
SUPPLEMENTAL WATERSHED PLAN & ENVIRONMENTAL ASSESSMENT

FOR REHABILITATION OF FLOODWATER RETARDING
STRUCTURE NO. 6 OF THE CALAVERAS CREEK WATERSHED



PREPARED BY



IN COOPERATION WITH

Alamo Soil and Water Conservation District

Wilson County Soil and Water Conservation District

San Antonio River Authority

SEPTEMBER 2009

**Supplemental Watershed Plan & Environmental Assessment
For
Rehabilitation of Floodwater Retarding Structure No. 6
of the
Calaveras Creek Watershed
Bexar and Wilson Counties, Texas**

Prepared By:
U.S. Department of Agriculture
Natural Resources Conservation Service

In Cooperation With:
San Antonio River Authority
Alamo Soil and Water Conservation District
Wilson County Soil and Water Conservation District

AUTHORITY

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of the Soil Conservation Act of 1935 (Public Law No. 46, 74th Congress) as implemented by the Watershed Protection item in the Department of Agriculture appropriation Act, 1954 (Pilot Watershed Program). The rehabilitation of floodwater retarding structure No. 6 is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472

ABSTRACT

Historical floods in the past fifty-three years since Floodwater Retarding Structure No. 6 was constructed have caused the auxiliary spillways to function on at least two occasions. Residential development has occurred downstream of the dam and a significant increase in traffic has occurred downstream of FRS No. 6 on U.S. Highway 87, which is a major transportation route leading into San Antonio from the East. These factors have caused concerns regarding the hydraulic capacity of the dam and human health and safety. Even though the dam was originally constructed as a high hazard (class "c") dam, it does not comply with current dam safety and performance criteria. Local project sponsors have chosen to rehabilitate the dam to address the identified safety deficiencies. The purposes of the proposed rehabilitation of floodwater retarding structure No. 6 are to maintain present level of flood control benefits and comply with current performance and safety standards. Rehabilitation of the site will require the following modifications to the structure: raise the top of the dam 2.0 feet with earth fill, extend the back toe of the embankment and flatten the back slope to 3:1 slope, replace existing principal spillway with new principal spillway, new intake structure and a new impact basin, realign and extend both auxiliary spillways, widen both auxiliary spillways by 55 feet and install splitter dikes, and install a foundation drain system. Project installation cost is estimated to be \$1,821,900, of which \$1,293,800 will be paid from the Small Watershed Rehabilitation funds and \$528,100 from local funds.

COMMENTS AND INQUIRIES

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 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, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

WATERSHED AGREEMENT

Between the

San Antonio River Authority (SARA)

Local Organization

Alamo Soil and Water Conservation District (Alamo SWCD)

Local Organization

Wilson County Soil and Water Conservation District (Wilson County SWCD)

Local Organization

(Hereinafter referred to as the Sponsoring Local Organizations)

and the

Natural Resources Conservation Service

United States Department of Agriculture

(Hereinafter referred to as the NRCS)

Whereas, The Watershed Protection Amendment to the SUPPLEMENTAL MEMORANDUM OF UNDERSTANDING for Calaveras Creek Watershed, State of Texas, executed by the Sponsoring Local Organizations (SLO) named therein and the Service, became effective on the 8th day of February, 1954; and

Whereas, in order to carry out the watershed work plan for said watershed, it has become necessary to replace the Watershed Protection Amendment to the Supplemental Memorandum of Understanding with a new Watershed Agreement; and

Whereas, in order to extend the watershed plan for said Floodwater Retarding Structure (FRS) No. 6 beyond its current evaluated life, it has become necessary to replace said Watershed Protection Amendment; and

Whereas, the rehabilitation of said FRS No.6 has been authorized under the authority of the Watershed Protection and Flood Prevention Act (PL 83-566) as amended by the Watershed Rehabilitation Amendments (PL 106-472) provides the authority for rehabilitation; and

Whereas, it has become necessary to supplement said watershed work plan by modifying FRS No. 6 to bring it up to current performance and safety standards and to extend the service life of the dam for an additional 50 years; 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 Work Plan for said watershed has been developed through the cooperative efforts of the SLO and the NRCS, which plan is annexed to and made a part of this agreement; and

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through

the NRCS, and the SLO hereby agree upon this supplemental plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan and including the following:

- 1. Term.** The term of this agreement is for the installation period and evaluated life of the project (50 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 borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.
- 3. Real property.** The SLO will acquire such real property as will be needed in connection with the works of improvement.
- 4. Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The SLO 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. 4601 et. seq. as further provided by Uniform Relocation Assistance and Real Property Acquisition for Federally Assisted Programs, 49 CFR Part 24, and 7 C.F.R. Part 21) when acquiring real property interests for this federally assisted project. If the SLO is legally unable to comply with the real property acquisition requirements of the Act, 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. Rehabilitation of Floodwater Retarding Structure (FRS) No. 6.** The amount and percentages of the Total Eligible Project Cost to be paid by the SLO and the NRCS are as follows:

| <u>Works of Improvement</u> | <u>SLO</u> | <u>NRCS</u> | <u>Total Eligible Project Cost</u> |
|-----------------------------|------------------|------------------|------------------------------------|
| Rehabilitation of FRS No.6 | \$528,100 35% | \$980,700 65% | \$1,508,800 100% |

The NRCS is responsible for the engineering services and project administration costs (\$313,100) it incurs. However, these costs are not used in the calculation of the federal cost share. Therefore, they are not included in Total Eligible Project Cost above.

An amount up to the percentage rate specified may be satisfied by SARA for rehabilitation cost of an element such as engineering, real property acquisition or construction. The decision to, and arrangements for, such action will be negotiated between SARA and NRCS and will be included in a project agreement executed immediately before implementation. The costs to NRCS will not exceed 100 percent of the construction cost.

- 6. Flood Plain Management.** The SLO agrees to participate in and comply with applicable Federal flood plain management and flood insurance programs before construction starts.
- 7. Water and mineral rights.** The SLO 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 SLO and these costs are not eligible as part of the SLO cost-share.

8. Permits. The SLO 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 SLO cost-share.

9. 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.

10. Additional agreements. A separate agreement will be entered into between NRCS and the SLO 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.

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

12. 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.

13. Operation and Maintenance (O&M). The SLO 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. Specifically, the San Antonio River Authority (SARA) will be responsible for the maintenance of FRS No. 6. An O&M agreement will be entered into before federal funds are obligated and continue for the project life (50 years). Although the SLO responsibility to the Federal Government for O&M ends when the O&M agreement expires, the SLO acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

14. Emergency Action Plan. Prior to construction, the SLO shall prepare an Emergency Action Plan (EAP) for FRS No. 6. The EAP shall meet the minimum content specified in Part 500.52 of the NRCS National Operation and Maintenance Manual, and meet applicable State agency dam safety requirements. The NRCS will determine that an adequate EAP is prepared prior to the execution of fund obligating documents of the structure. EAPs shall be reviewed and updated by the SLO annually.

15. 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, audiotope, 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, S.W., Washington, D.C. 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.

16. Certification Regarding Drug-Free Workplace Requirements (7 CFR 3017, Subpart F).

By signing this Watershed Agreement, the SLO are providing the certification set out below. If it is later determined that the SLO 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. 812) and as further defined by regulation (21 CFR 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 sub-recipients or subcontractors in covered workplaces).

Certification:

- A. The SLO 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 ten calendar days after receiving notice under paragraph (4) (b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must 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 number(s) 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 SLO may provide a list of the site(s) 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.

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

A. The SLO 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 SLO, 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 SLO shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients 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 Section 1352, Title 31, of the U.S. Code. 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.

18. Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions (7 CFR 3017).

A. The SLO 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 three-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 three-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 SLO is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

San Antonio River Authority

Local Organization

By [Signature]

Title General Manager

Date September 3, 2009

The signing of this agreement was authorized by a resolution of the governing body of the San Antonio River Authority adopted at a meeting held on MAY 28, 2008.

[Signature]
(Secretary, Local Organization)

ASSISTANT

Alamo Soil and Water Conservation District

Local Organization

By [Signature]

Title Chairman

Date September 1, 2009

The signing of this agreement was authorized by a resolution of the governing body of the Alamo SWCD adopted at a meeting held on Sept. 1, 2009.

[Signature]
(Secretary, Local Organization)

Wilson County Soil and Water Conservation District

Local Organization

By [Signature]

Title Chairman

Date 09/04/2009

The signing of this agreement was authorized by a resolution of the governing body of the Wilson County SWCD adopted at a meeting held on Sept. 4, 2009.

[Signature]
(Secretary, Local Organization)

Natural Resources Conservation Service
United States Department of Agriculture

Approved By Donald W. Gohmert
NRCS State Conservationist

Date SEP 14 2009

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SUMMARY OF SUPPLEMENTAL PLAN and ENVIRONMENTAL ASSESSMENT

Project Name: Rehabilitation of Floodwater Retarding Structure (FRS) No. 6, Calaveras Creek Watershed, Bexar County, Texas

Sponsoring Local Organizations (SLO): San Antonio River Authority (SARA), Alamo Soil and Water Conservation District (Alamo SWCD), and the Wilson County Soil and Water Conservation District (Wilson County SWCD).

Description of Recommended Plan: This alternative consists of removing the existing principal spillway inlet structure and pipe and installing a new principal spillway inlet tower and 36" pipe with an impact basin at the outlet end. Both auxiliary spillways will be widened 55 feet to accommodate the installation of splitter dikes and the outlet section of both auxiliary spillways will be extended, reshaped and realigned. The top of the dam would be raised by 2.0 feet with earth fill, the back slope of the embankment will be extended and flattened to a 3:1 slope and a new foundation drain system will be installed along the back toe of the embankment. All disturbed areas will be re-vegetated using adapted species. The revised evaluated life of the structure will be 50 years from the date rehabilitation construction is completed.

Resource Information:

Size of planning area: 4,808 acres

| Land Cover | Acres | Percent |
|------------|-------|---------|
| Grassland | 4,674 | 97.2 |
| Urban | 55 | 1.1 |
| Woodland | 79 | 1.6 |
| Total | 4,808 | 100.0 |

| Land Ownership | Acres | Percent |
|----------------|-------|---------|
| Private | 4,798 | 99.8 |
| State-Local | 5 | 0.1 |
| Federal | 5 | 0.1 |
| Total | 4,808 | 100.0 |

Number of farms in planning area: 19

Average farm size: 171 Acres

Prime and important farmland in planning area: 0 Acres

Number of minority farmers: 0

Number of limited resource farmers: 0

Project Beneficiary Profile: The planning area is primarily comprised of a mixture of agricultural land and urban residential and commercial development. The planning area is located within Bexar County, the majority of which is within the Extra Territorial Jurisdiction (ETJ) of the City of San Antonio. The reservoir is used for flood and sediment control. Abandonment of the dam by excavating a breach section through the

embankment would result in increased flood damages to downstream properties, residences and roadways. As such, private landowners, local governments, and the Federal government are the primary beneficiaries of this project.

According to the 2007 US Census, approximately 48.8% of the population within Bexar County is male and 51.2% is female. The 2007 per capita income for Bexar County was \$21,895, compared to Texas per capita income of \$23,938 and \$26,688 for the United States. The population of the county is about 65 percent white, about 7 percent black, less than 1 percent Native American, about 2 percent Asian, and about 25 percent some other race/two or more races. Ethnicity population within the county is about 57 percent Hispanic. Project area demographic information is assumed comparable to Bexar County data.

Wetlands: FRS No. 6 currently provides approximately 8.7 acres of shallow and deep water intermittent lacustrine (Cowardin Classification) habitat at the ported elevation of the principal spillway. These areas are intermittent open waters and do not have the hydrology necessary to meet the definition of a wetland under the Clean Water Act of 1972.

Flood plains: Approximately 247 acres are located downstream within the breach area of FRS No. 6. Approximate acreage of breach area by landuse is as follows: Urban area – 42 acres; Grassland – 118; Woodland – 79; Roads – 8 acres.

Highly erodible cropland: None

Fisheries: Currently there is an 8.7 surface acre intermittent sediment pool at the ported elevation that does not have sufficient duration to serve as a warm water fishery (lacustrine – Cowardin Classification). The Natural Resources Conservation Service (NRCS) has determined that there are no fisheries on this site.

Threatened and Endangered species: There are no species federally or state listed as threatened or endangered or suitable habitat for listed species in or close to the proposed project site.

Cultural resources: No historic properties are present in the planned project area (i.e. eligible for National Register of Historic Places).

Problem Identification: FRS No. 6 was originally constructed in 1956 as a class (c) high hazard dam. Even though the dam met safety standards applicable at the time of construction, safety criteria has changed and the dam no longer meets current performance and safety standards for a dam of this hazard classification. Both the Natural Resources Conservation Service (NRCS) and the State of Texas agree on the current hazard classification of the dam. Failure of the dam would result in potential loss of life and significant damage to downstream infrastructure and properties. Approximately 340 people downstream are at risk should the dam fail. This includes about 40 residents living within the breach area, as well as about 300 motorists traveling on Loop 106 (old U.S. Highway 87), U.S. Highway 87, and FM 1628 (Stuart Road) downstream of the dam. According to the Texas Department of Transportation, average daily traffic counts (2007) for the three highways downstream of FRS No. 6 were as follows: U.S. Highway 87 - 15,050 vehicles; Loop 106 – 950 vehicles; and FM 1628 – 4,200 vehicles.

Considering over 20,000 vehicles utilize the three highways every day, estimating 300 people in vehicles at risk from a dam failure is a conservative estimate.

Alternative Plans Considered: Alternative plans considered are the (1) No Action or Future Without Project (controlled breach of FRS No. 6); (2) Decommission of FRS No. 6 (partial removal of FRS No. 6); and (3) Rehabilitation of FRS No. 6 by raising the top of dam 2.0 feet, replacing the existing principal spillway with a new intake tower, pipe and impact basin, installing a new foundation drain system, extending and realigning both auxiliary spillways, widening each auxiliary spillway 55 feet to accommodate splitter dikes, and extending and flattening the back slope to a 3:1 slope.

Brief Description of Each Alternative

Alternative No. 1 – Future Without Project

This alternative, which does not involve federal action, consists of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event. This breach would be a minimum size opening in the dam from top of dam down to the valley floor, which would eliminate the structure's ability to store water. In order not to impede flows through the breached embankment and to remove potential safety hazards, the principal spillway components would also be removed. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. This course of action would minimize the sponsor's dam safety liability but would not eliminate all liability. The material (about 17,500 cu yd) would be placed in the present easement area.

Since the 100-year floodplain would be enlarged from 51 acres to 137 acres (about 168%) due to the absence of flood protection, potential future downstream development would be restricted. The dam and land currently covered by the sediment pool would be maintained as a greenbelt area. The estimated cost of this alternative is \$693,800.

Alternative No. 2 - Decommission FRS No. 6.

This alternative removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. Partial removal of the embankment would consist of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event. This would eliminate the structure's ability to store water. In order not to impede flows through the breached embankment and to remove potential safety hazards, the principal spillway components would also be removed. Excavated material (about 17,500 cu yd) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (about 10 acres). Riparian vegetation would be established along the stream channel (about 3 acres). Channel work would be performed to reconnect the stream channel through the sediment pool. A grade stabilization structure would be installed to prevent head cutting and sediment movement to downstream areas.

Since the 100-year floodplain would be enlarged from 51 acres to 137 acres (about 168%) due to the absence of flood protection, potential future downstream development would be restricted. The dam and land currently covered by the sediment pool would be maintained as a greenbelt area. Estimated cost of this alternative is \$1,145,000.

Alternative No. 3 – Rehabilitation of FRS No. 6

This alternative consists of removing the existing two-stage principal spillway and components, installing a new standard drop inlet type principal spillway with a 36 inch pipe, and installing an impact basin to replace the existing plunge pool. The new principal spillway crest elevation will be lowered 6.0 feet. The crest elevation of both existing auxiliary spillways would be unchanged; however both auxiliary spillways will be widened 55 feet to accommodate the installation of splitter dikes, and the exit sections of both spillways will be realigned, reshaped and extended. The top of the dam would be raised by 2.0 feet with earth fill. The back slope would be extended and flattened to a 3:1 slope when raising the dam and a new toe drain system would be installed along the back toe of the embankment. All disturbed areas would be re-vegetated to adapted species. Modifications to FRS No. 6 would insure compliance with current safety and performance standards. The evaluated life of the structure would be extended for an additional 50 years. The 100-year floodplain downstream of FRS No. 6 would be unchanged. The level of flood protection would increase from 45-year (2.2% frequency) to 80-year (1.2% frequency). The dam would continue to provide flood damage reduction benefits downstream. Estimated cost is \$1,821,900.

Project Purpose: The original purpose of FRS No. 6 was flood prevention. The purpose of the rehabilitation project is to maintain present level of flood control benefits and comply with current performance and safety standards.

Principal Project Measure: Rehabilitation of FRS No. 6 by replacing the principal spillway, raising the top of the dam and flattening the back slope, installing an impact basin, installing a new foundation drain system, and making modifications to the auxiliary spillways.

| | | | |
|-----------------------|----------------------|--------------------|--------------|
| Project Costs: | <u>Federal funds</u> | <u>Other Funds</u> | <u>Total</u> |
| | \$1,293,800 | \$528,100 | \$1,821,900 |

Project Benefits: Economic benefits of the project are derived from assuring the continued performance of FRS No. 6 by meeting current performance and safety standards. Benefits are based on continuing flood protection to the downstream area and avoiding projected costs associated with implementing Alternative No. 1. Total average annual benefits are estimated to be \$107,700, which include updated agricultural downstream benefits (\$17,700), reduction of sediment and erosion downstream (\$4,200), non-agricultural flood reduction benefits (\$48,200), avoidance of flood insurance administrative costs (\$1,800), and saving the SLO the cost of a controlled breach (\$35,800). Also, the risk of loss of life (about 40 residents located within the breach area and 300 motorists traveling on downstream roadways) from a dam failure would be minimized.

Other Impacts: Debris clean-up following major storm events could be done sooner.

Environmental Values Changed or Lost: Installation of the preferred alternative would disturb only a minimal amount of grassland and mesquite vegetation. After the installation of the impact basin and replacement of the principal spillway, the surface area of the sediment pool would be reduced by approximately 3.2 acres, and all disturbed areas would be replanted with adapted native and/or introduced grasses. Installation of the preferred alternative would have very minor adverse impacts to wildlife habitat associated with the clearing of grassland and mesquite trees. Only minor temporary impacts on water quality (turbidity and sedimentation) associated with construction would be anticipated. No compensatory mitigation is planned.

Major Conclusions: Rehabilitation of FRS No. 6 would minimize the risk of loss of life within the breach area, would have only a very minor impact to the environment, and would allow the continuance of flood prevention benefits.

Areas of Controversy: There are no known areas of controversy.

Issues to be Resolved: Any discharge of dredged or fill material in a water of the US associated with rehabilitation of FRS No. 6 would require a Department of the Army permit under Section 404 of the Clean Water Act of 1972. Also, for projects with disturbances equal to or greater than five acres it is necessary to have a Stormwater Pollution Prevention Plan (SWPPP) in place at least 48 hours prior to and during construction of the proposed project and filing a Notice of Intent with the Texas Commission on Environmental Quality is required. A Notice of Termination (NOT) must be filed once the site has reached final stabilization. The SLO would be responsible for developing an Emergency Action Plan (EAP) prior to construction and would review and update the EAP annually with local emergency response officials.

SUPPLEMENTAL WATERSHED PLAN & ENVIRONMENTAL ASSESSMENT

PURPOSE AND NEED FOR ACTION

INTRODUCTION

Within the Calaveras Creek Watershed major changes in land use from a rural setting to an urban setting has occurred in large portions of the watershed. This land use change has occurred upstream and downstream of many of the floodwater retarding structures in the Calaveras Creek Watershed. The Texas Commission on Environmental Quality (TCEQ) and the NRCS both concur that Calaveras Creek Watershed FRS No. 6 is a high hazard (class “c”) structure based on current criteria. The auxiliary spillways have functioned at least twice in the past. There are human health and safety concerns about the performance of this dam.

When Calaveras Creek Watershed was planned, the original intent of the floodwater retarding structures was to protect downstream agricultural areas of the watershed and prevent adverse economic and physical effect of flooding throughout the entire watershed community. The economy in the Calaveras Creek Watershed area was almost entirely agricultural (cropland and grassland) when the original planning was completed; however, fifty-six years later, the population growth within the expanding San Antonio metropolitan area and urbanization along U.S. Highway 87 has consumed much of the watershed. The population of Bexar County has grown from 500,460 in 1950 to 1,555,168 in 2007. Since 1940, the population of Bexar County has increased an average of 150,000 to 200,000 every 10 years (U.S. Bureau of Census). Changes in the economy, land use, and population growth within the Calaveras Creek Watershed have been especially noticeable in the vicinity of the nine constructed floodwater retarding structures in Calaveras Creek Watershed.

FRS No. 6 is located within the ETJ of San Antonio. The watershed for FRS No. 6 heads just north of FM 1346 approximately 10.5 miles east of downtown San Antonio, Bexar County, Texas. As a result of people at risk downstream, FRS No. 6 needs to be upgraded to meet current performance and safety standards and ensure continued protection of the watershed and the lives of people downstream.

PURPOSE AND NEED FOR THE PROJECT

This Supplemental Watershed Plan/Environmental Assessment was prepared to evaluate the rehabilitation of FRS No. 6. FRS No. 6 was originally installed under the authority of the Soil Conservation Act of 1935 (Public Law No. 46, 74th Congress) as implemented by the Watershed Protection item in the Department of Agriculture appropriation Act, 1954 (Pilot Watershed Program). The rehabilitation of FRS No. 6 is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472.

The purposes of the FRS No. 6 rehabilitation project are to maintain present level of flood control benefits and comply with the current performance and safety standards. FRS No. 6 was built in 1956 in a rural setting and is now influenced by population growth and land development

due to proximity to the San Antonio metropolitan area. In particular, there are twelve residences, four commercial properties, and three roadways with heavy use downstream that would be impacted by a dam failure of FRS No. 6. These roadways, Loop 106, U.S. Highway 87 and FM 1628 (Stuart Road), serve as the main routes between several residential developments, the East Central High School main campus, and regional traffic leading into the east side of San Antonio. This risk of loss of life and the dam not meeting current performance and safety standards is the reason that FRS No. 6 needs to be rehabilitated. Rehabilitation of FRS No. 6 is needed to protect downstream properties and infrastructure, and reduce the risk of loss of life. The rehabilitation of FRS No. 6 would allow for the service life of the dam to be extended for a minimum of fifty additional years.

WATERSHED PROBLEMS AND OPPORTUNITIES

The primary concern is the safety of FRS No. 6 and the potential problems that failure of the dam would cause. Approximately 40 people living downstream of FRS No. 6 are at risk should the dam fail. Also, about 300 motorists that might be traveling on Loop 106, U.S. Highway 87 and FM 1628 at the time of failure would be at risk.

Currently FRS No. 6 is functioning as originally planned and providing downstream flood damage protection from the 45-year, 24-hour storm. However, there is a possibility of the dam failing from overtopping if a storm produces runoff that is greater than the structure's current capacity. Total estimated damages from a catastrophic breach of FRS No. 6 would approach \$2,800,000 and the risk of loss of human life would be significant.

Following is a list of opportunities that would be realized through the implementation of this watershed rehabilitation plan:

- Comply with current dam safety criteria
- Protect human health and safety
- Protect infrastructure and transportation system
- Maintain flood control benefits and prevent increased flooding in the floodplain
- Maintain or improve water quality
- Protect fish and wildlife habitats
- Prevent SLO and others from costly consequences of a controlled breach

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

A scoping process was used to determine the issues significant in defining the problems, and formulating and evaluating alternatives. Scoping included public meetings, written request for input from state, local and federal agencies, and a coordination meeting with appropriate agencies. A steering committee of SLO and local citizens was also formed to solicit input.

Table A presents the results of the scoping process:

| <i>Table A – Identified Concerns</i> | | | |
|---|--------------------------|--|---------------------------------|
| Economic, social, environmental, and cultural concerns | Degree of Concern | Degree of Significance to Decision Making | Remarks |
| | | | |
| Dam Safety | High | High | Breach effect to Calaveras Lake |
| Human Health & Safety | High | High | |
| Flood Damages | High | High | |
| T&E Species | Low | Low | None identified |
| Cultural Resources | Low | Low | None identified |
| Prime Farm Lands | Low | Low | |
| Wetlands | Low | Low | |
| Air Quality | Low | Low | |
| Water Quality | Medium | Medium | |
| Water Quantity | Low | Low | |
| Aesthetics | Low | Low | |
| Sedimentation and Erosion | Medium | Medium | |
| Land Values | Low | Low | |
| Fish & Wildlife Habitat | Low | Low | |
| Recreation | Low | Low | |
| Environmental Justice | High | High | |

AFFECTED ENVIRONMENT

This Supplemental Plan/Environmental Assessment is for the watershed (drainage area) upstream of FRS No. 6 and the downstream area affected by a breach of the existing dam (Appendix C). FRS No. 6 was constructed on Chupaderas Creek, a tributary of Calaveras Creek, approximately 3.25 miles above Calaveras Lake (power plant lake owned and operated by City Public Service Energy). The Calaveras Creek Watershed is located in the San Antonio River Basin. A description of the Calaveras Creek Watershed can be found in the Calaveras Creek Watershed Work Plan dated June 1954.

The rehabilitation project area is 4,808 acres that consists of the drainage area of FRS No. 6 plus the area downstream that would be inundated by a breach of the dam. The project area is located within the ETJ of the City of San Antonio, Bexar County, Texas. Land uses within the rehabilitation project area include residential, commercial, ponds, highways, grazing lands, road and utility right-of-ways and open areas.

EXISTING CONDITIONS

Original Project

The Calaveras Creek Watershed Plan was designated as a project eligible for Federal assistance in August 1953 under the authority of the Soil Conservation Act of 1935 (Public Law No. 46, 74th Congress) as implemented by the Watershed Protection item in the Department of Agriculture appropriation Act, 1954 (Pilot Watershed Program). The plan provides for application of conservation practices for watershed protection and flood prevention. The local SLO are SARA, the Alamo SWCD and the Wilson County SWCD. Federal assistance was provided by the United States Department of Agriculture (USDA), Soil Conservation Service (now the Natural Resources Conservation Service or NRCS). A total of nine FRS were planned and constructed during 1954 through 1958. Two of the constructed sites were later decommissioned due to being inundated when Calaveras Lake was constructed. There has been no previous supplement to the original 1954 work plan.

Description of Existing Dam

FRS No. 6 was originally designed and constructed in 1956 as a high hazard (class “c”) dam, a hazard classification given to dams that pose a threat to loss of life. FRS No. 6 was constructed as a homogenous earth fill embankment with two vegetated auxiliary spillways and a principal spillway consisting of an inlet tower with a 19-inch concrete outlet pipe. The top of dam elevation is 555.9. The front slope of the embankment was constructed to a 3:1 slope and the back slope was constructed to a 2:1 slope with a foundation drain system beneath it. Both auxiliary spillways have a 250 foot bottom width and the crest elevation is 550.5. The principal spillway inlet structure is a 36-inch by 36-inch by 10-foot tower with the crest elevation of 534.0. The tower has four 8-inch square ports, two each on the front and back sides of the tower at elevation 530.8. There is an 8-inch sluice gate located at the bottom of the tower with an invert elevation of 524.5 to facilitate lowering the permanent water level for repairs and maintenance. The principal spillway outlet pipe consist of 180-feet of 19-inch diameter reinforced concrete pipe connected to the back side of the inlet tower and 40 feet of 21-inch 14 gauge galvanized corrugated bituminous coated pipe connected at the outfall end. As part of the routine operation and maintenance, the corrugated metal pipe tail section was replaced when it was approximately 50 years old. FRS No. 6 was also equipped with a Stage Recorder Float Well to provide

information on the actual effect of the recommended watershed protection program on runoff, erosion, sedimentation and evaporation. The instrumentation was operated for about 25 years by the U.S. Geological Survey, and abandoned in the late 1970's.

The NRCS conducted a field survey in 2009 and secured Light Detection and Ranging (LIDAR) survey information from SARA to determine current elevations of FRS No. 6. The 2009 field survey, LIDAR and 1956 "As-Builts" drawings all indicate consistency within the vertical datum (elevations); however, there are several discrepancies in the horizontal datum (surface areas and capacities) between the "As-Builts" and the other two surveys. At the present principal spillway crest elevation of 534 the sediment pool contains 16.6 surface acres and 69.7 acre feet of sediment storage. The current flood storage at auxiliary spillway crest elevation of 550.5 is 1,410.2 acre feet. The maximum height of the dam is 42 feet.

The embankment is in excellent condition. The Bermuda grass vegetative cover on the embankment and auxiliary spillways has provided a stable, non-erosive surface for the past 53 years. The embankment and auxiliary spillways are fenced to control grazing from livestock. No brush or trees are allowed to grow on the embankment or in the auxiliary spillways. The principal spillway inlet and conduit were visually inspected and no deficiencies were noted. The dam has no visual stability or foundation problems; however seepage appears to be entering the exit channel below the plunge pool through the right abutment. The land adjacent to FRS No. 6 is primarily used for grazing and agricultural purposes. Several properties border the detention pool area and intersect the auxiliary spillways.

Physical Features and Environmental Factors

Project location: The Calaveras Creek Watershed, located in Bexar and Wilson Counties, Texas, is comprised of 61,440 acres (about 96 square miles). Of this total, the drainage area for FRS No. 6 is 4,561 acres or about 7.13 square miles. FRS No. 6 is constructed on Chupaderas Creek which is a main tributary of Calaveras Creek. The watershed of FRS No. 6 heads just north of FM 1346 approximately 10.5 miles east of downtown San Antonio, Bexar County, Texas. Calaveras Creek Watershed FRS No. 6 is located at Latitude, decimal degree 29.38 and Longitude, decimal degree -98.29. The watershed is located within the San Antonio River Basin as delineated by the United States Water Resources Council, hydrologic unit number 12100301.

Topography: The project area lies within the rolling prairie of the Upper Coastal Plain Physiographic Area. The topography of the watershed ranges from rolling along the watershed divides to gently rolling to flat in the central section. Calaveras Creek Watershed has an average gradient of 12 feet per mile.

Soils and Geology: Calaveras FRS No. 6 is located on the sandstone and claystone of the Lower Eocene, Wilcox Group (E_{wi}). The site is positioned in the upper portion of the Wilcox Group. The upper section of the Wilcox contains a greater proportion of sand. The sandstone and claystone underlie the entire site. All the sandstone is silty and is very fine to fine grained. A large majority of the sandstone on site is hardness 1-2. Varying amounts of claystone is present in the sandstone. The claystone has a hardness of 1-2.

Quaternary Alluvium, (Q_{al}), is deposited in a channel incised into the E_{wi} . The topography of the west side of the channel is steeply sloped. It is produced by the presence of more erosion resistant Sandstone, forming an escarpment inhibiting lateral migration of the stream channel. The east side of the channel is gently sloping.

Subsurface water was encountered throughout the site during the geologic investigation. The site is located within the Carrizo-Wilcox Aquifer recharge zone. Even though the site is not listed as a recharge structure, it has performed as one.

On the surface the site is made up of mostly fine sandy loams and loamy fine sands on the uplands and frequently flooded soils along the creek. The gently to moderately sloping soils adjacent to FRS No. 6 consist of Miguel fine sandy loam and Wilco loamy fine sand on the uplands and Tinn and Frio soils along the stream (Web Soil Survey 2.2, National Cooperative Soil Survey 2007).

Climate: Bexar County has a modified subtropical climate, predominately continental in winter and marine in summer. Average annual rainfall is slightly less than 28 inches. Normal temperatures range from an average daily high of 94 degrees Fahrenheit in July and August to an average daily low of 42 degrees in January. The normal freeze-free period of 279 days extends from February 24 to November 30.

Cultural Resources: No prior cultural resources identification activities have taken place in association with the original FRS No. 6 project. The dam and reservoir was constructed in 1956, prior to passage and implementation of the National Historic Preservation Act and other historic preservation laws that now require NRCS (Soil Conservation Service at that time) to consider effects to significant cultural resources.

A search of the Native American Consultation Database was conducted to determine if there were any Indian tribes that might attach religious or cultural significance to historic properties that could be located in the proposed project area. This was done in accordance with 36 CFR 800.2 (c)(i) of the Advisory Council on Historic Preservation Regulations. The Mescalero Apache Tribe of the Mescalero Reservation, New Mexico has a claim to a land area that includes Bexar County, Texas (NPS 2009). NRCS has contacted the Tribal Historic Preservation Officer to determine if the tribes have an interest in the project area and no interest has been indicated.

A search of the Texas Archeological Sites Atlas, completed in April 2009 did not reveal any recorded archeological or historic sites in the vicinity of the proposed project (THC 2009). NRCS and the Texas State Historic Preservation Officer (SHPO) have agreed that a cultural resources survey should be completed on all areas of new disturbance associated with potential rehabilitation measures. Accordingly, the NRCS cultural resources specialist conducted a survey of areas of potential new disturbance associated with the prospective rehabilitation alternative at FRS No. 6 in April 2009. The areas have been subject to various disturbances associated with original construction and other activities including farming/ranching practices, roads, trails, and recreational facilities.

One cultural feature was identified during the survey – a possible bedrock mortar adjacent to the plunge pool of the existing principal spillway outlet. The mortar hole is about 10 cm deep and 15 cm diameter at the surface, tapering to a narrower bottom. There is evidence of pecking or abrasion around the top of the hole. The sandstone outcrop present along the creek has apparently been modified by flowing water in the ancient past – not as a result of the operation of FRS No. 6. Because of the bedrock cultural feature, the area was thoroughly examined for associated cultural resources. The stream has cut into a sandstone outcrop flanking the west side of Chupaderas Creek. This is a very steep area between the stream channel and the flatter adjacent upland where the west auxiliary spillway was constructed. Sandstone is at the surface or within a shallow soil all across this sloping area. A couple of isolated chert cobbles had some

damage that could be due to deliberate flake removal, but the material was very coarse and relatively poor quality for tool production. In addition, there were two chert pieces that may have been primary, exterior flakes, but these also did not exhibit sufficient characteristics to confidently declare them to be artifacts instead of ecofacts.

There has been a great deal of disturbance related to construction and operation of FRS No. 6, as well as agricultural land use. The area to the immediate east of the bedrock feature has eroded due to turbulent flow from the principal spillway outlet. The areas north, or upstream from the feature, along with the area to the immediate west, have been covered with earth fill as parts of the dam embankment or a constructed terrace that diverts runoff away from the outlet. A similar diversion is constructed on the opposite side of the plunge pool and apparent excavation has occurred between this diversion and a large oak tree to the east. These modifications may have obscured or destroyed any cultural deposits or features associated with the bedrock feature or other components of an archeological site that may have existed.

No significant cultural resources were found in the areas of potential new disturbance associated with rehabilitation measures at FRS No. 6 and overall there appears to be low potential for subsurface cultural deposits in these areas. The bedrock feature, by itself, does not possess sufficient information to provide insight into the prehistory of south central Texas. No other cultural resources were found in association with the feature. The FRS No. 6 dam and appurtenances were installed in 1956, and accordingly exceeds the threshold for consideration as a historic property under the NHPA. FRS No. 6 is a typical floodwater retarding structure in design and function and holds no unique engineering characteristics or relationship to important events or individuals. There could be some potential for subsurface deposits in the area of rehabilitation measures adjacent to Chupaderas Creek, but no cultural resources were found during the investigations.

The NRCS has determined pursuant to 36 CFR 800.4(d) that there are no properties included in or eligible for the National Register of Historic Places within the area of potential effect of the alternative resulting in rehabilitation of FRS No. 6. This determination was reported to the SHPO in June 2009 for review and concurrence (letter on file). The SHPO concurred by letter on July 13, 2009 that the project, as presently proposed, should not affect historic properties and should proceed as planned, with the stipulation that the bedrock mortar and vicinity be avoided during construction and that an archeological site trinomial be obtained, recording the location of this cultural resource (letter on file). The official site number is 41BX1814.

It should be noted that additional cultural resources investigations would be necessary should the no action or decommissioning alternatives be selected. At this time areas of potential effect for alternatives other than rehabilitation have not been specifically identified.

Prime Farmland: Soils in the project work area were evaluated by the USDA-NRCS in accordance with requirements of the Farmland Protection Policy Act (FPPA). The proposed project work area impacted by the rehabilitation of FRS No. 6 does contain Important Farmland as defined by the FPPA (0.0 acres Prime and Unique Farmland; 5 acres Statewide/Local Important), however the total soil index score of 60, utilizing the land evaluation and site assessment form AD-1006, was less than the 160 point threshold and “need not be given further consideration for protection” [7 CFR 658.4 (c) 2]. Completed forms and a letter documenting this determination are on file.

Fish and Wildlife Resources: FRS No. 6 is located within the ETJ of San Antonio in Bexar County, Texas. Land along the west side of the detention pool is used primarily for livestock grazing. The land cover is predominantly poor condition rangeland with a dense overstory of 6-8 foot tall mesquite and other invading brush species. FRS No. 6 currently provides habitat for small mammals, neo-tropical songbirds, shore birds and various water fowl. Various species of reptiles and amphibians also inhabit the project site.

Threatened and Endangered Species: The U.S. Fish and Wildlife Service (USFWS) lists 1 plant, 5 insect, 6 arachnid, 1 crustacean, 2 amphibian, 2 fish, and 3 bird species as threatened or endangered in Bexar County, Texas (Table B). Nineteen of the species are endangered, and only the San Marcos salamander is threatened. According to the Texas Parks and Wildlife Department (TPWD), Wildlife Division, Diversity and Habitat Assessment Programs, four species are state listed as endangered and seven species are state listed as threatened in Bexar County, Texas.

Investigations by NRCS biologists identified no individuals or suitable habitat for any species federally or state listed as threatened or endangered. The proposed project would have no effect on threatened or endangered species.

Table B shows Federally and State Listed Threatened and Endangered Species for Bexar County:

| Common Name | Scientific Name | Species Group | Federal Status | State Status |
|---------------------------------------|---|---------------|----------------|--------------|
| Cascade Caverns salamander | <i>Eurycea latitans complex</i> | Amphibians | | T |
| Comal blind salamander | <i>Eurycea tridentifera</i> | Amphibians | | T |
| San Marcos salamander | <i>Eurycea nana</i> | Amphibians | T | |
| Texas blind salamander | <i>Typhlomolge rathbuni</i> | Amphibians | E | |
| Braken Bat Cave Meshweaver | <i>Cicurina venii</i> | Arachnids | E | |
| Cokendolpher Cave Harvestman | <i>Texalla cokendolpheri</i> | Arachnids | E | |
| Government Canyon Bat Cave Meshweaver | <i>Cicurina vespera</i> | Arachnids | E | |
| Government Canyon Bat Cave Spider | <i>Neoleptoneta microps</i> | Arachnids | E | |
| Madla’s Cave Meshweaver | <i>Cicurina madla</i> | Arachnids | E | |
| Robber Baron Cave Meshweaver | <i>Cicurina baronia</i> | Arachnids | E | |
| American Peregrine Falcon | <i>Falco peregrinus anatum</i> | Birds | | T |
| Black-capped Vireo | <i>Vireo atricapilla</i> | Birds | E | E |
| Peregrine Falcon | <i>Falco peregrinus</i> | Birds | | T |
| Golden-cheeked Warbler | <i>Dendroica chrysoparia</i> | Birds | E | E |
| Interior least tern | <i>Sterna antillarum athalassos</i> | Birds | | E |
| White-faced Ibis | <i>Plegadis chihi</i> | Birds | | T |
| Whooping Crane | <i>Grus americana</i> | Birds | E | E |
| Wood stork | <i>Mycteria americana</i> | Birds | | T |
| Zone-tailed Hawk | <i>Buteo albonotatus</i> | Birds | | T |
| Peck's cave amphipod | <i>Stygobromus (=Stygonectes) pecki</i> | Crustaceans | E | |
| Fountain darter | <i>Etheostoma fonticola</i> | Fishes | E | |
| San Marcos gambusia | <i>Gambusia georgei</i> | Fishes | E | |
| Comal Springs dryopid beetle | <i>Stygoparnus comalensis</i> | Insects | E | |
| Comal Springs riffle beetle | <i>Heterelmis comalensis</i> | Insects | E | |

| | | | | |
|-------------------------|---------------------------|------------------|---|--|
| Helotes mold beetle | <i>Batrisodes venyivi</i> | Insects | E | |
| (unnamed) ground beetle | <i>Rhadine exillis</i> | Insects | E | |
| (unnamed) ground beetle | <i>Rhadine infernalis</i> | Insects | E | |
| Texas wild-rice | <i>Zizania texana</i> | Flowering Plants | E | |

Wetlands: The pool area of FRS No. 6 is an 8.7-acre intermittent lacustrine system that does not hold water due to a sand layer that runs beneath the sediment pool. Backhoe trenches greater than four feet deep were excavated at several locations in the existing sediment pool. These trenches showed no free water in the trench and no saturated soils at the bottom of the trenches. For the purpose of the National Wetland Inventory Maps, all water bodies visible on aerial photography that are less than 20 acres in size are considered to be in the palustrine system unless depth information is available or an active wave-formed or bedrock shoreline feature is visible. Since the sediment pool for FRS No. 6 does not maintain a permanent water body, there is no depth information or wave-formed shoreline features. While these areas are considered wetland systems under the Cowardin classification system (Classification of Wetlands and Deepwater Habitats of the United States, 1979, by Cowardin, Lewis M. et al.), the site does not exhibit wetland hydrology that is necessary for a jurisdictional wetland under the Clean Water Act of 1972.

STATUS OF OPERATION AND MAINTENANCE

SARA is responsible for the maintenance of FRS No. 6. SARA and the Alamo SWCD are jointly responsible for the operation of the structure. Inspections of the dam indicated that the dam is being operated and maintained properly. Bexar County prevents development from encroaching upon the 100-year floodplain.

The dam is in excellent condition. A thick stand of bermudagrass covers the front and back slopes of the dam and the auxiliary spillways. Trees and brush are not allowed to grow on the slopes of the embankment or in the auxiliary spillways. The inlet structure and conduit of the principal spillway were visually inspected and no deficiencies were noted. The corrugated metal pipe tail section of the conduit was replaced recently. Investigations indicate that the dam, including the principal spillway, is structurally sound and is being properly maintained.

SEDIMENTATION

The original planned total sediment volume was 337 ac-ft or 6.74 ac-ft/yr. This volume was broken down as follows: 200 ac-ft in the sediment pool (below 530.8.0 and the principal spillway crest elevation of 534.0). No aerated sediment or sediment in detention pool was included in the original plan.

The sediment survey and predictive soil loss equations, completed in 2009, indicates that there are well over 50 years of available sediment storage capacity remaining below elevation 528.0 (planned PS crest elevation). The accumulated sediment in the sediment and detention storage areas was not tested as it will not be disturbed during the rehabilitation of the FRS No. 6.

The 2009 sediment volume survey conducted by NRCS staff showed an accumulation of 2.3 ac-ft of sediment volume indicating that the actual sediment rate was 0.006 ac-ft /yr. The survey also indicated that 12.1 ac-ft of volume remained below the planned sediment pool elevation of 528.0 (available for future sediment storage). The fine-grained soils, gentle topography and stable land use suggest comparatively low sedimentation rates. With the continued change in

land use from agricultural to a rural urban interface, the estimated future sediment rate is calculated to be 0.006 ac-ft per year. The rehabilitation design of FRS No. 6 is for an evaluated life of 50 years. The sediment volume needed for the 50 year evaluated life of the rehabilitated structure is 2.4 ac-ft. No aerated sediment or sediment in detention pool was included in the rehabilitation of FRS 6.

BREACH ANALYSIS AND HAZARD CLASSIFICATION

Calaveras Creek Watershed FRS No. 6 does not meet current dam design and safety requirements. The dam was originally constructed in 1956 as a high hazard (class “c”) structure for the purpose of protecting downstream agricultural lands and residential homes from flooding. As a result of population growth over the years, twelve residences, four commercial properties, and three roadways are now at risk from a catastrophic breach of FRS No. 6.

The NRCS and the Texas Commission on Environmental Quality, Dam Safety Program, both agreed on the classification of the structure as “high hazard”. The high hazard classification is based on the risk of loss of life concerning at-risk residences located in the downstream dam breach inundation area. At risk are twelve residences, four commercial properties and three heavily to moderately traveled roadways located downstream.

Breach studies indicate that Loop 106 and U.S. Highway 87 would be overtopped by approximately 7 feet of floodwaters if the dam failed, resulting in extensive property and infrastructure damages. Also, FM 1628 would be overtopped by approximately 11 feet of water if the dam were to fail. Over 20,000 vehicles utilize these roadways daily.

The breach floodwaters would reach and inundate the first floor elevations of 12 residences (9 houses and 3 mobile homes) and 4 commercial properties. Eight of the residences (5 houses and 3 mobile homes) would flood at a depth and velocity that would most likely remove the structures from their foundations. Anybody inside of the residences at this time would face an extremely dire predicament. Table C contains information regarding depth of floodwaters.

Although the structure is presently sound, there is always the risk of failure. The most likely cause of FRS No. 6 failing is by overtopping. In the unlikely event that the structure was overtopped and failed, the most serious failure would be a breach in the highest point. This would result in a breach hydrograph that has a peak discharge of 31,900 cubic feet per second (cfs). Fair weather conditions were assumed to develop the breach hydrograph. The reservoir pool elevation was static at top of dam with non-storm conditions downstream. See Appendix C, Breach Inundation Map and Appendix D, Investigation and Analysis, Hydrology.

POTENTIAL MODES OF DAM FAILURE

Both NRCS and the State of Texas recognize that Calaveras Creek Watershed FRS No. 6 is a high hazard dam. Several potential modes of failure were examined as follows:

Sedimentation – Sediment can be deposited in both the sediment pool (the area below the principal spillway crest) and flood detention pool (the area between the principal spillway crest and the auxiliary spillway crest). When the sediment pool has filled to the elevation of the principal spillway inlet, the pool no longer has permanent water storage. As the detention pool loses storage due to sediment deposition, the auxiliary spillway operates, or has flowage, more

often and is therefore subject to erosion. A potential mode of failure exists as the auxiliary spillway continues to degrade, and depth and frequency of flow increases. The dam will ultimately breach.

FRS No. 6 was designed with a 50-year sediment storage life. In 2009 the sediment pool was completely dry and several trenches were excavated with a backhoe to determine the amount of sediment deposited since the dam was constructed. Sediment thickness estimates were recorded from the excavations and utilized to calculate the deposited sediment volume in the reservoir. The sediment survey and predictive soil loss equations indicate that while some sediment has accumulated (2.3 ac-ft), FRS No. 6 has sufficient storage capacity remaining for at least another 50 years. With the change in upstream land use, the actual sediment rates were dramatically lower than that originally planned. Future sediment load is expected to remain at a low rate as the land use continues to change from agricultural to urban. Therefore, in the near future, sedimentation presents a low potential mode of failure for FRS No. 6.

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 spillway's resistance to erosion. The integrity and stability of the embankment during overtopping is dependent on the depth, velocity, and duration of flow; the vegetative cover; and the embankment's resistance to erosion.

FRS No. 6 was originally designed to temporarily store the runoff from 6.97 inches of rain falling in 6 hours plus an additional 4.4' of elevation without overtopping the embankment. Current criteria require FRS No. 6 to temporarily store the Probable Maximum Precipitation (PMP) storm of 30.6" in 6 hours without overtopping the embankment. The PMP storm is the maximum design storm required by the State of Texas Dam Safety Office. The possibility of a storm of this magnitude occurring is very low, but if it does, flow will occur in the current auxiliary spillways at a depth that exceeds capacity for a long duration, and the dam will be overtopped. These conditions could lead to the possible breaching of the auxiliary spillway(s), the embankment, or both. FRS No. 6 is currently performing as originally designed and is expected to continue to perform into the future; however, it does not meet current dam safety design criteria for a high hazard dam. Therefore, the potential for FRS No. 6 to fail due to a deficiency in hydrologic capacity is judged to be high.

Seepage – Seepage is the primary geotechnical concern on FRS No. 6. Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material through the embankment or foundation. As the soil material is removed, voids can be created, allowing ever increasing amounts of water to flow through the embankment or foundation until the dam collapses due to the internal erosion. Seepage that increases with an increase in pool elevation is an indication of a potential problem, as is stained or muddy water. Foundation and embankment drainage systems can alleviate the seepage problem by removing the water without allowing soil particles to be transported away from the dam.

FRS No. 6 shows no visible signs of seepage along the back toe of the dam. Geologic investigation does not indicate this to be a concern; however a new foundation drain system is planned for installation. No sloughing or any other indications of embankment instability were noticed. FRS No. 6 is protected with a thick cover of bermudagrass, and no trees are present on the embankment or in the auxiliary spillways. Therefore, in the near future, seepage presents a low potential mode of failure for FRS No. 6.

Seismic – The integrity and stability of an earthen embankment are dependent on the presence of a stable foundation. Foundation movement through consolidation, compression, or lateral movement can create weak zones or voids within an embankment, separation of the principal spillway conduit joints, or in extreme cases, complete collapse of the embankment.

FRS No. 6 is located in the Algermissen Seismic Zone 0. There are no indications that any foundation movement has occurred in the past that would weaken the integrity of the embankment or any of the components of the structure, and none is anticipated in the future. Seismic activity creates only a very small potential as a mode for failure of FRS No. 6.

Embankment Slope Failure - An embankment slope failure allows increased saturation and weakens the integrity of the dam during the PMP and could result in a catastrophic failure. Slope failure can also create slides and sloughing that lower the top of dam elevation so that overtopping may occur during the PMP.

FRS No. 6 shows no visible signs of slope failure, sloughing, or any other noticeable indications of instability on the embankment. The embankment of FRS No. 6 is protected with a thick cover of bermudagrass, and there are no trees present. Therefore, embankment slope failure presents a low potential mode of failure for FRS No. 6, but it should continue to be monitored in the future.

Material Deterioration - Material used in the principal spillway system and fences are normal, common construction materials, but they are subject to weathering and chemical reaction due to natural elements within the soil, water, and atmosphere. Concrete components can deteriorate and crack, metal components can rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion caused by these leaks.

Based on available information and field observations, the structure appears to be in extremely good condition with no evidence of deterioration on any of the materials that would require structural repair at this time. Several metal components on the inlet tower have been replaced and/or painted. The metal tailpipe section of the outlet conduit has also been replaced. The conduit appears to be in excellent condition. As a result, the potential failure of the existing dam due to deteriorating components is judged to be low. However, due to the age of the existing structural components, FRS No. 6 should continue to be monitored annually and after significant storm events.

CONSEQUENCES OF DAM FAILURE

All of the structural components of the dam are in very good condition. However, the dam does not meet current safety standards for a dam in this location, and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that a storm of PMP magnitude would overtop the dam. The risk of dam failure is low, but the consequences of such a failure, if it were to occur, would likely be catastrophic.

Twelve residences and four commercial properties downstream of the dam as well as about 300 motorists would be at-risk in the event of a breach, resulting in about 340 people being subjected to the risk of loss of life. Given the estimated depth combined with the velocity of the breach floodwaters, there could be many other people (especially motorists) at risk of serious injuries.

If the dam fails, Loop 106 would be overtopped by approximately seven feet (Table C). U.S. Highway 87, which is a four lane highway containing two separate crossings, would also be overtopped by about seven feet of floodwaters. And, FM 1628 would be overtopped by about 11 feet of floodwaters. Given the depth and velocity of the floodwaters, it is estimated that all four crossings would be destroyed as a result of a breach. Vehicles on the three highways would be washed downstream, and the road surfaces would be damaged and impassable. Traffic would be disrupted for an extended time while the roadways were being repaired.

Table C shows the effects of a breach of FRS No. 6 on downstream properties and crossings.

| Downstream Properties/Crossings | Depth Above First Floor Elevation (ft) | Depth Over X-ing (ft) | Daily Traffic Count (#) | Maximum Velocity ^{1/} |
|--|---|------------------------------|--------------------------------|---------------------------------------|
| 12 Residences Total | – | – | – | – |
| 2 Houses | 1 – 3 | | | |
| 2 Houses, 2 Mobile Homes | 3 – 6 | | | |
| 5 Houses, 1 Mobile Home | > 9 | | | |
| 4 Commercial Properties | 2 – 9 | – | – | – |
| Loop 106 | – | 7 | 950 | 4 |
| U.S. Highway 87 | – | 7 | 15,050 | 7 |
| FM 1628 | – | 11 | 4,200 | 6 |

^{1/} Maximum velocity for identified crossing in feet per second.

Total damages from a catastrophic breach of FRS No. 6 are estimated to be \$1.1 million for residential and commercial properties (includes contents), \$1.5 million for all road crossings, \$45,000 for affected agricultural lands, and \$167,000 in traffic detour costs. As a result of a breach, approximately 12,500 cubic yards of fill material from the dam would move downstream, clogging stream channels and increasing flooding on roads and bridges.



FM Road 1628 (Stuart Road) Crossing approximately 5,000 feet downstream of FRS No. 6 would be completely submerged by floodwater to a depth of approximately 11 feet by a failure of the dam (flood depth approximated by tip of yellow arrow). 2007 Texas Department of Transportation average daily traffic count for FM 1628 was 4,200 vehicles.



This home, approximately 0.5 miles downstream of FRS No. 6, could have floodwaters reach into the second floor (10 feet deep above the ground floor elevation) if the dam were to breach. Potential flood depth approximated by the tip of yellow arrow.



U.S. Highway 87, approximately 0.7 miles downstream of FRS No. 6, could have floodwaters reach 7 feet deep if the dam were to breach. A breach of FRS No. 6 would submerge the crossing up to the tip of the yellow arrow. 2007 average daily traffic count by TxDOT was 15,050.



Creek crossing on Loop 106 approximately 0.5 miles downstream of FRS No. 6. A breach of FRS No. 6 would submerge the crossing a maximum of 7 feet (approximated by tip of yellow arrow). 2007 average daily traffic count by TxDOT for this section of road was 950.

ALTERNATIVES

FORMULATION PROCESS

A 50-year evaluated life was established as well as a 50-year period of analysis. All alternatives were planned to function for a minimum of 50-years with proper maintenance. Alternatives are eligible for financial assistance under the Watershed Protection and Flood Prevention Act (PL 83-566) as amended by the Watershed Rehabilitation Amendments of 2000 (Public Law 106-472). To be eligible for federal assistance, an alternative must meet the requirements as contained in the Watershed Rehabilitation Amendments of 2000.

The Future Without Project alternative serves as a baseline to evaluate the other alternatives. It depicts the most probable future conditions in the absence of a federally assisted project. SARA is the entity that owns the easements for the dam, and is responsible for determining what action to take if the dam is not brought up to current performance and safety standards.

Based on conditions set forth by the Future Without Project baseline, present conditions were developed. The dam does not meet current safety standards for a dam in this location, and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that the PMP would overtop the dam. Appendix C shows the area that will be flooded if the dam breached under fair weather conditions.

Failure of the dam would result in significant damage and risk of loss of life. SARA considered the following options in deciding the most likely course of action:

- Modify the dam to comply with current safety standards with Federal assistance.
- Modify the dam to comply with current safety standards without Federal assistance.
- Take no action and accept the risk of the dam failing sometime in the future.
- Breach the dam to eliminate the risk of failure from a catastrophic storm event.

After considering the options, SARA decided that their best option in the absence of Federal assistance is to breach the dam and eliminate the risk of the damages from a failure. Accepting the risk of the dam failure was deemed unacceptable, and no entity was identified which would accept the responsibility of the present dam.

Alternatives eligible for financial assistance under The Watershed Protection and Flood Prevention Act (PL 83-566) as amended by the Watershed Rehabilitation Amendments of 2000 and alternatives ineligible for financial assistance were developed. To be eligible for federal assistance, an alternative must meet the requirement as contained in Public Law 106-472.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

A wide range of non-structural and structural measures were considered singly and in combination as alternatives were formulated. Non-structural measures included flood plain management, liability insurance, zoning, flood warning systems, flood proofing of properties, and installation of storm water detention structures. These non-structural alternatives were either cost prohibitive or did not meet the purpose of the project.

Another non-structural alternative considered but rejected as economically infeasible included the purchase of deed restrictions of all land outside of the current 100-year floodplain but within the breach area, relocating residences within the breach area, and modifying FM 1628 so that the 100-year flood would not overtop the roadway. The estimated cost of this alternative (\$3.6 million) was based on complying with all of the policies and procedures of the NRCS and the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq. as implemented by 7 C.F.R. Part 21), and ensuring that traffic along FM 1628 would not be in peril. Even subtracting the modification cost of FM 1628 (which would not have been eligible for cost-share under the Rehabilitation program), this alternative would still have been economically infeasible due to excessive cost of relocation and deed restrictions (about \$2.1 million).

Several structural measures were considered but eliminated from detailed study. These included decommissioning of the dam by total removal of the embankment, raising the dam with a concrete parapet wall, raising the dam and installing a roller compacted concrete (RCC) spillway on top of the dam, and installing a 54 inch diameter principal spillway pipe in lieu of a 36 inch pipe.

Decommissioning of the dam by total removal of the embankment was eliminated due to cost considerations. Raising the dam with a concrete parapet wall was eliminated due to cost and possible problems with the strength of existing fill within the dam. Project costs associated with raising the top of the dam and installing an RCC spillway on top of the dam would far outweigh benefits from this alternative. And, besides being more expensive, the 54 inch diameter principal spillway pipe would cause induced flooding downstream, particularly by overtopping FM 1628 during low frequency storm events.

DESCRIPTION OF ALTERNATIVE PLANS

The following is a description of the alternative plans that were developed:

Alternative No. 1 – No Action or Future Without Project

Under this alternative, no additional federal funds would be expended on the project. This alternative consists of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event with no influence on the water surface profile. This breach would be a minimum size opening in the dam from top of dam down to the valley floor, which would eliminate the structure's ability to store water. The principal spillway components would also be removed to eliminate potential injury to visitors from adjacent neighborhoods. Downstream flooding conditions would be similar to those that existed prior to the construction of the dam. This course of action would minimize the sponsor's dam safety liability but would not eliminate all liability. The excavated material (about 17,500 cu yd) would be placed in the present easement area. The remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area.

Since the 100-year floodplain would be enlarged from 51 acres to 137 acres (about 168%) due to the absence of flood protection, potential future downstream development would be restricted. Although floodwaters from a 100-year storm event would not overtop Loop 106 or U.S. Highway 87, FM 1628 would be overtopped by about 5.1 feet. And, eight residences would also flood, with several at a depth of nearly 6 feet. The estimated cost of this alternative is \$693,800.

Alternative No. 2 - Decommission FRS No. 6

This alternative removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Although complete removal of the embankment is sometimes required for decommissioning, a partial removal of the embankment would take place. Partial removal of the embankment would consist of excavating a breach in the dam of sufficient size to safely pass the 100-year, 24-hour frequency flood event with no influence on the water surface profile. This would eliminate the structure's ability to store water. Downstream flooding conditions would be similar to those described for Alternative No. 1.

The remaining portion of the embankment and land currently covered by the sediment pool would be maintained as a greenbelt area. Excavated material (about 17,500 cu yd) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (about 10 acres). Channel work would be performed to reconnect the stream channel through the sediment pool. Riparian vegetation would be established along the stream channel (about 3 acres). A grade stabilization structure (GSS) would be installed to prevent head cutting and movement of sediment to downstream areas.

In order not to impede flows through the breached embankment, the principal spillway components would be removed. Removal of the components would also insure that people would not be subject to injury by climbing on or around the exposed components. The estimated cost of this alternative is \$1,145,000.

Alternative No. 3 – Rehabilitation of FRS No. 6

This alternative consists of removing the existing two-stage principal spillway and components, installing a new standard drop inlet type principal spillway with a 36 inch pipe, and installing an impact basin to replace the existing plunge pool. The new principal spillway crest elevation will be lowered by 6.0 feet. The crest elevation of both existing auxiliary spillways would be unchanged; however both auxiliary spillways will be widened 55 feet to accommodate the installation of splitter dikes, and the exit sections of both spillways will be realigned, reshaped and extended. The top of the dam would be raised by 2.0 feet with earth fill. The back slope would be extended and flattened to a 3:1 slope, and new toe drain system would be installed along the back toe of the embankment. All disturbed areas would be re-vegetated to adapted species. Modifications to FRS No. 6 would insure compliance with current safety and performance standards. The evaluated life of the structure would be extended for an additional 50 years. The 100-year floodplain downstream of FRS No. 6 would be unchanged. The level of flood protection would increase from 45-year (2.2% frequency) to 80-year (1.2% frequency). The dam would continue to provide flood damage reduction benefits downstream. Estimated cost is \$1,821,900.

For water and related land resources implementation studies, standards and procedures have been established in formulating alternative plans. These standards and procedures are found in "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G)". According to P&G, an alternative that reasonably maximizes net national economic development benefits is to be formulated. This alternative is to be identified as the national economic development (NED) plan. During the process of formulating alternatives, the NED alternative was determined to be one of the three alternatives listed above.

COMPARSION OF ALTERNATIVES

Table D compares effects of each of the alternatives.

| <i>Table D – Comparison of Effects of Alternatives</i> | | | |
|--|--|--|---|
| Resource Concerns | Alternative No. 1 Future Without Project | Alternative No. 2 Decommission FRS No. 6 | Alternative No. 3 Rehabilitation of FRS No. 6 |
| NED Account ¹ | | | |
| Project Investment | \$693,800 | \$1,145,000 | \$1,821,900 |
| Annual Benefits | \$0 | \$35,800 | \$107,700 |
| Annual Costs | \$0 | \$60,100 | \$104,100 |
| Net Benefits | \$0 | (\$24,300) | \$3,600 |
| EQ Account ² | | | |
| Wetlands | None present | None present | None present |
| Prime Farm Lands | None present | None present | None present |
| Water Quality | Increased sediment loads would occur downstream. | Efforts would be made to stabilize existing sediment and to prevent headcutting. | Impacts would be of a temporary nature during construction in accordance with state laws. |
| Water Quantity | Loss of sediment pool | Loss of sediment pool | Maintain sediment pool at reduced size of 5.5 acres. |
| Sedimentation and Erosion | Minor erosion during construction. Sediment pool converted to open area. | Minor erosion during construction. Sediment pool converted to open area. | Minor erosion during construction. 18 acres disturbed during construction. |
| Air Quality | Minor adverse during construction. | Minor adverse during construction | Minor adverse during construction. |
| Fish and Wildlife Habitat | Conversion of 8.7 acres of intermittent shallow and deep water habitat to riverine habitat without improved riparian zone or floodplain. | Conversion of 8.7 acres of intermittent shallow and deep water habitat to riverine habitat with improved riparian zone and floodplain. | Fish and wildlife habitat maintained. |
| Threatened & Endangered Species | No effect | No effect | No Effect |
| RED Account ³ | | | |
| Land Values | Minimal effect. | Minimal effect. | No Effect |
| OSE Account ⁴ | | | |
| Aesthetics | Area covered by sediment pool would be maintained as a greenbelt area. | Area covered by sediment pool would be maintained as a greenbelt area. | Total of 18 acres affected by construction activities and would be reseeded. |
| Dam Safety | Threat of dam failure would be removed. | Threat of dam failure would be removed. | Threat of dam failure is reduced. |
| Flood Damages | Downstream flood damages would increase. | Downstream flood damages would increase. | Continued protection from flooding. |
| Human Health and Safety | Reduced threat to loss of life. More frequent flooding. | Reduced threat to loss of life. More frequent flooding. | Reduced threat to loss of life. Increased flood protection. |
| Recreation | N/A | N/A | N/A |
| Cultural Resources | Potential effect if cultural resources present | Potential effect if cultural resources present | No effect |
| Environmental Justice | Minority property owners would experience greater flood damages. | Minority property owners would experience greater flood damages. | No effect |

¹ NED – National Economic Development: SLO would incur \$693,800 cost in the absence of federal action. This annualized cost (\$35,800) is included instead as a benefit for Alternatives 2 and 3 since it would not be incurred if any alternative except number one were adopted.

² EQ – Environmental Quality

³ RED – Regional Economic Development

⁴ OSE – Other Social Effects

Table E compares the monetary effects and associated impacts of the alternatives.

| Item | Alternative No. 1 Future Without Project | Alternative No. 2 Decommission FRS No. 6 | | Alternative No. 3 Rehabilitation of FRS No. 5 | |
|--|--|--|-----------------------|---|-----------------------|
| | Benefits | Benefits | Change in Benefits | Benefits | Change in Benefits |
| Flood Damage Reduction Benefits | \$0 | \$0 | \$0 | \$70,100 | \$70,100 |
| Avoidance of Flood Insurance Administration Costs | \$0 | \$0 | \$0 | \$1,800 | \$1,800 |
| Avoidance of Cost of Sponsor's Breach | \$0 | \$35,800 | \$35,800 | \$35,800 | \$35,800 |
| Total | \$0 | \$35,800 | \$35,800 | \$107,700 | \$107,700 |

^{1/} All numbers reflect 2008 prices.

ENVIRONMENTAL CONSEQUENCES

The following is a description of the effects that each alternative would have on the economic, social, environmental, and cultural concerns identified during the scoping process determined to be significant to decision making. The present conditions are described to provide a better understanding of the effects.

DAM SAFETY

- **Present Conditions** – The dam does not meet current safety standards for a dam in this location and there is a risk of the dam failing from overtopping. An analysis of the dam indicated that a storm of PMP magnitude would overtop the dam. The risk of dam failure is low but the consequences of such a failure if it were to occur would likely be catastrophic. A breach study was made to determine the effects of a one time catastrophic breach of the existing dam. The breach of the existing dam was considered to be overtopping of the dam with a breach as wide as the maximum height of the dam. The flow from the breach would overtop Loop 106, U.S. Highway 87, and FM 1628 by 7 feet, 7 feet, and 11 feet respectively. Although breach floodwaters would cause major damages immediately downstream, adverse effects to Calaveras Lake (specifically increased water volume and sedimentation) would be negligible.
- **Alternative No. 1** - The threat of the dam failing would be removed through a controlled breach of the dam thereby eliminating any concern for dam safety. The 100-year floodplain would be enlarged due to the absence of flood protection.
- **Alternative No. 2** - The threat of the dam failing would be removed by decommissioning the dam and removing a portion of the embankment by a controlled breach. Other conditions as described in Alternative No. 1 would apply.
- **Alternative No. 3** - The risk of the dam failing from overtopping would be reduced by raising the effective height of the dam and installing a new principal spillway thereby reducing the threat of a catastrophic breach.

HUMAN HEALTH & SAFETY

- **Present Conditions** – Although the dam is structurally safe, there is a threat of failure from overtopping by the occurrence of a PMP storm. There is a significant threat to human life and safety from dam failure. Twelve residences and 3 heavily traveled roadways downstream of FRS No. 6 would be affected by a breach, endangering 340 people.
- **Alternative No. 1** - No threat from failure. However, potential threat from flooding would increase, endangering residents in 8 homes, and motorists.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Threat to human life and safety from a dam failure would be reduced. Flood protection would continue for residents and motorists downstream of FRS No. 6.

FLOOD DAMAGES

- **Present Conditions** – The current dam provides complete protection from the 45-year, 24-hour event storm. However, damages from storms greater than this would continue.
- **Alternative No. 1** - Downstream flooding and damages to property and infrastructure would increase. Bexar County would incur additional costs from repairing increased flood damages to FM 1628 downstream of FRS No. 6. The limits of the 100-year floodplain would increase.

- **Alternative No. 2** - Same as Alternative No. 1
- **Alternative No. 3** - There would be continued protection from flooding. Threat of a catastrophic breach would be reduced due to FRS No. 6's ability to sustain the PMP storm without overtopping the dam. The level of flood protection would increase from 45-year (2.2% frequency) to 80-year (1.2% frequency).

THREATENED AND ENDANGERED (T&E) SPECIES

- **Present Conditions** - Current habitat is composed of an approximately 8.7-acre intermittent open water sediment pool and low quality rangeland with invading brush species. There are no species federally or state listed as threatened or endangered or suitable habitat for listed species in or close to the proposed project site.
- **Alternative No. 1** - No Effect.
- **Alternative No. 2** - No Effect.
- **Alternative No. 3** - No Effect.

CULTURAL AND HISTORIC RESOURCES

- **Present Conditions** – No known cultural resources are being affected.
- **Alternative 1** - There would be potential to affect cultural resources (should any be present) in areas where earth fill from dam is placed and in areas of any necessary modifications to infrastructure downstream.
- **Alternative 2** - There would be potential to affect cultural resources (should any be present) in previously undisturbed areas where earth fill from dam is placed and in areas of any necessary modifications to infrastructure downstream.
- **Alternative 3** - NRCS has conducted a cultural resources survey of the proposed rehabilitation work areas and no known cultural resources eligible for the NRHP would be affected by this alternative. In the event of a discovery of a potentially eligible cultural resource during construction, all work would cease until a cultural resource specialist evaluates the site and recommends a course of action to be followed.

PRIME FARMLANDS

- **Present Conditions** – There are no acres of prime farmland located in the proposed project work area or located downstream in the project area. The Farmland Protection Policy Act (FPPA) of 1981, as amended, states in 7 CFR 658.2 “farmland does not include land already in or committed to urban development or water storage”.
- **Alternative 1** – No Effect.
- **Alternative 2** – No Effect.
- **Alternative 3** – No Effect.

WETLANDS

- **Present Conditions** - The sediment pool for FRS No. 6 is composed of an 8.7-acre lacustrine (Cowardin Classification) wetland system with intermittent deep water and shallow water habitats. Stream channels above FRS No. 6 are ephemeral. There are no areas that meet the definition of a wetland under the Clean Water Act in the project area.
- **Alternative No. 1** - This alternative would convert the 8.7-acre sediment pool to an ephemeral stream with limited riparian zone and upland grassland. The upland grassland would most likely be used for grazing cattle or, if abandoned, converted to a mesquite stand due to the heavily established mesquite presently on the project site. Without FRS No. 6 in place, the increased flows due to development upstream would cause the ephemeral stream to incise, and the increased sediment loads would increase aggradation

downstream.

- **Alternative No. 2** - This alternative would convert the 8.7-acre sediment pool to an ephemeral stream with adjacent riparian zone and upland grassland. Reshaping the ephemeral channel and establishing riparian vegetation would help stabilize banks and reduce erosion. The installation of a GSS would reduce incising, prevent head cuts from moving upstream, and reduce aggradation downstream. The upland grassland, without constant maintenance, would most likely convert to a mesquite stand.
- **Alternative No. 3** - The 8.7-acre sediment pool would be temporarily impacted due to construction activities. The sediment pool would be temporarily impacted to install the new principal spillway inlet structure, outlet pipe and impact basin and to make needed modifications to the dam. Downstream turbidity might be temporarily increased during the construction period. The sediment pool would be reduced in size by 3.2 acres due to lowering the principal spillway inlet.

AIR QUALITY

- **Present Conditions** - No air quality problems have been specifically identified.
- **Alternative No. 1** - Impacts would be of a temporary nature associated with earthmoving and other construction activities. These conditions would only be present during construction activities and until the disturbed areas are re-vegetated. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - Same as Alternative No. 1.

WATER QUALITY

- **Present Conditions** - No water quality problems have been specifically identified. Data on the quality of runoff in the sediment pool is limited. Also, organic material and sediment deposited in the sediment pool affects the quality of the water.
- **Alternative No. 1** - Impacts would be of a temporary nature associated with earthmoving and other construction activities. Sediment in stream flow would be carried downstream. Increased flows due to the removal of FRS No. 6 would increase erosion and cause the stream to incise. Sediments and pollutants that are currently captured in the sediment pool would move downstream, increasing sediment loads and increasing aggradation downstream.
- **Alternative No. 2** - Same as Alternative No. 1 except to a lesser degree since re-vegetation and grade control measures are planned in the present sediment pool area.
- **Alternative No. 3** - Impacts would be of a temporary nature associated with earthmoving and other construction activities. These conditions would only be present during construction activities and until the disturbed areas are re-vegetated. The Stormwater Pollution Prevention Plan (SWPPP) required under the Texas Pollutant Discharge Elimination System (TPDES) and the Texas Commission on Environmental Quality (TCEQ) Storm Water Construction General Permit would minimize any degradation of water quality during construction.

WATER QUANTITY

- **Present Conditions** – Chupaderas Creek on which FRS No. 6 is constructed is an ephemeral stream. The amount of water contained in the sediment pool area of FRS No. 6 is dependent on rainfall and runoff.
- **Alternative No. 1** – During storm events, flood flows would move downstream adding to volume and peaks as it moves, thus increasing the floodplain to conditions existing prior

to construction of the dam.

- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** - During construction the sediment pool would be ineffective for a period of 2 to 3 months while the new principal spillway and outlet pipe are being installed. This condition would only be present until the lowest gated port in the principal spillway is closed following construction.

AESTHETICS

- **Present Conditions** – FRS No. 6's sediment pool (8.7 surface acres at ported elevation of 530.8) does not provide a consistent water supply, thus aesthetic value is minimal.
- **Alternative No. 1** – This alternative would leave a significant portion of the embankment in place. The material (about 17,500 cu yd) would be placed in the present easement area. The remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area.
- **Alternative No. 2** - This alternative would leave a significant portion of the embankment in place. Excavated material (about 17,500 cu yd) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (about 10 acres). The remaining portion of the embankment and land currently covered by the sediment pool would be maintained as a greenbelt area. Riparian vegetation would be established along the stream channel (about 3 acres). Channel work would be installed to reconnect the stream channel through the sediment pool.
- **Alternative No. 3** - About 18 acres would be affected by construction activities and would require reseeding to adapted native or introduced species following construction. Conditions following rehabilitation would be very similar to current conditions.

SEDIMENTATION

- **Present Conditions** – Sediment capacity of the reservoir was surveyed in 2009 and the report indicated that 69.7 acre-feet of capacity remains at or below elevation 534.0. The sediment contained in the sediment and detention areas of the structure has not been tested.
- **Alternative No. 1** - Current sediment deposits would be dislodged and transported downstream by the erosion process (headcutting created by breaching of FRS No. 6) until natural re-vegetation occurs. This process would continue until the incised ephemeral stream channel through the sediment deposit becomes stable.
- **Alternative No. 2** – Current sediment deposits would be stabilized with a GSS; however major flows would cause some sediment to be transported downstream.
- **Alternative No. 3** – Sediment volume of the structure would be provided for the next 50 plus years. Testing of the sediment would not be needed as it would not be disturbed during construction activities.

LAND VALUES

- **Present Conditions** – The project area is within the ETJ of San Antonio. Although population growth during the past 20 years or so has influenced land values positively in the watershed, values decreased a little in 2009 according to Bexar County Appraisal District.
- **Alternative No. 1** – Future development within the project area is projected to be minimal for the next 20 years or so. Therefore, potential future downstream development would be altered to account for the enlarged 100-year floodplain. Thus, land values could be negatively influenced.

- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – Same as Present conditions.

FISH AND WILDLIFE HABITAT

- **Present Conditions** – FRS No. 6 provides approximately 8.7 acres of intermittent deep water and shallow water habitat. There is increasing development on the east and south sides of FRS No. 6 adjacent to the auxiliary spillways. The majority of the land west of the lake adjacent to the detention pool is private undeveloped land used primarily for livestock grazing. The land cover is predominantly poor condition rangeland with a predominance of mesquite brush and low quality annual and perennial cool and warm season grasses and forbs. FRS No. 6 currently provides habitat for small mammals, neotropical songbirds, shore birds, and various water fowl during wet seasons. Various species of reptiles and amphibians also inhabit the project site.
- **Alternative No. 1** - This alternative would convert 8.7 acres of intermittent deep and shallow water habitats to an ephemeral stream with associated upland habitat. Breaching FRS No. 6 would adversely impact all species presently using the sediment pool due to increased erosion and downcutting in the stream. Aggradation would adversely impact fisheries downstream, and increased flows would adversely impact downstream riparian zones through erosion and lateral movement of the stream channel. The increase in open grassland would benefit seed eating species, small mammals such as rats and mice, and reptile species such as snakes and lizards. The open grassland would produce larger insect populations and therefore benefit insect eating species such as bobwhite quail, raccoons, and possum. The increase in open areas with prey species would benefit predator species such as raptors, coyote, and bobcat.
- **Alternative No. 2** - This alternative would have the same ultimate impacts as Alternative No. 1, but with stream channel shaping and planting of riparian vegetation, the habitats would function in less time and would be more stable than Alternative No. 1.
- **Alternative No. 3** - This alternative would have only minor temporary adverse impact to current wildlife habitat. Temporary turbidity due to the construction activities could impact fish and waterfowl habitat downstream during the construction period. After construction, the sediment pool would be reduced by 3.2 acres, but downstream flows during storm events would reach higher rates of flow more frequently and in a shorter time frame. A small area of mesquite trees would be cleared below the existing southwest auxiliary spillway to increase emergency flows. Most, if not all, of the land needed to widen the auxiliary spillways is currently in poor quality improved pastures. None of the large live oak trees located south of the structure will be cleared, and none of the large cottonwood trees located around the sediment pool will be cleared.

RECREATION

- **Present Conditions** – Due to the inconsistent water levels in the sediment pool, FRS No. 6 provides for very limited recreational opportunities, thus visitor-days and consequent benefits are estimated to be negligible.
- **Alternative No. 1** – As limited as they may be, any recreational opportunities for FRS No. 6 would be lost.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – Same as Present Conditions.

ENVIRONMENTAL JUSTICE

- **Present Conditions** – Based upon Bexar County demographics, it is estimated that 57%

of residents within the project area are Hispanic. Therefore, it is very likely that any minority property owners located downstream of FRS No. 6 benefit from flood protection.

- **Alternative No. 1** – Downstream minority property owners would be subject to increased flooding.
- **Alternative No. 2** - Same as Alternative No. 1.
- **Alternative No. 3** – Same as Present Conditions. In addition to continued flood protection, the threat to human life and safety from a dam failure would be reduced for minority property owners.

CUMULATIVE IMPACTS

The combined, incremental effects of human activity, referred to as cumulative impacts, are in some cases a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources and can result in the degradation of important resources. The assessment of cumulative impacts in National Environmental Policy Act (NEPA) documents is required by the Council of Environmental Quality (CEQ) regulations (1987). Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that is the focus of this cumulative impact analysis. As a result of the scoping process and discussions with resource agencies and interested groups; no cumulative impacts were identified for this project.

Outside actions in addition to those evaluated here are not known. Additional improvements (not already planned as part of Alternative No. 3) to the dam, sediment pool, and auxiliary spillway are not planned at this time. Any upstream development could affect hydrology or hydraulics, but development is unlikely. Although the project area is located both within the ETJ area of the City of San Antonio, it is not anticipated that Alternative No. 3 would adversely affect future development. To the contrary, it is projected that the rehabilitation of FRS No. 6 would allow any conceived future development (upstream and/or downstream) to be unimpeded. However, upstream/downstream land uses are anticipated to continue in both the short term and long term. As such, cumulative effects as a result of the Rehabilitation Alternative No.3 are not anticipated.

CONTROVERSY

There are no known areas of controversy.

RISK & UNCERTAINTY

The areas of risk and uncertainty associated with this project lie in the accuracy of estimating flood flows, flood elevations, cost estimates associated with each alternative, property values, the reliability of future projections, and the assessment of impacts on damages. The uncertainty of flood flows and water surface elevations has the potential for increased damages as new properties are converted from agricultural to residential and commercial use. It is possible these uncertainties could lead to increased risk to human life in the event of a dam breach. Hydrologic methods and computer modeling used in this analysis are consistent with the standards of practice at this time. However, the tributary is not gauged and no verification of storm flows is possible. Cost estimates were developed from available historic data. Factors discovered during actual design, notably the bearing capacity of the existing structure and availability of suitable material for construction could affect these estimates. The potential impacts for each alternative are estimated using techniques that relate potential damage to lost opportunity. However, these methods are in part based on professional judgment and actual experience could be different.

The SLO currently owns easements that meet minimum Public Law 83-566 requirements. However, these easements are at an elevation below top of dam. Although any future upstream development must adhere to current easement restrictions, there is the possibility of development below top of dam elevation. Such development could be at risk from flooding during events which exceed the elevation of upstream easements.

Within the context of this study effort, all alternatives were considered on a comparable basis. There does not appear to be any area that by using different procedures or making more intensive studies would have resulted in a different decision.

CONSULTATION & PUBLIC PARTICIPATION

PROJECT SPONSORS:

SLO of the Calaveras Creek Watershed project and of the FRS No. 6 rehabilitation project are SARA, Wilson County SWCD and the Alamo SWCD. SARA agreed to be the lead sponsor and to provide coordination of the project.

PLANNING TEAM:

An Interdisciplinary Planning Team provided for the “technical” administration of this project. Technical administration includes tasks pursuant to the NRCS nine-step planning process, and planning procedures outlined in the NRCS-National Planning Procedures Handbook. Some of the tasks undertaken by the Interdisciplinary Planning Team include but are not limited to: Preliminary Investigations, Hydrologic and Engineering Analysis, Reservoir Sedimentation Surveys, Economic Analysis, Evaluating Environmental Concerns, Formulating and Evaluating Alternatives, and Writing the Supplemental Plan/EA. Informal discussions amongst the planning team, SLO, NRCS, and landowners were conducted throughout the planning period.

A review of NEPA concerns was initiated early in the planning process by the planning team. Identified NEPA concerns were reviewed and documented.

An NRCS Archaeologist performed a cultural resources survey of the proposed project site. After consultation of the prepared report with the State Historic Preservation Officer, it was determined that no historic properties would be affected.

PUBLIC PARTICIPATION:

Integral to the planning process is the solicitation of public comments to identify, understand, and address the issues and concerns of the relevant agencies and the public. The SLO intent during the scoping process was to inform agencies and the public about the planning process and solicit their comments in order to identify issues and questions to consider when developing the Supplemental Watershed Plan and Environmental Assessment. During the scoping period, the SLO announced the commencement of the planning process through various means, invited written comments, and held a public scoping meeting. Opportunities for the public to participate in the planning process occurred at key milestones throughout the process.

An on-site scoping meeting was held on March 23, 24, and 25, 2009 and again on April 7 and 8, 2009 for field reconnaissance. USFWS and the TPWD furnished information concerning federally and state listed endangered and threatened species in Bexar County, Texas through their respective web sites. Environmental, cultural, and economic concerns were evaluated by NRCS personnel to determine effects of potential rehabilitation alternatives.

A public meeting was held on March 24, 2009 to explain the Watershed Rehabilitation Program and to discuss resource problems, issues, and concerns of local residents associated with the FRS No. 6 project area. Invitations to participate in the public meeting were made to potentially affected landowners and interested parties around and below FRS No. 6 and reservoir area. A power point presentation and handout material were utilized to provide information to the group.

Potential alternative solutions to bring the Calaveras Creek Watershed FRS No. 6 into compliance with current dam safety criteria were presented at the initial scoping committee meeting. A steering committee made up of local, interested individuals was formed. Comments and concerns were solicited from this committee during the planning process.

A second public meeting was held on June 17, 2009, to review the first draft of the Supplemental Plan and Environmental Assessment, summarize planning accomplishments, and present various structural and non-structural alternatives.

Comments on the Draft Supplemental Watershed Plan/Environmental Assessment were requested from the following federal, state, and local agencies and organizations. Response letters and disposition of comments are located in Appendix B.

Governor - State of Texas
Texas Office of State-Federal Relations (State Single Point of Contact)
Texas State Soil and Water Conservation Board
Texas Commission on Environmental Quality
Texas Parks & Wildlife Department
Texas Water Development Board
Texas AgriLife Research
Texas Historical Commission
US Army Corps of Engineers, Ft. Worth District
USDI-Bureau of Reclamation
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
USDA-Forest Service
USDA-Farm Service Agency
Bexar County Commissioners Court
Wilson County Soil and Water Conservation District
Alamo Soil and Water Conservation District
Local Steering Committee members
San Antonio River Authority

PROVISIONS OF THE PREFERRED ALTERNATIVE

PREFERRED ALTERNATIVE

Alternative No. 3 is the preferred alternative. The dam would be modified to meet current performance and safety standards for a high hazard dam and the service life of FRS No. 6 would be extended for an additional 50 years. The modification would consist of rehabilitation of FRS No. 6 by removing the existing two-stage principal spillway and components, installing a new standard drop inlet type principal spillway with a 36 inch pipe, and installing an impact basin to replace the existing plunge pool. The new principal spillway crest will be lowered by 6.0 feet. The crest elevation of both existing auxiliary spillways would be unchanged; however both auxiliary spillways will be widened 55 feet to accommodate the installation of splitter dikes, and the exit sections of both spillways will be realigned, reshaped and extended. The top of the dam would be raised by 2.0 feet with earth fill. The back slope would be extended and flattened to a 3:1 slope, and a new toe drain system would be installed along the back toe of the embankment. Estimated cost is \$1,821,900.

Construction activities would result in the disturbance of approximately 18 acres. The removal of vegetation would only be that necessary to allow rehabilitation of the structure. Disturbed areas would be reestablished to adapted vegetation to reduce erosion. Invasive species (if present) will be managed so that compliance with *Executive Order 13112 of February 3, 1999 – Invasive Species* will be met.”

The SLO will develop an Emergency Action Plan (EAP) before any rehabilitation construction activities begin stating the responsibilities for the development, implementation and review of actions necessary to provide safety to individuals downstream of the structure should extreme flooding occur.

RATIONALE FOR ALTERNATIVE PREFERENCE

Alternative plans were formulated as required by NRCS policy and “Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies” (P&G) (USWRC, 1983). According to P&G, an alternative that reasonably maximizes net national economic development benefits is to be formulated. This alternative is to be identified as the National Economic Development (NED) Plan. Alternative No. 3 (Rehabilitation of FRS No. 6) is the NED plan.

Alternative plans were formulated in consideration of the purposes of the project and concerns expressed during the public scoping process. Formulation of the alternative plans gave consideration to four criteria: completeness, effectiveness, efficiency, and acceptability. Alternative Nos. 1, 2, and 3 all meet the criteria for completeness. Alternative Nos. 1 and 2 remove the safety hazard of the dam from failing but they do not address the primary problem of assuring that downstream flood protection would continue to be provided.

Alternative No. 3 is the preferred alternative. It meets the purpose and need to maintain the present level of flood control benefits and comply with current performance and safety standards. It also produces the highest net monetary benefits and a local sponsor has agreed to fund the local share of the cost.

PURPOSE

The purposes of the FRS No. 6 rehabilitation project are to maintain the present level of flood control benefits and comply with the current performance and safety standards.

MEASURES TO BE INSTALLED

The recommended plan consists of structural modifications to FRS No. 6 as follows:

- Raise top of dam elevation 2.0 feet to 557.9 by using earth fill.
- Remove old principal spillway and components and install a new principal spillway (standard drop inlet type) at elevation 528.0 and install an impact basin to replace the existing plunge pool. The new principal spillway crest elevation will be lowered by 6.0 feet.
- Extend the back slope and flatten to a 3:1 slope and install a new toe drain system along back toe of embankment.
- Widen both auxiliary spillways 55 feet to accommodate installation of splitter dikes and realign, reshape and extend the outlet section of both auxiliary spillways.

COMPARISON OF STRUCTURAL DATA

Table F shows comparison of structural data between original as-built and planned rehabilitation:

| <i>Table F Comparison of Structural Data</i> | | | | |
|--|-------------|------------------------------|---|-----------------------------|
| FRS No. 6 | Unit | As Built^{1/} | Existing Conditions^{2/} | Planned^{2/} |
| Surface Area (Principal Spillway Crest) | acres | 50.0 | 16.6 | 5.5 |
| Elevation, Top of Dam (effective) | ft MSL | 555.9 | 555.9 | 557.9 |
| Principal Spillway | Type | Std. drop inlet, 2 stage | Std. drop inlet, 2 stage | Std. drop inlet |
| Length of Dam | Ft. | 2,033 | 2,033 | 2,191 |
| Elevation, Principal Spillway Crest | ft MSL | 534.0 | 534.0 | 528.0 ^{4/} |
| Pipe Diameter, Principal Spillway | in | 19 | 19 | 36 |
| Auxiliary Spillways | type | Veg. | Veg. | Veg. |
| Elevation, Auxiliary Spillway | ft MSL | 550.5 | 550.5 | 550.5 |
| Bottom Width, Auxiliary Spillway (2-250') | Ft. | 500 | 500 | 500 w/splitter dikes |
| Submerged Sediment Storage | acre-feet | 340 | 69.7 | 12.1 ^{3/} |
| Sediment Reserve Below Riser | acre-feet | 200 | - | - |
| Aerated Sediment Storage | acre-feet | 66 | - | 0.8 |
| Flood Storage | acre-feet | 1,906 | 1,410.2 | 1,467 |
| Total Storage at Auxiliary Spillway Crest | acre-feet | 2,246 | 1,479.9 | 1,479.9 |

^{1/} As built data based on 1956 Record Drawings using National Geodetic Vertical Datum of 1929 (NGVD29). Capacities and surface areas in "As-Built" Drawings contain errors.

^{2/} Existing and Planned conditions data based on 2009 survey data using North American Vertical Datum of 1988 (NAVD88)

^{3/} 2.4 ac-ft needed for 50 yr. program life, 12.1 ac-ft available at elevation 528.0

^{4/} The crest elevation of the planned principal spillway is 6.0 feet lower than the original principal spillway crest.

PERMITS, COMPLIANCE AND REQUIREMENTS PRIOR TO CONSTRUCTION

Potential Permits Needed

Any discharge of dredged or fill material in a water of the US associated with rehabilitation of FRS No. 6 would require a Department of the Army permit under Section 404 of the Clean Water Act of 1972. It is likely that any such discharge would be authorized by a general permit such as Nationwide General Permit 3 for Maintenance without a Preconstruction Notification.

For projects with disturbances equal to or greater than five acres it is necessary to have a Stormwater Pollution Prevention Plan (SWPPP) in place at least 48 hours prior to and during construction of the proposed project and filing a Notice of Intent with the TCEQ is required. A Notice of Termination (NOT) must be filed once the site has reached final stabilization.

Compliance with Local, State, and Federal Laws

All applicable local, state, and federal laws will be complied with in the installation of this project. Construction activities will require a SWPPP. U.S. Army Corps of Engineers guidelines indicate that the project will require authorization under Section 404 of the Clean Water Act, and that the project will likely fall within the scope of an existing nationwide permit (NWP#3, Maintenance). Any applicable permits required by the U.S. Army Corps of Engineers will be obtained before any construction activities begin.

Efforts to identify cultural resources have been conducted in compliance with Section 106 and Section 110 (f) and (k) of the National Historic Preservation Act. No historic properties were identified in the areas of Alternative 3 and no known sites are recorded in the vicinity. Ensuing disturbances associated with rehabilitation measures will be monitored for the presence of undiscovered sites. In the event of such discovery, appropriate actions will be taken in accordance with the State Level Agreement among NRCS and the Texas State Historic Preservation Officer, the National Programmatic Agreement among NRCS, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, and NRCS General Manual 420, Part 401 guidance.

Operation and Maintenance Agreement

The project will be operated and maintained by the Sponsoring Local Organizations. SARA has the primary responsibilities for maintenance of FRS No. 6. A new Operation and Maintenance (O&M) Agreement will be developed with SARA and the Alamo SWCD for FRS No. 6 for the 50-year program life of the structure. The new O&M Agreement will be signed before the Project Agreement is signed. O&M activities include but are not limited to inspections, maintenance and repairs of the principal spillways, dam, vegetation and the auxiliary spillways. Based on data from SARA, it is estimated that O&M activities will cost about \$10,000 per year.

Memorandum of Understanding

SARA and NRCS have entered into a Memorandum of Understanding (MOU) to establish a framework under which the SARA may proceed with work on specific aspects of the proposed rehabilitation project. Accordingly, that specified work might then contribute towards the SLO 35 percent cost-share obligation.

Project Agreement

The Sponsoring Local Organization responsible for the 35 percent non-federal cost share (SARA) and the NRCS will enter into a Project Agreement in accordance with the National Contract Grants and Agreement Manual before any work is initiated by either SARA or the NRCS.

Emergency Action Plan

The Sponsoring Local Organizations will provide leadership in developing an Emergency Action Plan (EAP) prior to the commencement of construction and will review and update the EAP annually with local emergency response officials. NRCS will provide technical assistance in preparation and updating of the EAP. The breach inundation map and data will be the basis for potential areas to be affected and citizens to be notified. The purpose of the EAP is to identify areas at risk, outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of FRS No. 6. The NRCS State Conservationist will verify that an EAP has been prepared prior to commencement of construction activities.

COST, INSTALLATION AND FINANCING

The installation of the project will be financed jointly by SARA and the NRCS. NRCS will use funds appropriated for this purpose. The percentages of the eligible project costs to be paid by SARA and the NRCS are as follows:

| | <u>SARA</u> | <u>NRCS</u> | <u>Estimated Project Cost</u> |
|----------------------------|-------------|-------------|-------------------------------|
| Rehabilitation of FRS No.5 | 35 % | 65 % | \$1,508,800 |

SARA is responsible for a minimum of 35% of total eligible project costs (i.e. construction, project administration, land rights). SARA will bear the incurred cost of project administration and land rights and will be credited for these costs as in-kind services. If the sum of project administration and land rights costs are less than 35% of total eligible costs, then SARA will also bear part of the construction cost. However, if the sum of project administration and land rights costs exceeds 35% of total eligible project costs, then SARA will bear the overage.

An amount up to the percentage rate specified may be satisfied by SARA for cost of an element such as engineering, real property acquisition or construction. The decision to, and arrangements for, such action will be negotiated between SARA and NRCS and will be included in a project agreement executed immediately before implementation. NRCS costs will not exceed 100 percent of the construction cost.

NRCS is responsible for the engineering services and project administration costs (\$313,100) it incurs. However, these costs are not used in the calculation of the federal cost share. These costs are, however, included in the Estimated Installation Cost (Table 1, Appendix A). Also, costs of water, mineral and other resource rights, as well as federal, state and local permits are the responsibility of SARA and are not counted toward local cost share. See Table 2 in Appendix A for a complete distribution of total rehabilitation costs.

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| Tim Dybala, Civil Engineer, NRCS | B.S. Agricultural Engineering | 32 |
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The local steering committee provided invaluable information, local concerns, and reviews during the development of the environmental assessment.

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APPENDIX A

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Table 5 - Estimated Average Annual Flood Damage Reduction Benefits

Table 6 - Comparison of NED Benefits and Costs

APPENDIX A

Table 1 - Estimated Installation Cost
FRS No. 6
Calaveras Creek Watershed, Texas
(Dollars) ^{1/}

| Installation Cost Item | Unit | Number | Estimated Costs ^{2/} | | |
|-------------------------------|-------------|---------------|--------------------------------------|--------------------|--------------------|
| | | | Public Law 83-566 Funds | Other Funds | Total |
| Rehabilitation of FRS No. 6 | No. | 1 | \$1,293,800 | \$528,100 | \$1,821,900 |
| Total Project | | | \$1,293,800 | \$528,100 | \$1,821,900 |

September/2009

^{1/} 2008 Prices.

^{2/} Public Law 83-566 Funds include NRCS Engineering and Project Administration (\$313,100), which are not included when calculating eligible federal cost share. Therefore, federal cost share is based on Total Eligible Project Cost of \$1,508,800.

APPENDIX A

**Table 2 - Estimated Cost Distribution - Structural and Non-structural Measures
FRS No. 6
Calaveras Creek Watershed, Texas
(Dollars) ^{1/}**

| | Installation Cost – Public Law 83-566 ^{2/} | | | | Installation Cost – Other Funds | | | | | |
|-----------------------------|---|------------------|------------------------|--------------------|---------------------------------|-------------|----------------------|------------------------|------------------|-------------------------|
| | Construction | Engineering | Project Administration | Total PL 566 | Construction | Engineering | Real Property Rights | Project Administration | Total Other | Total Installation Cost |
| Rehabilitation of FRS No. 6 | \$980,700 | \$142,300 | \$170,800 | \$1,293,800 | \$442,500 | \$0 | \$50,000 | \$35,600 | \$528,100 | \$1,821,900 |
| GRAND TOTAL | \$980,700 | \$142,300 | \$170,800 | \$1,293,800 | \$442,500 | \$0 | \$50,000 | \$35,600 | \$528,100 | \$1,821,900 |

September/2009

^{1/} 2008 Prices.

^{2/} Federal Engineering and Project Administration costs (\$313,100) are not included when calculating eligible federal cost share. Therefore, federal cost share is based on Total Eligible Project Cost of \$1,508,800.

APPENDIX A

**Table 3 - Structural Data – Dams with Planned Storage Capacity
Calaveras Creek Watershed, Texas**

| Item | Unit | FRS No.6 |
|---|--------------------|--------------------------|
| Class of structure | | High |
| Seismic zone | | 0 |
| Location | dec. deg. | Lat. 29.38, Long. -98.29 |
| Uncontrolled drainage area | sq-mi | 7.13 |
| Runoff curve number (1-day) (Avg. AMC) | | 61 |
| Time of concentration (T _c) | Hrs | 2.00 |
| Elevation top of dam | ft | 557.9 |
| Elevation crest of auxiliary spillway | ft | 550.5 |
| Elevation crest principal spillway | ft | 528.0 |
| Elevation sediment pool | ft | 528.0 |
| Maximum height of dam | ft | 42.9 |
| Volume of fill | yd ³ | 78,480 ^{1/} |
| Total capacity (auxiliary spillway crest) | ac-ft | 1479.9 |
| Sediment pool | ac-ft | 12.1 |
| Aerated sediment | ac-ft | 0.8 |
| Floodwater retarding pool | ac-ft | 1467 |
| Surface area | | |
| Sediment pool | acres | 5.5 |
| Floodwater retarding pool | acres | 174.4 |
| Principal spillway | | |
| Rainfall volume (1-day) | in | 10.0 |
| Rainfall volume (10-day) | in | 16.1 |
| Runoff volume (10-day) | in | 6.55 |
| Type of conduit | | R/C pipe |
| Diameter | in | 36 |
| Capacity | ft ³ /s | 192 |
| Auxiliary spillway | | |
| Type | | Vegetated |
| Bottom width (2- 250') | ft | 500 |
| Exit slope | % | 3.5 |
| Frequency of operation | % chance | 1.25 ^{2/} |
| Auxiliary spillway hydrograph | | |
| Rainfall volume | in | 13.30 |
| Runoff volume | in | 7.85 |
| Storm duration | hrs | 6 |
| Velocity of flow (V _e) | ft/s | 7.5 |
| Maximum reservoir water surface elevation | ft | 553.0 |
| Freeboard hydrograph | | |
| Rainfall volume | in | 30.80 |
| Runoff volume | in | 24.27 |
| Storm duration | hrs | 6 |
| Maximum reservoir water surface elevation | ft | 557.9 |
| Storage capacity equivalents | | |
| Sediment volume | in | 0.03 |
| Floodwater retarding volume | in | 3.86 |

1/ Total volume of fill in dam 78,480 CY (includes additional 25,000 CY needed in rehabilitation project).

September/2009

2/ Variance granted by NHQ for less than 100 year protection.

APPENDIX A
Table 4 - Estimated Average Annual NED Costs
FRS No. 6
 Calaveras Creek Watershed, Texas
 (Dollars) ^{1/}

| Evaluation Unit | ----- Project Outlays ----- | | Total |
|------------------------|--|--|------------------|
| | Amortization of Installation Cost ^{2/} | Operation, Maintenance and Replacement Cost | |
| FRS No.6 | \$94,100 | \$10,000 | \$104,100 |
| Grand Total | \$94,100 | \$10,000 | \$104,100 |

September/2009

^{1/} Price base 2008

^{2/} Amortized for 50 years at 4.625 percent

APPENDIX A

Table 5 - Estimated Average Annual Flood Damage Reduction Benefits

FRS No. 6

Calaveras Creek Watershed, Texas

(Dollars)^{1/2/}

| Item | Estimated Average Annual Damages Without the Project^{3/} | Estimated Average Annual Damages With the Project^{3/} | Estimated Average Annual Benefits |
|---------------------|--|---|--|
| Floodwater | | | |
| Crop and Pasture | \$27,300 | \$23,000 | \$4,300 |
| Other Agricultural | \$81,400 | \$68,000 | \$13,400 |
| Road and Bridge | \$22,300 | \$2,200 | \$20,100 |
| Urban | \$28,100 | \$0 | \$28,100 |
| Subtotal | \$159,100 | \$93,200 | \$65,900 |
| Sediment | | | |
| Overbank Deposition | \$1,100 | \$900 | \$200 |
| Erosion | | | |
| Flood Plain Scour | \$25,200 | \$21,200 | \$4,000 |
| Grand Total | \$185,400 | \$115,300 | \$70,100 |

September/2009

^{1/} Price Base: 2008 prices.

^{2/} All figures reflect agriculture-related damages and benefits, including damages and benefits to rural communities.

^{3/} Original downstream damages updated using applicable indices and updated data. Damages and benefits will accrue from floods of greater magnitude than the 500-year frequency event, but these were not evaluated.

APPENDIX A
Table 6 - Comparison of NED Benefits and Costs
FRS No. 6
 Calaveras Creek Watershed, Texas
 (Dollars) ^{1/}

| Evaluation Unit | Average Annual Benefits | | | Average Annual Cost ^{3/} | Benefit/Cost Ratio | |
|--|-------------------------|--------------------------------|---|-----------------------------------|--------------------|---------------------------------------|
| | Agriculture -Related | Nonagricultural | | | | |
| | | Damage Reduction ^{2/} | Avoidance of Cost of Flood Insurance Administration | | | Avoidance of Cost of Sponsor's Breach |
| Rehabilitation of Floodwater Retarding Structure No. 6 | \$70,100 | \$1,800 | \$35,800 | \$107,700 | \$104,100 | 1.03:1.00 |

September/2009

^{1/} Price Base: 2008 prices

^{2/} From Table 5

^{3/} From Table 4

APPENDIX B

Letters and Oral Comments Received on Draft Supplemental Watershed Plan and Environmental Assessment

José Dodier, Jr., *Chairman*
Barry Mahler, *Vice Chairman*
Aubrey Russell, *Member*
Marty H. Graham, *Member*



Jerry D. Nichols, *Member*
Joe Ward, *Member*
Larry D. Jacobs, *Member*
Rex Isom, *Executive Director*

TEXAS STATE SOIL & WATER CONSERVATION BOARD

Protecting and Enhancing Natural Resources for Tomorrow

July 31, 2009

Donald W. Gohmert, State Conservationist
USDA-NRCS
101 South Main
Temple, Texas 76501

Re: Rehabilitation of FRS Site 6 Calavaras Creek Watershed

Dear Don:

We have reviewed the Draft Plan Supplement and Environmental Assessment for the proposed rehabilitation of Floodwater Retarding Structure No. 6 of the Calavaras Creek Watershed, Bexar County, Texas.

This project is essential to maintain the flood control benefits the structure currently provides and to comply with current performance and safety standards. We strongly support the project and commend the project sponsors and NRCS for implementing this rehabilitation effort.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard Egg", is written over the typed name.

Richard Egg
Engineer

cc:

Rex Isom
Steve Bednarz, NRCS
Steve Uselton, NRCS

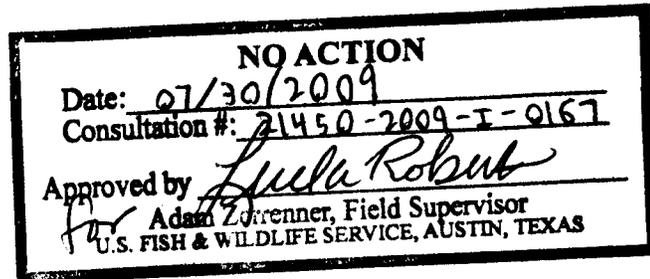


Natural Resources Conservation Service
101 South Main Street
Temple, Texas 76501

Pat
RCC
17
July
09
JC

June 19, 2009

Mr. Adam Zerrenner
Field Supervisor
U. S. Fish and Wildlife Service
Ecological Services
10711 Burnet Road, Suite 200
Austin, Texas 78758



Dear Mr. Zerrenner:

The USDA Natural Resources Conservation Service (NRCS), with assistance from local watershed sponsors, has completed a Draft Plan Supplement and Environmental Assessment (EA) for the proposed rehabilitation of Floodwater Retarding Structure (FRS) No. 6 of the Calaveras Creek Watershed, Bexar County, Texas. Calaveras Creek Watershed is located within the San Antonio River Basin. Sponsoring Local Organizations for the project are:

San Antonio River Authority
Alamo Soil and Water Conservation District
Wilson County Soil and Water Conservation District

The project is a federally-assisted action authorized by Section 14 of the Watershed Protection and Flood Prevention Act, 16 U.S.C.1012, as amended by Section 313 of Public Law 106-472. This section authorizes NRCS to provide technical and financial assistance to local sponsors for rehabilitation of aging dams constructed under the Watershed Protection and Flood Prevention Act (Public Law 83-566), the Flood Control Act of 1944 (Public Law 78-534), the Pilot Watershed Program, and the Resource Conservation and Development (RC&D) Program. The Draft Plan Supplement and Environmental Assessment is enclosed for your review and comment.

The purpose of this project is to maintain the present level of flood control benefits and comply with current performance and safety standards. There is a need to protect downstream life, properties, and infrastructures as well as reduce the risk of potential loss of life.

We are requesting that you review this project in accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969 (Public Law 91-190). Please submit your comments to this office on or before August 7, 2009. If your comments are not received by the due date, we will assume you do not wish to comment.

Helping People Help the Land

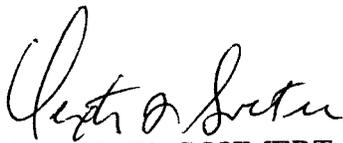
An Equal Opportunity Provider and Employer

AUG 27 2009

Page 2
June 19, 2009

For further information contact Steven Bednarz, Assistant State Conservationist (Water Resources) at 254-742-9871.

Sincerely,



DONALD W. GOHMERT
State Conservationist

Acting

Enclosure

Discussion and Disposition of Comments from letters received on the Draft Supplemental Watershed Plan and Environmental Assessment

Not all agencies and groups requested to comment on the Draft Supplemental Watershed Plan and Environmental Assessment submitted comments. The responding agencies and groups comments and the disposition of each are as follows:

Texas State Soil and Water Conservation Board

Comment: This project is essential to maintain the flood control benefits the structure currently provides and to comply with current performance and safety standards. We strongly support the project and commend the project sponsors and NRCS for implementing this rehabilitation effort.

Response: Noted

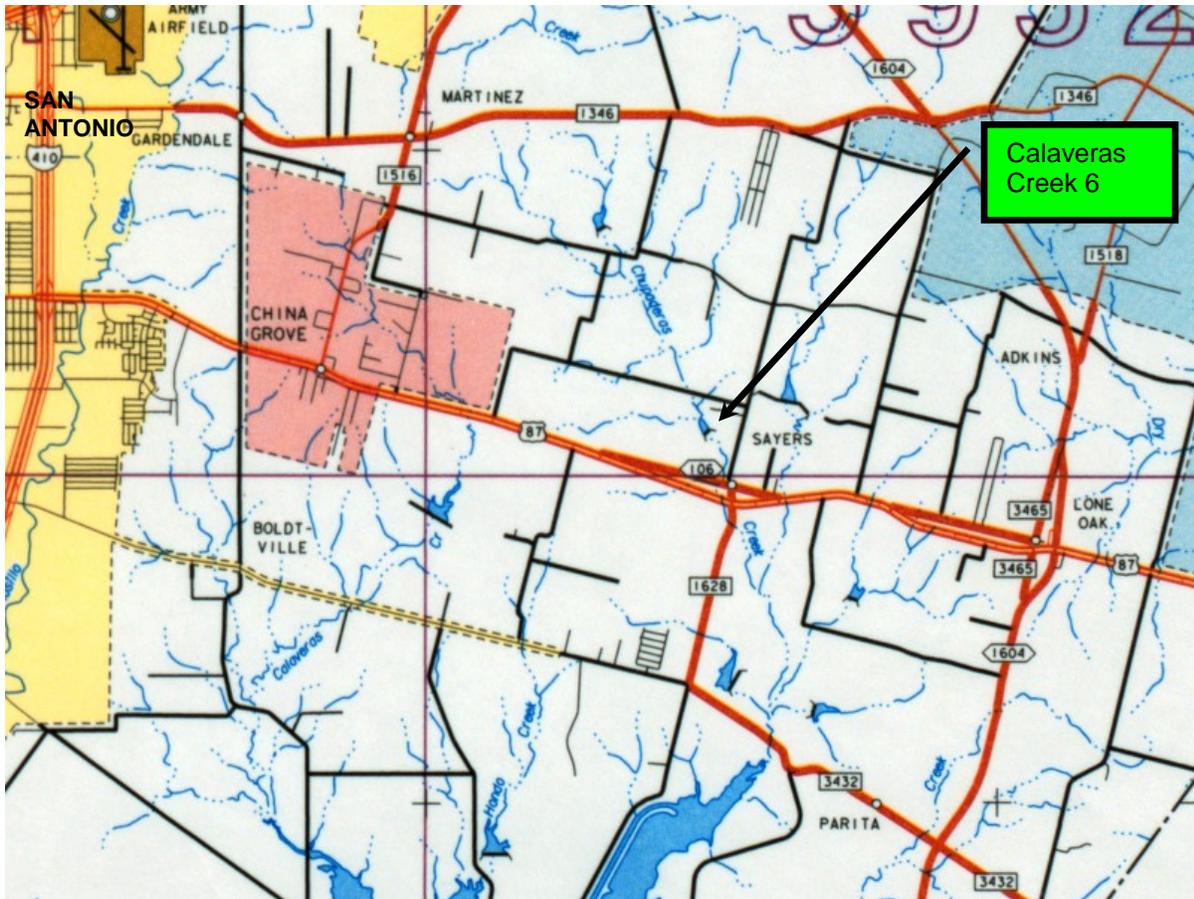
United States Fish and Wildlife Service

Comment: The agency submitted a “No Action” comment as a result of their review of the Draft Supplemental Watershed Plan and Environmental Assessment, meaning that no additional documentation or contact with their agency is necessary.

Response: Noted

APPENDIX C

VICINITY MAP



Vicinity Map – Calaveras Creek Watershed FRS 6 (From Texas Department of Transportation Map of Bexar County).

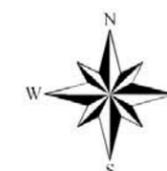


Calaveras Creek Watershed
Site 6
Bexar County, Texas

Breach Inundation Map

Legend

-  100-YR Floodplain
-  Limits of Breach Flood



Water Resources, Temple, Texas
May 2009

APPENDIX D

Investigation and Analysis

Table G displays the effects of the recommended plan on particular types of resources that are recognized by certain Federal policies.

| Table G - Effects of the Recommended Plan on Resources of National Recognition | | |
|---|--|--|
| Types of Resources | Principal Sources of National Recognition | Measurement of Effects |
| Air Quality | Clean Air Act, as amended (42 U.S.C. 7401 et seq.) | Minor temporary effect during construction |
| Areas of Particular Concern within the Coastal Zone | Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.) | Not present in planning area |
| Endangered & Threatened Species Critical Habitat | Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) | Not present in planning area |
| Fish & Wildlife Habitat | Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.) | Minor temporary effect during construction |
| Flood Plains | Executive Order 11988, Flood Plain Management | No Effect |
| Historical & Cultural Properties | National Historic Preservation Act of 1966, as amended (16 U.S.C. Sec. 470 et seq.) | Not present in planning area |
| Prime & Unique Farmland | CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act, Farmland Protection Policy Act of 1981. | Not present in planning area |
| Water Quality | Clean Water Act of 1977 (33 U.S.C. 1251 et seq.) | Minor temporary effect during construction |
| Wetlands | Executive Order 11990, Protection of Wetlands; Clean Water Act of 1977 (33 U.S.C. 1251 et seq.) Food Security Act of 1985 | No effect |
| Wild & Scenic Rivers | Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.) | Not present in planning area |

Economics:

In general, the NED benefits presented in this supplemental plan were developed based on Principles and Guidelines utilizing methods of (1) updating agricultural downstream benefits and sediment and erosion benefits; (2) updating rural community (urban area, road and bridge) flood reduction benefits; (3) avoiding flood insurance administration costs; and (4) saving the SLO the cost of a controlled breach.

For flood damage reduction agricultural benefits (including erosion and sediment), original damages with and without project were obtained from the 1954 work plan. Origins for these damages were compared with field notes of current land uses downstream of FRS No. 6. Extent of damages was adjusted due to changes in land use. Adjusted damages were updated using appropriate indices (prices paid by producers, prices received by producers, consumer price index, and construction cost index). The difference in damages with and without project results in benefits. Based on this analysis, updated flood damage reduction agricultural benefits (including erosion and sediment) were estimated to be \$21,900 annually.

There are 3 roadways (4 crossings – one roadway has 2 crossings) below FRS No. 6. According to the Texas Department of Transportation, the 2007 average daily traffic count for these roads (Loop 106, U.S. Highway 87, and FM 1628) was a total of 20,200 (950, 15,050, and 4,200 respectively). In the absence of the dam, floodwaters would only overtop FM 1628. Using current construction costs, floodwater damages were calculated with and without project. The damage reduction benefits were estimated to be \$20,100 annually.

Other benefits of the project were floodwater damage reduction benefits to the urban area located downstream of the dam. This area included 21 properties (15 residential, 2 public, and 4 commercial). The local tax appraisal district records were utilized in order to obtain values of properties (structures and land) that would possibly be affected by project activities. By utilizing the Urban Floodwater Damage Economic Evaluation (URB1) program, damages with and without project were calculated. Eight residential properties would incur floodwater damages under the Future Without Project (FWOP) Alternative. Alternative number three would reduce all flood damages within the urban area from the 100-year storm event. Therefore, average annual benefits would equal flood damages incurred, which amounted to \$28,100.

The cost of breaching the dam under the FWOP Alternative was considered a cost avoided benefit for the Decommissioning, and Rehabilitation Alternatives. A breach by the SLO of FRS No. 6 was estimated to cost \$693,800. Amortized over 50 years at 4.625%, annual cost is \$35,800, which equates to a cost savings (benefit).

The cost of acquiring flood insurance under the FWOP Alternative was considered a cost avoided by residents. For Alternative No. 3, eight properties which would be within the FWOP 100-year floodplain would not incur lower flood insurance costs. Therefore, Flood Insurance Program administrative expenses associated with each policy not purchased was claimed as a benefit. This additional cost was estimated to be \$1,800 annually for 8 policies. This also equates to a cost savings or benefit.

Summing the above-mentioned benefits equates to \$107,700. These annualized benefits are projected to occur over the period of analysis (50 years). Amortizing total installation costs (less federal engineering services and project administration) of \$1,508,800 at 4.625% interest over the 50-year period of analysis and allowing for annual operation and maintenance of \$10,000 produces annualized costs of \$104,100. Dividing benefits by costs results in a benefit:cost ratio of 1.03:1.00.

Hydrology:

Dam breach modeling performed for this project demonstrated that loss of life could occur as a result of dam failure and, as a result, the hazard classification for the dam is high hazard (class “c”). This classification requires that the dam meet two basic criteria:

- The 80-year, 10-day Principal Spillway Hydrograph (PSH) storm event will not overtop the auxiliary spillway crest (variance granted by NHQ during planning for less than 100 year protection); and
- The PMP does not overtop the dam.

The design to meet these criteria required determining event flow rates for the watersheds above and immediately below the structure. This was accomplished by the use of a TR-20 model. The dam hydraulic and hydrologic site computer analysis program SITES was used to develop

storage-discharge relationships, set the top of dam, auxiliary and principal spillway crests, and conduit dimensions for the FRS No. 6 rehabilitation alternatives. The two alternatives studied were the 6-hour PMP with a rainfall of 30.8 inches and the 24-hour rainfall, 5 point distribution of 45.0 inches. The 6-hour storm proved to be the most conservative design of the stability and integrity of the dam and auxiliary spillway. Simplified Dam Breach Routing Procedures (TR-66) were used to develop a breach hydrograph of FRS No. 6. Fair weather conditions were assumed to develop the breach hydrograph. The reservoir pool elevation was static at top of dam with non-storm conditions downstream. Event flow rates from the TR-20 model and the breach hydrograph were used in a previously developed HEC-RAS model of Calaveras Creek to define impacts and benefits associated with project alternatives. These models are available as part of the supporting documentation developed for this planning study.

The subtasks performed are summarized as follows:

- Assembly of existing relevant geographic information system (GIS) data into a project database;
- Delineation of the Calaveras Creek Dams and Calaveras Creek Watershed
- Estimation of rainfall depths for event and design storms
- Estimation of watershed time of concentration, T_c
- Estimation and calibration of watershed curve numbers
- Estimation of channel loss factors
- Use SITES program to evaluate FRS No. 6 rehabilitation alternatives
- Estimation of flow rates using the computer model TR-20
- Development of FRS No. 6 breach hydrograph
- Estimation of downstream water surface elevations using the computer model HEC-RAS

Engineering:

Engineering planning efforts were completed to meet the following rehabilitation project purposes:

- Maintain present level of flood control benefits.
- Comply with the current performance and safety standards.

The preferred alternative which best meets the purposes and need for the project is rehabilitation of the dam by construction of dam safety modifications developed to address dam safety deficiencies consistent with the dam's high hazard classification. Designed dam safety modifications include raising the dam 2.0 feet with earth fill, extending the back slope and flatten the back slope to a 3:1 slope, installing a new toe drain system, replacing the existing principal spillway inlet structure and conduit with a new inlet structure, 36 inch conduit and impact basin. Both of the auxiliary spillways will be widened by 55 feet to accommodate the installation of splitter dikes and the outlet sections will be realigned, reshaped and extended.

Engineering work items completed as part of the development of this planning study include:

- Gathering and reviewing existing site data.
- Identifying problems, opportunities, and concerns.
- Conducting planning studies, including:
 - Analyzing existing data
 - Conducting field investigations to evaluate the condition of existing structures and obtain additional data (e.g., survey and geotechnical data)
 - Developing topographic mapping for the watershed

- Conducting and assisting engineering, environmental, geologic, hydrologic, hydraulic, social, and economic analyses in accordance with the requirements of NRCS design criteria (e.g., national engineering handbook, technical releases, technical notes, design notes, SITES software, TR20 software)
- Developing design layouts and cost estimates for evaluation of design alternatives including:
 - No Action or Future Without Project
 - Decommission of dam
 - Rehabilitation of dam:
 - Raising top of dam
 - Increasing principal spillway capacity
 - Upgrading auxiliary spillway
- Developing inundation maps for impact comparisons associated with the proposed design modifications.
- Providing public involvement support services, including coordinating with local NRCS offices, site landowners, SLO, and the public; preparing presentations to the public; and attending public meetings.
- Preparing a Supplemental Watershed Plan and Environmental Assessment for the project SLO.

Environmental – Wetlands and Fish/Wildlife Habitat:

During the planning process, an evaluation was undertaken to determine what effects or consequences the selected alternatives would have on the environment. NRCS biologists, environmental coordinators and hydraulic engineers conducted multiple field reviews and determined that best professional judgment was appropriate to make fish and wildlife habitat determinations.

The pool area of FRS No. 6 is an 8.7-acre intermittent lacustrine system that does not hold water due to a sand layer that runs beneath the sediment pool. Backhoe trenches greater than four feet deep showed no free water in the trench and no saturated soils at the bottom of the trenches. The existing intermittent sediment pool does not have sufficient duration to serve as a warm water fishery, and does not have the hydrology necessary to meet the definition of a wetland under the Clean Water Act of 1972.

NRCS hydraulic engineers determined that the downstream low water crossing on FM 1628 is currently overtopped by flows from storm events classified as 5 year events or greater. Neither of the other two road crossings currently overtop from storm events up to and exceeding a 100 year event. If Calaveras Creek FRS No. 6 were removed, flows from the one-year event and greater would overtop FM 1628. For these reasons, NRCS biologists determined that:

- Increased flows from Alternatives 1 and 2 would overtop FM 1628 and would flow out of banks during minor storm events causing erosion in the area downstream of the existing structure, creating a braided stream system in this area, and adding to downstream aggradation due to the increased erosion,
- Alternatives 1 and 2 would convert all open water habitat to ephemeral riverine habitat,

- While Alternative 3 increases flows over existing conditions for storm events exceeding a 25 year event, flows from storm events less than 25 year events would be less than present conditions and would remain in the current channel,
- Alternative 3 would have only minor temporary adverse impacts to existing fish and wildlife habitats,
- Through conducting field investigations, no threatened or endangered species or suitable habitat for threatened or endangered species is present on the project site.

APPENDIX E

Consultation and Public Scoping Process

Summary of Consultation and Public Scoping Process

Integral to the planning process is the solicitation of public comments to identify, understand, and address the issues and concerns of the relevant agencies and the public. The SLO intent during the scoping process was to inform agencies and the public about the planning process and solicit their comments in order to identify issues and questions to consider when developing the Supplemental Watershed Plan and Environmental Assessment. During the scoping period, the SLO announced the commencement of the planning process through various means, invited written comments, and held a public scoping meeting. Opportunities for the public to participate in the planning process occurred at key milestones throughout the process. This appendix describes the planning for and results of the scoping process.

SLO include SARA, the Wilson County SWCD, and the Alamo SWCD. At the initiation of the planning process, meetings were held with representatives of the SLO to ascertain their interest and concerns regarding the rehabilitation of FRS No. 6 of the Calaveras Creek Watershed. The initial scoping meeting was held on March 24, 2009 with SLO, NRCS, and the invited public to discuss purposes and requirements of the rehabilitation program. Issues and concerns of the SLO and an initial outline of the public scoping process were also reviewed. SARA agreed to serve as the “lead sponsor,” being responsible for leading the planning process with assistance from NRCS. Informal discussions amongst the SLO, NRCS, and landowners were conducted throughout the entire planning period.

The scoping process was continuous and comments were solicited and received for consideration throughout the entire planning procedure.

A second public meeting was held in June, 2009 to review the results of the scoping process to date and to present potential alternative solutions to bring FRS No. 6 into compliance with current dam safety criteria. Through verbal and written comments, meeting participants provided input on issues and concerns to be considered in the planning process. Federal, State, and local agencies all participated in the scoping planning process.

A review of National Environmental Policy Act (NEPA) concerns was initiated at the first public meeting and was a major topic of discussion and concern throughout the entire planning process. NEPA concerns were reviewed and documented. Coordination with the State Historic Preservation Office (SHPO) was performed through written and verbal communications and a survey of the area of potential effects (APE) was prepared by the NRCS.

The United States Fish and Wildlife Service and the Texas Parks and Wildlife Department websites were visited to obtain an official list of the federally and state-listed threatened and endangered species known to exist in Bexar County, Texas. The findings are shown in Table B found on page 13 of this document.

