<u>Final</u> Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation

Borough of Conneautville
Crawford County, Pennsylvania

U.S. Department of Agriculture
NRCS Natural Resources Conservation Service
Harrisburg, Pennsylvania

In Cooperation with:
Borough of Conneautville

December 2012

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Borough of Conneautville, Crawford County, Pennsylvania

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Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Borough of Conneautville, Crawford County, Pennsylvania

Prepared by:
United States Department of Agriculture
Natural Resources Conservation Service

In Cooperation With:
Borough of Conneautville

Project Location:
Crawford County, Pennsylvania

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Plan Designation:
Final Plan-EE

AUTHORITY

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of Subtitle H of title XV of the Agriculture and Food Act of 1981 (16 U.S.C. 3451 et seq.: commonly known as the Resource Conservation and Development Program. Rehabilitation of Conneautville Dam is authorized under Section 14 of Public Law 83-566, the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Parts 1001-1008, 1010, and 1012).

ABSTRACT

The Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation describes a plan to meet all applicable USDA-Natural Resources Conservation Service (NRCS) and Commonwealth of Pennsylvania dam safety and performance standards and to extend the useful life of the Conneautville Dam (PA-RC&D-112) beyond its original evaluated life expectancy. The new life expectancy is 50 years. The project area is located in Conneautville Borough, Crawford County, Pennsylvania. Conneautville Dam is situated on Thatcher Run.

The purpose of the project is to maintain or improve the current level of flood damage reduction afforded to roads, bridges, and buildings by the existing Conneautville Dam and to comply with applicable design, performance and safety criteria for high hazard dams.

The need for this project arises from the fact that Conneautville Dam does not currently meet all applicable NRCS and Commonwealth of Pennsylvania dam safety and performance standards. The dam was originally constructed in 1984 with a 50 year service life. The dam was designed and constructed as an NRCS high hazard structure for the purpose of reducing downstream flood damages, primarily in the Conneautville Borough portion of the floodplain.

The primary objective for Conneautville Dam is to meet applicable NRCS and Commonwealth of Pennsylvania standards for public health and safety, including meeting the NRCS high hazard dam standard.

Alternative plans include no action and rehabilitation of the existing dam. Other alternatives were considered but were not evaluated in detail due to a variety of shortcomings. The preferred alternative is to rehabilitate the existing dam. This is also the National Economic Development Plan which is the plan that reasonably maximizes net national economic development benefits consistent with protecting the Nation's environment.

Dam rehabilitation will include: auxiliary spillway repair, embankment dam surface treatment, impact basin improvements, and filter diaphragm installation.

Economic benefits will exceed costs. Sponsor will incur 35% of the total eligible cost shared items or about $542,500. The planned action will bring the Conneautville Dam into compliance with current, applicable NRCS and Commonwealth of Pennsylvania dam safety and performance standards for high hazard dams.

There are no significant adverse environmental impacts from this project. This document is intended to fulfill requirements of the National Historic Preservation Act of 1966, the Endangered Species Act of 1973 and the National Environmental Policy Act (NEPA) of 1969, each as amended.

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 (including gender identity and expression), 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 Assistant Secretary for Civil Rights, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, S.W., Stop 9410, Washington, DC 20250-9410, or call toll-free at (866) 632-9992 (English) or (800) 877-8339 (TDD) or (866) 377-8642 (English Federal-relay) or (800) 845-6136 (Spanish Federal-relay)

WATERSHED AGREEMENT

between the

BOROUGH OF CONNEAUTVILLE,
(Referred to herein as Sponsor)

and the

NATURAL RESOURCES CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
(Referred to herein as NRCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsor for assistance in preparing a plan for works of improvement for the Conneautville Dam (PA-RC&D-112), Commonwealth of Pennsylvania, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012); and

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

Whereas, there has been developed through the cooperative efforts of the sponsor and NRCS a Watershed Project Plan- Environmental Evaluation for works of improvement for the Conneautville Dam (PA-RC&D-112), Commonwealth of Pennsylvania, hereinafter referred to as the Plan-EE or plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the sponsor hereby agree on this Watershed Project 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 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.

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 sponsor will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsor and NRCS are as shown in the Cost-share table in item 5 hereof. The sponsor acknowledges the potential risk of flood damages for the real property between the flowage rights elevation and the top of dam elevation.

   The sponsor agrees that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement

4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The sponsor hereby agrees to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsor is legally unable to comply with the real property acquisition requirements, it agrees that, before any Federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

5. **Cost-share for Watershed Project Plan.** The following table shows cost-share percentages and amounts for Watershed Project Plan implementation.

Works of Improvement	NRCS	Sponsor	Total
Cost-Sharable Items [1/]			
Rehabilitation of dam (Construction Costs)	$1,007,500	$537,500	$1,545,000
Relocation [2/]	$0	$0	$0
Sponsor's Planning Costs	NA	$0	$0
Sponsor's Engineering Costs	NA	$0	$0
Sponsor's Project Administration	NA	$5,000	$5,000
Land Rights Acquisition Cost [3/]	NA	$0	$0
Subtotal: Cost-Share Costs	$1,007,500	$542,500	$1,550,000
Cost-Share Percentages	**65.0%**	**35.0%**	**100.0%**
Non Cost-Sharable Items			
NRCS Engineering & Project Administration	$540,000	NA	$540,000
Natural Resource Rights	NA	$0	$0
Federal, State and Local Permits [4/]	NA	$0	$0
Subtotal: Non Cost-Share Costs	$540,000	$0	$540,000

[1/] Total eligible rehabilitation project costs for the purpose of cost sharing includes construction; land rights, easements, or right-of-ways; project administration; contracting; and all non- NRCS technical and engineering assistance for planning, design and installation. The Sponsor share shall be paid with non-federal funds. In-kind contributions may be counted as specified in a separate Memorandum of Understanding between the Sponsor and NRCS.

[2/] Investigation of the watershed project area indicates that no displacements will be involved under present conditions. However, in the event that displacement becomes necessary at a later date, the cost of relocation assistance and payments will be cost-shared in accordance with the percentages shown.

[3/] No land rights acquisition is needed under present conditions. In the event land rights must be acquired at a later date, the sponsor will acquire with other than Watershed Protection and Flood Prevention Act funds, such real property as will be needed in connection with the works of improvement. The value of real property is eligible as in-kind contributions toward the sponsor's share of the works of improvement costs. In no case will the amount of an in-kind contribution exceed the sponsor's share of the cost for the works of improvement. The maximum cost eligible for in-kind credit is the same as that for cost sharing

[4/] Sponsor cost estimated at less than $500.

6. **Land treatment agreements.** The Sponsor will encourage landowners and operators to continue to operate and maintain needed land treatment conservation measures for the protection and improvement of the watershed upstream of the dam.

7. **Floodplain Management.** Before construction of any project for flood prevention, the sponsor shall agree to participate in and comply with applicable Federal floodplain management and flood insurance programs.

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

9. **Permits.** The sponsor 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 sponsor's cost-share.

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

11. **Additional agreements**. A separate agreement will be entered into between NRCS and the sponsor 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.

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

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

14. **Operation and Maintenance (O&M).** The sponsor will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be entered into before Federal funds are obligated and will continue for the project life (50 years). Although the sponsor's responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsor acknowledges that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. **Emergency Action Plan.** Prior to construction, the sponsor shall prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may cause loss of life or as required by state and local regulations. The EAP shall be reviewed and updated by the sponsor as required by Pennsylvania Department of Environment Protection. The EAP shall meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure.

16. **Nondiscrimination Provisions.** The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex (including gender identity and expression), marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA Assistant Secretary for Civil Rights, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, S.W., Stop 9410, Washington, DC 20250-9410, or call toll-free at (866) 632-9992 (English) or (800) 877-8339 (TDD) or (866) 377-8642 (English Federal-relay) or (800) 845-6136 (Spanish Federal-relay).

17. **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.

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

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

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

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

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

Certification:

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

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about—
(a) The danger of drug abuse in the workplace;
(b) The grantee's policy of maintaining a drug-free workplace;
(c) Any available drug counseling, rehabilitation, and employee assistance programs; and
(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will—
(a) Abide by the terms of the statement; and
(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees shall provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted—
(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

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

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

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

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

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

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

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

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

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

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

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

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

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

20**. Clean Air and Water Certification.**

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

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

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S.

Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

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

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

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

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

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

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

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

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

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

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

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

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

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

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

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

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

23. **Signatures.** The signing of this Public Law 83-566 Watershed Agreement by an authorized representative of the Sponsor indicates that the Sponsor has reviewed this Agreement and the Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation and concur with the intent and contents of each.

CONNEAUTVILLE BOROUGH COUNCIL

The signing of this plan was authorized by a resolution of the Conneautville Borough Council governing body of the adopted at a meeting held on December 10, 2012.

By: _____ Date: 12/10/12

Eugene J. Bocan, Jr.
Chairman, Conneautville Borough Council
906 Main Street
Conneautville, PA 16406

Approved by: Date: 1/24/13

Denise Coleman, State Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
One Credit Union Place, Suite 340
Harrisburg, PA 17110-2993

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Borough of Conneautville, Crawford County, Pennsylvania
3rd Congressional District

SUMMARYOF WATERSHED PROJECT PLAN (Office of Management and Budget Fact Sheet)

Authorization

The Resource Conservation and Development Measure Plan for the Conneautville Flood Prevention Commonwealth of Pennsylvania, executed by the Sponsor and the USDA Soil Conservation Service (now USDA Natural Resources Conservation Service [NRCS]), became effective in April 1981 under the authority of Subtitle H of title XV of the Agriculture and Food Act of 1981 (16 U.S.C. 3451 et seq.: commonly known as the Resource Conservation and Development Program). Rehabilitation of Conneautville Dam is authorized under Section 14 of Public Law 83-566 the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Parts 1001-1008, 1010, and 1012). The responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to NRCS.

Sponsor

Borough of Conneautville

Proposed Action

The Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation describes a plan to meet all applicable USDA-Natural Resources Conservation Service (NRCS) and Commonwealth of Pennsylvania dam safety and performance standards and to extend the useful life of the Conneautville Dam (PA-RC&D-112) beyond its original evaluated life expectancy.

Purpose and Need for Action

Conneautville Dam (PA-RC&D-112) does not meet current dam design and safety requirements. The dam was originally constructed in 1984 as an NRCS high hazard structure for the purpose of reducing flood damages to downstream bridges, roads, and buildings. The Pennsylvania Department of Environmental Protection (PA DEP), Bureau of Waterways Engineering, classified Conneautville Dam, as a “high hazard” dam in March of 2002. An estimated 151 properties and 774 people are at risk should the dam breach unexpectedly. There is a need for continued damage reduction from floodwater, erosion and sediment in the 100-year flood plain downstream of the structure and a requirement to alleviate the design and safety concerns at the dam as identified by DEP.

Description of the Preferred Alternative

The Preferred Alternative consists of rehabilitating an aging floodwater retarding structure, Conneautville Dam (PA-RC&D-112), to meet current dam design, performance and safety standards and to extend its service life by 50 years. Rehabilitation will include auxiliary spillway repair, embankment dam surface treatment, impact basin improvements, and filter diaphragm installation. Auxiliary spillway repair will consist of a sheetpile wall constructed along the existing ravine, green bioengineering with livestakes and seeding to stabilize the ravine, and treatment with a lime amendment to mitigate the dispersive nature of the spillway material. Remediation of surficial erosion of the embankment dam consists of excavation of the surficial embankment soils to a depth of three feet, and replacing the excavated soil with compacted lime-amended soil fill. Impact basin improvements will consist of wingwall extension or equivalent. Rehabilitation of the embankment dam includes installation of a filter diaphragm below and adjacent to the principal spillway conduit, from the upstream limit of the existing blanket drain to the impact basin. The filter diaphragm will be tied in to the existing chimney and blanket drain system. When the planned measures are completed, there will be only temporary storage of floodwater behind the dam in the future.

Resource Information

Latitude 41.7577222 Longitude 80.361667 Hydrologic Unit Number 04120101

Climate and Topography

Average annual temperature is in the middle forty degree range (Fahrenheit). The average growing season without killing frost is 150 days, extending from early April to mid-October. Rainfall averages 40 inches annually.

About half of the yearly rainfall occurs during the growing season. Average annual runoff is approximately 15 inches.

The planning area is Thatcher Run Watershed which is northwest Crawford County, Pennsylvania. The watershed is a 461 acre drainage area with its headwaters in Spring Township and drains through the center of Conneautville Borough to Conneaut Creek. Conneaut Creek flows north and west through Erie County, Pennsylvania and the State of Ohio into Lake Erie. Topography includes gentle and steep slopes. Elevations range from 930 feet to 1210 feet mean sea level. The watershed is in the glaciated section of the Appalachian Plateaus Physiographic Province. Bedrock geology is of the Upper Devonian Age.

Land Use Acreages

Land Use	Drainage Area 1	Drainage Area 2	Total
Brush - Good Condition	3	0	3
Farmsteads	21	18	39
Impervious Surfaces - Roads	6	2	8
Meadow (including cropland)	52	52	104
Open Space - Good Condition	7	14	21
Open Water	4	0	4
Residential	7	20	27
Woods - Fair Condition	15	2	17
Woods - Good Condition	142	96	238
Totals	**257**	**204**	**461**
1 - All values in acres			
2 - Drainage Area 1 is tributary to the dam			
3 - Drainage Area 1 and 2 is tributary to the conduit through Conneautville downstream of the dam.			

Land ownership in the watershed is 97% private land and 3% (16.5 acres) is Borough of Conneautville for the dam and flood pool.

Population, Unemployment, Income

Conneautville Dam Rehabilitation			
	Conneautville Borough	Crawford County	Pennsylvania
Population [1/]	774	88,765	12,702,379
Minority	24	3,317	2,296,091
Unemployment	30	4,104	616,413
Median Household Income	$32,050	$38,321	$50,046
Median Property Values [2/]	$75,244	$98,700	$164,700

[1/] Source: U.S. Census Bureau, 2010 American Community Survey through American Fact Finder
[2/] http://www.city-data.com/county/Crawford_County-PA.html

Existing Dam

The dam was constructed in 1984 and sized to provide 7.3 acres of floodwater storage for a 100 year frequency rainfall and 2.3 acres of accumulated sediment storage capacity. The dam site replaced 3.2 acres of woodland, 7.5 acres of idle land and 0.5 acres of wetland. The original sediment storage area still has adequate capacity for approximately 80 years.

Alternative Plans Considered

Alternative 1 – Future Without Project (FWOP)

The FWOP involves removing a section of the dam embankment, the concrete cradle and principal spillway, along with stabilizing the constructed channel. Dam removal would be accomplished by cutting out a sufficient section of the embankment down to the valley floor, approximately 30-feet wide, to pass the flood resulting from the 100-year, 24-hour rainfall without impoundment behind the remaining embankment.

Estimated Cost: $468,000

The following damages, damage reduction, costs and benefits for this alternative are:

Average Annual Flood Damage	$157,800	Average Annual Cost	$21,800
Average Annual Benefits	$0	Net Benefits	($21,800)
Remaining Flood Damage	$157,800	B:C Ratio	N/A

No Federal cost share assistance for construction will be expended to implement this alternative.

Alternative 2 – Decommissioning
Decommissioning Conneautville Dam would involve removing the floodwater retarding capacity by removing the embankment down to the valley floor, removing the principal spillway and appurtenant features, and restoring the floodplain topography to the pre-dam conditions.

Estimated Cost: $1,364,000

Nineteen properties, roads, bridges and utilities remain at risk. The following damages, damage reduction, costs and benefits for this alternative are:

Average Annual Flood Damage	$157,800	Average Annual Cost	$63,500
Average Annual Benefits	$21,800	Net Benefits	($41,700)
Remaining Flood Damage	$157,800	B:C Ratio	0.3:1

Alternative 3 – Acquisition of at risk structures
Acquisition of at risk structures would involve the purchase of 151 at risk properties, demolition, and site restoration in the catastrophic dam breach inundation zone.

Estimated Cost: $24,000,000

Damages from a catastrophic breach are estimated well in excess of $22 million.

Alternative 4 – Floodproofing, floodplain regulation, and other nonstructural alternatives
The original RC&D Measure Plan for the Conneautville Flood Prevention Project presented a brief discussion of an alternative that included “some degree” of flood proofing for 45 structures. However, nonstructural measures alone will not reduce the effects of a catastrophic dam failure. There are 151 properties and 774 people in Conneautville, as well as roads, bridges, utilities and other infrastructure at risk in the catastrophic failure inundation zone.

Estimated Cost: $24,000,000

Damages from a catastrophic breach are well in excess of $22 million.

Alternative 5 – Decommissioning and Nonstructural
An alternative combining decommissioning of the current structure and nonstructural flood damage reduction measures for the remaining 19 at risk properties was considered.

Nonstructural measures include basement utility elevation or purchase/demolition of properties continuing to experience first floor flooding. Following is the estimated cost for this alternative.

Estimated Cost: $3,927,000

Average Annual Flood Damage	$157,800	Average Annual Cost	$183,800
Average Annual Benefits	$128,200	Net Benefits	($55,600)
Remaining Flood Damage	$51,400	B:C Ratio	0.7:1

Alternative 6– Dam Rehabilitation (Preferred Alternative)
Dam rehabilitation will include auxiliary spillway repair, embankment dam surface treatment, impact basin improvements, and filter diaphragm installation.

Estimated Cost: $2,090,000

Average Annual Flood Damage	$157,800	Average Annual Cost	$104,700
Average AnnualBenefits	$179,600	Net Benefits	$74,900
Remaining Flood Damage	$0	B:C Ratio	1.7:1

Dam Rehabilitation is the preferred alternative. This alternative maximizes net benefits and is the National Economic Development (NED) Plan.

Project Costs (Dam Rehabilitation)

Conneautville Dam (PA-RC&D-112) Watershed Project

Funding Source	PL 83-566 Funds		Other Funds		Total	
Project Costs [1/]	$	%	$	%	$	%
Construction	$1,007,500	65	$537,500	35	$1,545,000	100
Engineering	$465,000	100	$0	0	$465,000	100
Relocation	$0	0	$0	0	$0	0
Real Property Rights	$0	0	$0	0	$0	0
Project Administration	$75,000	94	$5,000	6	$80,000	100
Other	$0	0	$0	0	$0	0
TOTAL COSTS	$1,547,500	74	$542,500	26	$2,090,000	100
Annual O & M	$0	0	$7,400	100	$7,400	100

[1/] Price Base: 2012

Project Benefits (Dam Rehabilitation)

Conneautville Dam (PA-RC&D-112) Watershed Project

Monetary Benefits (Average Annual) [1/]	
Flood Damage Reduction	
Residential, Commercial, Transportation	$157,800
Other Benefits [2/]	$ 21,800
Monetary Benefits	**$179,600**

[1/] Price Base: 2012
[2/] Per Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, 1.7.2 (b) (3) - the avoided cost of the most likely alternative to the planned action

Average Annual Benefits and Costs

Average Annual Cost: [1/]	$104,700
Net Economic Benefit: [1/]	$74,900
Benefit Cost Ratio:	1.7 to 1.0
Period of Analysis:	50 years
Project Life:	50 years

[1/] Price Base 2012, Amortized over 50 years at 3.75%, includes Operation and Maintenance

Upland Erosion	Gully erosion on dam site will be controlled by project measures. Minor effects during construction will be controlled by Erosion and Sediment BMPs
Stream Bank Erosion	No effect
Sedimentation	Sediment retention at dam maintained
Surface Water Quality	No effect
Surface Water Quantity	No effect
Clean Water Act	No effect
Floodplain Management	Rehabilitation measures will maintain current level of flood protection
Wetlands	No effect
Air Quality	Slight increase in dust and exhaust during construction
Invasive Plants	No effect
Riparian Areas	Minor short term disturbance during construction
Fish & Wildlife Habitat	Minor short term disturbance during construction
Migratory Birds	Minor short term disturbance during construction
Endangered & Threatened Species	No Effect
Flood Damages	Flood damage protection extended 50 years
Cultural Resources	No effect
Environmental Justice	No disproportionate risk of adverse effects on particular ethnic, racial, or socially disadvantaged groups
Local and Regional Economy	Maintain existing benefits of reduced local costs for flood preparedness and cleanup and reduced damage to roads, bridges, utilities, homes and businesses
Public Health & Safety	Dam would meet dam safety standards and 774 people will continue to have reduced risk
Transportation	Transportation system protected from flood damage
Property Values	Property values maintained
Important Farmland	No effect
Compensatory Mitigation	None required

Major conclusions: Dam Rehabilitation is the National Economic Development Alternative, and is the preferred alternative

Areas of controversy: None known

Issues to be resolved: None known

This report is in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects. There is no evidence of unusual Congressional or local interest in the project.

PURPOSE AND NEED FOR ACTION

The purpose of the project is to maintain or improve the current level of flood damage reduction afforded to residential and commercial properties, roads, bridges and utilities by the existing Conneautville Dam (PA-RC&D-112) and to comply with applicable design, performance, and safety criteria for high hazard dams.

The need for this project arises from the fact that Conneautville Dam does not currently meet dam design and safety criteria and is reaching the end of its service life. The dam was originally constructed in 1984 as a high hazard structure for the purpose of reducing flood damages to downstream bridges, roads, and buildings. The Pennsylvania Department of Environmental Protection (PA DEP), Bureau of Waterways Engineering, classified Conneautville Dam, as a "high hazard" dam on March 3, 2002. The high hazard classification is based on the potential for loss of life due to bridges, roads, and buildings existing in the downstream dam breach inundation zone. There is a need for continued flood damage reduction in the 100-year flood plain downstream of the dam and a requirement that the dam meet applicable NRCS and Commonwealth of Pennsylvania standards for public health and safety to reduce the risk of loss of human life.

Watershed Problems

The Pennsylvania (PA) Department of Environmental Protection (DEP) Bureau of Waterways Engineering has classified Conneautville Dam as a high hazard dam (B-1) based on dam height, economic risk, and potential for loss of life should the dam breach.

The dam has been well maintained by the Borough of Conneautville; however, a few minor safety items need attention related to structural appurtenances. None of the safety issues identified by PA DEP are a result of poor maintenance, but rather are a result of the current dam safety classification and normal operational wear. Construction of the dam was completed in 1984 with a service life of 50 years. Conditions in the watershed have not changed extensively over the past 30 years since Conneautville Dam was planned and constructed. Current trends would indicate little change for the foreseeable future. When forecasting future conditions in the watershed, the overriding consideration is the need to remove the dam should no action be taken to implement alternative approaches.

Conneautville Dam does not currently meet NRCS or Commonwealth of Pennsylvania design and safety criteria associated with a high hazard dam. If the dam is not rehabilitated to comply with current dam safety standards or downstream risks are not addressed, PA-DEP will require that the dam be removed. This will place some 19 properties, numerous borough roads, bridges and utilities at risk from damage from the 100-year flood event.

The estimated 100-year flood damages with the existing dam and in the future without a dam are displayed below:

Flood Damage Table (Average Annual) [1/]		
	Existing Condition	Future Condition Without Dam
Residential, Commercial, Roads, Bridges & Utilities	$0	$157,800
Total Flood Damages	**$0**	**$157,800**

[1/] Price Base 2012

The existing dam and conduit control 720 cfs of runoff and provide $351,600 in average annual flood damage reduction. Should the dam be removed, the conduit will continue to control 320 cfs of runoff and provide $193,800 in average annual damage reduction.

Of particular concern regarding high hazard dams, a catastrophic breach of the dam could occur during a probable maximum precipitation (PMP) event. This PMP event would put the lives of nearly 774 people at risk, cause major damage to some 151 properties in the Borough of Conneautville, and deposit a significant amount of sediment in the breach inundation zone. The resultant flooding and sediment deposition would fill bridge openings and severely disrupt travel routes in the Borough. The damage is estimated to be significantly in excess of $22 million. Allowing a catastrophic breach would not be acceptable.

Watershed Opportunities

The following general watershed opportunities can be realized with some type of project action to address dam related problems of dam safety, flood damage reduction, and sedimentation:

- Compliance with federal and state dam design and safety criteria (NRCS high hazard and PA DEP Classification B-1, which denotes "high hazard" based on dam height, economic risk and potential for loss of life)
- Protect public safety
- Prevent increased flood damages
- Protect existing fish and wildlife habitats

SCOPE OF THE PLAN

The scoping of resource concerns was initiated at a meeting with the sponsor and open to the public on November 16, 2010. In addition planning personnel made on the ground observations during various site visits and field work during the planning process. A second meeting was held in February 2012. The Crawford County Conservation District as well as the Crawford County Planning Office and the Pennsylvania Department of Environmental Protection Division of Waterways Engineering were consulted regarding concerns. During the resource inventory phase of the planning several websites and remote sensing tools were used to gather pertinent data and resource information.

Summary of Scoping

ITEM/CONCERN	Relevant to the Proposed Action?		RATIONALE
	YES	NO	
SOIL			
Upland Erosion	X		Gullying in proximity to the dam and appurtenances poses a threat to the dam's integrity and adjacent properties.
Stream Bank Erosion	X		Minimally affected by some alternatives
Sedimentation	X		Current levels of sediment behind the dam have reduced future storage capacity
Prime and Unique Farmland		X	Not affected by project action
WATER			
Surface Water Quality	X		May be affected by some alternatives. TMDL not affected by project
Surface Water Quantity	X		Flooding is a main concern of residents and officials
Ground Water Quantity		X	Not affected by project.
Clean Water Act	X		Some alternatives may require permits or alter water quality slightly.
Regional Water Mgt. Plans and Coastal Zone Management Areas		X	None in the project area
Floodplain Management	X		Floodplain would be broader without dam rehabilitation
Wetlands	X		May be affected by some alternatives
Wild and Scenic Rivers		X	None in the project area
Sole Source Aquifers		X	None in the project area

ITEM/CONCERN	Relevant to the Proposed Action?		RATIONALE
	YES	NO	
AIR			
Air Quality	X		Slight short-term construction equipment exhaust & dust
Clean Air Act		X	Not applicable. Watershed is not located in a non-attainment air quality area
PLANTS			
Endangered Threatened Species		X	Not applicable – No state or federally listed plant species occur within the project disturbance area
Essential Fish Habitat		X	Not applicable – No EFH occurs within or downstream of project area
Invasive Species	X		May be affected by some alternatives
Natural Areas		X	None in the project area
Riparian Areas	X		May be affected by some alternatives
Forest Resources		X	Current acreage or conditions will not be affected by project action
Ecologically Critical Areas		X	None in project area
ANIMALS			
Fish and Wildlife Habitat	X		May be affected by some alternatives
Coral Reefs		X	Not applicable
Endangered and Threatened Species		X	Not applicable – No state or federally listed faunal species occur or forage within project disturbance area
Invasive Species		X	None known and none affected by project action
Migratory Birds/Bald and Golden Eagles	X		
HUMANS			
Flood Damages	X		Primary concern of Sponsor
Cost, Sponsor	X		A concern of sponsor due to limited resources
Cost, NED	X		Preferred Alternative is the NED
Cultural Resources	X		May be affected by some alternatives
Environmental Justice	X		There will be no disproportionate risk of adverse effects on particular ethnic, racial, or socially disadvantaged groups
Local and Regional Economy	X		May be affected by some alternatives
Potable Water Supply		X	Not affected by project action and will not alter existing ground water recharge or quality within the site
Public Health and Safety	X		Primary concern of Sponsor
Recreation		X	Not affected by project action
Scenic Beauty and Parklands		X	Not affected by project action
Land Use	X		May be affected by some alternatives
Transportation	X		May be affected by some alternatives
Property Values	X		May be affected by some alternatives
Scientific Resources		X	No significant scientific resources have been identified. The University of Pittsburgh has an Ecological Center/labrotary nearby but does not use the Thatcher Run Watershed.

AFFECTED ENVIRONMENT

Introduction

The natural, economic, and social resources features of the Thatcher Run Watershed were inventoried and updated to establish the current resource situation within the project area and to provide a base line for the NRCS-CPA-52 Environmental Evaluation Form for this project. The dam was constructed in 1984 and sized to provide 7.3 acres of floodwater storage for a 100 year frequency rainfall and 2.0 acres of accumulated sediment storage capacity. The dam site replaced 3.2 acres of woodland, 7.5 acres of idle land and 0.5 acres of wetland. Approximately 26 percent (%) of the original sediment storage area has been filled.

General Description

The Borough of Conneautville is a small rural community within Spring Township in Northwestern Crawford County, in the Northwestern corner of the state of Pennsylvania, about 30 miles southwest of Erie, PA. (see Appendix B – Project Location Map). The stream in Conneautville on which the Conneautville dam was constructed in 1984 is called Thatcher Run. Thatcher Run confluences below the dam with an unnamed tributary to Conneaut Creek at 41.7588 latitude and -80.3601 longitude. The RC&D Measure Plan describes Thatcher Run watershed with its headwaters in Spring Township and its discharge point to the Conneaut River in the Borough of Conneautville. Thatcher Run traverses a relatively undeveloped watershed, except in the last several thousand feet. The Measure Plan divided the Thatcher Run into two Drainage Areas since only one of them is contained by the dam. Drainage Area 1 is what we have labeled the main stem of Thatcher Run and is the watershed this environmental evaluation has focused upon. The un-named portion of the watershed labeled as “Drainage Area 2” joins Thatcher Run below the dam and, therefore, is generally excluded from this report. All references to the Thatcher Run Watershed are related to Drainage Area 1.

Drainage Area 1 or the Thatcher Run Watershed is 257 acres in size. Thatcher Run is approximately 1.6 miles in length. There appear to be seven man-made water bodies in the watershed. All but two are closely associated with Thatcher Run, either from damming or excavation. The remaining two appear to have been excavated. In March of 1981 there was one pond in the watershed, and it was noted that Thatcher Run is a perennial stream. There are numerous seeps and springs in the watershed, and the drainage path of Thatcher Run is sometimes quite sinuous.

Geologic Setting and Physiographic Region

The site is located in the Northwestern Glaciated Plateau Section of the Appalachian Plateau Province. The Northwestern Glaciated Plateau Section consists primarily of broad, rounded uplands cut by long, linear valleys. The uplands have a southeast-oriented linearity that is pronounced in eastern Erie and central Crawford Counties. Elsewhere upland linearity is obscure to absent. The uplands are cut by many flat-floored, narrow to wide valleys that are separated from adjacent uplands by steep slopes on one or both sides of the valley. The valleys are very linear and are oriented northwest-southeast for the most part although some valleys are normal to this orientation. The valley floors are often wetlands. There is frequently a considerable depth of unconsolidated material beneath the valley floor. Local relief between valley floor and the top of an adjacent upland may be up to 600 feet, but is generally less than 100 feet. Elevation ranges from 900 to 2,200 feet. The drainage pattern is dendritic. Bedrock, which is largely covered by glacial deposits, consists of a variety of sandstones, siltstones, and shales, as well as some conglomerates and coal. Bedding in the rocks is horizontal. Many of these rocks are relatively soft and were easily eroded into linear landforms by the continental glaciers.

The Section is located in northwestern Pennsylvania and includes all or almost all of Erie, Crawford, Mercer, and Lawrence Counties and parts of Warren, Venango, Butler, and Beaver Counties. It is traversed by Interstate 80 in Mercer County and Interstate 79 between Erie and the Section boundary south of Interstate 80; US Route 6 from west of Warren to Ohio; and US Route 322 from west of Franklin to Ohio; Pennsylvania Routes 89 north of Titusville, 18 from the Section boundary west of Erie to Beaver County, and 108 in Lawrence County. Other

interesting drives on Pennsylvania Routes are: 8 north of Titusville, 19 from Erie to Butler County, 77, 27, and 285 in Crawford County, 208 in Lawrence County, 58, 358, and US Route 62 in Mercer County.

The Section includes Outstanding Geological Features such as: Conneaut Lake, Conneaut Lake Kame, Conneaut Marsh, Dead-ice Terminal Moraine, Drumlins, Grant City Falls, Pikes Rocks, Quakertown Falls, Rock Creek Falls, Springfield Falls, Tamarack Swamp, Titus Bog, and West Liberty Esker. Near Pikes Rocks are: Lottsville Rock City, Nuttles Rocks, Brooks Rocks, and Baker Rocks. Rock Creek Falls occurs in Rock Creek Ravine. (http://www.dcnr.state.pa.us/topogeo/map13/13ngps.aspx).

Soils

In general the soils in a region are affected by geology, topography, plant community and hydrology. Crawford County lies entirely in the glaciated part of the Allegheny Plateau, with greatly varying topography from east to west. The eastern portion of the county has irregular terrain with deeper valleys and steeper slopes and like most of the land it drains south into the Allegheny River system. The northwestern area of the county, where the Thatcher Run watershed is located, is quite flat and drains into Lake Erie. Due to this flat landscape and slow permeability of the sub soil a large portion of the northwest is very poorly drained. Nearly three fourths of the county consists of soils that are very poorly to somewhat poorly drained. Sixty-five percent of the land area needs artificial drainage before it can be effectively used as farmland. Only about 10% is best suited for farming without any special management and about 20% is too steep, stony or swampy for intensive use. Five percent of the soils are droughty (http://www.crawfordconservation.com/soil.html).

The soils on the site include ten soil units, six of which are described as having an aquic moisture regime, designated with an asterisk (*) in Table A. Two of these potentially hydric soil units occur in the forested area adjacent to the eastern edge of the original pool, which was still visible as open water in the 1993 aerial photograph used in the soil map. Although these and other soils in the project area were not assessed in the field to confirm that they are undisturbed hydric soils associated with wetland hydrology and vegetation, it is assumed that they may support a wetland plant community, as noted in subsequent discussions about potential onsite wetlands.

Prime Farmlands

The Measure Plan indicated that there were 4.5 acres of Prime Farmland within the watershed in 1981. Using the web soil survey and Crawford County and Pennsylvania Department of Agricultural web sites the prime agricultural soils were further identified along with Farmland Preservation Activity. The PA Department of Agriculture together with the Crawford County Agricultural Preservation Bureau has purchased a total of 759 acres of easements on 3 farms in Crawford County. None of these farms, however, are in the Thatcher Run Watershed. Three Prime Farmland soils types were found in the Thatcher Run Watershed. They are Braceville gravelly loam 3-8% slope 3.8 acres, Philo silt loam 8.8 acres and Venango silt loam 3-8% 66.6 acres.

Table A: Soil Types Found Onsite

Soil Unit Symbol	Soil Unit Name	Soil Taxonomy	Soil Unit Description
Br	Braceville Gravelly Loam	Typic Fragiudalfs	The Braceville series consists of very deep, moderately well drained soils formed in glacial outwash of stratified sand, silt, and gravel. They are on terraces, benches, fans, and moraines. Slopes range from 0 to 25 percent. Permeability is moderately slow to slow.
Ca	Cambridge silt loam	Oxyaquic Fragiudalfs	The Cambridge series consists of very deep, moderately well drained soils formed in low-lime Wisconsinan age till on till plains and moraines. It is shallow or moderately deep to a fragipan. Permeability is moderate above the fragipan and slow or very slow in the fragipan. Slope ranges from 0 to 25 percent.
*Fh	Frenchtown silt loam	Typic Fragiaqualfs	The Frenchtown series consists of very deep, poorly drained soils formed in loamy Wisconsinan age till on till plains. Some pedons have a thin mantle of loess. Permeability is moderate above the fragipan and slow or very slow in the fragipan. Slope ranges from 0 to 8 percent.
*Hy	Holly silt loam	Fluvaquentic Endoaquepts	The Holly series consists of very deep, very poorly and poorly drained soils formed in loamy alluvium on flood plains. Saturated hydraulic conductivity is moderately high through high in the mineral soil. Slope ranges from 0 through 3 percent.
Ph	Philo silt loam	Fluvaquentic Dystrudepts	The Philo series consists of very deep, moderately well drained soils on floodplains. They formed in recent alluvium derived mainly from sandstone and shale. Permeability is moderate to moderately rapid. Slope ranges from 0 to 6 percent.
*Pk	Platea silt loam	Aeric Fragiaqulfs	The Platea series consists of very deep, somewhat poorly drained soils formed in Wisconsinan age till on till plains and moraines. It is shallow or moderately deep to a fragipan. Saturated hydraulic conductivity is moderately high above the fragipan and low or moderately low in the fragipan. Slope ranges from 0 to 15 percent.
*Rh	Red Hook Loam	Aeric Endoaquepts	The Red Hook series consists of very deep, somewhat poorly drained soils formed in Wisconsinan age glaciofluvial deposits on outwash plains and terraces, stream terraces, and moraines. Saturated hydraulic conductivity is moderately high through high in the mineral solum and substratum. Slope ranges from 0 through 8 percent.
*Sh	Sheffield silt loam	Typic Fragiaqualfs	The Sheffield series consists of deep, poorly drained soils that formed in glacial till on till plains. Permeability is moderately slow above the fragipan and is very slow in the fragipan. Slopes range from 0 to 3 percent.
VLF	Valois soils, very steep	Typic dystrudepts	The Valois series consists of very deep, well drained soils on nearly level to steep lateral moraines along lower valley sides. They formed in till dominated by sandstone, siltstone, or shale. Slope ranges from 0 to 60 percent.
*Vn	Venango silt loam	Aeric Fragiaqualfs	The Venango series consists of very deep, somewhat poorly drained soils formed in low-lime Wisconsinan age till on till plains and moraines. It is shallow or moderately deep to a fragipan. Saturated hydraulic conductivity is moderately high to high above the fragipan and moderately low or low in the fragipan and in the substratum. Slope ranges from 0 to 15 percent.

Soils information was obtained from https://soilseries.sc.egov.usda.gov/osdnamequery.asp

* Denotes soils with aquic moisture regime.

Watershed Features

Size and Shape. The Thatcher Run watershed (Drainage Area 1 - Lower Watershed) is generally a narrow oval shape and nearly 257 acres in size. The combined watershed, consisting of Drainage Areas 1 and 2, is 461 acres in size.

Aspect. Thatcher Run drains from the northeast to the west southwest. After flowing through the dam spillway the stream flows for a short distance before joining with the flow from Drainage Area 2 at about 41° 45.457'N and -80° 21.847' W. The conjoined streams then enter an underground culvert, and continue on to Conneaut Creek near the northern end of West Street in the Borough. Slopes in the watershed face generally to the south or north.

Drainage Characteristics. There are at least 6 intermittent streams and one ephemeral stream that enter Thatcher Run. Generally the soils on the watershed possess a shallow fragipan and may tend to not readily absorb precipitation and runoff. Subsequently multiple channels have developed within the watershed.

Obstructions to flow. There appear to be five in-stream/impounded or excavated water bodies associated with Thatcher Run, two excavated water bodies and one non-impounding or dry dam (Conneautville Dam) on the main stem of Thatcher Run.

Flooding/Floodplain. The Conneautville dam reduces areas subject to flooding from a 100 year frequency storm by fifteen acres. The RC&D Measure Plan identified 20 residences, and 25 commercial establishments, as well as roads and bridges that would see reduced flood damages after the dam was constructed. A search of the Flood Insurance Rate Maps for Conneautville indicated that there is an area of Zone A along the North side of Cusswego Road and Center Street estimated to be approximately seven acres. There is a larger area in Zone AE along the West side of the Bessemer and Erie Rail Road bed.

Land Use and Land Cover

In March 1981 the NRCS Measure Plan estimated that the upper 2/3 of the watershed including Drainage Areas 1 and 2 is rural with open land and woodland. The lower third of the watershed is similar except for an increased number of rural residences and borough development. Approximately 55 acres are in cropland, 125 acres in woodland, and 60 acres are developed. It is further estimated that 266 acres are in open lands such as pasture, meadows, home yards, parks and idle areas, all with generally good vegetative cover except for the proposed dam site which was sparsely vegetated. At the time of the last environmental assessment there was one, estimated, "Type 6" (Circular 39 Wetland classification for "Shrub Swamp") wetland, about ½ acre in size, located within the area of the proposed dam. This wetland area was converted into the pool above the dam and abuts the Platea Silt Loam (PkB) soil unit with an aquic moisture regime. Since it was originally a vegetated wetland, the open water pool was likely excavated within this same hydric soil type, but the original pool subsequently accumulated enough sediment to have been recolonized by 100% cover of dense emergent vegetation. According to the updated land cover assessment completed for purposes of hydrologic/hydraulic modeling the watershed is broken up into the following cover types, as seen in Table B below:

Table B: Land Use Acreage

Land Use	Acreage
Cropland	104
Woodland	255
Developed Land	74
Open land	28
Total	461

This recent break out of land cover does not differentiate between wooded wetland and upland woods.

The 461 acres in the watershed includes all areas tributary to the conduit downstream of the dam. With more recent and more accurate 2-foot contour interval LIDAR data the tributary area measured in GIS and used in current modeling is 461 acres. This includes Drainage Area 1, the area controlled by the dam and Drainage Area 2, the uncontrolled area tributary to the conduit. Table C lists land uses used for both drainage areas. These land uses were used for TR-20 modeling. In the assessment, the modeler used 'meadow' land use for areas that may have been row crops. During the reconnaissance in fall of 2010 the fields were unmaintained and it appeared they had been fallow for a number of years. In general, land uses were broken out into the classifications below, with the two sub-watersheds broken out in Table C below:

Table C: Land Use Acreages for Modeling Purposes

Land Use	Drainage Area 1	Drainage Area 2	Total
Brush - Good Condition	3	0	3
Farmsteads	21	18	39
Impervious Surfaces - Roads	6	2	8
Meadow (including cropland)	52	52	104
Open Space - Good Condition	7	14	21
Open Water	4	0	4
Residential	7	20	27
Woods - Fair Condition	15	2	17
Woods - Good Condition	142	96	238
Totals	257	204	461
1 - All values in acres			
2 -Drainage Area 1 is tributary to the dam			
3 -Drainage Area 1 and 2 is tributary to the conduit through Conneautville downstream of the dam.			

Air Quality

The US Environmental Protection Agency Website was used to determine current air quality conditions. This search found no areas in Crawford County are currently designated non-attainment areas for any of the criteria pollutants. (Source: www.epa.gov/airquality/greenbook)

Plant Community

According to the Ecological Regions of Pennsylvania, this site is located within the Glaciated Pittsburgh Plateau Ecological Region.

About half of the watershed is in agricultural or open grassy fields or reverting fields. The rest of the land is in upland, mesic or wet wooded swamp. The 1981 Measure plan reports that woody vegetation in the watershed includes: several species of black cherry (*Prunus serotina*), red and sugar maple (*Acer rubrum* and *A. saccharum*), white ash (*Fraxinus Americana*), scots pine (*Pinus sylvestris*), hawthorne (*Crataegus* spp.), crabapples (*Malus* spp.), wild (feral) apple (*Malus* sp.) and poison ivy (*Toxicodendron radicans*). Herbaceous plants include American pokeweed (*Phytolacca americana*), dandelion (*Taraxacum officinale*), wild carrot (*Daucus carota*), thistle (*Carduus* and *Cirsium* spp.) and numerous grasses and legumes grown as forage, such as bluegrass (*Poa annua*), timothy (*Phleum praetense*) and alfalfa (*Medicago sativa*).

Photos of the site taken in fall of 2010 document the occurrence of white pine (*Pinus strobus*), American elm (*Ulmus Americana*), red osier dogwood (*Cornus stolonifera*) and willow species (*Salix* spp.). The Crawford County Natural Heritage Inventory (http://www.natural heritage.state.pa.us) indicates that there are other species that inhabit the terrestrial and floodplain forests within the township including black walnut (*Juglans nigra*), American beech (*Fagus grandifolia*), basswood (*Tilia* sp.), and tulip poplar (*Liriodendron tulipifera*). In addition, many shrub species are common, including red osier dogwood, buttonbush (*Cephalanthus occidentalis*), spicebush (*Lindera benzoin*), winterberry (*Ilex verticillata*), and high bush blueberry (*Vaccinium corymbosum*), all of which are reliable wetland indicator species. Common herbaceous plants include wetland plants such as sensitive fern (*Onoclea sensibilis*) and skunk cabbage (*Symplocarpus foetidus*), as well as the upland Christmas fern (*Polystichum acrostichoides*), and various other ferns, grasses, and wildflowers.

Invasive Plants

No mention of invasive plant species was made within the 1981 Measure Plan. A review of recent dam inspection photographs by a botanist (Phil Rury) revealed the presence of at least two invasive plant species, coltsfoot (*Tussilago farfara*) and Canadian thistle (*Cirsium arvense*), on the dam embankment. Reed Canary Grass (*Phalaris arundinacea*) often invades wet meadows and drier marshes in this geographic area, but no obvious infestations of this grass were observed in photographs taken at the site. Although there may be other invasive plant species in the area, there are no other types of invasive plant species known to exist in the area. There are currently no dam operation and maintenance issues associated with invasive species. Because earth disturbances associated with the project could exacerbate the spread of any invasive vegetation within the project area, it will be critical to devise a long-term vegetation management plan (VMP) for the rehabilitated dam and pool areas that will reduce the potential for proliferation of invasive plants. To comply with Executive Order 13112 on 'Invasive Species', NRCS will strive to ensure that the planned project does not result in the introduction or spread of invasive species of flora or fauna.

Fish and Wildlife Community

The 1981 Measure Plan reported results of water quality and aquatic biota field observations in Thatcher Run at and upstream of its confluence with Conneaut Creek, the latter reported as a trout stream also inhabited by lampreys, several of which were seen in Conneaut Creek. A deep pool in Conneaut Creek at the confluence/mouth of Thatcher Run also was noted as being annually stocked with trout. Sampling station No. 2 on Thatcher Run, located about 50 feet upstream of its underground conduit, had populations of black nosed dace, bluntnose minnow, and fathead minnows. These 1981 field observations are generally consistent with the current stream classification of the main stem of Conneaut Creek as protected habitat for WWF (warm water fish) and MF (migratory fish), and for its tributaries as protected habitat for CWF (cold water fish) and MF. After the dam was constructed, the open water pool above the dam provided additional aquatic habitat that since has been lost due to dam safety concerns. The original pool is now fully vegetated and lacks open water habitat.

The 1981 Measure Plan noted that wildlife in the watershed is typical of the species found throughout Crawford County. Wildlife species inhabiting the Thatcher Run Watershed would be adapted to living in a developing urban area. Indeed, this would include, white tailed deer (*Odocoileus virginianus*), cottontail rabbits (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), red fox (*Vulpes vulpes*), North American opossum (*Didelphis virginiana*), grey squirrel (*Sciurus carolinensis*), chipmunk (*Tamiasciurus striatus*) and a variety of small mammals including voles, mice, and moles. The more important game species include deer, rabbit, squirrel, raccoon, woodchuck, wild turkey (*Meleagris gallopavo*), and ruffed grouse (*Bonasa umbellus*). The Crawford County Natural Heritage Inventory notes that because more than half of Crawford County is used for agriculture, most areas of contiguous wild lands are fragmented by agricultural fields and roadways. Some animals are adapted to and thrive on this type of land cover, such as white tailed deer, wild turkey and ruffed grouse.

Though a large percentage of the Thatcher Run Watershed is wooded, the current condition of the dam's reservoir pool site is open field. Impacts may occur to this resource area if the dam should impound water. Some bird species are adapted to living and nesting in areas that consist of only open field and it is likely construction would be limited to those seasons outside of the nesting periods for these species. Birds that range or may nest in the area are listed in Table D below:

Water resources reports related to the Thatcher Run watershed in 1981 note that aquatic biology studies were done on Thatcher Run and two of its tributaries. Although blacknose dace, fathead minnows, and bluntnose minnows were the only fish species observed, it was noted that the lamprey eels seen in Conneaut Creek at its confluence with Thatcher Run likely inhabit Thatcher Run. Macroinvertebrates identified included snails, stoneflies, dragonflies, mayflies, caddishly, dipteral and aquatic beetles. These species are indicative of high water quality.

Table D: Bird Species Adapted to Living in an Open Field

Bird Species	Feeding & Nesting Habits
Bobolink	Nests on the ground
Killdeer	Nests on open ground
Eastern kingbird	Nests in shrub or tree near open ground
Meadowlark	Builds a domed nest in a meadow
Mocking bird	Lives near open and shrubby areas
Pheasant	Lives, feeds and nests in fields
Loggerhead shrike	Nests in shrubs or trees near open ground
Field sparrow	Nests near on the ground
Grasshopper sparrow	Feeds in fields, nests on the ground
Henslow's sparrow	Nests on the ground
Savannah sparrow	Ground nester
Vesper sparrow	Ground nester
Woodcock	Feeds in open fields near woods

Wetlands and Water Resources

Wetlands

According to the 1981 Measure Plan only about 0.5 acres of shrub swamp (Type 6) wetland was located in the area of the present dam. It is presumed that this original wetland no longer exists and may have been converted to the original open water pool behind the dam. While the USFWS National Wetland Inventory (NWI) map for the project site does not indicate the presence of wetlands above or below the dam that are identifiable via remote sensing methods, the soil mapping for the site and local presence of many wetland indicator plant species suggests that much of the forested land is in fact swampland (see NWI maps at http://137.227.242.85/wetland/wetland.html). The original impoundment pool was open water (1993 aerial photograph). The two (2) acre sediment pool has reverted to a fully vegetated area without visible standing water and now likely consists of a wet meadow with early stages of scrub shrub layers. Given the presence of several hydric soil units above the dam abutting the original open water pool and the nature of the plant community, an emergent wetland, marsh and wet meadow now occupies at least the footprint of the former half-acre, manmade, open water pool behind the dam. This type of habitat appears to be relatively rare in the area and may have relatively high habitat value.

Surface Water

Water flows from a high elevation of about 1219 feet MSL in Spring Township at the top of the watershed to the discharge point of about elevation 943 feet MSL in the Borough of Conneautville. The surface water HUC code for the watershed is 4120101, which is part of the Great Lakes Region, Eastern Lake Erie Subregion. The water draining from Thatcher Run joins a northern unnamed tributary just before entering a culvert and discharging into the Conneaut Creek in the Borough of Conneautville. The last several hundred feet of stream channel may be partially underground and within a culvert but it appears there is some surface water where the flow path is located according to the USGS map and aerial photos.

According to the USGS 7.5 Minute quadrangle, the Creek turns at 90 degree right angles in two locations just before discharging. The Thatcher Run, including Drainage Areas 1 & 2, discharges into Conneaut Creek at approximately 41° 45.471' N and 80° 22.266'W in the Borough. Within the Thatcher Run watershed there are five in-stream ponds and two off-stream ponds. The RC&D Measure Plan indicates that there was only one impoundment in the watershed at the time of writing in 1981. Development of impoundments in the watershed has more than likely resulted in slowing and warming Thatcher Run. It is likely that eutrophication of these water bodies and receipt of sediments with associated nutrients from agricultural fields has resulted in an slight influx of non-point source contaminants, potentially resulting in lower water quality in Thatcher Run than was seen in 1981.

Conneaut Creek and Thatcher Run can be found on Drainage List X, Lake Erie, of PA's Title 25, Chapter 93 Water Quality Standards for water bodies (http://www.pacode.com/secure/data/025/chapter93/s93.9x.html). Conneaut Creek is designated as both a Warm Water Fishery (WWF) and a Migratory Fishery (MF). According to Drainage List X, all tributaries to Conneaut Creek are designated as Cold Water Fishery (CWF) and Migratory Fishery (MF).

Surface Water Quality

Chapter 93 of Title 25 of the Pennsylvania Code deals with surface water quality standards. Each major drainage basin is evaluated according to their component subwatersheds. There are five major basins, including the Delaware River, the Susquehanna River, the Ohio River, Lake Erie and the Genesee River basins. Thatcher Run is located in the Lake Erie Drainage Basin, labeled in the code as "Drainage List X". The rivers and streams in the basins are evaluated according to various physical and chemical parameters, including, dissolved oxygen, temperature, bacteria levels, etc. They are assigned specific water quality criteria related to certain designated water use.

Conneaut Creek and Thatcher Run are located in Drainage List X, Lake Erie, of PA's Title 25, Chapter 93 Water Quality Standards for water bodies. Conneaut Creek is designated as both a Warm Water Fishery (WWF) and a Migratory Fishery (MF). According to Drainage List X, all tributaries to Conneaut Creek are designated as Cold Water Fishery (CWF) and Migratory Fishery (MF).

As stated above, water quality sampling was performed as a part of the 1981 measure plan. Tests of water quality parameters included dissolved oxygen, pH, alkalinity and Biotic Index. Dissolved oxygen levels were tested at 10-11 ppm indicating near saturation of the water with oxygen. The pH ranged from 7.5-9 indicating that the soils/geology of the watershed was influenced by limestone or other Ca-bearing deposits. Alkalinity ranged from 27-109 ppm indicating a high amount of alkalinity, also indicating a source of carbonate (likely Calcium carbonate) in the soils and subsurface geology. The Biotic Index ranged from 7-12 indicating moderate pollution to clean. The report states that the lower portions of Thatcher Run seemed to display a macroinvertebrate population that is indicative of a more polluted water.

According to the PADEP's eMapPA queried on February24th, 2011 neither Thatcher Run nor Conneaut Creek are on the 303(d) list and no TMDL's have been established for these water bodies (http://www.emappa.dep.state.pa.us/emappa/viewer.htm)

Groundwater

The Thatcher Run watershed is located mostly within the Conewango Group Geologic Unit which consists of some shale, some siltstone and some sandstone. Generally this unit is a poor aquifer and many wells do not produce water. One-fifth of the wells yield less than 3 gallons per minute (gpm) and one in twenty of the wells yield more than 25 gpm. The lower portion of the watershed is located in the Conneaut Group Geologic Unity which consists of some shale and siltstone. Generally this unit is a poor aquifer with many unsuccessful wells; however, there are not many wells in this unit. About half of the wells yield 3 gpm. In both of these units the water is generally hard but usable to 50 feet, with alkalinity increasing with depth. At greater depths the water becomes increasingly salty (Geologic and Water Availability Map http://www.dcnr.state.pa.us/topogeo/pub/water/pdfs/w046_pl1.pdf)

Sole Source Aquifers

Research into U.S. Environmental Protection Agency and Pennsylvania Department of Environmental protection data bases reveals no formally established Sole Source Aquifers in the Conneautville vicinity. As part of the Conewango Group Geologic Unit consisting of shale, siltstone and sandstone with low permeability conditions are very limited for the production of well water as evidenced by numerous dry holes. Twenty percent of wells in the area yield less than 3 gpm and only 5% yield more than 25 gpm.

Drinking Water

Conneautville Borough Water Department services over 1000 people with drinking water from groundwater sources (http://www.city-data.com/city/Conneautville-Pennsylvania.html).

Protected Species and Habitats

The Pennsylvania Natural Diversity Inventory (PNDI) online database was queried in February 2011 to determine if protected species or species proposed for protection ranged within the watershed (http://www.gis.dcnr.state.pa.us/hgis-er/Login.aspx). As discussed below and documented in the NRCS-CPA-52 form, this review of the natural heritage data indicates that none of the project alternatives pose a risk of adverse

impact to individuals, populations or habitats of federal or state-listed species of endangered or threatened flora or fauna.

Critical Habitats and Unique Areas

The PNDI database review indicated that no core habitat, species of concern, supporting landscape, Important Bird Areas or Landscape Conservation Areas are located in or around the Thatcher Run Watershed and that no special areas appear on the map of Crawford County for the Thatcher Run Watershed. Thus, no federal or state-listed species of endangered or threatened flora or fauna are known to inhabit the project site nor upstream/downstream reaches of Thatcher Run that would be directly or indirectly altered by any of the alternatives. (see maps at http://www.naturalheritage.state.pa.us/cnhi/cnhi.htm).

Migratory Birds

Although as reported in Table D migratory birds are known to be present in the project area there will be no significant effects on their habitat or behavior as a result of any of the project alternatives. During construction periods their may be noise and human activity that may have temporary and ephemeral effects. The land use adjacent to the project site and watershed area will provide similar habitats for temporary refuge. No evidence of concern for migratory birds has been identified by either the Pennsylvania Natural Diversity Inventory or the Pennsylvania Natural Heritage Program in Crawford County. Because the potentially affected reaches of the stream and adjacent riparian habitats do not provide critical habitat for federally-protected, migratory birds or bald and golden eagles, none of the alternatives considered pose ecological risks of adverse impact to protected birds.

Wild and Scenic Rivers

Thatcher Run and the Conneaut Creek are not a part of a designated or proposed for designation Wild and Scenic River as of this writing. (http://www.rivers.gov/maps/zoom/conus/conus.html)

Cultural Resources

Prior to construction of the dam, consultation with the State Historic Program Office (SHPO) and Crawford County Historical Society determined that no archeological, historic, or cultural resources would be disturbed by the proposed dam construction. These consultations and conclusions were previously reported in the Environmental Assessment included in the 1981 RC&D Measure Plan. Since the dam was built in the footprint previously cleared for such resources, none of the proposed project alternatives pose a risk of impact to cultural resources. A recent follow-up review of The National Register of Historic Places website [http://nrhp.focus.nps.gov] reconfirmed that while several historical sites are nationally listed for Crawford County, none occur in the Borough of Conneautville or the watershed. Also, the Pennsylvania Historic and Museum Commission was contacted to confirm there are no known archeological or historical resources in the area of potential effect. Since there are no federally recognized Tribes in Pennsylvania there was no need for Tribal consultation.

Forest Resources

Although the Crawford County Natural Heritage Inventory lists several valuable woodland species, such as black walnut, sugar maple, basswood, and tulip poplar, any modifications to the dam would not impact the vitality and potential management of the forest resources for commercial production. The original impoundment pool has reverted to a natural, herbaceous plant community rather than a forest.,

Regional Water Management Plans and Coastal Zone Management Areas

The project will have no effect on Regional Water Management and Coastal Zone Management Areas.

Environmental Justice

The 2010 Census Data was used to document ethnic, racial, and socially disadvantaged populations. There will be no disproportionate risk of adverse effects on particular ethnic, racial, or socially disadvantaged groups.

Local and Regional Economy

The existing dam reduces average annual flood damages in Conneautville leading to reduced local costs for flood fighting and cleanup and reduced damage to roads, bridges, utilities, homes and businesses. Dam rehabilitation will preserve the local economy and provide $157,800 of average annual flood damage reduction benefits.

Floodplain Management

Conneautville Dam does not currently meet dam design and safety criteria and is reaching the end of its service life. The dam was originally constructed in 1984 as a high hazard structure for the purpose of reducing flood damages to downstream bridges, roads, and buildings. The Pennsylvania Department of Environmental Protection (PA DEP), Bureau of Waterways Engineering, classified Conneautville Dam, as a “high hazard” dam on March 3, 2002. The high hazard classification is based on the potential for loss of life due to bridges, roads, and buildings existing in the downstream dam breach inundation zone. The existing dam reduces flooding in Conneautville so that at least 19 properties, roads, bridges, and utilities are at reduced risk of flood damage. Dam rehabilitation will maintain flood damage reduction downstream of the dam with an average annual value estimated as $157,800.

Flood Damages

Existing flood damages from the 100-year flood are essentially eliminated by the existing dam and conduit. The flood damage reduction provided is estimated at an average annual value of $351,600. The dam provides $157,800 of average annual flood reduction benefits; the conduit $193,800. If dam safey standards are not met, the dam will have to be removed through a controlled breach resulting in an increase in average annual flood damages of $157,800 to 19 properties, roads, bridges and utilities. There is a need for continued flood damage reduction in the 100-year flood plain downstream of the dam and a requirement that the dam meet applicable NRCS and Commonwealth of Pennsylvania standards for public health and safety to reduce the risk of loss of human life.

DESCRIPTION OF EXISTING DAM

Original Project

The original project was based on a Resource Conservation and Development Measure Plan approved in April 1981. The project is located in the Borough of Conneautville, Crawford County, Pennsylvania. The project is sponsored by the Borough of Conneautville. Planning was initiated because of local interest in minimizing flood damages to residential and commercial properties and to upgrade community aesthetics and open space for incidental recreational activities. Project installation was completed in 1984. Installed measures include construction of Conneautville Dam (PA-RC&D-112; See Table E) and a conduit for flood protection.

Table E: Existing Structural Data for Conneautville Dam

Dam Name	Conneautville
Stream	Thatcher Run
Year Completed	1984
Cost	$574,000
Purpose	Flood Water Retarding
NRCS Dam Classification	C
Total Drainage Area Controlled	0.41 sq. mi.
Condition II Runoff Curve Number	77
Dam Characteristics	
Maximum Height	41 feet
Type	Earthen Embankment
Volume of Fill	33.167
Crest Length	660 feet
Auxiliary Spillway Type	Vegetative
Auxiliary Spillway Bottom Width	100 feet
Elevations (Mean Sea Level, NGVD29)	
Top of Dam	1001.4
Flood Pool	996.4
Normal Pool, Low Stage Prin. Spillway	982.6
Principal Spillway High Stage	996.4
Storage Capacity	
Total	69 acre feet
Sediment	5.63 acre feet
Floodwater retarding	60 acre feet
Surface Area	
Sediment Storage	2.0 acres
Floodwater retarding pool	7.4 acres
Principal Spillway	
Stages	
Low Stage Capacity	10.2 cfs.
High Stage Capacity	165 cfs.
Conduit Size	36 ins.
Type	Reinforced Concrete

Status of Operation and Maintenance of Dam

All material components of the dam are in good shape as a result of operation and maintenance activities by the dam's operator. NRCS inspections of the dam have not identified any material deterioration except for minor corrosion of the last section of principal spillway concrete pipe at the outlet, and small leaks in the slide gate and first pipe section (at the riser). These anomalies should be repaired. Material deterioration represents a low risk of dam failure. The Emergency Action Plan for the dam is in the process of being updated by the Borough of Conneautville in cooperation with the Crawford County Department of Emergency Services.

Sedimentation Rates

Most dams are designed to store sediment. When the sediment pool has filled to the elevation of the principal spillway inlet, the pool no longer has permanent water storage, but still maintains some level of flood control at or near its original level. As the detention pool storage is reduced due to sediment deposition, there is less flood storage capacity. The auxiliary spillway may operate, or has the potential for flowage more often. This effect on this particular dam is negligible at its current deposition rate. There is no record of the auxiliary spillway on Conneautville Dam ever carrying flood flows.

several soit test pits and confirming available storage volume by surveying the sediment pool. Approximately 0.069 acre-feet of sediment is delivered annually to the dam since construction was completed in 1984. The watershed tributary to the dam consists of well-established home sites and farmland with no signs of development or any changes beyond normal crop rotation. With no development or changes to the watershed expected, there is no present indication that the sediment delivery rate of 0.069acre-feet/year will significantly change in the future. Based on the amount of accumulated sediment and the sediment delivery rate, the remaining estimated sediment design life of the structure is approximately 82 years. The Operation and Maintenance Agreement for this rehabilitation project will not require any sediment removal.

The watershed was examined for possible sources of sediment contamination. The watershed contributing to the dam is approximately 93% pervious (240 acres) and 7% impervious (18 acres). There are no EPA Superfund Sites or sites listed on the National Priorities List (NPL). Additionally, there are no waters within the watershed assigned a Total Maximum Daily Load (TMDL) or listed on Pennsylvania's 303(d) List of Impaired Waters. No industrial sites or wastewater outfalls were observed within the watershed. Low density residential lots and farmsteads are located within the watershed. Although these building may have once used septic leach fields, the Borough installed a sanitary sewer system prior to the construction of the dam. Multiple meadows, brush lands and open fields were observed throughout the watershed with established vegetative cover, spanning approximately 27% of the watershed (69 acres). No evidence of current grazing or row crop farming operations was observed. Based on these observations, there are no sources of sediment contamination requiring further analytical review.

Breach Analysis

The breach analysis used in the development of this Watershed Plan-Environmental Evaluation is the same breach analysis that was used in the latest Emergency Action Plan for the dam. The analysis was prepared for the sponsor by NRCS in June, 1999. NRCS hazard classification is based upon the potential for loss of life resulting from a dry-weather breach of the dam. PA DEP requires evaluation of a breach of the dam in conjunction with a 72-hour Probable Maximum Precipitation (PMP) event in order to determine the potential downstream impacts. The breach analysis assumed a PMP breach with the dam at maximum stage of stored water.

Hazard Classification

The Conneautville Dam was originally constructed as an NRCS high hazard dam. This classification was based on the fact that there are state highways and bridges along with the Borough of Conneautville downstream of the dam. The Pennsylvania Department of Environmental Protection (PA, DEP), Bureau of Waterways Engineering identified this structure as a high hazard dam in March, 2002. These classifications are based upon the risk to life and property downstream in the event of a dam failure.

Potential Modes of Dam Failure

Five potential modes of failure were considered while assessing the consequences of failure of the Conneautville Dam and are described in detail below.

Stability – Results from the 6-hour SDH SITES model were used to evaluate auxiliary spillway stability per TR-60 and USDA Agricultural Handbook 667. The stability determination assumes a topsoil of class CL with retardance class C vegetation and a 0.2% design auxiliary spillway flow frequency. The stability results are summarized as follows:

- The SITES 6-hour SDH actual soil effective stress of 0.026 psf is less than the allowable stress of 0.056 psf.
- The SITES 6-hour SDH actual vegetal stress of 1.05 psf is less than the allowable stress if 4.20 psf.

The results indicate a safe dam condition, as the allowable stresses are not exceeded.

Hydrologic Capacity – The SITES modeling indicates that the principle spillway functions as designed, even with the evaluation of newer NOAA Atlas 14 rainfall statistics. Additionally, the SITES models indicate that the dam storage and auxiliary spillway geometry are capable of attenuating and conveying the PMP event without overtop of the dam. The Freeboard hydrograph runs indicate a water surface elevation of 1000.69. The existing grades along the top of the dam range from 1001.75 to 1002.14 as surveyed in November 2010, indicating that the top of dam elevation is sufficient to meet all storm events as prescribed by TR-60.

Auxiliary spillway stability and integrity results from the SITES runs indicate the dam does not breach in any of the six modeled scenarios. However, the scenarios modeling dispersive soils (Kd=1 and Kd=10) yield a headcut that infringes on the level section of the auxiliary spillway and erodes the majority of the spillway downstream of the level section.

In addition, the SITES does not fully account for the drainage feature to the left of the auxiliary spillway beginning at STA 37+00. A maintenance code of 3 was entered at this location indicating major discontinuities parallel to flow, but potential erosion and headcut are not accurately defined through this feature with SITES due to the models limited geometry input capabilities.

Additionally, hydraulic and hydrologic conditions required to inundate the 8-inch drains were evaluated. Weir calculations were performed at the end sill of the impact basin. For the drain to become submerged, 1.84 feet of flow (~75cfs) would need to occur over the top of the end sill. Calculations were also performed with the gate in the open position. To pass more than 38 cfs through the PS and begin to inundate the 8-inch drains, a headwater elevation of at least 987.6 is required. The PS only has the capacity to pass 51 cfs prior to the emergency spillway overtopping with the gate open (with the gate closed only 10.6 cfs can pass through the PS). This indicates that the 8-inch drains have never been submerged.

Seismic – The integrity and stability of an earthen embankment during an earthquake are dependent upon the presence of a stable foundation. Foundation movement through consolidations, compression, or lateral movement can cause the creation of voids within the embankment, separation of the principal spillway conduit joint, or in extreme cases, complete collapse of the embankment. The Thatcher Run Watershed is located in an area of low seismic risk; and, no historical events that would compromise structural integrity have been identified. Therefore, seismic activity reflects a low risk of dam failure.

Seepage – 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, the voids created allow even more water flow through the embankment or foundation until the dam collapses due to internal erosion. Seepage that increases with pool elevation is an indication of potential problems, as is stained or muddy water or “sand boils”. 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. Conneautville Dam does not currently exhibit obvious signs of excessive seepage. However, some seepage areas have been detected in the auxiliary spillway since the dam was constructed which may tend to lessen the integrity of the vegetation in those areas. Additionally, the concrete cradle, filter drain configuration and seepage collar detail utilized in the dam at the time of construction is not in accordance with current NRCS standards, which require that sand diaphragms be constructed to completely surround the Principle Spillway (PS) conduit. The detail utilized at the Conneautville dam includes the concrete cradle placed directly on embankment fill material. The blanket drain filter material abuts the sides of the conduit, but does not extend below the conduit. The current NRCS guidelines were implemented to address the potential for development of preferential flow paths adjacent to and below the PS conduit leading to failure of the dam. This condition is considered to be most critical for dams constructed of dispersive soils.

The concentration of jughole features above and adjacent to the PS on the downstream slope documented in historic inspections may be indicative of development of preferential seepage paths along the alignment of the conduit. Although the surface repairs made in 2005 appear to have been successful in limiting development of additional erosion features on the downstream slope, it is worth noting that the recently developed jughole on the downstream slope is located within approximately 25 ft of the PS. Also, the embankment is constructed with broadly-graded soils, which have a high potential for piping.

Material Deterioration – Material used in the principal spillway system, the foundation and embankment drains, and the pool drainage systems are subject to weathering and chemical reaction due to natural elements within the soil, water, and atmosphere. Concrete risers and conduits can deteriorate and crack, metal components will rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion cause by these leaks. Conneautville Dam has a concrete riser and conduit, along with foundation and embankment drains. All material components are in good condition. NRCS inspections of the dam have not identified any material deterioration except for minor corrosion of the last section of principal spillway concrete pipe at the outlet, and small leaks in the slide gate and first pipe section (at the riser). These anomalies should be repaired. Material deterioration represents a low risk of dam failure.
Based on issues identified by Gannet Fleming in 2004, the remedial dam repair conducted by NRCS in 2005 and recent evaluations and analyses performed by the Bioengineering Group Team, Conneautville Dam auxiliary

spillway was not designed or constructed for the capacity stated by today's standards for high hazard dams. It is necessary to maintain or improve the current level of flood damage reduction in Conneautville Borough provided by the Conneautville Dam to comply with applicable design performance and safety criteria for high hazard dams.

Consequences of Dam Failure

A catastrophic breach of the dam could occur during a probable maximum precipitation (PMP) event. This PMP event would put the lives of nearly 774 people at risk, cause major damage to some 151 properties in the Borough of Conneautville, and deposit a significant amount of sediment in the breach inundation zone. The resultant flooding and sediment deposition would fill bridge openings and severely disrupt travel routes in the Borough. The damage is estimated to be significantly in excess of $22 million.

ALTERNATIVES

Formulation Process

The Conneautville Dam Watershed Project Plan-Environmental Evaluation is formulated to address the identified watershed problems and opportunities with full consideration of the effects of various alternative solutions on other watershed resource concerns. The Sponsor's objectives are to maintain or enhance the current level of flood damage reduction afforded by the Conneautville Dam and to meet or exceed state and federal health and safety criteria. In summary, the following guidelines were used in the formulation process:

1. Meet or exceed state and federal dam safety criteria,
2. Maintain or enhance the current level of flood protection provided by Conneautville Dam and
3. Address major concerns of local residents within the scope of the Dam Rehabilitation Program and this planning process.

The action alternatives were formulated in consideration of the following four general criteria as outlined in Economic and Environmental Principles and Guidelines for Water and Related Land Resource Problems (P&G) (U.S. Water Resources Council, 1983):

1. **Completeness –** alternatives should address the purpose and need and the Sponsor's objectives for meeting the purpose and need.
2. **Effectiveness –** alternatives should reasonably alleviate identified watershed problems and help to achieve watershed opportunities.
3. **Efficiency –** alternatives should be cost -effective and if possible provide positive net economic benefits while protecting the environment.
4. **Acceptability –** alternatives should not have insurmountable adverse effects on the human environment that cannot be reasonably mitigated and should also have the *potential* to: a) be supported by the public; b) receive needed financial assistance or otherwise be able to be affordable to the Sponsor; c) comply with and receive all needed permits required by local, state and federal agencies.

In addition, formulation of alternative plans followed procedures outlined in the NRCS-National Watershed Program Manual, NRCS-National Planning Procedures Handbook, and other NRCS watershed planning policy.

The formulation process began with formal discussions between the Sponsor and the Pennsylvania Department of Environmental Protection, Bureau of Waterways Engineering (BWE). BWE conveyed state law and policy associated with high hazard dams. NRCS explained agency policy associated with the Dam Rehabilitation Program and alternative plans of action. In addition, the public was asked for feedback on the basic alternatives under consideration. As a result the following alternatives emerged that required further evaluation:

1. Future Without Project (No-Action)
No remediation or enhancements would be performed on the dam or emergency spillway. The sponsor would undertake a controlled breach of the dam thus eliminating its flood water retarding capability. The existing flood prevention conduit would remain in place. This alternative would not be eligible for federal financial assistance under the Watershed Protection and Flood Prevention Act, Public Law 83-566.

2. Decommissioning the dam
Involves restoring the stream/river by re-connecting the upstream and downstream channel in a non-erosive manner and restoring the stream/river. Dam embankment would be excavated to allow normal flows and up to 100-year flood flows through the site in a non-erosive manner. Accumulated sediment may need to be removed if directed by regulatory agencies. The decommission alternative would be developed in consideration of guidance in NRCS National Engineering Handbook, Part 653, Stream Corridor Restoration: Principles, Processes, and Practices.

3. Acquisition or relocation of at risk structures
Involves removing all structures within the breach inundation area and includes estimated costs for relocation, property acquisition, building demolition, decommissioning utilities, septic, wells and similar facilities and site stabilization/restoration.

4. Floodproofing, floodplain regulation, and other nonstructural measures
Includes measures to protect buildings from a catastrophic failure of the dam with the intent of lowering the hazard classification of the dam.

5. Decommissioning the dam plus nonstructural measures
Involves dam decommissioning plus nonstructural measures such as basement utility elevation or purchase/demolition of properties

6. Dam Rehabilitation
Dam rehabilitation will include: auxiliary spillway repair, embankment dam surface treatment, impact basin improvements, and filter diaphragm installation.

Alternatives Eliminated from Detailed Study

Alternative 2 – Decommissioning Conneautville Dam would involve removing the floodwater retarding capacity by removing the embankment down to the valley floor, removing the principal spillway and appurtenant features, and restoring the floodplain topography to the pre-dam conditions.

Estimated Cost: $1,364,000

The damages, damage reduction, costs and benefits for this alternative are:

Average Annual Flood Damage	$157,800	Average Annual Cost	$63,500
Average Annual Benefits	$21,800	Net Benefits	($41,700)
Remaining Flood Damage	$157,800	B:C Ratio	0.3:1

Decommissioning leaves 19 properties, roads, bridges and utilities at risk for flooding. Average annual damages of $157,800 remain. This alternative does not meet the project purpose and need to provide a 100-year level of flood protection for the community.

Alternative 3 –Property acquisition and demolition of at risk structures for 151 residential and commercial properties located in the dam breach inundation zone would prevent damages from a catastrophic breach in excess of $22,000,000. The purpose of the existing dam is to substantially reduce flood damages to central Conneautville. Removing the properties protected by the dam would eliminate the need for the dam. In addition to the excessive costs, this alternative would result in the elimination of a large portion of downtown Conneautville.

Estimated Cost: $24,000,000

Alternative 4 – Floodproofing, floodplain regulation, and other nonstructural alternatives are eliminated from further study because they do not address the effects of a catastrophic dam failure. The original RC&D Measure Plan for the Conneautville Flood Prevention Project presented a brief discussion of an alternative that included “some degree” of flood proofing for 45 structures. There are 151 properties and 774 people in Conneautville, as well as roads, bridges, utilities and other infrastructure at risk in the catastrophic failure inundation zone. Damages from a catastrophic breach are well in excess of $22,000,000.

Estimated Cost: $24,000,000

Alternative 5 – An alternative combining decommissioning of the current structure and nonstructural flood damage reduction measures for the remaining 19 at risk properties was considered. Nonstructural measures include basement utility elevation or purchase/demolition of properties continuing to experience first floor flooding. Following is the estimated cost for this alternative.

Estimated Cost: $3,927,000

Average Annual Flood Damage	$157,800	Average Annual Cost	$183,800
Average Annual Benefits	$128,200	Net Benefits	($55,600)
Remaining Flood Damage	$51,400	B:C Ratio	0.7:1

This alternative is eliminated from further study because of high cost (nearly twice the cost of the rehabilitation alternative), substantial remaining average annual damages to roads, bridges and utilities, and negative net benefits.

No Action Alternative/Future Without Project

Alternative 1 – Future Without Project (FWOP). Removing a section of the dam embankment, the concrete cradle and principle spillway, along with stabilizing the constructed channel represents an option for complying with the mandate from the Pennsylvania Department of Environmental Protection to fix or remove the dam. Dam removal would be accomplished by cutting out a sufficient section of the embankment down to the valley floor, approximately 30-feet wide, to pass the flood resulting from the 100-year, 24-hour rainfall without impoundment behind the remaining embankment. For stability, remnants of the embankment would be shaped to a 2:1 slope from both sides of the channel. Approximately 11,000 cubic yards of fill would be removed and disposed of within the existing borrow areas above the 100-year floodplain. The new stream banks created by the dam removal would need to be stabilized from excessive erosion.

FWOP - Estimated Cost: $468,000.

Nineteen properties remain at risk. The following damages, damage reduction, costs and benefits for this alternative are:

Average Annual Flood Damage	$157,800	Average Annual Cost	$21,800
Average Annual Benefits	$0	Net Benefits	($21,800)
Remaining Flood Damage	$157,800	B:C Ratio	N/A

No Federal cost share assistance for construction will be expended to implement this alternative.

National Economic Development (NED) Alternative

Alternative 6 – Dam Rehabilitation. Rehabilitation will include auxiliary spillway repair, embankment dam surface treatment, impact basin improvements, and filter diaphragm installation. Auxiliary spillway repair will consist of a sheetpile wall constructed along the existing ravine and green bioengineering with livestakes and seeding to stabilize the ravine. Dispersive soils in the auxiliary spillway and embankment will be treated with a lime amendment. Impact basin improvements will consist of wingwall extension or equivalent. Rehabilitation of the embankment dam includes installation of a filter diaphragm below and adjacent to the principal spillway conduit. The dam currently exists as a dry dam so there will be no need for drawdown to install these measures. No sediment will be removed as part of this alternative. The proposed rehabilitated measures, are illustrated on the Project Site Map (Appendix B)

No compensatory mitigation is required. Other mitigation includes such things as keeping sediment out of streams and site watering to control dust. NRCS and the project sponsor will apply for and comply with all state and local erosion and sediment requirements administered by the Crawford County Conservation District and the Pennsylvania Department of Environmental Protection.

Dam Rehabilitation is the NED Alternative and is the most cost effective of the alternatives considered. This is the Sponsor and NRCS preferred alternative.

Dam Rehabilitation - Estimated Cost: $2,090,000

Average Annual Flood Damage	$157,800	Average Annual Cost	$104,700
Average Annual Benefits	$179,600	Net Benefits	$74,900
Remaining Flood Damage	$0	B:C Ratio	1.7:1

Dam rehabilitation meets the Sponsor's objectives to continue providing flood protection for the residents of the Borough of Conneautville for the next 50 years and meets the dam safety and performance requirements of the Commonwealth of Pennsylvania and the Natural Resources Conservation Service (NRCS).

Table F: Summary and Comparison of Alternative Plans

Note: Other relevant issues and concerns are compared on the Environmental Evaluation Worksheet in the Environmental Consequences section.

	Future Without Project [1] (vs. Existing Condition)	**Dam Rehabilitation**
Measures	Controlled breach of dam by Sponsor Cut notch through dam Stabilize channel	Auxiliary spillway repair, including dispersive soil treatment, sheetpile wall and green bioengineering Embankment dam dispersive soil treatment Impact basin improvements
Total Investment	$468,000	$2,090,000
PL 83-566 Funds	$0	$1,547,500
Other Funds	$468,000	$542,500
Difference in cost from Future Without Project	$0	+$1,622,000

[1/] Future Without Project (No Federal Action)

Table G: National Economic Development Account[2/]

	Future Without Project [1] (vs. Existing Condition)	**Dam Rehabilitation**
Average Annual Benefits	0	$179,600
Average Annual Costs	$21,800	$104,700
Net Beneficial	(21,800)	$74,900

[1/] Future Without Project (No Federal Action)

[2/] Price base 2012, amortized over 50 years at a discount rate of 3.75 percent. Based on total economic benefits and costs of alternatives as compared to existing condition

Environmental Consequences

The NRCS-CPA-52 documents the environmental effects of the proposed action.

U.S. Department of Agriculture Natural Resources Conservation Service	NRCS-CPA-52 6/2010	A. Client Name: Borough of Conneautville, PA	
ENVIRONMENTAL EVALUATION WORKSHEET		B. Conservation Plan ID # (as applicable): Program Authority (optional): Section 14 of PL 83-566, the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Parts 1001-1008, 1010, 1012)	
D. Client's Objective(s) (purpose): 1) Maintain downstream flood damage reduction benefits 2) Meet current dam safety standards		C. Identification # (farm, tract, field #, etc as required): NRCS Dam No. PA-RC&D-112	

E. Need for Action:	G. Alternatives		
	No Action- Alt 1 √ if RMS ☐	*Dam Rehabilitation- Alt 6* √ if RMS ☐	√ if RMS ☐
The current dam does not meet NRCS and PA DEP high hazard dam safety standards. There is a need to alleviate dam safety concerns while maintaining the current 100-year flood protection downstream of dam.	No Federal Action / Future Without Project (FWOP) - Sponsor controlled breach of dam, including vegetated stabilization of site. Existing downstream conduit remains in-place.	Rehabilitate the dam to meet current safety standards and to continue to provide the existing level of flood protection to Conneautville Borough	

Resource Concerns

In Section "F" below, analyze, record, and address concerns identified through the Resources Inventory process. (See FOTG Section III - Resource Quality Criteria for guidance).

F. Resource Concerns and Existing / Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	H. Effects of Alternatives					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC
SOIL						
Erosion (Sheet and Rill) No significant sheet and rill erosion is evident above or below the dam.	No change upstream. Short-term increase in suspended sediment and turbidity downstream during construction, but proper controls will minimize erosion. With dam removed, sediment loading will increase downstream at rate of 0.069 ac-ft per year.	NOT meet ☐ QC	No change upstream. Short-term increase in suspended sediment and turbidity downstream during construction, but proper controls will minimize erosion. Sediment pool will continue to trap 0.069 ac-ft per year of sediment.	NOT meet ☐ QC		NOT meet ☐ QC
Erosion (Ephemeral Gully) Some gullying and jug holes occur on the existing embankment	The current gullying and jug holes will continue to grow larger on those portions of the dam slopes that are not removed by the 30 foot wide breach.	NOT meet ☐ QC	Erosion prevention treatments implemented as part of the dam rehabilitation will stabilize active erosion areas on the embankment, auxiliary spillway and ravine.	NOT meet ☐ QC		NOT meet ☐ QC
Erosion (Streambank) No significant stream bank erosion is evident above or below the dam	Increased stream flows may result in moderate increases in downstream erosion and undercutting of stream banks during high flow events. To reduce risk of such erosion, stream banks will be stabilized and protected from erosion, using bioengineering methods and other BMPs.	NOT meet ☐ QC	No change. Streambanks remain stable above and below dam.	NOT meet ☐ QC		NOT meet ☐ QC
Condition (Organic Matter) N/A	N/A	NOT meet ☐ QC	N/A	NOT meet ☐ QC		NOT meet ☐ QC
Condition (Compaction) N/A	N/A	NOT meet ☐ QC	N/A	NOT meet ☐ QC		NOT meet ☐ QC

F. Resource Concerns and Existing / Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	H. Effects of Alternatives (continued)					
	No Action- Alt 1		*Dam Rehabilitation- Alt 6*			
	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC
WATER						
Quantity (Excessive Subsurface Water) No excessive subsurface water	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quantity (Excessive Seepage) No excessive seepage	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quantity (Excessive Runoff, Flooding, or Ponding) 100 year flooding in Conneautville was eliminated with installation of the Conneautville Dam and Conduit. Flood damage prevention from the dam alone has an average annual value estimated at $157,800	Increased flooding in Conneautville, as shown on the 100-year Floodplain Map in Appendix C, so that 19 properties, roads, bridges and utilities will be at greater risk of flood damage. Average annual flood damage reduction benefit of $157,800 will be lost.	NOT meet ☐ QC	Maintain flood damage reduction downstream of the dam with an average annual value estimated at $157,800.	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Surface Water: Harmful Levels of Pesticides) According to the PADEP's MapPA neither Thatcher Run nor Conneaut Creek are on the 303(d) list and no TMDL's have been established for these water bodies	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Groundwater: Harmful Levels of Pesticides) No harmful levels of pesticides in groundwater	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Surface Water: Excessive Nutrients and Organics) According to the PADEP's MapPA neither Thatcher Run nor Conneaut Creek are on the 303(d) list and no TMDL's have been established for these water bodies	Increased downstream impacts to water quality by reducing the current detention time for water above the dam. In turn, this may reduce the settling and deposition of suspended sediment now occurring above the dam, leading to increased downstream transport of nutrients adsorbed to suspended sediments, further degrading surface water quality in Thatcher Run and Conneaut Creek.	NOT meet ☐ QC	By reducing the amount of erosion from growing jug holes and along the auxiliary spillway the dam rehabilitation measures will reduce the amount of soil erosion and downstream sediment transport, thus reducing downstream turbidity and nutrient loading impacts of suspended sediments currently migrating downstream from these erosional features.	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Groundwater: Excessive Nutrients and Organics) No excessive nutrients and organics in ground water	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Surface Water: Excessive Susp. Sedmt & Turbidity) No chronic condition with excessive suspended sediment and turbidity reported in Thatcher Run below the dam	Increase in suspended sediment and turbidity below existing dam during controlled breach, but this will be reduced with proper erosion and sediment control BMPs. The 0.069 ac-ft/year of sediment currently trapped by dam will be delivered downstream.	NOT meet ☐ QC	Temporary increases in suspended sediment and turbidity below dam during rehabilitation activities but this will be alleviated with proper erosion and sediment control BMPs. Sediment pool will continue to trap 0.069 acre-feet/year of sediment.	NOT meet ☐ QC		NOT meet ☐ QC

F. Resource Concerns and Existing / Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	H. Effects of Alternatives (continued)					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC
WATER						
Quality (Surface Water: Harmful Temperatures) No harmful temperatures in surface water	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Surface Water: Harmful Levels of Pathogens) No harmful levels of pathogens in surface water	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Groundwater: Harmful Levels of Pathogens) No harmful levels of pathogens in ground water	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Other None	None	NOT meet ☐ QC	None	NOT meet ☐ QC		NOT meet ☐ QC
AIR						
Pennsylvania air quality nonattainment counties can be found at: **PM 2.5:** http://www.epa.gov/reg3artd/airquality/pm25nonattareas.htm **Ozone:** http://www.epa.gov/reg3artd/airquality/ozone8hrmaintareas_2.htm						
Quality [Particulate Matter < 2.5µm diameter ("PM 2.5") No areas in Crawford County are designated as non-attainment areas for PM 2.5 or other criteria pollutants.	Minimal, short term, highly localized emissions of PM 2.5 may result from the use of diesel equipment and earth disturbances may cause localized increases in dust and coarse, airborne particulate matter that will be controlled using dust and erosion control BMPs.	NOT meet ☐ QC	Minimal, short term, highly localized emissions of PM 2.5 may result from the use of diesel equipment and earth disturbances may cause localized increases in dust and coarse, airborne particulate matter that will be controlled using dust and erosion control BMPs.	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Excessive Ozone) No areas in Crawford County are currently designated as non-attainment areas for ozone or other criteria pollutants.	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Chemical Drift) N/A	N/A	NOT meet ☐ QC	N/A	NOT meet ☐ QC		NOT meet ☐ QC
Quality (Objectionable Odors) No objectionable odors	No effect	NOT meet ☐ QC	No effect	NOT meet ☐ QC		NOT meet ☐ QC
Other None	None	NOT meet ☐ QC	None	NOT meet ☐ QC		NOT meet ☐ QC

F. Resource Concerns and Existing / Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	H. Effects of Alternatives (continued)					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC
PLANTS						
Condition (Noxious and Invasive Plants) Minor occurrences of invasive plant species observed, mostly confined to the mowed areas on the embankment.	Minor occurrences may proliferate following the Sponsor controlled breach. However, replanting of newly exposed soils with adapted species will help minimize the effect.	NOT meet ☐ QC	Minor occurrences of invasive plant species, mostly confined to the mowed areas on the embankment, are not expected to proliferate due to replanting of newly exposed soils with adapted species and long term vegetation management measures such as continued mowing.	NOT meet ☐ QC		NOT meet ☐ QC
Other None	None	NOT meet ☐ QC	None	NOT meet ☐ QC		NOT meet ☐ QC
ANIMALS						
Fish and wildlife (Inadequate Cover/Shelter)	Temporary minor impacts during construction to areas of minimal habitat quality. Minor beneficial impact on fish, wildlife and riparian habitat by restoring open channel habitat within the zone of the breach.	NOT meet ☐ QC	Temporary minor impacts during construction to areas of minimal habitat quality (dam embankment and auxiliary spillway).	NOT meet ☐ QC		NOT meet ☐ QC
Domestic animals (Inadequate Quantities and Qual. of Feed & N/A	N/A	NOT meet ☐ QC	N/A	NOT meet ☐ QC		NOT meet ☐ QC
Domestic animals (Inadequate Stock Water) N/A	N/A	NOT meet ☐ QC	N/A	NOT meet ☐ QC		NOT meet ☐ QC
Other None	None	NOT meet ☐ QC	None	NOT meet ☐ QC		NOT meet ☐ QC
HUMAN - Economic and Social Considerations						
Land Use Meadow/Cropland-104 ac, Woodland-255 ac, Developed land-74 ac, Open land-28ac; Total-461 ac	The 30 foot wide breach area will be replanted with native riparian woodland vegetation, slightly increasing the woodland habitat acreage.		No change from current condition.			
Public Health and Safety Existing dam and conduit provide 100-year flood protection to homes, businesses, roads, bridges, and utilities in the Borough of Conneautville. The dam does not meet current high hazard dam safety standards.	As shown on the FWOP 100-year flood plain map of Appendix C, a controlled breach of the dam will increase flooding for the 100-year rainfall event in Conneautville, with 19 properties, roads, bridges and utilities at greater risk of flood damage. Increased risk to emergency responders after floods.		No change, 100-year flood protection continues. Reduced risk to 774 people.			
Labor Higher than normal labor required for dam operation and management due to unstable embankment. Little need for emergency responders after major rain events.	Little operation and management requirements since dam will be removed. Increased need for emergency responders after floods.		Less operation and maintence needs due to stabilized dam embankment. Little need for emergency responders after major rain events			

F. Resource Concerns and Existing / Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	H. Effects of Alternatives (continued)					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC	Amount, Status, Description (short and long term)	√ if does NOT meet QC
HUMAN - Economic and Social Considerations						
Management Level Management of dam is complicated by unstable embankment. Little need for flood preparedness operations with dam in-place	Management of dam will be eliminated. Management of communitiy flood preparedness and operations will increase substantially.		Management of dam will be substantially reduced due to stablized embankment. Need for flood preparedness and operations remains low.			
Other None	None		None			

Special Environmental Concerns: Environmental Laws, Executive Orders, policies, etc.

In Section "I" complete and attach applicable Environmental Procedures Guide Sheets for documentation. Items with a "•" may require a federal permit or consultation/coordination between the lead agency and another government agency. In these cases, effects may need to be determined in consultation with another agency. Planning and practice implementation may proceed for practices not involved in consultation.

I. Special Environmental Concerns (Document compliance with Environmental Laws, Executive Orders, policies, etc.)	J. Impacts to Special Environmental Concerns					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action
•Clean Air Act www.epa.gov/airquality/greenbook	Upon Review, Not Applicable	☐	Upon Review, Not Applicable	☐		☐
•Clean Water Act / Waters of the U.S. Conneautville Borough is currently in compliance with provisions of the CWA. http://www.dep.state.pa.us/watermanagement_apps/tmdl/ and http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554276&mode=2	There will be no discharges of dredge or fill material into jurisdictional waters of the U.S., including wetlands, protected under Section 404 of the CWA. Some minimal discharge of suspended sediments into downstream reaches of Thatcher Run may occur during construction but this mostly will be prevented or minimized through the use of erosion and sedimentation control BMPs to assure that the Borough of Conneautville will be in compliance with provisions of the CWA, as well as the NPDES construction stormwater general permit and associated SWPPP.	☐	There will be no discharges of dredge or fill material into jurisdictional waters of the U.S., including wetlands, protected under Section 404 of the CWA. Some minimal discharge of suspended sediments into downstream reaches of Thatcher Run may occur during construction but this mostly will be prevented or minimized through the use of erosion and sedimentation control BMPs to assure that the Borough of Conneautville will be in compliance with provisions of the CWA, as well as the NPDES construction stormwater general permit and associated SWPPP.	☑		☐
•Coastal Zone Management None in project area http://www.dep.state.pa.us/river/about/about.htm	Upon Review, Not Applicable	☐	Upon Review, Not Applicable	☐		☐
Coral Reefs	N/A	☐	N/A	☐		☐
•Cultural Resources / Historic Properties The National Register of Historic Places http://nrhp.focus.nps.gov and consutation with SHPO	Upon Review, No Effect	☐	Upon Review, No Effect	☐		☐

I. Special Environmental Concerns (Document compliance with Environmental Laws, Executive Orders, policies, etc.)	J. Impacts to Special Environmental Concerns (continued)					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action
•Endangered and Threatened Species PNDI search http://www.naturalheritage.state.pa.us/	Upon Review, No Effect There are no federal or state-listed species of rare, threatened or endangered flora or fauna inhabiting the project site or areas downstream of the dam. See details in Affected Environment discussion.	☐	Upon Review, No Effect There are no federal or state-listed species of rare, threatened or endangered flora or fauna inhabiting the project site or areas downstream of the dam. See details in Affected Environment discussion.	☐		☐
Environmental Justice 2010 Census Data	No disproportionate adverse effects are anticipated to any ethnic, racial or socioeconomically disadvantaged families or groups downstream of the project, even if they reside in any of the 19 properties, roads, bridges, and utilities that would suffer increased flood damages within the breach inundation zone under the FWOP option.	☐	No disproportionate risk of adverse effects on particular ethnic, racial or other socioeconomically disadvantaged families or groups.	☐		☐
•Essential Fish Habitat None in PA	N/A	☐	N/A	☐		☐
Floodplain Management See 100 year and 500 year floodplain maps in Appendix C	A controlled breach of the dam will increase flooding in Conneautville so that at least 19 properties, roads, bridges, and utilities will be at increased risk of flood damage, with average annual flood damages of $157,800.	☐	Maintains current 100-year and 500-year floodplains downstream of the dam and maintains flood damge reduction benefits of $157,800 annually.	☑		☑
Invasive Species A few minor, scattered occurrences of herbaceous invasive species observed on the dam embankment. No invasive fauna are known in project area.	Minor occurrences may proliferate following the Sponsor controlled breach. However, replanting of newly exposed soils with adapted species will help minimize the effect.	☐	Minor occurrences of invasive plant species, mostly confined to the mowed areas on the embankment, are not expected to proliferate due to replanting of newly exposed soils with adapted species and long term vegetation management measures such as continued mowing.	☐		☐
•Migratory Birds/Bald and Golden Eagle Protection Act Typical assemblage of migratory birds that would be expected in a mixed urban, forest, and open habitat. No known occurrence of Bald or Golden Eagles.	No effect on eagles. Short term reduction in migratory bird habitat during the controlled breaching of the dam and until vegetation is reestablished.	☐	No effect on eagles. Short term reduction in migratory bird habitat during rehabilitation of the dam and until vegetation is reestablished.	☐		☐
Prime and Unique Farmlands None in the project impact area	Upon Review, Not Applicable	☐	Upon Review, Not Applicable	☐		☐
Riparian Area Determined by on-site observation	This alternative will slightly increase the current riparian area when the dam embankment is removed.	☐	No change in current riparian habitat	☐		☐
Sole Source Aquifers None in project area	Upon Review, Not Applicable	☐	Upon Review, Not Applicable	☐		☐

I. Special Environmental Concerns (Document compliance with Environmental Laws, Executive Orders, policies, etc.)	J. Impacts to Special Environmental Concerns (continued)					
	No Action- Alt 1		*Dam Rehabilitation-Alt 6*			
	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action	Status and progress of compliance. (Complete and attach Guide Sheets as applicable)	√ if needs further action
•Wetlands Estimated 0.5 acres of wetland present in current temporary flood pool behind dam	There will be a change in site hydrology, but no direct effect on wetlands. The current wetland will gradually become drier, triggering a change in the plant community composition.	☐	Upon Review, No Effect	☐		☐
•Wild and Scenic Rivers None in project area http://www.dcnr.state.pa.us/brc/rivers/scenicrivers/	Upon Review, Not Applicable	☐	Upon Review, Not Applicable	☐		☐
K. Other Agencies and Broad Public Concerns	*No Action- Alt 1*		*Dam Rehabilitation-Alt 6*			
Easements, Permissions, Public Review, or Permits Required and Agencies Consulted.	NPDES Construction Permit, Crawford County Conservation District Erosion and Sediment Control Plan Review and possibly Pennsylvania Chapter 105 stream encroachment permit		Pennsylvania Dam Permit, NPDES Construction Permit and Crawford County Conservation District Erosion and Sediment Control Plan Review			
Cumulative Effects Narrative (Describe the cumulative impacts considered, including past, present and known future actions regardless of who performed the actions)	Cumulative environmental and socioeconomic impacts of the FWOP/sponsor breach alternative would be increased flood damages to 19 properties, roads, bridges, and utilities, potential damages to other infrastructure and commerce downstream of the breached dam, as well as potential ecological damages to water quality, stream bank stability, and riparian habitat from increased flow velocities and resultant erosion of stream banks and riparian/floodplain habitats.		No adverse cumulative environmental, socioeconomic, or infrastructural impacts are anticipated for the dam rehabilitation alternative.			
L. Mitigation	No compensatory mitigation required. Erosion, sediment and, dust controls and re-vegetation of disturbed areas will be utilized to minimize temporary effects.		No compensatory mitigation required. Erosion, sediment and, dust controls and re-vegetation of disturbed areas will be utilized to minimize temporary effects.			
M. Preferred Alternative — √ preferred alternative	☐		☑		☐	
Supporting reason			This rehabilitation alternative will result in the dam meeting current high hazard dam safety standards, continues to protect 19 properties, roads, bridges, and utilities from flood damage, and maintains $157,800 in average annual flood damage reduction benefits. This is the National Economic Development (NED) Alternative with net benefits of $74,900 and a B:C ratio of 1.7 to 1.0. On 2/23/12, the Conneautville Borough Council approved this alternative.			

N. Context (Record context of alternatives analysis) | local | regional | national

The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.

O. Determination of Significance or Extraordinary Circumstances

Intensity: Refers to the severity of impact. Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

If you answer ANY of the below questions "yes" then contact the State Environmental Liaison as there may be extraordinary circumstances and significance issues to consider and a site specific NEPA analysis may be required.

Yes	No	
☐	☑	• Is the preferred alternative expected to cause significant effects on public health or safety?
☐	☑	• Is the preferred alternative expected to significantly effect unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?
☐	☑	• Are the effects of the preferred alternative on the quality of the human environment likely to be highly controversial?
☐	☑	• Does the preferred alternative have highly uncertain effects or involve unique or unknown risks on the human environment?
☐	☑	• Does the preferred alternative establish a precedent for future actions with significant impacts or represent a decision in principle about a future consideration?
☐	☑	• Is the preferred alternative known or reasonably expected to have potentially significant environment impacts to the quality of the human environment either individually or cumulatively over time?
☐	☑	• Will the preferred alternative likely have a significant adverse effect on ANY of the special environmental concerns? Use the Evaluation Procedure Guide Sheets to assist in this determination. This includes, but is not limited to, concerns such as cultural or historical resources, endangered and threatened species, environmental justice, wetlands, floodplains, coastal zones, coral reefs, essential fish habitat, wild and scenic rivers, clean air, riparian areas, natural areas, and invasive species.
☐	☑	• Will the preferred alternative threaten a violation of Federal, State, or local law or requirements for the protection of the environment?

P. The information recorded above is based on the best available information:
In the case where a non-NRCS person (i.e. a TSP) assists with planning they are to sign the first signature block and then NRCS is to sign the second block as the responsible federal agency for the planning action.

Signature (TSP if applicable)	Title	Date
Jeffry D. Malcord	Natural Resources Specialist	11/2/2012
Signature (NRCS)	**Title**	**Date**
Denise Calm	State Conservationist	11/13/12

The following sections are to be completed by the Responsible Federal Official (RFO)

Q. NEPA Compliance Finding (check one)
The preferred alternative:

		Action required
☐	1) is **not a federal action** where the agency has control or responsibility.	Document in "R.1" below. No additional analysis is required
☑	2) is a federal action that is **categorically excluded** from further environmental analysis **and** there are no extraordinary circumstances.	Document in "R.2" below. No additional analysis is required
☐	3) is a federal action that has been **sufficiently analyzed** in an existing Agency state, regional, or national NEPA document **and** there are no predicted significant adverse environmental effects or extraordinary circumstances.	Document in "R.1" below. No additional analysis is required.
☐	4) is a federal action that has been sufficiently analyzed in another Federal agency's NEPA document (EA or EIS) that addresses the proposed NRCS action and its' effects **and has been formally adopted by NRCS**. NRCS is required to prepare and publish the agency's own Finding of No Significant Impact for an EA or Record of Decision for an EIS when adopting another agency's EA or EIS document. **Note: This box is not applicable to FSA.**	Contact the State Environmental Liaison for list of NEPA documents formally adopted and available for tiering. Document in "R.1" below. No additional analysis is required
☐	5) is a federal action that has **NOT** been sufficiently analyzed or may involve predicted significant adverse environmental effects or extraordinary circumstances and may require an EA or EIS.	Contact the State Environmental Liaison. Further NEPA analysis required.

R. Rationale Supporting the Finding	
R.1 Findings Documentation	
R.2 Applicable Categorical Exclusion(s) (more than one may apply)	(1) Planting appropriate herbaceous and woody vegetation, which does not include noxious weeds or invasive plants, on disturbed sites to restore and maintain the sites ecological functions and services; Requires that the established vegetative community maintain the sites ecological functions and services, which could not be accomplished by converting native forests or grasslands.
	(14) Repairing or maintaining principal spillways and appurtenances associated with existing serviceable dams, originally constructed to NRCS standards, in order to meet current safety standards. Work will be confined to the existing footprint of the dam, and no major change in reservoir or downstream operations will result;
	(15) Repairing or improving (deepening/widening/armoring) existing auxiliary/emergency spillways associated with dams, originally constructed to NRCS standards, in order to meet current safety standards. Work will be confined to the dam or abutment areas, and no major change in reservoir or downstream operation will result;
	(16) Repairing embankment slope failures on structures, originally built to NRCS standards, where the work is confined to the embankment or abutment areas;

I have considered the effects of the alternatives on the Resource Concerns, Economic and Social Considerations, Special Environmental Concerns, and Extraordinary Circumstances as defined by Agency regulation and policy.

S. Signature of Responsible Federal Official:

Signature	Title	Date
[illegible]	State Conservationist	11/13/12

Additional notes

CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

To begin the planning process a meeting was held on November 16, 2010 with the Conneautville Borough Council and opened to the public. A meeting notice was posted in the local newspaper. The meeting included a presentation on the planning and implementation aspects of the dam rehabilitation. There was also an opportunity for the Council and other attendees to voice any concerns they anticipated with the project. Shortly after this meeting a Public Participation Plan was prepared to serve as a guide for carrying out the activities related to consultation, coordination and public participation. Members of the planning team visited the Crawford County Planning Office to seek information regarding issues or concerns that local planners might have. The planning effort was conducted with close coordination with the Pennsylvania Department of Environment Division of Waterways Engineering Dam Safety Staff. Representatives from this office attended the meeting on February 23, 2012. A second meeting was held with the Borough Council and the public on February 23, 2012. At this meeting the alternatives were presented and discussed. At the conclusion the Borough Council voted to select the rehabilitation alternative. On June 1, 2012 a copy of the Summary of the Conneautville Watershed Project Plan - Environmental Evaluation was sent to key local, regional, state and federal agencies requesting comments on the proposed actions. Comments received as a result of this request will be considered and included in the final Plan and Environmental Evaluation.

Following is a list of the agencies and elected officials that received the Summary of the Conneautville Watershed Watershed Project Plan - Environmental Evaluation:

Appalachian Regional Commission
Association of Dam Safety Officials
Pennsylvania Emergency Management Agency
Conneautville Borough Council
Crawford County Conservation District
Crawford County Office of Emergency Services
Crawford County Planning Commission
Division of Dam Safety, Bureau of Waterways, Engineering & Wetlands
Pennsylvania's Governors Policy Office
Pennsylvania's Association of Floodplain Managers
Pennsylvania DEP Northcentral Office
Pennsylvania's Soil Resource Conservation & Development
The Honorable Robert B. Casey, Jr.
The Honorable Michael Kelly
The Honorable Robert D. Robbins
The Honorable Bradley T. Roae
The Honorable Patrick Toomey
The Honorable John R. Evans
US Fish & Wildlife Service

Prior to construction of the dam, consultation with the State Historic Program Office (SHPO) and Crawford County Historical Society determined that there were no archeological, historic, or cultural resources would be disturbed by the proposed dam construction. These consultations and conclusions were previously reported in the Environmental Assessment included in the 1981 Measures Plan. Since the dam was built in the footprint previously cleared for such resources, none of the proposed project alternatives pose a risk of impact to archeological or historic resources. A recent follow-up review of The National Register of Historic Places website [http://nrhp.focus.nps.gov] reconfirmed that while several historical sites are nationally listed for Crawford County, none occur in the Borough of Conneautville or the watershed. A recent follow-up with the Pennsylvania Historical and Museum Commission confirmed there are no known archeological or historical sites in the area of potential effect.

The U.S. Fish & Wildlife Service was consulted and they responded that no federally listed species under their jurisdiction is known or likely to occur in the project area.

No consultation with the Army Corps of Engineers was necessary because the project will not alter or adversely impact reaches of Thatcher Run or Conneautville Creek downstream of the dam. No Clean Water Act Section 404 permit is required for this project since no material will be filled or dredged.

The Pennsylvania Natural Diversity Inventory (PNDI) online database was queried in February 2011 to determine if protected species or species proposed for protection ranged within the watershed). As documented in the NRCS-CPA-52 form, this review of the natural heritage data indicates that none of the project alternatives pose a risk of adverse impact to individuals, populations or habitats of federal or state-listed species of endangered or threatened flora or fauna.

THE PREFERRED ALTERNATIVE

Rationale for Alternative Preference

Six alternatives (Sponsor Breach – FWOP, Decommissioning, Acquisition of at risk structures, Other nonstructural alternatives, Decommissioning and nonstructural, Dam rehabilitation) were developed and presented to the Conneautville Borough on February 23, 2012. Two of these alternatives (FWOP and Dam Rehabilitation) merited detailed evaluation. The Borough Council voted to proceed with development of Dam Rehabilitation. This is the Preferred Alternative of both NRCS and the Council.

The Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation meets all applicable USDA-Natural Resources Conservation Service (NRCS) and Commonwealth of Pennsylvania dam safety and performance standards and extends the useful life of the Conneautville Dam (PA-RC&D-112) beyond its original evaluated life expectancy.

The Economic and Environmental Principles and Guidelines for Planning Water and Land Related Resources Implementation Studies require the evaluation of a National Economic Development Alternative (NED). This alternative is defined as that which maximizes the net benefits, consistent with protecting the Nation's environment. The Dam Rehabilitation Alternative meets the tests of completeness, effectiveness, efficiency and acceptability. The Preferred Alternative is the NED Alternative with net benefits of $74,900 and a B:C ratio of 1.7 to 1.0.

Measures to be Installed

The Preferred Alternative consists of rehabilitating an aging floodwater retarding structure, Conneautville Dam (PA-RC&D-112), to meet current dam design, performance and safety criteria and to extend its service life by 50 years. Rehabilitation will include auxiliary spillway repair, embankment dam surface treatment, impact basin improvements, and filter diaphragm installation. See Project Maps in Appendix B. These construction activities will correct identified dam deficiencies.

Auxiliary spillway repair will consist of a sheetpile wall constructed along the existing ravine. The sheetpile wall would be sized and constructed per NRCS guidelines and extend approximately 600 feet from the level section of the auxiliary spillway to the exit channel. Approximately 0.75 acres of green bioengineering measures will be implemented adjacent to the wall and will consist of livestakes and seeding to stabilize the ravine. The auxiliary spillway will be treated with a lime amendment to a depth of 3 feet to mitigate the dispersive nature of the spillway material.

Remediation of surficial erosion of the embankment dam consists of excavation of the surficial embankment soils to a depth of three feet and replacing the excavated soil with compacted lime-amended soil fill. Impact basin improvements will consist of wingwall extension or equivalent. Rehabilitation includes installation of a filter diaphragm below and adjacent to the principal spillway conduit, from the upstream limit of the existing blanket drain to the impact basin. The filter diaphragm will be tied in to the existing chimney and blanket drain system. The filter diaphragm will be sized and designed per NRCS guidelines (NEH Part 628 Chapter 45 Filter Diaphragms). Construction of the filter diaphragm will involve replacing approximately 60 feet of principal spillway conduit and adjacent PVC blanket drains, as well as modifications to the impact basin to accommodate realigned blanket drains.

No sediment removal is planned as part of dam rehabilitation since there is sufficient sediment storage capacity for the evaluated life of the dam. When the planned measures are completed, there will be only temporary storage of floodwater behind the dam in the future.

Table H: Comparison of Structural Physical Data

Conneautville Dam	Unit	Existing	Planned
Elevation Top of Dam	MSL 1/	1001.4	1001.4
Elevation Auxiliary Spillway	MSL 1/	996.4	996.4
Elevation Principal Spillway Low Stage	MSL 1/	982.6	982.6
Elevation Principal Spillway High Stage	MSL 1/	996.4	996.4
Dam Crest Length	Feet	660	660
Principal Spillway	Type	Concrete	Concrete
Auxiliary Spillway	Type	Vegetated	Vegetated
Sediment Storage (submerged)	Acre-Feet	5.63	5.63
Total Capacity - to top of dam	Acre-Feet	69	69

1/ Mean Sea Level, NGVD29

Mitigation

No compensatory mitigation is required.

All construction will be conducted so as to minimize erosion and sedimentation, including the development of an erosion and sediment control plan as part of the permitting process. Vegetation will be established immediately following construction on all land disturbed by construction activities. Appropriate plants for erosion control and wildlife habitat will be selected based upon the installation season, soils, surrounding vegetation, and Sponsor's preference.

In order to take precautions regarding introduction of invasive species as disturbed areas are being re-vegetated, the construction contract will include standards and specifications drawn from the NRCS Field Office Technical Guide requiring mechanical and/or chemical means of control.

All needed measures will be taken to mitigate (avoid, minimize, and compensate) any adverse impacts during construction and may include timing of the work, sediment controls such as seeding, mulching and silt fences and wetting construction areas to reduce dust.

Permits and Compliance

Dam Permit and General Permits. The dam operator, Borough of Conneautville, will be responsible for obtaining a Dam Permit from Pennsylvania Department of Environmental Protection (PA DEP), Bureau of Waterways Engineering, prior to commencing construction. At this time no work is planned downstream of the principal spillway plunge pool, therefore no General Permit 3 (GP3) will be required. There will likely be no fee or minimal fees for these permits based on a possible exemption for local government.

National Pollutant Discharge Elimination System (NPDES). The Phase I NPDES discharge program requires all operators of large construction activities which will disturb five or more acres of land to obtain permit coverage. More recently, NPDES Phase II regulations added permit coverage for small construction activities that disturb one to less than five acres. Effective December 7, 2002, DEP integrated the federal Phase II NPDES requirements into the existing Pennsylvania Phase I NPDES permit for stormwater discharges associated with construction activities (NPDES Construction Permit). An important distinction between Phase I and II is that the small construction activities only require permit coverage when the activity disturbs one to less than five acres and will result in a point source discharge to surface waters of the Commonwealth. The dam operator, Borough of Conneautville, will be responsible for obtaining a NPDES permit from PA DEP.

Other Federal Statutes and Interagency Coordination. Formal consultation with and/or permit acquisition from other federal and state agencies is not known to be required for the project, since the planned project will not permanently alter or adversely impact reaches of Thatcher Run and Conneaut Creek downstream of the dam. No Clean Water Act Section 404 permit is required for this project since no material will be filled or dredged.

Pennsylvania Clean Streams Law. The dam operator, Borough of Conneautville, will be responsible for preparing and submitting an Erosion & Sediment Control Plan to the Crawford County Conservation District to comply with Title 25 Chapter 102, the Clean Streams Law of Pennsylvania.

Costs and Cost Sharing

Estimated costs for installing the project are shown in Tables 1 and 2. Total annualized costs are shown in Table 4. The costs shown in Tables 1, 2 and 4 and throughout the document are based on standard cost accounting practices required of federal watershed planning agencies, such as NRCS. The cost accounting guidance is Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council, 1983). The basis for cost sharing between NRCS and the Sponsor is different and is based on the provisions of the dam rehabilitation amendments (PL-106-472) of the Watershed Protection and Flood Prevention program. Cost-sharing for authorized projects under the dam rehabilitation amendments is based on the following (USDA-NRCS, National Watershed Program Manual, December, 2009): The total cost of the rehabilitation project shall include all costs associated with construction, acquisition of property rights, project administration, non-federal technical assistance and contracting. Technical assistance provided by NRCS shall not be considered as part of the total cost. Technical services provided by the Sponsor during planning and installation shall be included. Sponsor shall be responsible for the cost of all water, mineral and other resource rights and all required permits. These costs shall not be considered part of the total cost. Federal funds will be 65% of the above defined costs, not to exceed 100% of the construction costs. The Sponsor shall be responsible for 35% of the calculated total cost of the rehabilitation project based on the above definitions using non-federal funds. In-kind contributions and the value of property rights acquired may be counted as agreed to under a separate Memorandum of Understanding (MOU). The MOU for the Conneautville Watershed Project was approved July 26, 2010. Based on this definition the estimated cost sharing allocation for the planned project is as follows (see the Watershed Agreement, Item 5, for additional details):

Cost-sharing:	PL-83-566 Funds	Other Funds	Total
Dam Rehabilitation	$1,007,500	$542,500	$1,550,000

Installation and Financing

The works of improvement for rehabilitation of the dam are planned for installation in year one of the evaluation period. The actual installation period is contingent on the availability of funds for design and installation. If cultural resources are discovered during installation, NRCS will cause construction to stop and follow policy contained in NRCS General Manual, 420 Part 401.

Responsibilities

NRCS will be responsible for the following:

- Design of the dam rehabilitation – drawings and specifications
- Executing a Project Agreement or similar implementation agreement with project Sponsor to obligate funds for cost-share payments
- Providing contract administration technical assistance
- Providing construction management technical assistance (Inspector, Contracting Officer Representative)
- Providing financial assistance equal to 65 percent of project costs, not to exceed 100 percent of actual construction costs, as appropriations become available under the Watershed Rehabilitation component of the Watershed Protection and Flood Prevention Act (PL 83-566)
- Certifying, in conjunction with DEP, Bureau of Waterways Engineering, completion of all installed measures
- State Conservationist will determine that Emergency Action Plan is prepared prior to obligating funds for construction.

Borough of Conneautville will be responsible for the following:

- Providing written assurance that they have the legal authority and sufficient funding; that they are willing and able to obtain all necessary land rights, easements, permits and that they will be responsible for ensuring the operation, maintenance and replacement of installed measures.
- Updating/completing an Emergency Action Plan based on the planned changes for Conneautville Dam

- Ensuring that the Borough continues to remain in compliance with federal floodplain management and flood insurance programs
- Securing all needed permits, easements, and rights for installation, operation, and maintenance
- Executing the Memorandum of Understanding with NRCS which provides a framework within which cost-share funds are credited
- Executing an Operation and Maintenance Agreement for Conneatville Dam with NRCS
- Executing a Project Agreement or similar implementation agreement with NRCS to obligate funds for cost-share payments
- Being responsible for all buried waste found during construction activities, if any, and all associated costs, although such costs could be included for in-kind credit at the Sponsor's request
- Installation of all planned measures
- Providing financial assistance or qualifying in-kind services at a rate equal to, or greater than, 35 percent of project costs using non-federal funds
- Providing local administrative services necessary for installation of the project

Other Organizations

- No other organizations other than the Borough of Conneautville and NRCS have any responsibilities in carrying out this plan.

Emergency Action Plan

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

Contracting

The project will be installed by means of a federal contract administered by NRCS, as requested by the Sponsor. Other contracting arrangements will be agreed to between NRCS and the Sponsor before either party commences work activities. A project or other implementation agreement between NRCS and the sponsor will detail the work activities and financial responsibilities for both parties.

Real Property

The Borough of Conneautville, as financial Sponsor, will be responsible for all needed land rights to implement the project. Based on planning estimates and land rights previously acquired for the dam, it is estimated that no additional land rights will be needed. In addition, no relocation of persons is needed in conjunction with the project. The sponsor acknowledges the potential risk of flood damages for the real property between the flowage rights elevation and the top of dam elevation.

Solid and Hazardous Wastes

There are no known solid or hazardous wastes identified in the project area. If such wastes are discovered during construction, the Sponsor will ensure that such wastes are identified and disposed of in accordance with all applicable federal, state and local rules and regulations. The Sponsor will be responsible for waste identification and disposal, and if warranted, testing of soil and ground water and remediation plans. These activities will generally require the services of a hazardous waste consultant certified by the Pennsylvania Department of Environmental Protection, Bureau of Waste Management.

Financing

The NRCS share of installation costs will be provided from funds appropriated under the Watershed Protection and Flood Prevention Act (PL 83-566), Watershed Rehabilitation. This is not a fund-obligating document, and federal assistance is subject to the availability of Congressional appropriations. The Sponsor has analyzed their financial requirements for carrying out the plan, including components that are not eligible for Federal assistance as part of this plan. The Sponsor will arrange for funds to be available, when needed, from donations, non-

Federal grants, cash reserves, tax revenues and other non-Federal sources. Credit for in-kind contributions will be as specified in the July 2010 Memorandum of Understanding.

The cost, if any, of all water, mineral and other resource rights and all required permits are not eligible for Federal financial assistance. These costs shall be borne, in full, by the Sponsor. The Sponsor also understands that they will be fully responsible for costs incurred for the operation, maintenance and replacement of installed measures.

Operation, Maintenance, and Replacement (O&M)

Measures installed in this plan, and previously installed measures, will be operated and maintained by the Sponsor with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new O&M agreement will be developed for Conneautville Dam utilizing the NRCS-National Operation and Maintenance Manual, and will be executed when the implementation agreement is executed. The new O&M agreement will be for the evaluated life of the rehabilitation project, which is 50 years. The Borough of Conneautville will be fully responsible for all operation, maintenance, repair and replacement of installed measures until such time that the structure is formally decommissioned in accordance with applicable laws and regulations. The O&M agreement will specify responsibilities of the Sponsor and include detailed provisions for retention, use, and disposal of property acquired or improved with PL 83-566 cost sharing, requirements for operation and inspection, financial plan for conducting O&M activities, consultation requirements for modifications to works of improvement, notification requirements for emergency situations, policy related to violations of the agreement, recurring review and update of the agreement, preparation and review requirements for an Emergency Action Plan, recordkeeping requirements, and other such requirements. Provisions will be made for free access of district, state, and federal representatives to inspect all structural measure and their appurtenances at any time.

Table 1: Estimated Installation Cost

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA
Dollars [1/]

Installation Cost Item	PL-83-566 NRCS	Other Than PL-83-566	Total
Total Dam Rehabilitation	$1,547,500	$542,500	$2,090,000

[1/] Price Base: 2012 Prepared: November 2012

Table 2: Estimated Cost Distribution - Water Resource Project Measures

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA
Dollars [1/]

Item	Installation Costs – Public Law 83-566				Installation Costs – Other Funds						Total Installation Cost
	Construction	Engineering	Project Admin.	Total PL 566	Construction	Engineering	Real Property Rights	Required Permits	Project Admin.	Total Other	
Dam Rehabilitation	$1,007,500	$465,000	$75,000	$1,547,500	$537,500	$0	$0	$0	$5,000	$542,500	$2,090,000

[1/] Price Base: 2012 Prepared: November 2012

Table 3: Structural Dam Data with Planned Storage Capacity

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA

Item	Unit	Amount
NRCS Dam Classification-	--	C
PA DEP Classification		B-1
Seismic Zone	-----	1
Total Drainage Area Controlled	Square Miles	0.41
Condition II Runoff Curve Number	-----	78
Time of Concentration (Tc)	Hours	1.36
Elevation, Top of Dam	Feet (MSL[1])	1001.8
Elevation, Auxiliary Spillway Crest	Feet (MSL[1])	996.4
Elevation, Principal Spillway Low Stage	Feet (MSL[1])	982.6
Elevation, Principal Spillway High Stage	Feet (MSL[1])	996.4
Maximum Height of Dam	Feet	41
Type of Dam	-----	Earthen Embankment
Dam, Volume of Fill	Cu. Yd	33,167
Dam Crest Length	Feet	660
Auxiliary Spillway Type	-----	Vegetative
Auxiliary Spillway Bottom Width	Feet	100
Auxiliary Spillway Exit Slope	%	2.5
Total Capacity	Ac. Ft	68.3
Capacity[2]		
Sediment Submerged(Available)[3]	Ac. Ft	5.4
Sediment Aerated	Ac. Ft	0.9
Floodwater Retarding	Ac. Ft	61.9
Surface Area		
Sediment Pool	Acres	2.0
Floodwater Retarding Pool[2]	Acres	7.9
Principal Spillway Design		
Rainfall Volume, (1day)	Inches	5.4
Rainfall Volume, (10 day)	Inches	8.4
Runoff Volume, (10 day)	Inches	7.5
Capacity (low-stage max)	Cubic Ft/Sec	10.2
Capacity (high-stage max)	Cubic Ft/Sec	165
Conduit Size	Inches	36
Conduit Type		Reinforced Concrete
Auxiliary Spillway Frequency of Operation	% chance for 10-day storm	<1%
Auxiliary Spillway Hydrograph		
Rainfall Volume	Inches	9.6
Runoff Volume	Inches	6.86
Storm Duration	Hours	6
Velocity of Flow (Ve)	Ft./Sec.	3.68
Maximum Surface Elevation	Feet (MSL[1])	998.1
Freeboard Hydrograph	6HR (24hr)	25.5in (31.0in)
Rainfall Volume	Inches	25.5
Runoff Volume	Inches	22.4
Maximum Elevation	Feet	1000.69
Velocity of Flow	Ft./Sec.	10.4
Capacity		
Sediment	Watershed Inches	0.30
Floodwater Retarding	Watershed Inches	2.83
Total Drainage Area Controlled	Square Miles	.41
Uncontrolled Drainage Area	Square Miles	0.32
Controlled Drainage Area	Square Miles	0.41

[1] NGVD29 Prepared: November 2012
[2] Crest of Auxiliary Spillway [3] 3.5 Ac.Ft. is required

Table 4: Estimated Average Annual NED Costs

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA
(Dollars) [1/]

Evaluation Unit	Project outlays		Other direct costs	Total
	Amortization of Cost [2/]	Operation, maintenance and replacement cost		
Dam rehabilitation	$97,300	$7,400	$0	$104,700

[1/] Price Base: 2012 Prepared: November 2012
[2/] Amortized over 50 years at a discount rate of 3.75 percent

Table 5: Estimated Average Annual Flood Damage Reduction Benefits

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA
(Dollars) [1/]

Item	Estimated average annual ag-related[2/] damage		Damage reduction benefit
	Without project	With project	
Floodwater damage			
Residential, Commercial and Transportation	$157,800	$0	**$157,800**
Grand total	**$157,800**	**$0**	**$157,800**

[1/] Price Base: 2012 Prepared: November 2012
[2/] Agriculture-related damage includes damage to rural communities

Table 6. Comparison of NED Benefits and Costs[1/]

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA
(Dollars) [1/]

Evaluation Unit	Average Annual			Average Annual Costs [3/]	Benefit Cost Ratio
	Direct Benefits [2/]	Other Benefits [4/]	Total Benefits		
Dam Rehabilitation	$ 157,800	$ 21,800	$ 179,600	$ 104,700	1.7 to 1.0

[1/] Price Base: 2012 Prepared: November 2012
[2/] From Table 5
[3/] From Table 4
[4/] Per Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G 1.7.2 (b) (3))- the avoided cost of the most likely alternative to the planned action

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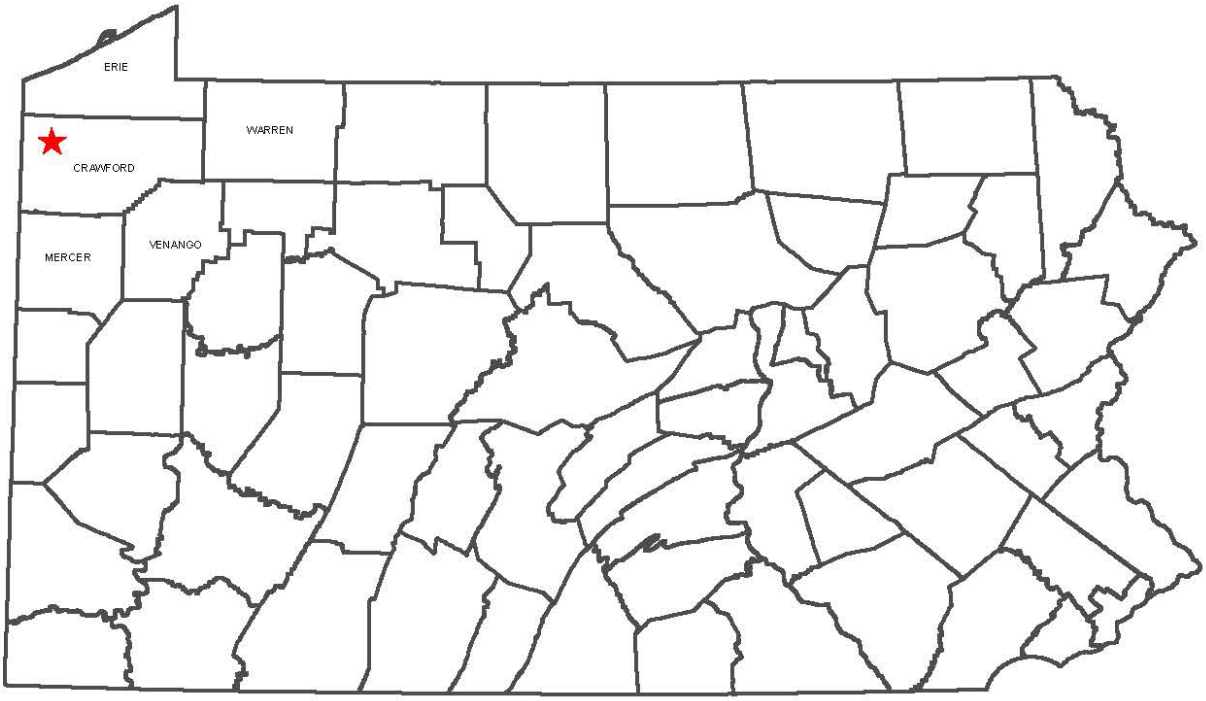
APPENDICES

Appendix A – Comments and Responses

(This activity is Categorically Excluded under the provisions of NEPA. Public and interagency input was received during project planning as described in Consultation, Coordination and Public Participation. No comments were received on the draft document)

Appendix B - Project Location Map

Conneautville Dam (PA - RC&D - 112)
Crawford County, PA

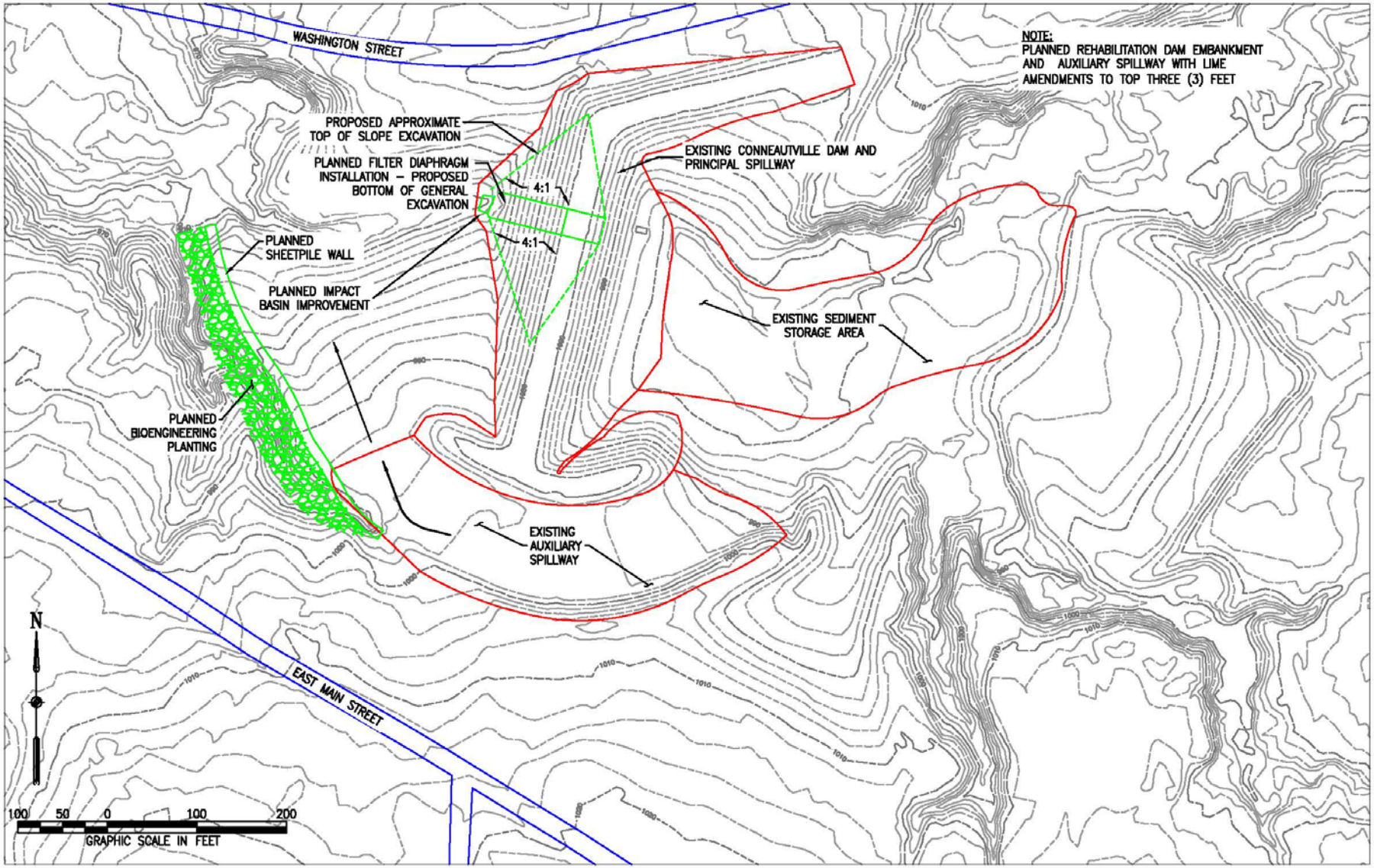


★ Conneautville Dam

0 25 50 100 Miles

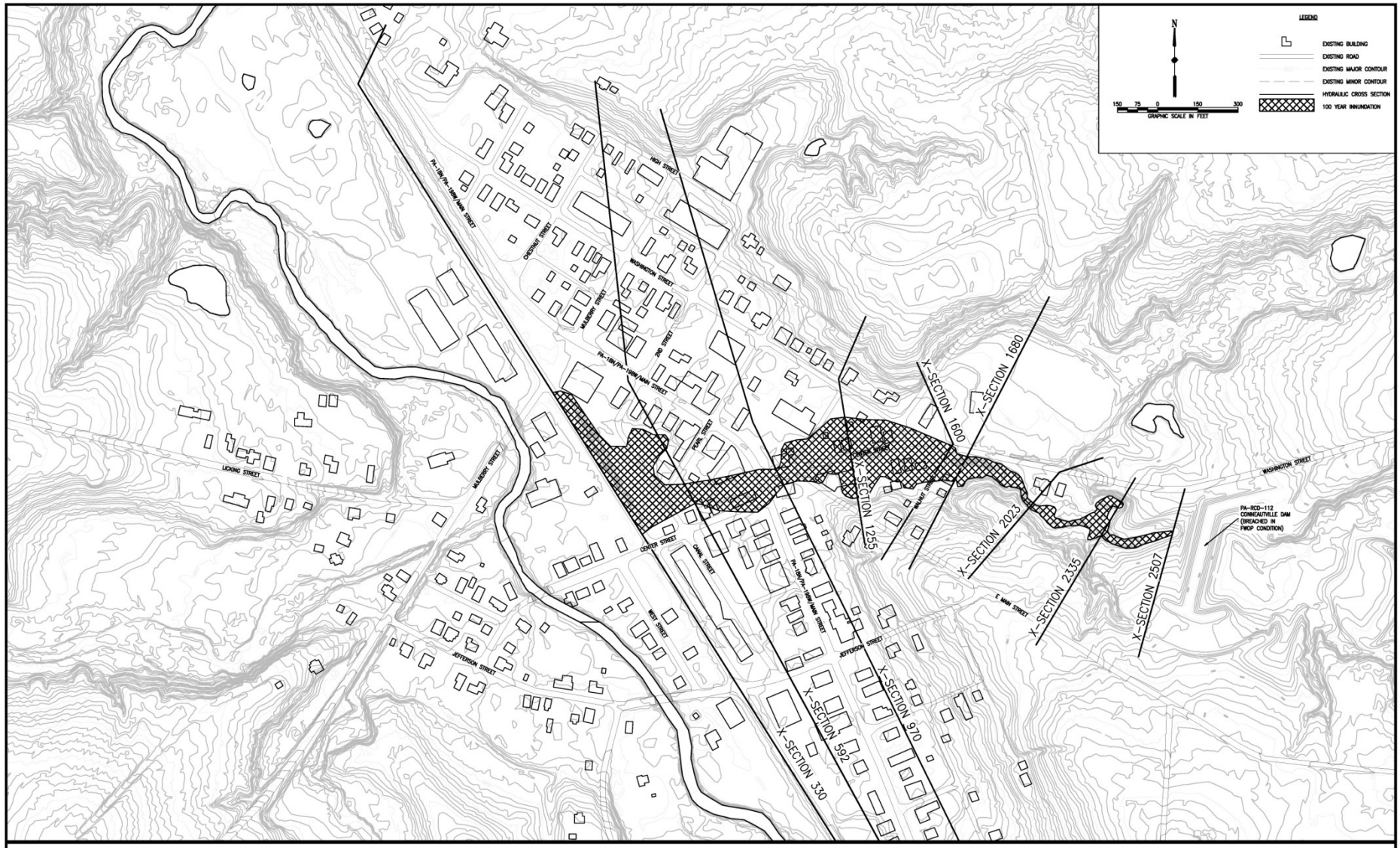
N

November 2012



APPENDIX B – PROJECT SITE MAP
CONNEAUTVILLE DAM (PA–RC&D–112)
CRAWFORD COUNTY, PA

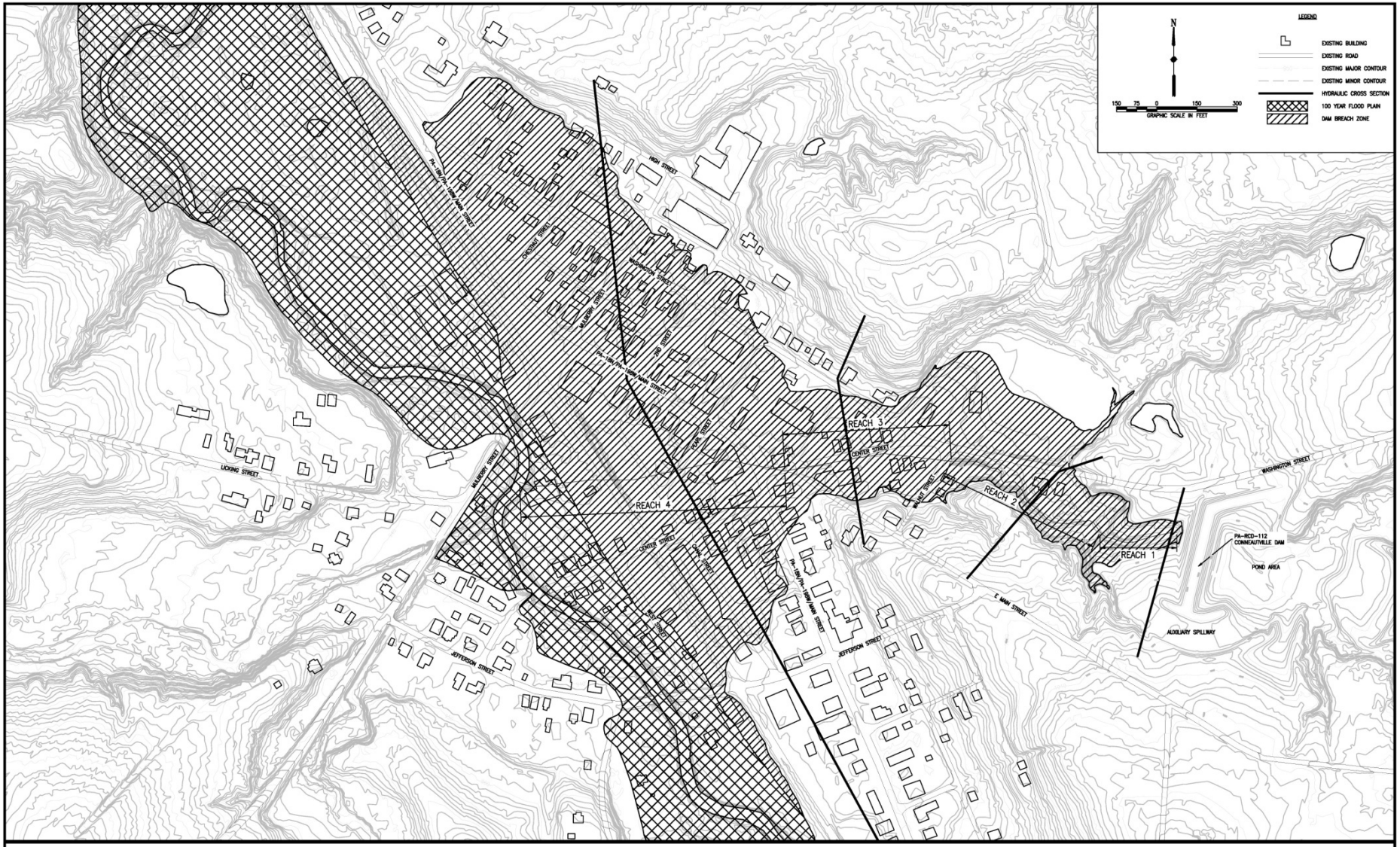
Appendix C
Inundation Map (FWOP Condition)



NRCS DAM REHABILITATION PLAN – CONNEAUTVILLE, CRAWFORD COUNTY, PENNSYLVANIA
PA-RCD-112
Inundation Map (FWOP Condition)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

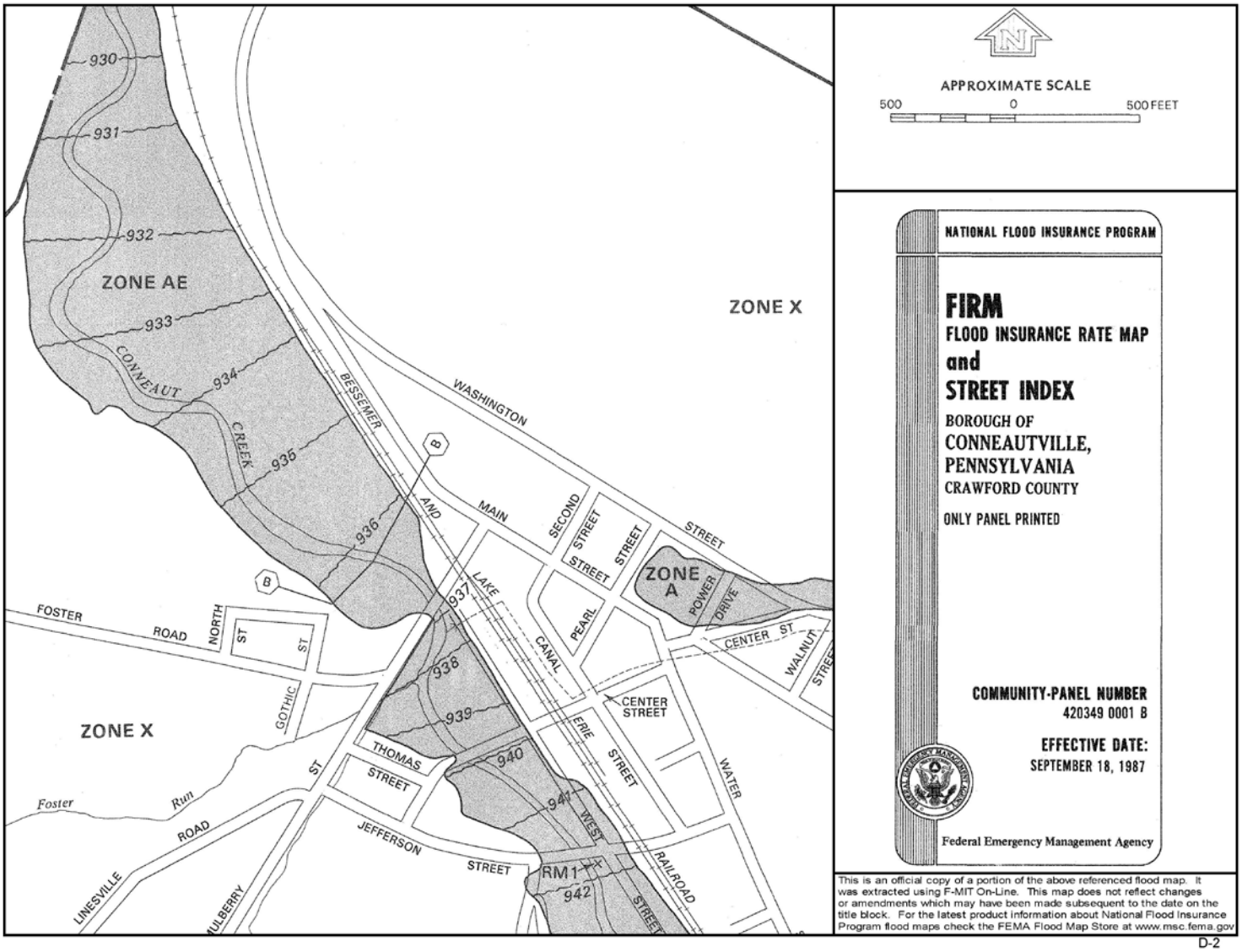
Appendix C
Dam Breach Inundation Map



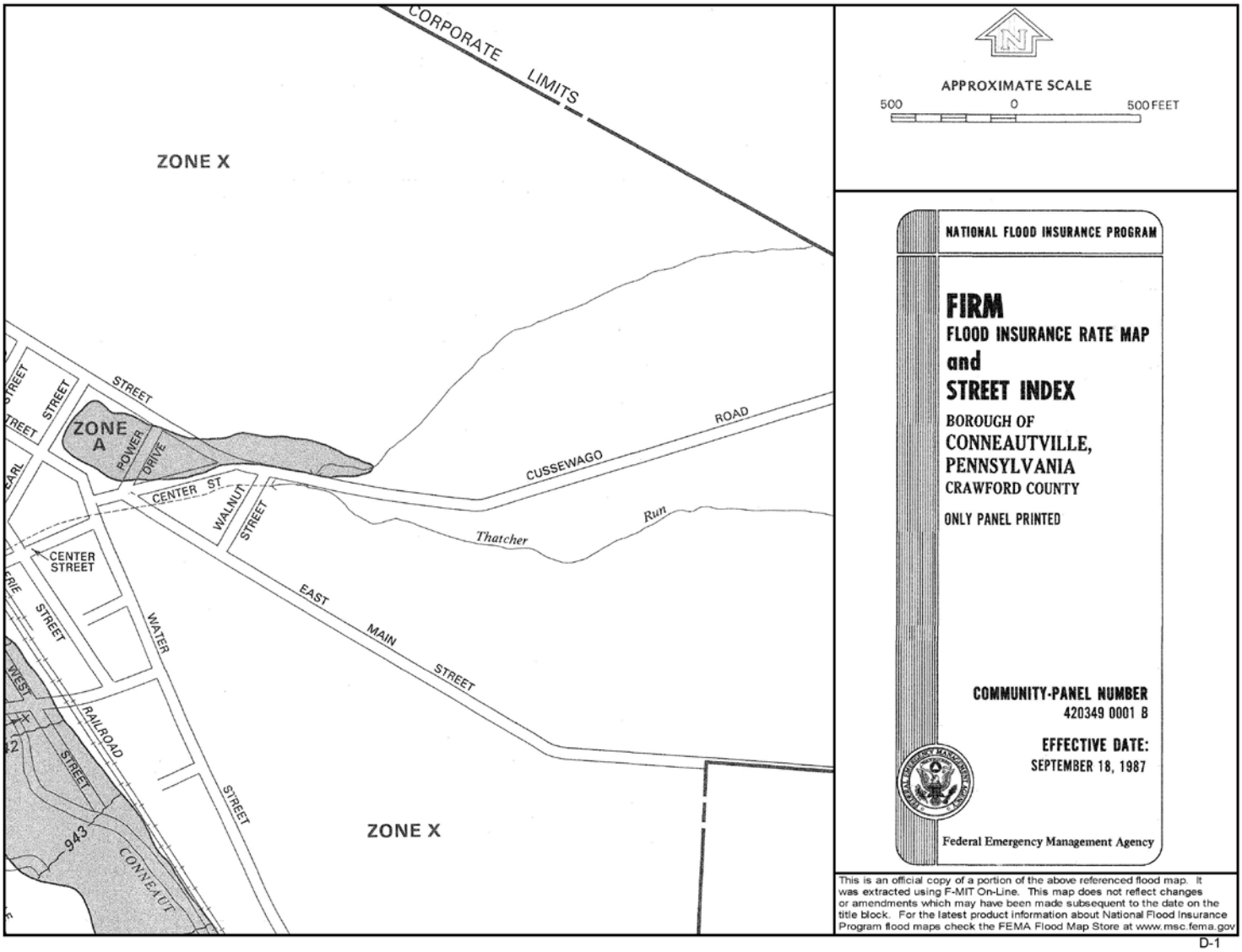
NRCS DAM REHABILITATION PLAN – CONNEAUTVILLE, CRAWFORD COUNTY, PENNSYLVANIA
PA-RCD-112
Dam Breach Zone

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

Appendix C
100 and 500 Year Floodplain with Project



D-2


CORPORATE LIMITS
ZONE X
ZONE A
POWER DRIVE
STREET
CENTER ST
WALNUT STREET
CENTER STREET
CUSSEWAGO ROAD
Thatcher Run
EAST MAIN STREET
WATER STREET
RAILROAD STREET
WEST STREET
CONNEAUT
943
ZONE X
APPROXIMATE SCALE
500 0 500 FEET
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
and
STREET INDEX
BOROUGH OF
CONNEAUTVILLE,
PENNSYLVANIA
CRAWFORD COUNTY
ONLY PANEL PRINTED
COMMUNITY-PANEL NUMBER
420349 0001 B
EFFECTIVE DATE:
SEPTEMBER 18, 1987
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

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Appendix D – Investigation and Analysis Report

Introduction

The Investigation and Analysis Report presents information that supports the formulation, evaluation, and conclusions of the Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation (Plan-EE). This report contains information required by the U.S. Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies." Duplication of information presented in the Plan-EE was avoided unless required for clarity.

Hydraulics and Hydrology

Principal Spillway

Model runs on rainfall depths and runoff volumes were developed using SITES to evaluate the principle spillway (PS) per TR-60 guidance. The PS hydraulic capacity was determined for the 1-day /10-day rainfall response and the 1-day/10-day runoff response. The stage-storage relationship for the dam was determined using 2009 LIDAR contour data. The LIDAR raw data is referenced to the North American Vertical Datum of 1988 (NAVD88). These elevations were converted to the National Geodetic Vertical Datum of 1929 (NGVD29) to be consistent with the as-built plans of the dam and previous hydraulic and hydrologic studies. (A datum adjustment of 0.56 should be added to NAVD88 elevations to obtain NGVD29 elevations.) A curve number of 78 and a time of concentration of 1.36 hours were used to determine the inflow hydrograph of the dam. The climatic index of 2.04 was determined by the lookup function using the Crawford County, Meadville 1S location.

The rainfall analysis was conducted using NOAA Atlas 14 rainfall statistics for the 1-day and 10-day durations. The runoff analysis was conducted using TR-60 runoff volumes for the 1-day and 10-day durations. The runoff analysis also used a CN of 100 according to TR-60 guidelines.

Auxiliary Spillway

The evaluation of the auxiliary spillway included the following SITES models:

- 6-hour Stability Design Hydrograph (SDH) to evaluate the stability of the auxiliary spillway
- 6-hour and 24-hour (5-point) Freeboard Hydrograph (FBH) to evaluate the integrity of the auxiliary spillway

Stability Design Hydrograph

A 6-hour SDH SITES model was run using updated rainfall parameters of 9.57 inches per TR-60 criteria for High Hazard Dams. Curve number, time of concentration, quick return flow, and the dam stage-storage relationship values as described above were used.

The auxiliary spillway profile template was updated in SITES to incorporate 2008 LIDAR data and reflects the inside of the curve of the spillway. A maintenance code of 3 was used in SITES to account for the drainage feature to the left of the auxiliary spillway which contains major discontinuities of flow.

Soil profile information was updated to incorporate soil borings and associated geotechnical lab results from samples collected in November 2010. In areas where soils information was not available from 2010 soil testing results, soils information remained unchanged from a SITES model formulated by Gannett Fleming in 2006. Lab results were used to calculate soil-specific Headcut Erodibility Indicies (HEI) per the NECS Method for Calculating HEI as a part of the SITES Design Guidance package.

The detachment rate (Kd) is used by SITES to evaluate the spillway erosion process due to surface detachment resulting from hydraulic shear stress. The Kd value is determined by the SITES program using input of dry bulk density and percent clay of the material being eroded. Alternately, Kd can be determined by jet erosion testing, at which time the value can be directly put into the model. As the soils lab scope did not include the jet erosion test to determine a Kd value, a sensitivity analysis was completed to determine the integrity ranges of Kd. An initial run with Kd-1.0 (within the typical range for most soils of 0.2 to 2.0) was executed. Based on the information provided by Danny McCook, former Civil Engineer and Geotechnical Specialist with the National Design, Construction and Soil Mechanics Center for the USDA-NRCS, the Kd value can range up to 10 for dispersive soils. A second SITES run was executed with Kd-10 to evaluate the sensitivity to the Kd parameter and determine the possible need for additional soils testing.

Freeboard Hydrograph
SITES models were performed for 6-hour and 24 hour (5 point) FBH scenarios to evaluate auxiliary spillway integrity. The following updated rainfall parameters were used: 6-hour value of 25.5 inches (PMP); 24-hour valueof 31.00 inches (PMP) with 5-point rainfall distribution per TR-60 criteria for High Hazard class dams.

The auxiliary spillway profile template was updated in SITES to incorporate 2008 LIDAR data and reflects the inside of the curve of the spillway. A maintenance code of 3 was used in SITES to account for the drainage feature to the left of the auxiliary spillway which contains major discontinuities of flow.

Soil profile information was updated to incorporate soil borings and associated geotechnical lab results from samples collected in November 2010. In areas where soils information was not available from 2010 soil testing results, soils information remained unchanged from a SITES model formulated by Gannett Fleming in 2006 include pool data, principal spillway information, the dam centerline profile, embankment information and topsoil material properties.

A total of six SITES runs were generated (three each for both the 6-hour and 24-hour FBH and SDH models). The first run for each model used SITES calculated Kd values based on input of bulk density and percent clay of each material. The second and third runs of each model assumed a Kd value of 1 and 10 respectively, evaluating the effects and sensitivity of potentially dispersive soils within the auxiliary spillway.

Site Investigation Procedures

Survey
A field survey was performed by project engineers in November 2010 to determine elevations of key features of the dam and spillway system. Elevations along the centerline of the top of dam, centerline of the auxiliary spillway, auxiliary spillway cross sections and downstream channel cross sections were collected. Additionally, two cross sections were surveyed within the impoundment area to enhance the LIDAR data for the purpose of estimating sediment volume behind the impoundment. It should be noted that the LIDAR data is presented in the North American Vertical Datum of 1988 (NAVD88), while the dam design and subsequent survey data references the National Geodetic Vertical Datum of 1929 (NGVD29). A datum adjustment of 0.56 should be added to NAVD88 elevations to obtain NGVD29 elevations. During the field survey, effort was made to locate the three site benchmarks but none of the three were found. The invert at the outlet of the 36-inch primary spillway was used as a reference elevation to collect additional survey data. The as-built drawings, as well as the 2004 survey associated with the dam rehabilitation project, both indicated an elevation of 971.00 (NGVD29) at the invert of the outlet pipe. Additionally, it was noted in the 2004 survey documentation that iron pins with yellow caps were set at all stations except 5+00 along the top of dam. None of these pins could be located during the field survey. Stationing along the top of dam was established using the centerline of the principle spillway and its known station of 5+85. A tape was extended in either direction to collect data along the crest of the dam at selected stations.

Sedimentation Survey
Spot elevations gathered during the field survey were used as comparison to verify the accuracy of the LIDAR data but were not used in creating the surface due to the 3 year difference in data sources and desired calculation of rate of sediment delivery. Additionally, the LIDAR surface was raised 0.56 feet to account for the vertical datum shift between the as-built and LIDAR data. The two surfaces were intersected to determine the difference in volume resulting from the two ground surfaces.

In September 2012, NRCS verified the sediment volume by excavating soil test pits and confirming the available storage volume by surveying the sediment pool. Four test pit locations were selected by an NRCS Geologist to represent the existing deposition locations. A Conneautville Borough backhoe and operator excavated the pits to a sufficient depth to reveal the soil profile. The test pit locations were recorded with a Topcon GPS receiver. The sediment pool was surveyed using survey grade Topcon GPS receivers with ±3.0mm horizontal and ±5.0mm vertical accuracy.Shots were taken around the perimeter of the sediment pool, at intervals of approximately every 20 feet, and at breaks in topography such as stream banks. The sediment storage volumes for the 2012 NRCS survey and the 1984 As-Built Drawing were determined by the average area method and compared to the 11/17/77 design volumes.

Subsurface Explorations and Laboratory Testing Program
A program of test borings was developed and performed to provide subsurface information necessary to support hydraulic modeling of the auxiliary spillway. Three test borings were conducted within the auxiliary spillway

footprint Standard penetration tests were conducted at approximate five foot intervals in the test borings, and Standard Penetration Resistance was measured and samples were retrieved at each test location. Three-inch diameter Shelby tube samples were obtained over select depth intervals to provide relatively undisturbed samples of the fine grained strata. Test boring depths ranged from 32 to 52 ft below ground surface.

A geotechnical laboratory testing program was performed to assist in classification of soils within the auxiliary spillway area, and estimation of engineering parameters necessary for SITES analysis. Index testing, including moisture content determination, particle size analysis, and Atterberg limits determinations were conducted as required to characterize the strata encountered. Triaxial compression tests were also performed on samples of the fine-grained materials to define strength characteristics.

Condition of Dam

Alternative Costs and Engineering

The hydrologic and hydraulic modeling submitted in support of Phase 1 of this project demonstrates that the Conneautville Dam provides the following flood protection:

1. The primary spillway is sized appropriately to convey required storm events,
2. The auxiliary spillway is sized appropriately to convey required storm events,
3. The dam has sufficient freeboard to safely convey each required storm event, and
4. The integrity and stability of the auxiliary spillway, as modeled in SITES, demonstrates the dam is stable during all storm events up to and including the PMP events.

Based on the above results from the hydrologic and hydraulic modeling of the dam, no modifications are required to effectively convey the required storm events through the primary and auxiliary spillways and NRCS and State Dam Safety hydrologic and hydraulic criteria are satisfied. However, the SITES model does not provide a means to quantify the effects of the discontinuity on the left side of the auxiliary spillway where an eroded drainage path has formed parallel to the spillway. The submitted SITES models were run using a maintenance code of 3, indicating “poor maintenance, major discontinuities parallel to flow”. The maintenance code does not model actual conditions of the discontinuity, but rather only indicates that there is a discontinuity present.

The discontinuity is formed by runoff from approximately 6.5 acres that is not tributary to or controlled by the dam. This uncontrolled runoff from the residential area enters the drainage feature adjacent to the dam through the side yard of homes just north of Main Street. During a site visit on June 17, 2011, EA staff performed additional reconnaissance in the area of the drainage feature and noted the following:

- Runoff from a portion of the uncontrolled drainage area south of the auxiliary spillway and the spillway itself reaches the discontinuity at a low point in the spillway just downstream of the level section.
- At this location, erosion extending from the bottom of the ravine, up the bank of the ravine and into the auxiliary spillway was noted.
- Portions of the residential lot on the south side of the ravine show signs of sloughing into the ravine
- Multiple rills and jug holes were observed, interspersed throughout the auxiliary spillway and adjacent residential properties in the area of the upstream portion of the ravine.
- A large jug hole, approximately three feet deep and three feet in diameter, was observed in the residential yard south of the upstream end of the ravine. Within this jug hole, the existing sanitary sewer line serving the residential properties along the south of the auxiliary spillway has been exposed. While jug holes were noted during the November site visit in this area, the sewer had not been exposed.

Based on observation during the November 2010 and June 2011 site visits, it appears that the vicinity of the left side of the auxiliary spillway just downstream of the level section, the ravine itself, and the rear of the residential lots south of the auxiliary spillway is an active erosion area.

It is our professional opinion that overflow from the auxiliary spillway should be contained to prevent water from comingling with the discontinuity in the event of an overtopping event that could also cause failure of the dam. Additionally, the erosion in and around the ravine is likely to increase and should be corrected to avoid expansion and potential ultimate failure of the dam. To address this concern, a sheetpile wall will be constructed along the existing ravine. The sheetpile wall would be sized and constructed per NRCS guidelines and extend approximately 600 feet from the level section of the auxiliary spillway to the exit channel. Green bioengineering measures will be implemented adjacent to the wall and will consist of livestakes and seeding to stabilize the ravine. The auxiliary spillway will be treated with a lime amendment to a depth of 3 feet to mitigate the dispersive nature of the spillway material.

The discussion of each of the following alternatives includes the continued operation of the 320 cfs conduit which provides protection for 26 of the 45 at risk properties leaving 19 properties at risk.

Economic Evaluation

Unless otherwise noted costs estimates were prepared using the RS Means method for engineering cost estimation. Estimates are inclusive of Engineering Services and Project Administration. Operation, Maintenance and Replacement Costs were added to alternatives as needed.

Engineering cost estimates were developed for 12 rehabilitation alternatives. Based on discussion with NRCS-PA, eight of these were eliminated from further evaluation due to high cost and invasive excavation for the concrete wall. The benefits and costs of other alternatives that included Future Without Project (FWOP); Decommissioning; Acquisition of at risk structures; Nonstructural measures (buy-out, demolition, site restoration); Decommissioning and Nonstructural measures; and Dam Rehabilitation were evaluated for their individual contribution to flood damage reduction in Conneautville Borough. These alternatives were then narrowed down to an action alternative (Dam Rehabilitation) and a no Federal action alternative (Future Without Project – Sponsor funded Controlled Breach).

Costs for the controlled breach, decommissioning, and dam rehabilitation were estimated using current engineering criteria. Costs for property acquisition, house demolition and site restoration and nonstructural measures are estimated from data provided by NRCS for the Neshaminy Creek Watershed, Bucks County, Pennsylvania. Current home values in the Borough of Conneautville were estimated from data at www.Zillow.com for the Property Acquisiton Alternative only. Assessed values are not used because the last appraisals were done in 1985. Decommissioning, Property Acquisition, Nonstructural Measures and Decommissioning plus Nonstructural Measures were eliminated from further study because they do not meet one or more of the completeness, effectiveness, efficiency, and acceptability criteria.

Construction cost for each alternative is the sum of construction, contingency (30% of construction) and mobilization/demobilization (5% of construction). Engineering is estimated at 30% of construction cost; project administration is estimated at 5% of construction cost. All line items are rounded up to the nearest $1,000. Total project cost is the sum of construction cost, engineering and project administration and other associated costs. Average annual cost is estimated by amortizing total project cost at 3.75% for 50 years (2012 water resource discount rate) and adding estimated annual operation and maintenance (O&M) cost. O&M costs for the alternatives are estimated at:

No O&M costs anticipated for Alternatives 1 or 2, Future Without Project or Decommissioning
$1,000 per year for Alternative 3 or 4, Acquisition or Flood proofing
$1,000 per year for Alternative 5, Decommissioning and Nonstructural Measures
$7,400 per year for Alternative 6, Dam Rehabilitation

The Future Without Project and Dam Rehabilitation alternatives were carried forward for detailed analysis. Total costs for installation, technical assistance and project administration as well as operation and maintenance costs were determined and amortized over the 50 year evaluation period at the current discount rate. All benefits and costs were calculated at a 2012 price base. The number of people at risk in Conneautville (774) from a catastrophic dam failure is the 2010 population of the Borough of Conneautville form the 2010 Census data.

Average annual flood damages, damage reduction, remaining damages and project benefits were estimated by first updating the historic damages and benefits contained in the 1980 Conneautville RC&D Measure Plan and Environmental Evaluation pages P7, E17 to E19 and the Summary Comparison table, Appendix A using the Consumer Price Index (CPI) multiplier for 1980 to 2011 (2.73). The CPI was used since no infrastructure damage values were enumerated in the original RC&D Measure Plan. The damages and damage reduction were reduced

to take account of the damage reduction provided by the 320 cfs conduit. The Economic Analysis is in a MicroSoft Excel Spreadsheet, which is available as part of the project substantiating data.

The Economic and Environmental Principles and Guidelines for Planning Water and Land Related Resources Implementation Studies were used to determine the National Economic Development Alternative (NED). This alternative is defined as that which maximizes the net benefits, consistent with protecting the Nation's environment. The economic evaluation was performed in accordance with Chapter 2, Section 4 of that planning guidance document and the principles outlined in the NRCS National Watershed Program Manual [In particular, Parts 501.11 A (2); 501.12. C; 505.35 B (1) (iii)-(iv); 505.35 E-F]

A review of the analysis reveals that Dam Rehabilitation meets the tests of completeness, effectiveness, efficiency and acceptability and is, in fact, the NED alternative providing project benefits of $179,600 at an average annual cost of $104,700; net benefits of $74,900 and a benefit/cost ratio of 1.7 to 1.0.

Effects Analysis

Ecological, cultural and socio-economic effects of alternatives were evaluated through a variety of techniques. Site investigations, literature review and consultation with state and local agencies were conducted to assess the existing condition of soil erosion, water quality and quantity, plants, air quality, fish and wildlife habitat, human concerns and special environmental concerns such as Clean Air Act, Clean Water Act, cultural resources, , endangered & threatened species,environmental justice, flood plain management, migratory birds and wetland, The analysis provided information regarding the natural resources features of the Thatcher Run Watershed and was developed as a companion to the NRCS-CPA-52 Environmental Evaluation form for this project. This analysis was conducted with consideration to the public participation scoping requirements set forth in the National Watershed Program Manual (NWPM) by considering the potential occurrences of and/or project impacts/risks to the list of 31 natural resources and other issues of concern presented in Section 501.24 Part B of the NWPM. The information presented in the Plan-EE is an overview of the relevant watershed characteristics compiled from existing information, including the Resources Conservation and Development Measure Plan (RC&D Measure Plan) and Environmental Assessment for Conneautville Flood Prevention Measure Number 42-6001-039-058 (Measure Plan) produced by the Penn Soil Resource Conservation and Development Area, Pennsylvania in March 1981. In addition various websites, as referenced, were used to provide information on natural resource conditions at the site. Jody Lasko, the NRCS District Conservationist for Crawford County, also was consulted about the status of local land treatment practices applied within the watershed since the installation of the Conneautville dam, including any NRCS Conservation Cost Share programs where an environmental evaluation using NRCS-CPA 52 might have been performed. No previous NRCS-CPA-52 Environmental Evaluation was prepared but onsite observations were made by environmental engineers from the Bioengineering Group to ground truth and supplement the compiled site information presented in this report.

Once alternatives were formulated, natural resources specialists evaluated the effect of each alternative on relavent resource concerns and special environmental concerns. Overall this evaluation was not complicated since the dam rehahibilitation alternative involves minimal changes to the existing features and functions of the dam and the construction will be confined to the existing dam and auxiliary spillway. The no action alternative (future without project) would be a sponsor breach of the dam, which involves removal of a portion of the existing embankment to allow flood flows to pass unimpeded. The no action alternative will impact the hydrology immediately above the dam and downstream of the dam and the movement of sediment downstream of the dam. The hydrology changes would have some affect on wetland located in the existing dam temporary storage pool, by changing the depth and duration of floodwater. The change will also increase flood flow depth and duration downsteam, including increased streambank erosion and increased flood damages in Conneautville. The portion of the dam that would be removed has little or no habitat value, so the primary on-site effects will be small improvements in habitat value at the site of the embankment. The socio-economic effects are the most pronounced and the methodology for this analysis is described above.

Appendix E – Project Data

PL83-566 Project Information Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation Conneautville Borough, Crawford County, PA	
Rehab General Description Data	
Hydrologic Unit Area:	04120101
Longitude (decimal format):	41.7577222
Latitude (decimal format):	-80.361667
Area of the Project (acres):	461
Project Evaluated Life:	50 years
Project Discount Rate:	3.75%
Price Base:	2012
BC Ratio:	1:7:1
Total Cost (Table 1):	$2,090,000
Dam Number:	PA-RC&D-112
National Inventory of Dams Number (NID):	PA-01213
Congressional District of dam:	03-PA
FIPS Code of dam:	42039
# Single-Purpose Floodwater Retarding Structures Planned:	One
# Multi-Purpose Structures Planned:	none
Rehab Project Purpose(s):	Flood Control

PL83-566 Project Information Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation Conneautville Borough, Crawford County, PA	
Sponsor Data	
Organization:	Borough of Conneautville
Sponsor Representative (optional):	Eugene Bocan
Sponsor Title: (Director, Manager, etc.):	Council Chairman
Sponsor Type: (County, State, etc.):	Municipality
Address:	906 Main Street
City:	Conneautville
State:	Pennsylvania
Zip:	16406
Phone:	814-587-2471
Email:	cvboro@windstream.net
Fax:	814-587-2471
O&M Responsibility (Yes/No):	Yes

PL83-566 Project Information Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation Conneautville Borough, Crawford County, PA	
Rehab Budget Request Data	
Failure Index (Application for Federal Assistance):	189
Population at Risk (Application for Federal Assistance):	774
Risk Index (Application for Federal Assistance):	7088
Price Base:	2012
Estimated Installation Cost (Watershed Agreement):	$1,550,000
Priority - State Dam Safety Agency:	High
Number of Municipal Water Supply Users:	0

PL83-566 Project Information

Conneautville Dam (PA-RC&D-112)
Watershed Project Plan-Environmental Evaluation
Conneautville Borough, Crawford County, PA

Rehab Subset of Benefits Data

Price Base:	2012
Total Funds Needed (FA/TA) (Table 1): PL-83-566 NRCS	$1,547,500
Other Than PL-83-566	$542,500
Agricultural Related Flood Damage Reduction Benefits:	$157,800
(Average Annual $)	
Non-Agricultural Related Flood Damage Reduction Benefits:	0
Agricultural Related Non-Flood Benefits:	$21,800
(Average Annual $)	
Non-Agricultural Related Non-Flood Benefits:	0
(Average Annual $)	
Beneficiaries (No.):	774
Visitor Days (Optional):	0
Farms and Ranches Benefited (No.):	0
Bridges Benefited (No.):	7
Public Facilities Benefited (No.):	0
Businesses Benefited (No.):	11
Homes Benefited (No.):	8
Reduced Erosion (Tons/Yr.):	0
Reduced Sedimentation (Tons/Yr.):	135
Streams/Corridors Enhanced/Protected (Miles):	1
Lakes/Reservoirs Enhanced/Protected (Surface Acres):	0
Domestic Water Supplies Benefited (No.):	0
Incidental Recreation Benefited (No. of Waterbodies/Stream Segments):	1
Groundwater Recharge (Acre-Feet):	0

PL83-566 Project Information Conneautville Dam (PA-RC&D-112) Watershed Project Plan-Environmental Evaluation Conneautville Borough, Crawford County, PA	
Rehab Subset of Benefits Data (Continued)	
Wetlands Created, Enhanced, or Restored (Acres):	0
Upland/Riparian Habitat Created/Enhanced (Acres):	0
Threatened and Endangered Species Benefited:	none
Population with Reduced Risk:	774