USDA NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service

DRAFT SUPPLEMENTAL WATERSHED PLAN No. 2
and Environmental Assessment for
Rehabilitation of Piney Run Dam
Piney Run Watershed
Carroll County, Maryland

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

In Cooperation With:
Carroll Soil Conservation District
and
Commissioners of Carroll County

February 2025

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AUTHORITY

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) as amended. The rehabilitation of Piney Run Dam is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472.

ABSTRACT

The Piney Run Dam was installed to meet three purposes for the Piney Run watershed: provide flood control for the area along Piney Run downstream of the structure, provide a raw water supply for southeastern Carroll County, and provide a recreational area for southeastern Carroll County. Since the works of improvement were constructed in 1974, the dam has operated without significant issues. During the 48 years of operation, the spillway has not activated although its flood of record caused water to approach but not overtop the spillway crest. The State of Maryland, which regulates the Piney Run Dam as a high hazard potential structure has expressed concern with the spillway capacity of the structure based on a 2016 hydrologic and hydraulic study of the dam. The state has also expressed concern with the erosive potential of the subsurface materials underlying the spillway. Concurrently, the Commissioners of Carroll County have a need to identify municipal raw water supply sources such as Piney Run Reservoir, as backup to one of their primary sources of raw water at Liberty Reservoir. The purpose of this supplemental watershed plan is to reduce the risk of a catastrophic breach of the dam and associated loss of life by complying with current NRCS and State of Maryland dam safety and performance criteria, to maintain the purpose of the original plan for flood protection, recreational development, and sediment storage, and to maintain a backup source of municipal raw water. The preferred alternative is to rehabilitate Piney Run Dam by expanding the existing auxiliary spillway width by 25 feet and raising its crest by 0.8 feet, raising the existing dam crest 4.5 feet with earth fill, including the core zone and chimney filter, while maintaining the downstream slope at three-horizontal-to-one-vertical (3H:1V), modifying the impact basin and rate control system to accommodate the additional embankment fill, armoring the steep slope downstream of the AS exit channel with roller-compacted concrete and installing a cutoff wall at the auxiliary spillway crest, replacing the downstream ends of each of the toe drains, making minor repairs to the existing principal spillway riser and water supply intake tower, and installing a cold water release system in the water supply intake tower. The total project installation cost for the project is estimated to be $11,300,000 of which $7,229,850 will be paid from the Small Watershed Rehabilitation funds and $4,070,150 from local funds.

COMMENTS AND INQUIRIES

Comments and inquires must be received by <MONTH, DAY>,2025. Submit comments and inquiries to: Jacob Dieguez, State Conservation Engineer, USDA/NRCS, 339 Busch's Frontage Road, Suite 205, Annapolis, Maryland 21409-5543 (443-699-5226).

NON-DISCRIMINATION STATEMENT

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

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PINEY RUN WATERSHED
SUPPLEMENTAL WATERSHED PLAN AGREEMENT NO. 2

between the
Carroll Soil Conservation District
Commissioners of Carroll County
(Referred to herein as Sponsors)

and the

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

Whereas, the watershed plan for Piney Run Watershed, State of Maryland dated May 1968, executed by the Sponsors named therein and NRCS, became effective on the 27th day of August 1969; and

Whereas, a supplemental agreement for said watershed, executed by the Sponsors named therein and NRCS, became effective on the 16th day of April 1973 as supplemented; and

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

Whereas, the Carroll County Park and Recreation Board has been reorganized as a department within the Carroll County government under the responsibility of the Commissioners of Carroll County; and

Whereas, the Carroll County Sanitary Commission has been reorganized as a bureau within the Department of Public Works, itself a department within the Carroll County government under the responsibility of the Commissioners of Carroll County; and

Whereas, the Maryland Department of Water Resources became the Maryland Water Resources Administration in 1969 and became a part of the Maryland Department of the Environment in 1987; and

Whereas, the Maryland Department of the Environment has requested to be removed as a local organization sponsoring this agreement; and

Whereas, in order to carry out the watershed plan for said watershed, it has become necessary to modify said watershed agreement; and

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for works of improvement for Piney Run Dam in the Piney Run Watershed, State of Maryland, 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, as amended, has been assigned by the Secretary of Agriculture to the NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsors and NRCS a Supplemental Watershed Work Plan and Environmental Assessment for works of improvement for the rehabilitation of Piney Run Dam of the Piney Run Watershed, State of Maryland, hereinafter referred to as the Plan-EA or plan, which plan is annexed to and made a part of this agreement;

Whereas, a Supplemental Watershed Plan which modifies the watershed plan dated May 1968 for said watershed has been developed through the cooperative efforts of the Sponsors and the NRCS;

Now, therefore, the Secretary of Agriculture through the NRCS and the Sponsors hereby agree upon the following modifications of the terms, conditions, and stipulations of said watershed agreement as supplemented which became effective on the 16th day of April 1973;

1. The Carroll Park and Recreation Board is hereby removed as one of the local organizations sponsoring this agreement.

2. The Carroll County Sanitary Commission is hereby removed as one of the local organizations sponsoring this agreement.

3. The Maryland Water Resources Administration, now part of the Maryland Department of the Environment, is hereby removed as one of the local organizations sponsoring this agreement.

4. Paragraph numbered 1 of the Watershed Work Plan Agreement as modified by paragraph 1 of the Supplemental Watershed Work Plan Agreement No. 1 is modified to read as follows:

   1. Real property. The sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsors and NRCS are as shown in the Cost-share table in item 5 hereof.

   The sponsors 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

5. Paragraph numbered 2 of the Watershed Work Plan Agreement is modified to read as follows:

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

6. Paragraph numbered 9 of the Watershed Work Plan Agreement is modified to read as follows:

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

measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

7. Paragraph numbered 10 of the Watershed Work Plan Agreement is modified to read as follows:

   10. 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.

8. Paragraph numbered 11 of the Watershed Work Plan Agreement is modified to read as follows:

   11. 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.

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

9. Paragraph numbered 12 of the Watershed Work Plan Agreement is modified to read as follows:

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

10. Paragraph numbered 13 of the Watershed Work Plan Agreement is modified to read as follows:

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

11. Paragraph numbered 5 of the Supplemental Watershed Work Plan Agreement No. 1 which adds paragraph numbered 14 to the Watershed Work Plan Agreement is modified to read as follows:

    14. Uniform Relocation Assistance and Real Property Acquisition Policies Act. The sponsors 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 sponsors are 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.

12. Paragraph numbered 6 of the Supplemental Watershed Work Plan Agreement No. 1 which adds paragraph numbered 15 to the Watershed Work Plan Agreement is modified to read as follows:

    15. Nondiscrimination Provisions. In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.
    Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

    To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

    USDA is an equal opportunity provider, employer, and lender.

    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.

13. Paragraphs numbered 3 and 5 of the Watershed Work Plan Agreement as modified by paragraphs 2 and 3 respectively of the Supplemental Watershed Work Plan Agreement No. 1 are hereby deleted from the agreement.

14. Paragraph numbered 4 of the Watershed Work Plan Agreement is hereby deleted from the agreement.

15. Paragraphs numbered 16 through 28 are hereby added as follows:

    16. Term. The term of this agreement is for the installation period (2 years) and evaluated life of the project (100 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

17. Cost-share for Watershed Work Plan. The following table shows cost-share percentages and amounts for Watershed Work Plan implementation.

Works of Improvement	NRCS	Sponsors	Total
Cost-Sharable Items			
Rehabilitation of dam (Construction Costs)	$6,089,850	$3,179,150	$9,269,000
Relocation, Replacement-in-Kind (1)	$0	$0	$0
Relocation, Required Decent, Safe, Sanitary	$0	$0	$0
Sponsors' Planning Costs	N\A	$0	$0
Sponsors' Engineering Costs	$1,040,000	$560,000	$1,600,000
Sponsors' Project Administration(2)	N\A	$100,000	$100,000
Land Rights Acquisition Cost	N\A	$0	$0
Subtotal: Cost-Share Costs	**$7,129,850**	**$3,839,150**	**$10,969,000**
Cost-Share Percentages(3)	**65%**	**35%**	**100%**
Non Cost-Sharable Items (4)			
NRCS Engineering & Project Administration	$100,000	N\A	$100,000
Natural Resource Rights	N\A	$0	$0
Federal, State and Local Permits	N\A	$200,000	$200,000
Relocation, Beyond Required Decent, Safe, Sanitary	N\A	$0	$0
Subtotal: Non Cost-Share Costs	N\A	$31,000	$31,000
TOTAL:	**$100,000**	**$231,000**	**$331,000**

(1) 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.

(2) The sponsors and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.

(3) Maximum NRCS cost-share is 65% of Cost-Shareable items not to exceed 100% of construction cost (including Replacement-in-Kind; Required Decent, Safe, Sanitary; and flood proofing of downstream properties).

(4) If actual Non Cost-Sharable item expenditures vary from these figures, the responsible party will bear the change.

18. Land treatment agreements. The Sponsors 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.

19. Floodplain Management. Before construction of any project for flood prevention, the sponsors must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsor entering into a construction contract.

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

21. Emergency Action Plan. Prior to construction, the sponsors must 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 must 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 must be reviewed and updated by the sponsors annually.

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

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

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

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

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

Certification:

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

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

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

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

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must—

(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 must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice must include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted—

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

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

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

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

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

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

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

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of

Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The sponsors must 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 must 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.

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

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

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

2. Where the primary sponsors is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

25. Clean Air and Water Certification.

1) The project sponsoring organizations signatory to this agreement certify as follows:
   1.0 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.
   2.0 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.

3.0 To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

2) The project sponsoring organizations signatory to this agreement agrees as follows:

1.0 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.

2.0 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.

3.0 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.

4.0 To insert the substance of the provisions of this clause in any nonexempt subagreement.

3) The terms used in this clause have the following meanings:

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

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

3.0 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).

4.0 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).

5.0 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 will 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.

26. Assurances and Compliance. As a condition of the grant or cooperative agreement, the sponsors assure and certify that they are 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.

27. Examination of Records. The sponsors must 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.

28. Signatures. The signing of this Public Law 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsor(s) has reviewed this Agreement and the Piney Run Watershed Piney Run Dam Supplemental Watershed Work Plan No. 2-Environmental Assessment and concur with the intent and contents of each.

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

Signatures

Commissioners of Carroll County By _____
Kenneth A. Kiler, President

225 North Center Street, Westminster, Maryland 21157 Date _____
Address

The signing of this plan was authorized by a resolution by the Commissioners of Carroll County governing body and adopted at an official meeting held on _____, 2025 at Westminster, Maryland.

_____ Date: _____
Kenneth A. Kiler, President

Carroll Soil Conservation District By _____
Myron Frock, Chairman

700 Agricultural Center Drive, Westminster, Maryland 21157 Date _____
Address

The signing of this plan was authorized by a resolution by the Carroll Soil Conservation District governing body and adopted at an official meeting held on _____, 2025 at Westminster, Maryland.

_____ Date: _____
Matthew McMahon, District Engineer

Natural Resources Conservation Service
U.S. Department of Agriculture

Approved by:

_____
Suzy Daubert, State Conservationist

Date: _____

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SUMMARY (OFFICE OF MANAGEMENT AND BUDGET FACT SHEET)

DRAFT SUPPLEMENTAL WATERSHED PLAN – ENVIRONMENTAL ASSESSMENT
for Rehabilitation of Piney Run Dam
Piney Run Watershed
Carroll County, Maryland
8th Congressional District

S.1. Authorization

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) as amended. The rehabilitation of Piney Run Dam is authorized under Public Law 83-566 (as amended), and as further amended by Section 313 of Public Law 106-472.

S.2. Sponsors

The project sponsors are the Carroll Soil Conservation District and Commissioners of Carroll County.

S.3. Proposed Action

The proposed action is the rehabilitation of Piney Run Dam to meet current United States Department of Agriculture Natural Resources Conservation Service (NRCS) and State of Maryland performance standards for a Class 'C' high hazard potential dam with a service life of 100 years starting from the estimated completion date of the project in 2027.

S.4. Purpose and Need for Action

A recent hydrologic and hydraulic study of the dam commissioned by the Maryland Department of the Environment of the dam's spillway capacity indicates that the dam does not have sufficient capacity to safely pass its spillway flood design (Charles P. Johnson and Associates, 2016). In addition, the State of Maryland has expressed concern over the erodibility of the auxiliary spillway if it were to activate. While there is a need for action to reduce dam safety risk, there is also a need for continued flood protection in the Piney Run Watershed as well as preservation of existing recreation and potential future water supply uses of the reservoir. The purpose of this supplemental watershed plan is to reduce the risk of a catastrophic breach of the dam and associated loss of life by complying with current NRCS and State of Maryland dam safety and performance criteria, to maintain the purpose of the original plan for flood protection, recreational development, and sediment storage, and to maintain a backup source of municipal raw water.

The needs identified in the original Piney Run Watershed Plan of flood damage reduction, municipal water supply, water-oriented recreation, and downstream sediment damage reduction remain although the need for municipal water has changed to a need for a backup municipal raw water supply source in the event the currently used source is no longer accessible. In addition to the original identified needs, this supplemental watershed plan is needed to reduce the risk of a catastrophic failure of the dam and associated potential loss of life and comply with NRCS and State of Maryland dam safety and performance criteria.

S.5. Description of Preferred Alternative

The preferred alternative plan will rehabilitate the Piney Run Dam to meet current safety and performance standards for a Class 'C' high hazard potential dam, provide 100 years of submerged sediment storage after construction, and maintain the current level of flood protection downstream.

Measures included for the rehabilitation of the Piney Run Dam are:

- Widen the auxiliary spillway from 250 to 275 feet by excavating the right-side slope of the auxiliary spillway channel.
- Raise the dam crest elevation while maintaining the existing 22-foot crest width and three-horizontal-to-one-vertical (3H:1V) side slopes of the embankment from elevation (EL.) 540.5 feet to EL. 545.0 feet.
- Raise the central core zone and chimney filter of the embankment to the freeboard hydrograph/spillway design flood peak water surface elevation.
- Modify the impact basin and rate control system to accommodate the additional embankment fill.
- Install roller-compacted concrete (RCC) along the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel. Install a secant pile cutoff wall under the RCC into bedrock and provide tieback anchors into rock.
- Install a cutoff wall and scour pad of traditional reinforced concrete at the auxiliary spillway crest. The top of the cutoff wall would be approximately 0.8 feet above the elevation of the existing spillway crest (EL. 531.2 feet) at EL. 532.0 feet and would be done to raise the auxiliary spillway crest by 0.8 feet. The bottom of the wall would be at the elevation of the top of the RCC armoring.
- Replace the downstream end of the toe drain conduits and install access manholes to improve maintenance and inspection.
- Make minor repairs to structural components of the principal spillway riser and water supply intake tower.
- Modify the water supply intake tower to install an automated cold water release system to maintain the health of Piney Run.

S.6. Resource Information

The Piney Run Dam is located in Carroll County, Maryland on Piney Run, a tributary of South Branch of the Patapsco River, located approximately one mile northwest of Sykesville, Maryland.

The Piney Run Dam was constructed in 1974 to provide flood damage reduction, water supply, recreation, and sediment storage. The embankment is a zoned, compacted earth fill dam. A 10-foot-wide core trench with 2H:1V side slopes was constructed at the centerline of the dam an average of about 7 feet below natural ground. The dam is approximately 73 feet tall and 624 feet

long. The upstream and downstream slopes of the embankment are approximately 3H:1V. The top width of the structure is approximately 22 feet. Piney Run Dam impounds Piney Run Reservoir, an approximately 290-acre lake at normal pool which is located in Piney Run Park. The land around the dam and reservoir is owned by Carroll County and used as part of the park. The land upstream of Piney Run Dam and Reservoir is predominantly privately owned.

Climate:

- Temperature: The average coolest month is January with low temperatures averaging 22 degrees Fahrenheit (ºF). The average warmest month is July with average temperatures of 88°F. Average temperatures reflect data collected between 1981 and 2010.
- Precipitation: Total annual precipitation is approximately 43.4 inches.
- Topography: The study area is located in southeastern Carroll County, Maryland, and is generally 465 to 580 feet above mean sea level. Topography within the Study Area is characterized by rolling uplands interrupted by incised stream valleys. Within the Study Area, much of the natural topography has been significantly impacted by construction of the dam and its appurtenant works.

Table S-1 lists the resource information for Piney Run Dam and the land use upstream of the Piney Run Dam.

Table S-1. Resource Information

Resource	Description		
Latitude / Longitude	39°23'15.72"N/ 76°58'32.74"W		
Hydrologic Unit Code	HUC8:02060003, HUC12: 020600031003		
Hydrologic Unit Code Name	HUC8: Gunpowder-Patapsco, HUC-12: Piney Run		
Watershed Size	6,759.2 acres (10.6 square miles)		
Land Use (acres)[1]	Water		290.0
	Tree Canopy		2,527.9
	Shrubland		17.8
	Herbaceous		3,472.5
	Barren		37.2
	Structures		88.5
	Impervious Surfaces		155.2
	Impervious Roads		106.1
	Tree Canopy over Structures		14.9
	Tree Canopy over Impervious Surfaces		30.9
	Tree Canopy over Impervious Roads		18.2
	Total		6,759.2
Land Ownership	78.5% Private	21.5% State/Local	0% Federal

[1]Land Uses are taken from the Chesapeake Bay Land Cover Dataset (Chesapeake Conservancy, 2016)

S.7. Population and Demographics

Table S-2 provides population and demographics characteristics of Carroll County and the state of Maryland

Table S-2. Population and Demographics Characteristics

Characteristic	Carroll County	Maryland
Population	172,891	6,177,224
Population Change (2010-2020)	7.4%	7.0%
Median Household Income	$99,569	$87,063
Population Below the Poverty Level	5.2%	10.3%
Minority Population[1]	12.7%	51%

Source: (US Census Bureau, 2020)

[1]Minority population is best understood as the inverse of "white-alone, not Hispanic or Latino in US Census data.

S.8. Relevant Resource Concerns Identified through Scoping

The scoping process followed the general procedures consistent with NRCS guidance and NWPM 501.24 requirements. Both NRCS procedures and NEPA regulations (40 CFR 1500-1508) require that NRCS use scoping early in the planning process to identify issues, concerns, and potential effects that require detailed analysis. Federal, state, and local agencies and representatives, as well as non-governmental agencies received an invitation to the scoping period in mid-May 2021. Public participation was performed through multiple public meetings and establishment of a project website where information pertaining to the project including final technical reports, public meeting materials, and other information was shared. A project email address published in public meeting materials and on the website provided a point of contact for the public to engage with the Sponsor on the project, ask questions, and provide feedback. Public engagement and agency coordination conducted as part of the scoping process is further discussed in **Section 6.0**. Resource concerns identified during the scoping process included concerns regarding handling of sediment, water quality, dam safety and infrastructure, invasive species, biological resources, recreation, and water supply. These concerns are addressed throughout the Plan-EA, as appropriate.

S.9. Alternative Plans Considered

Alternatives that were analyzed in detail include the No Action or Future without Project (Alternative 0), Rehabilitation (Alternative 1), Rehabilitation with Water Supply (Alternative 2), Dam Decommissioning (Alternative 6), and the Future without Federal Investment (Alternative 1A).

Alternative 0 (No Action/Future without Project)

No action would be taken to address the purpose and need. The current level of flood protection would remain as well as the current use of the reservoir for recreation. The reservoir would continue to store sediment which would continue to fill the reservoir. The allocated water supply volume would remain unused but available as a backup supply if the Sponsor decided to install the necessary infrastructure to use it. The risk of catastrophic failure of the dam would also

remain as the dam would not be able to safely pass the FBH and the spillway erodibility would remain unchanged and unmitigated.

Alternative 1 (Rehabilitation): The dam would be modified to meet NRCS and State of Maryland criteria for Class 'C' high hazard potential dams. The following measures would be implemented:

- Widen the auxiliary spillway from 250 to 275 feet by excavating the right-side slope of the auxiliary spillway channel.
- Raise the dam crest elevation while maintaining the existing 22-foot crest width and three-horizontal-to-one-vertical (3H:1V) side slopes of the embankment from elevation (EL.) 540.5 feet to EL. 545.0 feet.
- Raise the central core zone and chimney filter of the embankment to the freeboard hydrograph/spillway design flood peak water surface elevation.
- Modify the impact basin and rate control system to accommodate the additional embankment fill.
- Install roller-compacted concrete (RCC) along the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel. Install a secant pile cutoff wall under the RCC into bedrock and provide tieback anchors into rock.
- Install a cutoff wall and scour pad of traditional reinforced concrete at the auxiliary spillway crest. The top of the cutoff wall would be approximately 0.8 feet above the elevation of the existing spillway crest (EL. 531.2 feet) at EL. 532.0 feet and would be done to raise the auxiliary spillway crest by 0.8 feet. The bottom of the wall would be at the elevation of the top of the RCC armoring.
- Replace the downstream end of the toe drain conduits and install access manholes to improve maintenance and inspection.
- Make minor repairs to structural components of the principal spillway riser and water supply intake tower.
- Modify the water supply intake tower to install an automated cold water release system to maintain the health of Piney Run.

It should also be noted that implementation of Alternative 1 would require mitigation for 6.5 acres of forest clearing to accommodate the dam crest raise and spillway integrity measures.

Alternative 2 (Rehabilitation with Water Supply): The dam would be modified to meet NRCS and State of Maryland criteria for Class 'C' high hazard potential dams and the necessary infrastructure would be installed to connect the reservoir to the Carroll County public water supply system. To accommodate the future sediment pool without compromising the other storage allocations, the normal pool would need to be raised by 2.3 feet. The following measures would be implemented:

- Widen the auxiliary spillway by excavating the right side slope of the spillway channel to increase capacity, install a concrete labyrinth weir structure, and use the material generated by the excavation to raise the dam crest from EL. 540.5 feet to EL. 544.5 feet by placing fill on the crest and then on the downstream slope of the embankment to maintain the crest width and existing side slopes;
- Modify the principal spillway impact basin to accommodate the additional embankment fill;
- Remove the rate control vault and associated conduits;
- Raise the principal spillway riser crest by 2.3 feet from EL. 523.0 feet to EL. 525.3 feet and modify the walls of the structure to accommodate the increased hydrostatic loads. The reservoir would need to be completely drained to accommodate this part of the project;
- Raise the water supply intake tower by 2.5 feet. No additional structural modifications would be required for this structure;
- Install RCC along the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel. The RCC toe would sit on a secant pile cutoff wall with concrete cap and tieback anchors. Both the wall and anchors would extend into rock to an elevation at or below the expected eroded elevation of the spillway.
- Construct a smaller cutoff wall and scour pad of traditional reinforced concrete would be installed at the auxiliary spillway crest to arrest any head cut that would form in the exit channel of the auxiliary spillway during activation. The top of the cutoff wall would be at the elevation of the existing auxiliary spillway crest and the bottom would be at the elevation of the top of the RCC armoring. This cutoff wall can be constructed monolithically with the labyrinth weir described above.
- Construct a gravity transmission conduit and pump station from the existing water supply conduit running through the dam on the right bank of Piney Run, downstream of the dam. From the pump station, construct a force main conduit along the downstream toe of the spillway, through the RCC armoring then turning north and extending to connect to the County's water supply system. The pump station would be designed to include the functionalities of the removed rate control vault;
- Repair the downstream end of the toe drain conduits and add access manholes to improve maintenance and inspection;
- Make minor repairs to structural components of the principal spillway riser and water supply intake tower; and
- Modify the water supply intake tower to install an automated cold water release system to maintain the health of Piney Run downstream of the reservoir. This system would require an allocation of 170 acre-feet of water based on the basis of design report for the system (Michael Baker, LimnoTech, 2016) and would be taken from the volume of water currently allocated to water supply.

Implementation of Alternative 2 will require mitigation for approximately 11.9 acres of forest clearing to accommodate the dam crest raise and water supply infrastructure. The normal pool increase would also impact 6.5 acres of wetlands, approximately 850 feet of stream channel, and require minor modifications to the waterfront area of the park. Approximately 300 feet of White Rock Road would need to be modified to raise the low point of the road approximately 0.5 feet to meet County requirements for safe passage of the 4% annual exceedance event. As a consequence of raising the pool 2.3 feet, complete the following mitigation projects:

- Provide approximately 14.3 acres of reforestation and afforestation planting;
- Complete approximately 300 linear feet of road improvements to raise the low point of White Rock Road north of the reservoir to provide nine inches of freeboard over the 4% annual exceedance event per County criteria;
- Complete mitigation projects for 13 acres of wetlands (assuming 6.5 acres lost at a 2:1 replacement ratio) and 850 linear feet of stream restoration (assume 850 linear feet permanently impacted assuming a 1:1 restoration ratio) to compensate for those wetlands and stream permanently impacted from the normal pool increase; and
- Make modifications to the Piney Run Park waterfront infrastructure including five docks, two boat ramps, one gazebo and associated walkway to accommodate the normal pool increase and the proposed water supply pool operating limits which will range from EL. 525.3 feet to EL. 511.0 feet (maximum fluctuation of 14.3 feet).

Alternative 6 (Dam Decommissioning): The dam would be decommissioned by draining the reservoir and removing the entire dam embankment and appurtenant structures to meet the State of Maryland requirement of conveying the 1% AEP event with less than three feet of depth. Approximately 20,000 linear feet of stream channel in the reservoir would be restored, and approximately 250 acres of tree planting or other land conversion of the former reservoir area would be completed. Decommissioning the dam would also require flood proofing or acquiring 13 properties downstream where structures, including two pump stations, and modification of three roads downstream that would be placed in the 1% AEP floodplain by the decommissioning action plus mitigation to environmental impacts of modifying the roads.

Future without Federal Investment (Alternative 1A): In this alternative, the project's purpose and need would need to be satisfied by using local funding resources. If no federal investment were made the Sponsor has indicated that they would likely pursue a repair of the dam to meet State of Maryland criteria over a significantly longer period of time due to limited available funding opportunities and resources. Under these circumstances, the dam would remain un-repaired for a longer period of time subjecting downstream properties, people, infrastructure, and the environment to a higher risk of dam failure over an extended period of time. In addition, interim risk reduction measures would be required such as lowering the normal pool of the reservoir to increase flood storage capacity and reduce the chance of overtopping or spillway erosion during an extreme flood event. Ultimately, this alternative would involve the same measures as Alternative 1.

The recommended alternative for the Piney Run Dam is Alternative 1. This alternative is the locally preferred and maximizes the net national benefits. The project costs for the recommended plan are provided in **Table S-3**. The most likely scenario is for the project to be implemented over 36 months, including design, permitting, and construction.

Table S-3. Project Costs (Dollars)

Project Costs	PL-83-566 Funds[1]		Other Funds[1]		Total Dollars
	Dollars	%	Dollars	%	
Construction	$6,089,850	66%	$3,179,150	34%	$9,269,000
Engineering	$1,040,000	65%	$560,000	35%	$1,600,000
SUBTOTAL COSTS	**$7,129,850**	**66%**	**$3,739,150**	**34%**	**$10,869,000**
Real Property Rights	N\A	0%	N\A	0%	$0
Relocation	N\A	0%	N\A	0%	$0
Project Administration	$100,000	50%	$100,000	50%	$200,000
Other (Permits)	$0	0%	$231,000	100%	$231,000
TOTAL COSTS	**$7,229,850**	**64%**	**$4,070,150**	**36%**	**$11,300,000**

[1] Price level: 2022 base year

S.10. Project Benefits

The preferred alternative reduces the potential for loss of life and maintains protection of existing infrastructure downstream of the dam as well as property values around the lake and associated recreational benefits as well as a backup source of raw water supply. Net average annual equivalent benefits between the Future without Federal Investment and the recommended plan is -$313,000

Number of Direct Beneficiaries/Population at Risk: The population at risk is 768 people. Additional beneficiaries including users of the water-oriented recreational opportunities provided by the reservoir who receive approximately 22,046 average annual user days from those opportunities and the 8 property owners of the 10 structures who receive flood damage reduction benefits from the dam, as well as the population served by one County-operated sewage pumping station that receives flood damage reduction benefits.

Other Beneficial Effects:

- Reduces the potential for loss of life by reducing the possibility of dam failure;
- Reduces the Sponsor's liability associated with continuing to operate an unsafe and noncompliant dam;
- Preserves the level of flood protection (1% annual exceedance event) for downstream agricultural lands, houses, and infrastructure;
- Protects real estate values by continuing to provide at least the current level of flood damage reduction;
- Complies with high hazard potential dam safety and performance standards established by NRCS and the State of Maryland;

- Extends the service life of the dam for an additional 100 years; and
- Preserves existing recreation opportunities.

Benefit-to-Cost Ratio (discount rate of 2.5%): 0.1

Net Economic Beneficial Effects: -$283,000

S.11. Period of Analysis

The standard evaluation period for dam rehabilitation under PL 83-566 is a minimum of 50 years and a maximum of 100 years. Piney Run Dam was analyzed for a 103-year period of analysis (3 year for implementation and 100-year evaluation period).

S.12. Project Life

The project life intended to be 100 years.

S.13. Environmental Impacts

Temporary and minor adverse impacts associated with the construction phase of the preferred alternative (Alternative 1) are provided in **Table S-4**.

Table S-4. Summary of Environmental Effects for the Preferred Alternative

ITEM/CONCERN	PINEY RUN DAM - SUMMARY OF EFFECTS OF ALTERNATIVE 1
Land Use and Recreation	Land use and recreation would be temporarily impacted during construction from ground disturbing activities and closure of a 0.1-mile section of the Piney Run Park hiking trail. Alternative 1 is consistent with the 2014 Carroll County Master Plan, the 2018 Freedom Community Comprehensive Plan, and the 2019 Water and Sewer Master Plan Triennial Update. Overall, Alternative 1 would have *short-term, less than significant adverse impacts* and *no long-term impacts* to land use and recreation.
Geological Resources	Bedrock is anticipated to be encountered during construction. As such, minor, localized impacts to geologic conditions would be *long-term and less-than-significant.* Slight changes to topography would also result from dam modifications, resulting in a *long-term, less-than-significant adverse impacts* to topography. Additionally, construction activities would remove vegetation cover and disturb soil throughout the LOD, including soils designated as prime farmland and farmland of statewide importance. Overall, impacts to soils would be *short-term, less-than-significant adverse* and would be minimized by adherence to BMPs outlined in the ESCP. Once construction is complete, dam modifications, including installation of permanent erosion control measures, would incur *long-term beneficial impacts* due to decreased sedimentation and a heightened level of flood protection for FPPA-designated soils downstream.

ITEM/CONCERN	PINEY RUN DAM - SUMMARY OF EFFECTS OF ALTERNATIVE 1
Water Resources	Water resources would be indirectly impacted by increased erosion and sedimentation during ground disturbing activities, resulting in *short-term, less-than-significant adverse impacts* on surface water, wetlands, and riparian areas. These impacts would be minimized through adherence to the CGP and project-specific ESCP, which would identify erosion control and BMPS to manage stormwater discharges. Additionally, there would be a *short-term, less-than-significant adverse impact* on groundwater due to potential release of HTMW during operation of construction equipment. Construction of Alternative 1 would encroach on a 100-year floodplain; and includes modification of the impact basin as well as filling (on the downstream slope of the dam) in the floodplain. As such, detailed floodplain maps showing the effects of the Alternative 1 on the boundary of the floodplain would be developed in compliance with 7 CFR 650.25. In the long-term, dam modification would have beneficial impacts on surface water, wetlands, water quality, and riparian areas from installation of erosion control devices and the automated cold water release system. Additionally, Alternative 1 is compatible with regional water resource plans.
Biological Resources	Construction activities, including vegetation clearing and operation of heavy equipment, would have *short-term, less-than-significant adverse impacts* on vegetation, fish and wildlife, and special status species. Impacts would be minimized through adherence to the FCP and Planting Plan. Mitigation would be required for approximately 6.5 acres of forest clearing. The Sponsors determined and USFWS concurred that Alternative 1 *may affect but is not likely to adversely affect* the NLEB. Once dam modifications are complete, improvements to downstream habitat would have *beneficial impacts* on aquatic wildlife. Additionally, the construction contractor would minimize invasive species impacts through standard construction BMPs and disturbed areas would be revegetated with native species.
Air Quality and Climate	A general conformity applicability analysis performed for Alternative 1 determined that emissions would be de minimis and a General Conformity Determination is not required.
Noise	Construction of Alternative 1 would have a *short-term, less-than-significant* impact on the noise environment in the Study Area. Impacts would be minimized through standard construction BMPs (e.g., shut down noise-generating equipment when not needed, locate equipment as far as practicable from sensitive receptors).
Cultural Resources	Five sites (18CR292, 18CR293, 18CR294, and 18CR295 and Piney Run Dam) were identified within or near the Area of Potential Effects (APE). Of these sites, one site potentially eligible for the NRHP (Site 18CR293) was recommended for a Phase II Archeological Evaluation. The result of this evaluation of Site 18CR293 recommended that the site was not eligible for listing in the NRHP. In correspondence dated March 26, 2024, SHPO-MHT concurred with this recommendation. Sites 18CR292 and 18CR294 were determined to not be eligible as documented in email correspondence between the NRCS and the SHPO-MHT dated January 24, 2024. Site 18CR295 was determined to not be eligible as documented in email correspondence between the NRCS and the SHPO-MHT dated July 23, 2021. Piney Run Dam was determined to not be eligible as documented in correspondence between the NRCS and the SHPO-MHT dated December 5, 2023. Based on this correspondence, Alternative 1 would have *no adverse effect* on historic properties.
Socioeconomics	Alternative 1 would be anticipated to have a *short-term, beneficial impact* on the surrounding communities from increased construction expenditures.

ITEM/CONCERN	PINEY RUN DAM - SUMMARY OF EFFECTS OF ALTERNATIVE 1
Environmental Justice	No impacts as no EJ communities of concern with respect to race or income are present in the Study Area.
Health and Safety	Construction contractors would be required to adhere to all OSHA and MOSH standards during construction to ensure the safety of contractors on the site. Additionally, the construction site would not be accessible by members of the general public. Therefore, there would be *no short-term impacts* on health and safety during construction. Once dam modifications are complete, there would be long-term beneficial impacts as repairs to the dam would reduce the risk of dam failure and protect the surrounding communities.
Infrastructure	Alternative 1 would have a *short-term, less-than-significant impact* on infrastructure, primarily from increased construction traffic in the area. There would be long-term beneficial impacts from increased flood protection of infrastructure downstream of the dam.
Hazardous and Toxic Materials and Waste	Operation of construction equipment and vehicles would create the potential for discharge, spills, and contamination of commonly used products at the site. Therefore, construction of Alternative 1 would have the potential for *short-term, less-than-significant adverse impacts* from releases of HTMW. Impacts would be minimized through spill prevention and control measures contained within the project-specific ESCP.
Cumulative Impacts	Alternative 1 would contribute to *short-term, less-than-significant adverse cumulative impacts* to soils, water resources, biological resources, air quality, and noise. Construction equipment and vehicles required for dam modifications, would also cumulatively impact the local noise environment, while also producing air emissions. Overall, cumulative impacts would not exceed significance thresholds and would be temporary.

S.14. Major Conclusions

Implementation of the preferred alternative will bring the Piney Run Dam into compliance with both NRCS safety and performance standards for a Class 'C' high hazard potential dam and State of Maryland safety criteria for the same. This alternative has the greatest net economic benefit of all alternatives analyzed and a benefit-to-cost ratio of 0.1. This alternative is also the locally preferred alternative and will be implemented with federal assistance.

S.15. Areas of Controversy and Issues to be Resolved

Controversial Issues: None identified.

Issues to be Resolved: The anticipated issues to be resolved for the implementation of the preferred alternative include final determination of the extents of existing flowage easements on adjacent private property and if, necessary, preparation and execution of additional easements to cover backwater incursions on to private property. The recommended backwater elevation for easement is the proposed auxiliary spillway elevation of EL. 532.0 feet which is above the peak water surface elevation in the reservoir during the 100-year, 24-hour storm event.

S.16. Evidence of Unusual Congressional or Local Interest

No evidence of unusual Congressional or local interests was identified.

S.17. Compliance Certificate

Is this report in compliance with executive order, public laws, and other statutes governing the formulation of water resource projects? Yes _X_ No ___

1.0 INTRODUCTION

1.1. Changes Requiring Preparation of a Supplement

This Supplemental Watershed Plan and Environmental Assessment formulated, evaluated, and resolved alternatives for the rehabilitation of Piney Run Dam located within the Piney Run Watershed, a subwatershed of the South Branch of the Patapsco River, in Carroll County, Maryland (see Project Map in **Appendix B**).

Piney Run Dam is a multi-purpose dam that was designed and constructed as a Class 'C' (State of Maryland Category I) high hazard potential structure (Soil Conservation Service - SCS, 1968). Current requirements of both the United States Department of Agriculture Natural Resources Conservation Service (NRCS) and the State of Maryland require a freeboard hydrograph (FBH) event of the probable maximum flood (PMF - NRCS, 2019a and State of Maryland, 2021). The design hydrologic and hydraulic analysis for the dam showed that it is capable of passing a six-hour duration event equivalent to 2.58 times the one percent annual exceedance probability rainfall, or 13.7 inches although the design report does not indicate if discharge is through the auxiliary spillway alone or a combination of the principal and auxiliary spillways. The peak water surface elevation for this event is at the dam crest elevation of 540.5 feet. Additionally, the analysis showed that a "maximum probable storm (MPS)", similar to the probable maximum precipitation (PMP) event that is currently evaluated, of five times the 100-year rainfall depth or 26.5 inches would overtop the dam crest (Rummel, Klepper, and Kahl – RK&K, 1972). A subsequent analysis completed in 2016 concurred that the dam cannot pass the FBH without overtopping the dam (Charles P. Johnson and Associates, Inc. - CPJ, 2016).

In addition, the regulator for dams in Maryland, the State of Maryland, Department of the Environment, Water and Science Administration, Dam Safety Division (MDE), issued a letter to the Sponsor expressing concern over the hydraulic capacity of the dam as discussed herein, noting additional concern over the potential integrity of the auxiliary spillway during the freeboard hydrograph flood event, and requesting that the owner complete an analysis of the auxiliary spillway integrity under the required freeboard hydrograph loading conditions (State of Maryland, 2017).

This Supplemental Watershed Plan-EA documents the planning process by which NRCS provided technical assistance to the Sponsors and the public in addressing resource issues and concerns within the Piney Run Watershed and complied with the requirements of the National Environmental Policy Act (NEPA).

The format of this Plan-EA follows the plan format outline that must be followed for all Watershed Project Plans as outlined in the USDA-NRCS National Watershed Program Manual (NRCS, 2015) Part 501 and USDA-NRCS National Watershed Program Handbook (NRCS, 2014) Part 601. The Plan-EA assists NRCS in determining if the preferred alternative would have a significant impact on the quality of the human environment and, if so, requires preparation of an Environmental Impact Statement.

1.2. Project History

The original Piney Run Watershed work plan was prepared, and works of improvement were installed, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666) as amended and supplemented. The original watershed work plan was developed in May 1968. The evaluated life of the project was 100 years.

The dam was constructed between 1973 and 1974 and has since been operated and maintained by the Sponsor. The dam is regulated by the MDE as a Category I high hazard potential dam and as such is inspected annually. Regular investigations and analyses of the dam have been completed between 1975 and present day by both the Sponsor and the MDE. Most notably, the MDE commissioned a hydrologic and hydraulic analysis of the dam in 2016 to evaluate the dam's hydraulic capacity and to develop breach inundation maps using current tools and methods. The analysis found that the dam did not have the capacity to pass the required FBH, which for high hazard potential dams is the PMF for both State of Maryland and NRCS criteria (CPJ, 2016). Recent risk evaluations indicate that the Piney Run Dam Risk Index is 3,421. The risk evaluation is provided in **Appendix F**.

1.3. Purpose and Need for Action

The original purpose of the Piney Run Watershed Plan was to provide flood protection, water supply, recreational development, and sediment storage. This purpose was developed in response to identified needs for flood damage reduction, municipal water supply, water-oriented recreation, and downstream sediment damage reduction (SCS, 1968).

The purpose of this supplemental watershed plan is to reduce the risk of a catastrophic breach of the dam and associated loss of life by complying with current NRCS and State of Maryland dam safety and performance criteria, to maintain the purpose of the original plan for flood protection, recreational development, and sediment storage, and to maintain a backup source of municipal raw water.

The needs identified in the Piney Run Watershed Plan remain although the need for municipal water has changed to a need for a backup municipal raw water supply source in the event the currently used source is no longer accessible. In addition to the original identified needs, this supplemental watershed plan is needed to reduce the risk of a catastrophic failure of the dam and associated potential loss of life and comply with NRCS and State of Maryland dam safety and performance criteria.

1.4. Watershed Problems

The following watershed problems supporting the supplement water plan needs were identified and are described in detail below.

Dam Deficiencies: When the dam was designed in the early 1970s, the requirements at the time were that it safely pass a storm equivalent to 2.58 times the 100-year precipitation depth for a six-hour duration event. Since then, NRCS and State of Maryland dam safety and performance

criteria have changed due to regulatory amendments. Current criteria evaluate dam efficacy based on the PMF event. Based on current analyses, a storm of this magnitude under current conditions is estimated to overtop Piney Run Dam by up to three feet, which has the potential to cause erosion on the downstream slope and ultimately result in a dam failure and uncontrolled release of the Piney Run Reservoir. The failure of Piney Run Dam could result in a significant loss of life. As such, Piney Run Dam does not comply with current regulatory requirements.

In addition, recent investigations of the auxiliary spillway's erodibility conducted to inform the Supplemental Watershed Plan indicated that the spillway would be susceptible to significant erosion resulting in a potential breach of the spillway crest under the required loading conditions for high hazard potential dams.

Backup Water Supply: The Sponsor has expressed a need to explore alternative water supply sources as backup to their current sources of raw water for their municipal water supply system. Currently, the Sponsor can withdraw up to 4.2 million gallons per day from the Liberty Reservoir through an agreement with the reservoir's owner, the city of Baltimore, Maryland. However, since the Sponsor does not control the use of the reservoir, and withdrawals are subject to continued agreements between Baltimore City and the Sponsor, the Sponsor has identified a need to determine backup sources of water in the event Liberty Reservoir can no longer be used as a withdrawal source.

Sedimentation: The investigation portion of this study revealed that the originally allocated sediment storage volume of the reservoir has been used and sedimentation rates are projected to be higher than originally planned. Excessive sedimentation volumes will reduce the volume of water allocated to other uses: recreation, backup water supply, and flood control.

1.5. Watershed Opportunities

By meeting the purpose for and need of the project, the following opportunities would be recognized by implementing an alternative to meet the project purpose. Quantification of these opportunities will be provided in other sections of this report.

- Comply with current NRCS and State of Maryland dam safety and performance criteria;
- Reduce the risk of loss of life associated with catastrophic failure of the dam;
- Reduce Sponsor liability associated with operation of a non-compliant dam;
- Maintain a backup source of municipal raw water for the area served by Liberty Reservoir;
- Extend the service life of Piney Run Dam for an additional 100 years;
- Continue to provide downstream flood protection to protect lives and property;
- Continue to provide water-oriented recreational opportunities at Piney Run Park; and
- Continue to provide sediment storage capacity in the reservoir.

2.0 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

On January 29, 2020, a meeting was held at the Carroll County Department of Land and Resource Management in Westminster, Carroll County, Maryland to discuss the investigation phase of the study including identifying issues of economic, environmental, cultural, and social importance in the watershed. Input was provided by the staff from the Carroll County government. Factors that would affect soil, water, air, plant, animals, and human resources were identified by the team.

Local citizens at the first public meeting held on February 25, 2020, did not express any additional concerns.

The scoping process identified (1) the objectives, needs, and primary concerns for the Sponsor, (2) the relevant issues associated with the Piney Run Dam, and (3) the environmental concerns associated with the Project. **Table 2-1** identifies the specific concerns and their relevance to the proposed action.

Table 2-1. Resource Concerns Considered and Identified Through Scoping

RESOURCE AREA	Relevant to the Proposed Action?		RATIONALE
	YES	NO	
LAND USE AND RECREATION			
Land Use	X		The project area may impact land within and in adjacent to the study area. This resource is retained for detailed analysis.
Public Recreation	X		The project area is situated in a publicly accessible recreation area within Piney Run Park and concerns regarding public recreation access were identified by the public during the scoping process. This resource is retained for detailed analysis.
Parklands	X		The project area is situated within Piney Run Park and concerns regarding park access were raised during the scoping process. This resource is retained for detailed analysis.
Scenic Beauty	X		The viewshed in the vicinity of the project area may be modified by implementation of a proposed alternative. This resource is retained for detailed analysis.

RESOURCE AREA	Relevant to the Proposed Action? YES	NO	RATIONALE
Wild and Scenic Rivers	X		A segment of the South Branch Patapsco River approximately 2-miles downstream of the dam is designated in the National Park Service's National Rivers Inventory for its cultural and recreational value. The dam discharges to Piney Run, which discharges to the South Branch Patapsco River. Therefore, the proposed action may affect this designated segment. This resource is retained for detailed analysis.
GEOLOGICAL RESOURCES			
Geology	X		The proposed action may involve ground disturbance and excavation. This resource is retained for detailed analysis.
Topography	X		The proposed action may involve ground disturbance which may modify topography in the study area. This resource is retained for detailed analysis.
Soils (Including Erosion and Sedimentation)	X		The proposed action may involve ground disturbance, which would impact soils and may result in erosion and sedimentation. Furthermore, sedimentation in the reservoir far exceeds the submerged sediment storage capacity of the reservoir. Multiple commenters raised concerns regarding sedimentation during the scoping period. This resource is retained for detailed analysis.
Prime and Unique Farmland, and Farmland of Statewide Significance.	X		Prime farmland soils are present within the project area and downstream of the dam. This resource is retained for detailed analysis.
WATER RESOURCES			
Water Resources	X		The project area includes open water, floodplains, and riparian areas. This resource is retained for detailed analysis.
Floodplain Management	X		The project area is located within the 100-year floodplain. This resource is retained for detailed analysis.
Regional Water Resource Plans	X		The proposed action is included in the 2014 Carroll County Master Plan, the 2018 Freedom Community Comprehensive Plan, and the 2019 Water and Sewer Master Plan Triennial Update. This resource is retained for detailed analysis.
Riparian Areas	X		Riparian areas are present and may be affected by the proposed alternatives. This resource is retained for detailed analysis.

RESOURCE AREA	Relevant to the Proposed Action? YES	NO	RATIONALE
Water Quality	X		Surface water is present in the project area and water quality may be affected during ground disturbing activities. This resource is retained for detailed analysis.
Waters of the United States, (Including Special Aquatic Sites)	X		Waters of the United States are present in the project area and may be affected by the proposed action. This resource is retained for detailed analysis.
Wetlands	X		Wetlands are present in the project area and may be affected by the proposed action. This resource is retained for detailed analysis.
Coastal Zone Plans		X	The project is not located in an area subject to Coastal Zone Management Act requirements and no concerns regarding coastal zones were identified during scoping. Therefore, this resource is not relevant to the proposed action and is dismissed from further analysis.
Sole Source Aquifers		X	The project area is not located on a sole source aquifer and no concerns regarding sole source aquifers were identified during scoping. Therefore, this resource is not relevant to the proposed action and is dismissed from further analysis.
BIOLOGICAL RESOURCES			
Endangered and Threatened Species	X		Federal and state endangered and threatened species may be present in the project area. This resource is retained for detailed analysis.
Fish and Wildlife	X		The project area provides habitat to fish and wildlife. This resource is retained for detailed analysis.
Forest Resources	X		Impacts to existing forest in the proposed action area are anticipated for proposed alternatives other than the no-action alternative. This resource is retained for detailed analysis.
Invasive Species	X		Invasive species have been identified in the project area. This resource is retained for detailed analysis.
Migratory Birds	X		Migratory birds, including bald eagles, are known to utilize habitat surrounding the project area. This resource is retained for detailed analysis.
Natural Areas	X		Natural areas are defined as land or water units where natural conditions have been retained and protected. The forested areas surrounding the Piney Run Dam are designated for conservation purposes. This resource is retained for detailed analysis.
Coral Reefs		X	No coral reefs are present on or near the project area. No concerns regarding coral reefs were identified during the scoping process. Therefore, coral reefs are not relevant to the proposed action and are dismissed from further analysis.

RESOURCE AREA	Relevant to the Proposed Action? YES	NO	RATIONALE
Ecologically Critical Areas		X	No ecologically critical areas occur within the project area and no concerns regarding ecologically critical areas were identified during the scoping process. Therefore, ecologically critical areas are not relevant to the proposed action and are dismissed from further analysis.
Essential Fish Habitat		X	There are no essential fish habitats present in the project area and no concerns regarding this resource were identified during scoping. Therefore, essential fish habitat is not relevant to the proposed action and this resource is dismissed from further analysis
AIR QUALITY			
Air Quality	X		The project is located in a non-attainment county (Carroll) for National Ambient Air Quality Standard for 8-Hour Ozone. Temporary construction related emissions are anticipated. This resource is retained for detailed analysis.
NOISE			
Noise	X		Temporary construction related noise is anticipated. This resource is retained for detailed analysis.
CULTURAL RESOURCES			
Cultural Resources	X		Cultural resources exist in the vicinity of the Piney Run Dam and American Indian Tribes have historic ties to the area. This resource is retained for detailed analysis.
SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE			
Socioeconomics and Protection of Children	X		The proposed action would be conducted by local contractors, would modify land use in the area. Residential homes are located within 0.5 mile of the project area. This resource is retained for detailed analysis.
Environmental Justice and Civil Rights	X		Potential air and noise emissions resulting from the proposed action could result in disproportionate effects to environmental justice communities if present. This resource is retained for detailed analysis.
Social Issues		X	The proposed action is not anticipated to effect social issues and no concerns regarding this resource were identified during scoping. Therefore, this resource is not relevant to the proposed action and is dismissed from further analysis.
HEALTH AND SAFETY			

RESOURCE AREA	Relevant to the Proposed Action? YES	NO	RATIONALE
Public Health and Safety	X		Piney Run Dam is classified as having a high hazard potential and in its existing condition may be a risk to the public during an extreme flood event. Property owners expressed concerns regarding potential catastrophic impacts if the dam were to fail. This resource is retained for detailed analysis.
Occupational Health and Safety	X		Contractors would be used to facilitate implementation of the proposed action. This resource is retained for detailed analysis.
INFRASTRUCTURE			
Infrastructure	X		Nearby infrastructure, such as portions of Hollenberry Road, may be affected by the proposed action. This resource is retained for detailed analysis.
HAZARDOUS AND TOXIC MATERIALS AND WASTE			
Hazardous and Toxic Materials and Waste	X		Hazardous and toxic materials and waste associated with operation of standard construction equipment would be present during implementation of the proposed action. This resource is retained for detailed analysis.
MISCELLANEOUS			
National Economic Efficiency	X		An economic analysis was completed, is referenced throughout the Plan-EA, and incorporated specifically into **Appendix D**.
Scientific Resources		X	There are no scientific resources/studies identified in the project area. No concerns regarding this resource were identified during scoping. Therefore, this resource is not relevant to the proposed action and is dismissed from further analysis.

3.0 AFFECTED ENVIRONMENT

This chapter describes current baseline conditions within and in the vicinity of the Piney Run Dam Study Area (Study Area) pertaining to the following relevant technical resources: land use and recreation, geological resources, water resources, biological resources, air quality, noise, cultural resources, socioeconomics and environmental justice, health and safety, infrastructure, and hazardous and toxic materials and waste. In compliance with the National Environmental Policy Act of 1969 (NEPA; 42 United States Code [USC] §§ 4321 et seq.) and the President's Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500 – 1508), the United States Department of Agriculture's (USDA) NEPA regulations (7 CFR Part 650), NRCS Title 190 General Manual Part 410, and NRCS National Environmental Compliance Handbook Title 190 Part 610, this section focuses on resources that would be potentially affected by implementation of the Piney Run Dam Supplemental Watershed Plan No. 2 (Proposed Action; see **Table 2-1**). Following the discussion of baseline resources, a description of the existing dam conditions and evaluation of potential failure modes is presented (see **Section 3.18** and **Section 3.19**)

3.1. Planning Activities

Geologic, engineering, environmental, and cultural investigations and analyses were conducted by the Sponsor with assistance from AECOM to accurately describe the affected environment. These investigations and analyses are listed below.

Hydrologic and hydraulic analyses were conducted in defining the affected environment, including:

- Development of watershed boundaries and hydraulic model topography from current LiDAR;
- Development of structure (culvert, bridge, and dam) critical dimensions from currently available information, field-run and aerial photogrammetry survey, and site visits;
- Development of watershed hydrologic models for Piney Run Dam and the aggregate watershed of Piney Run, for eight statistical storms: 50 percent through 0.2 percent AEP flood;
- Development of a detailed two-dimensional hydraulic mesh for Piney Run including detailed structural information for existing bridges and culverts on Piney Run downstream of Piney Run Dam to the confluence of Piney Run with the South Branch of the Patapsco River;
- Development of an unsteady U.S. Army Corps of Engineers, Hydrologic Engineering Center – Riverine Analysis System program (HECRAS) model for Piney Run, from the Piney Run Dam outlet to the confluence with the South Branch of the Patapsco River;
- Development of Water Resources Site Analysis Program (SITES) models for Piney Run Dam, to include development of NRCS design floods per TR-210-60 (NRCS, 2019a).

- Evaluation of the existing auxiliary spillway for erosion potential using the SITES model and subsurface material properties determined via a subsurface geologic and geotechnical investigation.
- Development of a breach analysis for multiple loading conditions including the seismic, static, and hydrologic breach events required by NRCS. The two-dimensional HECRAS model previously described was extended downstream approximately 12 additional miles until the termination criteria required by the State of Maryland was reached.

Geologic and geotechnical analysis were conducted including:

- Completion of a subsurface geologic and geotechnical investigation including 25 hollow stem auger borings with rock coring, collection of samples, classification, and material and strength laboratory testing.
- Slope stability and seepage analyses of the earth embankment structure at Piney Run Dam
- Filter compatibility analyses of the filters and drains in the earth embankment structure at Piney Run Dam.
- Development of input parameters for the evaluation of the spillway erosion potential using the SITES program as described in the hydrologic and hydraulic analyses description.

Inspections of the dam were completed including:

- Visual inspection of the dam, spillways, and appurtenant structures including operation of gates and valves.
- Inspection of the principal spillway conduit, low level outlet drain conduit, and toe drain conduits using a remotely operated vehicle-mounted camera.

Environmental investigations were also completed including:

- Natural resources inventories and wetland delineations;
- Identification of threatened and endangered species and fish and wildlife resources;
- Cultural and archeological investigations including a Phase I and Phase II archeological investigations;
- Socioeconomic evaluations; and
- Bathymetric survey and a sedimentation study.

3.1.1. Ecosystem Service Framework

The Guidance for Conducting Analyses under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments (PR&G - USDA, 2017) requires implementation studies, including watershed plan-

environmental documents to identify and incorporate into the evaluation, ecosystem services associated with each resource. Ecosystem services are defined as "the direct or indirect contributions, including economic, environmental and social effects, which ecosystems make to the environment and human populations" (CEQ, 2013). Focusing on ecosystem services supports a stronger connection between ecological conditions and how they will affect people (NESP, 2016).

Ecosystem Services are divided into four categories:

1. Provisioning – tangible goods provided for direct human use and consumption (food, fiber, water, timber, power);

2. Regulating – services that maintain a world that is possible for people to live in (flood control, water filtration, climate stabilization, crop pollination);

3. Cultural – services that make the world a place in which people want to live (recreation, aesthetic viewsheds, tribal values); and

4. Supporting – underlying processes that maintain conditions for life on Earth (water cycling, nutrient cycling, soil formation).

To provide a basis for evaluation, each ecosystem service is assigned a benefit-relevant indicator (BRI) which provides a means of evaluating the effect of changes to the ecosystem service.

Figure 3-1 shows a conceptual relationship known as a causal chain between the Proposed Action to changes in ecological features, affected ecosystem services, their BRIs, and resulting societal benefits. Specific ecosystem services, identified in the causal chain in red text, are discussed in the remainder of this document.

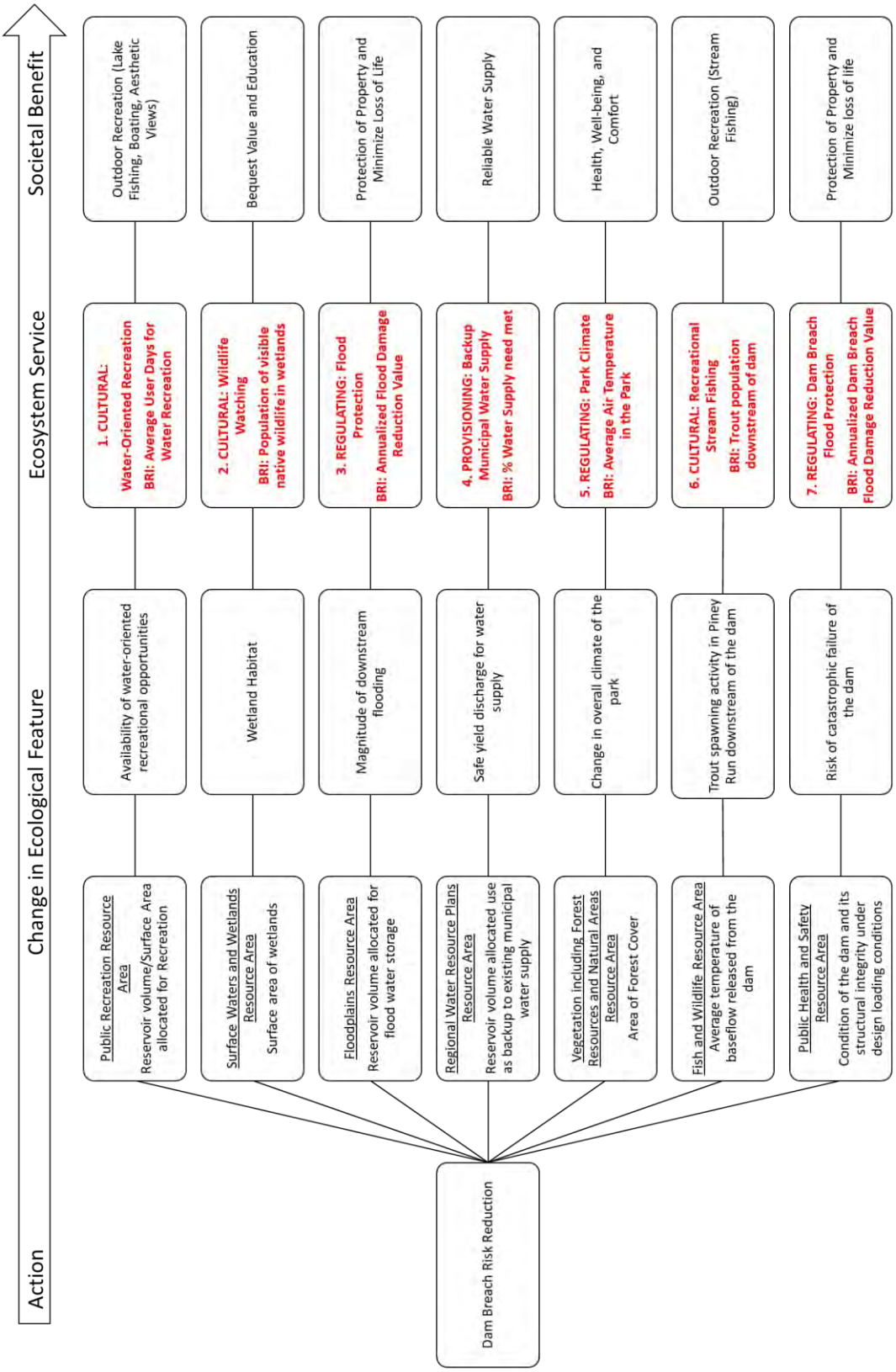


Figure 3-1. Ecosystem Service Causal Chain

3.2. Project Location

Piney Run Dam is situated in a publicly accessible recreation area within Piney Run Park, located in Eldersburg, an unincorporated area/census-designated place in the southern region of Carroll County, Maryland. The town of Sykesville is less than 1.0 mile south of the dam. Carroll County is located approximately 15.0 miles northwest of Baltimore, Maryland.

The Piney Run Dam is located on Piney Run, a tributary to the South Branch of the Patapsco River, a tributary to the Patapsco River.

3.3. Land Use and Recreation

Land use can be separated into two primary categories: natural and human modified. Natural land cover includes woodlands, rangeland, grasslands, and other open or undeveloped areas. Human-modified land use includes residential, commercial, industrial, communications and utilities, agricultural, institutional, recreational, and generally other areas developed from a natural land cover condition. Land use is regulated by management plans, policies, guidelines, and ordinances (i.e., zoning) that determine the type and extent of land use allowable in specific areas and protect specially designated or environmentally sensitive areas.

Land use data from the Carroll County Government GIS Open Data library reveal primarily agricultural land use in the County interspersed with areas designated for conservation purposes (Carroll County Government, 2020). Residential and commercial use areas are clustered around unincorporated Eldersburg. The County is generally rural although recent suburban development has increased.

3.3.1. Study Area Land Use

The Study Area is located within the Piney Run Watershed (HUC 021309081023). Land use in the watershed is primarily designated for conservation use and contains the Piney Run Park, a public recreation area, as well as the reservoir and dam. Lands designated for conservation use are defined as areas where it is considered feasible and desirable to conserve open spaces, water supply sources, woodland areas, wildlife, and other natural resources (Carroll County Department of Recreation and Parks, 2017).

The conservation land use area may include areas containing steep slopes, stream valleys, and water supply sources. Within Carroll County, the watershed also comprises residential and agricultural land uses, and small scattered patches of industrial and retail uses.

The Study Area includes maintained grass along Piney Run Dam, the dam embankment and associated dam infrastructure, and access roads. Private residences and residential roads are present to the northeast and southwest of the Study Area. The forested areas immediately surrounding Piney Run Dam are designated for conservation purposes.

3.3.2. Watershed Land Use

The total drainage area above the Piney Run Dam is 6,759.2 acres. The drainage area was derived using ArcMap 10.6 (ESRI, 2018), Arc Hydro tool, and LiDAR topography (State of Maryland, 2019). Automatic ArcMap delineations were checked and edited, as necessary. The land use/land cover data were extracted from the 2016 Chesapeake Bay Land Cover Dataset. **Table 3-1** lists the land uses in the watershed area upstream of the Piney Run Dam, as well as in the hydrologic (FBH) breach inundation zone below the Piney Run Dam. Located approximately 15 miles west of Baltimore, Maryland, land use in the watershed is transitioning from predominately rural and natural land covers such as pasture, cropland, and wooded to a mix of low density residential development, rural, and natural land covers. **Appendix C** contains land use maps of the upstream contributing watershed.

Table 3-1. Existing Land Use

Chesapeake Bay Land Cover Type	Controlled Drainage Area Above Piney Run Dam (acres)	Hydrologic (PMF) Breach Inundation Zone below Piney Run Dam (acres)
Water	290.0	197.5
Tree Canopy	2,527.9	2,160.3
Shrubland	17.8	0.0
Herbaceous	3,472.5	586.4
Barren	37.2	35.3
Structures	88.5	17.2
Impervious Surfaces	155.2	109.9
Impervious Roads	106.1	48.6
Tree Canopy over Structures	14.9	1.4
Tree Canopy over Impervious Surfaces	30.9	4.1
Tree Canopy over Impervious Roads	18.2	15.4
Total	**6,759.2**	**3,186.1**

3.3.3. Public Recreation, Parkland, and Scenic Beauty

The reservoir impounded by Piney Run Dam (Piney Run Reservoir) is a popular recreational area for the community. Piney Run Reservoir offers fishing and boating activities, including canoe, kayak, and rowboat rentals (Carroll County Government, 2020b). The reservoir is stocked with largemouth bass, black crappie, yellow perch, rainbow trout, and other species. Surrounding Piney Run Reservoir is Piney Run Park, encompassing 550 acres of fields, forest, and open space. Piney Run Park offers over 5.0 miles of hiking trails, tennis courts, playgrounds, and picnic areas. The Piney Run Nature Center is located within Piney Run Park and provides educational programs throughout the year to school, youth, and community organizations. In 2019, Piney Run Park received a total of 103,367 visitors. Based on conversations with Carroll County Department of Recreation and Parks staff, it is estimated that approximately 20% of annual visitors use the reservoir facilities (e.g., boating, fishing), while the remaining 80% use other park facilities.

Recreational trails connecting to the rest of Piney Run Park run through the Study Area; no other recreational facilities are present.

The overall visual landscape for the Study Area is rural suburban with a mix of forest, agricultural fields, and residential homes. While some areas of the Study Area are somewhat viewable by residences, views tend to be shielded by mature forest.

Piney Run Reservoir, with Carroll County as the Sponsor, was the recipient of funds from the federal Land and Water Conservation Fund (LWCF) in 1972. As such it may be qualified under Section 6(f) of the Land and Water Conservation Fund Act of 1965. However, since the project would not seek to convert public outdoor recreation lands to non-recreational purposes, the project would remain in compliance with Section 6(f).

3.3.4. Wild and Scenic Rivers

A segment of the South Branch of the Patapsco River occurring approximately 2 miles south of the Piney Run dam is listed on National Park Service's Nationwide Rivers Inventory for its cultural and recreational value. The South Branch of the Patapsco River is managed as a put-and-take trout fishery and was first stocked in 1990. Historically, the Patapsco River supported spawning for anadromous fish species. Spawning habitat has been restricted over the past 150 years due to dam construction along the extent of the river. In recent years, segments of the river's lower extent have been re-opened and spawning habitat for anadromous fish now exists near Bloede Dam, approximately 15 miles south of the Piney Run Dam. (MDE, 2022a)

Existing conditions provide the following ecosystem service to the public that access Piney Run Park:

Cultural Service: Water-Oriented Recreation (Service 1): Piney Run Park offers outdoor, water-oriented activities such as fishing or boating, opportunities to observe wildlife such as waterfowl or fish and aesthetic viewsheds in the park. This service provides benefits to the public in the form of outdoor recreation activities, interaction with nature, and appreciation of aesthetic views. These viewsheds may also be enjoyed by adjacent property owners who may have been motivated to purchase their property due to the surrounding viewsheds observed from their property. The assigned BRI is the estimated average user-days attributed to water-oriented recreation in the above-listed forms.

3.4. Geological Resources

Geological Resources include geology, topography, and soils. Geological resources consist of surface and subsurface materials and their properties. Principal geologic factors influencing the ability to support structural development are seismic properties (i.e., potential for subsurface shifting, faulting, or crustal disturbance), soil stability, and topography.

The Farmland Protection Policy Act (FPPA) (7 USC 4201 et seq.) of 1981 states that federal agencies must "minimize the extent to which federal programs contribute to the unnecessary

conversion of farmland to nonagricultural uses." The resources protected by the FPPA include prime and unique farmland, which are categorized by the Natural Resources Conservation Service (NRCS) based on underlying soil characteristics.

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Under natural conditions, these soils can support growth and reproduction of hydrophytic vegetation. Presence of hydric soils is one of the criteria used to identify and delineate wetlands (Section 3.5).

3.4.1. Regional Geology

Carroll County lies in the Piedmont Plateau province, which comprises hard, crystalline igneous and metamorphic geology (Maryland Geological Survey, 2020). Bedrock in the region includes phyllite, marble, schist, and moderately to slightly metamorphosed volcanic rocks. Historically, mineral resources were present in the region, including, building stone and small deposits of nonmetallic minerals, base-metal sulfides, gold, chromite, and iron ore.

Piney Run Dam is located within the Morgan Run Formation adjacent to areas of alluvium upstream and downstream of the dam (Muller, 1994). The Morgan Run Formation primarily consists of fine- to medium-grained garnetiferous mica schist and quartz-mica schist containing discontinuous layers and lenses of quartzite ranging from five centimeters (2.0 inches) to one meter (3.3 feet) thick. Areas of Alluvium are typically one to five meters (16.4 feet) thick, occur in floodplains of streams, and consist of interbedded light gray to brown gravel, sand, silt, and gray-blue to gray-brown clay. The gravel is dominantly quartz, and the sand and silt are predominantly quartz-mica mixtures. The bedrock of the Study Area consists of Pre-Cambrian metamorphic rock, which is made up of metamorphosed igneous and sedimentary rocks with pegmatite and granitic pluton intrusions. Schist, gabbro, gneiss, marble, granite, and quartzite are among the multitude of rocks in this part of the Piedmont Plateau (Maryland Geological Survey, 2020).

3.4.2. Local Geology

The rock foundation of Piney Run Dam consists of Pre-Cambrian metamorphic rock, which is made up predominately of schist and quartzite (RK&K, 1971). Local geology of Piney Run Dam shown on the Geologic Map of the Finksburg Quadrangle (Muller, 1994) indicates that the dam is located within the Morgan Run Formation [mr, a, um, and g] adjacent to areas of Alluvium [Qal] upstream and downstream of the dam. According to Muller's 1994 geologic map, the Morgan Run Formation primarily consists of fine- to medium-grained, lustrous, silver-gray to greenish-gray, garnetiferous mica schist and quartz-mica schist containing discontinuous layers and lenses of quartzite ranging from five centimeters to one meter thick. Areas of Alluvium are typically one to five meters thick, occur in floodplains of streams, and consist of interbedded light gray to brown gravel, sand, silt, and gray-blue to gray-brown clay. The gravel is dominantly quartz, and the sand and silt are dominantly quartz-mica mixtures.

Based on historical geologic and geotechnical data collected during the pre-construction geologic investigation (RK&K, 1971) and during a geologic and geotechnical investigation performed in 2019 (AECOM, 2019) at the Piney Run Dam site, the embankment is two-zone compacted earth fill embankment consisting of shell and core zones. Embankment fill heights vary from 15 feet at the abutments to nearly 80 feet near the center of the dam at a location between the principal spillway conduit location and the location of the original stream channel. The embankment shell zone generally consists of silty sand with varying amounts of gravel (SM) while the embankment core zone consists of silty sand with varying amounts of gravel (SM), clayey sand with varying amounts of gravel (SC), and sandy lean clay (CL). Embankment fill in the shell zones, both upstream and downstream of the core zone, is underlain by silty gravel with sand (GM) and silty sand with a small amount of gravel (SM). In the area of the core zone, the fill was placed directly on bedrock into which a grout curtain had been installed. It should be noted that the dam was observed to have potential seepage issues near the left abutment contact in 1977 evidenced by an elevated water level in an adjacent piezometer and a wet area observed near the downstream toe. However, these issues had abated by late 1990s.

The existing auxiliary spillway is underlain by silty gravel with sand (GM), silty sand with varying amounts of gravel (SM), clayey sand (SC), silty clayey sand (SC-SM), sandy silt (ML), sandy lean clay (CL), and sandy silty clay (CL-ML). Decomposed rock was encountered directly above bedrock in the majority of borings within auxiliary spillway. The decomposed rock layer ranged from approximately zero to 34 feet thick and averaged 9.5 feet thick. The SITES analysis performed for the existing auxiliary spillway indicated a head cut erodibility index (K_h), or indication of how erodible the earth material underlying the spillway is, ranging between 0.06 to 0.16 for underlying soils and 10 to 50 for the underlying bed rock. Additional information on the SITES auxiliary spillway integrity analysis can be found in Section 3.19.3.

Historical records indicate that the auxiliary spillway/right abutment area was used as a borrow source for embankment shell material during original construction. The 2019 geologic and geotechnical investigation included investigation of the right abutment area as a borrow source. The borrow area studied indicated residual soil layers beyond the existing auxiliary spillway area measuring between 8- and 78-feet thick, with an average thickness of 37 feet. Residual soils in this area consist of silty sand with varying amounts of gravel (SM), clayey sand (SC), sandy lean clay (CL), sandy silt (ML), and sandy elastic silt (MH) which are generally consistent with the materials already present in the embankment shell and which indicate the area could continue to be a good source of borrow material.

3.4.3. Topography

Carroll County is characterized by rolling hills with prominent topographical relief from Parr's Ridge, a physiographic feature bisecting the county from southwest to northeast. The region's distinctive topography, evidenced by contrasting ridges, valleys, and other prominent features, is a product of differential weathering of the several rock types found in this area (Reger & Cleaves, 2020). Topography within the Study Area is also characterized by rolling uplands interrupted by incised stream valleys. In many places within the Study Area, the natural topography has been significantly impacted by the existing dam embankment/abutments, the

emergency spillway, and large borrow/spoil wasting areas created during the dam's construction. Elevations within the Study Area range between 465 and 580 feet above mean sea level (AMSL).

3.4.4. Soils

Soils in the Study Area are generally well drained and loamy. Eight different soil types occur within the Study Area, in addition to the dam (earth fill). Soils classified as "hydric" may pose a development concern related to poor drainage, a high-water table, or a high shrink/swell potential. Hydric soils are saturated, flooded, or ponded with water during the growing season, long enough to develop anaerobic (oxygen-deprived) conditions in the upper soil. Together with hydrophytic vegetation and other hydrologic characteristics, these soils are a potential indicator of wetland hydrology (NRCS, 2019b).

Table 3-2 shows select soil characteristics for soils immediately surrounding the Piney Run Dam. One hydric soil (Codorus silt loam, 0 to 3 percent slopes) occurs in this area. In addition, Brinklow channery loam, 15 to 25 percent slopes, and Manor loam, 15 to 25 percent slopes, are highly erodible soils.

Table 3-2. Select Soil Characteristics

Map Unit Symbol	Soil Type	Acres in Study Area	Percent of Study Area	Prime Farmland	Hydric	Farmland of Statewide Importance	Description
BrC	Brinklow channery loam, 8 to 15 percent slopes	1.2	2.4	Yes	No	No	Well-drained soils. Depth to water table is more than 80 inches.
BrD	Brinklow channery loam, 15 to 25 percent slopes	7.8	15.5	No	No	No	Well-drained soils. Depth to water table is more than 80 inches.
CdA	Codorus silt loam, 0 to 3 percent slopes	7.2	14.2	Yes[1]	Yes	No	Moderately well-drained soils. Depth to water table is approximately 18 to 30 inches.
GdB	Glenelg loam, 3 to 8 percent slopes	13.2	26.1	Yes	No	No	Well-drained soils. Depth to water table is more than 80 inches.
GdC	Glenelg loam, 8 to 15 percent slopes	0.1	0.2	Yes	No	Yes	Well-drained soils. Depth to water table is more than 80 inches.
GhB	Glenville silt loam, 3 to 8 percent slopes	3.6	7.1	Yes	No	No	Moderately well-drained soils. Depth to water table is approximately 18 to 22 inches.

Map Unit Symbol	Soil Type	Acres in Study Area	Percent of Study Area	Prime Farmland	Hydric	Farmland of Statewide Importance	Description
MaD	Manor loam, 15 to 25 percent slopes	5.6	11.0	No	No	No	Well-drained soils. Depth to water table is more than 80 inches.
MaF	Manor loam, 25 to 65 percent slopes	7.4	14.6	No	No	No	Well-drained soils. Depth to water table is more than 80 inches.

3.4.5. Prime and Unique Farmland

Based on the NRCS Soil Survey, soils that are designated as prime farmland or farmland of statewide importance occur within the Study Area. There are areas located downstream of the Piney Run Dam that are adjacent to Piney Run that have been identified as prime farmland and farmland of statewide importance, but none appear to be actively being farmed.

3.5. Water Resources

Water resources evaluated in this analysis include, surface waters and wetlands, water quality, groundwater, floodplains, regional water resource plans, and riparian areas.

3.5.1. Surface Waters and Wetlands

Surface water resources comprise lakes, rivers, and streams and are important for a variety of reasons including ecological, economic, recreational, aesthetic, and human health. Surface waters are considered to be "waters of the United States" (WOUS), which has a broad meaning under the Clean Water Act (CWA) and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands serve a variety of functions including flood control, groundwater recharge, maintenance of biodiversity, wildlife habitat, recreational opportunities, and maintenance of water quality. WOUS are protected under Section 404 of the CWA.

Piney Run is the dominant surface water within the Study Area and flows in a southeast direction from its impoundment in Piney Run Reservoir. The stream runs for approximately 12.5 miles (mi) from its headwaters near the Village of Winfield, beyond the intersection of MD 97 and MD 26, to its discharge into the Patapsco River approximately 6.2 mi southeast of the Study Area.

A planning level survey of wetlands and stream boundaries was conducted to identify surface waters and wetlands present in the Study Area and estimate potential impacts associated with each alternative. This planning level survey was conducted by using publicly available information sources (e.g., LIDAR) to desktop delineate wetlands and waters, coupled with limited field verification to refine the desktop delineation. In addition to Piney Run, this survey

identified a lateral tributary to Piney Run and several suspected non-tidal wetlands downstream of the dam. Wetlands and Waters delineations were performed in September 2023 in accordance with applicable United States Department of the Army, Corps of Engineers guidance.

Wetlands provide the following ecosystem service to the public that access Piney Run Park as well as the dam and reservoir:

Cultural Service: Wildlife Watching (Service 2): Piney Run reservoir contains a significant area of wetlands along its edges. In addition, there are areas of wetlands immediately downstream of the dam, all located within the boundaries of Piney Run Park. These wetlands, among their many benefits, reduce the concentrations of harmful nutrients such as nitrogen and phosphorous delivered through runoff into the reservoir while also increasing the amount of oxygen in the soil and water, thus providing habitat to support a wide variety of plants and animals. These areas offer opportunities to observe wildlife and plants in their natural setting. This service provides the benefit of wildlife watching as well as supporting the bequest value of the area. The BRI for this service is the population of visible native wildlife in wetlands.

3.5.2. Water Quality

Section 303(d) of the CWA directs each State to identify and list waters in which current required controls of a specified substance are inadequate to achieve water quality standards. MDE's 2020-2022 Final Integrated Report notes Piney Run as Category 5 under Section 303(d), which indicates the waterbody is impaired and in need of a total maximum daily load for one designated use (aquatic life and wildlife), due to temperature exceedance. Piney Run Reservoir is noted as Category 2 under Section 303(d) for two designated uses: aquatic life and wildlife, and fishing. Category 2 water bodies are "water bodies meeting some water quality standards but with insufficient data and information to determine if other water quality standards be being met". The water quality standards listed for Piney Run Reservoir under Category 2 for aquatic life and wildlife in Piney Run are total phosphorus, dissolved oxygen, and sedimentation while for fishing are polychlorinated biphenyl and mercury in fish tissue (MDE, 2022b).

3.5.3. Floodplains

Floodplains are areas of low, level ground on one or both sides of a stream channel that are subject to periodic inundation by flood water. A "100-year" or 1% AEP floodplain has a 1 percent chance of inundation in any given year, while a "500-year" or 0.2% AEP floodplain has a 0.2 percent chance. Inundation dangers associated with floodplains have prompted Federal, State, and local legislation that limits development in these areas**.**

Carroll County and incorporated areas participate in the National Flood Insurance Program (NFIP). The current effective FEMA flood hazard delineation and countywide Flood Insurance Study (FIS) was published on October 2, 2015 under study number 24013CV001A. The FEMA Map Service Center website indicates that no Letters of Map Revision (LOMRs) have been filed for this area since the effective date of the existing Digital Flood Insurance Rate Map (DFIRM). Approximately 1.4 square miles of the 18.4-square mile Piney Run watershed is within either a 1% AEP or 0.2% AEP floodplain. The original work plan for the watershed discusses serious

flooding problems in the watershed before the dam was constructed, including major floods that occurred in 1946, 1956, and 1967. Flooding without the dam was determined at the time to potentially cause significant damage to roads and bridges, to portions of the Springfield Hospital complex including the water treatment plant, and to agricultural floodplain land (SCS, 1968). The FIS and Flood Insurance Rate Map (FIRM) 24013C0313D indicates that the reaches upstream and downstream of the Piney Run Dam and Reservoir are classified as Zone AE while the area within the Piney Run Reservoir to a point approximately 2.5 miles downstream of the dam (a point located between Slacks Road and Brangles Road) is classified as Zone A. A floodplain map for Piney Run Dam and Reservoir is provided in **Appendix C**.

There are approximately two structures, neither of which are habitable (park structures) within the dam backwater area classified as Zone A and five structures, two of which are habitable, in Zone AE, all located downstream of the dam. According to the existing condition modeling performed for this plan, there is an estimated single structure, an uninhabitable park structure, at risk during the 1% AEP flood upstream of the Piney Run Dam and none at risk downstream. However, during the 0.2% AEP flood the same modeling estimates approximately seven structures at risk, two uninhabitable park structures upstream of the dam and five structures, four of which are habitable, downstream of the dam. Of these structures, one structure, a sanitary sewer pumping station is considered critical infrastructure.

The FIS discusses the flood control benefits of the dam noting that at Arrington Road located near the downstream end of the watershed, “the discharge from a 100-year frequency flood with the dam is reduced to the same discharge as a 25-year frequency flood without the dam” (FEMA, 2015). Floodplain issues are typically managed through preventive and corrective measures to reduce the risk of current and future flood impacts. The construction of Piney Run Dam is an example of a preventative structural measure that attenuates floods to protect downstream properties. Currently, no documentation could be located of any problems related to flooding or other water quantity issues, but it is noted that the dam plays a significant role in flood protection of downstream properties.

The local floodplain administrator is Carroll County which governs floodplains under Chapter 153 of the County code. The code stipulates that no development including capital improvement projects may occur in a floodplain without prior county approval. The County code also provides guidance and requirements for floodplain setbacks, easements, and provides for an alternatives analysis for projects involving work in a floodplain.

The following ecosystem service was identified related to floodplains:

Regulating Service: Flood Protection (Service 3): As detailed in this section, the existing Piney Run Dam provides protection from flooding to people and property downstream of the dam to the confluence of Piney Run and the South Branch of the Patapsco River. In addition, reducing the risk of a catastrophic breach of the dam also reduces the risk of a flood resulting of a dam breach. Protection from floods supports societal benefits to protect property and minimize loss of life. The BRI for this service is the annualized flood damage reduction benefits measured in dollars for the maximum flood protection event accommodated by the dam.

3.5.4. Groundwater

Groundwater describes the water present beneath the Earth's surface and is an essential resource used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of aquifer or well capacity, water quality, and surrounding geologic composition.

The Schist-Saprolite Aquifer underlies the Study Area (Carroll County Department of Land Use, Planning, and Development, 2011). Most groundwater is stored in the saprolite, which overlies the solid rock (Maryland Geological Survey, 2020a). Groundwater occurs primarily from secondary porosity and permeability provided by fractures (Trapp and Horn, 1997).

No potable wells occur within the Study Area, although 13 monitoring/observation wells related to the Piney Run Dam occur within the Study Area.

3.5.5. Regional Water Resource Plans

The Study Area is included in the following water resource planning documents: the 2014 Carroll County Master Plan, which outlines goals, recommendations, and implementation efforts to guide planning and zoning within the county; the 2018 Freedom Community Comprehensive Plan, which provides a framework for land use, growth management, agricultural policies, economic development, water resources, natural environmental resources, community facilities and services, and recreational resources for the greater Eldersburg/Sykesville area; and the 2019 Water and Sewer Master Plan Triennial Update, which provides a framework for the development and expansion of adequate water and sewer systems throughout the county (Carroll County Government, 2014; Carroll County Government, 2018; Carroll County Government, 2019).

Regional Water Resource Plans yield the following ecosystem service:

Provisioning Service: Backup Municipal Raw Water Supply (Service 4): The 2019 updates to the Water and Sewer Master Plan projected a need for the Freedom District, the water service area nearest to the Piney Run Reservoir, of 3.244 million gallons per day and a projected overall County-wide demand of 9.88 million gallons per day. As discussed in Section 1 of this document, the County currently has an agreement with the City of Baltimore to withdraw up to 4.2 million gallons per day of raw water for municipal use from Liberty Reservoir. In the event such an agreement is terminated, a backup source to Liberty Reservoir would be needed. Piney Run has been shown in previous studies to have the ability to provide up to 3.65 million gallons per day of raw water for municipal use based on the allocated storage volume. This service supports the societal benefit of a reliable water supply. The BRI for this service is the percentage of the water supply need met by the backup municipal raw water supply.

3.5.6. Riparian Areas

Riparian areas are present within the Study Area. NRCS policy requires integration of riparian area management into all plans and alternatives. Federal and Maryland State law does not

specifically regulate riparian areas. However, wetlands and waters of the U.S. which are often located in riparian areas may be subject to Federal and State regulations. Carroll County has established a 100-foot riparian buffer; however, this regulation only applies to developers (MDE, 2022c). Riparian areas are located along the entire reservoir/land interface as well as immediately downstream of both the principal and auxiliary spillway outlets.

3.6. Biological Resources

Biological resources addressed in this EA consist of vegetation (including forest resources and natural areas), invasive species, fish and wildlife, and special status species. Special status biological resources are defined as those plant and animal species protected under the federal Endangered Species Act of 1973 (ESA), Bald and Golden Eagle Protection Act of 1940, Migratory Bird Treaty Act of 1918, or under applicable state laws or regulations.

The Study Area for biological resources includes vegetation present within the Piney Run Park, wildlife present on-site or within 0.5 mile of the site boundary, and aquatic resources present on-site or downstream of the site within 0.5 mile.

3.6.1. Vegetation, including Forest Resources and Natural Areas

The Study Area primarily comprises forested uplands and is dominated by upland tree species, including oaks (*Quercus spp*), hickories (*Carya spp*), and tulip poplar (*Liriodendron tulipifera*). Other dominant vegetation include ash-leaf maple (*Acer negundo*), and rambler rose (*Rosa multiflora*), an invasive species. The herbaceous stratum is dominated by the invasive common reed (*Phragmites australis*).

Natural areas are defined as land or water units where natural conditions have been retained or protected. As discussed in Section 3.3.1, the Study Area has been designated for conservation by Carroll County. This designation applies to areas where it is considered feasible and desirable to conserve open spaces, water supply sources, woodland areas, wildlife, and other natural resources (Carroll County Department of Recreation and Parks, 2017).

Forest resources provide the following ecosystem service:

Regulating Service: Park Climate (Service 5): The park climate is impacted by the amount of forest cover within it. This includes the area of shaded from the sun, protection from the wind, and air temperature. This in turn affects park users' perception of whether the park is a comfortable place to enjoy recreational activities. This service supports a benefit to people of providing a comfortable, healthy place to enjoy recreational activities. The BRI for this service is the average air temperature in the park.

3.6.2. Invasive Species

Invasive plant species are abundant throughout the Study Area and a total of 17 species were observed during field surveys conducted on November 4, 2019 (**Table 3-3**). The amount of invasive species is described in terms of relative aerial coverage to other invasive and non-

invasive species in the area, based on an observational review, and categorized as high, medium, or low occurrence abundance. Species in high abundance include Japanese stiltgrass (*Mycrostegium vimineum*), wine berry (*Rubus phoenicolasius*), wavyleaf basketgrass (*Oplismenus hirtellus subsp. Undulatifolius*), and barberry (*Berberis thunbergii*).

Table 3-3. Invasive Species within the Study Area

Common Name	Scientific Name	Occurrence Abundance[1]
Barberry	*Berberis thunbergii*	Medium to High
Beefsteak plant	*Perilla frutescens*	Medium
Chinese privet	*Ligustrum sinense*	Medium
Chinese wisteria	*Wisteria sinensis*	Low
English ivy	*Hedera helix*	Low
Garlic mustard	*Alliaria petiolate*	Medium
Ground ivy	*Glechoma hederacea*	Low
Honeysuckle bush	*Lonicera maackii*	Low
Japanese honeysuckle	*Lonicera japonica*	Medium
Japanese stiltgrass	*Mycrostegium vimineum*	High
Mile a minute	*Persicaria perfoliate*	Medium
Multiflora rose	*Rosa multiflora*	Medium
Oriental bittersweet	*Celastrus orbiculatus*	Medium
Russian olive	*Elaeagnus angustifolia*	Medium
Tree of heaven	*Ailanthus altissima*	Low
Wavyleaf basketgrass	*Oplismensus hirtellus*	High
Wine berry	*Rubus phoenicolasius*	High

[1]Occurrence Abundance is defined as:
High = greater or equal to 30 percent coverage
Medium = 5 to 30 percent coverage
Low = less than 5 percent coverage

3.6.3. Fish and Wildlife

Wildlife likely to utilize the Study Area are typical of the Piedmont Plateau region of the Eastern US, such as the eastern box turtle (*Terrapene carolina carolina*), eastern rat snake (*Pantherophis alleghanensis*), white-tailed deer (*Odocoileus virginianus*), eastern cottontail rabbit (*Sylvilagus floridanus*), Eastern grey squirrel (*Sciurus carolinensis*), blue jay (*Cyanocitta cristata*), and great horned owl (*Bubo virginianus*). Waterfowl within the vicinity include wood duck (*Aix sponsa*), hooded merganser (*Lophodytes cucullatus*), common merganser (*Mergus merganser*), and double-crested cormorant (*Phalacrocorax auritus*) (Maryland Ornithological Society, 2020).

The aquatic habitat of Piney Run Reservoir is mapped as a Lacustrine, Limnetic, Unconsolidated Bottom, Permanently flooded, Impoundment, with a variety of depth, habitat types, and substrates that support numerous assemblages of species (USFWS, 2020a). As such, Piney Run supports native fish species such as pumpkinseed sunfish (*Lepomis gibbosus*), red eared sunfish

(*Lepomis microlophus*), redbreast sunfish (*Lepomis auritus*), brown bullhead (*Ameiurus nebulosus*), smallmouth bass (*Micropterus dolomieu*), white sucker (*Catostomus commersonii*), spotfin shiner (*Catostomus commersonii*), creek chub (*Semotilus atromaculatus*), and tessellated darter (*Etheostoma olmstedi*). The lake also supports introduced, non-native populations of striped bass (Morone saxatilis), tiger muskie (*Esox masquinongy x Esox lucius*), and rainbow trout (*Oncorhynchus mykiss*). The Piney Run Reservoir supports recreational fishing and is regularly stocked with largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), yellow perch (*Perca flavescens*), channel catfish (*Ictalurus punctatus*), and bluegill (*Lepomis macrochirus*) (Rudow's FishTalk, 2020).

Native submerged aquatic plants such as curly pondweed (*Potamogeton crispus*) provide important cover and food for a variety of species and help support a productive recreational fishery (MDNR). The most abundant invasive aquatic vegetation encountered in the reservoir is the invasive hydrilla (*Hydrilla verticillata*).

The non-native plain pocketbook (*Lampsilis cardium*) from the Potomac River is fairly common in Maryland's rivers and streams and is potentially present in Piney Run. In addition, crayfish (*Cambarus spp.*), common stonefly (*Paragnetina media*), mayflies (*Hexagenia limbata*), and caddisflies (Order *Trichoptera*) are just a few of the many types of native aquatic insects and macroinvertebrates that may occur.

Fish and Wildlife provide the following ecosystem service:

Cultural Service: Recreational Stream Fishing (Service 6): Water quality, including temperature, turbidity and sediment, dissolved oxygen, and pollutants in Piney Run is impacted by the manner which surface water travels through the reservoir to the Piney Run located downstream of the dam. Currently, Piney Run is on Maryland's 303(d) list as an impaired stream, in part due to elevated temperature which do not allow it to meet its designated use which includes supporting trout. Stream temperature affects the ability of trout to spawn in Piney Run which affects the population of trout available for recreational fishing in Piney Run and the South Branch of the Patapsco River downstream of the dam. This service supports a benefit to people of recreational fishing from streams. The BRI for this service is the population of trout in Piney Run downstream of the dam.

3.6.4. Special Status Species

Special status species include threatened and endangered (T&E) plants and animals that are Federally or State-protected; bald eagles, as protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940; and migratory birds, as protected under the Migratory Bird Treaty Act (MBTA).

Federal status as a T&E species is derived from the Endangered Species Act (ESA) of 1973 (16 USC §1531 et seq.) and is administered by USFWS. They maintain a current list of Federally endangered and threatened species, candidate species, and species of concern. Candidate species and species of concern designated by USFWS receive no statutory protection under the ESA. In Maryland, MDNR administers the Nongame and Endangered Species Conservation Act

(Annotated Code of Maryland 10-2A-01), which is the primary Maryland law that governs the legal State listing of T&E species.

3.6.4.1.Threatened and Endangered Species

According to the USFWS Information for Planning and Consultation (IPAC) database, the Federally endangered northern long-eared bat (NLEB; *Myotis septentrionalis*) is the only Federally listed species with the potential to occur within or around the Study Area. In addition, IPAC also identified the monarch butterfly, which is a candidate species under the ESA. No Federally designated critical habitat is present (USFWS, 2020b).

The NLEB is found across much of the eastern and north-central US. The NLEB hibernates in caves and abandoned mines during the winter, and forages in the surrounding wooded areas in autumn. During late spring and summer, the NLEB roosts and forages in upland forests. The primary threats to NLEB include white-nose syndrome, a disease caused by fungus that disturbs hibernation and causes a deadly loss in energy stores, and the degradation of its summer or winter roosting habitat from human activities. The forested portion of the Study Area has the potential to provide summer roosting and foraging habitat for the NLEB. Additional consultation was performed with the USFWS in the fall of 2023. The 15-day waiting period associated with this coordination passed with no further comment from the USFWS indicating that consultation on the project was complete and no further action was necessary unless new information concerning the project that changes the effect of the project on the NLEB is developed or the project is modified that causes the effect to the NLEB to change in a way that was not previously contemplated during this consultation.

Monarch butterflies in North America undergo long-distance migration between summer and overwintering sites (Monarch Joint Venture, 2022). In Maryland, small numbers of monarch butterflies can be seen throughout summer, with larger numbers being visible during migration periods. Southern migration through Maryland occurs between August and October, while northern migration occurs between May and June (Monarch Joint Venture, 2022). The Study Area may provide suitable summer and migration stop-over habitat for the monarch butterfly.

A total of 17 State-listed T&E species have the potential to occur within Carroll County. Based on consultation with MDNR via letter dated 30 January 2020, no natural heritage resources, including Federal and State-listed species, are anticipated to be present in the Study Area (**Appendix E**).

State listed threatened species include the following:

- Triangle Floater (*Alasmidonta undulata*);
- Brook Floater (*Alasmidonta varicosa*);
- Henslows's Sparrow (*Ammodramus henslowii*);
- Atlantic Spike (*Elliptio producta*);

- Glassy Darter (*Etheostoma vitreum*);
- Baltimore Checkerspot (*Euphydryas phaeton*);
- Bog Turtle (*Glyptemys muhlenbergii*);
- Bald Eagle (*Haliaeetus leucocephalus*);
- Yellow Lampmussel (*Lampsilis cariosa*);
- Loggerhead Shrike (*Lanius ludovicianus*);
- Indiana Bat (*Myotis sodalis*);
- Golden-crowned Kinglet (*Regulus satrapa*);
- Regal Fritillary (*Speyeria idalia*);
- Creeper (*Strophitus undulatus*);
- Slender Amphipod (*Stygobromus tenuis tenuis*);
- Laura's Clubtail (*Stylurus laurae*); and
- Appalachian Bewick's Wren (*Thryomanes bewickii altus*).

3.6.4.2. Bald Eagles

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrsaetos*) are protected under the BGEPA, which prohibits the take, possession, transport, or sale of live or dead eagles and their parts, nests, or eggs unless authorized by permit. Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large, dominant trees are utilized for nesting sites, typically within 1.0 mile of open water. According to the Maryland Bald Eagle Nest Monitoring Program, bald eagle nests have been observed within the vicinity of the Piney Run Reservoir, including one bald eagle nest near the dam area, situated approximately 0.1 mile to the northwest (Maryland Bird Conservation Partnership, 2020).

The golden eagle is rarely seen in Maryland and presence is only documented during non-breeding months (September through late April). Preferred habitat in Maryland includes open areas with large numbers of geese and other waterfowl (Maryland Biodiversity Project, 2022).

3.6.4.3. Migratory Birds

The MBTA prohibits, unless permitted by regulations, the take of any migratory bird listed in the MBTA, including any part, nest, or egg of any such bird (16 USC § 703). Migratory birds include species with at least some populations breeding in the continental US and/or Canada, including songbirds, shorebirds, water birds, and waterfowl.

Maryland is located within the Atlantic Flyway, where lands may provide resting, feeding, and breeding grounds to migratory birds (USFWS, 2020a). IPAC identified nine migratory birds of conservation concern (BCC)[1] potentially occurring in the Study Area.

Migratory BCCs and their corresponding breeding season are listed below:

- Black-billed Cuckoo (*Coccyzus erythrophalmus*); Breeds May 15 to October 10
- Chimney Swift (*Chaetura pelagica*); Breeds March 15 to August 25
- Kentucky Warbler (*Oporonis formosus*); Breeds April 20 to August 20
- Prairie Warbler (*Dendroica discolor*); Breeds May 1 to July 31
- Prothonotary Warbler (*Protonotaria citrea*); Breeds April 1 to July 31
- Red-headed Woodpecker (*Melanerpes erythrocephalus*); Breeds May 10 to September 10
- Rusty Blackbird (*Euphagus carolinus*); Breeds elsewhere
- Wood Thrush (*Hylocichla mustelina*); Breeds May 10 to August 31

3.7. Air Quality and Climate

Air quality conditions at a given location are a function of several factors including the quantity and type of pollutants emitted locally and regionally, as well as the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersal include wind speed and direction, atmospheric stability, climate temperature, and topography.

3.7.1. Criteria Pollutants and Hazardous Air Pollutants

The ambient air quality in an area can be characterized in terms of whether it complies with the primary and secondary National Ambient Air Quality Standards (NAAQS). The Clean Air Act (CAA), as amended, requires the U.S. Environmental Protection Agency (USEPA) to set NAAQS for pollutants considered harmful to public health and the environment. NAAQS are provided for six principal pollutants called "criteria pollutants" (as listed under Section 108 of the CAA): carbon monoxide; lead; nitrogen dioxide; ozone; sulfur dioxide; and particulate matter divided into two size classes of (1) aerodynamic size less than or equal to 10 micrometers (PM_{10}), and (2) aerodynamic size less than or equal to 2.5 micrometers ($PM_{2.5}$). The General Conformity Rule (40 CFR Part 51, Subpart W) requires Federal agencies to prepare written Conformity Determinations for Federal actions in or affecting NAAQS in non-attainment areas, except when the action is covered under the Transportation Conformity Rule or when the action is exempt because the total increase in emissions is insignificant, or de minimis.

Carroll County is a non-attainment area for the 8-hour ozone NAAQS (USEPA, 2022a). Specifically, the County is considered in moderate nonattainment of the 2008 ozone NAAQS and

[1] The USFWS identifies BCCs with potential to occur on the Project Site. BCCs are defined as "migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent [the USFWS's] highest conservation priorities" (USFWS, 2015).

marginal nonattainment of the 2015 ozone NAAQS (USEPA 2022b). Additionally, the state of Maryland is included in the Ozone Transport Region. As such, the County must evaluate the emissions of ozone precursors (nitrogen oxides [NO_x] and volatile organic compounds [VOC]) to determine the applicability of the general conformity regulations. The applicable de minimis levels in Carroll County are 100 tons per year (tpy) for NO_x and 50 tpy for VOC (40 CFR § 93.153(b)(1)).

Under the CAA, USEPA established New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) to minimize emissions of criteria pollutants and hazardous air pollutants (HAPs) from man-made emission sources. Although typically present in minimal quantities in the ambient air, HAPs have high toxicity which may pose a threat even at low concentrations. NESHAPs primarily apply to "stationary sources," which are emission sources that have a fixed location (e.g., fuel-burning boilers and generators, entire facilities/plants, etc.), as opposed to "mobile sources," which are emission sources that have the ability to move from one location to another (e.g., motor vehicles, trains, airplanes, etc.). With the exception of motor vehicles or equipment utilized during dam inspections and land maintenance activities (e.g., mowing), no emission sources occur within the Study Area.

3.7.2. Sensitive Receptors

Sensitive receptors include, but are not limited to, asthmatics, children, and the elderly, as well as specific facilities, such as long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, and childcare centers.

As the Study Area is located within an area primarily used for undeveloped outdoor recreational purposes, no sensitive receptors are present. Sensitive receptors within the vicinity include residential properties to the northeast and southwest of the Study Area. Approximately 50 residences are present within a 0.5-mile radius of the Piney Run Dam. In addition, Flohrville United Methodist Church and Springfield Presbyterian Church are located 0.4 mile east and 0.8 mile south of the dam, respectively. Sykesville Middle School, approximately 1.0 mile from the dam, is the nearest school.

3.7.3. Greenhouse Gases and Climate Change

The Study Area lies within the humid subtropical climate zone, as classified by the Köppen climate classification system, and is characterized by hot and humid summers, and cool winters with variable snowfall (NOAA, 2020). Temperatures range from an average high of 87.6 degrees Fahrenheit (°F) in July to an average low of 21.9°F in January based on data collected between 1981 and 2010. Average annual precipitation is approximately 43.4 inches; average annual snowfall is 33.5 inches (NOAA, 2014).

Greenhouse gases (GHGs) are components of the atmosphere that trap heat relatively near the surface of the earth and contribute to shifts in the global climate (i.e., the greenhouse effect and climate change). Water vapor occurs naturally and is the most abundant GHG. Other GHGs, such as carbon dioxide (CO_2; the second most abundant GHG), nitrous oxide, methane,

hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, result from human activities, such as the burning of fossil fuels. State-wide GHG emissions in Maryland were estimated at 57.6 million metric tpy of CO_2 equivalent in 2016 (USEIA, 2019).

GHGs are regulated under Section 202 of the CAA. The USEPA regulates GHGs through mobile source emission standards, the Prevention of Significant Deterioration program, and the Title V Operating Permits program. Additionally, 40 CFR 98 requires facilities that emit 25,000 metric tons of CO_2 equivalent to annually report their GHG emissions to USEPA. There are no reporting facilities within 5 miles of the Study Area according to USEPA's GHG Reporting Program website (USEPA, 2020).

3.8. Noise

Noise is defined as unwanted sound and is typically any sound that is undesirable due to its interference with communications or other human activities and its ability to affect hearing. Noise may be intermittent or continuous, steady, or impulsive. Human response to noise varies depending on the sound pressure level, type of noise, distance from the noise source, sensitivity, and time of day.

Sound, within the range of human hearing, can vary in intensity by over 1 million units. Therefore, a logarithmic scale, known as the decibel (dB) scale, is used to quantify sound intensity and to compress the scale to a more manageable range. Sound is characterized by its amplitude (how loud it is), frequency (pitch), and duration. The human ear does not hear all frequencies equally; thus, the A-weighted decibel scale (dBA) is used to reflect the selective sensitivity of human hearing. The human range of hearing amplitude extends from 0 dBA to 120 dBA, 0 dBA being the threshold of hearing for someone with a normal hearing mechanism and 120 dBA being the threshold of pain. The USEPA recommends a 70 dBA over a 24-hour (or 75 dBA over 8-hour) average exposure limit for environmental noise (USEPA, 1974).

Carroll County has a specific noise control ordinance to provide for the control of sound levels throughout the County that promotes public health, safety, and welfare. The noise ordinance includes noise limits for different land uses. **Table 3-4** provides the maximum allowable noise level permitted at receiving land uses (Carroll County 2004 Code §93.03).

Table 3-4. Maximum Allowable Sound Levels (dBA)

Day/Night	Industrial	Commercial	Residential
Day	75	67	65
Night	75	62	55

Source: (Carroll County Government, 2005)

The areas surrounding the Study Area include undeveloped lands, rural and suburban single-family residences, and some commercial properties. Populations residing in rural or other non-urban areas are estimated to experience outdoor Day-Night Average Sound Level values ranging

between 30 and 50 dBA (FICON, 1992; USEPA, 1974). The predominant off-site source of ambient noise in the site vicinity includes roadway traffic and the routine operations of nearby businesses. Landscaping work at nearby residences may also generate occasional noise from the use of lawn mowers or weed cutters. Sensitive noise receptors, those that are more susceptible to adverse effects of high noise levels, are present within 1.0 mile of the Study Area and are the same as those listed for air quality.

3.9. Cultural Resources

Cultural resources are historic properties as defined by the National Historic Preservation Act (NHPA); cultural items as defined by the Native American Graves Protection and Repatriation Act (NAGPRA); archaeological resources as defined by the Archaeological Resources Protection Act; sacred sites as defined by Executive Order (EO) 13007 to which access is afforded under the American Indian Religious Freedom Act; and collections and associated records as defined by 36 CFR Part 79. NEPA requires consideration of "important historic, cultural, and natural aspects of our natural heritage." Consideration of cultural resources under NEPA includes the necessity to independently comply with the applicable procedures and requirements of other Federal and State laws, regulations, EOs, and presidential memoranda.

The NHPA of 1966, as amended (Public Law 89-665; 54 USC §300101 et seq.), establishes the policy of the Federal government to provide leadership in the preservation of historic properties and administer Federally owned or controlled historic properties. Section 106 of the NHPA (54 USC §306108) requires Federal agencies to consider the effect an undertaking may have on historic properties; its implementing regulations, 36 CFR Part 800, describe the procedures for identifying and evaluating historic properties; assessing the effects of Federal actions on historic properties; and consulting to avoid, reduce, or minimize adverse effects. As part of the Section 106 process, agencies are required to consult with the State Historic Preservation Office (SHPO).

The Section 106 process requires each undertaking to define an Area of Potential Effect (APE). An APE is "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any properties exist…[and the APE] is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" (36 CFR Part 800.16[d]).

3.9.1. Architectural and Archeological Resources

A Phase I archaeological survey was conducted in the area surrounding the Piney Run Dam coincident with the Preferred Alternative during 3-6 December 2019. The survey consisted of visual surface inspection for above-ground evidence of archaeological sites and the excavation of shovel test pits resulting in the identification of four historic archaeological sites and one prehistoric artifact and one historic artifact documented as isolated finds. The archaeological sites include: 18CR292, an early twentieth century refuse pit; 18CR293, an early nineteenth to early twentieth century farmstead; 18CR294, a likely nineteenth century spring box; and 18CR295, a possible nineteenth century domestic occupation. In addition, Piney Run Dam is

over 50 years old and is considered to be a potential historic site. Site 18CR295 was determined to not be eligible for listing in the National Register of Historic Places (NRHP) in correspondence between the NRCS and the SHPO dated 23 July 2021. Piney Run Dam was determined to not be eligible for listing in the NRHP based on correspondence between the NRCS and the SHPO dated 5 December 2023. Sites 18CR292 and 18CR294 were determined to not be eligible for listing in the NRHP based on correspondence between the NRCS and the SHPO dated 24 January 2024. No other archaeological surveys have occurred within a 0.5-mile radius of the study area, and no previously recorded archaeological sites are located within a 0.5-mile radius of the study area.

Site 18CR293 was investigated further by performing a Phase II archeological survey. The findings of the survey resulted in a recommendation that the site was not eligible for listing in the NRHP. The state SHPO concurred with this recommendation in correspondence dated 26 March 2024.

Eight above-ground resources are located within a 0.5-mile radius of the study area. CARR-962, the J. Thomas Harris House, is no longer extant. CARR-1011, the White Rock Church, was recommended eligible for the NRHP on the 1993 Maryland Inventory of Historic Places (MIHP) form. CARR-1016, the Flohrville Union Chapel, was recommended eligible for the NRHP on the 1993 MIHP form. CARR-1386, the Horpel Farm Tenant House, is no longer extant. The Springfield Hospital Center (CARR-1197) and three individual resources (CARR-1250, CARR-1253, and CARR-1255) are located along MD 32; all four were recommended eligible for the NRHP on the 1986 MIHP forms. A portion of the Springfield Hospital Center identified as the Warfield Property used to have a Maryland Historical Trust easement, but this easement was terminated on August 1, 2021.

3.9.2. Native American Consultation

The USDA-NRCS has conducted formal consultation with federally recognized Native American tribes as required under EO 13175, Consultation and Coordination with Tribal Governments. The following 20 federally recognized tribes were identified as having potential ancestral ties to or interest in Carroll County:

- Oneida Indian Nation
- Oneida Tribe of Indians of Wisconsin
- Onondaga Nation
- Saint Regis Mohawk Tribe
- Tuscarora Nation
- Seneca Cayuga Nation
- Delaware Nation
- Delaware Tribe of Indians
- Shawnee Tribe of Oklahoma
- Eastern Shawnee Tribe
- Shawnee Tribe
- Cayuga Nation
- Stockbridge-Munsee Community Band of Mohican Indians
- Tonawanda Band of Seneca Nation
- Pamunkey Indian Tribe
- Chickahominy Indian Tribe
- Upper Mattaponi Tribe
- Rappahannock Tribe
- Monacan Indian Nation
- Nansemond Indian Tribe

These entities were invited to participate as Sovereign Nations in both the EA and the NHPA Section 106 process. A record of Native American Consultation is included in **Appendix E**.

3.10. Socioeconomics

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Human population is affected by regional birth and death rates as well as net migration. Economic activity typically comprises employment, personal income, and industrial growth. Impacts on these two fundamental socioeconomic indicators can also influence other components such as housing availability and public services provision.

The following subsections identify and describe the socioeconomic environment surrounding the Study Area, including the unincorporated community of Eldersburg, Carroll County, and the State of Maryland. Socioeconomic areas of discussion include local demographics, regional and local economy, local housing, and local recreation activities. Data used in preparing this section was collected from the 2020 US Census (US Census Bureau, 2020) and the 2010 US Census (US Census Bureau, 2010).

3.10.1. Population

The State of Maryland had a population increase of 9.0 percent from 2000 to 2010, similar to the 9.7 percent increase in the US population over the same period (**Table 3-5**) (US Census Bureau, 2010). Both Carroll County and Eldersburg populations grew more than the US and State averages between 2000 and 2010. Population growth between 2010 and 2020 occurred at similar rates in the US, State of Maryland, and Eldersburg (approximately 7 percent), with Eldersburg experiencing growth at 6.7 percent, while the rate of growth in Carroll County was lower (3.4 percent).

Table 3-5. Population

Area	2000	2010	2020	Population Change 2000 – 2010 (%)	Population Change 2010 – 2020 (%)
United States	281,421,906	308,745,538	331,449,281	9.7	7.4
Maryland	5,296,486	5,773,552	6,177,224	9.0	7.0
Carroll County	150,897	167,134	172,891	10.8	3.4
Eldersburg	27,741	30,531	32,582	10.1	6.7

Sources: (US Census Bureau, 2010)*;* (US Census Bureau, 2020)

3.10.2. Regional Economy

Local, County, and State per capita and median household income from 2020 is summarized in **Table 3-6**. Eldersburg has a higher median household income and per capita income than both Carroll County and the State of Maryland.

Table 3-6. Regional Income

Area	Number of Households	Median Household Income ($)	Per Capita Income ($)	Population Below Poverty Level (%)
Maryland	2,230,527	87,063	43,352	10.3
Carroll County	61,261	99,569	43,183	5.2
Eldersburg	10,661	125,981	51,154	3.4

3.10.3. Housing

Table 3-7 presents selected housing characteristics for the State of Maryland, Carroll County, and Eldersburg. Median home values and mortgages are highest in Eldersburg when compared to the County and State, while median rent is highest for the State. Additionally, the State of Maryland has the highest percentage of renter-occupied housing units (33.9 percent), compared to Carroll County (17.9 percent) and Eldersburg (11.8 percent).

Table 3-7. Housing Characteristics

Area	Housing Units	Owner-Occupied (%)	Median Value ($)	Median Monthly Home Mortgage ($)	Renter Occupied (%)	Median Gross Rent ($)
Maryland	2,546,344	67.1	325,400	2,028	33.9	1,415
Carroll County	66,197	82.1	343,400	2,204	17.9	1,121
Eldersburg	Not Listed	88.2	391,600	2,291	11.8	1,235

3.10.4. Schools

Several educational facilities are located within 2.0 miles of the Study Area. These include Sykesville Middle School, Eldersburg Elementary School, Piney Ridge Elementary School, and Liberty High School. Sykesville Middle School, located approximately one mile from the Study Area, is the nearest school.

Table 3-8 provides regional educational attainment for persons 25 years and older. The percentage of individuals with a bachelor's degree or higher is generally similar for the State, County, and Eldersburg. Both the County and Eldersburg have lower percentages of individuals without a high school diploma than the State (9.4 percent). Carroll County has the highest percentage of high school graduates (48.5 percent) compared to Eldersburg (46.0 percent) and the State (45.8 percent).

Table 3-8. Regional Educational Attainment of Persons 25 years and Older

Area	No Diploma (%)	High School Graduate or Higher (%)	Bachelor's Degree or Higher (%)
Maryland	9.4	90.6	40.9
Carroll County	6.9	93.1	37.0
Eldersburg	5.1	94.1	48.6

Source: (US Census Bureau, 2020)

3.10.5. Shops and Services

No shops and services are present within the Study Area and few occur in close proximity due to the rural and residential nature of the land use. Five businesses are located within 0.5 mile of the site: Fogle's Septic Services (0.22 mile southwest), an optometrist (0.47 mile south), Acts Chesapeake Regional Office (0.35 mile east), and two restaurants (0.38 mile east). The majority of regional businesses in the vicinity occur along MD 32 and MD 26.

3.10.6. Protection of Children

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was established to prioritize identification and assessment of environmental health risks and safety risks that may affect children, who may suffer disproportionately from environmental health and safety risks, and to ensure Federal agencies' policies, programs, activities, and standards address environmental and safety risks to children.

No individuals, including children, currently live on or occupy the Study Area. Children may occur periodically within the Study Area while utilizing Piney Run Park for recreational purposes. Single-family homes are located within 0.5-mile of the Study Area. The percentage of the population under age 18 is generally similar between the town, County, and State (see **Table 3-9**).

Table 3-9. Total Population versus Population under Age 18

Area	Total Population	Population under 18	Population under 18 (%)
Maryland	6,177,224	1,265,167	22.1
Carroll County	172,891	37,863	21.9
Eldersburg	32,582	7,364	22.6

Source: (US Census Bureau, 2020)

3.10.7. Agriculture Statistics

According to the USDA's 2017 Census of Agriculture, harvested cropland in Carroll County was dominated by corn (for grain), wheat (for grain), and soybeans (for beans). **Table 3-10** lists 2017 statistical data on agricultural land and products for Carroll County that were obtained from the

USDA 2017 Census of Agriculture.

Table 3-10. Land and Product Statistics for Carroll County

Statistic	2017
Number of farms	1,174
Land in farms	146,778 acres
Average size of farm	125 acres
Market value of products sold	$110,447,000
Average per farm	$94,077

Source: USDA 2017 Census of Agriculture

3.11. Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal agencies to identify and address disproportionate adverse effects of their programs, policies, and activities on minority and low-income populations. Potential environmental justice considerations are determined by comparing demographic and economic characteristics (minority population composition and poverty rates) within the project sites to the same characteristics in the surrounding region.
Table 3-11 presents regional demographics by race for the areas surrounding the Study Area.

Table 3-11. Regional Population by Race

Area	Maryland	Carroll County	Eldersburg
All Individuals	6,177,224	172,891	32,582
White Non-Hispanic or Latino (%)	49.0	87.3	85.3
Hispanic or Latino (%)	11.1	4.3	4.0
African American (%)	31.4	4.1	4.4
American Indian and Alaska Native (%)	0.7	0.3	0.1
Asian Alone (%)	6.9	2.3	3.7
Native Hawaiian and other Pacific Islander Alone (%)	0.1	0.1	0.1
Two or More Races (%)	3.1	4.3	3.5

Source: (US Census Bureau, 2020)

3.11.1. Low-Income Populations

The U.S. Census Bureau defines a "poverty area" as an area where 20 percent or more of the residents have incomes below the poverty threshold, and an "extreme poverty area" as one with 40 percent or more below the poverty level.

Neither Carroll County nor the unincorporated community of Eldersburg meet the definition of a poverty area as the estimated poverty rates are 5.2 percent and 3.4 percent, respectively (**Table 3-6**). The poverty rate for the State of Maryland is 10.3 percent (**Table 3-6**).

3.11.2. Minority Populations

The term "minority" is best understood as the inverse of "white-alone, not Hispanic or Latino" in US census data. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population of the larger surrounding area.

Neither the unincorporated community of Eldersburg nor Carroll County contain minority populations, as defined above. According to **Table 3-10**, the percentages of minority persons in Eldersburg and Carroll County are 14.7 percent and 12.7 percent, respectively. These numbers are significantly lower than the percentage of minority persons in the State of Maryland (51 percent).

As neither the unincorporated community of Eldersburg nor Carroll County are defined as poverty areas and do not contain notable minority populations, the Study Area is not considered to be an environmental justice area of concern.

3.12. Health and Safety

A healthy and safe environment is one in which there is no potential, or there is an optimally reduced potential, for death, serious bodily injury or illness, or property damage. Health and safety addresses matters such as workers' health and safety during facility construction activities and subsequent operation, and public safety during facility construction activities and subsequent operation.

3.12.1. Public Health and Safety

The Carroll County Sheriff's Office is responsible for law enforcement patrol in and around the Study Area and reports issues related to local law enforcement. The Carroll County Sheriff's Southern Office is located approximately 2.0 miles northeast of the dam, while the Sykesville Police Department is approximately 1.5 miles south. The nearest fire station is the Sykesville-Freedom District Fire Station, a volunteer fire department located approximately 0.6 mile east of the dam. The nearest general hospital is Northwest Hospital (10.0 miles southeast), a non-profit hospital with 231 beds for acute care services (Lifebridge Health, 2020). Additionally, ExpressCare Urgent Care Center is located 1.8 miles northeast of the dam.

Piney Run Dam is classified as a high hazard dam based on the potential for loss of human life due to the prevalence of bridges, roads, homes, and buildings located in the downstream breach

inundation zone. The dam does not comply with NRCS and State of Maryland safety and performance criteria for a high hazard dam.

Currently, Piney Run Dam does not meet NRCS and State of Maryland criteria for a Class 'C' high hazard potential dam, thus putting public health and safety at risk. The failure of Piney Run Dam during the worst-case flood event would result in potential loss of life and property damage, particularly to 181 downstream structures (including commercial, institutional, and residential buildings), 44 roads, and one railroad line.

Public Health and Safety presents the following ecosystem service:

Regulating Service: Dam Breach Flood Protection (Service 7): The condition of the dam and its structural integrity under its maximum expected loading conditions influences the overall risk of a catastrophic failure of the dam. If the condition of the dam its structural integrity is improved the risk of a failure is expected to be lower than if this was not done. Lower risk of failure reduces the changes of catastrophic downstream flooding. This service supports a benefit to people of protecting property and minimizing potential loss of life. The BRI for this service is the annualized dam breach flood damage reduction benefits measured in dollars.

3.12.2. Occupational Health and Safety

The health and safety of contractors in Maryland are safeguarded by the Maryland Occupational Safety and Health (MOSH) State Plan, as managed by the Maryland Division of Labor and Industry. The MOSH State Plan adopts all standards set forth by the Federal Occupational Safety and Health Administration (OSHA), in addition to unique general industry, construction, and agricultural standards (US Department of Labor, 2020). MOSH standards specify the amount and type of training required for construction workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

3.13. Infrastructure

Infrastructure is defined as the fundamental facilities and systems serving a geographic area, such as the transportation network and utilities. Specifically, utilities are defined as the public service of providing essential services such as sanitary sewer, water, electricity, and natural gas.

The Study Area consists of a primarily undeveloped land with park . The only structures that occur on the property are Piney Run Dam itself, park infrastructure (piers, boat ramps, gazebos, and walking trails) and previously identified historic sites. The 73-foot high earth embankment dam comprises a 57.85-foot high concrete riser, draining into a 36-inch reinforced concrete pipe. The 36-inch conduit extends approximately 304 feet and discharges to a reinforced concrete impact basin.

Neighboring businesses are served by major utility infrastructure (i.e., natural gas, electric, potable water, and sanitary sewer). Baltimore Gas and Electric Company (BGE) is the natural gas and electric power supplier in the area. Water service is provided by the Freedom District Water Treatment Plant, owned and operated by Carroll County, Maryland. Sewerage service is

provided by the Freedom District Wastewater Treatment Plant, owned by the State of Maryland, and operated by the Maryland Environmental Service using conveyance systems owned and operated by Carroll County. Two groundwater sources, the Raincliffe and Fairhaven wells, supplement the Freedom District Water Treatment Plant (Carroll County Government, 2020c).

Roadways in the surrounding area are primarily smaller, residential roads. MD 32 is the nearest highway and is less than 0.5 mile southeast of the site; it runs north-south through Carroll County. Clearview Airpark is the nearest public airport located less than 6.0 miles north of the Study Area. The Baltimore/Washington International Thurgood Marshall Airport is the nearest international airport, approximately 22.0 miles southeast of the Study Area.

3.14. Hazardous and Toxic Materials and Waste

Hazardous materials are defined as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions [in 49 CFR 173]" (49 CFR 171.8).

Hazardous wastes are defined by the Resource Conservation and Recovery Act of 1976 in 42 USC §6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

In addition to threatening human health and well-being, the improper release of or exposure to hazardous materials and wastes may threaten wildlife, plants, fish, and their habitats, soil systems, and water resources. Localized conditions such as soil, topography, water resources, and climate may affect the extent of contamination from or exposure to hazardous substances. A query of the MDE Oil Control Program's database found no remediation sites requiring cleanup within 1.0 mile of the Study Area (MDE, 2022d). Further, no Superfund sites are present in Carroll County.

3.15. Description of Existing Dam

The below record of the existing conditions of the Piney Run Dam is a compilation of the following documents as well as observations made during the site visits and engineering investigations associated with this Supplemental Watershed Plan effort:

- Geotechnical Investigation Report (RK&K, 1971)
- Design Report (RK&K, 1972)
- Piney Run Dam As-Built (SCS, 1975)
- 2018 Dam Safety Inspection Report (Maryland Department of the Environment - MDE, 2019a)

3.15.1. Current Condition of the Dam

The Piney Run Dam is located approximately one mile northwest of Sykesville, Maryland and discharges to Piney Run, South Branch of the Patapsco River. Piney Run Dam is a typical NRCS earthen embankment dam with storage allocated for sediment storage, recreation, water supply, and flood control. The 2018 MDE dam inspection report noted that the dam's spillway inadequacy warrants a rating of "Unsafe" but maintained a rating of "Acceptable" provided that the Sponsor continue "to work toward evaluating the spillway and upgrading the dam" (MDE, 2019). Piney Run Dam is in overall good condition, with some areas of concern noted in the MDE inspection report. These items noted will be addressed by the Sponsor and are not cause of the needed dam rehabilitation. They include:

1. The dam is well-maintained and in good condition. The grass vegetation on the dam embankment and in the emergency (auxiliary) spillway had been mowed just prior to the inspection.

2. There was visible little depression on the dam crest that was not noted during previous inspections. This area should be monitored periodically to ensure that condition does not deteriorate over time.

3. The principal spillway pipe was not inspected this year. A video inspection of the pipe conducted in 2009 showed it to be in good condition. However, the interior of the principal spillway pipe, and the interior and exterior of the riser structure should be video inspected by a diver in near future. (Note: this work was performed as part of the preparation of this Supplemental Watershed Plan-EA – see discussion of findings in this section.)

4. The damaged grates at the ends of the internal drainpipes were noted and need to be replaced.

5. The lake drain gate was exercised during the inspection by opening it 20 turns and then closing it and was found to work properly. As requested during previous inspections, the lake drain gate operator has been painted.

6. The valve controls in intake structure have been painted as requested by MDE during last inspection.

7. Trees to be removed from the emergency (auxiliary) spillway by the Sponsor: from downstream end of channel to flat area about 20-30 feet downstream, and from the sides of the emergency spillway to a height of 5 feet above the channel bottom.

8. Improperly graded boring backfill location observed in emergency (auxiliary) spillway channel. This area should be monitored periodically to ensure that condition does not deteriorate over time.

9. The water level in observation wells were measured by the MDE during the inspection. The water levels for the wells located within the dam embankment were entered into an Excel spreadsheet and plotted. The data were found to be generally consistent with previous measurements.

10. The EAP for Piney Run Dam, an important document summarizing the procedures for protecting downstream citizens and property owners from the consequences of flooding or potential failure of Piney Run Dam, was updated on December 9, 2020. The 2021 update should include the new maps prepared in 2020.

Potential Dam Safety Deficiencies

The Piney Run Dam was designed and constructed between 1973 and 1975 to be a multi-purpose, Class 'C' high hazard potential dam because there is a potential for loss of life downstream due to residential development and multiple roads should the dam breach. However, the dam does not have the auxiliary spillway capacity to safely pass the FBH for a Class 'C' high hazard potential dam without overtopping the embankment. In addition, the auxiliary spillway would be engaged during the Principal Spillway Hydrograph (PSH) event under ultimate watershed development conditions. Finally, a SITES analysis indicates that the spillway may experience severe erosion and possible failure during the stability design hydrograph (SDH) and FBH.

As-Built Dam Specifications

The dam was constructed between 1973 and 1975 and "As-Built" drawings are available. The original as-built elevations were based on NGVD29 vertical datum. The embankment is two-zone, compacted earth fill dam. A core trench with 1H:3V upstream side slope and vertical downstream side slope that varies in bottom width from 38 feet to 54 feet was constructed at the centerline of the dam an average of about 15 feet below natural ground.

The dam is approximately 73 feet tall and 630 feet long. The upstream and downstream slopes of the embankment are approximately 3H:1V upstream, 3H:1V downstream. The top width of the structure is approximately 22 feet. The site was surveyed in October 2019 by AECOM, and all elevations are given using NAVD88 vertical datum. The datum adjustment from the datum used on the design and as-built drawings (NGVD29) to the October 2019 survey datum is -1.0 foot based on a comparative analysis of monuments placed on the dam. **Table 3-12** summarizes as-built and existing structural data for the Piney Run Dam.

Table 3-12. As-Built and Existing Structural Data

Item	Piney Run Dam	
	As-Built	**Existing**
Local Name	Piney Run Dam	
Latitude / Longitude	39°23'15.72"N/ 76°58'32.74"W	
Site Number	MD00139	
Year Completed	1975	
Purpose	Flood Control, Water Supply(1), Recreation	
Drainage Area (mi^2)	10.43	10.56

Item	Piney Run Dam	
	As-Built	**Existing**
Dam Height (ft)	73	
Dam Type	Earthfill	
Dam Volume (yds^3)	171,000[(2)]	
Dam Crest Length (ft)	624	624
Total Capacity (ac-ft)	8,842	8,870
Sediment Submerged (ac-ft)	303	725
Sediment Aerated (ac-ft)	36	57
Recreation	2,340	2,193[(3)]
Water Supply	3,357	3,146[(3)]
Floodwater Retarding (ac-ft)	2,806	2,749
Surface Area (ac)		
Sediment Pool (ac)	31	Unknown
Recreation Pool (ac)	182	165
Water Supply Pool (ac)	298	290
Flood Pool (ac)	379	377
Principal Spillway		
Type	Drop inlet, Single Stage	
Riser Height (ft)	57.8	
Conduit Size (in)	36	
Low Level Port Elevation (ft)	N\A	N\A
Riser Weir Crest Elev. (ft)	523.0	523.0
Auxiliary Spillway Crest Elevation (ft)	531.0	531.2
Capacity at Aux Crest (cfs)	224.9	222.5
Energy Dissipater	Concrete Impact Basin	Concrete Impact Basin
Auxiliary Spillway		
Type	Earthen channel with protective vegetative cover	
Width (ft)	250	249
Capacity (% of PMF)	62%	
Normal Pool Elevation (ft)	523.5	523.5
Flood Pool Elevation (ft)	"Overtops"[(4)]	543.5
Top of Dam Elevation (ft)	541.6	540.5
Datum [(5)]	NAVD88	

Notes:
(1) Water supply allocation is currently not used and there are currently no plans to use it.
(2) Volume of fill from Piney Run Reservoir As-Built Drawings (SCS, 1975).
(3) Recreation and water supply allocation volumes are pro-rated based on the remaining normal pool volume after sediment storage.
(4) Denotation per Piney Run Design Report (RK&K, 1971).
(5) Original as-built elevations based on NGVD29, but all elevations shown have been converted to the 2019 survey datum of NAVD88.

Principal Spillway

The principal spillway riser is a 57.85-foot high (measured from top of footing), reinforced concrete riser inlet structure with inside dimensions of 9-feet-long by 3-feet-wide, sitting on a 2-foot-thick foundation. The riser has overflow weirs on the two 9-foot long sides at EL. 523.0 feet and drains into a 36-inch reinforced concrete pipe (RCP) which lies on a concrete cradle extending from rock to the spring line of the conduit and has six concrete anti-seep collars spaced evenly between the riser and the centerline of the dam. The weirs are protected with horizontal steel bar trash racks below EL. 522.5 feet and with expanded metal grating from EL. 522.5 feet to the top slab of the riser. The riser is accessed via boat and can be entered through a locking hatch in the top slab and a safety ladder on the downstream wall extending to within six feet of the invert of the structure. From that point, there was a traditional ladder installed on the left wall extending the last six feet to the invert of the structure, however that ladder has since been removed. The 36-inch conduit extends approximately 304 feet and discharges to a reinforced concrete impact basin. The impact basin also has outlets for both internal drains (which capture internal drainage from the toe drain and chimney filter) and for the rate control pipes which discharge from the water intake conduit discussed below. There is a chain link fence that surrounds the impact basin on the upstream, left, and right sides.

The spillway conduit, inlet structure, and impact basin were inspected visually and via camera in 2019 are generally in good condition. The fall protection safety rail for the inlet structure ladder should be either re-secured to the ladder or replaced and the bottom six-foot section of the ladder which was missing should also be re-installed. Woody debris was present in on one of the weirs of the inlet structure and was removed by the Sponsor. Photographs of the existing principal spillway system are provided in **Figure 3-2**.

Above-water portion of riser

Conduit interior (typical)

Impact basin

Receiving stream

Figure 3-2. Principal spillway inlet, conduit, and outlet.

Lake Drain

A lake drain consisting of a headwall intake structure, 24-inch RCP, and slide gate that discharges into the riser structure on the upstream side. The intake structure of the lake drain system is a reinforced concrete headwall and footing slab with two angle iron bars extending diagonally from the top of the headwall to the upstream edge of the footing slab to function as a trash rack. The 24-inch conduit lies on a concrete cradle and has three anti-seep collars spaced evenly between the riser and a point 54 feet upstream. The slide gate that is mounted on the inside of the spillway riser has a rising stem with guides spaced approximately 8.33 feet apart per the construction documents and a hand-operated crank to open it mounted to the top slab of the riser. The slide gate has been observed historically at rates estimated to be approximately 100 gallons per minute and the recent inspection recommended to have the leaks repaired in the next 12 months.

The lake drain conduit was inspected via camera in 2019 is generally in good condition. During the inspection process, divers replaced the existing trash rack bars. The lake drain is test-operated annually at minimum with no observed issues.

Water Supply Intake Structure

In parallel with the principal spillway is a water supply intake tower which was installed during construction of the dam and intended to be used to deliver raw water to a future water treatment plant. However, at this time, this system has never been fully activated. The infrastructure installed as part of this system consists of a reinforced concrete intake tower with six rising stem gates, located at varying depths (5-, 8-, 11-, and 14-feet deep plus two gates at 19 feet deep) and two rising stem gates to control the water flow out of the intake tower. The top slab of the intake tower is covered in an enclosed structure which houses the riser stem gate operators and prevents vandalism. The structure can be accessed via a steel catwalk. The intake tower leads to a 24-inch RCP which runs through the embankment approximately 352 feet downstream before terminating at a bulkhead. This water supply line has rate control piping and a manometer vault accessible at the downstream toe of the dam. The rate control pipe system consists of twin 16-inch ductile iron pipes with butterfly valves to control flow. One of the pipes has a venturi fitting to measure flow. A manometer was originally included in the installation but was vandalized and

does not currently exist. Reportedly, the valves that control the flow to the manometer are inoperable. The flow meter infrastructure including the venturi fitting is located in an underground vault located between the 24-inch conduit and the principal spillway outfall.

The water supply tower was inspected in 2019 and 2020 is generally in good condition. There are a few gate operators with operating wheels either missing or broken. In addition, an attempt was made to dewater the intake tower and 24-inch conduit to inspect them via camera, but the gates could not be shut sufficiently to dewater the intake tower and conduit. The conduit was last inspected via camera in 2013 and was found to be in good condition.

Auxiliary Spillway

A 250-foot-wide, grass-lined auxiliary spillway was excavated into the right abutment. The as-built drawings show a 285-foot-long grassed inlet section sloping at 2.0% up to the control section, a 30-foot-long control section, and an exit section at a 2.5% slope for approximately 330 feet before transitioning to the 4H:1V original ground slope. The average side slopes of the spillway channel are 2.8H:1V. The spillway currently has a good protective grass cover with minimal weeds and is in good condition.

The 2020 inspection report noted a location of potential poor grading around an old borehole that should be monitored and recommended that woody vegetation be cleared from downstream end of the 2.5% exit channel to flat area approximately 30 feet downstream (through the steep section of the original ground slope beyond the formal spillway exit channel), and from the sides of the spillway to a height of five feet above the channel bottom.

Embankment

The upstream and downstream embankments were found to be in good condition, respectively, during the 2019 and 2020 inspections. The upstream embankment has good grass coverage and no visible signs of distress. There is wave erosion along the upstream slope water line that needs to be monitored and repaired as needed. The downstream slope has good grass coverage and no visible signs of distress. Wet areas have historically been observed at downstream toe of slope but concerns over underlying seepage have abated since the late 1990s. This area should continue to be monitored for seepage. Embankment photos are provided in **Figure 3-3.**

Embankment crest looking toward left abutment. Upstream embankment slope and wave protection.

Figure 3-3. Embankment condition

Topographic and Sediment Survey

A topographic survey performed by AECOM (October 2019) combined with Carroll County LiDAR information was the basis for critical elevations and the design of rehabilitative measures. The existing principal spillway riser weir crest was measured at EL. 523.0 feet. The top of dam was surveyed at low point of 540.5 feet. The as-built top of dam elevation was 540.6 feet (adjusted from NGVD29 to NAVD88).

A bathymetric and sediment survey of the Piney Run Reservoir was performed by AECOM (October 2019). The acoustic bathymetric survey indicated that the reservoir had a water depth varying from 0 to 54 feet, with an average water depth of 18 feet during the survey. A comparative analysis of the 2019 bathymetric survey (datum-adjusted for comparison) with previous surveys of the reservoir performed during planning of the original project and in 1989 indicated an average sediment depth of 2.5 feet. With the water level at an elevation of 523.0 feet at the time of the sediment survey, the accumulated sediment volume below the water surface at the time of the survey was estimated to be 725 acre-feet.

Sedimentation

The Piney Run Dam was designed for a service life of 100 years with 339 acre-feet of sediment storage. The normal pool surface area was planned at 146 acres.

Two methods were used to estimate annual sediment yield; one method based on a comparative analysis of the reservoir bathymetry over time, and one method that used analysis methods to understand sediment delivery from the watershed and from erosion of the tributary streams to the reservoir. The comparative analysis method yielded an estimated annual sediment load rate of 16.5 acre-feet per year. The analysis-based method yielded an annual sediment load estimate of 19.0 acre-feet per year. Both methods used to estimate submerged sediment deposition rate exceed the original 3.4 acre-feet/year planned.

A study of the watershed, future land use and zoning, and tributary channel conditions indicated that future sedimentation rates could increase to up to 43.4 acre-feet per year depending on the rate of build-out of the watershed, future erosion of the stream channels, and status of mitigation projects in the watershed to arrest erosion. Because the state of Maryland and Carroll County have both enacted strict stormwater management standards on development requiring stormwater treatment to mimic pre-development (defined as “woods in good condition”) hydrologic conditions using best management practices with 80% minimum reduction in total suspended sediment rates, the increase in estimated sedimentation loading (24.4 acre-feet per year) could be reduced by as much as 80% which would yield a total estimated future loading rate of 23.9 acre-feet per year. An analysis was performed in accordance with the NRCS’ National Engineering Handbook, Section 3 *Sedimentation* (NRCS, 1983) to estimate the ability of the reservoir to trap sediment as well as how that sediment would be stored: either submerged (below normal pool) or aerated (above normal pool). Based on the reservoir capacity to annual watershed runoff volume ratio which is 1.05, the estimated trap efficiency is 100% and based on the coarse-grained materials and moderate watershed relief, the estimated aerated sediment portion is 30%. Based

on these estimates, the estimated 100-year aerated sediment load is 717 acre-feet and submerged sediment load is 1,673 acre-feet.

The existing sediment pool volume of 339 acre-feet has been exceeded by approximately 386 acre-feet or 113% of the intended 100-year volume. However, as the portion of the reservoir allocated to water supply is not currently being used, there is sufficient additional volume in the normal pool of the reservoir that was intended to be allocated to water supply (3,357 acre-feet). Since the water supply use of the reservoir is not being used, there is ample storage volume to accommodate the anticipated 100-year submerged sediment load of 1,673 acre-feet. The sediment load rate depends on how much, if at all, the development of the contributing watershed changes.

3.16. Status of Operations and Maintenance

Operation and Maintenance (O&M) of the Piney Run Dam is performed by the Sponsor. Formal inspections are performed annually by representatives of the Sponsor, Carroll Soil Conservation District, MDE and NRCS. AECOM was present during the annual inspections in 2019 and 2020. Routine brush management and repairs are conducted as recommended by the inspections and as needed. Based on inspection reports and site visits to the dam site, O&M is considered adequate.

3.17. Breach Analysis and Hazard Classification

Breach analyses were performed for seismic (normal pool), static (pool at spillway crest elevation), and hydrologic (FBH, spillway design flood - SDF, or PMF) scenarios as required by Technical Release No. 210-60 *Earth Dams and Reservoirs* (NRCS, 2019) using methods required by the MDE guidance document, *Guidance for Completing a Dam Breach Analysis for Small Ponds and Dams in Maryland.* (MDE, 2018) to confirm the high hazard potential classification and estimate the downstream inundation zones. Impacts to downstream properties and road crossings were assessed. Breach maps depicting the results of the breach analysis for the Piney Run Dam are provided in **Appendix C**.

In summary, a seismic condition breach of the Piney Run is estimated to impact 36 structures and 14 transportation crossings downstream of the dam. A static condition breach is estimated to impact 40 structures and 19 transportation crossings downstream of the dam. A hydrologic condition breach is estimated to impact 181 structures and 45 transportation crossings downstream of the dam. The breach analysis was terminated at the location where the modeled flood depths with and without breach for the hydrologic scenario converged to within one foot of each other, approximately 27 miles downstream.

Revised breach analyses reflecting the final design condition will be performed during the design phase of the Piney Run Dam rehabilitation and the updated inundation data will be provided to the Sponsors for use in an EAP update.

3.18. Evaluation of Potential Failure Modes

3.18.1. Sedimentation

The major land uses in the watershed above the Piney Run Reservoir include 36% residential, 26% cropland, 25% forest, meadow, and other natural land uses, 5% open space, 4% open water, 2% pasture and rangeland, 1% transportation, and 1% commercial. The current zoning of the watershed indicates that imperviousness could increase from approximately 10.4% to 22.4% in an ultimate development scenario. The future sediment accumulation rate is estimated to be 23.9 acre-feet per year or 2,390 acre-feet over the 100-year analysis period. Assuming the allocated water supply pool (3,146 acre-feet under existing conditions) continues to not be used, this volume can be accommodated by the unused water supply volume. The potential for failure due to inadequate sediment storage capacity is low but would prevent the Sponsor from using the water supply function without removing significant amounts of sediment, increasing the pool volume, implementing measures to arrest the sedimentation upstream of the reservoir, or reducing other allocations.

3.18.2. Hydrologic Capacity

Hydrologic failure of a dam occurs when the auxiliary spillway is breached or when the dam is overtopped and fails. The Piney Run Dam was designed as a Class ‘C’ high hazard potential dam but currently does not meet dam safety criteria as required by the NRCS to prevent overtopping or breaching of the auxiliary spillway and/or embankment during the FBH event as required for a Class ‘C’ high hazard potential dam. During the FBH event, the dam crest is estimated to overtop by as much as three feet which could cause it to erode and collapse. Therefore, Piney Run Dam can be described as having a high potential to fail due to insufficient spillway capacity.

3.18.3. Spillway Integrity

An auxiliary spillway integrity analysis was performed using the SITES model. Subsurface information obtained from the original geologic investigation report (RK&K, 1971) and from a geologic and geotechnical investigation made during this study were used to develop representative geologic profiles through the auxiliary spillway with conservative (i.e., most erodible) input parameters. The K_h and other soil and rock parameters were estimated based on available subsurface data. Based on survey data of the existing topography of the ground surface, the auxiliary spillway is approximately 249-feet wide with 2.8H:1V side slopes. Three different profiles through the auxiliary spillway were evaluated. These were along the inside edge of the spillway (closest to the dam, left side), through the centerline of the spillway and along the outside edge of the spillway (furthest from the dam, right side).

Twelve borings were drilled in the auxiliary spillway to determine subsurface profiles and to collect samples for estimation of soil and rock erodibility parameters for auxiliary spillway integrity analysis. Laboratory testing of soil samples collected during the subsurface exploration program made as part of this study was performed for use in the spillway integrity analysis. All testing was performed in accordance with applicable ASTM test standards. Calculations were performed to estimate soil and rock erodibility parameters for use in an auxiliary spillway integrity analysis using the SITES program. The K_h represents a measure of the resistance of the earth material to erosion. The K_h was estimated for each stratum using procedures from the

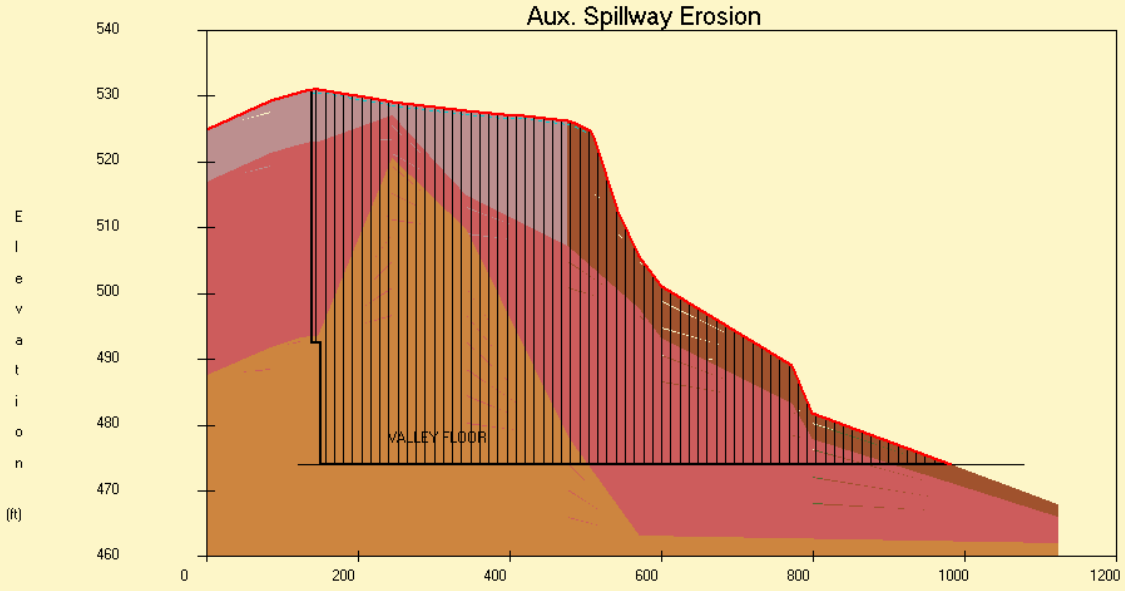
National Engineering Handbook, Part 628, Chapter 52, Field Procedures Guide for the Headcut Erodibility Index (NRCS, 2001) and the equation below:

$$K_h = M_s * K_b * K_d * J_s$$

Where M_s is the mass strength number, K_b is the block size number, K_d is the discontinuity bond shear strength number, and J_s is the relative ground structure number. Other subsurface material properties used in the SITES model include dry density, percent clay, plasticity index and representative diameter.

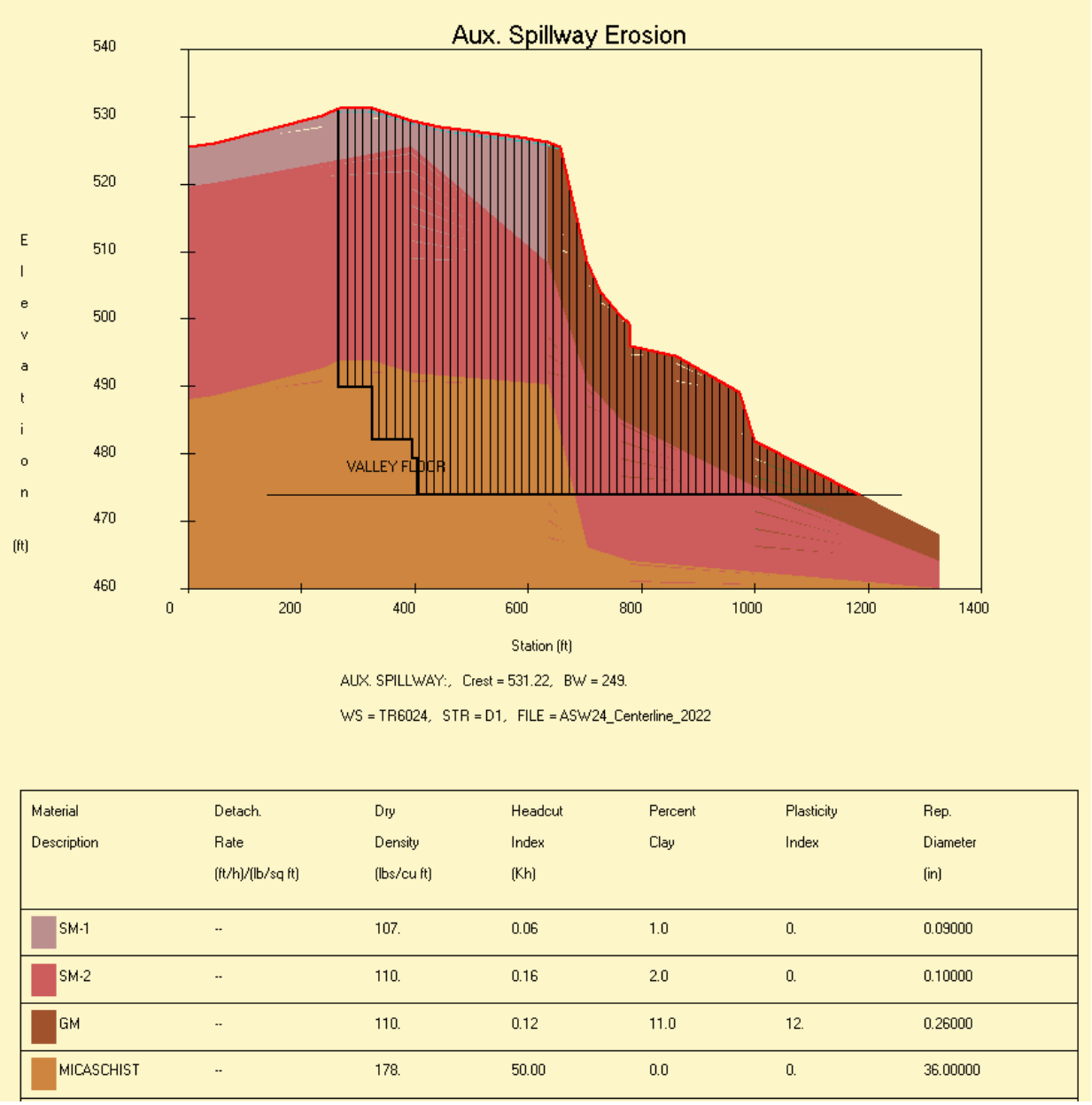
The auxiliary spillway surface condition parameters were estimated based on the conditions observed during a visual inspection made in November 2019. The Vegetal Retardance Curve Index is approximated by the Manning's roughness value of the cover through the auxiliary spillway. A Manning's roughness value of 0.04 was used for the constructed portion of the auxiliary spillway while a value of 0.10 was used for the wooded area downstream of the constructed portion of the spillway. The vegetal cover factor ranges from zero for non-vegetated surfaces to 0.87 for typical turf grass sod covers. The area downstream of the constructed portion of the auxiliary spillway was assumed to have a vegetal cover factor of 0.5 which corresponds to typical bunch grasses. The maintenance code describes the overall uniformity of the cover in the channel. A maintenance code of 1 was used for the constructed portion of the spillway profile which represents uniform cover. A maintenance code of 2 was used for the wooded area downstream of the constructed portion of the spillway which represents minor discontinuities present in the cover. The potential rooting depth is the depth to which roots could reasonably penetrate under good growing conditions. A potential rooting depth of 1.0 foot was used for the constructed portion of the spillway and a depth of 5.0 feet was used for the wooded area downstream of the constructed portion of the spillway. The valley floor is defined as the elevation below which the spillway will not erode. In this case, erosion is unlikely below this elevation due to the presence of tailwater during the spill event. The valley floor was defined as elevation 474.0 feet for all of the profiles modeled in SITES which is approximately two feet below the elevation of the floodplain downstream of the dam.

Schematic profiles of the inside edge, centerline and outside edge of the auxiliary spillway from the SITES model output are presented in **Figure 3-4**, **Figure 3-5**, and **Figure 3-6**, respectively. Soil and rock material input properties are also presented in each figure.



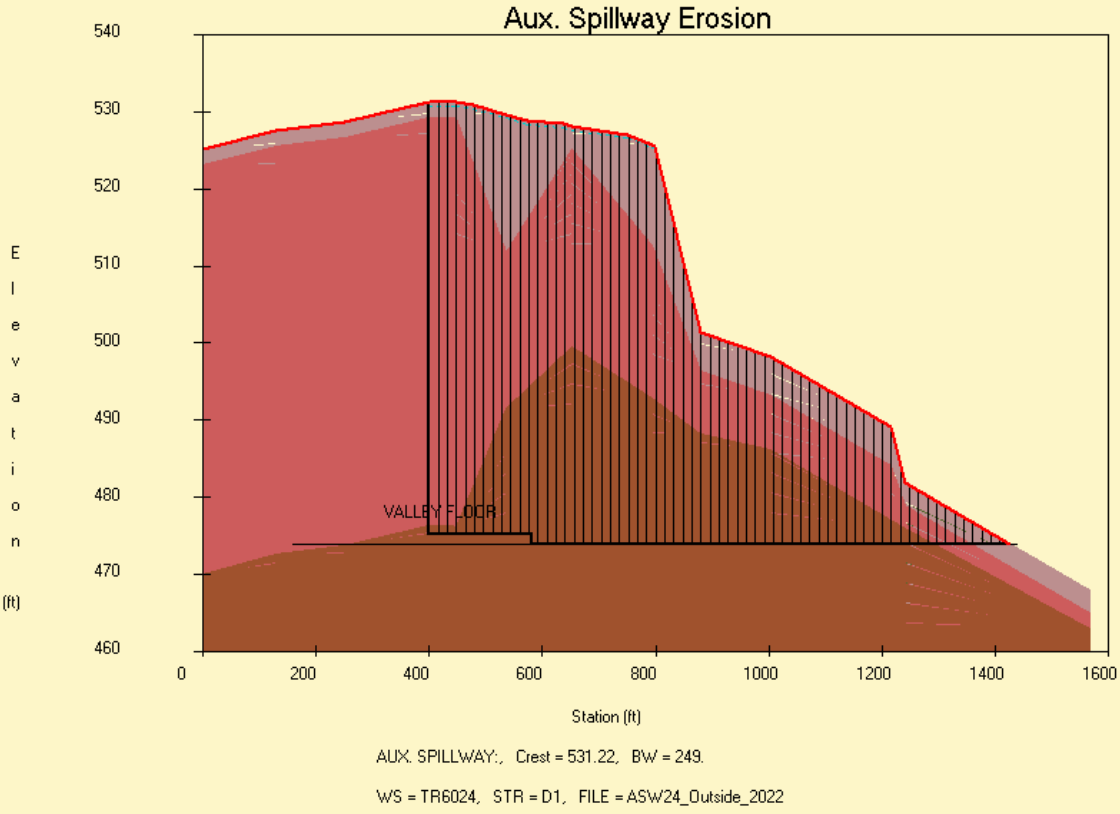
Material Description	Detach. Rate (ft/h)/(lb/sq ft)	Dry Density (lbs/cu ft)	Headcut Index (Kh)	Percent Clay	Plasticity Index	Rep. Diameter (in)
ML	--	100.	0.06	3.0	0.	0.01000
SM	--	105.	0.16	1.0	0.	0.14000
GM	--	110.	0.12	11.0	12.	0.26000
MICASCHIST	--	178.	10.00	0.0	0.	12.00000

Figure 3-4. Plot of auxiliary spillway inside edge profile and extent of erosion from integrity analysis for existing conditions 24-hour PMF obtained from SITES model output.



Material Description	Detach. Rate (ft/h)/(lb/sq ft)	Dry Density (lbs/cu ft)	Headcut Index (Kh)	Percent Clay	Plasticity Index	Rep. Diameter (in)
SM-1	--	107.	0.06	1.0	0.	0.09000
SM-2	--	110.	0.16	2.0	0.	0.10000
GM	--	110.	0.12	11.0	12.	0.26000
MICASCHIST	--	178.	50.00	0.0	0.	36.00000

Figure 3-5. Plot of auxiliary spillway centerline profile and extent of erosion from integrity analysis for existing conditions 24-hour PMF obtained from SITES model output.



Material Description	Detach. Rate (ft/h)/(lb/sq ft)	Dry Density (lbs/cu ft)	Headcut Index (Kh)	Percent Clay	Plasticity Index	Rep. Diameter (in)
SM-1	--	93.	0.06	1.0	0.	0.10000
SM-2	--	110.	0.16	2.0	0.	0.09000
MICASCHIST	--	170.	20.00	0.0	0.	24.00000

Figure 3-6. Plot of auxiliary spillway outside edge profile and extent of erosion from integrity analysis for existing conditions 24-hour PMF obtained from SITES model output.

The SITES model-based auxiliary spillway integrity analysis for the inside edge profile, centerline profile, and outside edge profile all show erosion of the soil overburden of the auxiliary spillway and a breach of the spillway crest during passage of the 6- and 24-hour PMF events. The SITES model shows that the 24-hour PMF scenario is the worst-case scenario for the integrity of the spillway. During the 24-hour PMF event, the model estimates a maximum final head cut depth of approximately 57 feet for the inside edge, centerline, and outside edge profiles. A breach of the spillway could endanger the main dam embankment or result in an uncontrolled released of the reservoir. Therefore, Piney Run Dam can be described as having a high potential to fail as a result of issues related to its auxiliary spillway integrity. Potential rehabilitation alternatives to address this issue can be found in Section 4 of this Watershed Plan.

3.18.4. Seepage

Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material from 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 the internal erosion. Seepage that increases with a rise in pool elevation is an indication of a potential problem, as is stained or muddy water or "sand boils" (the up-welling of sediment transported by water through voided areas). From the late 1970s until the mid to late-1990s, Piney Run exhibited signs of potential seepage manifested by wet areas at the downstream toe near the left abutment as well as elevated water levels in a mid-slope piezometer. However, since that time, no indications of seepage have been noted in annual inspections and the water level in the subject piezometer has returned to normal. In addition, a seepage analysis completed in 2020 and based on sampled material properties and calibrated to historical piezometer data found the dam to meet applicable factors of safety for steady-state seepage conditions with and without seismic influences. While monitoring should continue in the future, potential failure due to seepage is estimated to be low.

3.18.5. Stability

The dam does not show evidence of embankment slope failure, including sloughing or sliding. The auxiliary spillway is in good condition with good grass cover and minimal weeds. A slope stability analysis was completed in 2019 and showed that the dam meets applicable factors of safety for all required cases. The risk of failure due to stability is judged to be low.

3.18.6. Seismic

The Piney Run Dam is located in an area of low potential seismic activity per the USGS National Seismic Hazard Maps (USGS, 2019) and its risk of failure due to a seismic event is judged to be low.

3.18.7. Material Deterioration

The materials used in the principal spillway system are subject to weathering and chemical reactions due to natural elements within the soil, water, and atmosphere. Concrete risers and conduits can deteriorate and crack, metal components can rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion caused by these leaks. Based on inspections of the dam components completed in 2019 including visual inspection of all above-ground components and camera inspections of the principal spillway conduit and riser structure, the embankment and principal spillway appear to be in good condition. The camera inspections completed for the corrugated metal internal drain conduits showed deterioration and corrosion of the conduits as well as a number of bends in the conduits at the downstream ends of each which made them difficult to easily inspect. Therefore, the risk of failure due to material deterioration of the internal drain conduits is judged to be moderate.

3.18.8. Conclusions

Currently, a hydrologic failure is the most likely failure mode for the Piney Run Dam. The other potential modes of failure present low to moderate risk.

3.19. Consequences of Dam Failure

Inundation due to dam failure potentially has the following consequences at each structure.

Both the population-at-risk (PAR) estimate (**Appendix F**) and breach zone analyses (**Appendix C**) estimate depths of inundation based upon the surveyed (when available) or LiDAR natural ground elevations at a structure. A structure was considered to be at risk for the PAR estimate when the estimated depth of floodwater exceeded one foot above the elevation of the lowest inhabitable floor. For the breach maps located in **Appendix C**, structures inundated above the finish floor elevation (FFE) by any depth are included in the breach zone.

Loss of Life
The breach inundation study indicates that a dam failure may result in inundation of residential structures and transportation infrastructure. Details regarding the breach inundation studies can be found in **Section 3.18**.

To estimate the PAR from a hydrologic dam breach scenario, the following impacted infrastructure was taken into consideration:

- 181 Residential, Commercial, Institutional, or Municipal structures
- 38 County Roads
- 5 State Roads
- 1 Interstate Highway
- 1 Freight Railroad

Given the number of properties and vehicles located within the breach zone, it is estimated that at a minimum the number of people at risk due to a breach of the Piney Run Dam would be 768. PAR calculations are provided in **Appendix F**.

Release of Harmful Materials
The sediment stored in the reservoir and eroded embankment material released to Piney Run would harm water quality, degrade aquatic habitat, and reduce downstream channel capacity.

Agricultural Damage
Agricultural land downstream of the Piney Run Dam is minimal. However, flood damage and sediment transport may cause reduced productivity of the small amount of agricultural land downstream of the dam.

Infrastructure Destruction

Residential dwellings, fences, roads, bridges, and public utilities including those that provide for public water supply and sanitary sewage collection may be damaged or destroyed.

4.0 ALTERNATIVE FORMULATION

4.1. Formulation Overview

Formulation of the alternative rehabilitation plan for Piney Run Dam followed procedures outlined in the Natural Resources Conservation Service's (NRCS) *National Watershed Program Manual* (NRCS, 2015). Other guidance incorporated into the formulation process included the *Principles and Requirements for Federal Investments in Water Resources* (Council on Environmental Quality, 2013), the *Interagency Guidelines* (Council on Environmental Quality, 2014), and *Guidance for Conducting Analyses under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal water Resource Investments* (USDA, 2017), the *Economics Handbook, Part II for Water Resources*, and other NRCS watershed planning policies. Several alternatives were considered for the site.

The formulation process built upon the investigations completed and documented within this report and included discussions with the Sponsor, NRCS, and MDE. Alternative plans of action were developed based upon NRCS planning requirements and the ability of the alternatives to meet the purpose and need.,

At minimum, the following alternatives must be considered in development of a rehabilitation plan:

- NEPA No Action / Future without Project
- Future without Federal Investment (FWOFI)
- Dam Decommissioning
- Dam Rehabilitation
- Use of non-structural measures to meet the project purpose and need

4.2. Formulation Process

Alternatives were formulated to meet the purpose and need of this supplemental watershed plan as well as comply with applicable NRCS, NEPA, and other federal guidance and requirements.

The NEPA No Action or the NRCS Future-without-project alternative is the estimation of the most probable future condition expected to occur in absence of any of the study's alternative plans (NRCS, 2015). This alternative provides the basis for comparison of the other alternatives in the study. When considering this alternative, the future condition was considered. Under this alternative, the Sponsor would continue to operate and maintain the dam and reservoir as they currently do but would undertake no actions to address the dam's identified deficiencies.

The FWOFI alternative is the alternative that represents the most probable future condition expected to occur in absence of investment by the federal government in the project. In this case,

the project's purpose and need would need to be satisfied by the Sponsor using local funding resources. If no federal investment were made, there are three likely outcomes:

1. The Sponsor could decommission the dam which would be done under the same conditions as a local decommissioning option. The Sponsor would lose the possibility of Piney Run Reservoir serving as backup water supply source to Liberty Reservoir.

2. The Sponsor could repair the dam to meet State of Maryland criteria to safely pass the FBH and improve spillway integrity. The Sponsor would not make any improvements to establish Piney Run Reservoir as an active backup source of water supply to Liberty Reservoir.

3. The Sponsor could do nothing. In this case, MDE would likely issue an Administrative Order requiring the Sponsor to repair the dam to meet State of Maryland criteria or decommission the dam. If the Sponsor chooses not to comply, MDE could decommission the dam using their own forces and subsequently require the Sponsor to compensate the State of Maryland for the work. In either case, Piney Run Reservoir would not exist as a backup water supply source to Liberty Reservoir.

Given these three options, the Sponsor has indicated that they would likely pursue the second option, a repair of the dam to meet State of Maryland criteria although over a significantly longer period of time. Under these circumstances, the dam would remain un-repaired for a longer period of time subjecting downstream properties, people, infrastructure, and the environment to a higher risk of dam failure due to un-addressed deficiencies for an extended period of time.

The Dam Decommissioning alternative assumes the Sponsor decommissioning the dam with federal assistance and completing restoration of the dam site and reservoir bed. Under this alternative, the dam would be excavated to meet State of Maryland criteria for a decommissioned dam (1% AEP event impoundment depth is less than three feet). The water supply intake tower and principal spillway riser structures would be removed and the conduits either removed if exposed or otherwise abandoned in place. The stream channels would be stabilized from the downstream end of the impact basin to the culverts under White Rock Road (approximately 20,000 LF). No action would be taken to address backup water supply and the Sponsor would continue to not have an available backup water supply source to Liberty Reservoir.

When considering dam rehabilitation alternatives, a series of design options were developed to address the purpose and need and aid in the formulation of alternatives for consideration.

1. Dam Deficiency - Spillway Capacity Design Options
    a. Widen Spillway – widen the existing auxiliary spillway and raise the dam crest with the material excavated from the spillway to increase both reservoir and spillway capacity.
    b. Supplemental Spillway – excavate a second auxiliary spillway in the left abutment to raise the dam crest with the excavated material from the auxiliary spillway to increase both reservoir and spillway capacity.

c. Crest Raise – raise the dam crest to increase both reservoir and existing spillway capacity.

2. Dam Deficiency - Spillway Erodibility Design Options
   d. RCC Armoring – Install RCC armoring to rock on the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel to prevent the initiation of erosion during spillway activation. A secant pile cutoff wall extending into rock with concrete cap and tieback anchors into rock would be installed at the toe of the RCC armoring. A smaller cutoff wall and scour pad of traditional reinforced concrete would be installed at the auxiliary spillway crest to arrest any head cut that would form in the exit channel of the auxiliary spillway during activation. The smaller cutoff wall would extend below the top elevation of the RCC armoring.

   e. Cutoff Wall – Install a secant pile cutoff wall into rock with concrete cap and tieback anchors into rock near the downstream end of the flatter section of the auxiliary spillway exit to prevent spillway erosion from propagating a head cut through the auxiliary spillway. A smaller cutoff wall and scour pad of traditional reinforced concrete would be installed at the auxiliary spillway crest to arrest any head cut that would form in the exit channel of the auxiliary spillway during activation. The smaller cutoff wall would extend below the top elevation of the secant pile cutoff wall.

3. Backup Water Supply Design Options
   a. No Action – take no action to improve water supply alternatives. The Sponsor would not have a backup water supply for what is currently drawn from Liberty Reservoir owned by the City of Baltimore. A decision of no action at this time does not remove the potential for future implementation of water supply at Piney Run.

   b. Maintain Normal Pool - Maintain the current normal pool elevation and construct raw water transmission infrastructure at the downstream toe of the dam including a pump station. The safe yield of the reservoir would be reduced to offset the reservoir volume lost to sedimentation and allow for restoration of the sediment pool allocation required by the original watershed plan. A functioning backup water supply would be achieved but if used would result in significant fluctuations to the normal pool level which would affect the waterfront infrastructure at Piney Run Park as well as additional forest clearing impacts for the water supply infrastructure.

   c. 2.3-foot Normal Pool Raise - Raise the normal pool elevation by 2.3 feet and construct raw water transmission infrastructure at the downstream toe of the dam including a pump station. The safe yield of the reservoir would be maintained with the normal pool raise offsetting the loss of volume due to sedimentation and allowing for restoration of the sediment pool allocation. A functioning backup water supply would be achieved but if used would result in significant fluctuations to the normal pool level which would affect the waterfront infrastructure at Piney Run Park as well as wetland, stream, forest, and infrastructure (road and waterfront) impacts due to the increased footprint of the

higher maximum normal pool and additional forest clearing impacts for the water supply infrastructure.

d. 4-foot Normal Pool Raise - Raise the normal pool of the reservoir by 4 feet to increase reservoir safe yield. Install a new intake, pump station, and transmission infrastructure in the reservoir near the existing access road from Hollenberry Road. A functioning backup water supply would be achieved but if used would result in significant fluctuations to the normal pool level which would affect the waterfront infrastructure at Piney Run Park as well as wetland, stream, forest, and infrastructure (road and waterfront) impacts due to the increased footprint of the higher maximum normal pool and additional forest clearing impacts for the water supply infrastructure.

4. Sediment Pool Allocation Restoration Design Options
   a. Reallocate from Water Supply Volume - Reduce the safe yield of the reservoir and reallocate storage from the water supply volume for sediment storage;
   b. Reallocate from Recreation Volume - Take no action and consider the sediment pool volume (approximately 725 acre-feet) accommodated by re-allocating part of the recreation pool allocation, since the recreation lake area would remain approximately the same area as intended (165 acres minimum) despite a significantly reduced recreation pool volume. The project then will continue to maintain the required sediment pool allocation.
   c. Dredge - Dredge accumulated sediment (approximately 725 acre-feet) from the reservoir which includes restoring the sediment pool allocation to its original volume of 339 acre-feet;
   d. 2.3-foot Normal Pool Raise - Raise the pool by approximately 2.3 feet to EL. 525.3 feet to restore the volume lost to sedimentation which includes restoring the sediment pool allocation to its original volume of 339 acre-feet.

In addition, there are several other elements that would be included in any structural modification alternative. These elements are:

1. Repair the downstream end of the toe drain conduits and add access manholes to improve maintenance and inspection.

2. Make minor repairs to the structural components of the principal spillway riser and water supply intake tower.

3. Modify the principal spillway riser to install an automated cold water release system to maintain the health of Piney Run below the dam.

These design options were evaluated and used to formulate four dam rehabilitation design alternatives

- Dam Rehabilitation without Water Supply Infrastructure
- Dam Rehabilitation and Water Supply Infrastructure with a Normal Pool Raise of 2.3 feet
- Dam Rehabilitation and Water Supply Infrastructure with no change in Normal Pool

- Dam Rehabilitation and Water Supply Infrastructure with a Normal Pool Raise of 4.0 feet

An alternative that considered using non-structural measures to meet the project's purpose and need were considered. Under this alternative, no action would be taken at the dam, but the Sponsor would need to acquire portions or all of hundreds of downstream properties and raise roads that may be impacted by a breach of the dam to remove the hazard of the dam. No action would be taken to address spillway integrity. No action would be taken to address a backup water supply and the Sponsor would continue to not have an available backup water supply source to Liberty Reservoir.

A tabular reference for the formulated alternatives is provided in **Table 4-1**.

Table 4-1. Formulated Alternatives

Alternative	Name
0	NEPA No Action/Future without Project
1	Dam Rehabilitation without Water Supply Infrastructure (NRCS-funded)
1A	FWOFI – Dam Rehabilitation without Water Supply Infrastructure
2	Dam Rehabilitation and Water Supply Infrastructure with a Normal Pool Raise of 2.3 feet
3	Dam Rehabilitation and Water Supply Infrastructure with no change in Normal Pool
4	Dam Rehabilitation and Water Supply Infrastructure with a Normal Pool Raise of 4.0 feet
5	Non-Structural Measures
6	Dam Decommissioning

4.3. Alternatives Considered but not Carried Forward for Detailed Study

Prior to formulating the alternatives, the following design options were considered but due to reasons described below were determined to not merit inclusion in any formulated alternative:

1. Spillway Capacity
    a. Supplemental Spillway – based on a finding of the geological and geotechnical investigation, subsurface conditions in the left abutment of the dam at the location of a proposed second auxiliary spillway are similar to those in the right abutment at the location of the existing auxiliary spillway. Therefore, similar problems with spillway integrity would be encountered and similar mitigation measures to improve spillway integrity would be required. Because of this, the cost of installing a second auxiliary spillway would be significantly higher than other spillway modification alternatives.
    b. Crest Raise – for this design option, only the dam crest would be raised and therefore, borrow areas would need to be identified and accessed. These borrow areas would require longer transportation distances and times and therefore result in higher construction costs. In addition, the dam crest would need to be raised more under this scenario than under a similar scenario where the spillway was widened because spillway capacity below the existing dam crest would not increase. Due to these factors, the cost of addressing spillway capacity purely through raising the dam crest would be significantly higher than a scenario where

the dam crest was raised in conjunction with a widening of the auxiliary spillway crest.

2. Spillway Erodibility
    a. No design options related to spillway erodibility were eliminated prior to formulating alternatives.
3. Backup Water Supply
    a. No design options related to backup water supply were eliminated prior to formulating alternatives.
4. Sediment Pool Allocation Restoration
    a. Reallocate from Recreation Storage – although the minimum required recreation pool area (152 acres at the elevation of the required recreation pool volume) would be maintained at or greater than originally intended (146 acres).
    b. Dredging – Dredging the accumulated 725 acre-feet of sediment in the reservoir to restore the original sediment pool allocation (339 acre-feet) was evaluated. It was determined that the cost for dredging alone would likely exceed the cost to the Sponsor for addressing the remaining objectives of the project and thus meet the purpose and need.

In addition to the design options not carried forward in any of the formulated alternatives, the following alternatives were also not carried forward for detailed analysis:

Alternative 3: Dam Rehabilitation and Water Supply Infrastructure: In this alternative, the dam would be modified to meet NRCS and State of Maryland criteria for Class 'C' high hazard potential dams including expansion of the auxiliary spillway, raising the dam crest from EL. 540.5 feet to EL. 545.0 feet, and installing roller compacted concrete armoring at the downstream end of the auxiliary spillway. In addition, the necessary infrastructure would be installed to connect the existing water supply intake tower and conduit to the County's water supply system. Implementation of Alternative 3 would require mitigation for approximately 7.9 acres of forest clearing to accommodate the dam crest raise and water supply infrastructure. It would also require modifications to the Piney Run Park waterfront infrastructure including five docks and two boat ramps to accommodate the proposed water supply pool operating limits which would range from EL. 523.0 feet to EL. 506.0 feet (maximum fluctuation of 17 feet). This alternative was ruled out for the following reasons:

- The alternative would result in a reduced safe yield since an allowance for the sedimentation that has already occurred in the reservoir and additional sedimentation would need to be made, thus reducing the volume of water allocated to water supply. There would then need to be additional study for the impacts of operating the reservoir at a reduced safe yield.
- The alternative would require additional infrastructure to be installed that is beyond the scope of improvements that NRCS would likely fund.

Alternative 4: Dam Rehabilitation and Water Supply Infrastructure with a Normal Pool Raise of 4.0 feet: In this alternative, the dam would be modified to meet NRCS and State of Maryland criteria for Class 'C' high hazard potential dams including expansion of the spillway, raising the dam crest, and installing a secant pile cutoff wall in the auxiliary spillway to arrest erosion if it were to occur during an auxiliary spillway activation event. In addition, the normal pool would be raised by four feet to increase safe yield of the reservoir from 3.65 to approximately 3.84 million gallons per day and the necessary infrastructure would be installed to connect the reservoir to the County's water supply system albeit using a new intake tower constructed further upstream in the reservoir near the existing dam access road. Implementation of Alternative 4 would require mitigation for approximately 31 acres of forest clearing to accommodate the dam crest raise, spillway integrity measures, and pool raise, approximately 12 acres of wetland impacts and 1,500 feet of stream impacts. Approximately 0.5 acres of the Piney Run Park waterfront would be permanently impacted by the pool raise and approximately 570 linear feet of White Rock Road would need to be raised to meet County Road requirements for flood hydraulics. This alternative was ruled out for the following reasons:

- The estimated cost of the alternative including costs of some of the comparative design operations (e.g., secant pile wall versus roller compacted concrete armoring) was significantly higher) than similar alternatives that would meet the purpose and need.
- The impacts to forest, wetlands, and waterways would be significantly greater due to the expansion of the normal pool which increases negative environmental impacts, lengthens the project schedule due to permitting and increased mitigation requirements, as well as increases construction costs.
- There would be significant temporary and permanent impacts to the recreational aspects of the park including potentially losing use of the reservoir for two years while the riser structure is modified, the reservoir refilled, and major required modifications are made to the waterfront infrastructure of the park (docks, ramps, etc.) due to encroachment of the raised normal pool.
- The Sponsor did not deem the benefit of a small amount of additional safe yield of the reservoir to be worth the costs and impacts anticipated for this alternative.

Alternative 5: Non-Structural Measures: Under this scenario, the issues at the dam would not be addressed but the hazard potential would need to be eliminated by completing non-structural measures downstream. Approximately 181 properties would need to either be purchased or otherwise flood-proofed either by constructing flood barriers (walls, levees, etc.) or flood proofing the structures themselves in multiple counties between the dam and Elkridge, Maryland. It should be pointed out that such a flood proofing effort would require the 100% participation in order to successfully have the hazard class reduced and based on many cases historically, such participation is not likely. In addition, 44 roads including one interstate highway and approximately 15 miles of railroad would need to be raised above the breach inundation area or otherwise flood proofed. The feasibility of these measures, which would need to occur in other political jurisdictions, are not likely to be feasible and the associated costs, even if less expensive floodproofing options were employed at each of the structures, would be significantly higher than any repair option. In addition, complete participation of all structure owners plus the owners

of the roadways which include multiple counties, the state of Maryland, and CSX railroad, is not likely.

4.4. Alternatives Carried Forward for Detailed Study

The following alternatives were determined to be feasible and carried forward for detailed study:

4.4.1. Alternative 0 – NEPA No Action/Future without Project

For this alternative, there would be no federal participation in the project and the Sponsor would take no action to address the purpose and need. The Sponsor would continue to operate and maintain the dam as is currently done and would continue to comply with routine State of Maryland requirements for dam ownership including annual inspections and annual updates to the Emergency Action Plan.

The current level of flood protection and current use of the reservoir for recreation. Would continue under existing conditions. The reservoir would continue to store and accumulate sediment. The allocated water supply volume would remain unused but available as a backup supply if the Sponsor decided to install the necessary infrastructure to use it. The risk of catastrophic failure of the dam would also remain as the dam would not be able to safely pass the FBH and the spillway erodibility would remain unchanged and unmitigated.

4.4.2. Alternative 1 – Dam Rehabilitation without Water Supply Infrastructure

In this alternative, which assumes Federal investment, the dam would be modified to meet NRCS and State of Maryland criteria for Class ‘C’ high hazard potential dams. However, the County would not make any improvements to establish Piney Run Reservoir as a backup water supply source.

Alternative 1 would involve the following measures:

1. Widen the auxiliary spillway by excavating the right-side slope of the spillway channel to increase capacity. To address a current projected deficiency under ultimate watershed development conditions, install an approximately 1-foot-high reinforced concrete weir structure at the spillway to prevent activation of the spillway for events equal to or less than the 1% AEP event and the principal spillway hydrograph events. Use the material generated by the excavation to raise the dam crest from EL. 540.5 feet to EL. 545.0 feet. The crest raise would be accomplished by placing fill on the crest and then on the downstream slope of the embankment to maintain the existing 22-foot crest width and 3H:1V side slopes of the embankment. In addition, the preliminary slope stability and seepage analyses indicate that the modified geometry will meet applicable factors of safety for all cases, provided both the central core zone and chimney filter of the embankment are raised to the freeboard hydrograph/spillway design flood peak water surface elevation of EL. 544.0 feet. Therefore, raising these zones of the embankment is included in this Alternative. Long-term monitoring of embankment settlement would be required following completion of construction of the embankment raise.

2. As a result of raising the dam crest, a preliminary structural analysis shows that the existing impact basin and rate control vault would be structurally insufficient to handle the increased load from raising the grade around them. Therefore, plans to modify the impact basin and rate control system to accommodate the additional embankment fill will be required or construction of new structures can be completed further downstream.

3. Install RCC along the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel. The RCC toe would sit on a secant pile cutoff wall with concrete cap and tieback anchors. Both the wall and anchors would extend into rock to an elevation at or below the expected eroded elevation of the spillway. A smaller cutoff wall and scour pad of traditional reinforced concrete would be installed at the auxiliary spillway crest to arrest any head cut that would form in the exit channel of the auxiliary spillway during activation. The top of the cutoff wall would be at the elevation of the existing auxiliary spillway crest and the bottom would be at the elevation of the top of the RCC armoring. This cutoff wall can be constructed monolithically with the short weir crest structure described above.

4. No action would be taken to address backup water supply and the Sponsor would continue to not have an available backup water supply source to Liberty Reservoir.

5. The sediment storage will be accommodated by re-allocating a portion of the unused water supply pool for future sediment storage. If the water supply were ever realized as part of a future action, the available water supply pool and corresponding safe yield would be reduced by this volume.

6. Repair the downstream end of the toe drain conduits and add access manholes to improve maintenance and inspection.

7. Make minor repairs to structural components of the principal spillway riser and water supply intake tower.

8. Modify the water supply intake tower to install an automated cold water release system to maintain the health of Piney Run downstream of the reservoir. This system would require an allocation of 170 acre-feet of water based on the basis of design report for the system (Michael Baker, LimnoTech, 2016) and would be taken from the volume of water currently allocated to water supply.

It should also be noted that implementation of Alternative 1 would require mitigation for 6.5 acres of forest clearing to accommodate the dam crest raise and spillway integrity measures.

4.4.3. Alternative 1A – Future without Federal Investment

In this alternative, the project's purpose and need would need to be satisfied by the Sponsor using local funding resources. As previously stated, if no federal investment were made, the Sponsor has indicated that they would likely pursue a repair of the dam to meet State of Maryland criteria although over a significantly longer period of time due to limited available

funding. Under these circumstances, the dam would remain un-repaired for a longer period of time subjecting downstream properties, people, infrastructure, and the environment to a higher risk of dam failure over an extended period of time.

Interim risk reduction measures to reduce or prevent activation of the auxiliary spillway which is susceptible to erosion and to increase flood storage to reduce the possibility of overtopping during an extreme flood event would need to be taken and may be required and enforced by the State of Maryland. These measures would likely consist of a temporary lowering of the normal pool of the reservoir until repairs could be made. Lowering the reservoir would have a significant impact on the recreational benefits of the dam and reservoir and would likely result in significant, albeit temporary loss of revenue from reservoir-based usage of Piney Run Park as well as temporary environmental impacts to the streams and wetlands located on the edges of the reservoir.

No action would be taken to address backup water supply and the Sponsor would continue to not have an available backup water supply source to Liberty Reservoir.

This alternative would involve the same measures as Alternative 1. Similarly, implementation of Alternative 1A would require mitigation for 6.5 acres of forest clearing to accommodate the dam crest raise and spillway integrity measures.

4.4.4. Alternative 2 – Dam Rehabilitation and Water Supply Infrastructure with a Normal Pool Raise of 2.3 feet

In this alternative, the dam would be modified to meet NRCS and State of Maryland criteria for Class ‘C’ high hazard potential dams. In addition, the necessary infrastructure would be installed to connect the reservoir to the County’s water supply system. The alternative would address the sediment pool allocation deficiency by raising the normal pool by 2.3 feet to EL. 525.3 feet to increase reservoir storage and restore the required sediment pool and water supply allocations lost to sedimentation.

Alternative 2 would involve the following measures:

1. Widen the auxiliary spillway by excavating the right-side slope of the spillway channel to increase capacity. At the auxiliary spillway crest, install a concrete labyrinth weir structure to prevent activation of the spillway for events equal to or less than the 1% AEP event and the PSH event and safely pass the FBH/SDF. This will require lowering the existing auxiliary spillway crest elevation and widening it slightly to accommodate the structure. Use the material generated by the excavation to raise the dam crest elevation from EL. 540.5 feet to EL. 544.5 feet. The crest raise would be accomplished by placing fill on the crest and then on the downstream slope of the embankment to maintain the existing side slopes of the embankment. In addition, the preliminary slope stability and seepage analyses indicate that the modified geometry will meet applicable factors of safety for all cases, provided both the central core zone and chimney filter of the embankment are raised to the FBH/SDF peak water surface elevation. Therefore, raising these zones of the embankment is included in this Alternative. Long-term monitoring of

embankment settlement would be required following completion of construction of the embankment raise.

2. A preliminary structural analysis shows that the existing impact basin and rate control vault would be structurally insufficient to handle the increased load from raising the grade around them. Therefore, modify the impact basin to accommodate the additional embankment fill. The rate control vault and associated conduits would be removed, and their functionality relocated to a downstream pump station.

3. To restore the sediment pool allocation, raise the principal spillway riser crest by 2.3 feet. This will involve removing and replacing the top slab and trash rack and raising the riser walls. Since the principal spillway weir crest controls the pool elevation, this will result in a 2.3-foot raise to the normal pool.

4. Due to the increased hydrostatic loading on the riser structure from the increased normal pool, the structure will have to be modified by sistering the entire length of the existing walls from the outside (an inside approach is not possible due to the limited interior dimensions of the riser). This will require extensive excavation into the upstream face of the embankment to ensure safe and stable slopes and draining of the reservoir which will significantly impact park recreational operations from both logistical and financial perspectives. Draining of the reservoir, constructing the riser modifications, and rebuilding the dam embankment, and refilling the reservoir may take two years or longer depending on precipitation in the watershed.

5. During the time the reservoir is drained, dredging of existing sediment may be performed as a way to increase sediment storage.

6. Raise the water supply intake tower by 2.5 feet. This will involve removing and replacing the existing structure on top of the tower and raising the tower walls. Because the water supply intake tower was designed for a maximum hydrostatic load of EL. 530.0 feet (seven feet above the current normal pool and 4.7 feet above the normal pool proposed by this alternative) no additional structural modifications would likely be required.

7. Install RCC along the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel. The RCC toe would sit on a secant pile cutoff wall with concrete cap and tieback anchors. Both the wall and anchors would extend into rock to an elevation at or below the expected eroded elevation of the spillway. A smaller cutoff wall and scour pad of traditional reinforced concrete would be installed at the auxiliary spillway crest to arrest any head cut that would form in the exit channel of the auxiliary spillway during activation. The top of the cutoff wall would be at the elevation of the existing auxiliary spillway crest and the bottom would be at the elevation of the top of the RCC armoring. This cutoff wall can be constructed monolithically with the labyrinth weir described above.

8. Construct a gravity transmission conduit and pump station from the existing water supply conduit running through the dam on the right bank of Piney Run, downstream of the dam.

From the pump station, construct a force main conduit along the downstream toe of the spillway, through the RCC armoring then turning north and extending to connect to the County's water supply system. The pump station would be designed to include the functionalities of the removed rate control vault.

9. Repair the downstream end of the toe drain conduits and add access manholes to improve maintenance and inspection.

10. Make minor repairs to structural components of the principal spillway riser and water supply intake tower.

11. Modify the water supply intake tower to install an automated cold water release system to maintain the health of Piney Run. This system would require an allocation of 170 acre-feet of water based on the basis of design report for the system (Michael Baker, LimnoTech, 2016) and would be taken from the volume of water currently allocated to water supply.

Implementation of Alternative 2 will require mitigation for approximately 11.9 acres of forest clearing to accommodate the dam crest raise and water supply infrastructure. The normal pool increase would also impact 6.5 acres of wetlands, approximately 850 feet of stream channel, and require minor modifications to the waterfront area of the park. Approximately 300 feet of White Rock Road would need to be modified to raise the low point of the road approximately 0.5 feet to meet County requirements for safe passage of the 4% AEP event. As a consequence of raising the pool 2.3 feet, complete the following mitigation projects:

- Provide approximately 14.3 acres of reforestation and afforestation planting.
- Complete approximately 300 linear feet of road improvements to raise the low point of White Rock Road north of the reservoir to provide nine inches of freeboard over the 4% AEP event per County criteria.
- Complete mitigation projects for 13 acres of wetlands (assuming 6.5 acres lost at a 2:1 replacement ratio) and 850 linear feet of stream restoration (assume 850 linear feet permanently impacted assuming a 1:1 restoration ratio) to compensate for those wetlands and streams permanently impacted from the normal pool increase.
- Make modifications to the Piney Run Park waterfront infrastructure including five docks, two boat ramps, one gazebo, and associated walkways to accommodate the normal pool increase and the proposed water supply pool operating limits which would range from EL. 525.3 feet to EL. 511.0 feet (maximum fluctuation of 14.3 feet).

4.4.5. Alternative 6 – Decommissioning

Under this scenario, all benefits of the dam would be lost including flood protection, recreation, and potential water supply. The dam would be decommissioned by draining the reservoir and removing the entire dam embankment and appurtenant structures to meet the state of Maryland requirement of conveying the 1% AEP event with less than three feet of depth. Approximately 20,000 linear feet of stream channel in the reservoir would be restored, and approximately 250

acres of tree planting or other land conversion of the former reservoir area would be completed. Comparative dam-in-place and dam decommissioned inundation maps as well as tabulated impacts are provided in the Appendices F and G respectively of the *Piney Run Watershed Study, Piney Run Dam Hydrologic and Hydraulic Report* (AECOM, 2020).

4.5. Summary and Comparison of Alternative Plans

Table 4-2 provides a summary and comparison of the alternative plans for Piney Run Dam. Refer to **Section 5.0**, Environmental Consequences for additional information.

Table 4-2. Piney Run Dam Summary and Comparison of Alternative Plans

Alternatives	0: NEPA No Action/FWOP	1: Repair Dam, No Water Supply	1A (FWOFI): No Current Action - Deferred Project	2: Repair Dam, Raise Pool, Add Water Supply[1]	6: Dam Decommissioning
Optimizing Criteria					
Locally Preferred		✓			
Environmentally Preferred					✓
Socially Preferred		✓			
Guiding Principles					
Healthy and Resilient Ecosystems					✓
Sustainable Economic Development		✓			
Floodplains		✓			
Public Safety					✓
Environmental Justice		✓			
Watershed Approach					✓
Ecosystem Services Evaluation					
Provisioning Services – tangible goods provided for direct human use (e.g., timber, food, fiber, water)					
4. Backup Municipal Water Supply (BRI: Portion - % of Water Supply Need Met)	54%	54%	54%	66%	0%
Regulating Services - maintains the world we live in and is regulated (e.g., flood control, erosion, water quality, crop pollination)					
3. Flood Protection (BRI: Annualized Flood Reduction Benefit)	$0	$1,000	$1,000	$0	-$158,000

5. Park Climate (BRI: Average Air Temperature in the Park)	Average air temperature would remain the same since no changes to forest cover would be made.	Average air temperature may increase temporarily since forest cover would be removed for construction of improvements. However, in the long-term reforestation would allow the forest cover to be re-established and afforestation may result increased forest cover and possibly a lower average air temperature.	Average air temperature may increase temporarily since forest cover would be removed for construction of improvements. However, in the long-term reforestation would allow the forest cover to be re-established and afforestation may result increased forest cover and possibly a lower average air temperature.	Average air temperature may increase temporarily since forest cover would be removed for construction of improvements. However, in the long-term reforestation would allow the forest cover to be re-established and afforestation may result increased forest cover and possibly a lower average air temperature.	Average air temperature would decrease as a result of land conversion of the reservoir to partially forested and partially meadowed land scape.
7. Dam Breach Flood Protection (BRI: Annualized Dam Breach Flood Reduction Benefit)	There would be no change to annualized dam breach flood damage reduction benefits	Annualized dam breach flood damage reduction benefits would go up as a result of modification to reduce the risk of failure.	Annualized dam breach flood damage reduction benefits would go up as a result of modification to reduce the risk of failure. However, these benefits would take longer to realize than under other alternatives since the project would have a delayed implementation schedule leaving the risk of failure higher for a longer period of time.	Annualized dam breach flood damage reduction benefits would go up as a result of modification to reduce the risk of failure.	Annualized dam breach flood damage reduction benefits would go up as a result of decommissioning of the dam which would eliminate its risk of failure.
Cultural Services – makes the world a place people want to live (e.g., recreation, spiritual, aesthetics)					

1. Water-Oriented Recreation (BRI: Average Annual Water Recreation Visitors)	22,046	22,046	22,046 (temporarily 0 if reservoir were lowered)	22,046	0
2. Wildlife Watching (BRI: Population of Visible Native Wildlife in Wetlands)	Population in wetland areas would decrease if wetland areas were reduced by sedimentation.	Population in wetland areas would remain the same.	Population in wetland areas would remain the same.	Population in wetland areas would decrease as naturally created wetlands are destroyed by raise of normal pool. However, population could increase (rebound) later as new wetland areas are created adjacent to the new reservoir limits.	Population in wetland areas would increase from large amounts of newly created wetlands installed as part of reservoir bed restoration.
6. Recreational Stream Fishing (BRI: Trout Population in Piney Run Downstream of Dam)	Trout population would go down if stream temperature regulation would not be implemented.	Trout population would go up as stream temperature regulation measures would be installed and operated.	Trout population would go up as stream temperature regulation measures would be installed and operated but not as fast as other alternatives since implementation would be delayed.	Trout population would go up as stream temperature regulation measures would be installed and operated.	Trout population would go up more than other alternatives because stream temperature would not be impacted by a reservoir and the reach downstream of the dam would be reconnected to the reach upstream of the dam offering more spawning grounds for trout.
Economic Analysis					
Costs					
Net Project Investment					
Federal PL-83-566	$0	$7,229,850	$7,229,850	$15,615,000	$17,402,500
Other Federal	$0	$0	$0	$0	$0
Matching	$0	$4,070,150	$4,070,150	$9,385,000	$9.797,500
Total	$0	$11,300,000	$11,300,000	$25,000,000	$27,200,000
Annual[2] Project Investment	$0	$313,000	$250,000	$691,000	$752,000

Net Annual O&M[3]					
Federal PL-83-566	$0	$0	$0	$0	$0
Other Federal	$0	$0	$0	$0	$0
Matching	$0	$0	$0	$40,000	($22,000)
Total Annual O&M	$0	$0	$0	$40,000	($22,000)
Total Annual Costs	$0	$313,000	$250,000	$731,000	$730,000
Benefits					
Flood Damage Reduction	$0	$30,000	$30,000	$29,000	($128,000)
Recreation Benefit	$0	$0	($173,000)	($92,000)	($725,000)
Total Annual Benefits	$0	$30,000	($143,000)	($63,000)	($853,000)
Evaluation					
Benefit-Cost Ratio	0.0	0.1	(0.6)	(0.1)	(1.2)
Net Benefit	$0	($283,000)	($393,000)	($794,000)	($1,583,000)

Notes:
[1] There would be $40 million in additional infrastructure costs to connect the water supply system to a water treatment plant, which would be the responsibility of the Sponsor and is not eligible for cost share. This cost was not incorporated into the overall economic analysis.
[2] 2022 price level, 103-year period of analysis, and 2.5% discount rate.
[3] "O&M" stands for Operation and Maintenance".

5.0 ENVIRONMENTAL CONSEQUENCES

Alternative plans of action can result in a multitude of effects on resources upstream and downstream of Piney Run Dam. This section describes anticipated effects on resource concerns identified by the Sponsors, the public, and agency personnel in the Scoping meeting and the public meetings.

For the purpose of the following discussions, project areas within the affected environment are defined below.

1. Limit of disturbance (LOD) – The maximum extent that could potentially be temporarily disturbed during construction to accommodate for borrow areas, equipment staging, construction.

2. Normal pool – This term refers to the acreage of the normal pool area directly upstream from the Piney Run Dam.

5.1. Land Use and Recreation

A land use and recreation impact would be significant if it would 1) be incompatible with an adjacent or nearby land use; 2) be substantially inconsistent or non-compliant with applicable land use plans or policies; or 3) substantially interfere with existing recreational uses of nearby areas.

5.1.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative, the Piney Run Dam would not be repaired. Land uses on and in the vicinity of the Study Area would remain under existing conditions. Therefore, the No Action Alternative would have *no impact* on land use and recreation.

Cultural Service: Water-Oriented Recreation (Service 1): The ecosystem service of water-oriented recreation would not be affected since no action would be taken.

5.1.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Land Use: Alternative 1 would require temporary ground disturbance within the LOD to facilitate modification of the dam. The LOD is located entirely within land owned by the Piney Run Park and designated for conservation. Ground disturbance during construction would be limited to areas on or directly adjacent to the dam and spillway to the extent practicable and all impacts would cease once construction is complete. Alternative 1 would not permanently alter the land use in or adjacent to the LOD or require any changes to zoning or land use designations. Furthermore, the Carroll County Department of Planning in a letter dated May 18, 2022, and expressed that the alternative would be consistent with the 2014 Carroll County Master Plan, the 2018 Freedom Community Comprehensive Plan, and the 2019 Water and Sewer Master Plan

Triennial Update (**Appendix E**). Therefore, Alternative 1 would have *short-term, less than significant adverse impacts* and *no long-term impacts* to land use.

Public Recreation, Parkland, and Scenic Beauty: Alternative 1 would be implemented entirely within Piney Run Park property. However, the LOD contains no recreational facilities and would not result in the permeant conversation of public outdoor recreational lands to non-recreational purposes. A small portion (less than 0.1 mile) of the Piney Run Park hiking trail occurs in the northeast portion of the LOD and would be closed off during construction. The Piney Run Park trail dead ends at the grassy clearing immediately surrounding the dam and most of the trail would remain open for recreation throughout implementation of Alternative 1. Once dam modifications are complete, the full hiking trail would be reopened for public use. Additionally, views of the LOD from highly trafficked park areas are generally restricted by topography and mature forest and would only occasionally impact the scenic beauty of the area. Therefore, Alternative 1 would have *short-term, less than significant impacts* to public recreation, parkland, and scenic beauty. Once dam modifications are complete, the area would be returned to public recreational use and dam modifications would not noticeably alter the scenic beauty of the area. Therefore, there would be *no long-term impacts* to public recreation, parkland, and scenic beauty under Alternative 1.

Wild and Scenic Rivers: Alternative 1 would have *no short- or -long-term effects* on the listed segment of the South Branch of the Patapsco River. This segment occurs approximately 2 miles downstream of the Piney Run dam, and construction would not noticeably impact this segment's use as a recreational fishery.

Cultural Service: Water-Oriented Recreation (Service 1): The ecosystem service of water-oriented recreation would not be affected since the normal pool elevation, or surface would not change during or after construction of Alternative 1 and therefore, the number of average annual user days for water-oriented recreation is anticipated to remain at pre-project levels.

5.1.3. Alternative 1A – Future without Federal Investment

Land Use: Land Use impacts under Alternative 1A would be identical to those described for Alternative 1.

Public Recreation, Parkland, and Scenic Beauty: Alternative 1A would have similar impacts to public recreation, parkland, and scenic beauty to those described for Alternative 1. However, implementation of Alternative 1A would also require the Piney Run Reservoir to be temporarily lowered as a risk reduction measure until the dam could be rehabilitated. Lowering the reservoir would substantially limit public recreation supported by the reservoir (e.g., fishing, swimming, and boating), as well as the scenic beauty of the area. This would result in *significant short-term impacts* to public recreation, parklands, and scenic beauty. This impact would however be temporary, and the reservoir would be returned to its pre-project levels once dam modifications are complete, resulting in *no long-term impacts* to public recreation, parkland, and scenic beauty.

Wild and Scenic Rivers: Alternative 1A would have *no short- or -long-term effects* on the listed segment of the South Branch of the Patapsco River. This alternative would involve lowering the

Piney Run Reservoir by discharging to Piney Run, which feeds into the South Branch of the Patapsco River. However, water would be discharged at a rate that would not impact the recreational and fishery uses of the segment, which occurs approximately two miles downstream of the Piney Run dam.

Cultural Service: Water-Oriented Recreation (Service 1): The ecosystem service of water-oriented recreation would be adversely affected since the normal pool may be lowered during the period prior to when the project construction commences as a dam safety risk-reduction measure. After construction of Alternative 1A, the number of average annual user days for water-oriented recreation is expected to return to pre-project levels.

5.1.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Land Use: Alternative 2 would result in land use impacts identical to those described for Alternatives 1 and 1A. In addition, Alternative 2 would also require raising the Piney Run Reservoir by 2.3 feet, which would impact approximately 0.1 acre of private property. However, lands abutting the reservoir are governed by flowage easements, which give the easement grantee rights to overflow, flood, or submerge the land. As such, Alternative 2 would not be substantially incompatible with adjacent land uses. Therefore, Alternative 2 would have *short- and long-term less-than-significant impacts* on land use.

Public Recreation, Parkland, and Scenic Beauty: Under Alternative 2, the LOD would be disturbed in a similar manner as described for Alternatives 1 and 1A. However, the dam would be modified to raise the normal pool of the reservoir by 2.3-feet, which would require substantial modifications to the dam when compared to Alternatives 1 and 1A. This would require draining the reservoir to facilitate extensive modifications to the dam. Current recreational opportunities are centered around water-related activities, such as fishing and boating. The reservoir also provides scenic appeal to picnickers and hikers. These activities would no longer be feasible or desirable if the reservoir is drained. Impacts would be long term as refilling the reservoir may take two years or longer. Further, rebuilding a robust fishery would be both a time- and cost-intensive endeavor, as the fishery would need to contain both forage and predator species, contain species of high and low value from a fishing perspective (thereby appealing to the public), and support a healthy population that can sustain recreational fishing.

Under this alternative, recreational infrastructure (five docks, two ramps, and one gazebo) would need to be modified due to the normal pool elevation being raised. Thus, recreational access would be temporarily impacted while these structures are modified. In addition, the use and access of these recreational features could experience additional long-term impacts from fluctuations in the normal pool elevation when the reservoir is drawn down for water supply; however, these impacts would be temporary and their duration dependent on the amount of fluctuation and time needed for it to be replenished by the watershed. To minimize impacts from pool fluctuations, the docks would be retrofitted to accommodate pool fluctuations, and the boat ramps would be lengthened to extend to the minimum expected normal pool level. However, significant impacts on recreation could occur during the occasional drought periods, which could lower the minimum pool level beyond normal conditions, preventing use and access to

recreational access points. As such, Alternative 2 would result in *potentially significant short- and long-term impacts* to public recreation, parkland, and scenic beauty.

Wild and Scenic Rivers: Impacts under Alternative 2 would be similar to those described for Alternative 1A. While this alternative would involve lowering the Piney Run Reservoir by discharging to Piney Run, water would be discharged at a rate that would not impact the recreational and fishery uses of the listed segment of the South Branch of the Patapsco River. Therefore, Alternative 2 would have no short- or long-term impacts on the listed segment of the South Branch of the Patapsco River.

Cultural Service: Water-Oriented Recreation (Service 1): The ecosystem service of water-oriented recreation would be adversely affected since the normal pool would be lowered during construction. After construction of Alternative 2, the number of average annual user days for water-oriented recreation is expected to return to pre-project levels.

5.1.5. Alternative 6 – Dam Decommissioning

Land Use: Alternative 6 would require temporary ground disturbance within the LOD to facilitate removal of both the dam and conversion of the reservoir bed to a different land use. The LOD is located entirely within land owned by the Piney Run Park and designated for conservation. Ground disturbance during construction would cover areas on or directly adjacent to the dam, spillway, and reservoir. Alternative 6 would result in significant changes to the land use in the area of the reservoir and dam, as the dam would be removed, and the reservoir drained. This alternative proposes to convert the land to forest and meadow land covers, which would be consistent with the land uses of the adjacent lands in Piney Run Park. Conversion to these land uses and restoration of the stream channels connecting Piney Run from upstream of the reservoir to downstream of the dam would result in connection of wildlife habitats and expansion of natural ecosystems that currently exist along the edges of the reservoir. Therefore, Alternative 6 would have *short-term adverse*, and *long-term significant, but beneficial impacts* to land use.

Public Recreation, Parkland, and Scenic Beauty: Alternative 6 would be implemented entirely within Piney Run Park property and would result in significant changes to the major features of the park and the recreation opportunities offered. Draining the reservoir would significantly alter the viewsheds within the park and water-oriented recreational opportunities would be limited to those that could be performed in a stream channel such as fly fishing. The existing park waterfront would cease to exist as the docks and boat ramps would not connect to a large body of water. Therefore, Alternative 6 would have *short-term* and *long-term, significant impacts* to public recreation, parkland, and scenic beauty.

Wild and Scenic Rivers: Impacts under Alternative 6 would be similar to those described for Alternative 1A and 2. While this alternative would involve draining the Piney Run Reservoir by discharging to Piney Run, water would be discharged at a rate that would not impact the recreational and fishery uses of the listed segment of the South Branch of the Patapsco River. Therefore, Alternative 6 would have *no short- or long-term impacts* on the listed segment of the South Branch of the Patapsco River.

Cultural Service: Water-Oriented Recreation (Service 1): The ecosystem service of water-oriented recreation would be adversely affected since the reservoir would be drained permanently. Therefore, the number of average annual user days for water-oriented recreation is expected to be zero.

5.2. Geological Resources

An earth resources impact would be significant if it would 1) expose people or structures to major geological hazards; 2) substantially increase potential occurrences of erosion or sedimentation; or 3) violate the FPPA.

5.2.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative, no dam modifications would be implemented, and the dam would remain under existing conditions. Therefore, the No Action Alternative would have *no impacts* to geological resources in the Study Area.

5.2.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Geology: During construction, excavation would be required to widen the auxiliary spillway channel to increase the spillway's capacity. Excavation would be required up to approximately 25 feet below current grade to facilitate dam modifications, specifically installation of the cutoff wall for the RCC armoring. Bedrock is anticipated to be encountered when installing the RCC. As such, minor localized impacts to geologic conditions would be expected. While these impacts would permanently alter the geology at the LOD, impacts would affect only a small area within the Study Area. Further no geologic hazards are apparent in the Study Area and the area is at low risk for seismic events (Section 3.19.6). Therefore, geologic impacts under Alternative 1 would be *long-term* and *less-than-significant*.

Topography: As discussed in Section 4.4.1, Alternative 1 would involve raising the dam crest by 4.5 feet. Materials excavated to widen the spillway would be used to raise the dam crest and bring it to final grade. Overall, changes to topography from dam modifications would result in slight permanent alterations to topography in the LOD. However, the layout of the site has been designed to minimize these changes to the extent practicable. Further, all graded slopes would be designed and constructed in a manner that would minimize potential future erosion, including through revegetation. Any changes to surface drainage would not be substantial and would be minimized to the extent practical; as noted in Section 5.3, the Alternative 1 would maintain/restore pre-development hydrology in compliance with Section 438 of the Energy Independence and Security Act (EISA). Therefore, *long-term, less-than-significant adverse impacts* to topography would result from construction of the Alternative 1.

Soils: Construction of Alternative 1 would remove vegetation cover, disturb the soil surface, and compact the soil throughout the LOD. These minor soil impacts would be associated primarily with the operation of standard heavy construction equipment and the clearing of 6.5 acres of forest. In compliance with NPDES, the Sponsor would obtain coverage under MDE's General Permit for Stormwater Associated with Construction Activity. This would require preparation of

a site-specific Erosion and Sediment Control Plan (ESCP), which would contain site-specific BMPs for erosion and sediment control, soil compaction concerns, and stormwater management. Construction crews would adhere to best management practices (BMPs) outlined in the ESCP, and the erosion and sediment controls would be implemented prior to land-disturbing activities and maintained in good working order for the duration of construction.

Overall, disturbed areas would be quickly re-vegetated in accordance with the CGP to minimize the potential for construction-related erosion. Therefore, Alternative 1 would have *short-term, less-than-significant adverse impacts* to soils in the LOD. Dam modifications under Alternative 1 would include the installation of permanent erosion control measures along the spillway and exit channel which would serve to control long-term sedimentation downstream of the dam. Therefore, Alternative 1 would have *long-term, beneficial impacts* to soils in the Study Area.

Prime Farmland: As discussed in Section 3.4.5, soils designated as prime farmland and farmland of statewide importance are present in the Study Area. As such, construction would disrupt prime farmland soils. However, the LOD is part of the Piney Run Park property, designated for conservation use, and not actively farmed. Once construction is complete, *long-term beneficial impacts* to prime farmland would result as prime farmland areas downstream from the dam would incur a higher level of flood protection.

5.2.3. Alternative 1A – Future without Federal Investment

Geological resource impacts under Alternative 1A would be identical to those described for Alternative 1.

5.2.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Geology and Topography: Impacts to geology and topography under Alternative 2 would be similar to those described for Alternatives 1 and 1A.

Soils: Soil impacts for Alternative 2 would also be similar to those for Alternatives 1 and 1A, except that Alternative 2 would also include raising the normal pool of the reservoir would require modifications to the park's waterfront infrastructure as well as road improvements along approximately 300 feet of White Rock Road, which would increase the amount of ground disturbance when compared to the Alternatives 1 and 1A. If dredging of the reservoir were performed as part of Alternative 2, dredge spoils would need to be tested and properly disposed of in accordance with the findings of the testing as well as local, state, and federal laws and regulations. However, construction of Alternative 2 would not substantially increase erosion and sedimentation. Therefore, Alternative 2 would have a *short-term, less-than-significant* impact on soils.

Prime Farmland: Alternative 2 would require raising the normal pool of the reservoir, which would inundate areas considered to be prime farmland under the FPPA, resulting in a *long-term, less-than-significant impact* to prime farmland.

5.2.5. Alternative 6 – Dam Decommissioning

Geology and Topography: Impacts to geology and topography under Alternative 6 would include significant excavation and removal of the earth embankment, approximately 75 feet high at the dam site and deposition of that material throughout the reservoir bed as well as grading of the reservoir bed to facilitate land use conversion from a reservoir to forest and meadow uses and to complete restoration of stream channels through the reservoir. However, because there are no geologic hazards are apparent in the Study Area and the area is at low risk for seismic events (Section 3.19.6), Alternative 6 would have *short- and long-term less-than-significant impacts* on geology and topography.

Soils: Alternative 6 would result in more ground disturbance than any other alternative and draining the reservoir would expose a large area of bare soil that would require rapid stabilization to prevent erosion during construction. Alternative 6 would require similar protocols for erosion and sediment control as described in Alternative 1. Alternative 6 may also allow increased conveyance of sediment through the stream system during large flood events since the reservoir would not be available to trap sediment as it currently does. This would be mitigated by the restoration of stable stream channels throughout the stream system within the reservoir bed area. Therefore, Alternative 6 would have *short- and long-term less-than-significant impacts* to soils.

Prime Farmland: Alternative 6 would include draining the reservoir and removing the dam, which would allow for some areas considered to be prime farmland under the FPPA to be restored, particularly in and around the dam footprint. Therefore, there would be a *long-term, less-than-significant impact* to prime farmland.

5.3. Water Resources

A water resources impact would be significant if it would 1) substantially reduce water availability or interfere with the water supply to existing users; 2) substantially adversely affect surface or groundwater quality; 3) degrade unique hydrologic characteristics; or 4) violate established water resources laws or regulations.

5.3.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative, existing conditions at the Piney Run Dam would continue for the foreseeable future. Therefore, *no impact* to water resources would result from implementation of the No Action Alternative.

Cultural Service: Wildlife Watching (Service 2): The ecosystem service of wildlife watching is not expected to be affected because no action would be taken.

Regulating Service: Flood Protection (Service 3): The ecosystem service of flood protection is not expected to be affected for events less than or equal to the 1% AEP event because no action would be taken.

Provisioning Service: Backup Municipal Water Supply (Service 4): The ecosystem service of backup municipal water supply is not expected to be affected because no action would be taken.

5.3.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Surface Water: Under Alternative 1, modifications to the dam outlet would have approximately 60 linear feet of direct stream impacts to Piney Run. No impacts to the unnamed tributary downstream of the spillway are anticipated. Excavation, soil stockpiling, and grading activities to facilitate the dam modifications may temporarily increase erosion and sedimentation in the Piney Run drainage basin. A site visit was conducted on August 30, 2022 by representatives from Carroll County, MDE, and USACE, in which USACE stated that the project would likely be eligible for CWA Section 404 permitting under the existing state programmatic general permit. This was confirmed by correspondence from MDE received May 24, 2024 which confirmed the project is considered a Category A project which can be granted federal approval without review by the USACE under the Maryland State Programmatic General Permit-6. In addition, the Sponsor would obtain coverage under the current USEPA stormwater CGP and develop a project-specific ESCP, which would identify erosion controls and BMPs to manage stormwater discharges. The site would also be designed in compliance with Section 438 of the EISA to restore the pre-development hydrology of the site to the maximum extent technically feasible. Therefore, construction under Alternative 1 would have *short-term, less-than-significant adverse impacts* on surface waters and wetlands. Impacts would be minimized to the extent practicable through adherence to the CGP and the ESCP. No mitigation for surface water impacts under Alternative 1 would be required per correspondence with MDE.

In the long-term, implementation of Alternative 1 would result in installation of permeant erosion control measures along the exit channel would minimize the potential for future erosion and sedimentation in Piney Run. Therefore, there would be *long-term beneficial impacts* to surface waters under Alternative 1.

Wetlands: Under Alternative 1, no direct impacts to wetlands are anticipated. Wetlands near the LOD could be indirectly impacted by increased erosion and sedimentation during construction; however, these impacts would be temporary and would be minimized through adherence to the CGP and the ESCP. The Sponsors would obtain all necessary permits from USACE prior to starting construction. During the site visit on August 30, 2022, MDE stated that if anticipated wetland impacts hold up after a detailed delineation is completed, then Alternative 1 would not require authorization through the MDE non-tidal wetlands division. The wetlands delineation completed in September 2023 confirmed no impacts based on the delineated location of wetlands and MDE confirmed this in their response letter received May 24, 2024. Therefore, Alternative 1

would have a *short-term, less-than-significant adverse impacts* on wetlands. No mitigation for wetland impacts under Alternative 1 would be required per correspondence with MDE.

Cultural Service: Wildlife Watching (Service 2): The ecosystem service of wildlife watching is not expected to be affected because the normal pool of the reservoir is not expected to be altered during construction and therefore, wetland habitat is not expected to change. Therefore, the population of visible wildlife in wetland habitat is not expected to change.

Water Quality: Implementation of Alternative 1 would have no effect on water quality within the Piney Run Reservoir, as construction would be limited to the dam and areas immediately downstream. Piney Run downstream of the dam is listed as impaired due to temperature exceedance. As discussed above, ground disturbance during construction would increase the potential for erosion and sedimentation in the Study Area. However, none of the streams in the Study Area are listed as impaired due to sediment loads. Construction of the dam modifications is not anticipated to affect the temperature of Piney Run. Therefore, construction of Alternative 1 would have *no effect* on impaired streams in the Study Area. Once dam modifications are complete, the automated cold water release system that would be installed during dam modifications would have a *beneficial impact* on Piney Run downstream of the dam.

Floodplains: Construction of Alternative 1 would encroach on a 100-year floodplain; and includes modification of the impact basin as well as filling (on the downstream slope of the dam) in the floodplain. As such, detailed floodplain maps showing the effects of the Alternative 1 on the boundary of the floodplain would be developed in compliance with 7 CFR 650.25. Implementation of Alternative 1 would not change water levels in the Piney Run Reservoir or in Piney Run downstream and would comply with applicable floodplain regulations. Therefore, Alternative 1 would have *long-term, less-than-significant adverse impacts* on floodplains in the Study Area.

Regulating Service: Flood Protection (Service 3): The ecosystem service of flood protection is not expected to be affected for events less than or equal to the 1% AEP event since the dam's flood control capability is not proposed to be altered for those events. Therefore, the annualized flood damage reduction benefits would not change.

Groundwater: Construction of Alternative 1 would not be anticipated to intersect groundwater (e.g., through deep excavation), involve groundwater withdrawals, or intentionally release or inject materials into groundwater resources and aquifers. The 13 monitoring/observation wells related to the Piney Run Dam would be protected in-place and modified as necessary to accommodate changes in grade, if needed. Potential impacts to groundwater may still occur, however, from the accidental spill or release of petroleum products or other liquids used during construction activities. With implementation of BMPs, such as performing routine inspections of equipment, maintaining spill-containment materials on-site, and adhering to site-specific hazardous and toxic materials and waste (HTMW) plans, the potential for impacts to groundwater would be minimized, resulting in *short-term, less-than-significant adverse* impacts

to groundwater in the Study Area. Once construction of Alternative 1 is complete, there would be *no long-term or ongoing impacts* to groundwater.

Regional Water Resource Plans: As discussed in Section 5.1, the Carroll County Department of Planning, in a letter dated May 18, 2022, expressed that the alternative would be consistent with the 2014 Carroll County Master Plan, the 2018 Freedom Community Comprehensive Plan, and the 2019 Water and Sewer Master Plan Triennial Update (Section 6.3). Therefore, Alternative 1 would be compatible with and would have *no impact* on regional water resource plans.

Provisioning Service: Backup Municipal Water Supply (Service 4): The ecosystem service of backup municipal water supply is expected to be reduced by Alternative 1. The portion of the reservoir volume allocated to water supply would be reduced because of additional anticipated required sediment storage as well as an additional allocation of water for the automated cold water release system. Therefore, the reduced volume allocated for water supply would reduce the portion of the currently projected unmet water supply need if the Sponsor's current source of water were to be taken offline.

Riparian Areas: Alternative 1 would not create or destroy any riparian areas in the Study Area. Impacts to riparian areas resulting from Alternative 1 would be identical to those described above for surface water, wetlands, and water quality, resulting in *short-term, less-than-significant impacts* and *long-term beneficial impacts*.

5.3.3. Alternative 1A – Future without Federal Investment

Water resource impacts under Alternative 1A would be similar to those described above for Alternative 1. However, temporarily lowering the Piney Run Reservoir would incur short-term impacts on wetlands and riparian areas bordering the reservoir, as these areas would be temporarily drained. As with Alternative 1, Sponsors would coordinate with USACE and obtain all necessary permits prior to starting construction or modifying water levels in the reservoir. These impacts would be greater than those under Alternative 1 because of the more significant temporary upstream impacts. Therefore, short-term impacts under Alternative 1A would be greater than those described under Alternative 1 but would still be at less-than-significant levels. Once dam modifications are complete, the long-term water resource impacts would be identical to those described for Alternative 1.

Cultural Service: Wildlife Watching (Service 2): The ecosystem service of wildlife watching is expected to be adversely affected since the normal pool may be lowered during the period prior to when the project construction commences as a dam safety risk-reduction measure. After construction of Alternative 1A, the population of visible wildlife in wetland habitat is expected to return to pre-project levels.

Regulating Service: Flood Protection (Service 3): The ecosystem service of flood protection is not expected to be adversely affected for events less than or equal to the 1% AEP event. If the reservoir is lowered as a dam safety risk reduction measure, flood protection may be improved since additional flood storage capacity would result from lowering the reservoir. Therefore, the

annualized flood damage reduction benefits may increase in the short term while the pool is lowered but remain the same in the long term since no changes to the flood control capability of the dam are proposed.

Provisioning Service: Backup Municipal Water Supply (Service 4): The ecosystem service of backup municipal water supply is expected to be reduced by Alternative 1A. The portion of the reservoir volume allocated to water supply would be reduced because of additional anticipated required sediment storage as well as an additional allocation of the automated cold water release system. Therefore, the reduced volume allocated for water supply would in turn, reduce the portion of the currently projected unmet water supply need if the Sponsor's current source of water were to be taken offline.

5.3.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Water resource impacts under Alternative 2 would be identical to those described above for Alternative 1, with additional impacts resulting from raising the normal pool of the reservoir. The proposed 2.3-foot raise in the normal pool level would increase the reservoir footprint by 5 acres, which would cause a permanent encroachment into the 1% AEP floodplain. Additionally, raising the pool is anticipated to result in permanent impacts to approximately 6.5 acres of wetlands and 850 linear feet of stream channels, predominately along tributaries that discharge into the reservoir upstream of the dam. This would result in *potentially significant short- and long-term adverse impacts* on surface water, wetlands, and riparian areas under Alternative 2.

Overall, Alternative 2 would have much greater impacts on the surrounding water resources than Alternative 1 as a consequence of raising the normal pool level by 2.3 feet. However, implementation of Alternative 2 would adhere to applicable water resource laws and regulations and would not substantially reduce water availability or quality or degrade unique hydrologic characteristics. Therefore, significant adverse impacts are not anticipated to occur on groundwater or stormwater resources.

For permit compliance, Sponsors would complete additional formal delineation of Waters of the US for impacted areas upstream of the dam following USACE methods and coordinate with USACE to obtain all necessary permits prior to starting construction or modifying water levels in the reservoir. Alternative 2 is anticipated to require 850 LF of stream mitigation at a minimum of 1:1 restoration ratio. The County would need to complete mitigation projects to accommodate the approximately 6.5 acres of wetland impacts (assuming mitigation at a 2:1 replacement ratio for forested/scrub-shrub wetlands; 1:1 replacement ratio for emergent wetlands). All necessary Section 401/404 permits would be obtained prior to construction of Alternative 2. From a floodplain perspective, Alternative 2 would require raising the floodplain elevation upstream of the dam within the general reservoir area and therefore, expanding the floodplain limits due to the increased floodplain elevation from the reservoir raise. This would require Conditional Letter of Map Revision from FEMA prior to starting construction and a Letter of Map Revision from FEMA once construction is complete. BMPs such as those described under Alternative 1 in addition to maintaining existing stream flow and hydrologic function of the stream would minimize impacts on water resources to the extent practicable. Construction activities would

comply with the applicable provisions of the CWA, Section 438 of the EISA, and EO 13508 to control and manage erosion and minimize discharge. Further, the County must adhere to EO 11990, Protection of Wetlands, and EO 11988, Floodplain Management, if wetlands and floodplains would be impacted. A Notice of Intent of potential wetland and floodplain impacts, in addition to a Finding of No Practicable Alternative would be required.

Cultural Service: Wildlife Watching (Service 2): The ecosystem service of wildlife watching is expected to be adversely affected since the normal pool would be lowered during construction. After construction of Alternative 2, the ecosystem service would continue to be adversely affected by the 2.3 foot increase which would flood existing wetlands reducing the wetland habitat area. Therefore, the population of visible wildlife in wetland habitat is expected to be reduced until wetland areas on the fringes of the new reservoir normal pool establish themselves.

Regulating Service: Flood Protection (Service 3): The ecosystem service of flood protection is expected to be adversely affected for events less than or equal to the 1% AEP event due to proposed changes in the flood control capability of the dam. Based on the changes, the magnitude of the releases from the dam during events up to and including the 1% AEP event are estimated to be slightly larger and therefore may impact a larger population compared with Alternatives 0, 1, and 1A. Therefore, the annualized flood reduction benefits would decrease slightly due to the minor effects of the changes to the flood control capability of the dam.

Provisioning Service: Backup Municipal Water Supply (Service 4): The ecosystem service of backup municipal water supply is expected to be reduced by Alternative 2 but not as much as it would be Alternatives 1 or 1A. The portion of the reservoir volume allocated to water supply would be reduced because of additional anticipated required sediment storage as well as an additional allocation of water for the automated cold water release system but would be offset by raising the normal pool by 2.3 feet to gain additional storage for use as backup water supply. Therefore, the reduced volume allocated for water supply would in turn, reduce the portion of the currently projected unmet water supply need if the Sponsor's current source of water were to be taken offline. However, this portion would be higher than for Alternatives 1 and 1A.

5.3.5. Alternative 6 – Dam Decommissioning

Surface Water: Alternative 6 would involve draining the reservoir and re-connecting and restoring the stream channels within the reservoir bed. The stream restoration would result in connecting the reach of Piney Run downstream of the dam with its tributaries upstream of the dam resulting in a more connected stream system and aquatic habitat. The result of implementation of Alternative 6 would a net increase in the length of stream in the area. In the short-term, construction could cause inadvertent discharges of sediment into surface waters which would cause adverse effects. This would be mitigated by the implementation of an erosion and sediment control plan including provisions for care of water during construction. Therefore, Alternative 6 would have *short-term less-than-significant impacts* and *long-term beneficial impacts* to surface water.

Wetlands: Alternative 6 would involve draining reservoir-adjacent wetlands temporarily as the reservoir is drained as part of the decommissioning of the dam. However, these wetlands would

be restored, and additional wetland areas added as a result of the land conversion of the reservoir bed. These wetlands would be located adjacent to restored stream channels to provide a suitable water source. The result of implementing Alternative 6 would be a net increase in the surface area of wetlands in the area. Therefore, implementation of Alternative 6 would have *short-term significant adverse impacts* on wetlands but *long-term less-than-significant impacts* on wetlands.

Cultural Service: Wildlife Watching (Service 2): The ecosystem service of wildlife watching is expected to experience short-term significant adverse impacts since the normal pool would be drained. However, Alternative 6 would include stream channel restoration and reconnection with the stream channel downstream of the dam as well as creation of additional stream-related aquatic habitat which should result in long-term significant beneficial impacts on wildlife watching as the new habitat supports additional wildlife. Therefore, the population of visible wildlife in wetland habitat is expected to be reduced until the restoration is complete and wildlife return to the area at which point it is expected to increase to be greater than pre-construction conditions.

Water Quality: Water quality under Alternative 6 would include moderation of stream temperature as baseflows are conveyed directly through the decommissioned reservoir without storage meaning that the temperature of the water would likely not increase as a result of storage in the reservoir. Sediment conveyance that would not be as restricted without the reservoir's sediment rapping capability may result in increases to suspended solids in the stream as more sediment is conveyed downstream. If this occurred, it would adversely impact water quality. Overall, Alternative 6 would result in *long-term beneficial impacts* to water quality.

Floodplains: Under Alternative 6, the floodplain elevation upstream of the dam would be lowered since the reservoir would be drained and the limits of the floodplain decreased. Downstream of the dam under Alternative 6, the floodplain elevation would increase due to removal of the flood attenuation capability of the dam and the limits of the floodplain would increase as well resulting in potentially more impacts. However, structures would either be acquired or floodproofed to mitigate the risks of increased flooding under Alternative 6. Alternative 6 would therefore have *significant long-term impacts* to floodplains.

Regulating Service: Flood Protection (Service 3): The ecosystem service of flood protection is expected to be adversely affected due to removal of the dam and its flood control capability. Therefore, the annualized flood reduction benefits from flooding would decrease due to the effects of removing the dam.

Groundwater: Construction of Alternative 6 would not be anticipated to intersect groundwater (e.g., through deep excavation), involve groundwater withdrawals, or intentionally release or inject materials into groundwater resources and aquifers. The 13 monitoring/observation wells related to the Piney Run Dam would be removed as part of the decommissioning work. Potential impacts to groundwater may still occur, however, from the accidental spill or release of petroleum products or other liquids used during construction activities. As with Alternative 1, mitigation plans and BMPs would be implemented to minimize the potential for impacts to groundwater, resulting in *short-term, less-than-significant adverse* impacts to groundwater in the

Study Area. Once construction of Alternative 6 is complete, there would be *no long-term or ongoing impacts* to groundwater.

Regional Water Resource Plans: The previously referenced regional water resource plans all assume that Piney Run reservoir would remain and would still provide a possible backup source of municipal raw water supply. However, if Alternative 6 were implemented, the reservoir would cease to exist as a backup water supply option. Therefore, this alternative would not be compatible with and would have *significant adverse long-term impacts* on regional water resource plans.

Provisioning Service: Backup Municipal Water Supply (Service 4): The ecosystem service of backup municipal water supply would be eliminated by Alternative 6 since the dam would be decommissioned. Therefore, none of the currently projected unmet water supply need would be met in the event the Sponsor's current source of water were to be taken offline.

Riparian Areas: Alternative 6 would create additional riparian area within the Study Area, specifically along the newly created stream channels in the former reservoir bed. Impacts to existing riparian areas resulting from Alternative 6 would be similar to those for Alternative 1 and mitigated with stream restoration efforts as part of the alternative implementation resulting in *short-term, less-than-significant impacts* and *long-term beneficial impacts*.

5.4. Biological Resources

A biological resources impact would be significant if it would 1) substantially reduce regionally or locally important habitat; 2) substantially diminish a regionally or locally important plant or animal species; or 3) adversely affect recovery of a federally or state-protected species.

5.4.1. Alternative 0 – NEPA No Action/Future without Project

Under the No Action Alternative, modifications to the Piney Run Dam would not be implemented, and there would be *no impact* to biological resources in the Study Area.

Regulating Service: Park Climate (Service 5): The ecosystem service of park climate as measured by the average air temperature in the park is not expected to change because no action would be taken.

Cultural Service: Recreational Stream Fishing (Service 6): The ecosystem service of recreational stream fishing as measured by the population of trout in Piney Run downstream of the dam is not expected to change because no action would be taken.

5.4.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Vegetation: The Sponsor's assume that the entire LOD would be cleared during construction, which would include 6.5 acres of forest clearing. In accordance with the Maryland Forest Conservation Act (MFCA), a Forest Conservation Plan (FCP) and Planting Plan would be created and enacted for Alternative 1. Forest areas identified as retention, reforestation, or

afforestation areas in the FCP would be placed under a long-term protection agreement (e.g., a conservation easement or similar framework). Mitigation would be required for approximately 6.5 acres of forest clearing to accommodate the dam crest raise and spillway integrity measures. While tree clearing would be limited to the extent needed and temporary cleared areas would be re-seeded with vegetation, mitigation would be required for permanent forest clearing impacts. Overall, Alternative 1 would have *short- and long-term less-than-significant impacts on vegetation*.

Regulating Service: Park Climate (Service 5): Overall, Alternative 1 would have *short-term adverse impacts* on park climate as measured by the average air temperature in the park as forest cover is removed to facilitate construction of the alternative. However, Alternative 1 would have *no impact* as the areas where the forest is cleared are reforested either in place or in other nearby areas. In addition, there would be some afforestation required to comply with the MFCA which would result in a net increase in tree canopy and thus potential lower average air temperature in the park making it a more comfortable place for recreation.

Invasive Species: Native vegetation communities and wildlife habitats could be impacted by the introduction or encroachment of noxious weeds or invasive species during construction. However, contractors would minimize the introduction or spread of invasive species by implementing standard construction BMPs such as cleaning all construction equipment prior to bringing it on-site. Once construction is complete, the site would be revegetated with native species. Therefore, there would be *no impact* on invasive species under Alternative 1.

Fish and Wildlife: During construction, common wildlife species occurring in the LOD would be physically displaced, and construction noise and increased human activity may also disturb wildlife species located within the Study Area. Mobile wildlife species, such as birds and mammals, would likely relocate to areas of similar habitat near the site, although less-mobile species (e.g., some reptiles and amphibians) could be inadvertently destroyed by construction activities. Although disturbance, displacement, or inadvertent wildlife mortality from construction activities would be an adverse impact, such impacts would occur at the individual level, rather than the population or species level, and would not inhibit the continued propagation of common wildlife populations and species near the LOD. Therefore, construction of Alternative 1 would result in *short-term, less-than-significant adverse impacts* to wildlife. Once construction is completed, common fish and wildlife species would benefit from the habitat enhancements and improvements (e.g., raising the water temperature and decreased sedimentation) to Piney Run downstream of the dam. Therefore, Alternative 1 would have a *long-term beneficial impact* to fish and wildlife.

Cultural Service: Recreational Stream Fishing (Service 6): The ecosystem service of recreational stream fishing is expected to experience beneficial impacts from implementation of an automated cold water release system. Moderation of the stream temperature in Piney Run downstream of the dam would improve aquatic habitat promoting spawning of fish, particularly trout. This would increase the availability of recreational fishing opportunities in Piney Run downstream of the dam. Therefore, the population of trout in Piney Run downstream of the dam would increase as a result of Alternative 1.

Special Status Species: The NLEB is the only federally listed species with the potential to occur in the project area. In May 2021, the Sponsors completed the USFWS's assisted determination key for the NLEB 4(d) Rule via IPaC. This determination key concluded that the project *may affect but is not likely to adversely affect* the NLEB. On June 2, 2021, USFWS responded to a Section 7 request concurring with this effect determination and noting that there are no known NLEB hibernacula or maternity roosts in the area (**Appendix E**). Subsequently, on November 30, 2022, the USFWS announced that the NLEB would be uplisted to endangered status under the ESA. As a result, effect determinations made pursuant to this species' 4(d) Rule would be nullified. In response, the Sponsors have committed to restricting tree clearance during the NLEB's active season (April 1 through October 31). This restriction would ensure that tree clearance activities occur only when the NLEB is not present in the project area. Additional coordination with the USFWS was completed in October 2023 and the 15-day advisory period expired on November 7, 2024 with no additional correspondence from the USFWS. With the addition of the time of year restriction on tree clearing, the Sponsors determined that project would have.

In a letter dated January 30, 2021, MDNR confirmed that no state-listed spies have been recorded previously in the project area. The monarch butterfly, if present, would likely avoid the LOD during construction and therefore, the risk of mortality would be low.

As described in Section 3.6.4, a bald eagle nest is located approximately 0.1 mile to the northwest of the dam. Sponsors would comply with the USFWS's National Bald Eagle Management Guidelines and, prior to starting construction the USFWS's recommended Northeast Bald Eagle Project Screening Form would be completed, which would identify potential avoidance measures, such as distance buffers (USFWS, 2007; USFWS, 2020c). If the Sponsors determine that implementing avoidance measures would not be practicable, USFWS would be contacted to determine a path forward in compliance with the BGEPA. Bald eagles that forage in the area would likely avoid the LOD during construction due to increased noise and human presence.

Additionally, this alternative could impact migratory birds in the Study Area during construction. In the January 30, 2021 letter from MDNR, MDNR noted that forest interior dwelling bird habitat occurs in the Study Area. Most birds would likely avoid the LOD or relocate to nearby habitats in the Study Area, or regionally. To minimize potential impacts to nesting migratory birds, the Sponsor's would only undertake construction/clearing activities outside of the general nesting period for migratory birds (i.e., May 1 to September 10).

Overall, construction of this alternative is not likely to affect any federal or state listed species and the Sponsors would adhere to time of year restrictions and avoidance measure to minimize impacts to bald eagles and migratory birds. Therefore, Alternative 1 would have *short-term less-than-significant* impacts to special status species during construction. Once construction is complete, there would be *no long-term impacts* to special status species.

5.4.3. Alternative 1A – Future without Federal Investment

Biological resource impacts under Alternative 1A would be similar to those described for Alternative 1 with the exception that temporarily lowering the reservoir would have varying impacts on aquatic life. High tolerance species such as channel catfish (*Ictalurus punctatus*) could survive lower water depths and changes in environmental conditions. Lower tolerance species with specialized temperature and dissolved oxygen requirements, however, such as rainbow trout (*Oncorhynchus mykiss*), would not survive. Lowering the reservoir would not be anticipated to result in substantial impacts to non-aquatic wildlife species, including bald eagles and migratory birds. Overall, biological resource impacts under Alternative 1 would be *short-term and less-than-significant*. Long-term beneficial biological resource impacts described for Alternative 1 would be identical under Alternative 1A.

Regulating Service: Park Climate (Service 5): Overall, Alternative 1A would have similar effects on the park climate as Alternative 1.

Cultural Service: Recreational Stream Fishing (Service 6): The ecosystem service of recreational stream fishing is expected to experience beneficial impacts from implementation of an automated cold water release system. Moderation of the stream temperature in Piney Run downstream of the dam would improve aquatic habitat promoting spawning of fish, particularly trout. This would increase the availability of recreational fishing opportunities in Piney Run downstream of the dam. Therefore, the population of trout in Piney Run downstream of the dam would increase as a result of Alternative 1A although because Alternative 1A would have a longer time until it was fully implemented, the effects of Alternative 1A would occur later than under Alternative 1.

5.4.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Biological Resource impacts under Alternative 2 would be greater than those described for Alternatives 1 and 1A, due primarily to in-water construction work (i.e., dredging), temporarily draining the reservoir, and raising water levels in the reservoir. In-water construction work (i.e., possible dredging) would temporarily increase underwater noise and vibrations, and disturb bottom sediments, resulting in a temporary increase in suspended sediments and turbidity in the Piney Run Reservoir. An increase in turbidity could interfere with foraging and shelter behaviors of aquatic species, as well as affect fish respiration. Mobile species would be able to move to more suitable areas to avoid localized construction sites, while less mobile species, such as benthic invertebrates and larvae, may experience loss of life. Possible dredging could provide some offsetting benefits by reducing problematic species, such as hydrilla and milfoil, reducing colonial habitat for cyanobacteria, and reducing cover for planktivores from the removal of invasive species as part of the dredging work. Further, approximately 11.9 acres of forest clearing would be required to accommodate the dam crest raise. Similar to Alternative 1, a FCP

and Planting Plan would be created and enacted for in compliance with the MFCA. Mitigation would be required for approximately 14.3 acres of forest clearing.

In addition, potential draining of the reservoir would result in permanent long-term impacts to the existing robust fishery. Depending on the extent of draining required and if some water remains in the reservoir, high tolerance species such as channel catfish (*Ictalurus punctatus*) could survive lower water depths and changes in environmental conditions. Lower tolerance species with specialized temperature and dissolved oxygen requirements, however, would not survive. Complete draining of the reservoir would result in the loss of life to all fish. Other aquatic-dependent species (i.e., amphibians and reptiles) inhabiting the reservoir would be permanently impacted as well if not relocated prior to construction activities. Predator species that rely on the fish stock in the reservoir (e.g., bald eagles [*Haliaeetus leucocephalus*]) would also experience adverse impacts as they would need to alter foraging behaviors to find an alternate food source. Additionally, migratory birds that utilize the reservoir would experience adverse impacts from loss of suitable habitat. Impacts to Federal and State listed species would be similar to those described for Alternative 1. Impacts could be minimized through construction phasing or use of a cofferdam; however, coordination with the MDE and the MDNR would be required to ensure impacts to aquatic species are minimized to the extent practicable.

Therefore, implementation of Alternative 2 may substantially, although temporarily, reduce regionally important habitat, resulting in a *potentially significant adverse impact* to biological resources in the Study Area.

Regulating Service: Park Climate (Service 5): Overall, Alternative 2 would have similar effects on the park climate as Alternative 1.

Cultural Service: Recreational Stream Fishing (Service 6): The ecosystem service of recreational stream fishing is expected to experience beneficial impacts from implementation of an automated cold water release system. Moderation of the stream temperature in Piney Run downstream of the dam would improve aquatic habitat promoting spawning of fish, particularly trout. This would increase the availability of recreational fishing opportunities in Piney Run downstream of the dam. Therefore, the population of trout in Piney Run downstream of the dam would increase as a result of Alternative 2.

5.4.5. Alternative 6 – Dam Decommissioning

Vegetation: The Sponsor assumes that the entire LOD would be cleared during construction, which is not anticipated to include any forest clearing. Regardless, in accordance with the Maryland Forest Conservation Act (MFCA), a Forest Conservation Plan (FCP) and Planting Plan may be required to be created and enacted for Alternative 6. Forest areas identified as retention, or afforestation areas in the FCP would be placed under a long-term protection agreement (e.g., a conservation easement or similar framework). No mitigation would be required for as no forest clearing is anticipated. In addition, as part of the reservoir land conversion, the reservoir bed would be converted to forest and meadow land uses potentially providing additional afforestation

area. Overall, Alternative 6 would have *short-term less-than-significant adverse impacts and long-term beneficial impacts on vegetation*.

Regulating Service: Park Climate (Service 5): Overall, Alternative 6 would have *long-term significant beneficial impacts* on park climate as measured by the average air temperature in the park as forest cover would be increased as a result of conversion of part of the reservoir bed to forested area. This would result in a net increase in tree canopy and thus potential lower average air temperature in the park making it a more comfortable place for recreation.

Invasive Species: Impacts to Invasive Species are anticipated to be similar to those described for Alternative 1.

Fish and Wildlife: During construction, common wildlife species occurring in the LOD would be physically displaced, and construction noise and increased human activity may also disturb wildlife species located within the Study Area. Mobile wildlife species, such as birds and mammals, would likely relocate to areas of similar habitat near the site, although less-mobile species (e.g., some reptiles and amphibians) could be inadvertently destroyed by construction activities. Although disturbance, displacement, or inadvertent wildlife mortality from construction activities would be an adverse impact, such impacts would occur at the individual level, rather than the population or species level, and would not inhibit the continued propagation of common wildlife populations and species near the LOD. Therefore, construction of Alternative 6 would result in *short-term, less-than-significant adverse impacts* to wildlife. Once construction is completed, aquatic wildlife species that reside in the reservoir would be permanently displaced while common fish and wildlife species that benefit from wetland or riparian environment would benefit from the habitat enhancements and improvements (e.g., stream restoration and wetland creation) within the LOD and in Piney Run downstream of the dam. Therefore, this alternative would have a *long-term beneficial impact* to fish and wildlife.

Cultural Service: Recreational Stream Fishing (Service 6): The ecosystem service of recreational stream fishing is expected to experience beneficial impacts from implementation Alternative 6. Specifically, removing the dam and reconnecting the Piney Run stream channel through the dam and reservoir footprint would promote both temperature moderation as the reservoir would be eliminated allowing cooler water to flow continuously from upstream to downstream while would provide improved aquatic habitat promoting spawning of fish, particularly trout. This would increase the availability of recreational fishing opportunities in Piney Run downstream of the dam. Therefore, the population of trout in Piney Run downstream of the dam would increase because of Alternative 6.

Special Status Species: Impacts to Special Status Species are anticipated to be similar to those described for Alternative 1.

5.5. Air Quality and Climate

5.5.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative there would be no impact to air quality as air emissions in the Study Area would remain the same as compared to existing conditions.

5.5.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

There would be no significant adverse impacts on air quality. Criteria pollutants generated during construction and land conversion activities would be temporary (limited to the duration of construction activities) and would primarily result from mobile construction equipment and vehicle operation on site, construction employee commuting, and dust generated from disturbance on unpaved areas. While sensitive receptors are present within 1.0 mile of the Alternative 1 area, standard construction BMPs (e.g., cover beds of dump trucks while in transport to minimize fugitive dust emissions, locate equipment and staging zones as far as practicable from sensitive receptors) would minimize environmental impacts to the extent practicable. Overall, Alternative 1 would have *short-term, less-than-significant impacts* on air quality in the Study Area. Once construction is complete, there would be *no long-term or ongoing adverse impacts* to air quality.

Because Carroll County is located in the Ozone Transport Region and is considered nonattainment of the ozone NAAQS, a General Conformity applicability analysis was performed for each alternative. An emission inventory was developed using standard construction equipment operation rates and employee commute rates. Emission factors for mobile sources (e.g., construction equipment and employee commute vehicles) were developed using UESPA's MOVES model and applied to equipment and vehicle operation rates. The emission factors were developed specifically for Carroll County summer weekday operations for each year of construction. Additionally, standard emission rates for fugitive emissions generation (e.g., PM_{10} and $PM_{2.5}$ from site preparation and equipment operation on unpaved surfaces, and VOC emissions from paving) were applied to the work areas. These emissions are "netted" on an annual basis. **Table 5-1** provides an overview of criteria pollutant and precursor emissions for each construction year.

Table 5-1: Criteria Pollutant Emissions – Alternative 1

Year	Pollutant Emissions (Tons per Year)					
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC
2025	2.57	8.37	14.25	1.55	0.02	0.33
De Minimis Exceeded?	N/A	No	N/A	N/A	N/A	No
2026	5.45	11.61	27.38	2.91	0.03	0.55
De Minimis Exceeded?	N/A	No	N/A	N/A	N/A	No

Notes: CO = Carbon Monoxide; NOx = Nitrogen Oxides; PM10 = Particulate Matter less than 10 microns diameter; PM2.5 = Particulate Matter less than 2.5 microns diameter; SOx = Sulfur Oxides; VOC = Volatile Organic Compounds; N/A = Not Applicable
Sources: AECOM 2022; USEPA MOVES, run on 09 October 2022.

NOx emissions would total approximately 8.37 tons in 2025 and 11.61 tons in 2026. VOC emissions would total approximately 0.33 tons in 2025 and 0.55 tons in 2026. Applicable de minimis thresholds are 100 tpy for NO_x and 50 tpy for VOC. Accordingly, the General Conformity Applicability analysis presented on **Table 5-1** indicates that Alternative 1 emissions of NO_x and VOC are de minimis and a General Conformity Determination is not required.

No mitigation measures would be required. However, the appropriate permits for construction and operation must be obtained from the MDE.

5.5.3. Alternative 1A – Future without Federal Investment

Air quality impacts under Alternative 1A would be similar to those described under Alternative 1. However, these impacts would be spread out over a longer period of time as Alternative 1A would require an extended construction schedule. Therefore, annual netted emissions would be less than those associated with Alternative 1, and NOx and VOC emission rates would be below de minimis thresholds. Accordingly, a General Conformity Determination is not required.

5.5.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Impacts under Alternative 2 would be similar as under Alternative 1; however, Alternative 2 would have slightly greater impacts on air quality as more construction activities would be required.

An emission inventory was developed for Alternative 2 using the methodologies described for Alternative 1 (**Section 5.5.2**). **Table 5-2** provides an overview of criteria pollutant and precursor emissions for each construction year.

Table 5-2: Criteria Pollutant Emissions – Alternative 2

Year	Pollutant Emissions (Tons per Year)					
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC
2025	4.21	17.93	21.42	2.40	0.03	0.75
De Minimis Exceeded?	N/A	No	N/A	N/A	N/A	No
2026	16.61	22.56	42.76	4.66	0.07	1.68
De Minimis Exceeded?	N/A	No	N/A	N/A	N/A	No

Notes: CO = Carbon Monoxide; NOx = Nitrogen Oxides; PM10 = Particulate Matter less than 10 microns diameter; PM2.5 = Particulate Matter less than 2.5 microns diameter; SOx = Sulfur Oxides; VOC = Volatile Organic Compounds; N/A = Not Applicable
Sources: AECOM 2022; USEPA MOVES, run on 09 October 2022.

NOx emissions would total approximately 17.93 tons in 2025 and 22.56 tons in 2026. VOC emissions would total approximately 0.75 tons in 2025 and 1.68 tons in 2026. Applicable de minims thresholds are 100 tpy for NO_x and 50 tpy for VOC. Accordingly, the General Conformity Applicability analysis presented on **Table 5-2** indicates that Alternative 2 emissions of NO_x and VOC are de minimis and a General Conformity Determination is not required.

No mitigation would be required; BMPs and regulatory requirements required under Alternative 2 would be the same as discussed under Alternative 1.

5.5.5. Alternative 6 – Dam Decommissioning

Impacts under Alternative 6 would be greater than Alternatives 1, 1A and 2 as Alternative 6 would have greater impacts on air quality as more construction activities would be required.

An emission inventory was developed for Alternative 6 using the methodologies described for Alternative 1 (**Section 5.5.2**). **Table 5-3** provides an overview of criteria pollutant and precursor emissions for each construction year.

Table 5-3: Criteria Pollutant Emissions – Alternative 6

Year	Pollutant Emissions (Tons per Year)					
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC
2025	20.85	56.43	24.19	3.22	0.12	2.23
De Minimis Exceeded?	N/A	No	N/A	N/A	N/A	No
2026	26.19	35.44	22.37	2.79	0.10	2.22
De Minimis Exceeded?	N/A	No	N/A	N/A	N/A	No

Notes: CO = Carbon Monoxide; NOx = Nitrogen Oxides; PM10 = Particulate Matter less than 10 microns diameter; PM2.5 = Particulate Matter less than 2.5 microns diameter; SOx = Sulfur Oxides; VOC = Volatile Organic Compounds; N/A = Not Applicable
Sources: AECOM 2022; USEPA MOVES, run on 09 October 2022.

NOx emissions would total approximately 56.43 tons in 2025 and 35.44 tons in 2026. VOC emissions would total approximately 2.23 tons in 2025 and 2.22 tons in 2026. Applicable de

minims thresholds are 100 tpy for NO_x and 50 tpy for VOC. Accordingly, the General Conformity Applicability analysis presented on **Table 5-3** indicates that Alternative 6 emissions of NO_x and VOC are de minimis and a General Conformity Determination is not required.

No mitigation would be required; BMPs and regulatory requirements required under Alternative 6 would be the same as discussed under Alternative 1.

5.6. Noise

Noise from construction equipment operation and on-road construction vehicles traveling to and from the project area has the potential to affect neighborhood noise levels.

A noise impact would be significant if it would 1) violate applicable noise regulations, 2) cause unsafe noise conditions for nearby receptors during construction, or 3) substantially affect normal operations of noise-sensitive receptors during operation of the Proposed Action. Since no new long-term noise sources would be created under the Proposed Action, only construction activities would potentially impact noise conditions within the Study Area.

5.6.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative, the proposed modifications to the Piney Run Dam would not occur, and there would be *no impact* to the noise environment.

5.6.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Noise generating sources during construction activities would be associated primarily with standard heavy construction equipment. Noise levels would be greatest for receptors nearest the construction area, including residences along Waters Edge Court and Hollenberry Road. Standard construction BMPs (e.g., shut down noise-generating equipment when not needed, locate equipment as far as practicable from sensitive receptors) would minimize environmental impacts to sensitive receptors to the extent practicable. Construction activities would comply with the Carroll County noise control ordinance and OSHA and MOSH safety requirements to prevent hearing damage. Therefore, Alternative 1 would have a *short-term, less-than-significant* impact on the noise environment in the Study Area.

No mitigation measures would be required

5.6.3. Alternative 1A – Future without Federal Investment

Noise impacts under Alternative 1A would be identical to those described under Alternative 1. However, these impacts would be spread out over a longer period of time as Alternative 1A would require an extended construction schedule.

5.6.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Noise impacts under Alternative 2 would be similar to those under Alternative 1; however, Alternative 2 would have greater impacts on the surrounding noise environment as more construction activities would be required. Construction activities would comply with applicable noise control and safety requirements. Therefore, Alternative 2 would have a *short-term, less-than-significant impact* and *no long-term impacts* on the noise environment in the Study Area.

No mitigation would be required; BMPs and regulatory requirements required under Alternative 2 would be the same as discussed under Alternative 1.

5.6.5. Alternative 6 – Dam Decommissioning

Noise impacts under Alternative 6 would be similar to those under Alternative 2; however, Alternative 6 would have greater impacts on the surrounding noise environment as more construction activities would be required. Construction activities would comply with applicable noise control and safety requirements. Therefore, Alternative 6 would have a *short-term, less-than-significant impact* and *no long-term impacts* on the noise environment in the Study Area.

No mitigation would be required; BMPs and regulatory requirements required under Alternative 6 would be the same as discussed under Alternative 1.

5.7. Cultural Resources

A cultural resources impact would be significant if it would constitute an unresolved adverse effect as defined in Section 106 of the NHPA (36 CFR 800.5): alteration, directly or indirectly, of any of the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of its location, design, setting, materials, workmanship, feeling, or association.

5.7.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative, the proposed modifications to the Piney Run Dam would not occur and there would be no impact to cultural resources.

5.7.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Alternative 1 would have *no adverse effect* on historic properties. While one historic resource (Site 18CR293) located in the Area of Potential Effects was determined to be potentially eligible for listing in the NRHP in the Phase I investigation, it was not recommended for listing in the Phase II investigation. This was concurred with by the MHT, the Maryland SHPO on March 26, 2024. The USDA-NRCS conducted a Section 106 consultation with MHT (**Appendix E**). In addition, no indirect effects, such as those to viewsheds, viewpoints, viewshed corridors, or

physically adjacent historic resources, are anticipated due to dense tree cover and topographic variation.

No mitigation measures would be required. An Inadvertent Discovery Plan would be followed if archaeological or historical materials, including human remains, were encountered during construction. The plan would require construction to stop immediately, consultation with SHPO and NRCS cultural resources staff, and notification to the appropriate Tribes.

5.7.3. Alternative 1A – Future without Federal Investment

Alternative 1A would have cultural resource impacts identical to those described above for Alternative 1.

5.7.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

There would be potentially significant adverse impacts on cultural resources. Although no known sites with cultural significance eligible for listing in the NHRP occur within Alternative 2's LOD, other unknown archaeological and historic resources may be affected from the 2.3-foot pool raise. Alternative 2 would have potentially greater adverse impacts on cultural resources than Alternative 1.

Mitigation may be required under Alternative 2. Additional cultural surveys would be needed to determine the presence of significant cultural resources within the LOD of Alternative 2 and the broader APE. If impacts to significant cultural resources could not be avoided, a project-specific Memorandum of Agreement or Programmatic Agreement would be required, pursuant to 36 CFR 800.6(c) and 800.14(b)(1). The agreement would include the effect of the undertaking on historic properties and negotiations between signatories on measures to avoid, minimize, or mitigate the adverse effects on historic properties. The Inadvertent Discovery Plan would be the same as discussed under Alternative 1.

5.7.5. Alternative 6 – Dam Decommissioning

There would be potentially significant adverse impacts on cultural resources. Although no known sites with cultural significance eligible for listing in the NHRP occur within Alternative 6's LOD, other unknown archaeological and historic resources may be affected from removing the dam or completing land conversion activities in the reservoir bed. Alternative 6 would have potentially greater adverse impacts on cultural resources than Alternatives 1, 1A or 2.

Mitigation may be required under Alternative 6. Additional cultural surveys would be needed to determine the presence of significant cultural resources within the LOD of Alternative 6 and the broader APE. If impacts to significant cultural resources could not be avoided, a project-specific Memorandum of Agreement or Programmatic Agreement would be required, pursuant to 36 CFR 800.6(c) and 800.14(b)(1). The agreement would include the effect of the undertaking on historic properties and negotiations between signatories on measures to avoid, minimize, or

mitigate the adverse effects on historic properties. The Inadvertent Discovery Plan would be the same as discussed under Alternative 1.

5.8. Socioeconomics

A socioeconomic impact would be significant if it would 1) substantially alter the location and distribution of the local population or 2) change current economic conditions in the Study Area in a way that would be notable and harmful for surrounding communities and residents.

The total population under 18 years of age does not exceed 25 percent of the overall population in the surrounding area (Eldersburg) and is similar to the proportion in Carroll County. While children are present elsewhere on park property and at schools, daycares, and similar facilities near the Study Area, they would not be permitted near an active construction site, and the site would be secured to prevent unauthorized or accidental access. With site monitoring and access controls in place, and standard air quality controls in place, the Proposed Action would not have the potential to disproportionately impact off-site children. Therefore, protection of children does not warrant special consideration under EO 13045 for this Proposed Action, and this resource is dismissed from further analysis.

5.8.1. Alternative 0 - NEPA No Action/Future without Project

The No Action Alternative would have *no impact* on socioeconomic conditions in the Study Area. No mitigation measures would be required.

5.8.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Implementation of Alternative 1 would not displace nearby residents or adversely affect economic conditions in the Study Area. Proposed construction activities would likely be completed by local contractors, increasing employment opportunities, personal incomes, and materials purchases within the community. If non-local contractors support construction, direct economic benefits associated with expenditures on lodging, food, and retail would accrue to the local community. Tax revenues associated with direct and indirect construction expenditures would also benefit economic conditions. Therefore, the Alternative 1 would be anticipated to have a *short-term, beneficial impact* on the surrounding communities during construction. Once construction is complete, there would be *no long-term* or *ongoing impacts* to socioeconomics in the Study Area.

5.8.3. Alternative 1A – Future without Federal Investment

Implementation of Alternative 1A would have similar socioeconomic impacts as those described for Alternative 1, with *short-term beneficial impacts* resulting from local expenditure during construction. Additionally, Alternative 1A would require lowering the Piney Run Reservoir would reduce recreational opportunities in the Piney Run Park, likely resulting in some decrease in visitors to the park. Decrease of park visitors would be temporary and is not anticipated to affect socioeconomic conditions in the Study Area. Therefore, the Alternative 1 would have *short-term, less-than-significant impacts* on socioeconomics.

5.8.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Alternative 2 would have similar socioeconomic impacts as described above for Alternatives 1 and 1A. However, Alternative 2 would likely require draining the Piney Run Reservoir, which would substantially reduce the park's appeal to the public and would likely result in a substantial decrease of visitors. These impacts would be long-term, as it would take a minimum of 2 years to refill the reservoir and longer to rebuild the reservoir's fishery and may adversely affect socioeconomic conditions in the Study Area. Therefore, Alternative 2 would have *long-term potentially significant impacts* to socioeconomics in the Study Area.

5.8.5. Alternative 6 – Dam Decommissioning

Alternative 6 would have similar socioeconomic impacts as described above for Alternatives 1, 1A, and 2. However, Alternative 6 would result in draining the Piney Run Reservoir, which would substantially reduce the park's appeal to the public and would likely result in a substantial decrease of visitors, particularly those that patronize the park for water-oriented recreation activities. As an example, fishing tournaments (seven were held in 2022) held on the reservoir and sponsored by the park would be eliminated. These community events would adversely impact the community's value of the park. The time it would take to allow the restored streams to fully develop into suitable fish habitat to allow for fly fishing would be several years and even then, only stream fishing techniques such as fly fishing would be effective in the restored section of Piney Run. These impacts would be long-term and may adversely affect socioeconomic conditions in the Study Area. Therefore, Alternative 6 would have *long-term potentially significant impacts* to socioeconomics in the Study Area.

5.9. Environmental Justice

As no EJ communities of concern with respect to race or income are present in the Study Area, there is no potential to disproportionately impact EJ communities. Therefore, there would be no impacts on environmental justice under any of the alternatives.

5.10. Health and Safety

A health and safety impact would be significant if it would violate applicable federal, state, or local safety regulations; or if it would expose worker or the public to substantial risk of injury or death.

5.10.1. Alternative 0 - NEPA No Action/Future without Project

Under the No Action Alternative, dam modifications needed to protect life and property from future flooding events, as well as to comply with NRCS and State of Maryland dam safety regulations would not be conducted. Therefore, the No Action Alternative would have a *potentially significant impact* to health and safety due to the Piney Run Dam continuing to violate federal and state dam safety regulations.

Regulating Service: Dam Breach Flood Protection (Service 7): The ecosystem service of dam breach flood protection is not expected to experience a change in impacts because no action would be taken.

5.10.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Under Alternative 1, the County would adhere to all OSHA and MOSH standards during construction to ensure the safety of contractors on the site. Additionally, the construction site would not be accessible by members of the public. Therefore, there would be *no short-term impacts* on health and safety during construction. Once dam modifications are complete, there would be long-term beneficial impacts as repairs to the dam would reduce the risk of dam failure and protect the surrounding communities, as well as bring the dam into compliance with federal and state regulations.

Regulating Service: Dam Breach Flood Protection (Service 7): The ecosystem service of dam breach flood protection is expected to experience *long-term beneficial impacts* as a result of implementation of Alternative 1. Alternative 1 would result in reduced risk of catastrophic failure of the dam. Therefore, the annualized dam breach flood damage reduction benefits would increase as a result of Alternative 1.

5.10.3. Alternative 1A – Future without Federal Investment

Alternative 1A would have health and safety impacts identical to those described for Alternative 1, with the exception that beneficial impacts would be realized over a significantly longer period of time. As such, the dam would remain un-repaired for a longer period of time, subjecting downstream properties and people to a higher risk of dam failure.

Regulating Service: Dam Breach Flood Protection (Service 7): The ecosystem service of dam breach flood protection is expected to experience similar impacts as a result of implementation of Alternative 1A as Alternatives 1 or 2. Alternative 1A would result in reduced risk of catastrophic failure of the dam but the impacts would take longer to be realized because the project would be delayed under Alternative 1A compared with Alternatives 1 or 2. Therefore, the annualized dam breach flood damage reduction benefits would increase because of Alternative 1A but later than under Alternatives 1 or 2.

5.10.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Health and safety impacts under Alternative 2 would be identical to those described for Alternative 1. Alternative 2 would result in a slightly greater health and safety benefit than Alternative 1A, as proposed activities under Alternative 2 would not be restricted by funding availability.

Regulating Service: Dam Breach Flood Protection (Service 7): The ecosystem service of dam breach flood protection is expected to experience similar impacts because of implementation of

Alternative 2 as Alternative 1. Alternative 2 would result in reduced risk of catastrophic failure of the dam but the impacts similar to Alternative 1. Therefore, the annualized dam breach flood damage reduction benefits would increase because of Alternative 2 in a similar manner to Alternative 1.

5.10.5. Alternative 6 – Dam Decommissioning

Health and safety impacts under Alternative 6 would be identical to those described for Alternatives 1 and 2. Alternative 6 would result in a slightly greater health and safety benefit than Alternative 1A, as proposed activities under Alternative 6 would not be restricted by funding availability.

Regulating Service: Dam Breach Flood Protection (Service 7): The ecosystem service of dam breach flood protection is expected to experience *significant long-term beneficial impacts* as a result of implementation of Alternative 6. These benefits would be greater than Alternatives 1, 1A, or 2 because the dam and the associated risk of failure would be removed. Therefore, the annualized dam breach flood damage reduction benefits would increase more under Alternative 6 than any other alternative.

5.11. Infrastructure

An infrastructure impact would be significant if it would substantially impact park infrastructure or if increases in traffic would contribute to a noticeable degradation of existing traffic conditions.

5.11.1. Alternative 0 - NEPA No Action/Future without Project

The No Action Alternative would have no impact on existing infrastructure in the Study Area.

5.11.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Construction of Alternative 1 would have no impact on park infrastructure aside from impacts to the dam itself. Additionally, Alternative 1 would result in temporary increases in construction-related traffic at the site, that would include workers' personal commuting vehicles and heavy construction vehicles. Construction related traffic is not anticipated to contribute to a noticeable degradation of existing traffic conditions. Therefore, Alternative 1 would have a *short-term, less-than-significant impact* on infrastructure. Following completion of construction, dam modifications would reduce the risk of dam failure, thus protecting infrastructure downstream of the dam. Therefore, Alternative 1 would have a *long-term beneficial impact* on infrastructure in the Study Area.

5.11.3. Alternative 1A – Future without Federal Investment

Alternative 1A would have infrastructure impacts identical to those described for Alternative 1, with the exception that beneficial impacts would be realized over a significantly longer period of time. As such, the dam would remain un-repaired for a longer period of time, subjecting downstream infrastructure to a higher risk of dam failure.

5.11.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Under Alternative 2, all impacts described under Alternative 1 would occur, with additional infrastructure impacts resulting from raising the water level in the reservoir. Approximately 300 feet of White Rock Road would need to be modified to raise the low point of the road approximately 0.5 feet to meet County safety requirements. In addition, recreational infrastructure would be impacted from the modification of five docks, two boat ramps, and one gazebo; however, this would only be a temporary impact to infrastructure. Short-term impacts would be less-than-significant. Overall, construction would result in *short-term, less-than-significant* adverse impacts, while raising the water level in the reservoir would result in l*ong-term potentially significant impacts*, dependent upon the extent of impacts to park infrastructure and potential degradation of traffic conditions during modification of White Rock Road.

5.11.5. Alternative 6 – Dam Decommissioning

Under Alternative 6, construction would impact park infrastructure within Piney Run Park. Park infrastructure occurring at the waterfront would be removed. Specifically, the docks, boat ramps, and gazebo would need to be modified/removed since the reservoir would be drained. Additionally, Alternative 6 would result in temporary increases in construction-related traffic at the site, that would include workers' personal commuting vehicles and heavy construction vehicles. Construction related traffic is not anticipated to contribute to a noticeable degradation of existing traffic conditions. Therefore, Alternative 6 would have a *short-term, less-than-significant impact* on infrastructure. Following completion of construction, the dam would be removed and inherently eliminate the risk of dam failure, thus protecting infrastructure downstream of the dam. Because the dam decommissioning would eliminate the flood protection benefit provided by the dam, three road crossings of Piney Run downstream of the dam would need to be modified to accommodate increased flood flows. Structures that would potentially be impacted by increased flood flows would either be purchased or flood-proofed. Therefore, Alternative 6 would have a *long-term beneficial impact* on infrastructure in the Study Area.

5.12. Hazardous and Toxic Materials and Waste

An HTMW impact would be significant if it would 1) interrupt, delay, or impede ongoing cleanup efforts; or 2) create new or substantial human or environmental health risks (e.g., soil or groundwater contamination).

5.12.1. Alternative 0 - NEPA No Action/Future without Project

No hazardous waste or toxic materials would be generated or potentially released with implementation of the No Action Alternative. Therefore, *no impacts* related to HTMW would occur.

5.12.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Alternative 1 is not anticipated to generate any hazardous waste or impact cleanup efforts at remediation sites in Carroll County. Operation of construction equipment and vehicles would create the potential for discharge, spills, and contamination of commonly used products, such as diesel fuel, gasoline, oil, antifreeze, and lubricants, at the Project Site. Even without major release events, multiple minor releases could have potential effects to the environment within the Study Area. However, all hazardous materials or waste discovered, generated, or used during construction would be handled, containerized, and disposed of in accordance with applicable local, state, and federal regulations. Spill prevention and control measures contained within the project-specific ESCP would also help to minimize potentially adverse impacts. Therefore, construction of Alternative 1 would have the potential for *short-term, less-than-significant adverse impacts* from releases of HTMW. Following construction there would be no potential for release of HTMW; therefore, there would be *no long-term impacts*.

5.12.3. Alternative 1A – Future without Federal Investment

Alternative 1A would have HTMW impacts identical to those described for Alternative 1.

5.12.4. Alternative 2 – Dam Modification and Water Supply Infrastructure with a Normal Pool Raise of 2.3 Feet

Alternative 2 would have HTMW impacts similar to those described for Alternative 1 and 1A; however, the potential for accidental HTMW release would be greater due to the larger extent of construction activities and the possibility of dredging in the reservoir while the pool is lowered. Testing and characterization of dredge material would need to be performed and the dredge spoils disposed of in accordance with local, state, and federal laws and regulations. The Sponsor would need to identify suitable dredge disposal areas.

The possibility for significant adverse impacts from HTMW may exist. If dredging activities were to occur as part of Alternative 2, they would disturb bottom sediments, resulting in the risk of sediment contamination.

5.12.5. Alternative 6 – Dam Decommissioning

Alternative 6 would have HTMW impacts similar to those described for Alternatives 1, 1A, and 2; however, the potential for accidental HTMW release would be greater due to the larger extent of construction activities and the potential to disturb sediments in the reservoir bed as it is converted to new land uses after being drained. Disturbance of sediments would result in the risk of sediment contamination. Therefore, Alternative 6 would have the potential for *short-term, significant adverse impacts.*

5.13. Cumulative Effects

This section includes a description of past, current, reasonably foreseeable future actions, and cumulative effects organized by resource and then by alternative. The Sponsors identified past,

present, and reasonably foreseeable actions with potential causal relationships to the Proposed Action.

Although the term "past, present, and reasonably foreseeable future actions is used in this analysis to describe all considered actions that may interact with the Proposed Action, the cumulative analysis focuses on ongoing and reasonably foreseeable future actions, specifically those projects that are well-developed, in mature planning stages, and/or have funding secured. Past actions have been included and assessed in the establishment of the environmental baseline and are already considered in the impact analysis for each evaluated resource area. **Table 5-4** provides a summary of foreseeable future actions.

Table 5-4: Past, Present, and Reasonably Foreseeable Actions

Project Name	Location	Project Type	Description
Fairhaven Main Entry and Commons Renovations	7200 Third Avenue, Sykesville, MD 21784	Residential	Proposal to modify existing building entrances and driveway and parking areas. This project would include new landscaping and stormwater facilities throughout parking areas. In addition, this project would add 0.29 acres of forest to the existing forest conservation easement area within the Fairhaven campus (Carroll County Bureau of Development Review, 2022).
M.G. Fulton Services Contractor Storage Yard	133 White Way, Sykesville, MD	Industrial	Proposal to modify an existing 30-acre contractor storage yard by demolishing existing structures and constructing two new buildings. This project would include construction and maintenance of stormwater management facilities (CLSI, 2017).
Northrop Grumman Sykesville Parking Expansion	7301 Sykesville Road, MD	Industrial	Proposal to expand parking area at the existing Northop Grumman manufacturing and research center. This project would include modifications to the facilities stormwater management infrastructure (Morris & Ritchie Associates, 2022)

5.13.1. Cumulative Effects Under Alternative 0

Under Alternative 0, the Sponsors would not implement dam modifications to bring the Piney Run Dam into compliance with federal and state dam safety regulations. There would be no Proposed Action-related changes and, consequently, no incremental impacts on the resource areas from Alternative 0; therefore, no cumulative effects would occur.

5.13.2. Cumulative Effects Under Alternative 1/1A

Cumulative effects would be the same across Alternative 1 and Alternative 1A. Implementation of Alternative 1/1A would not cumulatively significantly impact any resource area discussed in this Plan-EA. Incremental effects of these alternatives, when taken into consideration with effects of past, present, and reasonably foreseeable future projects, would contribute *short-term, less-than-significant adverse cumulative impacts* to soils, water resources, biological resources, air quality, and noise. Construction activities would involve clearing and ground disturbing activities that would temporarily increase downstream erosion and impact fish and wildlife, including special status species and vegetation in the Study Area. Construction equipment and vehicles required for dam modifications (e.g., excavators, dump trucks), would also cumulatively affect the local noise environment, while also producing air emissions. These cumulative effects would not exceed the significance thresholds identified in Section 5.0 and would be *temporary and less-than-significant*.

5.13.3. Cumulative Effects Under Alternative 2

Overall, Alternative 2 would result in the greatest adverse cumulative effects due to the proposed 2.3-foot pool raise, possibility of dredging activities, and potential draining of the reservoir. Alternative 2 would be subject to greater regulatory compliance and require more mitigation measures, more field surveys/investigations to assess the full extent of the impacts, and a more extensive permitting process. As discussed throughout Section 5.0, implementation of Alternative 2 would result in *potentially significant adverse impacts* to land use, water resources, biological resource, socioeconomics, and infrastructure.

5.13.4. Cumulative Effects Under Alternative 6

Overall, Alternative 6 would have similar cumulative effects to Alternative 2 but in different resource areas. Because of the extent of the measures proposed (decommissioning the dam, permanently draining the reservoir, and completing restoration work over the 290-acre reservoir bed), Alternative 6 would be subject to a more extensive permitting process than the other alternatives. This alternative would also result in *significant long-term adverse impacts* to land use, socioeconomics, and regional water resource planning efforts. However, *significant long-term beneficial impacts* to biological and water resources (surface water, wetlands, and water quality, and riparian areas) would be realized.

5.14. Risk and Uncertainty

Cultural Resources
Based on the results of the background review, field survey, and assessments, no cultural resources of significance that meet the necessary criteria to be considered eligible for inclusion in the National Register of Historic Places within the APE and adjacent to the anticipated limits of disturbance of the project associated with rehabilitation measures at the Piney Run Dam. Therefore, the project has been recommended to be categorized as having No Adverse Effect by the SHPO/MHT through a consultation effort made by the NRCS. Documentation of this determination is provided in **Appendix E**.

The tribal search indicated that 20 Tribes have indicated interest in ancestral lands and might attach religious or cultural significance to historic properties or have claims to land areas within Carroll County, Maryland. These tribes were contacted by the NRCS regarding this project during the planning process. Consultation efforts were completed in November 2024 and are documented in **Appendix E**. None of the tribes contacted indicated an interest in the project at this time.

Economics
Risk and uncertainty were incorporated into the flood damage reduction. The uncertainty could be reduced for the economic analysis, but that would require more intensive primary and secondary data collection. Identification of the economically preferred alternative was not distorted by the level of uncertainty. Thus, it was determined that increased investment in analysis was not necessary and any reduction in risk and uncertainty would not result in the identification of a different economically preferred alternative.

Hydrology and Hydraulics

Areas of risk and uncertainty associated with this project lie in the accuracy of estimating flood flows and flood elevations. The uncertainty of flood flows and water surface elevations has the potential for increased damages as new properties are converted from agricultural to residential or commercial use. It is possible these uncertainties could lead to increased risk to human life in the event of a dam breach. Hydrologic methods and computer modeling used in this analysis are consistent with the standards of practice at this time. However, the tributary is not gauged, and no verification of storm flows is possible. Potential impacts for each alternative are estimated using techniques that relate potential flood damages to the benefits provided by the alternative. For example, an alternative may provide for a greater normal pool for use in any of the multiple purposes of the reservoir, but in doing so may result in higher discharges for flood events resulting in greater potential for flood damage downstream. However, these methods are in part based on professional judgment, and actual experience could be different.

Engineering

Areas of risk and uncertainty associated with this project lie in the accuracy of estimating costs associated with each alternative. Cost estimates were developed from available historic and current data. Factors discovered during actual design, notably the availability of suitable material for construction could affect these estimates. Potential impacts for each alternative are estimated using techniques that relate potential damage to lost opportunity. However, these methods are in part based on professional judgment, and actual experience could be different.

6.0 CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

6.1. Previous Assessments and Assistance Request

MDE commissioned a hydrologic and hydraulic analysis of the Piney Run Dam which was completed in 2016 and indicated that the dam lacked sufficient spillway capacity to safely pass the regulatory spillway design flood, the PMF, with adequate freeboard (one foot per State of Maryland requirements). MDE issued a letter to the Sponsor dated August 9, 2017 summarizing a meeting held between MDE and Carroll County, Maryland and providing a recommended course of action over the findings of the 2016 hydrologic and hydraulic analysis. The Sponsor completed an estimated risk-based profile of the Piney Run Dam in July 2018 which has been updated and included in **Appendix F**.

The Sponsor submitted a formal request for assistance to NRCS for the Piney Run Dam on January 18, 2019. The requests for assistance listed concerns regarding the existing spillway capacity and the ability of the spillway to withstand erosive forces during a spill event.

6.2. Public Engagement

The Sponsor held multiple public meetings as well as presentations at multiple meetings of the Commissioners of Carroll County in 2020 and 2021. The meetings were held to inform the public and the County's leaders of project progress, present and discuss project alternatives, and solicit input. A summary of the meetings held as part of this project is below.

- February 25, 2020 – An in-person meeting was held and the South Carroll Senior Center in Eldersburg, Maryland by the Sponsor and its consultant to make an initial presentation of the project, present the purpose and need for the project, and solicit input. The presentation was supported by a Microsoft PowerPoint slide deck. The meeting was attended by approximately 17 people including a representative from NRCS and a representative from the Town of Sykesville Town Council located downstream of the dam. At this meeting, the problems identified at the dam including spillway capacity and integrity as well as backup water supply availability were presented along with an overview of the dam, and summary of investigative work completed. Plans for future project work were also discussed including a timeline for completion of this Watershed Plan-EA as well as an overall timeline of the project through construction of any improvements. There were a few comments received, however, none pertained to the actual scope of the project itself.
- February 25, 2021 – A virtual presentation was made by the Sponsor to the Commissioners of Carroll County to provide an update on project progress and present the project Alternatives (0, 1, 1A, and 2) as well as their associated costs and impacts. The presentation was supported by a Microsoft PowerPoint slide deck presented over the virtual platform. The Sponsor also informed the Commissioners of Carroll County of the intent to hold two virtual public meetings on March 11, 2021 to present the Alternatives to the public.

- March 11, 2021 – Two virtual meetings were held by the Sponsor and its consultant using the Zoom® platform to present project alternatives to the public, answer questions and solicit feedback. The meetings were held at 1:00 PM and 6:00 PM to facilitate the various work schedules of the public due to the Covid-19 pandemic. The meeting was publicized using a press release on the project website and distributed to the project's email list. The 1:00 PM meeting was attended by approximately 42 people and the 6:00 PM meeting was attended by approximately 62 people. At this meeting the background of the project, purpose and need, Alternatives 0, 1, 1A, and 2 and their associated costs and impacts were presented to the public using the same slide deck presented on February 25, 2021 to the Commissioners of Carroll County presented over the Zoom® platform. Following the presentation at each meeting, public input was solicited, and questions were asked and answered. The general response from the public at both meetings was significantly in favor of Alternative 1 and not in favor of Alternative 2. Common comments received were that the dam should be made safe but that using the reservoir for water supply, particularly given the means to use the full water supply allocation including raising the normal pool, temporarily draining the reservoir to reinforce the riser, and significant impacting Piney Run Park and the natural setting of the reservoir, was not appealing.
- March 18, 2021 – The Commissioners of Carroll County convened and voted to select Alternative 1 as the locally-preferred alternative. This selection was consistent with the feedback provided by the public at both public meetings held on March 11, 2021 as well as emails received through the project's email address monitored by the Sponsor.

Additional public participation was performed through establishment of a project website where information pertaining to the project including final technical reports, public meeting materials, and other information was shared. A project email address published in public meeting materials and on the website provided a point of contact for the public to engage with the Sponsor on the project, ask questions, and provide feedback. The email address was used extensively by the public in addition to emails sent to their local representatives to voice their opinions concerning what the locally preferred alternative should be. The Sponsor engaged and responded to public input and questions as they were received. Public input sent via email was reviewed by the Sponsor and documented for the project. A list of questions received, and answers provided is included as **Appendix A**.

6.3. Agency Consultation

Local, state, federal, and tribal agencies were consulted for the project. Consultations were initiated by both the NRCS and the Sponsor's consultant in mid-May 2021 for general agencies, and in mid-August for tribal agencies. The consultation list included (initial consultation date shown in parentheses):

- Federal Agencies:
  - U.S. Environmental Protection Agency (May 13, 2021)
  - Federal Emergency Management Agency (May 13, 2021)
  - Natural Resources Conservation Service, Maryland (May 13, 2021)
  - U.S. Army Corps of Engineers (May 13, 2021)

  - U.S. Fish and Wildlife Service (May 12/13, 2021)
- Tribal Agencies (August 12, 2021 for all Tribal agencies)
  - Oneida Indian Oneida Indian Nation
  - Oneida Tribe of Indians of Wisconsin
  - Onondaga Nation
  - Saint Regis Mohawk Tribe
  - Tuscarora Nation
  - Seneca Cayuga Nation
  - Delaware Nation
  - Delaware Tribe of Indians
  - Shawnee Tribe of Oklahoma
  - Eastern Shawnee Tribe
  - Shawnee Tribe
  - Cayuga Nation
  - Stockbridge-Munsee Community Band of Mohican Indians
  - Tonawanda Band of Seneca Nation
  - Pamunkey Indian Tribe
  - Chickahominy Indian Tribe
  - Upper Mattaponi Tribe
  - Rappahannock Tribe
  - Monacan Indian Nation
  - Nansemond Indian Tribe
- State Agencies
  - Department of the Environment – Dam Safety Permits Division (May 13, 2021)
  - Department of the Environment – Non-Tidal Wetlands Division (May 13, 2021)
  - Department of the Environment – Waterway Construction Division (May 13, 2021)
  - Department of Natural Resources (May 12/13, 2021)
  - Maryland Historic Trust (May 6, 2021)
- Local Agencies
  - Carroll County Department of Land and Resource Management (May 13, 2021)
  - Carroll County Department of Planning (May 13, 2021)
  - Carroll County Department of Public Safety (May 13, 2021)

- Carroll County Department of Public Works (May 13, 2021)
- Carroll County Department of Recreation and Parks (May 13, 2021)
- Carroll Soil Conservation District (May 13, 2021)
- Town of Sykesville (May 13, 2021)

Initial consultation with the U.S. Fish and Wildlife Service (USFWS) was performed via obtaining an Information for Planning and Consultation database (IPaC) report for the affected area of the project. The IPaC report indicated the potential for the Federally endangered northern long-eared bat to occur within or around the area. The report did not indicate the presence of any other Federally designated critical habitat. The follow-up consultation was responded to by USFWS on June 2, 2022. Additional coordination was performed in October 2023. The response indicated that the project "may affect, not likely to adversely affect" the northern long-eared bat. Therefore, no further consultation is needed.

Initial consultation with the MDNR for review of the project area for state- or federally-listed rare, threatened, or endangered species was performed in December 2019 and a response received from MDNR January 30, 2020. The response indicated that there are no state or federal records for listed plan or animal species within the area and as a result there were "no specific concerns regarding potential impacts or recommendations for protection measures". MDNR did point out that remote analysis suggested that the forested portion of the project area contains Forest Interior Dwelling Bird habitat. A follow-up consultation was made by NRCS on May 12, 2021, and by the Sponsor's consultant on May 13, 2021. A response was received from MDNR to the follow up response on July 12, 2021, confirming the response of January 30, 2020. Therefore, no further consultation is needed.

The MDE Non-Tidal Wetlands division responded to the consultation request on May 18, 2021 noting that permanent or temporary impacts to non-tidal wetlands, the 25-foot buffer thereof, streams, or 100-year non-tidal floodplain would require authorization. As a Maryland Use Class III-P stream, permanent non-tidal wetland impacts require both public notice and mitigation. A pre-application meeting was held with the Non-Tidal Wetlands and Waterway Construction divisions of MDE, USACE, and Carroll County on August 30, 2022. During this meeting, proposed modifications to the Piney Run Dam and key potential impacts to environmental and cultural/historic site features were discussed, and the regulatory agency representatives provided feedback on potential permitting implications. A Joint Federal/State Application for the alternation of Any Floodplain, Waterway, Tidal, or Nontidal Wetland (or buffer) in Maryland was filed with the MDE on May 16, 2024, and responses received in May and July 2024. Based on the application submitted, the MDE distributed the application to its Non-Tidal Wetlands and Waterway Construction and Dam Safety Permits divisions. It also noted that the project was considered a Category A project in accordance with the Maryland State Programmatic General Permit-6 and authorization could be made without federal (USACE) review.

A response was received from the MDE Waterway Construction Division on July 8, 2024, noting that no authorization was required from the Nontidal Wetlands and Water Construction Division. A response was received from the MDE Dam Safety Permits Division on July 9, 2024, noting that the design concept (Alternative 1) submitted was generally acceptable and that they look

forward to further submissions including detailed construction drawings, basis of design calculations, and project specifications to complete the permitting process.

The Carroll County Department of Planning responded to the consultation request on May 18, 2021 indicating that it fully supported the project and noting that the project is consistent with the 2014 County Master Plan, 2018 Freedom Community Comprehensive Plan, and 2019 Water and Sewer Master Plan Triennial Update. No further consultation is needed.

The Federal Emergency Management Agency (FEMA) responded to the consultation request on May 20, 2021, providing suggestions for additional sources of information pertaining to the dam and floodplain. These information sources had already been investigated as part of the initial phase of the project. No further consultation is needed.

Consultation with Maryland SHPO/MHT was initiated by the Maryland NRCS on May 6, 2021. SHPO/MHT responded on July 23, 2021, indicating the following:

- One site located near the auxiliary spillway should be avoided during construction and preserved in place. If the site cannot be avoided, Phase II evaluative investigations would be needed prior to construction or site preparation work involving ground-disturbing activities.
- SHPO/MHT would need to review site plans clearly illustrating that the site in questions would be avoided during construction before a "no adverse effect" recommendation for the overall project can be issued.

On July 25, 2022, MHT was provided with a concept plan showing avoidance of 18CR293. Concurrence with a No Adverse Effect determination is pending SHPO/MHT's review of the site plans.

To confirm that site 18C293 was not eligible for listing a Phase II Archeological Evaluation was completed and a report submitted to the MHT on March 6, 2024. The MHT concurred with the report's recommendation that the site was not eligible for listing in the NHRP on March 26, 2024.

The Maryland NRCS led tribal consultation efforts. Each tribe received three letters of certified mail, with one copy of each letter sent to the Tribal Historic Preservation Office and one copy of each letter sent to the Chief/President. Letters were sent on August 12, 2021, initiating the consultation process, October 18, 2021, describing the rehabilitation alternatives and requesting questions and comments, and October 13 and 20, 2022. Tribes were also contacted by phone or email on November 4, 2021, February 8, 2022, and July 14, 2022. Finally, closeout consultation letters were sent by certified mail on October 10, 2024, with follow up emails sent October 28, 2024 and November 6, 2024, the final email including a request for a read receipt. Responses from those contact efforts are documented in the Tribal consultation documentation provided in **Appendix E**. This documentation also includes a summary memo, copies of the letters sent, and a list of Federally recognized tribes, Maryland State-recognized tribes, and other Maryland tribes.

7.0 PREFERRED ALTERNATIVE

7.1. Rationale for Preferred Alternative

Alternative 1 has been selected as the Preferred Alternative, the Alternative that best meets the purpose and need for the project, is preferred by the local community and their leadership and, of the three alternatives involving federal investment (1, 2, and 6), provides the most economic benefit with the social impacts. Although Alternative 6 is considered as the alternative that provides the greatest cumulative environmental benefit, it is does not provide as much economic benefits, nor does it have as few impacts to the community as Alternative 1. The local community does also not prefer it

The comparative evaluation shows that Alternative 1 would meet the purpose and need while presenting few impacts to the community and in particular, Piney Run Park. Therefore, it is considered the Socially-preferred alternative. Alternative 1 also presents fewer environmental impacts than Alternatives 1A and 2 but is not as environmental beneficial as Alternative 6 which is considered the Environmentally-preferred alternative. When the alternatives were presented to the public during public meetings held in March 2021, Alternative 1 was preferred by nearly all who attended and/or provided comments. The Carroll County Commissioners, as leaders of the County, also voted in favor of endorsing Alternative 1 in March 2021. Therefore, Alternative 1 is considered the Locally-preferred alternative. Finally, the economic analysis shows that Alternative 1 provides the greatest benefit-cost ratio and maximum economic benefits when comparing Alternatives 1, 2 and 6. Therefore, it is considered the economically-preferred alternative.

7.1.1. Alternative Tradeoffs

There were several tradeoffs between the Alternatives that were examined. The most significant tradeoffs are discussed in this section.

7.1.1.1. Tradeoff 1: Water-Oriented Recreation (Service 1) versus Recreational Stream Fishing (Service 6)

Alternatives 1, 1A, and 2 would all have minimal impacts on the expected use of the area for water-oriented recreation. However, Alternative 6 which would result in decommissioning the dam and completing stream channel restoration work would result in increased recreational stream fishing as measured by trout populations in Piney Run compared with Alternatives 1, 1A, and 2 as Piney Run downstream of the dam is reconnected with Piney Run upstream of the dam. However, Alternative 6 would also result in a significant reduction in water-oriented recreation overall as the recreational opportunities offered by the reservoir would be lost.

7.1.1.2. Tradeoff 2: Wildlife Watching (Service 2) versus Backup Water Supply (Service 4)

Alternative 2 would meet approximately 66% of the current water supply need for the local service area while Alternative 1 would meet 54% of that need. Alternative 2 would result in significantly greater to wetlands and associated habitat compared with Alternative 1 and thus would result in a drop if the population of visible native wildlife in wetlands and therefore a drop

in wildlife watching opportunities. Compared with Alternative 6 which would provide 0% of the current water supply need for the local service area, Alternatives 1 and 2 would provide significantly more backup water supply but Alternative 6 would result in enhancements to wetland areas through land conversion of the reservoir bed and therefore increased opportunities for wildlife watching.

7.1.1.3. Tradeoff 3: Dam Safety Improvements and Risk Reduction versus Financial Expense

Alternatives 1, 2, and 6 would both address the dam safety issues identified in the purpose and need while Alternative 1A would not immediately do so. This would maintain a comparatively elevated level of risk of failure of the dam and resulting loss of life consequences during an extreme rainfall event for an indeterminate amount of time until the Sponsor could identify funding sources to make such repairs on their own. Failure of the dam would have catastrophic impacts on downstream properties, people, infrastructure, and the environment. Alternative 1A would result in short term savings of the expense of implementing the project but would do so at the risk of an extreme rainfall event occurring and potentially putting the dam in danger of failing. In addition, there may be short term costs in the form of loss of recreation revenue if an interim risk reduction measure such as lowering of the normal pool is required to be implemented.

Alternative 1 would have some temporary and permanent impacts on the adjacent habitat through loss of forest and to the adjacent community and park during construction only. However, impacts for Alternative 1 would be far less significant and more temporary in nature when compared with Alternative 2 but greater than Alternative 6 which would include significant restoration of stream channel and land conversion of the reservoir bed to forest and meadow land uses. Alternative 1 may also have less adverse impacts than Alternative 1A, due to that alternative having required interim risk reduction measures.

Impacts to forest would be offset through mitigation (reforestation and afforestation) in compliance with local and state laws.

7.2. Measures to Be Installed

Measures included for the rehabilitation of the Piney Run Dam are:

1. Widen the auxiliary spillway by excavating the right side slope of the spillway channel from 250 to 275 feet. This will involve excavating approximately 37,000 cubic yards (CY) of material.

2. Raise the dam crest elevation 4.5 feet while maintaining the existing 22-foot crest width and 3H:1V side slopes of the embankment from EL. 540.5 feet to EL. 545.0 feet. This will involve placement of approximately 37,000 CY of material which will be excavated from the spillway (the same borrow area used for the existing embankment shell).

3. Raise the central core zone and chimney filter of the embankment to the FBH/SDF peak water surface elevation. This will involve import and placement of approximately 2,600 CY of core material and approximately 1,700 CY of fine aggregate for the chimney filter.

   The core material is anticipated to meet the following requirements:
   a. USCS Material Type: GC, SC, or CL
   b. Fines content (passing the #200 sieve) > 30%
   c. Detailed specifications for materials should be developed during the detailed design of the modifications to the dam.
   d. ASTM C 33 fine aggregate is anticipated to be appropriate for the chimney filter material. The portion of the chimney filter to be raised is at the top of the filter and therefore no coarse aggregate is needed. Detailed specifications for materials should be developed during the detailed design of the modifications to the dam.

4. Modify the impact basin and rate control system to accommodate the additional embankment fill or construct new structures downstream.

5. Install roller-compacted concrete (RCC) along the steep slope immediately downstream of the end of the constructed auxiliary spillway exit channel. Install a secant pile cutoff wall under the RCC into bedrock and provide tieback anchors into rock.

6. Install a cutoff wall and scour pad of traditional reinforced concrete at the auxiliary spillway crest. The top of the cutoff wall would be approximately 0.8 feet above the elevation of the existing spillway crest (EL. 531.2 feet) at EL. 532.0 feet and would be done to raise the auxiliary spillway crest by 0.8 feet. The bottom of the wall would be at the elevation of the top of the RCC armoring resulting in an overall wall height of 9 feet (8.2 feet below grade for the cutoff and 0.8 feet above grade for the weir structure).

7. Replace the downstream end of the toe drain conduits and install access manholes to improve maintenance and inspection.

8. Make minor repairs to structural components of the principal spillway riser and water supply intake tower.

9. Modify the water supply intake tower to install an automated cold water release system to maintain the health of Piney Run.

After the implementation of these planned works of improvement, the Piney Run Dam will meet all current NRCS and Maryland Dam Safety criteria and performance standards and will provide 100 years of future sediment storage. Detailed structural data for the proposed rehabilitated dam can be found in **Table 7-3**.

7.3. Emergency Action Plan

The Sponsor maintains an Emergency Action Plan (EAP) for the Piney Run Dam and updates the document annually. As required by the National Engineering Manual, Part 520, Subpart C, Section 520.27 and the NOMM, Part 500, Subpart F, the NRCS State Conservationist is to determine that an EAP is prepared for the Piney Run Dam prior to the execution of fund obligating documents for construction of the structure. The breach inundation map of the final design will be the basis for potential areas to be affected and citizens to be notified. The purpose of the EAP is to identify areas at risk, outline appropriate actions, and to designate parties responsible for those actions in the event of a potential failure of the Piney Run Dam.

7.4. Real Property Rights

7.4.1. General

Real Property
The entire limits of the proposed work lie on property owned by the Sponsor. Therefore, no additional real property acquisition is required for completion of the project. The Sponsor agrees that all land acquired now or previously 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 that will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

Uniform Relocation Assistance and Real Property Acquisition Policies Act
Although acquisition of additional real property is not anticipated for this project, 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) if 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.

7.4.2. Easements

The Sponsor is responsible for obtaining any needed land rights, title, and easements associated with the rehabilitation projects and associated works of improvement. According to NRCS policy, for watershed rehabilitation projects the minimum land rights area upstream from the dam must be for all areas below the elevation of the top of dam, unless the plan allows a lower elevation (not be lower than the elevation of the 1% AEP storm or auxiliary spillway elevation, whichever is higher). In this case, the plan will require that the Sponsor hold land rights upstream of the dam to a minimum elevation of EL. 532.0 which is above the 1% AEP peak water surface elevation in the reservoir.

The Sponsor currently holds title to real property or a flowage easement which covers land required for the construction and/or related construction activities of the preferred alternative. Temporary land rights or easements for access or staging areas during construction are not anticipated to be needed. No residential or commercial relocations will be necessary as a result of the project.

7.5. Mitigation

During construction, site mitigation measures will include erosion and sediment control, seeding of disturbed areas, dust control, and other practices identified during the design process. An erosion and sediment control plan will be developed 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 the Sponsor's preference. All tools, equipment, and vehicles will be cleaned before transporting materials and before entering and leaving the worksites to prevent the introduction and spread of invasive plant species.

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.

Compliance with the MFCA will be addressed during design. This will include provisions to mitigate for an anticipated removal of approximately 6.5 acres of forest. A forest conservation plan to enumerate the impacts and address the regulatory reforestation and afforestation requirements in accordance with the state and local laws.

7.6. Permits and Compliance

Prior to construction, the Sponsors will be responsible for obtaining and complying with permits required by federal, state, and/or local regulatory agencies. Based on the scope of work of the preferred alternative, the engineering, environmental, and cultural resource investigations completed, and agency correspondence received to date, the following permits or approvals are anticipated for this project:

- U.S. Army Corps of Engineers (USACE) Authorization – based on the limited impacts to waters of the U.S. anticipated for this project, USACE authorization is expected to be issued as coverage for the project under the *Maryland State Programmatic General Permit 5* (MSPGP-5). Authorization has been applied for using the *Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland* and confirmation of this intended authorization received from through correspondence from the permit coordination authority, the MDE. Waterway Construction Permit (issued by MDE) – based on the scope of the modifications to the dam and the impacts to waters of the U.S. anticipated for this project, a General Waterway Construction Permit is expected to be required by the MDE. As the project will involve modifications to the dam, the permit will be administered by the Dam Safety Permits Division within MDE. Authorization has been applied for using the *Joint*

Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland and confirmation of this intended authorization received from the permit coordination authority, the MDE.

- General Permit for Stormwater Associated with Construction Activity (USEPA/MDE) – based on the anticipated disturbed area for the project (12.4 acres), coverage under Maryland's National Pollutant Discharge Elimination System (NPDES) *General Permit for Stormwater associated with Construction Activity* issued by the USEPA will be required. This permit must be applied for by filing a Notice-of-Intent (NOI) with MDE.
- Commercial Permit (Carroll County) – based on the anticipated disturbed area for the project (12.4 acres), a Commercial Permit will be required. This permit will require, as a pre-requisite, approval of an erosion and sediment control plan from the Carroll Soil Conservation District.

If additional cultural resources are discovered during construction, work will cease and the SHPO/MHT will be notified. Appropriate investigations procedures will be initiated.

7.7. Costs and Cost Sharing

Table 7-1 through **Table 7-6**, located at the end of Chapter 7 describe the project costs, project benefits, and structure data for the Preferred Alternative. Estimated installation costs and cost sharing allocations for the Preferred Alternative is shown in **Tables 7-1** and **Table 7-2**. Structure data for the preferred alternative is provided in **Table 7-3**. Total annualized costs are shown in **Table 7-4**. Costs shown in **Table 7-1**, **Table 7-2**, and **Table 7-4** and throughout the document are based on standard cost accounting practices required of federal watershed planning agencies, such as NRCS. The basis for cost sharing between NRCS and the Sponsor is based on the provisions of the dam rehabilitation amendments of the Watershed Protection and Flood Prevention program.

Table 7-5 displays the average annual benefits of the Preferred Alternative, and **Table 7-6** provides a comparison of economic benefits and costs. The analysis used a 2022 price level, 2.5% discount rate, and 103-year period of analysis.

7.8. Installation and Financing

The project is planned for an overall schedule of 36 months including design, permitting, and construction. The actual installation period is contingent on the availability of funds for design, permitting, and installation.

During construction, equipment will not be allowed to operate when conditions are such that soil erosion and water, air, and noise pollution cannot be satisfactorily controlled.

NRCS will provide assistance to the Sponsors with the Piney Run Dam Rehabilitation project. NRCS will be responsible for the following:

- Execute a new Operation and Maintenance Agreement with the Sponsors that extends the O&M responsibilities for another 100 years following construction. This agreement will be based on the NRCS National Operation and Maintenance Manual.
- Provide financial assistance equal to 65% of total eligible project costs, not to exceed 100% of actual construction costs.
- Verify that a current EAP is developed before construction is initiated.
- Provide engineering support, technical assistance, and approval during the design and construction of the project.
- Certify completion of all installed measures.

The Sponsor will be responsible for the following:

- Remove trees as requested by the Maryland Department of the Environment at the downstream end of the auxiliary spillway.
- Secure all permits, easements, and rights necessary for installation, operation and maintenance of the rehabilitated structure.
- Update the EAP for the dam prior to the initiation of construction.
- Execute an updated Operation and Maintenance Agreement with NRCS for the dam. This agreement will be based on the NRCS National Operation and Maintenance Manual.
- Procure and manage engineering services for the design, construction, and certification of the project.
- Provide local administrative and contract services necessary for the installation of the project.
- Provide non-federal funds for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.
- Participate in and comply with applicable Federal floodplain management and flood insurance programs.
- Enforce all associated easements and rights-of-way for the safe operation of the dam.

The NRCS share of installation costs will be provided from funds appropriated under the Watershed Protection and Flood Prevention Act (Public Law 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 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.

7.9. Operation, Maintenance, and Replacement

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. An updated O&M agreement will be developed, utilizing the NRCS-National Operation and Maintenance Manual, and will be executed when the implementation agreements are executed. The term of the new O&M agreement will be for 100 years following the completion of rehabilitation. 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 Public Law 83-566 cost sharing. Provisions will be made for free access of Sponsor, state, and federal representatives to inspect all structural measures and their appurtenances at any time.

Table 7-1. Estimated Installation Costs

Cost Item	PL-83-566 Funds[1,2]	Other Funds[1]	Total[1]
Piney Run Dam	$7,229,850	$4,070,150	$11,300,000

[1] Price level: 2022

[2] Federal agency responsible for assisting in installation of works of improvement

Table 7-2. Estimated Cost Distribution – Structural Measures

Cost Item	Installation Costs: PL-83-566[1]				Installation Costs: Other Funds[1]						Total Project Cost
	Construc-tion	Engineer-ing	Project Admin-istration	Total PL-83-566	Construc-tion	Engin-eering	Real Property	Permitting /O&M Clearing	Project Admin-istration	Total Other Funds	
Piney Run Dam	$6,089,850	$1,040,000	$100,000	$7,229,850	$3,179,150	$560,000	$0	$231,000	$100,000	$4,070,150	$11,300,000

[1] Price level: 2022

Table 7-3. Structural Data - Dams with Planned Storage Capacity (Piney Run Watershed, Piney Run Dam, Maryland)

Item	Unit	Piney Run Dam Planned Rehabilitation
Class of Structure		High
Seismic Zone		1
Uncontrolled Drainage Area	sq-mi	10.6
Controlled Drainage Area	sq-mi	N/A
Total Drainage Area	sq-mi	10.6
Runoff Curve Number (1-day) (Avg. AMC)		72
Time of Concentration (T_c)	hrs	2.87
Elevation Top of Dam[1]	ft	545.0
Elevation Crest of Vegetated Auxiliary Spillway	ft	531.2
Elevation Crest of Auxiliary Spillway (Weir)	ft	532.0
Elevation Crest Principal Spillway	ft	523.0
Auxiliary Spillway Type		Vegetated
Auxiliary Spillway Bottom Width	ft	275
Auxiliary Exit Slope	%	2.0
Maximum Height of Dam	ft	78
Volume of Embankment Fill	yd^3	212,300[2]
Volume of Additional Embankment Shell Fill	yd^3	37,000
Volume of Additional Embankment Core Fill	yd^3	2,600
Volume of Additional Chimney Drain Fill	yd^3	1,700
Total Capacity (Auxiliary Spillway Crest)	ac-ft	8,393
Between high and low stage	N\A – Single inlet principal spillway	
Sediment Submerged	ac-ft	1,960
Sediment Aerated	ac-ft	360
Recreation	ac-ft	2,340
Water Supply Allocation	ac-ft	869
Cold Water Release Allocation	ac-ft	170
Floodwater Retarding	ac-ft	2,694
Surface Area		
Sediment Pool	acres	157
Recreation Pool	acres	237
Water Supply Pool Allocation	acres	281
Cold Water Release Pool	acres	290
Floodwater Retarding Pool	acres	386
Principal Spillway		
Rainfall Volume (1-day)	in	8.3
Rainfall Volume (10-day)	in	12.2
Runoff Volume (10-day)	in	5.8

Item	Unit	Piney Run Dam Planned Rehabilitation
High Stage Capacity (at Auxiliary Spillway Crest)	ft^3/s	224
Type of Conduit		RCP
Dimensions of Conduit	in	36
Frequency of Operation (Vegetated Auxiliary Spillway)	% AEP	1.0
Auxiliary Spillway Hydrograph		
Rainfall Volume	in	17.3
Runoff Volume	watershed-inches	13.9
Storm Duration	hrs	72[3]
Velocity of Flow (V_e)	ft/s	8.6
Maximum Reservoir Water Surface Elevation	Ft	536.75
Freeboard Hydrograph		
Rainfall Volume	watershed-inches	38.9
Runoff Volume	watershed-inches	35.2
Storm Duration	hrs	72[3]
Maximum Reservoir Water Surface Elevation	ft	544.0
Storage Capacity Equivalents		
Sediment Volume	watershed-inches	3.5
Recreation Volume	watershed-inches	4.1
Water Supply Pool Allocation Volume	watershed-inches	1.5
Cold Water Release Volume	watershed-inches	0.3
Floodwater Retarding Volume	watershed-inches	5.4

1/ All elevations are recorded in North American Vertical Datum 1988 (NAVD88).
2/ From as-built plans plus estimated additional fill volume
3/ Critical duration storm event for a Class 'C' spillway design flood per MDE criteria.

Table 7-4. Average Annual Preferred Alternative Costs

Project Alternative	Total Capital Costs	Average Annual Capital Costs	Average Net Annual O&M	Average Annual Costs
Alternative 1	$11,300,000	$313,000	$0	$313,000

Notes: 2022 price level, 103-year period of analysis, and 2.5% discount rate. Average Annual Capital Costs include interest during construction.

Table 7-5. Estimated Average Annual Benefits

Project Alternative	Flood Damage Reduction Benefits	Recreation Benefits	Average Annual Benefits
Alternative 1	$30,000	$0	$30,000

Notes: 2022 price level, 103-year period of analysis, and 2.5% discount rate.

Table 7-6. Economic Benefits and Costs

Project Alternative	Average Annual Benefits	Average Annual Costs	Net Annual Benefits	Benefit-Cost Ratio
Alternative 1	$30,000	$313,000	($283,000)	0.1

Notes: 2022 price level, 103-year period of analysis, and 2.5% discount rate.

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9.0 LIST OF PREPARERS

Table 9-1. List of Preparers

Name / Title	Current Position (Years)	Education	Total Experience (Years)	Applicable Certifications
NRCS				
Jacob Dieguez, State Conservation Engineer, Maryland	1	B.S. Civil Engineering	13	PE
J'Que Jones, State Conservation Engineer, Maryland (2019-2023)	3	B.S. Biological and Agricultural Systems Engineering	14	PE
Carroll County, Maryland Department of Land and Resource Management				
Christopher Heyn, Director	2	B.S. Civil Engineering M.S. Environmental Engineering	30	PE
Engineering/Consulting Firm – AECOM				
Robert Pinciotti, Project Manager, Engineer-in-Charge	19	B.S. Civil Engineering M.S. Civil Engineering	40	PE
Jeff Blass, Task Manager, Hydrology/Hydraulics, Breach Analysis, Rehab. Alt. Analysis, Cost Estimates	4	B.S. Civil Engineering; M.S. Civil Engineering; M.B.A	19	PE
Wesley Hollenbach, SITES	5	B.E.E. Environmental; Engineering	11	PE, CFM
Kris Wachtel, Geotechnical Engineering Analysis, Visual Inspection	7	B.S. Civil Engineering M.S. Civil Engineering Ph D. Civil Engineering	5	
Nicolette Schluter, Geotechnical Investigation, Visual Inspection	4	B.S. Civil Engineering; M.E. Civil Engineering	6	EIT
Madison Woeltje, Alternative Analysis CADD	3	B.S. Civil Engineering & Math	5	EIT
Richard Walker, Structural Analysis	9	B.S. Civil Engineering; M.S. Civil Engineer	13	PE
Jason Weiss, Economic Analysis	23	B.I.E. Industrial Engineering; M.S. Resource Economics and Policy	27	
Frida Cruz, Economic Analysis	4	M.S. Applied Economics	5	
Thomas Redstone, Economic Analysis	4	B.A. Economics & Environmental Studies; Masters in Planning, Policy, & Management	8	AICP; ENV SP
Jennifer Warf, Environmental Scientist	7	B.A. Zoology M.S. Environmental Studies	32	
Charlene Wu, Environmental Scientist	6	B.S. Environmental Science and Policy M.S. Environmental Management	10	
Blair Jenet, Environmental Scientist	6	M.A. Environmental Science B.A. Environmental Science	7	WPIT LEED GA

Name / Title	Current Position (Years)	Education	Total Experience (Years)	Applicable Certifications
Scott Seibel, Archeology/Cultural Resources	12	B.A. Archaeological Studies; M.S. Archaeomaterials	25	RPA
Peter Regan, Archeology/Cultural Resources	7	B.A. History & Anthropology; MA Archaeology	15	RPA
Brandon Alderman, Sedimentation Analysis	6	B.S. Biology; B.S Chemistry	16	Rosgen Level IV
Tim King, Bathymetric Surveys	12	B.S. Geology	36	PG (Pennsylvania)
Michael Greer, Geophysics	22	M.S. Geophysics	22	PG (Louisiana)
Michael Hohl, Conduit Inspections	7	B.S. Geography	9	

10.0 DISTRIBUTION LIST

Comments were requested on the Draft Supplemental Plan No. 2 – EA from the following agencies and organizations.

10.1. Federal Agencies

NRCS National Watershed Management Center, Little Rock, Arkansas.

U.S. Fish and Wildlife Service, Annapolis, Maryland

U.S. Army Corps of Engineers District, Baltimore, Maryland

U.S. Environmental Protection Agency Region 3, Philadelphia, Pennsylvania

10.2. Maryland State Agencies

Maryland Department of Natural Resources, Annapolis, Maryland

Maryland Department of the Environment, Baltimore, Maryland

Maryland Historic Trust, Crownsville, Maryland

10.3. Other

Carroll County Department of Land and Resource Management

Carroll County Department of Recreation and Parks

Carroll County Department of Public Works

Carroll Soil Conservation District

Commissioners of Carroll County

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