HYDROGRAPH
 SDH = STABILITY DESIGN HYDROGRAPH
 FBH = FREEBOARD HYDROGRAPH

DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE

REVISION

EXHIBIT 1-1 - STRUCTURE TERMINOLOGY WAKARUSA WATERSHED DOUGLAS COUNTY, KANSAS			
Project Mgr:	LMS	 13910 W. 96th Terrace Lenexa, Kansas 66215 Phone: (913) 492-7777 Fax: (913) 492-7443	Scale: NOT TO SCALE
Approved By:	LMS		Date: 01/28/10
Drawn By:	DBM		Project No. 02097080
			File Name: DAM.DWG

1.3.2 Dam Hazard Criteria

Site 24 was originally designed and built as a Low Hazard Class dam because the land both upstream and downstream of the structure was crop and pasture land. In 1998, inspection of the dam resulted in the re-classification of the dam from a low hazard structure, to a high hazard structure due to recreational ball fields immediately below the dam, downstream development, and roadways. The Division of Water Resources (DWR) required the Watershed District to raise the dam embankment by 1.7 feet. This work was completed in 1998; however, the dam was apparently not raised adequately. Continued upstream development has also contributed to the hydraulic inadequacy of the dam. A High Hazard Class is for structures having potential for extensive loss of human life in the event of a breach or any serious damage to homes, commercial buildings, important public utilities, main highways, or railroads. Site 24 does not meet the current NRCS and state High Hazard Class standards.

1.4 Problems and Opportunities

Until the federal interest is completed for this project, any significant modifications to the structure must be approved by the NRCS. The structure was constructed in 1974, with a planned economic life of 100 years. Consequently, any modifications that decrease the flood benefits of this dam would not be approved during this term.

1.4.1 Problems

The original dam, designed and built in 1974, had a design life of 100 years. The dam was originally designed as a low hazard class dam, before being reclassified in 1998. The existing dam falls short of the safety requirements for a high hazard class dam.

1.4.2 Opportunities

The potential opportunities from this dam include continued flood control to downstream facilities and the city of Lawrence, Kansas, incidental recreation and water quality.

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CHAPTER 2 AFFECTED ENVIRONMENT

2.1 Project Setting

Wakarusa Watershed Flood Retarding Dam No. 24 (Site 24) is located adjacent to the city of Lawrence, KS and approximately one mile northeast of Clinton Lake, on Yankee Tank Creek (see Appendix F – Figure 1 - Project Location Map). The drainage area contributing to Site 24 is approximately 3.4 square miles. The contributing drainage area consists of urban areas of Lawrence, Kansas, as well as privately owned cropland, rangeland, and publicly owned roads, bridges, and rights-of-way.

2.1.1 Original Project

The Wakarusa Watershed Plan of Work (POW) was authorized by the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat 666, as amended). Site 24 is a flood control dam originally constructed with federal funds under the authority of PL-566. The POW was completed in May 1966 and originally approved in 1967.

The plan formulated measures to address erosion control and watershed flooding and protection. These measures included a system of eight floodwater retarding impoundments/structures and land treatment practices. Refer to the original Wakarusa Watershed POW (Appendix E) for floodwater retarding impoundments/structures and land treatment practice details.

2.1.2 Physical Data

Site 24 is located in the Dissected Till Plains and the Osage Plains Section of the Central Lowlands physiographic province. The major topographic features are the Kansas and Wakarusa River valleys and uplanduestas that remained due to differential erosion of limestone, sandstone, and shale. The north portion of the county is drained by the Kansas River along with its tributaries. The south portion of the county is drained by the Marais des Cygnes River and its tributaries. Elevations in Douglas County range from approximately 770 feet above mean sea level along the Kansas River to approximately 1000 feet above mean sea level in the southwest portion of the county. Most of the land to the south of Site 24 consists of farms and cropland. The City of Lawrence metropolitan area exerts urbanization pressure on land use to the north, east, and west.

Yankee Tank Creek is a tributary of the Wakarusa River located in northern Douglas County, Kansas in the Wakarusa River Watershed area. The drainage area for the Wakarusa River Watershed is 94,977 acres or 148.4 square miles. The majority of the watershed is located in Douglas County. The climate of the area is continental and temperate, with cold winters, warm and hot summers, low to moderate humidity, light precipitation in the winter, pronounced rainfall peak late in spring and early in summer, and moderate amount of wind. The average daily maximum temperature in July is 88 degrees Fahrenheit and the average daily minimum temperature in January is 16 degrees Fahrenheit. Annual precipitation is 37 inches.

The original POW details additional physical attributes.

2.1.3 Land Use

Current land use and treatment within the drainage basin to Site 24 is identified in Table 2-1.

Table 2-1 Land Use in Drainage Basin for Site 24

Land Use Description	Acres
Cultivated Crops	169
Deciduous Forest	306
Mixed Forest	24
Woody Wetlands	3
Shrub/Scrub	5
Pasture, Tame	445
Developed, Low Intensity	334
Developed, Medium Intensity	61
Developed, High Intensity	1
Developed, Open Space	315
Herbaceous	451
Water	65
Total	2179

2.2 Existing Conditions

Resource concerns are issues related to the natural environment. These issues are identified by local interests and the public as they relate to soil, water, air, plants, and animals. The human factor must also be considered.

The existing conditions of the site include an impoundment of open water surrounded by riparian areas on the north, grass-covered rangeland on the east and west, and a grass-covered earthen dam on the south. Urban areas such as a residential neighborhood are located in the surrounding area to the north of the impoundment, and a commercial area such as ball fields and an athletic facility to the east of the impoundment. The area immediately downstream of the dam consists of grass-covered rangeland. Farther south downstream of the dam, the area consists of tree and grass-covered land, rangeland, roads, a municipal sports complex, and a few structures. Yankee Tank Creek discharges from the dam to the south and appears generally tree-covered. Urban areas such as residential neighborhoods are located north of the inundation area north of Kansas Highway 10. The dam is located on private land with an easement for the dam and its appurtenances. The auxiliary spillway is located on the east side of the dam (left abutment).

2.2.1 Human Health and Safety/Public Health and Safety

Site 24 was originally designed as a low hazard class structure. Due to development downstream of Site 24; including ball fields, roads, and a municipal sports complex, Site 24 is no longer classified as a low hazard dam. Because of this, Site 24 does not meet state and NRCS high hazard class criteria. This inadequacy poses a risk to human health and safety in that a catastrophic breach of the current dam would lead to the potential loss of human life.

2.2.2 Water Quality

Approximately 6 acres of riparian areas exist immediately adjacent to the normal pool and upstream of the pool. These areas act as a trap for sediment, nutrients and pesticides, and organic loadings. This results in relatively slowing the degradation of the water quality of the upstream pool and downstream waters due to the capture and retention of incoming pollutants (sediment, nutrients, pesticides, and organics) in runoff waters. In addition, the capture and retention of these pollutants

in the pool reduces the transport of sediment and attached nutrients, pesticides, and organic loadings in the downstream waters.

Surface Water

Yankee Tank Creek and the associated impoundment at Site 24 are not listed on the Kansas Department of Health and Environment (KDHE) 2008 303(d) List of Impaired Waters. Total Maximum Daily Loads (TMDLs) were not identified for Yankee Tank Creek or the associated impoundment at Site 24 in the Kansas-Lower Republican River Basin.

Groundwater

The underlying geology of the Project area consists of Newman Terrace deposits and the Lawrence Formation (Douglas Group) with a Kanwaka Shale and Oread Limestone (Shawnee Group) bedrock component. Groundwater water quality problem documents for the Yankee Tank Creek Watershed have not been found.

2.2.3 Erosion and Sedimentation

Sediment from upland areas is transported to the project site and is deposited in the reservoir pool area. As the velocity of the water coming into the reservoir slows, sediment is deposited at the upper end and continues to fill the reservoir until it reaches the inlet elevation of the principal spillway.

A bathymetric survey was completed to determine the existing reservoir capacity and to estimate the volume of sediment deposited in the reservoir. The sediment accumulation is assumed to be the difference between the existing and original reservoir volumes below the principal spillway elevation. The original capacity was adjusted to account for the borrow volume used to construct the dam. This analysis indicates that the sedimentation rate of this structure is very low. (See Appendix E – Sediment Yield Calculations).

2.2.4 Recreation

Site 24 and its surrounding area could potentially provide aquatic and other passive recreational opportunities. Fishing boats with trolling motors, paddleboats, canoes, and rowboats could be used within the areas of the normal pool. Other recreational opportunities of Site 24 and its surrounding area could include bird watching and fishing. Any recreational opportunities associated with Site 24 are limited to private property owners and their guests.

2.2.5 Transportation

Clinton Parkway (primary access road to the site) is located approximately 380 feet south of the dam at Site 24. Highway K-10 exists approximately 600 feet downstream (south) of Site 24 and within the inundation area. Yankee Tank Creek crosses under Clinton Parkway and Highway K-10 south of the dam from Site 24. Clinton Parkway and Highway K-10 are major thoroughfares and serve as key routes to hospitals and for emergency vehicles. A few local streets, including Olympic Drive, Clinton Parkway frontage, East 1048 Road, Spelcher Road, West 27th Street, East 1200 Road, North 1200 Road, US Highway 59, and East 1400 Road exist within 5 miles downstream of Site 24.

2.2.6 Fish and Wildlife Resources

The drainage area of Site 24 consists of lands dedicated to residential/urban use, with riparian areas located along the two branches of Yankee Tank Creek which discharge into Site 24. The dam impounds one first-order and one second-order, intermittent streams as defined by the “blue-line” streams on 1:24,000-scale US Geological Survey topographic mapping. Existing agricultural practices and existing recreational fields and minimal low-density rural residential development

have altered the natural habitat in various areas within the drainage basin. As Table 2-1 indicates, 169 acres of cultivated cropland and 711 acres of total developed land currently exist within the drainage basin of Site 24.

The wildlife, plant, and animal species found near Site 24 are likely 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 associated with disturbance and cropping situations. Approximately 20 acres of urban timber and range surround the normal pool areas of the structure. These areas, consisting of trees (Honey Locust, Silver Maple, Black Willow, Siberian Elm, Osage Orange, Walnut, Mulberry, Cedar, Cottonwood), shrubs (Dogwood, Buckbrush), vines (Grape, Poison Ivy), grass (Wildrye), and forbs (False Indigo, Nightshade, Ironweed) provide additional habitat for wildlife species. Wildlife that can be found in the general area can include white-tailed deer, rabbits, mice, squirrels, striped skunks, raccoons, and songbirds (such as robins), and avian species such as crows, hawks, and pheasants.

Wetland areas identified as generally L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded) and as PEMCh (Palustrine, Emergent, Seasonally Flooded, Diked/Impounded) have established within the original permanent pool/streams/areas immediately adjacent to streams of Site 24. Wetland areas identified as PEMC (Palustrine, Emergent, Seasonally Flooded) have established below the dam at Site 24. Wildlife species found in the wetlands may vary from season to season due to changes in wetland hydrological conditions.

2.2.7 Water Features

Wetlands

Wetlands in the area were identified via a determination as performed by the NRCS. Wetland areas classified through the NRCS non-certified determination include Other Waters/Wetlands. The wetlands include areas occurring within the original permanent pool/streams/areas immediately adjacent to streams and below the dam. A total of 58.2 acres of wetlands were identified as generally L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded) and as PEMCh (Palustrine, Emergent, Seasonally Flooded, Diked/Impounded), and 0.4 acres were identified as generally PEMC (Palustrine, Emergent, Seasonally Flooded).

Impoundments

Impoundments or pool areas are associated with Site 24. Table 2-2 provides details on the normal pool associated with Site 24.

Table 2-2 Impoundment Pool Information Summary

Drainage Area (acres)	Normal Pool Area (acres)	As-Built Maximum Depth (feet)
2179	52.7	21.4

Drainages

The main hydrological feature associated with Site 24 is Yankee Tank Creek (see Appendix F: Project Map, Figure 1). Adjacent riparian areas appear to be associated with Yankee Tank Creek downstream of the dam.

2.3 Status of Operation and Maintenance

The Kansas Division of Water Resources conducted a safety inspection of the dam on April 26, 2007. The Division found debris accumulations in the principle spillway and damage in the auxiliary spillway due to adjacent construction activities. These issues have since been addressed. There are no other O&M issues associated with the site.

2.4 Sedimentation

Table 2-3 Predicted 50/100-year Sediment Accumulations

2009 Surveyed Remaining Sediment Storage Capacity ¹ (acre-feet ²)	50/100-year Predicted Sediment Storage Requirement (acre-feet)	Structure Status for 50/100-year Sediment Requirement
382	100/200	Has sufficient capacity to accommodate the 100-year predicted sediment storage requirement below the top of the principal spillway.

Notes:

¹ Remaining sediment storage defined between the surveyed reservoir bottom and the top of the principal spillway riser.

² Acre-feet is a unit of volume, defined as covering a surface area of 1 acre (43,560 feet) by a depth of 1 foot of material

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)
2	2

Note:

¹ Predicted sediment rate is equal to the historic sediment rate.

2.5 Existing Hazard Class and Breach Analysis

2.5.1 Existing Hazard Class

As discussed in Section 1.3.2, Dam Hazard Criteria, Site 24 was originally built as a Low Hazard Class Dam but was reclassified as a High Hazard Dam by DWR in 1998. The Division of Water Resources (DWR) required the Watershed District to raise the dam embankment by 1.7 feet. This work was completed in 1998, however, the dam was apparently not raised adequately. Continued upstream development has also contributed to the hydraulic inadequacy of the dam. Site 24 does not meet the current NRCS and state High Hazard Class standards.

2.5.2 Breach Analysis

A breach analysis was conducted by NRCS for Site No. 24 to provide a prediction of the extent and timing of flooding from a catastrophic breach of the dam. The results from this analysis are sufficient for developing an inundation map and/or an emergency action plan. Due to limitations in modeling the flow dynamics of a severe, abrupt, and debris-laden breach wave, the modeling and results should be considered approximate. The dam breach analysis was performed using equations in NRCS Technical Release 60 (TR-60), NRCS Technical Release 66 (TR-66) criteria, and Dave Froehlich's peak flow equation (Froehlich, 1995) to develop an analytical breach hydrograph. The U.S. Army Corps of Engineer's Hydrologic Engineering Centers - River Analysis System (HEC-RAS) software model was used to route the floodwater downstream to determine peak discharges and water surface elevations through the reach below the modeled breach failure.

2.5.3 Interpretation of Breach Analysis

In analyzing the results in total, it appears that a High Hazard Class designation of Site No. 24 is appropriate. A catastrophic breach has the potential to affect several recreational fields, a State Highway, a US Highway, and a major city street.

The following roads are located within the breach area: Clinton Parkway (primary access road to the site) is located approximately 380 feet south of the dam at Site 24. Highway K-10 exists approximately 600 feet downstream (south) of Site 24 and within the inundation area. Yankee Tank Creek crosses under Clinton Parkway and Highway K-10 south of the dam from Site 24. A few local streets, including Olympic Drive, Clinton Parkway frontage, East 1048 Road, Spelcher Road, West 27th Street, East 1200 Road, North 1200 Road, US Highway 59, and East 1400 Road exist within 5 miles downstream of Site 24 which will be affected by a breach.

Additionally, there are also 8 structures (5 recreational related ball fields – 2 ball fields at the toe of the dam, 1 residence, and 2 unknown), 5 parking lots, 10 baseball fields, 19 soccer fields, 8 ponds, the Pat Dawson Billings Nature Area, the Kanza Southwind Nature Preserve, 1 high tension overhead power line, and a small portion of 1 electrical substation downstream of Site 24 that would be flooded in the event of a catastrophic breach. The number of structures and recreational fields was based on review of the aerial breach inundation map.

2.6 Potential Modes of Dam Failure

Due to the classification of the dam as a high hazard structure, several modes of dam failure were examined, namely:

Hydrologic

- Hydrologic capacity
- Sedimentation
- Scour at the toe of the dam

Internal Erosion/Piping

- Seepage
- Material deterioration

Seismic/Landslides

2.6.1 Sedimentation

The Site 24 dam was designed for a 100-year sediment storage capacity below the inlet of the principal spillway. At current sediment rates, there is adequate capacity to store well over the expected 100-year sediment volume. Sedimentation presents a low potential of failure for the Site 24 dam.

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. Site 24 was originally designed as a Low Hazard Class structure. A 1998 inspection of the dam resulted in the re-classification of the dam from a low hazard structure to a high hazard structure due to recreational ball fields immediately below the dam, downstream development, and roadways. Division of Water Resources (DWR) required the Watershed District to raise the level of the dam by

1.7 feet to elevation 897 feet. This elevation was set by routing the 50% 6-hour probable maximum precipitation (PMP) storm using AMC III runoff conditions with no overtopping. This work was completed in 1998.

A survey conducted by the DWR in 2001 found that approximately 375 feet of the embankment near the left side (looking downstream) was lower than the approved top of dam elevation of 897 feet, with a low point elevation of 896.6 feet, which was less than what was approved. The Chief Engineer did not require the District to raise the top of dam elevation the additional 0.4 feet in this area due to the good stand of grass on the dam. However, if future modifications were conducted on the embankment, the low spot would be required to be raised. The dam remains hydraulically inadequate to meet high hazard criteria.

The District drained the permanent pool of the dam in the fall of 2007 to replace a seized drawdown valve, which was replaced. The District has left the valve open and maintains the dam in a dry condition. Leaving the drawdown valve open allows for additional flood detention capacity in the reservoir.

The current criteria for sizing the auxiliary and principal spillways are found in TR-60.

The auxiliary spillway is 50 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 storage capacity of the structure does not meet current state or federal standards. The potential of failure due to inadequate hydraulic capacity is moderate.

2.6.3 Seepage

All earth dams develop steady seepage conditions in the long-term. The existing dam does not indicate any seepage problem at this time. Although the internal toe drain outlet appears to be dry, this needs to be checked and restored to ensure internal seepage is controlled.

The seepage through the embankment under the normal principal spillway operating level does not appear to be a problem. More detailed seepage information will be collected during the geology investigation for the design phase of this project.

2.6.4 Scour

According to the Dam Safety Inspection Report, dated April 26, 2007, the stilling basin is in relatively good shape; however, the outlet channel and creek is severely eroded. Additionally, erosion in the auxiliary spillway was noted due to construction projects in the area (building construction to the east of the dam and sewer line installation through the spillway). The Dam Safety Inspection Report noted that the erosion near the terminus of the spillway outlet channel had been ripped up, but was not satisfactorily repaired. Additionally, several trails were noted on the downstream slope from fishermen and/or ball players walking to the crest.

The principal spillway outlet is located at the toe of the existing dam in its deepest section. There is extensive scour and erosion in the plunge pool area of the stilling basin. The plunge pool needs to be excavated to proper depths to act as a dissipating plunge pool and slopes stabilized with riprap. The dam toe slope is too steep at the outlet location, requiring extension of the outlet pipe and backfill to repair the downstream slope of the dam. The outlet channel banks need to be protected against bank erosion. Slope stability of the plunge pool will not have a great effect on stability of the

rest of the structure. Therefore, the relative potential for failure due to scour of the outlet channel is low.

2.6.5 Material Deterioration

The material deterioration could be a concern due to the age of the structure. The embankment and foundation materials of the dam have become saturated over the years. Natural degradation of materials would affect the shear strengths of the embankment and foundation materials. The embankment appears to be visually stable.

Existing concrete in the principal spillway riser and the precast concrete conduit appear to be in satisfactory condition.

2.6.6 Seismic

A seismic event creates additional loading on the structures that may affect the slope stability of the embankment. The foundation soils appear to be non-liquefiable materials under a seismic shaking. This site is located in Zone 2 as described in NRCS TR-60 technical release. The seismic coefficient is fairly low. The seismic stability is not considered to be a concern. During design stage a pseudo-static stability analysis with seismic loading should be performed.

2.7 Consequences of Dam Failure

The consequences of a failure of the existing dam include flood damage and potential loss of human life at locations below the dam. Flood damage would include interruption of the road traffic, damage to some structures, numerous recreational ball fields, roads, bridges, and utilities. Additional flood damage would include scour of the downstream channel, damage to the lower cropland, and the transport of undesirable sediment. The potential for loss of human life is greatest in the recreational ball fields, as numerous ball fields lie in the potential inundation zone below the dam. There are currently 8 structures (5 ball field related, 1 residence, and 2 unknown), 5 parking lots, 10 baseball fields, 19 soccer fields, 8 ponds, the Pat Dawson Billings Nature Area, the Kanza Southwind Nature Preserve, one high tension overhead power line, a small portion of 1 electrical substation, a State Highway, a US Highway, a major city street, and numerous minor streets that are located in the predicted breach inundation area. Potential for loss of human life would also be high on the downstream roads, such as Clinton Parkway and Highway K-10, should a breach occur. Clinton Parkway and Highway K-10 are major thoroughfares and serve as key routes to hospitals and for emergency vehicles.

The population at risk includes users of the ball fields, the nature area, and the travelling public on Clinton Parkway and Highway K-10. The number of people at risk would be highly dependent on the time of day of the potential breach occurrence. The current dam is hydrologically inadequate and could be breached by overtopping.

CHAPTER 3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of the EA includes the drainage area of Site 24 and its benefit area (see Appendix F, Project Location Map and Drainage Area). 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. Selected agencies were contacted that might have input on the project: US Army Corps of Engineers, Kansas State NRCS, US Fish & Wildlife Service, Kansas Department of Wildlife and Parks, Kansas State Historical Society, Kansas Department of Agriculture, and Division of Water Resources.

Table 3-1 identifies the primary resource concerns within the scope of the project as well as other special environmental concerns required to be studied by NRCS. 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 Proposed Action		Comments
	Yes	No	
Human Health and Safety	X		The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk of loss of human life if the design flood event should occur, and the dam has not been reconstructed to current design standards. Federal Reconstruction Alternative will upgrade the dam to meet current NRCS and state high hazard class criteria; The No Federal Action alternative will upgrade the dam to meet current state hazard criteria, but Federal High Hazard criteria will not be met. The purpose of both alternatives is to protect human populations from flooding events and provide flood protection in a manner that minimizes the risk of loss of human life.
Water Quality	X		Water quality as it relates to erosion and resultant sedimentation is a potential long-term 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 the KDHE or local authority.

Economic and Social	X		The Project is not anticipated to affect the economic and social resources in or around the Project area as both alternatives protect downstream populations from flooding. The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk of loss of human life and property if the design flood event should occur, and the dam has not been reconstructed to current design standards.
Erosion and Sedimentation	X		Bathymetric survey provides existing accumulated sediment level within reservoir. A potential opportunity of the Project is to provide additional erosion and sedimentation control for existing agricultural sources and expanding urban development.
Flood Control	X		The primary purpose of the structure is flood control.
Land Use	X		Minor land use changes in the area of the dam/spillway would occur with either alternative from modifications to the structure, with the following exception: the recreational ball fields located at the toe of the dam would be impacted by the expansion of the toe.
Recreation		X	The structure has minimal existing and future recreational value limited to the site owners and guests, which is further limited by pool level and access restrictions.
Regional Water Resource Plans		X	No watershed management plans have been found for the Project area. No coastal zones are present.
Transportation	X		Clinton Parkway exists approximately 380 feet downstream (south) of the Site 24 dam within the inundation area. Highway K-10 exists approximately 600 feet downstream (south) of the Site 24 dam within the inundation area. Several local streets as defined in Section 2.5.3 exist within 5 miles downstream of the Site 24 dam within the inundation area. Since the existing condition of the dam does not meet the federal or state high hazard criteria, a dam breach will likely impact downstream roads located in the inundation area. The Project is anticipated to beneficially affect transportation systems in or around the Project area as both alternatives protect downstream populations from flooding.
NRCS Planning Requirements 1/	Relevant to Proposed Action		Comments
	Yes	No	
Cultural Resources		X	The Kansas State Historic Preservation Office (SHPO) was contacted. The Project area was reviewed by the Kansas State Historical Society. No significant archeological sites were found in the Project area. See Archeological Survey report, which is attached. SHPO concurred with the Archeological Survey that no historic properties will be affected. See attached SHPO letter. Review of the online National Register of Historic Places (NRHP) website did not reveal the presence of the site structure on the NRHP. Tribal consultation was completed by the NRCS.
Threatened and Endangered (T&E) Species		X	No known T&E or critical habitat will be disturbed. Based on review of the species letter prepared on October 19, 2009 by the NRCS (Section 5.7) Wakarusa Watershed Site 24 rehabilitation project does not provide habitat and there is no federal critical habitat at this site; the project will have no effect on Douglas County, Kansas Federal threatened or endangered species; and no concerns related to state listed

			species were identified at this time.
Environmental Justice		X	No concerns as alternatives do not impact area populations due to maintained flood control.
Fish and Wildlife Coordination Act		X	The Fish and Wildlife Coordination Act does not apply to PL566 projects (Section 12 of PL 83-566 requires coordination with the USFWS). Please refer to the Threatened and Endangered (T&E) Species section above.
Floodplain Management	X		<p>Douglas County participates in the National Flood Insurance Program (NFIP).</p> <p>Site 24 is located within a Zone "X" (areas determined to be outside 500-year floodplain) as mapped by the Federal Emergency Management Agency (FEMA) floodplain designation for Douglas County, Kansas and Incorporated Areas, dated November 7, 2001.</p> <p>According to a Flood Hazard Area Map from the City of Lawrence, Kansas Interactive Mapping Website (not dated), the potential dam breach flood inundation area along Yankee Tank Creek downstream of the dam is included in the floodway and 100-year flood plain. A floodplain permit may be necessary for any action alternative. 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 floodplains for FEMA is not part of this project.</p> <p>The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk to the floodplain if the design flood event should occur and the dam has not been reconstructed to current design standards.</p>
Invasive Species	X		All precautions will be taken to reduce or eliminate invasive species from developing in the Project area.
Migratory Birds		X	No anticipated effect. Construction should occur outside the nesting season of April 1 to July 15.
Natural Areas		X	None exist.
Prime and Unique Farmlands		X	Areas of Prime Farmland are adjacent to Site 24. No long-term effect will occur with any alternative as Prime and Unique Farmlands are not planned for conversion to non-agricultural use which are generally located near the existing spillway. Approximately 5 acres of prime and important farmland may be temporarily impacted by the construction activities in the area of Site 24. These areas will be restored by excavating and stockpiling the topsoil, and replacing the topsoil in the impacted area after construction activities are complete. These areas will be reseeded with similar species as were present prior to impact.
Riparian Area	X		Riparian areas exist within the Project area. Approximately 0.11 acres would be affected. Based on new State and Federal high hazard criteria; the dam may present a risk to the riparian areas if Site 24 is not reconstructed to current high hazard standards.

Wetland	X		<p>On-site wetland determination indicated existing reservoir is a 58.2-acre wetland (identified on a National Wetlands Inventory Map as L1UBHh [Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded] and PEMCh [Palustrine, Emergent, Seasonally Flooded, Diked/Impounded]). Approximately 0.4 acres were identified by the NRCS as OW/W below the dam (identified on a National Wetlands Inventory Map as PEMC [Palustrine, Emergent, Seasonally Flooded]). Stream appears to have a definable ordinary high water mark and bed and bank and is under COE jurisdiction.</p> <p>A wetland determination was conducted by the NRCS in 2009, which revealed a total of approximately 58.6 acres of Other Waters/Wetlands (OW/W) identified as L1UBHh, PEMCh, and PEMC at Site 24.</p>
Waters of US/Clean Water Act	X		Nationwide Permit is anticipated for re-construction.
Wild and Scenic Rivers		X	None are present in the Project area.
National Economic Development	X		Rehabilitation requires application of the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G).
Fish Habitat		X	<p>Fish habitat may have existed in the lake; however, the District drained the permanent pool of the dam in 2007 for replacement of a drawdown valve and has been maintaining the dam in a dry condition. Note the surface water level of the impoundment was manually lowered at the time of this study. It will be allowed to return to designed normal water level as the lowered water level does not represent permanent condition at the site.</p> <p>The normal pool elevation will not be changed by the recommended/NED alternative. Placement of fill would not encroach into the permanent pool or stilling basin. Any disturbed areas would be restored to pre-work conditions. As a result, fish habitat will not be affected. Additionally, no known T&E or critical habitat will be disturbed. See species letter prepared on October 19, 2009 by the NRCS.</p>
Wildlife Habitat		X	Areas temporarily impacted by construction activities will be restored to pre-construction conditions, thereby not permanently affecting wildlife habitat. Additionally, no known T&E or critical habitat will be disturbed. See species letter prepared on October 19, 2009 by the NRCS.
HEL (Highly Erodible Land)		X	Highly erodible land is present in the area of Site 24. Approximately 5 acres of highly erodible land may be temporarily impacted by the construction activities in the area of Site 24. These areas will be restored by excavating and stockpiling the topsoil, then replacing the topsoil in the impacted area after construction activities are complete. These areas will be reseeded with similar species as were present prior to impact.
Coral Reefs		X	None present in the project area.
Ecologically Critical Areas		X	Based on discussions within regarding wetlands, fish habitat, natural resources, and threatened and endangered species, ecologically critical areas do not appear near the project area. Further, there are no environmental protection zones in the area.

Forest Resources		X	Limited impact to trees near outfall area. Construction area will not be in wooded or forested area. No cumulative impacts. See Riparian Areas as all forest resources are located within the riparian areas.
Parklands		X	No parklands or refuges near project area.
Scenic Beauty		X	No scenic places or byways listed near project area in Douglas County.
Scientific Resources		X	Not known to exist and not relevant to the project.
Sole Source Aquifers		X	No designated sole source aquifers in the State of Kansas.
Soil Resources		X	Soil resources in Kansas are tied primarily to the agricultural industry, which is the number one industry in the State of Kansas. Areas of Prime Farmland are adjacent to Site 24. No long-term effect will occur with any alternative as Prime and Unique Farmlands are not planned for conversion to non-agricultural use which are generally located near the existing spillway. Approximately 5 acres of prime and important farmland may be temporarily impacted by the construction activities in the area of Site 24. These areas will be restored by excavating and stockpiling the topsoil, and replacing the topsoil in the impacted area after construction activities are complete.
Water Resources		X	No impact or change to the quantity of water within the water resources of the area.

Notes:

- 1/ Based on KS-CPA-52, "Environmental Effects for Conservation Planning," revised February 2009 and as provided in the NWM (National Watershed Manual), Section 504.37.

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CHAPTER 4 ALTERNATIVES

4.1 Formulation Process and Alternatives Eliminated from Detailed Study

A range of alternatives to satisfy the purpose of the Project was initially considered during the original plan formulation. The range of alternatives included both structural and non-structural concepts with which to meet the Project purpose. Input on the range of alternatives was identified during original planning and again was sought at the agency and public scoping meeting held on August 25, 2009.

A screening process was used for the range of alternatives. Alternatives that failed any one of the following set of general screening criteria were not carried forward for detailed study:

- Considered not technically reliable (Completeness)
- Not justifiable by tangible and/or intangible benefits¹ (Efficiency)
- Not socially and/or environmentally acceptable (Acceptability)
- Unable to fulfill the Project purpose (Effectiveness)

Table 4-1 summarizes the range of alternatives considered and the screening of the alternatives. Table 4-1 also identifies the alternatives eliminated and those carried forward for detailed study.

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

Alternative	Summary of Alternative	Screening of Alternative	Carried Forward for Detailed Study
No Federal Action High Hazard	Rehabilitate Site 24 to meet current state dam safety criteria for high hazard structures.	This alternative would meet the purpose and need for Federal Action.	Yes
Federal Decommissioning	Remove the embankment, stabilize the grade, reconnect the channel, and vegetate bare and denuded areas. Mitigate downstream hazards by raising roadways, constructing bridges, and protecting downstream properties.	Decommissioning results in an increase in flood damages, reduced water quality, and significant decommissioning costs. The cost of this alternative is prohibitive.	No
Federal Reconstruction	Rehabilitate Site 24 to meet current state and NRCS dam safety criteria for high hazard structures.	This alternative would meet the purpose and need for Federal Action.	Yes
Hazard Removal	Remove downstream hazards and maintain dam as a low-hazard dam. Hazard removal includes raising roadways, constructing bridges, and protecting downstream properties.	The cost of removing hazards is prohibitive. Costs include reconstructing roads, bridges, as well as flood-proofing or removing downstream improvements.	No
National Economic Development (NED) Alternative	To maximize net economic gain.	This alternative would meet the purpose and need for Federal Action.	Yes

¹ Tangible benefits are those for which a measurable benefit can be quantified, such as land values. Intangible benefits are those for which an improvement is obtained when quantification by a defined measurement is prohibitive, such as visual enhancement or water quality improvements.

4.2 Description of Alternative Plans

4.2.1 Alternative 1 – No Federal Action - High Hazard

This alternative modifies the dam to meet the State of Kansas High Hazard Class criteria, without reducing the flood control benefits. These modifications would not need to meet NRCS criteria.

If federal assistance were not available, the SLO would likely rehabilitate the dam to meet minimum criteria for a Kansas High Hazard dam. This would include raising the dam approximately two feet, widening the auxiliary spillway to approximately 100 feet wide, and armoring the auxiliary spillway outlet. In order to extend the life of the dam an additional 100 years, the principal spillway would also need to be replaced with a 30-inch diameter conduit. The area disturbed during construction activity will be kept to a minimum. Soil erosion and sediment control structures will be installed and maintained. All disturbed areas will be restored to pre-work conditions and seeded to species similar to the species existing prior to construction.

4.2.2 Alternative 2 – Federal Decommissioning

Decommissioning Site 24 is required to be considered during evaluation under the Watershed Rehabilitation Program. Decommissioning involves considerable planning and forethought so that no hazards remain once the structure is taken out of service. This includes removal of the embankment and principal spillway structure, stabilizing the overfall at the embankment and existing principal spillway, creating a stable channel through the reservoir area so that water may flow unabated through the newly established channel, and stabilizing the deposited sediment within the reservoir pool area.

The removal of the dam removes the beneficial effects of the structure. Flooding will resume to pre-construction levels below the structure and put lives and property at risk of flooding. The reservoir pool area will be reduced and/or eliminated as the structure will be removed, vegetative establishment will be difficult on the exposed sediment. A riprap grade control structure would need to be constructed to stabilize accumulated sediment in the impoundment and to reconnect the stream channels. During and after removal, and until vegetative establishment, there will be an increase of sediment into the stream during out-of-bank flows. Stormwater conveyance structures under Clinton Parkway and Kansas Highway 10 would need to be enlarged. Flood-proofing the affected properties would entail installing dikes or walls to an elevation that would protect those properties from the breach wave. The existing impoundment area and any disturbed areas (altered during construction activities) would be graded and seeded. A rough order-of-magnitude cost for construction costs for dam removal and mitigation costs for future damages is approximately \$6,000,000.

This alternative was not evaluated in further detail. This alternative was not considered a reasonable alternative as associated costs were exorbitant.

4.2.3 Alternative 3 - Federal Reconstruction

The federal reconstruction alternative includes the reconstruction of Site 24 to meet NRCS dam safety criteria for high hazard structures. These requirements exceed state dam safety criteria for high hazard structures in Kansas.

Reconstruction activities would include the removal of the existing 24-inch diameter principal spillway and replacing it with a 30-inch diameter conduit. The principal spillway riser would be replaced with new components, with the crest of the inlet on the principal spillway to be set at elevation 879.4. The embankment would be raised approximately 7 feet to meet hydrologic capacity of a high hazard class structure by placing fill on the top of the dam and on the

downstream face of the embankment. The auxiliary spillway will be widened to approximately 100 feet, and the spillway outlet channel would be armored. The area disturbed during construction activity will be kept to a minimum. Soil erosion and sediment control structures will be installed and maintained. All disturbed areas will be restored to pre-work conditions and seeded to species similar to the species existing prior to construction. Estimated construction cost for this alternative is \$1,172,500.

Table 4-2 summarizes the spillway parameters for Federal reconstruction by comparing the existing conditions and proposed changes to high hazard rehabilitation.

Table 4-2 Spillway Parameters for Federal Reconstruction – High Hazard Class Alternative

Description	Existing Conditions ¹	High Hazard Rehabilitation
Principal Spillway Crest Elevation (feet)	879.4	879.4
Diameter of Conduit (inches)	24	30
Auxiliary Spillway Crest Elevation (feet)	890.3	891.5
Bottom Width (feet)	50	100
Top of Embankment Elevation (feet)	895.3	903.5

Notes:

¹ Based on as-built drawings of this structure.

4.2.4 Alternative 4 - Hazard Removal

This alternative would involve leaving the structure in place and removal and/or protection of hazards (homes, roads, and bridges) below Site 24. This alternative would include enlarging and raising the bridge on Clinton Parkway and Kansas Highway 10 directly below Site 24, and flood proofing the properties affected by a catastrophic breach. Enlarging and raising the existing bridge structure would be required as a modeled catastrophic breach wave overtops Clinton Parkway and Highway 10 creating a potential for loss of human life. Flood-proofing the affected properties would entail installing dikes or walls to an elevation that would protect those properties from the breach wave. The area disturbed during construction activity will be kept to a minimum. Soil erosion and sediment control structures will be installed and maintained. All disturbed areas will be restored to pre-work conditions and seeded to species similar to the species existing prior to construction. A rough order-of-magnitude cost for construction costs for dam removal and mitigation costs for future damages is approximately \$6,000,000.

This alternative was not evaluated in further detail. This alternative was not considered a reasonable alternative as associated costs were exorbitant.

4.3 Comparison of Alternatives

Section 602.2 of the National Watershed Manual, released in January 2010, states that for watershed rehabilitation program plans where human life is at risk in the event of a catastrophic failure of an existing dam, and the dam does not meet current safety and performance standards, the National Economic Development (NED) plan is defined as the federally assisted alternative with the greatest net benefits. In the event of catastrophic failure of Site 24, human life would be at risk. Furthermore, the dam does not meet current safety and performance standards for a high hazard class structures. Therefore, the NED alternative for this rehabilitation plan is the federal reconstruction high hazard class alternative.

Table 4-3 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.

Table 4-3 Comparison of Alternatives

General Information	No Federal Action – High Hazard – Future Without Federal Project	Federal Reconstruction High Hazard Class (NED and Preferred Alternative)
Alternative Description	Rehabilitate to State High Hazard Standards.	Rehabilitate to meet NRCS High Hazard Class criteria.
Project Cost 1/	\$1,395,600	\$1,988,600
National Economic Development (NED)	No Federal Action – High Hazard – Future Without Federal Project	Federal Reconstruction – High Hazard Class (NED and Preferred Alternative)
Beneficial, Annual	\$249,600	\$249,600
Adverse, Annual	\$67,500	\$96,200
Net Benefit	\$182,100	\$153,500
Regional Economic Development (RED)	The RED Account was not included in the plan since it was not identified as an issue during plan development.	

Environmental Quality (EQ) - Relevant Issues and Concerns		
Resource Concerns of SLO, Public, Agencies	No Federal Action – High Hazard – Future Without Federal Project	Federal Reconstruction High Hazard Class (NED and Preferred Alternative)
Human Health and Safety	Continues the operation and risk of the present dam until rehabilitation practices can be funded and constructed.	Reduces the threat of a breach. Would retain existing flood control benefits for an event exceeding the 100-year rain event.
Water Quality	Would retain flood control and related downstream potential for residential and roadway flooding for rain event under a 100 year event.	Would retain existing impoundment and related long term water quality benefits.
Economic and Social	Would retain existing impoundment and related long term water quality benefits.	Would protect downstream populations from flooding.
Erosion and Sedimentation	Would protect downstream populations from flooding.	Would retain existing erosion and sedimentation levels.
Flood Control	Would retain existing erosion and sedimentation levels.	Retain/upgrade existing flood control benefits.
Land Use	Retain/upgrade existing flood control benefits.	Limited loss of land due to dam expansion and no loss of agricultural land.
Transportation	Limited loss of land due to dam expansion and no loss of agricultural land.	Would protect downstream populations and transportation systems from flooding.
	Would protect downstream populations and transportation systems from flooding.	
NRCS Planning Requirements	No Federal Action – High Hazard – Future Without Federal Project	Federal Reconstruction High Hazard Class (NED and Preferred Alternative)
Floodplain Management	Would protect downstream populations from flooding.	Would protect downstream populations from flooding.
Riparian Area	Approximately 0.03 acres would be affected.	Approximately 0.11 acres would be affected.
Wetlands	No permanent loss of wetlands is anticipated to occur above the top of the dam as pool level will remain the same. However, due to the extension of the toe of the dam, approximately 0.02 acres of PEMC would be permanently filled and covered by the dam extension below the dam.	No permanent loss of wetlands is anticipated to occur above the top of the dam as pool level will remain the same. However, due to the extension of the toe of the dam, approximately 0.05 acres of PEMC would be permanently filled and covered by the dam extension below the dam.
Waters of US/Clean Water Act	Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 15 feet of stream channel that averages 36 feet in width. Nationwide Permit is anticipated for re-construction.	Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. Nationwide Permit is anticipated for re-construction.

Other Social Effects (OSE) 2/		
OSE	No Federal Action – High Hazard – Future Without Federal Project	Federal Reconstruction High Hazard Class (NED and Preferred Alternative)
Urban and Community Impacts	Positive – expanded flood protection; no impacts as community will function as it has in the past with flood protection.	Positive – expanded flood protection; no impacts as community will function as it has in the past with flood protection.
Income and employment	Positive – expanded flood protection	Positive – expanded flood protection
Population distribution	Positive – expanded flood protection	Positive – expanded flood protection
Long term productivity	Positive – expanded flood protection	Positive – expanded flood protection
Energy requirements	None	None
Energy conservation	None	None
Loss of human life	Beneficial – reduction in loss of human life from breach flood. No federal assistance is available to the sponsor for this alternative. Therefore, it may be years before sponsor obtains the funds required to implement this alternative. It is not certain where the sponsor will obtain funding. As a result, the risk inherent in a dam that does not meet current design criteria will remain until dam is rehabilitated.	Beneficial – reduction in loss of human life from breach flood. Federal funds are currently available to fund the federal portion of this alternative. The sponsor's share of funding for this alternative will be significantly less than the funding required to implement the No Federal Action Alternative. Therefore this alternative will be implemented sooner than the No Federal Action Alternative.
Health and Safety	Beneficial – reduction in potential breach due to heavy rain event.	Beneficial – reduction in potential breach due to heavy rain event.

Notes:

- 1/ Project Cost includes engineering and project administration.
- 2/ The OSE account is a means of displaying and integrating into water resources planning information of alternative plan effects from perspectives that are not reflected in the other three NED, RED, and EQ accounts.

CHAPTER 5 ENVIRONMENTAL CONSEQUENCES

5.1 Effects of Alternative Plans

5.1.1 Human Health and Safety and Economic and Social

Existing Conditions

The existing structure currently provides flood control benefits to downstream areas. If Site 24 had a catastrophic breach, approximately 940 acres of floodplains located between the toe of the embankment and approximately 2 miles east of US Highway 59 along the Wakarusa River (approximately 5 miles) would be inundated, and thus a high risk of loss of human life caused by the flooding event. Yankee Tank Creek (the stream channel carrying the breach flow) flows under Kansas Highway 10 in three locations in Douglas County and Lawrence, Kansas. The highway will suffer damage as a result of a breach. Additional roads, recreational facilities, 8 structures, and native/nature areas are present within the breach area.

The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk of loss of human life and property if the design flood event should occur and the dam has not been reconstructed to current design standards.

The two alternatives would provide flood control benefits to downstream areas while protecting against the loss of human life from a catastrophic breach in the next 100 years.

No Federal Action – High Hazard Alternative

This alternative modifies the dam to meet the state of Kansas high hazard class criteria, without reducing the flood control benefits. Site 24 would be designed to control up to a 100-year rain event with a 100-year design life.

Federal Reconstruction Alternative (NED and Preferred Alternative)

Through federal rehabilitation, Site 24 will be reconstructed to meet NRCS dam safety criteria for high hazard structures. These requirements exceed state dam safety criteria for high hazard structures in Kansas. The design life of the Project is planned for 100 years. Site 24 would be designed to control a rainfall event that exceeds a 100-year frequency event.

Human health and safety/public health and safety (health and safety) would increase by removing the threat of a breach inundation in the long term. The risk of breach inundation to existing and future downstream property would be reduced. By rehabilitating to current safety criteria, any downstream structures would have additional protection. In addition, this alternative would improve the existing flood control benefits of the structure due to improved floodwater retarding pool storage.

5.1.2 Water Quality

Existing Conditions

Existing water quality conditions for the onsite lake appear to be typical for impoundments in the local area. The lake functions to accumulate pollutants such as sediment, nutrients, pesticides, and organic loading as would be expected to be discharged to the lake from the surrounding land.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

There would be no long-term effect on existing water quality both downstream and within the impoundment as the two alternatives provide the same water quality benefits. Pollutants such as sediment, nutrients, pesticides, and organic loading are not anticipated to increase downstream with either alternative. Water Quality Indicators such as water transparency and aquatic habitat are not anticipated to change.

Temporary short-term effects on surface water quality would result from construction 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 fencing and seeding with sod-forming species on areas removed of vegetation would be implemented to minimize erosion and sediment load transport and the subsequent temporary effects on surface water quality related to construction activities. State permitting requirements would help ensure that surface water quality impacts are kept at an acceptable level.

No Federal Action – High Hazard Alternative

Construction activities would include adding fill to the embankment, enlarging the principal spillway, enlarging the auxiliary spillway, protecting the embankment with a fence, and miscellaneous earthmoving activities.

Federal Reconstruction Alternative (NED and Preferred Alternative)

Construction activities would include adding fill to the embankment, enlarging the principal spillway, replacing the existing principal spillway pipe and inlet, protecting the embankment with a fence, reconstructing and enlarging the auxiliary spillway, and miscellaneous earthmoving activities.

5.1.3 Erosion and Sedimentation

Existing Conditions

The existing structure currently provides flood control benefits to downstream areas. Sediment accumulations in the detention pool would diminish flood storage capacity and increase the frequency of auxiliary spillway flow. This would result in increased erosion of the auxiliary spillway outlet.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

The dam would continue to provide flood control benefits. The sediment storage capacity for a 100-year design life would be provided. Temporary short-term effects on erosion and sedimentation would result from construction activities. Standard BMPs such as silt fencing and seeding with sod-forming species on areas removed of vegetation would be implemented to minimize erosion and sediment load transport under a storm water pollution prevention plan as more than 1 acre of land is being covered by construction activities.

5.1.4 Flood Control

Existing Conditions

The existing structure currently provides flood control benefits to downstream areas. If Site 24 were catastrophically breached, approximately 940 acres of floodplains located between the toe of the embankment and approximately 2 miles east of US Highway 59 along the Wakarusa River (approximately 5 miles) would be inundated. The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk of loss of human life and property if the design flood event should occur and the dam has not been reconstructed to current design standards.

No Federal Action – High Hazard Alternative

This alternative provides flood control for events for 100-year rain events by increasing the height of the dam. The existing pipe spillway elevation will remain the same.

Federal Reconstruction Alternative (NED and Preferred Alternative)

This alternative provides flood control for events including 100-year rain events by increasing the height of the dam higher than the No Federal Action – High Hazard Alternative. The existing pipe spillway elevation will remain the same. Due to the increase in floodwater retarding capacity provided by this alternative, a slight increase to existing flood control benefits would occur.

5.1.5 Land Use

Existing Conditions

Existing land use in the area of Site 24 includes grass and tree-covered land in the immediate area of the lake under ownership by the upstream homeowners association, Alvamar, Inc., and individual residential property owners. Area use beyond the lake includes additional grass and tree-covered land, cropland, recreational ball fields, and urban residential land.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

There would be no changes to the normal pool of Site 24. Minimal loss of land (under 10 acres) would be required for increasing the height and toe of the dam along with potential spillway expansion. Additionally, no prime or unique farmland will be converted to non-agricultural use. This would also mean no permanent land use change from agriculture.

5.1.6 Transportation

Existing Conditions

Local transportation systems are located in the immediate area of the site. Clinton Parkway (primary access road to the site) is located approximately 380 feet south of the dam at Site 24. Highway K-10 exists approximately 600 feet downstream (south) of Site 24 and within the inundation area. Yankee Tank Creek crosses under Clinton Parkway and Highway K-10 south of the dam from Site 24. A few local streets, including Olympic Drive, Clinton Parkway frontage, East 1048 Road, Spelcher Road, West 27th Street, East 1200 Road, North 1200 Road, US Highway 59, and East 1400 Road exist within 5 miles downstream of Site 24. Since the existing condition of the dam does not meet the federal or state high hazard criteria, a dam breach will likely impact downstream roads located in the inundation area.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

The Project is anticipated to beneficially affect transportation systems in or around the Project area as both alternatives protect downstream populations from flooding. Both alternatives will increase flood protection to the downstream transportation systems and decrease the likelihood of a breach.

5.1.7 Cultural Resources

Existing Conditions and All Alternatives

The Kansas State Historic Preservation Office (SHPO) was contacted. The Project area was reviewed by the Kansas State Historical Society. No significant archeological sites were found in the Project area. See Archeological Survey report, Appendix E. SHPO concurred with the Archeological Survey that no historic properties will be affected. See attached SHPO letter and Appendix B for copies of the tribal consultation. The National Register of Historic Places (NRHP)

on-line website was reviewed. No historic properties are recorded in the project area. Tribal consultation was completed by the NRCS.

As the structure is not over 50 years old, it was not specifically evaluated by a cultural resources specialist / archaeologist meeting the requirements outlined by the Secretary of the Interior's Standards and Guidelines.

5.1.8 Floodplain Management

Existing Conditions

Douglas County participates in the National Flood Insurance Program (NFIP). Site 24 is located within a Zone "X" (areas determined to be outside 500-year floodplain) as mapped by the Federal Emergency Management Agency (FEMA) floodplain designation for Douglas County, Kansas and Incorporated Areas, dated November 7, 2001. According to a Flood Hazard Area Map from the City of Lawrence, Kansas Interactive Mapping Website (not dated), the potential dam breach flood inundation area along Yankee Tank Creek downstream of the dam is included in the floodway and 100-year flood plain. The dam in its existing condition is not in a state of failure or breach but does not meet current State and Federal high hazard criteria. Therefore, the dam may present future risk to flood plain management within this Project area and downstream through the watershed area due to a catastrophic breach if not brought to current high hazard standards.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

A floodplain permit may be necessary for any action alternative. It is not anticipated that any of the alternatives would result in an adverse effect or incompatible development within the base floodplain. Both alternatives will increase flood protection to downstream properties by raising the auxiliary spillway to either state and/or federal criteria. True mapping of the floodplains for FEMA is not part of this project.

5.1.9 Invasive Species

Existing Conditions

Existing land use in the area of Site 24 includes grass and tree-covered land in the immediate area of the lake. Area use beyond the lake includes additional grass and tree-covered land, cropland, recreational ball fields, and urban residential land. A survey of invasive grass and tree species was not completed.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

During construction or reconstruction activities, site restoration activities will be completed to restore grass cover to areas altered by construction activities. Measures will be taken to control noxious weeds through the use of noxious weed-free seed and topsoil according to the NRCS Invasive Species Policy, supporting Executive Order 13112. Noxious weeds will be monitored and controlled through normal operation and maintenance activities.

5.1.10 Riparian Area

Existing Conditions

Riparian areas exist to the northeast and northwest of the impoundment and a small grass-covered riparian area below the existing dam structure. The riparian areas are located along the two branches of Yankee Tank Creek which discharge into Site 24. Adjacent riparian areas and agricultural fields appear to be associated with Yankee Tank Creek downstream of the dam. The riparian areas appear to be tree and grass covered land and include the Pat Dawson Billings Nature

Area and the Kanza Southwind Nature Preserve which could be utilized for recreational purposes. The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk to adjacent and downstream riparian areas due to a catastrophic breach if the design flood event should occur and the dam has not been reconstructed to current design standards.

No Federal Action – High Hazard and Federal Reconstruction Alternatives (NED and Preferred Alternative)

Based on review of the species letter prepared on October 19, 2009 by the NRCS, the Wakarusa Watershed Site 24 rehabilitation project does not provide habitat and there is no federal critical habitat at this site; the project will have no effect on Douglas County, Kansas Federal threatened or endangered species; and no concerns related to state listed species were identified at this time.

No Federal Action – High Hazard Alternative

Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 15 feet of stream channel that averages 36 feet in width. Approximately 100 feet of grass-covered riparian area will be permanently filled and covered below the existing dam. As a result, approximately 0.03 acres of grass-covered riparian area will be replaced by the dam embankment. However, a larger riparian area to the northeast and northwest of the impoundment will not be affected by either alternative as existing pool levels will remain.

Federal Reconstruction Alternative (NED and Preferred Alternative)

Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. Approximately 100 feet of grass-covered riparian area will be permanently filled and covered below the existing dam. As a result, approximately 0.11 acres of grass-covered riparian area will be replaced by the dam embankment. However, a larger riparian area to the northeast and northwest of the impoundment will not be affected by either alternative as existing pool levels will remain.

As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact. Additionally, there are miles of quality riparian areas immediately downstream of the existing dam which are present within a 100 year flood plain and some immediately upstream of the project. Just south of the project area are miles of wooded and riparian area associated with and downstream of Clinton Lake. This further demonstrates a lack of foreseeable future impact and further demonstrates that the actions would not cause significant impact due to the abundance of riparian areas in the vicinity of the project.

5.1.11 Wetlands and Other Waters of the U.S.

Existing Conditions

An on-site wetland determination conducted by the NRCS in 2009 indicated that the existing reservoir is a 58.2-acre wetland (identified on a National Wetlands Inventory Map as L1UBHh [Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded] and PEMCh [Palustrine, Emergent, Seasonally Flooded, Diked/Impounded]). Approximately 0.4 acres were identified by the NRCS as OW/W below the dam (identified on a National Wetlands Inventory Map as PEMC [Palustrine, Emergent, Seasonally Flooded]).

The dam does not meet current State and Federal criteria for high hazard class dams. There is a risk to downstream waters of the US due to a catastrophic breach if the design flood event should occur and the dam has not been reconstructed to current design standards.

No Federal Action – High Hazard Alternative

During construction there would be a potential for work activity to temporarily encroach into the reservoir area and into the downstream stilling basin and outlet channel. The permanent pool has already been drawn down to perform the work. Placement of fill would not encroach into the permanent pool or stilling basin. Any disturbed areas (altered during construction activities) would be restored to pre-work conditions. The preliminary borrow area will be in the impoundment area upstream of the dam.

A wetland determination was conducted by the NRCS in 2009, which revealed approximately 58.6 acres of wetlands at Site 24, of which approximately 58.2 acres is located within the existing reservoir. With increased floodwater capacity, wetland areas identified in the existing reservoir may become temporarily or permanently inundated during storm/flood events. No permanent loss of wetlands is anticipated to occur as the pool level will remain the same. However, due to the extension of the toe of the dam, approximately 0.02 acres of PEMC would be filled and covered by the dam extension. This is below the USACE regulatory trigger of 0.1 acres of wetland disturbance allowed by the USACE.

Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 15 feet of stream channel that averages 36 feet in width. Approximately 15 feet of stream channel below the current dam will be filled and covered by the dam extension. A Nationwide Permit is anticipated for re-construction. Nationwide Permit 3 (Maintenance) does not have a stipulation as to the linear feet of stream that can be altered or removed by this action.

As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact.

Federal Reconstruction Alternative (NED and Preferred Alternative)

During construction there would be work activity in and at the fringes of the permanent pool, downstream stilling basin, and outlet channel. The remaining pool would be released at a controlled rate to draw down the permanent pool to an elevation at which work could be accomplished. Placement of fill to raise the embankment will encroach into the permanent pool and stilling basin. Any disturbed areas (altered during construction activities) would be restored to pre-work conditions. The preliminary borrow area will be in the impoundment area upstream of the dam.

A wetland determination was conducted by the NRCS in 2009, which revealed approximately 58.6 acres of wetlands at Site 24, of which approximately 58.2 acres is located within the existing reservoir. With increased floodwater capacity, wetland areas identified in the existing reservoir may become temporarily or permanently inundated during storm/flood events. No permanent loss of wetlands is anticipated to occur as the pool level will remain the same. However, due to the extension of the toe of the dam, approximately 0.05 acres of PEMC would be permanently removed and covered by the dam. This is below the USACE regulatory trigger of 0.1 acres of wetland disturbance allowed by the USACE.

Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. Approximately 50 feet of stream channel below the current dam will be filled and covered by the dam extension. A Nationwide Permit is anticipated for re-construction. Nationwide Permit 3 (Maintenance) does not have a stipulation as to the linear feet of stream that can be altered or removed by this action.

As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact.

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 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; CEQ, 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.

As the wetlands, riparian areas, and stream areas are within the same finite area with no other foreseeable future impact, there does not appear to be a significant cumulative impact.

The primary cumulative impact issues associated with the Project would be effects on human health and safety, and flood control associated with both Alternatives.

For this Project, cumulative effects on these issues were evaluated within the Site 24 Watershed in Douglas County, Kansas. For the purpose of this evaluation, health and human safety is linked to flood control and potential flood hazard. Currently, there are no plans for major State or County roadway expansions within the Wakarusa Site 24 Watershed. Cumulative effects of the Project are analyzed in relation to proposed development near the structure. There are no specific short-term or long-term plans for development around the site area; however the site is adjoining the city limits of the City of Lawrence. The City of Lawrence has seen significant development around the site and within the areas that Site 24 provides flood protection. Future development does not appear to have cumulative effects on the existing and above-listed resources with the selection of either the No Federal Action – High Hazard or the Federal Reconstruction Alternatives.

Health and Human Safety and Flood Control

The existing structure currently provides flood control benefits to downstream areas. If Site 24 had a catastrophic breach, approximately 940 acres of floodplains located between the toe of the embankment and approximately 2 miles east of US Highway 59 along the Wakarusa River (approximately 5 miles) would be inundated, and thus a high risk of loss of human life caused by the flooding event. Yankee Tank Creek (the stream channel carrying the breach flow) flows under Kansas Highway 10 in three locations in Douglas County and Lawrence, Kansas. The highway will suffer damage as a result of a breach. A catastrophic breach will overtop Clinton Parkway and Kansas Highway 10. Additional roads, recreational facilities, and native/nature areas are present within the breach area.

Both the No Federal Action – High Hazard and Federal Reconstruction Alternatives would provide additional flood control benefits to downstream areas protecting the loss of human life from breaches/flooding in the next 100 years. The cumulative effects on health and human safety are not considered to be significant with either alternative as the purpose of this structure is flood control. Federal Reconstruction to meet current state and NRCS dam safety criteria for high hazard structures would provide increased flood control benefits over the No Federal Action – High Hazard Alternative.

5.3 Indirect Effects

Indirect effects are project-induced effects (positive or negative) that would affect the human socioeconomic 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 both Alternatives is the preservation of existing developed properties and associated property values as the Alternatives extend flood protection/control for the existing structures and roads in the future.

5.4 Risk and Uncertainty

5.4.1 Engineering/Environment

The short-term effect of sediment being released into the stream, from the pool drawdown during construction, on aquatic species is not known. Increased sediment in the stream temporarily affects aquatic life. Controlling the rate of release of water from the permanent pool will minimize this effect.

The water control structure set at elevation 879.4, will maintain the permanent pool elevation to the existing pool elevation for greater than 100 years.

5.4.2 Economics

In order to account for the flood control benefits associated with the structure, the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G), and guidance from the National Watershed Manual (NWM) was used.

The economic benefits contain a moderate degree of uncertainty. This was explicitly recognized throughout the analysis. Economic benefit values were taken from the 1966 Plan of Work and indexed to 2009 dollars, consistent with guidance in Section 507.01 (f) of the NWM. See Appendix D – Section 5 – Economic Evaluation. Additional non-agricultural benefits were also calculated based on storm series events and 2009 property values.

5.4.3 Threatened and Endangered Species

Assessment of threatened and endangered species/habitat, cultural resources, and migratory bird habitat contains a moderate degree of risk and uncertainty when utilizing maps, inventories, and/or reports prepared by others. Such information was used in preparation of this EA report. Data obtained from inventories, maps, and reports prepared by others was not field verified. The actual effects or impacts to these resources from the alternatives may vary slightly either beneficially or adversely but is not anticipated to have significant impact to the findings of this EA. This risk and uncertainty would be similar for both alternatives.

5.5 Controversy

There are no known controversial issues associated with this project, except the potential for future lawsuits by either or both the upstream and downstream property holders. These lawsuits could stem from the removal of the dam as the development was constructed based on the existing dam at Site 24 remaining in place to continue to provide flood protection benefits, and from upstream development due to loss of recreational/visual benefits.

5.6 Precedent for Future Actions with Significant Impacts

This project will not set precedence for future actions.

5.7 Compliance with Federal, State, and Local Laws

5.7.1 Federal

Section 404 Permit

A Section 404 permit from USACE is required for impacts to wetlands and other waters of the U.S. USACE requires prior authorization of discharges of dredged or fill material, including those for temporary construction purposes, into waters of the U.S. (33 USC 1344).

Federal Reconstruction Alternative

Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. A Section 404 nationwide permit from the USACE is required for this project and will be authorized prior to construction of the Project. A Section 401 Clean Water Act, Water Quality Certification, permit will be obtained prior to construction of the Project, along with the Section 404 permit. It would appear that a nationwide permit (NWP) Number 3 would be appropriate for this project.

Endangered Species Act

The agency taking the action makes a determination if the proposed action has either a “no effect” or “may affect” on a listed species or designated critical habitat. If the agency determines there is a “may affect” then, Section 7(a)(2) of the Endangered Species Act states that the federal agency shall consult with U.S. Fish and Wildlife Service (USFWS).

Federal Reconstruction Alternative

An environmental assessment, dated October 19, 2009, was completed by the USDA - NRCS. According to the assessment, “Site 24 does not provide habitat and there is no federal critical habitat at this site.” Additionally, the assessment noted that “there are no concerns related to the state listed species at this time.” As such, this alternative will be in compliance with the Endangered Species Act.

National Historic Preservation Act, Section 106

The Kansas State Historic Preservation Office (SHPO) and Kansas State Historical Society (KSHS) were requested to provide recommendations regarding compliance with section 106 of the National Historic Preservation Act (NHPA).

Federal Reconstruction Alternative

A literature review (Phase I) and on-site investigation (Phase II) were conducted and SHPO and KSHS provided clearance for the proposed activities associated with this project. No cultural resources or historic properties were identified. Review of the online National Register of Historic Places (NRHP) website did not reveal the presence of the site structure on the NRHP. No cultural

resources or historic properties were identified. A request for input from tribes, which may have interest in this project, was completed by the NRCS. Responses were received from the Eastern Shawnee Tribe, Wichita and Affiliated Tribes, and the Osage Nation. The Eastern Shawnee Tribe, Wichita and Affiliated Tribes, and the Osage Nation concurred that the proposed project will have no effect on cultural or historic properties. As such, this alternative will be in compliance with section 106 of the National Historic Preservation Act (NHPA).

In the event that cultural resources (excluding human remains) are discovered during installation, NRCS will cause work to stop in that area and conduct an investigation and evaluation by a qualified cultural resources specialist. If human remains are discovered, work will cease in that area and protocol as described in the Kansas Unmarked Burial Sites Preservation Act will be implemented.

Bald and Golden Eagle Protection Act

According to the USFWS website, the “Bald and Golden Eagle Protection Act (1940) protects eagles from commercial exploitation and safeguards their continued survival in the United States.”

Federal Reconstruction Alternative

An environmental assessment, dated October 19, 2009, was completed by the NRCS Department of Agriculture. According to the assessment, “Site 24 does not provide habitat and there is no federal critical habitat at this site.” Additionally, the assessment noted that “there are no concerns related to the state listed species at this time.” As such, this alternative will be in compliance with the Endangered Species Act.

Migratory Bird Treaty Act

According to the USFWS website, the Migratory Bird Treaty Act “made it illegal for people to “take” migratory birds, their eggs, feathers or nests.”

Federal Reconstruction Alternative

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 or minimize effects on nesting migratory birds. Should clearing activities be required during this time period, a survey of the affected habitats may be conducted to determine if nesting migratory birds are present. A survey would be coordinated with USFWS to determine if any migratory birds would be affected. As such, this alternative will be in compliance with the Migratory Bird Treaty Act.

Fish and Wildlife Coordination Act

According to the USFWS website, the Fish and Wildlife Coordination Act “provides the basic authority for the Fish and Wildlife Service's involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It also requires Federal agencies that construct, license or permit water resource development projects to first consult with the Service (and the National Marine Fisheries Service in some instances) and State fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts.”

Fish and Wildlife Coordination Act does not apply to PL566 projects as Section 12 of PL 83-566 requires coordination with the USFWS. Please see *Endangered Species Act* above for details

5.7.2 State

Kansas Department of Agriculture, Division of Water Resources (DWR) Construction Permit

Through the Kansas Stream Obstruction Act (K.S.A. 82a-301 to 305a, 2004), a permit is required to be obtained prior to the construction of a dam or other water obstruction.

The Kansas Water Appropriations Act (K.A.R. 5-6-2, Storage of water in watershed district reservoirs) states that a permit may be issued to appropriate water for beneficial use that proposes the storage of water in a watershed district reservoir. The landowner is to have the use of space in the sediment pool to store the water to which he or she might be entitled under the water appropriation act. The watershed district board of directors allocated or gave to the landowner all or a specified part of the sediment pool for the storage of water in accordance with the water appropriation act. (Authorized by K.S.A. 82a-706a; modified, L. 1978, ch. 460, May 1, 1978.)

Additional Kansas law requires that (K.A.R. 5-30-1. Approval of or permits for dams) the chief engineer shall not approve or grant a permit for any dam subject to the jurisdiction of the chief engineer under the authority of K.S.A. 1979 Supp. 82a-301 through 305a as amended, unless the applicant also receives prior approval of his or her application to appropriate water for beneficial use to be diverted by means of the dam for which the approval or permit is sought, unless the sole proposed use for the water is for domestic use. (Authorized by K.S.A. 82a-706a, 82a-709; effective May 1, 1980.)

Section 401 Water Quality Certification

As part of the Section 404 permit, Section 401 Water Quality Certification must be obtained from the Kansas Department of Health and Environment (KDHE). 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.

The 401 Water Quality Certification for the reconstruction of the Project is anticipated to be issued in conjunction with the Section 404 permit.

Section 402 National Pollutant Discharge Elimination System

KDHE 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 KDHE prior to construction of the Project.

Kansas Unmarked Burial Sites Preservation Act

The Unmarked Burial Sites Preservation Act (KSA 75-2741-75-2754) is the state law for the protection of unmarked burials. If human remains are found during construction activities, construction must stop in that area and procedures set forth by the State must be followed. The purposes of this act are to:

- (1) Provide adequate protection for unmarked burial sites and human skeletal remains located on all lands within the state of Kansas;
- (2) Prohibit unauthorized disturbance of any unmarked burial sites; and
- (3) Provide procedures for the proper care and protection of unmarked burial sites and human skeletal remains found in the state of Kansas.

Under the provisions of the Kansas Unmarked Burial Sites Preservation Act; the law specifically relates to unmarked burial sites, human remains and artifacts on private and public lands. No one without a permit may disturb an unmarked burial site or possess human remains or grave goods. Possession of grave goods obtained prior to January 1, 1990 is exempted. No one may display human remains or artifacts from burials or trade in such artifacts. Anyone with knowledge of such activities must report it or is guilty of a misdemeanor with a fine of not less than \$100 or more than \$500. Anyone discovering human skeletal remains must immediately notify the local law enforcement agency, which notifies the coroner. The coroner determines if the remains are forensic, and then notifies the State Historical Society. The Society consults with the Unmarked Burial Sites Preservation Board. After disinterment, the remains and goods may be studied for up to one year by the State Historical Society. Scientific study may be extended by six months. Upon completion of the analysis, the remains and goods will be under the direction of the Unmarked Burial Sites Preservation Board. The Secretary of the State Historical Society will establish, with Board approval, a cemetery on state land for re-interment of human skeletal remains and grave goods from unmarked burials.

5.7.3 Local

Compliance with local zoning, regulated floodplain, or other watershed plans is anticipated.

CHAPTER 6 CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

6.1 Public Participation

The watershed district and conservation district hold regular meetings that are open to the public.

Interested agencies were invited to the Environmental Evaluation to review the project on August 25, 2009. Comments were requested from interested agencies. No written responses were received.

Tribes with potential interest were identified and sent correspondence to seek any interest in the project. Responses were due by November 27, 2009. Responses were received from the Eastern Shawnee Tribe, Wichita and Affiliated Tribes, and the Osage Nation. The Eastern Shawnee Tribe, Wichita and Affiliated Tribes, and the Osage Nation concurred that the proposed project will have no effect on cultural or historic properties.

A public meeting was held in Overbrook, Kansas to review the project and determine what additional issues are associated with this project.

Wakarusa Watershed Board meetings were held on August 25, 2009, January 12, 2010 and April 6, 2010 to review alternatives and their effects on the environment. At the January 12 meeting, alternatives were introduced and the project was explained to the public. The SLOs agreed at the April 6, 2010 meeting that the Federal Reconstruction alternative was the recommended alternative and met the overall purpose and need for the project.

6.2 Agency Consultation

Agency Participation

Agencies were requested to participate in an environmental evaluation during the scoping process. Comments were requested by all interested agencies. No comments were received from agencies during the comment period.

The US Army Corps of Engineers (USACE) was offered the opportunity to provide comment on the project and assist in identifying permits needed for the alternatives at an on-site meeting. The USACE indicated that a Nationwide Permit Number 3 would be appropriate for this project.

Agencies were notified of the August 25, 2009 Wakarusa Watershed Board meeting and asked to provide comments. No written comments were received.

Agency Consultation

Several agencies were consulted as cooperating agencies during the development of this plan; including USFWS, SPHO, and KSHS and tribes (under the NHPA).

An environmental assessment, dated October 19, 2009, was completed by the USDA - NRCS. According to the assessment, "Site 24 does not provide habitat and there is no federal critical habitat at this site." Additionally, the assessment noted that "there are no concerns related to the state listed species at this time."

The Kansas SHPO and KSHS were requested to provide recommendations regarding compliance with section 106 of the National Historic Preservation Act (NHPA). An on-site investigation was conducted and SHPO and KSHS provided clearance for the proposed activities associated with this project as no cultural resources or historic properties were identified. Review of the online National

Register of Historic Places (NRHP) website did not reveal the presence of the site structure on the NRHP. A request for input from tribes, which may have interest in this project, was completed by the NRCS. Responses were received from the Eastern Shawnee Tribe, Wichita and Affiliated Tribes, and the Osage Nation. The Eastern Shawnee Tribe, Wichita and Affiliated Tribes, and the Osage Nation concurred that the proposed project will have no effect on cultural or historic properties. As such, this alternative will be in compliance with section 106 of the National Historic Preservation Act (NHPA).

The Fish and Wildlife Coordination Act does not apply to PL566 projects as Section 12 of PL 83-566 requires coordination with the USFWS.

Due to increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. A Section 404 nationwide permit from the USACE is required for this project and will be authorized prior to construction of the Project. A Section 401 Clean Water Act, Water Quality Certification, permit will be obtained prior to construction of the Project, along with the Section 404 permit.

CHAPTER 7 PROVISIONS OF THE RECOMMENDED ALTERNATIVE

7.1 Selection of the Preferred Alternative

Site 24 is a high hazard class dam. The earthfill dam has a principal spillway consisting of a concrete riser and barrel, and an earthen auxiliary spillway. The PL-83-566 purpose for this project is flood prevention.

The Federal Reconstruction alternative will modify the dam to meet current state and NRCS safety standards and to maintain flood damage reduction benefits associated with Site 24. Works of improvement include raising the top of dam elevation, replacement of the principal spillway, widening the auxiliary spillway, and raising the auxiliary spillway elevation. These works of improvement will have a design life of 100 years. Refer to Appendix A, Tables: Table A-3 for additional structure data. No impacts to cultural resources are expected. Refer to Section 5.7.1 for information concerning the discovery of cultural resources during construction.

According to P&G, the NED alternative would be the Federal Reconstruction Alternative. P&G guidance requires that the National Economic Development, or NED Alternative, which maximizes monetary net benefits, be selected for implementation unless there is an overriding reason for selecting another alternative based on federal, state, local, or international concerns related to the social and environmental accounts.

Section 602.2 of the National Watershed Manual, released in January 2010, states that for watershed rehabilitation program plans where human life is at risk in the event of a catastrophic failure of an existing dam, and the dam does not meet current safety and performance standards, the National Economic Development (NED) plan is defined as the federally assisted alternative with the greatest net benefits.' In the event of catastrophic failure of Site 24, human life would be at risk. Furthermore, the dam does not meet current safety and performance standards for a high hazard class structures. Therefore, the NED alternative for this rehabilitation plan is the federal reconstruction high hazard class alternative.

The Federal Reconstruction alternative was selected as the NED and Recommended Plan based upon the following overriding reasons:

- The PL-83-566 purpose for this project is flood prevention. The existing dam does not meet current State and Federal criteria for high hazard class dams. There is a risk of loss of human life and property if the design flood event should occur and the dam has not been reconstructed to current design standards. The estimated inundation area resulting from a catastrophic failure of the dam includes 8 structures, Clinton Parkway, Highway K-10, US Highway 59, multiple recreational athletic fields, and two nature preserves. The Federal Reconstruction alternative will reduce the risk of failure by replacing the principal spillway, enlarging the auxiliary spillway, and increasing the flood detention capacity of the reservoir.
- The No Federal Action – High Hazard alternative must be funded solely by the Sponsor. Estimated Project costs are approximately \$1,395,600. It could take many years for the Sponsor to acquire the needed funds. Therefore the risk associated with a dam that does not meet current standards is likely to remain for some time.
- Federal funds are available for the Federal Reconstruction alternative, and construction could begin within a year. The sponsor's share of Project cost is estimated at \$522,000. The sponsor will be able to acquire these funds far sooner than if the No Federal Action – High Hazard alternative is chosen.

The following information in this chapter relates to the Federal Reconstruction Alternative, as it would be implemented with federal program assistance.

7.2 Rationale for the Recommended Plan

The purpose of the federal action is to meet current state and NRCS safety standards and to maintain flood damage reduction benefits associated with Site 24 and within Douglas County and Lawrence, Kansas (PL 83-566 approved purpose “flood prevention”). The Federal Reconstruction Alternative meets the Project purpose of continued flood control benefits. Site 24 would have a project cost of \$1,988,600 and an average annual benefit of \$67,500. The dam currently provides an additional non-Ag construction cost avoidance benefit of \$266,200. See Appendix A: Tables, Tables A-5 and A-6, for additional information. Additional information regarding the economic analysis for the Project can be found in Appendix D: Investigation and Analysis Report, Section 5.0 Economic Evaluation.

7.3 Permits and Compliance

The U.S. Army Corps of Engineers requires a dam modification or operation and maintenance permit (NWP 3) for reconstruction. Special conditions will be associated with this permit.

The Kansas Department of Agriculture, Division of Water Resources, requires an application for a permit to modify a dam. All of the activities for modification are covered under this application. The plans, specifications, and design report will need to meet the requirements outlined in KAR 5-40-76 (repair or modifications of a permitted or pre-jurisdictional dam).

Impoundment of more than 15 acre-feet of surface water requires a permit issued under the Kansas Water Appropriation Act. A water rights application is required to account for the additional evaporation from the increased surface area created by raising the principal spillway inlet. The principal spillway inlet elevation will remain at 879.4 after rehabilitation of the dam.

7.4 Costs

The following sections describe the major components of installation costs, the percentage of cost share of each component, and components of the recommended costs. See Appendix A: Tables, Tables A-1, A-2, and A-4, and Appendix D: Investigation and Analysis Report, Section 5.0, Economic Evaluation, for values for installation costs and recommended costs. The Lower Wakarusa Site 24 Watershed Supplemental Agreement 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; earthwork; and seeding.

NRCS will pay up to 65 percent of the eligible project costs but not exceed 100 percent of the total construction costs. The cost share rate for Site 24 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, Table D4-4, for a detailed estimate of construction costs values for Site 24 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 30 percent of the total construction costs. NRCS would provide 100 percent of funding for the cost of engineering. See Appendix A: Tables, Tables 1 and 2, for a summary of real property acquisition, easement costs, and cost share.

Real Property Acquisition and Easements

The Project has existing easements in place, which were recorded prior to original installation. These easements will be evaluated to determine applicability for each alternative.

Based on the review of the parcel ownership information and development at the toe of the dam, it appears that two properties adjoining the downstream toe of the dam will need to be acquired for construction of the selected site rehabilitation. Additional easements may be required prior to reconstruction. Easements will be required to the top of dam elevation as required by state statute.

Project Administration

Project administration primarily consists of legal review, survey, and documentation of new property acquisition and easement areas. Project administration costs were estimated to be 15 percent of construction costs. The SLO would be required to provide 100 percent of funding for its own 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 Annual Costs

In Appendix A: Tables, Table A-4 identifies the average annual costs for the Recommended Plan. 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 101 years using the Fiscal Year 2010 Federal discount rate of 4.375 percent.

Operation, Maintenance, and Replacement Costs

Annual operation, maintenance, and replacement costs were estimated at 0.4% of construction 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 allocation of Project construction costs between the SLO and NRCS for the Federal Reconstruction Alternative.

Table 7-1 Total Estimated Eligible Project Costs – Federal Reconstruction Alternative

Works of Improvement	SLO	PL 83-566 Funds	Total Estimated Eligible Project Costs
Rehabilitation of Site 24	\$522,000	\$1,466,600	\$1,988,600

7.5.2 Planned Sequence of Installation

All easements, permits, and installation will be completed in year one of the evaluation period. The SLO has taxing authority for Project funding. The SLO has the power of eminent domain any may exercise their authority as needed to acquire any necessary land rights.

The reconstruction of the Project will occur within a year. Breaching the dam at the principal spillway and removal of the principal spillway structure will occur first. A coffer dam with a control structure will be constructed above the principal spillway to allow for construction to occur. A by-pass channel will be constructed around the pipe to allow for controlled flows to occur during construction and allow for a controlled release of any water above the sediment level. This will be completed in order to control excessive erosion and sediment being transported downstream.

After the principal spillway and pipe are installed, earthfill will be placed and compacted and the auxiliary spillway widened.

7.5.3 Responsibilities

The SLO would obtain the permits and follow the compliance actions as identified in Section 7.3 Permits and Compliance. 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.

NRCS is responsible for planning, design, and construction inspection and checkout.

The Sponsors' responsibilities include, permits, easements, financing up to 35 percent of the total project costs, and operation and maintenance of the Project.

7.5.4 Contracting

Site 24 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 Relocation

The watershed district has the authority to acquire necessary easements for the Project. Easements are required to the top of dam elevation as required by Kansas statute administered by DWR. These easements are required to be in place for the life of the structure.

Current easements were recorded in the early 1970's with an easement to Elevation 904.0.

The watershed district is pursuing an attorney's opinion to provide adequate assurance that easements are in place and adequate for the work to be completed.

7.5.6 Financing

The watershed district has the authority to levy taxes for operation and maintenance and rehabilitation activities. These funds may be used for easement acquisition, administration, and construction.

The watershed may apply for state funding through the State Conservation Commission, Small Watershed Rehabilitation Program. These funds are authorized for construction and administration, and in combination with federal financial assistance are not to exceed 80 percent of the total project cost.

7.5.7 Conditions for Providing Assistance

The cost of rehabilitating Site 24 is estimated to be \$1,491,400 (excluding NRCS engineering and project administration costs). NRCS, under authority of PL 83-566, will provide \$969,400. The SLO, using other authorities, will provide \$522,000. Federal technical assistance, engineering services, project administration, and funds for construction are contingent upon appropriations for these purposes.

7.6 Operation, Maintenance, and Replacement

A new Operation and Maintenance (O&M) Plan and Agreement will be developed prior to construction of the selected alternative. The Plan and Agreement will be based on guidance found in the National Operations and Maintenance Manual, and will detail the responsibilities for operation and maintenance for the Sponsors and NRCS. The term of the agreement will be for 100 years, and must be signed by the NRCS and the Sponsors before the NRCS provides financial assistance to the Project.

7.7 Emergency Action Plan

The sponsors will provide leadership in developing an Emergency Action Plan (EAP) and will update the EAP annually with local emergency response officials. NRCS will provide technical assistance in preparation and updating of the EAP. The purpose of the EAP is to outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of a floodwater retarding structure. The NRCS State Conservationist will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. The EAP shall be reviewed and updated by the sponsors annually.

7.8 Mitigation

Approximately 5 acres of prime and important farmland and highly erodible cropland may be temporarily covered by the construction activities in the area of Site 24. Best management practices through the preparation of a storm water pollution prevention plan will be employed during construction activities to minimize and/or avoid impacts to water quality. These construction areas will be restored by excavating and stockpiling the topsoil, then replacing the topsoil in the impacted area after construction activities are complete. These areas will be reseeded with similar species as were present minimizing impact to the environment.

All alternative borrow areas are located outside of the riparian system.

Due to an increase in width of the structure and extension of the toe of the embankment, there would be a loss of 50 feet of stream channel that averages 36 feet in width. Approximately 100 feet of riparian area along the 50 feet of stream channel will be impacted below the dam. As a result, approximately 0.11 acres of riparian area will be impacted. Because the impact to the riparian area will be negligible, mitigation is not anticipated. The borrow area will not be in the riparian area.

During construction or reconstruction activities, site restoration activities will be completed to restore grass cover to areas altered by construction activities. Only seed that is weed free (does not contain noxious or invasive species) will be used to control noxious weeds. Measures will also be taken through use of weed seed-free topsoil (as feasible).

The current pool level is not changed and the planned change in downstream flow is negligible. Therefore, long term impacts appear to be avoided and/or minimized.

LIST OF PREPARERS

Name	Present Title	----- Education -----		Experience Titles & Time in Job-Yrs	Other (Licenses, etc.)
		Degree	Cont. Educ.		
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Dean Krehbiel	Resource Conservationist	BS, Biology		Resource Conservationist - 1 Watershed Planning Specialist - 5 District Conservationist - 4 Soil Conservationist - 2.5 Soil Conservation Technician - 1.5	
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 - Kansas State Office
 - National Water Management Center
 - National Headquarters
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Kansas Department of Agriculture, Division of Water Resources
- Kansas Department of Wildlife and Parks
- Kansas State Historic Preservation Office
- State Association of Kansas Watersheds
- Douglas County Conservation District
- Douglas County Commission
- City of Lawrence
- Kansas Department of Transportation
- Kansas State Conservation Commission
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