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

April 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 inquiries must be received by April 13, 2025. Submit comments and inquiries to: Jacob Dieguez, State Conservation Engineer, USDA/NRCS, 5601 Sunnyside Avenue, Beltsville, Maryland 20705, Mail Stop #5598 (443-699-5226).

NON-DISCRIMINATION STATEMENT

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 agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsors are legally unable to comply with the real property acquisition requirements, they agree 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
Maintenance (O&M Clearing)	$0	$31,000	$31,000
Subtotal: Non Cost-Share Costs	**$100,000**	**$231,000**	**$331,000**
TOTAL:	**$7,229,850**	**$4,070,150**	**$11,300,000**

(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 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
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 July 3, 2025 at Westminster, Maryland.

Kenneth A. Kiler
Kenneth A. Kiler, President

Date: 7/3/2025

Carroll Soil Conservation District By ______________________
Gregory Dell, Chairman

700 Agricultural Center Drive, Westminster, Maryland 21157 Date 7-28-25
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 7/24/25, 2025 at Westminster, Maryland.

______________________ Date: 7/28/25
Matthew McMahon, District Manager

Natural Resources Conservation Service
U.S. Department of Agriculture

Approved by:

____
Suzy Daubert, State Conservationist

Date: 8/7/25

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SUMMARY (OFFICE OF MANAGEMENT AND BUDGET FACT SHEET)

SUPPLEMENTAL WATERSHED PLAN – ENVIRONMENTAL ASSESSMENT
for Rehabilitation of Piney Run Dam
Piney Run Watershed
Carroll County, Maryland
2nd & 3rd ~~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 from elevation (EL.) 540.5 feet to EL. 545.0 feet while maintaining the existing 22-foot crest width and three-horizontal-to-one-vertical (3H:1V) side slopes of the embankment.
- 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 chimney/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 from elevation (EL.) 540.5 feet to EL. 545.0 feet while maintaining the existing 22-foot crest width and three-horizontal-to-one-vertical (3H:1V) side slopes of the embankment.
- 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 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.

The 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 alternative 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/O&M Clearing)	$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 include 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 is 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 limits of disturbance, 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 best management practices (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 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
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 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?		RATIONALE
	YES	NO	
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 for 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			
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.
Civil Rights	X		Potential air and noise emissions resulting from the proposed action could result in disproportionate effects on 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			
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.

RESOURCE AREA	Relevant to the Proposed Action? YES	NO	RATIONALE
Occupational Health and Safety	X		Contractors would be used to facilitate the 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, 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, material, and strength laboratory testing.
- Slope stability and seepage analyses of the earth embankment structure at Piney Run Dam
- 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 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.

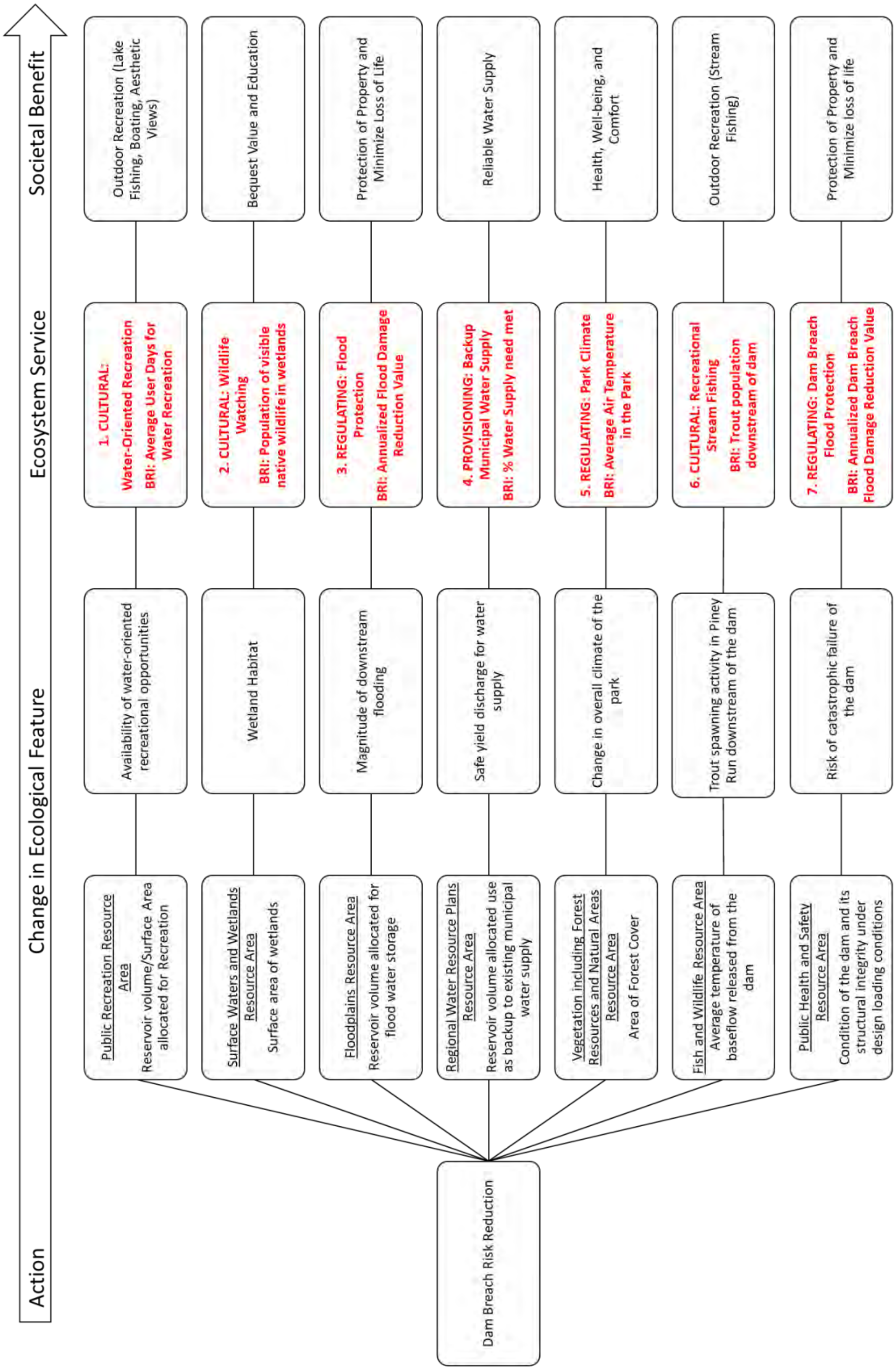


Figure 3-1. Ecosystem Service Causal Chain

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 the 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 the 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 perform a desktop delineation of 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 in 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 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 limits 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 lowest percentage of individuals with a bachelor's degree (37.0 percent) compared to Eldersburg (48.6 percent) and the State (40.9 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 a 0.5-mile radius 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. 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.

3.11.1. 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 and its structural integrity is improved, the risk of a failure is expected to be lower than if this was not done. The 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.

3.11.2. 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.

3.12. 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 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.

3.13. 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.

3.14. 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)

3.14.1. 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 small 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 the 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 the 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.

<u>Potential Dam Safety Deficiencies</u>
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 a 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 3-11. 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
Dam Height (ft)	73	
Dam Type	Earth fill	
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

Item	Piney Run Dam	
	As-Built	**Existing**
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 58-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 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.

<u>Lake Drain</u>

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 having the leaks repaired in the next 12 months.

The lake drain conduit was inspected via camera in 2019 and 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 the 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 BMPs 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.

3.15. 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.

3.16. 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 on 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.

3.17. Evaluation of Potential Failure Modes

3.17.1. 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.

3.17.2. 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.

3.17.3. 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).

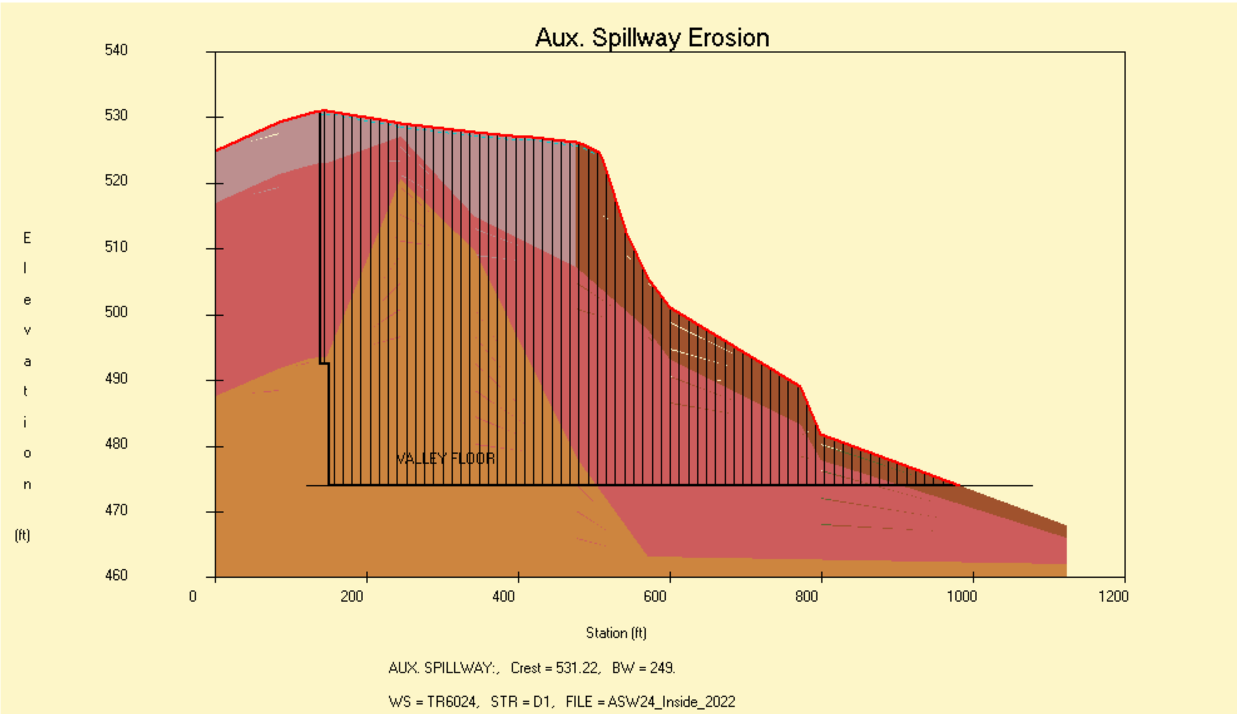
Twelve borings were drilled in the auxiliary spillway to determine subsurface profiles and to collect samples for estimation of soil and rock erodibility parameters for auxiliary spillway integrity analysis. Laboratory testing of soil samples collected during the subsurface exploration program made as 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.

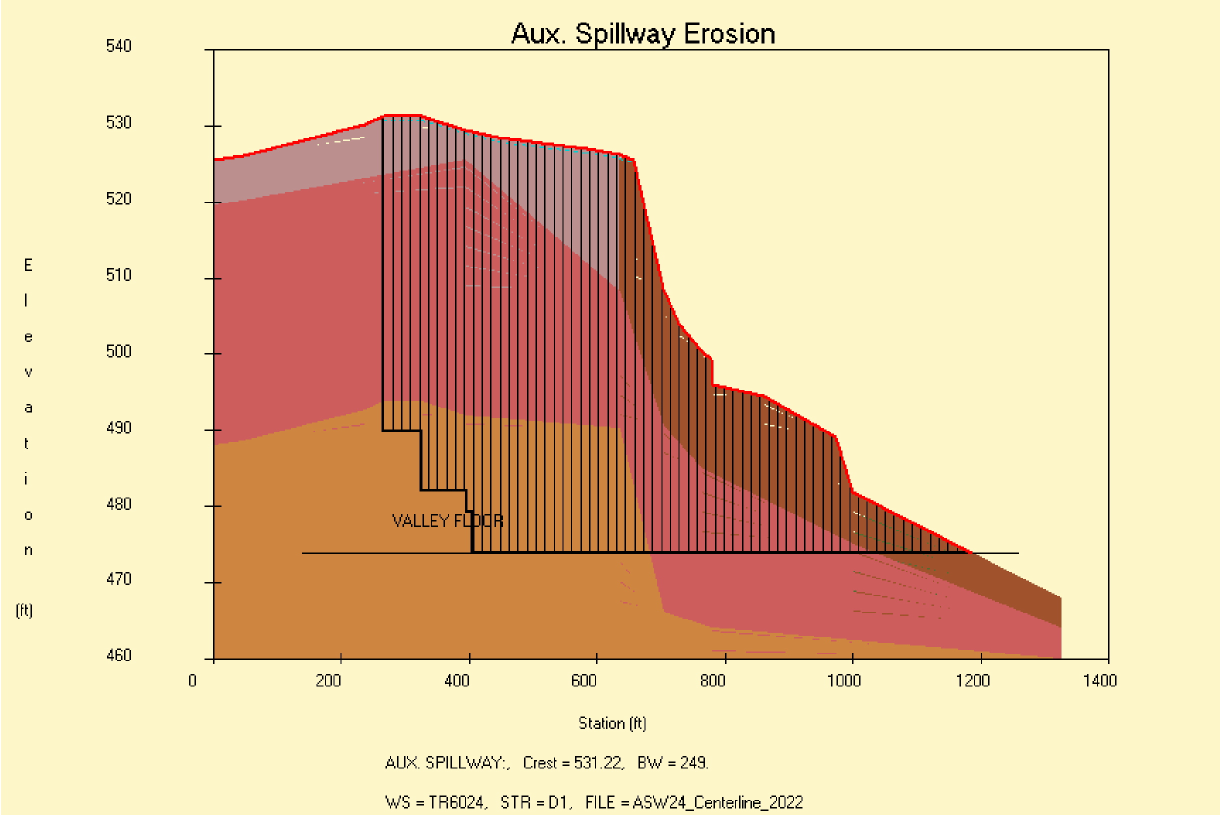
The auxiliary spillway surface condition parameters were estimated based on the conditions observed during a visual inspection made in November 2019. The Vegetal Retardance Curve Index is approximated by the Manning's roughness value of the cover through the auxiliary spillway. A Manning's roughness 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.



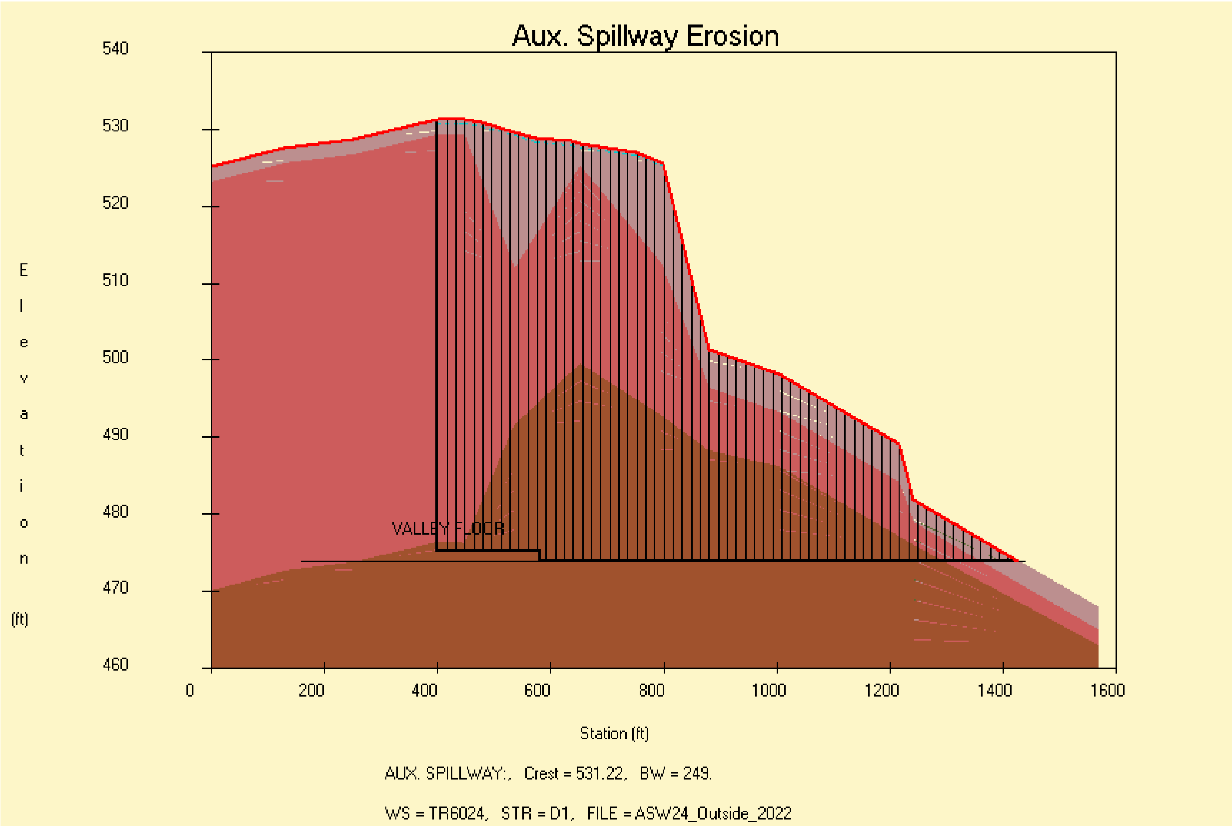
Material Description	Detach. Rate (ft/h)/(lb/sq ft)	Dry Density (lbs/cu ft)	Headcut Index (Kh)	Percent Clay	Plasticity Index	Rep. Diameter (in)
ML	--	100.	0.06	3.0	0.	0.01000
SM	--	105.	0.16	1.0	0.	0.14000
GM	--	110.	0.12	11.0	12.	0.26000
MICASCHIST	--	178.	10.00	0.0	0.	12.00000

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 release 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.

3.17.4. 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.

3.17.5. 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.

3.17.6. 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.

3.17.7. 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.

3.17.8. Conclusions

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

3.18. 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.

<u>Loss of Life</u>
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**.

<u>Release of Harmful Materials</u>
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.

<u>Agricultural Damage</u>
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 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 alternatives to meet the purpose and need.

At minimum, the following alternatives must be considered in the 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 it 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. The 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 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 comparative summary 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					✓
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 the 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* on 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 the 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 the 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 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* on 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 geological 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, 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 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 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* on 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 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* on 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 Piney Run Dam would continue for the foreseeable future. Therefore, *no impact* on water resources would result from the 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 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 on 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 the 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 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 the 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 a 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 were 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 the 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 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 needed if the Sponsor's current source of water were to be taken offline. However, this portion would be higher than 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 the implementation of Alternative 6 would be 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* on 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, afforestation would be required to comply with the MFCA which would result in a net increase in tree canopy and thus potentially 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. In addition, sediment runoff from construction activities could adversely affect aquatic species, such as the Laura's Clubtail (*Stylurus laurae*) if BMPs as part of erosion and sediment control plan and stormwater pollution prevention plan are not strictly adhered to. 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 have 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* on 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* on 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, an FCP and Planting Plan would be created and enacted for 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 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 potentially lower the 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. In addition, sediment runoff from construction activities could adversely affect aquatic species, such as the Laura's Clubtail (*Stylurus laurae*) if BMPs as part of erosion and sediment control plan and stormwater pollution prevention plan are not strictly adhered to. Although disturbance, displacement, or inadvertent wildlife mortality from construction activities would have 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, the construction of Alternative 6 would result in *short-term, less-than-significant adverse impacts* on 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* on 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 on 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 to 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 in **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, locating 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 on 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 on 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 on 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

The 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, 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. The decrease in park visitors would be temporary and is not anticipated to affect socioeconomic conditions in the Study Area. Therefore, 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 in 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* on 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 in 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. 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.

5.9.1. 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* on 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.

5.9.2. 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.

5.9.3. 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.

5.9.4. 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 the implementation of Alternative 2 as Alternative 1. Alternative 2 would result in a 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.

5.9.5. 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.

5.10. 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.

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

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

5.10.2. Alternative 1 – Dam Modification without Water Supply Infrastructure

Construction of Alternative 1 would have no impact on park infrastructure aside from impacts on the dam itself. Additionally, Alternative 1 would result in temporary increases in construction-related traffic at the site, which 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 the infrastructure downstream of the dam. Therefore, Alternative 1 would have a *long-term beneficial impact* on infrastructure in the Study Area.

5.10.3. 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.

5.10.4. 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.

5.10.5. 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, which 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.

5.11. 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).

5.11.1. 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.

5.11.2. 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 on 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 the release of HTMW; therefore, there would be *no long-term impacts*.

5.11.3. Alternative 1A – Future without Federal Investment

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

5.11.4. 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.

5.11.5. 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.*

5.12. 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 the 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)

5.12.1. 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.

5.12.2. 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*.

5.12.3. 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.

5.12.4. 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.

5.13. Risk and Uncertainty

<u>Cultural Resources</u>
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 an 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.
- A notice of availability was published in the Carroll County Times and on the project website on March 13, 20, and 27, 2025 which included notification of a public hearing. A public hearing was held on April 3, 2025 during a regularly scheduled meeting of the Carroll County Commissioners. There were no public comments made at this meeting. The notice published for the public hearing and briefing paper from the public hearing are provided in **Appendix A**.

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. No questions or comments were received from the public during the draft report review period despite the publications of the notice of availability and the provision of a public hearing.

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.

A notice of availability of the draft document was distributed to the regulatory agencies listed in Section 10 on March 11, 2025 via email. A copy of the notice of availability and comments received is provided in **Appendix A**.

During the review period, one comment on the proposed Draft Plan-EA was received from the MDNR as follows:

The Wildlife and Heritage Service has determined that there is a record of state rare Laura's Clubtail (Stylurus laurae) documented in a portion of Piney Run located at the very southern end of the study area near Henryton. This species could potentially occur in other parts of Piney Run in closer proximity to the proposed work. The Laura's Clubtail is thought to have an aquatic larval stage that is especially susceptible to the effects of siltation. We would encourage the applicant to adhere stringently to all appropriate best management practices for sediment and erosion control during all phases of work for this project.

This Final Plan-EA was revised as appropriate based on that comment and internal review.

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 does not provide as much economic benefits, nor does it have as few impacts on the community as Alternative 1. The local community also does 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 environmentally 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, the 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. Strict adherence to soil erosion and sediment control BMPs is required to minimize the affects on aquatic species such as the state rate Laura's Clubtail (*Stylurus laurae*) which is documented in Piney Run at the downstream end of the affected area.

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 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 the 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 the 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
	Construction	Engineering	Project Administration	Total PL-83-566	Construction	Engineering	Real Property	Permitting /O&M Clearing	Project Administration	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	20	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

11.0 Index

Appendix A Comments and Responses on Draft Plan-EA

Figure A - 1. Notice of Availability of Draft Plan-EA to Agencies

From: [redacted]
Sent: Tuesday, March 11, 2025 9:50 AM
To: [redacted]
Subject: Notice of Availability: DRAFT SUPPLEMENTAL WATERSHED PLAN No. 2 and Environmental Assessment for Rehabilitation of Piney Run Dam Piney Run Watershed Carroll County, Maryland

Hello,

On behalf of the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), we are providing the following notification:

The NRCS, with assistance from local watershed sponsors, has completed a draft watershed plan supplement and environmental assessment (EA) for the proposed rehabilitation of Piney Run Dam of the Piney Run watershed, Maryland. Piney Run watershed is located within the Patapsco River basin. Sponsoring local organizations for the project are:

- Carroll Soil Conservation District
- Commissioners of Carroll County

The project is a federally assisted action authorized by section 14 of the Watershed Protection and Flood Prevention Act, 16 U.S.C. Section 1012, as amended by section 313 of Public Law 106-472. This section authorizes the NRCS to provide technical and financial assistance to local sponsors for rehabilitation of aging dams constructed under the Watershed Protection and Flood Prevention Act (Public Law 83-566), the Flood control Act of 1944 (Public Law 78534), the Pilot Watershed Program, and the Resource Conservation and Development (RC&D) Program. The draft plan supplement and environmental assessment is provided for your review and comment at the following web hyperlink:

[illegible]

The document is accessible using the three hyperlinks found below the green comments icon on the webpage accessed using the above web hyperlink.

The purpose of this project is to maintain the present level of flood control benefits and comply with current performance and safety standards. There is a need to protect downstream properties and infrastructures as well as reduce the risk of potential loss of life. We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190).

We request that comments be received by the NRCS on or before April 13, 2025. If your comments are not received by the due date, we will assume you do not wish to comment. For further information, please contact [redacted], Environmental Engineer, at 301.[redacted] or [redacted] Comments may be provided through the project website linked via the hyperlink above or by email at PineyRunStudy@carrollcountymd.gov.

Thank you for your participation in this project.

Figure A - 2. Environmental Protection Agency, Region 3 Response to Draft Plan-EA

From: [redacted]
Sent: Thursday, April 3, 2025 12:24 PM
To: PineyRunStudy@carrollcountymd.gov
Cc: [redacted]
Subject: Piney Run Study Supplemental EA Comments

This Message Is From an External Sender
This message came from outside your organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Report Suspicious

Good Afternoon,

Thank you for providing the opportunity to participate in the review of the Piney Run Draft Supplemental Watershed Plan and Environmental Assessment. We have no comments to provide at this point in the NEPA process.

We appreciate being included in this process and look forward to reviewing the final EA.

Best,
[redacted]
Life Scientist, NEPA and Technical Assistance Branch
EJ, Community Health, & Environmental Review Division, U.S. EPA R3
Phone [redacted]
Email: [redacted]

Figure A - 3. SHPO – Maryland Historic Trust Response to Draft Plan-EA

From: Maryland Historical Trust <donotreply@maryland.gov>
Sent: Monday, April 7, 2025 7:14 PM
To: [redacted]
Subject: MHT e106 project review – MHT Completed Comments

This Message Is From an External Sender
This message came from outside your organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Report Suspicious

Date:	April 07, 2025
To:	[redacted]
Project Name:	DRAFT SUPPLEMENTAL WATERSHED PLAN No. 2 and Environmental Assessment for Rehabilitation of Piney Run Dam Piney Run Watershed
County:	Carroll County
Agency:	U.S. Department of Agriculture
Second Agency:	-- Not noted --
MHT Log #:	202501569

MHT Response: Thank you for providing the Maryland Historical Trust the opportunity to comment on the above-referenced undertaking using the MHT e106 system. The Maryland Historical Trust has reviewed the submitted project for its effects on historic and archeological resources, pursuant to Section 106 of the National Historic Preservation Act of 1966 and/or the Maryland Historical Trust Act of 1985. We offer the following comments and/or concurrence with the agency's findings:

The undertaking will have no effect on historic properties. Additional consultation with our office may be required if there are any significant changes in project scope or location.

Thank you for your cooperation in this review process. Since the MHT response is now complete, this response will appear in the Completed section of your project dashboard. No hard copy of this response or attachments will be sent. If you have questions, please contact the following MHT project reviewers:

[redacted]

Figure A - 4. Maryland Department of Natural Resources Response to Draft Plan-EA

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

April 23, 2025

Mr. Jeff Blass
AECOM
12420 Milestone Center Drive
Suite 150
Germantown, MD 20876

RE: Environmental Review for Draft Supplemental Watershed Plan No. 2 and EA for Rehab of Piney Run Dam, Carroll County, Maryland.

Dear Mr. Blass:

The Wildlife and Heritage Service has determined that there is a record of state rare Laura's Clubtail (*Stylurus laurae*) documented in a portion of Piney Run located at the very southern end of the study area near Henryton. This species could potentially occur in other parts of Piney Run in closer proximity to the proposed work. The Laura's Clubtail is thought to have an aquatic larval stage that is especially susceptible to the effects of siltation. We would encourage the applicant to adhere stringently to all appropriate best management practices for sediment and erosion control during all phases of work for this project.

If the project changes in the future such that the limits of proposed disturbance or overall site boundaries are modified, please provide us with revised project maps and we will provide you with an updated evaluation. Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at lori.byrne@maryland.gov or at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2025.0665.cl

Figure A - 5. Notice of Availability of Draft Plan-EA to Native American Tribes

USDA
United States Department of Agriculture

March 12, 2025

[redacted]

Re: Draft Watershed Plan Supplement and Environmental Assessment (EA) for Piney Run Dam

Dear [redacted]

The USDA Natural Resources Conservation Service (NRCS), with assistance from local watershed sponsors, has completed a draft watershed plan supplement and environmental assessment (EA) for the proposed rehabilitation of Piney Run Dam of the Piney Run watershed, Maryland. Piney Run is located within the Patapsco River basin. Sponsoring local organizations for the project are:

Carroll Soil Conservation District
Commissioners of Carroll County

The project is a federally assisted action authorized by section 14 of the Watershed Protection and Flood Prevention Act, 16 U.S.C. Section 1012, as amended by section 313 of Public Law 106-472. This section authorizes NRCS to provide technical and financial assistance to local sponsors for rehabilitation of aging dams constructed under the Watershed Protection and Flood Prevention Act (Public Law 83-566), the Flood control Act of 1944 (Public Law 78-534), the Pilot Watershed Program, and the Resource Conservation and Development (RC&D) Program. The draft plan supplement and environmental assessment is provided for your review and comment at the following website:
https://www.carrollcountymd.gov/government/directory/planning-land-management/resource-management/piney-run-watershed-study/

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

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before April 13, 2025. If your comments are not received by the due date, we will assume you do not wish to comment.

We will also reach out via the email address we have on file for you. For further information contact [redacted] Environmental Engineer, at [redacted] or [redacted] Comments may be provided through the project website provided above or by email at PineyRunStudy@carrollcountymd.gov.

Sincerely,

[redacted]
State Conservationist

Natural Resources Conservation Service
5601 Sunnyside Avenue
Beltsville, MD 20705
Voice (410) 757-0861 – FAX (855) 432-9027
An Equal Opportunity Provider, Employer and Lender

Figure A - 6. Summary of Draft Plan-EA Distribution to and Coordination with Native American Tribes

Affiliation	Name	Position	Salutation	Email	Address 1	Address 2	City, State, Zip	NEPA Public Review	Phone	Website
Oneida Indian Nation	Jesse Bergevin	Historic Resources Specialist	Mr. Bergevin	jbergevin@oneida-nation.org	2037 Dream Catcher Plaza		Oneida, NY 13421-0662	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received an email read receipt on 3/14/2025. Received a signed certified mail receipt 3/2025.	315-829-8463	
Oneida Tribe of Indians of Wisconsin	Stacie Cutbank	THPO	Ms. Cutbank	sdanfor3@oneidanation.org	P.O. Box 365		Oneida, WI 54115-0365	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received an email read receipt on 3/14/2025.	920-490-3929	
Onondaga Nation	Joseph Heath	General Counsel	Mr. Heath		Onondaga Nation	4040 Route 11	Nedrow, NY 13120	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Sent a letter by certified mail on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	315-475-2559	
Saint Regis Mohawk Tribe	Darren Bonaparte	THPO	Mr. Bonaparte	darren.bonaparte@srmt-nsn.gov	Saint Regis Mohawk Tribe Tribal Administration Building	71 Margaret Terrance Memorial Way	Akwesasne, NY 13655	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	518-358-2272 ext. 2163	
Tuscarora Nation	Bryan Printup	Chiefs Council	Mr. Printup	bprintup@hetf.org	5226 Walmore Road		Lewiston, NY 14092	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	716-264-6011	
Seneca-Cayuga Nation	William Tarrant	THPO	Mr. Tarrant	wtarrant@sctribe.com	P.O. Box 453220		Grove, OK 74345	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	918-787-5452 ext. 6061	
Delaware Nation	Katelyn Lucas	THPO	Ms. Katelyn Lucas	klucas@delawarenation-nsn.gov	Cultural Preservation Department	P.O. Box 825	Anadarko, OK 73005	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	405-247-2448 ext. 1403	
Delaware Tribe of Indians	Susan Bachor	Historic Preservation Representative	Ms. Bachor	smbachor@gmail.com	P.O. Box 64		Pocono Lake, PA 18347	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025.	610-761-7452	
Absentee-Shawnee Tribe of Oklahoma	Devon Frazier	THPO	Ms. Frazier	dfrazier@astribe.com / 106NAGPRA@astribe.com	2025 S. Gordon Cooper Drive		Shawnee, OK 74801	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025.	405-275-4030 ext. 6243	
Eastern Shawnee Tribe	Paul Barton	THPO	Mr. Barton	thpo@estoo.net	70500 E. 128 RD		Wyandotte, OK 74370	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	918-666-5151 ext. 1833	
Shawnee Tribe	Tonya Tipton	THPO	Ms. Tipton	tonya@shawnee-tribe.com		29 S. Hwy 69A	Miami, OK 74355	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	918-542-2441 ext. 103	
Cayuga Nation	Sharon Leroy	THPO?	Ms. Leroy	sharon.leroy@cayuganation-nsn.gov	P.O. Box 803		Seneca Falls, NY 13148	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	315-568-0750	
Stockbridge-Munsee Community Band of Mohican Indians	Bonney Hartley	THPO	Ms. Bonney Hartley	bonney.hartley@mohican-nsn.gov	86 Spring Street		Williamstown, MA 01267	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received an email read reciept 3/14/2025. 3/18/2025 Jeffrey C Bendremer Ph.D., RPA, THPO responded, "Though we routinely consult on such projects, Carroll County, Maryland is situated outside of the Stockbridge-Munsee Community Traditional Homeland/Area of Interest. Therefore, the Stockbridge-Munsee Community Tribal Historic Preservation Office has no comment regarding the aforementioned action." Received an email read receipt from Ms. Hartley on 3/14/2025. Received a signed certified mail receipt 3/2025.	413-884-6048	
Tonawanda Band of Seneca Nation	Christine Abrams	Cultural Preservation	Ms. Abrams	tonseneca@aol.com	7027 Meadville Road		Basom, NY 14013	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	716-542-4244 or 716-542-2341	
Pamunkey Indian Tribe	Bradby Brown	Assistant Chief, Deputy THPO	Mr. Brown	pamunkeytribe@pamunkey.org	1054 Pocahontas Trail	Pamunkey Indian Reservation	King William, VA 23086	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.		
Pamunkey Indian Tribe	Kendall Stevens	Cultural Resource Director	MS. Kendall Stevens	kendall.stevens@pamunkey.org	1054 Pocahontas Trail	Pamunkey Indian Reservation	King William, VA 23086	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.		
Chickahominy Indian Tribe	Stephen R. Adkins	Chief	Chief Adkins	stephen.adkins@chickahominytribe.org	Chickahominy Indian Tribe	8200 Lott Cary Road	Providence Forge, VA 23140	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	804-829-5548	
Chickahominy Indian Tribe - Eastern Division	Gerald A. Stewart	Chief	Chief Stewart	consultations@cit-ed.org	Chickahominy Indians Eastern Division	2895 Mt. Pleasant Road	Providence Forge, VA 23140	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025.	804-966-7815	
Upper Mattaponi Tribe	W. Frank Adams	Chief	Chief Adams	admin@umitribe.org	Upper Mattaponi Indian Tribe	13476 King William Road	King William, VA 23086	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.	804-769-0041	http://www.uppermattaponi.org
Rappahannock Tribe	G. Anne Richardson	Chief	Chief Richardson	chiefannerich@aol.com	Rappahannock Tribe Cultural Center	5036 Indian Neck Rd.	Indian Neck, VA 23148	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.		
Monacan Indian Nation	Kenneth Branham	Chief	Chief Branham	tribaloffice@monacannation.com	Monacan Indian Nation	P.O. Box 960	Amherst, VA 24521	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025.	434-946-0389	
Nansemond Indian Tribe	Samuel Bass	Chief	Chief Bass	samflyingeagle48@yahoo.com	Nansemond Indian Nation	1001 Pembroke Lane	Suffolk, VA 23434	Sent a letter by certified mail and emailed a copy of the letter requesting a read receipt for public and interagency review on 3/14/2025. The letter provided the Draft Watershed Plan Supplement and Environmental Assessment (EA) and requested comments by 4/13/2025. Received a signed certified mail receipt 3/2025.		

Figure A - 7. Notice of Availability of Draft Plan-EA to Public

NOTICE OF PUBLIC HEARING

The County Commissioners of Carroll County will hold a public hearing on Thursday, April 3, 2025, beginning no sooner than 9:00 a.m., regarding the Piney Run Watershed Study. The Maryland Department of Environment (MDE) required Carroll County to evaluate the Piney Run dam for compliance and resolve any deficiencies. The study has been completed and the final report will be presented at the public hearing.

For information on how to comment during the public comment portion of the hearing, please contact Christopher Heyn, Director, Department of Planning and Land Management at 410-386-2949 during normal business hours, Monday through Friday, prior to the date of the hearing.

The Americans with Disabilities Act applies to the Carroll County Government and its programs, services, activities, and facilities. Anyone requiring an auxiliary aid or service for effective communication or who has a complaint should contact The Department of Citizen Services, 410-386-3600 or 1-888-302-8978 or MD Relay 7-1-1/1-800-735-2258, as soon as possible but no later than 72 hours before the scheduled event.

The final report may be viewed on the County's website: https://www.carrollcountymd.gov/government/directory/planning-land-management/resource-management/piney-run-watershed-study/.

CCT 13/003 Mar. 13, 20, 27 7781704

Figure A - 8. Draft Plan Public Hearing Briefing Paper

Department of Planning & Land Management
Briefing Paper
Public Hearing – April 3, 2025

Issue:

Piney Run Watershed Study

Background:

The Maryland Department of Environment, Dam Safety Division (MDE) expressed concern that the Piney Run Dam may not comply with current design standards. MDE issued a requirement that Carroll County evaluate the dam for compliance and resolve any deficiencies by August 2027.

The Carroll County Bureau of Resource Management applied for grant funding from the Natural Resources Conservation Service (NRCS) to implement the first phase of work, a watershed study to validate if there are deficiencies and a plan to address them. That study has been completed and the final report is required to go to public hearing.

Staff will present the results of the report and then public comment regarding the final report will be heard. The final report can be found on the County website:

https://www.carrollcountymd.gov/government/directory/planning-land-management/resource-management/piney-run-watershed-study/

No action is required by the Board of County Commissioners other than to close the public hearing. Following the closure of the administrative process of the watershed study, staff will return for approval from the Board to apply for further grant funding from NRCS for the next phase of the dam rehabilitation.

Action:

Conduct a public hearing on the final Piney Run Watershed Study.

Staff recommended motion:

I move the Board of County Commissioners conclude the public hearing.

Attendees:

Christopher Heyn, Director, Department of Planning and Land Management

Figure A - 9. Notice of Finding of No Significant Impact

DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

Rehabilitation of the Piney Run Dam, Piney Run Watershed
Carroll County, Maryland

AGENCY: Natural Resources Conservation Service, USDA.
ACTION: Notice of Finding of No Significant Impact
SUMMARY: Pursuant to section 102(2)(c) of the National Environmental Policy Act of 1969, the Council on Environmental Quality Regulations (40 CFR Part 1500), and the Natural Resources Conservation Service Regulations (7 CFR Part 650), the Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA), gives notice that an environmental impact statement is not being prepared for the Piney Run Watershed, Carroll County, Maryland for the rehabilitation of the Piney Run Dam.

The environmental assessment of this federally assisted action indicates that the project will not cause significant local, regional, or national impacts on the environment. As a result of these findings, Suzy Daubert, Maryland NRCS State Conservationist, has determined that the preparation and review of an environmental impact statement are not needed for this project.

The project purposes are to rehabilitate the Piney Run Dam to meet current USDA-NRCS and Maryland Department of the Environment safety and performance criteria for a "high" hazard potential dam and to maintain the current level of flood damage protection.

The Notice of Finding of No Significant Impact (FONSI) has been forwarded to the Environmental Protection Agency and to various Federal, State, and local agencies and interested parties. A limited number of copies of the FONSI are available to fill single copy requests at the address below. Basic data developed during the environmental assessment are also on file and may be reviewed by appointment at the address below.

For further information contact: Jacob Dieguez, State Conservation Engineer, Natural Resources Conservation Service, 5601 Sunnyside Ave, Stop 5598 c/o Maryland State Office, Beltsville, Maryland, 20705, email: jacob.dieguez@usda.gov, telephone: 443-699-5226.

This activity is listed in the Catalog of Federal Domestic Assistance under No. 10.904, Watershed Protection and Flood Prevention, and is subject to the provisions of Executive Order 12372, which requires intergovernmental consultation with State and local officials.

Suzy Daubert

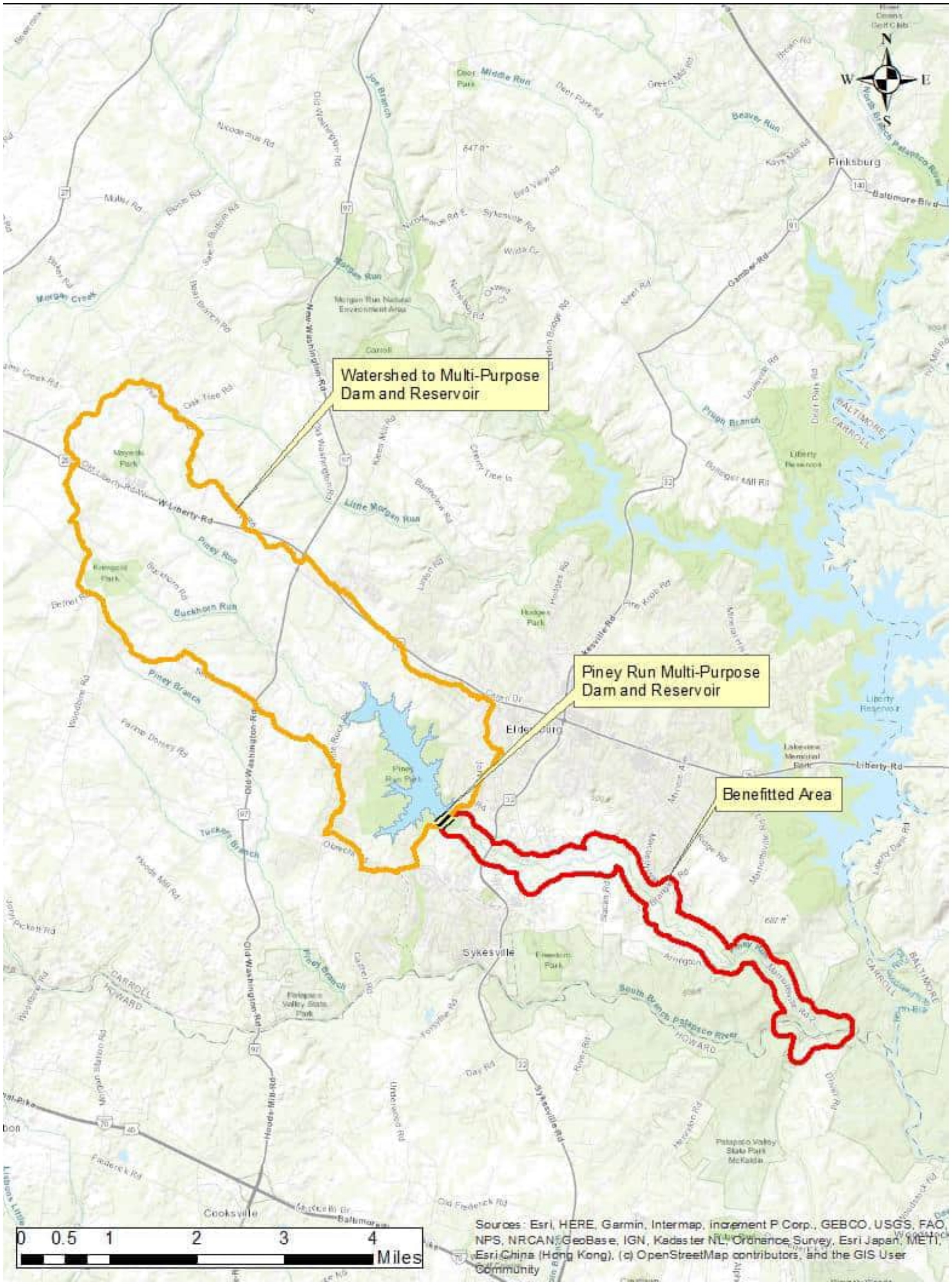
State Conservationist
USDA-NRCS
Beltsville, MD

4/15/2025

CCT 22/001 May 19 7815222

Appendix B Project Map

Figure B - 1. Piney Run Watershed Project Map



Appendix C Support Maps

Figure C - 1. Piney Run Land Use Map

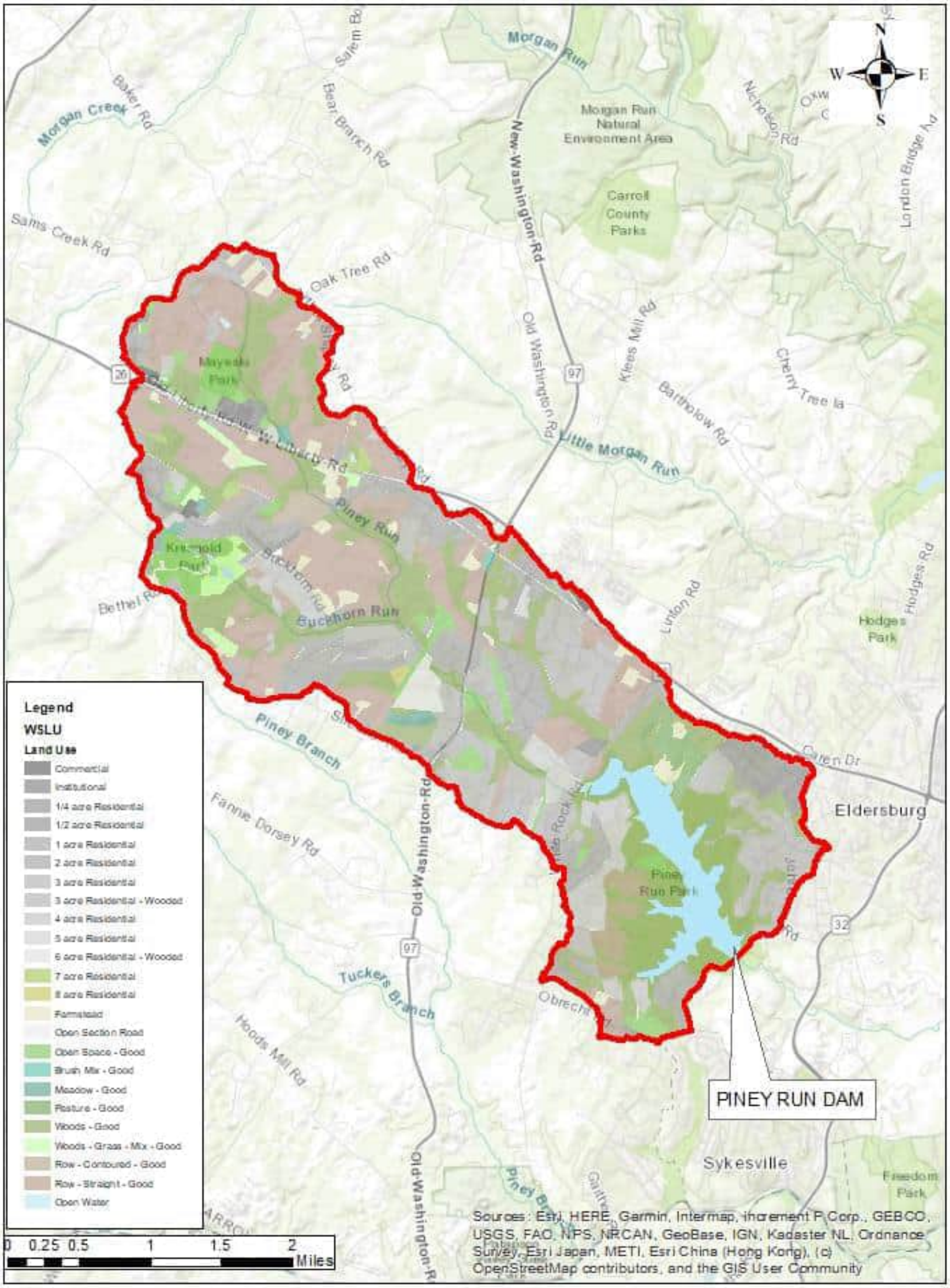


Figure C - 2. Piney Run Dam 2% AEP Non-Breach Event Floodplain Map (1 of 5)

Figure C - 3. Piney Run Dam 2% AEP Non-Breach Event Floodplain Map (2 of 5)

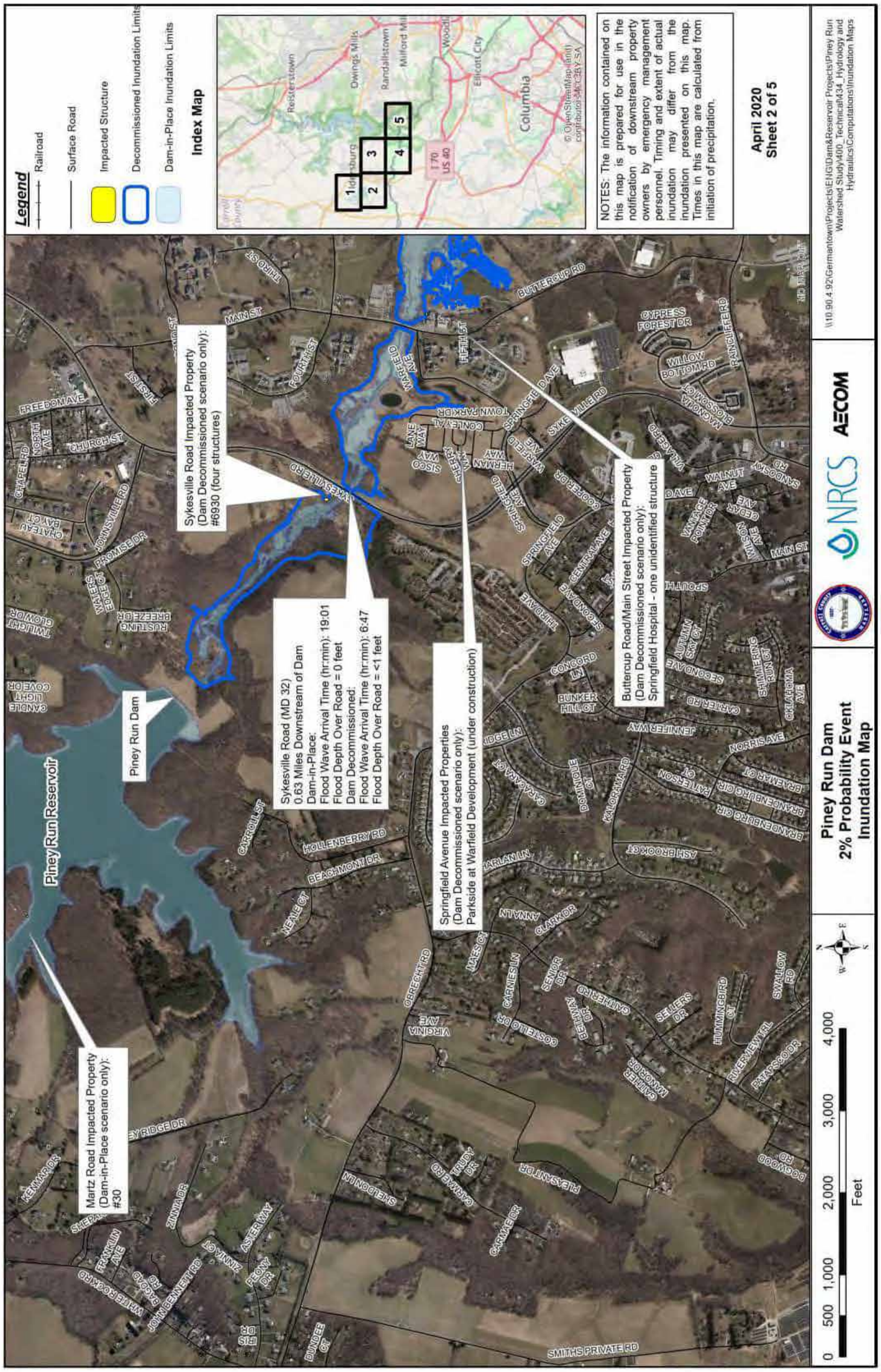


Figure C - 4. Piney Run Dam 2% AEP Non-Breach Event Floodplain Map (3 of 5)

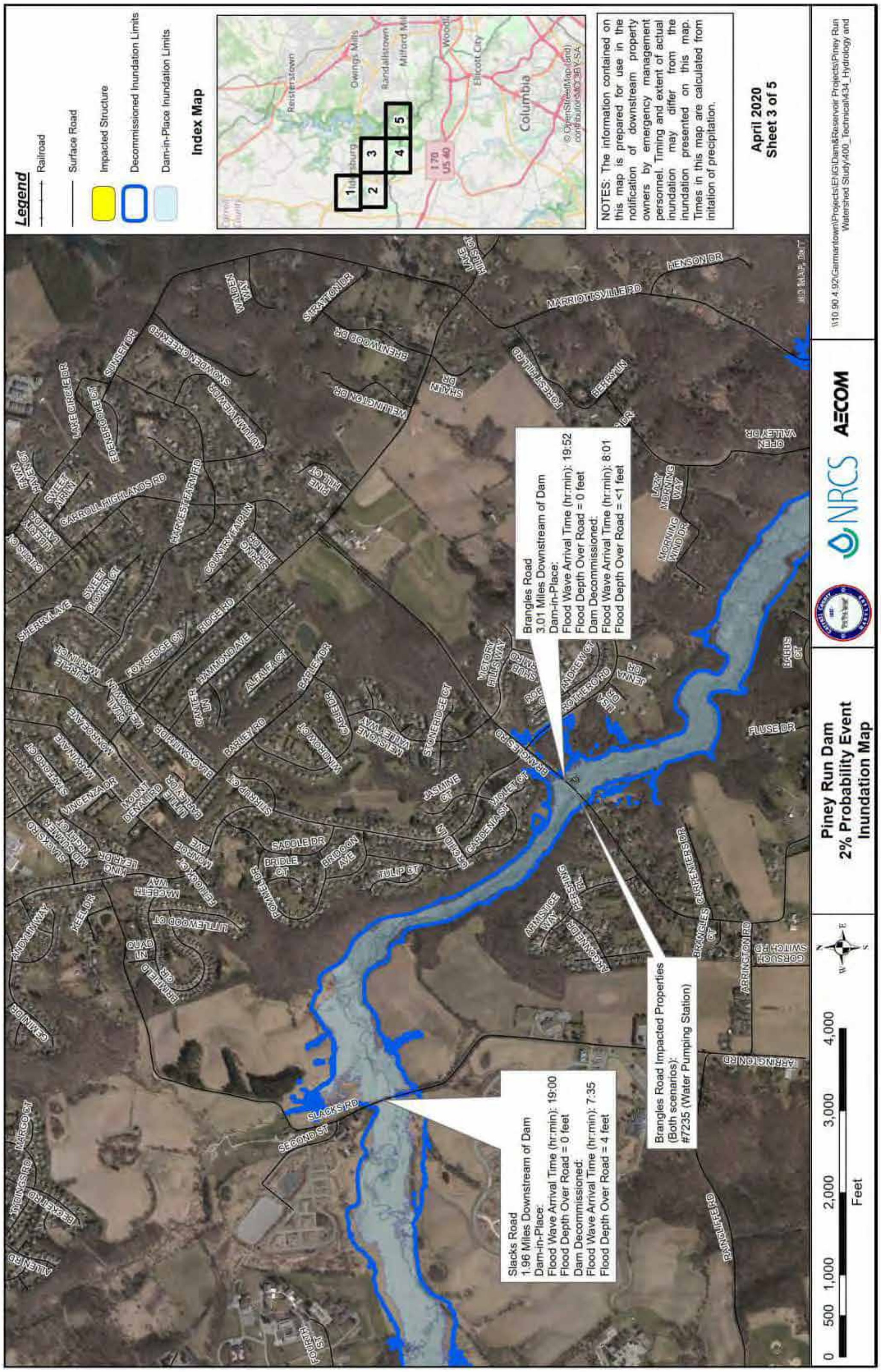


Figure C - 5. Piney Run Dam 2% AEP Non-Breach Event Floodplain Map (4 of 5)

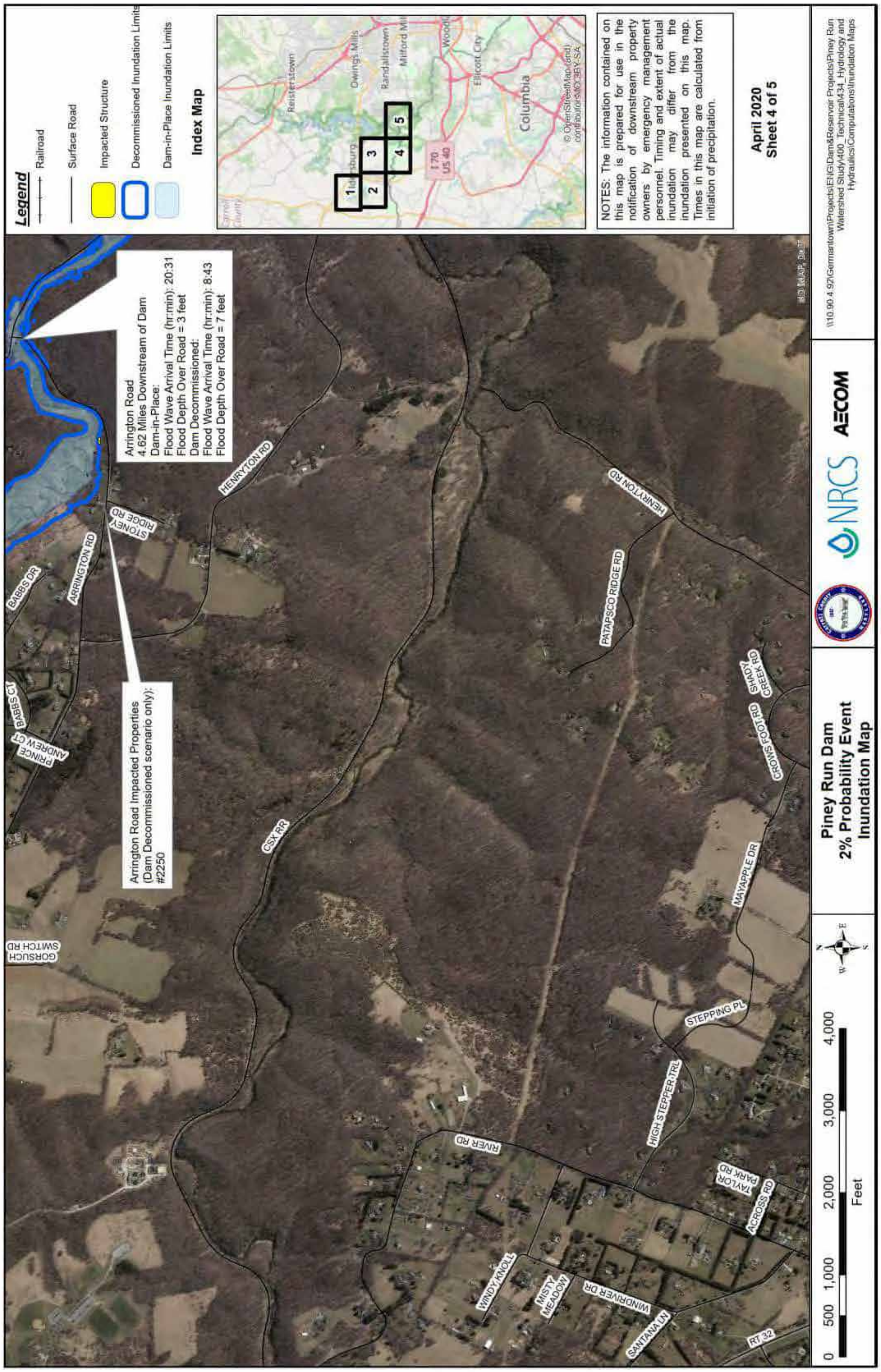


Figure C - 6. Piney Run Dam 2% AEP Non-Breach Event Floodplain Map (5 of 5)

Figure C - 7. Piney Run Dam 1% AEP Non-Breach Event Floodplain Map (1 of 5)

Figure C - 8. Piney Run Dam 1% AEP Non-Breach Event Floodplain Map (2 of 5)

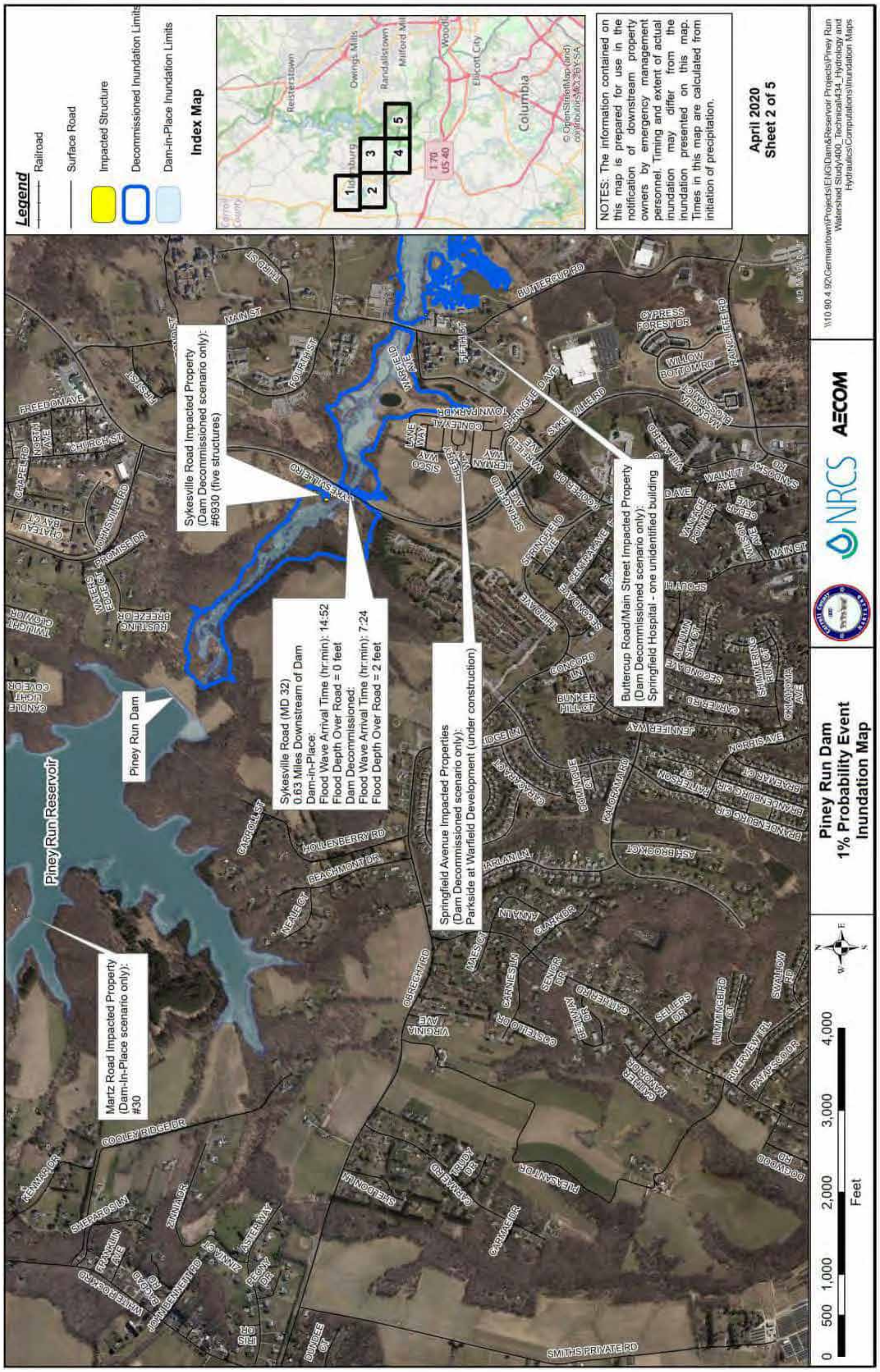


Figure C - 9. Piney Run Dam 1% AEP Non-Breach Event Floodplain Map (3 of 5)

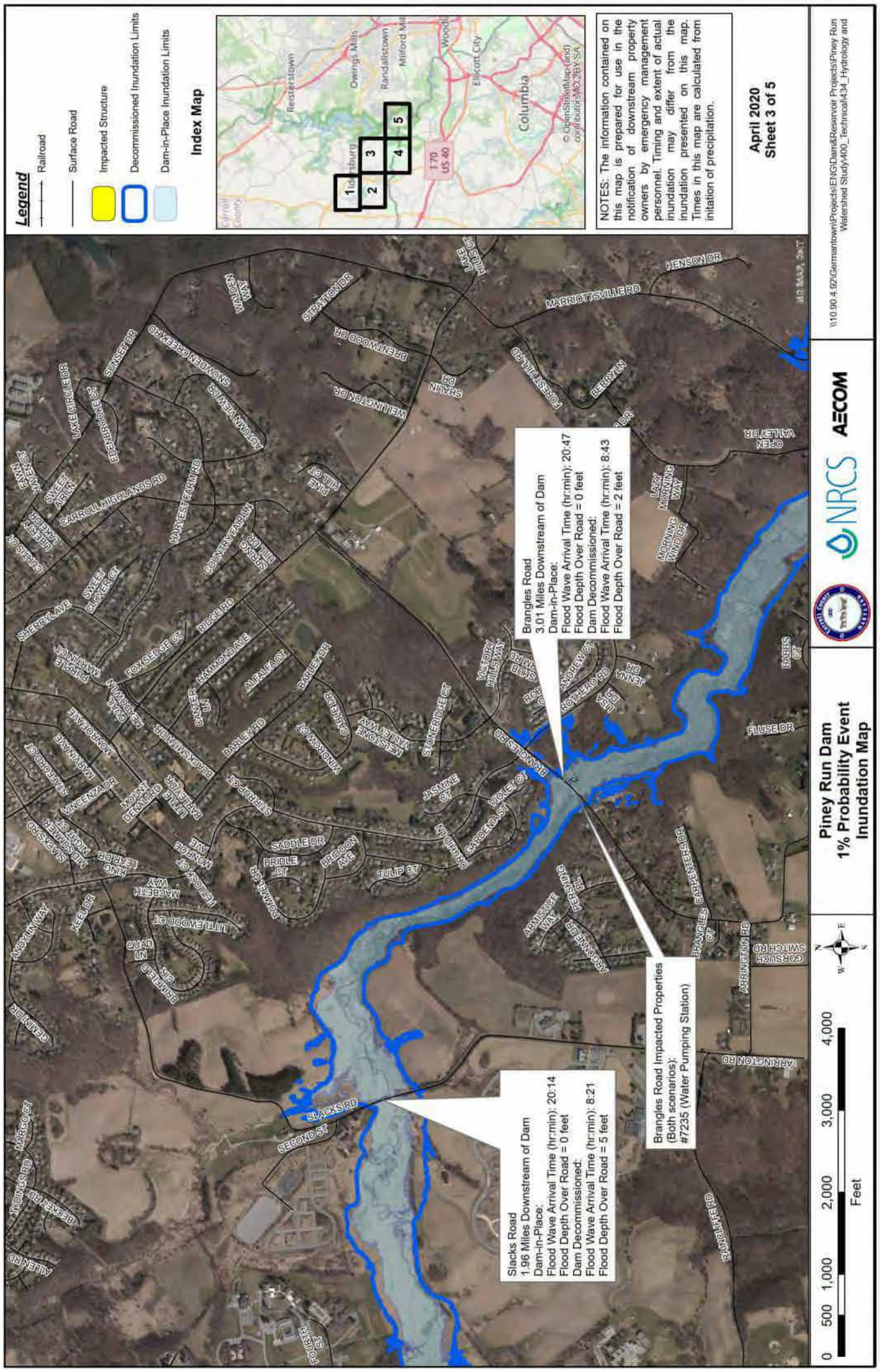


Figure C - 10. Piney Run Dam 1% AEP Non-Breach Event Floodplain Map (4 of 5)

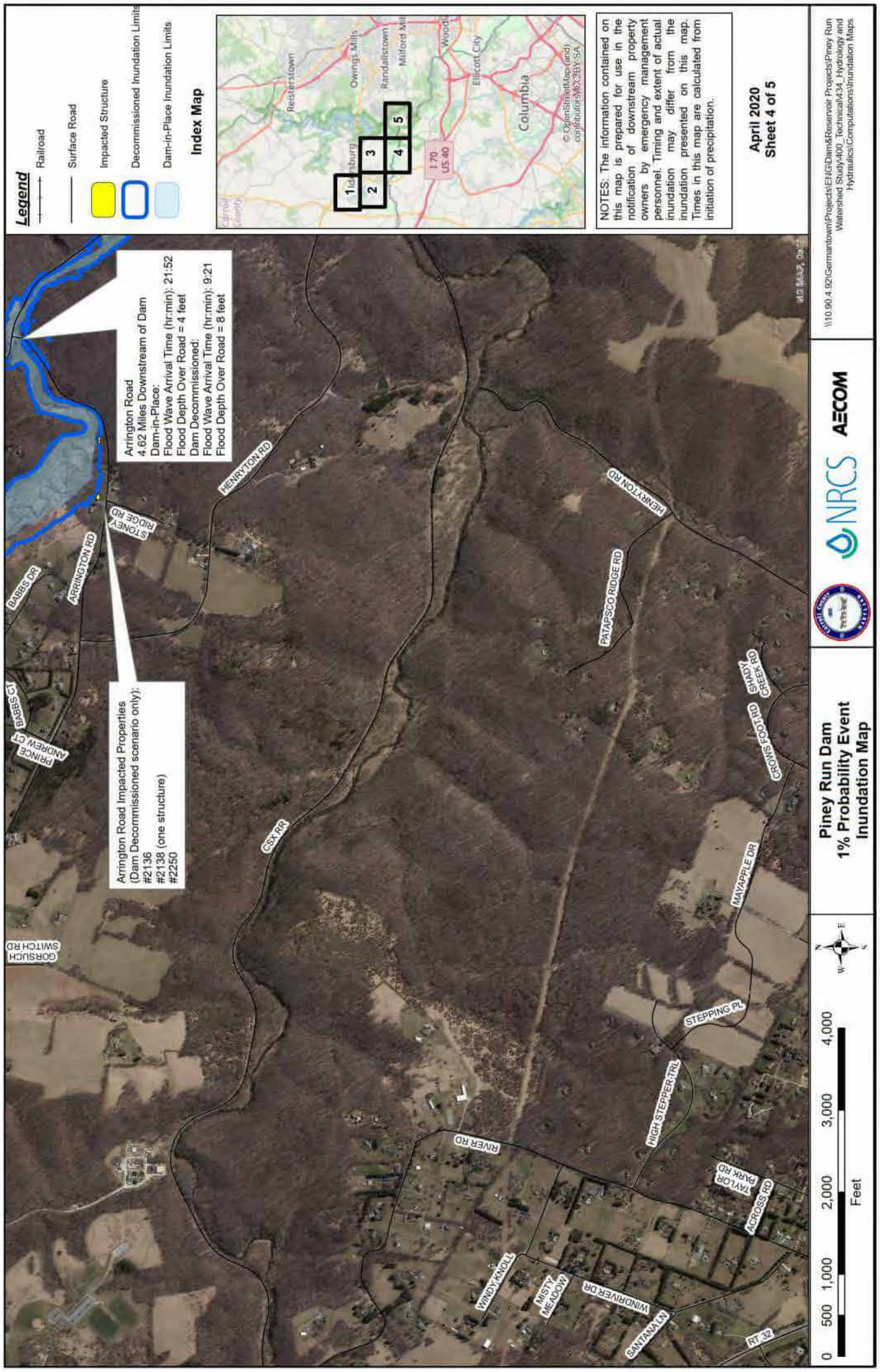


Figure C - 11. Piney Run Dam 1% AEP Non-Breach Event Floodplain Map (5 of 5)

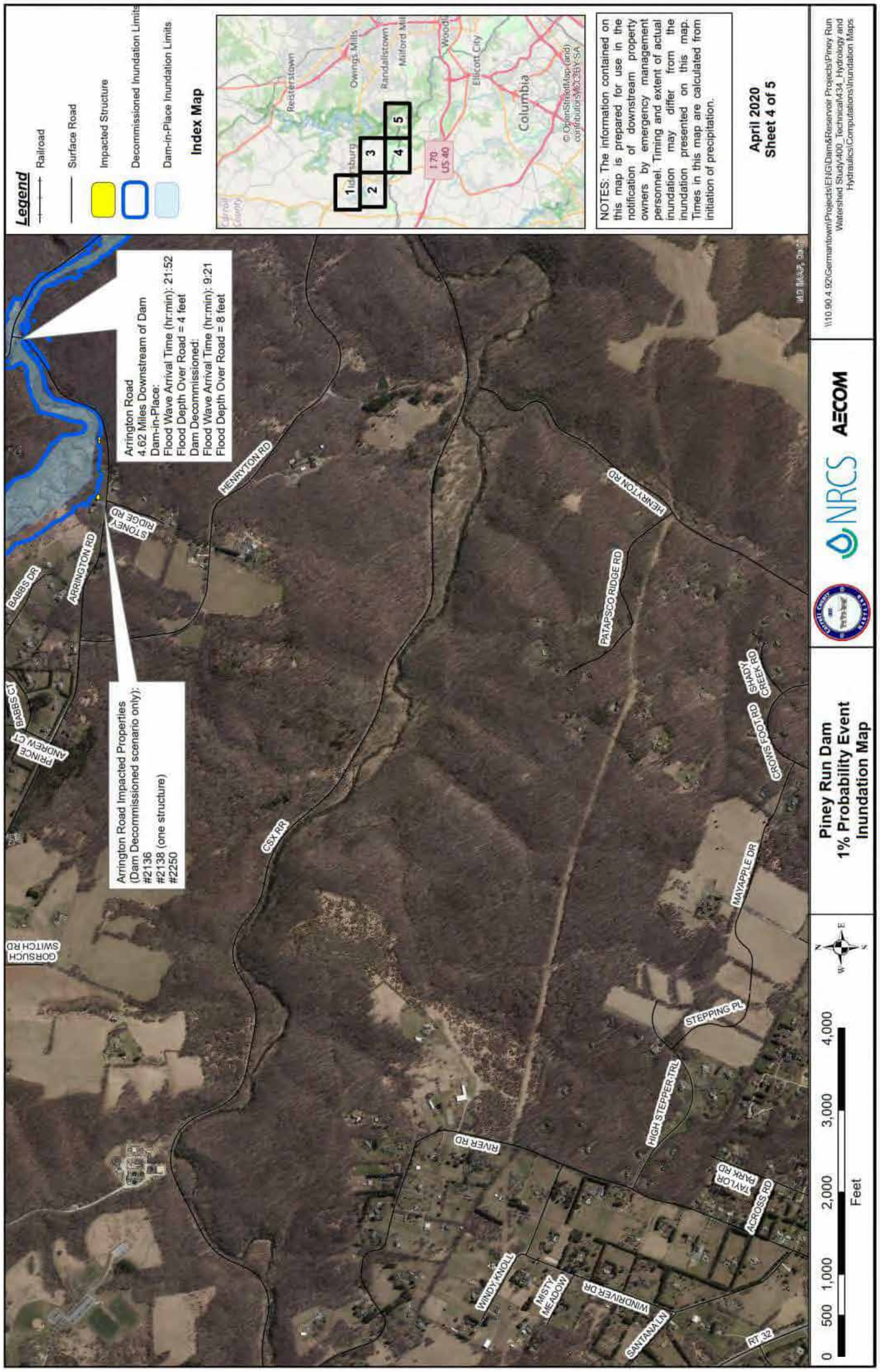


Figure C - 12. Piney Run Dam 0.2% AEP Non-Breach Event Floodplain Map (1 of 5)

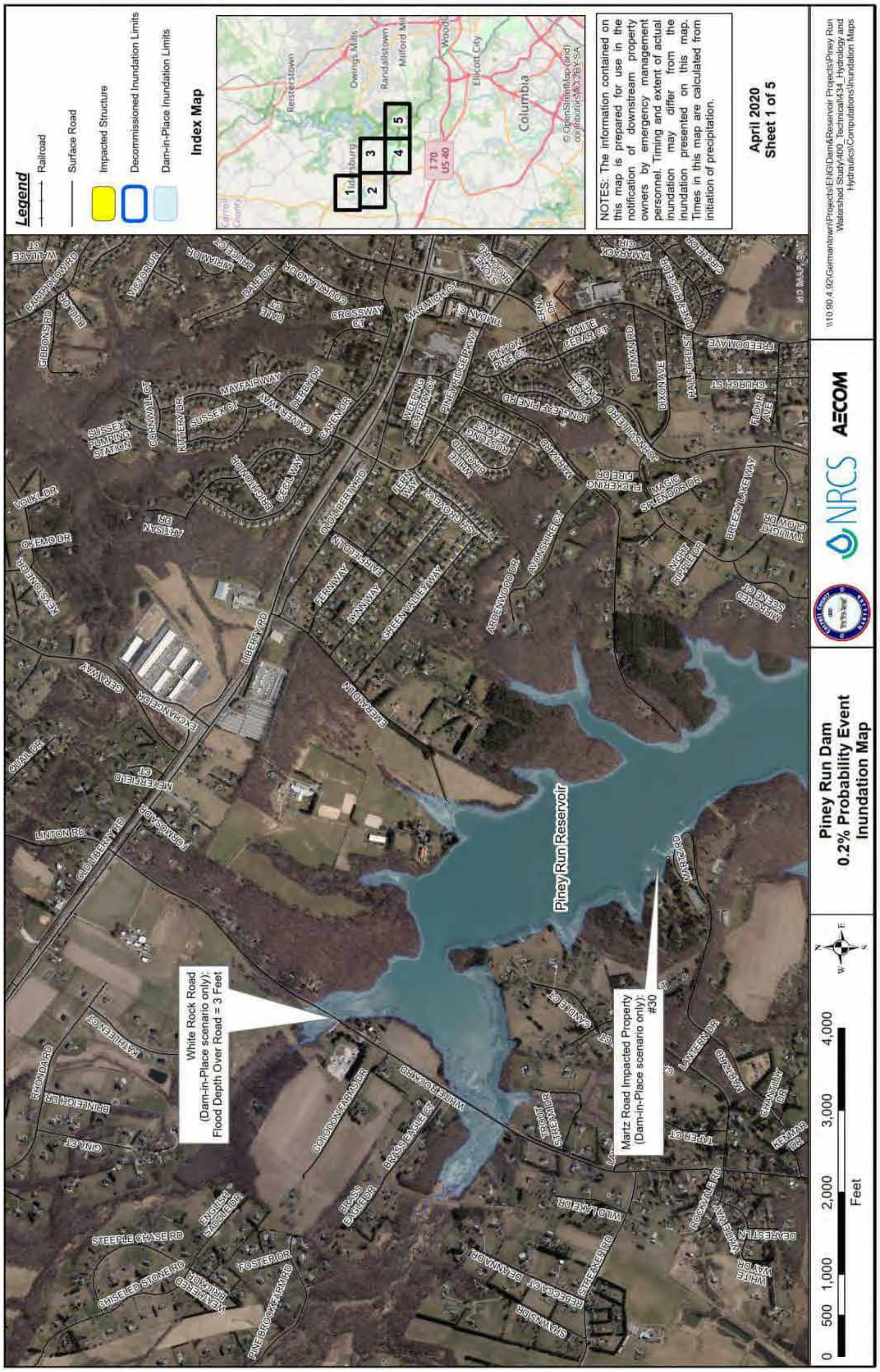


Figure C - 13. Piney Run Dam 0.2% AEP Non-Breach Event Floodplain Map (2 of 5)

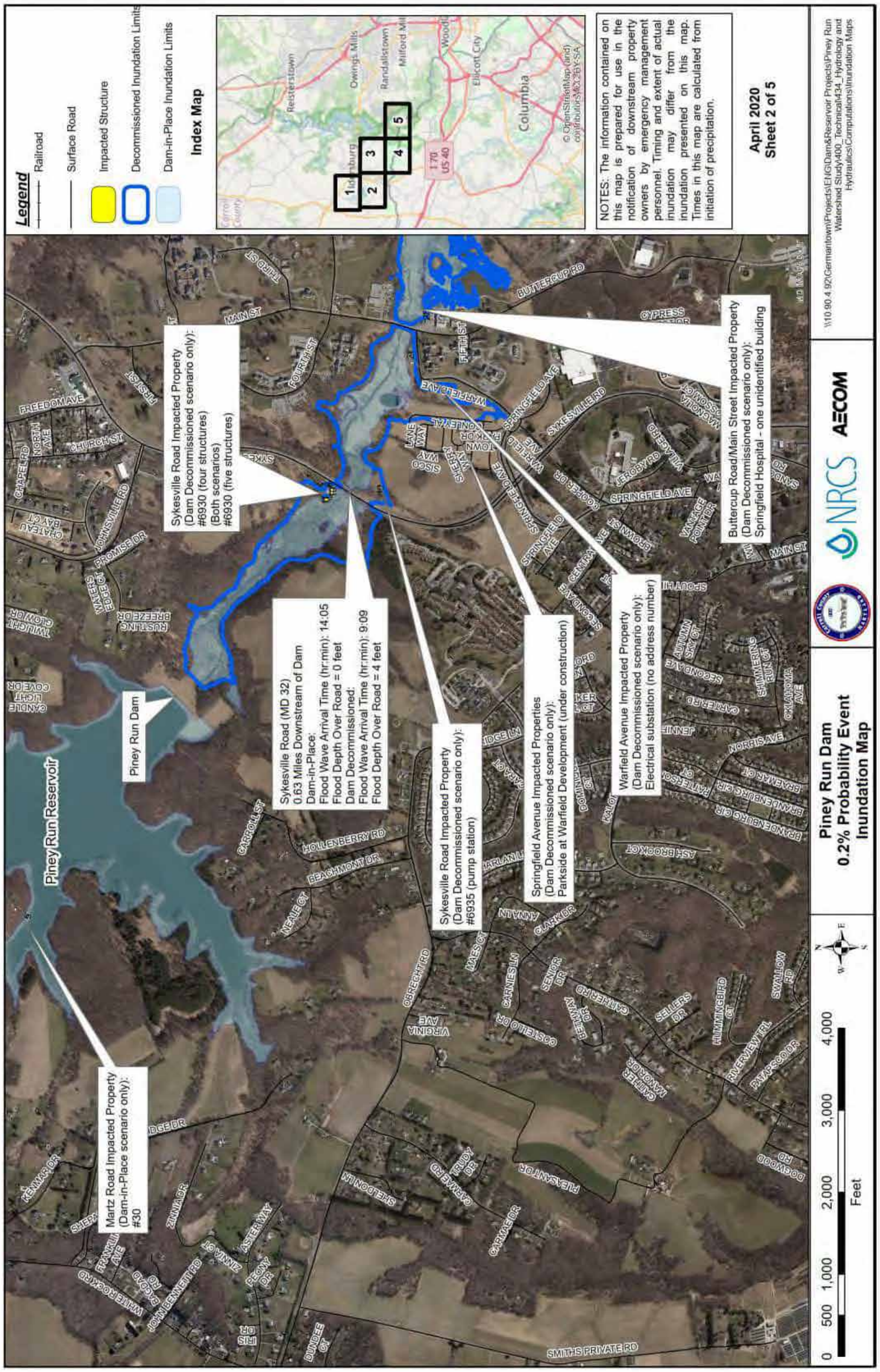


Figure C - 14. Piney Run Dam 0.2% AEP Non-Breach Event Floodplain Map (3 of 5)

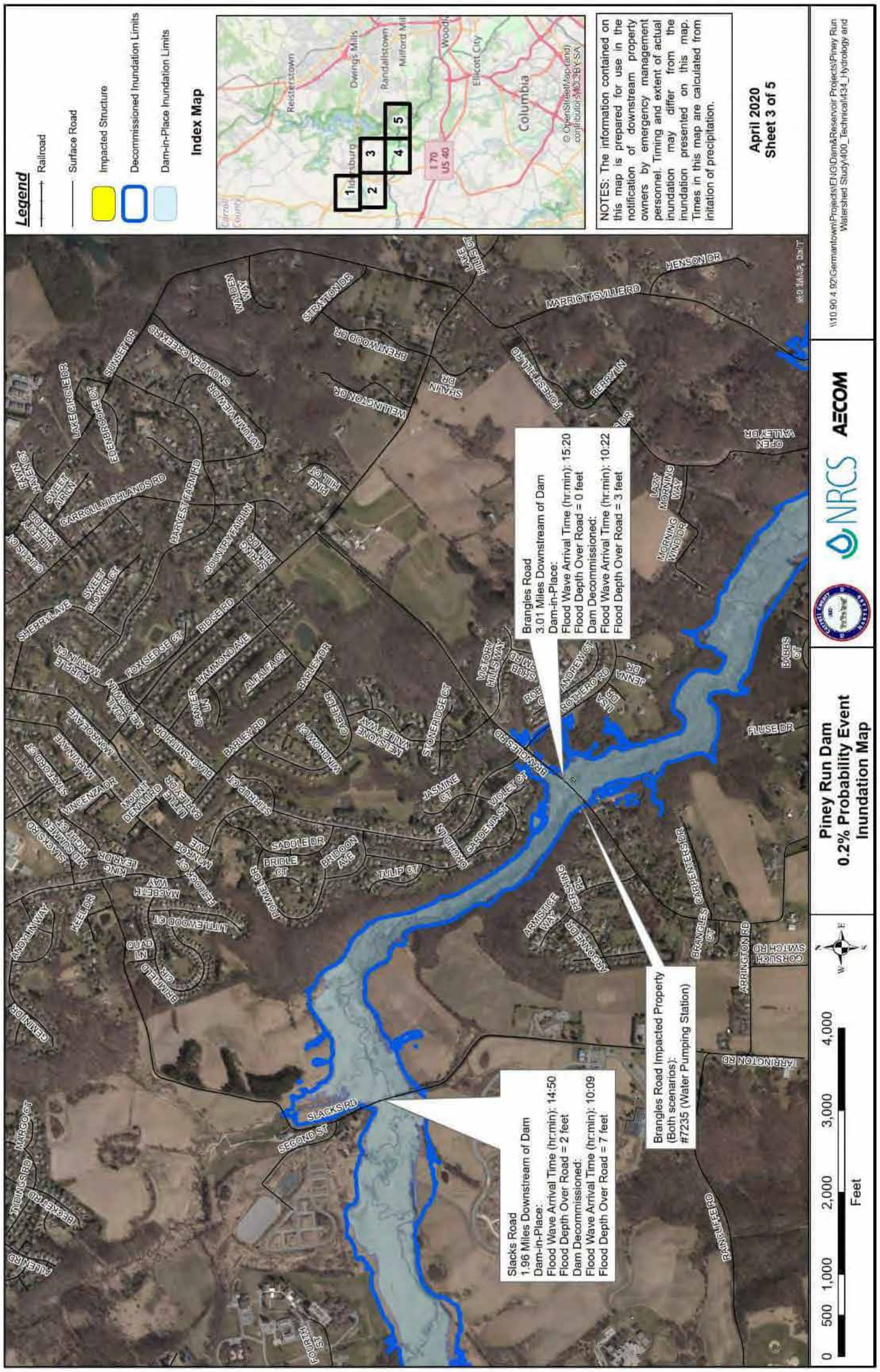


Figure C - 15. Piney Run Dam 0.2% AEP Non-Breach Event Floodplain Map (4 of 5)

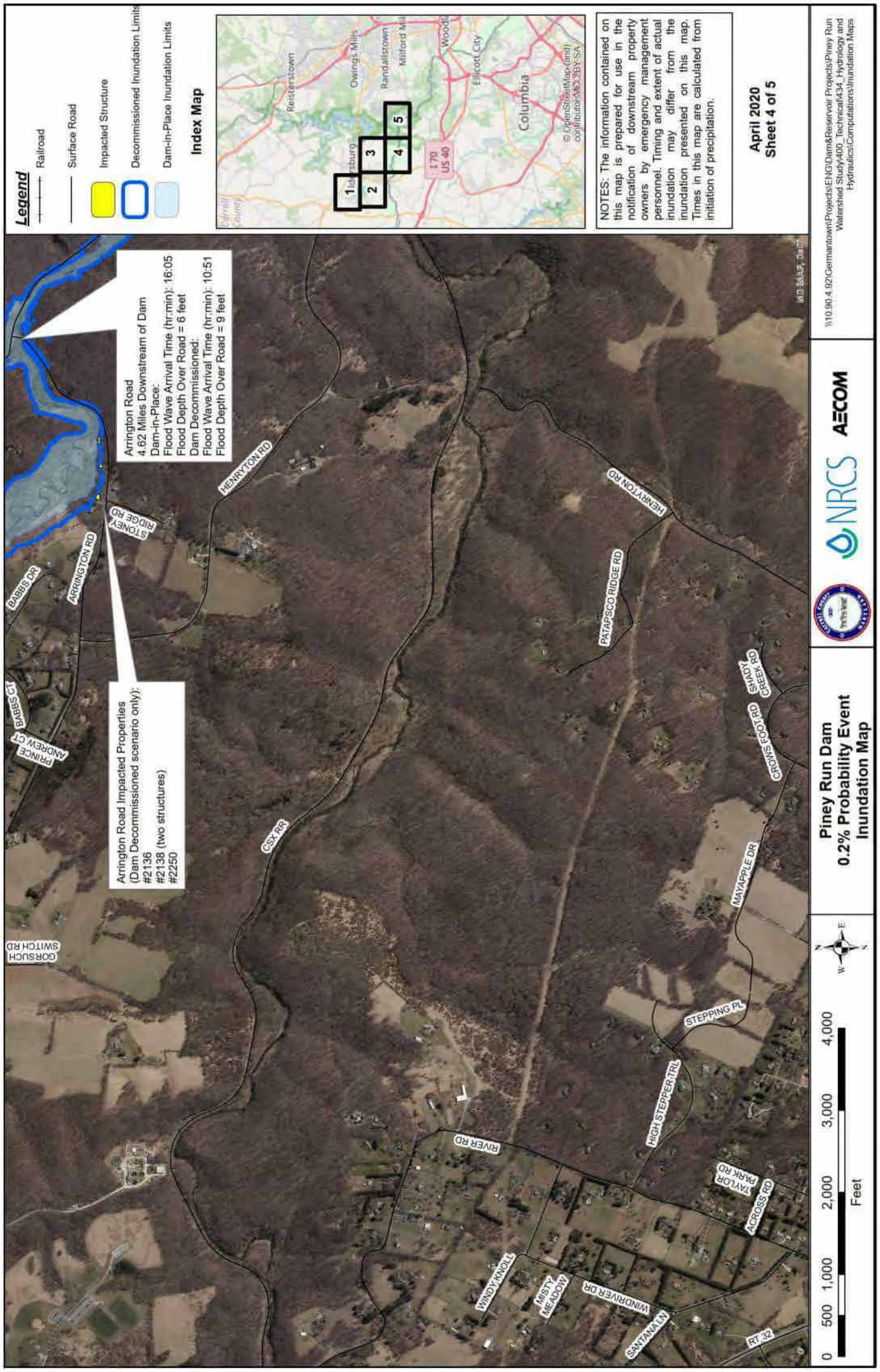


Figure C - 16. Piney Run Dam 0.2% AEP Non-Breach Event Floodplain Map (5 of 5)

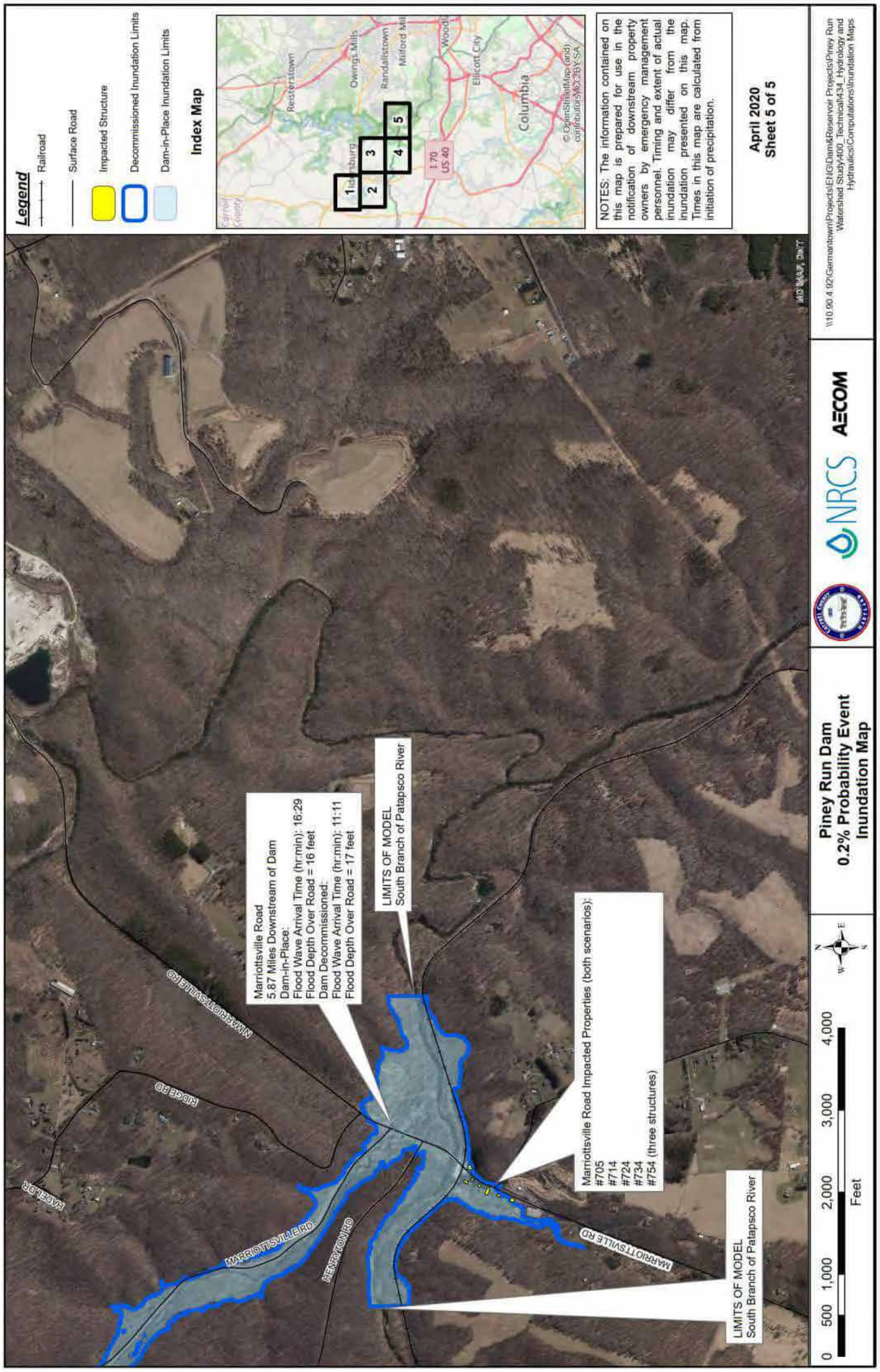


Figure C - 17. Piney Run Dam Hydrologic Breach Inundation Map (1 of 14)

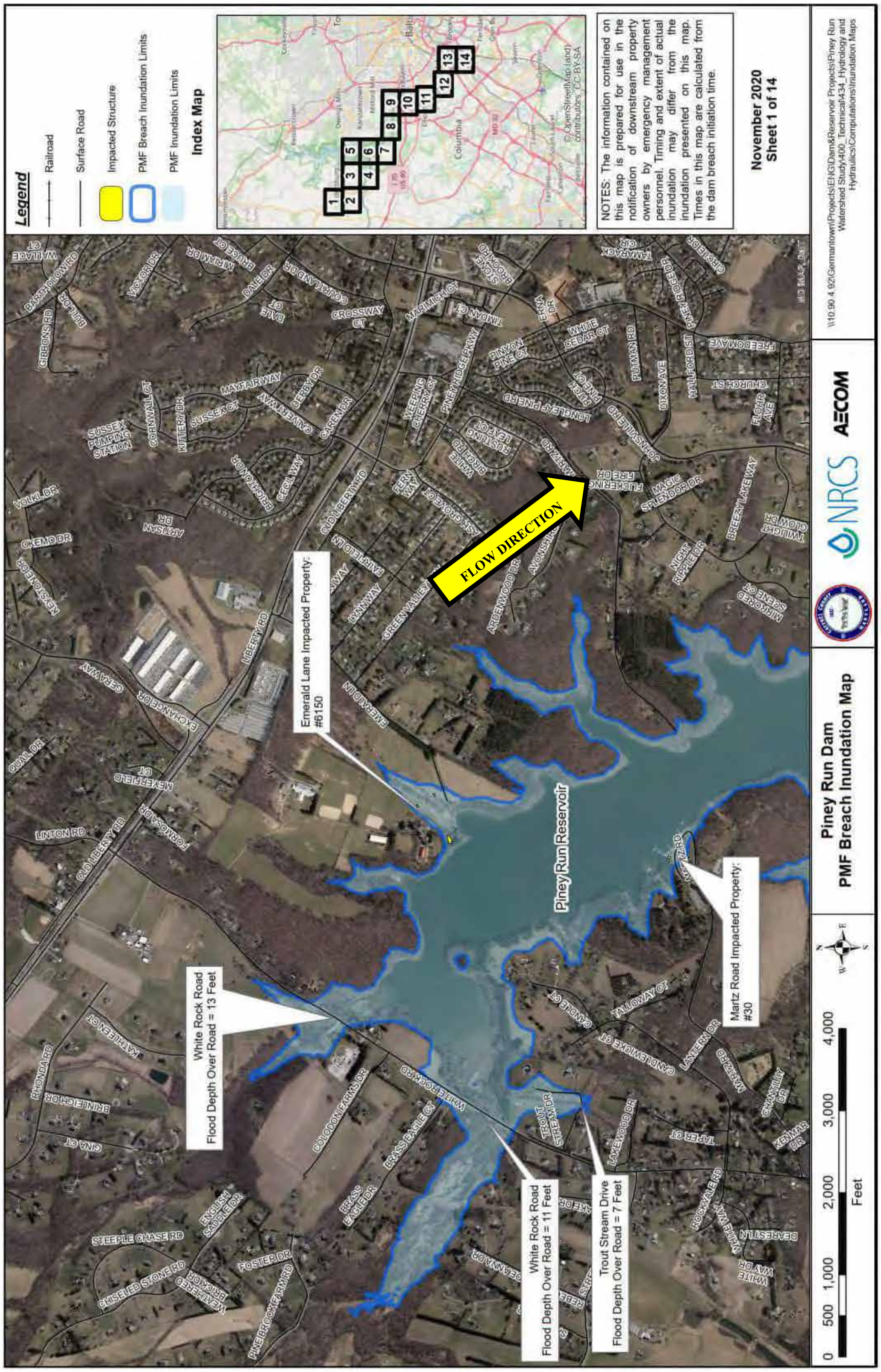


Figure C - 18. Piney Run Dam Hydrologic Breach Inundation Map (2 of 14)

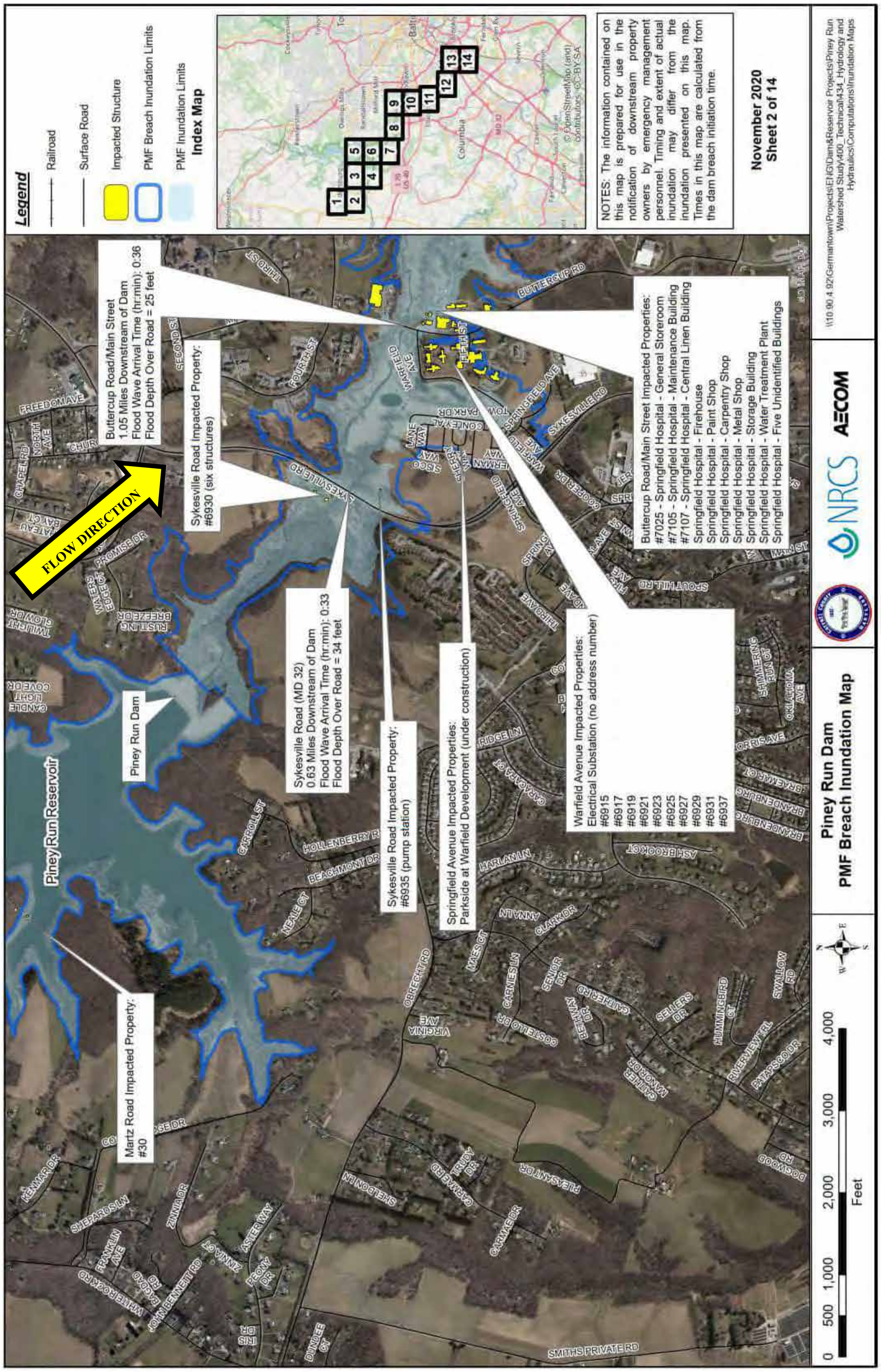


Figure C - 19. Piney Run Dam Hydrologic Breach Inundation Map (3 of 14)

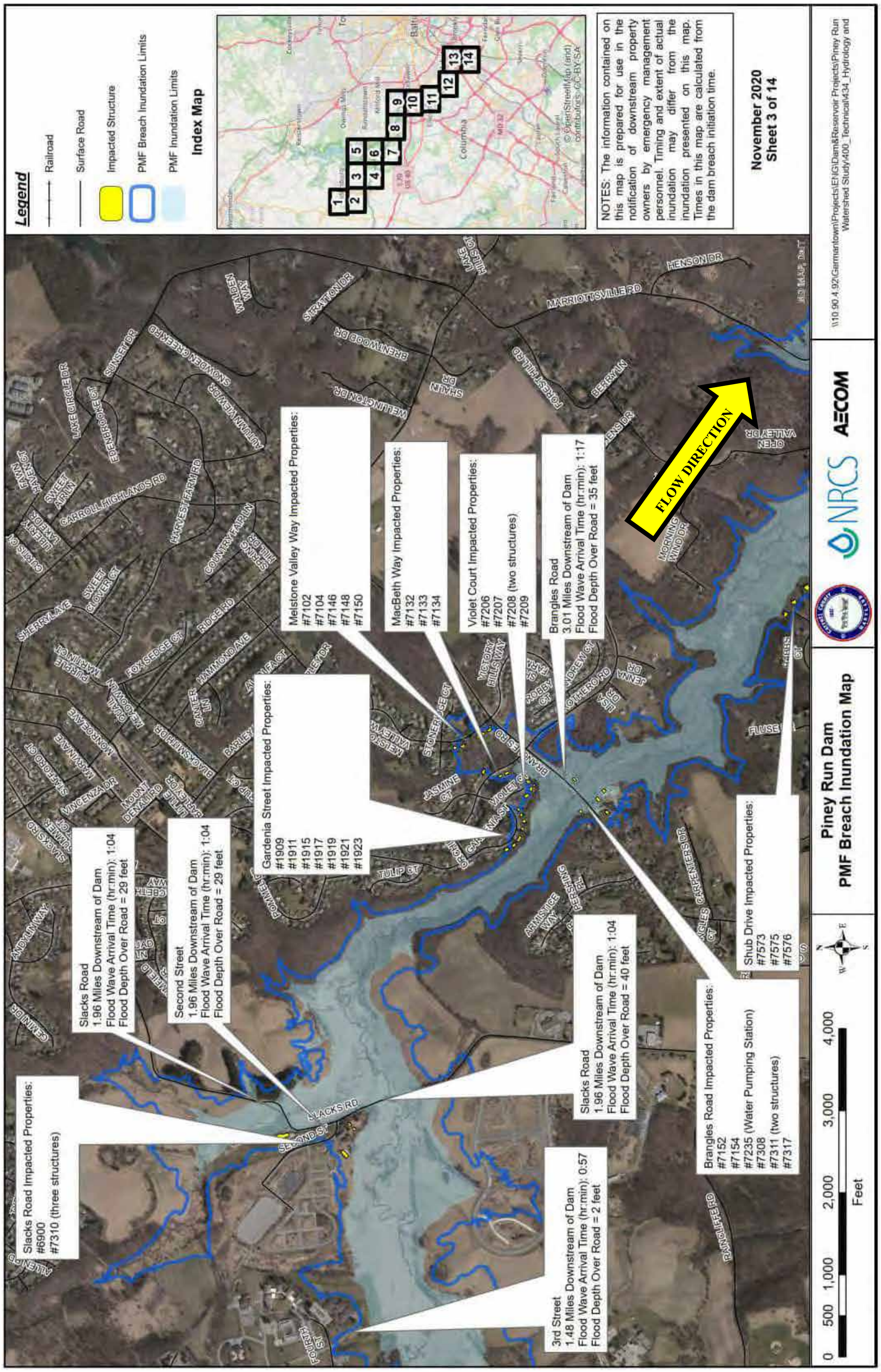


Figure C - 20. Piney Run Dam Hydrologic Breach Inundation Map (4 of 14)

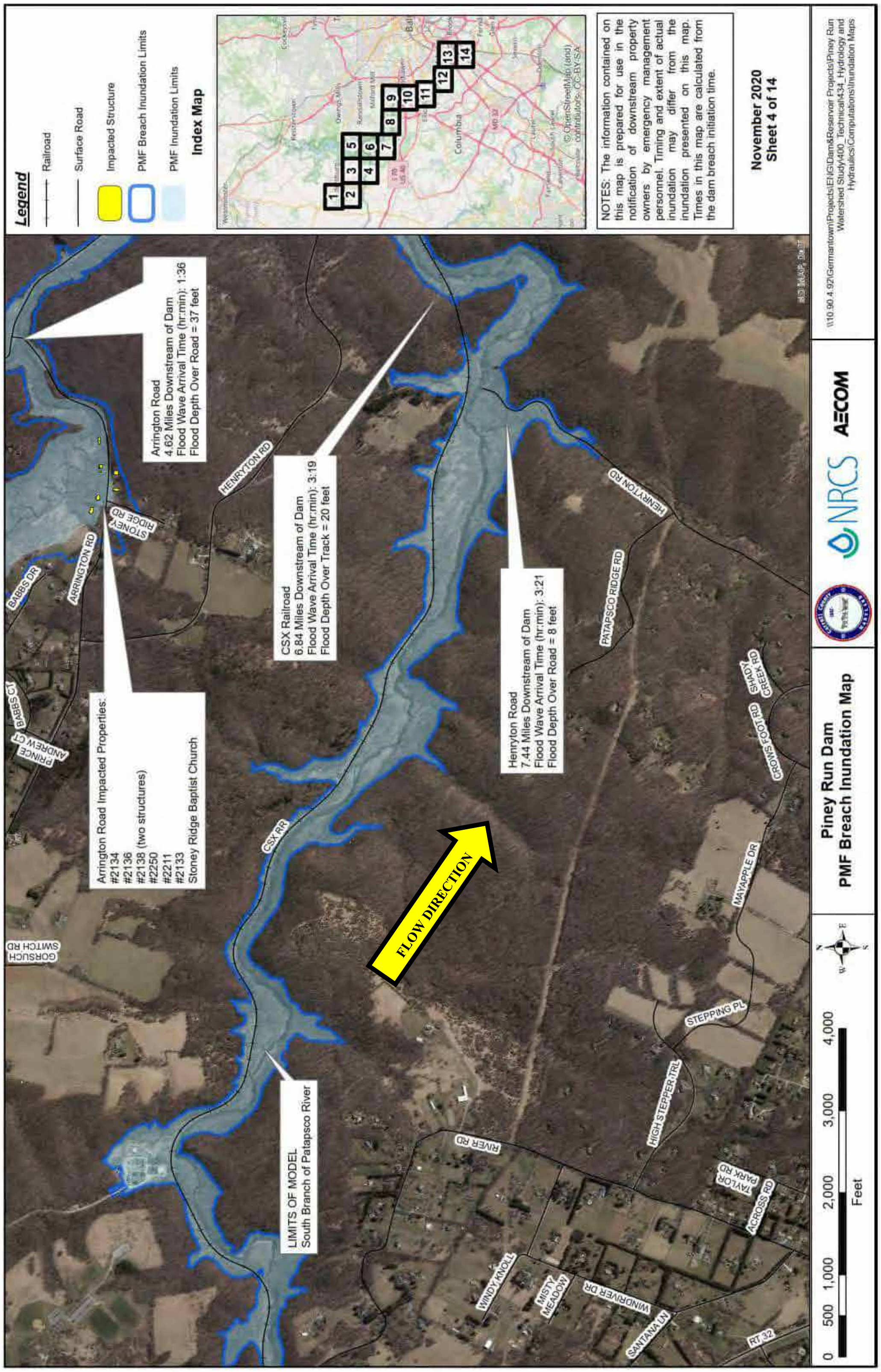


Figure C - 21. Piney Run Dam Hydrologic Breach Inundation Map (5 of 14)

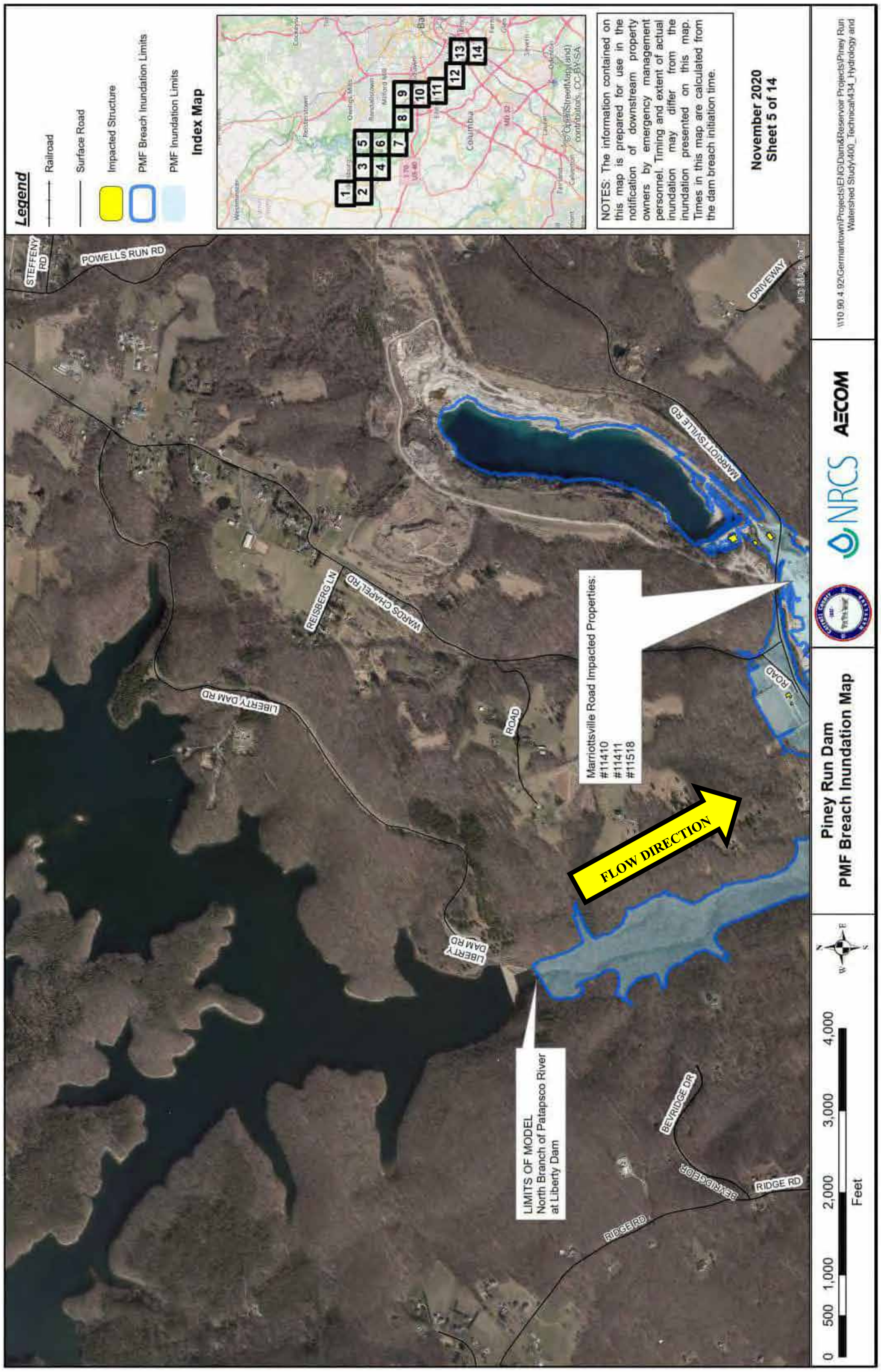


Figure C - 22. Piney Run Dam Hydrologic Breach Inundation Map (6 of 14)

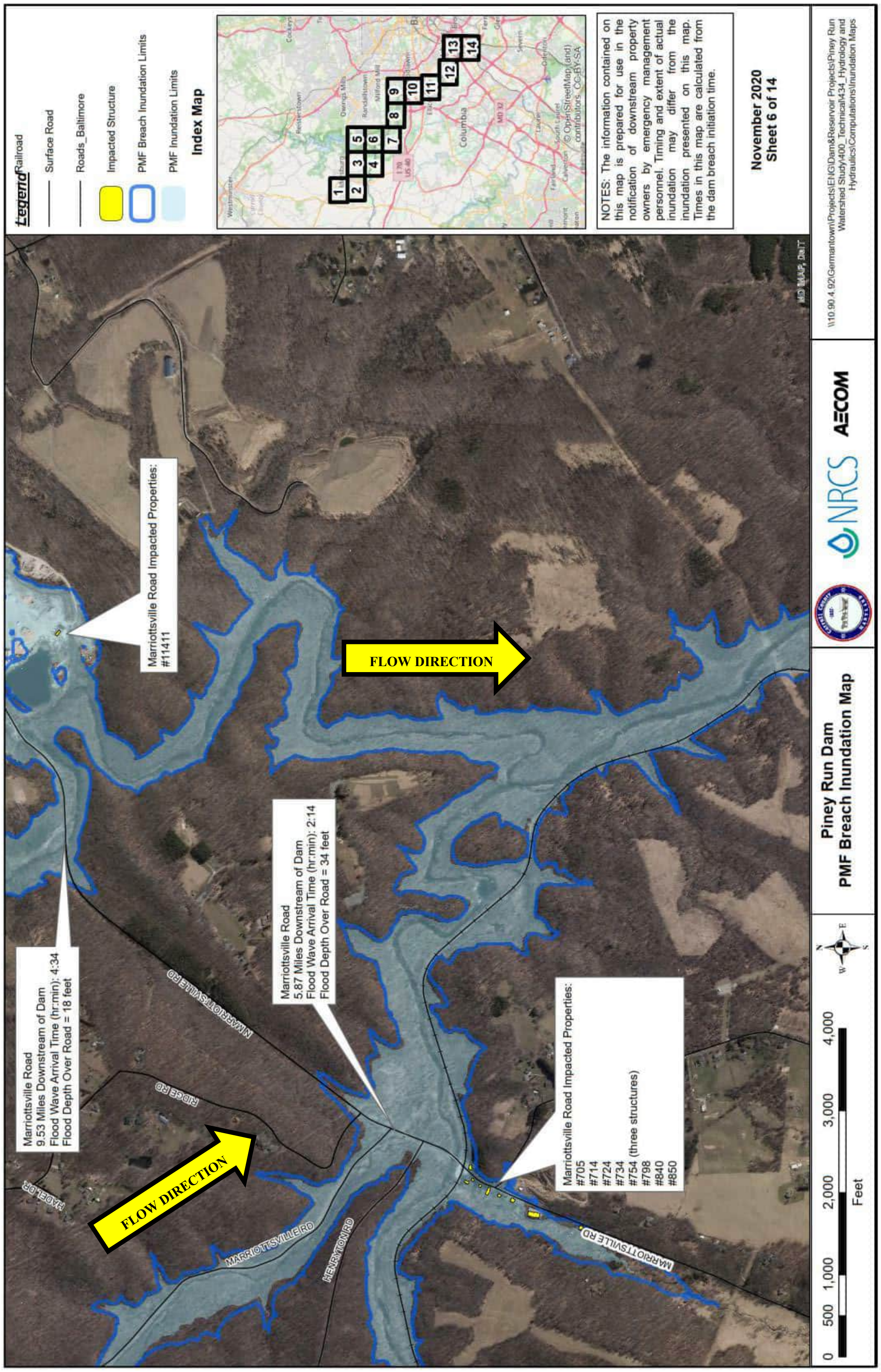


Figure C - 23. Piney Run Dam Hydrologic Breach Inundation Map (7 of 14)

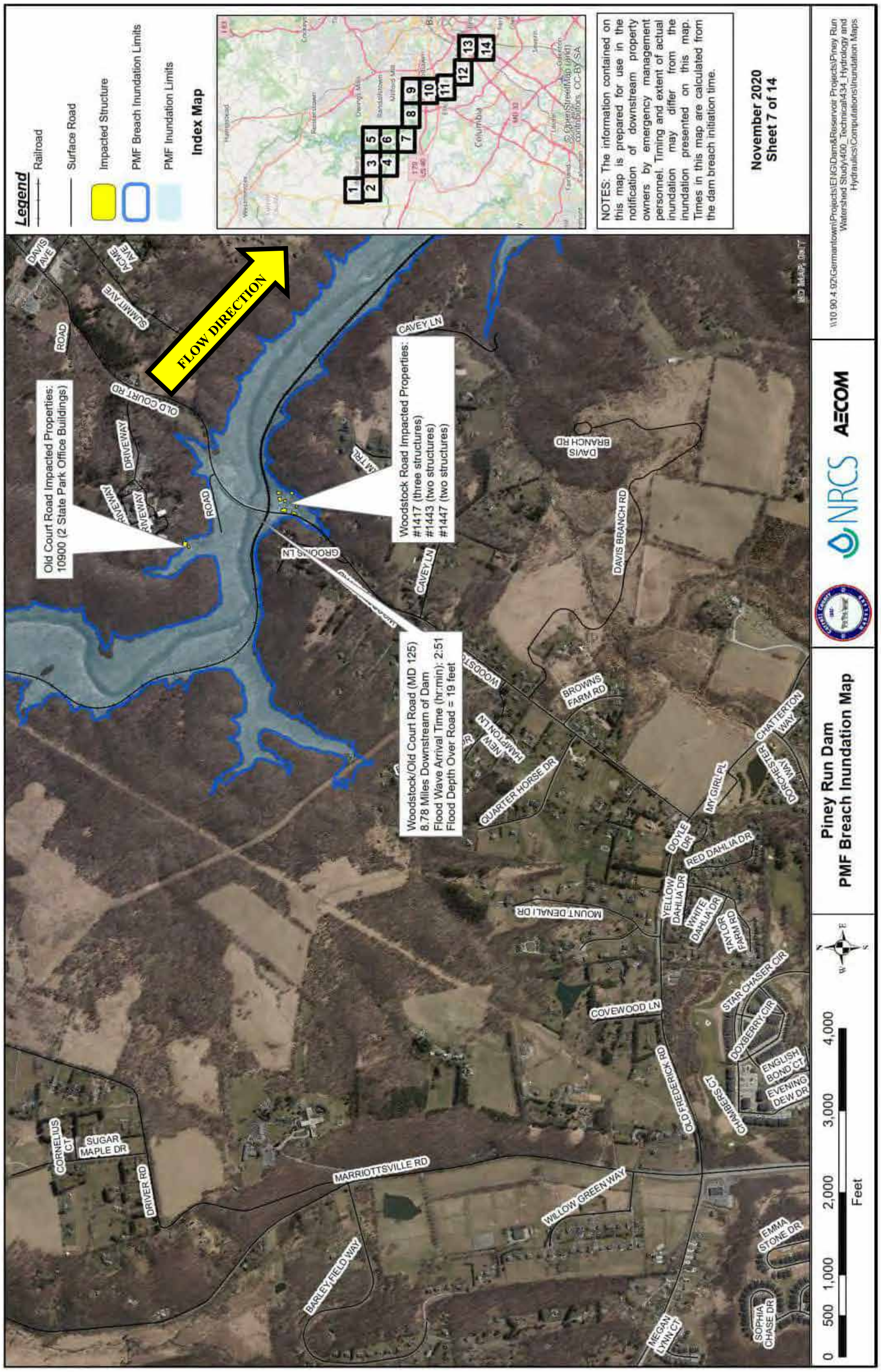


Figure C - 24. Piney Run Dam Hydrologic Breach Inundation Map (8 of 14)

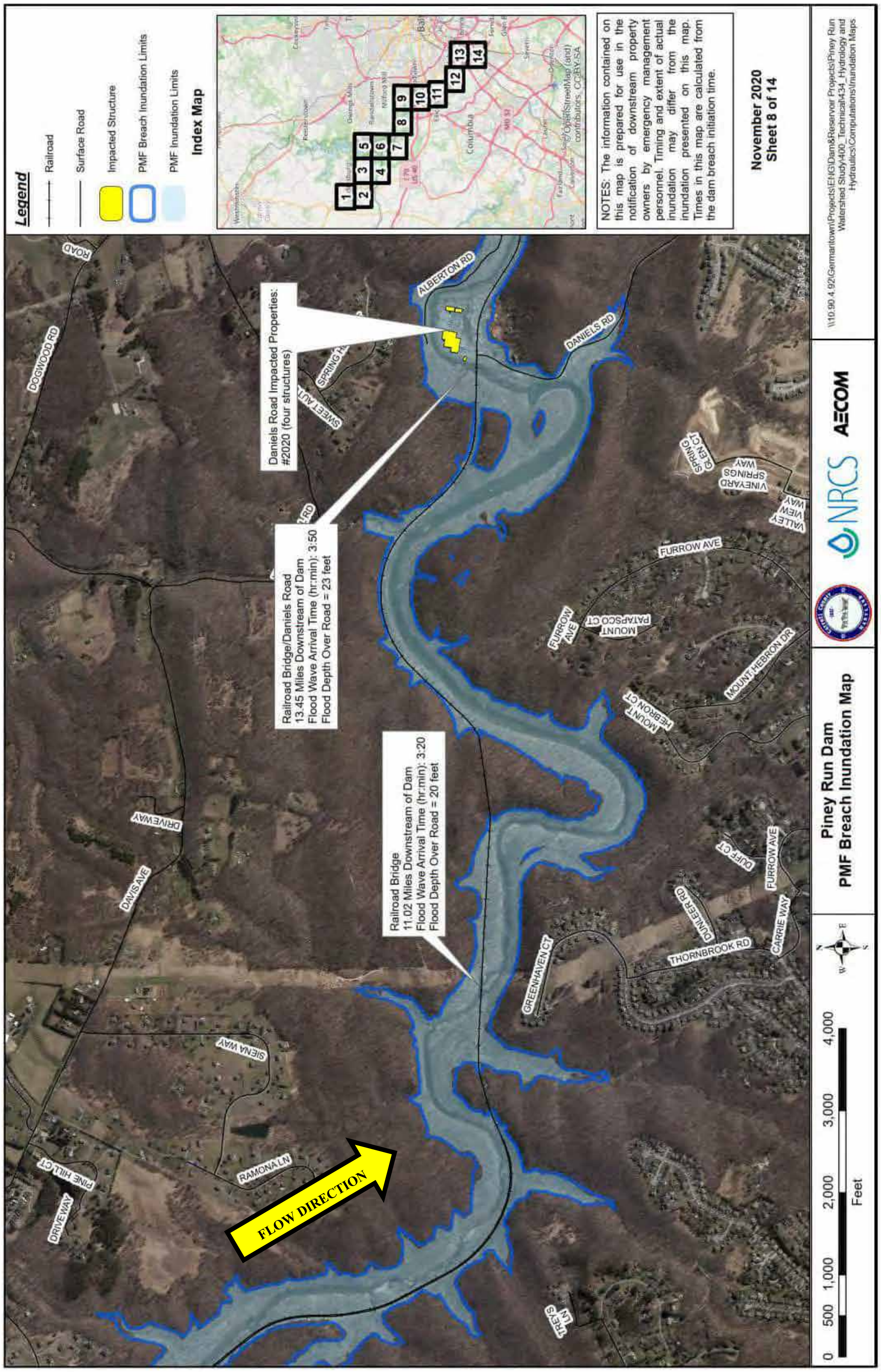


Figure C - 25. Piney Run Dam Hydrologic Breach Inundation Map (9 of 14)

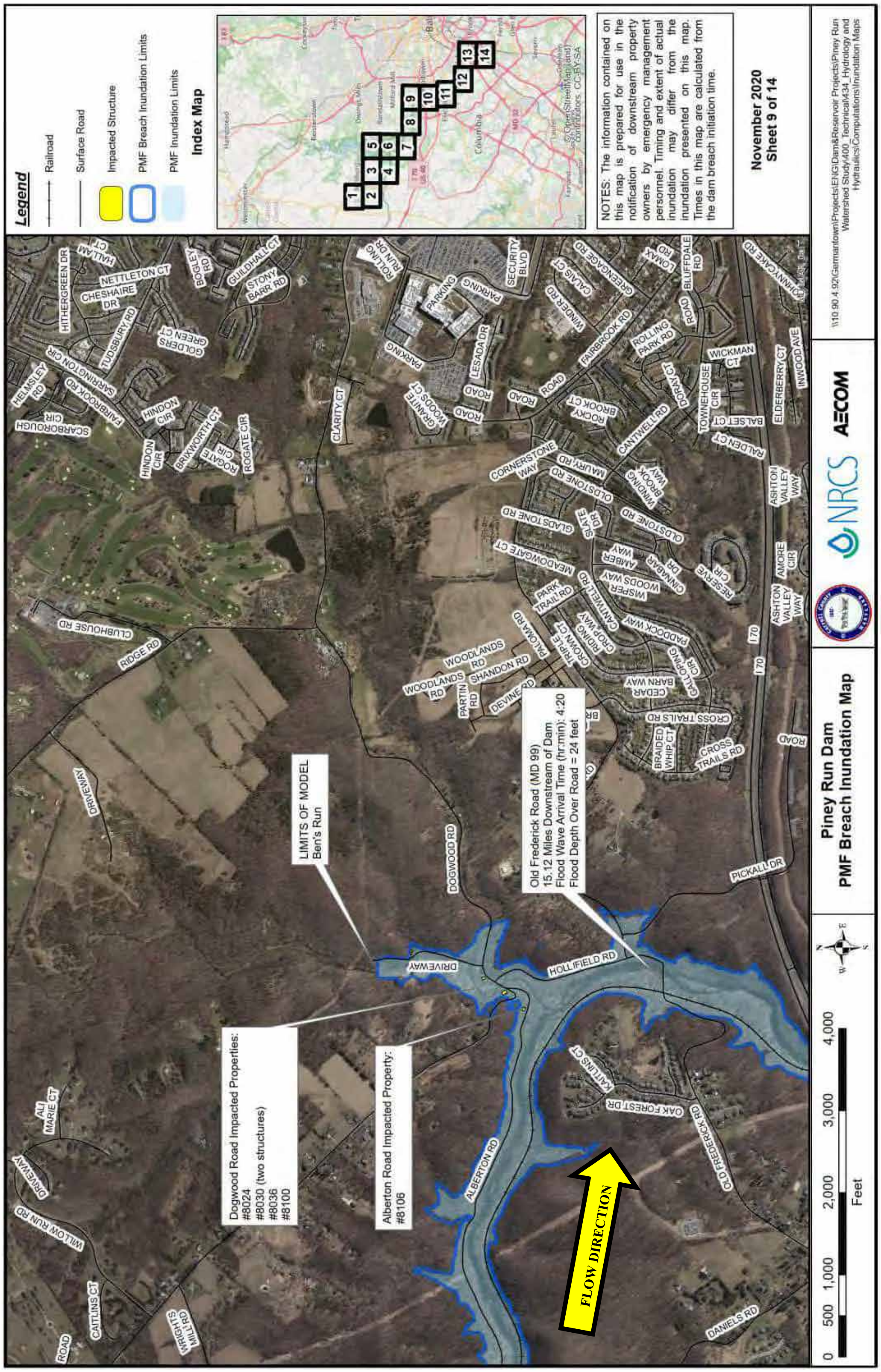


Figure C - 26. Piney Run Dam Hydrologic Breach Inundation Map (10 of 14)

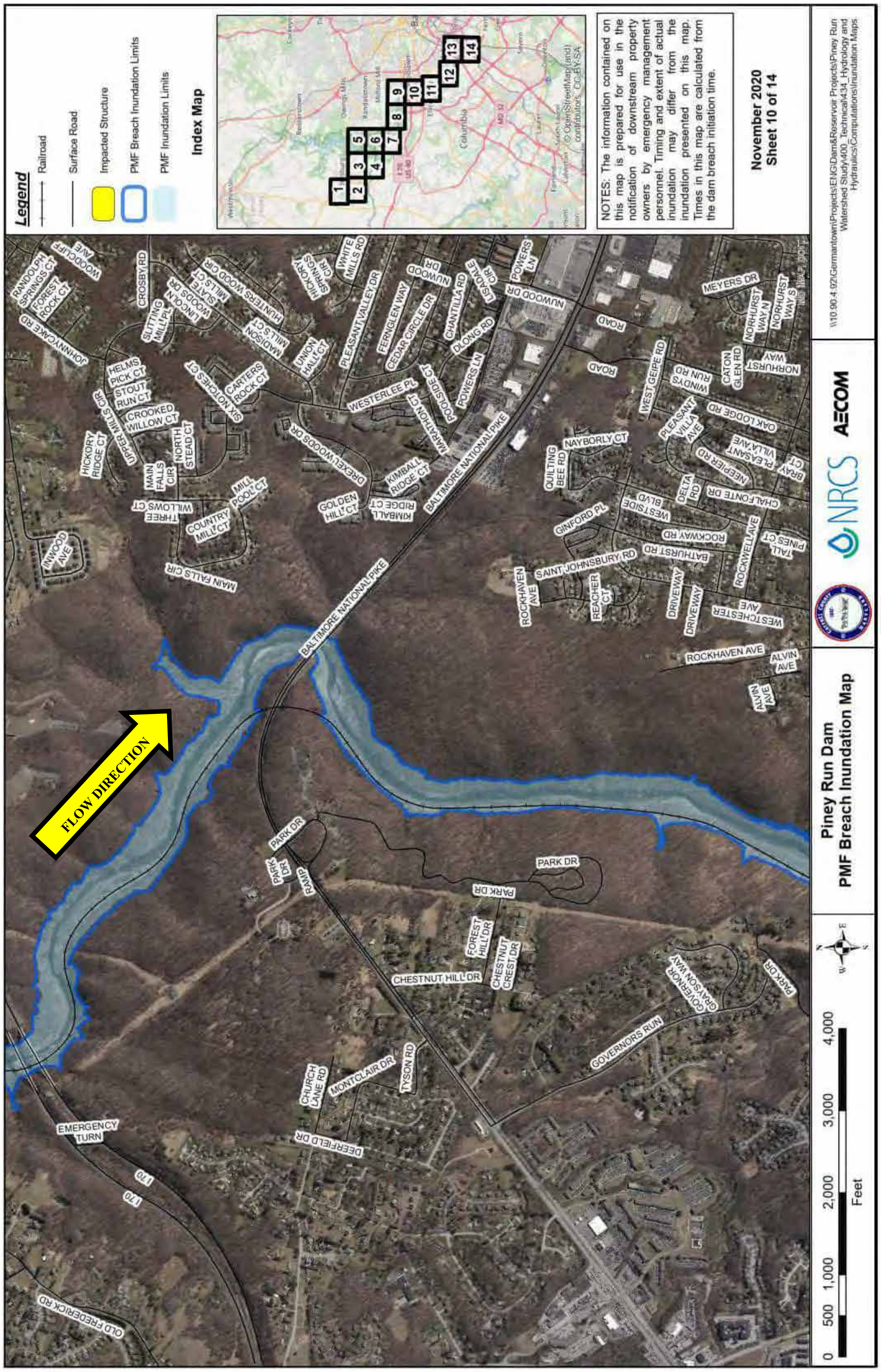


Figure C - 27. Piney Run Dam Hydrologic Breach Inundation Map (11 of 14)

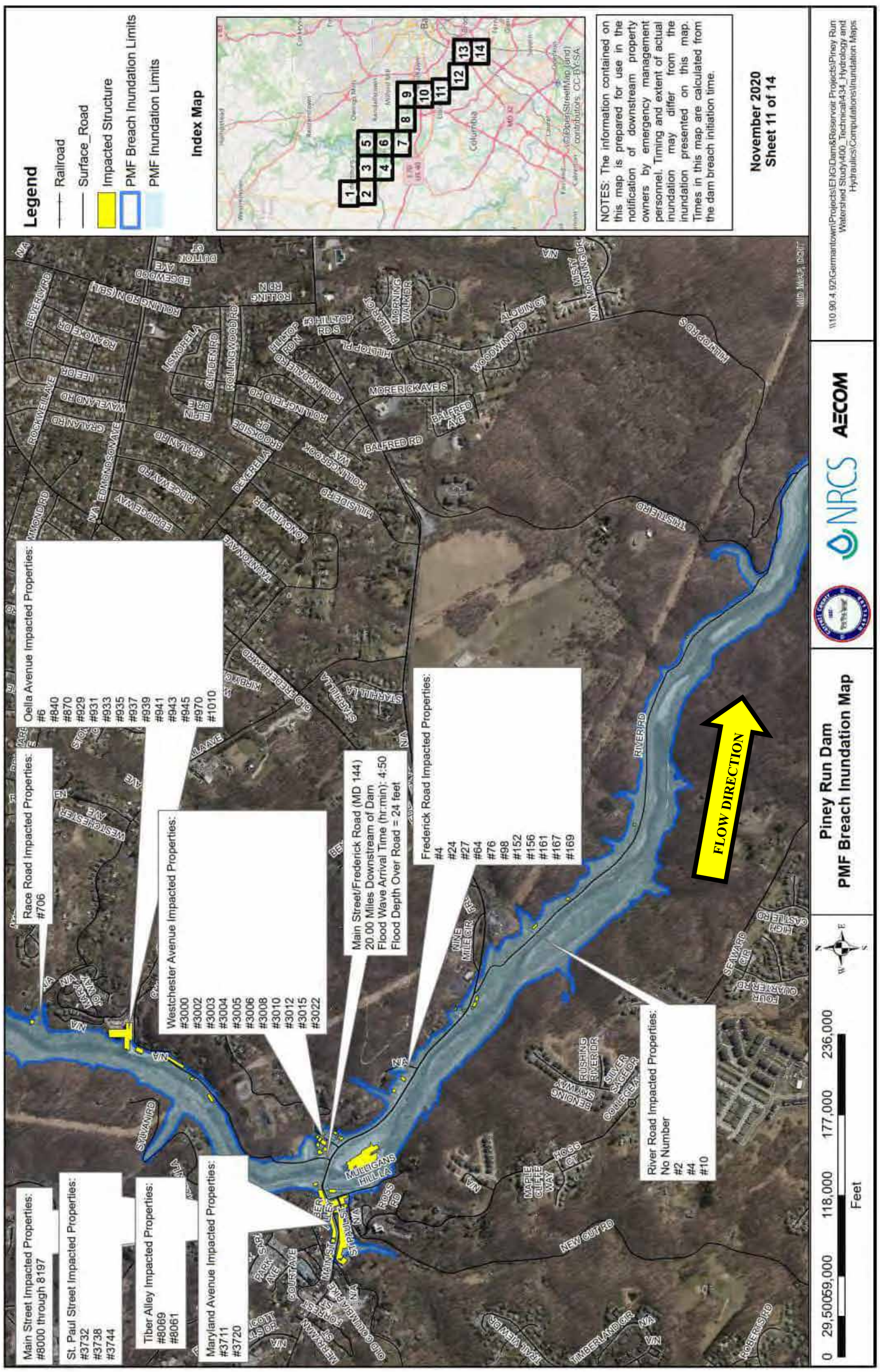


Figure C - 28. Piney Run Dam Hydrologic Breach Inundation Map (12 of 14)

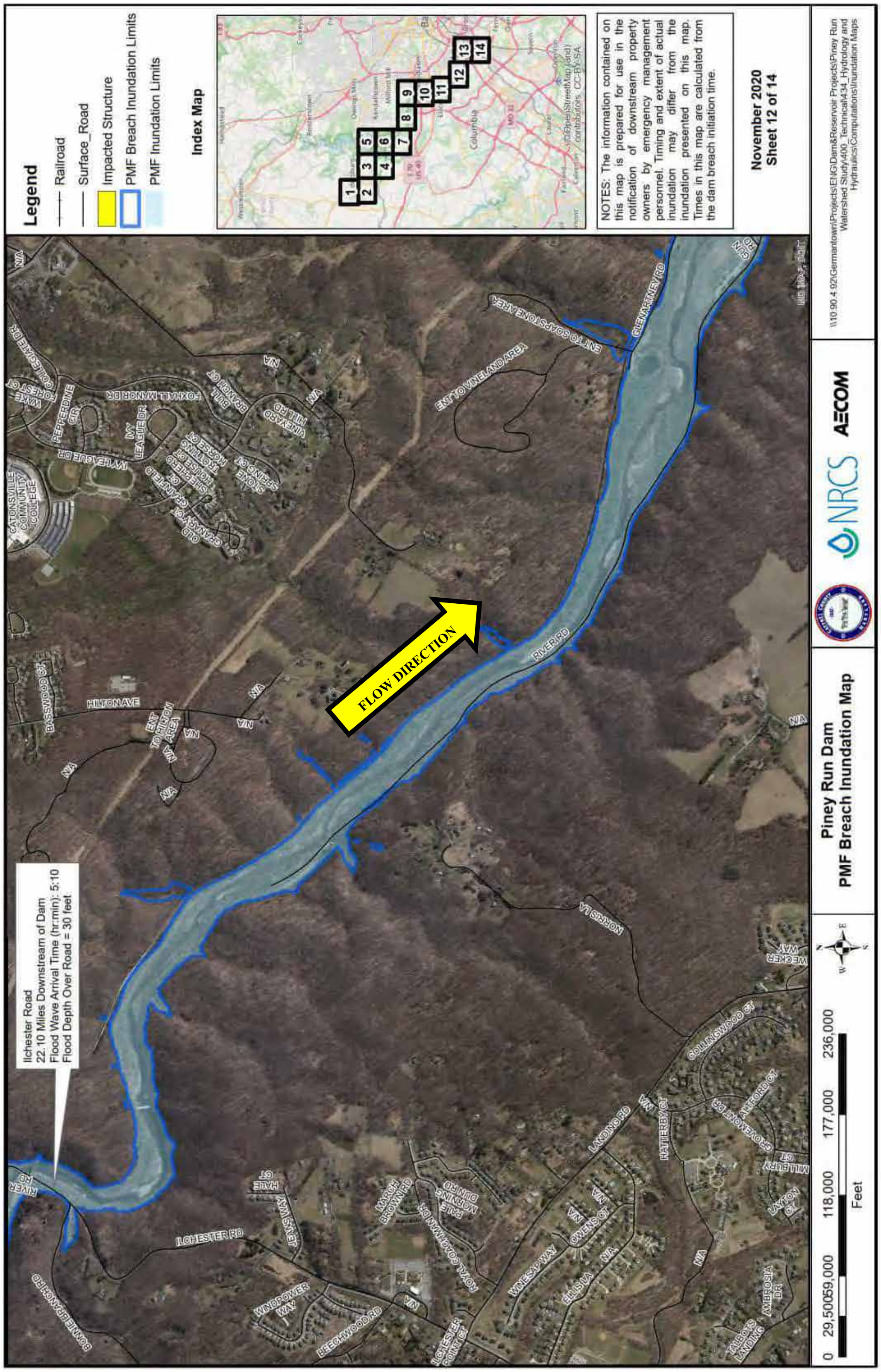


Figure C - 29. Piney Run Dam Hydrologic Breach Inundation Map (13 of 14)

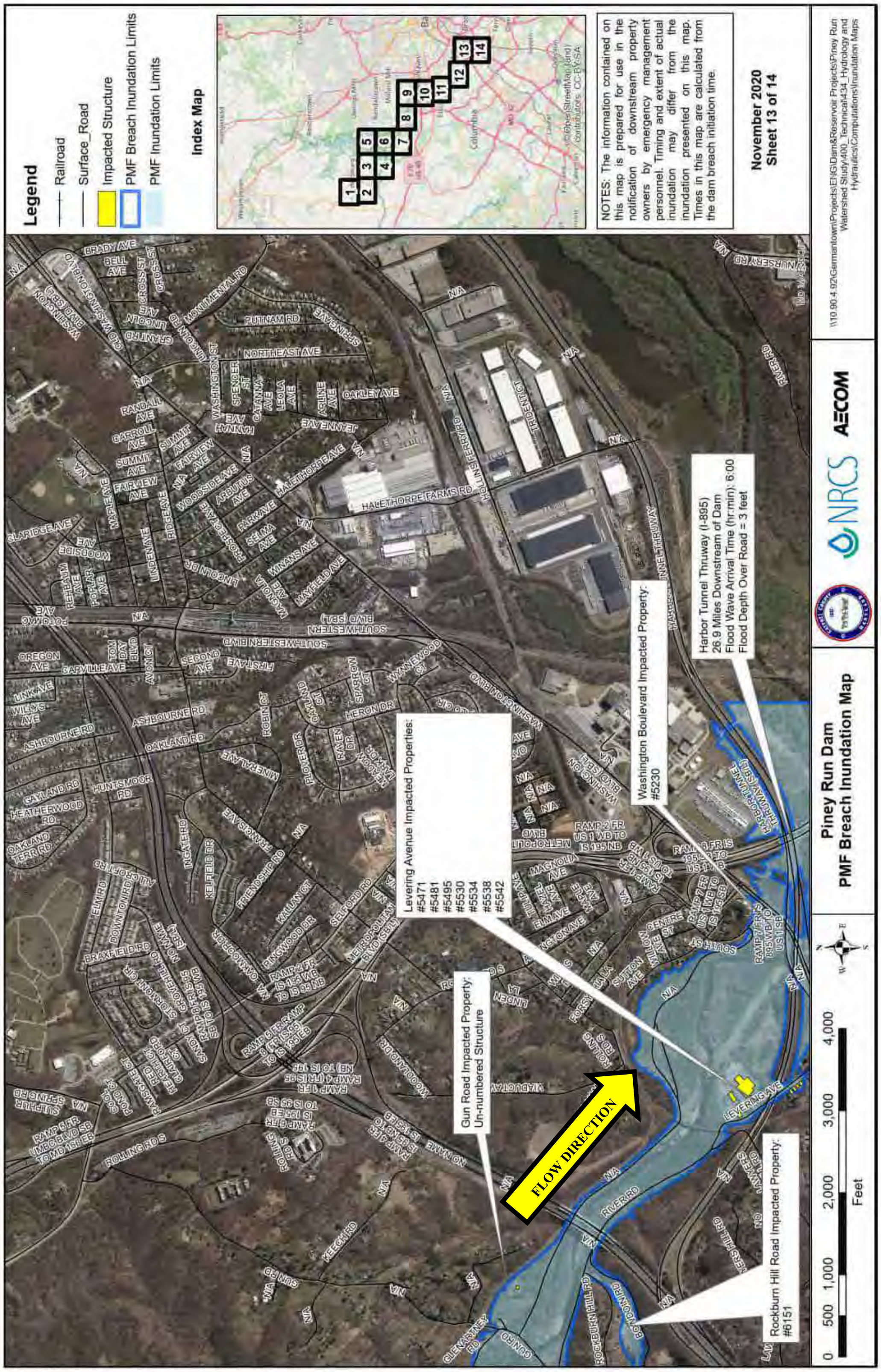


Figure C - 30. Piney Run Dam Hydrologic Breach Inundation Map (14 of 14)

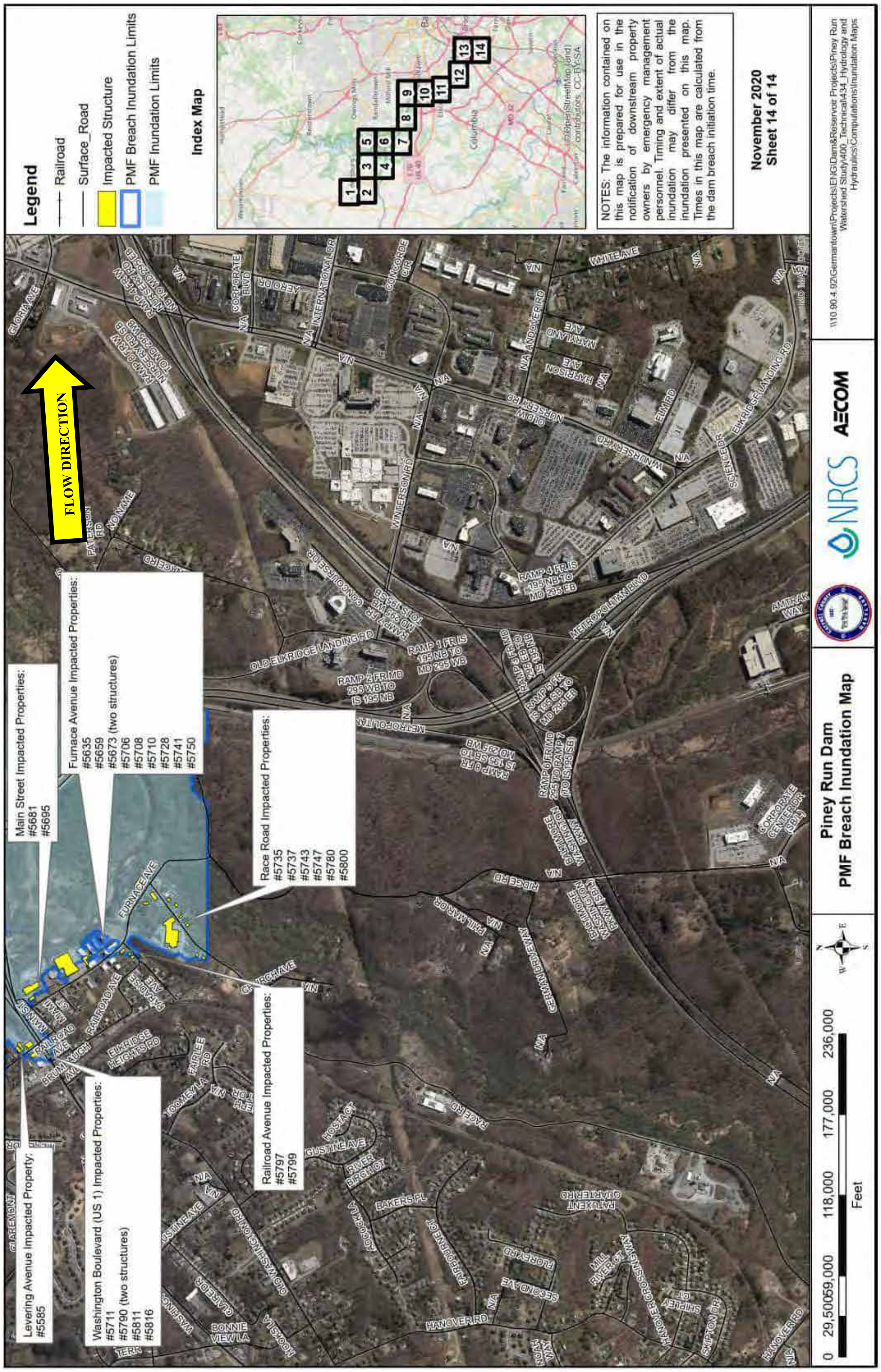


Figure C - 31. Piney Run Dam Existing Conditions

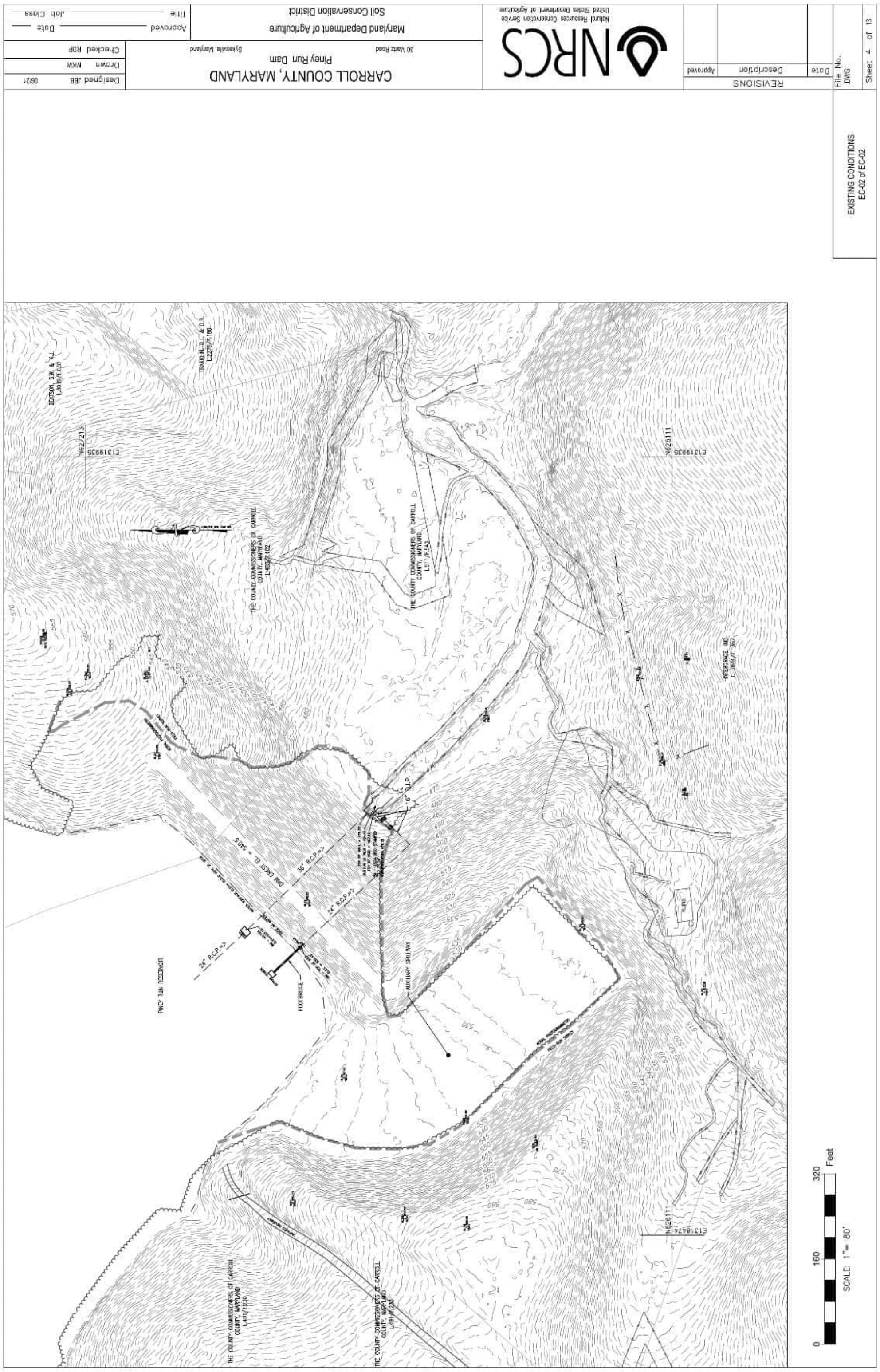


Figure C - 32. Piney Run Dam Alternative 1 Site Plan

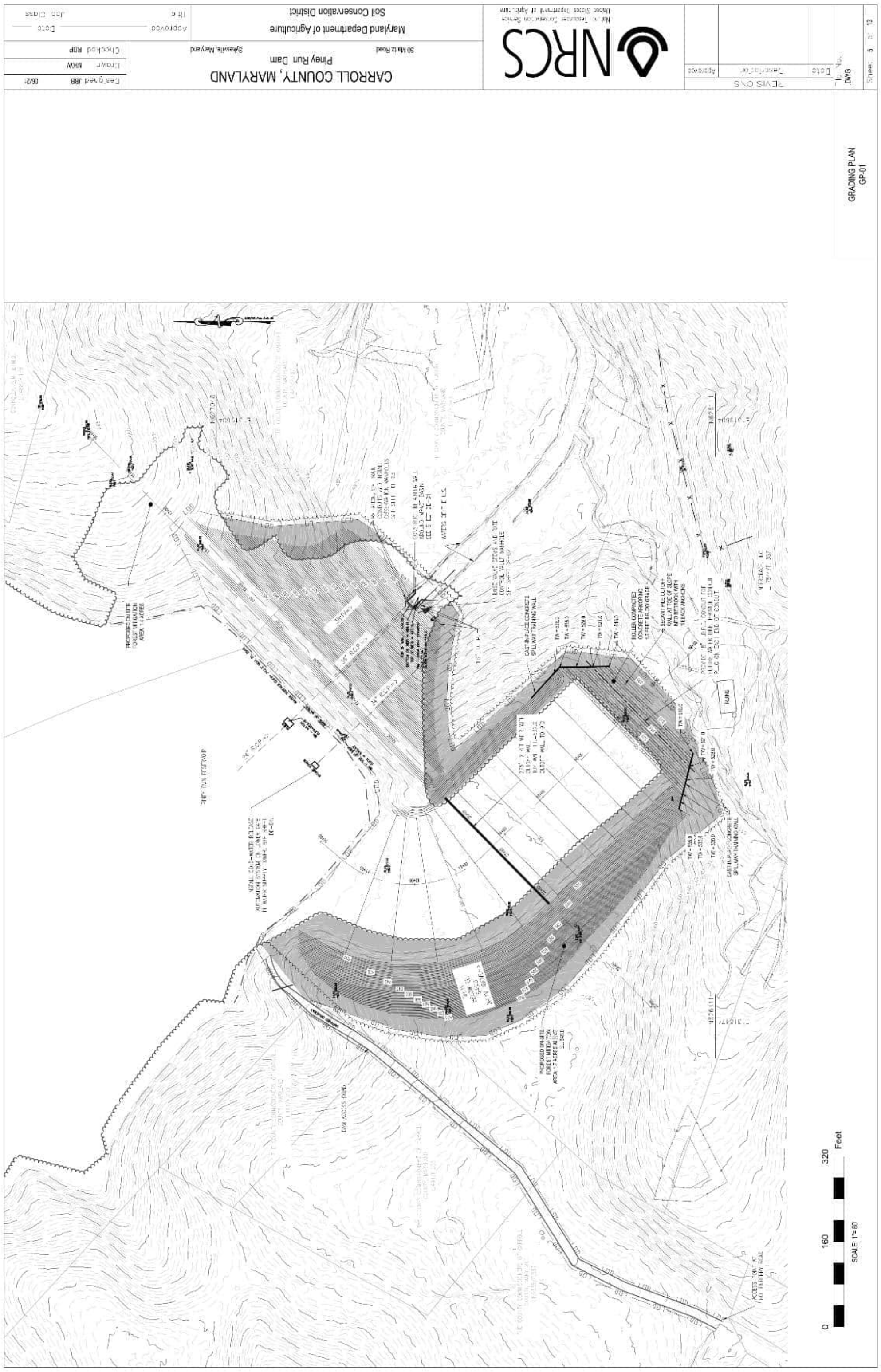


Figure C - 33. Piney Run Dam Alternative 1 Embankment Typical Section

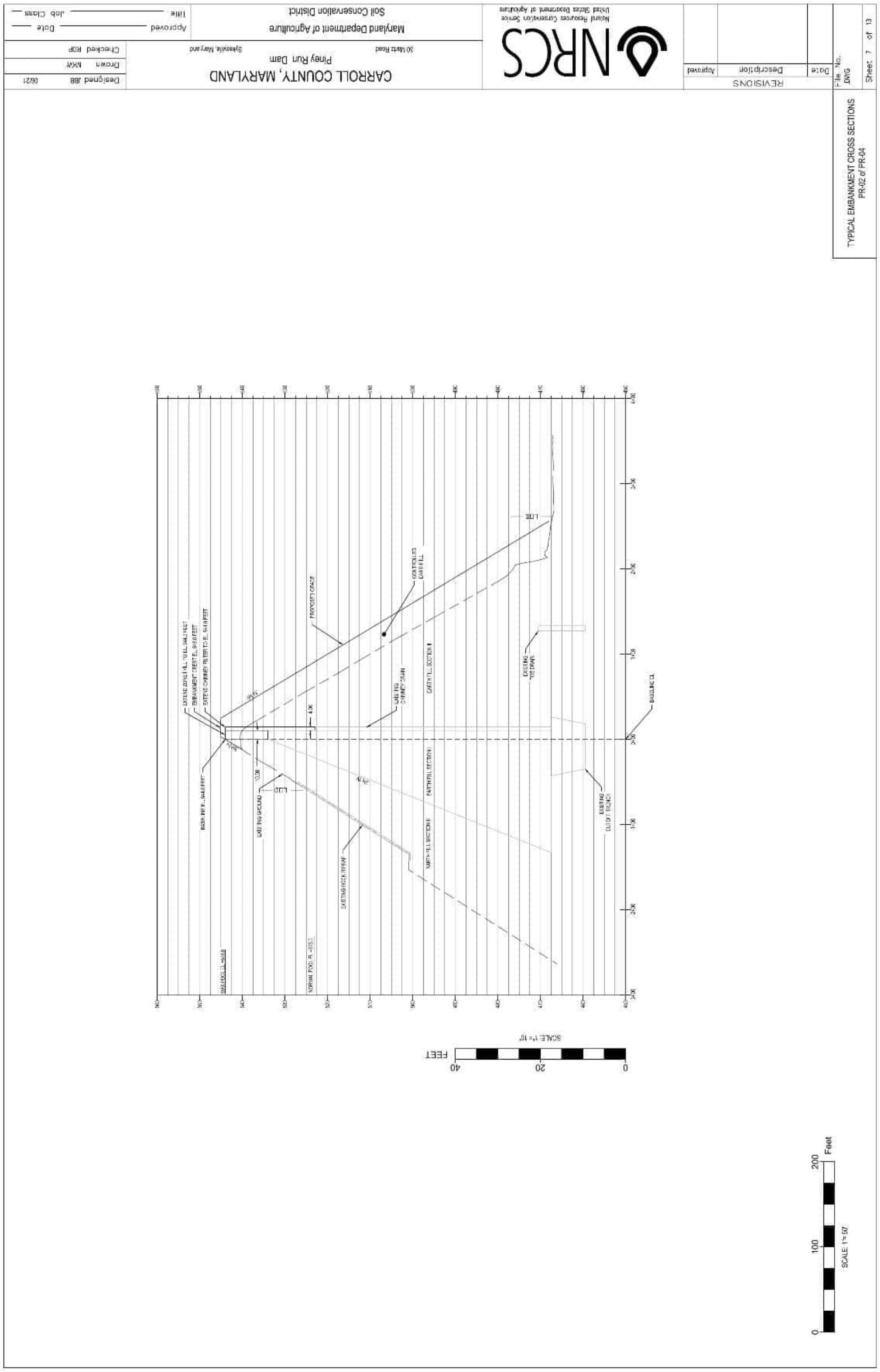


Figure C - 34. Piney Run Dam Alternative 1 Auxiliary Spillway Profile

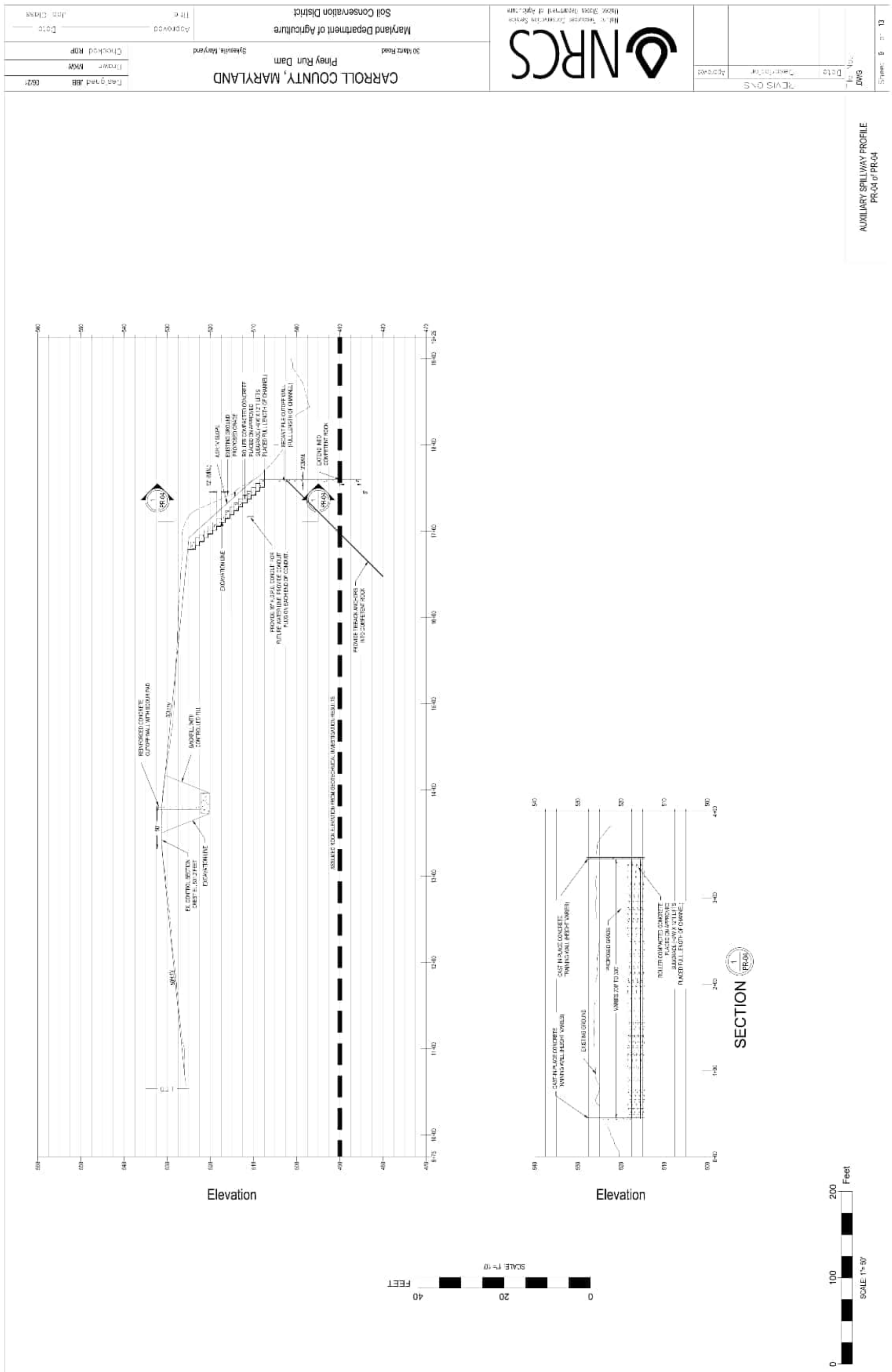


Figure C - 35. Piney Run Dam Principal Spillway End Wall Modifications

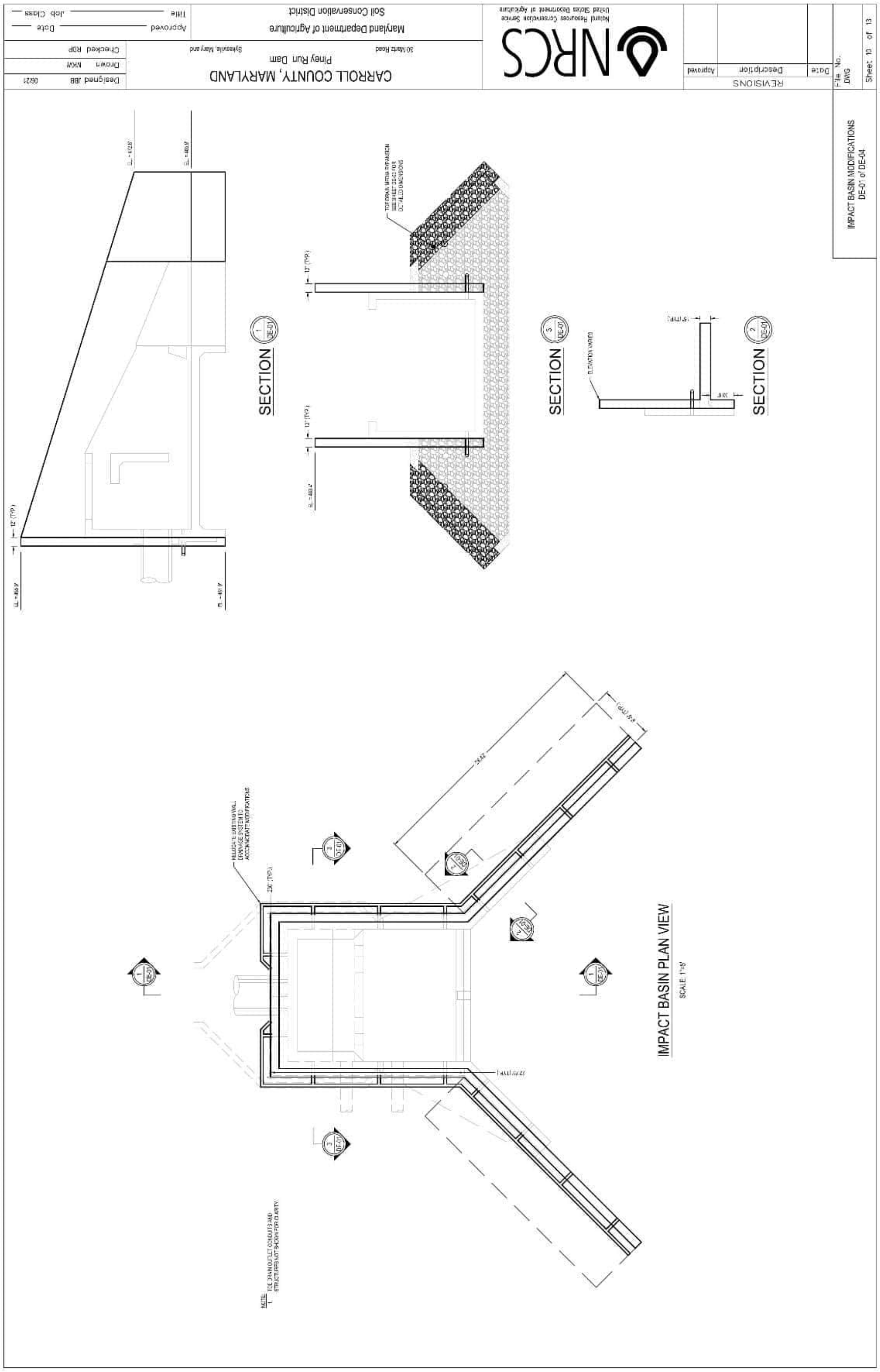


Figure C - 36. Piney Run Dam Rate Control Vault Modifications

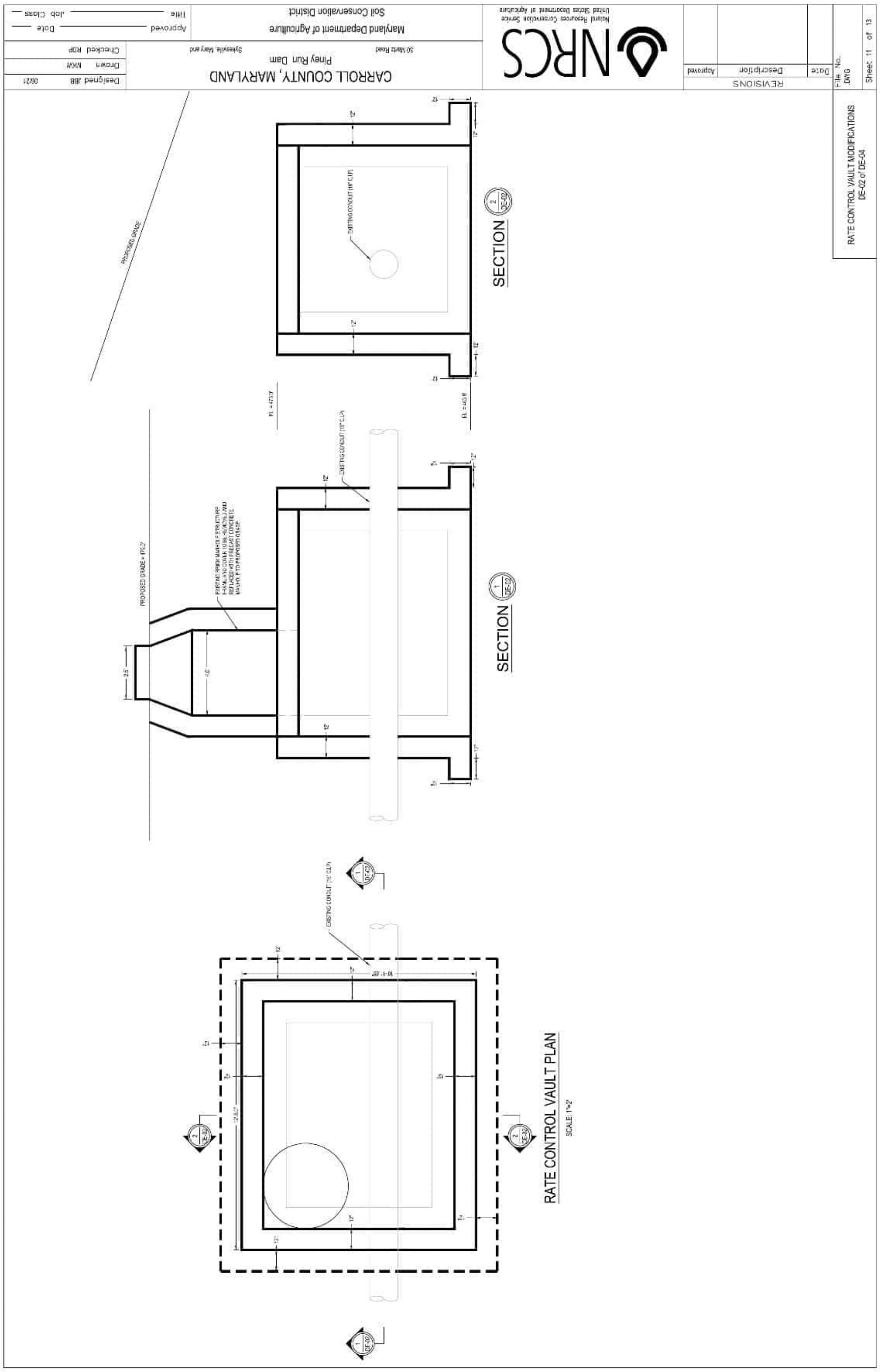


Figure C - 37. Piney Run Dam Internal Drain Modifications

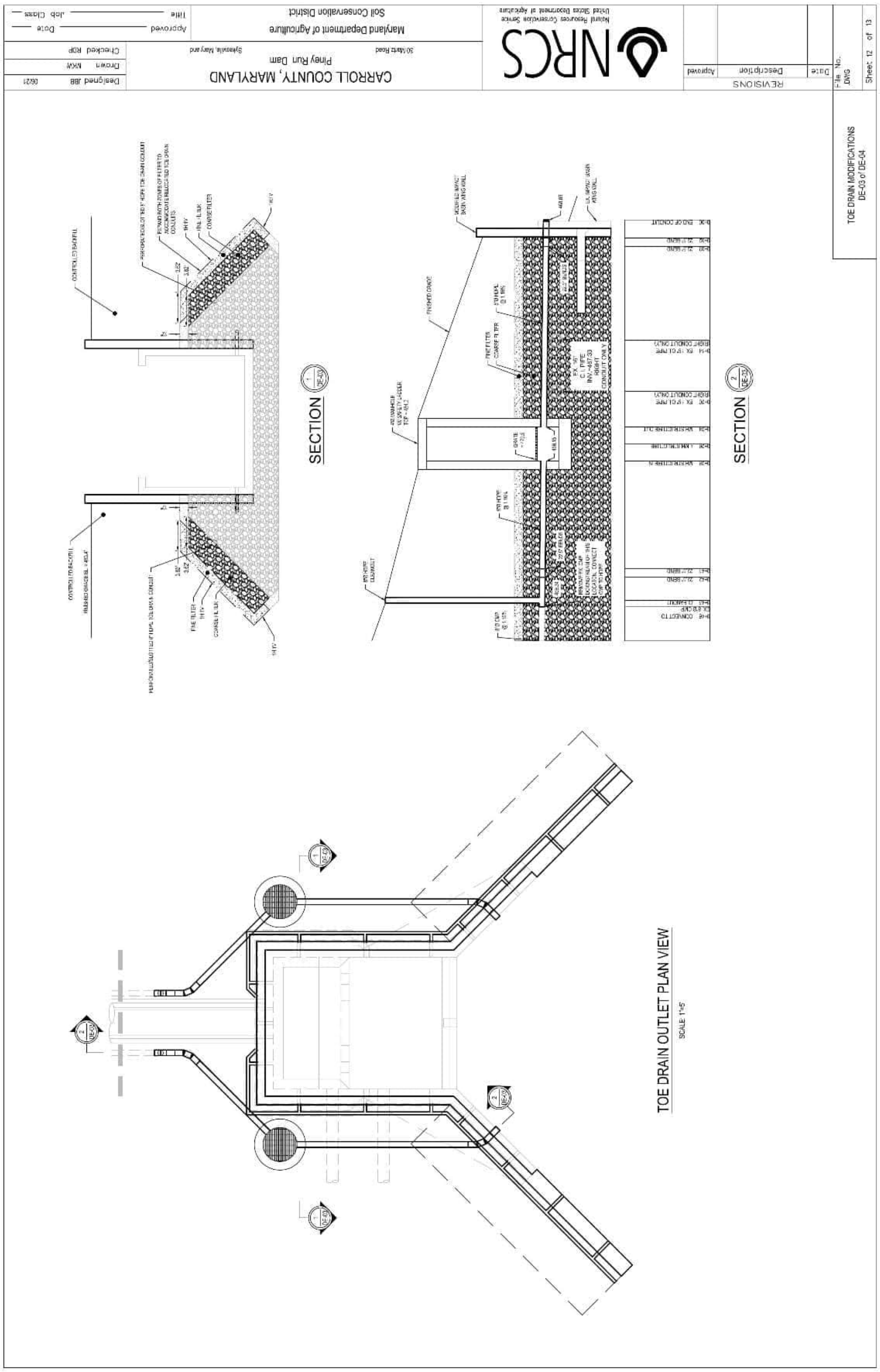


Figure C - 38. Geologic Investigation Plan

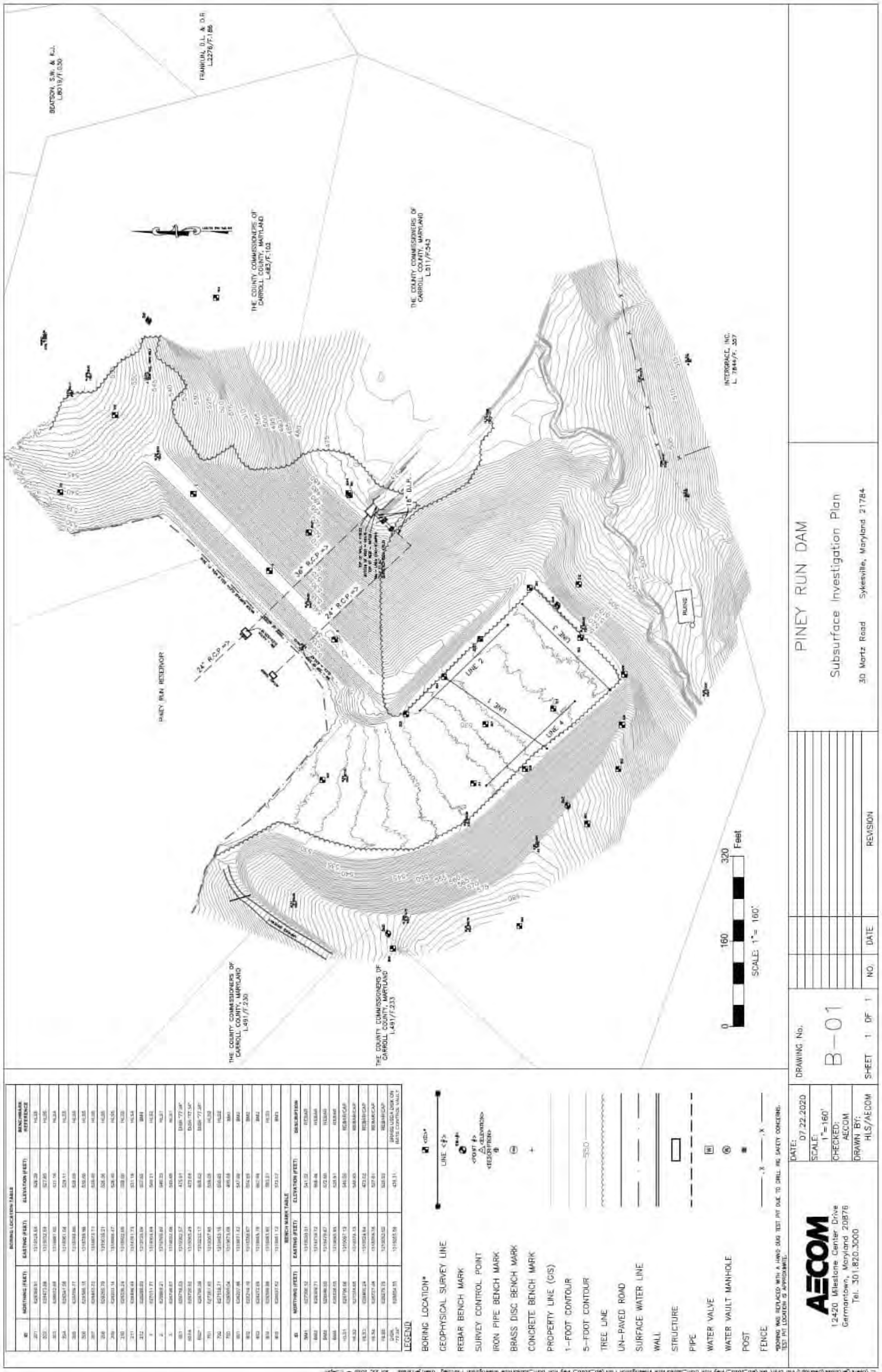


Figure C - 39. Piney Run Study Area Water Resources

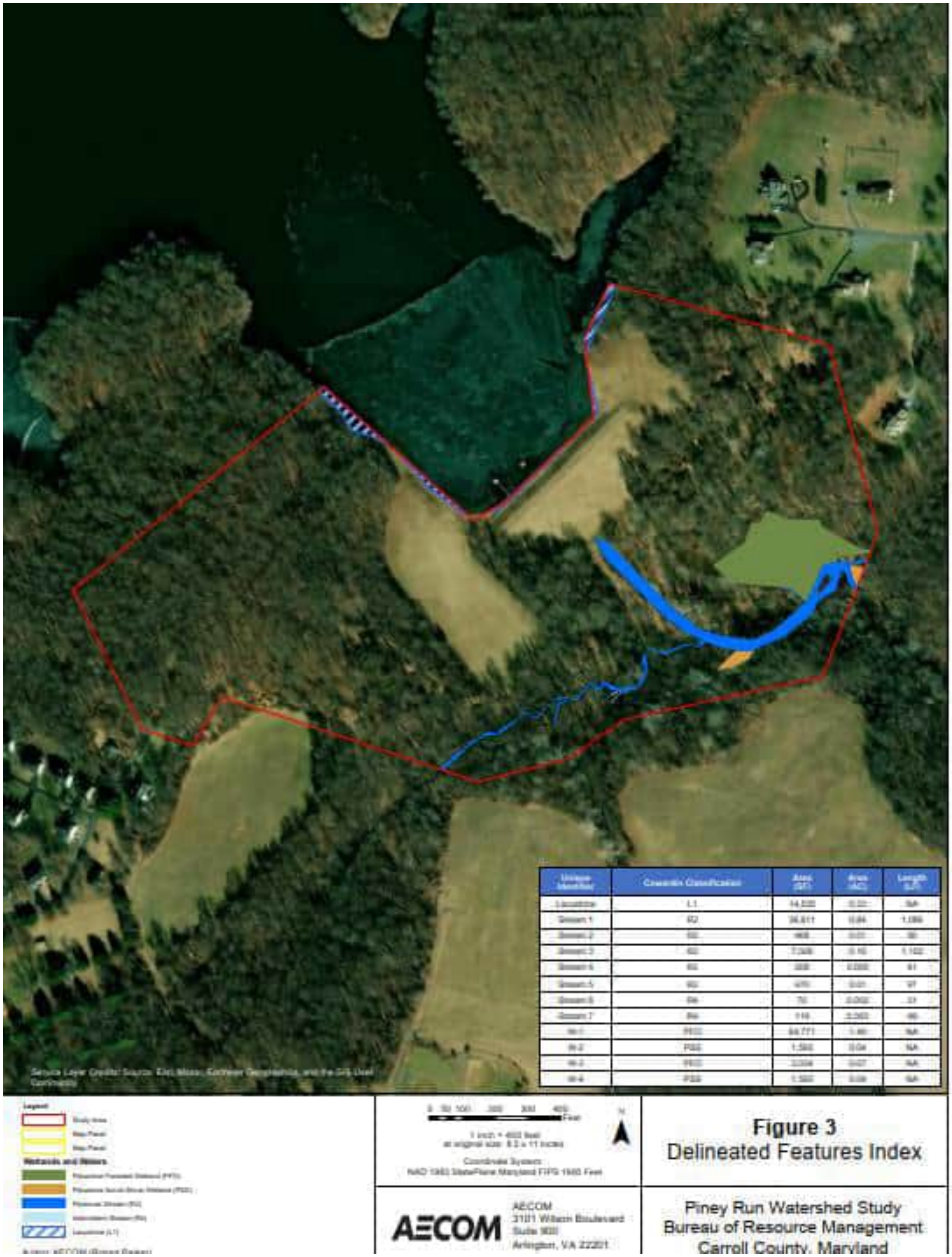


Figure C - 40. Piney Run Study Area Vegetation

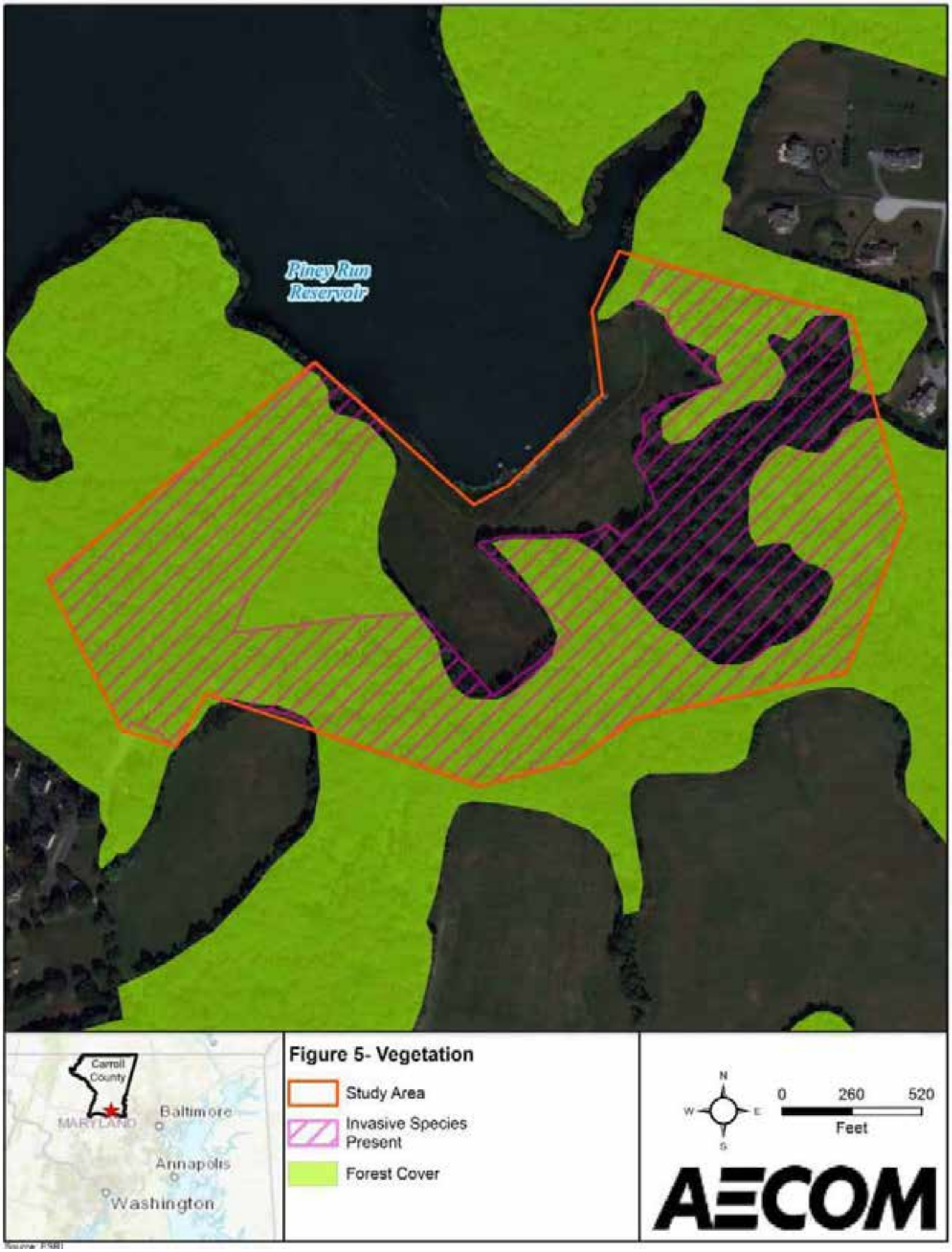
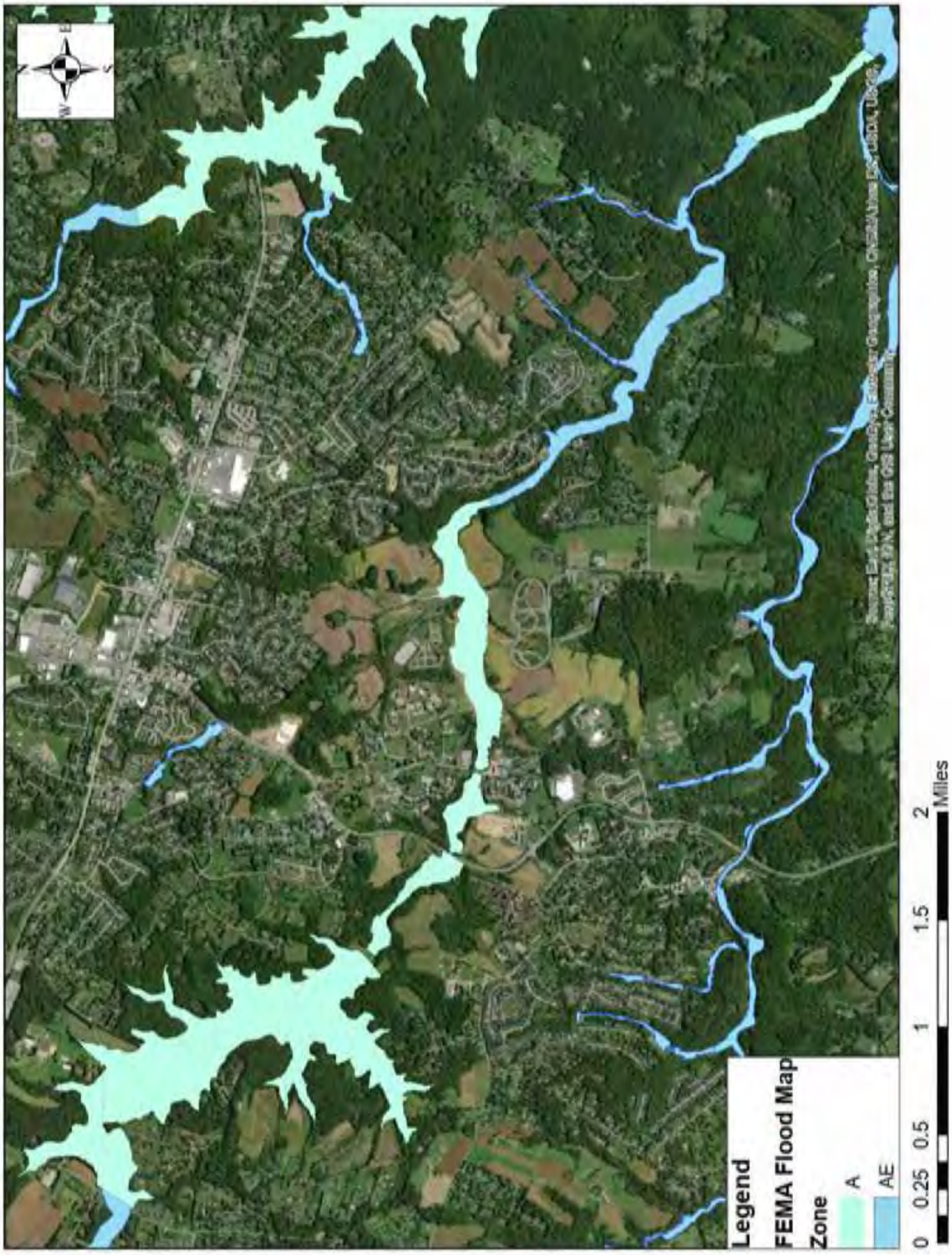


Figure C - 41. Piney Run FEMA Flood Map



Appendix D Investigation and Analysis Report

D.1 Introduction

This appendix provides supplementary information pertaining to the investigations and analyses completed to support this Watershed Plan-EA. The administrative record contains additional supporting information relevant to each section of this appendix.

D.2 Existing Data

The following data was provided by Carroll County, Maryland and the Maryland Department of the Environment Dam Safety Division (MDE) and reviewed as part of this project:

- Construction Drawings
- As-Built Drawings
- As-Built Report
- Design Report
- County-Wide Water Supply Studies
- Watershed Plan
- Original and Supplemental Watershed Agreements
- Inspection Reports
- Construction Photos
- Supporting Documentation and Correspondence

D.3 Inspections

D.3.1 Visual Inspection

A visual inspection was conducted on November 5, 2019 by walking the crest, slopes, and abutments as well as the earthen spillway entrance, control, and exit channel sections. Visual observations were made of the exposed areas of the dam and appurtenant structures.

Primary observations from the inspection included the following:

- Depressions on the upstream and downstream slopes;
- Woody debris lodged in the trash rack of the principal spillway riser;
- Broken/corroded animal grates on the internal drain outlets;
- Damage to two observation wells (#9 and #11) which made readings difficult to obtain and possibly inaccurate.

Primary recommendations from the inspection are summarized below:

- Fill the upstream depression with compacted fill material and over seed. Monitor the depression on the downstream slope;
- Remove woody debris from the principal spillway riser taking care not to allow debris to fall into the bottom of the riser (completed December 20, 2019);
- Repair/replace the animal guards on the internal drain outlets;
- Repair/replace the damaged sections of observation wells #9 and #11;

When compared with the last documented annual inspection report by MDE and The United States Department of Agriculture Natural Resources Conservation Services (NRCS), there were no observed changes identified in the dam, its appurtenant structures, or the reservoir within view of the dam.

D.3.2 Conduit Inspections

Inspections of conduits in the dam were made using remotely operated vehicle (ROV) video inspection techniques on December 19, 20, and 23, 2019. The ROV system provides the capability to complete remote inspections of pipe runs up to 500 feet in length. The system allows capturing real-time video to document the existing conditions of each conduit of interest. The ROV was launched laterally from one end of each pipe to survey and document the pipe conditions without the need for human entry into confined spaces at the following locations:

- Principal spillway intake tower
- Principal spillway conduit
- Lake drain conduit
- Left (Northeast) internal drain conduit
- Right (Southwest) internal drain conduit

In the principal spillway conduit, there were approximately one to two inches of water flowing in the conduit invert during the inspection. The conduit appears to have well-seated joints. Minor pitting was observed along conduit walls below the spring line of the pipe (between three o'clock and nine o'clock) and minor spots of efflorescence above the spring line (between nine o'clock and three o'clock) along the entire length of the conduit.

In the lake drain conduit, which was bulkheaded and dewatered prior to inspection, there were approximately one to two inches of water flowing in the conduit invert. The inspection showed the conduit as having well-seated joints. Minor pitting was observed along conduit walls all around the conduit along its entire length. Discontinuities having the look of a scrape or indentation in the invert of the conduit wall were observed at locations 338.58 feet (six o'clock), 339.08 feet (six o'clock), 356.41 feet (between six o'clock and nine o'clock), and 363.16 feet (between seven o'clock and eight o'clock) along the pipe. No indications of leaks were identified at these locations. Minor hairline cracks with some efflorescence were observed at location 370.0 feet (between 10 o'clock and 12 o'clock).

Inspection of the principal spillway riser proceeded from top to bottom. The inspection showed that the safety ladder fall protection system running down the center of the ladder was misaligned toward the bottom of the ladder and that there was no ladder for approximately 12 feet at the bottom of the tower. The riser interior walls appeared to be in good condition with no major visible defects and the lake drain sluice gate rising stem extension and guides also appeared to be in operable condition.

The lake drain sluice gate was successfully operated several times during the inspections. The sluice gate itself was not completely sealed and there was a significant amount of water entering the riser from around the gate disc. A review previous inspections showed that this has been a problem for many years with flow rates estimated as high as 100 gallons per minute (0.22 cubic feet per second). Since the estimated leak rate is lower than the estimated inflow rate to the reservoir, there is not a concern about loss of water in the reservoir through the gate. In addition, there is no historical documentation or anecdotal evidence pertaining the issue of maintaining the normal pool reservoir despite the leaking gate.

During inspection of the left internal drain conduit, there were approximately one to two inches of water standing/flowing in the conduit invert. Loss of the conduit bitumen wall coating was observed along the entire conduit. Potential leaks were noted at locations 3.66 feet (two at four o'clock) and 48.58 feet (when pulling the camera out of the conduit in the downstream direction - two at seven o'clock) on the conduit. In all cases, these potential leaks appear to have some pressure, forcing water up into the conduit above the standing water. At location 16.33 feet there was a large object noted at seven o'clock. Sediment deposits were also found in the invert of the conduit at location 15.0 feet. Significant buildup of material was observed between locations 61.16 feet and 70.91 feet and deeper flows and sediment were observed from locations 71.91 feet to the end of the inspection which is at the approximate location of the toe drain "tee" connection to the internal drain conduit. A characterization of these sediments could not be made from review of the video and therefore, it is not possible to determine a source at this time.

During inspection of the right internal drain conduit, there were approximately one to two inches of water standing/flowing in the conduit invert. Loss of conduit wall bitumen coating was observed along the entire conduit. Potential leaks were noted at location 10.25 feet (when pulling the camera out of the conduit in the downstream direction - two at seven o'clock) on the conduit. These potential leaks appear to have some pressure forcing water up into the conduit above the standing water. At location 17.0 feet there was a large object noted at six o'clock. Significant buildup of material was observed between locations 52.91 feet and 76.33 feet and deeper flows and sediment were observed from locations 76.33 feet to just beyond the location of the toe drain "tee" connection to the internal drain conduit. A characterization of these sediments could not be made from review of the video and therefore, it is not possible to determine a source at this time.

Primary recommendations are summarized below:

- Re-inspect all conduits in five years and beyond that on a five-year cycle to identify any changes affecting performance or safety of the conduits.

- In the principal spillway riser, replace the missing section of the access ladder at the bottom of the principal spillway intake tower and repair or replace the fall protection system before any further access using the ladder system is attempted.
- Complete a detailed inspection and adjustment of the gate components including the wedges to improve the overall seal by a qualified technician within the next 12 months.
- Re-align the downstream end of the drain system where the drain alignments run around the impact basin to their outlets. Install an access point such as a manhole or vault along the alignment of each internal drain conduit to allow for easier maintenance, camera inspections, discharge measurement, and discharge sampling and evaluation. The new internal drains should be aligned to reduce the number of bends for easier maintenance and inspection. All new conduit should be made of high density polyethylene (HDPE).
- The raw water intake tower and conduit were not able to be inspected completely due to malfunctioning gates in the tower that did not allow the tower and conduit to be dewatered. A previous inspection of the dewatered conduit performed by Progress Marine in November 2013 was reviewed and no major findings were identified. Inspect and repair the raw water intake tower gates to functional condition. Inspect the raw water intake tower and water supply conduit under dewatered conditions.

D.4 Affected Environment Investigations

Investigations into the affected environment were conducted in November and December 2019 and included wetland and waters of the U.S. delineations, invasive species assessment, and Phase I and Phase II archeological surveys.

D.4.1 Wetlands and Waters of the U.S.

A wetlands and waters delineation was conducted in September 2023 that identified five perennial riverine streams comprising 2,432 linear feet (LF), two intermittent riverine streams comprising 70 LF, and two palustrine forested (PFO) wetlands comprising 1.56 acres, and two palustrine scrub shrub wetlands comprising 0.08 acres within the Study Area. Perennial riverine streams are waterways with continuous flow throughout the year while intermittent riverine streams have little to no flow during dry seasons.

D.4.2 Invasive Species

Invasive species are abundant throughout the Study Area and a total of 17 species were observed during field surveys conducted on 4 November 2019. 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).

D.4.3 Cultural Resources

A Phase I archaeological survey was conducted in the Study Area during 3-6 December 2019. The survey consisted of visual surface inspection for above-ground evidence of archaeological sites and the excavation of 217 shovel test pits. The survey results found 1 prehistoric and 242 historic artifacts, and the identification of 4 historic archaeological sites. The prehistoric artifact and 1 of the historic artifacts occurred as isolated finds, while the remaining 241 historic artifacts are attributed to 3 of the 4 historic sites. 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, due to its age of over 50 years, the Piney Run Dam itself is also considered a site potentially eligible for listing in the NHPA's National Register of Historic Places (NRHP).

Site 18CR293 includes 5 features and 224 historic artifacts representing two functionally discrete site loci. Locus A served as the farmstead's agricultural core as indicated by the foundations of a large barn and secondary outbuilding, along with a low-density scatter of artifacts with very limited functional diversity. Locus B served as the farmstead's domestic epicenter, as indicated by a dwelling foundation and higher quantities of more functionally diverse artifacts, including service and storage wares. The distribution of artifacts and features reflects the division of space the site occupants imposed on the landscape. Site 18CR293 is also located in what was likely a very isolated part of the valley throughout the nineteenth century, a setting which might have forced site occupants to adapt to life in a more remote location.

For a property or site to be listed or eligible for listing in the NRHP, it must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the NRHP significance criteria listed below (54 USC 302103):

- Association with events that have made a significant contribution to the broad patterns of our history;
- Association with the lives of significant persons in our past;
- Embodiment of the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
- Yielded, or may be likely to yield, information important in history or prehistory

Determinations of eligibility for listing in the NRHP were made by the NRCS and concurrence sought from the Maryland State Historic Preservation Office, the Maryland Historic Trust. The determinations of the five sites were as follows:

1. Site 18CR292 – Not eligible. The site lacks a clear affiliation with any individual historic occupation and lack of associate value and data potential to yield significant information about local consumer practices. This determination was concurred with by the Maryland Historic Trust in January 2024.

2. Site 18CR293 – Potentially eligible. The site was recommended to be avoided by the project due to the presence of numerous features, discrete activity areas, and intact archaeological deposits. However, since it could not be avoided by the dam's operations, particularly if the auxiliary spillway were to activate, a Phase II archeological evaluation of Site 18CR293 was completed in late 2023. Based on the results of the evaluation, the site was determined to be not eligible for listing in the NRHP as it did not meet any of the criteria for listing. This determination was concurred with by the Maryland Historic Trust in March 2024.
3. Site 18CR294 – Not eligible. The site lacks a clear affiliation with any individual historic occupation and absence of potentially meaningful historical and archeological contexts. This determination was concurred with by the Maryland Historic Trust in January 2024.
4. Site 18CR295 – Outside of the APE. The site was represented within the APE at its western extent by a single positive shovel test pit. NRCS determined based on the proposed limits of disturbance that this site would be avoided by all ground-disturbing activity. Since it is upstream of the dam and above the maximum pool elevation, it would also be avoided by dam operations. This recommendation was concurred with by the Maryland Historic Trust in July 2021.
5. Piney Run Dam – Not eligible. The site does not meet any of the criteria for listing in the NRHP. This recommendation was concurred with by the Maryland Historic Trust in December 2023.

D.5 Geology

A geologic investigation was performed to inform the engineering assessment of the embankment and spillway at the Piney Run Dam.

D.5.1 Geologic Setting

Piney Run Dam is located in central Maryland within the Piedmont physiographic province. In the western part of the province, lithology includes "phyllite, slate, marble, and moderately to slightly metamorphosed volcanic rocks" (Maryland Geological Survey, 2020). 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].

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.

The surface soils of the dam and abutments are identified in the NRCS Web Soil Survey as "Dams, concrete" [DAM]. It should be noted that Piney Run Dam is an earthen embankment dam, but it does include concrete components such as the concrete riser, intake structure, and impact basin. The surface soils downstream of the dam outlet consist of Codorus silt loam [CdA] with 0 to 3 percent slopes. The surface soils of the auxiliary spillway and west of the auxiliary spillway outside slope consist of Glenelg loam [GdB] with 3 to 8 percent slopes. The surface soils directly surrounding the auxiliary spillway to the west, south, and east consist of Manor loam [MaF] with 25 to 65 percent slopes. The surface soils of the northeast (left) abutment consist of Brinklow channery loam [BrC and BrD] with 8 to 15 and 15 to 25 percent slopes, respectively.

D.5.2 Seismic Potential

Based on the United States Geological Survey (USGS) Earthquake Hazards Program Quaternary Fault and Fold Database of the United States (https://earthquake.usgs.gov/hazards/qfaults/), the Central Virginia Seismic Zone (Class A) is the closest identified fault location to Piney Run Dam. Located between Richmond, Virginia and Charlottesville, Virginia, these faults are located approximately 128 miles from Piney Run Park.

Peak ground acceleration (PGA) was determined based on USACE ER 1110-2-1806 (2016). Piney Run Dam is a High Hazard dam, which is a determining factor in PGA return period selection. For this site, a return period of 10,000 years was selected as there is potential for loss of life from failure at normal pool levels, which means the dam would be categorized as a high consequence structure in the event of a seismic failure and thus subjected to an analysis return period of 10,000 years per TR-210-60 requirements. A shear wave velocity of 760 m/sec was selected as it is on the boundary of Class B "rock" and Class C "very dense soil and soft rock" site classifications from American Society of Civil Engineers (ASCE) Standard 7-16 Minimum

Design Loads and Associated Criteria for Buildings and Other Structures (2016). From the USGS Unified Hazard Tool, the PGA is projected to be 0.185g (https://earthquake.usgs.gov/hazards/interactive/).

D.5.3 Geologic Investigation Program

The subsurface investigation was performed between November 25, 2019 and January 15, 2020. Twenty-five total borings were drilled using a CME-55 track-mounted drill rig: twelve on the existing auxiliary spillway, five beyond the outside slope of the existing auxiliary spillway, three on the embankment, three on the left abutment, and two at the downstream toe (one of which is an offset boring). In addition, one hand-dug test pit was performed on the middle portion of the downstream slope approximately halfway between the crest and toe of the slope.

Soil was drilled using 3 ¼-inch inside-diameter hollow stem augers. Representative soil samples were obtained using a 2-inch outer-diameter split spoon sampler in general accordance with ASTM International (ASTM) D1586 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. SPTs were performed by driving a split-barrel sampler with a 140-pound hammer dropped 30 inches. Soil samples were collected in jars and were obtained by split spoon sampling generally at 5-foot intervals. Where possible, samples were tested with a pocket penetrometer and pocket shear vane from the split spoon.

Shelby tube sampling was performed in select borings in general accordance with ASTM D1587, Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes. These samples were collected for laboratory testing requiring relatively undisturbed soil samples. Bulk samples were also obtained from select borings by sampling from the auger cuttings.

One additional bulk sample was obtained from the hand-dug test pit located on the mid-downstream slope of the embankment because the drill rig was not able to safely access the location without significantly damaging the embankment.

Rock core sampling was performed generally at auger refusal using an NQ wireline coring barrel and 2 ½-inch outer diameter coring rods. Rock coring was performed at all boring locations except Borings 205 and 601A. The rock coring ranged between five linear feet (Borings 601 and 208) and 35 linear feet (Boring 805). In some instances, rock coring was performed with a split core barrel prior to auger refusal in order to sample the transitionary material at the soil-rock interface.

Upon drilling completion, 1-inch-diameter PVC pipes with slotted perforations in the bottom foot were temporarily installed in the majority of borings in order to take 24-hour groundwater readings and to preserve the hole to its termination for tremie grouting. After taking final groundwater readings, borings were backfilled by tremie grouting using cement-bentonite grout.

D.5.4 Laboratory Testing

Laboratory testing on soil and rock samples obtained during the subsurface investigation of Piney Run Dam was performed in general accordance with ASTM standards. The following laboratory tests were performed:

- Twenty-one (21) tests with ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- Thirty-three (33) tests with ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- Twenty-one (21) tests with ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- Ten (10) tests with ASTM D7263 Standard Test Methods for Laboratory Determination of Density (Unit Weight) of Soil Specimens
- One (1) test with ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600kN-m/m3))
  - Thirty-seven (37) tests with ASTM D7928 Standard Test Method for Particle Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
  - Ninety-nine (99) tests with ASTM D6913 Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
  - Four (4) tests with ASTM D7012 Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures
  - Three (3) tests with ASTM D4767 Standard Test Method for Consolidated Undrained Triaxial Compression Test for Cohesive Soils
- One (1) test with ASTM D7181 Standard Test Method for Consolidated Drained Triaxial Compression Test for Soils
  - One (1) test with ASTM D5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
- Two (2) tests with ASTM D854 Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
  - Two (2) tests with ASTM C128 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate

Tests with ASTM D4221, Standard Test Method for Dispersive Characteristics of Clay Soil by Double Hydrometer or ASTM D6572, Standard Test Methods for Determining Dispersive Characteristics of Clayey Soils by the Crumb Test, were planned for soil samples from the auxiliary spillway. However, within the spillway proper, the soils were found to be non-plastic and thus a test for dispersion was determined to not be applicable.

D.5.5 Subsurface Conditions

The thickness of organic topsoil varied across the site with a maximum thickness of approximately 12 inches in Boring 805.

Piney Run Dam is an earth fill dam containing an earthen core. The material used to construct the dam is hereby referred to as Embankment Fill, consisting of Embankment Shell and Embankment Core material. The Embankment Fill material was sampled and tested from three borings located along the crest, two borings at the downstream toe of the dam, and a hand-dug test pit at the downstream mid-slope. Embankment Shell samples were visually classified as Silty SAND with varying amounts of gravel (SM). One sample was laboratory classified as Silty SAND with gravel (SM). Embankment core samples were visually classified as Silty SAND with varying amounts of gravel (SM), Clayey SAND with varying amounts of gravel (SC), and Sandy Lean CLAY (CL). Three samples were laboratory classified as Silty SAND (SM) and Sandy Lean CLAY (CL).

Residual soil was not identified in any of the Embankment Core borings, but based on the original design drawings, it is believed that a residual soil layer exists between the Embankment Fill and the underlying bedrock under the Embankment Shell zone, both upstream and downstream of the core trench as confirmed by Boring 601. Residual soil measured at Boring 601 is approximately seven feet thick. The soils were visually classified as Silty GRAVEL with sand (GM), and Silty SAND with a small amount of gravel (SM).

Nearly all soil sampled in the left abutment was considered residual because it is in a cut area, with only a few feet of possible fill encountered in Boring 702. The Residual soil thickness at the center of the left abutment, measured at Boring 702, is approximately 38 feet. Residual soil samples on the left abutment were visually classified as Silty GRAVEL with sand (GM), Silty SAND with varying amounts of gravel (SM), Clayey SAND with varying amounts of gravel (SC), and Sandy Lean CLAY (CL). Select samples were laboratory classified as Silty SAND (SM) and Silty GRAVEL with sand (GM) within the top ten feet.

Nearly all soil sampled in the auxiliary spillway was considered residual because it is in a cut area, with only a small amount of apparent fill encountered in Boring 211. The Residual soil thickness within the auxiliary spillway measured between zero feet (Boring 204) and 39 feet (Boring 207), with an average thickness of 25 feet. Auxiliary spillway soil was visually classified as 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). Select samples were laboratory classified as Silty GRAVEL with sand (GM), Silty SAND with varying amounts of gravel (SM), and SILT with varying amounts of sand (ML).

All soil sampled in the area beyond the auxiliary spillway right (outside) slope was considered residual because the borings are located in a wooded, undisturbed area. Residual soil thickness beyond the auxiliary spillway right slope measured between 8 feet (Boring 805) and 78 feet (Boring 803), with an average thickness of 37 feet. Residual Soil samples beyond the auxiliary spillway outside slope were visually classified as Silty SAND with varying amounts of gravel

(SM), Clayey SAND (SC), Sandy Lean CLAY (CL), Sandy SILT (ML), and Sandy ELASTIC SILT (MH). Select samples were laboratory classified as Sandy ELASTIC SILT (MH), SILTY SAND (SM), and SILTY GRAVEL with sand (GM).

Decomposed Rock was encountered directly above bedrock in the majority of borings within the left abutment, auxiliary spillway, and area beyond the auxiliary spillway outside slope. The decomposed rock layer ranged from approximately zero to 34 feet thick and averaged 9.5 feet thick. The material recovered in the split spoon was most often visually classified as slightly moist, brown to gray, non-plastic, fine to coarse Silty SAND with varying amounts of gravel (SM). Other visual classifications included Silty GRAVEL with sand (GM), Poorly Graded SAND with silt (SP-SM), Silty Clayey SAND with gravel (SC-SM), and Sandy SILT (ML).

The bedrock encountered in borings generally matched the Morgan Run Formation lithology described in Muller's 1994 geologic map. Rock core samples were predominantly weak to strong, slightly to highly weathered, slightly to intensely fractured, fine to medium grained, brownish gray to dark gray MICA SCHIST, with many samples containing quartz inclusions. Fractures were predominantly slightly rough to rough with spotty to partial iron and dark brown staining infill, with some fractures containing soil infill.

D.6 Engineering

Engineering investigations were performed to support evaluation of the existing conditions as well as development and evaluation of the proposed alternatives.

D.6.1 Surveys

Survey data was collected via field-run topographic, aerial photogrammetric, and bathymetric methods. The field-run topographic surveys were conducted to map all features in the Study Area as well as topography located under tree canopy. In the areas of the Study Area not under tree canopy, such as the dam embankment and auxiliary spillway, aerial photogrammetric data was collected using an un-manned aerial system (UAS) airframe. The photogrammetric data was combined with the field run survey data using a series of targets set on the ground and located using field-run survey techniques.

The bathymetry of the reservoir was assessed with the sonar transducer mounted to a small boat. The boat traveled in transects across the reservoir while the transducer collected sonar date of the reservoir bottom.

Survey control was established from permanent control points established by Carroll County, Maryland. The horizontal datum for the survey was the North American Datum of 1983 (NAD83), Maryland State Plane and the vertical datum was the North American Vertical Datum of 1988 (NAVD88). A comparative analysis of the benchmarks placed on various features of the appurtenant works of the dam indicates that the datum adjustment from the as-builts to the current NAVD88 datum is -1.0 feet.

D.6.2 Hydrologic and Hydraulic Analysis

A hydrologic and hydraulic analysis of the Piney Run Dam was prepared for existing and ultimate development watershed conditions. Using Geographic Information System (GIS) ArcMap version 10.6 software, a hydrologic database was created to support the watershed analysis. The GIS hydrologic database contains input data used to define and characterize the watershed, such as hydrologic soil types, land use types, runoff curve number and time of concentration. A gridded terrain surface was obtained in the form of a Hydro Flattened Digital Elevation Model (DEM) with a 10-foot cell size resolution. The DEM was derived from Light Detection and Ranging (LiDAR) data published by the state of Maryland Geographic Information Office's (GIO) iMAP Program in 2016.

The NRCS' Water Resources Site Analysis Computer Program, SITES version 2005.1.8 was used to create a hydrologic model of the Piney Run Dam watershed. This model was used to estimate the inflow hydrographs to Piney Run Dam and route the storms through the reservoir as required by State of Maryland and NRCS guidance. Since the watershed is less than 50 square miles, in accordance with NRCS guidance, the basin was modeled as a single sub-basin as shown in Figure 4. The watershed was delineated using ArcGIS hydrology tools and manually verified. The watershed area is estimated to be 6,760 acres (10.6 square miles).

Rainfall losses were computed using NRCS' Runoff Curve Number method. The CN was determined using ArcMap to overlay the land use and hydrologic soil groups within the watershed to determine the weighted CN. The CN for existing conditions was 72 and for ultimate conditions which used zoning data to determine land use, was 75.

To convert excess precipitation into surface runoff, the Soil Conservation Service (SCS) Unit Hydrograph Transform Method was employed within the watershed model. The Standard graph type with peak rate factor of 484 was selected for this analysis as recommended by Maryland Hydrology Panel for the Piedmont and Blue Ridge physiographic regions which encompass the Piney Run Dam watershed (Maryland Hydrology Panel, 2016). The Time of Concentration (Tc) for the watershed was calculated using the Velocity Method which is a segmental approach involving defining travel times for three different flow types along the longest flow path: sheet flow, shallow concentrated flow, and open channel flow. The estimated time of concentration of the Piney Run Dam watershed is 2.87 hours under existing conditions and 2.49 hours under ultimate conditions.

Precipitation data including estimated depth and distribution for each event modeled was collected from the following data sources:

- National Oceanic and Atmospheric Administration's Atlas 14, Volume 2, Version 3
- Hydrometeorological Report No. 51: "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian" (NOAA, 1978)

Atlas 14 provided data for all annual exceedance probability (AEP) events up to and including the 0.2% AEP (500-year) event. The AEP events used the NOAA Type C rainfall distribution in accordance with NRCS guidance. HMR-51 provided data for the PMP.

The following events were analyzed:

- 2% AEP, 24-hour event
- 1% AEP, 24-hour event
- 0.2% AEP, 24-hour event
- PSH event
- SDH event
- FBH event

In accordance with TR-210-60 guidance for flood retarding structures, the principal spillway was analyzed for a 1% annual exceedance, 10-day duration event using methods described in the National Engineering Handbook (NEH), Part 630, Chapter 21, Design Hydrographs (NRCS, 2019). The temporal distribution of the PSH is created in the SITES model by critically stacking the resulting runoff values and accumulating the results.

Likewise, TR-210-60 guidance requires that the auxiliary spillway be analyzed for discharge capacity, stability (erosion potential), and integrity (breach potential). This analysis is performed by examining spillway performance under both six- and 24-hour duration events and using the most critical results when evaluating the spillway.

In accordance with TR-210-60 guidance and Maryland regulations, the dam must be analyzed for capacity and sufficient freeboard using FBH/SDF event. This analysis is performed by examining the dam's hydraulic performance under both six- and 24-hour duration events for TR-210-60 and for the six, 24-, and 72-hour events based State of Maryland guidance and using the most critical results when evaluating discharge capacity and freeboard. As a Class 'C' high hazard potential dam, the required precipitation depth for the FBH/SDF is the PMP.

The United States Army Corps of Engineers Hydrologic Engineering Center Meteorological Visualization Utility Engine, version 3.0 (HEC-MetVue) was used to manipulate HMR-51 datasets including temporal and spatial aggregation of datasets and areal average computations to develop the PMP events for the Piney Run Dam watershed. HEC-MetVue utilizes methodologies of NOAA's HMR-52 to adjust the precipitation depth and extents for the size, shape, and orientation of the watershed and to temporally distribute precipitation.

HEC-MetVue gives a 72-hour output hyetograph for the watershed. Unit hyetographs for six- and 24-hour duration storms were extracted from the 72-hour hyetograph using the method in the NEH Part 630, Chapter 4, Storm Rainfall Depth and Distribution (NRCS, 2015). These unit hyetographs were input into the SITES program for the six- and 24-hour duration SDH events to create temporal distributions of the SDH precipitation depths.

The FBH/PMP depths were obtained as described in this section. As previously discussed, HEC-MetVue gives a 72-hour output hyetograph for the watershed (Maryland requires consideration of PMP events as long as the 72-hour event for the purposes of determining the PMF). This hyetograph was used to model the 72-hour event in SITES while six- and 24-hour hyetographs were extracted using the method in the NEH Part 630, Chapter 4, Storm Rainfall Depth and Distribution (NRCS, 2015). The hyetographs for these events were input directly into the SITES program.

Reservoir routing through Piney Run Reservoir and Dam was performed within the SITES watershed model. The stage-storage relationship of Piney Run Reservoir was developed using a combination of bathymetric survey data below elevation 523.0 which was performed in 2019 one-meter LiDAR data obtained from the Maryland GIO above elevation 523.0. Storage volume calculations were prepared to elevation 546.0 (approximately 5.5 feet above the dam crest elevation). The principal and auxiliary spillway stage-discharge ratings were developed internally in the SITES model using geometric input data derived from the survey and as-built plans.

D.6.3 Spillway Integrity Analysis

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 geologic investigation made during this study were used to develop representative geologic profiles through the auxiliary spillway with conservative (i.e., most erodible) input parameters. Headcut erodibility index (Kh) and other soil and rock parameters were estimated based on available subsurface data. 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 head cut erodibility index for each stratum was estimated using procedures in the NEH, Part 628, Chapter 52, Field Procedures Guide for the Headcut Erodibility Index (NRCS, 2001).

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 because of downstream control. The valley floor was defined as elevation 496.0 feet for all of the profiles modeled in SITES which is the elevation where the inside edge profile meets the stream channel approximately 150 feet downstream of the constructed portion of the auxiliary spillway.

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 35 feet for the inside edge, centerline, and outside edge profiles.

A sensitivity analysis was performed where the soil and rock parameters were evaluated for a range of values to determine if altering the subsurface profile and material properties would change the results of the model. The sensitivity analysis showed that the spillway would still breach during a 24-hour PMF event even if the material properties were changed to the least possible erodible material properties based on the possible range of material properties as determined by the soil borings and lab testing results. The sensitivity analysis was performed on the inside edge profile, centerline profile, and outside edge profile with the results and the material properties used shown in Figure 18, Figure 19, and Figure 20, respectively. All three profiles showed that a breach would likely occur. The results of the sensitivity analysis support the original material properties used because even when the least erodible material properties within the range of possible material properties are used, the model still shows a breach of the spillway.

D.6.4 Hazard Classification

The hazard classification of the dam was assessed by completing a breach analysis in accordance with TR-210-60. The breach analysis included three events: seismic (normal pool), static (auxiliary spillway crest) and hydrologic (FBH peak water surface elevation) failures with the breach wave modeled downstream until a termination criterion was met. For the seismic and static breaches, the criterion was that the peak water surface elevation of the breach wave be less than that of the 1% AEP floodplain at that location, which occurred approximately 18 miles downstream of the dam. For the hydrologic breach, the criterion was that the difference in water surface elevation between the flood wave during a hydrologic breach event and the flood wave during the hydrologic event with no breach be less than one foot. This criterion was met approximately 27 miles downstream of the dam.

The breaches were modeled using a two-dimensional mesh modeling approach in HEC-RAS version 5.07. Hydrographs and inputs for the model were obtained from the SITES models generated for the hydrologic and hydraulic analysis. For the hydrologic breach scenario, additional hydrographs for downstream watersheds were added in assuming the outer precipitation isohyets of the PMP event extended over those watersheds as appropriate in accordance with State of Maryland guidance (MDE, 2018).

Based on the model output, impacts of a breach of the dam during the hydrologic event may impact up to 181 structures, 44 roads, and one freight railroad. Due to the extensive impacts, the dam is recommended to remain classified as a Class ‘C’ high hazard potential structure.

D.6.5 Reservoir Sedimentation

A study of reservoir sedimentation was made for the Piney Run Reservoir. The bathymetry data was compared to the original reservoir bathymetry as well as bathymetric surveys made in 1989 and 2013. The data showed that the reservoir has accumulated approximately 725 acre-feet of sediment during its 45-year service life (approximately 16.5 acre-feet per year). This is approximately 213% of the allocated sediment pool.

Two methods were used to estimate annual sediment yield; one method based on a comparative analysis of the reservoir bathymetry over time as indicated above, 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 analysis-based method yielded an annual sediment load estimate of 19.0 acre-feet per year. Both methods used to estimate the sediment deposition rate are in excess of 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 BMPs 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. Based on the reservoir capacity to watershed runoff ratio, the estimated trap efficiency is 97% and based on the materials a watershed characterization, the estimated aerated sediment portion is 20%. Based on these estimates, the estimated 100-year aerated sediment load is 360 acre-feet and submerged sediment load is 1,960 acre-feet.

The Sponsor, through their own programmatic efforts, has undertaken investigations and studies of the Piney Run watersheds as well as other watersheds in the County including stream surveys and planning-level studies with the intent of implementing stream stabilization and restoration projects as well as upland stormwater management projects in the future. At this time, the exact date and order of project implementation has not been determined. Upon implementation, these projects will support reductions erosion rates of the stream channels with discharge into the reservoir and lower the currently estimated sedimentation rate.

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 sediment load of between 1,960 acre-feet. The sediment load rate depends on how much, if at all, the development of the contributing watershed changes.

D.6.6 Slope Stability and Seepage Analyses

Computer modeling analyses were performed on Piney Run Dam to determine the slope stability under existing and proposed alternative conditions. The computer modeling analysis was performed in general accordance with TR-210-60 requirements. Seepage and slope stability analyses were performed using SLOPE/W of GeoStudio 2016 (Version 8.16.2.14053) software. Spencer's method, which satisfies all static equilibrium conditions, was used in these analyses.

Three cross sections were analyzed at Piney Run Dam, perpendicular to the dam crest centerline, were taken at each of the three embankment crest boring locations. The location of the soil and rock layers are based on the geologic investigation completed as part of this project and supplemented with historical documentation. Embankment core, cutoff trench, chimney drain, and trench drain dimensions were based on the Piney Run Dam design drawings (SCS, 1975).

Existing conditions as well as conditions expected under Alternatives 1 and 2 were analyzed.

Hydraulic conductivity for embankment soils at Piney Run Dam is based on laboratory testing and empirical values. One hydraulic conductivity test was performed on sample T-1 (25.0 – 26.2 feet, depth) obtained from Boring 2 for the embankment core. The hydraulic conductivity of the embankment core undisturbed sample (47.5 percent fines) is 9.3E-06 cm/sec (2.6E-02 ft/day).

For the Embankment shell, residual soil, and drain material, hydraulic conductivity was estimated based on the Kozeny-Carman equation (Duncan, 2008). The Kozeny-Carman equation is a method used to correlate hydraulic conductivity with material grain size. One bulk sample from the embankment shell was compared with estimated values from eight embankment core values. Comparison showed there was no significant difference in hydraulic conductivity between the Embankment Shell (average 31.6 percent fines, 8.27E-01 ft/day) and the Embankment Core (average 44.5 percent fines, average 9.66E-01 ft/day).

Empirical values were obtained through the following literature sources to correlate the estimated values:

- Duncan, M. (2008). "Methods for Evaluating Permeability of Soils". Virginia Tech CGPR No. 51. Blacksburg, VA
- Natural Resources Conservation Service. (2012). National Engineering Handbook, Part 631 Geology, Chapter 3: Engineering Classification of Earth Materials. U.S. Department of Agriculture.

- Natural Resources Conservation Service. (2012). National Engineering Handbook, Part 631 Geology, Chapter 4: Engineering Classification of Rock Materials. U.S. Department of Agriculture.
- United States Bureau of Reclamation. (2014). Design Standards No. 13 Embankment Dams, Chapter 8: Seepage.

The lean clay layer of the inner core was estimated based on National Engineering Handbook, Part 631 Geology, Chapter 3: Engineering Classification of Earth Materials (NRCS, 2012a).

Anisotropy estimates of Embankment Core, Embankment Shell, and Residual soils were based on ranges of accepted values found in the United States Bureau of Reclamation (USBR) Design Standards No. 13 Embankment Dams, Chapter 8: Seepage (USBR, 2014). Estimated values were selected from these ranges through calibration of the seepage model to observed levels in the observation wells of the dam. For the Embankment Core and Shell, the vertical hydraulic conductivities were selected to be 1/10 and 1/5 the horizontal hydraulic conductivity, respectively. For Residual Soil, vertical hydraulic conductivity was selected to be 1/2 of the horizontal hydraulic conductivity. Proposed fill hydraulic conductivity was assumed to be the same as the existing fill material.

Bedrock hydraulic conductivity was estimated based on NRCS National Engineering Handbook Part 631, Chapter 4, Engineering Classification of Rock Materials (NRCS, 2012b) and USBR Design Standards No. 13 Embankment Dams, Chapter 8: Seepage (USBR, 2014) for Mica Schist, which was identified as the predominant rock at Piney Run Dam during the geotechnical investigation and is a metamorphic rock.

Hydraulic conductivity of the filter drain material was estimated based on Hazen's formula (Duncan, 2008). This method estimates hydraulic conductivity based on the D10 (grain size diameter of 10% passing) of material from grain size distribution. Values were obtained from Piney Run As-Builts (1975), Sheet 12 for coarse and fine limits. The estimated hydraulic conductivity of the drain material ranged from 21.5 ft/day (7.60E-03 cm/sec) to 382.7 ft/day (1.35E-01 cm/sec). For this analysis, a hydraulic conductivity of 50 ft/day was selected.

The material properties used for slope stability analysis are based on laboratory testing and engineering judgement. One CID Triaxial Test and one CIU Triaxial Test with pore water measurements (ASTM D 4767) were performed on the Embankment Core. One CIU Triaxial Test was performed on a remolded specimen from a bulk sample of the Embankment Shell. The Residual soil effective strength friction angle was estimated from a CIU Triaxial Test performed on a sample from the crest of the auxiliary spillway outside slope (803, T-2). Boring 803, sample T-2 soil classified as Silty SAND (SM) with approximately 40% fines. The residual soil unit weight was based on the average of the laboratory-measured unit weights from the same area, the auxiliary spillway outside slope, for consistency. Data from this area were used because there was insufficient recovery in the undisturbed sample from the toe boring (Boring 601).

Four compressive strength tests were performed with an average compressive strength of 10412.5 psi. The minimum compressive strength of these tests was 6353 psi. Cohesion equaling one-half compressive strength is based on assuming a zero-degree friction angle and cohesion equal to one-half the difference between major and minor principal stresses. Bedrock cohesion was assumed to be one-half of the unconfined ultimate compressive strength. As the compressive strength test is unconfined, the minor principal stress is zero psi. Therefore, the Mohr's circle radius is equal to one half of the major principal stress, which is the resultant compressive strength.

However, to account for potential variances and/or weathering within the Bedrock, only a percentile of the cohesion of Bedrock was assumed in the analyses. For these analyses, approximately 25 percent of the laboratory cohesion based on engineering judgment was assumed to create a conservative model. This correlates to a cohesion of 794 psi (114,336 pounds per square foot).

Friction angle for the existing filter drain material was estimated based on USACE Mechanical and Physical Properties of ASTM C 33 fine aggregate. The designed gradation tables of existing filter drain material presented in the Piney Run Dam As-Built drawings, Sheet 12 (SCS, 1975). Comparison of the designed filter drain material with ASTM C 33 fine aggregate shows that the coarse limits of each material are similar to ASTM C 33 fine aggregate slightly coarser after D_{25}. The designed existing filter drain material fine boundary is finer than ASTM C33 sand for the range, with the difference at D_{15} being 0.38 mm for the designed existing filter drain material compared with 1.18 mm for ASTM C 33 fine aggregate. For ASTM C 33 Fine Aggregate, laboratory testing presented in the report showed a peak friction angle of 40 degrees, minimum friction angle of 32.8 degrees, and an average friction angle of 36.5 degrees. A 35 degree friction angle was selected for the designed existing drain material which is at approximately the lower one-third of the range for ASTM C 33 fine aggregate.

Saturated unit weight of the Embankment Core and Embankment Shell were estimated based on laboratory test results for dry unit weight, average moisture content, and specific gravity of the Embankment Core, as undisturbed samples of the Embankment Shell were unable to be obtained. Saturated unit weight of the Residual Soil beneath the embankment shell was estimated based on laboratory results from Residual Soil encountered beyond the auxiliary spillway outside slope, because there was insufficient recovery in the undisturbed sample from the toe boring (Boring 601).

Bedrock dry unit weight was determined during laboratory testing of compressive strength. Saturated unit weight of rock was conservatively estimated based on dry unit weight.

Proposed fill soil strength properties were estimated to be the same as those for the existing Embankment Shell.

The seepage analyses were performed using SEEP/W of GeoStudio 2016 (Version 8.16.2.14053). At the reservoir, a boundary condition for the head elevation of the pool (normal pool or flood surcharge pool) being analyzed was used in each model. Boundary conditions were set within SEEP/W to simulate observed conditions at the dam for normal pool models. Normal Pool reservoir elevation was set at the reservoir elevation measured during inspection (EL. 523.5 feet) for existing conditions. The normal pool tailwater elevation was assumed to be at EL. 469.1 feet based on 72-hr groundwater reading in Boring 601(measured EL. 469.1 feet).

Flood surcharge pool, based on freeboard hydrograph level, was selected to be one foot below the crest of dam (EL. 539.5 feet) for existing conditions. Tailwater at auxiliary spillway crest reservoir pool elevation was assumed to be the elevation at 75 percent of the principal spillway conduit height at the outlet (EL. 469.41 feet). Tailwater elevation at flood surcharge pool was analyzed for two scenarios: (1) assumed one foot higher than tailwater at auxiliary spillway crest pool, and (2) due to seepage through the dam, downstream existing ground surface elevation. Finally, the principal spillway drain elevation, which refers to the base of the chimney drain, was utilized as a boundary condition.

The boundary conditions used for seepage analysis for existing conditions are summarized below:

- Normal Pool Elevation: 523.5 feet
- Flood Surcharge Pool (auxiliary spillway crest) Elevation: 531.0 feet
- Flood Surcharge Pool Elevation: 539.5 feet
- Tailwater Elevation (Normal Pool): 469.1 feet
- Tailwater Elevation (auxiliary spillway crest): 469.41 feet
- Tailwater Elevation (Flood Surcharge Pool): (1) 470.41 feet and (2) existing ground surface elevation
- Principal Spillway Drain Elevation: 470.0 feet

The phreatic surface within the embankment at Piney Run Dam for existing conditions was estimated based on open well readings and 24-hour minimum observations from 2019-2020 borings. Measured well data, laboratory test data and empirical values from literature for hydraulic conductivity and anisotropy were used to conservatively estimate the phreatic surface at Piney Run Dam during flood surcharge conditions. Based on TR-210-60, flood surcharge elevation is the reservoir at freeboard hydrograph level. For this analysis, flood surcharge elevation was assumed to be one foot below the top of dam elevation at EL. 539.5 feet.

Seepage analysis boundary conditions for proposed Alternatives 1 and 2 are based on designed pool and freeboard elevations for the reservoir. Tailwater elevations for normal and freeboard hydrograph conditions were estimated based on existing condition analysis. **Table D-1** provides the boundary conditions for each alternative.

Table D - 1. Alternatives Boundary Conditions

Condition	Analysis	
	Alternative 1	**Alternative 2**
Normal Pool Elevation (ft)	523.5	525.3
Freeboard Hydrograph (ft)	544	543.5
Tailwater Elevation (Normal Pool)	469.1	469.1
Tailwater Elevation (Flood Surcharge Pool)	470.41	470.41

Slope Stability analyses were performed on the previously described cross section using the 2019 and 2005 versions of TR-210-60 guidelines for existing and proposed alternative conditions. The analyses performed measured slope stability for rapid drawdown conditions for the upstream slope, steady-seepage slope conditions for full and normal pool conditions and seismic analysis at normal pool conditions for the downstream slope. Slope stability analyses were performed using SLOPE/W. Spencer's method of slices, which satisfies all conditions of static equilibrium, including horizontal and vertical force equilibrium, and moment equilibrium, was used for the analysis. Minimum depth for a failure was set at two feet. Failure was considered for circular failure planes and non-circular failure planes for deep failures as well as shallow failure within the embankment slope. The results of the analyses show that existing conditions at Piney Run Dam meet the requirements for slope stability for all conditions analyzed.

D.6.7 Exit Gradient

Analysis was performed to determine the potential for piping at the downstream embankment at Piney Run Dam. This analysis was performed based on Hurricane and Storm Damage Risk Reduction System Design Guidelines (USACE, 2012) and Critical Horizontal Seepage Gradients (O'Leary, et al, 2013) guidelines. Minimum factor of safety for the analysis was evaluated t 1.6 from USACE (2012). The results indicated that the downstream toe exceeds the minimum factor of safety for exit gradient and potential piping for existing and proposed alternative conditions.

D.6.8 Filter Compatibility

Analysis was performed to determine if soil materials located at Piney Run Dam are compatible for filtration and/or drainage. Filtration inhibits the movement of fine material particles between soils. Particle movement between soils may initiate internal erosion and piping. Drainage is analyzed to determine if groundwater can easily pass between soils. Obstructed groundwater flow paths can cause increased pore pressures within the embankment, potentially causing heave and/or seepage on the downstream embankment slope.

Both the chimney filter and toe drains are two-stage filters using the same material specification for the coarse and fine-grained stages, respectively. The fine-grained chimney filter material as specified in the as-built drawings (Soil Conservation Service, 1975) ranges in size from #200 sieve (0.075 mm) to 3/8-inches (9.5 mm) and is similar in gradation to the coarse limit of ASTM C-33 Fine Aggregate. The coarse-grained material as specified on the same as-built drawing ranges in size from #16 sieve (1.2 mm) to three inches and is a mix of 60 percent #2 gravel and 40 percent #5 gravel. A review of the specified materials against current NRCS filter gradation guidelines (NRCS, 2017) was completed and found that the fine-grained filter specification was compatible with the soils used in both the Embankment Shell and Embankment Core materials based on soil samples taken during the 2019-2020 subsurface geologic and geotechnical investigation. The analysis also showed that the coarse-grained filter specification as specified in the as-built drawings was generally compatible with the fine-grained filter specification. It should be noted that the coarse-grained filter specification lies partially outside the maximum allowable limits for larger grain sizes (greater than the 60th percentile diameter).

D.7 Economic Effects of Alternatives

An economic analysis was conducted to quantify impacts to the watershed for project alternatives to address issues at Piney Run dam. This memorandum describes the methods used to quantify the impacts of the alternatives and to determine economic feasibility of the alternatives.

Following a preliminary analysis of possible alternatives, four alternatives were carried forward for evaluation. The alternatives are comprised of one No Action alternative (also referred to as the Future Without Project (FWOP) alternative), one future without federal investment (FWOFI) alternative, two rehabilitation alternatives, and one decommissioning alternative. **Table D-2** describes the five alternatives.

Table D - 2. Description of Alternatives

Alternative	Description
Alternative 0 (No Action/FWOP)	Continue the regular maintenance of the dam, but no modifications to the dam or spillways would be made to address concerns (i.e., existing conditions would remain).
Alternative 1	Piney Run dam would be modified with federal support to meet NRCS and Maryland Department of the Environment (MDE) criteria for Class 'C'/high hazard dams.
Alternative 1a (FWOFI)	The local sponsor would modify Piney Run dam to meet NRCS and Maryland Department of the Environment (MDE) criteria for Class 'C' high hazard dams. Because of funding constraints, the rehabilitation would not be implemented for 10 years. In the interim, the reservoir would be drawn down to reduce the risk of failure. Once rehabilitation is complete, the reservoir would be refilled and returned to normal pool.
Alternative 2	Piney Run dam would be modified to meet NRCS and MDE criteria for Class 'C'/high hazard dams. Additionally, improvements to establish Piney Run reservoir as a backup water supply source would be made by installing the necessary infrastructure to connect the reservoir to Carroll County's water supply system.
Alternative 6	Piney Run dam would be decommissioned, the reservoir drained would be removed, and creek would be established in a state similar to pre-construction of the dam.

D.7.1 Economic Framework

In general, the national economic benefits presented in this supplemental plan were developed based on guidance contained in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*[2] and the *Principles, Requirements and Guidelines for Federal Investments in Water Resources.*[3]

Economic feasibility for an alternative is determined by comparing the average annual benefits to the average annual costs. If the average annual benefits for the alternative exceed the average

[2] U.S. Water Resources Council, 1983. *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, March.
[3] *Principles, Requirements and Guidelines for Federal Investments in Water Resources,* 2014.

annual costs, then the alternative is considered economically feasible. The economic analysis considers the No Action alternative as the baseline condition, which assumes the existing maintenance activities continue but no major changes are made to dam. The analysis is formulated from the perspective that changes/impacts resulting from implementation of any of the other alternatives (Alternatives 1, 1A, 2, and 6) in relation to the No Action alternative were measured as a cost or a benefit (i.e., a zero benefit, zero cost approach was applied to No Action alternative). Costs and benefits are reported in 2022 dollars (2022$) and were evaluated over a 103-year period of analysis (36 months of construction and 100-year evaluation period) using a 2.5 percent discount rate. Inputs or assumptions provided in a year prior to 2022 were adjusted to 2022 dollars using the U.S. Gross Domestic Product (GDP) deflators.

The hydrologic and hydraulic (H&H) analysis conducted by AECOM Technical Services Inc. for each of the alternatives was used to estimate the depth of flooding throughout the study area. The economic analysis uses inundation models for five flood recurrence intervals, which are the 4-percent- (25-year), 2-percent- (50-year), 1-percent- (100-year), 0.5-percent- (200-year), and 0.2-percent- (500-year) recurrence interval flood events, to estimate future damages from flooding within the study area.

Under the No Action alternative, the dam would not be brought up to current federal standards and many of the underlying issues would remain. Therefore, there is still a chance for the dam to fail from a seismic, hydraulic, or static event. Failure due to erosion of the auxiliary spillway was estimated to be the failure mode with the highest probability of occurrence. Based on incremental modeling of spillway way erosion, the spillway was determined to have the potential to failure in a storm with an annual exceedance probability as high as 0.2 percent. Once this event occurs, it was assumed that the spillway would have a 10 percent change of eroding through the crest resulting in failure and uncontrolled release of the reservoir. As a result, a one-time failure with a probability of 0.02[4] percent was evaluated and incorporated into the average annual damages (AAD) for the No Action alternative. The No Action alternative assumed that the existing flood conditions would continue until the dam fails.

D.7.2 Benefit Analysis

The following describe the analyses used to evaluate the benefits of the alternatives. The benefits represent damage reduction from future flooding and are evaluated in average annual terms. The benefit categories considered were:

- Residential and nonresidential structures
- Automobiles
- Debris removal
- Infrastructure
- Recreation

[4] The runoff associated with a 0.2-percent annual exceedance probability will activate the auxiliary spillway with sufficient discharge to potentially cause enough erosion for the spillway to erode through its crest causing an uncontrolled release. It was reasonably assumed that the subsequent probability of failure if this storm occurs is 10 percent. Therefore, the estimated annual probability of failure is 0.02-percent.

- Agriculture

D.7.2.1 Residential and Nonresidential Structures

Knowledge of existing development located in a floodplain is essential when evaluating a flood-risk-management alternative. An inventory was conducted of residential and nonresidential structures located in the study area, which serves as the base data for the economic analysis. The structure inventory comprises residential and nonresidential structures that are within the area of inundation associated with a failure of the dam, which is estimated to be the worst-case scenario and therefore included all structures that could be potentially impacted (however, the estimated number of structures impacted varies by flood event). Data from the Carroll and Howard Counties' assessors were obtained, cleaned, and used as the basis for the structure inventory. A total of 231 structures were identified.

The structures were assigned a building class and structure type based on the structure descriptions in the assessor's data. **Table D-3** lists the building classes, structure types, and number of structures in the inventory assigned to each class.

Table D - 3. Structure Type and Number of Structures in Inventory

Building Class	Structure Type	Number of Structures
Apartment	Residential	4
Farm Structure	Nonresidential	5
Shop	Nonresidential	4
Church	Nonresidential	2
Commercial Building	Nonresidential	70
Garage/Shed	Nonresidential	8
Industrial Building	Nonresidential	9
Firehouse	Nonresidential	1
General Storeroom	Nonresidential	1
Institutional Building	Nonresidential	9
Maintenance Building	Nonresidential	1
Municipal Building	Nonresidential	3
Nursing Home	Nonresidential	1
Outbuilding	Nonresidential	2
State Park Structure	Nonresidential	5
Pump Station	Nonresidential	2
Single Family House	Residential	78
Storage Building	Nonresidential	1
Townhouse	Residential	20
Unidentified Building	Nonresidential	5
	Total	**231**

The foundation height was subtracted from the flood depth at each structure to estimate the depth of inundation in relation the first-floor elevation (FFE). Structure types and their respective foundation heights are listed in **Table D-4**.

Table D - 4. Assumed Foundation Heights

Structure Type	Foundation Height (Feet Above Ground Level)
Nonresidential	0.5
Residential, no basement	0.5

Each structure was assigned a depth-damage function (DDF) based on the structure type that estimates an economic loss as a percentage of the value of the structure based on the building class and depth of flooding. DDFs were sourced from the U.S. Army Corps of Engineers' (USACE's) Economic Guidance Memorandum (EGM) 01-03, *Generic Depth-Damage Relationships*[5] and EGM *Generic Depth-Damage Relationships for Residential Buildings with Basements*.[6] DDFs for nonresidential buildings were sourced from FEMA's Benefit-Cost Analysis Toolkit.[7] Within each DDF are the percentage damage for the structure and its contents. Because the DDFs estimate damages at 1-foot intervals, straight-line interpolation was used to estimate damages in 0.1-foot intervals. The structure and content DDFs for the structure types are provided in **Tables D-17 through D-20**.

Data from the H&H analysis and GIS were used to estimate the depth of inundation in relation to the FFE at each structure for each recurrence interval. Using an Excel-based model developed for this analysis, the depth of inundation was correlated to the DDF to calculate the percent damage to each structure. The percent damage was then multiplied by the structure improvement value[8] to estimate the damages. Similarly, the analysis uses the depth of inundation to calculate the percent damage to contents per flood recurrence interval, which was then multiplied by the contents' value to estimate the content damages. The total damages from all of recurrence interval were annualized to estimate the average annual damages for each alternative.

Because the DDFs are estimated for stillwater flooding, the damage estimates were not appropriate for most of the flooding that would occur under the hydraulic failure scenario, where high-velocity floodwater can quickly destroy a structure. FEMA defines high velocity as conditions where the depth x velocity (DV) is greater than 200 feet^3/second^2. For the analysis, the H&H analysis was reviewed to identify conditions where the DV may be greater than 200 feet^3/second^2. If the conditions indicated there could be high-velocity floodwaters, the structure and contents were assumed to be 100 percent damaged (i.e., destroyed). The majority of the structures in the inventory were estimated to be impacted by high-velocity floodwaters during the failure scenario.

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[5] USACE, 2000. *Generic Depth-Damage Relationships*, EGM 01-00. December 4. https://planning.erdc.dren.mil/toolbox/library/EGMs/egm01-03.pdf
[6] USACE, 2003. *Generic Depth-Damage Relationships for Residential Buildings with Basements*, EGM 04-01. October 10. https://planning.erdc.dren.mil/toolbox/guidance.cfm?Option=BL&BL=OnlyInlandFlood&Type=None&Sort=Default.
[7] FEMA, 2019. *Benefit-Cost Analysis Toolkit, Version 6.0*. https://www.fema.gov/media-library/assets/documents/179903.
[8] For properties without improvement values identified in the Carroll County Assessor database, the improvement value of such a property were estimated by applying the replacement value ($/sqft) suggested by RS Means to the size of the structure.

D.7.2.2 Automobiles

The damages to automobiles were determined using the USACE EGM 09-04, *Generic Depth-Damage Relationships for Vehicles*.[9] In accordance with the guidance, the elevation of each automobile was assumed to be the mean ground elevation estimated at each structure. The damages to vehicles at residences depends on the following: the average number of vehicles per household and the percentage of vehicles that are likely to be at the residence at the time the flood waters reach the property.

In 2019, the median number of vehicles per household in the study area was 1.98. The average vehicle value was obtained from CoPilot. According to CoPilot's Return to Normal Index Report, the average retail value for used vehicles was $33,341 in calendar year 2022.

The length of potential warning time and the access to a safe evacuation route to a flood-free location were considered to estimate the percentage of vehicles that would likely remain in the flood-prone location. For the study area, the analysis assumes that the warning time would be less than 6 hours; therefore, 50.5 percent of the vehicles in the flood area would be evacuated according to USACE EGM 09-04 and 49.5 percent would remain.

Because only those vehicles not used for evacuation can be included in the damage calculations, an adjusted average vehicle value of $32,691 ($33,341 x 1.981 x 0.495) was assigned to each individual residential structure. The analysis calculated automobile damages for each flood recurrence interval. No automobiles were assigned to nonresidential structures.

D.7.2.3 Debris Removal

In some flooding events, structure owners incur costs from debris accumulation and the required costs for removal, as described in guidance from USACE.[10] Costs associated with debris removal were assumed to vary between structures with and without a basement. Due to data limitation issues, only structures with flood depths greater than the first-floor elevation were assumed to incur debris removal costs. Debris removal costs were monetized for each structure inundated in the analysis.

Debris removal costs were estimated for structures without a basement. The debris costs include the labor to load and remove debris from site, county landfill disposal fee, and opportunity cost lost by the homeowner due to time spent cleaning and breaking down debris. FEMA has estimated 25 to 30 cubic yards of debris for a structure without a basement from a flood event.[11] Assuming 1 ton of mixed debris has a volume of 4 cubic yards, the average volume of debris for a structure without a basement is about 6.9 tons.

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[9] USACE, 2009. *Generic Depth-Damage Relationships for Vehicles*, EGM 09-04. June 22. https://planning.erdc.dren.mil/toolbox/guidance.cfm?Option=BL&BL=OnlyInlandFlood&Type=None&Sort=Default.

[10] USACE, 2018. *Souris River Basin Flood Risk Management Draft Feasibility Report With Integrated Environmental Assessment; Bottineau, McHenry, Renville Ward County, North Dakota, Appendix E: Economics*, https://www.mvp.usace.army.mil/Portals/57/docs/Civil%20Works/Flood%20Risk%20Management/Souris%20River/Appendix%20E%20Economics.pdf?ver=2018-11-19-105908-867.

[11] FEMA, 2010. Debris Estimating Field Guide, https://www.fema.gov/pdf/government/grant/pa/fema_329_debris_estimating.pdf.

Using the Homewyse Debris Removal Cost Calculator[12], labor costs to load and remove the debris from the site were estimated. To load and remove the debris, approximately 1.03 hours of labor is required for every cubic yard and the average labor cost per cubic yard is estimated to be $28 ($114 per ton) in the study area, based on the Homewyse Debris Removal Cost Calculator. The average disposal fee in the study area is $80 per ton, based on costs at county landfills, with one ton free for disposal. The total estimated debris removal cost (labor and disposal fee) per ton is $194. The debris labor removal and disposal fee per structure, for a structure without a basement is summarized in **Table D-5**.

To break down the debris for removal, it is assumed homeowners forego other activities, such as work and leisure to clean up the debris, the opportunity cost was estimated to value this time. The value of time (per person-hour) was estimated using the average 2021 median household income for the study area from the Census and updating to 2022 dollars using U.S. GDP deflator. First, dividing household income by 2,080 hours to get $59 hourly wage per household, for the value of time working.[13] For leisure time, an opportunity cost of $39 per hour per household was assigned based on the common practice used in economics literature to value recreation time as fraction of hourly wage. In literature, this fraction ranges from one-third of the wage to the full wage; therefore, a fraction of two-third was conservatively used to estimate the opportunity cost of leisure. During the flood aftermath, homeowners were assumed to forego recreation time two-thirds of the time and forego work one-third of the time, for an average value of time of $46 per hour per household. This was then divided by 1.77[14] (the average working person per household) for a total of $26 per person-hour. The estimated labor time to break down debris per ton is 4.1 hours for one person. The total estimated average opportunity cost per household for structures without a basement are summarized in **Table D-5**.

Average annual debris removal costs were estimated for the alternatives. The net difference is estimated to be the flood mitigation benefits of the alternative.

Table D - 5. Debris Removal Costs per Structure

Structure Type	Average Tons of Debris	Debris Removal Labor and Disposal Costs	Owner Opportunity Cost of Time	Total Cost of Debris Removal
Structure – Without Basement	6.9	$1,300	$700	$2,000

Note: 2022 price level. Monetary values rounded to nearest hundred.

If a structure received damages above the FFE for flooding at any of the recurrence intervals, the debris cleanup costs were applied and annualized.

D.7.2.4 Infrastructure

Similar to structure flood damages, the analysis used flood depths and DDFs to calculate the percent damage to community infrastructure per flood recurrence interval and each alternative. DDFs for community infrastructure (roadways) were sourced from a 2012 USACE Report, *Development of Depth-Emergency Cost and Infrastructure Damage Relationships for Selected*

[12] Homewyse, 2020. *Cost to Remove Construction Debris*, https://www.homewyse.com/services/cost_to_remove_construction_debris.html.
[13] FEMA, 2010. Debris Estimating Field Guide, https://www.fema.gov/pdf/government/grant/pa/fema_329_debris_estimating.pdf.
[13] Homewyse, 2020. *Cost to Remove Construction Debris*, https://www.homewyse.com/services/cost_to_remove_construction_debris.html.
[14] U.S. Census Bureau – Maryland Quick Facts. Persons per household multiplied by the percentage of population in civilian work force.

South Louisiana Parishes[15]. From the report, values used for the analysis assume the following: freshwater flooding with a duration of inundation lasting 1 day. The respective DDF, varying on flood depth and infrastructure type, was multiplied by the improvement value to estimate the cost of flood damages. Average annual flood damages were estimated for each alternative. The net difference in damages between the No Action Alternative and each of the other alternatives is estimated to be the benefits of those other alternatives.

Roadway flooding events result in damages to the roadways, emergency clean-up costs, and increase travel time from traffic detours due to road closure. Travel time costs were estimated for each alternative. The net difference in costs between the No Action alternative and each of the other alternatives is estimated to be the roadway detour damage reduction benefits of those other alternatives.

Roadway Flood Damages and Costs
As described above, DDFs to estimate flood damages to roadways were sourced from a 2012 USACE report. The replacement value of roadways was multiplied by the respective DDF and the number of impacted miles, to estimate the value of roadways damages from a given flood event and project alternative. Roadway clearing costs were also considered, the total cost of clearing varies on the number of miles impacted and flood depth, values were sourced from the 2012 USACE Report and adjusted to 2022 dollars. For roadway clearing costs, costs are approximately $4,200 per flooded mile at a 2.0 feet flood depth, $53,000 per mile at a 5-foot flood depth, and $270,000 per mile at a 12-foot flood depth.

Under the alternatives, seven roadways flood: Marriottsville Road, Henrytown Road, Slacks Road, Arrington Road, Brangles Road, Marriottsville Road #2 and Sykesville Road. A replacement value of $250,000 per mile (2022 dollars) was for all roadways.

Roadway Detour – Travel Time Savings
As a results of roadway flooding, road closures occur and detours are required for vehicles, increasing travel times. Roadways that are considered in this portion of the analysis are listed in **Table D-6**. Only two of the seven roads that flood in the study area were considered for this portion, to avoid double counting vehicles.

The analysis conservatively assumes an average road closure of 1 day from flood events that result in flooding greater than 0 feet on a roadway listed in **Table D-6**. The road closure duration only considered road flooding and does not consider longer road closures from damages to the road. Time savings per detour trip avoided range between 1 and 12 minutes per vehicle. Based on U.S. DOT values, an average vehicle occupancy of 1.67 was used and the value of time of $26 per person-hours (estimated under debris removal costs) was used to estimate the value of time saved per hour of road closure avoided.

[15] USACE New Orleans District, Development of Depth-Emergency Cost and Infrastructure Damage Relationships for Selected South Louisiana Parishes, March 2012

Table D - 6. Roadways – Detours

Name	AADT (2018)	Existing Route Time (minutes)	Average Detour Route Time (minutes)	Value of Time Saved Per Day – Road Closure Avoided
Brangles Road	1,952	8	9	$846
Marriottsville Road	5,471	14	18	$9,483

D.7.2.5 Recreation

The Piney Run reservoir and its recreational amenities are a significant asset to the regional community. The existing average annual park visitors and boat users at Piney Run Park are listed in **Table D-7**, which is assumed to be the annual visitors under No Action, Alternative 1, 1A and Alternative 2. Under Alternative 6 – Federal Decommissioning, the Piney Run reservoir, a major attraction of Piney Run Park, would no longer exist, and some current recreational activities at the park would not be possible, such as fishing and boating, and the user experience would be decreased for all users. This would result in significant loss of recreational amenities to the community. Based on current park visitor trends seen by Carroll County Department of Recreation and Parks, 100 percent of boat users would no longer visit, and non-boat users would reduce by 50 percent if Alternative 6 is implemented based on discussions with park managers who are familiar with both the site and visitors.

Table D - 7. Piney Run Park Visitors

Year	Total Visitors	Non-Boat Users	Boat Users
2019	103,367	82,694	20,673
2018	111,490	89,192	22,298
2017	118,535	94,828	23,707
2016	115,129	92,103	23,026
2015	102,619	82,095	20,524
Average Annual Visitors (No Action, Alternative 1 and Alternative 2)	110,228	88,182	22,046
Average Annual Visitors (Alternative 6)	44,091	44,091	0

Source: Carroll County Department of Recreation and Parks and AECOM

The analysis used the Unit Day Value (UDV) method to estimate recreation impacts of the alternatives. The UDV method and informed opinion were used to estimate a point value, assigned to five areas of recreation criteria, for a total point value assignment for the park, as shown in **Table D-8**. **Table D-8** includes the Park's estimated UDV values for the alternatives based on general recreation activities. Under the No Action and Alternative 1, the Park is anticipated to retain its recreational value, however Alternative 2 and Alternative 6 will result in less benefits. Alternative 2 is anticipated to have less recreational benefits than the No Action alternative and Alternative 1 from reduced aesthetic quality of the park due to potential fluctuations in reservoir levels associated with water supply withdrawals. Under Alternative 6, recreational benefits will be lost from a reduction in visitors and a reduction in the recreational quality of Piney Run Park from the loss of the reservoir. The analysis did not consider the impacts to recreation should there be a failure of the dam under the No Action alternative.

For each point value estimate, there is an associated dollar value per visitor-day, the dollars values used for the analysis are listed in **Table D-8**. Dollar values used are FY 2022 from the USACE *Economic Guidance Memorandum* (EGM) 20-03. The total recreational value of the reservoir with the project was estimated by multiplying the number of visitors by the unit day value. Average annual recreational benefits were estimated for the alternatives. The net difference in benefits between the No Action alternative and of the other alternatives is estimated to be the recreation benefit of those other alternatives.

Table D - 8. Piney Run Park Unit Day Value Total Points

Recreation Criteria	Possible UDV Points	Alt. 0 (No Action)	Alt. 1	Alt. 1a (FWOFI)	Alt. 2	Alt. 6
Recreation Experience	**30**	**16**	**16**	**13**	**13**	**11**
Two general activities (General); Heavy use or frequent crowding or other interference with use (Specialized)	0-4					
Several general activities (General); Moderate use, other users evident and likely to interfere with use (Specialized)	5-10					
Several gen activities; one high-quality (General); Moderate use, some evidence of other users and occasional interference with use due to crowding (Specialized)	11-16	✓	✓	✓	✓	✓
Several gen activities; more than one high-quality (General); (Specialized)	17-23					
Numerous high-quality activities (General); (Specialized)	24-30					
Availability of Opportunity	**18**	**4**	**4**	**4**	**4**	**2**
Several within 1 hour; a few within 30 min	0-3					✓
Several within 1 hour; none within 30 min	4-6	✓	✓	✓	✓	
One or two within 1 hour; none within 45 min	7-10					
None within 1 hour	11-14					
None within 2 hours	15-18					
Carrying Capacity	**14**	**11**	**11**	**11**	**11**	**11**
Minimum facility for development for public health and safety	0-2					
Basic facility to conduct activity	3-5					
Adequate facilities to conduct activity without	6-8					

Recreation Criteria	Possible UDV Points	Alt. 0 (No Action)	Alt. 1	Alt. 1a (FWOFI)	Alt. 2	Alt. 6
deterioration of the resource or activity experience						
Optimum facilities to conduct activity	9-11	✓	✓	✓	✓	✓
Ultimate facilities to achieve intent of project	12-14					
Accessibility	**18**	**18**	**18**	**18**	**18**	**18**
Limited access by any means to or within site	0-3					
Fair access, poor quality roads to site; limited access within site	4-6					
Fair access, fair roads to site; good roads within site	7-10					
Good access, good roads to site; good roads within site	11-14					
Good access, high standard road to site; good access within site	15-18	✓	✓	✓	✓	✓
Environmental Quality	**20**	**10**	**10**	**3**	**5**	**3**
Low aesthetic factors that significantly lower quality	0-2					
Average aesthetic quality; minor factors lower quality	3-6			✓	✓	✓
Above average aesthetic quality; limiting factors can be rectified	7-10	✓	✓			
High aesthetic quality; no factors lower quality	11-15					
Outstanding aesthetic quality; no factors lower quality	16-20					
Total Points	**100**	**59**	**59**	**49**	**51**	**45**
Total Points (rounded per guidance)	**100**	**60**	**60**	**50**	**50**	**50**
Unit Day Value (2022$) per person-day		**$10.41**	**$10.41**	**$9.57**	**$9.57**	**$9.57**

D.7.2.6 Agriculture

There is very little agricultural land downstream of Piney Run dam that would be impacted by a flood event (except during a flood event resulting from a failure). As a result of the small amount of agricultural land and the limited impacts of the alternatives described in the previous section, agricultural land damages and benefits were not quantified for this analysis.

D.7.2.7 Benefits not Quantified

Some benefits of Alternatives 1, 1A, 2 and 6 were not quantified, most significantly is the benefit of having backup water supply provided with Alternative 2. Under Alternative 2, Piney Run reservoir will have the capabilities to support Carroll County as a water supply source, however this would only occur in an emergency situation, such as if Baltimore City were not able to supply water to Carroll County during extreme drought conditions. These benefits were not quantified due to the uncertainty of estimating when such a situation would occur and what other sources of water may be available to Carroll County.

D.7.2.7 Benefit Summary

This section summarizes the benefits analysis, which includes comparisons of the impacts to structures from the alternatives. **Table D-9** presents the number of structures flooded above the FFE for each recurrence interval. The number of structures flooded is significantly lower than the number of structures inventoried because the inventory was based on a worst-case failure scenario.

Table D - 9. Number of Structures Flooded Above the First Floor Elevation (FFE)

Recurrence Interval		Alternative 0 (No Action)	Alternative 1	Alternative 1A	Alternative 2	Alternative 6
4%	25-Year	0	0	0	1	8
2%	50-Year	0	0	0	1	10
1%	100-Year	0	0	0	1	10
0.5%	200-Year	4	4	4	7	13
0.2%	500-Year	5	5	5	8	16
0.02%	Spillway Failure	186	N/A	N/A	N/A	N/A

Structure-related benefits include damage reductions to structures, contents, automobiles, and debris removal. A summary of damages for all alternatives by recurrence interval is provided in **Table D-10**. The damages for the No Action consider those related to the existing dam until a failure occurs, therefore the damage estimates for the recurrence intervals are similar to those of the other alternatives, while the damage for the hydraulic event are the estimated damages of the failure scenario.

Table D – 10. Summary of Damages by Recurrence Interval (2022$)

Recurrence Interval		Building	Contents	Auto	Debris Removal	Infrastructure	Total Damages
Alternative 0 (No Action*/FWOP)							
4%	25-year	$0	$0	$0	$0	$76,000	$76,000
2%	50-year	$0	$0	$0	$0	$103,000	$103,000
1%	100-year	$0	$0	$0	$0	$137,000	$137,000
0.5%	200-year	$106,000	$59,000	$42,000	$8,000	$247,000	$462,000
0.2%	500-year	$196,000	$109,000	$84,000	$10,000	$378,000	$777,000
0.02%	Spillway Failure	$71,361,000	$56,622,000	$2,177,000	$468,000	$21,097,000	$151,725,000
Alternative 1							
4%	25-year	$0	$0	$0	$0	$76,000	$76,000
2%	50-year	$0	$0	$0	$0	$103,000	$103,000
1%	100-year	$0	$0	$0	$0	$137,000	$137,000
0.5%	200-year	$106,000	$59,000	$42,000	$8,000	$247,000	$462,000
0.2%	500-year	$196,000	$109,000	$84,000	$10,000	$378,000	$777,000
Alternative 1a (FWOFI)							
4%	25-year	$0	$0	$0	$0	$76,000	$76,000
2%	50-year	$0	$0	$0	$0	$103,000	$103,000
1%	100-year	$0	$0	$0	$0	$137,000	$137,000
0.5%	200-year	$106,000	$59,000	$42,000	$8,000	$247,000	$462,000
0.2%	500-year	$196,000	$109,000	$84,000	$10,000	$378,000	$777,000
Alternative 2							
4%	25-year	$7,000	$4,000	$0	$2,000	$76,000	$90,000
2%	50-year	$12,000	$8,000	$0	$2,000	$103,000	$125,000
1%	100-year	$17,000	$10,000	$0	$2,000	$137,000	$166,000
0.5%	200-year	$136,000	$77,000	$42,000	$14,000	$247,000	$516,000
0.2%	500-year	$234,000	$130,000	$87,000	$16,000	$383,000	$850,000
Alternative 6							
4%	25-year	$170,000	$98,000	$82,000	$16,000	$456,000	$822,000
2%	50-year	$317,000	$181,000	$115,000	$20,000	$571,000	$1,204,000
1%	100-year	$320,000	$184,000	$127,000	$20,000	$747,000	$1,398,000
0.5%	200-year	$457,000	$267,000	$159,000	$26,000	$684,000	$1,593,000
0.2%	500-year	$634,000	$364,000	$195,000	$32,000	$765,000	$1,990,000

*Note: This alternative assumes that no action would be taken and that the existing condition would remain until the time when a failure occurs.

The average annual damages were estimated for each alternative. To estimate the average annual damages associated with each alternative, the total damages were averaged between each recurrence interval and applied to the incremental probability between the respective flood events and the values summed (i.e., integrated under the curve). Annual flood damages for the Alternative 0 (No Action), Alternative 1, and Alternative 1A would be the same (not including the impacts of a failure), while Alternative 2 would see slightly more downstream damages because of changes to the principal spillway. Alternative 6 would have the greatest damages because the dam would be removed, and the existing flood protection provided by the dam would not be available.

To estimate the total average annual damages associated with the failure under Alternative 0 (No Action), the total damages for the event were applied a probability of occurrence of 0.02 percent, resulting in an annual average damage estimate of $30,000 which was added to the average annual damages with the dam in place.

The average annual damage reduction benefit for Alternatives 1, 1A, 2 and 6 were estimated by comparing the damages that would occur under each of the alternatives with those that would occur under Alternative 0 (No Action – the existing annual damages plus those from a failure). **Table D-11** summarizes the estimated annual damages for each alternative and the damage reduction benefit of Alternatives 1, 1A, 2, and 6 in relation to Alternative 0 (No Action).

Table D - 11. Annual Damage Reduction Benefit

Alternative	Average Annual Damages	Annual Damage Reduction Benefit
Alternative 0 (No Action)	$43,000	NA
Alternative 1	$13,000	$30,000
Alternative 1A	$13,000	$30,000
Alternative 2	$14,000	$29,000
Alternative 6	$172,000	($128,000)

The recreation analysis evaluated the recreational value at Piney Run Park for each of the alternatives. **Table D-12** summarizes the recreation values associated with each alternative and the benefit of Alternatives 1, 1A, 2, and 6 in relation to Alternative 0 (No Action).

Table D - 12. Annual Recreation Impacts

Alternative	Annual Recreation Value	Average Annual Recreation Benefit
Alternative 0 (No Action)	$1,147,000	NA
Alternative 1	$1,147,000	$0
Alternative 1A	$974,000	($173,000)
Alternative 2	$1,055,000	($92,000)
Alternative 6	$422,000	($725,000)

A summary of total average annual benefits is provided in **Table D-13**.

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Table D - 13. Summary of Average Annual Damages Avoided (2022$)

Alternative	Annual Damage Reduction Benefit	Average Annual Recreation Benefit	Total Average Annual Benefits
Alternative 1	$30,000	$0	$30,000
Alternative 1a	$30,000	($173,000)	($143,000)
Alternative 2	$29,000	($92,000)	($63,000)
Alternative 6	($128,000)	($725,000)	($853,000)

D.7.3 Cost Analysis

The average annual operation and maintenance (O&M) costs for each alternative were estimated. The net O&M costs for each Alternatives 1, 1A, 2, and 6 is the difference between the cost for that alternative and Alternative 0 (No Action). (**Table D-14**).

Table D - 14. Average Annual O&M Costs

Alternative	Annual O&M Costs	Net Annual O&M Costs
Alternative 0 (No Action)	$22,000	NA
Alternative 1	$22,000	$0
Alternative 1A	$22,000	$0
Alternative 2	$62,000	$40,000
Alternative 6	$0	($22,000)

The average annual costs associated with the alternatives and O&M costs of implementation for the alternatives are summarized in **Table D-15**. The marginal on-site capital cost difference between Alternative 1 and Alternative 2 is approximately $13.7 million. Under Alternative 2 additional costs would be incurred offsite to complete the pipeline extension and for modifications at the water treatment plant. The additional off-site costs (which are not included in the construction costs in **Table D-15**) would be approximately $40 million based on estimates by Carroll County Department of Public Works.

Table D - 15. Design and Construction Cost of Alternative Implementation (2022$)

Alternative	Construction Costs	Average Annual Construction Costs	Net Annual O&M Costs	Average Annual Costs
Alternative 1	$11,300,000	$313,000	$0	$313,000
Alternative 1a	$11,300,000	$250,000	$0	$250,000
Alternative 2	$25,000,000	$691,000	$40,000	$731,000
Alternative 6	$27,200,000	$752,000	($22,000)	$730,000

Note: 2022 price level, 103-year period of analysis, and 2.5% discount rate. Interest during construction is included in the Average Annual Construction Costs.

D.7.4 Results of the Economic Analysis

Benefits and costs over the period of analysis were annualized to allow for a direct comparison of average annual benefits to average annual costs. The benefits and costs were evaluated using a price level of 2022 dollars, a discount rate of 2.5 percent, and a 103-year period of analysis. **Table D-16** summarizes the analysis results.

Table D - 16. Benefit-Cost Analysis Summary (2022$)

Category	Alternative 1	Alternative 1A	Alternative 2	Alternative 6
Average Annual Costs	$313,000	$250,000	$731,000	$730,000
Average Annual Benefits	$30,000	($143,000)	($63,000)	($853,000)
Average Annual Net Benefits	($283,000)	($393,000)	($794,000)	($1,583,000)
Benefit-Cost Ratio (BCR)	0.1	(0.6)	(0.1)	(1.2)

Notes: 2022 price level, 103-year period of analysis, and 2.5% discount rate. All $ values rounded to the nearest thousand.

Table D - 17. Depth-Damage Function – Residential Building

Depth Inundation (feet)	Slab	Residential-NB	Residential-2NB	Split Level-NB	Residential-2B	Mobile Home	Auto
-2.00	0%	0%	0%	0%	10%	0%	0%
-1.90	0%	0%	0%	1%	10%	0%	0%
-1.80	0%	1%	1%	1%	11%	0%	0%
-1.70	0%	1%	1%	2%	11%	0%	0%
-1.60	0%	1%	1%	2%	12%	0%	0%
-1.50	0%	2%	2%	3%	12%	0%	0%
-1.40	0%	2%	2%	4%	12%	0%	0%
-1.30	0%	2%	2%	4%	13%	0%	0%
-1.20	0%	2%	2%	5%	13%	0%	0%
-1.10	0%	3%	3%	5%	14%	0%	0%
-1.00	0%	3%	3%	6%	14%	0%	0%
-0.90	1%	4%	4%	6%	14%	1%	0%
-0.80	2%	5%	4%	6%	15%	2%	0%
-0.70	4%	6%	5%	6%	15%	2%	0%
-0.60	5%	7%	5%	6%	16%	3%	0%
-0.50	6%	8%	6%	7%	16%	4%	0%
-0.40	7%	9%	7%	7%	16%	5%	0%
-0.30	8%	10%	7%	7%	17%	6%	0%
-0.20	10%	11%	8%	7%	17%	6%	0%
-0.10	11%	12%	8%	7%	18%	7%	0%
0.00	12%	13%	9%	7%	18%	8%	0%
0.10	13%	14%	10%	7%	18%	12%	1%
0.20	15%	15%	10%	7%	19%	15%	3%
0.30	16%	16%	11%	8%	19%	19%	4%
0.40	17%	17%	11%	8%	20%	22%	6%
0.50	19%	18%	12%	8%	20%	26%	7%
0.60	20%	19%	13%	8%	21%	30%	11%
0.70	21%	20%	13%	9%	21%	33%	15%
0.80	22%	21%	14%	9%	21%	37%	20%
0.90	24%	22%	15%	9%	22%	40%	24%
1.00	25%	23%	15%	9%	22%	44%	28%
1.10	28%	24%	16%	10%	23%	46%	30%
1.20	30%	25%	16%	10%	23%	48%	32%
1.30	33%	26%	17%	10%	24%	50%	33%
1.40	35%	27%	17%	11%	24%	52%	35%
1.50	38%	28%	18%	11%	25%	54%	37%
1.60	40%	29%	19%	12%	25%	55%	39%
1.70	43%	29%	19%	12%	26%	57%	41%
1.80	45%	30%	20%	12%	26%	59%	42%
1.90	48%	31%	20%	13%	27%	61%	44%
2.00	50%	32%	21%	13%	27%	63%	46%
2.10	53%	33%	21%	13%	27%	64%	48%
2.20	55%	34%	22%	14%	28%	65%	49%
2.30	58%	35%	23%	14%	28%	66%	51%
2.40	60%	35%	23%	15%	29%	67%	52%
2.50	63%	36%	24%	15%	29%	68%	54%
2.60	65%	37%	24%	16%	30%	69%	56%

Depth Inundation (feet)	Slab	Residential-NB	Residential-2NB	Split Level-NB	Residential-2B	Mobile Home	Auto
2.70	68%	38%	25%	16%	30%	70%	57%
2.80	70%	39%	25%	17%	31%	71%	59%
2.90	73%	39%	26%	17%	31%	72%	60%
3.00	75%	40%	26%	17%	32%	73%	62%
3.10	78%	41%	27%	18%	32%	74%	63%
3.20	80%	42%	27%	18%	33%	74%	65%
3.30	83%	42%	28%	19%	33%	75%	66%
3.40	85%	43%	28%	20%	34%	75%	68%
3.50	88%	44%	29%	20%	34%	76%	69%
3.60	90%	44%	29%	21%	35%	76%	70%
3.70	93%	45%	30%	21%	35%	77%	72%
3.80	95%	46%	30%	22%	36%	77%	73%
3.90	98%	46%	31%	22%	36%	78%	75%
4.00	100%	47%	31%	23%	37%	78%	76%
4.10	100%	48%	32%	23%	37%	78%	77%
4.20	100%	48%	32%	24%	38%	78%	78%
4.30	100%	49%	33%	25%	38%	79%	79%
4.40	100%	50%	33%	25%	39%	79%	80%
4.50	100%	50%	34%	26%	39%	79%	82%
4.60	100%	51%	34%	26%	40%	79%	83%
4.70	100%	51%	35%	27%	40%	79%	84%
4.80	100%	52%	35%	28%	41%	80%	85%
4.90	100%	53%	36%	28%	41%	80%	86%
5.00	100%	53%	36%	29%	42%	80%	87%
5.10	100%	54%	37%	30%	42%	80%	88%
5.20	100%	54%	37%	30%	43%	80%	89%
5.30	100%	55%	38%	31%	43%	80%	90%
5.40	100%	55%	38%	32%	44%	80%	91%
5.50	100%	56%	38%	32%	44%	81%	92%
5.60	100%	56%	39%	33%	45%	81%	93%
5.70	100%	57%	39%	34%	45%	81%	94%
5.80	100%	58%	40%	34%	46%	81%	95%
5.90	100%	58%	40%	35%	46%	81%	96%
6.00	100%	59%	41%	36%	47%	81%	97%

Table D - 18. Depth-Damage Function – Commercial Building

Depth Inundation (feet)	Retail-Furniture	Retail-Electronics	Retail-Clothing	Hotel	Fast Food	Non-Fast Food	Hospital	Medical Office	Protective Services	Correctional Facility	Recreation	Religious Facilities	Schools	Service Station	Office One-Story	Convenience Store	Grocery	Apartment	Industrial Light	Warehouse, Refrig	Warehouse - Non-Refrigerated	Government	Vacant
-2.00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.90	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.80	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.70	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.60	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.50	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.40	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.30	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.20	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.90	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.80	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.70	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.60	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.50	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.40	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.30	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.20	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.10	1%	1%	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	1%	1%	1%	2%	1%	1%	1%	1%	1%	0%	0%
0.20	2%	2%	2%	2%	3%	4%	3%	2%	2%	2%	3%	3%	3%	2%	3%	3%	2%	2%	2%	2%	2%	0%	0%
0.30	3%	4%	4%	3%	5%	6%	4%	4%	3%	3%	4%	5%	4%	3%	4%	5%	3%	4%	3%	4%	3%	0%	0%
0.40	4%	5%	5%	4%	6%	7%	5%	5%	4%	4%	5%	6%	5%	4%	5%	6%	4%	5%	4%	5%	4%	0%	0%
0.50	6%	6%	6%	5%	8%	9%	7%	6%	5%	5%	6%	8%	7%	5%	6%	8%	5%	6%	6%	6%	5%	0%	0%
0.60	7%	7%	7%	7%	9%	11%	8%	7%	6%	6%	8%	9%	8%	6%	8%	9%	6%	7%	7%	7%	7%	0%	0%
0.70	8%	8%	9%	8%	11%	13%	10%	9%	7%	7%	9%	11%	10%	7%	9%	11%	8%	8%	8%	9%	8%	0%	0%
0.80	9%	10%	10%	9%	12%	15%	11%	10%	8%	8%	10%	12%	11%	8%	10%	12%	9%	9%	9%	10%	9%	0%	0%

Depth Inundation (feet)	Retail-Furniture	Retail-Electronics	Retail-Clothing	Hotel	Fast Food	Non-Fast Food	Hospital	Medical Office	Protective Services	Correctional Facility	Recreation	Religious Facilities	Schools	Service Station	Office One-Story	Convenience Store	Grocery	Apartment	Industrial Light	Warehouse, Refrig	Warehouse - Non-Refrigerated	Government	Vacant
0.90	10%	11%	11%	10%	14%	17%	12%	11%	9%	9%	11%	14%	12%	9%	12%	14%	10%	11%	10%	11%	10%	0%	0%
1.00	11%	12%	12%	11%	15%	19%	14%	12%	10%	11%	13%	16%	14%	10%	13%	15%	11%	12%	11%	12%	11%	0%	0%
1.10	12%	13%	13%	12%	16%	20%	15%	13%	10%	11%	14%	17%	15%	11%	13%	16%	12%	12%	12%	13%	12%	0%	0%
1.20	12%	13%	14%	12%	18%	21%	16%	14%	11%	12%	15%	18%	15%	12%	14%	17%	12%	13%	13%	14%	12%	0%	0%
1.30	13%	14%	14%	13%	19%	22%	17%	15%	12%	13%	15%	19%	16%	12%	15%	18%	13%	14%	13%	15%	13%	0%	0%
1.40	14%	15%	15%	13%	20%	23%	18%	15%	12%	14%	16%	20%	17%	13%	15%	18%	14%	15%	14%	15%	14%	0%	0%
1.50	14%	15%	16%	14%	21%	25%	19%	16%	13%	15%	17%	21%	18%	14%	16%	19%	14%	15%	15%	16%	15%	0%	0%
1.60	15%	16%	16%	14%	22%	26%	20%	17%	14%	16%	18%	22%	19%	14%	16%	20%	15%	16%	15%	17%	15%	0%	0%
1.70	15%	17%	17%	15%	24%	27%	21%	18%	14%	17%	19%	23%	20%	15%	17%	21%	16%	17%	16%	18%	16%	0%	0%
1.80	16%	17%	18%	16%	25%	28%	22%	18%	15%	18%	20%	24%	21%	15%	17%	22%	17%	17%	17%	19%	17%	0%	0%
1.90	17%	18%	18%	16%	26%	30%	23%	19%	15%	18%	21%	25%	22%	16%	18%	23%	17%	18%	18%	19%	18%	0%	0%
2.00	17%	19%	19%	17%	27%	31%	24%	20%	16%	19%	22%	27%	23%	17%	18%	24%	18%	19%	18%	20%	18%	0%	0%
2.10	18%	19%	19%	17%	28%	32%	25%	21%	16%	20%	23%	27%	23%	17%	19%	24%	19%	19%	19%	21%	19%	0%	0%
2.20	18%	20%	20%	18%	29%	32%	26%	21%	17%	20%	23%	28%	24%	18%	20%	25%	19%	20%	19%	21%	19%	0%	0%
2.30	19%	20%	20%	18%	30%	33%	27%	22%	17%	21%	24%	29%	24%	18%	20%	26%	20%	20%	20%	22%	20%	0%	0%
2.40	19%	21%	21%	19%	30%	34%	28%	22%	18%	21%	25%	29%	25%	18%	21%	27%	20%	21%	20%	23%	20%	0%	0%
2.50	20%	21%	21%	19%	31%	35%	28%	23%	18%	22%	25%	30%	26%	19%	21%	28%	21%	21%	21%	23%	21%	0%	0%
2.60	21%	22%	22%	20%	32%	35%	29%	24%	18%	22%	26%	31%	26%	19%	22%	28%	21%	22%	21%	24%	21%	0%	0%
2.70	21%	23%	22%	20%	33%	36%	30%	24%	19%	22%	27%	31%	27%	20%	22%	29%	22%	22%	22%	25%	22%	0%	0%
2.80	22%	23%	23%	21%	33%	37%	31%	25%	19%	23%	27%	32%	27%	20%	23%	30%	22%	23%	22%	25%	22%	0%	0%
2.90	22%	24%	23%	21%	34%	38%	32%	26%	20%	23%	28%	33%	28%	21%	23%	31%	23%	23%	23%	26%	22%	0%	0%
3.00	23%	24%	24%	22%	35%	39%	33%	26%	20%	24%	29%	33%	28%	21%	24%	31%	23%	24%	23%	27%	23%	0%	0%
3.10	23%	25%	25%	22%	36%	39%	34%	27%	21%	25%	29%	34%	29%	22%	24%	32%	24%	24%	24%	27%	23%	0%	0%
3.20	24%	25%	25%	23%	37%	40%	35%	28%	21%	26%	30%	35%	30%	22%	25%	33%	25%	25%	24%	28%	24%	0%	0%
3.30	25%	26%	26%	23%	38%	41%	36%	29%	22%	26%	31%	35%	30%	23%	25%	34%	25%	25%	25%	29%	25%	0%	0%
3.40	25%	27%	26%	23%	39%	42%	37%	30%	22%	27%	31%	36%	31%	23%	26%	34%	26%	26%	25%	30%	25%	0%	0%
3.50	26%	27%	27%	24%	40%	43%	38%	31%	23%	28%	32%	37%	32%	24%	26%	35%	27%	26%	26%	30%	26%	0%	0%
3.60	27%	28%	28%	24%	41%	44%	39%	31%	23%	29%	33%	37%	32%	25%	27%	36%	27%	27%	27%	31%	26%	0%	0%
3.70	27%	28%	28%	25%	42%	44%	40%	32%	24%	30%	33%	38%	33%	25%	27%	37%	28%	27%	27%	32%	27%	0%	0%
3.80	28%	29%	29%	25%	43%	45%	41%	33%	24%	31%	34%	39%	34%	26%	28%	37%	29%	28%	28%	32%	27%	0%	0%

Depth Inundation (feet)	Retail-Furniture	Retail-Electronics	Retail-Clothing	Hotel	Fast Food	Non-Fast Food	Hospital	Medical Office	Protective Services	Correctional Facility	Recreation	Religious Facilities	Schools	Service Station	Office One-Story	Convenience Store	Grocery	Apartment	Industrial Light	Warehouse, Refrig	Warehouse - Non-Refrigerated	Government	Vacant
3.90	28%	29%	29%	26%	44%	46%	42%	34%	25%	32%	35%	39%	34%	26%	28%	38%	29%	28%	28%	33%	28%	0%	0%
4.00	29%	30%	30%	26%	44%	47%	43%	35%	25%	33%	35%	40%	35%	27%	29%	39%	30%	29%	29%	34%	28%	0%	0%
4.10	29%	30%	30%	27%	45%	48%	44%	35%	26%	33%	36%	41%	35%	27%	29%	39%	30%	29%	29%	34%	29%	0%	0%
4.20	30%	31%	31%	27%	46%	48%	44%	36%	26%	33%	36%	41%	35%	27%	29%	39%	30%	29%	29%	35%	29%	0%	0%
4.30	30%	31%	31%	27%	46%	49%	45%	36%	27%	33%	37%	42%	36%	28%	30%	40%	31%	30%	30%	35%	30%	0%	0%
4.40	31%	32%	32%	28%	47%	50%	46%	37%	27%	34%	37%	42%	36%	28%	30%	40%	31%	30%	30%	35%	30%	0%	0%
4.50	31%	32%	32%	28%	47%	50%	46%	37%	28%	34%	37%	43%	36%	28%	30%	41%	31%	30%	30%	36%	30%	0%	0%
4.60	31%	32%	32%	28%	48%	51%	47%	37%	28%	34%	38%	43%	37%	29%	31%	41%	32%	31%	31%	36%	31%	0%	0%
4.70	32%	33%	33%	29%	48%	52%	48%	38%	29%	35%	38%	44%	37%	29%	31%	41%	32%	31%	31%	37%	31%	0%	0%
4.80	32%	33%	33%	29%	49%	52%	48%	38%	29%	35%	39%	45%	37%	29%	31%	42%	32%	31%	32%	37%	31%	0%	0%
4.90	32%	34%	34%	29%	49%	53%	49%	39%	30%	35%	39%	45%	38%	30%	32%	42%	33%	31%	32%	37%	32%	0%	0%
5.00	33%	34%	34%	30%	50%	54%	50%	39%	30%	35%	39%	46%	38%	30%	32%	43%	33%	32%	32%	38%	32%	0%	0%
5.10	33%	34%	34%	30%	50%	54%	51%	40%	30%	36%	40%	46%	38%	30%	33%	43%	33%	32%	33%	38%	32%	0%	0%
5.20	33%	35%	35%	30%	51%	55%	52%	41%	31%	37%	40%	47%	39%	31%	33%	44%	34%	32%	33%	39%	33%	0%	0%
5.30	34%	35%	35%	31%	51%	56%	53%	42%	31%	37%	41%	47%	39%	31%	33%	44%	34%	33%	34%	39%	33%	0%	0%
5.40	34%	35%	35%	31%	52%	57%	54%	43%	31%	38%	41%	48%	39%	32%	34%	45%	35%	33%	34%	40%	34%	0%	0%
5.50	35%	36%	36%	31%	52%	57%	55%	44%	31%	39%	42%	48%	40%	32%	34%	45%	35%	33%	35%	40%	34%	0%	0%
5.60	35%	36%	36%	31%	53%	58%	56%	45%	32%	39%	42%	49%	40%	32%	35%	46%	36%	33%	35%	41%	34%	0%	0%
5.70	35%	36%	37%	32%	53%	59%	57%	46%	32%	40%	43%	49%	41%	33%	35%	46%	36%	34%	35%	41%	35%	0%	0%
5.80	36%	36%	37%	32%	54%	59%	58%	47%	32%	40%	43%	50%	41%	33%	36%	47%	37%	34%	36%	42%	35%	0%	0%
5.90	36%	37%	37%	32%	55%	60%	59%	48%	32%	41%	44%	50%	41%	33%	36%	47%	37%	34%	36%	43%	36%	0%	0%
6.00	36%	37%	38%	33%	55%	61%	60%	49%	33%	42%	44%	51%	42%	34%	37%	48%	38%	35%	37%	43%	36%	0%	0%

Table D - 19. Depth-Damage Function – Residential Contents

Depth Inundation (feet)	Slab	Residential-NB	Residential-2NB	Split Level-NB	Residential-2B	Mobile Home
-2.0	0%	0%	0%	0%	8%	0%
-1.9	0%	0%	0%	0%	8%	0%
-1.8	0%	0%	0%	0%	8%	0%
-1.7	0%	1%	0%	1%	9%	0%
-1.6	0%	1%	0%	1%	9%	0%
-1.5	0%	1%	1%	1%	9%	0%
-1.4	0%	1%	1%	1%	9%	0%
-1.3	0%	2%	1%	2%	9%	0%
-1.2	0%	2%	1%	2%	10%	0%
-1.1	0%	2%	1%	2%	10%	0%
-1.0	0%	2%	1%	2%	10%	0%
-0.9	1%	3%	1%	2%	10%	1%
-0.8	2%	4%	2%	2%	10%	2%
-0.7	3%	4%	2%	2%	11%	4%
-0.6	4%	5%	3%	2%	11%	5%
-0.5	5%	5%	3%	3%	11%	6%
-0.4	6%	6%	3%	3%	11%	7%
-0.3	7%	6%	4%	3%	11%	8%
-0.2	8%	7%	4%	3%	12%	10%
-0.1	9%	8%	5%	3%	12%	11%
0.0	10%	8%	5%	3%	12%	12%
0.1	12%	9%	5%	3%	12%	17%
0.2	14%	9%	6%	3%	12%	23%
0.3	16%	10%	6%	3%	12%	28%
0.4	18%	10%	6%	4%	13%	34%
0.5	20%	11%	7%	4%	13%	39%
0.6	22%	11%	7%	4%	13%	44%
0.7	24%	12%	8%	4%	13%	50%
0.8	26%	12%	8%	4%	13%	55%
0.9	28%	13%	8%	5%	14%	61%
1.0	30%	13%	9%	5%	14%	66%
1.1	32%	14%	9%	5%	14%	68%
1.2	33%	14%	9%	5%	14%	71%
1.3	35%	15%	10%	6%	14%	73%
1.4	36%	15%	10%	6%	15%	76%
1.5	38%	16%	10%	6%	15%	78%
1.6	39%	16%	11%	6%	15%	80%
1.7	41%	17%	11%	7%	15%	83%
1.8	42%	17%	12%	7%	15%	85%
1.9	44%	17%	12%	7%	16%	88%
2.0	45%	18%	12%	8%	16%	90%
2.1	48%	18%	13%	8%	16%	90%
2.2	51%	19%	13%	8%	16%	90%
2.3	54%	19%	13%	9%	16%	90%
2.4	57%	20%	14%	9%	17%	90%
2.5	60%	20%	14%	9%	17%	90%
2.6	63%	20%	14%	10%	17%	90%
2.7	66%	21%	15%	10%	17%	90%
2.8	69%	21%	15%	10%	17%	90%
2.9	72%	22%	15%	11%	18%	90%

Depth Inundation (feet)	Slab	Residential-NB	Residential-2NB	Split Level-NB	Residential-2B	Mobile Home
3.0	75%	22%	16%	11%	18%	90%
3.1	78%	22%	16%	12%	18%	90%
3.2	80%	23%	16%	12%	18%	90%
3.3	83%	23%	16%	12%	18%	90%
3.4	85%	23%	17%	13%	19%	90%
3.5	88%	24%	17%	13%	19%	90%
3.6	90%	24%	17%	14%	19%	90%
3.7	93%	25%	18%	14%	19%	90%
3.8	95%	25%	18%	14%	19%	90%
3.9	98%	25%	18%	15%	20%	90%
4.0	100%	26%	19%	15%	20%	90%
4.1	100%	26%	19%	16%	20%	90%
4.2	100%	26%	19%	16%	20%	90%
4.3	100%	27%	19%	17%	20%	90%
4.4	100%	27%	20%	17%	21%	90%
4.5	100%	27%	20%	18%	21%	90%
4.6	100%	28%	20%	18%	21%	90%
4.7	100%	28%	20%	19%	21%	90%
4.8	100%	28%	21%	19%	22%	90%
4.9	100%	28%	21%	20%	22%	90%
5.0	100%	29%	21%	20%	22%	90%
5.1	100%	29%	22%	21%	22%	90%
5.2	100%	29%	22%	21%	22%	90%
5.3	100%	30%	22%	22%	23%	90%
5.4	100%	30%	22%	22%	23%	90%
5.5	100%	30%	23%	23%	23%	90%
5.6	100%	30%	23%	23%	23%	90%
5.7	100%	31%	23%	24%	24%	90%
5.8	100%	31%	23%	24%	24%	90%
5.9	100%	31%	24%	25%	24%	90%
6.0	100%	32%	24%	25%	24%	90%

Table D - 20. Depth-Damage Function – Commercial Contents

Depth Inundation (feet)	Retail-Furniture	Retail-Electronics	Retail-Clothing	Hotel	Fast Food	Non-Fast Food	Hospital	Medical Office	Protective Services	Correctional Facility	Recreation	Religious Facilities	Schools	Service Station	Office One-Story	Convenience Store	Grocery	Apartment	Industrial Light	Warehouse, Refrig	Warehouse - Non-Refrigerated	Government	Vacant
-2.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-1.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-0.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.1	5%	2%	3%	2%	2%	3%	1%	1%	1%	1%	3%	3%	2%	2%	2%	2%	3%	2%	2%	3%	2%	0%	0%
0.2	9%	5%	6%	3%	4%	6%	3%	3%	3%	3%	5%	6%	4%	3%	4%	5%	6%	4%	4%	6%	4%	0%	0%
0.3	14%	7%	9%	5%	6%	8%	4%	4%	4%	4%	8%	9%	7%	5%	6%	7%	9%	7%	6%	9%	6%	0%	0%
0.4	19%	9%	12%	6%	9%	11%	6%	6%	6%	5%	10%	12%	9%	7%	8%	9%	12%	9%	8%	12%	8%	0%	0%
0.5	23%	12%	15%	8%	11%	14%	7%	7%	7%	7%	13%	15%	11%	8%	10%	12%	15%	11%	10%	15%	10%	0%	0%
0.6	28%	14%	17%	10%	13%	17%	9%	9%	9%	8%	15%	18%	13%	10%	12%	14%	18%	13%	12%	18%	12%	0%	0%
0.7	33%	16%	20%	11%	15%	19%	10%	10%	10%	9%	18%	21%	15%	12%	14%	16%	22%	15%	14%	21%	15%	0%	0%
0.8	37%	18%	23%	13%	17%	22%	12%	11%	11%	11%	21%	23%	17%	13%	16%	19%	25%	17%	15%	24%	17%	0%	0%

Depth Inundation (feet)	Retail-Furniture	Retail-Electronics	Retail-Clothing	Hotel	Fast Food	Non-Fast Food	Hospital	Medical Office	Protective Services	Correctional Facility	Recreation	Religious Facilities	Schools	Service Station	Office One-Story	Convenience Store	Grocery	Apartment	Industrial Light	Warehouse, Refrig	Warehouse - Non-Refrigerated	Government	Vacant
0.9	42%	21%	26%	15%	19%	25%	13%	13%	13%	12%	23%	26%	20%	15%	18%	21%	28%	20%	17%	27%	19%	0%	0%
1.0	47%	23%	29%	16%	21%	28%	15%	14%	14%	13%	26%	29%	22%	16%	20%	23%	31%	22%	19%	30%	21%	0%	0%
1.1	48%	24%	31%	17%	23%	30%	16%	16%	15%	14%	28%	31%	23%	18%	21%	25%	32%	23%	20%	32%	22%	0%	0%
1.2	50%	25%	32%	18%	25%	32%	17%	17%	16%	15%	29%	33%	23%	19%	23%	26%	33%	23%	22%	33%	23%	0%	0%
1.3	51%	26%	34%	19%	26%	34%	18%	18%	17%	16%	31%	35%	24%	20%	24%	28%	34%	24%	23%	35%	25%	0%	0%
1.4	53%	27%	36%	20%	28%	36%	20%	19%	18%	16%	33%	37%	25%	21%	26%	30%	35%	25%	24%	37%	26%	0%	0%
1.5	54%	29%	38%	21%	30%	38%	21%	21%	20%	17%	35%	39%	26%	23%	27%	32%	36%	26%	25%	39%	27%	0%	0%
1.6	56%	30%	39%	22%	32%	40%	22%	22%	21%	18%	37%	41%	27%	24%	29%	33%	37%	27%	26%	41%	29%	0%	0%
1.7	57%	31%	41%	23%	33%	43%	23%	23%	22%	19%	38%	43%	28%	25%	30%	35%	38%	28%	27%	43%	30%	0%	0%
1.8	59%	32%	43%	24%	35%	45%	25%	24%	23%	20%	40%	45%	29%	26%	31%	37%	39%	29%	29%	44%	31%	0%	0%
1.9	60%	33%	45%	25%	37%	47%	26%	26%	24%	20%	42%	47%	30%	28%	33%	38%	40%	30%	30%	46%	32%	0%	0%
2.0	62%	34%	46%	26%	39%	49%	27%	27%	25%	21%	44%	48%	30%	29%	34%	40%	41%	30%	31%	48%	34%	0%	0%
2.1	62%	35%	47%	27%	40%	50%	28%	28%	26%	22%	46%	50%	31%	30%	35%	41%	42%	31%	32%	49%	35%	0%	0%
2.2	63%	36%	48%	28%	41%	51%	29%	30%	27%	23%	48%	51%	32%	31%	37%	42%	43%	32%	33%	50%	36%	0%	0%
2.3	64%	37%	49%	29%	43%	51%	30%	31%	28%	24%	49%	52%	33%	33%	38%	44%	45%	33%	34%	51%	38%	0%	0%
2.4	64%	38%	50%	29%	44%	52%	31%	32%	30%	25%	51%	53%	34%	34%	39%	45%	46%	34%	36%	52%	39%	0%	0%
2.5	65%	39%	51%	30%	46%	53%	32%	34%	31%	26%	53%	54%	35%	35%	40%	46%	47%	35%	37%	54%	41%	0%	0%
2.6	66%	40%	52%	31%	47%	54%	33%	35%	32%	27%	55%	55%	36%	36%	41%	48%	48%	36%	38%	55%	42%	0%	0%
2.7	66%	41%	53%	32%	48%	55%	34%	36%	33%	28%	57%	57%	36%	37%	42%	49%	49%	36%	39%	56%	43%	0%	0%
2.8	67%	42%	54%	33%	50%	56%	35%	38%	34%	29%	59%	58%	37%	38%	43%	50%	50%	37%	40%	57%	45%	0%	0%
2.9	68%	43%	55%	33%	51%	56%	36%	39%	36%	30%	61%	59%	38%	40%	44%	52%	52%	38%	41%	58%	46%	0%	0%
3.0	68%	44%	55%	34%	53%	57%	37%	40%	37%	31%	63%	60%	39%	41%	45%	53%	53%	39%	42%	59%	47%	0%	0%
3.1	69%	47%	57%	35%	54%	59%	39%	42%	38%	32%	64%	61%	40%	43%	46%	55%	54%	40%	43%	60%	48%	0%	0%
3.2	70%	49%	58%	35%	55%	60%	40%	44%	39%	34%	65%	62%	40%	44%	47%	56%	55%	40%	44%	60%	49%	0%	0%
3.3	71%	51%	60%	36%	56%	62%	42%	45%	40%	35%	66%	63%	41%	46%	48%	58%	56%	41%	45%	61%	50%	0%	0%
3.4	73%	53%	61%	36%	57%	63%	44%	47%	41%	36%	67%	64%	41%	48%	49%	60%	57%	41%	46%	62%	51%	0%	0%
3.5	74%	56%	63%	37%	58%	65%	45%	49%	42%	38%	68%	65%	42%	49%	50%	62%	58%	42%	47%	62%	52%	0%	0%
3.6	75%	58%	64%	37%	59%	66%	47%	50%	43%	39%	69%	66%	43%	51%	51%	64%	60%	43%	48%	63%	53%	0%	0%
3.7	76%	60%	66%	38%	60%	67%	48%	52%	44%	40%	70%	67%	43%	53%	52%	65%	61%	43%	49%	64%	54%	0%	0%
3.8	77%	62%	67%	39%	61%	69%	50%	54%	45%	42%	71%	67%	44%	54%	53%	67%	62%	44%	50%	64%	55%	0%	0%

Depth Inundation (feet)	Retail-Furniture	Retail-Electronics	Retail-Clothing	Hotel	Fast Food	Non-Fast Food	Hospital	Medical Office	Protective Services	Correctional Facility	Recreation	Religious Facilities	Schools	Service Station	Office One-Story	Convenience Store	Grocery	Apartment	Industrial Light	Warehouse, Refrig	Warehouse - Non-Refrigerated	Government	Vacant
3.9	78%	65%	69%	39%	62%	70%	52%	55%	46%	43%	72%	68%	44%	56%	54%	69%	63%	44%	51%	65%	56%	0%	0%
4.0	79%	67%	70%	40%	63%	72%	53%	57%	47%	44%	73%	69%	45%	58%	55%	71%	64%	45%	52%	66%	57%	0%	0%
4.1	80%	68%	71%	41%	64%	73%	55%	58%	47%	45%	74%	70%	45%	58%	56%	72%	65%	45%	53%	67%	58%	0%	0%
4.2	80%	69%	72%	42%	65%	73%	57%	59%	48%	46%	74%	71%	46%	59%	57%	72%	66%	46%	54%	67%	59%	0%	0%
4.3	81%	70%	73%	42%	66%	74%	58%	60%	49%	47%	75%	71%	46%	59%	58%	73%	67%	46%	55%	68%	59%	0%	0%
4.4	82%	71%	74%	43%	67%	75%	60%	61%	50%	48%	76%	72%	46%	60%	59%	74%	69%	46%	56%	69%	60%	0%	0%
4.5	82%	72%	75%	44%	68%	76%	62%	62%	51%	49%	76%	73%	46%	61%	59%	75%	70%	46%	57%	70%	61%	0%	0%
4.6	83%	73%	75%	45%	69%	77%	63%	63%	52%	49%	77%	74%	47%	61%	60%	76%	71%	47%	57%	71%	62%	0%	0%
4.7	84%	75%	76%	46%	70%	77%	65%	64%	53%	50%	78%	74%	47%	62%	61%	77%	72%	47%	58%	72%	63%	0%	0%
4.8	84%	76%	77%	47%	71%	78%	67%	65%	54%	51%	79%	75%	47%	62%	62%	78%	73%	47%	59%	73%	64%	0%	0%
4.9	85%	77%	78%	48%	72%	79%	68%	66%	54%	52%	79%	76%	48%	63%	63%	78%	74%	48%	60%	73%	65%	0%	0%
5.0	86%	78%	79%	49%	73%	80%	70%	67%	55%	53%	80%	76%	48%	63%	64%	79%	75%	48%	61%	74%	66%	0%	0%
5.1	86%	79%	80%	49%	74%	80%	71%	68%	56%	54%	80%	77%	48%	64%	65%	80%	77%	48%	62%	75%	66%	0%	0%
5.2	87%	80%	81%	49%	74%	81%	72%	69%	57%	55%	81%	77%	49%	65%	66%	81%	78%	49%	63%	75%	67%	0%	0%
5.3	87%	80%	82%	50%	75%	81%	73%	70%	58%	56%	81%	78%	49%	66%	67%	82%	79%	49%	64%	76%	68%	0%	0%
5.4	88%	81%	83%	50%	76%	82%	74%	71%	58%	57%	82%	78%	49%	66%	68%	83%	80%	49%	65%	76%	69%	0%	0%
5.5	88%	82%	84%	51%	76%	82%	75%	71%	59%	58%	82%	79%	50%	67%	69%	84%	81%	50%	66%	77%	70%	0%	0%
5.6	89%	83%	85%	51%	77%	83%	75%	72%	60%	59%	82%	79%	50%	68%	70%	85%	83%	50%	67%	78%	70%	0%	0%
5.7	89%	84%	86%	51%	77%	83%	76%	73%	61%	59%	83%	80%	51%	68%	70%	85%	84%	51%	69%	78%	71%	0%	0%
5.8	90%	85%	87%	52%	78%	84%	77%	74%	61%	60%	83%	80%	51%	69%	71%	86%	85%	51%	70%	79%	72%	0%	0%
5.9	90%	86%	88%	52%	79%	84%	78%	75%	62%	61%	84%	81%	51%	70%	72%	87%	86%	51%	71%	79%	73%	0%	0%
6.0	91%	87%	89%	52%	79%	85%	79%	75%	63%	62%	84%	81%	52%	71%	73%	88%	87%	52%	72%	80%	74%	0%	0%

Appendix E Agency Consultation Responses

Figure E - 1. Maryland Department of Natural Resources

Maryland DNR Response

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Jeannie Haddaway-Riccio, Secretary

January 30, 2020

Ms. Charlene Wu
AECOM
3101 Wilson Boulevard
Suite 900
Arlington, VA 22201

RE: Environmental Review for Piney Run Watershed Study - Piney Run Dam Rehab, Carroll County, Maryland.

Dear Ms. Wu:

The Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area shown on the map provided. As a result, we have no specific concerns regarding potential impacts or recommendations for protection measures at this time. We would like to point out, however, that our remote analysis suggests that the forested area on this property contains Forest Interior Dwelling Bird habitat. Populations of many bird species which depend on this type of forested habitat are declining in Maryland and throughout the eastern United States. Interested landowners can contact us for further voluntary guidelines to help conserve this important habitat.

Please be sure to let us know if the limits of proposed disturbance or overall site boundaries change and we will provide you with an updated evaluation. Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2020.0024.cl

Tawes State Office Building | 580 Taylor Avenue | Annapolis, Maryland 21401
410-260-8DNR or toll free in Maryland 877-620-8DNR • dnr.maryland.gov — TTY Users Call via the Maryland Relay

Figure E - 2. United States Fish and Wildlife Service – Northern Long Eared Bat Correspondence

USFWS Response

Blass, Jeff

From: CBFO Project Review, FWS <cbfoprojectreview@fws.gov>
Sent: Wednesday, June 2, 2021 2:29 PM
To: Wu, Charlene
Cc: cheyn@carrollcountymd.gov; jque.jones@usda.gov; Blass, Jeff; Warf, Jennifer
Subject: [EXTERNAL] Re: Piney Run Project Review Request – USFWS

Hi Charlene-

Thank you for sending this project in for review. Since there will be less than 15 acres of tree clearing, and there are no known hibernacula or maternity roosts in the area, we concur that this project is "not likely to adversely affect" northern long-eared bat. Please let me know if you have any questions.

Thank you,
Kathleen

From: Wu, Charlene <Charlene.Wu@aecom.com>
Sent: Thursday, May 13, 2021 8:07 PM
To: CBFO Project Review, FWS <cbloprojectreview@fws.gov>
Cc: cheyn@carrollcountymd.gov <cheyn@carrollcountymd.gov>; jque.jones@usda.gov <jque.jones@usda.gov>; Blass, Jeff <jeff.blass@aecom.com>; Warf, Jennifer <Jennifer.Warf@aecom.com>
Subject: [EXTERNAL] Piney Run Project Review Request - USFWS

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon,

Carroll County, with federal investment from the United States Department of Agriculture - Natural Resources Conservation Services, is preparing a Supplemental Watershed Plan and Environmental Assessment in support of the rehabilitation of Piney Run Dam in Carroll County, Maryland. We are seeking input from your agency regarding any information or potential environmental concerns associated with this project. Please see the attached letter for additional information. We would appreciate any comments, concerns, information, studies, or other data you may have regarding this project within **thirty (30) days** of receipt of this correspondence.

We look forward to and welcome your participation in this analysis. Thank you!

Regards,
Charlene Wu

Charlene Wu
Environmental Planner
Impact Assessment and Permitting
D: [illegible] C: [illegible]
Charlene.wu@aecom.com

AECOM

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127

In Reply Refer To:
Project code: 2023-0024324
Project Name: Piney Run Dam Rehabilitation

October 23, 2023

Federal Nexus: yes
Federal Action Agency (if applicable): Natural Resources Conservation Service

Subject: Federal agency coordination under the Endangered Species Act, Section 7 for 'Piney Run Dam Rehabilitation'

Dear Benjamin Obenland:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on October 23, 2023, for 'Piney Run Dam Rehabilitation' (here forward, Project). This project has been assigned Project Code 2023-0024324 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements may not be complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (DKey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis completed by the Service, your project has reached the determination of "May Affect, Not Likely to Adversely Affect" the northern long-eared bat. Unless the Service advises you within 15 days of the date of this letter that your

IPaC-assisted determination was incorrect, this letter verifies that consultation on the Action is complete and no further action is necessary unless either of the following occurs:

- new information reveals effects of the action that may affect the northern long-eared bat in a manner or to an extent not previously considered; or,
- the identified action is subsequently modified in a manner that causes an effect to the northern long-eared bat that was not considered when completing the determination key.

15-Day Review Period

As indicated above, the Service will notify you within 15 calendar days if we determine that this proposed Action does not meet the criteria for a "may affect, not likely to adversely affect" (NLAA) determination for the northern long-eared bat. If we do not notify you within that timeframe, you may proceed with the Action under the terms of the NLAA concurrence provided here. This verification period allows the identified Ecological Services Field Office to apply local knowledge to evaluation of the Action, as we may identify a small subset of actions having impacts that we did not anticipate when developing the key. In such cases, the identified Ecological Services Field Office may request additional information to verify the effects determination reached through the Northern Long-eared Bat DKey.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may affect the species and/or critical habitat listed above. Note that reinitiation of consultation would be necessary if a new species is listed or critical habitat designated that may be affected by the identified action before it is complete.

If you have any questions regarding this letter or need further assistance, please contact the Chesapeake Bay Ecological Services Field Office and reference Project Code 2023-0024324 associated with this Project.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Piney Run Dam Rehabilitation

2. Description

The following description was provided for the project 'Piney Run Dam Rehabilitation':

> The purposes of the proposed rehabilitation of the Piney Run Dam are to comply with current performance and safety standards while maintain present level of flood control benefits and to implement, if found to be feasible and beneficial, the water supply use of the reservoir. The preferred alternative is to rehabilitate the Piney Run Dam by expanding the existing 250-foot-wide earthen auxiliary spillway width by 25 feet and raising its crest by 0.8 feet (AS) on the right abutment to 275 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 (RCC) and installing a cutoff wall at the AS auxiliary spillway crest, replacing the downstream ends of each of the toe drains, making minor repairs to the existing principal spillway (PS) riser and water supply intake tower, and installing a cold water release system in either the PS riser or in the water supply intake tower.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.3872133499999996,-76.97665023493201,14z

DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of "may affect, but not likely to adversely affect" for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. The action area does not overlap with an area for which U.S. Fish and Wildlife Service currently has data to support the presumption that the northern long-eared bat is present. Are you aware of other data that indicates that northern long-eared bats (NLEB) are likely to be present in the action area?

   Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed NLEB acoustic detections. Data on captures, roost tree use, and acoustic detections should post-date the year when white-nose syndrome was detected in the relevant state. With this question, we are looking for data that, for some reason, may have not yet been made available to U.S. Fish and Wildlife Service.

   No

3. Does any component of the action involve construction or operation of wind turbines?

   Note: For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.)

   No

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Yes

5. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

   No

6. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

   Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

   Yes

7. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

   No

8. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

   No

9. Have you determined that your proposed action will have no effect on the northern long-eared bat? Remember to consider the effects of any activities that would not occur but for the proposed action.

   If you think that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, answer "No" below and continue through the key. If you have determined that the northern long-eared bat does not occur in your project's action area and/or that your project will have no effects whatsoever on the species despite the potential for it to occur in the action area, you may make a "no effect" determination for the northern long-eared bat.

   Note: Federal agencies (or their designated non-federal representatives) must consult with USFWS on federal agency actions that may affect listed species [50 CFR 402.14(a)]. Consultation is not required for actions that will not affect listed species or critical habitat. Therefore, this determination key will not provide a consistency or verification letter for actions that will not affect listed species. If you believe that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, please answer "No" and continue through the key. Remember that this key addresses only effects to the northern long-eared bat. Consultation with USFWS would be required if your action may affect another listed species or critical habitat. The definition of Effects of the Action can be found here: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

   No

10. [Semantic] Is the action area located within 0.5 miles of a known northern long-eared bat hibernaculum?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

    Automatically answered
    No

10/23/2023

11. **Does the action area contain any caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating northern long-eared bats?**

    No

12. **Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?**
    (If unsure, answer "Yes.")

    Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats (*i.e.*, live trees and/or snags ≥3 inches (12.7 centimeter) dbh), answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    Yes

13. **Will the action cause effects to a bridge?**

    No

14. **Will the action result in effects to a culvert or tunnel?**

    No

15. **Does the action include the intentional exclusion of northern long-eared bats from a building or structure?**

    Note: Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local U.S. Fish and Wildlife Services Ecological Services Field Office to help assess whether northern long-eared bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures

    No

16. **Does the action involve removal, modification, or maintenance of a human-made structure (barn, house, or other building) known or suspected to contain roosting bats?**

    No

17. **Will the action directly or indirectly cause construction of one or more new roads that are open to the public?**

    Note: The answer may be yes when a publicly accessible road either (1) is constructed as part of the proposed action or (2) would not occur but for the proposed action (i.e., the road construction is facilitated by the proposed action but is not an explicit component of the project).

    No

18. Will the action include or cause any construction or other activity that is reasonably certain to increase average daily traffic on one or more existing roads?

    Note: For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

19. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

20. Will the proposed action involve the creation of a new water-borne contaminant source (e.g., leachate pond pits containing chemicals that are not NSF/ANSI 60 compliant)?

    No

21. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    No

22. Will the action include drilling or blasting?

    Yes

23. Will the drilling or blasting affect known or potentially suitable hibernacula, summer habitat, or active year-round habitat (where applicable) for the northern long-eared bat?

    Note: In addition to direct impacts to hibernacula, consider impacts to hydrology or air flow that may impact the suitability of hibernacula. Additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    Yes

24. Will the proposed action result in the cutting or other means of knocking down, bringing down, or trimming of any trees suitable for northern long-eared bat roosting?

    Note: Suitable northern long-eared bat roost trees are live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities.

    Yes

PROJECT QUESTIONNAIRE

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

6.5

In what extent of the area (in acres) will trees be cut, knocked down, or trimmed during the inactive (hibernation) season for northern long-eared bat? **Note:** Inactive Season dates for spring staging/fall swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas

6.5

In what extent of the area (in acres) will trees be cut, knocked down, or trimmed during the active (non-hibernation) season for northern long-eared bat? **Note:** Inactive Season dates for spring staging/fall swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas

0

Will all potential northern long-eared bat (NLEB) roost trees (trees ≥3 inches diameter at breast height, dbh) be cut, knocked, or brought down from any portion of the action area greater than or equal to 0.1 acre? If all NLEB roost trees will be removed from multiple areas, select 'Yes' if the cumulative extent of those areas meets or exceeds 0.1 acre.

Yes

Enter the extent of the action area (in acres) from which all potential NLEB roost trees will be removed. If all NLEB roost trees will be removed from multiple areas, entire the total extent of those areas. Round up to the nearest tenth of an acre.

6.5

For the area from which all potential northern long-eared bat (NLEB) roost trees will be removed, on how many acres (round to the nearest tenth of an acre) will trees be allowed to regrow? Enter '0' if the entire area from which all potential NLEB roost trees are removed will be developed or otherwise converted to non-forest for the foreseeable future.

1.7

Will any snags (standing dead trees) ≥3 inches dbh be left standing in the area(s) in which all northern long-eared bat roost trees will be cut, knocked down, or otherwise brought down?

No

Will all project activities by completed by April 1, 2024?

No

IPAC USER CONTACT INFORMATION

Agency: AECOM
Name: Benjamin Obenland
Address: 12420 Milestone Center Drive
Address Line 2: Suite 150
City: Germantown
State: MD
Zip: 20876
Email benjamin.obenland@aecom.com
Phone: 3019442414

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Natural Resources Conservation Service

Figure E - 3. Federal Emergency Management Agency

FEMA Response

From: Dunn, Margaret <margaret.dunn@fema.dhs.gov>
Sent: Thursday, May 20, 2021 4:14 PM
To: Wu, Charlene <Charlene.Wu@aecom.com>
Subject: [EXTERNAL] FW: Piney Run Project Review Request - FEMA

Hi Charlene,
I am responding to your request to FEMA to provide information regarding the Piney Run Dam in Carroll County, MD.

1. Our latest flood hazard information is available through FEMA's Map Service Center and through Maryland's State Flood Tool. The MD state tool is probably the best to use for geographic information and you can download the hydraulic model there. You can find the full Flood Insurance Study for Carroll County through the Map Service Center.
2. We also recommend looking at dam data in Carroll County's Hazard Mitigation Plan. The public version of the plan has redacted dam information, but you can probably get direct information through the County. The current hazard mitigation plan is expired but we understand the County will be moving forward to make an update soon.
3. Any additional information we have regarding this dam would be found in the ACOE National Inventory of Dams, which is publicly available.

As a side note, FEMA does have a new grant program called the High Hazard Potential Dam grant that provides funding for the rehabilitation of high hazard dams. I don't know if the Piney Run Dam would qualify, but you can visit the link for more information.

Thank you,
Maggie
--
Maggie Dunn, AICP (she/her)
Outreach Coordinator | Mitigation Division | Region 3
Mobile: (202) 372-5145
margaret.dunn@fema.dhs.gov

Federal Emergency Management Agency
fema.gov

FEMA

Figure E - 4. Carroll County, Maryland Department of Planning

Carroll County Department of Planning Response

Lynda D. Eisenberg
Director
Department of Planning

410-386-5145, fax 410-386-8978
Toll-free 1-888-302-8978
MD Relay service 7-1-1/800-735-2258

Mary S. Lane
Planning Manager

Carroll County Government
225 North Center Street
Westminster, Maryland 21157
email: ccplanning@carrollcountymd.gov

Jennifer E. Warf, Associate Vice President
AECOM Technical Services
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

May 18, 2021

Dear Ms. Warf,

The Carroll County Department of Planning has reviewed the proposal to rehabilitate Piney Run Dam. Piney Run Dam and Reservoir is an important source of recreation and a future drinking water supply for the County and the Department fully supports this project.

The rehabilitation project is consistent with 2014 County Master Plan, the 2018 Freedom Community Comprehensive Plan and the 2019 Water and Sewer Master Plan Triennial Update. The 2018 Freedom Community Comprehensive Plan states that "…the Piney Run Reservoir and Park further contributes to the community's overall sense of character, through its conserved resources, including wetlands, forested areas, and open fields."

Goals and recommendations from the Freedom Plan include: to establish and maintain existing wildlife corridors in the Piney Run and to restart the permitting process to establish Piney Run Reservoir as a future water supply source to provide redundancy and back up supply. This rehabilitation project would help toward the implementation of these objectives.

As stated in the 2019 Triennial Update to the Water and Sewer Master Plan: Piney Run Reservoir was designed as a future water supply source and the County reserves the right to use it in the future. This project will help to maintain this as an important source of future drinking water for the County.

Thank you for the opportunity to comment on this important project. If I can be of further assistance, please contact the Carroll County Department of Planning at 410-386-5145.

Sincerely,

Lynda Eisenberg

Lynda Eisenberg, Director

DEPARTMENT OF PLANNING
Planning for success in Carroll County

Figure E - 5. Maryland Department of the Environment – Non-Tidal Wetlands

Maryland Department of the Environment Non-Tidal Wetlands Response

From: Amanda Sigillito -MDE- <amanda.sigillito@maryland.gov>
Sent: Tuesday, May 18, 2021 11:36 AM
To: Wu, Charlene <Charlene.Wu@aecom.com>
Cc: cheyn@carrollcountymd.gov; jque.jones@usda.gov; Blass, Jeff <jeff.blass@aecom.com>; Warf, Jennifer <Jennifer.Warf@aecom.com>; Scott Bass -MDE- <scott.bass@maryland.gov>; William Seiger -MDE- <william.seiger@maryland.gov>
Subject: [EXTERNAL] Re: Piney Run Project Review Request - MDE Wetlands Division

Dear Ms. Wu:

Thank you for your email. The Nontidal Wetlands Division screened the site and identified nontidal wetlands both up- and downstream of the structure. Permanent or temporary impacts to the nontidal wetlands, the 25-foot nontidal wetland buffer, streams or 100-year nontidal floodplain will require authorization. Additionally, Piney Run is a Use III-P stream, so any permanent nontidal wetland impacts will require both public notice and mitigation.

You may want to consider requesting a pre-application meeting with the Nontidal Wetlands and Waterway Construction Divisions. We can arrange a time to meet in the field and discuss the scope of the project as well as impact avoidance and minimization measures. A pre-application meeting can be requested at:

https://mde.maryland.gov/programs/Water/WetlandsandWaterways/Pages/PreApplicationIntroduction.aspx

Please feel free to contact me with any questions.

Sincerely,

Amanda Sigillito, Chief
Nontidal Wetlands Division
Due to the COVID-19 virus and the need for safety precautions, many state employees are working remotely.

CHANGING
Maryland
FOR THE BETTER

Amanda Sigillito
Chief, Nontidal Wetlands Division
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
amanda.sigillito@maryland.gov
410-537-3766 (O)
443-829-8127 (C)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

Figure E - 6. Pre-Application Meeting Minutes (30 August 2021) – Maryland Department of the Environment (Dam Safety, Non-Tidal Wetlands, Waterway Construction) and United States Army Corps of Engineers

AECOM

Minutes

Meeting name
Pre-Application Meeting

Time
10:00 AM

Project name
Piney Run Watershed Plan-EA Project

Prepared by
Jeff Blass

Meeting date
August 30, 2022

Location
Piney Run Dam, Sykesville, Maryland

AECOM project number
60614688

Attendees
AECOM - Jeff Blass
AECOM - Patrick Moreland
Carroll County - Chris Heyn
Carroll County - Ed Singer
MDE - Debra Correia
MDE - Pavla Dinesahu
MDE - Ariel Ben-Sorek
USACE - Joseph DaVia
USACE - Nicole Voelker

Circulation list
Attendees

The purpose of this meeting was to explain the proposed modifications project for the Piney Run Dam and key potential impacts to environmental and cultural/historic site features and to gather feedback from regulatory agency representatives on permitting implications.

Jeff Blass led the site walk and explained the key components of the proposed modifications:

The primary objectives of the project are to address previously identified deficiencies at the Piney Run Dam:

- The overall spillway capacity is insufficient. The dam cannot pass spillway design flood without overtopping the crest by several feet.
- The auxiliary spillway is constructed on erodible material. If the spillway were to activate under extreme flood conditions, the dam may be susceptible to failure via erosion through the spillway resulting in an uncontrolled release.

The proposed modifications include the following general improvements:

- The dam crest will be raised several feet using borrow material from the right side slope of the auxiliary spillway which will be widened as a result. This will be done as a downstream-slope raise meaning that fill will be placed on the downstream slope as well.
- To minimize stream impacts, the principal spillway impact basin will be modified to increase the height of the perimeter wall to act as an earth retaining structure to retain the additional fill. This will eliminate the need to extend the principal spillway conduit due to the increased fill height of the embankment.
- The exit channel of the auxiliary spillway will be armored with roller-compacted concrete at the steep portion of the exit channel beyond the existing tree line to arrest any erosion that may occur during activation. A concrete cutoff wall will be installed at the crest to arrest any erosion that may occur in the shallow-sloped portion of the exit channel.
- Chris Heyn explained that an automated cold water release system already designed by the County will be installed in the un-used water intake structure located to the right of the principal spillway. This system will require a conduit to be installed underwater connecting to the water intake structure at the 19 foot deep intake on the structure. Pipe anchors will be required to anchor the pipe to the surface of the embankment.

Key environmental and cultural resource features were noted during the site walk:

- Two stream channels are located on or near the site. The main channel of Piney Run emanates from the principal spillway outfall. Piney Run is a Use Class III stream. Jeff Blass indicated that approximately 50 linear feet of impacts from construction and potential placement of additional riprap are expected.
- A lateral tributary that confluences with Piney Run downstream of the site is located at the downstream toe of slope of the auxiliary spillway exit channel. No impacts to this stream are anticipated.
- Suspected non-tidal wetlands are located downstream of the downstream toe of slope of the embankment dam to the left of the principal spillway and Piney Run itself. No impacts to these wetlands or their buffer is anticipated.

C:\Users\[illegible] 08 30 Pre-Application Meeting Minutes_FINAL.docx

AECOM

- A cultural site of significance was identified near the downstream toe of slope of the auxiliary spillway exit channel. No impacts to this site are anticipated. Jeff Blass indicated that correspondence with the Maryland Historic Trust is on-going and their response letter indicated that if a site plan showing avoidance could be provided, then they could issue a letter of no significant impact.

USACE Comments:

- The project would likely be designated as a Category A project and be eligible for permitting under the existing state programmatic general permit (GP-6) which expires in 2026. However, several aspects may trigger designation as a Category B project
- If there are impacts to a cultural resources site (there is an existing site of significance located just beyond the proposed limits of disturbance near the auxiliary spillway exit channel) then a Category B designation would be appropriate.
- If any concrete or soil fill is placed in the reservoir, the USACE would need to consider whether or not the project would be eligible as a Category B designation. If this is the case, the project would need to be permitted directly by the USACE rather than being permitted as a Category A project under a State Programmatic General Permit.
- The submittal should include a detailed depiction of the impacts (Jeff Blass suggested a stand-along impact plate).

MDE Comments:

- If the anticipated wetland impacts hold up after a detailed delineation effort is completed, then the project would not require authorization from the non-tidal wetlands division.
- The project will require a permit from the Dam Safety Permits division. Ariel Ben-Sorek believed the scope of the proposed modifications would require an OB-type permit (obstruction) rather than a repair permit.
- Because the project is being permitted by the Dam Safety Permits division, separate authorization from the Waterway Construction Division will not be required. The Dam Safety permit will include the conditions that would otherwise be provided in a Waterway authorization.

Figure E - 7. Maryland Department of the Environment – Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland (or buffer) in Maryland Response

Maryland
Department of
the Environment

Wes Moore, Governor
Aruna Miller, Lt. Governor

Serena McIlwain, Secretary
Suzanne E. Dorsey, Deputy Secretary

May 24, 2024

AECOM
12420 Milestone Center Dr, Ste 150
Germantown, Maryland 20876

Project Name:	CL Bur of Res Mgmt - Piney Run Dam
Project Address:	30 Martz Rd Sykesville, MD 21784
Tracking Number:	202460756
Permit Number:	24-NT-3087
AI Number:	89810
Application Received:	May 16, 2024
County:	Carroll

The Regulatory Services Coordination Office of the Maryland Department of the Environment's Wetlands and Waterways Protection Program (WWPP) has received your Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland (or buffer) in Maryland. Based on the information in your application your project is considered a Minor project for fee purposes and anticipated processing time, and is considered a Category A project under the Army Corps of Engineers (USACE) Maryland State Programmatic General Permit-6 (MDSPGP-6). An application categorized as 'A' under the MDSPGP-6 may be granted federal approval by WWPP, without separate USACE review. Our goal at MDE is to complete the MDE review of your application within 180 days of the date of receipt. If your project is a nontidal stream or wetland restoration/ rehabilitation project, the Department's goal is to complete the State review of your application within 90 days from the date of receipt. The following WWPP project managers have been assigned to review your application:

Waterways Division: Debra Correia at debra.correia@maryland.gov or 410-537-3900

If available, please forward an electronic copy of the Joint Permit Application and supporting documentation to the email address listed for your WWPP project manager.

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258
www.mde.maryland.gov

Joint Application Acknowledgement Letter
May 24, 2024
Page 2

Your application has been forwarded to the following groups for review:

☐ Tidal Wetlands Division	☐ Nontidal Wetlands Division
☒ Waterway Construction Division	☒ Dam Safety Permits Division (410) 537-3552
☐ U.S. Army Corps of Engineers (410) 962-3670	☐ Compliance Division (410) 537-3510

You will be contacted individually or jointly by the groups that have been checked above within 45 days to advise you as to whether WWPP has all the information it needs to complete its review and what, if any, additional information is needed. In order to continue to process your application in a timely manner, it is important that you or your agent respond to such information requests promptly. Many delays in processing applications can be attributed to delays in MDE receiving the necessary requested information.

A primary function of WWPP is to convey and store flood waters and buffer adjacent land and water from related impacts. With climate change increasing precipitation, sea level rise and flooding in Maryland, the hydrology of wetland and waterway systems are also expected to change, possibly increasing flood risks to projects in or near wetlands, waterways, or their regulated buffers. The Department is incorporating the best available flooding information and science into WWPP application decisions. However, as an applicant proposing regulated activities in a possible flood prone area, you are also responsible for considering your project's flood vulnerability and risks, and including such considerations in your project's design, location, and scope. If your project changes the course, current, or cross-section of waters of the State in a mapped tidal or nontidal Federal Emergency Management Agency (FEMA) 100-year floodplain you are required to notify the appropriate local government and the state National Floodplain Insurance Program (NFIP) coordinator at MDE, Mr. Dave Guignet, by email at dave.guignet@maryland.gov of the proposed work and the impacts to the FEMA floodplain. Additionally, if the work/construction activity will change or alter the FEMA 100-year boundaries or elevations, you are fully responsible for and required to contact FEMA and apply for a Conditional Letter of Map Amendment (CLOMR) which may necessitate a separate hydrologic and hydraulic study (determined by FEMA) before construction; and complete the FEMA Amendment process with a Letter of Map Amendment or Revision (LOMR) after construction is completed. This includes coordinating and informing the local government/community throughout the process. This requirement is in addition to any MDE authorization. If you have any questions regarding this FEMA requirement, please contact Dave Guignet by email at dave.guignet@maryland.gov.

Please note that if the proposed project changes during the course of processing, or if WWPP determines that other regulated resources may be impacted, your application may be recategorized and/or forwarded to other entities for their review and input (for example, Maryland Historical Trust, Tribal nations, Maryland Department of Natural Resources, U.S. Environmental Protection Agency, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and/or U.S. Coast Guard). Reviews by these other groups may add additional time to the review period. Your WWPP reviewer will let you know if your application has been forwarded to other groups for their review. If the Compliance box is checked, this application has been identified to contain after-the-fact work or is subject to a pending or ongoing compliance or enforcement action and has been forwarded to the Water and Science Administration, Compliance Program, for review and comment. Prior to issuance of the authorization, WWPP will consult with the Compliance Program. If a Tidal Wetlands License issued by the State Board of Public Works is required for your project, you will be advised by that agency regarding any additional required license fee.

Obtaining the authorizations checked above will satisfy the requirements of WWPP and the federal permit requirements from USACE. We suggest that you retain this letter for future reference.

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258
www.mde.maryland.gov

Joint Application Acknowledgement Letter
May 24, 2024
Page 3

When multiple permits are required for a particular project, WWPP may consolidate all permit reviews into one process. You should not proceed with any work on your project until you have received the required written authorizations. You are still obligated to obtain any other required authorizations including any other federal and state approvals as well as local grading and building permits.

For information on the status of your application, you may call the Regulatory Services Coordination Office at (410)537-3752 (Baltimore/Annapolis). Please reference your tracking number listed above for all written and telephone correspondence. You may also contact the individual review groups that are processing your application at the listed telephone numbers to obtain or provide specific information relating to this application.

Sincerely,

Regulatory Services
Coordination Staff

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258
www.mde.maryland.gov

Figure E - 8. Maryland Department of the Environment – Waterway Construction Division Response Letter

Maryland
Department of
the Environment

Wes Moore, Governor
Aruna Miller, Lt. Governor

Serena McIlwain, Secretary
Suzanne E. Dorsey, Deputy Secretary

TRACKING #: 202460756/24-NT-3087

PROJECT: Carroll Co. Bureau of Resource Mgmt./Piney Run Dam/Rehabilitation

SUBJECT: Initial Waterway/Floodplain Review Comments

DATE: July 8, 2024

Mr. Chris Heyn:

The Maryland Department of the Environment received your Joint Federal/State Application for the alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland on May 16, 2024. Your Application requested authorization for impacts associated with the rehabilitation of Piney Run Dam in Carroll County.

Upon review of the information submitted, we have determined that no authorization is required from the Department's Nontidal Wetlands Division and Waterway Construction Division. This determination is based upon the project not impacting any MDE-regulated nontidal wetland or nontidal wetland buffer. The nontidal waterway/floodplain impacts from the project will be approved through the MDE Dam Safety Division permit. Dam Safety will contact you separately with the status of their review.

A copy of the application has been forwarded to the U.S. Army Corps of Engineers. The federal authorization for the project will be sent directly to you once their review is complete.

Should you have any questions or comments regarding this matter, please contact me at (410)537-3900 or Debra.Correia@maryland.gov.

Sincerely,

Debra Correia

Debra Correia
Senior Regulatory & Compliance Engineer
Waterway Construction Division

cc: WMA Compliance, Carroll County w/file
Jeff Blass, P.E., AECOM
ACOE, Northern Division
Dam Safety Division

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258
www.mde.maryland.gov

Figure E - 9. Maryland Department of the Environment – Dam Safety Permits Division Response Letter

Maryland
Department of
the Environment

Wes Moore, Governor
Aruna Miller, Lt. Governor

Serena McIlwain, Secretary
Suzanne E. Dorsey, Deputy Secretary

July 9, 2024

Mr. Christopher Heyn
Carroll County Bureau of Resource Mgmt.
225 North Center Street
Westminster, MD 21157

File No.: **24-MR-0072**
Agency Interest (AI): **89810**
Tracking Number: **202460756**
Project Description: **Piney Run Dam Repair**
Assigned Staff: **William Ashby, P.E.R.**

The Department of the Environment, Water and Science Administration, Dam Safety program (the Department) has received your application for a permit to repair Piney Run Dam. The application has been assigned a file number and staff member as noted above. Should you have questions, please refer to the File Number when responding.

A cursory review of the materials submitted in support of the application indicates that some material is incomplete or missing. It is our understanding that this initial submittal consists of the 30% (Concept) package. We anticipate that you will provide the following items as part of subsequent submittals as the project moves into the 60% (Design and Development) stage:

- Detailed construction plans
- Project specifications
- Basis of Design Report
  - Summary of proposed work and project goals
  - Summary of design standards applicable to project
  - Hazard Classification Statement
  - Dam Inspection Report (for existing dams)
  - Hydrology & Hydraulics Report
  - Dam Breach Analysis and Hazard Classification Report
  - Geotechnical Engineering Report
  - Structural Engineering Report
  - Mechanical and Electrical Engineering Report
- Supporting calculations and software input/output records.

Note that every dam and project is unique, therefore any questions pertaining to the specific content of the above-mentioned submittals should be discussed with the staff member assigned to the application. As we perform a more detailed review of the concept submittal, we will contact you about any items that need additional clarification. At this point in the review process, we are in general agreement with the concept as submitted.

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258
www.mde.maryland.gov

Pursuant to § 5-506, Environment Article, Annotated Code of Maryland, you are required to serve notice of the application to owners of property contiguous to the parcels on which the dam and reservoir are located as well as downstream property owners affected by the proposed construction. Please submit a copy of the tax map identifying the property owners notified. In addition, you must notify the mayor or chief executive official of each affected City or County. The notice must be served personally or by certified mail and shall include the location and a description of the project. Attached is a sample letter for your use and a "Certification of Notification" form which must be submitted before your application will be processed. The Department will compile a list of interested persons including those on the "Certification of Notification".

After the application is considered complete in accordance with Code of Maryland Regulations ("COMAR") 26.01.07, the Department shall prepare a notice of completed application that will include your name and address, a description of your project and instructions on how persons may submit comments on your project and how they may request a public informational hearing. This notice will be mailed to the individuals on the interested persons list and will be published for one day in a newspaper of general circulation in your area. You will be billed by the Department for the cost of publication in the local newspaper. Please complete and submit the enclosed "Public Notice Billing Approval Form."

In accordance with COMAR 26.17.04.05, the plans must be prepared by a professional engineer, registered in the State of Maryland, and experienced in dam design and construction. The applicant is also required to hire a professional engineer, referred to as the Engineer-In-Charge, to supervise the construction in order to assure that the dam is built according to the approved plans and the design assumptions. It is strongly recommended that the design engineer or a qualified member of the design team be retained to supervise the construction. Please have your engineer complete and submit the enclosed affidavit attesting to their qualifications in design and/or construction supervision.

You or your engineer must also prepare a maintenance plan describing the steps to be followed for the continued maintenance of the dam and reservoir during the expected life of the structure. This plan shall describe what work is to be called for at periodic intervals or when necessary to keep the structure in good condition. Among other items it shall address mowing or cutting of brushy growth on the embankment, preventing erosion or gullying of embankment surfaces, clearing of toe drains, removing accumulated trash and debris, protecting against rust and spalling, and exercising valves or other mechanical equipment. The description of this program shall be submitted to the Department for approval and will be included as a condition of the construction permit.

For dams classified as High Hazard, you or your engineer must also submit an Emergency Action Plan ("EAP"), for evacuation of downstream residents and road closures downstream of the dam which would be inundated should the dam fail. Yearly updates to this EAP must be submitted to the Department by May 1st of each year.

Attached you will find a "Memorandum of Land Restrictions" that will alert potential subsequent owners of the dam and the future legal and maintenance responsibilities associated with the dam. Please complete the first page, sign the memorandum and submit a check, payable to the Clerk of the Court for Carroll County to cover the land recordation fees. Please contact the Clerk of the Court for the fee amount. The Department will record the document. The completed document and the recording fee must be received prior to issuance of a permit.

A decision will be made on your application after the Department has received all the necessary supporting information and after the public informational hearing, if requested, has been held. An electronic set (PDF format) of the construction plans, specifications, and design reports must be submitted for approval prior to the issuance of the permit. You and your engineer each will receive a copy of the approved plans with a copy of the permit.

For your information, a permit-processing outline is enclosed. If you have any questions or require any additional information, please contact me at email william.ashby@maryland.gov, or call (410) 537-3554, or call Mr. John Roche, P.E. at (410) 537-3552.

Sincerely,

William S. Ashby, P.E.R.
Sr. Water Resources Engineer
Dam Safety Permits Division

Enclosures

cc: Engineer (Jeff Blass, P.E., AECOM) w/enclosures
John Roche, P.E., Chief, Dam Safety Permits Division

Figure E - 10. Maryland Department of Planning, Historic Trust (SHPO) Consultation and Concurrence Summary Letter and Supporting Correspondence

From: Maryland Historical Trust <donotreply@maryland.gov>
Sent: Thursday, November 14, 2024 2:48 PM
To: Mundt, Jessica - FPAC-NRCS, MD
Subject: MHT e106 project review – MHT Completed Comments

Date:	November 14, 2024
To:	Jessica Mundt
	Maryland NRCS, USDA
Project Name:	Piney Run Dam Watershed Study- 30 Martz Rd, Sykesville, MD 21784
County:	Carroll County
Agency:	Natural Resources Conservation Service
Second Agency:	-- Not noted --
MHT Log #:	202404559

MHT Response: Thank you for providing the Maryland Historical Trust the opportunity to comment on the above-referenced undertaking using the MHT e106 system. The Maryland Historical Trust has reviewed the submitted project for its effects on historic and archeological resources, pursuant to Section 106 of the National Historic Preservation Act of 1966 and/or the Maryland Historical Trust Act of 1985. We offer the following comments and/or concurrence with the agency's findings:

The undertaking will have no effect on historic properties. Additional consultation with our office may be required if there are any significant changes in project scope or location.

Please note that MHT has also concurred with the delineation of the APE for this undertaking.

Thank you for your cooperation in this review process. Since the MHT response is now complete, this response will appear in the Completed section of your project dashboard. No hard copy of this response or attachments will be sent. If you have questions, please contact the following MHT project reviewers:

Dixie Henry

Maryland Historical Trust
Project Review and Compliance
100 Community Place
Crownsville, MD 21032
mht.section106@maryland.gov

MHT.Maryland.gov
Planning.Maryland.gov

USDA
United States Department of Agriculture

Dixie L. Henry, Ph.D.
Preservation Officer, Project Review and Compliance
Maryland Historical Trust
Maryland Department of Planning
100 Community Place
Crownsville, MD 21032

October 11, 2024

Re: Piney Run Dam Watershed Study

Dear Ms. Henry,

The purpose of this letter is to summarize the findings and results of Phase I and Phase II archaeological investigations as well as consultation with the Maryland Historical Trust (MHT) associated with the Piney Run Dam Watershed Study. This letter will also provide a finding of effect on historic properties for the overall project.

The United States Department of Agriculture-Natural Resources Conservation Service (NRCS) is providing assistance to the Commissioners of Carroll County for the Piney Run Dam Watershed Study in Carroll County, Maryland. Although Piney Run Dam met all requirements when it was constructed in 1974, the Maryland Department of the Environment (MDE) stated that there are concerns the dam may not meet current safety criteria. The watershed study will allow the County to evaluate the dam and determine options for addressing any identified deficiencies. NRCS determined that the project is an undertaking, as defined in 36 CFR 800.16(y), that has the potential to affect historic properties. NRCS was in consultation with MHT under Section 106 of the National Historic Preservation Act (NHPA) regarding this study by May 2021 and possibly earlier. NRCS is continuing consultation with your agency, MHT.

The County contracted AECOM to conduct a Phase I archaeological survey of the Piney Run Dam Study project area and a Phase II archaeological evaluation of Site 18CR293, to assist the County in meeting its regulatory obligations under Section 106 of the NHPA. AECOM produced the following reports documenting this work:

- Phase I Archaeological Investigation for the Piney Run Watershed Study, Piney Run Dam Carroll County, Maryland, produced by AECOM for the Carroll County Bureau of Resource Management, April 2020.
- Phase II Archaeological Evaluation of Site 18CR293, Piney Run Watershed Carroll County, Maryland, produced by AECOM for the Carroll County Bureau of Resource Management, February 2024.

The Area of Potential Effects (APE) identified by NRCS for the Phase I survey encompassed 50.58 acres generally east, west, and south of Piney Run Dam (Figures 1 and 2). The Phase I archaeological survey was conducted in December 2019 and consisted of visual surface inspection for above-ground evidence of archaeological sites and the excavation of 217 shovel test pits. This survey resulted in the identification of four historic archaeological sites (18CR292, 18CR293, 18CR294, and 18CR295). One site, 18CR293 was recommended for Phase II evaluation. In addition, the Piney Run Dam is 50 years old as of 2024 and therefore was considered as a potential historic property.

Natural Resources Conservation Service
5601 Sunnyside Avenue
Beltsville, MD 20705
Voice (410) 757-0861 – FAX (855) 432-9027
An Equal Opportunity Provider, Employer and Lender

The following sections provide greater detail regarding investigations and findings for the archaeological sites and Piney Run Dam:

18CR292 and 18CR294

Site 18CR292 is located in the uplands west of the dam and represents an isolated refuse disposal pit dating to the early 20th century. The site lacks a clear affiliation with any individual historic occupation, and while it can provide generic insights into some local consumer practices, it lacks the associative values and data potential to yield significant information. Therefore, NRCS recommended Site 18CR292 not eligible for listing in the National Register of Historic Places (NRHP). No further work was recommended.

Site 18CR294 is located at the eastern edge of the APE and consists of a large stone spring box that may date to the 19th century. No artifacts were recovered from 18CR294, which lacks a clear affiliation with any known, nearby historic occupation. Given the absence of potentially meaningful historical and archaeological contexts, 18CR294 likely possesses very limited data potential. For these reasons, NRCS recommended Site 18CR294 not eligible for listing in the NRHP. No further work was recommended.

In a letter dated September 14, 2023, NRCS requested MHT's comments and concurrence on eligibility determinations for Sites 18CR292 and 18CR294. In an email to NRCS dated January 24, 2024, MHT staff concurred that both sites are ineligible for listing in the NRHP and that no further archeological investigations were warranted.

18CR293

Site 18CR293, located immediately southeast of the dam's emergency spillway, represents a small 19th century farmstead. Phase I investigations identified various features including a possible capped well, two barn/outbuilding foundations, a spring box, and a dwelling foundation, arranged in two discrete activity loci representing agricultural and domestic site uses. Artifacts were recovered from intact contexts and exhibited spatial patterns that reflect the separate agricultural and domestic site uses. Site 18CR293 exhibits intact archaeological features, deposits, and discrete activity areas representative of a site type that has not been addressed in the local archaeological record. Given these considerations, Site 18CR293 was recommended potentially eligible for listing in the NRHP and that the site be avoided during future ground disturbing activities.

The site could not be avoided, and Phase II evaluations were conducted in October 2023. The Phase II evaluation of 18CR293 consisted of the excavation of 22 shovel test pits and nine test units and resulted in the recovery of over 7,000 historic artifacts. Based on the Phase II data, Site 18CR293 represents a small 19th to early 20th century farmstead. Features included two outbuilding foundations, an access road, a spring box, and remnants of a dwelling foundation. Artifacts date from the late 18th through 20th century, with most recovered in the vicinity of the house. A review of archival records suggested the house was occupied by farm hands and/or tenant farmers.

Site 18CR293 is not associated with an event important to history (criterion a), is not associated with a significant individual (criterion b) and does not embody a distinctive or exceptional example or work of a master (criterion c). While artifacts and features documented at 18CR293 provide information about the historic farmstead, artifacts were not well stratified. Soil layers were thin and included a mix of artifacts from the long occupation period, and most artifacts were recovered from the upper stratum associated with the demise of the building. The dwelling foundation had deteriorated, with no intact foundation or subsurface features remaining. While the stone and concrete outbuilding foundations remain intact, artifact deposits in this area were minimal, with limited research value. The site does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site (criterion d) and does not retain a high level of integrity. For these reasons, NRCS determined Site 18CR293 not eligible for the NRHP.

In a letter dated March 6, 2024, NRCS requested MHT's comments and concurrence on the eligibility determination for Site 18CR293. MHT signed the letter on March 26, 2024, and concurred with NRCS's determination that 18CR293 is not eligible for the NRHP.

18CR295

Site 18CR295 is an unidentified historic occupation represented by a single positive STP at the western extent of the APE and a nearby stone foundation to the west and outside of the APE. Four historic artifacts were collected from the A/Ap horizon within the STP, including one piece of machine-made bottle glass (1893+) and three wire nails (1890+). Low density archaeological deposits within the APE represent the site periphery, while the core of the site is likely located beyond the APE near the foundation. Because the site core could not be more closely investigated, NRCS found that the site's overall nature, age, extent, cultural affiliation, integrity, and potential NRHP eligibility could not be assessed. NRCS has determined the Limit of Disturbance (LOD) for the Piney Run Dam Watershed Study which indicates that site 18CR295 will be avoided by all ground-disturbing activity (Figures 3 and 4).

In an email to NRCS, dated July 23, 2021, MHT provided their opinion that the proposed undertaking has low potential for impacting significant deposits associated with Site 18CR295 and that no further investigations were needed at this site for this undertaking.

Piney Run Dam

Piney Run Dam was constructed in 1974 and consists of an earthen embankment that represents a common type of dam built in the 1970s. Piney Run Dam is not associated with an event important to history (criterion a), is not associated with a significant individual (criterion b) and does not embody a distinctive or exceptional example or work of a master (criterion c). As a common earthen embankment dam, Piney Run Dam does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site (criterion d). For these reasons, NRCS determined Piney Run Dam not eligible for the NRHP.

In an email exchange dated December 5, 2023, NRCS inquired if MHT would recommend completing a determination of eligibility (DOE) for Piney Run Dam as the dam structure is 50 years old as of 2024. MHT responded that a DOE was not recommended. In addition, MHT stated that in their opinion Piney Run Dam would not be eligible for listing on the NRHP.

In summary, as the result of work associated with the Piney Run Dam Watershed Study, NRCS has determined Sites 18CR292, 18CR293, 18CR294, and Piney Run Dam are not eligible for inclusion in the NRHP. Site 18CR295 is located at the western edge of the APE and extends further west outside of the APE. Because the site core could not be more closely investigated, NRCS could not make a determination on the site's eligibility for the NRHP. NRCS determined the LOD for the Study and it was found that site 18CR295 will be avoided by all ground-disturbing activity.

NRCS requests SHPO's concurrence with our definition of the APE and our determination of No Historic Properties Affected for the Piney Run Dam Watershed Project.

If you have any questions or comments, please feel free to contact me. Thank you for your consideration.

Sincerely,

JESSICA MUNDT Digitally signed by JESSICA MUNDT Date: 2024.10.11 10:09:55 -04'00'

Jessica Mundt
Cultural Resources Specialist
USDA-NRCS Maryland State Office
5601 Sunnyside Ave, Mail Stop 5598
Beltsville, Md 20705
Jessica.mundt@usda.gov

Figure 1. Topographic map showing the APE for the Phase I Archaeological Investigation for the Piney Run Dam Watershed Study.

Figure 2. Aerial photograph showing the APE for the Phase I Archaeological Investigation for the Piney Run Dam Watershed Study.

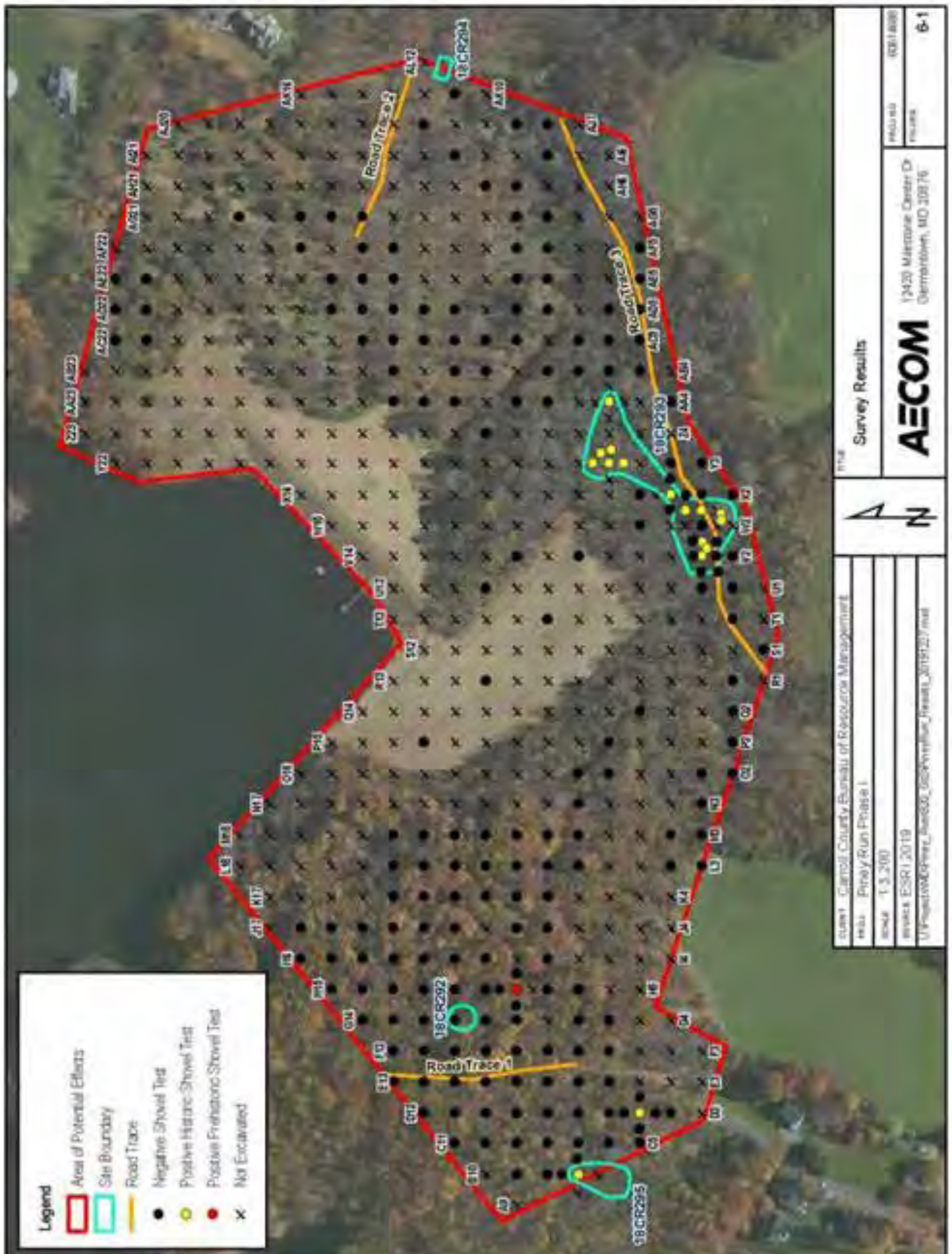

Figure 3. Aerial photograph showing location of shovel test pit excavations for the Phase I Archaeological Investigation for the Piney Run Watershed Study including the APE and site locations.

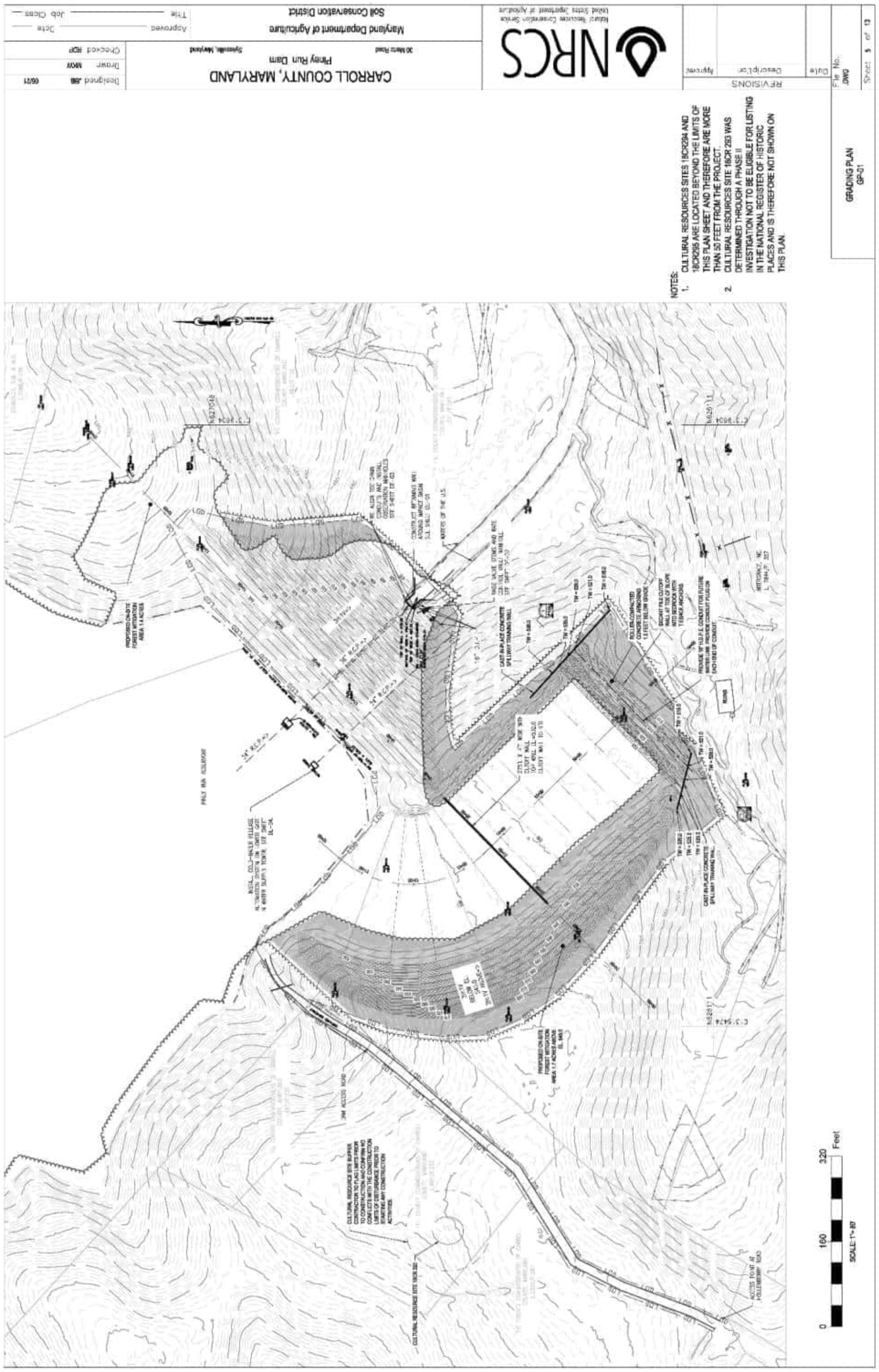

Figure 4. Piney Run Watershed Study plan showing the planned grading and Limit of Distrubance (LOD).

Blass, Jeff

From:	Dixie Henry -MDP- <[redacted]>
Sent:	Wednesday, October 19, 2022 2:43 PM
To:	Blass, Jeff
Cc:	Warf, Jen; Strano, Steve - NRCS, Annapolis, MD; Jones, J'Que - NRCS, Annapolis, MD; Baker, Michael - FPAC-NRCS, Annapolis, MD; Heyn, Chris; Seibel, Scott
Subject:	Re: Piney Run MHT Review Results

Jeff -- Thank you for providing the Maryland Historical Trust (MHT) with detailed site plans for the Piney Run Dam Rehabilitation project in Carroll County.
Following our review of the Phase I archaeological survey report and the site plans, we concur that site 18CR293 will be sufficiently avoided during construction
and preserved in place. We would recommend that protective fencing be installed prior to any site preparation activities, and that the fenced-off area also be delineated
on all site plans (including all civil sheets that will be provided to contractors and subcontractors) to ensure that the area containing site 18CR293 is correctly identified as
an area that is not to be disturbed or used in ANY way during the construction.

Following our review of these materials, it is our recommendation that the proposed dam rehabilitation work will have no effect on historic properties.

Please let us know if you have any questions or need further information -

- Dixie Henry

Dixie L. Henry, Ph.D.

Preservation Officer, Project Review and Compliance

Maryland Historical Trust

Maryland Department of Planning

100 Community Place

1

[redacted]

From:	Miller, Meredith - FPAC-NRCS, MD [redacted]
Sent:	Wednesday, March 27, 2024 8:00 AM
To:	[redacted]
Cc:	
Subject:	FW: MHT e106 project review – MHT Completed Comments
Attachments:	202401353.pdf

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Report Suspicious

[redacted]

From: Maryland Historical Trust <donotreply@maryland.gov>
Sent: Tuesday, March 26, 2024 4:16 PM
To: [redacted]
Subject: MHT e106 project review – MHT Completed Comments

Date:	March 26, 2024
To:	Meredith Miller USDA NRCS
Project Name:	Piney Run Watershed - Phase II Evaluation of Site 18CR293 Draft Report
County:	Carroll County
Agency:	Natural Resources Conservation Service
Second Agency:	-- Not noted --
MHT Log #:	202401353

MHT Response: Thank you for providing the Maryland Historical Trust the opportunity to comment on the above-referenced undertaking using the MHT e106 system. The Maryland Historical Trust has reviewed the submitted project for its effects on historic and archeological resources, pursuant to Section 106 of the National Historic Preservation Act of 1966 and/or the Maryland Historical Trust Act of 1985. We offer the following comments and/or concurrence with the agency's findings:

No historic properties will be affected by the proposed undertaking. Additional consultation with our office may be required if there are any significant changes in project scope or location.

*****Notice: Refer to the attached document for MHT's response to your project submittal. Please click the link below. No hard copy of this comment email or attachments will be sent.*****

202401353.pdf

Thank you for your cooperation in this review process. Since the MHT response is now complete, this response will appear in the Completed section of your project dashboard. No hard copy of this response or attachments will be sent. If you have questions, please contact the following MHT project reviewers:

Dixie Henry [redacted]

Maryland Historical Trust
Project Review and Compliance
100 Community Place
Crownsville, MD 21032
mht.section106@maryland.gov

MHT.Maryland.gov
Planning.Maryland.gov

2024D1853

Dixie L. Henry, Ph.D.
Preservation Officer, Project Review and Compliance
Maryland Historical Trust
Maryland Department of Planning
100 Community Place
Crownsville, MD 21032

March 6, 2024

Re: Phase II Evaluation at Site 18CR293

Ms. Henry,

Attached please find the report of the *Phase II Archaeological Evaluation of Site 18CR293, Piney Run Watershed Carroll County, Maryland*, produced by AECOM for the Carroll County Bureau of Resource Management.

The Phase II evaluation of 18CR293 consisted of the excavation of 22 shovel test pits and nine test units and resulted in the recovery of over 7,000 historic artifacts. Based on the Phase II data, Site 18CR293 represents a small 19th to early 20th century farmstead. Features included two outbuilding foundations, an access road, a spring box, and remnants of a dwelling foundation. Artifacts spanned the late 18th through 20th century, with most found in the vicinity of the house. A review of archival records suggests the house was occupied by farm hands and/or tenant farmers.

Site 18CR293 is not associated with an event important to history (criterion a), is not associated with a significant individual (criterion b), and does not embody a distinctive or exceptional example or work of a master (criterion c). While artifacts and features documented at 18CR293 provide information about the historic farmstead, artifacts were not well stratified. Soil layers were thin and included a mix of artifacts from the long occupation period, and most artifacts were recovered from the upper stratum associated with the demise of the building. The dwelling foundation had deteriorated, with no intact foundation or subsurface features remaining. While the stone and concrete outbuilding foundations remain intact, artifact deposits in this area were minimal, with limited research value. The site does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site (criterion d) and does not retain a high level of integrity. Site 18CR293 is recommended not eligible for the NRHP.

Thank you,

Meredith Miller
Environmental Engineer, USDA - Maryland NRCS

I concur with the above recommendation that 18CR293 is Not Eligible for the NRHP.

Dixie Henry 3/26/2024

Dixie L. Henry, Preservation Officer, Maryland Historical Trust

From: Becky Roman -MDP-
To: Sheehan, Nora - FPAC-NRCS, VA
Cc: Baker, Michael - FPAC-NRCS, MD; Dixie Henry -MDP-; Strong, Steve - FPAC-NRCS, MD; Jones, D'Que - FPAC-NRCS, TX
Subject: Re: DOE for Piney Run Dam, Dam Rehabilitation Project, Carroll County
Date: Tuesday, December 5, 2023 11:50:24 AM
Attachments: image001.png

Hello Nora,

Thank you for reaching out to MHT before submitting a completed DOE for Piney Run Dam. A DOE for the Piney Run Dam was never requested by MHT, and would not be based on its age. Based on information available on MDE's Fisheries website, the dam and reservoir were built by the COE in 1974 and in our opinion would not be eligible for listing on the National Register of Historic Places.

In addition, based on my review of our compliance log, the historic preservation consultation with MHT for the Piney Run Dam Rehabilitation Project is complete. A Phase I archaeology study was done by consultant AECOM and impacts to an identified site was avoided through project design. In was MHT's determination that the undertaking would have no effect on historic properties. Please see link to our final response with determination of effect on historic properties here: https://apps.mht.maryland.gov/compliancelog/pdfs/202204604.pdf

If the project scope of work or design has changed to include new areas of ground disturbance, please have NRCS submit the new project information to our office for review. Dixie Henry is the lead MRCS reviewer, and would see this submission and only bring me in as needed if above-ground resources may be present or effected.

If the team at NRCS have any further questions, please do not hesitate to contact us. For questions on historic structures and landscapes, I can be reached at [redacted]. For questions regarding the archeology review, please contact Dixie Henry at [redacted].

As to completing DOEs in Maryland - we have guidance on our website at: https://mht.maryland.gov/Pages/projectreview/project-review-DOE-Guide.aspx. FYI - we will be updating the web-based DOE guide in the next several months, so I am telling everyone to check back sometime in 2023.

Good to hear from you! Have a great rest of your week,
Becky

Becky Roman *(she, her, hers)*
Preservation Officer / Architectural Historian

Project Review and Compliance
Maryland Historical Trust
Maryland Department of Planning
[redacted]
Mht.maryland.gov Please take our customer service survey

On Tue, Dec 5, 2023 at 11:17 AM Sheehan, Nora - FPAC-NRCS, VA [redacted] wrote:

Hi Becky,

I am assisting the Maryland NRCS office with 106 review for a dam rehabilitation project on the Piney Run Dam in Carroll County. The dam will be 50 years old in 2024 so I was asked to complete a determination of eligibility. I have not done a DOE in Maryland before, so am not sure of the process. Any guidance you can give me would be appreciated!

Thanks,

Nora

Nora Sheehan

Cultural Resources Specialist

USDA-NRCS

1606 Santa Rosa Road Suite 209

Richmond VA 23229

[redacted]

USDA United States Department of Agriculture
Natural Resources Conservation Service

[redacted]

From: Jones, J'Que - NRCS, Annapolis, MD [redacted]
Sent: Monday, July 26, 2021 1:27 PM
To: Heyn, Chris; Blass, Jeff
Cc: Warf, Jennifer; Strano, Steve - NRCS, Annapolis, MD; Baker, Michael - FPAC-NRCS, Annapolis, MD; Jones, J'Que - NRCS, Annapolis, MD
Subject: [EXTERNAL] Piney Run MHT Review Results

Chris and Jeff,

See below the results of the MHT review.

Thanks;

J'Que C. Jones, PE
Maryland State Conservation Engineer
USDA-Natural Resources Conservation Service
John Hanson Business Center
339 Busch's Frontage Road, Suite 301
Annapolis, MD 21409-5543
[redacted]

[redacted]

From: Dixie Henry -MDP- <[redacted]
Sent: Friday, July 23, 2021 2:53 PM
To: Baker, Michael - FPAC-NRCS, Annapolis, MD <[redacted]
Subject: Fwd: Piney Run and

Hi Michael! I have completed my review of the Phase I archeological survey report that was prepared for the Piney Run Dam Rehabilitation project in
Carroll County. I will be concurring that sites 18CR292 and 18CR294 are both ineligible for listing in the National Register of Historic Places. No further
investigations are warranted at these two sites. Similarly, site 18CR295 (stone foundation) is located outside of the APE, and it is our opinion that the
proposed undertaking has a low potential for impacting significant deposits associated with this site. No further investigations are warranted at this site for
this particular undertaking.

Site 18CR293, however, contains the remains of a small 19th c. farmstead and is located just southeast of the dam's emergency spillway. We concur with the
Principal Investigator's recommendation that this site be avoided during construction and preserved in place. If the site cannot be avoided, Phase II evaluative
investigations will be needed prior to construction or site preparation work involving ground-disturbing activities.

1

Given these findings, MHT will need to be provided with site plans clearly illustrating that site 18CR293 will be avoided during construction. (Site 18CR293 is denoted as site Piney Run 2 on the site map found on page 6-2 of the Phase I report). Once we have site plans indicating that the site will be preserved in place, we will be able to provide a "no adverse effect" recommendation for the overall project.

Let me know if you have any questions or need further information –

- Dixie

Dixie L. Henry, Ph.D.

Preservation Officer, Project Review and Compliance

Maryland Historical Trust

Maryland Department of Planning

100 Community Place

Crownsville, MD 21032

[redacted]

mht.maryland.gov

Please take our customer service survey.

To check on the status of a project submittal, please use our online search: https://mht.maryland.gov/compliancelog/ComplianceLogSearch.aspx.

---------- Forwarded message ---------
From: **Beth Cole - MHT** [redacted]
Date: Wed, Jul 21, 2021 at 10:42 AM
Subject: Re: Piney Run and
To: Baker, Michael - FPAC-NRCS, Annapolis, MD [redacted] Dixie Henry -MDP- [redacted]

Thanks Michael - I am including Dixie Henry in this response as she is the primary review and will follow up with you regarding Piney Run and general coordination procedures. Thanks for bringing this to our attention.

3

Beth

To check on the status of a submittal, please use our online search: https://mht.maryland.gov/compliancelog/ComplianceLogSearch.aspx.

Beth Cole
Administrator, Project Review and Compliance
Maryland Historical Trust
Maryland Department of Planning
100 Community Place
Crownsville, MD 21032

[redacted]
MHT.Maryland.gov
Please take our customer service survey

On Wed, Jul 21, 2021 at 9:21 AM Baker, Michael - FPAC-NRCS, Annapolis, MD <[redacted] wrote:

Hi Beth,

Wanted to know if there has been an update to Piney Run submission. I know that you guys are under staffed and a lot but just wanted to check to make sure it was received. Also wanted to bring to your attention that field staff have been receiving their reviews back from MHT and would appreciate if I could also be added to those emails so I can update our tracker.

Michael Baker

State Planning Specialist

USDA-NRCS

339 Busch's Frontage Rd, Suite 301

Annapolis, MD 21409

[redacted]

Figure E - 11. Native American Tribe Coordination

USDA
United States Department of Agriculture

Memorandum

Subject: Tribal Consultation Contacts - Piney Run Watershed Rehab Plan-EA

Date: 11/29/2022

To: Commissioners of Carroll County

From: J'Que C. Jones, PE, State Conservation Engineer

As part of the development of the Watershed Plan – Environmental Assessment for the Piney Run Watershed Rehabilitation project under Agreement # NR193B19XXXXC005, Maryland NRCS has made several attempts to contact and solicit Tribal cooperation and participation in the development of the plan. Michael Baker, State Planning Specialist was the primary point of contact for these efforts.

Three letters of certified mail were delivered to each tribe. Each tribe received each letter twice as a copy was sent to their Tribal Historic Preservation Office and the other to their Chief/President. The first letter was sent out on August 12, 2021, asking for the Tribe's interest in starting a consultation process with our Agency in Maryland. The second letter sent out on October 18, 2021, was specific to the Piney Run Rehabilitation project in which it described the rehabilitation alternatives being considered and requested that questions or comments pertaining to the project be provided. A final set of certified letters specific to the Piney Run project were mailed to the Tribes on October 13, 2022, and October 20, 2022. As of today, there have been no responses to the letters sent out. Copies of the letters sent out are attached.

Each tribe was contacted on November 4, 2021, February 8, 2022, and July 14, 2022, by phone or email. A list of all the federally recognized tribes contacted is shown on the attached spreadsheet. The green coloring demarks that THPO that was contacted. Their respective responses are listed in the comment box found within the attached Tribal Contacts document.

As a result of unresponsiveness or negative responses to requests for participation, tribal consultation requirements have been satisfied, and the development and finalization of the plan can progress. This memo serves as documentation of the efforts made.

Natural Resources Conservation Service
339 Busch's Frontage Road, Suite 301
Annapolis, Maryland 21409-5543
Voice (443) 482-2912
An Equal Opportunity Provider and Employer

Should you have questions, please feel free to contact me at (443) 482-2912 or jque.jones@usda.gov or Michael Baker at michael.p.baker@usda.gov.

J'Que C. Jones, PE
NRCS, Annapolis, MD

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USDA United States Department of Agriculture
Natural Resources Conservation Service

(Stamp date when signed)
[Name of Tribal Leader]
[Title of Contact]
[Name of Tribal Organization]
[Address]
[City, State, ZIP]
Initiation of Tribal Consultation
for Identification of Ancestral Lands in [STATE]
Dear [NAME OF TRIBAL OFFICIAL (with appropriate honorific)]
Chairperson – Honorable

I hope this letter finds you well. My staff and I look forward to opening a dialog with your tribe regarding the interest of the (insert tribe or Nation's name) in developing a working relationship for government-to-government consultation on future projects and undertakings within the State of Maryland. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) is a federal agency that works with producers and landowners to help them conserve, maintain, and improve the condition of natural resources on their land. The NRCS emphasizes voluntary science-based conservation, and provides both technical and financial assistance for solving natural resource problems to individual landowners and producers. Technical assistance may be in the form of conservation planning or an engineering design. Financial assistance is provided to landowners and producers through Farm Bill programs such as the Environmental Quality Incentives Program (EQIP) or the Conservation Stewardship Program (CSP). Additionally, the NRCS may assist communities with watershed planning and provide financial assistance to implement watershed plans and dam rehabilitation projects.

As a Federal agency, NRCS complies with the National Historic Preservation Act of 1966 (as amended), and implementing regulations, and takes historic properties (i.e., buildings, structures, archeological sites, objects, traditional cultural properties and districts eligible or listed in the National Register of Historic Places) into account for all undertakings that have the potential to affect such properties. Section 800.4(b)(1) of these regulations' states that Federal agency officials must make a "reasonable and good faith effort" to identify historic properties within each project's area of potential effect (APE) that may be affected by their undertakings. This reasonable and good faith effort may include background research, consultation, interviews, sample field investigations, and field survey.

The NRCS is interested in strengthening its tribal relationship by conducting government-to-government consultations with tribal nations. Our goal is to begin an ongoing program of tribal consultation between [TRIBAL ORGANIZATION] and the NRCS Maryland pertinent to Section 106 process, and Executive Order 13175 NRCS welcomes any refinements to the consultation process you may suggest. In addition, my staff will be reaching out to schedule a call or meeting soon. If [NAME OF TRIBAL ORGANIZATION] is interested in arranging a

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consultation meeting for your Nation, have any questions, or need additional information, please contact me by telephone (xxx) xxx-xxxx or email xxxx@xxx.gov. I look forward to hearing from you.

Sincerely,
[NAME]
State Conservationist
CC:
THPO
NRCS CRS

TERRON HILLSMAN
State Conservationist

USDA United States Department of Agriculture
Natural Resources Conservation Service

(Stamp date when signed)
[Name of Tribal Leader]
[Title of Contact]
[Name of Tribal Organization]
[Address]
[City, State, ZIP]

Dear [NAME OF TRIBAL OFFICIAL (with appropriate honorific)]
Chairperson – Honorable

NRCS Maryland seeks [Tribe]'s input on knowledge or awareness of cultural resources as they relate to Piney Run Dam Rehabilitation project. The project location is in Sykesville, Maryland with the area of potential effect (APE) located on the maps within the packet. The project is in the planning phase for rehabilitating the dam that creates Piney Run Lake. The plan is to analyze and describe environmentally friendly alternatives to ensure that the dam remains safe and continues to avoid damaging life and property in the surrounding areas. Federal funding was provided to Carroll County through the NRCS Watershed Rehabilitation Program (OL-566) for the planning phase of the project. Upon completion of the planning phase, the project sponsors could apply for funding from NRCS for the implementation phase.

The planning phase included development and analysis of alternatives and an environmental review. Six alternatives were initially considered, but only the no action and three of the original alternatives were evaluated because the others were deemed unreasonable. The alternatives considered were:

- **Alternative 0** – No action
- **Alternative 1** – Dam modification without water supply infrastructure – This alternative brings the dam up to current specifications and requires the clearing of 6.5 acres of forest near the existing dam.
- **Alternative 2** – Dam modification and water supply infrastructure with a normal pool raise of 2.3 feet – This alternative brings the dam up to current specifications and increases the pool elevation to account for a sediment pool deficiency. This alternative requires clearing of 11.9 acres of forest and impacts 6.5 acres of wetlands and 850 linear feet of stream.
- **Alternative 3** – Dam modification and water supply infrastructure with no raise in pool elevation – This alternative is similar to alternative 2, but without raising the normal pool elevation. This alternative requires clearing of 7.9 acres of forest.

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As part of the review process, the project sponsor contracted with AECOM to prepare a phase 1 archaeological investigation. The phase 1 investigation identified four historic archaeological sites within the APE, one of which they recommended as potentially eligible for listing in the NHRP, one of which they could not make a recommendation, and two of which they recommended were not eligible for listing. In addition to the archaeological investigation NRCS Maryland encourages [Tribe] to share concerns or considerations the [Tribe] may have regarding cultural resources within the APE to conclude the planning phase of this project.

Please contact me at XXX-XXX-XXXX or ramon.ortiz@usda.gov with any question or additional information is required.

Sincerely,
Ramon Ortiz
Acting State Conservationist

Attachments:
Phase 1 Archaeological Investigation

USDA
United States Department of Agriculture

October 8, 2024

[redacted]

Re: Tribal Consultation for Piney Run Dam Watershed Study

Dear [redacted]

The purpose of this letter is to summarize the findings and results of Phase I and Phase II archaeological investigations as well as consultation with the [redacted] associated with the Piney Run Dam Watershed Study. This letter will also provide a finding of effect on historic properties for the overall project.

The United States Department of Agriculture-Natural Resources Conservation Service (NRCS) is providing assistance to the Commissioners of Carroll County for the Piney Run Dam Watershed Study in Carroll County, Maryland. Although Piney Run Dam met all requirements when it was constructed in 1974, the Maryland Department of the Environment (MDE) stated that there are concerns the dam may not meet current safety criteria. The watershed study will allow the County to evaluate the dam and determine options for addressing any identified deficiencies. NRCS determined that the project is an undertaking, as defined in 36 CFR 800.16(y), that has the potential to affect historic properties. NRCS initiated consultation with the [redacted] regarding this study via a letter sent by certified mail on October 18, 2021, which described the project and the rehabilitation alternatives being considered and requested any questions or comments pertaining to the project. The [redacted] was also contacted on November 4, 2021, by phone or email.

Carroll County contracted AECOM to conduct a Phase I archaeological survey of the Piney Run Dam Study project area and a Phase II archaeological evaluation of Site 18CR293, to assist the County in meeting its regulatory obligations under Section 106 of the NHPA. AECOM produced the following reports documenting this work:

- Phase I Archaeological Investigation for the Piney Run Watershed Study, Piney Run Dam Carroll County, Maryland, produced by AECOM for the Carroll County Bureau of Resource Management, April 2020.
- Phase II Archaeological Evaluation of Site 18CR293, Piney Run Watershed Carroll County, Maryland, produced by AECOM for the Carroll County Bureau of Resource Management, February 2024.

The Area of Potential Effects (APE) identified by NRCS for the Phase I survey encompassed 50.58 acres generally east, west, and south of Piney Run Dam (Figures 1 and 2). The Phase I archaeological survey was conducted in December 2019 and consisted of visual surface inspection for above-ground evidence of archaeological sites and the excavation of 217 shovel test pits. This survey resulted in the identification of four historic archaeological sites (18CR292, 18CR293, 18CR294, and

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Beltsville, MD 20705
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18CR295). One site, 18CR293 was recommended for Phase II evaluation. In addition, the Piney Run Dam is 50 years old as of 2024 and therefore was considered as a potential historic property.

The following sections provide greater detail regarding investigations and findings for the archaeological sites and Piney Run Dam:

<u>18CR292 and 18CR294</u>

Site 18CR292 is located in the uplands west of the dam and represents an isolated refuse disposal pit dating to the early 20th century. The site lacks a clear affiliation with any individual historic occupation, and while it can provide generic insights into some local consumer practices, it lacks the associative values and data potential to yield significant information. Therefore, NRCS recommended Site 18CR292 not eligible for listing in the National Register of Historic Places (NRHP). No further work was recommended.

Site 18CR294 is located at the eastern edge of the APE and consists of a large stone spring box that may date to the 19th century. No artifacts were recovered from 18CR294, which lacks a clear affiliation with any known, nearby historic occupation. Given the absence of potentially meaningful historical and archaeological contexts, 18CR294 likely possesses very limited data potential. For these reasons, NRCS recommended Site 18CR294 not eligible for listing in the NRHP. No further work was recommended.

In a letter dated September 14, 2023, NRCS requested MHT's comments and concurrence on eligibility determinations for Sites 18CR292 and 18CR294. In an email to NRCS dated January 24, 2024, MHT staff concurred that both sites are ineligible for listing in the NRHP and that no further archeological investigations were warranted.

<u>18CR293</u>

Site 18CR293, located immediately southeast of the dam's emergency spillway, represents a small 19th century farmstead. Phase I investigations identified various features including a possible capped well, two barn/outbuilding foundations, a spring box, and a dwelling foundation, arranged in two discrete activity loci representing agricultural and domestic site uses. Artifacts were recovered from intact contexts and exhibited spatial patterns that reflect the separate agricultural and domestic site uses. Site 18CR293 exhibits intact archaeological features, deposits, and discrete activity areas representative of a site type that has not been addressed in the local archaeological record. Given these considerations, Site 18CR293 was recommended potentially eligible for listing in the NRHP and that the site be avoided during future ground disturbing activities.

The site could not be avoided, and Phase II evaluations were conducted in October 2023. The Phase II evaluation of 18CR293 consisted of the excavation of 22 shovel test pits and nine test units and resulted in the recovery of over 7,000 historic artifacts. Based on the Phase II data, Site 18CR293 represents a small 19th to early 20th century farmstead. Features included two outbuilding foundations, an access road, a spring box, and remnants of a dwelling foundation. Artifacts date from the late 18th through 20th century, with most recovered in the vicinity of the house. A review of archival records suggested the house was occupied by farm hands and/or tenant farmers.

Site 18CR293 is not associated with an event important to history (criterion a), is not associated with a significant individual (criterion b) and does not embody a distinctive or exceptional example or work of a master (criterion c). While artifacts and features documented at 18CR293 provide information about the historic farmstead, artifacts were not well stratified. Soil layers were thin and included a mix of artifacts from the long occupation period, and most artifacts were recovered from the upper stratum associated with the demise of the building. The dwelling foundation had deteriorated, with no intact foundation or subsurface features remaining. While the stone and concrete outbuilding foundations remain intact, artifact deposits in this area were minimal, with limited research value. The site does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site (criterion d) and does not retain a high level of integrity. For these reasons, NRCS determined Site 18CR293 not eligible for the NRHP.

In a letter dated March 6, 2024, NRCS requested MHT's comments and concurrence on the eligibility determination for Site 18CR293. MHT signed the letter on March 26, 2024, and concurred with NRCS's determination that 18CR293 is not eligible for the NRHP.

18CR295

Site 18CR295 is an unidentified historic occupation represented by a single positive STP at the western extent of the APE and a nearby stone foundation to the west and outside of the APE. Four historic artifacts were collected from the A/Ap horizon within the STP, including one piece of machine-made bottle glass (1893+) and three wire nails (1890+). Low density archaeological deposits within the APE represent the site periphery, while the core of the site is likely located beyond the APE near the foundation. Because the site core could not be more closely investigated, NRCS found that the site's overall nature, age, extent, cultural affiliation, integrity, and potential NRHP eligibility could not be assessed. NRCS has determined the Limit of Disturbance (LOD) for the Piney Run Dam Watershed Study which indicates that site 18CR295 will be avoided by all ground-disturbing activity (Figures 3 and 4).

In an email to NRCS, dated July 23, 2021, MHT provided their opinion that the proposed undertaking has low potential for impacting significant deposits associated with Site 18CR295 and that no further investigations were needed at this site for this undertaking.

Piney Run Dam

Piney Run Dam was constructed in 1974 and consists of an earthen embankment that represents a common type of dam built in the 1970s. Piney Run Dam is not associated with an event important to history (criterion a), is not associated with a significant individual (criterion b) and does not embody a distinctive or exceptional example or work of a master (criterion c). As a common earthen embankment dam, Piney Run Dam does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site (criterion d). For these reasons, NRCS determined Piney Run Dam not eligible for the NRHP.

In an email exchange dated December 5, 2023, NRCS inquired if MHT would recommend completing a determination of eligibility (DOE) for Piney Run Dam as the dam structure is 50 years old as of 2024. MHT responded that a DOE was not recommended. In addition, MHT stated that in their opinion Piney Run Dam would not be eligible for listing on the NRHP.

In summary, as the result of work associated with the Piney Run Dam Watershed Study, NRCS has determined Sites 18CR292, 18CR293, 18CR294, and Piney Run Dam are not eligible for inclusion in the NRHP. Site 18CR295 is located at the western edge of the APE and extends further west outside of the APE. Because the site core could not be more closely investigated, NRCS could not make a determination on the site's eligibility for the NRHP. NRCS determined the Limit of Disturbance (LOD) for the Study and it was found that site 18CR295 will be avoided by all ground-disturbing activity. NRCS has made a determination of No Historic Properties Affected for the Piney Run Dam Watershed Project.

NRCS Maryland encourages the [redacted] to share any concerns or considerations they may have regarding archaeological investigations and cultural resources within the APE.

Please contact me at [redacted] or [redacted] with any questions or if additional information is required.

Sincerely,

SUZY DAUBERT Digitally signed by SUZY DAUBERT Date: 2024.10.10 08:38:40 -04'00'

Suzy Daubert
State Conservationist

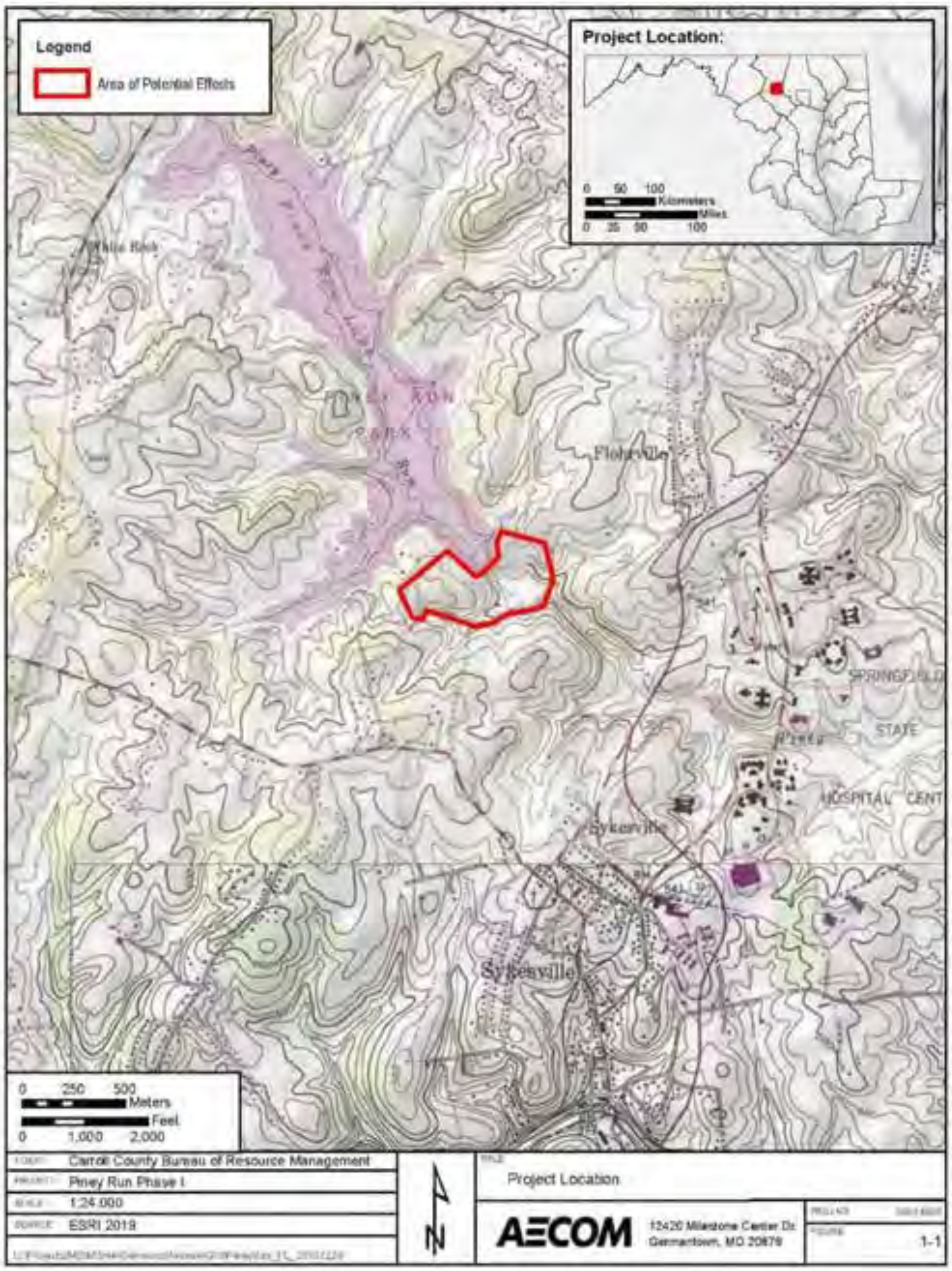

Figure 1. Topographic map showing the APE for the Phase I Archaeological Investigation for the Piney Run Dam Watershed Study.

Figure 2. Aerial photograph showing the APE for the Phase I Archaeological Investigation for the Piney Run Dam Watershed Study.

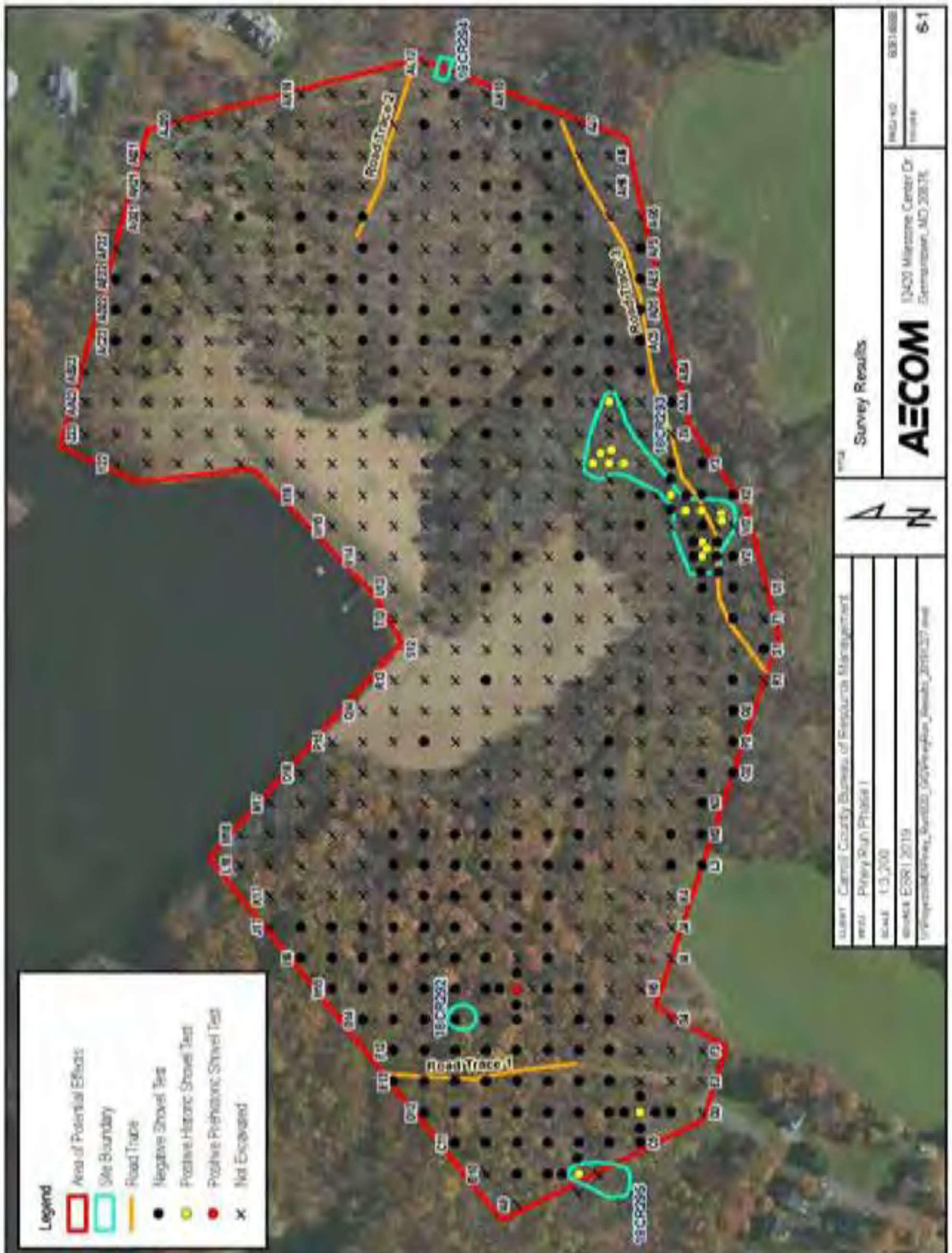

Figure 3. Aerial photograph showing location of shovel test pit excavations for the Phase I Archaeological Investigation for the Piney Run Watershed Study including the APE and site locations.

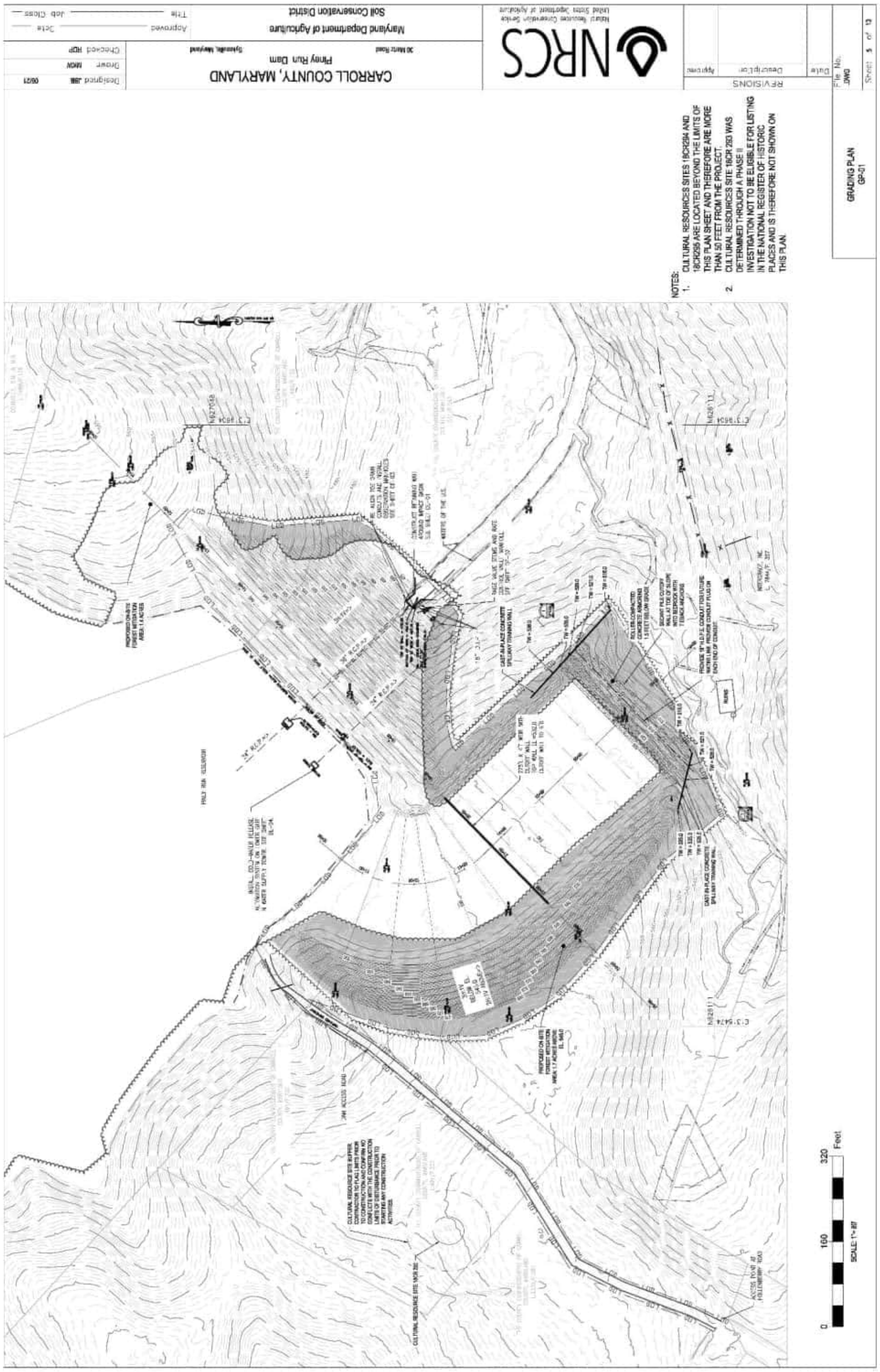

Figure 4. Piney Run Watershed Study plan showing the planned grading and Limit of Distrubance (LOD).

Affiliation	Name	Position	Salutation	Email	Address 1	Address 2	City, State, Zip	Date Called	Michael Baker Comments	Jess Mundt Comments	Phone	Website
Oneida Indian Nation	Raymond Halbritter	Nation Representative	Mr. Halbritter		5218 Patrick Road		Verona, NY 13478				315-829-8900	[illegible]
Oneida Indian Nation	Jesse Bergevin	Historic Resources Specialist	Mr. Bergevin	jbergevin@oneida-nation.org	2037 Dream Catcher Plaza		Oneida, NY 13421-0662	11/3/2021 & 2/8/2022 & 7/14/2022	Left Message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024. Mr. Bergevin responded by email on 11/6/2024 "The Oneida Indian Nation has no comments or concerns regarding the project and its studies."	315-829-8487	
Oneida Tribe of Indians of Wisconsin	Tehassi Hill	Tribal Chairman	Mr. Hill	[illegible]@oneidanation.org	P.O. Box 365		Oneida, WI 54155-0365				920-869-4432	[illegible]
Oneida Tribe of Indians of Wisconsin	Stacie Cutbank	THPO	Ms. Cutbank	[illegible]	P.O. Box 365		Oneida, WI 54155-0365	11/4/2021 & 2/8/2022 & 7/14/2022 7/15/2022	Left Message - Spoke with Stacie and sent her emails regarding Piney Run on 7/14/2022. Said she would either get back by the end of the week, or at the start of August 1 to let me know if they are interested in Piney Run or consultations. Email delivery failed. Called back and asked for updated email. Called back on 7/15 left message.	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024. Received a read receipt 11/6/2024.	920-490-3819	
Onondaga Nation	Sidney Hill	Chief	Chief Hill		Onondaga Nation	4040 Route 11	Nedrow, NY 13120				315-492-0302	[illegible]
Onondaga Nation	Joseph Heath	General Counsel	Mr. Heath		Onondaga Nation	4040 Route 11	Nedrow, NY 13120	11/4/2021 & 2/8/2022 & 7/14/2022	Left Message - 7/14/22 called got directly busy line	Closeout consultation letter sent by certified mail 10/10/2024. Called Mr. Heath 10/28/2024 and left a message. Called Mr. Heath 11/6/2024 and left a message requesting any comments from the Onondaga Nation and stating that we plan to move forward with the project next week.	315-475-3558	
Onondaga Nation	Anthony Gonyea	Faithkeeper (Beaver Clan)	Faithkeeper Gonyea	[illegible]@gmail.com	Onondaga Nation	4040 Route 11	Nedrow, NY 13120				315-952-3109	
Saint Regis Mohawk Tribe	Beverly Cook	Chief	Chief Cook		Saint Regis Mohawk Tribe Tribal Administration Bu	71 Margaret Terrance Memorial Way	Akwesasne, NY 13655				518-358-2272	[illegible]
Saint Regis Mohawk Tribe	Michael Conners	Chief	Chief Conners		Saint Regis Mohawk Tribe Tribal Administration Bu	71 Margaret Terrance Memorial Way	Akwesasne, NY 13655				518-358-2272	
Saint Regis Mohawk Tribe	Eric Thompson	Chief	Chief Thompson		Saint Regis Mohawk Tribe Tribal Administration Bu	71 Margaret Terrance Memorial Way	Akwesasne, NY 13655				518-358-2272	
Saint Regis Mohawk Tribe	Darren Bonaparte	THPO	Mr. Bonaparte	darren.bonaparte@srmt-nsn.gov	Saint Regis Mohawk Tribe Tribal Administration Bu	71 Margaret Terrance Memorial Way	Akwesasne, NY 13655	11/4/2021 & 2/8/2022 & 7/14/2022	Left Message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	518-358-2272 ext. 2185	
Tuscarora Nation	Leo R. Henry	Chief	Chief Henry		2006 Mt. Hope Road		Lewiston, NY 14092				716-601-4737	[illegible]
Tuscarora Nation	Bryan Printup	Chiefs Council	Mr. Printup	[illegible]	5226 Walmore Road		Lewiston, NY 14092	11/4/2021 & 2/8/2022 & 7/14/2022	Asked for some security codes could not leave message - Left message for environmental office 7/14/2022	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	716-264-6011	
Seneca-Cayuga Nation	Sarah S. Channing	Chief	Chief Channing		23701 South 655 Road	10 Hwy	Grove, OK 74344				918-787-5452 ext. 6012	[illegible]
Seneca-Cayuga Nation	William Tarrant	THPO	Mr. Tarrant	[illegible]	P.O. Box 453220		Grove, OK 74345	11/4/2021	No interest in Piney Run Dam Rehabilitation. William says there is not a lot of interest of the tribe in Maryland, mostly NY, PA. May reach out at later date.	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	918-787-5452 ext. 6001	
Delaware Nation	Deborah Dotson	Tribal President	President Dotson		P.O. Box 825		Anadarko, OK 73005				405-247-2448 ext. 1101	[illegible]
Delaware Nation	Erin Paden	Historic Preservation Director	Ms. Paden email undeliverable. They have a new THPO Katelyn Lucas, (405) 544-8115, klucas@delawarenation-nsn.gov	[illegible] (undeliverable)	Cultural Preservation Department	P.O. Box 825	Anadarko, OK 73005	11/4/2021	Prefers to be reached via email. They are interested in consultation, but they are not interested in the Piney Run Dam Rehab.	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent to Ms. Paden with signed letter attached on 10/28/2024. Email was undeliverable. The tribe has a new THPO and a follow up email was sent to her with the signed letter attached. Second follow up email sent to new THPO with signed letter attached and request for a read receipt on 11/6/2024	405-247-2448 ext. 1403	
Delaware Tribe of Indians	Chester "Chet" Brooks	Chief	Chief Brooks	[illegible]@delawaretribe.org	5100 Tuxedo Blvd		Bartlesville, OK 74006				918-337-6590	http://delawaretribe.org
Delaware Tribe of Indians	Larry Heady	THPO	Mr. Heady	[illegible]	1200 Commercial Street Roosevelt Hall, RM 212	Emporia State University	Emporia, KS 66801				620-341-6818	
Delaware Tribe of Indians	Susan Bachor	Historic Preservation Representative	Ms. Bachor	[illegible]; [illegible]; [illegible]@delawaretribe.org (email failed)	P.O. Box 64		Pocono Lake, PA 18347	11/4/2021 & 2/8/2022 & 7/14/2022	Left Message - 7/14/2022 Only interested in county along the Chesapeake. No interest in Piney Run, will email for other consultation	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	610-761-7452	
Absentee-Shawnee Tribe of Oklahoma	John Raymond Johnson	Governor	Governor Johnson		2025 S. Gordon Cooper Drive		Shawnee, OK 74801				405-275-4030 ext. 128	[illegible]

Absentee-Shawnee Tribe of Oklahoma	Devon Frazier	THPO	Ms. Frazier	dfrazier@astribe.com / 106NAGPRA@astribe	2025 S. Gordon Cooper Drive		Shawnee, OK 74801	11/4/2021	Cecil, Garrett, Harford, Howard, Montgomery and Allegany. Piney Run is not within the current counties. Sent email for starting consultation	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent to both addresses with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024. Received a read receipt from Clayton Martinez on 11/6/2024	405-275-4030 ext. 6243	
Absentee-Shawnee Tribe of Oklahoma	Carol Butler	Cultural Preservation Director	Ms. Butler	cbutler@astribe.com / 106NAGPRA@astribe	2025 S. Gordon Cooper Drive		Shawnee, OK 74801				405-275-4030 ext. 6243	
Eastern Shawnee Tribe	Glenna J. Wallace	Chief	Chief Wallace		P.O. Box 350		Seneca, MO 64865				918-666-2435	http://[illegible]
Eastern Shawnee Tribe	Brad Barnes	Language Director	Mr. Barnes	[illegible]	70500 E. 128 RD		Wyandotte, OK 74370				918-238-5151 ext. 1833	
Eastern Shawnee Tribe	Paul Barton	THPO	Mr. Barton	[illegible]	70500 E. 128 RD		Wyandotte, OK 74370	11/4/2021 & 2/8/2022 & 7/14/2022 7/19/2022	Left Message Answered on 7/14/2022 will email Paul and call back on 7/19	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024	918-666-5151 ext. 1833	
Shawnee Tribe	Ben Barnes	Chief	Chief Barnes	[illegible]	P.O. Box 189	29 S. Hwy 69A	Miami, OK 74355				918-542-2441	http://www.shawnee-tribe.com
Shawnee Tribe	Tonya Tipton	THPO	Ms. Tipton	[illegible]		29 S. Hwy 69A	Miami, OK 74355	11/4/2021 & 2/8/2022 & 7/14/2022	Left Message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024	918-542-2441 ext. 105	
Cayuga Nation	Clint Halftown	Federal Representative	Mr. Halftown		P.O. Box 803		Seneca Falls, NY 13148				315-568-0750	http://www.cayuganation-nsn.gov
Cayuga Nation	Sharon Leroy	THPO I	Ms. Leroy	[illegible]	P.O. Box 803		Seneca Falls, NY 13148	11/4/2021 & 2/8/2022 & 7/14/2022	left message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024	315-568-0750	
Stockbridge-Munsee Community Band of Mohican Indians	Shannon Holsey	Tribal President	Honorable Shannon Holsey	[illegible]	N8476 Moh-He-Con-Nuck Road	P.O. Box 70	Bowler, WI 54416				715-793-4387	http://www.mohican.com
Stockbridge-Munsee Community Band of Mohican Indians	Bonney Hartley	THPO	Ms. Bonney Hartley	[illegible]	65 Spring Street		Williamstown, MA 01267	11/4/2021 & 2/8/2022 & 7/14/2022	left message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow-up email sent with signed letter attached and request for a read receipt on 11/6/2024. 10/28/2024 Jeffrey C. Bendremer Ph.D., RPA THPO responded, "Though we routinely consult on such projects, Carroll County, Maryland is situated outside of the Stockbridge-Munsee Community Traditional Homeland/Area of Interest. Therefore, the Stockbridge-Munsee Community Tribal Historic Preservation Office has no comments regarding the aforementioned action."	413-884-6048	
Tonawanda Band of Seneca Nation	Roger Hill	Chief	Honorable Roger Hill	[illegible]	7027 Meadville Road		Basom, NY 14013				716-542-4244 or 716-542	none
Tonawanda Band of Seneca Nation	Christine Abrams	Cultural Preservation	Ms. Abrams	[illegible]	7027 Meadville Road		Basom, NY 14013	11/4/2021	I spoke with Christine and she says they are currently uninterested in consultation with projects in Maryland.	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024	716-542-4244 or 716-542-2341	
Pamunkey Indian Tribe	Robert Gray	Chief	Chief Gray	[illegible]	1054 Pocahontas Trail	Pamunkey Indian Reservation	King William, VA 23086					
Pamunkey Indian Tribe	Shelby Brown	Assistant Chief, Deputy THPO	Mr. Brown	[illegible]	1054 Pocahontas Trail	Pamunkey Indian Reservation	King William, VA 23086	11/4/2021 & 7/14/2022	sent an email	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024		

Pamunkey Indian Tribe	Shaleigh Howells	Cultural Resource Director	Shaleigh	shaleigh.howells@pamunkey.org Undeliverable 10/23/2024. They have a new Cultural Resource Director: Randall Stevens (randall.stevens@pamunkey.org)	1054 Pocahontas Trail	Pamunkey Indian Reservation	King William, VA 23086	11/4/2021 2/3/2022	1(sent an email 3) Shaleigh prefers digital records to be sent to your email and also Chief Gray. The Tribe is not interested in consultation with NRCS in MD at this time but may reconsider this position in the future (a little over a year). Shaleigh has asked to send Piney Run to her through email.	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent to Ms. Howells with signed letter attached on 10/23/2024. Email was undeliverable. Sent a second follow up email to new Cultural Resource Director: Randall Stevens with the letter attached (randall.stevens@pamunkey.org). Second follow up email sent to new email with signed letter attached and request for a read receipt on 11/6/2024		
Chickahominy Indian Tribe	Stephen R. Adkins	Chief	Chief Adkins	stephen.adkins@chickahominytribe.org	Chickahominy Indian Tribe	8200 Lott Cary Road	Providence Forge, VA 23140	11/4/2021 & 2/3/2022 & 7/14/2022	left a message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	804-829-[illegible]	
Chickahominy Indian Tribe - Eastern Division	Gerald A. Stewart	Chief	Chief Stewart	[illegible]	Chickahominy Indians Eastern Division	3120 Mt. Pleasant Road	Providence Forge, VA 23140	11/4/2021	Doris Austin Dept Tribal Administrator and confirms they do not have interest in projects done in Maryland.	Closeout consultation letter sent by certified mail 10/10/2024. New email address identified: consultation@cit-ed.org. From the website it is unclear if Gerald Stewart is still the chief. Follow up email sent with signed letter attached on 10/23/2024. Second follow up email sent to the new email address with signed letter attached and request for a read receipt on 11/6/2024	804-[illegible]-7815	
Upper Mattaponi Tribe	W. Frank Adams	Chief	Chief Adams	admin@umitribe.org	Upper Mattaponi Indian Tribe	13476 King William Road	King William, VA 23086	11/4/2021 & 2/3/2022 & 7/14/2022	left message	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	804-[illegible]	http://www.uppermattaponi.org
Rappahannock Tribe	G. Anne Richardson	Chief	Chief Richardson	[illegible]@aol.com	Rappahannock Tribe Cultural Center	5036 Indian Neck Rd.	Indian Neck, VA 23148	11/4/2021	sent email	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/23/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.		
Monacan Indian Nation	Kenneth Branham	Chief	Chief Branham	tribaloffice@monacannation.com	Monacan Indian Nation	P.O. Box 960	Amherst, VA 24521	11/4/2021 & 2/3/2022 & 7/14/2022	left message - 7/14/2022 [illegible] THPO just hired new one left message for new THPO.	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.	434-946-0389	
Nansemond Indian Tribe	Samuel Bass	Chief	Chief Bass	[illegible]@yahoo.com	Nansemond Indian Nation	1001 Pembroke Lane	Suffolk, VA 23434	11/4/2021	sent email	Closeout consultation letter sent by certified mail 10/10/2024. Follow up email sent with signed letter attached on 10/28/2024. Second follow up email sent with signed letter attached and request for a read receipt on 11/6/2024.		

State Recognized Tribes

Affiliation	Name	Position	Salutation	Email	Address 1	Address 2	City, State, Zip	Phone	Website
Accohannock Indian Tribe, Inc.	Mike Hinman	Tribal Council Chair	Mr. Hinman		28380 Crisfield Marion Road		Marion Station, MD 21838	410-968-0194 or 410-603-6197	
Accohannock Indian Tribe, Inc.	Pat Carson	Tribal Co-chair, Treasurer	Mr. Carson	pat_carson12@msn.com	28380 Crisfield Marion Road		Marion Station, MD 21838	443-783-0538	
Piscataway Indian Nation	Billy Red Wing Tayac	Chief	Chief Tayac		P.O. Box 312		Port Tobacco, MD 20677	301-932-0808	
Piscataway-Conoy Tribe of Maryland	Tribal Council		Tribal Council	piscatawayconoycouncil@gmail.com	P.O. Box 638		Bryans Road, MD 20616	240-210-3232	http://piscatawayconoytribe.com/index.html
Piscataway-Conoy Subgroups:									
Choptico Band of Indians	Rico Newman	Historic Preservation Officer	Mr. Newman	rico.newman@gmail.com	3953 Pine Cone Circle		Waldorf, MD 20602	301-744-9553	
Cedarville Band of Piscataway Indians	Natalie Standing-on-the-Rock Proctor	Tribal Chair	Ms. Proctor	piscatawayindians@gmail.com	American Indian Cultural Center	16816 Country Lane	Waldorf, MD 20601	240-640-7213	https://www.piscatawayindians.com
Piscataway Businesses/Organizations with "Maryland Indian Status":									
Maryland Indian Tourism Association	Rico Newman			same email/address/phone as above					
Conoy Creations	Natalie Standing-on-the-Rock Proctor			same email/address/phone as above					
Maryland Commission on Indian Affairs	Keith Colston	Administrative Director	Mr. Colston	keith.colston@maryland.gov	301 W. Preston Street Suite 1500		Baltimore, MD 21201		

Other Maryland Tribes

Affiliation	Name	Position	Salutation	Email	Address 1	Address 2	City, State, Zip	Phone	Website
Assateague Peoples Tribe	Michael G. Morabito	Chief	Chief Morabito	bearseeseagles@msn.com	300 Russell Road		Bethany Beach, DE 19930	302-539-8890	
Nause-Waiwash Band of Indians, Inc.	Donna "Wolf Mother" Abbott	Chief	Chief Abbott	wkdwrknmom@aol.com	212 East Appleby Ave.		Cambridge, MD 21613	410-724-6795	www.turtletracks.org
Pocomoke Indian Nation	Norris C. Howard, Sr.	Paramount Chief	Chief Howard	Quindocqua@aol.com	3355 Allen Rd.		Eden, MD 21822	410-742-6795	http://www.pocomokeindiannation.org/index.html
Baltimore American Indian Center			Sir or Madam	Info@BaltimoreAmericanIndianCenter.Org	113 South Broadway		Baltimore, MD 21231	410-675-3535	https://baltimoreamericanindiancenter.org

DRAFT REPORT

PHASE I ARCHAEOLOGICAL INVESTIGATION FOR THE PINEY RUN WATERSHED STUDY, PINEY RUN DAM CARROLL COUNTY, MARYLAND

PREPARED FOR:
CARROLL COUNTY BUREAU OF RESOURCE MANAGEMENT
225 NORTH CENTER STREET
WESTMINSTER, MD 21157

PREPARED BY:
PETE REGAN, MA, RPA

PRINCIPAL INVESTIGATOR:
SCOTT SEIBEL, MA, RPA

AECOM
12420 MILESTONE CENTER DRIVE, SUITE 150
GERMANTOWN, MD 20876

APRIL 2020

AECOM

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ABSTRACT

Under contract to the Carroll County Bureau of Resource Management (BRM), AECOM conducted a Phase I archaeological survey in support of the Piney Run Watershed Study at Piney Run Dam, Carroll County, Maryland. The BRM initiated this study to develop a Watershed Project Plan as the initial phase of work ultimately intended to mitigate design deficiencies identified at the Piney Run Dam. The Area of Potential Effects (APE) for the current archaeological study comprises approximately 20.47 hectares (50.58 acres) generally east, west, and south of the dam. This study was initiated to assist the BRM in meeting regulatory obligations under Section 106 of the National Historic Preservation Act of 1966, as amended. The goals of this study were to identify the presence, extent, nature, and potential significance of archaeological deposits, if any, within the APE.

The survey consisted of surface inspection and the excavation of 217 shovel test pits (STPs) and resulted in the recovery of one prehistoric artifact and 242 historic artifacts and the identification of four historic archaeological sites. Site 18CR292, located in the uplands west of the dam, represents an isolated refuse disposal pit dating to the early twentieth century. The site lacks a clear affiliation with any individual historic occupation, and while it can provide generic insights into some local consumer practices, it lacks the associative values and data potential to yield significant information. Therefore, AECOM recommends 18CR292 not eligible for listing in the National Register of Historic Places (NRHP). No further work is recommended.

Site 18CR293, located immediately southeast of the dam’s emergency spillway, represents a small nineteenth century farmstead. Features include a possible capped well, two barn/outbuilding foundations, a spring box, and a dwelling foundation, arranged into two discrete activity loci segregating agricultural from domestic site uses. Artifacts were recovered from intact contexts and exhibited spatial patterns that reflect the separate agricultural/domestic site uses. While numerous nineteenth century farmsteads have been excavated in Carroll County, none appear to have been investigated within the Piney Run valley. Site 18CR293 exhibits intact archaeological features, deposits, and discrete activity areas representative of a site type that has not been addressed in the local archaeological record. Given these considerations, AECOM recommends 18CR293 potentially eligible for listing in the NRHP and that the site be avoided during potential future ground disturbing episodes. If the site cannot be avoided, a Phase II evaluation is recommended to determine its NRHP eligibility.

Site 18CR294, located at the eastern edge of the APE, consists of a large stone spring box that may date to the nineteenth century. No artifacts were recovered from 18CR294, which lacks a clear affiliation with any known, nearby historic occupation. Given the absence of potentially meaningful historical and archaeological contexts, 18CR294 possesses very limited data potential. For these reasons, AECOM recommends the site not eligible for listing in the NRHP. No further work is recommended.

Site 18CR295 is an unidentified historic occupation represented by a single positive STP and a nearby stone foundation west of the APE. Low density archaeological deposits within the APE represent the site periphery, while the core is likely located beyond the APE near the foundation. Because the site core could not be more closely investigated, the site’s overall nature, age, extent, cultural affiliation, integrity, and potential NRHP eligibility could not be assessed. AECOM recommends additional work only in the event that site avoidance is not possible.

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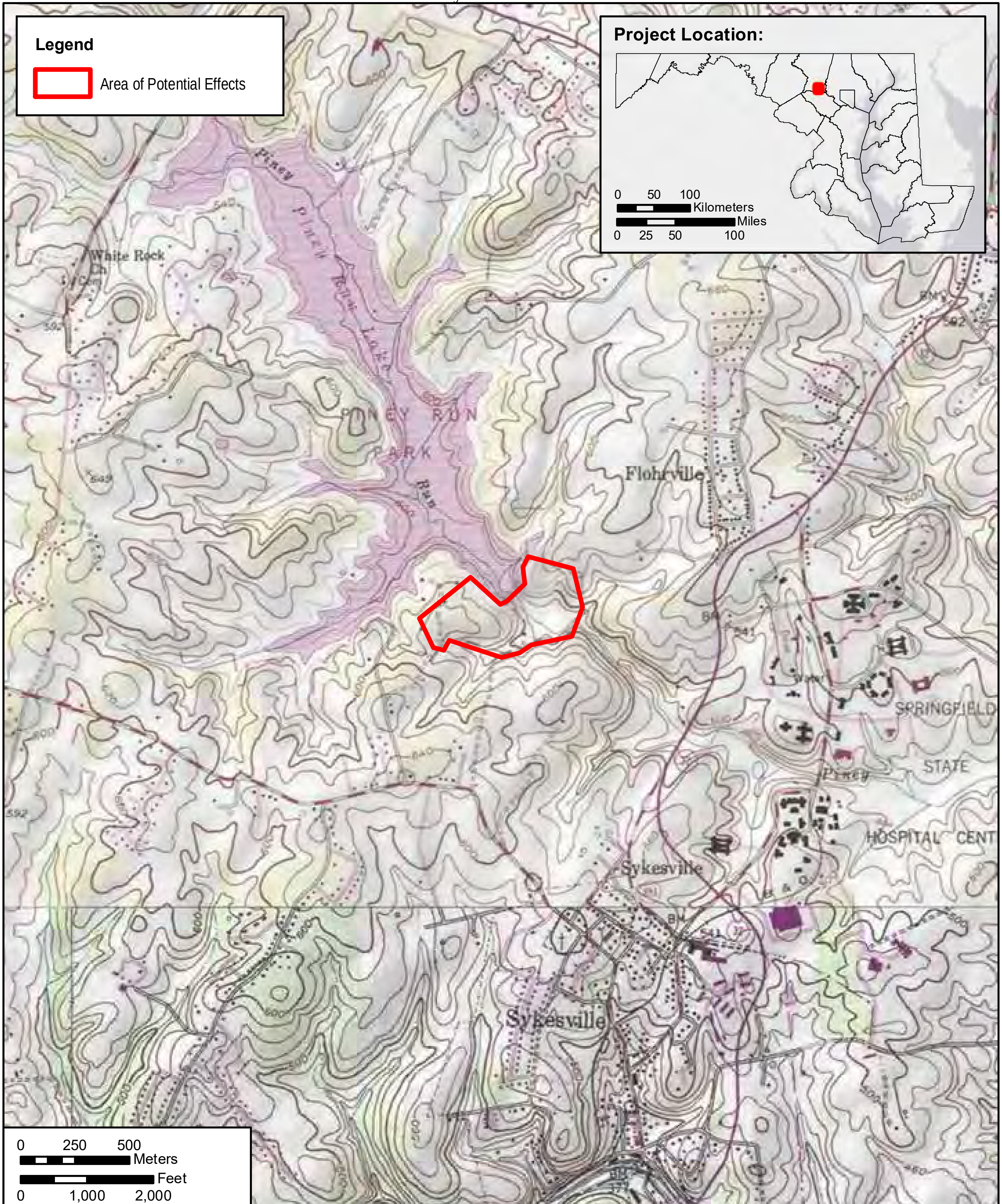
1.0 INTRODUCTION

Carroll County Bureau of Resource Management (BRM) contracted AECOM to conduct an archaeological Phase I survey in support of the Piney Run Watershed Study, located at Piney Run Dam, Carroll County, Maryland (Figure 1-1). This investigation was undertaken as part of a broader initiative to mitigate design deficiencies that have become apparent in the dam. The current study's project area is coterminous with the Area of Potential Effects (APE), encompassing approximately 20.47 hectares (50.58 acres) generally east, west, and south of Piney Run Dam (Figure 1-2). The APE is located within Maryland Archaeological Research Unit 14, Patapsco-Back-Middle Drainages (Figure 1-3).

The goal of the Phase I investigation was to determine the presence or absence of archaeological sites within the APE that may be eligible for listing in the National Register of Historic Places (NRHP). The undertaking is federally funded and requires federal permits, making it subject to Section 106 of the National Historic Preservation Act of 1966, as amended. All work was conducted in accordance with the Maryland Historical Trust's (MHT) *Standards and Guidelines for Archaeological Investigations in Maryland* (Shaffer and Cole 1994), the *Standards and Guidelines for Archaeological Investigations in Maryland, Technical Update #1* (Morehouse et al. 2018), and the Secretary of the Interior's Standards and Guidelines for Curation (36 CFR 79).

Archaeological field investigations were conducted from December 3 to 6, 2019. Scott Seibel served as the Principal Investigator, and Pete Regan was the Field Director. Benjamin Stewart served as Crew Chief, while Kayla Marciniszyn and Barbara Helton served as field technicians. Kayla Marciniszyn served as Laboratory Director. Nina Shinn served as the geographic information systems (GIS) specialist.

Following this Introduction, the report includes seven sections of text: Project Location and Description, Cultural Context, Previous Investigations, Research Design, Results, Summary and Recommendations, and References Cited. Appendix A contains the Qualifications of the Investigators, Appendix B contains the Artifact Catalog, and Appendix C contains the Archaeological Site Forms.



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:24,000
SOURCE:	ESRI 2019

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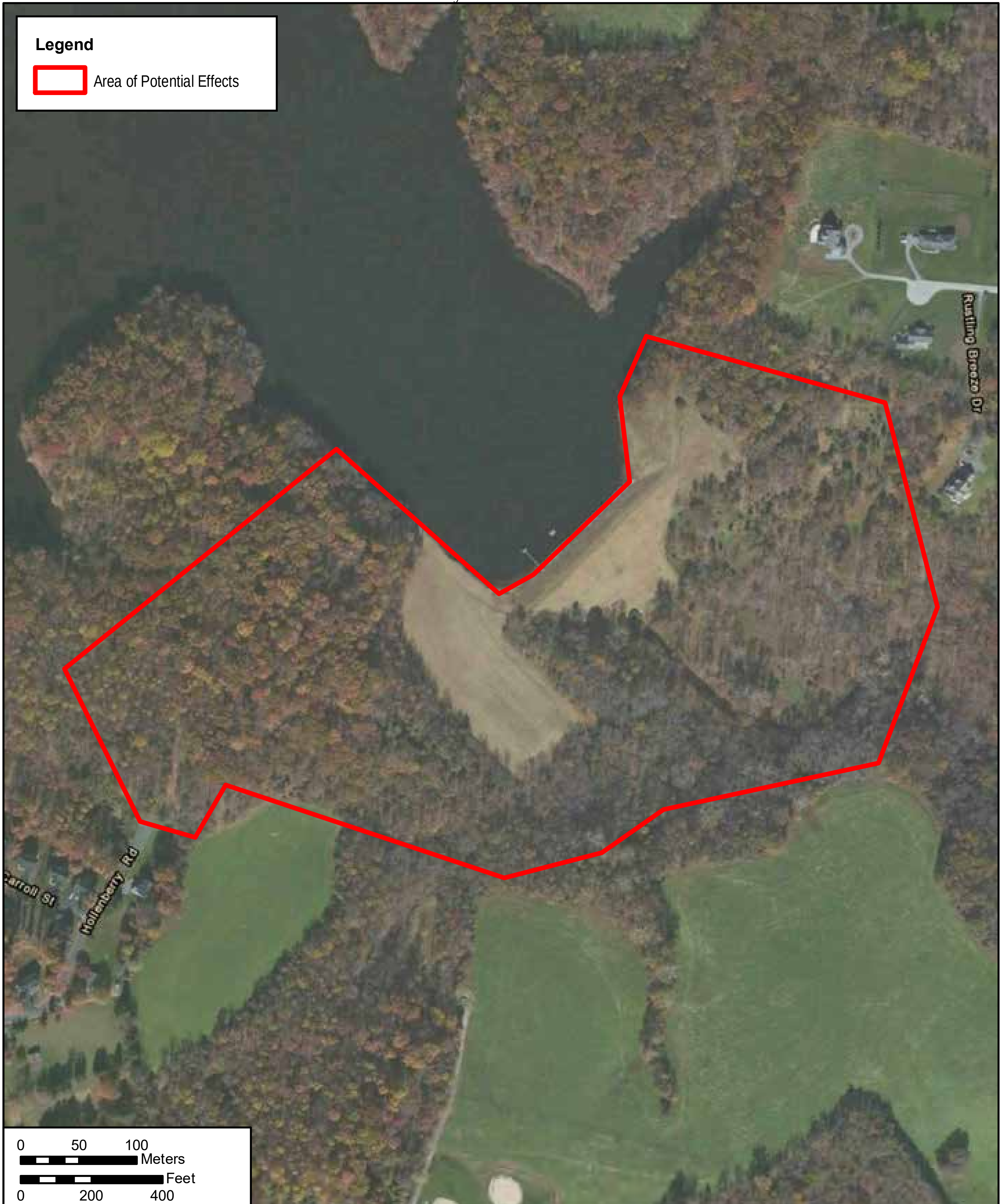
N

TITLE
Project Location

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 1-1



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PROJECT:	Piney Run Phase I
SCALE:	1:4,500
SOURCE:	ESRI 2019

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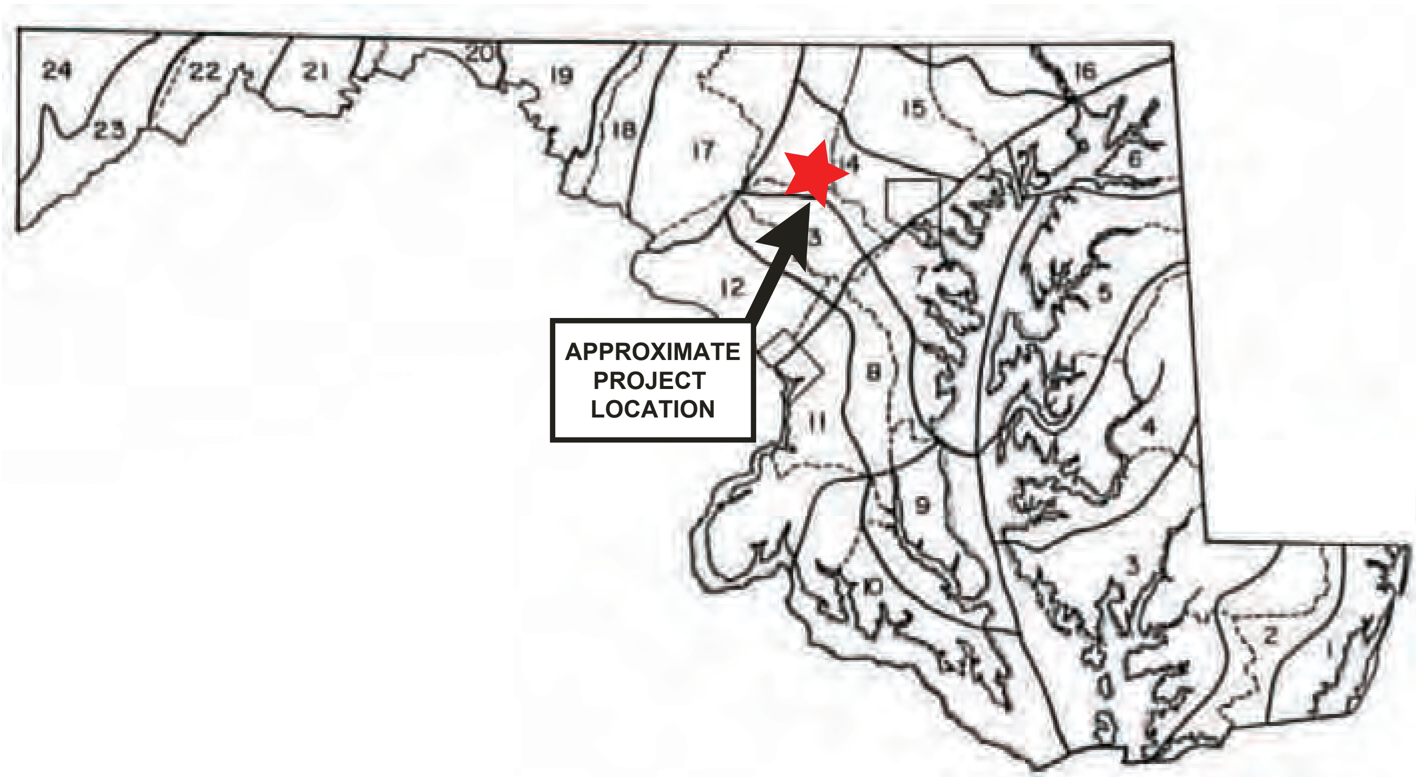
N

TITLE
Area of Potential Effects

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 1-2



CLIENT	Carroll County Bureau of Resource Management	TITLE	Maryland Archaeological Research Units
PROJ	Piney Run Phase I	AECOM 12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
SCALE	As Shown		FIGURE 1-3
SOURCE	N/A		
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

2.0 PROJECT LOCATION AND DESCRIPTION

2.1 PROJECT LOCATION

The APE is located generally east, west, and south of Piney Run Dam along Piney Run less than 1 kilometer (km) (0.6 mile [mi]) north of the Sykesville corporate limits in Carroll County, Maryland. The APE extends up to 300 meters (m) (984 feet [ft]) east, 460 m (1,509 ft) west, and 205 m (673 ft) south of the center of the Piney Run Dam crest. Portions of the APE boundary correspond to the Piney Run Reservoir shoreline and the property lines of parcel 0714002626; elsewhere the APE has no physical or legal boundaries.

2.2 GEOLOGY AND PHYSIOGRAPHY

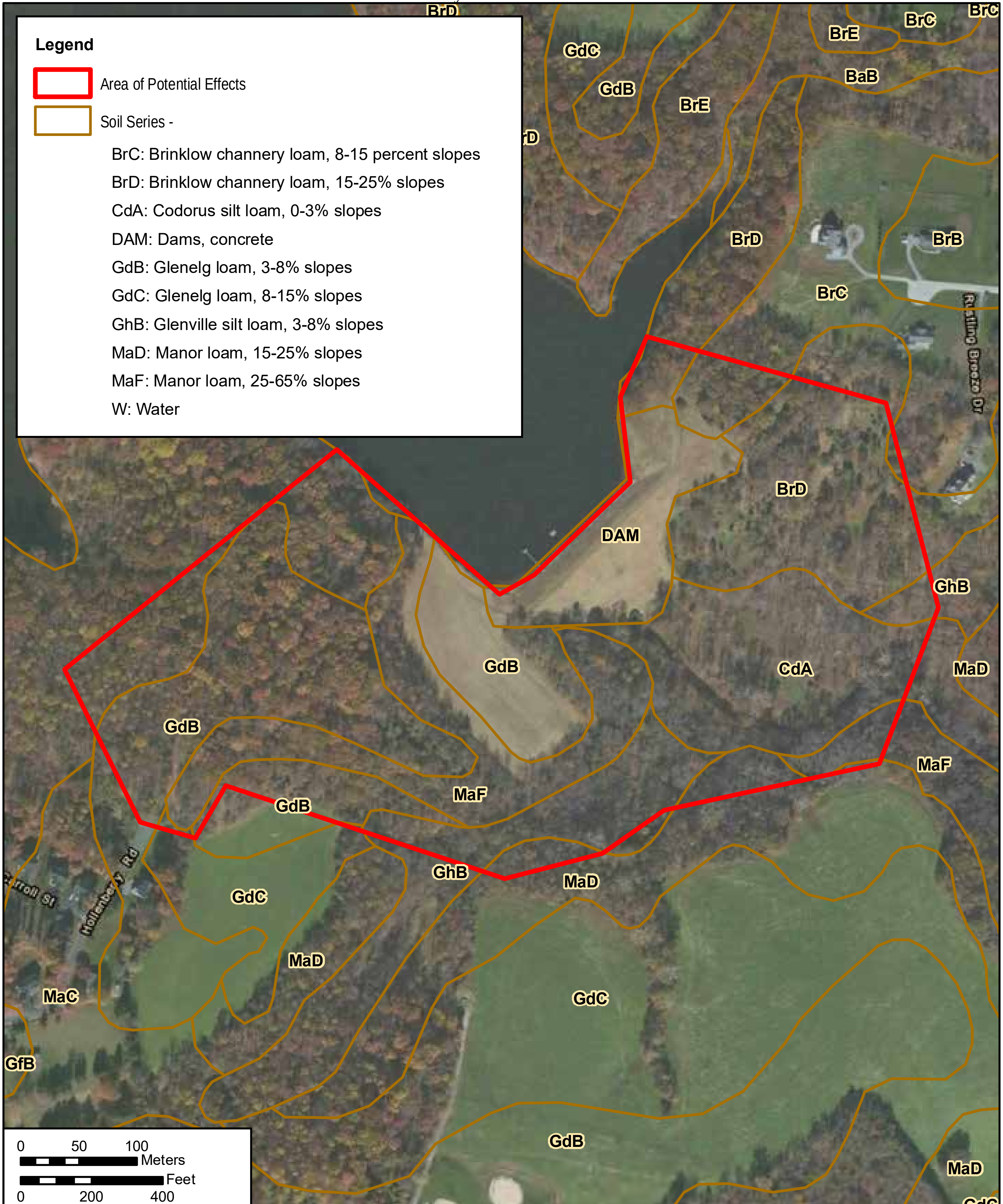
The APE is located in the Hampstead Upland District of the Piedmont Plateau Physiographic Province's Harford Plateaus and Gorges Region (Reger and Cleaves 2008). Spanning from the Coastal Plain west to Catoctin Mountain, the Piedmont Plateau exhibits a highly variable geologic profile (Maryland Geological Survey [MGS] 2012). The eastern portion of the province, in which the APE is located, is comprised of igneous and metamorphosed igneous and sedimentary rocks with pegmatite and granitic pluton intrusions (MGS 2012). The western portion is largely comprised of metamorphosed volcanic rocks. The Hampstead Upland District features rolling to steep terrain, often dissected by steep-walled gorges (Reger and Cleaves 2008). The APE is within the Morgan Run Formation, which 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 (Muller 1994:n.p.). Areas of Alluvium occur in floodplains of streams and consist of interbedded "light gray to brown gravel, sand, silt, and gray-blue to gray-brown clay" (Muller 1994:n.p.). The gravel is dominantly quartz, and the sand and silt are dominantly quartz-mica mixtures.

2.3 HYDROLOGY AND TOPOGRAPHY

Piney Run is the major waterbody within the immediate vicinity of the APE, bisecting it as the stream flows southeast from its impoundment in Piney Run Reservoir. Piney Run, a third-order stream, flows from its headwaters near the rural village of Winfield to its discharge into the Patapsco River approximately 10 km (6.2 mi) southeast of the APE. Topography within the APE is defined by rolling uplands interrupted by incised stream valleys. Side slopes are often very steep, though toe and summit slopes are typically gentle. The largest expanse of level terrain occurs on the Piney Run floodplain, southeast of the dam. In many places, the natural topography has been significantly impacted by the dam embankment/abutments, the emergency spillway, and large borrow/spoil wasting areas created during the dam's construction. Elevations within the APE range between 142 and 177 m (465 and 580 ft) above mean sea level.

2.4 PROJECT AREA SOILS

The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) has mapped five soil units within the APE (USDA NRCS 2019a; Figure 2-1). These include Brinklow channery loam (map symbols BrC and BrD), Codorus silt loam (CdA), Glenelg loam (GdB and GdC), Glenville silt loam (GhB), and Manor loam (MaD and MaF). Additionally, the USDA NRCS has mapped dams/concrete (DAM) and water (W) for small portions of the APE. Relevant APE soils data, including drainage class, parent material, slope, and typical pedon, are presented in Tables 2-1 through 2-6 (USDA NRCS 2019a, 2019b).



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:4,500
SOURCE:	ESRI 2019 and USDA NRCS 2019a

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TITLE
Project Area Soils

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 2-1

Table 2-1. Project Area Soils Summary

Soil	Map Unit(s)	Drainage Class	Parent Material	Slope (%)
Brinklow Channery Loam	BrC, BrD	Well-Drained	Weathered Schist/Phyllite Residuum	8-25
Codorus Silt Loam	CdA	Moderately Well-Drained	Phyllite/Schist/Diabase/Greenstone Loamy Alluvium	0-3
Glenelg Loam	GdB, GdC	Well-Drained	Weathered Mica Schist Residuum	3-15
Glenville Silt Loam	GhB	Moderately Well-Drained	Metamorphic Rock Colluvium or Phyllite Residuum	3-8
Manor Loam	MaD, MaF	Well-Drained	Weathered Mica Schist Residuum	3-8

Table 2-2. Brinklow Channery Loam Typical Pedon

Horizon	Depth (cm)	Color	Texture
Ap	0-25	Brown (7.5YR 5/4)	Channery Silt Loam
Bt	25-48	Strong Brown (7.5YR 5/8)	Channery Silt Loam
BC	48-63	Strong Brown (7.5YR 5/8), Reddish Yellow (7.5YR 7/6), and Yellowish Red (5YR 5/6)	Channery Loam
Cr	63-89	Reddish Yellow (5YR 7/6)	Very Channery Loam
R	89+	N/A	Hard Phyllite Bedrock

Table 2-3. Codorus Silt Loam Typical Pedon

Horizon	Depth (cm)	Color	Texture
Ap	0-23	Brown (10YR 4/3)	Silt Loam
Bw1	23-46	Dark Yellowish Brown (10YR 4/4)	Silt Loam
Bw2	46-76	Brown (10YR 5/3)	Loam
C1	76-137	Light Yellowish Brown (10YR 6/4)	Loam
C2	137-165	Light Yellowish Brown (10YR 6/4)	Loam

Table 2-4. Glenelg Loam and Silt Loam Typical Pedon

Horizon	Depth (cm)	Color	Texture
Ap1	0-15	Brown (10YR 4/3)	Loam
Ap2	15-25	Brown (7/5YR 4/4)	Clay Loam
Bt1	25-46	Strong Brown (7.5YR 5/8)	Clay Loam
Bt2	46-64	Strong Brown (7.5YR 5/6)	Clay Loam
Bt3	64-76	Yellowish Brown (10YR 5/6)	Clay Loam
BCt	76-107	Yellowish Red (5YR 5/6) and Yellowish Brown (10YR 5/6)	Loam
CBt	107-137	Yellowish Red (5YR 5/6) and Yellowish Brown (10YR 5/6)	Loam
C	137-193	Strong Brown (7.5YR 5/8), Brownish Yellow (10YR 6/8), and Yellow (10YR 7/6)	Extremely Channery Sandy Loam

Table 2-5. Glenville Silt Loam Typical Pedon

Horizon	Depth (cm)	Color	Texture
Ap	0-23	Dark Yellowish Brown (10YR 4/4)	Silt Loam
Bt2	23-41	Yellowish Brown (10YR 5/6)	Silt Loam
Bt2	41-48	Yellowish Brown (10YR 5/6)	Silt Loam
Btx	48-63	Brown (10YR 5/3)	Silt Loam
Btgx	63-84	Light Brownish Gray (10YR 6/2) and Brown (10YR 5/3)	Silt Loam
BC	84-99	Yellowish Brown (10YR 5/4)	Silt Loam
C	99-208	Yellowish Brown (10YR 5/4)	Channery Loam

Table 2-6. Manor Loam Typical Pedon

Horizon	Depth (cm)	Color	Texture
A1	0-5	Very Dark Grayish Brown (10YR 3/2)	Loam
A2	5-15	Dark Yellowish Brown (10YR 4/4)	Sandy Loam
Bw1	15-33	Strong Brown (7.5YR 4/6)	Sandy Loam
Bw2	33-56	Strong Brown (7.5YR 4/6)	Sandy Loam
C1	56-76	Dark Yellowish Brown (10YR 4/4), Strong Brown (7.5YR 5/8), Yellowish Red (5YR 4/6)	Sandy Loam
C2	76-112	Olive Brown (2.5Y 4/4), Strong Brown (7.5YR 5/6), and Pink (7.5YR 7/4)	Very Channery Sand
C3	112-135	Olive Brown (2.5Y 4/4), Light Brown (7.5YR 6/3), and Yellowish Red (5YR 5/8)	Channery Loamy Sand
C4	135-183	Olive Brown (2.5Y 4/4), Dark Yellowish Brown (10YR 4/4), and Reddish Yellow (7.5YR 6/8)	Channery Loamy Sand

2.5 CURRENT LAND USE

The APE currently consists of rolling upland forests and lightly wooded floodplains within a publicly accessible recreation area that is part of Piney Run Park. Modern disturbances include the dam embankment/abutments, the emergency spillway, borrow/spoil wasting areas created during the dam’s construction, dam and reservoir infrastructure, and modern access roads. These disturbances comprise a significant portion of the APE.

3.0 CULTURAL CONTEXT

The MHT has developed cultural contexts that provide a necessary framework for the description and analysis of known and anticipated cultural resources (Weissman 1986). These contexts are the basis for evaluating the significance of resources within the APE. The contexts are organized by geographic region, time/developmental period, and theme. The time periods listed in the following prehistoric and historic contexts are those identified by the MHT as important historic contexts for the state (Weissman 1986). Where necessary, dates and terminology have been updated to incorporate new information.

3.1 PREHISTORIC CONTEXT

Regional prehistory is traditionally divided into three major periods: the Paleoindian (10,000–7500 B.C.), Archaic (7,500–2,000 B.C.), and Woodland (2000 B.C.–A.D. 1600) periods. Taken together, the major eras of Mid-Atlantic prehistory represent a timescale beginning with the earliest regional occupations and concluding with the watershed period of contact with European and African cultures. While there may be evidence of human occupation in western North America and South America before 10,000–12,000 B.C., there is no conclusive evidence in the Mid-Atlantic region for human occupation before the Paleoindian period. There is, however, a great deal of debate over the issue, and archaeological sites such as Cactus Hill in Virginia (e.g., McAvoy and McAvoy 1997), Meadowcroft Rockshelter in southwestern Pennsylvania (e.g., Adovasio et al. 1978), and the Topper Site in South Carolina (e.g., Parfit 2000; Rose 1999) have provided tantalizing yet controversial and inconclusive evidence for human occupations predating the Paleoindian period.

Major alterations to Native American lifeways help characterize each period, as trends in settlement patterns, subsistence strategies, exchange networks, and material culture-experienced diachronic change. The Archaic and Woodland periods are further subdivided into Early, Middle, and Late periods, which are characterized by changes in material culture, environmental adaptation, subsistence strategies, settlement patterns, technology, and socio-political configurations. Since no potentially significant prehistoric resources were found during the current investigation, the following prehistoric context is a brief discussion of the defining qualities of each period as expressed by the prehistoric inhabitants of the Mid-Atlantic in general.

3.1.1 Paleoindian Period (10,000–7,500 B.C.)

The end of the Pleistocene epoch (ca. 12,000–10,000 years ago) represents the terminus of the Ice Age or at least the beginning of a long interglacial episode. The environment during this time was quite different from modern conditions. Moisture that was locked up in the glacial ice sheets resulted in lower sea levels, and more exposure of land area along coastal areas. Areas that were exposed during this time were subsequently inundated by the global rise in sea level that began at the end of Pleistocene when climatic amelioration resulted in melting continental ice sheets. During this period of post-glacial warming, the climate was probably 3 to 8 degrees Celsius colder than at present and the vegetation consisted of an open spruce parkland forest composed of spruce, pine, fir and alder (Brush 1986; Owens et al. 1974; Sirkin et al. 1977). While the dates for the Paleoindian period are continuously debated, it is generally accepted that human populations had become established in spatially discrete areas of North America by 10,000 B.C.

The Paleoindian toolkit included fluted projectile points, which were typically manufactured from high-quality lithic materials chosen for their predictable and consistent flaking properties.

Projectile point types included Clovis, Cumberland/Barnes, Crowfield, Hardaway-Dalton, and Hardaway Side-Notched. Other tools in the Paleoindian toolkit included knives, endscrapers, sidescrapers, gravers, burins, denticulates, *pieces esquillées*, wedges, perforators, and generalized unifaces and bifaces (Dent 1995).

Preferred lithic materials for these projectile points were high-quality cryptocrystalline rock such as jasper and chert (Dent 1995; McCary 1984), though tools made from locally available quartz and quartzite cobbles have been documented at sites in the Mid-Atlantic region (e.g., Ebright 1992; McAvoy and McAvoy 1997). Archaeologists have postulated that Paleoindian hunter-gatherers traveled long distances to obtain raw materials for tool production, as has been shown by studies of lithic procurement systems centered on the Thunderbird site and other Mid-Atlantic sites (e.g., Custer 1984; Gardner 1977).

Paleoindian period settlements consisted of seasonally-occupied camps, from which forays were made to obtain specialized resources, such as stone for tool manufacture (Custer 1984; Dent 1995; Gardner 1977). Site types postulated for the Paleoindian period include base camps, quarry sites, quarry reduction stations, quarry-related base camps, base camp maintenance stations, outlying hunting stations, and isolated projectile point finds (Gardner 1977). These site types are considered part of the "seasonal round" of Paleoindian settlement. The primary means of subsistence was the hunting of large game such as moose, elk, and deer, although plants, fish, and other wild game were also important food resources (Dent 1995; Kavanagh 1982; McNett 1985).

Much of what archaeologists know about Paleoindians comes from isolated finds of fluted projectile points, the majority of which are found in Coastal Plain settings (Dent 1995). Ebright (1992) postulated that in the Piedmont province, settlement may have been focused on riverine settings. Kavanagh (1982) reported two fluted point finds west of the APE: one at site 18FR17, located at the confluence of Tuscarora Creek and the Monocacy River; and the second, an isolated find, on a terrace of the Monocacy River. A single projectile point dating to the mid-Paleoindian period was reported on a terrace of the Potomac River in Frederick County, and eight Hardaway-Dalton points have been documented in the Monocacy River Valley (Kavanagh 1982).

3.1.2 Archaic Period (7,500–2,000 B.C.)

The Archaic period is conventionally sub-divided into the Early (7,500–6,000 B.C.), Middle (6,000–4,000 B.C.), and Late (4,000–2,000 B.C.) subperiods. In the Mid-Atlantic area, Archaic sites are much more numerous, larger, and richer in artifacts than the earlier Paleoindian sites. They represent a series of adaptations that were increasingly sedentary and focused on the resources available along large rivers and major tributaries. Other, often smaller, sites of this period located away from the main streams probably represent seasonal or other specialized activities. Increasing territoriality and regional diversity are reflected in the varieties of artifacts, especially projectile points, throughout the Archaic Period.

Evidence from Paleoindian and Early Archaic sites suggest that the transition from the Paleoindian way of life was not a sharp break, but rather a gradual transition (Custer 1990). This transition was associated with a major climatic change that marks the end of the Pleistocene and beginning of the Holocene. The cool and moist climate of the late Ice Age shifted to a warmer and drier climate that approximates that of today. Rising sea levels inundated the lower Susquehanna River Valley and began forming the Chesapeake Bay estuary and its large salt and brackish water marshes, habitats that provided a rich and diverse subsistence base (Kraft 1976). As temperatures increased during the early Holocene, vegetation in the region shifted from coniferous forests of spruce to mixed deciduous/coniferous forests of hemlock, birch, hickory, and oak (Brush 1986; Custer 1990; Owens et al. 1974; Sirkin et al. 1977). After 7,000 B.C. the spread of deciduous woodlands into upland areas, which previously had been predominantly spruce, hemlock, and pine forests, opened up new habitats to be exploited by animals and humans (Custer 1990).

The Archaic period represents a regional lifestyle shift driven in part by changes in climatic, biotic, and environmental conditions that occurred at the end of the Pleistocene. While the Paleoindian foraging system continued through the Early and Middle Archaic subperiods, settlement strategies eventually shifted in focus to macro-group base camps with outlying resource procurement sites. Newly emerging ecosystems enabled Mid-Atlantic populations to expand into regions with productive freshwater environments, shifting early base camp sites from lithic to biotic resources (Custer 1990).

By the end of the Archaic period, numerous technomic innovations had been developed throughout the Mid-Atlantic: broadspear points, steatite bowls and net weights, bannerstones, and ground stone celts are all represented in the material assemblage toward the close of the Archaic period (Mouer et al. 1981; Barse et al. 2006; Dent 1995).

3.1.3 Woodland Period (2,000 B.C.–A.D. 1600)

The Woodland period is conventionally divided into the Early (2,000–500 B.C.), Middle (500 B.C.–A.D. 900), and Late (A.D. 900–1600) subperiods based on changes in ceramic types, lithic technologies, subsistence patterns, and social development. The climate during the Woodland period is characterized by a return to cool, moist conditions and establishment of vegetation that is characteristic of the region today. The Woodland period is marked by the introduction of ceramics, significant population growth, and an increasingly sedentary way of life. Hunting and gathering of wild floral and faunal resources remained important, but incipient horticulture, based on maize cultivation, eventually formed an important part of the subsistence base.

It was previously thought that the transition between the Archaic and Woodland periods, between 2,000–1000 B.C., represented the introduction of horticulture (e.g., Fritz 1993; Smith 1992, 1995). Although Early Woodland groups in the South and Midwest used cultivated plants, there is presently no evidence that cultivated foods played a role in the diet of Early Woodland people in the area. Very efficient hunting and gathering systems (Caldwell 1958), including riverine and marine species exploitation, may have made the acceptance of cultigens slow at first. Only after A.D. 800–900, when varieties of tropical cultigens adapted to local conditions arrived in the Mid-Atlantic area, did cultivated foods begin to assume an important role (Smith 1995). These tropical cultigens complemented cultigens of the Eastern Agricultural Complex (erect knotweed, goosefoot, little barley, maygrass, squash, sunflower, and sumpweed) that had been part of the prehistoric diet for centuries.

Early Woodland settlement patterns were still riverine-based, with larger settlements, like that at the Marcey Creek site in Arlington County, Virginia (Manson 1948), often at the junction of fresh water and brackish water streams. Smaller camps, like those discovered near Mattawoman Creek in Charles County (Child et al. 1995) were established seasonally in areas where there was high potential for other resources.

The earliest ceramic types from the area are the steatite-tempered Marcey Creek and Selden Island wares, which were replaced by the sand or crushed quartz-tempered Accokeek wares. Stone tools characteristic of the Early Woodland period include a variety of projectile point styles, drills, perforators, flake tools, scrapers, bifaces, anvil stones, net sinkers, mortars, pestles, manos, metates, groundstone tools (e.g., axes, adzes, celts), ground slate, gorgets, and tools made from animal bone and teeth (Dent 1995).

The Middle Woodland period (500 B.C. –A.D. 900) generally is not well-defined, and researchers disagree about the exact boundaries of the period. Dent (1995:235) has referred to this period of "technological homogenization" where "ceramic and projectile point variability becomes limited to fewer types." Despite the presence of fewer ceramic and projectile point styles, the Middle Woodland period represents a continuation and further development of cultural complexity that culminates in the Late Woodland period. In addition, intensification in trade networks over a large region is one of the notable trends evident by the onset of the Middle Woodland period. It is thought that warmer and drier conditions may have prevailed during this period (Kellogg and Custer 1994).

3.1.4 European Contact (ca. A.D. 1600)

Native American culture at the time of contact with Europeans was a continuation of the Woodland lifeways. However, at this time, materials of European manufacture, acquired via trade, were also being incorporated into the indigenous tool kit. Subsistence was largely based on agriculture, though wild plants and game continued to be important. Settlements in the Mid-Atlantic region were typically nucleated villages of dome shaped wigwams and semi-rectangular long-house structures constructed of sapling poles and covered by grass, reeds, or tree-bark panels. Sometimes villages were fortified with wooden palisade walls. Societies were stratified and organized into chiefdoms that at times became confederated paramount chiefdoms (Dent 1995). Captain John Smith's explorations of the Chesapeake Bay area during the years 1608–1610 marked the first well-documented contact between European explorers and Native Americans in the region. Captain Smith's journal (Sultana Projects 2019) describes his travels and maps Indian villages along the extensive estuaries of the Potomac River. Captain Smith noted six tribes living on the northern side of the Potomac River, with the largest population found at the community of Moyaone, possibly near the modern town of Accokeek, Maryland (Stephenson et al. 1963).

Sixteenth and seventeenth century societies living in the Potomac River valley and along Maryland's western shore belonged largely to the Potomac and Piscataway chiefdoms, many of which were allied into loose confederacies (Grumet 1992). Further upriver lived the more independent Portobagos, Doegs, and Nacotchtankes, of whom little is known. European exploration and settlement in the area continued through the 1600s, with relations between the Native Americans and Europeans marked by periods of peaceful coexistence interrupted by times of tension and hostility (Potter 2006). As more land was granted to colonists and local tribes were encroached upon, relations further deteriorated. Natives of the Maryland coastal plain probably first felt the impact of European contact through contagious diseases and the movements of other native groups. By the 1650s, the Europeans had taken an aggressive role in claiming lands and driving out the Native Americans. Disease and warfare virtually exterminated the extant Native American cultures, and those that survived eventually were forced out of their homelands. By 1697, surviving peoples of the Potomac Valley began to move west of the Fall Line and into the depopulated Susquehanna Valley (Grumet 1992). At the start of the eighteenth century, most surviving local Native Americans had left the area. However, descendants of survivors continue to live in Maryland today, and some have become organized as the Piscataway Indian Nation, and the Piscataway Conoy Tribe of Maryland. The groups have not been granted Federal recognition but are recognized by the State of Maryland (MHT 2019).

3.2 EUROAMERICAN HISTORIC CONTEXT

The following discussion divides the historic period of Maryland and Carroll County into five subperiods following those identified by the MHT as important historic contexts for the state. These include Euro-American Contact and Settlement (1570–1725); Rural Agrarian Intensification (1725–1815); Agricultural-Industrial Transition (1815–1870); Industrial Dominance (1870–1930); and Modern (1930–Present).

3.2.1 Euro-American Contact and Settlement (1570–1725)

In 1634, Europeans established St. Mary's City, the first permanent settlement in Maryland. St. Mary's City was the capital of the Colony of Maryland and remained so until the capital was moved to Anne Arundel County in 1694. The first historical record of the name Baltimore County did not appear until 1659 in a writ issued to the county sheriff; formal boundaries were first mentioned in 1674, when Cecil County was created from the eastern portion of the county (Brooks and Rockel 1979; Lanman 2009). Baltimore County originally included parts of what are now Cecil, Harford, Carroll, Anne Arundel, Howard, and Kent counties, as well as Baltimore City. The county was named after the second Lord Baltimore, Cecil Calvert, who took his title from his barony estates in Longford County, Ireland (Brugger 1988).

The charter from King Charles I gave Cecil Calvert ownership over the approximately seven million ac of land of the Maryland colony. From 1634 through 1680, the Calverts promoted the settlement of the colony through the headright system in which small tracts of land were granted to those who funded their own or others' passage to the colony, usually 50 ac per "head". Over 34,000 land patents are known to have been recorded under the headright system, a figure that is thought to account for 80 percent of the settlers entering Maryland prior to 1684 (Maryland State Archives 2018). During the early settlement period, settlements focused on the Potomac and Patuxent Rivers, and Maryland quickly became an important tobacco-producing colony. The landscape remained sparsely populated, however, with few resident landlords.

3.2.2 Rural Agrarian Intensification Period (1725–1815)

Agriculture, specifically tobacco cultivation, remained the primary occupation of settlers and residents in the Baltimore County area throughout most of the eighteenth century, though the county was largely uninhabited at the beginning of the century. In the early part of the eighteenth century there were fewer than 500 families living within the county boundaries, and most of those were concentrated along the coastline (Brooks and Rockel 1979). Initially the inhabited landholdings in the county consisted of small clearings with simple one or two room houses. The small clearings eventually grew, giving way to large farms with a number of outbuildings and workers.

The widespread cultivation of tobacco, a highly land- and labor-intensive cash crop, contributed towards the persistence of larger land holdings and the rise of slave ownership in the region. The falling value of tobacco also led to increased dependence on enslaved labor in the eighteenth century, and by 1737, slaves made up 38.5 percent of the total taxable population of Baltimore County (Brooks and Rockel 1979). In 1747, in an effort to regulate the quality and quantity of tobacco produced in the colony, the colonial legislature instituted tobacco inspections, a system already in place in Virginia. Tobacco inspection points were established throughout the colony, each with warehouses and inspectors (Brugger 1988). Tobacco remained the principle cash crop throughout the colonial period in the Baltimore County area; however, the rapid depletion of the soil from intensive tobacco cultivation led to early crop diversification, and staples such as wheat and corn supplemented tobacco as major cash crops. Towns began to develop throughout the colony around major land routes, ports, and mills (Brugger 1988).

Meanwhile, further west in the county, the area that would become Carroll County would remain sparsely occupied until well into the nineteenth century (Wesler et al. 1981; Bunting and D'Amario 1999). Few navigable waterways and a landscape bisected by deep gullies discouraged settlement by wealthy landowners interested in high yield crops like tobacco. The land was settled by German immigrants from Pennsylvania, who established small grain farms, and built mills on the many rushing streams in the area. Settlements consisted of small hamlets connected by road networks to mills and harbors on the Patapsco River (D'Amario 1976). The primary industry was grain milling.

3.2.3 Agricultural-Industrial Transition (1815–1870)

The continued exhaustion of the soil from tobacco cultivation and the subsequent decline in quality and price of tobacco resulted in economic and demographic changes throughout the Chesapeake region. Societies were formed to experiment with and disseminate alternative agricultural practices such as crop rotation and diversification (Brugger 1988). One method to improve soils was through the introduction of organic and mineral materials, such as lime. German chemist Justus Freiherr von Liebig is often considered the father of modern "agricultural chemistry" for demonstrating the importance of nitrogen and noting that plants require inorganic nutrients to grow (e.g., Justus 1847). This type of scientific treatment of soils and promotion of these farming practices began to appear in popular publications in the 1840s and 1850s. For example, Samuel Sands' publication, *The American Farmer*, ran monthly in Baltimore starting in 1845. The first issue was chiefly concerned with advice on different types of manure, including the use of lime, to "resuscitate worn-out lands" (*American Farmer* 1845:19). Similarly, the 1849 British publication *On the Use of Lime in Agriculture* is a 300-page step-by-step manual on the proper preparation and use of lime to improve soils, covering different types of limestone, procurement, burning, stacking, and field application (Johnston 1849). Books and journals that explained the benefits and proper use of mineral and organic materials to improve farm produce found a ready market in Maryland. In the limestone-rich Piedmont areas of Baltimore and Carroll counties, lime kilns for private use were a common element of farms during this period (Chapman Publishing Company 1897).

In addition to attempts to improve soil quality, large land holdings were divided into smaller tracts for small-scale, family-owned diversified farms that produced a variety of crops. Commerce and industry became increasingly important, influencing the development of new transportation systems. In 1828 the construction of the Baltimore and Ohio Railroad began at Mt. Clare in what is now Baltimore City (O'Donnell 1968). It was hoped the railroad would open up access to the port at Baltimore to farms and industries farther west. The Baltimore and Susquehanna Railroad was completed in 1832, with a track running north from Baltimore to York, Pennsylvania, and by 1838 a train was making the round-trip journey between the two cities once a day (Clemens 1983).

In 1830, the Baltimore and Ohio Railroad built a stop at a small hamlet of Sykesville. The town grew around the rail stop, and nearby farmers were able to diversify crops and grow more perishable foods that could now be rapidly shipped to markets by rail (Tyler et al. 2015). Carroll County became a distinct jurisdictional entity in 1837 (Wesler et al. 1981).

The late Antebellum period and Civil War brought much friction into Carroll County. The German farmers with small plots tended to be against slavery, while the English farmers with larger plantations favored slavery but not secession (Hall 2005). The split sympathies put Carroll County residents against each other. During the war, Sykesville was raided by J.E.B. Stuart and his cavalry.

3.2.4 Industrial Dominance (1870–1930)

Farming continued to be the prime economic engine of Carroll County in the early twentieth century. There was little growth outside of the burgeoning mill towns along the Patapsco, like Daniels and Ellicott City in neighboring Howard, County.

In 1868 much of Sykesville was destroyed by flooding (Hall 2005). The town was originally centered on the Howard County side of the Patapsco River, but following the flood, the city was rebuilt on higher ground, on the Carroll County side of the river. Most of the Victorian buildings extant in downtown Sykesville were built by architect J.H. Fowble during the 1890s. The town was incorporated in 1904 (Wimmer 1985).

3.2.5 Modern (1930–Present)

The county remained largely rural into the 1930s. During the Depression many of the small farm plots were foreclosed. Large sections of Sykesville’s business district were destroyed by fire in 1937 (Downtown Sykesville Connection 2018). Following the Second World War, Sykesville and surrounding environs began to grow rapidly as part of the post-war suburban expansion. Today Carroll County and its population centers of Sykesville, Eldersburg, and Mt. Airy are closely intertwined economically and culturally with Baltimore and Frederick.

3.3 PROJECT AREA HISTORY

Historic maps and aerial photographs were reviewed to develop a preliminary history of the APE, characterizing historic land use patterns and the built environment to the extent possible. Historic images from the Library of Congress, United States Geological Survey (USGS), Johns Hopkins University, and other repositories were examined as appropriate.

While historic maps from the seventeenth through early nineteenth centuries were available for review, none provided sufficient detail to determine land use practices and occupancy status within the APE. It is expected that during the seventeenth and eighteenth centuries, the APE likely was unoccupied, given the generally dispersed nature of Carroll County’s rural population at the time. While the population density remained relatively low during the early nineteenth century, it is possible that rural domestic, agricultural, and/or industrial (e.g., mining, milling) occupations may have been extant within or adjacent to the APE.

The earliest available maps detailing developments within the vicinity of the APE were separately produced in 1862 by Simon J. Martenet and J.N. Macomb (Figures 3-1 and 3-2). The Martenet map includes significantly more detail that the Macomb map, the latter being a simplified version that used the former as a basis. Both maps show no development within or adjacent to the APE, though several residences are shown to the northwest and various industries are shown downstream to the southeast. The APE was isolated from the principal road networks, perhaps contributing to its underdevelopment and/or exclusion from mapping. It is interesting to note that the Macomb map shows a small, incompletely drawn road spur leading north from a bend in what is now Obrecht Road and on a trajectory that may have led north into the APE. Several unmapped historic road traces were observed during this project, and it is possible that the incomplete road Macomb illustrated would have connected to one of these. Neither the Martenet nor Macomb maps depicted tertiary rural roads, so it is possible that minor routes had been established within the APE by this time. Theoretically, unmapped historic occupations could have existed along these routes.

CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:24,000
SOURCE:	Martenet 1862

U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1862Martenet_20191220

N

TITLE

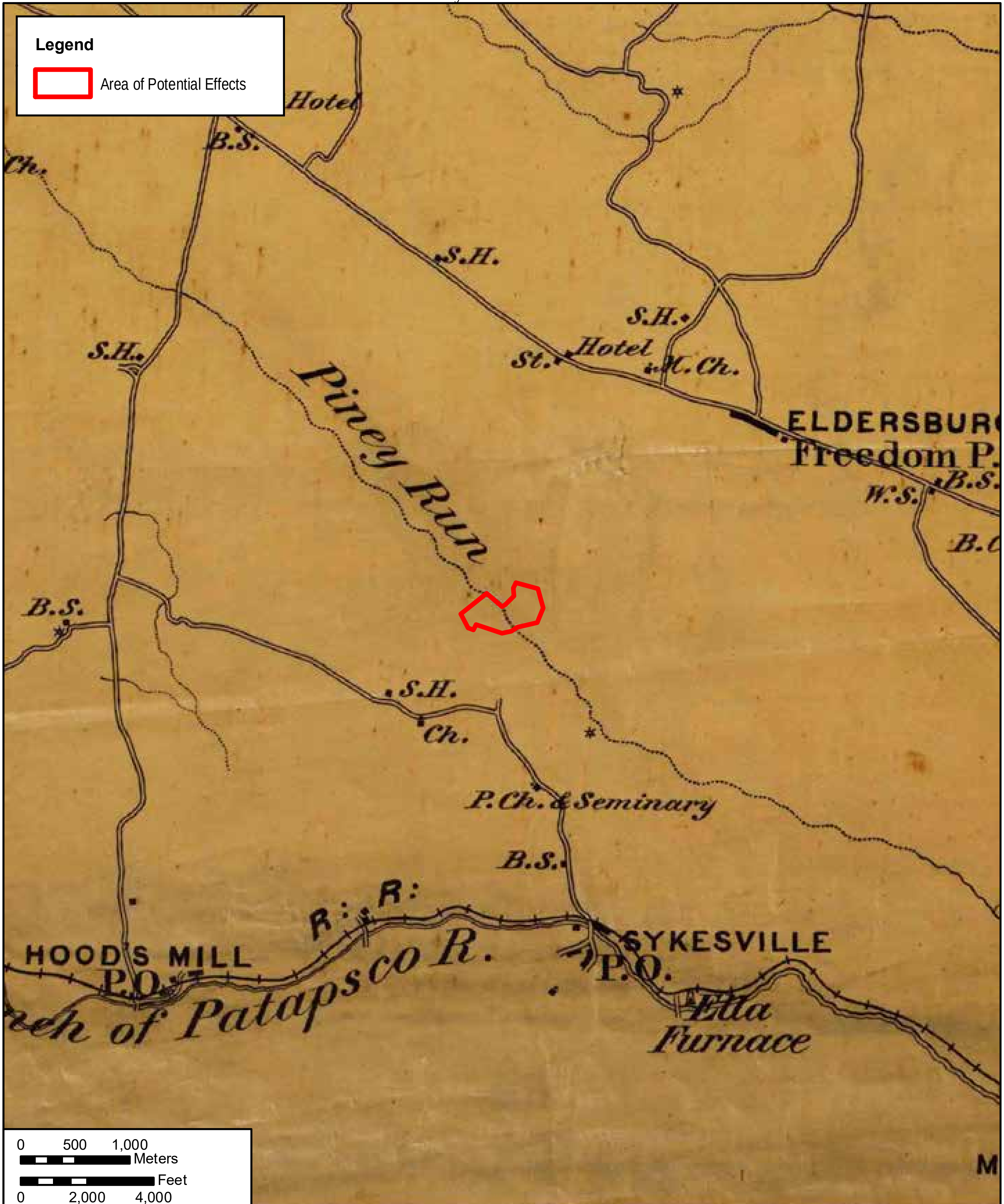
1862 Martenet Map

AECOM

12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688

FIGURE 3-1



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:48,000
SOURCE:	Macomb 1862

U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1862Macomb_20191223

N

TITLE
1862 Macomb Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO	60614688
FIGURE	3-2

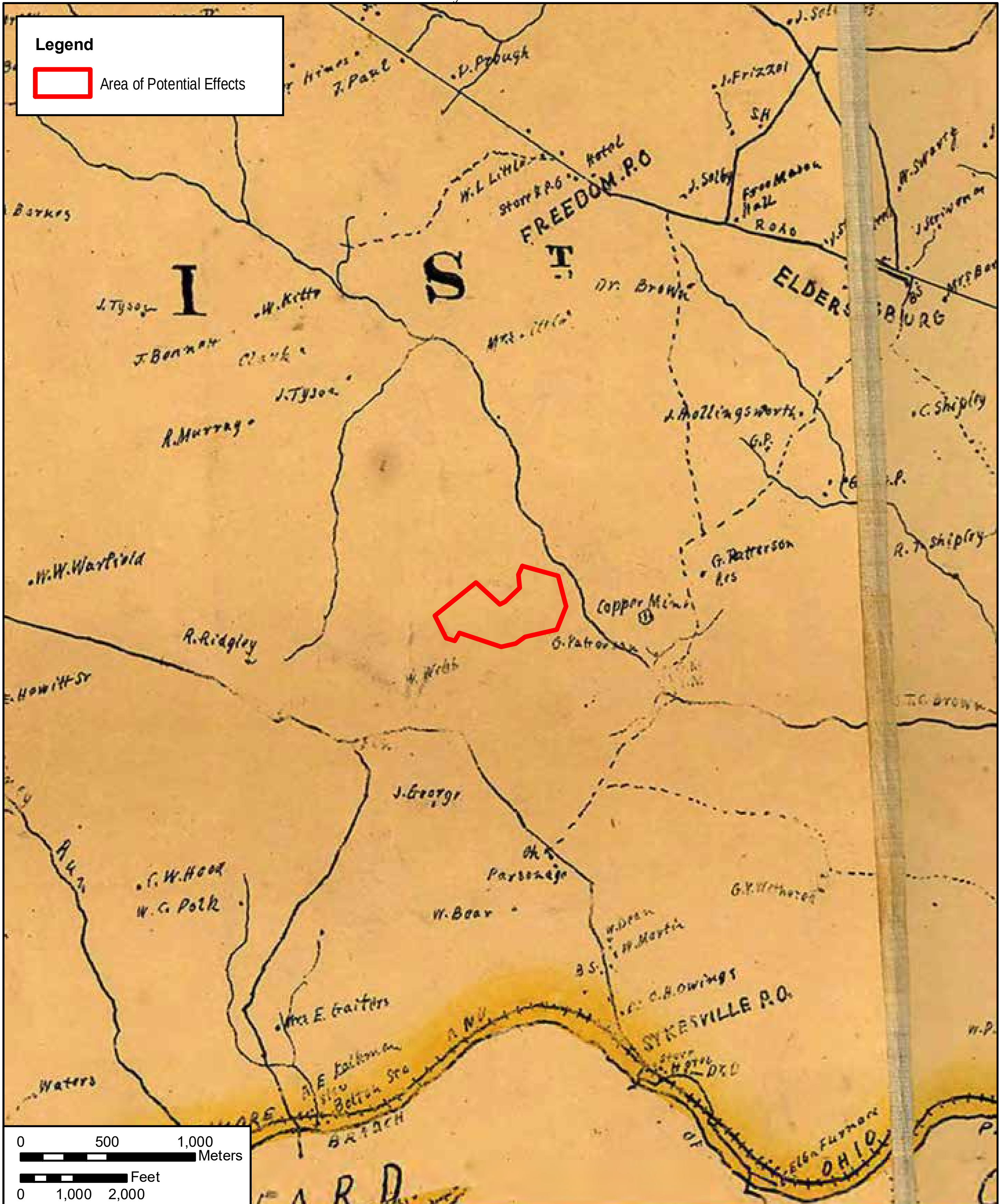
In 1863, William Shearer produced a more rudimentary map of Carroll County that somewhat crudely depicts the principal roads and waterways in the vicinity of the APE (Figure 3-3). Useful only as a schematic, Shearer's map does not illustrate road alignments, stream courses, and historic occupations with the spatial accuracy evident in the 1862 maps above. It correctly shows how principal features of the cultural landscape were arranged relative to one another, but their distances and orientations appear to be general approximations. Fewer residential and industrial occupations are shown compared to the 1862 Martenet map, though Shearer depicted some dwellings absent from earlier maps. Despite the inaccuracies, Shearer's map generally concurs with the 1862 maps insofar as no improvements were shown within the APE.

The 1892 United States Geological Survey's (USGS) Ellicott quadrangle provided some additional details regarding the rural road network within the APE (Figure 3-4). A nonextant road is shown branching northwest from what is now Maryland Route 32 (MD 32), following the footslopes and floodplain on the south side of "Winter Run" (now Piney Run). Shortly after entering the APE, this road abruptly turns northeast to cross an unnamed stream as well as Piney Run before continuing northwest to intersect what is now a portion of Martz Road submerged beneath Piney Run Reservoir. The map only selectively illustrated local buildings, giving preference to those associated with towns/villages; more dispersed buildings (e.g., farmsteads) typically were not shown, with the exception of those serving industrial or institutional purposes (e.g., mills, churches, schoolhouses). Therefore, while no buildings are depicted within the APE or vicinity, this does not indicate that none existed.

The 1906 USGS Ellicott quadrangle shows significantly more detail than its 1892 predecessor (Figure 3-5). The unnamed road shown in 1892 connecting what is now MD 32 and Martz Road was only partially extant by 1906, the northwestern two-thirds of it having fallen into disuse. However, the segment linking MD 32 to the APE still survived as an unimproved route following Piney Run to an unidentified occupation located south/southwest of the existing Piney Run Dam. Located on the north side of the road and built into the footslopes of the Piney Run valley, it appears likely that this occupation was domestic/agricultural in nature. While it is possible that it could have served an industrial purpose, such as milling or mining, this seems unlikely. The absence of a millrace (illustrated for mills elsewhere) and its distance upslope from Piney Run suggest it was not a mill, while its distance from any improved roads or other means of transport suggests it was not a mining operation. Its general isolation would have made hauling raw and/or finished materials more than a kilometer over an unimproved road impractical, whereas a farmstead would have been more self-sufficient and probably less reliant on regular travel.

In 1911, the United States Post Office Department (USPOD) issued a rural delivery service map of Carroll County, showing residences, delivery points, and the road network (Figure 3-6). No occupations are depicted within or adjacent to the APE, though several dwellings appear in the broader vicinity. The unimproved road depicted on the 1906 USGS map is still shown, though the building at its northwestern terminus is not. Whether the building was unoccupied, or whether its isolation precluded its illustration, is not clear.

A 1943 aerial photograph provides the earliest available true representation of improvements and land uses within the APE (Figure 3-7). In general, agricultural fields and forest stands characterize contemporaneous land uses, along with what appear to be at least three farmsteads within/adjacent to the APE. In the southcentral portion of the APE, a farmstead is clearly visible and corresponds to the historic occupation first illustrated on the 1906 USGS map. The small complex was accessed via a dirt road leading north-northeast from what is now Obrecht Road. Two barns/outbuildings



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:30,000
SOURCE:	Shearer 1863

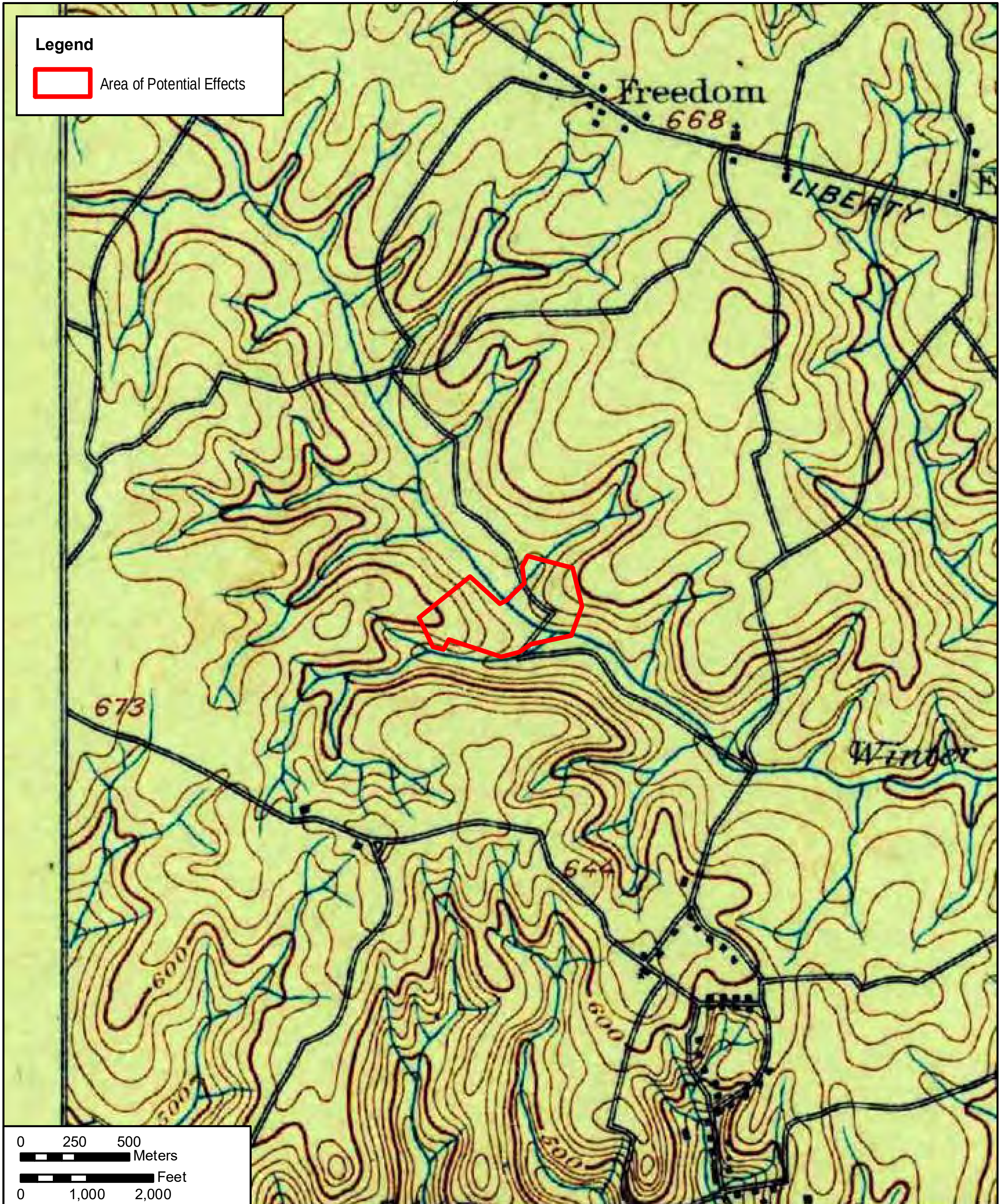
U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1863_20191223

N

TITLE
1863 Shearer Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-3



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:24,000
SOURCE:	USGS 1892

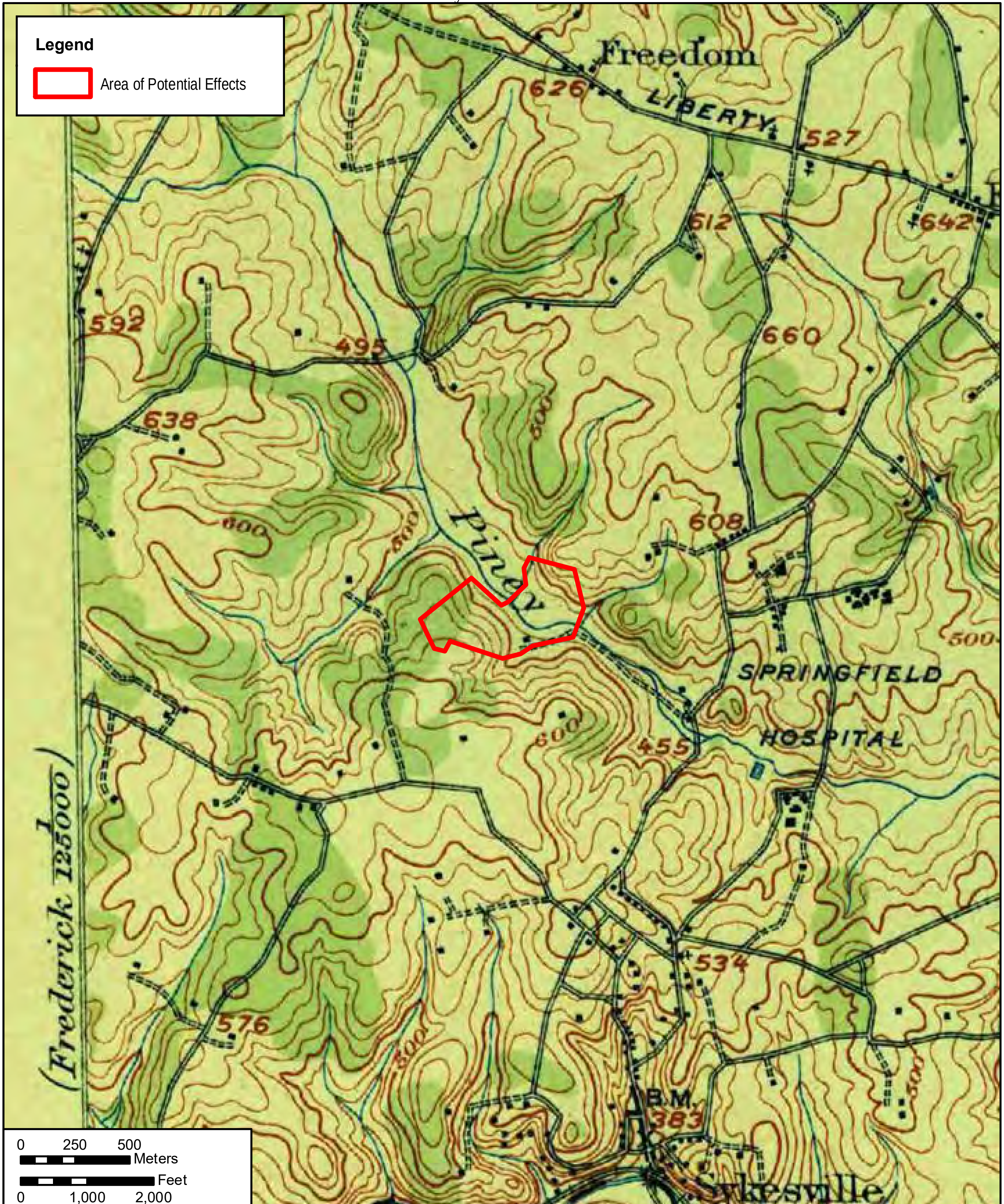
U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1892_20191223

N

TITLE
1892 USGS Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-4



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:24,000
SOURCE:	USGS 1906

U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1906_20191224

N

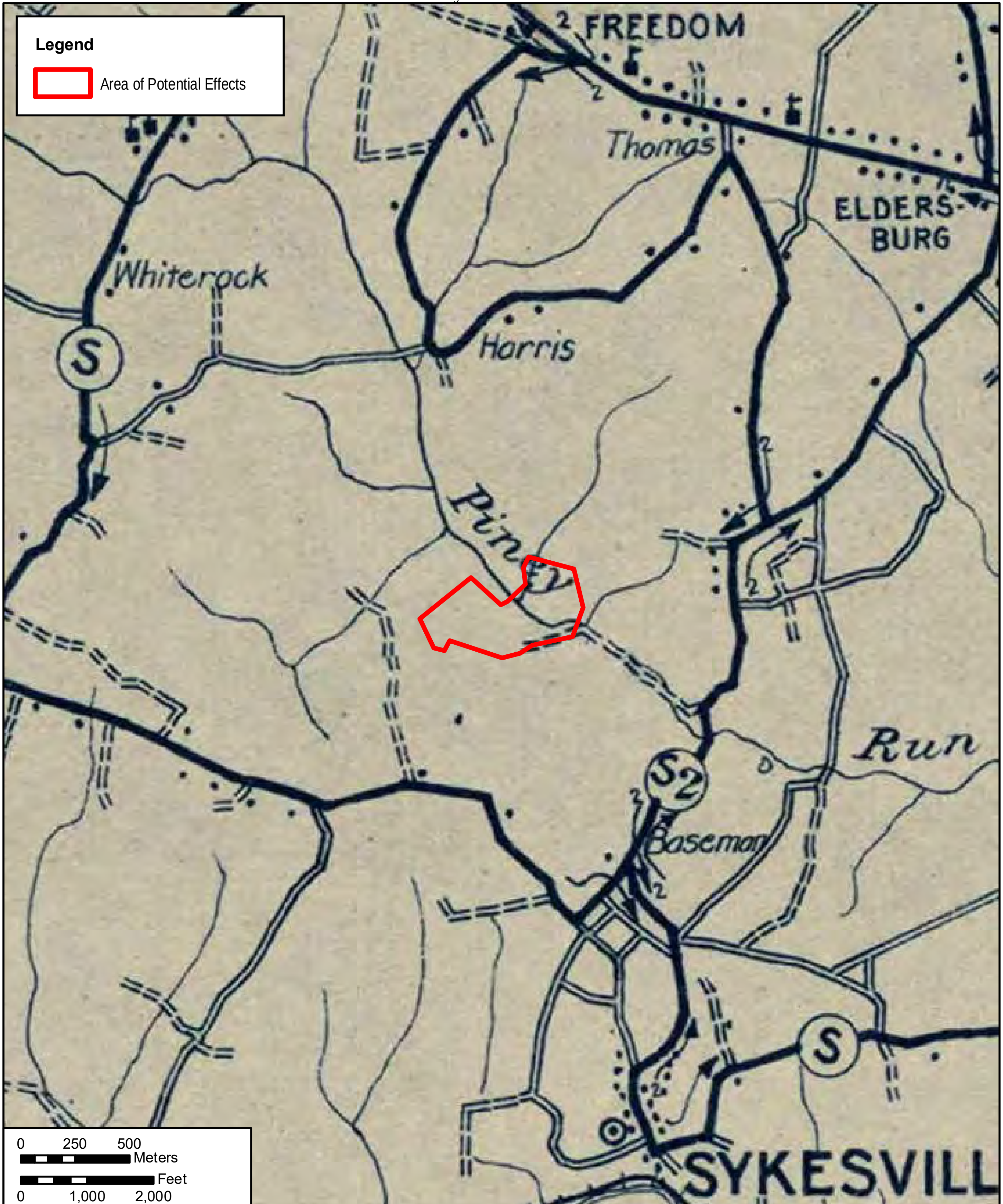
TITLE

1906 USGS Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688

FIGURE 3-5



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:24,000
SOURCE:	USPOD 1911

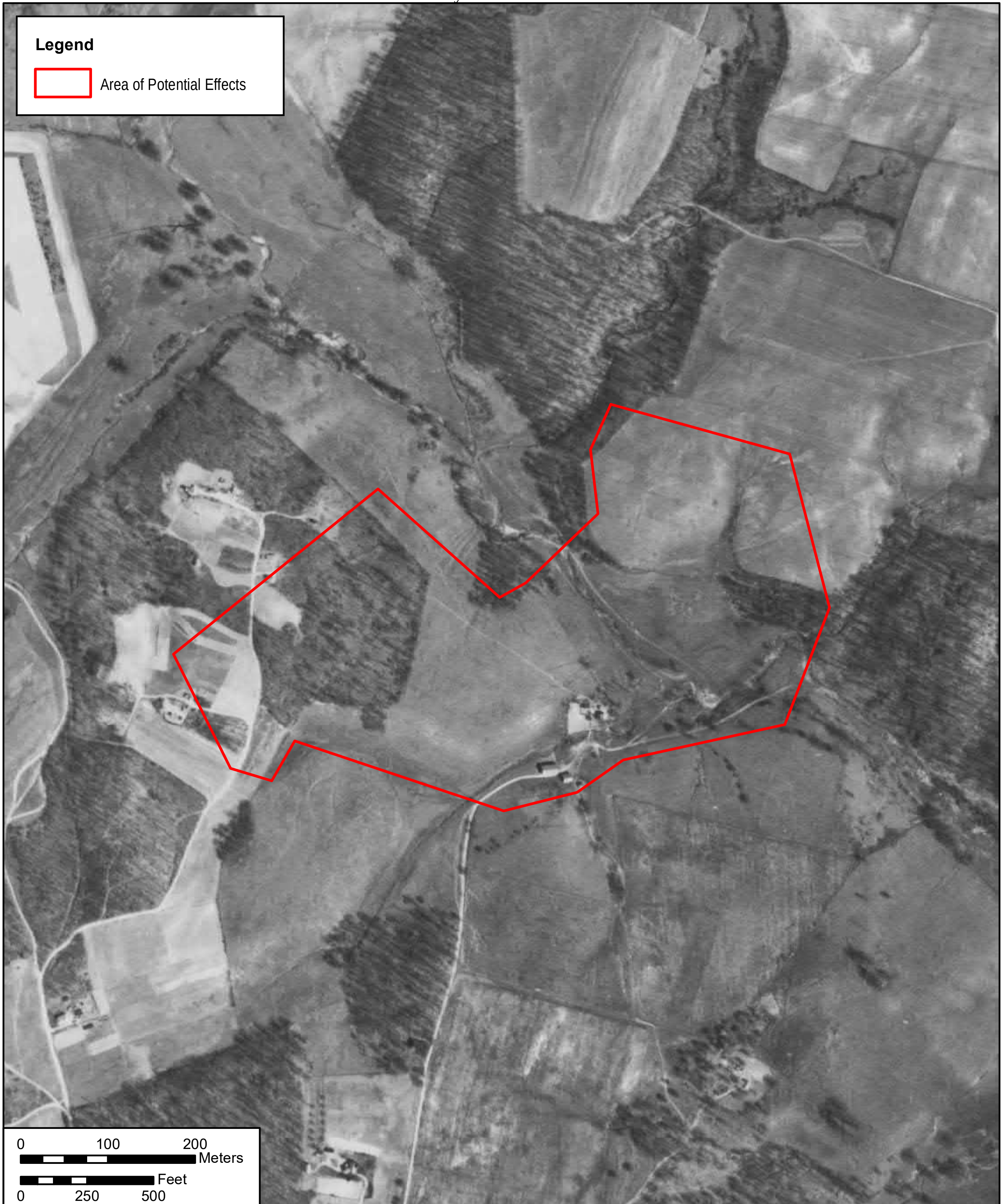
U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1911_20191226

N

TITLE
1911 USPOD Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-6



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

N

TITLE
1943 Aerial Photograph

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-7

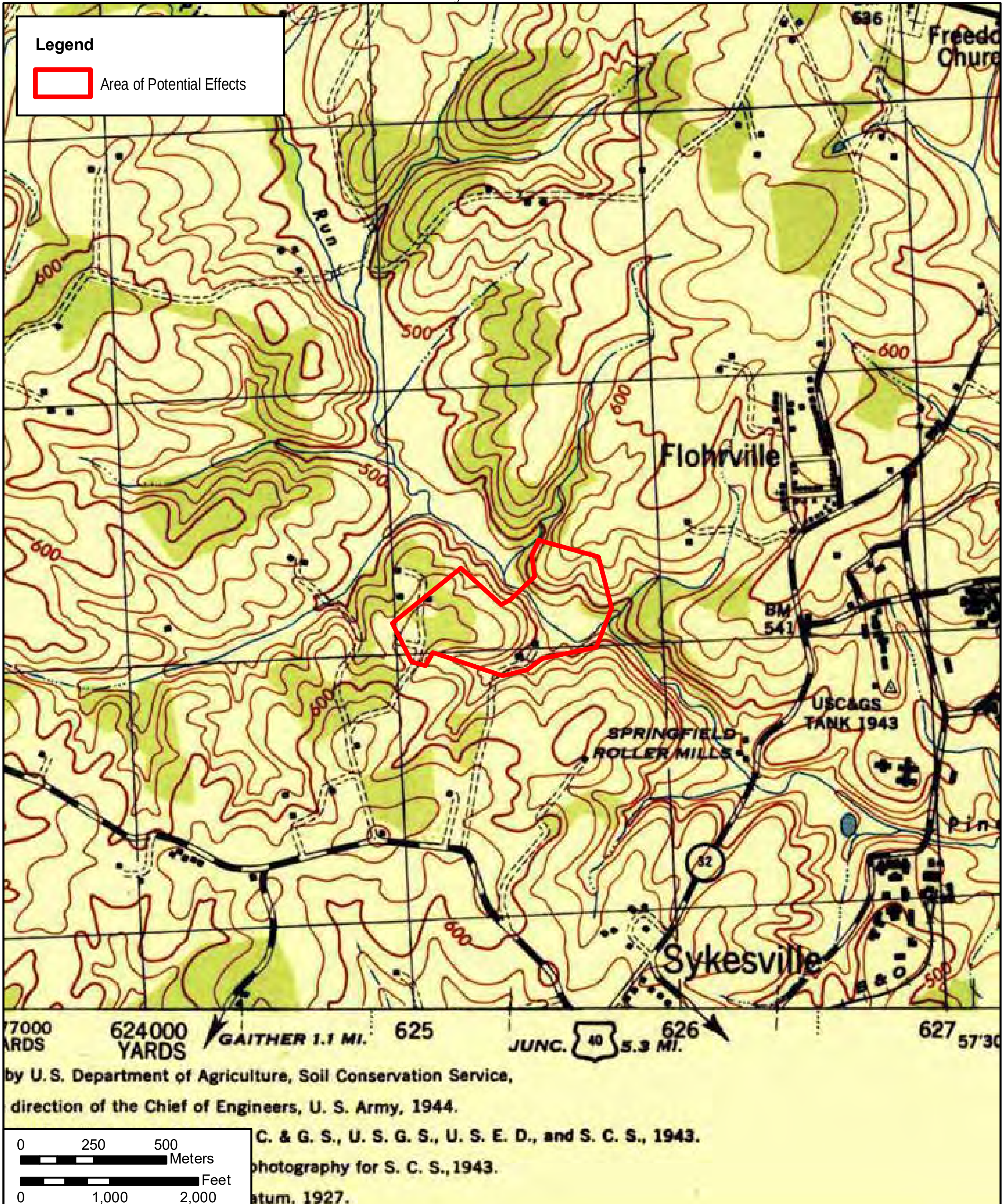
are clearly visible along either side of this road, with a third building (or possibly a small building complex) located to the northeast on the opposite side of a small stream. The vegetation in this space is sharply contrasted against the surrounding agricultural fields and could represent yard space. The potential yard space and distance from the barns/outbuildings suggests this may have served as the occupation's residential area.

A second farmstead is visible just beyond the far western edge of the APE, accessed by another dirt road leading north from what is now Obrecht Road. The farmstead's layout is difficult to discern due to poor image quality, but it appears to include several buildings clustered relatively close together, one of which may be within a few feet of the APE boundary. Following this dirt road farther north, it leads to a building located on the APE's northwestern boundary. It is not clear if this represents a distinct farmstead, or an outbuilding/secondary dwelling associated with the larger farmstead clearly visible to the north/northwest beyond the APE.

The 1944 USGS Finksburg quadrangle is the earliest available 7.5-minute map and provides a simplified view of the built environment depicted in the 1943 aerial photograph (Figure 3-8). Each building is represented with the same generic solid black square symbol, making it impossible to differentiate between a range of possible functions (e.g., industrial, agricultural, domestic). However, the 1953 USGS Finksburg quadrangle used unique symbols to distinguish broad classes of building types (Figure 3-9). Solid black squares were used to identify Class 1 buildings, (structures sheltering human activities; e.g., dwellings), while open squares correspond to Class 2 buildings (structures protecting machines, materials, or animals; e.g., large barns/sheds). The farmstead in the southcentral part of the APE includes a Class 2 building that corresponds to the large barn shown in the 1943 aerial photograph, as well as a Class 1 building to the northeast that almost certainly represents a dwelling (as the 1943 photograph suggested). The farmstead just west of the APE was represented by a single dwelling on the 1953 map, though the 1943 photograph suggested additional buildings (possibly too small for USGS illustration standards) were present. The farmstead along the northwestern APE boundary was represented by a dwelling as well, and it is unclear from historic maps and aerial photographs whether any outbuildings were located nearby. As suggested above, this dwelling could represent an independent property or it could have been affiliated with the larger farmstead north/northwest of the APE.

A 1958 aerial photograph shows that the farmstead in the southcentral part of the APE may have fallen into disuse, though poor image quality and contrast makes it difficult to determine (Figure 3-10). While the two barns/outbuildings clearly visible on the 1943 aerial photograph are still evident, the location of the dwelling immediately to the northeast appears to be overgrown. A small access road linking the barns to the dwelling has all but faded by this time and no yard spaces are clearly visible. Additionally, some tree growth has returned to the far northern end of the agricultural fields surrounding this property, possibly indicating a lapse in agricultural activity. It is therefore possible that the farmstead was abandoned by this time, though the photograph's quality makes this difficult to confirm. No buildings are clearly apparent within the farmsteads along the western and northwestern boundaries of the APE, but this is a product of poor image quality; subsequent aerial photography confirms they were still standing at this time.

A marked up 1963 aerial photograph provides additional details on ownership and occupancy statuses for the properties that comprised the APE (Figure 3-11). The farmstead in the southcentral part of the APE, on property belonging to "Frank Beaseman" (Beasman), was partially circled and labeled "VAC" (almost certainly "vacant"). By this time, the photograph clearly shows that the farmstead's access road had fallen into disuse while the area around the former dwelling had



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:18,000
SOURCE:	USGS 1944

U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1944_20191226

N

TITLE
1944 USGS Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-8

CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:18,000
SOURCE:	USGS 1953

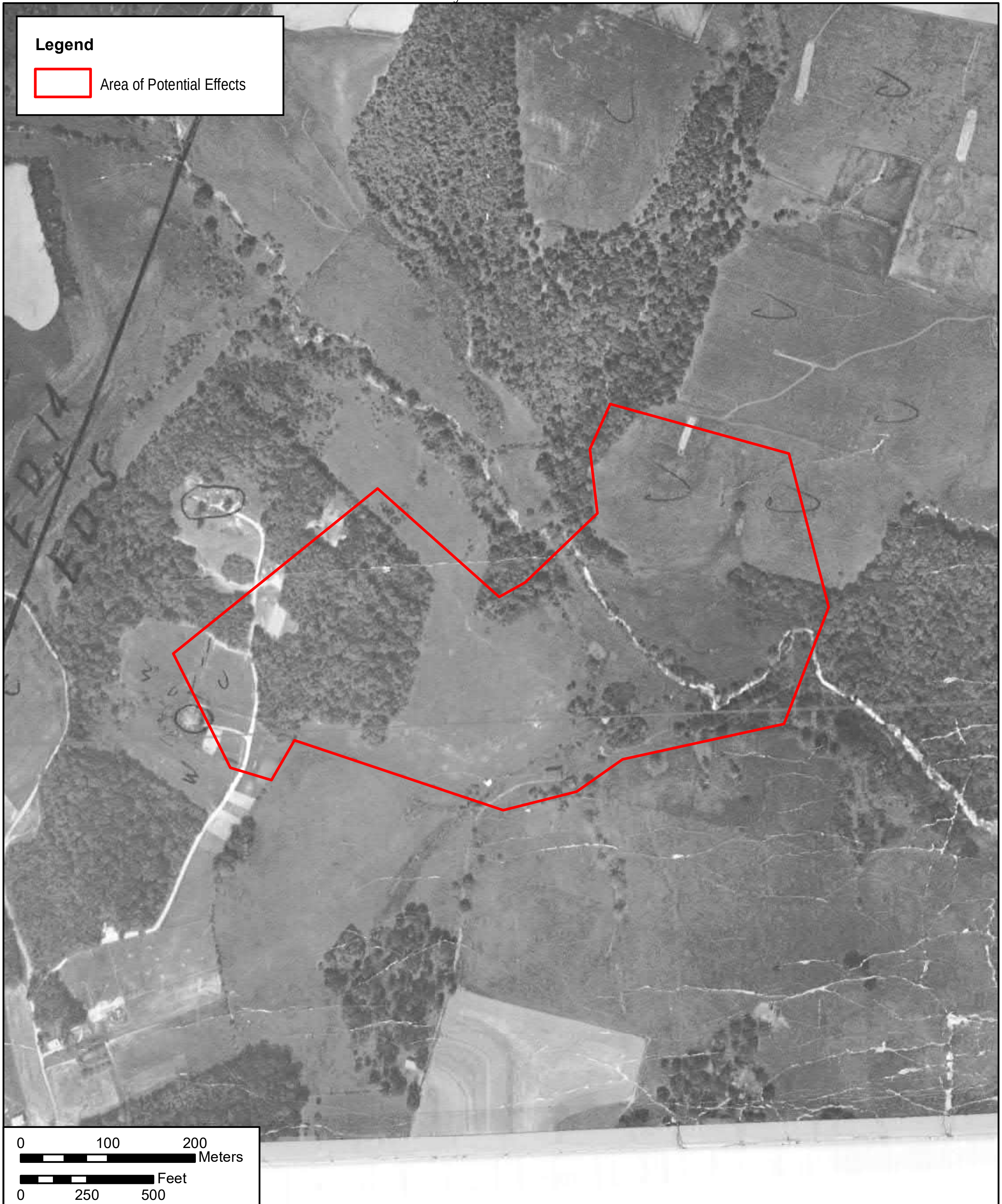
U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1953_20191226

N

TITLE
1953 USGS Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-9



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

TITLE
1958 Aerial Photograph

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-10

CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

TITLE
1963 Aerial Photograph

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

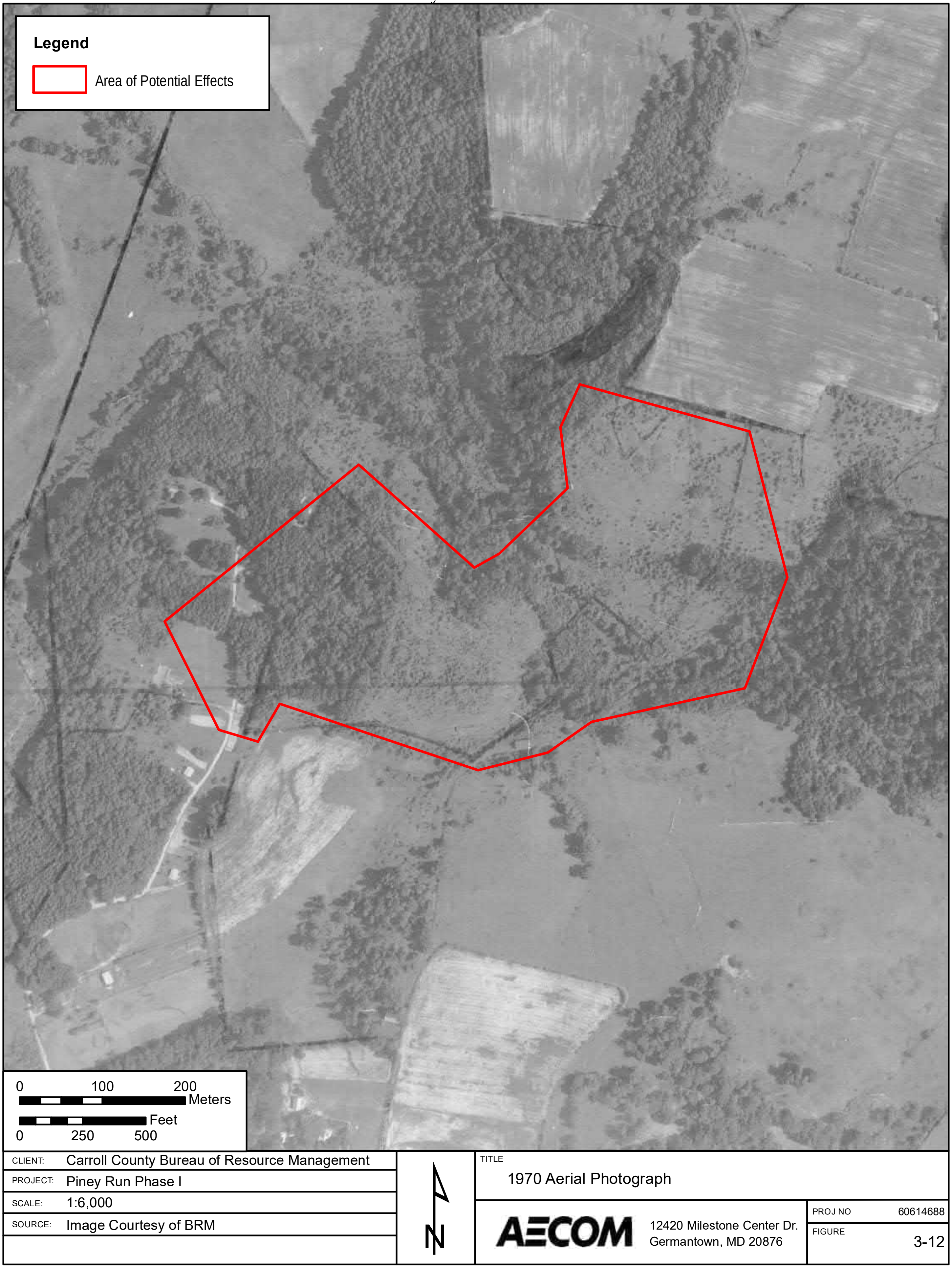
PROJ NO 60614688
FIGURE 3-11

become increasingly overgrown. Returning tree and shrub growth are clearly evident throughout the fields surrounding the farmstead, substantiating evidence from the 1958 photograph that agricultural activities had ceased. The farmstead near the western boundary of the APE was still extant, though poor image resolution makes it difficult to distinguish individual buildings. The owner's name is not clearly legible on the photograph, though the surname probably reads "Dorsey". The farmstead on the northwestern boundary of the APE was also extant, though specific details of the building arrangement are also obscured by poor image quality. The owner's surname, Carroll, is legible but the given name is not.

A 1970 aerial photograph shows increasingly dense forest growth returning to the former agricultural fields that once dominated the central and eastern portions of the APE (Figure 3-12). In the southcentral part of the APE, the large barn is the only remnant of the previous farmstead still clearly visible. The farmstead at the west end of the APE appears to have been demolished by this time, though local tree growth makes this difficult to state conclusively. Tree growth also obscures details of the farmstead located along the APE's northwestern boundary, though the encroaching forest could be an indication it was no longer occupied.

A photorevised edition of the 1953 USGS map was released in 1971, but the built environment within the APE was not updated from its 1953 appearance despite the broad changes shown on the foregoing aerial photographs. In 1972, however, as-built drawings were prepared for the construction of the Piney Run dam and reservoir, encompassing the APE (Figure 3-13). The site plan drawing provides coverage for most of the APE and clearly shows three structures located south/southeast of the emergency spillway (located on the southwest side of the dam embankment, collocated with "Borrow II"). The easternmost and westernmost buildings respectively correspond to the Class 1 and 2 buildings shown on the 1953 USGS map. As noted above, these likely represent a dwelling and barn. A third building immediately southeast of the barn represents the outbuilding originally visible in the 1943 aerial photograph. The small complex was accessed by the same unimproved road extending northward from what is now Obrecht Road as shown on mid-century maps and aerial photographs. The only other built feature noted for this complex is a well shown at the large barn's southwest corner. No other buildings are apparent within the APE, though the plan did not detail the area that would have included the two farmsteads previously shown along the west and northwest boundaries of the APE.

A statewide topographic map produced by MGS in 1976 did not illustrate any of the historic occupations within the APE (Figure 3-14). In the southcentral part of the APE, a park road and turnabout are illustrated where the farmstead once stood, though it is unclear if this road was ever fully constructed. A road and turnabout are illustrated in the western part of the APE as well and in the vicinity of the farmstead that lately stood along the APE's northwestern boundary. This road follows the trajectory of a historic farmstead access road but is not passable today.

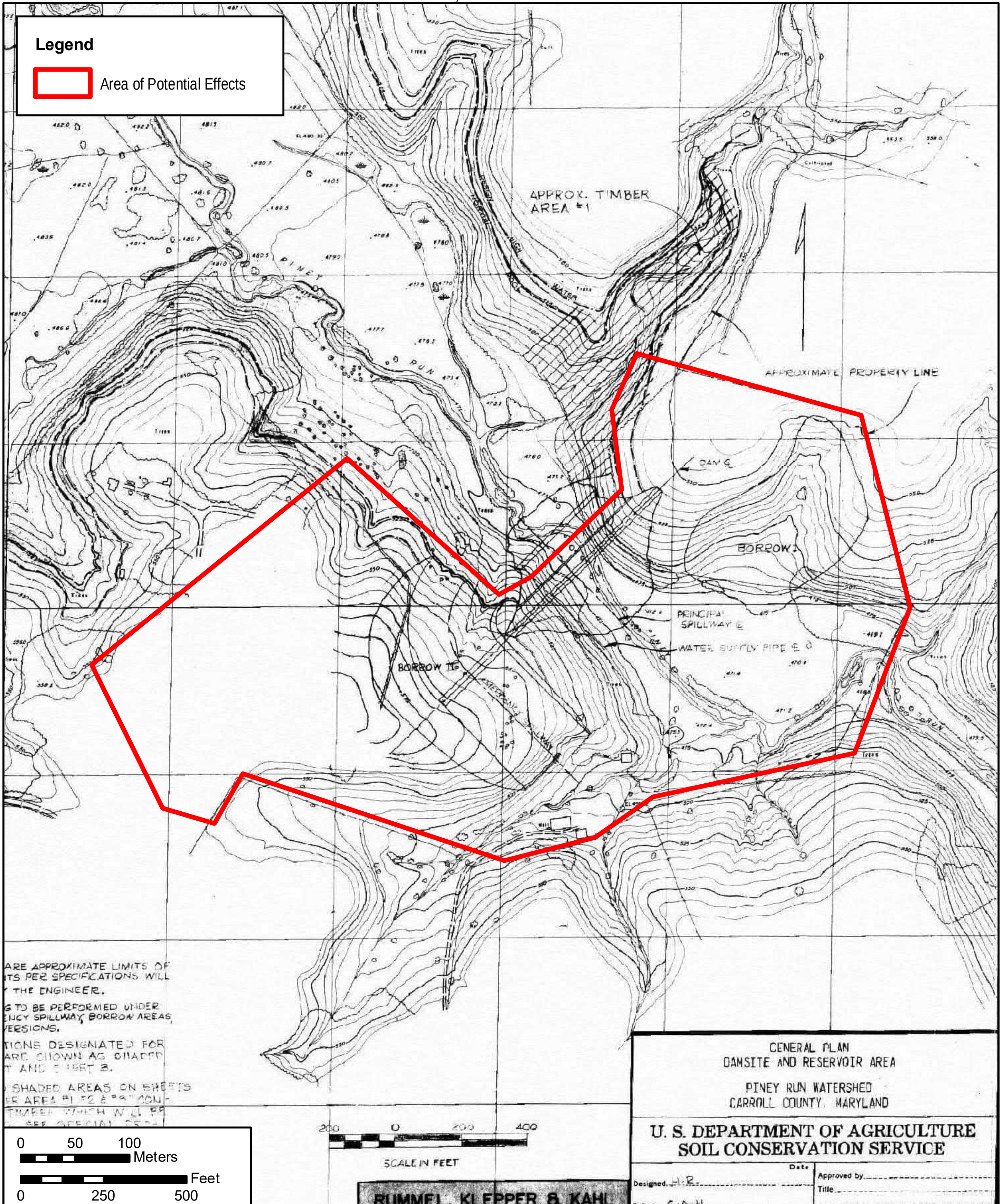


CLIENT: Carroll County Bureau of Resource Management
PROJECT: Piney Run Phase I
SCALE: 1:6,000
SOURCE: Image Courtesy of BRM

TITLE
1970 Aerial Photograph

AECOM 12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-12



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:4,800
SOURCE:	County Commissioners of Carroll County 1972

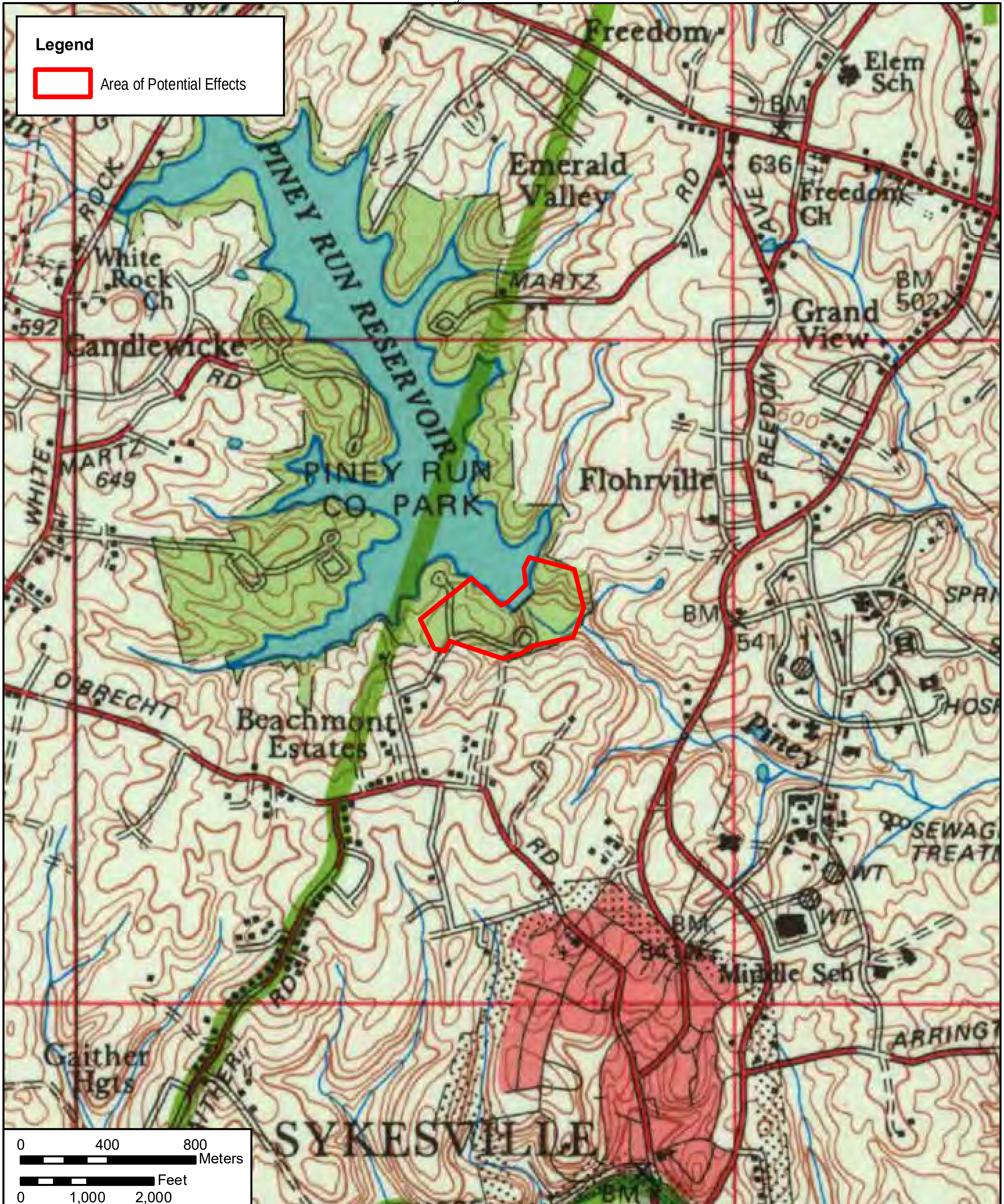
U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1972_20191226

N

TITLE
Piney Run Dam and Reservoir Site Plan

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-13



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase I
SCALE:	1:24,000
SOURCE:	MGS 1976

U:\Projects\MD\MSHA\GlenwoodAvenue\GIS\PineyRun_1976_20191226

TITLE: 1976 MGS Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-14

4.0 PREVIOUS INVESTIGATIONS

Previous cultural resources investigations, archaeological sites, and above-ground resources registered with MHT within 1.6 km (1 mi) of the APE were reviewed as part of this project. The primary objective of this research was to characterize the cultural resources profile of the surrounding area as an aid for contextualizing the results of the current study.

4.1 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS

Six previous cultural resource investigations have been registered with MHT within 1.6 km (1 mi) of the APE. In 1980, Wesler et al. conducted surveys along 326 systematically selected half-mile road segments across Maryland's piedmont region (Wesler et al. 1981). Two such segments were investigated along MD 32, resulting in the identification of no archaeological deposits.

In 1993, the American University conducted a Phase I survey of a 2-ha (5-ac) area for a proposed water treatment facility associated with Piney Run Reservoir (Dent and Jirikowic 1994). One hundred thirty-five STPs were excavated, resulting in the recovery of an isolated quartz flake and the identification of a ruin immediately east of the project's limits and within the current APE. The ruin was depicted on an incomplete excavation plan map adjacent to a trail in the valley south of the spillway (Figure 4-1). While the investigators did not record it as a site, they described it as:

> the remains of what appears to have been a wooden barn constructed on a foundation of local micaceous schist fieldstone. The structure measures 30 x 60 feet, with 10 foot openings on both ends and a silo foundation just east of the ruins. The hardware used in the structure indicate it was constructed in the 20th century (Dent and Jirikowic 1994:26).

No subsurface investigation occurred within the ruins, and no evidence for additional structural features was observed. This building is the same as that which first appeared on the 1944 USGS map and identified as a Class 2 building on the 1953 USGS map (Figures 3-8 and 3-9).

In 2003, Robert Wall & Associates conducted a Phase I survey of the proposed reconstruction of MD 32 at Maryland Route 851 (Wall 2003). The project area encompassed approximately 6.9 ha (17 ac), most of which was agricultural fields. No archaeological sites or isolated artifacts were identified during pedestrian survey and systematic shovel testing.

In 2004, Charles Hall conducted a Phase I survey of 97 acres on the grounds of the Springfield State Hospital and Phase II evaluations of 18CR172, 18CR255, and 18CR256 (Hall 2005). Site 18CR172 represents a nineteenth century domestic occupation subsequently used as a hospital facility. Site 18CR255 is a low-density, nondiagnostic prehistoric lithic scatter. Site 18CR256 is an early to mid-twentieth century concentration of hospital dining hall refuse. Sites 18CR172 and 18CR256 were recommended eligible for listing in the NRHP, while 18CR255 was not.

In 2015, Applied Archaeology and History Associates, Inc. (AAHA) conducted a Phase I survey of 5.1 ha (12.61 ac) in advance of the construction of the proposed Freedom Readiness Center (AAHA 2015). Fifty-two STPs were excavated, and a systematic pedestrian survey was conducted, resulting in the identification of 18CR283, a collection of late historic concrete foundations. The site was recommended not eligible for listing in the NRHP.

In 2017, AECOM conducted a Phase I survey in advance of stream restoration efforts along Piney Run over 1 km (0.8 mi) east of the APE (Koziarski 2018). In total, 886 STPs were excavated, resulting in the identification of 18CR287 and 18CR288. Site 18CR287 represents the remnants

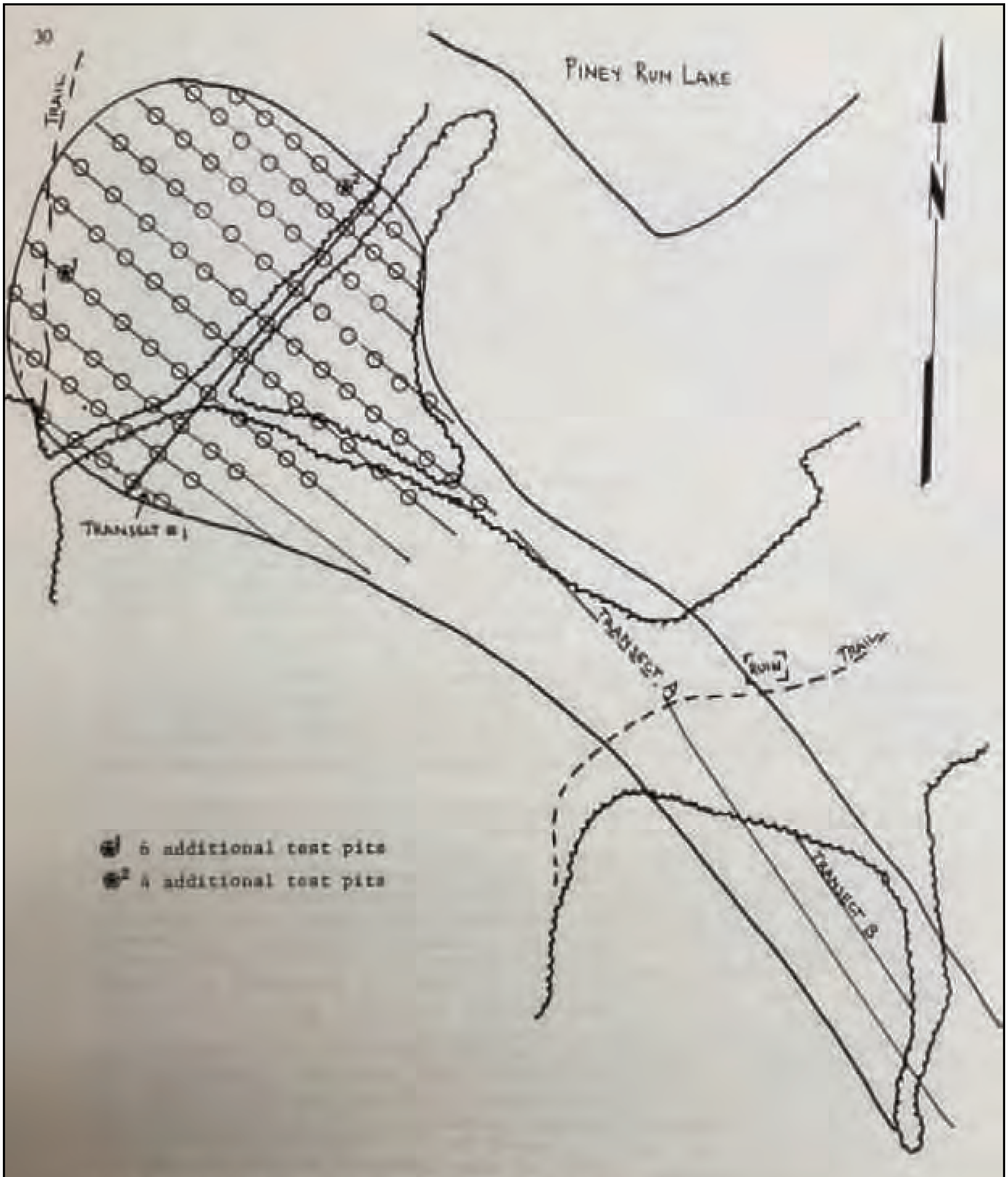


FIGURE 9: LOCATION OF SHOVEL TEST PITS AND TRANSECTS

Transect A: 22 shovel test pits
Transect B: 8 shovel test pits
Scale: 1" = 200'

CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	As Shown
SOURCE	Dent and Jirikowic 1994:30
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics	

TITLE
American Universty Partial Excavation Plan

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688
FIGURE 4-1

of the eighteenth to twentieth century Elias Brown mill, while 18CR288 represents a nineteenth to twentieth century rock quarry. Neither site was determined to possess good research potential, and both were recommended not eligible for listing in the NRHP.

4.2 PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES

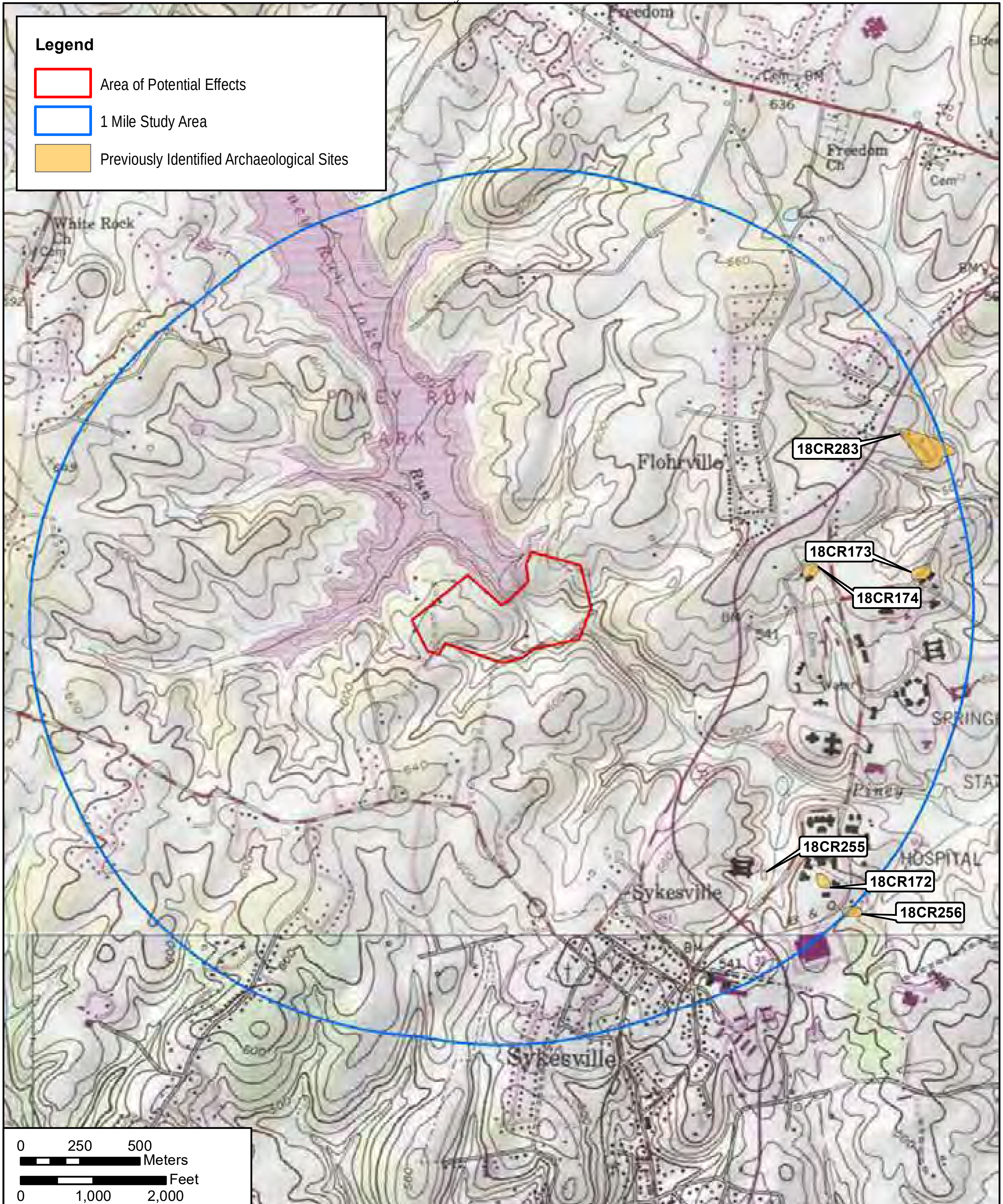
Six archaeological sites have been registered with MHT within 1.6 km (1 mi) of the APE (Table 4-1; Figure 4-2). These resources include one prehistoric and five historic sites. Historic sites include domestic, industrial, and institutional sites dating from the late eighteenth to the early twentieth century. The prehistoric site represents a low-density lithic scatter lacking diagnostic material. MHT staff have determined 18CR172 and 18CR256 eligible for listing in the NRHP, while two sites have been determined not eligible by MHT and the other two have not been assessed.

Table 4-1. Archaeological Sites within 1.6 km (1 mi) of the APE

Site Number	Site Name	Site Type	Temporal Affiliation	NRHP Status
18CR172	Buttercup Cottage	Farm House / Hospital Building	Mid-19th to Early 20th C.	Eligible
18CR173	Martin Gross “K” Cottage	Hospital Cottage / Industrial Site	Late 19th to 20th C.	Unassessed
18CR174	Patterson House	Mansion / Hospital Building	Late 19th to Early 20th C.	Unassessed
18CR255	Warfield Prehistoric Scatter #1	Lithic Scatter	Unknown Prehistoric	Not Eligible
18CR256	Warfield Dump	Dining Hall Debris	Early 20th C.	Eligible
18CR283	Springfield North Gate	Hospital Structure	Early 20th C.	Not Eligible

4.3 PREVIOUSLY RECORDED ABOVE-GROUND RESOURCES

Over 80 above-ground resources have been registered within 1.6 km (1 mi) of the APE, most of which are associated with the Springfield Hospital Center to the east. The center was established in 1894 as a psychiatric hospital built on the “cottage design” that has grown to include 62 historic buildings (Bowlin 1986). Parts of the Sykesville Historic District also fall within a 1.6-km (1-mi) radius of the APE. The district includes 97 resources constructed between 1850 and 1925 and is listed in the NRHP.



CLIENT: Carroll County Bureau of Resource Management
PROJECT: Piney Run Phase I
SCALE: 1:22,000
SOURCE: ESRI 2019

N

TITLE
Archaeological Sites within 1 Mile of APE

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 4-2

5.0 RESEARCH DESIGN

5.1 OBJECTIVE

The primary objective of the Phase I survey was to identify the presence, extent, nature, age, and potential significance of archaeological deposits, if any, within the APE.

5.2 METHODS

5.2.1 Research

Background research was undertaken using resources available from the MHT library and Maryland's cultural resource information system (MEDUSA) to characterize archaeological and above-ground resources within the vicinity of the APE. Digital archives, site forms, survey reports, and GIS data were examined to provide a depiction of the local archaeological record as part of this project's broader contextual framework. Electronic resources were utilized to compile cartographic data and supplementary historic context information to more thoroughly detail the area's cultural background. These include digital materials available from the Library of Congress, Johns Hopkins University, and other repositories as appropriate.

5.2.2 Field Methods

The Phase I survey consisted of STP excavation along a 20-m (65.6-ft) controlled grid oriented to true north and limited to the APE. Radial STPs were excavated at 10-m (32.8-ft) intervals in cardinal directions around positive primary STPs. In some locations, judgmental STPs were excavated to provide additional survey coverage of specific landforms and to aid archaeological site investigation. Each STP measured 40 centimeters (cm) (1.3 ft) in diameter and was excavated 10 cm (0.33 ft) into sterile subsoil. No STPs were excavated in areas of standing water, on slopes greater than 15 percent, or in areas of extensive disturbance. STPs were assigned unique alphanumeric identifiers representing coordinates along the survey grid's y (alphabetic) and x (numeric) transects; letters increase west to east and numbers increase south to north. Radial and judgmental STPs were identified by distances in cardinal directions from a primary STP. For example, judgmental STP W-3 E2.5 S12.5 is located 2.5 m (8.2 ft) east and 12.5 m (41 ft) south of primary STP W-3. Where archaeological sites were identified, site boundaries were determined by the distribution of positive STPs, cultural features, and pertinent landform characteristics (e.g., slope/waterbody constraints).

Field data were recorded on standard field forms and in general field notes. The forms included Munsell soil color, soil texture, profiles, features present, artifacts recovered, excavator's initials, and the date of excavation. The locations of STPs were noted on field maps and recorded using a global positioning system (GPS) unit. Archaeological features were documented on site plans, in photographs, and on feature forms describing the features' shapes and dimensions, location, and interpretation/feature types.

All soils were screened through 6.34-millimeter (mm) (0.25-inch [in]) hardware mesh to ensure uniform artifact recovery. Collected artifacts were bagged in plastic sealing bags labeled with all relevant provenience information, including project name, site name/locus (as appropriate), STP, feature number (as appropriate), stratum, level, the number of artifacts recovered, excavator initials, and date. Obviously modern artifacts (e.g., plastic) were generally noted on forms and discarded in the field. Very small brick fragments were occasionally found in low quantities with other historic artifacts; these were noted and discarded in the field.

5.2.3 Laboratory Analysis

Artifacts were transported to the AECOM archaeological laboratory in Gaithersburg, Maryland, where they were cleaned, cataloged, and analyzed according to the Secretary of the Interior's *Standards and Guidelines for Curation* (United States Department of the Interior 1991) and Morehouse et al.'s (2018) *Technical Update No. 1 of the Standards and Guidelines for Archaeological Investigations in Maryland*. The objectives of laboratory analysis and cataloging were to determine the date, function, cultural affiliation, and preliminary significance of the artifacts to the extent possible. Artifacts will be curated with the Maryland Archaeological Conservation Laboratory (MACL) in St. Leonard, Maryland.

As appropriate, artifacts were gently washed using tap water and a soft toothbrush before being analyzed, cataloged, and rebagged according to provenience. Artifact data were entered into a Microsoft Access 2010 database. The same attributes were recorded for all artifacts, including lot number (corresponding to provenience), artifact number (sequential numbers arbitrarily assigned within a lot), count, material (i.e., the main material composition of the artifact), and form (i.e., intended use). The original form was often difficult to determine given the fragmentary nature of the artifacts, resulting in the form designation of "fragment." Identical, or nearly identical, artifacts within a provenience were grouped together under the same catalog number. (Note: catalog number = lot number plus artifact number).

Many of the historic artifacts were identifiable as to material, form, and function, while others required research to determine their function and/or dates of manufacture. Numerous internet resources were helpful such as MACL's *Diagnostic Artifacts in Maryland* (2015), the Florida Museum's *Historical Archaeology Ceramic Type Collection* (2019), and the BLM/SHA *Historic Glass Bottle and Identification and Information* (Lindsey 2020). Artifact dating and identification were based on the following sources: The Clorox Company (2019); Deetz (1996); The Green Spark Plug Company (2018); Lindsey (2020); Miller et al. (2000); *The New Movie Magazine* (1933); O'Rourke (1991); South (1977); and Visser (1997).

The same attributes were recorded for all artifacts, including: count; material (i.e., the main material composition of the artifact); class, type, and object. The object was often difficult to determine given the fragmentary nature of artifacts. Additional group-specific attributes were recorded as appropriate.

Identical, or nearly identical, artifacts within a provenience were grouped together under the same catalog number (note: The catalog number is the bag number followed by artifact number.) For example, all the window glass fragments within a single bag number (i.e., all from the same provenience) would be given the same artifact number. Whenever possible, mendable artifacts were grouped together. An attempt was made to classify all historic ceramics according to published pottery types (e.g., whiteware, pearlware, stoneware). Those sherds not easily recognized were assigned a descriptive name based on surface treatment and paste. Diagnostic ceramic, glass, and metal artifacts were used to estimate dates for site activities.

Historic artifacts were classified using Orser's (1988) functional typology (Table 5-1), which provides a means for interpreting the function of specific historic artifact classes. Within Orser's system, historic artifacts were analyzed according to material type and function, when possible. One additional category (6 Unknown) was added to the functional typology to better capture unidentified artifacts. An additional subcategory was added to the labor category (5c Household) to capture artifacts used during household work (e.g., cleaning products).

Table 5-1. Functional Typology (Modified from Orser 1988)

1. Foodways	
	a. Procurement – Ammunition, fishhooks, fishing weights, etc.
	b. Preparation – Baking pans, cooking vessels, large knives, etc.
	c. Service – Fine earthenware, flatware, tableware, etc.
	d. Storage – Coarse earthenware, stoneware, glass bottles, canning jars, bottle stoppers, etc.
	e. General Foodways – Unidentified glass and ceramic containers
	f. Floral – Nut shells, seeds, fruit pits, phytoliths, pollen
	g. Faunal – Animal bones, antlers, horns, shells and other remains.
2. Clothing	
	a. Fasteners – Buttons, eyelets, snaps, hooks, eyes, etc.
	b. Manufacture – Needles, pins, scissors, thimbles, etc.
	c. Other – Shoe leather, metal shoe shanks, clothes hangers, etc.
3. Household/Structural	
	a. Architectural/Construction – Nails, flat glass, spikes, mortar, bricks, slate, etc.
	b. Hardware – Hinges, tacks, nuts, bolts, staples, hooks, brackets, etc.
	c. Furnishings/Accessories – Stove parts, furniture pieces, lamp parts, fasteners, etc.
4. Personal	
	a. Medicinal – Medicine bottles, droppers, etc.
	b. Cosmetic – Hairbrushes, hair combs, jars, etc.
	c. Recreational – Smoking pipes, toys, musical instruments, souvenirs, etc.
	d. Monetary – Coins, etc.
	e. Decorative – Jewelry, hairpins, hatpins, spectacles, etc.
	f. Other – Pocketknives, fountain pens, pencils, ink wells, etc.
5. Labor	
	a. Agricultural – Barbed wire, horse shoes, harness buckles, hoes, plow blades, scythe blades, etc.
	b. Industrial – Tools, etc.
	c. Household – Household cleaning products, clothes iron, etc.
6. Miscellaneous	
	a. Automotive – Car/vehicle components
	b. Unknown – Functionally unidentifiable or unassignable artifacts

5.3 EXPECTED RESULTS

Given the APE's proximity to several mapped historic occupations, it was expected that at least one rural domestic/agricultural site dating to the late nineteenth/early twentieth century would be encountered. As noted in Section 3.3, historic mapping revealed one farmstead dating to at least the turn of the twentieth century within the APE and immediately south/southeast of the emergency spillway. At the outset of this investigation, it was unclear if archaeological deposits associated with this historic occupation would have survived the construction of the dam and spillway in the 1970s. Mid-twentieth century mapping suggested at least two possible dwellings within the immediate vicinity of the APE's western and northern boundaries, though it was not clear if deposits associated with these occupations would fall within the APE. It was likewise expected that prehistoric sites may be present within the APE, particularly southeast of the dam where Piney Run follows along its natural channel. Depending upon local topographic and hydrological conditions, it was though that prehistoric sites may be located on the broad floodplain and any adjacent terraces.

6.0 RESULTS

In total, 217 STPs were excavated, resulting in the recovery of one prehistoric artifact and 242 historic artifacts and the identification of three historic road traces and four archaeological sites (Figure 6-1). The following discussion addresses general field conditions, soil profiles, and testing results before describing the four newly identified archaeological sites in greater detail.

6.1 FIELD CONDITIONS

Natural landforms within the APE consist of rolling forested uplands dissected by incised stream valleys with moderately sized floodplains. Throughout the APE, the topographic relief ranges from minor to severe, with slopes greater than 15 percent being very common and significantly limiting STP excavation in many areas.

West of Piney Run, the north half of the APE consists of gently sloping knolls that rapidly steepen as they approach the Piney Run Reservoir to the north and an unnamed tributary to Piney Run to the south (Figure 6-2). The knolls appear to have been recently used as casual dumping grounds for late historic/modern household and automotive refuse. A disused road, identified as Road Trace 1, tracks north across this portion of the APE, leading from Hollenberry Road to what was once a small cluster of dwellings north of the APE as shown on historic maps (Figure 6-3).

The south half of the APE west of Piney Run consists of a narrow stream valley gradually descending east to Piney Run and steep hillsides rising to the south/southeast (Figure 6-4). A disused road, identified as Road Trace 3, tracks southwest-northeast along the APE's southern margin; initially level with the narrow stream valley, the road rises to the northeast where it becomes incised into the steep side slopes above Piney Run.

East of Piney Run, the APE consists of a broad floodplain bound by generally steep slopes rising to relatively level summits to the north and east (Figure 6-5). Extensive portions of the floodplain exhibited standing water and appear to be semi-permanent wetlands (Figure 6-6). Another disused road, identified as Road Trace 2, tracks northwest into the APE, stopping abruptly at what initially appeared to be a natural, gently sloping stream terrace (Figure 6-7). Subsequent review of as-built construction documents associated with Piney Run Dam indicated that this terrace was entirely artificial and used as a soil borrow/wasting area.

Large portions of the APE exhibit significant prior ground disturbance. Disturbances include the dam embankment and abutments; the emergency spillway west of the dam; the impact basin where the reservoir's outflow pipe discharges into a modified channel; borrow areas identified as "Borrow I" and "Borrow II" on Figure 3-13; buried infrastructure/utilities; and access roads leading to both of the dam's abutments (Figures 6-8 through 6-11). In general, STPs were not excavated in areas of prior disturbance, though some tests were placed within "Borrow I" and "Borrow II" (collocated with the emergency spillway) to characterize soils and determine the presence of any potentially intact buried surfaces (i.e., undisturbed strata with archaeological remnants of historic and/or prehistoric activities).

6.2 SHOVEL TESTING

Shovel testing was limited by excessive slopes, large areas of prior ground disturbance, and to a lesser extent, standing water in the vicinity of Piney Run and an unnamed tributary to the west. As a result, more than half of the STPs plotted at 20-m (65.6-ft) intervals across the APE could not be excavated (Figure 6-1).

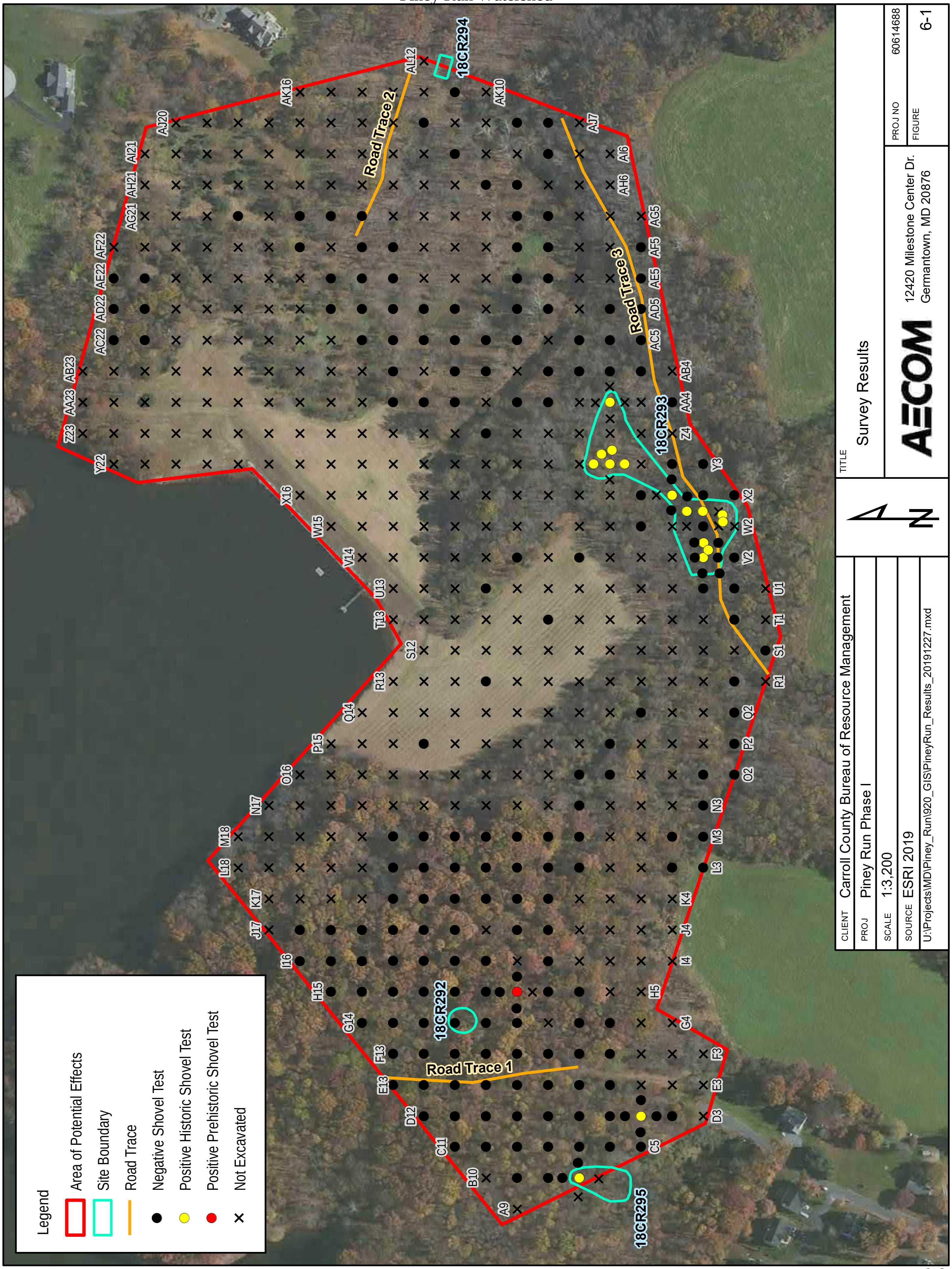

Legend
Area of Potential Effects
Site Boundary
Road Trace
Negative Shovel Test
Positive Historic Shovel Test
Positive Prehistoric Shovel Test
Not Excavated
18CR292
18CR293
18CR294
18CR295
Road Trace 1
Road Trace 2
Road Trace 3
CLIENT Carroll County Bureau of Resource Management
PROJ Piney Run Phase I
SCALE 1:3,200
SOURCE ESRI 2019
U:\Projects\MD\Piney_Run\920_GIS\PineyRun_Results_20191227.mxd
TITLE Survey Results
AECOM
12420 Milestone Center Dr.
Germantown, MD 20876
PROJ NO 60614688
FIGURE 6-1

Figure 6-2. Sloping Forested Uplands West of Piney Run, Facing Northeast

Figure 6-3. Road Trace 1, Facing South

CLIENT Carroll County Bureau of Resource Management	TITLE Project Photographs	
PROJ Piney Run Phase I		
SCALE N/A	AECOM 12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
SOURCE N/A		FIGURES 6-2 and 6-3
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics		

Figure 6-4. Unnamed Stream Valley West of Piney Run, Facing South

Figure 6-5. Piney Run Floodplain, Facing Southeast

CLIENT Carroll County Bureau of Resource Management	TITLE Project Photographs		
PROJ Piney Run Phase I			
SCALE N/A	AECOM	PROJ NO	60614688
SOURCE N/A	12420 Milestone Center Dr. Germantown, MD 20876	FIGURES	6-4 and 6-5
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

Figure 6-6. Wetlands on Piney Run Floodplain, Facing Southeast

Figure 6-7. Road Trace 2, Facing Southeast

CLIENT	Carroll County Bureau of Resource Management	TITLE	Project Photographs
PROJ	Piney Run Phase I		
SCALE	N/A	PROJ NO	60614688
SOURCE	N/A	FIGURES	6-6 and 6-7

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AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

Figure 6-8. Piney Run Dam, Facing East

Figure 6-9. Emergency Spillway, Facing South

CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	N/A
SOURCE	N/A

\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics

TITLE
Project Photographs

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURES 6-8 and 6-9

Figure 6-10. Impact Basin, Facing Southeast

Figure 6-11. Access Road West of Dam, Facing Southwest

CLIENT	Carroll County Bureau of Resource Management	TITLE	Project Photographs
PROJ	Piney Run Phase I		
SCALE	N/A	PROJ NO	60614688
SOURCE	N/A	AECOM 12420 Milestone Center Dr. Germantown, MD 20876	FIGURES 6-10 and 6-11
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

Areas found to be suitable for STP excavation were located in three general areas. West of Piney Run and northwest of its unnamed tributary, a series of wide, relatively level hill summits provided the largest continuous shovel testing area. West of Piney Run and along the southern edge of the APE, the stream valley of the unnamed tributary provided numerous testing opportunities along its floodplain and adjacent terraces. East of Piney Run, shovel testing typically clustered on the Piney Run floodplain and a gently sloping terrace that partially served as soil borrow/wasting area "Borrow I" during the dam's construction. North of the floodplain, the APE encompassed only a limited area of relatively level hill summits free of dam construction disturbances and suitable for shovel testing.

The center of the APE is dominated by the dam and emergency spillway. A few STPs were excavated on the emergency spillway to characterize stratigraphy and determine if any potentially intact buried surfaces lay beneath more recent fill deposits. However, it was not anticipated that such surfaces would be present, given the significant amount of ground disturbance required to create the emergency spillway. The dam's construction report noted that 22,500 cubic yards of soil were removed from this area ("Borrow II") and redistributed in "Borrow I"; this amount of earth moving suggested a minimal possibility for buried surfaces in the emergency spillway (Kerslake ca. 1975).

Soil profiles throughout the APE generally exhibited minor variations that typically corresponded to landform/setting. Three broad profile types emerged, though a small number of STPs associated with the use/occupation of various archaeological features do not fall into these categories; such STPs are addressed in the appropriate site discussions in section 6.4 below.

Stratigraphic profile Type 1 was identified in STPs excavated within upland portions of the APE. These typically revealed the existing surface mineral layer/plowzone (A/Ap horizon) overlying culturally sterile subsoil (B horizon). This A/Ap-B horizon stratigraphic sequence was also documented in some locations along the Piney Run floodplain.

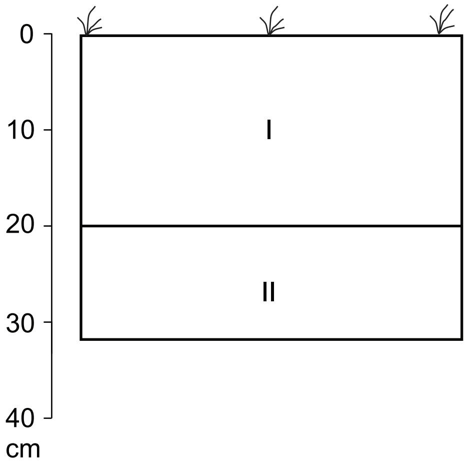
Type 2 was identified in some floodplain STPs where three strata were documented. This stratigraphic sequence is interpreted as the A/Ap horizon atop two distinct components of the B horizon or an A/Ap and B horizon overlying a poorly developed mineral layer (C horizon).

Type 3 was identified in areas of prior significant ground disturbance, primarily along the emergency spillway. This area was selectively ground-truthed to confirm dam construction documentation suggesting a heavily modified ground disturbance. STPs in this area typically revealed a single stratum of fill overlying the C horizon. Representative profiles are illustrated in Figure 6-12.

6.3 ARTIFACTS

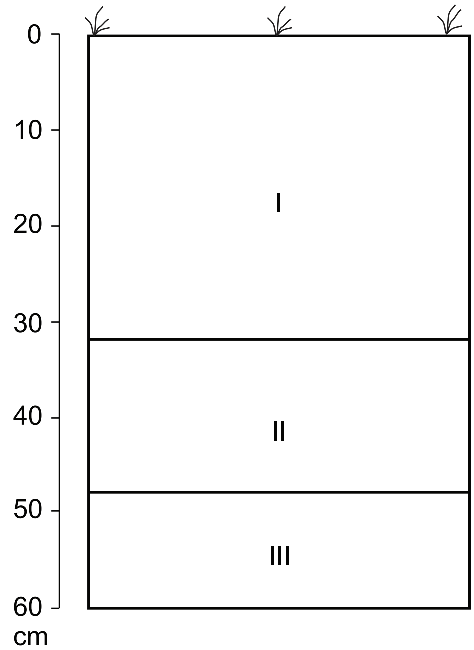
One prehistoric artifact and 242 historic artifacts were recovered during this investigation (Table 6-1). Of these, 13 were collected from the ground surface, while the remaining 230 were recovered from 17 STPs. All artifacts were recovered west of Piney Run and primarily near the southern and western boundaries of the APE. Miscellaneous historic artifacts, dominated by unidentifiable glass and iron, were most common (n=89; 36.6 percent), closely followed by historic foodways (n=77; 31.7 percent) and household/structural (n=72; 29.6 percent) material. Significantly lower quantities of labor, personal, and prehistoric artifacts comprise the remainder of the assemblage.

Type 1, STP H-11



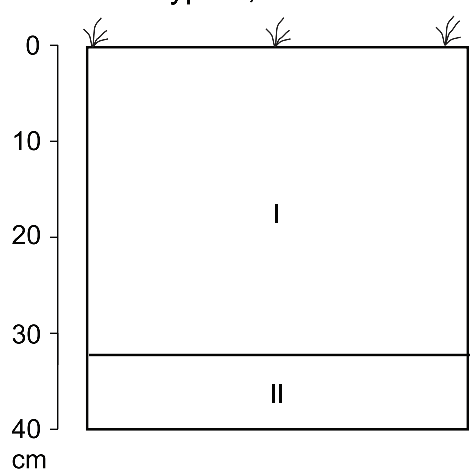
I = Brown (7.5YR 4/4) silt loam Ap horizon
II = Strong brown (7.5YR 5/6) silty clay loam B horizon

Type 2, STP AG-8



I = Dark yellowish brown (10YR 4/4) silt loam A horizon
II = Yellowish brown (10YR 5/6) silt loam B horizon
III = Light yellowish brown (2.5Y 6/4) silty clay loam B or C horizon

Type 3, STP R-10



I = Dark yellowish brown (10YR 3/4) loam fill
II = Light olive brown (2.5Y 5/6) channery silty clay loam C horizon

CLIENT Carroll County Bureau of Resource Management	TITLE Representative STP Profiles
PROJ Piney Run Phase I	
SCALE As Shown	AECOM 12420 Milestone Center Dr. Germantown, MD 20876
SOURCE N/A	PROJ NO 60614688
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics	FIGURE 6-12

Table 6-1. Artifact Summary

STP	Group						Count
	Foodways	Household/ Structural	Labor	Miscellaneous	Personal	Prehistoric	
Surface	11		1		1		**13**
AA-6	1	1		49			**51**
B-7	1	3					**4**
D-5	1						**1**
H-9						1	**1**
V-3	17	6		1			**24**
V-3 E10		2		1			**3**
V-3 E5 S2.5		2					**2**
W-3 E10	2						**2**
W-3 E10 N10		3	1	4			**8**
W-3 E2.5 S12.5		1					**1**
W-3 W7.5 S12.5		1		2			**3**
X-4		2					**2**
Y-6	1	1					**2**
Y-6 8E 10S	23	35		16			**74**
Y-6 N10		3		2			**5**
Y-6 N5 E5	3	7		9			**19**
Y-6 S10	17	5		5	1		**28**
Total	**77**	**72**	**2**	**89**	**2**	**1**	**243**

Of these, 241 historic artifacts are associated with three newly identified archaeological sites and will be discussed with the site descriptions below. The remaining historic artifact and the prehistoric artifact are isolated finds. The isolated historic artifact is part of an ironstone plate (1842-1930) identified in STP D-5. This STP is located near several push piles northwest of Hollenberry Road in an area used for modern refuse disposal. The push piles, likely created when this part of Hollenberry Road was repurposed for dam access, signify high levels of local disturbance. This artifact cannot be attributed to a particular historic occupation, as it could derive from one of several nearby former residences. Furthermore, it has likely been redistributed when Hollenberry Road was modified. Site 18CR295 is the closest known historic occupation, but it is located over 40 m (131 ft) away. Several other historic occupations are known to have existed nearby, any one of which may have disposed of the artifact as roadside refuse.

The single prehistoric artifact is a tertiary quartz flake identified in STP H-9, located on a gently sloping hill summit. Radial STP excavation and a pedestrian inspection of the surrounding area revealed no additional artifacts or any ideal landforms (e.g., stream terrace) where lithic maintenance/production would have been likely. Dent and Jirikowic (1994) identified a quartz flake on a nearby hillslope, but this artifact was located over 100 m (328 ft) away. While these two isolates indicate prehistoric activities in the vicinity, no evidence for a definitive habitation, resource procurement, or lithic reduction site was identified.

6.4 ARCHAEOLOGICAL SITES

Four newly identified archaeological sites were recorded during this survey: 18CR292 is an early twentieth century refuse pit; 18CR293 is an early nineteenth to early twentieth century farmstead; 18CR294 is a likely nineteenth century spring box; and 18CR295 is a possible nineteenth century domestic occupation. Each site is described in greater detail below.

6.4.1 18CR292

Site 18CR292 is located in the northwest portion of the APE, immediately southeast of STP G-11 (Figures 6-1 and 6-13). The surrounding landform consists of a series of forested hill summits gradually descending north toward what is now a submerged hollow along the Piney Run stream valley (Figure 6-14). This portion of the APE contains a widely dispersed scatter of discarded metal, glass, plastic, and rubber materials, most of which appear to date to the second half of the twentieth century (Figure 6-15). Site 18CR292 is situated approximately 40 m (131 ft) east of Road Trace 1 and encompasses 0.02 ha (0.05 ac).

This site is defined by Feature 1, a lobe-shaped pit measuring up to 5.5 m (18 ft) long by 2.5 m (8.2 ft) wide and extending up to 1 m (3.3 ft) below the surface (Figures 6-16 and 6-17). Exhibiting slumping sides and amorphous contours, Feature 1 was littered with discarded glass bottles, unidentifiable iron fragments, automotive parts, and a few historic ceramics. Probing the sides of the feature revealed no structural elements which, together with its overall shape and contents, indicated that it did not likely represent a cellar pit repurposed as a trash disposal site. A scatter of glass bottles extended outward approximately 1 meter (3.3 ft) from Feature 1. Pedestrian and subsurface investigations of the surrounding area revealed no additional archaeological features or deposits or any indication of a sustained historic occupation.

Feature 1 contained hundreds of glass bottles/vessel glass fragments, large pieces of metal (e.g., automotive parts), and other generic refuse. No architectural artifacts were found in the feature. Due to the overwhelming quantity of material, a sample of well preserved, diagnostic artifacts was collected for analysis (Figure 6-18). Preference was given to representative intact/mostly intact glass bottles and single examples of the observed ceramic ware types (Table 6-2).

Table 6-2. 18CR292 Artifact Summary

Group	Subgroup	Artifact	Date Range	Count
Foodways	General Foodways	Hazel Atlas Bottle, Likely Shoe Polish	1923-1982	1
		Hazel Atlas Medicinal/Cosmetic Bottle	1923-1982	1
	Service	Ironstone	1842-1930	1
		Milk Glass	Late 19th C.+	1
		Decalcomania Hotel Ware	1890+	1
	Storage	Hazel Atlas Mustard Jar	1923-1982	1
		Cap Seat Milk Bottle	1892+	1
		Coca-Cola Bottle, Westminster Plant	1920-1957	1
		Albany Slip Stoneware	1805-1920	1
		Albany/Bristol Slip Stoneware	1890-1920	1
Labor	Household	Clorox Bottle	1933-1936	1
Personal	Cosmetic	Dr. Ellis Waving Fluid Bottle	1920s-1940s	1
Total				**12**

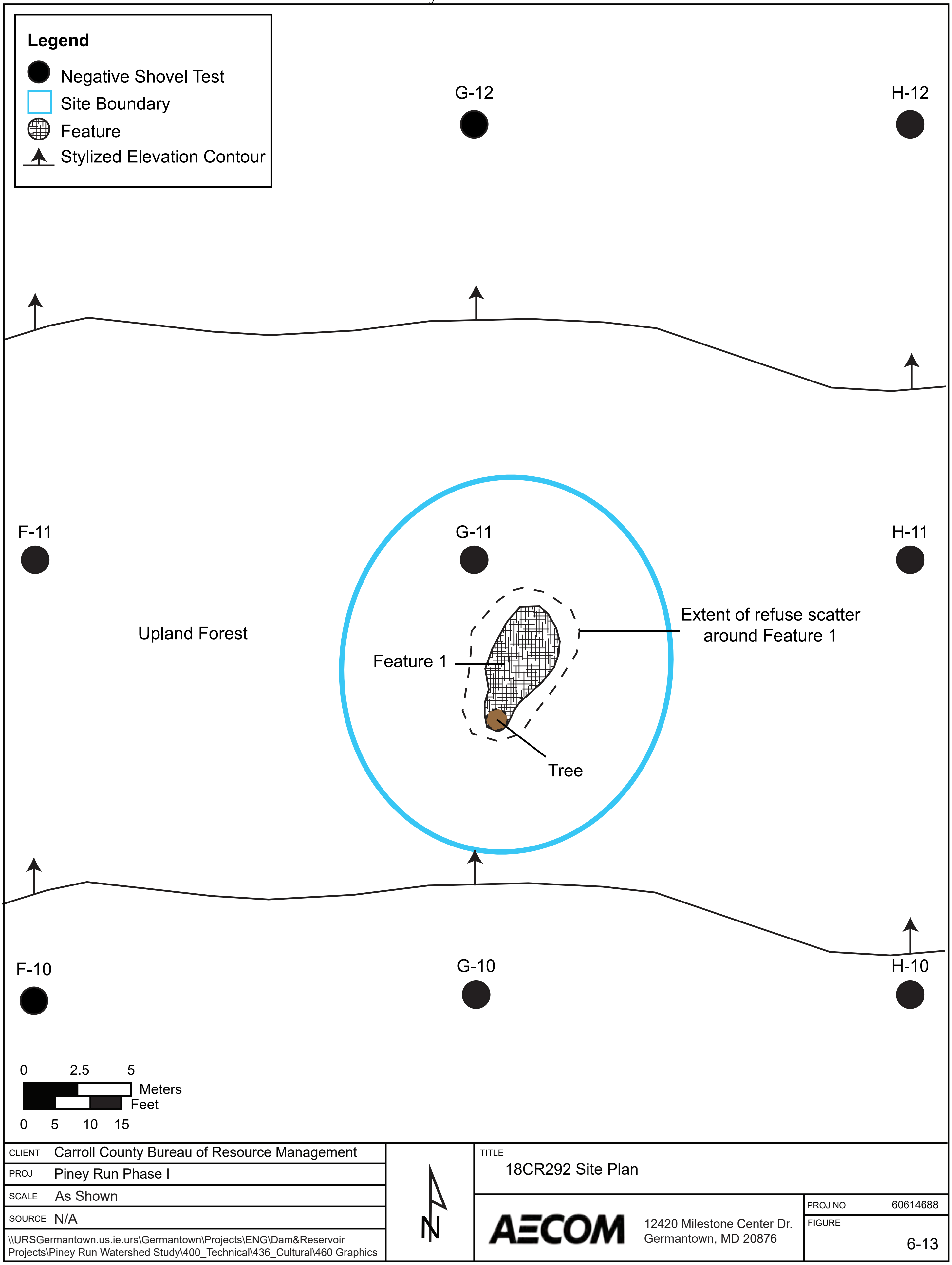

Legend
Negative Shovel Test
Site Boundary
Feature
Stylized Elevation Contour
G-12
H-12
F-11
G-11
H-11
Upland Forest
Feature 1
Extent of refuse scatter around Feature 1
Tree
F-10
G-10
H-10
0 2.5 5
Meters
Feet
0 5 10 15
CLIENT Carroll County Bureau of Resource Management
PROJ Piney Run Phase I
SCALE As Shown
SOURCE N/A
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics
N
TITLE
18CR292 Site Plan
AECOM
12420 Milestone Center Dr.
Germantown, MD 20876
PROJ NO 60614688
FIGURE
6-13

Figure 6-14. 18CR292 Terrain Overview, Facing West

Figure 6-15. Modern Surficial Refuse near 18CR292, Facing East

CLIENT	Carroll County Bureau of Resource Management	TITLE	Project Photographs
PROJ	Piney Run Phase I	AECOM 12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
SCALE	N/A		FIGURES 6-14 and 6-15
SOURCE	N/A		
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

Figure 6-16. 18CR292, Feature 1, Facing East

Figure 6-17. 18CR292, Feature 1, Facing South

CLIENT	Carroll County Bureau of Resource Management	TITLE	Project Photographs
PROJ	Piney Run Phase I		
SCALE	N/A	PROJ NO	60614688
SOURCE	N/A	AECOM 12420 Milestone Center Dr. Germantown, MD 20876	FIGURES 6-16 and 6-17
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

Top Row: Decalcomania Hotel Ware (1.01); Plain Ironstone (1.02); Albany/Bristol Slip Stoneware (1.04)
Bottom Row: Dr. Ellis Waving Fluid Bottle (1.07); Coca-Cola Bottle (1.06); Medicinal/Cosmetic Bottle (1.10)

CLIENT	Carroll County Bureau of Resource Management	TITLE	18CR292 Representative Artifacts
PROJ	Piney Run Phase I	PROJ NO	60614688
SCALE	As Shown	FIGURE	6-18
SOURCE	N/A		

\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

The functional categories of the artifact sample are reflective of the majority of artifacts identified within Feature 1. While miscellaneous metal and glass objects were observed, most of the Feature 1 assemblage consisted of glass bottles/bottle fragments similar in function, age, and manufacturer to those shown in Table 6-2. Collected and uncollected artifacts from Feature 1 predominantly derive from domestic uses, with discarded storage, medicinal, cleaning, and cosmetic bottles the most common types. Service and storage ceramics were observed in starkly lesser quantities alongside a few car parts and unidentified metal fragments. The distribution of functional groups makes it clear that Feature 1 was predominantly used as a domestic refuse pit.

The manufacturing periods of the artifact sample shown in Table 6-2 are reflective of the uncollected diagnostic materials left in Feature 1. While these periods broadly span the early nineteenth century to the present, they strongly cluster in the first half of the twentieth century. Historic maps/aerial photographs presented in Section 3.3 shows that a small group of dwellings may have been built north of 18CR292 between 1911 and 1943 (Figures 3-6 and 3-7). Feature 1 almost certainly originated as a casual dumping site for one or more of the nonextant residences in this small rural community.

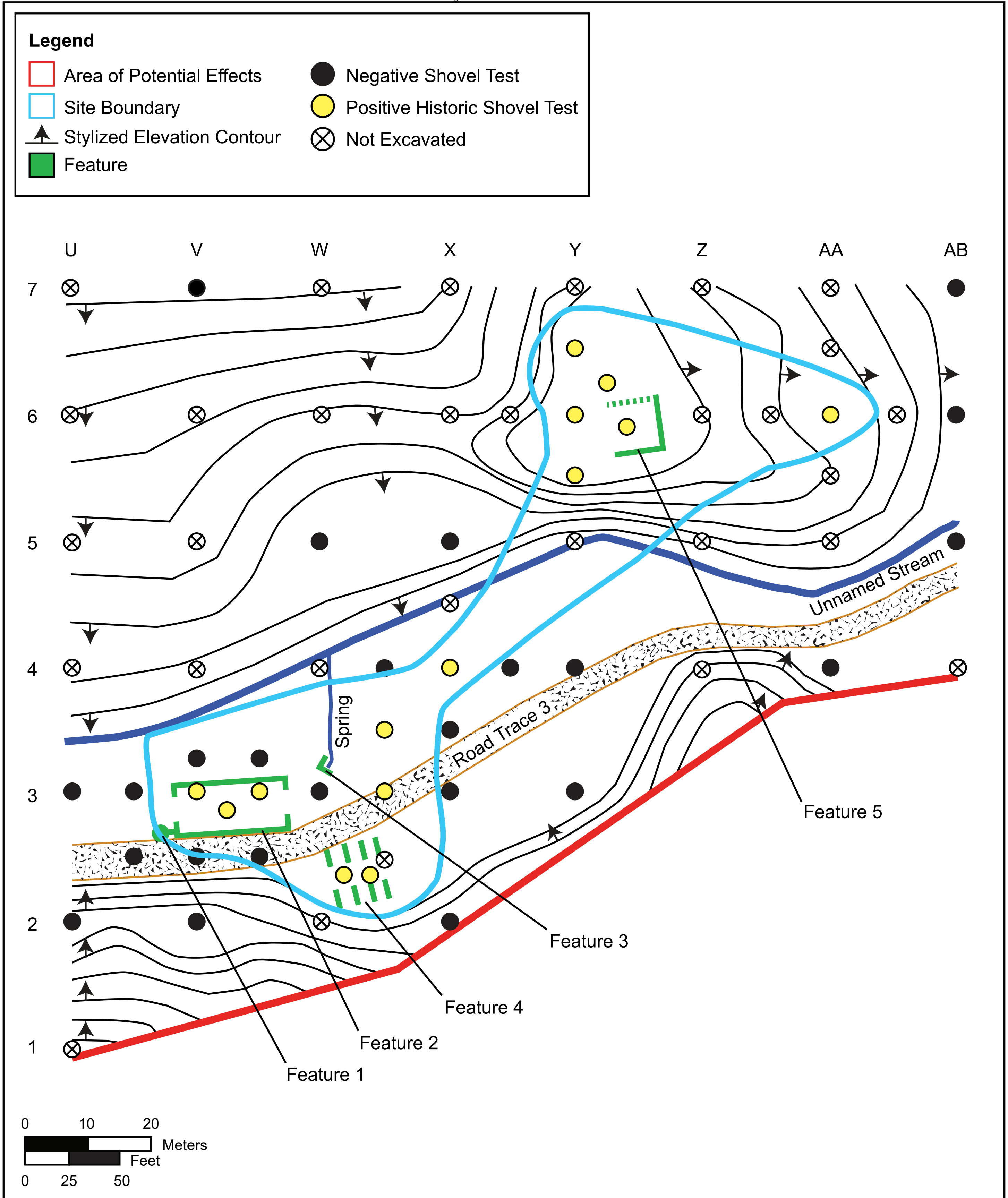
Site 18CR292 represents an early twentieth century refuse disposal pit in the vicinity of several farmsteads that were extant by at least 1943 according to aerial photography (Figure 3-7). Presumably, 18CR292 was sited at a distance from these occupations to consolidate refuse in a spatially segregated area; the large concentration of glass artifacts may reflect intentionally keeping this sharp, hazardous debris away from pedestrian and vehicular traffic. However, because the site is located so far from each of the farmstead's historically mapped dwellings, it is unclear if it was the disposal site for one or more of these occupations. Though the assemblage is reflective of some consumer habits attributable to a local community, the site cannot be more particularly associated with a given dwelling or family at this time. This limits the site's information potential and, given the sampling strategies used during the current survey, it is unlikely that additional excavation will yield potentially significant deposits.

Given that the site cannot be definitively attributed to a given historic occupation, together with its limited potential to yield additional significant information, AECOM recommends 18CR292 not eligible for listing in the NRHP. It lacks the informational potential required to satisfy Criterion D and lacks the associative values necessary to satisfy Criteria A, B, and/or C. No additional work is recommended.

6.4.2 18CR293

Site 18CR293 is located in the south-central portion of the APE, southeast of the emergency spillway within the small, forested valley of an unnamed Piney Run tributary (Figures 6-1 and 6-19). The site corresponds to the historic farmstead shown in the southcentral part of the APE on historic maps and aerial photographs presented in section 3.3. The site is organized into two discrete loci on adjacent but distinct landforms (Figures 6-20 and 6-21). Locus A is located on the south side of the unnamed tributary, partially within its floodplain and partially cut into a terrace on the toeslopes rising to the south. Locus B is located on the north side of the unnamed tributary, midway up the hillslopes rising northwest toward the emergency spillway. Road Trace 3 bisects Locus A along the floodplain's southern margin. The site encompasses 0.33 ha (0.83 ac).

The site is defined by five features and a scatter of 224 historic artifacts recovered from 14 STPs. Features 1 through 4, representing an agricultural complex, are located in Locus A, while Feature 5, the remnants of a farmstead dwelling, is located in Locus B. Upon site discovery, the shovel



CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	As Shown
SOURCE	N/A

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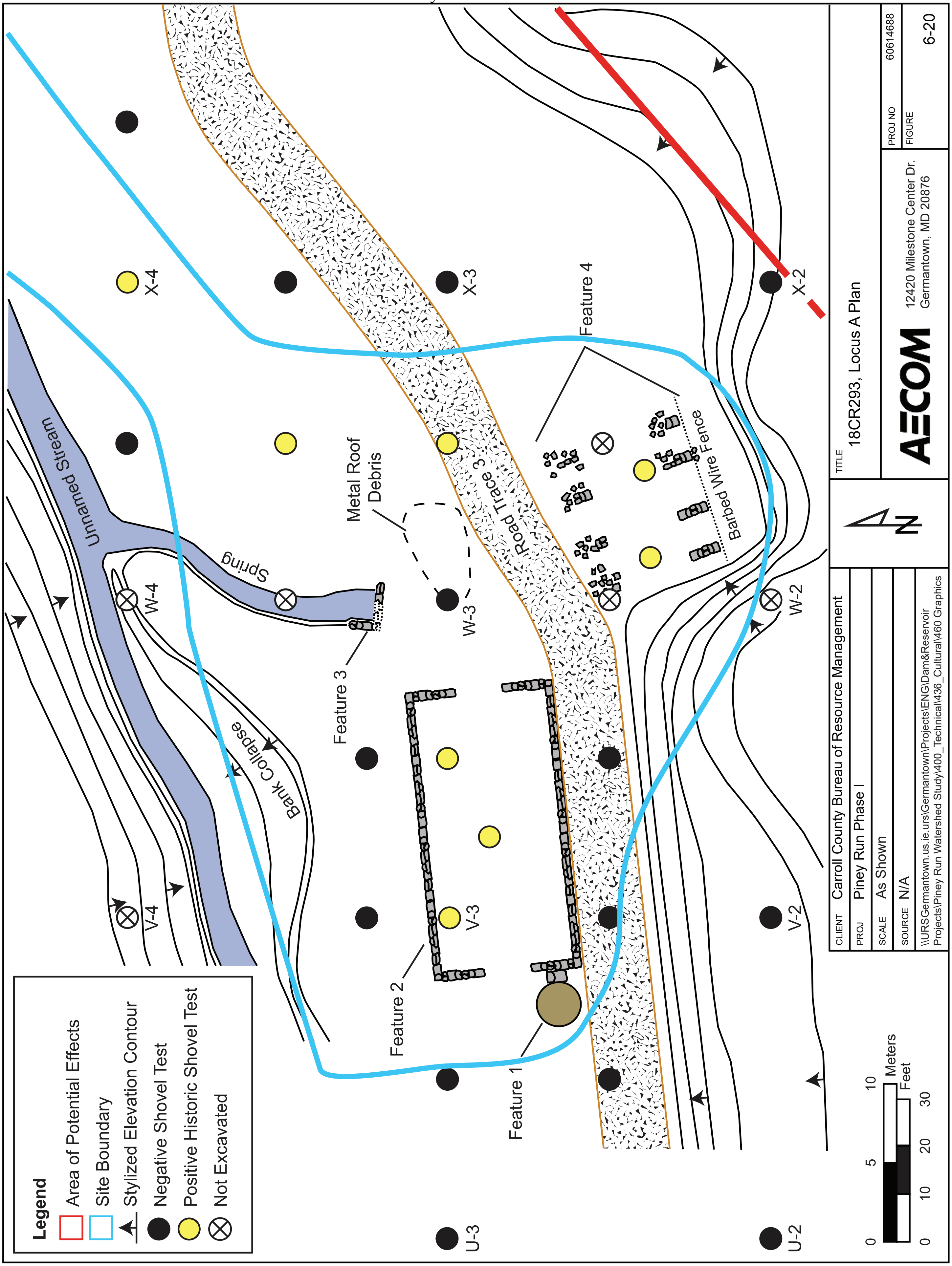
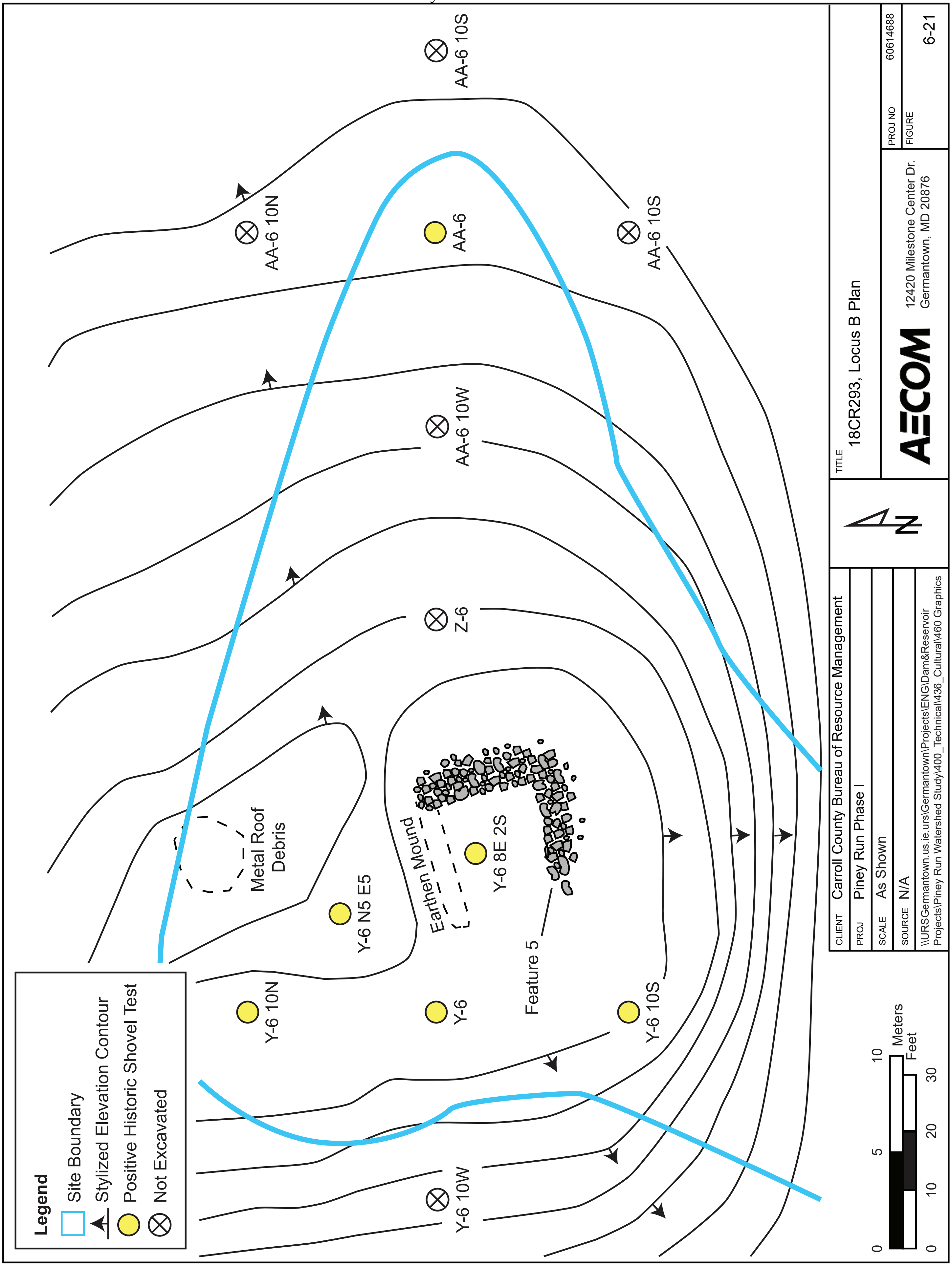
N

TITLE
18CR293 Site Plan

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-19


Legend
Area of Potential Effects
Site Boundary
Stylized Elevation Contour
Negative Shovel Test
Positive Historic Shovel Test
Not Excavated
Unnamed Stream
Spring
Bank Collapse
Metal Roof Debris
Road Trace 3
Barbed Wire Fence
Feature 1
Feature 2
Feature 3
Feature 4
X-4
X-3
X-2
W-4
W-3
W-2
V-4
V-3
V-2
U-3
U-2
0
5
10
Meters
0
10
20
30
Feet
CLIENT Carroll County Bureau of Resource Management
PROJ Piney Run Phase I
SCALE As Shown
SOURCE N/A
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics
TITLE 18CR293, Locus A Plan
12420 Milestone Center Dr.
Germantown, MD 20876
PROJ NO 60614688
FIGURE 6-20


Legend
Site Boundary
Stylized Elevation Contour
Positive Historic Shovel Test
Not Excavated
AA-6 10S
AA-6 10N
AA-6
AA-6 10S
AA-6 10W
Z-6
Metal Roof Debris
Earthen Mound
Y-6 8E 2S
Y-6 N5 E5
Feature 5
Y-6 10N
Y-6
Y-6 10S
Y-6 10W
0 5 10 Meters
0 10 20 30 Feet
N
CLIENT Carroll County Bureau of Resource Management
PROJ Piney Run Phase I
SCALE As Shown
SOURCE N/A
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics
TITLE 18CR293, Locus B Plan
AECOM
12420 Milestone Center Dr.
Germantown, MD 20876
PROJ NO 60614688
FIGURE 6-21

testing interval was reduced to 10 m (32.8 ft) (as possible) within the vicinity of four features identified in Locus A to define site boundaries and refine artifact distributions. Additional STPs were excavated in judgmental locations to test the interior of particular features and in those locations where landform restrictions precluded excavation at the 10-m (32.8-ft) interval. The topography within Locus B is considerably more restrictive due to excessive slope, allowing only limited 10-m (32.8-ft) interval and judgmental testing within the immediate vicinity of Feature 5.

Site stratigraphy exterior to the features was fairly consistent across both site loci. STPs typically revealed two strata, representing the surface mineral horizon/plowzone (A/Ap horizon) atop the culturally sterile subsoil (B horizon). In several instances, an organic layer (O horizon) overlay the A/Ap horizon. STPs W-3 and Y-6 10S serve as representative examples from Loci A and B, respectively (Figure 6-22). STPs placed within the two continuous foundations, Features 2 and 5, revealed two or more strata of historic fill overlying the B horizon/prepared dirt floors. STPs V-3 5E 2.5S and Y6 8E 2S represent the interiors of Features 2 and 5, respectively (Figure 6-22).

As noted, 18CR293 is visually recognizable as a collection of five structural features organized into geographically and functionally discrete loci. These features are summarized in Table 6-3 and described in greater detail below.

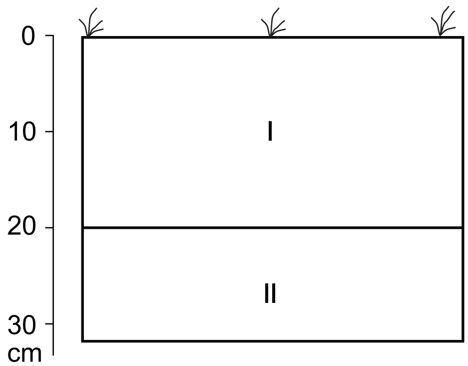
Table 6-3. 18CR293 Feature Summary

Locus	Feature No.	Feature Type	Date
A	1	Possible Capped Well	Unknown
	2	Barn Foundation	19th C.
	3	Spring Box	Likely 19th C.
	4	Outbuilding Foundation	Unknown
B	5	Dwelling Foundation	19th C.

Feature 1 is an intact concrete cylinder built at the edge of the unnamed tributary’s floodplain where it abuts Road Trace 3 (Figures 6-23 and 6-24). The feature is short, rising less than 1 m (3.3 ft) above the floodplain to an elevation nearly level with the grade of Road Trace 3. Measuring approximately 2.5 m (8.2 ft) in diameter, the feature’s upper surface is shallowly dished, forming a broad bowl shape less than 0.15 m (0.5 ft) deep and filled with leaf litter. While the concrete itself is not diagnostic, it features small rounded pebbles in a medium-hard cement matrix which is likely of more recent construction (perhaps early twentieth century) than the stone-built features nearby. The side and upper surfaces are smooth-finished and exhibit no indications that the feature supported a larger structure (e.g., a silo) or mounted machinery. A small concrete-over-stone pad adjoins Feature 1 to the southwest corner of Feature 2, a large barn foundation described below. While Dent and Jirikowic (1994) described this feature as a silo foundation, its uncharacteristically narrow width and the lack of evidence for any kind of superstructure makes this interpretation unlikely. Furthermore, no excessive amounts of brick, tile, concrete, or other materials typically used in silo construction were observed nearby. The 1972 Piney Run Dam and Reservoir site plan (Figure 3-13), the earliest documentation of this feature, identified it as a well, which is more consistent with the feature’s size and form. If this is correct, Feature 1 represents a capped well.

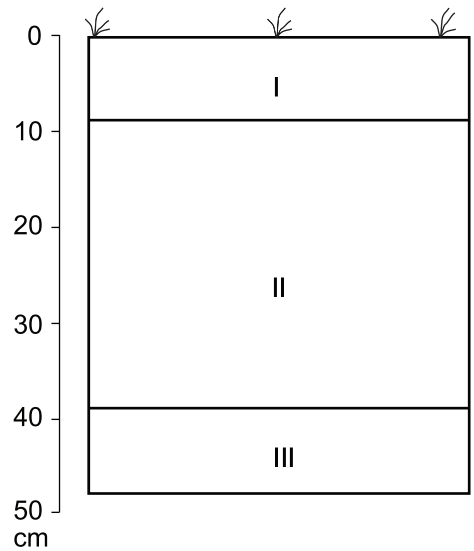
Feature 2 is a large, rectilinear stone foundation representing the predominant building in Locus A (Figures 6-25 and 6-26). Measuring 18.25 m (60 ft) east-west by 9.3 m (30.5 ft) north-south, Feature 2 exhibits mirrored 3-m (10-ft) wide openings on its east and west walls and directly abuts

STP W-3



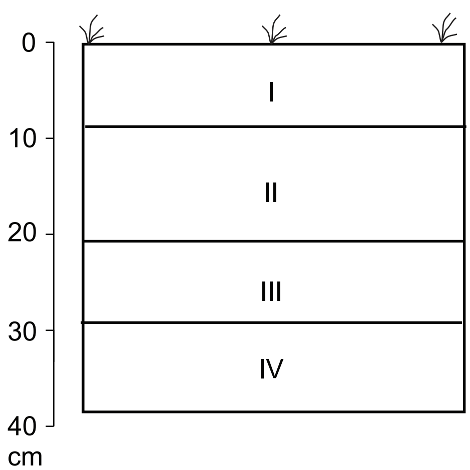
I = Brown (10YR 4/3) silt loam A/Ap horizon
II = Light olive brown (2.5Y 5/6) gravelly silty clay loam B horizon

STP Y-6 10S



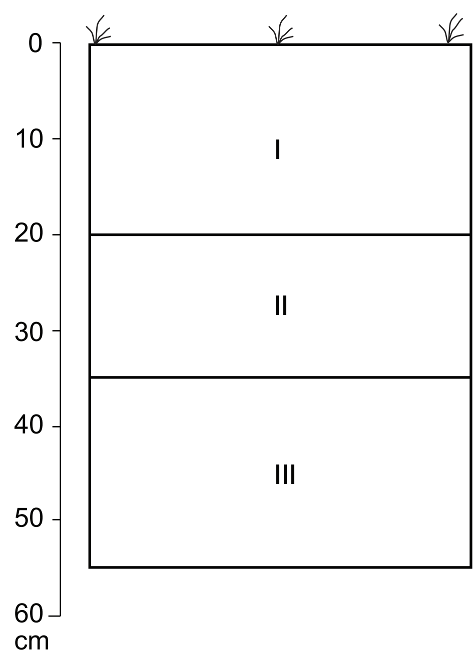
I = Black (10YR 2/1) silt loam O horizon
II = Brown (7.5YR 4/4) silty clay loam A/Ap horizon
III = Yellowish red (5YR 5/6) clay loam B horizon

STP V-3 5E 2.5S



I = Very dark grayish brown (10YR 3/2) loam fill
II = Strong brown (7.5YR 4/6) silty clay loam fill
III = Dark yellowish brown (10YR 4/4) loamy sand fill
IV = Light yellowish brown (2.5Y 6/3) silt loam B horizon or prepared surface

STP Y-6 10S



I = Black (10YR 2/1) silt loam and charcoal fill
II = Light reddish brown (5YR 6-3) silt loam and charcoal fill
III = Light yellowish brown (2.5Y 6/4) silt loam B horizon or prepared surface

CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	As Shown
SOURCE	N/A

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TITLE
18CR293 Representative STP Profiles

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-22

Figure 6-23. 18CR293, Feature 1, Facing South

Figure 6-24. 18CR293, Feature 1, Facing North

CLIENT	Carroll County Bureau of Resource Management	TITLE	Project Photographs
PROJ	Piney Run Phase I	PROJ NO	60614688
SCALE	N/A	FIGURES	6-23 and 6-24
SOURCE	N/A	AECOM	12420 Milestone Center Dr. Germantown, MD 20876

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Figure 6-25. 18CR293, Feature 2, Facing West

Figure 6-26. 18CR293, Feature 2, Facing Southeast

CLIENT Carroll County Bureau of Resource Management	TITLE Project Photographs		
PROJ Piney Run Phase I			
SCALE N/A			
SOURCE N/A	AECOM	12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			FIGURES 6-25 and 6-26

Road Trace 3 along its south wall. The foundation is composed of randomly coursed phyllite and/or schist rubble with several of the individual stones measuring more than 1 m (3.28 ft) in length. Small pockets of lime/sand mortar are still evident in the stonework, though much of it has disintegrated. While the wall fabric generally exhibits few modified stones, each of the exterior corners exhibit massive cut quoins (Figure 6-27). Large remnants of sawn lumber studded in cut nails (manufactured 1790-1910), representing beams or rafters, are strewn about Feature 2. In some locations, the remains of a timber sill plate survive intact on the uppermost course of stonework, featuring cut nails driven into the exterior surface (Figure 6-28). This detail indicates that the feature's superstructure was of frame construction and possibly sheathed in timber siding (e.g., board and batten, lapboard). A large, nearby pile of standing-seam metal panels represents the building's roofing. The feature's size, dimensions, and wide parallel openings indicate that it almost certainly served as a barn, likely built in the style of a small transverse crib/frame barn (Mroszczyk 2007). Along with its shape and dimensions, Feature 2's interpretation as a barn is supported by the 1953 USGS map, which shows it as a Class 2 building (Figure 3-9).

Three STPs were placed within Feature 2, revealing two to three layers of fill atop a sharply distinguished subsoil and/or possible dirt floor. Twenty-nine artifacts were recovered from the interior of Feature 2 (Table 6-4). Most of the artifacts (n=17) are foodways glass fragments, followed by structural (n=10) and unidentified (n=2) artifacts. Given the context of discovery, and the lack of other domestic artifacts, the dominance of foodways glass is not interpreted as representative of domestic activities within Feature 2. The contents of this container glass may have simply been consumed/utilized onsite in the performance of farming duties. Diagnostic artifacts (n=7) are limited to cut and wire nails, suggesting a nineteenth century structure with twentieth century repairs/modifications. As noted above, uncollected cut nails were seen driven into several of the barn's surviving framing members. A review of historic mapping could not corroborate the feature's construction period, as it was not depicted on any available maps/aerial photographs until the mid-twentieth century despite obviously earlier origins.

Table 6-4. 18CR293, Feature 2 Interior Artifact Summary

Group	Subgroup	Artifact	Date Range	Count
Foodways	General Foodways	Bottle Glass		13
		Indeterminate Hollow Glass		4
Household/Structural	Architectural / Construction	Cut Nail	1790-1910	4
		Indeterminate Nail		2
		Wire Nail	1890+	3
		Window Glass		1
Miscellaneous	Unknown	Indeterminate Flat Glass		1
		Iron Wire		1
Total				**29**

Feature 3 is located approximately 5 m (16.4 ft) northeast of the northeast corner of Feature 2 and represents an ell-shaped rubble stone and concrete spring box (Figures 6-29 and 6-30). The west side of the ell consists of a 1.3-m (4.25-ft) long, 0.4-m (1.3-ft) wide stone retaining wall built to prevent the surrounding floodplain from slumping into the head of the spring channel. The south side of the ell consists of the 1.1-by-0.75-m (3.6-by-2.5-ft) closed-top spring box flanked by small stone retaining walls. The stonework consists of randomly coursed phyllite and/or schist rubble

Figure 6-27. 18CR293, Feature 2 Quoins, Facing Southwest

Figure 6-28. 18CR293, Feature 2 Stonework and Timber Sill Plate Detail, Facing South

CLIENT Carroll County Bureau of Resource Management	TITLE Project Photographs		
PROJ Piney Run Phase I			
SCALE N/A	AECOM	12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
SOURCE N/A			FIGURES 6-27 and 6-28
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Figure 6-29. 18CR293, Feature 3, Facing Southwest

Figure 6-30. 18CR293, Feature 3 Detail, Facing South

CLIENT	Carroll County Bureau of Resource Management	TITLE	Project Photographs
PROJ	Piney Run Phase I	PROJ NO	60614688
SCALE	N/A		
SOURCE	N/A	FIGURES	6-29 and 6-30

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AECOM 12420 Milestone Center Dr. Germantown, MD 20876 that appears to have been set in highly degraded lime/sand mortar. The stone spring box has been resurfaced with the same kind of concrete used to build Feature 1. No artifacts were found in association with Feature 3, though stone construction similarities shared with Feature 2 suggest a nineteenth century origin. The concrete surfacing presumably indicates twentieth century maintenance. No historic or modern mapping depicts Feature 3.

Feature 4 represents the second building identified in Locus A (Figures 6-31 and 6-32). Built onto a modified terrace above the unnamed tributary's floodplain, Feature 4 is located approximately 10 m (33 ft) southeast of Feature 2 on a slightly different orientation that fronts the southern edge of Road Trace 3. Parallel rows of four stone piers each define the building's footprint. The piers survive in varying states of completeness, with the intact ones each measuring 2.1 m (6.9 ft) north-south by 0.6 m (2 ft) east-west. The pier columns are spaced slightly more than 2 m (6.5 ft) apart and the rows are 4.8 m (15.75 ft) apart, producing a nearly square footprint measuring approximately 9.2 m (30.2 ft) east-west by 9 m (29.5 ft) north-south. Each pier is less than 0.5 m (1.6 ft) tall, built predominantly of phyllite and/or schist fieldstone that was once set in a lime/sand mortar that has heavily decayed.

Two judgmental STPs were placed within Feature 4. One terminated atop a rock impasse, while the other revealed an Ap horizon overlying natural eluvial and subsoil strata (E and B horizons). Four artifacts were recovered from the Ap horizon, including one wire nail (1890+), one window glass fragment, and two thick flat glass fragments that may be associated with an automobile/machinery. These few artifacts alone do not provide much commentary on construction period and function, though the proximity to Feature 2 and the absence of domestic material suggests Feature 4 represents an agricultural outbuilding such as a tobacco drying house or other produce storage area. This is suggested by the building's elevated location on a terrace above the floodplain and the use of stone piers, which may have aided in protection from surface water runoff while promoting air circulation. Feature 4's period of construction is unclear, as the use of stone piers could easily date to the nineteenth or early twentieth century. The only map to depict this feature is the 1972 site plan (Figure 3-13), though it is evident on the earliest available aerial photography from 1943 (Figure 3-7).

Feature 5 is a largely collapsed stone foundation for a dwelling situated in Locus B approximately 70 m (230 ft) northeast of Feature 4 (Figures 6-33 and 6-34). The building was sited on a highly constrained, artificially leveled terrace approximately midway up a moderately inclined hillslope rising north above the unnamed tributary. Remnants of the building's foundation were only visible along its east and west sides, with each wall measuring approximately 7.5 m (24.6 ft) long and consisting of disarticulated phyllite/schist rubble. No evidence of the building's west foundation wall was observed, while the north side of the foundation appears to have partially banked into the hillslope. No clearly defined stone structure was visible on the north side, but a linear earthen berm suggests where the north foundation may have been. Approximately midway along this berm, a small concentration of disarticulated bricks may signify the location of a hearth/chimney. A contorted pile of standing seam metal roofing is located 10 m (33 ft) to the north.

One judgmental STP (Y-6 8E 2S) was excavated within Feature 5, revealing two layers of burned fill atop the culturally sterile B horizon (Figure 6-22). The transition between the burned fill and the B horizon is sharp and distinct, a possible indication that the surface of the B horizon served as the dirt floor of a cellar or crawlspace. The extensive quantities of charcoal in the two fill strata suggest the building was destroyed in a fire. Both fill strata also contained significant quantities of finished plaster, suggesting the structure exhibited interior finishing on its walls. Seventy-four

Figure 6-31. 18CR293, Feature 4, Facing Northwest

Figure 6-32. 18CR293, Feature 4 Stone Pier Detail, Facing Southwest

CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	N/A
SOURCE	N/A
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TITLE
Project Photographs

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURES 6-31 and 6-32

Figure 6-33. 18CR293, Feature 5, Facing North

Figure 6-34. 18CR293, Feature 5 South Wall, Facing East

CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	N/A
SOURCE	N/A
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TITLE	Project Photographs
AECOM 12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
	FIGURES 6-33 and 6-34

artifacts were recovered from the interior of Feature 5 (Table 6-5). The proportion of foodways artifacts suggests the building was residential, corroborating historic USGS maps that depicted it as a dwelling. A domestic use is also suggested by the large quantities of finished plaster identified in STP Y-6 8E 2S, as this kind of wall/ceiling surface treatment most likely would appear in a residential context. Diagnostic artifacts, dominated by cut nails, suggest it was built in the nineteenth century but occupied into the twentieth century. Its twentieth century occupancy was clearly documented on USGS maps beginning in 1906, but it does not appear on any available nineteenth century maps. Its omission is likely a product of map scaling and/or cartographic oversight due to the dwelling's isolation. Aerial photographs presented in section 3.3 suggest mid-twentieth century abandonment.

Table 6-5. 18CR293, Feature 5 Interior Artifact Summary

Group	Subgroup	Artifact	Date Range	Count
Foodways	General Foodways	Bottle Glass		12
		Machined Bottle Glass	1893+	2
	Storage	Canning Jar		2
		Redware		1
		Machined Bottle Glass	1893+	1
		Milkglass Lid Liner	1869+	5
Household/Structural	Architectural/Construction	Window Glass		7
		Cut Nail	1790-1910	20
		Wire Nail	1890+	5
		Mortar		1
		Mortar and Plaster		2
Miscellaneous	Automotive	Spark Plug	1908-1974	1
	Unknown	Glass		13
		Iron		2
Total				**74**

In total, 224 historic artifacts were recovered from 18CR293 (Table 6-6). Just over 54 percent (n=121) were recovered from the A/Ap Horizon, with the remainder recovered from fill deposits interior to Feature 2 (n=29) and Feature 5 (n=74) as described above. Almost 80 percent of the artifacts (n=179) were found in Locus B, while just over 20 percent (n=45) originated in Locus A. This discussion will first present the assemblage as a whole before examining the distributions between Loci A and B.

Table 6-6. 18CR293 Artifact Summary

Group	Count	Percent
Foodways	64	28.57
Household/Structural	69	30.80
Labor	1	0.45
Miscellaneous	89	39.73
Personal	1	0.45
Total	**224**	**100.00**

Miscellaneous artifacts are the most common and represent almost 40 percent (n=89) of the site assemblage. These artifacts lack functionally diagnostic traits and include unidentifiable fragments of glass (n=73), iron (n=13), and leather (n=3).

Household/structural artifacts represent just over 30 percent (n=69) of the assemblage and include cut (n=25), wire (n=11), and indeterminate nails (n=9), window glass (n=20), mortar and plaster (n=2), a piece of mortar, and a nut/bolt.

Foodways artifacts account for 28.5 percent of the assemblage (n=64) and consist of glass (n=45), ceramic (n=17), and metal (n=2) artifacts. Foodways glass includes botte glass (n=34), indeterminate hollow glass (n=6), and milkglass lid liners (n=5). While most of the bottle glass was unidentifiable, individual fragments of a beer/soda bottle, a beer/alcohol/wine bottle, a cosmetic/medicinal bottle, and a possible poison bottle were recovered. Foodways ceramics include creamware (n=6), pearlware (n=4), redware (n=3), and single examples of Astbury, ironstone, North American stoneware, and hard paste porcelain. Nine foodways ceramics exhibited decoration, including overglaze painted creamware in a feather motif (n=4), painted pearlware (n=2), slip decorated pearlware in a checkerboard pattern (n=2), and a piece of molded (paneled) porcelain. Ceramic service wares (n=13) were more common than storage wares (n=4), though specific ceramic objects could only be identified in a few cases (one saucer and four coffee/tea cup fragments). Lastly, the foodways metal artifacts are represented by two aluminum canning jar lids.

The remainder of the 18CR293 assemblage consists of single examples of labor and personal artifacts. The sole labor artifact is a fragment of barbed wire, while the personal artifact is a white ball clay tobacco pipe bowl fragment.

Sixty temporally diagnostic artifacts were recovered from 18CR293, including metal (n=38), ceramic (n=12), and glass (n=10) artifacts (Table 6-7). Diagnostic metal artifacts include cut (n=25) and wire (n=11) nails alongside single examples of barbed wire and an Albert Champion spark plug. Diagnostic ceramics include creamware (n=6), pearlware (n=4), and single examples of ironstone and Astbury. Diagnostic glass artifacts include milkglass (n=5), machine-made glass (n=4), and solarized glass (n=1) and machine-made glass. The single Astbury fragment is the only artifact definitively produced in the early to mid-eighteenth century. As a very early outlier, this artifact is probably indicative of a family heirloom or otherwise curated object, rather than a contemporaneous historic occupation. The prevalence of cut nails indicates that much of the onsite building activities likely occurred during the nineteenth century. The prevalence of late eighteenth to early nineteenth century ceramics indicates that the site's domestic component originated around this time. Later artifacts suggest that the site was occupied into at least the early twentieth century, but it is currently unclear when the site was abandoned. It is clear from the historic record that occupation ceased by at least the early 1970s when Piney Run Dam was constructed, but the lack of diagnostic artifacts definitively produced from the mid-twentieth century onward suggests an earlier period of abandonment.

Table 6-7. 18CR293 Diagnostic Artifacts

Artifact	Date Range	Count
Astbury	1720-1750	1
Creamware	1762-1820	2
Creamware, Overglaze Painted	1765-1815	4
Pearlware, Painted, China Glaze	1775-1810	1

Artifact	Date Range	Count
Pearlware	1775-1840	3
Cut Nail	1790-1910	25
Ironstone	1842-1930	1
Milkglass Lid Liner	1869+	5
Solarized Glass	1880-1920	1
Barbed Wire	1887+	1
Wire Nail	1890+	11
Machine-Made Glass	1893+	4
Albert Champion Spark Plug	1908-1974	1
Total		**60**

The artifacts' horizontal distribution signifies the way in which 18CR293 was utilized as a farmstead, reflecting a clear division of domestic and agricultural/utilitarian spaces. The artifact signature from Locus A is much more consistent with utilitarian spaces which, as Features 2 and 4 suggest, likely embodied an agricultural character. Within Locus B, the artifacts are more clearly associated with sustained residential uses. The greatest quantity and variety of artifacts were recovered from Locus B, with substantially fewer and less diverse artifacts originating in Locus A (Table 6-8; Figures 6-35 and 6-36).

Table 6-8. 18CR293 Artifact Summary by Locus

Locus	Group	Count	Percent
A	Foodways	19	42.22
	Household/Structural	17	37.78
	Labor	1	2.22
	Miscellaneous	8	17.78
A Total		***45***	***100.00***
B	Foodways	45	25.14
	Household/Structural	52	29.05
	Miscellaneous	81	45.25
	Personal	1	0.56
B Total		***179***	***100.00***
Total		**224**	**100.00**

Forty-five artifacts were recovered from eight STPs in Locus A (Table 6-9). Foodways artifacts account for just over 42 percent (n=19) of the Locus A assemblage and include bottle (n=14) and indeterminate hollow (n=5) glass. Household/structural artifacts represent nearly 38 percent of the Locus A assemblage (n=17) and include window glass (n=2) along with cut (n=4), wire (n=6), and indeterminate (n=5) nails. Miscellaneous artifacts account for almost 18 percent (n=8) of the assemblage and consist of indeterminate iron (n=5) and glass (n=3) fragments. A single labor artifact accounts for the remainder of the Locus A assemblage and consists of a barbed wire fragment.

Figure 6-35. 18CR293, Locus A Representative Artifacts
Top Row: Barbed Wire (10.20); Cut Nail (16.01); Wire Nail (8.02)
Bottom Row: Possible Poison Bottle Glass (9.01); Cosmetic/Medicinal Bottle Glass (9.02); Square Bottle Glass (9.08); Possible Automotive Glass (17.01)

Figure 6-36. 18CR293, Locus B Representative Artifacts
Top Row: Cut Nail (11.18); Wire Nail (11.25); Spark Plug (11.28)
Middle Row: Soda Bottle Glass (11.01); Lid Liner (11.03); Solarized Glass (13.03); Olive Green Glass (15.13)
Bottom Row: Creamware (15.02); Astbury (15.08); Pearlware (15.14); Ironstone (15.07); Tobacco Pipe Bowl (15.12)

CLIENT Carroll County Bureau of Resource Management	TITLE Project Photographs		
PROJ Piney Run Phase I			
SCALE As Shown			PROJ NO 60614688
SOURCE N/A	AECOM	12420 Milestone Center Dr. Germantown, MD 20876	FIGURES 6-35 and 6-36
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Table 6-9. 18CR293, Locus A Artifact Summary

Group	Subgroup	Artifact	Date Range	Count
Foodways	General Foodways	Bottle Glass		14
		Indeterminate Hollow Glass		5
Household / Structural	Architectural / Construction	Window Glass		2
		Cut Nail	1790-1910	4
		Indeterminate Nail		5
		Wire Nail	1890+	6
Labor	Agricultural	Barbed Wire	1887+	1
Miscellaneous	Unknown	Glass		3
		Iron		5
Total				**45**

The foodways artifacts show very little diversification, with all artifacts representing bottle or unidentified hollow glass fragments. This is not suggestive of a domestic functional component, where ceramic and personal artifacts may be expected, and instead may be a product of casual disposal and/or use/consumption during the performance of nondomestic activities. Furthermore, the very limited quantities and functional diversity of the remainder of the Locus A assemblage are consistent with expectations for a cluster of outbuildings. While the artifacts do not directly suggest an agricultural function (excepting perhaps the barbed wire), Features 2 and 4 were almost certainly built as barns/sheds on the basis of their structural traits and the identification of Feature 2 as a Class 2 building on the 1953 USGS map.

Eleven diagnostic artifacts were recovered from Locus A, including six wire nails (1890+), four cut nails (1790-1910), and one piece of barbed wire (1887+). These are in addition to the numerous, uncollected cut nails identified in the surviving timbers within and adjacent to Feature 2. The diagnostic artifact assemblage within Locus A indicates that it likely originated in the nineteenth century, with repairs/modifications extending into the twentieth century.

One hundred seventy-nine historic artifacts were recovered from six STPs in Locus B (Table 6-10). Miscellaneous artifacts are most common (n=81), followed by household/structural (n=52), foodways (n=45), and personal (n=1) artifacts.

Table 6-10. 18CR293, Locus B Artifact Summary

Group	Subgroup	Artifact	Count
Foodways	General Foodways	Unidentified Bottle Glass	18
		Indeterminate Hollow Glass	1
	Service	Porcelain	1
		Creamware	6
		Astbury	1
		Ironstone	1
		Pearlware	4
	Storage	Canning Jar Lid	2
		Redware	3
		Stoneware	1

Group	Subgroup	Artifact	Count
Foodways	Storage	Bottle Glass	2
		Milkglass Lid Liner	5
Household/Structural	Architectural/Construction	Window Glass	18
		Cut Nail	21
		Wire Nail	5
		Indeterminate Nail	4
		Mortar	1
		Mortar and Plaster	2
	Hardware	Bolt/Nut	1
Miscellaneous	Automotive	Spark Plug	1
	Unknown	Glass	70
		Iron	7
		Leather Strap	3
Personal	Recreational	Ball Clay Tobacco Pipe Bowl	1
Total			**179**

Miscellaneous artifacts account for over 45 percent of the Locus B assemblage (n=81) and include unidentifiable glass (n=70) and iron (n=7) objects, along with three pieces of a leather strap and a single spark plug. Household/structural artifacts represent just over 29 percent (n=52) of the assemblage and include cut (n=21), wire (n=5), and indeterminate (n=4) nails, window glass (n=18), mortar and plaster (n=2), mortar (n=1), and a bolt/nut (n=1).

Foodways artifacts represent just over 25 percent (n=45) of the assemblage and include glass (n=26), ceramic (n=17), and metal (n=2) artifacts. Foodways glass includes bottle (n=20) and indeterminate hollow (n=1) glass alongside milkglass lid liners (n=5). Foodways ceramics include creamware (n=6), pearlware (n=4), redware (n=3), and single examples of Astbury, ironstone, North American stoneware, and hard paste porcelain. Nine foodways ceramics exhibited decoration, including overglaze painted creamware in a feather motif (n=4), painted pearlware (n=2), slip decorated pearlware in a checkerboard pattern (n=2), and a piece of molded (paneled) porcelain. Ceramic service wares (n=13) were more common than storage wares (n=4), though specific ceramic objects could only be identified in a few cases (one saucer and four coffee/tea cup fragments). The foodways metal artifacts are represented by two aluminum canning jar lids.

Lastly, the sole personal artifact is a white ball clay tobacco pipe bowl fragment. This artifact is undecorated and too fragmented to determine pipe bore diameter.

The Locus B assemblage is consistent with expectation for a domestic occupation. The foodways artifacts are relatively robust given the limited amount of excavation and speak to food storage and service activities. The relatively higher amount of window glass is also suggestive of a residence, as is the extensive amount of plaster discarded from judgmental STP Y-6 8E 2S. These plaster fragments exhibited finished surfaces, suggesting wall or ceiling applications far more typical of a dwelling than any other farmstead building. The pipe bowl fragment adds a narrow but important recreational dimension to the assemblage, creating a fuller image of the occupants' cultural behaviors.

Forty-nine diagnostic artifacts were recovered from Locus B, including metal (n=27), ceramic (n=12), and glass (n=10) artifacts (Table 6-11). Diagnostic metal includes cut (n=21) and wire (n=5) nails as well as a single Albert Champion spark plug. Diagnostic ceramics include creamware (n=6), pearlware (n=4), and single examples of ironstone and Astbury. Diagnostic glass includes milkglass (n=5), machine-made (n=4), and solarized (n=1) fragments.

Table 6-11. 18CR293, Locus B Diagnostic Artifacts

Artifact	Date Range	Count
Astbury	1720-1750	1
Creamware	1762-1820	2
Creamware, Overglaze Painted	1765-1815	4
Pearlware, Painted, China Glaze	1775-1810	1
Pearlware	1775-1840	3
Cut Nail	1790-1910	21
Ironstone	1842-1930	1
Milkglass Lid Liner	1869+	5
Solarized Glass	1880-1920	1
Wire Nail	1890+	5
Machine-Made Glass	1893+	4
Albert Champion Spark Plug	1908-1974	1
Total		**49**

The single piece of Astbury is the only object definitively produced during the early to mid-eighteenth century. As a very early outlier, it is unlikely that this artifact represents a contemporaneous historic occupation within Locus B. Rather, it was probably curated by the site's early occupants, perhaps as a family heirloom or otherwise valued keepsake. Cut nails represent the most common diagnostic artifact from Locus B, all of which were presumably used in the construction of the dwelling (Feature 5). The prevalence of these nails, and the absence of earlier wrought nails, suggests a nineteenth century construction period. This period can be further refined using the Locus B ceramics, most of which were produced in the late eighteenth to early nineteenth century. The cut nails and early ceramics, therefore, collectively suggest Locus B was occupied by the early nineteenth century. Later diagnostics suggest the site was occupied throughout the nineteenth century and into the early twentieth. Only one artifact was definitively produced after 1900, though several have manufacturing periods that extend into the twentieth century. Additional research is needed to resolve Locus B's occupational period, but based on the data available, it appears to have spanned at least the early nineteenth to the early twentieth century.

Site 18CR293 represents an early nineteenth to early twentieth century farmstead with well-defined domestic and agricultural/utilitarian use areas. Locus A represents the focal point of agricultural actives, centered on a large barn (Feature 2) and smaller outbuilding (Feature 4), while Locus B exhibits remnants of the farmstead's dwelling (Feature 5) and its domestic epicenter. The site was omitted from nineteenth century maps, possibly due to issues of map scale and/or the farmstead's isolation, but the diagnostic artifacts strongly suggest it originated in the early nineteenth century. While only one artifact definitively produced during the twentieth century was recovered, numerous others have manufacturing endpoints extending well into the twentieth century. The lack of definitively mid-twentieth century artifacts may be an indication that 18CR293 was no longer occupied by this time, as 1958 and later aerial photography suggests (Figures 3-10 through 12). While it is unclear when the farmstead was abandoned, it may have occurred as the result of a fire, as significant amounts of charcoal were identified in an STP interior to Feature 5.

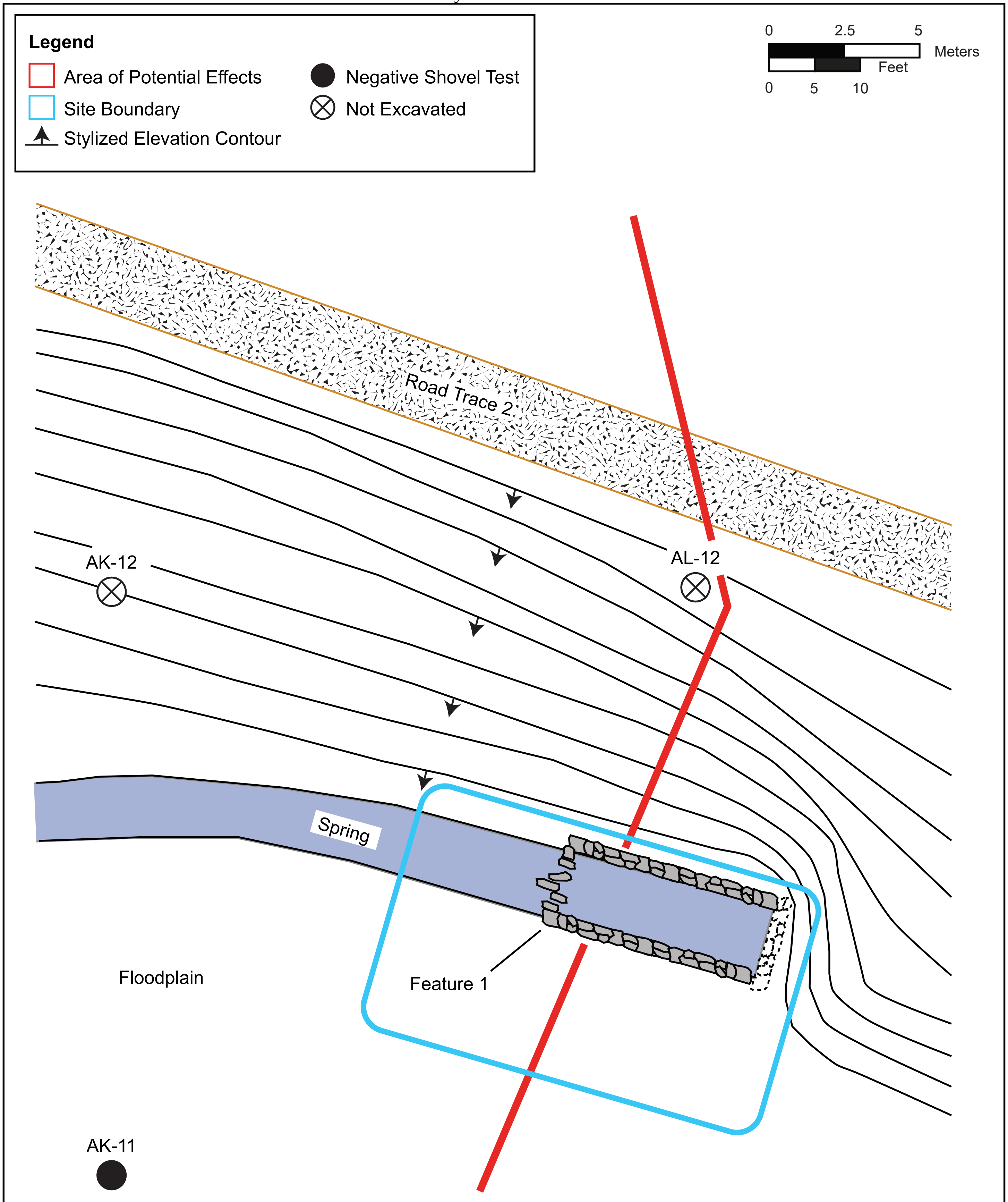
The site exhibits discrete horizontal artifact patterning reflective of the distribution of its agricultural and domestic features. It likewise possesses good archaeological integrity in terms of both its intact features and artifact deposits. These considerations contribute to the site's research value, as does its broader historical/archaeological context. While nineteenth century farmsteads are a very common site type in Carroll County, relatively few have been documented within the immediate vicinity. A review of the MHT's site files and MEDUSA GIS database revealed that no historic farmsteads have been formally excavated within the Piney Run valley, though several are known to have existed. This suggests that 18CR293 may be able to contribute significant information to local history, not only in terms of rural settlement generally but settlement within the Piney Run valley specifically. Throughout the nineteenth century, historic mapping suggests 18CR293 was isolated from the principal thoroughfares and the larger clusters of farmsteads to the northwest and industries/institutions to the southeast. The aspect of its setting may have driven the site's occupants to adopt particular adaptations to life in a relatively remote location, which could be evident in farming practices, consumer choice, recreational activities, and other behaviors that can leave archaeological traces.

Given the site's integrity, diverse features, meaningful artifact patterning, and research value, AECOM recommends 18CR293 potentially eligible for listing in the NRHP under Criterion D. It is recommended that potential ground disturbances associated with this undertaking avoid the site. If avoidance is not possible, a Phase II evaluation is recommended to formally determine its NRHP eligibility in advance of potential impacts arising from the undertaking.

6.4.3 18CR294

Site 18CR294 is located at the far eastern edge of the APE, immediately southwest of STP AL-12 and partially extending east of the APE (Figures 6-1 and 6-37). The site is centered atop a springhead on the Piney Run floodplain, abutting the steep toeslope of the forested ridges rising to the northeast. Road Trace 2 passes above 18CR294 along an alignment cut into the slopes; there is no trace of any passage leading from the road down to the floodplain to have provided access to the site. The site encompasses 0.01 ha (0.03 ac)

The site is defined by Feature 1, a large, open-top stone spring box constructed around a springhead that emerges on the floodplain at the base of the slopes (Figures 6-38 and 6-39). Measuring 7.5 m (24.6 ft) long and 3.3 m (10.8 ft) wide, the north and east walls of Feature 1 rise up to 1 m (3.3 ft) to meet the grade of the slopes while the south wall rises up to 0.5 m (1.6 ft) to meet the grade of the surrounding floodplain. While these three walls remain intact, the west wall has partially collapsed, allowing the spring to flow through its rubble. The entirety of Feature 1 is constructed of randomly coursed phyllite rubble with some large cut blocks. The stonework appears to have been dry set, though it is possible that it could have been bonded in a lime/sand mortar that has since deteriorated. Feature 1 may have possessed a roof at one time to protect the spring head from leaf litter accumulation, but no evidence for such was observed. The feature's construction materials tentatively suggest a nineteenth century or earlier construction date.



CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	As Shown
SOURCE	N/A

\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics

TITLE
18CR294 Site Plan

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-37

Figure 6-38. 18CR294, Feature 1, Facing East

Figure 6-39. 18CR294, Feature 1, Facing Southeast

CLIENT Carroll County Bureau of Resource Management		TITLE Project Photographs	
PROJ Piney Run Phase I			
SCALE N/A		AECOM 12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
SOURCE N/A			FIGURES 6-38 and 6-39
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

No artifacts were found at 18CR294, though ground conditions precluded excavation within the vicinity. STPs could not be placed south or west of Feature 1 due to surface water on the floodplain, nor could they be placed north due to excessive slope or east due to the APE boundary. The ground surface was closely inspected for artifacts and cultural features, but no additional resources were identified. This may be expected, as spring boxes were not always sited in the immediate proximity of historic occupations. Rather, these ancillary features had to be constructed wherever clean groundwater emerged, often in sloped or flooded areas unsuitable for sustained habitation.

Historic maps/aerial photography revealed no evidence for any buildings within the vicinity of the site, though this does not necessarily mean it was unoccupied. This portion of the Piney Run valley appears to have been relatively isolated during the nineteenth and early twentieth centuries, so it is possible that contemporaneous map makers simply chose not to travel into the area to survey it. Historically documented occupations in the broader area include farmsteads, mines, and mills, and this site could have served as a water supply to such occupations. The spring box's relatively large size could be an indication that it provided drinking water to more than one occupation.

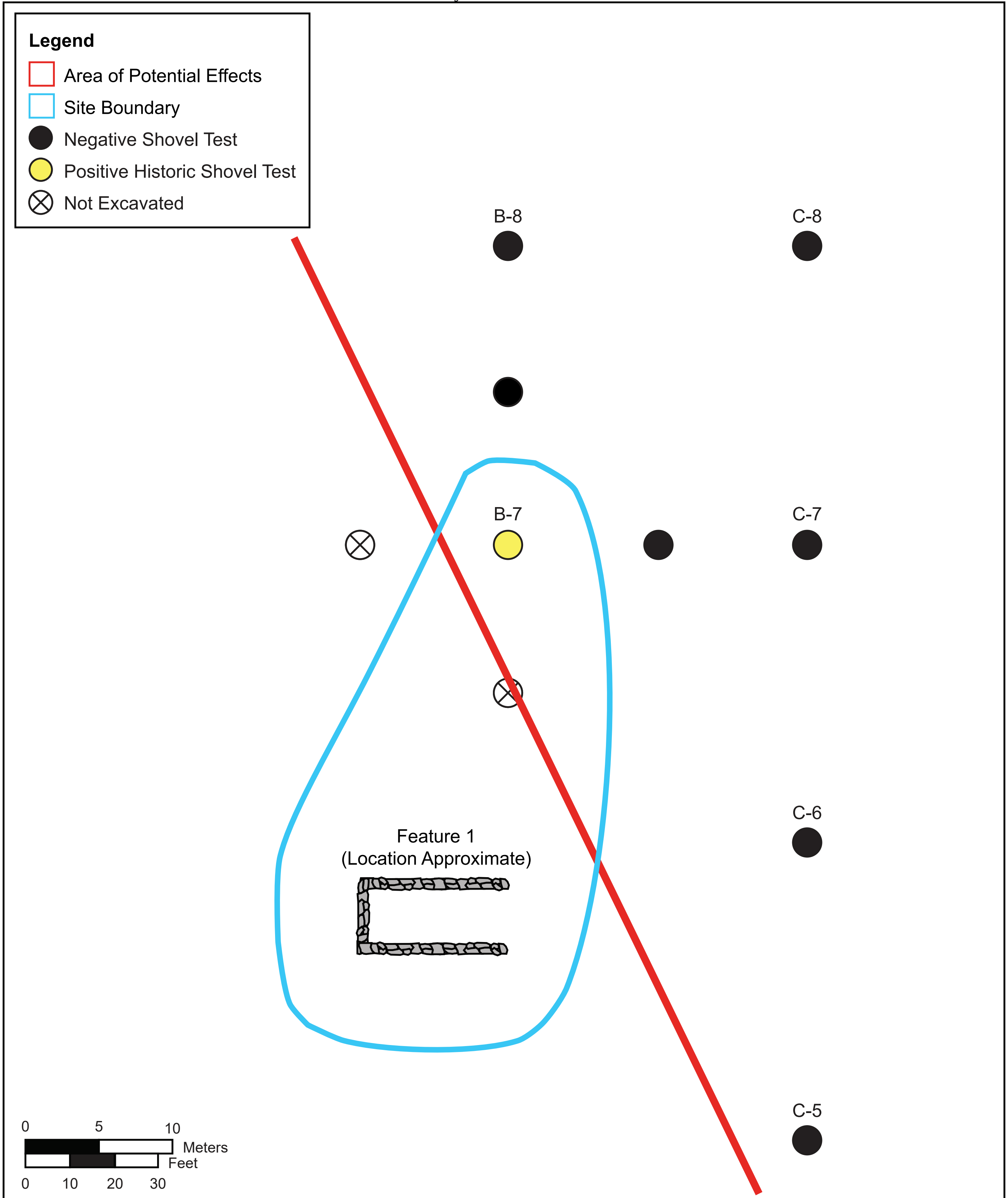
Site 18CR294 represents a stone spring box constructed along the east edge of the APE, on the Piney Run floodplain at the base of a hillslope and below Road Trace 2. No artifacts were found in association with this site, which may be isolated from any nearby historic occupations. It was not possible to search the area east of the site, so it is possible that associated archaeological deposits are present outside of the APE.

While the site includes a relatively intact structural feature indicative of a discrete activity area dedicated to water extraction, it possesses no artifacts or clear associations with any observed or historically documented occupations. Lacking a more fully defined context, the site possesses limited interpretational value beyond what has already been discerned. Given these considerations, AECOM recommends 18CR294 not eligible for listing in the NRHP as it lacks the informational potential required to satisfy Criterion D and lacks the associative values necessary to satisfy Criteria A, B, and/or C. No additional work is recommended.

6.4.4 18CR295

Site 18CR295 is located on the western edge of the APE and is inclusive of STP B-7 as well as a nearby stone foundation located south and west of the APE (Figures 6-1 and 6-40). The site is located on a forested hill summit that gently slopes down to the northwest to the Piney Run Reservoir. Historic mapping/aerial photography presented in section 3.3 show a farmstead once existed in this area, centered just beyond the western boundary of the APE, from at least 1943 to the 1970s. The site encompasses 0.06 ha (0.16 ac).

The site is defined by positive STP B-7 as well as Feature 1, a nearby and heavily overgrown stone foundation located beyond the APE boundaries (Figure 6-41). Feature 1 was photographed, but was not measured, drawn, or subjected to any pedestrian/subsurface investigation since it was not located within the APE. The rectilinear foundation is oriented roughly east-west along its long axis and appears to measure approximately 5 by 10 m (16.4 by 33 ft). Its west, north, and south walls were clearly visible, extending up to approximately 1 m (3.3 ft) above the forest floor. The west wall appears to include a doorway, but this could not be confirmed. No evidence for an east wall was observed, though it could be obscured by vegetation. The walls appear to be constructed of randomly coursed phyllite rubble with one entry piercing the west wall. Disarticulated sheet and piped metal objects could be seen within the foundation, but they could not be identified without closer inspection. The historically rural character of the local area suggests this may be



CLIENT	Carroll County Bureau of Resource Management
PROJ	Piney Run Phase I
SCALE	As Shown
SOURCE	N/A

\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics

TITLE 18CR295 Site Plan

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688

FIGURE 6-40

CLIENT Carroll County Bureau of Resource Management	TITLE 18CR295, Feature 1, Facing West		
PROJ Piney Run Phase I			
SCALE N/A	AECOM	12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO 60614688
SOURCE N/A			FIGURE 6-41
\\URSGermantown.us.ie.urs\Germantown\Projects\ENG\Dam&Reservoir Projects\Piney Run Watershed Study\400_Technical\436_Cultural\460 Graphics			

the foundation of a dwelling, barn, or other agricultural outbuilding. If the opening in the west wall represents a cellar access door, Feature 1 may represent a dwelling foundation

The only positive STP within 18CR295, B-7, was located approximately 25 m (82 ft) north of Feature 1 and revealed two strata. Stratum I was a 26-cm (0.85-ft) thick brown (7.5YR 4/3) silt loam Ap horizon overlying a strong brown (7.5YR 5/6) silty clay loam B horizon extending to the base of excavation. Four historic artifacts were collected from the A/Ap horizon, including one piece of machine-made bottle glass (1893+) and three wire nails (1890+). The artifacts' limited quantity and variety does not provide significant information into the use and occupation of 18CR295, though they do indicate that the site was occupied around the turn of the twentieth century or later.

According to the historic aerial photography presented in Section 3.3, a building was present within the vicinity of 18CR295 by at least 1943 (Figure 3-7). The 1953 USGS map showed the 1943 structure as a Class 1 building which, given the local context of rural settlement, almost certainly indicates a farmstead dwelling (Figure 3-9). It is not known if this historically mapped dwelling corresponds to Feature 1, or if Feature 1 served as the foundation for an associated outbuilding. Regardless, the use of a stone foundation strongly suggests the occupation predates 1943 by a considerable margin. The reason for the site's omission from earlier historic maps is unclear, but as noted elsewhere in this report, the general area's isolation and accessibility via unimproved tertiary roads may have discouraged cartographic survey.

Only the periphery of 18CR295 is located within the APE. The site core, which presumably lies in the direction of Feature 1, could not be investigated during the current study. The site's nature, age, and overall integrity therefore remain unknown at this time. Given that the site could not be more thoroughly investigated, AECOM cannot make a recommendation of potential NRHP eligibility. It is recommended that potential future ground disturbances avoid the site. Additional work is recommended to determine potential eligibility in the event ground disturbance is anticipated.

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7.0 SUMMARY AND RECOMMENDATIONS

AECOM conducted a Phase I archaeological survey as part of the Piney Run Watershed Study at the Piney Run Dam in Carroll County, Maryland. This study was undertaken in support of a concurrent Environmental Assessment and in advance of potential ground disturbing activities associated with the mitigation of design deficiencies identified at the dam. The APE for the archaeological survey is coterminous with the project area and encompasses approximately 20.47 ha (50.58 ac).

The archaeological survey consisted of visual surface inspection for above-ground evidence of archaeological sites and the excavation of 217 shovel test pits (STPs). Primary STPs were excavated on a 20-m (65.6-ft) interval grid oriented to true north, radial STPs were excavated around positive primary STPs at 10-m (32.8-ft) intervals, and judgmental STPs were placed in opportunistic locations to test specific landforms and/or archaeological deposits as needed.

This survey resulted in the recovery of one prehistoric artifact and 242 historic artifacts and the identification of four historic archaeological sites (18CR292 through 18CR295). The prehistoric artifact and one of the historic artifacts occurred as isolated finds, while the remaining 241 historic artifacts are attributed to three of the four newly recorded sites.

Site 18CR292 represents an isolated refuse pit dating to the early twentieth century but lacks any clear affiliation with a particular historic occupation. Though several early twentieth century dwellings were once located in the vicinity, it is unclear which, if any, are associated with 18CR292. Furthermore, the terrain surrounding this site has been used as a casual refuse disposal area in late historic and modern times, with tires, plastic, alcohol bottles, and metal scattered throughout the area. Site 18CR292 could therefore represent the refuse of a single household, or several. While the site may contribute generic insights into basic consumer preferences from the first half of the twentieth century, it cannot be definitively tied to a particular occupation and thus lacks the context necessary for a more meaningful interpretation. Given these considerations, AECOM recommends 18CR292 not eligible for listing in the NRHP as it lacks the informational potential required to satisfy Criterion D and lacks the associative values necessary to satisfy Criteria A, B, and/or C. No additional work is recommended.

Site 18CR293 represents an early nineteenth to at least early twentieth century farmstead located in a small, unnamed stream valley near the southern edge of the APE. The site includes five features and 224 historic artifacts representing two functionally discrete site loci. Locus A served as the farmstead’s agricultural core as indicated by the foundations of a large barn and secondary outbuilding, along with a low-density scatter of artifacts with very limited functional diversity. Locus B served as the farmstead’s domestic epicenter, as indicated by a dwelling foundation and higher quantities of more functionally diverse artifacts, including service and storage wares. The distribution of artifacts and features reflects the division of space the site occupants imposed on the landscape.

While farmsteads have been a mainstay of Carroll County’s cultural landscape for centuries, no farmstead within the Piney Run valley appears to have been archaeologically investigated. In particular, 18CR293 is located in what was likely a very isolated part of the valley throughout the nineteenth century, a setting which might have forced site occupants to adapt to life in a more remote location. Some adaptations could have left evidence in the form of general site use, consumer preferences and choice, recreational activities, farming and resource procurement practices, and other archaeologically visible aspects of the occupants' behavior, strategies, and agency.

Given the presence of numerous features, discrete activity areas, and intact archaeological deposits, together with the paucity of comparable site types in the Piney Run valley and the unique qualities of the site's historically remote setting, 18CR293 has the potential to yield important information to local historical knowledge of farmstead use, design, and occupation within the valley during the nineteenth and early twentieth centuries. For these reasons, AECOM recommends 18CR293 potentially eligible for listing in the NRHP under Criterion D. It is recommended that potential future ground disturbances avoid the site. If the site cannot be avoided, a Phase II evaluation is recommended to formally determine its NRHP eligibility.

Site 18CR294 represents an isolated stone spring box located on the eastern edge of the Piney Run floodplain. While the feature survives mostly intact and serves as a good example of a large-scale masonry spring box, it is not clearly affiliated with any historic occupation identified in the documentary record or in the field. Its location at the edge of the APE, surrounded by steep slopes and saturated soil, prevented STP excavation in the immediate vicinity. However, given the local soil and topographic conditions, together with the feature's apparent isolation, it is unlikely that significant archaeological deposits are present. While 18CR294 is indicative of an ancillary activity area used for historic resource procurement, its lack of a more robust historic association limits its research potential. Given these considerations, AECOM recommends 18CR294 not eligible for listing in the NRHP as it lacks the informational potential required to satisfy Criterion D and lacks the associative values necessary to satisfy Criteria A, B, and/or C. No additional work is recommended.

Site 18CR295 is an unidentified historic occupation represented by a positive STP within the APE and a nearby stone foundation west of the APE. The STP contained four diagnostic artifacts manufactured sometime since the 1890s, while the foundation's rubble stone construction fabric suggests a possible nineteenth century construction date. Since the foundation could not be archaeologically investigated, its function remains unclear; however, the historically agricultural nature of the local area suggests the foundation likely supported a dwelling, barn, or other farmstead outbuilding. The site core presumably is located within the vicinity of the foundation, while artifacts within the APE represent peripheral deposits. The site's nature, age, and overall integrity therefore remain unknown at this time. Given that the site could not be more thoroughly investigated, AECOM cannot make a recommendation of potential NRHP eligibility. It is recommended that potential future ground disturbances avoid the site. Additional work is recommended to determine potential eligibility in the event ground disturbance is anticipated.

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Appendix A:
Qualifications of Investigators

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Scott Seibel, MSc, has over 21 years of professional experience in archeological excavations, research and compliance studies and exceeds the *Secretary of the Interior's Professional Qualification Standards* (36CFR Part 61) for archeology and history. A Registered Professional Archeologist, Mr. Seibel has extensive cultural resource management experience for a wide range of private and governmental clients, having served as Principal Investigator or Field Director for tens of thousands of acres of Phase I archeological survey, dozens of Phase II evaluations and a dozen Phase III data recovery excavations across the United States. He received his Bachelor's Degree in Archeological Studies at the University of Texas at Austin in 1996 and his Master's Degree in Archeomaterials at the University of Sheffield in England in 1997.

Peter Regan, MA, is a Registered Professional Archaeologist (RPA) with over 12 years of experience in cultural resources management and exceeds the Secretary of the Interior's professional qualifications for archaeology and history. He specializes in historic site analyses, biological archaeology, historic research, and developing public outreach platforms for archaeological sites and other places of cultural interest. Mr. Regan has worked throughout the United States for numerous federal, state, municipal, and private clients on a wide variety of sites under all phases of excavation. In addition to extensive compliance-driven experience, Mr. Regan has served as a research consultant for archaeology and cultural outreach projects and is Vice Chairman of Frederick, Maryland's Historic Preservation Commission. As a Senior Archaeologist and Senior Historian with AECOM, he directs field projects, generates high quality technical documents, and contributes to numerous aspects of project execution, data analysis, and interagency coordination.

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Appendix B:
Artifact Catalog

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Piney Run Ph I

Site Number **Locus:** **STP:** H-9 **Feature** **Strat:** II **Depth:** 9 to 22 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0002.000	1	Prehistoric, Prehistoric	Lithic, Quartz	Flake, Tertiary, Complete			---	Size G-4

Site Number **Locus:** **STP:** D-5 **Feature** **Strat:** I **Depth:** 0 to 25 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0004.000	1	Historic, Foodways	Ceramic, Refined Earthenware	Plate, Base Sherd		Ironstone/Stone China/White Granite	---	

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Foodways	Ceramic, Porcelain	Plate, Base/Body/Rim Sherd		Hotel Ware/Industrial Ware	Decal Overglaze--Brown-Classical	Decoration = Main decoration is acanthus leaf with a floral band behind it and a geometric band just below the rim

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Foodways	Ceramic, Refined Earthenware	Cup, Coffee/Tea, Body/Rim Sherd		Ironstone/Stone China/White Granite	---	

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

0001.000	1	Historic, Foodways	Ceramic, Stoneware	Vessel, Hollowware, Body/Rim Sherd		North American, Slip Glazed	Albany-Type Slip---	Albany slip on interior and exterior; Either a large bowl or wide-mouthed jar

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Foodways	Ceramic, Stoneware	Vessel, Hollowware, Body Sherd		North American, Slip Glazed	Albany & Bristol Slips---	Albany slip on interior, bristol slip on exterior

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Labor	Glass, Common Glass	Bottle, Cleaning Product, Complete	Amber	Machined	Embossed--- Lettering	Lettering = "CLOROX" embossed on neck and shoulder and around the base, "16 oz" fill line around the shoulder, "REG. U.S./PAT OFF." and "CLOROX" in a diamond on the base of the bottle

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Soda, Complete	Aqua Green	Machined	Embossed-Ribbed-- Lettering	Lettering = "COCA-COLA/TRADE MARK REGISTERED/BOTTLE PAT'D DEC 25, 1923/ MIN CONTENTS 6-FL 0ZS." on body, "WESTMINSTER/MD" on base; Bottling at Westminster likely began in 1920 (Baltimore Sun)

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Personal	Glass, Common Glass	Bottle, Cosmetic, Complete	Colorless	Machined	Embossed---Lettering	Raised wavy pattern on surface of bottle; Lettering = "DR. ELLIS/SPECIAL QUICK DRY WAVING FLUID/WAVE SET" on one face, "DIP THE/COMB IN/THE BOTTLE" on opposing face, "MADE IN USA" on base

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Condiment, Complete		Machined	Ribbing-Embossed--Lettering	Lettering = "HA" on base - Hazel Atlas bottling company; Mustard jar with standard barrel shape; Fragments of metal screw cap remain

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Complete	Colorless	Machined	Embossed---Lettering	Lettering = "2 1/2 OZ" on neck "HA" on base - Hazel Atlas bottling company; likely a shoe polish bottle

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Complete	Colorless	Machined	Embossed---Lettering	Lettering = "HA" on base - Hazel Atlas bottling company; likely a medicine or cosmetic bottle

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Milk, Shoulder/Neck	Colorless	Machined, Press and Blow	Embossed---Lettering	Lettering = "(HEA?)LTH DEPT/(1?)924

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.001	1	Historic, Foodways	Glass, Milk Glass	Cup, Coffee/Tea, Almost Complete	White	Machined	---	

Site Number 18CR292 **Locus:** **STP:** - **Feature** 1 **Strat:** Surface **Depth:** to

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0001.001	1	Historic, Foodways	Metal, Iron	Cup, Coffee, Complete		Indeterminate	Enamel--White-	Likely cast

Site Number 18CR293 **Locus:** A **STP:** W-3 E10 **Feature** **Strat:** II **Depth:** 5 to 27 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0005.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** W-3 E10 **Feature** **Strat:** II **Depth:** 5 to 27 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0005.000	1	Historic, Foodways	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** X-4 **Feature** **Strat:** I **Depth:** 0 to 27 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

0006.000	1	Historic, Household/Structural	Metal, Iron	Nail, Complete		Wire Wound	---	

Site Number 18CR293 **Locus:** A **STP:** X-4 **Feature** **Strat:** I **Depth:** 0 to 27 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0006.000	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Wire Wound	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 **Feature** **Strat:** I **Depth:** 0 to 15 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0007.000	1	Historic, Foodways	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 **Feature** **Strat:** I **Depth:** 0 to 15 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0007.000	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 E10 **Feature** **Strat:** II **Depth:** 12 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0008.000	1	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Colorless		---	

Site Number 18CR293 **Locus:** A **STP:** V-3 E10 **Feature** **Strat:** II **Depth:** 12 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0008.000	1	Historic, Household/Structural	Metal, Iron	Nail, Complete		Wire Wound	---	Clinched; very little oxidation

Site Number 18CR293 **Locus:** A **STP:** V-3 E10 **Feature** **Strat:** II **Depth:** 12 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0008.000	1	Historic, Miscellaneous	Metal, Iron	Wire, Fragment		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Other, Body Sherd	Cobalt	Mold Blown, Indeterminate	Ridged---	Ridging on exterior surface, possible poison bottle

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Other, Body Sherd	Aqua	Mold Blown, Indeterminate	Embossed---Lettering	Lettering = "DR (?)" - either a cosmetic or medicinal bottle

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Shoulder	Aqua	Mold Blown, Indeterminate	---	Seam present

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	4	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	2	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Aqua/Colorless	Mold Blown, Indeterminate	---	Seam present

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	2	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Colorless	Mold Blown, Indeterminate	---	Seam present

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	4	Historic, Foodways	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	2	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Fragment	Colorless	Mold Blown, Indeterminate	---	Possible square/rectangular bottle; Angled shoulders; Seam present

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.000	1	Historic, Miscellaneous	Glass, Common Glass	Indeterminate Flat, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.001	2	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Cut	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.001	1	Historic, Household/Structural	Metal, Iron	Nail, Tip, Shaft		Cut	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.001	2	Historic, Household/Structural	Metal, Iron	Nail, Complete		Wire Wound	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 **Feature** **Strat:** II **Depth:** 10 to 24 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0009.001	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** W-3 E10 N1 **Feature** **Strat:** II **Depth:** 5 to 29 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0010.000	3	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** W-3 E10 N1 **Feature** **Strat:** II **Depth:** 5 to 29 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0010.000	1	Historic, Labor	Metal, Iron	Barbed Wire, Fragment		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** W-3 E10 N1 **Feature** **Strat:** II **Depth:** 5 to 29 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0010.000	4	Historic, Miscellaneous	Metal, Iron	Indeterminate, Fragment		Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Beer/Soda, Finish	Green	Machined	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	6	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Amber	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	3	Historic, Foodways	Glass, Milk Glass	Lid Liner, Fragment	White	Machined	Embossed---Lettering	Lettering = "BOYD'S GENUINE PORCE(LAIN CAP)"; Fragments mend

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Milk Glass	Lid Liner, Fragment	White	Machined	Embossed---Lettering	Lettering = "7"

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Common Glass	Lid Liner, Fragment	White	Machined	Embossed---Lettering	Lettering = "(?)RS *diamond*"

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Finish	Colorless	Machined	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Base Sherd	Colorless	Machined	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Colorless	Mold Blown, Indeterminate	Embossed---Lettering	Lettering = "OR RE(SALE?)/THIS" - Likely "this bottle not for reuse or resale"

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Colorless	Mold Blown, Indeterminate	Embossed---Lettering	Lettering = "(?)CO(?)"

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Colorless	Mold Blown, Indeterminate	Embossed---Other	Other = possible depiction of an arrow

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

0011.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Shoulder	Colorless	Mold Blown, Indeterminate	---	Possible flask

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Colorless	Mold Blown, Indeterminate	---	Seam present

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	12	Historic, Miscellaneous	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	1	Historic, Miscellaneous	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	2	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	5	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	2	Historic, Household/Structural	Metal, Iron	Nail, Complete		Cut	---	Possibly burned

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.001	3	Historic, Household/Structural	Metal, Iron	Nail, Complete		Cut	---	Possibly burned

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	1	Historic, Household/Structural	Metal, Iron	Nail, Complete		Cut	---	Possibly burned

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	3	Historic, Household/Structural	Metal, Iron	Nail, Complete		Cut	---	Possibly burned

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	7	Historic, Household/Structural	Metal, Iron	Nail, Complete		Cut	---	Possibly burned

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	3	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Cut	---	Possibly burned

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	1	Historic, Household/Structural	Metal, Iron	Nail, Shaft		Cut	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	1	Historic, Household/Structural	Metal, Iron	Nail, Complete		Wire Wound	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	3	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Wire Wound	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	1	Historic, Household/Structural	Metal, Iron	Nail, Tip, Shaft		Wire Wound	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	1	Historic, Miscellaneous	Metal, Iron	Spark Plug, Complete		Machined	Stamped--Green-Lettering	Lettering = "AC/G12" on the porcelain portion of the spark plug. AC = Albert Champion (AC Delco today)

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.002	1	Historic, Foodways	Ceramic, Coarse Earthenware	Vessel, Hollowware, Base Sherd		Redware, Black Glazed	Unglazed-Wash-Orange-	Orange wash on exterior, black glaze interior; Small portion of base likely overfired

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.003	1	Historic, Household/Structural	Other, Mortar	Mortar, Fragment			---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.003	2	Historic, Household/Structural	Other, Mortar	Mortar and Plaster, Fragment			---	Small mortar fragments with plaster on one surface

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.003	2	Historic, Miscellaneous	Metal, Iron	Other, Fragment		Indeterminate	---	Possible thread cap; fragments mend

Site Number 18CR293 **Locus:** B **STP:** Y-6 E8 S2 **Feature** **Strat:** II **Depth:** 20 to 35 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0011.003	2	Historic, Foodways	Metal, Aluminum	Jar, Canning, Lid		Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** AA-6 **Feature** **Strat:** I **Depth:** 0 to 60 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0012.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Cobalt	Mold Blown, Indeterminate	Embossed---Lettering	Lettering = "(?)N/(?)O/(?)M(?)"

Site Number 18CR293 **Locus:** B **STP:** AA-6 **Feature** **Strat:** I **Depth:** 0 to 60 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0012.000	49	Historic, Miscellaneous	Glass, Common Glass	Other, Fragment	Colorless	Indeterminate	---	Thin bodied glass, possibly part of kerosene/chimney lamp

Site Number 18CR293 **Locus:** B **STP:** AA-6 **Feature** **Strat:** I **Depth:** 0 to 60 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0012.000	1	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Finish	Cobalt	Machined	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	2	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Body Sherd	Amber	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	1	Historic, Miscellaneous	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless, Solarized	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	5	Historic, Miscellaneous	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	6	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N5 E5 **Feature** **Strat:** I **Depth:** 0 to 18 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0013.000	3	Historic, Miscellaneous	Fauna, Leather	Strap, Fragment			---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N10 **Feature** **Strat:** II **Depth:** 10 to 20 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0014.000	2	Historic, Miscellaneous	Glass, Common Glass	Indeterminate Hollow, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N10 **Feature** **Strat:** II **Depth:** 10 to 20 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0014.000	1	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Colorless	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N10 **Feature** **Strat:** II **Depth:** 10 to 20 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0014.000	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Cut	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 N10 **Feature** **Strat:** II **Depth:** 10 to 20 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0014.000	1	Historic, Household/Structural	Metal, Iron	Bolt/Nut, Fragment		Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	1	Historic, Foodways	Ceramic, Porcelain	Saucer, Rim Sherd		Porcelain, Hard Paste	Molded---Paneled	Paneled molding below the rim

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	4	Historic, Foodways	Ceramic, Refined Earthenware	Cup, Coffee/Tea, Body/Rim Sherd		Creamware	Painted, Overglaze--Red-Feather	Painted feather in red enamel overglaze; Three of four sherds mend, but fourth sherd likely part of vessel

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	2	Historic, Foodways	Ceramic, Refined Earthenware	Tableware/Toiletware, Unid., Fragment		Creamware	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

0015.000	1	Historic, Foodways	Ceramic, Refined Earthenware	Vessel, Hollowware, Body Sherd		Pearlware	Painted--Blue-China Glaze	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	1	Historic, Foodways	Ceramic, Refined Earthenware	Tableware/Toiletware, Unid., Body Sherd		Pearlware	Painted--Olive Green-Indeterminate	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	2	Historic, Foodways	Ceramic, Refined Earthenware	Vessel, Hollowware, Rim Sherd		Pearlware	Slip Decorated-Engine Turned-Brown; Blue; Black-Checkerboard	Sherds mend

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	1	Historic, Foodways	Ceramic, Refined Earthenware	Tableware/Toiletware, Unid., Fragment		Ironstone/Stone China/White Granite	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	1	Historic, Foodways	Ceramic, Refined Earthenware	Tableware/Toiletware, Unid., Fragment		Astbury	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.000	1	Historic, Foodways	Ceramic, Coarse Earthenware	Indeterminate, Fragment		Redware, Brown Glazed	---	Thin bodied, glazed on both surfaces

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	1	Historic, Foodways	Ceramic, Coarse Earthenware	Indeterminate, Fragment		Redware, Black Glazed	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	1	Historic, Foodways	Ceramic, Stoneware	Vessel, Hollowware, Body Sherd		North American, Salt Glazed, Gray/Buff Bodied	Unglazed---	Unglazed interior; buff bodied

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	1	Historic, Personal	Ceramic, Clay	Tobacco Pipe, Bowl		White Ball Clay	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	1	Historic, Foodways	Glass, Common Glass	Bottle, Beer/Wine/Liquor, Body Sherd	Olive Green	Mold Blown, Indeterminate	---	Possible case bottle

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	1	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	2	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	2	Historic, Household/Structural	Metal, Iron	Nail, Fragment		Indeterminate	---	Heavy oxidation

Site Number 18CR293 **Locus:** B **STP:** Y-6 S10 **Feature** **Strat:** II **Depth:** 8 to 39 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0015.001	5	Historic, Miscellaneous	Metal, Iron	Indeterminate, Fragment		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** V-3 E5 S2.5 **Feature** **Strat:** IV **Depth:** 29 to 37 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0016.000	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Cut	---	Possibly burnt

Site Number 18CR293 **Locus:** A **STP:** V-3 E5 S2.5 **Feature** **Strat:** IV **Depth:** 29 to 37 cmb

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0016.000	1	Historic, Household/Structural	Metal, Iron	Nail, Head, Shaft		Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** W-3 W7.5 S1 **Feature** **Strat:** I **Depth:** 0 to 19 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0017.000	2	Historic, Miscellaneous	Glass, Common Glass	Other, Fragment	Aqua Green	Indeterminate	---	Thick bodied flat glass; likely for automobile or machinery

Site Number 18CR293 **Locus:** A **STP:** W-3 W7.5 S1 **Feature** **Strat:** I **Depth:** 0 to 19 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0017.000	1	Historic, Household/Structural	Glass, Common Glass	Window Glass, Fragment	Aqua	Indeterminate	---	

Site Number 18CR293 **Locus:** A **STP:** W-3 E2.5 S1 **Feature** **Strat:** I **Depth:** 0 to 22 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0018.000	1	Historic, Household/Structural	Metal, Iron	Nail, Complete		Wire Wound	---	Clinched

Site Number 18CR295 **Locus:** **STP:** B-7 **Feature** **Strat:** I **Depth:** 0 to 26 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0003.000	1	Historic, Foodways	Glass, Common Glass	Bottle, Unid., Neck	Colorless	Machined	---	Seam present

Site Number 18CR295 **Locus:** **STP:** B-7 **Feature** **Strat:** I **Depth:** 0 to 26 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0003.000	1	Historic, Household/Structural	Metal, Steel	Nail, Complete		Wire Wound	---	Clinched; very little oxidation

Site Number 18CR295 **Locus:** **STP:** B-7 **Feature** **Strat:** I **Depth:** 0 to 26 cmbs

Catalog	Qty	Group/Subgroup	Material	Object/Segment	Color	Type	Decoratio	Comments
0003.000	2	Historic, Household/Structural	Metal, Steel	Nail, Complete		Wire Wound	---	One nail has significant amount more of oxidation than the other

***Artifact Total:* 243**

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Appendix C:
Archaeological Site Forms

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MARYLAND INVENTORY OF HISTORIC PROPERTIES

ARCHEOLOGICAL SITE SURVEY: BASIC DATA FORM

Date Filed: 01/08/2020

Check if update: ☐

Maryland Department of Planning
Maryland Historical Trust
Division of Historical and Cultural Programs
100 Community Place
Crownsville, Maryland 21032

Site Number: 18CR292	
County: Carroll	

A. DESIGNATION

1. Site Name: Piney Run 1

2. Alternate Site Name/Numbers: ____________

3. Site Type (describe site chronology and function; see instructions):
Early twentieth century, isolated refuse disposal pit. Primary refuse is glass bottles (beverage, cosmetic/ Medicinal) and jars, with minor amounts of metal debris (automotive, fencing) and some foodways ceramics.

4. Prehistoric ______ Historic __X__ Unknown ______

5. Terrestrial __X__ Submerged/Underwater ______ Both ______

B. LOCATION

6. USGS 7.5' Quadrangle(s): Finksburg | (For underwater sites) NOAA Chart No.:

(Photocopy section of quad or chart on page 4 and mark site location)

Latitude in decimal degrees 39.387203 Longitude in decimal degrees -76.979622

7. Maryland Archeological Research Unit Number: 14

8. Physiographic Province (check one):
   - ______ Allegany Plateau
   - ______ Ridge and Valley
   - ______ Great Valley
   - ______ Blue Ridge
   - ______ Lancaster/Frederick Lowland
   - __X__ Eastern Piedmont
   - ______ Western Shore Coastal Plain
   - ______ Eastern Shore Coastal Plain

9. Major Watershed/Underwater Zone (see instructions for map and list): Patapsco River

C. ENVIRONMENTAL DATA

10. Nearest Water Source: Piney Run Reservoir Stream Order: 2

11. Closest Surface Water Type (check all applicable):
   - ______ Ocean
   - ______ Estuarine Bay/Tidal River
   - ______ Tidal or Marsh
   - __X__ Freshwater Stream/River
   - ______ Freshwater Swamp
   - ______ Lake or Pond
   - ______ Spring

12. Distance from closest surface water: 140 meters (or 450 feet)

C. ENVIRONMENTAL DATA [CONTINUED]

13. Current water speed: ______ knots 14. Water Depth: ______ meters

15. Water visibility: ________________

16. SCS Soils Typology and/or Sediment Type: GdB (Glenelg Loam)

17. Topographic Settings (check all applicable):

_______ Floodplain
_______ Interior Flat
_______ Terrace
_______ Low Terrace
_______ High Terrace
_______ Hillslope
X Hilltop/Bluff
_______ Upland Flat
_______ Ridgetop
_______ Rockshelter/Cave
_______ Unknown
_______ Other: ______________

18. Slope: 2%

19. Elevation: 177 meters (or 580 feet) above sea level

20. Land use at site when last field checked (check all applicable):

_______ Plowed/Tilled
_______ No-Till
X Wooded/Forested
_______ Logging/Logged
_______ Underbrush/Overgrown
_______ Pasture
_______ Cemetery
_______ Commercial
_______ Educational
_______ Extractive
_______ Military
_______ Recreational
_______ Residential
_______ Ruin
_______ Standing Structure
_______ Transportation
_______ Unknown
_______ Other: ______________

21. Condition of site:

_______ Disturbed
X Undisturbed
_______ Unknown

22. Cause of disturbance/destruction (check all applicable):

_______ Plowed
_______ Eroded/Eroding
_______ Graded/Contoured
_______ Collected
_______ Vandalized/Looted
_______ Dredged
_______ Heavy Marine Traffic
_______ Other: ______________

23. Extent of disturbance:

_______ Minor (0-10%)
_______ Moderate (10-60%)
_______ Major (60-99%)
_______ Total (100%)
_______ % unknown

C. ENVIRONMENTAL DATA [CONTINUED]

24. Describe site setting with respect to local natural and cultural landmarks (topography, hydrology, fences, structures, roads). Use continuation sheet if needed.

The surrounding landform consists of a series of forested hill summits gradually descending north toward what is now a submerged hollow along the Piney Run stream valley. The area around the site contains a widely dispersed scatter of discarded metal, glass, plastic, and rubber materials, most of which appear to date to the second half of the twentieth century. The site is situated approximately 40 m (131 ft) east of a historic road, which itself exhibits casual refuse disposal areas along its edges. This road is a now disused extension of Hollenberry Road and once provided access to four historic occupations first evidenced on a 1944 USGS map. The site could be associated with one or several of these occupations.

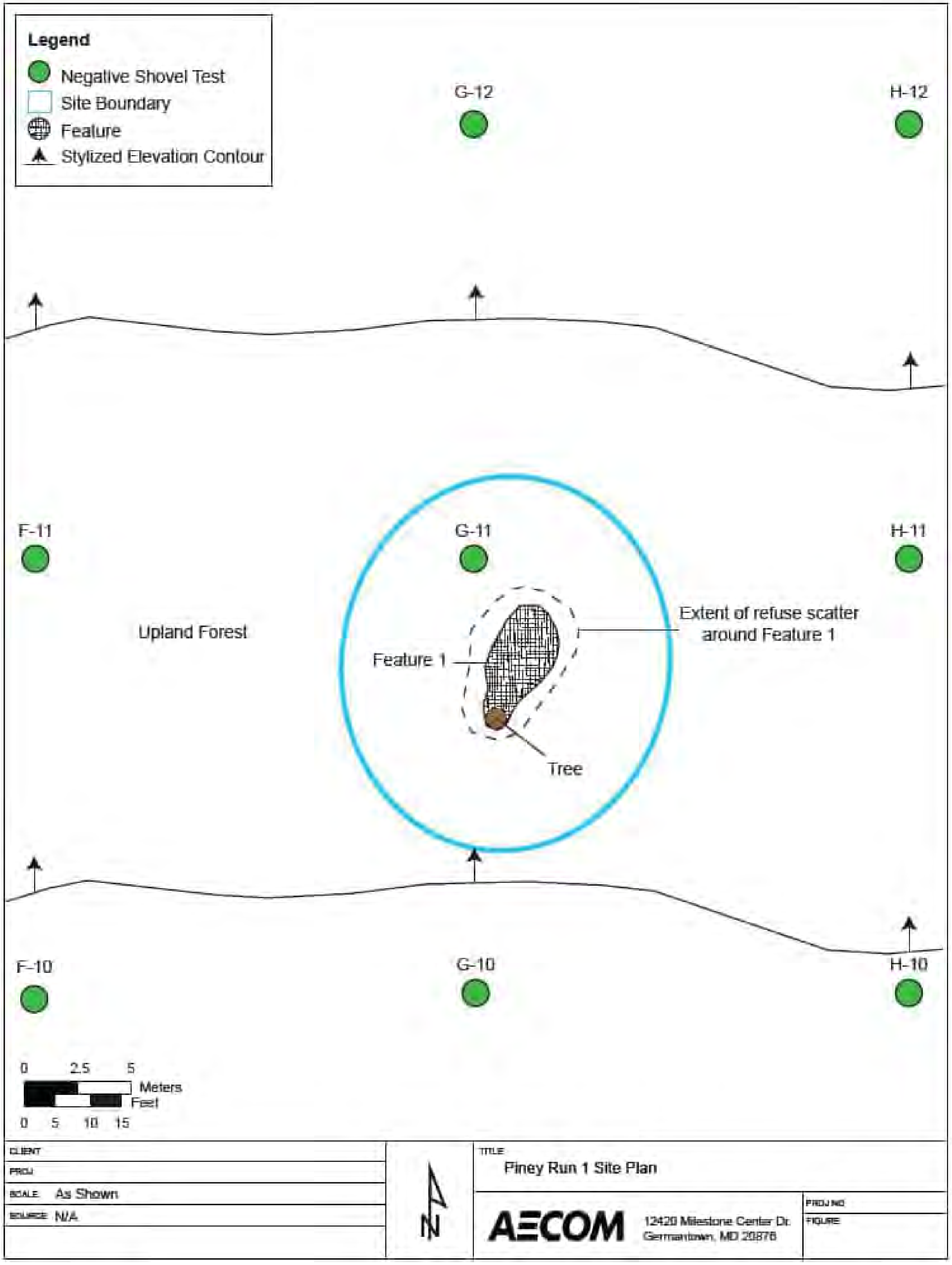
25. Characterize site stratigraphy. Include a representative profile on separate sheet, if applicable. Address plowzone (presence/absence), subplowzone features and levels, if any, and how stratigraphy affects site integrity. Use continuation sheet if needed.

The site is limited to a single refuse pit feature, all surrounding grid STPs were negative for cultural material. These generally revealed an A/Ap horizon overlying the B horizon and showed no signs of significant recent disturbance.

26. Site size: 16.25 meters by 15 meters (or 53.3 feet by 49.2 feet)

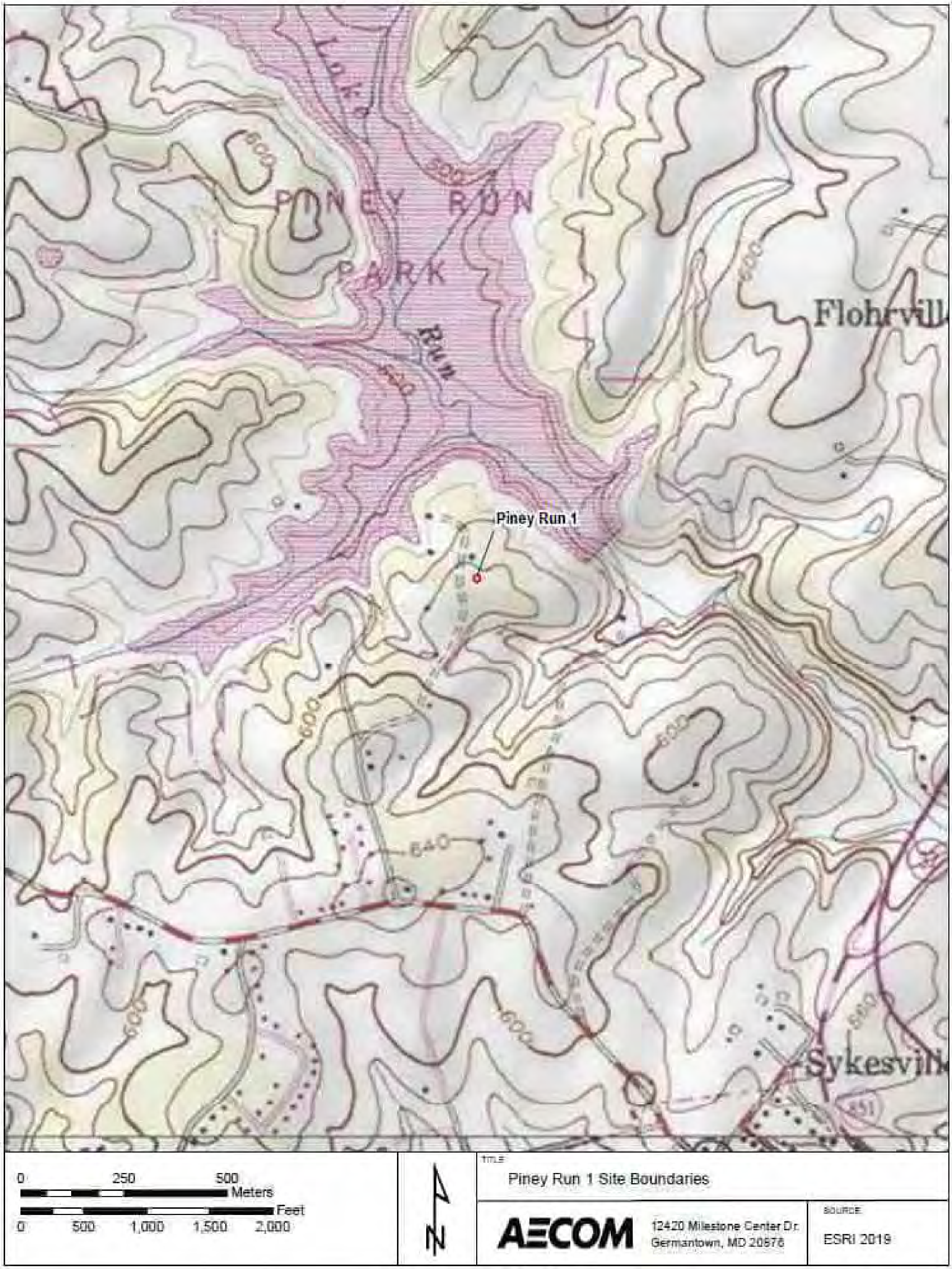
Site Number: 18CR292 **Page 3a**
BASIC DATA FORM

27. Draw a sketch map of the site and immediate environs, here or on separate sheet:



Scale: North arrow:

Photocopy section of quadrangle map(s) and mark site location with heavy dot or circle and arrow pointing to it.



D. CONTEXT

28. Cultural Affiliation (check all applicable):

PREHISTORIC
_______ Unknown
_______ Paleoindian
_______ Archaic
_______ Early Archaic
_______ Middle Archaic
_______ Late Archaic
_______ Terminal Archaic
_______ Woodland
_______ Adena
_______ Early Woodland
_______ Middle Woodland
_______ Late Woodland

_______ CONTACT

HISTORIC:
_______ Unknown
17th century
_______ 1630-1675
_______ 1676-1720
18th century
_______ 1721-1780
_______ 1781-1820
19th century
_______ 1821-1860
_______ 1861-1900
20th century
___X___ 1901-1930
___X___ post-1930

____ UNKNOWN

E. INVESTIGATIVE DATA

29. Type of investigation:
____X__ Phase I
_______ Phase II/Site Testing
_______ Phase III/Excavation
_______ Archival Investigation
_______ Monitoring
_______ Field Visit
_______ Collection/Artifact Inventory
_______ Report From Informant
_______ Other: _______________

30. Purpose of investigation:
____X__ Compliance
_______ Research
_______ Avocational
_______ Regional Survey
_______ Site Inventory
_______ MHT Grant Project
_______ Other: _______________

31. Method of sampling (check all applicable):
_______ Non-systematic surface search
____X__ Systematic surface collection
_______ Non-systematic shovel test pits
_______ Systematic shovel test pits
_______ Excavation units
_______ Mechanical excavation
_______ Remote sensing
_______ Other: _______________

32. Extent/nature of excavation: _______________

F. SUPPORT DATA

33. Accompanying Data Form(s):
________ Prehistoric
___X____ Historic
________ Shipwreck

34. Ownership: _______ Private ________ Federal ________ State ___X____ Local/County _______ Unknown

35. Owner(s): County Commissioners of Carroll County
Address: 225 North Center Street, Westminster, MD 21157
Phone: ____
Email: ____

36. Tenant and/or Local Contact: ____
Address: ____
Phone: ____
Email: ____

37. Other Known Investigations: ____

38. Primary report reference or citation: Regan, Pete (2020) *Phase I Archaeological Investigation for the Piney Run Watershed Study, Piney Run Dam, Carroll County, Maryland.* (AECOM)

39. Other Records (e.g. slides, photos, original field maps/notes, sonar, magnetic record)?

____ Slides	X Field record	____ Other: ____
X Photos	____ Sonar	
X Field maps	____ Magnetic record	

40. If yes, location of records: AECOM, Germantown

41. Collections at Maryland Archeological Conservation (MAC) Lab or to be deposited at MAC Lab?
X Yes
____ No
____ Unknown

42. If NO or UNKNOWN, give owner: ____
location: ____
and brief description of collection: ____

43. Informant: ____
Address: ____
Phone: ____
Email: ____

44. Site visited by Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 12/06/2019

45. Form filled out by: Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 01/08/2020

46. Site Summary/Additional Comments (append additional pages if needed):

The site is located among a series of forested hill summits gradually descending north toward what is now a submerged hollow along the Piney Run stream valley. The vicinity contains a widely dispersed scatter of discarded metal, glass, plastic, and rubber materials, most of which appear to date to the second half of the twentieth century. The site is situated approximately 40 m (131 ft) east of a historic road trace, which itself exhibits casual refuse disposal areas along its edges. This road trace is a now disused section of Hollenberry Road, which provided access to a few historic occupations first apparent on a 1944 USGS map.

This site is defined by Feature 1, a lobe-shaped pit measuring up to 5.5 m (18 ft) long by 2.5 m (8.2 ft) wide and extending up to 1 m (3.3 ft) below the surface. Exhibiting slumping sides and amorphous contours, Feature 1 was littered with discarded glass bottles, unidentifiable iron fragments, automotive parts, and a few historic ceramics. Probing the sides of the feature revealed no structural elements which, together with its overall shape and contents, indicated that it was specifically excavated for refuse disposal as opposed to having been a repurposed cellar pit. A scatter of glass bottles extended outward from Feature 1 approximately 1 meter (3.3 ft). Pedestrian and subsurface investigations of the surrounding area revealed no additional archaeological features or deposits or any indication of a sustained historic occupation.

Feature 1 contained hundreds of glass bottles/vessel glass fragments, large pieces of metal (e.g., automotive parts), and other generic refuse. No architectural artifacts were found in the feature. Due to the overwhelming quantity of material, a sample of well preserved, diagnostic artifacts was collected for analysis. Preference was given to representative intact/mostly intact glass bottles and single examples of the observed ceramic ware types. Most of the glass bottles were attributable to early to mid-twentieth century manufactures and represent alcohol, soda, condiment, cleaning product, and cosmetic/medicinal bottles. A few ironstone and hotel ware fragments were observed as well. Uncollected artifacts consist of similar/identical bottles, glass jars, some automotive pieces, and miscellaneous iron fragments.

This site represents an early twentieth century refuse disposal pit associated with a small cluster of dwellings possible built to the north of the APE sometime between 1911 and 1945 according to historic mapping. Presumably, the site was placed at a distance from these residences to consolidate refuse in a spatially segregated area; the large concentration of glass artifacts may be a reflection of intentionally keeping these sharp, possibly hazardous materials away from pedestrian and vehicular traffic. However, because the site is located so far from each of the dwellings, it is not possible to determine if it was the disposal site for one or more of these occupations. Though the assemblage is reflective of some consumer habits attributable to a local community, the site cannot be more particularly associated with a given dwelling or family at this time. This limits the site’s information potential and, given the sampling strategies used during the current survey, it is unlikely that additional excavation will yield potentially significant deposits.

Given that the site cannot be definitively attributed to a given historic occupation, together with its limited potential to yield additional significant information, AECOM recommends this site not eligible for listing in the NRHP. It lacks the informational potential required to satisfy Criterion D and lacks the associative values necessary to satisfy Criteria A, B, and/or C. No additional work is recommended.

MARYLAND ARCHEOLOGICAL SITE SURVEY: HISTORIC DATA FORM

Site Number 18CR292

1. Site class (check all applicable, check at least one from each group):

a.
- ______ domestic
- ______ industrial
- ______ transportation
- ______ military
- ______ sepulchre
- ______ religious
- ______ commercial
- ______ educational
- ______ non-domestic agricultural
- ______ unknown
- ___X___ other: refuse disposal

b.
- ______ urban
- ___X___ rural
- ______ unknown

c. standing structure:
- ______ yes
- ___X___ no
- ______ unknown

d. above-grade/visible ruin:
- ______ yes
- ___X___ no
- ______ unknown

2. Site Type (check all applicable):
- ______ artifact concentration
- ______ possible structure
- ______ post-in-ground structure
- ______ frame structure
- ______ masonry structure
- ______ log structure
- ______ farmstead
- ______ plantation
- ______ townsite
- ______ road/railroad
- ______ wharf/landing
- ______ bridge
- ______ ford
- ______ mill (specify:____________________)
- ______ raceway
- ______ quarry
- ______ furnace/forge
- ______ other industrial (specify): ____________________
- ______ battlefield
- ______ military fortification
- ______ military encampment
- ______ cemetery
- ______ unknown
- ___X___ other: refuse pit

3. Ethnic Association:
- ______ Native American
- ______ African American
- ______ Angloamerican
- ______ Hispanic American
- ______ Asian American
- ______ other Euroamerican (specify): ____________________
- ___X___ unknown
- ______ other: ____________________

4. Categories of material remains present (check all applicable):
- ___X___ ceramics
- ___X___ bottle/table glass
- ___X___ other kitchen artifacts
- ______ architecture
- ______ furniture
- ______ arms
- ______ clothing
- ______ personal items
- ______ tobacco pipes
- ______ activity items
- ______ human skeletal remains
- ______ faunal remains
- ______ floral remains
- ______ organic remains
- ______ unknown
- ___X___ other: automotive

5. Diagnostics (choose from manual and give number recorded or observed):
- 3 Hazel Atlas bottles/jars
- 1 ironstone
- 1 milk glass
- 1 decalcomania hotel ware
- 1 cap seat milk bottle
- 1 Westminster Coca-Cola bottle
- 1 Albany slip stoneware
- 1 Albany/Bristol stoneware
- 1 Clorox bottle
- 1 Dr. Ellis waving fluid bottle

6. Features present:
   X yes
   ___ no
   ___ unknown

7. Types of features present:

___ construction feature
___ foundation
___ cellar hole/storage cellar
___ hearth/chimney base
___ posthole/postmold
___ paling ditch/fence
___ privy
___ well/cistern
X trash pit/dump
___ sheet midden
___ planting feature
___ road/drive/walkway
___ depression/mound
___ burial
___ railroad bed
___ earthworks
___ raceway
___ wheel pit
___ unknown
___ other: ______

8. Flotation samples collected:
   ___ yes
   X no
   ___ unknown

analyzed:
   ___ yes, by ______
   ___ no
   ___ unknown

9. Soil samples collected:
   ___ yes
   X no
   ___ unknown

analyzed:
   ___ yes, by ______
   ___ no
   ___ unknown

10. Other analyses (specify): ______

11. Additional comments:

12. Form filled out by: Pete Regan
Address/Company: AECOM
Date: 01/08/2020

MARYLAND INVENTORY OF HISTORIC PROPERTIES

ARCHEOLOGICAL SITE SURVEY: BASIC DATA FORM

Date Filed: 01/08/2020

Check if update: ☐

Maryland Department of Planning
Maryland Historical Trust
Division of Historical and Cultural Programs
100 Community Place
Crownsville, Maryland 21032

Site Number: 18CR293	
County: Carroll	

A. DESIGNATION

1. Site Name: Piney Run 2

2. Alternate Site Name/Numbers: ______

3. Site Type (describe site chronology and function; see instructions):
Early nineteenth to at least early twentieth century farmstead

4. Prehistoric ______ Historic X Unknown ______

5. Terrestrial X Submerged/Underwater ______ Both ______

B. LOCATION

6. USGS 7.5' Quadrangle(s): Finksburg | (For underwater sites) NOAA Chart No.:

(Photocopy section of quad or chart on page 4 and mark site location)

Latitude in decimal degrees 39.386053 Longitude in decimal degrees -76.975603

7. Maryland Archeological Research Unit Number: 14

8. Physiographic Province (check one):
- ______ Allegany Plateau
- ______ Ridge and Valley
- ______ Great Valley
- ______ Blue Ridge
- ______ Lancaster/Frederick Lowland
- X Eastern Piedmont
- ______ Western Shore Coastal Plain
- ______ Eastern Shore Coastal Plain

9. Major Watershed/Underwater Zone (see instructions for map and list): Patapsco River

C. ENVIRONMENTAL DATA

10. Nearest Water Source: Tributary to Piney Run Stream Order: 1

11. Closest Surface Water Type (check all applicable):
- ______ Ocean
- ______ Estuarine Bay/Tidal River
- ______ Tidal or Marsh
- X Freshwater Stream/River
- ______ Freshwater Swamp
- ______ Lake or Pond
- ______ Spring

12. Distance from closest surface water: 0 meters (or 0 feet)

C. ENVIRONMENTAL DATA [CONTINUED]

13. Current water speed: ______ knots 14. Water Depth: ______ meters

15. Water visibility: ________________

16. SCS Soils Typology and/or Sediment Type: GhB (Glenelg Silt Loam)

17. Topographic Settings (check all applicable):
_______ Floodplain _______ Hilltop/Bluff
_______ Interior Flat _______ Upland Flat
X Terrace _______ Ridgetop
_______ Low Terrace _______ Rockshelter/Cave
_______ High Terrace _______ Unknown
_______ Hillslope _______ Other: ______________

18. Slope: 2-25%

19. Elevation: 149 meters (or 490 feet) above sea level

20. Land use at site when last field checked (check all applicable):
_______ Plowed/Tilled _______ Extractive
_______ No-Till _______ Military
X Wooded/Forested _______ Recreational
_______ Logging/Logged _______ Residential
_______ Underbrush/Overgrown _______ Ruin
_______ Pasture _______ Standing Structure
_______ Cemetery _______ Transportation
_______ Commercial _______ Unknown
_______ Educational _______ Other: ______________

21. Condition of site:
_______ Disturbed
X Undisturbed
_______ Unknown

22. Cause of disturbance/destruction (check all applicable):
_______ Plowed _______ Vandalized/Looted
_______ Eroded/Eroding _______ Dredged
_______ Graded/Contoured _______ Heavy Marine Traffic
_______ Collected _______ Other: ______________

23. Extent of disturbance:
_______ Minor (0-10%)
_______ Moderate (10-60%)
_______ Major (60-99%)
_______ Total (100%)
_______ % unknown

C. ENVIRONMENTAL DATA [CONTINUED]

24. Describe site setting with respect to local natural and cultural landmarks (topography, hydrology, fences, structures, roads). Use continuation sheet if needed.

The site is located southeast of the Piney Run Dam and Reservoir emergency spillway within a small, forested valley of an unnamed tributary to Piney Run. The site is organized into two discrete loci occurring on adjacent but distinct landforms. Locus A is located on the south side of the unnamed tributary, partially within its small floodplain and partially cut into a terrace on the toeslopes of the ridges rising to the south. This portion of the farmstead corresponds to its agricultural/utilitarian use area. Locus B is located on the north side of the unnamed tributary, midway up the hillslopes rising northwest toward the emergency spillway. This portion of the farmstead corresponds to its domestic use area. A historic road trace bisects Locus A along the floodplain's southern margin. This road trace once linked the site to what is now Obrecht Road to the south and continues toward Piney Run, then follows it downstream (southeast) an unknown distance toward what is now Maryland Route 32.

Five surface features were documented. In Locus A, these include a likely capped well, a spring box, the stone foundation of a transverse frame barn, and a series of eight stone piers that likely supported an agricultural outbuilding (shed, barn, &c.). The first three are located on the floodplain adjacent to the unnamed Piney Run tributary, while the fourth was built into an adjacent terrace. The fifth feature was documented in Locus B and represents the remnants of the farmstead dwelling's stone foundation. This is located on the opposite side of the tributary from the other features and was built onto an artificially leveled area midway up the slopes rising northwest toward the Piney Run Dam emergency spillway.

25. Characterize site stratigraphy. Include a representative profile on separate sheet, if applicable. Address plowzone (presence/absence), subplowzone features and levels, if any, and how stratigraphy affects site integrity. Use continuation sheet if needed.

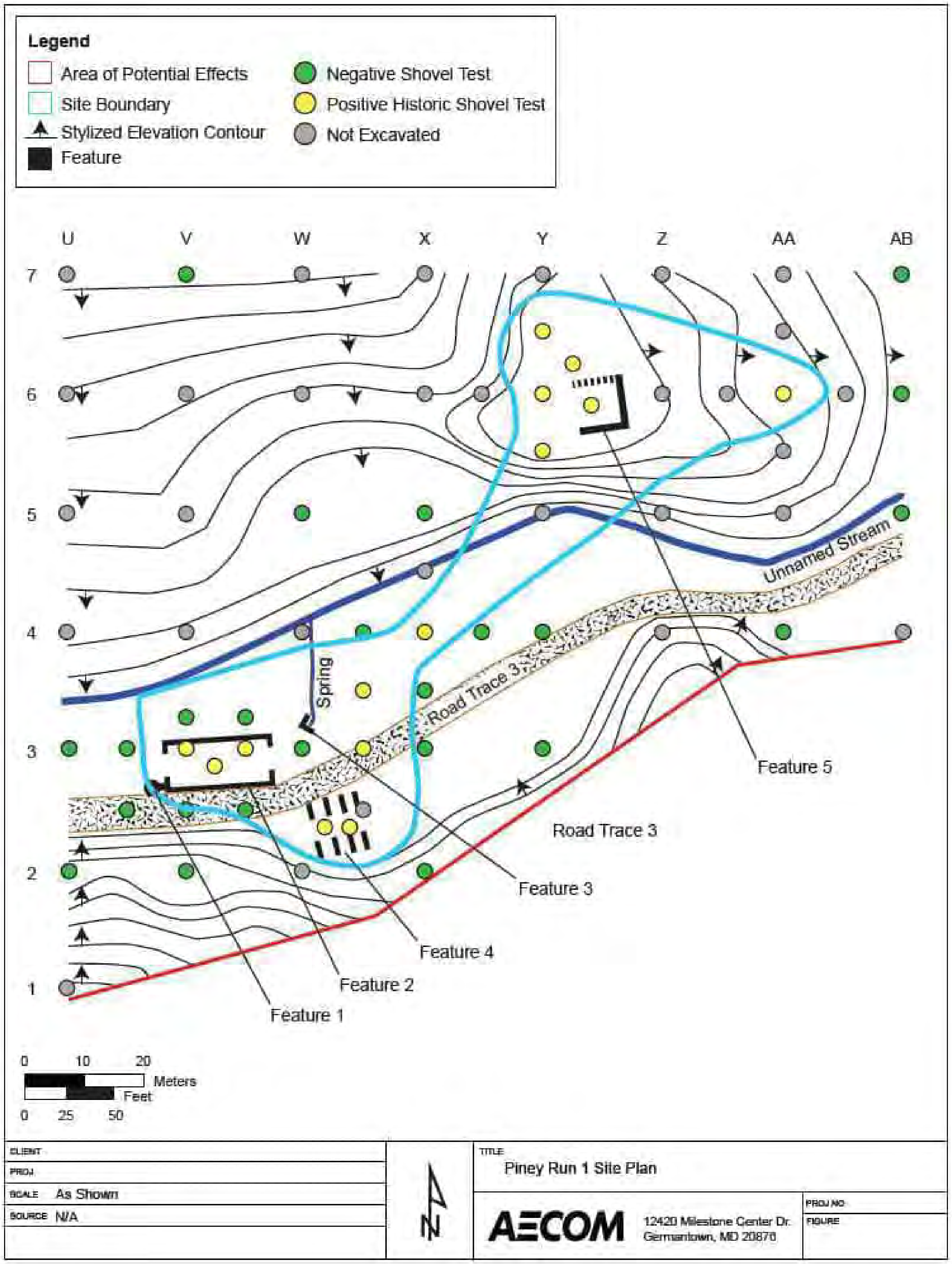
Site stratigraphy exterior to the features was fairly consistent across both site loci. STPs typically revealed two strata, representing the surface mineral horizon/plowzone (A/Ap horizon) atop the culturally sterile subsoil (B horizon). In several instances, an organic layer (Ao horizon) overlay the A/Ap horizon. STPs placed within the foundation footprint of the transverse frame barn and the dwelling revealed two or more strata of historic fill overlying the B Horizon or prepared dirt floors. See attached representative profiles.

26. Site size: 120 meters by 40 meters (or 394 feet by 131 feet)

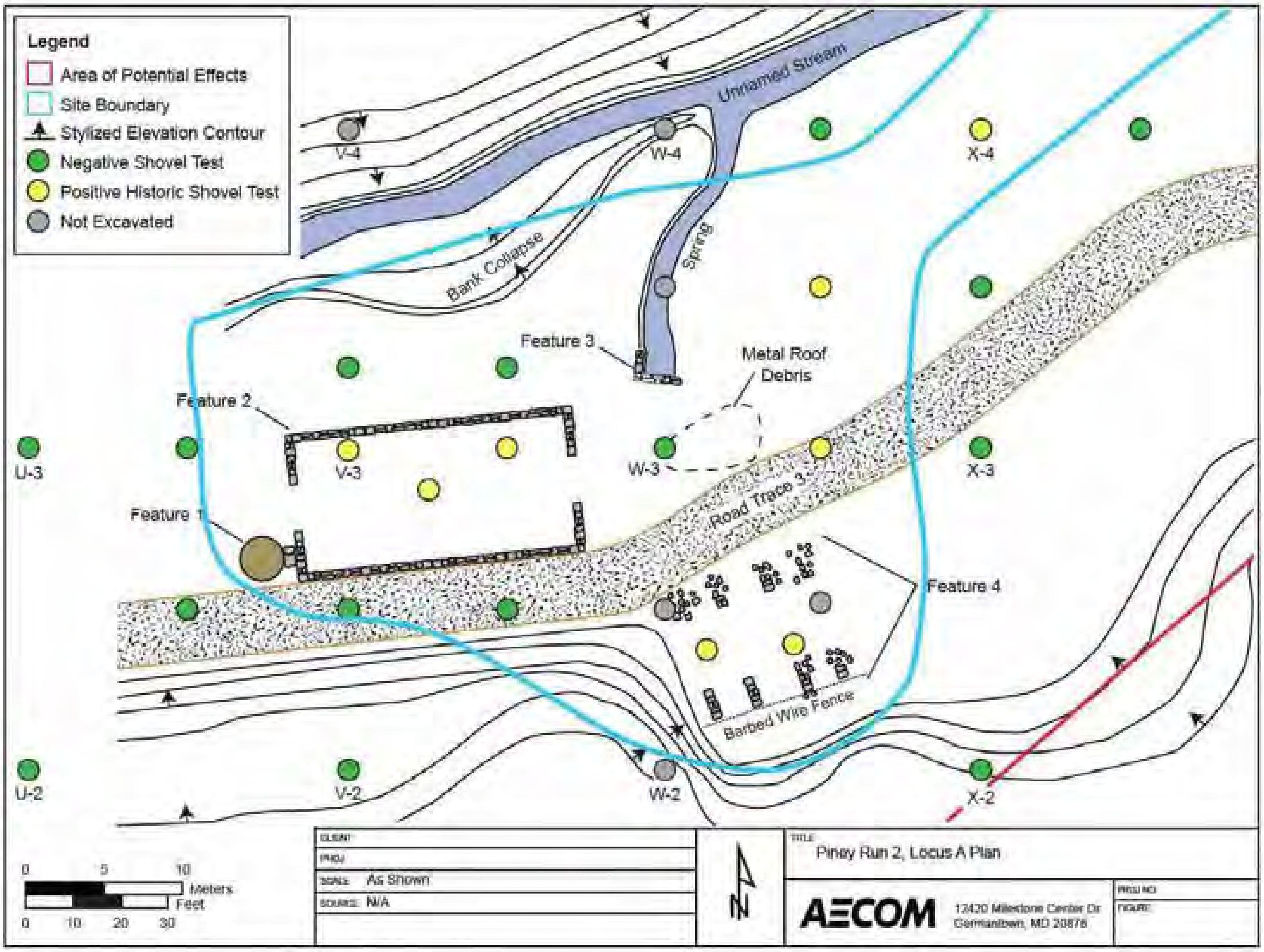
Site Number: 18CR293 **Page 3a**

BASIC DATA FORM

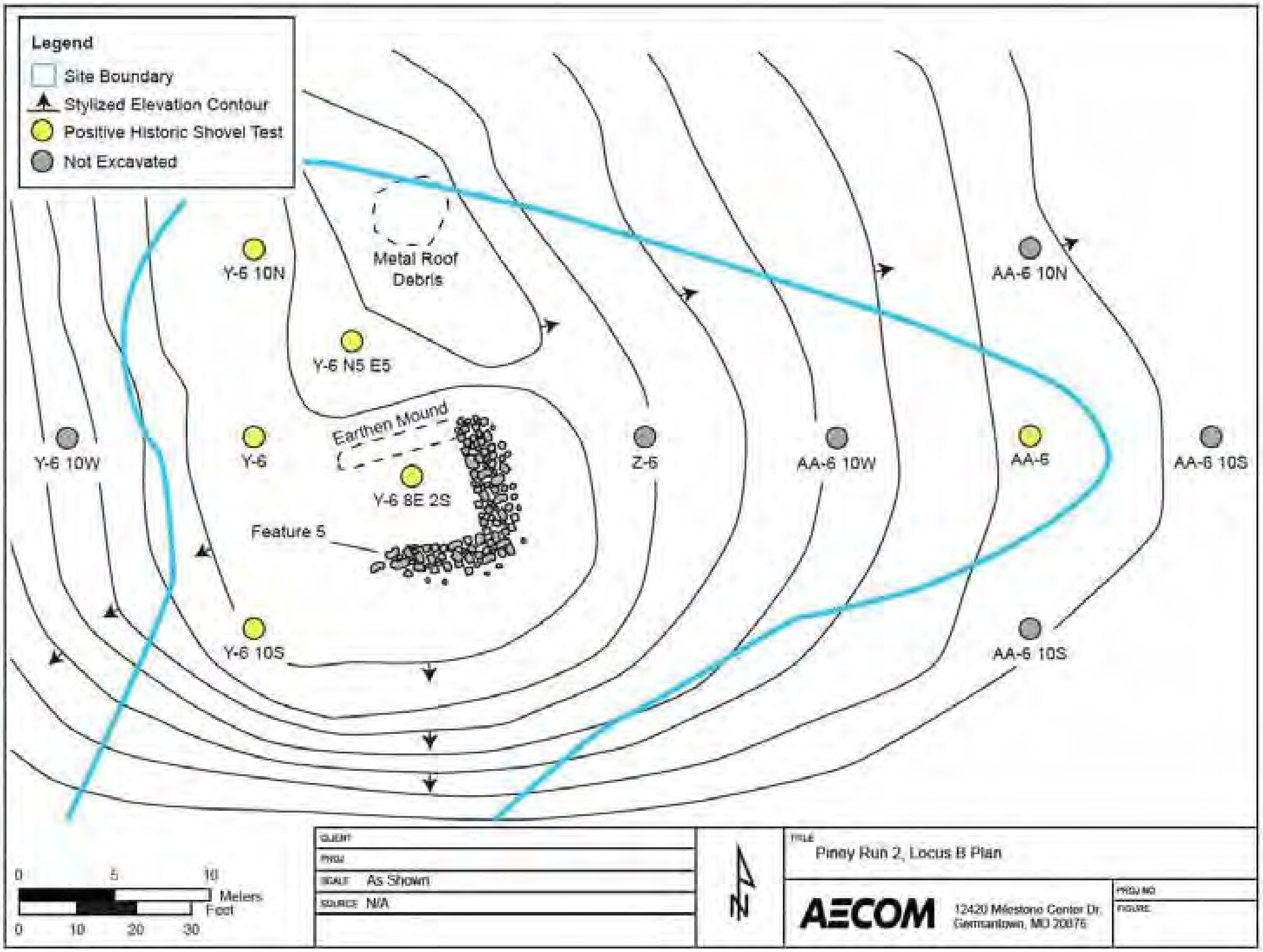
27. Draw a sketch map of the site and immediate environs, here or on separate sheet:



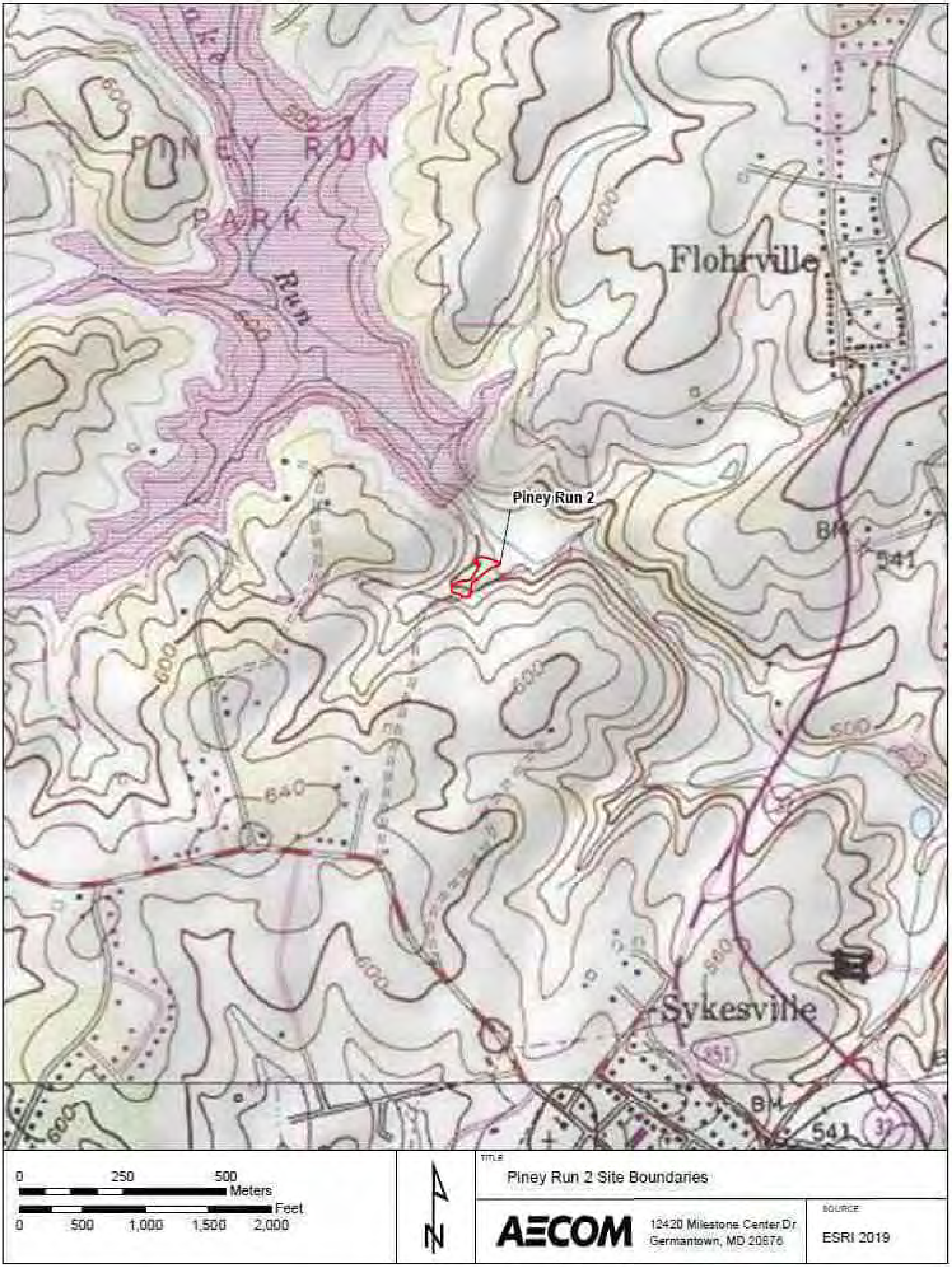
Scale: North arrow:


Legend
Area of Potential Effects
Site Boundary
Stylized Elevation Contour
Negative Shovel Test
Positive Historic Shovel Test
Not Excavated
Unnamed Stream
Bank Collapse
Spring
V-4
W-4
X-4
Feature 3
Metal Roof Debris
Feature 2
U-3
V-3
W-3
X-3
Road Trace 3
Feature 1
Feature 4
Barbed Wire Fence
U-2
V-2
W-2
X-2
0 5 10 Meters
0 10 20 30 Feet
CLIENT
PROJ
SCALE As Shown
SOURCE N/A
N
TITLE
Piney Run 2, Locus A Plan
AECOM
12420 Milestone Center Dr
Germantown, MD 20876
PROJ NO
FIGURE

Site Number: 18CR293 **Page 3c**
BASIC DATA FORM



Photocopy section of quadrangle map(s) and mark site location with heavy dot or circle and arrow pointing to it.



D. CONTEXT

28. Cultural Affiliation (check all applicable):

PREHISTORIC
_______ Unknown
_______ Paleoindian
_______ Archaic
_______ Early Archaic
_______ Middle Archaic
_______ Late Archaic
_______ Terminal Archaic
_______ Woodland
_______ Adena
_______ Early Woodland
_______ Middle Woodland
_______ Late Woodland

_______ CONTACT

HISTORIC:
_______ Unknown
17th century
_______ 1630-1675
_______ 1676-1720
18th century
_______ 1721-1780
X 1781-1820
19th century
X 1821-1860
X 1861-1900
20th century
X 1901-1930
_______ post-1930

____ UNKNOWN

E. INVESTIGATIVE DATA

29. Type of investigation:
X Phase I
_______ Phase II/Site Testing
_______ Phase III/Excavation
_______ Archival Investigation
_______ Monitoring
_______ Field Visit
_______ Collection/Artifact Inventory
_______ Report From Informant
_______ Other: _______________

30. Purpose of investigation:
X Compliance
_______ Research
_______ Avocational
_______ Regional Survey
_______ Site Inventory
_______ MHT Grant Project
_______ Other: _______________

31. Method of sampling (check all applicable):
_______ Non-systematic surface search
X Systematic surface collection
_______ Non-systematic shovel test pits
X Systematic shovel test pits
_______ Excavation units
_______ Mechanical excavation
_______ Remote sensing
_______ Other: _______________

32. Extent/nature of excavation: Primary STPs excavated on 20-meter grid oriented to true north. Upon site discovery, the interval was reduced to 10 meters, with judgmental STPs excavated as necessary to aid in delineation and feature investigation. Twenty-eight STPs were excavated to delineate/investigate the site, of which 14 were positive for historic artifacts. STPs measured 40 centimeters in diameter and were excavated 10 centimeters into sterile subsoil.

F. SUPPORT DATA

33. Accompanying Data Form(s):
_______ Prehistoric
X Historic
_______ Shipwreck

34. Ownership: _______ Private _______ Federal _______ State X Local/County _______ Unknown

35. Owner(s): County Commissioners of Carroll County
Address: 225 North Center Street, Westminster, MD 21157
Phone: ______
Email: ______

36. Tenant and/or Local Contact: ______
Address: ______
Phone: ______
Email: ______

37. Other Known Investigations: Richard Dent and Christine A. Jirikowic mentioned the barn foundation and what they described as a silo foundation (much more likely to be a capped well) in their 1994 report, *Preliminary Archaeological Reconnaissance of the Proposed Site of Piney Run Lake Water Treatment Facility, Carroll County, Maryland* (MHT report CR 20). They did not register the ruins as a site, however, and no archaeological investigation was conducted.

38. Primary report reference or citation: Regan, Pete (2020) *Phase I Archaeological Investigation for the Piney Run Watershed Study, Piney Run Dam, Carroll County, Maryland.* (AECOM)

39. Other Records (e.g. slides, photos, original field maps/notes, sonar, magnetic record)?

___ Slides	X Field record	___ Other: ___
X Photos	___ Sonar	
X Field maps	___ Magnetic record	

40. If yes, location of records: AECOM, Germantown

41. Collections at Maryland Archeological Conservation (MAC) Lab or to be deposited at MAC Lab?
X Yes
___ No
___ Unknown

42. If NO or UNKNOWN, give owner: ______
location: ______
and brief description of collection: ______

43. Informant: ______
Address: ______
Phone: ______
Email: ______

44. Site visited by Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 12/06/2019

45. Form filled out by: Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 01/08/2020

46. Site Summary/Additional Comments (append additional pages if needed):

The site is located southeast of the Piney Run Dam and Reservoir emergency spillway within a small, forested valley of an unnamed tributary to Piney Run. The site is organized into two discrete loci occurring on adjacent but distinct landforms. Locus A is located on the south side of the unnamed tributary, partially within its small floodplain and partially cut into a terrace on the toeslopes of the ridges rising to the south. This portion of the farmstead corresponds to its agricultural/utilitarian use area. Locus B is located on the north side of the unnamed tributary, midway up the hillslopes rising northwest toward the emergency spillway. This portion of the farmstead corresponds to its domestic use area. A historic road trace bisects Locus A along the floodplain's southern margin. This road trace once linked the site to what is now Obrecht Road to the south and continues toward Piney Run, then follows it downstream (southeast) an unknown distance toward what is now Maryland Route 32.

Five surface features were documented. In Locus A, these include a likely capped well, a spring box, the stone foundation of a transverse frame barn, and a series of eight stone piers that likely supported an agricultural outbuilding (shed, barn, &c.). The first three are located on the floodplain adjacent to the unnamed Piney Run tributary, while the fourth was built into an adjacent terrace. The fifth feature was documented in Locus B and represents the remnants of the farmstead dwelling's stone foundation. This is located on the opposite side of the tributary from the other features and was built onto an artificially leveled area midway up the slopes rising northwest toward the Piney Run Dam emergency spillway.

In total, 224 historic artifacts were recovered from Piney Run 2. Just over 54 percent (n=121) were recovered from the A/Ap Horizon, with the remainder recovered from fill deposits interior to the transverse barn (n=29) and dwelling (n=74). Almost 80 percent of the artifacts (n=179) were found in Locus B, while just over 20 percent (n=45) originated in Locus A.

Miscellaneous artifacts are the most common and represent almost 40 percent (n=89) of the site assemblage. These artifacts lack functionally diagnostic traits and include unidentifiable fragments of glass (n=73), iron (n=13), and leather (n=3). Household/structural artifacts represent just over 30 percent (n=69) of the assemblage and include cut (n=25), wire (n=11), and indeterminate nails (n=9), window glass (n=20), mortar and plaster (n=2), a piece of mortar, and a nut/bolt.

Foodways artifacts account for 28.5 percent of the assemblage (n=64) and consist of glass (n=45), ceramic (n=17), and metal (n=2) artifacts. Foodways glass includes botte glass (n=34), indeterminate hollow glass (n=6), and milkglass lid liners (n=5). While most of the bottle glass was unidentifiable, individual fragments of a beer/soda bottle, a beer/alcohol/wine bottle, a cosmetic/medicinal bottle, and a possible poison bottle were recovered. Foodways ceramics include creamware (n=6), pearlware (n=4), redware (n=3), and single examples of Astbury, ironstone, North American stoneware, and hard paste porcelain. Nine foodways ceramics exhibited decoration, including overglaze painted creamware in a feather motif (n=4), painted pearlware (n=2), slip decorated pearlware in a checkerboard pattern (n=2), and a piece of molded (paneled) porcelain. Ceramic service wares (n=13) were more common than storage wares (n=4), though specific ceramic objects could only be identified in a few cases (one saucer and four coffee/tea cup fragments). Lastly, the foodways metal artifacts are represented by two aluminum canning jar lids.

The remainder of the Piney Run 2 assemblage consists of single examples of labor and personal artifacts. The sole labor artifact is a fragment of barbed wire, while the personal artifact is a white ball clay tobacco pipe bowl fragment.

Sixty temporally diagnostic artifacts were recovered from Piney Run 2, including metal (n=38), ceramic (n=12), and glass (n=10) artifacts (Table 6-7). Diagnostic metal artifacts include cut (n=25) and wire (n=11) nails alongside single examples of barbed wire and an Albert Champion spark plug. Diagnostic ceramics include creamware (n=6), pearlware (n=4), and single examples of ironstone and Astbury. Diagnostic glass artifacts include milkglass (n=5), machine-made glass (n=4), and solarized glass (n=1) and machine-made glass. The single Astbury fragment is the only artifact definitively produced in the early to mid-eighteenth century. As a very early outlier, this artifact is probably indicative of a family heirloom or otherwise curated object, rather than a contemporaneous historic occupation. The prevalence of cut nails indicates that much of the onsite building activities likely occurred during the nineteenth century. The prevalence of late eighteenth to early nineteenth century ceramics indicates that the site's domestic component originated around this time. Later artifacts suggest that the site was occupied into at least the early twentieth century, but it is currently unclear when the site was abandoned. It is clear from the historic record that occupation ceased by at least the early 1970s when Piney Run Dam was constructed, but the lack of diagnostic artifacts definitively produced from the mid-twentieth century onward suggests an earlier period of abandonment.

The artifacts' horizontal distribution signifies the way in which Piney Run 2 was utilized as a farmstead, reflecting a clear division of domestic and agricultural/utilitarian spaces. The artifact signature from Locus A is much more consistent with utilitarian spaces which, as the outbuilding foundation suggest, likely embodied an agricultural character. Within Locus B, the artifacts a more clearly associated with sustained residential uses. The greatest quantity and variety of artifacts were recovered from Locus B, with substantially fewer and less diverse artifacts originating in Locus A.

In summary, this site represents an early nineteenth to early twentieth century farmstead with well-defined domestic and agricultural/utilitarian use areas. Locus A represents the focal point of agricultural actives, centered on a large barn and smaller outbuilding, while Locus B exhibits remnants of the farmstead's dwelling and its domestic epicenter. The site was omitted from nineteenth century maps, possibly due to issues of map scale and/or the farmstead's isolation, but the diagnostic artifacts strongly suggest it originated in the early nineteenth century. It is less clear when the site was abandoned. While only one artifact definitively produced during the twentieth century was recovered, numerous others have manufacturing endpoints extending well into the twentieth century. The lack of definitively mid-twentieth century artifacts may be an indication that the site was no longer occupied by this time, and it was certainly abandoned prior to the construction of Piney Run Dam in the early to mid-1970s. While it is unclear when the farmstead was abandoned, it may have occurred as the result of a fire. As noted, significant amounts of charcoal were identified in an STP within the building's interior.

The site exhibits discrete horizontal artifact patterning reflective of the distribution of its agricultural and domestic features. It likewise possesses good archaeological integrity in terms of both its intact features and artifact deposits. These considerations contribute to the site's research value, as does its broader historical/archaeological context. While nineteenth century farmsteads are a very common site type in Carroll County, relatively few have been documented within the immediate vicinity. A review of the MHT's site files and MEDUSA GIS database revealed that no historic farmsteads have been formally excavated within the Piney Run valley, though several are known to have existed. This suggests the site may be able to contribute significant information to local history, not only in terms of rural settlement generally but settlement within the Piney Run valley specifically. Throughout the nineteenth century, historic mapping indicates the site was isolated from the principal thoroughfares and the larger clusters of farmsteads to the northwest and industries/institutions to the southeast. The aspect of its setting may have driven the site's occupants to adopt particular adaptations to life in a relatively remote location, which could be evident in farming practices, consumer choice, recreational activities, and other behaviors that can leave archaeological traces.

Given the site's integrity, diverse features, meaningful artifact patterning, and research value, AECOM recommends it potentially eligible for listing in the NRHP under Criterion D. It is recommended that potential future ground disturbances avoid the site. If avoidance is not possible, a Phase II evaluation is recommended to formally determine its NRHP eligibility.

MARYLAND ARCHEOLOGICAL SITE SURVEY: HISTORIC DATA FORM

Site Number 18CR293

1. Site class (check all applicable, check at least one from each group):

a.
- X domestic
- ______ industrial
- ______ transportation
- ______ military
- ______ sepulchre
- ______ religious
- ______ commercial
- ______ educational
- X non-domestic agricultural
- ______ unknown
- ______ other: ______

b.
- ______ urban
- X rural
- ______ unknown

c. standing structure:
- ______ yes
- X no
- ______ unknown

d. above-grade/visible ruin:
- X yes
- ______ no
- ______ unknown

2. Site Type (check all applicable):
- ______ artifact concentration
- ______ possible structure
- ______ post-in-ground structure
- ______ frame structure
- ______ masonry structure
- ______ log structure
- X farmstead
- ______ plantation
- ______ townsite
- ______ road/railroad
- ______ wharf/landing
- ______ bridge
- ______ ford
- ______ mill (specify: ______)
- ______ raceway
- ______ quarry
- ______ furnace/forge
- ______ other industrial (specify): ______
- ______ battlefield
- ______ military fortification
- ______ military encampment
- ______ cemetery
- ______ unknown
- ______ other: ______

3. Ethnic Association:
- ______ Native American
- ______ African American
- ______ Angloamerican
- ______ Hispanic American
- ______ Asian American
- ______ other Euroamerican (specify): ______
- X unknown
- ______ other: ______

4. Categories of material remains present (check all applicable):
- X ceramics
- X bottle/table glass
- X other kitchen artifacts
- X architecture
- ______ furniture
- ______ arms
- ______ clothing
- X personal items
- X tobacco pipes
- ______ activity items
- ______ human skeletal remains
- ______ faunal remains
- ______ floral remains
- ______ organic remains
- ______ unknown
- ______ other: ______

5. Diagnostics (choose from manual and give number recorded or observed):

1 Astbury	11 wire nails
6 creamware	4 machine-made glass
4 pearlware	1 Albert Champion spark plug
25 cut nails	
1 ironstone	
5 milkglass lid liners	
1 solarized glass	
1 barbed wire	

6. Features present:
   __X__ yes
   _____ no
   _____ unknown

7. Types of features present:
   _____ construction feature
   __X__ foundation
   _____ cellar hole/storage cellar
   _____ hearth/chimney base
   _____ posthole/postmold
   _____ paling ditch/fence
   _____ privy
   __X__ well/cistern
   _____ trash pit/dump
   _____ sheet midden
   _____ planting feature
   _____ road/drive/walkway
   _____ depression/mound
   _____ burial
   _____ railroad bed
   _____ earthworks
   _____ raceway
   _____ wheel pit
   _____ unknown
   __X__ other:
   spring box

8. Flotation samples collected:
   _____ yes
   __X__ no
   _____ unknown

   analyzed:
   _____ yes, by _____
   _____ no
   _____ unknown

9. Soil samples collected:
   _____ yes
   __X__ no
   _____ unknown

   analyzed:
   _____ yes, by _____
   _____ no
   _____ unknown

10. Other analyses (specify): _____

11. Additional comments:

12. Form filled out by: Pete Regan
Address/Company: AECOM
Date: 01/08/2020

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MARYLAND INVENTORY OF HISTORIC PROPERTIES

ARCHEOLOGICAL SITE SURVEY: BASIC DATA FORM

Date Filed: 01/08/2020

Check if update: ☐

Maryland Department of Planning
Maryland Historical Trust
Division of Historical and Cultural Programs
100 Community Place
Crownsville, Maryland 21032

Site Number:	18CR294
County:	Carroll

A. DESIGNATION

1. Site Name: Piney Run 3

2. Alternate Site Name/Numbers: ____________

3. Site Type (describe site chronology and function; see instructions):
Possible nineteenth century masonry spring box

4. Prehistoric ____ Historic X Unknown ____

5. Terrestrial X Submerged/Underwater ____ Both ____

B. LOCATION

6. USGS 7.5' Quadrangle(s): Finksburg | (For underwater sites) NOAA Chart No.:

(Photocopy section of quad or chart on page 4 and mark site location)

Latitude in decimal degrees 39.387311 Longitude in decimal degrees -76.972489

7. Maryland Archeological Research Unit Number: 14

8. Physiographic Province (check one):
   - ____ Allegany Plateau
   - ____ Ridge and Valley
   - ____ Great Valley
   - ____ Blue Ridge
   - ____ Lancaster/Frederick Lowland
   - X Eastern Piedmont
   - ____ Western Shore Coastal Plain
   - ____ Eastern Shore Coastal Plain

9. Major Watershed/Underwater Zone (see instructions for map and list): Patapsco River

C. ENVIRONMENTAL DATA

10. Nearest Water Source: Spring feeding into Piney Run Stream Order: 1

11. Closest Surface Water Type (check all applicable):
   - ____ Ocean
   - ____ Estuarine Bay/Tidal River
   - ____ Tidal or Marsh
   - X Freshwater Stream/River
   - ____ Freshwater Swamp
   - ____ Lake or Pond
   - X Spring

12. Distance from closest surface water: 0 meters (or 0 feet)

C. ENVIRONMENTAL DATA [CONTINUED]

13. Current water speed: ______ knots

14. Water Depth: ______ meters

15. Water visibility: ________________

16. SCS Soils Typology and/or Sediment Type: CdA (Codorus Silt Loam)

17. Topographic Settings (check all applicable):
    - __X__ Floodplain
    - _______ Interior Flat
    - _______ Terrace
    - _______ Low Terrace
    - _______ High Terrace
    - _______ Hillslope
    - _______ Hilltop/Bluff
    - _______ Upland Flat
    - _______ Ridgetop
    - _______ Rockshelter/Cave
    - _______ Unknown
    - _______ Other: ______________

18. Slope: 0-3%

19. Elevation: 143 meters (or 470 feet) above sea level

20. Land use at site when last field checked (check all applicable):
    - _______ Plowed/Tilled
    - _______ No-Till
    - __X__ Wooded/Forested
    - _______ Logging/Logged
    - _______ Underbrush/Overgrown
    - _______ Pasture
    - _______ Cemetery
    - _______ Commercial
    - _______ Educational
    - _______ Extractive
    - _______ Military
    - _______ Recreational
    - _______ Residential
    - _______ Ruin
    - _______ Standing Structure
    - _______ Transportation
    - _______ Unknown
    - _______ Other: ______________

21. Condition of site:
    - _______ Disturbed
    - __X__ Undisturbed
    - _______ Unknown

22. Cause of disturbance/destruction (check all applicable):
    - _______ Plowed
    - _______ Eroded/Eroding
    - _______ Graded/Contoured
    - _______ Collected
    - _______ Vandalized/Looted
    - _______ Dredged
    - _______ Heavy Marine Traffic
    - _______ Other: ______________

23. Extent of disturbance:
    - _______ Minor (0-10%)
    - _______ Moderate (10-60%)
    - _______ Major (60-99%)
    - _______ Total (100%)
    - _______ % unknown

C. ENVIRONMENTAL DATA [CONTINUED]

24. Describe site setting with respect to local natural and cultural landmarks (topography, hydrology, fences, structures, roads). Use continuation sheet if needed.

This site is centered atop a springhead on the Piney Run floodplain, abutting the steep toeslope of the forested ridges rising to the northeast. It is located on the northeast side of Piney Run, downstream from the Piney Run Dam impact basin and near to where Piney Run appears to flow in its historical channel (i.e., not the modified channel immediately below the dam). The site, which consists of a large, stone masonry spring box, was built into the floodplain where the spring emerges and exhibits no signs of any nearby occupation or dedicated access road/trail. A historic road trace is located on the slopes above the site, but it does not appear to have provided access historically. This road trace continues an unknown distance southeast as it follows Piney Run toward what is now Maryland Route 32. It tracks northwest but vanishes as it approaches areas heavily impacted by dam construction.

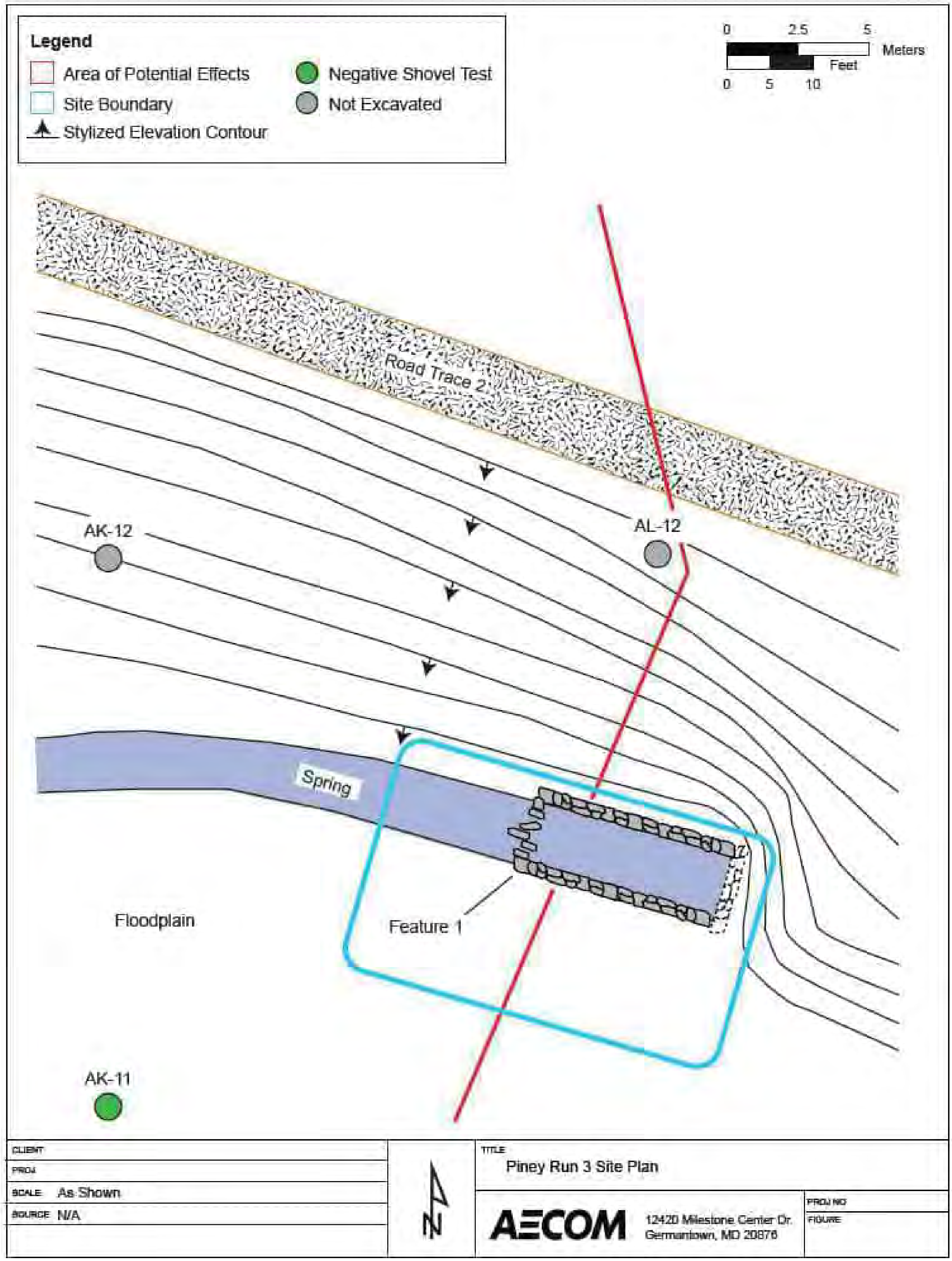
25. Characterize site stratigraphy. Include a representative profile on separate sheet, if applicable. Address plowzone (presence/absence), subplowzone features and levels, if any, and how stratigraphy affects site integrity. Use continuation sheet if needed.

Terrain and soil conditions precluded STP excavation, as it was surrounded by either excessive slopes or the saturated floodplain.

26. Site size: 14 meters by 9 meters (or 46 feet by 30 feet)

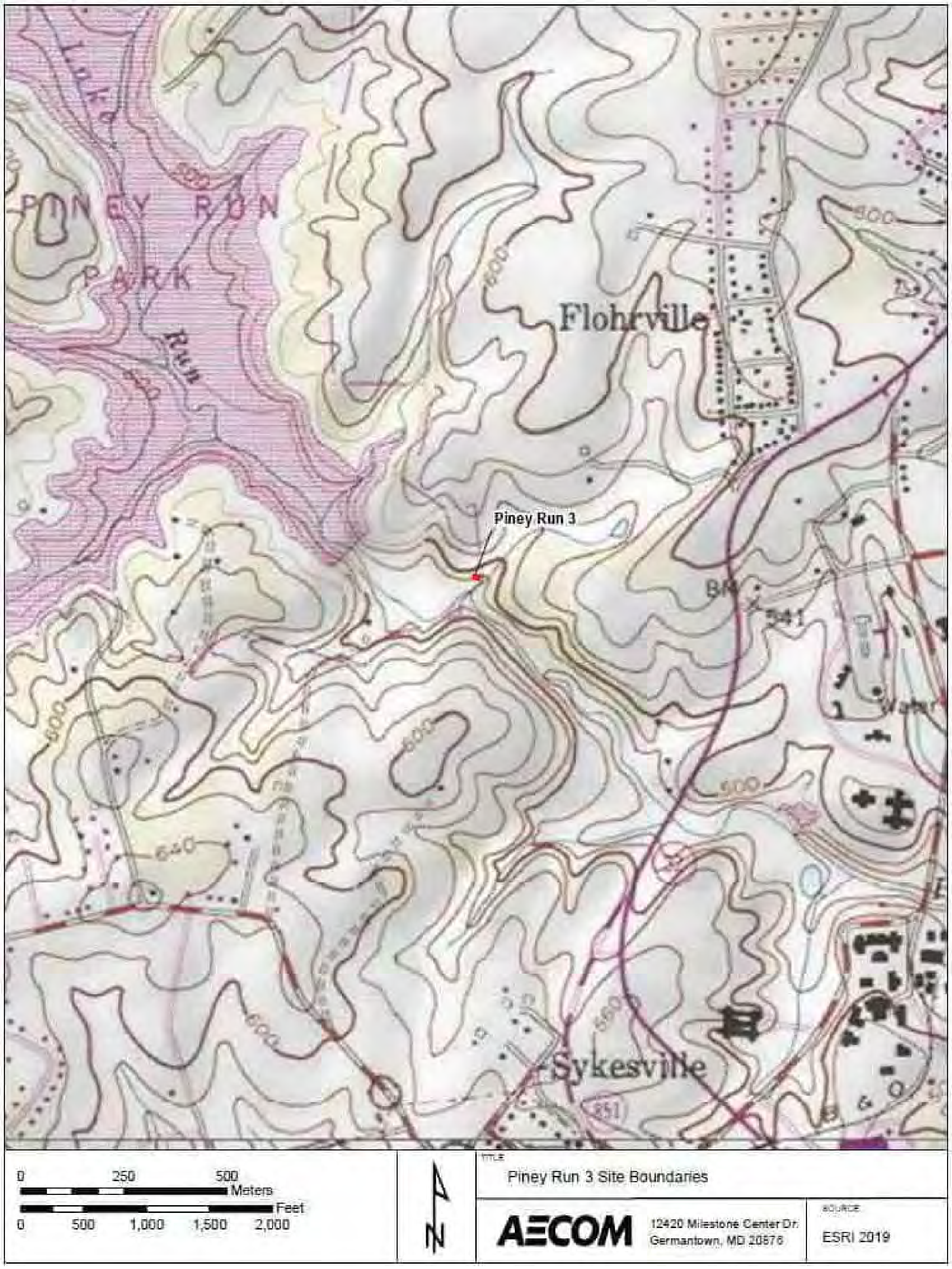
Site Number: 18CR294 **Page 3a**
BASIC DATA FORM

27. Draw a sketch map of the site and immediate environs, here or on separate sheet:



Scale: North arrow:

Photocopy section of quadrangle map(s) and mark site location with heavy dot or circle and arrow pointing to it.



D. CONTEXT

28. Cultural Affiliation (check all applicable):

PREHISTORIC
_______ Unknown
_______ Paleoindian
_______ Archaic
_______ Early Archaic
_______ Middle Archaic
_______ Late Archaic
_______ Terminal Archaic
_______ Woodland
_______ Adena
_______ Early Woodland
_______ Middle Woodland
_______ Late Woodland

_______ CONTACT

HISTORIC:
X Unknown
17th century
_______ 1630-1675
_______ 1676-1720
18th century
_______ 1721-1780
_______ 1781-1820
19th century
_______ 1821-1860
_______ 1861-1900
20th century
_______ 1901-1930
_______ post-1930

____ UNKNOWN

E. INVESTIGATIVE DATA

29. Type of investigation:
X Phase I
_______ Phase II/Site Testing
_______ Phase III/Excavation
_______ Archival Investigation
_______ Monitoring
_______ Field Visit
_______ Collection/Artifact Inventory
_______ Report From Informant
_______ Other: _______________

30. Purpose of investigation:
X Compliance
_______ Research
_______ Avocational
_______ Regional Survey
_______ Site Inventory
_______ MHT Grant Project
_______ Other: _______________

31. Method of sampling (check all applicable):
_______ Non-systematic surface search
X Systematic surface collection
_______ Non-systematic shovel test pits
_______ Systematic shovel test pits
_______ Excavation units
_______ Mechanical excavation
_______ Remote sensing
_______ Other: _______________

32. Extent/nature of excavation: Site could not be excavated due to surrounding adjacent excessive slopes and adjacent saturated floodplain. Site was subjected to pedestrian inspection and photographic/narrative/mapping documentation only.

F. SUPPORT DATA

33. Accompanying Data Form(s):
_______ Prehistoric
X Historic
_______ Shipwreck

34. Ownership: _______ Private _______ Federal _______ State X Local/County
_______ Unknown

35. Owner(s): County Commissioners of Carroll County
Address: 225 North Center Street, Westminster, MD 21157
Phone: ______
Email: ______

36. Tenant and/or Local Contact: ______
Address: ______
Phone: ______
Email: ______

37. Other Known Investigations: ______

38. Primary report reference or citation: Regan, Pete (2020) *Phase I Archaeological Investigation for the Piney Run Watershed Study, Piney Run Dam, Carroll County, Maryland.* (AECOM)

39. Other Records (e.g. slides, photos, original field maps/notes, sonar, magnetic record)?

___ Slides	X Field record	___ Other: ___
X Photos	___ Sonar	
X Field maps	___ Magnetic record	

40. If yes, location of records: AECOM, Germantown

41. Collections at Maryland Archeological Conservation (MAC) Lab or to be deposited at MAC Lab?
X Yes
___ No
___ Unknown

42. If NO or UNKNOWN, give owner: ______
location: ______
and brief description of collection: ______

43. Informant: ______
Address: ______
Phone: ______
Email: ______

44. Site visited by Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 12/06/2019

45. Form filled out by: Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 01/08/2020

46. Site Summary/Additional Comments (append additional pages if needed):

This site is centered atop a springhead on the Piney Run floodplain, abutting the steep toeslope of the forested ridges rising to the northeast. It is located on the northeast side of Piney Run, downstream from the Piney Run Dam impact basin and near to where Piney Run appears to flow in its historical channel (i.e., not the modified channel immediately below the dam). The site, which consists of a large, stone masonry spring box, was built into the floodplain where the spring emerges and exhibits no signs of any nearby occupation or dedicated access road/trail. A historic road trace is located on the slopes above the site, but it does not appear to have provided access historically. This road trace continues an unknown distance southeast as it follows Piney Run toward what is now Maryland Route 32. It tracks northwest but vanishes as it approaches areas heavily impacted by dam construction.

The site is defined by Feature 1, a large, open-top stone spring box constructed around a springhead that emerges on the floodplain at the base of the slopes. Measuring 7.5 m (24.6 ft) long and 3.3 m (10.8 ft), the north and east walls of Feature 1 rise up to 1 m (3.3 ft) to meet the grade of the slopes while the south wall rises up to 0.5 m (1.6 ft) to meet the grade of the surrounding floodplain. While these three walls remain intact, the west wall has partially collapsed, allowing the spring to flow through its rubble. The entirety of Feature 1 is constructed of randomly coursed phyllite rubble with some large cut blocks. The stonework appears to have been dry set, though it is possible that it could have been bonded in a lime/sand mortar that has since deteriorated. Feature 1 may have possessed a roof at one time to protect the spring head from leaf litter accumulation, but no evidence for such was observed. The feature’s construction materials tentatively suggest a nineteenth century or earlier construction date.

No artifacts were found at the site, though ground conditions precluded excavation within the vicinity of the site. STPs could not be placed south or west of Feature 1 due to surface water on the floodplain, nor could they be placed north due to excessive slope or east due to the APE boundary. The ground surface was closely inspected for artifacts and cultural features, but no additional resources were identified. This may be expected, as spring boxes were not necessarily sited in the immediate proximity of a historic occupation. Rather, these ancillary features had to be constructed wherever clean groundwater emerged, often in sloped or flooded areas unsuitable for sustained habitation.

Historic maps revealed no evidence for any buildings within the vicinity of the site, though this does not necessarily mean it was unoccupied. This portion of the Piney Run valley appears to have been relatively isolated during the nineteenth and early twentieth centuries, so it is possible that contemporaneous map makers simply chose not to travel into the area to survey it. Historically documented occupations in the broader area include farmsteads, mines, and mills, and it is possible that this site served as a water supply to a more local industrial and/or domestic occupation. The spring box’s relatively large size could be an indication that it provided drinking water to more than one occupation.

While the site includes a relatively intact structural feature indicative of a discrete activity area dedicated to water extraction, it possesses no artifacts or clear associations with any observed or historically documented occupations. Lacking a more fully defined context, the site possesses limited interpretational value beyond what has already been discerned. Given these considerations, AECOM recommends it not eligible for listing in the NRHP as it lacks the informational potential required to satisfy Criterion D and lacks the associative values necessary to satisfy Criteria A, B, and/or C. No additional work is recommended.

MARYLAND ARCHEOLOGICAL SITE SURVEY: HISTORIC DATA FORM

Site Number 18CR294

1. Site class (check all applicable, check at least one from each group):

a.
______ domestic
______ industrial
______ transportation
______ military
______ sepulchre
______ religious
______ commercial
______ educational
______ non-domestic agricultural
______ unknown
___X__ other:
water extraction (spring box)

b.
______ urban
___X__ rural
______ unknown

c. standing structure:
______ yes
___X__ no
______ unknown

d. above-grade/visible ruin:
___X__ yes
______ no
______ unknown

2. Site Type (check all applicable):

______ artifact concentration
______ possible structure
______ post-in-ground structure
______ frame structure
___X__ masonry structure
______ log structure
______ farmstead
______ plantation
______ townsite
______ road/railroad
______ wharf/landing
______ bridge
______ ford
______ mill (specify:____________________)
______ raceway
______ quarry
______ furnace/forge
______ other industrial (specify):
____
______ battlefield
______ military fortification
______ military encampment
______ cemetery
______ unknown
______ other:_________________________

3. Ethnic Association:

______ Native American
______ African American
______ Angloamerican
______ Hispanic American
______ Asian American
______ other Euroamerican (specify):
____
___X__ unknown
______ other:
____

4. Categories of material remains present (check all applicable):

______ ceramics
______ bottle/table glass
______ other kitchen artifacts
______ architecture
______ furniture
______ arms
______ clothing
______ personal items
______ tobacco pipes
______ activity items
______ human skeletal remains
______ faunal remains
______ floral remains
______ organic remains
______ unknown
______ other:
____

5. Diagnostics (choose from manual and give number recorded or observed):

Page 2 **Site Number: 18CR294**

HISTORIC DATA FORM

6. Features present:
   - __X__ yes
   - ______ no
   - ______ unknown

7. Types of features present:
   - ______ construction feature
   - ______ foundation
   - ______ cellar hole/storage cellar
   - ______ hearth/chimney base
   - ______ posthole/postmold
   - ______ paling ditch/fence
   - ______ privy
   - ______ well/cistern
   - ______ trash pit/dump
   - ______ sheet midden
   - ______ planting feature
   - ______ road/drive/walkway
   - ______ depression/mound
   - ______ burial
   - ______ railroad bed
   - ______ earthworks
   - ______ raceway
   - ______ wheel pit
   - ______ unknown
   - __X__ other: spring box

8. Flotation samples collected:
   - ______ yes
   - __X__ no
   - ______ unknown

   analyzed:
   - ______ yes, by ______________
   - ______ no
   - ______ unknown

9. Soil samples collected:
   - ______ yes
   - __X__ no
   - ______ unknown

   analyzed:
   - ______ yes, by ______________
   - ______ no
   - ______ unknown

10. Other analyses (specify):__________________________

11. Additional comments:

12. Form filled out by: Pete Regan
    Address/Company: AECOM
    Date: 01/08/2020

MARYLAND INVENTORY OF HISTORIC PROPERTIES

ARCHEOLOGICAL SITE SURVEY: BASIC DATA FORM

Date Filed: 01/08/2020

Check if update: ☐

Maryland Department of Planning
Maryland Historical Trust
Division of Historical and Cultural Programs
100 Community Place
Crownsville, Maryland 21032

Site Number: 18CR295	
County: Carroll	

A. DESIGNATION

1. Site Name: Piney Run 4

2. Alternate Site Name/Numbers: ______

3. Site Type (describe site chronology and function; see instructions):
Possible nineteenth to early/mid-twentieth century domestic occupation

4. Prehistoric ______ Historic X Unknown ______

5. Terrestrial X Submerged/Underwater ______ Both ______

B. LOCATION

6. USGS 7.5' Quadrangle(s): Finksburg | (For underwater sites) NOAA Chart No.:

(Photocopy section of quad or chart on page 4 and mark site location)

Latitude in decimal degrees 39.386403 Longitude in decimal degrees -76.980847

7. Maryland Archeological Research Unit Number: 14

8. Physiographic Province (check one):
- ______ Allegany Plateau
- ______ Ridge and Valley
- ______ Great Valley
- ______ Blue Ridge
- ______ Lancaster/Frederick Lowland
- X Eastern Piedmont
- ______ Western Shore Coastal Plain
- ______ Eastern Shore Coastal Plain

9. Major Watershed/Underwater Zone (see instructions for map and list): Patapsco River

C. ENVIRONMENTAL DATA

10. Nearest Water Source: Piney Run Reservoir Stream Order: 2

11. Closest Surface Water Type (check all applicable):
- ______ Ocean
- ______ Estuarine Bay/Tidal River
- ______ Tidal or Marsh
- X Freshwater Stream/River
- ______ Freshwater Swamp
- X Lake or Pond
- ______ Spring

12. Distance from closest surface water: 175 meters (or 574 feet)

C. ENVIRONMENTAL DATA [CONTINUED]

13. Current water speed: ______ knots 14. Water Depth: ______ meters

15. Water visibility: ________________

16. SCS Soils Typology and/or Sediment Type: GdB (Glenelg Loam)

17. Topographic Settings (check all applicable):

_______ Floodplain
_______ Interior Flat
_______ Terrace
_______ Low Terrace
_______ High Terrace
_______ Hillslope
X Hilltop/Bluff
_______ Upland Flat
_______ Ridgetop
_______ Rockshelter/Cave
_______ Unknown
_______ Other: ______________

18. Slope: 2%

19. Elevation: 178 meters (or 585 feet) above sea level

20. Land use at site when last field checked (check all applicable):

_______ Plowed/Tilled
_______ No-Till
X Wooded/Forested
_______ Logging/Logged
_______ Underbrush/Overgrown
_______ Pasture
_______ Cemetery
_______ Commercial
_______ Educational
_______ Extractive
_______ Military
_______ Recreational
_______ Residential
_______ Ruin
_______ Standing Structure
_______ Transportation
_______ Unknown
_______ Other: ______________

21. Condition of site:

_______ Disturbed
_______ Undisturbed
X Unknown

22. Cause of disturbance/destruction (check all applicable):

_______ Plowed
_______ Eroded/Eroding
_______ Graded/Contoured
_______ Collected
_______ Vandalized/Looted
_______ Dredged
_______ Heavy Marine Traffic
_______ Other: ______________

23. Extent of disturbance:

_______ Minor (0-10%)
_______ Moderate (10-60%)
_______ Major (60-99%)
_______ Total (100%)
_______ % unknown

C. ENVIRONMENTAL DATA [CONTINUED]

24. Describe site setting with respect to local natural and cultural landmarks (topography, hydrology, fences, structures, roads). Use continuation sheet if needed.

    The site is located on a forested hill summit that gently slopes down to the northwest to the Piney Run Reservoir. It is located approximately 75 meters northwest of the end of the paved portion of Hollenberry Road and 95 meters northeast of a small, modern residential development on Carroll Street. The site includes the remnants of a stone foundation that could not be investigated due to its location beyond the APE. It could be seen from the edge of the APE and approximately mapped, potentially coinciding with a residence first mapped in 1944 (though the stone foundation clearly indicates it was constructed considerably earlier than that). No road traces were observed that would have provided access to the site, and no other above-ground features were evident.

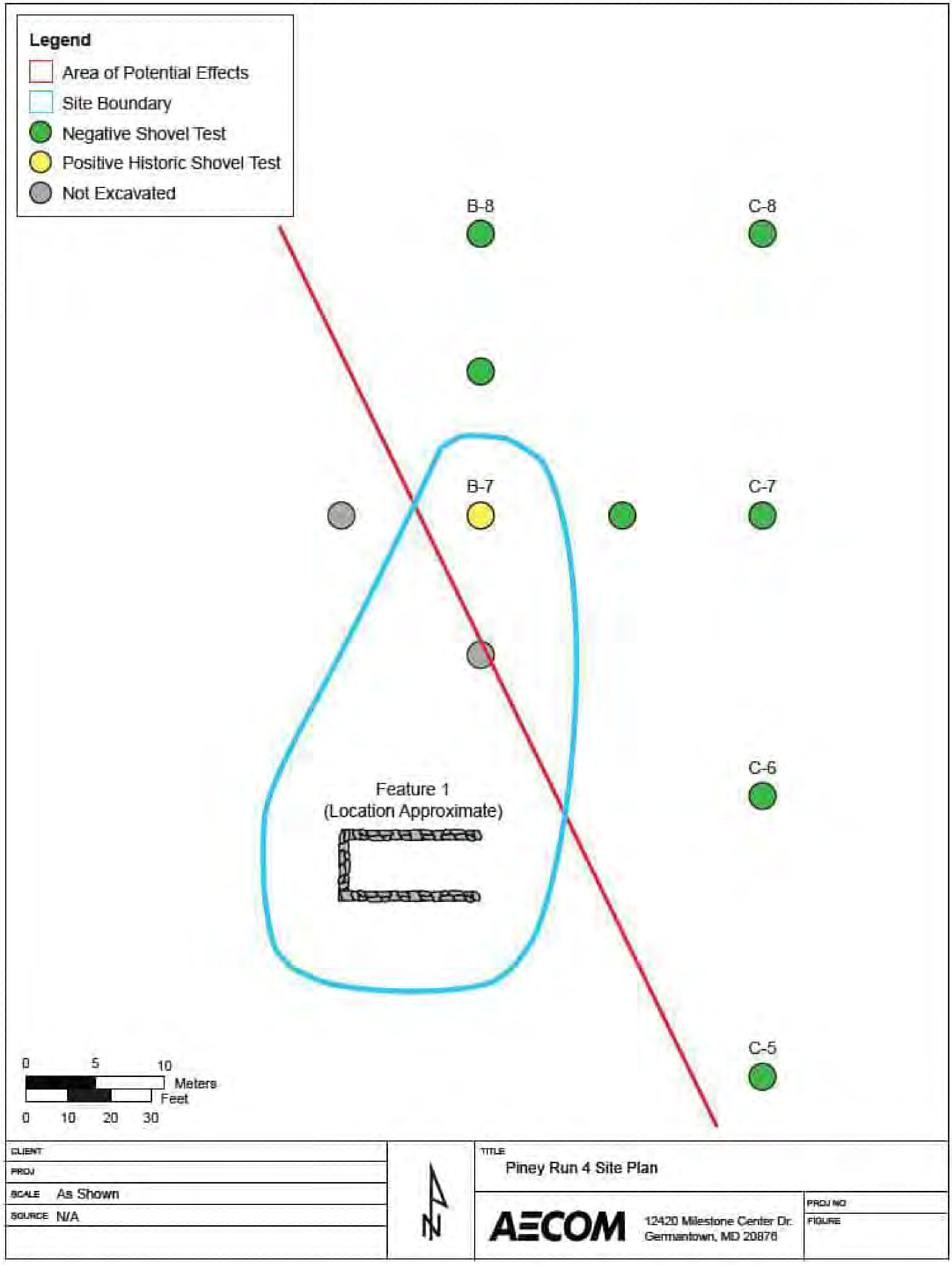
25. Characterize site stratigraphy. Include a representative profile on separate sheet, if applicable. Address plowzone (presence/absence), subplowzone features and levels, if any, and how stratigraphy affects site integrity. Use continuation sheet if needed.

    The only positive STP within Piney Run 4, B-7, was located approximately 25 m (82 ft) north of the foundation and revealed two strata. Stratum I was a 26-cm (0.85-ft) thick brown (7.5YR 4/3) silt loam Ap horizon overlying a strong brown (7.5YR 5/6) silty clay loam B horizon extending to the base of excavation. No obvious signs of modern disturbance were observed

26. Site size: 40 meters by 20 meters (or 131 feet by 66 feet)

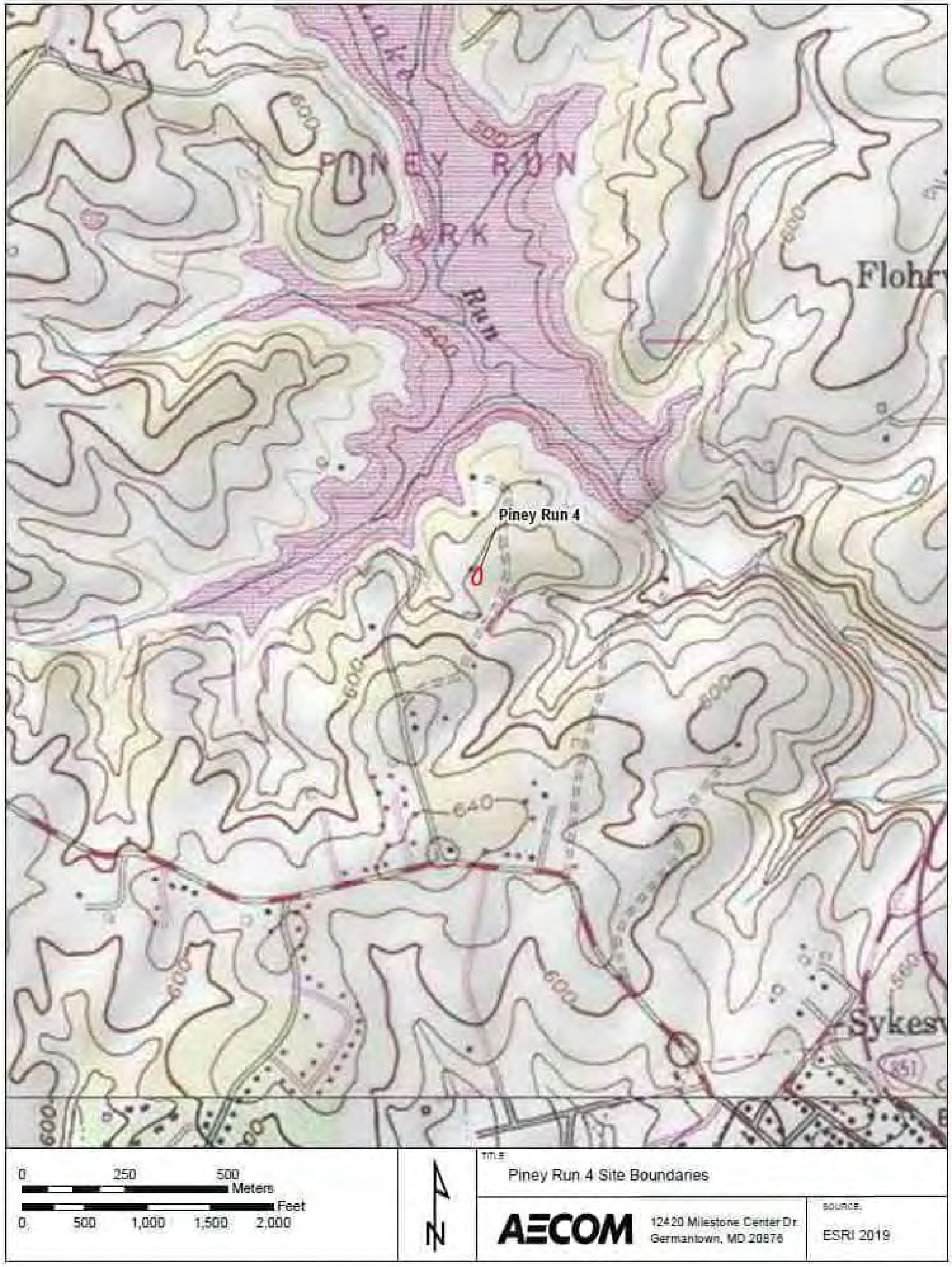
Site Number: 18CR295 **Page 3a**
BASIC DATA FORM

27. Draw a sketch map of the site and immediate environs, here or on separate sheet:



Scale: North arrow:

Photocopy section of quadrangle map(s) and mark site location with heavy dot or circle and arrow pointing to it.



D. CONTEXT

28. Cultural Affiliation (check all applicable):

PREHISTORIC
_______ Unknown
_______ Paleoindian
_______ Archaic
_______ Early Archaic
_______ Middle Archaic
_______ Late Archaic
_______ Terminal Archaic
_______ Woodland
_______ Adena
_______ Early Woodland
_______ Middle Woodland
_______ Late Woodland

_______ CONTACT

HISTORIC:
_______ Unknown
17th century
_______ 1630-1675
_______ 1676-1720
18th century
_______ 1721-1780
_______ 1781-1820
19th century
_______ 1821-1860
___X___ 1861-1900
20th century
___X___ 1901-1930
_______ post-1930

____ UNKNOWN

E. INVESTIGATIVE DATA

29. Type of investigation:
____X__ Phase I
_______ Phase II/Site Testing
_______ Phase III/Excavation
_______ Archival Investigation
_______ Monitoring
_______ Field Visit
_______ Collection/Artifact Inventory
_______ Report From Informant
_______ Other: _______________

30. Purpose of investigation:
____X__ Compliance
_______ Research
_______ Avocational
_______ Regional Survey
_______ Site Inventory
_______ MHT Grant Project
_______ Other: _______________

31. Method of sampling (check all applicable):
_______ Non-systematic surface search
____X__ Systematic surface collection
_______ Non-systematic shovel test pits
____X__ Systematic shovel test pits
_______ Excavation units
_______ Mechanical excavation
_______ Remote sensing
_______ Other: _______________

32. Extent/nature of excavation: Three STPs were excavated at 10-meter intervals to delineate the very small portion of the site within the APE, only one of which was positive. The site core, presumably collocated with a stone foundation observed beyond the APE boundary, could not be investigated during the current study.

F. SUPPORT DATA

33. Accompanying Data Form(s):
________ Prehistoric
______X__ Historic
________ Shipwreck

34. Ownership: _______ Private ________ Federal ________ State ___X____ Local/County
_______ Unknown

35. Owner(s): County Commissioners of Carroll County
Address: 225 North Center Street, Westminster, MD 21157
Phone: ______
Email: ______

36. Tenant and/or Local Contact: ______
Address: ______
Phone: ______
Email: ______

37. Other Known Investigations: ______

38. Primary report reference or citation: Regan, Pete (2020) *Phase I Archaeological Investigation for the Piney Run Watershed Study, Piney Run Dam, Carroll County, Maryland.* (AECOM)

39. Other Records (e.g. slides, photos, original field maps/notes, sonar, magnetic record)?

___ Slides	X Field record	___ Other: ___
X Photos	___ Sonar	
X Field maps	___ Magnetic record	

40. If yes, location of records: AECOM, Germantown

41. Collections at Maryland Archeological Conservation (MAC) Lab or to be deposited at MAC Lab?
X Yes
___ No
___ Unknown

42. If NO or UNKNOWN, give owner: ______
location: ______
and brief description of collection: ______

43. Informant: ______
Address: ______
Phone: ______
Email: ______

44. Site visited by Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 12/06/2019

45. Form filled out by: Pete Regan
Company/Group name: AECOM
Address: 12420 Milestone Center Drive, Germantown, MD 20876
Phone: 301-944-2554
Email: peter.regan@aecom.com Date: 01/08/2020

46. Site Summary/Additional Comments (append additional pages if needed):

The site is located on a forested hill summit that gently slopes down to the northwest to the Piney Run Reservoir. It is located approximately 75 meters northwest of the end of the paved portion of Hollenberry Road and 95 meters northeast of a small, modern residential development on Carroll Street. The site includes the remnants of a stone foundation that could not be investigated due to its location beyond the APE (Feature 1). It could be seen from the edge of the APE and approximately mapped, potentially coinciding with a residence first mapped in 1944 (though the stone foundation clearly indicates it was constructed considerably earlier than that). No road traces were observed that would have provided access to the site, and no other above-ground features were evident.

The site is defined by one positive STP as well as Feature 1, which was photographed, but was not measured, drawn, or subjected to any pedestrian/subsurface investigation since it was not located within the APE. The rectilinear foundation is oriented roughly east-west along its long axis and appears to measure approximately 5 by 10 m (16.4 by 33 ft). Its west, north, and south walls were clearly visible, extending up to approximately 1 m (3.3 ft) above the forest floor. An opening in the west wall may be a doorway. No evidence for an east wall was observed, though it could be obscured by vegetation. The walls appear to be constructed of randomly coursed phyllite rubble with one entry piercing the west wall. Disarticulated sheet and piped metal objects could be seen within the foundation, but they could not be identified without closer inspection. The historically rural character of the local area suggests this may be the foundation of a dwelling, barn, or other agricultural outbuilding. The opening in the west wall could be a cellar access point, in which case Feature 1 may represent a dwelling foundation.

The only positive STP within Piney Run 4 was located approximately 25 m (82 ft) north of Feature 1. Four historic artifacts were collected from the A/Ap horizon in this STP, including one piece of machine-made bottle glass (1893+) and three wire nails (1890+). The artifacts' limited quantity and variety does not provide significant information into the use and occupation of Piney Run 1, though they do indicate that the site was occupied around the turn of the twentieth century or later.

According to historic mapping, a building was present within the vicinity of this site by at least 1944. The use of a stone foundation almost certainly predates 1944 by a considerable margin, suggesting that this site may have been omitted from earlier mapping. The building shown in 1944 was again illustrated on a 1953 USGS map, where it was shown as a Class 1 dwelling. Given the rural agrarian nature of the surrounding community, this almost certainly represents a dwelling. Whether Feature 1 was the foundation of this dwelling or an associated outbuilding presently is unclear.

Only the periphery of this site was located within the APE. The site core, which presumably lies in the direction of Feature 1, could not be investigated during the current study. The site's nature, age, and overall integrity therefore remain unknown at this time. Given that the site could not be more thoroughly investigated, AECOM cannot make a recommendation of potential NRHP eligibility. Additional work is recommended to determine potential eligibility in the event ground disturbance is anticipated.

MARYLAND ARCHEOLOGICAL SITE SURVEY: HISTORIC DATA FORM

Site Number 18CR295

1. Site class (check all applicable, check at least one from each group):

a.
- ______ domestic
- ______ industrial
- ______ transportation
- ______ military
- ______ sepulchre
- ______ religious
- ______ commercial
- ______ educational
- ______ non-domestic agricultural
- __X__ unknown
- ______ other: ____________

b.
- ______ urban
- __X__ rural
- ______ unknown

c. standing structure:
- ______ yes
- __X__ no
- ______ unknown

d. above-grade/visible ruin:
- __X__ yes
- ______ no
- ______ unknown

2. Site Type (check all applicable):
- ______ artifact concentration
- ______ possible structure
- ______ post-in-ground structure
- __X__ frame structure
- ______ masonry structure
- ______ log structure
- ______ farmstead
- ______ plantation
- ______ townsite
- ______ road/railroad
- ______ wharf/landing
- ______ bridge
- ______ ford
- ______ mill (specify: ____________)
- ______ raceway
- ______ quarry
- ______ furnace/forge
- ______ other industrial (specify): ____________
- ______ battlefield
- ______ military fortification
- ______ military encampment
- ______ cemetery
- ______ unknown
- ______ other: ____________

3. Ethnic Association:
- ______ Native American
- ______ African American
- ______ Angloamerican
- ______ Hispanic American
- ______ Asian American
- ______ other Euroamerican (specify): ____________
- __X__ unknown
- ______ other: ____________

4. Categories of material remains present (check all applicable):
- ______ ceramics
- __X__ bottle/table glass
- ______ other kitchen artifacts
- __X__ architecture
- ______ furniture
- ______ arms
- ______ clothing
- ______ personal items
- ______ tobacco pipes
- ______ activity items
- ______ human skeletal remains
- ______ faunal remains
- ______ floral remains
- ______ organic remains
- ______ unknown
- ______ other: ____________

5. Diagnostics (choose from manual and give number recorded or observed):

1 machine-made glass
3 wire nails

Page 2 **Site Number: 18CR295**

HISTORIC DATA FORM

6. Features present:
   - __X__ yes
   - ______ no
   - ______ unknown

7. Types of features present:
   - ______ construction feature
   - __X__ foundation
   - ______ cellar hole/storage cellar
   - ______ hearth/chimney base
   - ______ posthole/postmold
   - ______ paling ditch/fence
   - ______ privy
   - ______ well/cistern
   - ______ trash pit/dump
   - ______ sheet midden
   - ______ planting feature
   - ______ road/drive/walkway
   - ______ depression/mound
   - ______ burial
   - ______ railroad bed
   - ______ earthworks
   - ______ raceway
   - ______ wheel pit
   - ______ unknown
   - ______ other: ____________________

8. Flotation samples collected:
   - ______ yes
   - __X__ no
   - ______ unknown

   analyzed:
   - ______ yes, by ______________
   - ______ no
   - ______ unknown

9. Soil samples collected:
   - ______ yes
   - __X__ no
   - ______ unknown

   analyzed:
   - ______ yes, by ______________
   - ______ no
   - ______ unknown

10. Other analyses (specify):__________________________

11. Additional comments:

12. Form filled out by: Pete Regan
    Address/Company: AECOM
    Date: 01/08/2020

AECOM

PHASE II ARCHAEOLOGICAL EVALUATION OF SITE 18CR293

Piney Run Watershed
Carroll County, Maryland

Carroll County Bureau of Resource Management

AECOM Project Number: 60614688

February 2024

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position

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February 2024

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Abstract

Under contract to the Carroll County Bureau of Resource Management (BRM), AECOM conducted a Phase II archaeological survey in support of the Piney Run Watershed Study at Piney Run Dam, Carroll County, Maryland. The BRM initiated this study to develop a Watershed Project Plan as the initial phase of work ultimately intended to mitigate design deficiencies identified at the Piney Run Dam. The Area of Potential Effects (APE) for the current archaeological study comprises approximately 20.47 hectares (50.58 acres) generally east, west, and south of the dam. This study was initiated to assist the BRM in meeting regulatory obligations under Section 106 of the National Historic Preservation Act of 1966, as amended. In 2019, AECOM completed a Phase I survey of the APE, resulting in identification of four archaeological sites (18CR292, 18CR293, 18CR294, and 18CR295). Sites 18CR292 and 18CR294 were determined to be not eligible for the National Register of Historic Places (NRHP), and 18CR295 was determined to be outside of the APE. Site 18CR293 was recommended potentially eligible based on the presence of features and artifacts spanning the nineteenth century. The goal of this Phase II investigation was to evaluate the eligibility of site 18CR293 for the NRHP.

The evaluation consisted of the excavation of 22 shovel test pits (STPs) and nine test units (TUs) and resulted in the recovery of one prehistoric and 7,089 historic artifacts. Site 18CR293, located immediately southeast of the dam's emergency spillway, represents a small nineteenth to early twentieth century farmstead. Features included a possible silo foundation, two barn/outbuilding foundations, a road/ driveway, a spring box, and remnants of a dwelling foundation, with features arranged into two discrete activity loci segregating agricultural from domestic site uses. Artifacts spanning the late eighteenth through twentieth century were recovered, with most found in the vicinity of the house. The house appears to have been a frame building resting on a stacked stone foundation with a stone chimney and brick hearth on the north side. At some point a standing-seam metal roof had been added. The house had been built into the hill side. A review of archival records suggests the house was occupied by farm hands and/or tenant farmers and not the property owners.

Artifacts were not well stratified, and the deposit appears primarily associated with the demise of the house and refuse disposal on the slope. Investigation in the dwelling showed that the former stacked stone foundation had deteriorated with no intact foundation or subsurface features remaining. While the stone and concrete outbuilding foundations remain intact, artifact deposits in this area were minimal and primarily consisted of machine-made bottle glass and wire nails. The site does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site. Site 18CR293 is recommended not eligible for the NRHP and no further investigation is recommended.

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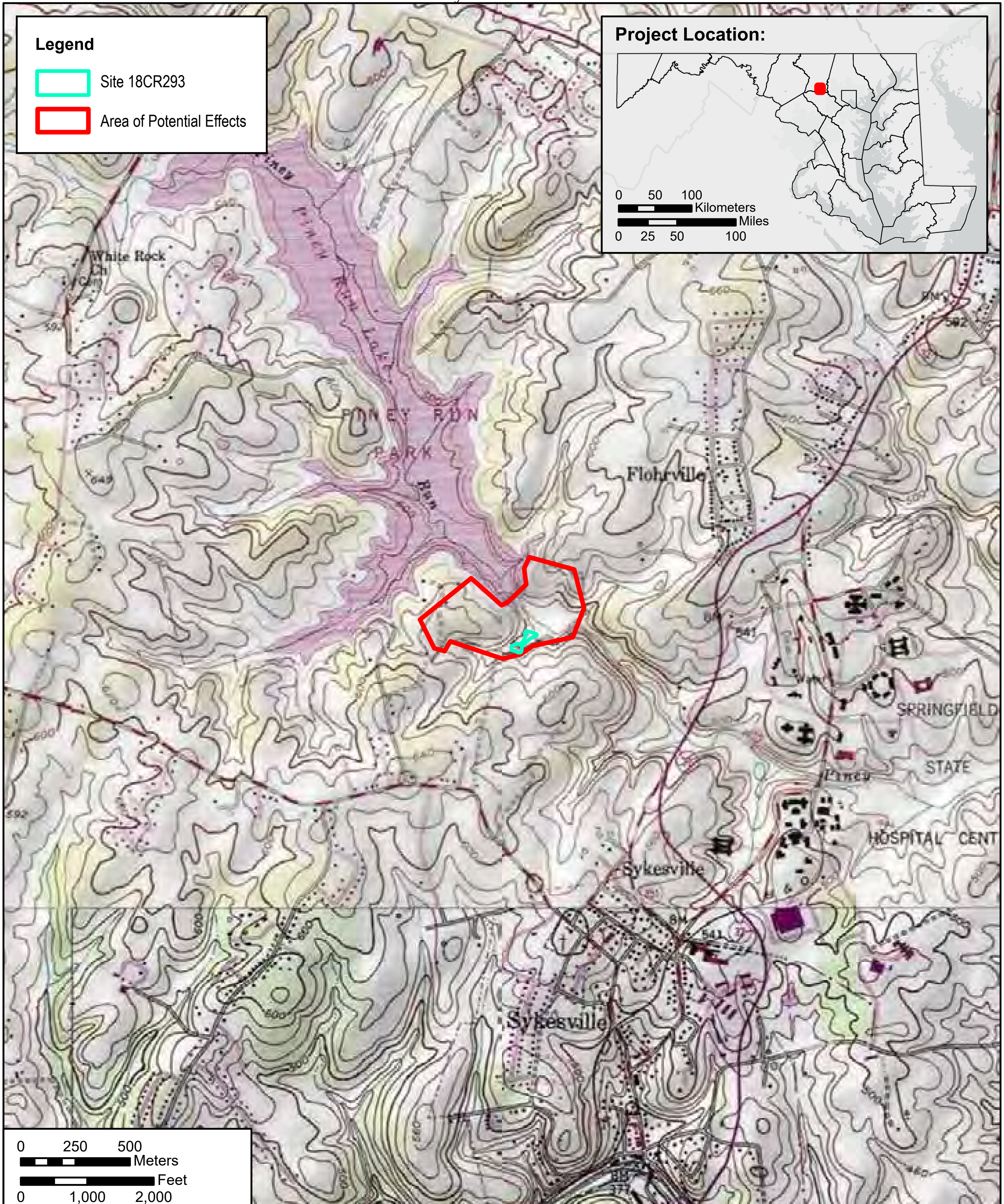
1. Introduction

Carroll County Bureau of Resource Management (BRM) contracted AECOM to conduct a Phase II archaeological evaluation of 18CR293 in support of the Piney Run Watershed Study, located at Piney Run Dam, Carroll County, Maryland (Figure 1-1). This investigation was undertaken as part of a broader initiative to mitigate design deficiencies that have become apparent in the dam. The Area of Potential Effects (APE) encompasses approximately 20.47 hectares (50.58 acres) generally east, west, and south of Piney Run Dam (Figure 1-2). The APE is located within Maryland Archaeological Research Unit 14, Patapsco-Back-Middle Drainages (Figure 1-3). AECOM identified 18CR293 during Phase I survey of the APE in 2019 and recommended the site potentially eligible for the National Register of Historic Places (NRHP; Regan 2020).

The goal of the Phase II investigation was to determine the eligibility of site 18CR293 for listing in the NRHP. The undertaking is federally funded and requires federal permits, making it subject to Section 106 of the National Historic Preservation Act of 1966, as amended. All work was conducted in accordance with the Maryland Historical Trust's (MHT) Standards and Guidelines for Archaeological Investigations in Maryland (Shaffer and Cole 1994), the Standards and Guidelines for Archaeological Investigations in Maryland, Technical Update #1 (Morehouse et al. 2018), and the Secretary of the Interior's Standards and Guidelines for Curation (36 CFR 79).

Archaeological field investigations were conducted from October 2 to 13, 2023 within the 0.83-acre site. Heather Crowl served as the Principal Investigator, and Christine Nestleroth was the Field Director. Amanda Valko, William Russo, Charles Simpson, and Layla Meyers served as field technicians. Carolyn Horlacher served as Laboratory Director, and Maddie Penney served as Lab technician. Nina Shinn Polizze and Kate McCormick served as the geographic information systems (GIS) specialists. Sarah Traum and Christina Sabol conducted archival research. All key personnel meet the Secretary of the Interior's Professional Qualification Standards for Archaeology and Architectural History (36 CFR 61).

Following this Introduction, the report includes seven sections of text: Environmental Setting, Cultural Context, Previous Investigations, Research Design, Results, Summary and Recommendations, and References Cited. Appendix A contains the Qualifications of the Investigators, and Appendix B contains the Artifact Catalog.



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase II
SCALE:	1:24,000
SOURCE:	ESRI 2019

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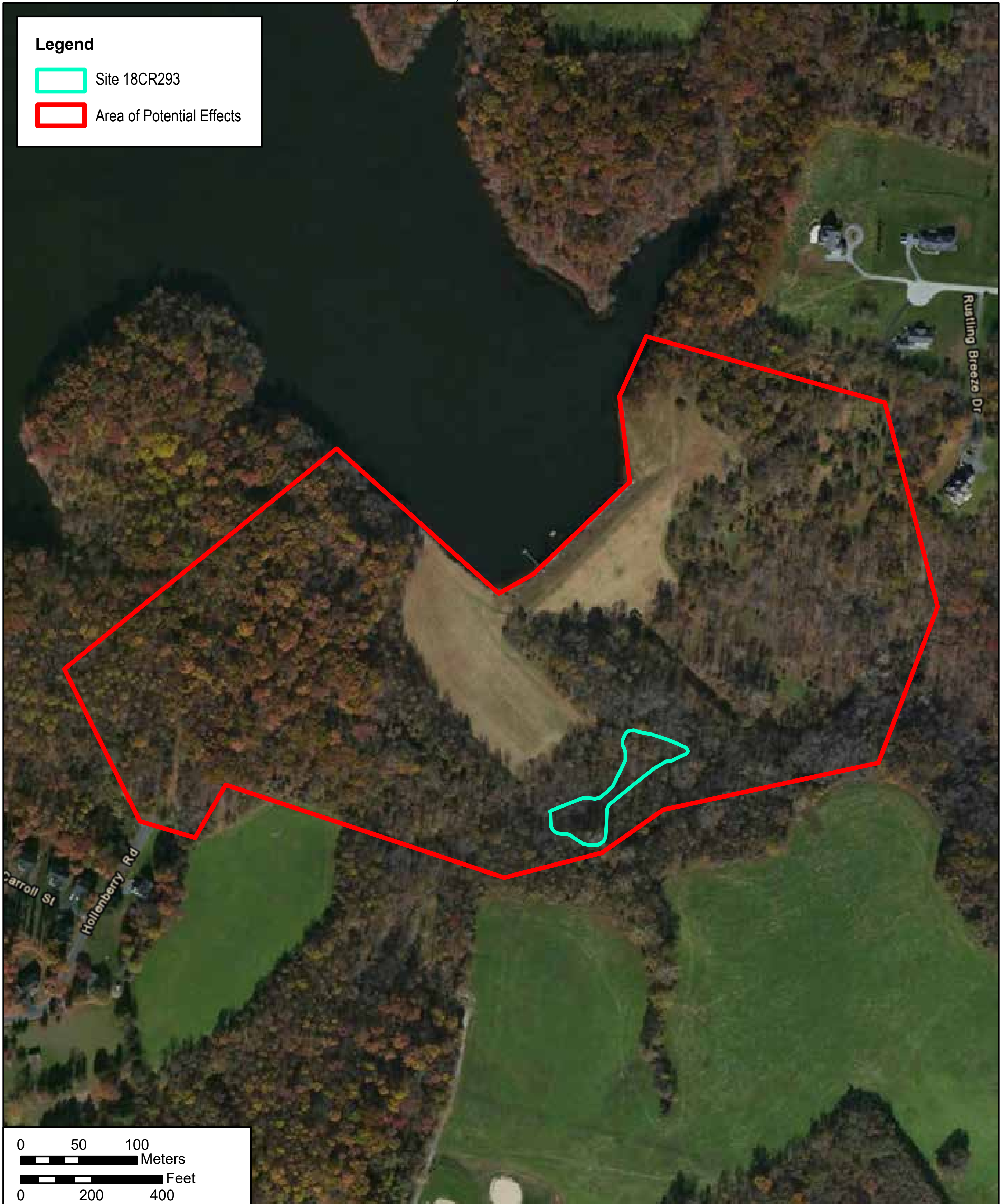
TITLE
Project Location

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 1-1



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PROJECT:	Piney Run Phase II
SCALE:	1:4,500
SOURCE:	ESRI 2022

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TITLE
Area of Potential Effects

AECOM
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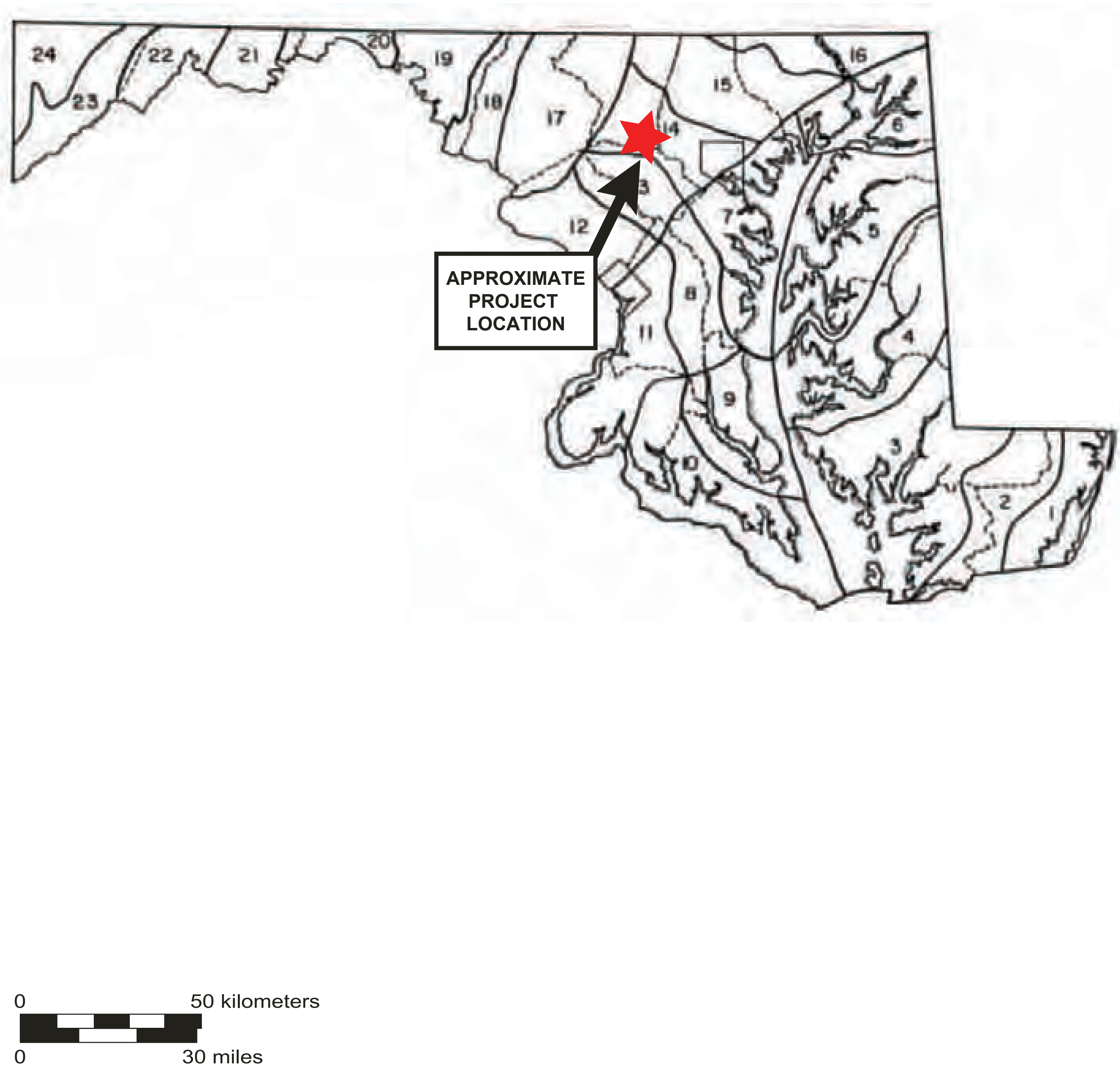
Germantown, MD 20876

PROJ NO 60614688
FIGURE 1-2



CLIENT	Carroll County Bureau of Resource Management	TITLE	Maryland Archaeological Research Units
PROJ	Piney Run Phase II	PROJ NO	60614688
SCALE	As Shown	FIGURE	1-3
SOURCE	N/A		

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2. Environmental Setting

2.1 Project Location

The APE is located generally east, west, and south of Piney Run Dam along Piney Run less than 1 kilometer (km) (0.6 mile [mi]) north of the Sykesville corporate limits in Carroll County, Maryland. The APE extends up to 300 meters (m) (984 feet [ft]) east, 460 m (1,509 ft) west, and 205 m (673 ft) south of the center of the Piney Run Dam crest. Portions of the APE boundary correspond to the Piney Run Reservoir shoreline and the property lines of parcel 0714002626; elsewhere the APE has no physical or legal boundaries.

2.2 Geology and Physiography

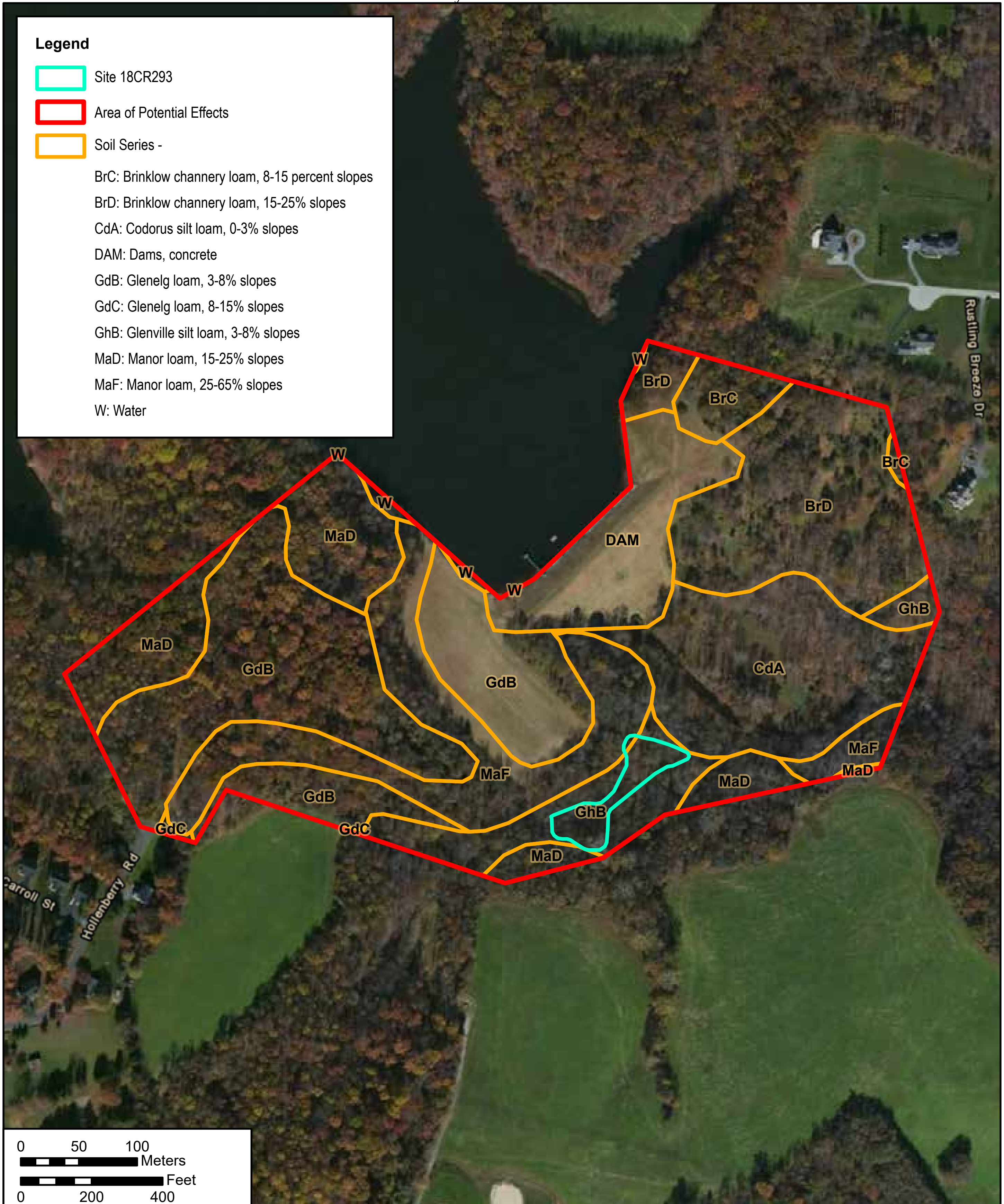
The APE is located in the Hampstead Upland District of the Piedmont Plateau Physiographic Province's Harford Plateaus and Gorges Region (Reger and Cleaves 2008). Spanning from the Coastal Plain west to Catoctin Mountain, the Piedmont Plateau exhibits a highly variable geologic profile (Maryland Geological Survey [MGS] 2012). The eastern portion of the province, in which the APE is located, is comprised of igneous and metamorphosed igneous and sedimentary rocks with pegmatite and granitic pluton intrusions (MGS 2012). The western portion is largely comprised of metamorphosed volcanic rocks. The Hampstead Upland District features rolling to steep terrain, often dissected by steep-walled gorges (Reger and Cleaves 2008). The APE is within the Morgan Run Formation, which primarily consists of "fine- to medium-grained, lustrous, silver-gray to greenish-gray, mica schist and quartz-mica schist" containing discontinuous layers and lenses of quartzite (Muller 1994:n.p.). Areas of Alluvium occur in floodplains of streams and consist of interbedded "light gray to brown gravel, sand, silt, and gray blue to gray-brown clay" (Muller 1994:n.p.). The gravel is dominantly quartz, and the sand and silt are dominantly quartz-mica mixtures.

2.3 Hydrology and Topography

Piney Run is the major waterbody within the immediate vicinity of the APE, bisecting it as the stream flows southeast from its impoundment in Piney Run Reservoir. Piney Run, a third-order stream, flows from its headwaters near the rural village of Winfield to its discharge into the Patapsco River approximately 10 km (6.2 mi) southeast of the APE. Topography within the APE is defined by rolling uplands interrupted by incised stream valleys. Side slopes are often very steep, though toe and summit slopes are typically gentle. The largest expanse of level terrain occurs on the Piney Run floodplain, southeast of the dam. In many places, the natural topography has been significantly impacted by the dam embankment/abutments, the emergency spillway, and large borrow/spoil wasting areas created during the dam's construction. Elevations within the APE range between 142 and 177 m (465 and 580 ft) above mean sea level.

2.4 Project Area Soils

The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) has mapped five soil units within the APE (USDA NRCS 2023). The soils within the project area are displayed in Table 2-1 and a map of the documented soils within the project area is included in Figure 2-1. Site 18CR293 includes Glenville silt loam, 3-8 percent slopes (GhB). Table 2-2 presents the typical soil profile for Glenville silt loam.



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PROJECT:	Piney Run Phase II
SCALE:	1:4,500
SOURCE:	ESRI 2022 and USDA NRCS 2023

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TITLE
Project Area Soils

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Germantown, MD 20876

PROJ NO 60614688
FIGURE 2-1

Table 2-1. Soil Types in the APE

Soil Type	Map Unit	Drainage Class	Parent Material
Brinklow Channery Loam	BrC, BrD	Well-Drained	Weathered Schist/Phyllite Residuum
Codorus Silt Loam	CdA	Moderately Well-rained	Phyllite/Schist/Diabase/Greenstone Loamy Alluvium
Glenelg Loam	GdB, GdC	Well-Drained	Weathered Mica Schist Residuum
Glenville Silt Loam	GhB	Moderately Well-Drained	Metamorphic Rock Colluvium or Phyllite Residuum
Manor Loam	MaD, MaF	Well-Drained	Weathered Mica Schist Residuum

Table 2-2. Glenville Silt Loam Typical Pedon

Horizon	Depth (cm)	Description
Ap	0-23	Dark Yellowish Brown (10YR 4/4) Silt Loam
Bt1	23-41	Yellowish Brown (10YR 5/6) Silt Loam
Bt2	41-48	Yellowish Brown (10YR 5/6) Silt Loam
Btx	48-63	Brown (10YR 5/3) Silt Loam
Btgx	63-84	Light Brownish Gray (10YR 6/2) and Brown (10YR 5/3) Silt Loam
BC	84-99	Yellowish Brown (10YR 5/4) Silt Loam
C	99-208	Yellowish Brown (10YR 5/4) Channery Loam

2.5 Current Land Use

The APE currently consists of rolling upland forests and lightly wooded floodplains within a publicly accessible recreation area that is part of Piney Run Park. Modern disturbances include the dam embankment/abutments, the emergency spillway, borrow/spoil wasting areas created during the dam's construction, dam and reservoir infrastructure, and modern access roads. These disturbances comprise a significant portion of the APE.

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3. Cultural Context

The MHT has developed cultural contexts that provide a necessary framework for the description and analysis of known and anticipated cultural resources (Weissman 1986). These contexts are the basis for evaluating the significance of resources within the APE. The contexts are organized by geographic region, time/developmental period, and theme. The time periods listed in the following prehistoric and historic contexts are those identified by the MHT as important historic contexts for the state (Weissman 1986). Where necessary, dates and terminology have been updated to incorporate new information.

3.1 Prehistoric Context

Archaeologists have traditionally divided prehistoric Native American settlement in Virginia into three general periods. They include the Paleoindian (ca. 10,000 – 8,000 B.C.), the Archaic (ca. 8,000 – 1,000 B.C.), and the Woodland (ca.1,000 B.C. – A.D. 1600) periods (Caldwell 1958; Dent 1995; Gardner 1989). The Archaic and Woodland can be further subdivided into Early, Middle and Late periods. These periods span the time from the earliest human occupation of the region until sustained contact with people from Europe and Africa at the beginning of the seventeenth century.

3.1.1 Paleoindian Period

During the Late Pleistocene geological period (the end of the last Ice Age), the first human activity began in what is now the eastern United States. The climate then was colder and moister than it is today, and the vegetation consisted of spruce, pine, fir, and alder (Brush 1986; LeeDecker and Holt 1991). The Paleoindian period traditionally begins in North America with the arrival of the first humans from Asia across Beringia a 1,000-mi-wide, ice-age land bridge connecting Siberia with British Columbia and Alaska. Microblade technology similar to that discovered at D'uktai Cave in Siberia (ca. 16,000 B.C.) has been found in the Yukon (e.g., Bluefish Caves), Alaska (e.g., Tanana Valley sites), and the eastern United States (e.g., Meadowcroft Rockshelter and Cactus Hill) (Adovasio and Pedler 2005; Fagan 2000). The peopling of the "New World" is often debated. Numerous additional migration routes into North America have since been proposed; future discovery of additional Paleoindian archaeological sites and multidisciplinary collaboration (e.g., paleoclimate, genetics, linguistics) will certainly aid in our understanding of the colonization of North America (Adovasio and Pedler 2005).

While definitive evidence of human occupation in the Mid-Atlantic region is generally attributed to the Clovis culture with its signature fluted points beginning about 10,000 B.C., traces of earlier occupation are present at several regional sites. The Cactus Hill site in southern Virginia (McAvoy and McAvoy 1997), the Meadowcroft Rockshelter site in southwestern Pennsylvania (Adovasio et al. 1998), and the Barton site in western Maryland (Wall et al. 2001) have all yielded carbon-dates pre-dating Clovis occupation, although no clear diagnostic artifacts have been identified in the earliest deposits at these sites. Although there is much to be learned about the pre-Clovis toolkit, micro-blade technology appears to be a defining characteristic.

The Paleoindian toolkit typically consists of diagnostic lanceolate projectile points, formal scrapers, gravers, unifacial and bifacial knives, and burins. Diagnostic projectile points consist of fluted and unfluted forms and include Clovis, Cumberland, and Dalton types (Justice 1995). Limaces are also thought to be diagnostic of this time (e.g., Vail Site, Gramly 1982). Paleoindian tools tend to be well made; they were typically manufactured from high-quality cryptocrystalline materials chosen for their predictable and consistent flaking properties.

Paleoindian sites are rare in the Mid-Atlantic region, but enough sites have been identified to provide for an interpretation of prehistoric settlement patterns and subsistence during the period. Much of what archaeologists know about Paleoindians comes from isolated finds of fluted projectile points (e.g., Flint Run Complex; Gardner 1974, 1977). Buried Paleoindian sites are rare in Maryland (e.g., Higgins Site, Ebright 1992). Paleoindian settlements consisted of seasonally occupied camps, from which forays were made to obtain specialized resources, such as stone for tool manufacture (Custer 1984a; Dent 1995; Gardner 1977).

Site types postulated for the Paleoindian period include base camps, quarry sites, quarry reduction stations, quarry-related base camps, base camp maintenance stations, outlying hunting stations, and isolated projectile point finds (Turner 1994).

The Paleoindian period inhabitants of the Mid-Atlantic region are typically viewed as being close to the idealized forager (Binford 1980), with small bands moving through the landscape for most of the year, hunting, fishing, and foraging for wild edibles. While Paleoindian subsistence was probably focused on hunted game, evidence suggests that plants and fish were also important food resources (Dent 1995; Kavanagh 1982; McNett l985). Bands may have come together to form larger groups during certain times of the year at sites located near geographically restricted resources such as quarry sites (Dent 1995). Turner (1994) describes this settlement/subsistence pattern as “tethered nomadism”. In this view, small foraging groups would move through relatively large territories throughout the year, returning to quarry sites in order to replenish and/or manufacture new tools (Barse and Harbison 2000; Gardner 1974).

3.1.2 Archaic Period (8,000-1,000 B.C.)

The Archaic period dates to ca. 8,000 to 1,000 B.C. and is conventionally subdivided into the Early (ca. 8,000–6,000 B.C.), Middle (ca. 6,000–4,000 B.C.), and Late (ca. 4,000–1,000 B.C.) periods. The Archaic period generally refers to pre-ceramic sites associated with hunter-gatherers that occupied the emerging deciduous forests of the Eastern Woodlands. Human populations living in the region during the Archaic period were adapting to major changes in the environment.

A climatic shift at the end of the Pleistocene ca. 8,000 B.C. brought about dramatic warming and environmental changes. As glaciers receded north, boreal (e.g., spruce) forest was replaced by pine and deciduous mast-producing species (e.g., oak and hickory). A variety of small game species arose. Innovations, such as ground stone for processing mast (i.e., nuts) and the introduction of the atlatl, occur during the Archaic period and represent new adaptations to a changing environment.

3.1.2.1 Early Archaic Period (8,000-6,000 B.C.)

The Early Archaic is marked by the replacement of lanceolate bifacial projectile points of Paleoindian assemblages with somewhat smaller, side- and corner-notched and bifurcate-base projectile points (Gardner 1974, 1977). These stylistic changes in lithic tool technology reflect changes in subsistence strategies, which moved towards the exploitation of a more diverse set of animals. The introduction of notching likely reflects the introduction of the atlatl. Side- and corner-notched projectile points diagnostic of the Early Archaic period in the region include Dalton/Hardaway, Kessel, Palmer, Charleston, and Kirk; bifurcate types include LeCroy, MacCorkle, St. Albans, and Kanawha (Dent 1995; Justice 1995). There was an apparent shift in lithic raw material preferences during the Early Archaic. At the beginning of the period, there was still a focus on imported stone for tool manufacturing, but by the end of the period, locally available stone was in more use.

Settlement patterns in this period were dictated by the distribution of floral and faunal resources, and were, therefore, scattered across a wider range of environmental zones (Barse and Harbison 2000). Both Gardner (1974) and Custer (1980) have hypothesized that, during the Early Archaic period, people banded together into macro-base camps—or groups of families—in the spring and summer and dispersed into smaller micro-base camps in the fall and winter. The larger base camps were in the valley floodplains, while the smaller fall and winter camps were in upland regions.

The number and distribution of Early Archaic sites across the region likely reflect an adaptation to the abundant and diverse game species that inhabited the rapidly spreading deciduous forests. There is little faunal evidence from archaeological sites dating to the Early Archaic period, though “it is assumed that this environment supported bear, deer, elk, and a variety of small game adapted to a northern climate” (Kavanagh 1982). One exception is the Cactus Hill site (44SX202), which contains the remains of species that are still common in the region today (Whyte 1995). Floral evidence from sites, such as the Crane Point site on the Maryland Western Shore, includes hickory nut, butternut, acorn, amaranth, and chenopodium (Lowery and Custer 1990; Lowery 2001, 2003). Other sites in the region have produced similar results (Dent 1995). The floral remains recovered from Early Archaic contexts indicate that a variety of plants were used for food. In addition to floral remains, stone artifacts, such as grinding slabs, milling stones, and nutting stones, are indications of increased reliance on plant foods, while adzes indicate the increased use of wood. The changes in tool types have been interpreted as a shift in subsistence strategies towards a broad-spectrum adaptation, which indicates the utilization of a variety of species of animals and plants, rather than a focus primarily on large animals.

3.1.2.2 Middle Archaic Period (6,000-4,000 B.C.)

The beginning of the Middle Archaic period coincided with the onset of the Atlantic climatic episode, a warm, humid period with a gradual rise in sea level that led to the development of inland swamps (Barse and Beauregard 1994). It was a period marked by an increase in summer drought, sea level rise, grassland expansion into the Eastern Woodlands, the appearance of new plant species, and the spread of deciduous forests (Carbone 1976; Hantman 1990). These changes significantly altered the Mid-Atlantic region, from a relatively homogeneous to a much more diverse environment (Barse and Harbison 2000). During this time, the effects of sea level rise following deglaciation were visible; extensive riverine swamps formed, and river and estuary systems took on their modern configurations. Large Middle Archaic occupations have been identified around Zekiah and Mattawoman Swamps in southern Maryland, and Dismal Swamp in Virginia, evidence that Middle Archaic populations opportunistically expanded into a newly emerging, ecologically productive environment (Custer 1990).

Stemmed and side-notched projectile point forms are characteristic of the Middle Archaic period. Diagnostic projectile points include Stanly, Morrow Mountain, Guilford, Halifax, Otter Creek, and Brewerton series (Coe 2006; Dent 1995; Hranicky 1994; Justice 1995; Klein and Klatka 1991). The Laurentian Tradition (ca. 4,000–2,000 B.C.), which encompasses the late Middle Archaic and early Late Archaic, is represented by Otter Creek, Vosburg, and Brewerton corner- and side-notched types (Ritchie 1980). Fully grooved axes are also diagnostic of this period.

Most Middle Archaic sites are identified through projectile point finds on Holocene terraces and upland surfaces in the Potomac Valley, as well as along estuaries and swamp margins, and near springheads. Middle Archaic occupations tend to be small and artifact assemblages limited primarily to tool manufacturing debitage related to toolkit replenishment (Barse and Beauregard 1994). Most are surface finds (e.g., Zekiah Swamp, Looker and Tidwell 1963); however, Middle Archaic occupations have been identified at a few stratified sites (e.g., Clifton Site, Barse and Beauregard 1994; Higgins Site, Ebright 1992).

A rise in the number of Middle Archaic sites is indicative of steady population growth. Settlement patterns of the period are defined by a foraging pattern that emphasized the use of seasonally available floral and faunal resources (Barse and Harbison 2000; Chapman 1975). Settlements consisted of small base camps located in or near inland swamps that were conveniently accessible to seasonally available subsistence resources, as well as small, temporary upland hunting sites. Custer (1990) has interpreted available Middle Archaic settlement data as indicating a serial settlement system that began replacing the more cyclical system prevalent during the Early Archaic beginning around 6,500 B.C. In this model, Middle Archaic groups moved through their territory, establishing base camps with smaller, satellite resource procurement camps or base camp maintenance stations (e.g., hunting, collecting, or quarrying sites), from which resources were brought to the base camps. Base camps were moved seasonally as resources in different environments became available.

Reliance on seasonally available resources required a dependable collecting and harvesting schedule, and the development of a more specialized toolkit to process diverse resources. The increasing reliance on seasonally available plant and animal resources required Middle Archaic groups to schedule their occupations based on the time of year when resources, such as nuts and seeds, could be harvested or collected.

3.1.2.3 Late Archaic Period (4,000-1,000 B.C.)

By approximately 3,000 B.C., modern vegetation had become established in the region, and the climate was punctuated by alternating periods of dry and moist conditions (Brush 1986). In general, the Late Archaic period is characterized by a warmer and drier climate than that of today, with the development of xeric forests (e.g., oak and hickory) and open grasslands (Carbone 1976; Custer 1984b; Kellogg and Custer

1994). The sea level continued to rise but was relatively stable by the end of the Late Archaic period (Colman et al. 1993; Dent 1995; Lowery 2003).

This period is characterized by the exploitation of riverine and estuarine resources. Higher sea levels resulted in the saline cline moving upriver in tidal environments, which forced freshwater-spawning fish to travel further upstream to spawn. This, in turn, resulted in seasonal fish runs in the rivers and streams along the Coastal Plain. Another effect of sea level rise was the development of brackish water estuaries in the greater Chesapeake area, which encouraged the spread of aquatic food species, including oysters and blue crabs (Barse et al. 2006; Gardner 1982). The exploitation of new food sources resulted in changes to the Late Archaic toolkit, site types, and settlement patterns.

As previously mentioned, the Laurentian Tradition (ca. 4,000–2,000 B.C.) continued into the early Late Archaic period, and is represented by Otter Creek, Vosburg, and Brewerton corner- and side-notched types (Ritchie 1980). Other diagnostic projectile points of the Late Archaic period include the Piscataway, Vernon, and Bare Island/Holmes types of the Piedmont Tradition (Steponaitis 1983); however, Mouer (1991) assigns Piscataway and Vernon points to the Early Woodland period, following the reinterpretation of the Stephenson et al.'s (1963) work at the Accokeek Creek site.

The Broadspear Tradition appeared throughout most of the eastern Coastal Plain around the beginning of the second millennium B.C. (Mouer et al. 1981). Diagnostics include the Savannah River, Koens-Crispin, and Susquehanna Broadspear points, as well as steatite bowls. In Maryland and Virginia, the beginning of the Transitional period is marked by the appearance of the Savannah River Complex, originally described by Coe (2006) with the appearance of Savannah River points around 2,200 B.C. (Mouer 1991). Bannerstones and three-quarter grooved axes first appear in the archaeological record during the Late Archaic period.

Technological development continued throughout the Late Archaic period. Groundstone objects, including carved steatite bowls and steatite net weights, are common components of period assemblages (Barse et al. 2006). The steatite bowls recovered from Late Archaic sites represent the first archaeologically visible, durable container technology in the Mid-Atlantic region. It is believed that, prior to the appearance of steatite bowls, the prehistoric inhabitants of the region used containers made from more perishable materials, such as wood or woven baskets, but these objects have not been preserved in the archaeological record.

The most common steatite vessel form is the shallow, round to oblong, thick-walled bowl with an unrestricted opening and opposing lug handles on the side (Dent 1995). Traditionally, these bowls have been interpreted as cooking vessels used in indirect heat cooking, whereby the contents of the bowl were boiled by the addition of heated stones (Dent 1995; Klein 1997). Steatite vessels have also been interpreted as vessels used to process items consumed during rituals, or to serve ritual drinks or foods, rather than for generalized cooking (Hantman and Gold 2002; Klein 1997).

While most Late Archaic sites can be characterized as short-term exploitive sites or camps, and short-term base camps, the movement of the saline cline, creation of brackish water estuaries, and development of seasonal fish runs led to a new settlement type, the long-term base camp. These larger, semi-sedentary base camps were typically located at the divide between fresh water and brackish water sections of major rivers (Dent 1995). Late Archaic semi-sedentary base camps appear to represent multi-season occupations near stable, predictable riverine/estuarine resources (Barse et al. 2006; Klein and Klatka 1991). Not only were these sites occupied for longer periods of time, but also Late Archaic populations began to invest labor in constructing permanent features that could be used year after year by groups returning to these base camps.

Subsistence was still largely based on gathering and hunting, although there was an increased reliance on riverine resources towards the end of the period (Steponaitis 1983). Seasonal hunting and foraging continued, but exploitation of riverine resources rapidly became an important part of the subsistence base. This continued the earlier trend towards a broad-spectrum adaptation, in which a variety of resources were exploited in many different environmental settings. This broad-spectrum adaptation is another way of characterizing what Caldwell (1958) called "primary forest efficiency" in the Archaic of the Eastern Woodlands.

Several indicators point to an intensification of certain subsistence strategies ca. 2,000 B.C., representing a major change in lifeways. This intensification has been explained both as a consequence of gradual change (Caldwell 1958) and as episodic change relating to shifts in the composition of the environment (Carbone 1976). Structures used to exploit anadromous fish runs, such as fish weirs, were constructed during this period and reflect the intensive riverine focus of the latter part of the period. While riverine resources were certainly important, interior and upland areas continued to be utilized by Late Archaic peoples. Late Archaic subsistence economies may be described as diffuse, considering the use of upland areas for a broad range of resource procurement activities, including gathering foods, such as acorns, hickory nuts, and butternuts, as well as hunting large and small game (Cleland 1976). By 1,500 B.C., subterranean storage pits and steatite containers appear in the archaeological record; both are direct evidence of technological development that reflects the production of food surpluses and the need to preserve them over an extended period. The appearance of large numbers of implements used to process seed and fiber products is further evidence of this emerging economic pattern.

3.1.3 Woodland Period (1,000 B.C.-A.D. 1600)

The Woodland period in Maryland is divided into the Early (1,000–500 B.C.), Middle (500 B.C.–A.D. 900), and Late (A.D. 900–1600) periods based on changes in ceramic types, lithic technologies, subsistence patterns, and social development. The climate during the Woodland period is characterized by a return to cool, moist conditions and the establishment of vegetation that is typical of the region today.

The Woodland period across most of the Mid-Atlantic is marked by the introduction of ceramics, significant population growth, and the development of semi-sedentary and sedentary ways of life. Production innovations, as reflected in ceramic types, have become a significant basis for dating Woodland period archaeological site components. Hunting and gathering of wild floral and faunal resources remained important, but budding horticulture, based on maize cultivation, eventually formed an important part of the subsistence base (Dragoo 1975). An increased focus on estuarine resources, especially shellfish, is manifested in numerous shell middens, especially in the lower reaches of the Potomac estuary (Mouer 1991).

3.1.3.1 Early Woodland Period (1,000-500 B.C.)

Early Woodland sites are generally larger than sites of previous periods, and reflect an increasing reliance on estuarine resources, such as shellfish. This is evidenced by finds of large shell midden sites dated to this period. It was previously thought that the transition between the Archaic and Woodland periods, between 2,000 and 1,000 B.C., represented the introduction of horticulture (e.g., Fritz 1993; Smith 1992). Although Early Woodland groups in the South and Midwest used cultivated plants, there is presently no evidence that cultivated foods played a role in the diet of Early Woodland people in the area. Very efficient hunting and gathering systems (Caldwell 1958), including riverine and marine species exploitation, may have made the acceptance of cultigens slow at first. Only after A.D. 900, when varieties of tropical cultigens adapted to local conditions arrived in the Mid-Atlantic, did cultivated foods begin to assume an important role (Smith 1992).

Projectile points characteristic of the Early Woodland period includes Calvert, Rossville, Potts, and Piscataway types, some of which are also found in Late Archaic contexts (Dent 1995; Hranicky 1991, 1993, 1994). Other artifact types include drills, perforators, flake tools, scrapers, bifaces, anvil stones, net sinkers, mortars, pestles, manos, metates, groundstone tools (e.g., axes, adzes, celts), ground slate, gorgets, and tools made from animal bone and teeth (Dent 1995).

The introduction of pottery around 1,000 B.C. marks the beginning of the Woodland period. Potters' innovations, as reflected in ceramic types, have become a significant basis for dating Woodland period archaeological site components. The earliest ceramic types from the area are the steatite-tempered Marcey Creek ware and Selden Island varieties, which were replaced by the sand or crushed quartz-tempered Accokeek wares. These ceramics are associated with fishtail and corner-notched projectile point types. Accokeek ceramics are often associated with Calvert and Rossville points (Wesler et al. 1981).

Settlement patterns in the Early Woodland period are like those of the Late Archaic, and at numerous sites, Early Woodland occupations succeed earlier Late Archaic habitations with little or no evidence of a break in occupation. The settlement-subsistence system was focused primarily on a series of base camps, where people gathered to exploit seasonally available resources (Gardner 1982). These base camps were used to harvest anadromous fish in the spring and early summer, and to exploit estuarine resources in the fall and early winter. Smaller sites generally associated with specialized ventures, such as hunting or quarrying, are found on or near interior drainages. Other than a trend towards sedentism and more focused hunting and gathering, subsistence patterns were similar to those of the preceding Late Archaic period, with increasing reliance on marine resources (e.g., shellfish) and cultivated plants (Dent 1995). Barber (1991) contends that an increase in sedentism was, in part, a result of a stabilized sea level that facilitated the establishment of resource-rich environments.

3.1.3.2 Middle Woodland Period (500 B.C. – A.D. 900)

Generally, the Middle Woodland period is not well defined, and researchers disagree about the exact boundaries of the period. Dent (1995:235) has referred to this as a period of "technological homogenization," where "ceramic and projectile point variability becomes limited to fewer types." Despite the presence of fewer ceramic and projectile point styles, the Middle Woodland period represents a continuation and further development of cultural complexity that culminates in the Late Woodland period. In addition, intensification in trade networks over a large region is one of the notable trends evident by the onset of the Middle Woodland period. It is thought that warmer and drier conditions may have prevailed during this period (Kellogg and Custer 1994).

Stone toolkits utilized by Middle Woodland peoples are basically the same as those used during the succeeding Late Woodland, but more exotic lithic materials are evident in Middle Woodland assemblages. The technology evident in many of the Middle Woodland sites seems to favor bifacial tool production rather than the prepared core and blade flake technology that typifies Ohio Valley cultures at this time. Projectile points characteristic of the Middle Woodland period includes Selby Bay/Fox Creek and Jack's Reef types (Custer 1989; Dent 1995; Potter 1993). Other tool types found during the Middle Woodland period are similar to those found during the Early Woodland period, and include drills, perforators, flake tools, scrapers, bifaces, anvil stones, net sinkers, mortars, pestles, manos, metates, groundstone tools (e.g., axes, adzes, celts), ground slate, and gorgets (Dent 1995). Dent (1995) also notes that bone tools, such as awls and needles, appear to be more ubiquitous during the Middle Woodland than the preceding Early Woodland period. The presence of non-local rhyolite, argillite, and jasper at a few sites suggests that exchange networks may have been in place between the Coastal Plain and areas near both western Maryland and the New Jersey Fall Line (Barse and Beauregard 1994).

The major ceramic type for the area is Popes Creek (Barse and Beauregard 1994; Dent 1995), which was first manufactured in the Early Woodland period. The style persisted through the early Middle Woodland period in the region (Maryland Archaeological Conservation Laboratory [MAC] 2003). Mockley ware was introduced ca. A.D. 200. Different diagnostic projectile point/knife types are associated with the Pope's Creek and Mockley phases of the Middle Woodland. Rossville and Adena points are found at early Middle Woodland sites in association with Pope's Creek ceramics. Lithic artifacts associated with Mockley ceramics include crudely flaked, side-notched, and parallel-stemmed Selby Bay or Fox Creek points. These projectile point/knife types are followed by terminal Middle Woodland arrowheads, such as Jack's Reef corner-notched (Sperling 2008; Wright 1973).

Settlement patterns were largely similar to those of the Early Woodland period, although base camp settlements located at fresh and brackish water junctions appear to have been abandoned in favor of broader floodplain sites, where maximum resource exploitation of both non-tidal and tidal aquatic resources was possible (Dent 1995). The large number of sites for this period and the extensive size of some of the sites support the argument for possible seasonal aggregation and dispersal. There is some evidence for a significant shift towards settlement of coastal and estuarine areas (Davidson 1981), though Hughes (1980) notes that inland areas along swamps and small streams were still being utilized. Hunting and gathering continued as the primary method of acquiring food, with an increased reliance on riverine and domesticated plant resources. The presence of large, shell middens during the Middle Woodland period indicates the increased reliance on shellfish. There was also an intensification of horticultural practices, although hunting, fishing, and plant collecting were still important subsistence pursuits.

3.1.3.3 Late Woodland Period (A.D. 900-1600)

The Late Woodland period is traditionally viewed as the culmination of technological, settlement, and subsistence trends that began in the Early Woodland. By the Late Woodland, cultivated crops became important in subsistence for much of the region (Dent 1995). It was during this time that maize horticulture was adopted, although hunting, gathering, and fishing remained an important part of the subsistence economy. The Holocene was historically thought to have been climatically stable; however, research within the past two and a half decades has demonstrated that it was punctuated by abrupt periods of cooling or drought lasting decades or centuries (e.g., Brush and Hilgartner 2000; Osborn and Briffa 2006; Willard et al. 2005). One of these cooling cycles, the Little Ice Age, occurred between ca. A.D. 1300 and 1850. Wall et al. (2001) notes that archaeological evidence in the region suggests less agriculturally productive areas were occupied after A.D. 1400, which is perhaps a reflection of deteriorating environmental conditions caused by the Little Ice Age.

Late Woodland ceramics found in the region include Page, Shepard, Townsend, Potomac Creek, and Shenks Ferry wares (Egloff and Potter 1982; MAC 2003). Ceramic decoration and embellishment appear to be very important at this time. Projectile points characteristic of the Late Woodland period includes small triangular styles, such as the Madison and Levanna types and their variants and are evidence of a change in hunting technology from the atlatl-launched spear to the bow and arrow (Custer 1989; Dent 1995). There is an apparent preference for locally available stone material for making points. Other stone artifacts associated with Late Woodland period sites include scrapers, perforators, bifaces, hoes, choppers, net sinkers, groundstone axes, celts, adzes, mauls, grinding slabs, metates, manos, mortars, pestles, pendants, boatstones, bannerstones, and abraders (Dent 1995; Stephenson et al. 1963). Artifacts made from shell and bone are also recovered from Late Woodland period sites, including fishhooks, scraping implements, pendants, awls, bodkins, beamers, needles, pins, and beads (Dent 1995). Clay tobacco pipes were manufactured during this period and copper beads and pendants are also found (Dent 1995).

The establishment of stable agriculture during the Late Woodland period led to the development of sedentary floodplain villages, which were often located within palisades near agricultural fields (Wall 2001). The reliance on agriculture, as well as the presence of the remains of village palisades, hearths, storage pits, middens, and burials, indicates the greatest degree of sedentism seen until this time. Settlements were generally located on broad floodplains, often near the junction of a tributary stream and river (Wall 2001). Hunting and gathering was conducted from larger estuarine camps surrounded by micro-band camps. Smaller foraging and hunting ranges would have resulted in more limited exploration for lithic raw materials and greater dependence on resources found near the camps, as well as those regularly obtained through exchange with other groups.

One of the first widespread and clearly defined Late Woodland groups was the Montgomery Focus/Complex (Slattery and Woodward 1992). The Montgomery Focus initially was defined based on a suite of characteristics associated with numerous sites excavated along the Middle Potomac River Valley and adjacent tributaries (e.g., the Monocacy River) dating to A.D. 900–1450 (Dent 2005; Slattery and Woodward 1992). The Montgomery Focus sites have been interpreted as representing the settlements of small communities of agriculturalists along the banks of the Middle Potomac River and its larger tributaries (Dent 2005; Slattery and Woodward 1992). The type was defined by Schmitt (1952) based on his excavations at the Shepard site (18MO3) in Montgomery County, Maryland. Montgomery Focus/Complex sites are characterized by a circular palisade wall enclosing a series of elongated circular wooden post structures that are arranged around a ring of storage/trash pits encircling a small open space. The diagnostic ceramic ware associated with Montgomery Focus sites is Shepard ware (Dent 2005; Slattery and Woodward 1992).

Increased population density and competition for choice land and resources led to the rise of chiefdoms and a hierarchical political organization (Dent 1995). After A.D. 1500, there was an increase in social and political interaction among native tribes in the region, and Potter (1993) has suggested that an alliance of Coastal Plain Algonquian groups was formed prior to European contact. By the time of European contact, multiple chiefdoms existed along the Coastal Plain of Virginia and Maryland, including the Conoy, Piscataway, and Powhatan chiefdoms (Potter 1993).

3.1.4 European Contact (ca. A.D. 1600)

Native American culture at the time of contact with Europeans was a continuation of the Woodland lifeways. However, at this time, materials of European manufacture, acquired via trade, were also being incorporated into the indigenous tool kit. Subsistence was largely based on agriculture, though wild plants and game continued to be important. Settlements in the Mid-Atlantic region were typically nucleated villages of dome shaped wigwams and semi-rectangular long-house structures constructed of sapling poles and covered by grass, reeds, or tree-bark panels. Sometimes villages were fortified with wooden palisade walls. Societies were stratified and organized into chiefdoms that at times became confederated paramount chiefdoms (Dent 1995). Captain John Smith's explorations of the Chesapeake Bay area during the years 1608–1610 marked the first well-documented contact between European explorers and Native Americans in the region. Captain Smith's journal (Sultana Projects 2019) describes his travels and maps Indian villages along the extensive estuaries of the Potomac River. Captain Smith noted six tribes living on the northern side of the Potomac River, with the largest population found at the community of Moyaone, possibly near the modern town of Accokeek, Maryland (Stephenson et al. 1963).

Sixteenth and seventeenth century societies living in the Potomac River valley and along Maryland's western shore belonged largely to the Potomac and Piscataway chiefdoms, many of which were allied into loose confederacies (Grumet 1992). Further upriver lived the more independent Portobagos, Doegs, and Nacotchtankes, of whom little is known. European exploration and settlement in the area continued through the 1600s, with relations between the Native Americans and Europeans marked by periods of peaceful coexistence interrupted by times of tension and hostility (Potter 2006). As more land was granted to colonists and local tribes were encroached upon, relations further deteriorated. Natives of the Maryland coastal plain probably first felt the impact of European contact through contagious diseases and the movements of other native groups. By the 1650s, the Europeans had taken an aggressive role in claiming lands and driving out the Native Americans. Disease and warfare virtually exterminated the extant Native American cultures, and those that survived eventually were forced out of their homelands. By 1697, surviving peoples of the Potomac Valley began to move west of the Fall Line and into the depopulated Susquehanna Valley (Grumet 1992). At the start of the eighteenth century, most surviving local Native Americans had left the area. However, descendants of survivors continue to live in Maryland today, and some have become organized as the Piscataway Indian Nation, and the Piscataway Conoy Tribe of Maryland. The groups have not been granted Federal recognition but are recognized by the State of Maryland (MHT 2019).

3.2 Historic Context

The following discussion divides the historic period of Maryland and Carroll County into five subperiods following those identified by the MHT as important historic contexts for the state. These include Euro-American Contact and Settlement (1570–1725); Rural Agrarian Intensification (1725–1815); Agricultural-Industrial Transition (1815–1870); Industrial Dominance (1870–1930); and Modern (1930–Present).

3.2.1 Euro-American Contact and Settlement (A.D. 1570-1725)

In 1634, Europeans established St. Mary's City, the first permanent settlement in Maryland. St. Mary's City was the capital of the Colony of Maryland and remained so until the capital was moved to Anne Arundel County in 1694. The first historical record of the name Baltimore County did not appear until 1659 in a writ issued to the county sheriff; formal boundaries were first mentioned in 1674, when Cecil County was created from the eastern portion of the county (Brooks and Rockel 1979; Lanman 2009). Baltimore County originally included parts of what are now Cecil, Harford, Carroll, Anne Arundel, Howard, and Kent counties, as well as Baltimore City. The county was named after the second Lord Baltimore, Cecil Calvert, who took his title from his barony estates in Longford County, Ireland (Brugger 1988).

The charter from King Charles I gave Cecil Calvert ownership over the approximately seven million ac of land of the Maryland colony. From 1634 through 1680, the Calverts promoted the settlement of the colony through the headright system in which small tracts of land were granted to those who funded their own or others' passage to the colony, usually 50 ac per "head". Over 34,000 land patents are known to have been recorded under the headright system, a figure that is thought to account for 80 percent of the settlers entering Maryland prior to 1684 (Maryland State Archives 2018). During the early settlement period, settlements focused on the Potomac and Patuxent Rivers, and Maryland quickly became an important tobacco-producing colony. The landscape remained sparsely populated, however, with few resident landlords.

3.2.2 Rural Agrarian Intensification Period (A.D. 1725-1815)

Agriculture, specifically tobacco cultivation, remained the primary occupation of settlers and residents in the Baltimore County area throughout most of the eighteenth century, though the county was largely uninhabited at the beginning of the century. In the early part of the eighteenth century there were fewer than 500 families living within the county boundaries, and most of those were concentrated along the coastline (Brooks and Rockel 1979). Initially the inhabited landholdings in the county consisted of small clearings with simple one or two room houses. The small clearings eventually grew, giving way to large farms with a number of outbuildings and workers.

The widespread cultivation of tobacco, a highly land- and labor-intensive cash crop, contributed towards the persistence of larger land holdings and the rise of slave ownership in the region. The falling value of tobacco also led to increased dependence on enslaved labor in the eighteenth century, and by 1737, slaves made up 38.5 percent of the total taxable population of Baltimore County (Brooks and Rockel 1979). In 1747, in an effort to regulate the quality and quantity of tobacco produced in the colony, the colonial legislature instituted tobacco inspections, a system already in place in Virginia. Tobacco inspection points were established throughout the colony, each with warehouses and inspectors (Brugger 1988). Tobacco remained the principal cash crop throughout the colonial period in the Baltimore County area; however, the rapid depletion of the soil from intensive tobacco cultivation led to early crop diversification, and staples such as wheat and corn supplemented tobacco as major cash crops. Towns began to develop throughout the colony around major land routes, ports, and mills (Brugger 1988).

Meanwhile, further west in the county, the area that would become Carroll County would remain sparsely occupied until well into the nineteenth century (Wesler et al. 1981; Bunting and D'Amario 1999). Few navigable waterways and a landscape bisected by deep gullies discouraged settlement by wealthy landowners interested in high yield crops like tobacco. The land was settled by German immigrants from Pennsylvania, who established small grain farms, and built mills on the many rushing streams in the area. Settlements consisted of small hamlets connected by road networks to mills and harbors on the Patapsco River (D'Amario 1976). The primary industry was grain milling.

3.2.3 Agricultural-Industrial Transition (A.D. 1815-1870)

The continued exhaustion of the soil from tobacco cultivation and the subsequent decline in quality and price of tobacco resulted in economic and demographic changes throughout the Chesapeake region. Societies were formed to experiment with and disseminate alternative agricultural practices such as crop rotation and diversification (Brugger 1988). One method to improve soils was through the introduction of organic and mineral materials, such as lime. German chemist Justus Freiherr von Liebig is often considered the father of modern "agricultural chemistry" for demonstrating the importance of nitrogen and noting that plants require inorganic nutrients to grow (e.g., Justus 1847). This type of scientific treatment of soils and promotion of these farming practices began to appear in popular publications in the 1840s and 1850s. For example, Samuel Sands' publication, The American Farmer, ran monthly in Baltimore starting in 1845. The first issue was chiefly concerned with advice on different types of manure, including the use of lime, to "resuscitate worn-out lands" (American Farmer 1845:19). Similarly, the 1849 British publication On the Use of Lime in Agriculture is a 300-page step-by-step manual on the proper preparation and use of lime to improve soils, covering different types of limestone, procurement, burning, stacking, and field application (Johnston 1849). Books and journals that explained the benefits and proper use of mineral and organic materials to improve farm produce found a ready market in Maryland. In the limestone-rich Piedmont areas of Baltimore and Carroll counties, lime kilns for private use were a common element of farms during this period (Chapman Publishing Company 1897).

In addition to attempts to improve soil quality, large land holdings were divided into smaller tracts for small-scale, family-owned diversified farms that produced a variety of crops. Commerce and industry became increasingly important, influencing the development of new transportation systems. In 1828 the construction of the Baltimore and Ohio Railroad began at Mt. Clare in what is now Baltimore City (O'Donnell 1968). It was hoped the railroad would open up access to the port at Baltimore to farms and industries farther west. The Baltimore and Susquehanna Railroad was completed in 1832, with a track running north from Baltimore to York, Pennsylvania, and by 1838 a train was making the round-trip journey between the two cities once a day (Clemens 1983).

In 1830, the Baltimore and Ohio Railroad built a stop at a small hamlet of Sykesville. The town grew around the rail stop, and nearby farmers were able to diversify crops and grow more perishable foods that could now be rapidly shipped to markets by rail (Tyler et al. 2015). Carroll County became a distinct jurisdictional entity in 1837 (Wesler et al. 1981).

The late Antebellum period and Civil War brought much friction into Carroll County. The German farmers with small plots tended to be against slavery, while the English farmers with larger plantations favored slavery but not secession (Hall 2005). The split sympathies put Carroll County residents against each other. During the war, Sykesville was raided by J.E.B. Stuart and his cavalry.

3.2.4 Industrial Dominance (A.D. 1870-1930)

Farming continued to be the prime economic engine of Carroll County in the early twentieth century. There was little growth outside of the burgeoning mill towns along the Patapsco, like Daniels and Ellicott City in neighboring Howard, County.

In 1868 much of Sykesville was destroyed by flooding (Hall 2005). The town was originally centered on the Howard County side of the Patapsco River, but following the flood, the city was rebuilt on higher ground, on the Carroll County side of the river. Most of the Victorian buildings extant in downtown Sykesville were built by architect J.H. Fowble during the 1890s. The town was incorporated in 1904 (Wimmer 1985).

3.2.5 Modern (A.D. 1930-Present)

The county remained largely rural into the 1930s. During the Depression many of the small farm plots were foreclosed. Large sections of Sykesville's business district were destroyed by fire in 1937 (Downtown Sykesville Connection 2018). Following the Second World War, Sykesville and surrounding environs began to grow rapidly as part of the post-war suburban expansion. Today Carroll County and its population centers of Sykesville, Eldersburg, and Mt. Airy are closely intertwined economically and culturally with Baltimore and Frederick.

3.3 Project-Specific History

Historic maps and aerial photographs were reviewed to develop a preliminary history of the APE, characterizing historic land use patterns and the built environment to the extent possible. Historic images from the Library of Congress, United States Geological Survey (USGS), Johns Hopkins University, and other repositories were examined as appropriate. Archival materials, including land records, wills, and tax lists were used alongside the historic maps and secondary narratives to provide an ownership chain-of-title for the site along with additional information on the land's potential occupants and structural improvements. Table 3-1 presents a summary of the ownership history. It should be noted that in some instances, the archival record is incomplete, and property ownership has been inferred based on available data. The occupation of this particular site is largely unclear because it has long been part of a very large parcel, and likely functioned as a tenant farm within the larger farm.

Table 3-1. Chain of Title Summary

Instrument	Document	Description	Date
	Patent Map	Samuel Smith patented 201 acre “Charles Delight Enlarged”	1783
	MSA 2023C	William Patterson patented “Springfield”, which incorporated “Charles Delight Enlarged”	1827
	MSA 2023C	George Patterson added land and repatented the tract as “Springfield Enlarged”	1854
Deed	53:301	Prudence Patterson and James Carroll, executors of will of Florence Patterson Carroll convey 1700 acres of “Springfield” to Frank Brown for $50,000	22 June 1880
Deed	64:510	Frank Brown and wife, Mary R., convey 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” to John Welbourn for $9,000	29 July 1886
Deed	68:318	John Welbourn and wife, Lucy H, convey 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” to John T. and A.K. Williams	18 May 1888
Deed	71:544	Anthony K. Williams and wife, Ann Elizabeth, convey their half-interest in the 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” to John T. Williams for $3,000	17 September 1890
Deed	81:543	John T. Williams died intestate in 1894. His widow, Jane E. Williams purchased the 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” from the other heirs of John T. Williams for $5743.70.	27 November 1895
Deed	92:78	Charles W. Quynn, executor of the will of Jane E. Williams, conveyed the 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” to Mordecai C. Jones for $3791.	12 January 1901
Deed	93:115	Mordecai Jones and wife, Alice K, convey 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” to Joseph T. Harris	22 April 1901
Deed	93:315	Joseph Harris and wife, Margaret, convey 229.75 acres of “Springfield Enlarged”, encompassing Lots 6, 7, and the “Mine Lot Relocated” to Mary H. Todd for $6000	1 November 1902
Deed	98:565	Mary H. Todd conveys 112 acres, part of “Springfield Enlarged,” to Johnzie Beasman for $2,600.	6 February 1904
Intestate		Johnzie Beasman died 25 January 1922, intestate. His real estate was vested in his widow, Laura E. Beasman, and son, Frank B. Beasman.	
Will	16:27	Laura E. Beasman’s will, dated 16 November 1929, devised all of her real estate, inherited from her husband, Johnzie Beasman, to her son, Frank Beasman	16 November 1946

Instrument	Document	Description	Date
Will	17:544	Frank B. Beasman's will, dated 2 August 1950, devised all of his real estate to the Convention of the Protestant Episcopal Church of the Diocese of Maryland	20 July 1960
Deed	511:543	The Convention of the Protestant Episcopal Church of the Diocese of Maryland sold 56.0505 acres to the County Commissioners of Carroll County, for use as part of the Piney Run	11 May 1972

While historic maps from the seventeenth through early nineteenth centuries were available for review, none provided sufficient detail to determine land use practices and occupancy status within the APE. It is expected that during the seventeenth and eighteenth centuries, the APE likely was unoccupied, given the generally dispersed nature of Carroll County's rural population at the time. At the end of the eighteenth century, 18CR293 was part of the tract "Charles Delight Enlarged" as shown on a map of early land patents (Horvath 1984). This 201-acre tract was patented in 1783 by Samuel Smith in what was then Baltimore County (Maryland State Archives, 2023c). A connection between this tract and Samuel Smith was unable to be made with later landowner's records. Also given the frequency of the Smith surname in Baltimore, more information on this patentee was unable to be established.

It appears that the tract "Charles Delight Enlarged," including site 18CR293 was incorporated into another tract "Springfield," then 1,378.25 acres, which was patented by William Patterson in 1827. William Patterson was an Irish émigré, who came to Maryland in 1775. He married Dorcas Spear, of the prominent Spear-Smith family. He rose to become a very wealthy and influential Baltimore merchant, helping found the Merchant's Exchange, the Bank of Maryland, and Canton Company. He was an early investor and promoter of the Baltimore and Ohio Railroad (Maryland Center for History and Culture 2023).

Upon William Patterson's death soon after the patent, Springfield passed to William Patterson's youngest son, George Patterson. George Patterson made Springfield his home and focused on general farming. His farm was known as a "model farm" and he practiced scientific farming, including a nine-year pattern of crop rotation and heavy application of manure and phosphates. He was well-known for his herds of Devon cattle and Berkshire hogs. Springfield also included a grist mill, constructed ca. 1824 along Piney Run, and iron and copper mines that were opened ca. 1850 (Maryland State Archives 2023b; Scharf 1882 vol. 2:873-874). George Patterson added parcels to Springfield and in 1854 repatented it as "Springfield Enlarged", including 1,759 acres (Maryland State Archives 2023c).

The 1840 census lists George Patterson as living in Carroll County, with four free white persons, three free colored persons, and 48 slaves making up his household (United States Bureau of the Census 1840). In the 1850 census of free persons, the George Patterson household included himself, a 53-year-old farmer, his wife, daughter, and Margaret Wilhelm, relationship unknow (United States Bureau of the Census 1850a). Listed in the 1850 census' slave schedule are 40 slaves, ranging in age from 70 to 5 months old (United States Bureau of the Census 1850b). Similar occupants are listed in the 1860s census, with the free population including George Patterson, a 63-year-old farmer, with real estate valued at $150,000 and personal property at $78,000, his wife, daughter, a relative of his wife's and two female servants (United States Bureau of the Census 1860a). The slave schedule for that census lists George Patterson as owning 37 slaves, ranging in age from 75 to 3 years old (United States Bureau of the Census 1860b).

The earliest available maps detailing developments within the vicinity of the APE were separately produced in 1862 by Simon J. Martenet and J.N. Macomb (Figures 3-1 and 3-2). The Martenet map includes significantly more detail that the Macomb map, the latter being a simplified version that used the former as a basis. Neither map shows development within or adjacent to 18CR293, although they do show other developments on Patterson's property, including the sawmill and copper mines. It is interesting to note that the Macomb map shows a small, incompletely drawn road spur leading north from a bend in what is now Obrecht Road and on a trajectory that may have led north into the APE.

CLIENT: Carroll County Bureau of Resource Management
PROJECT: Piney Run Phase II
SCALE: 1:24,000
SOURCE: Martenet 1862
L:\Legacy\Projects\MD\Piney_Run\

N

TITLE: 1862 Martenet Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO: 60614688
FIGURE: 3-1

CLIENT	Carroll County Bureau of Resource Management
PROJECT	Piney Run Phase II
SCALE	1:48,000
SOURCE	Macomb 1862

L:\Legacy\Projects\MD\Piney_Run\

N

TITLE
1862 Macomb Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-2

In 1863, William Shearer produced a more rudimentary map of Carroll County that somewhat crudely depicts the principal roads and waterways in the vicinity of the APE (Figure 3-3). Useful only as a schematic, Shearer's map does not illustrate road alignments, stream courses, and historic occupations with the spatial accuracy evident in the 1862 maps above. It correctly shows how principal features of the cultural landscape were arranged relative to one another, but their distances and orientations appear to be general approximations. Fewer residential and industrial occupations are shown compared to the 1862 Martenet map, though Shearer depicted some dwellings absent from earlier maps. Despite the inaccuracies, Shearer's map generally concurs with the 1862 maps insofar as no improvements were shown within the APE.

George Patterson died in 1869, with his property passing to his only child, Florence Patterson Carroll. After Florence Patterson Carroll's death in 1879, Springfield was sold by her executors to Frank Brown for $50,000 (Carroll County Deed Book [CCDB] 53:301). No census records were able to be located for Florence Patterson Carroll in 1870.

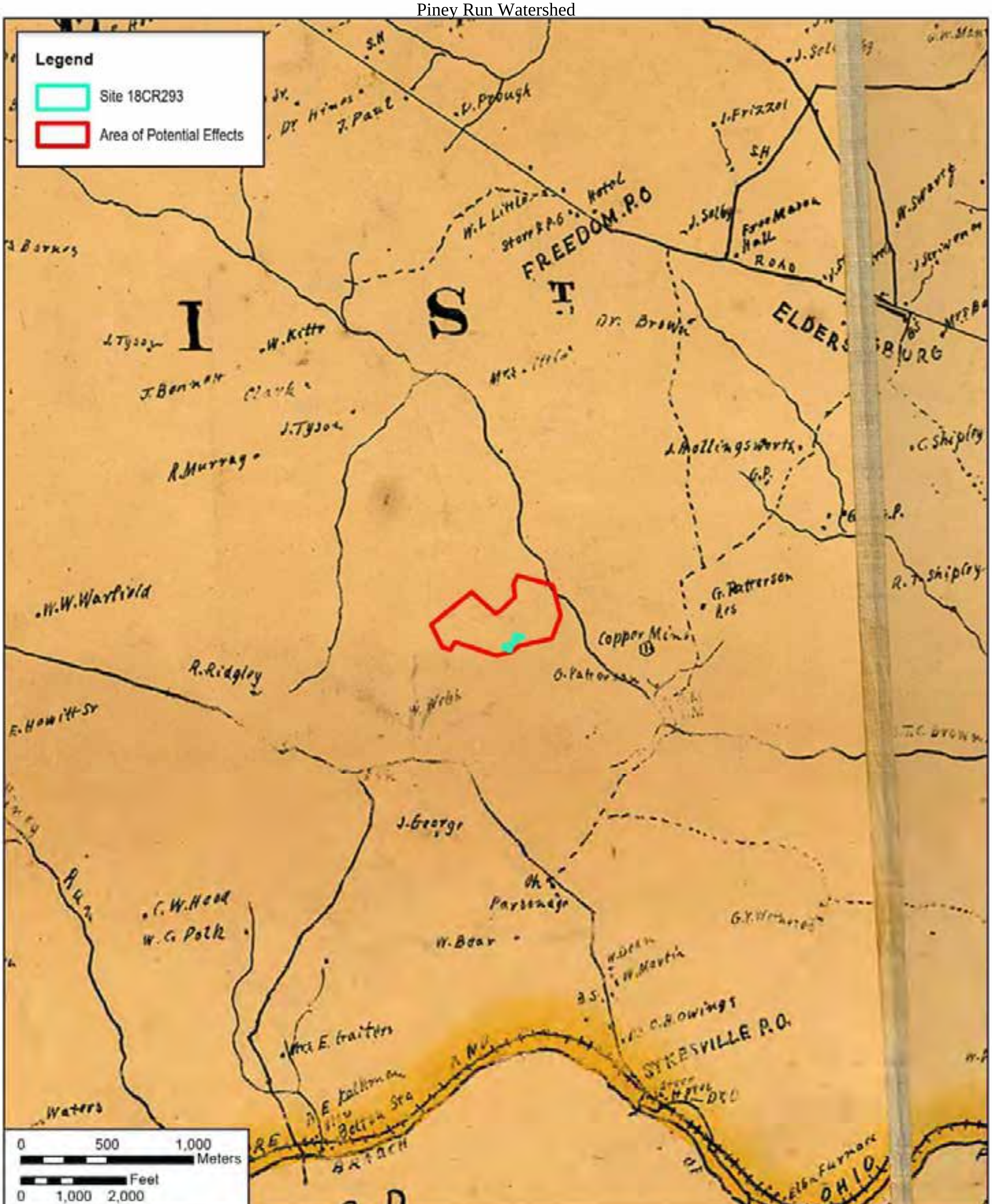
Frank Brown was the cousin of Florence Patterson Carroll, and nephew of George Patterson. Brown also had owned a large, adjoining tract of land, "Brown's Inheritance." Frank Brown continued the model farming of his uncle, while also serving in Maryland politics as a member of the House of Delegates from 1875-1879 and governor of Maryland from 1892-1896 (Maryland State Archives 2023a). The 1880 population census lists the Frank Brown household as including the 33-year-old Brown, enumerated as a farmer, his wife, his mother, and an aunt. Also listed with his household are six servants, including three coachmen (United States Bureau of the Census 1880).

Frank Brown only briefly owned the part of Springfield Enlarged that included 18CR293. In 1886, he sold 229 acres of "Springfield Enlarged" to John Welbourn for $9,000 (CCDB 64:510). The property then was sold again several times in quick succession, including in May 1888 to John and A.K. Williams for $6,000 (CCDB 63:318); then in September 1890 A.K. Williams sold his share to John Williams for $3,000 (CCDB 71:544). John Williams had died in 1894, and his widow, Jane Williams, purchased the property from his heirs (CCDB 81:543).

The 1892 United States Geological Survey's (USGS) Ellicott quadrangle provided some additional details regarding the rural road network within the APE (Figure 3-4). A nonextant road is shown branching northwest from what is now Maryland Route 32 (MD 32), following the foot slopes and floodplain on the south side of "Winter Run" (now Piney Run). Shortly after entering the APE, this road abruptly turns northeast to cross an unnamed stream as well as Piney Run before continuing northwest to intersect what is now a portion of Martz Road submerged beneath Piney Run Reservoir. The map only selectively illustrated local buildings, giving preference to those associated with towns/villages; more dispersed buildings (e.g., farmsteads) typically were not shown, with the exception of those serving industrial or institutional purposes (e.g., mills, churches, schoolhouses). Therefore, while no buildings are depicted within the APE or vicinity, this does not indicate that none existed.

After Jane Williams' death in 1901, there was a series of short ownership periods, with the property remaining intact as 229 acres. Jane Williams' executor sold the property to Mordecai Jones for $3,791 in January 1901 (CCDB 92:78); in April 1901 Jones sold the property to Joseph T. Harris for $4,000 (CCDB 93:115); a little over a year later, in November 1902, Harris sold the property to Mary Todd for $6,000 (CCDB 96:315); then in February 1904, Mary Todd sold the property to Johnzie Beasman for $2,600 (CCDB 98:565). Johnzie Beasman was a farmer who renamed the property "Fairhaven." He built a large, frame, two-and-one-half story tall Queen Anne house with a wrap-around porch (Maryland Historical Trust 1972). This house was located approximately 0.75 mile southeast of 18CR293, near SR 32/Sykesville Road. Johnzie Beasman was also involved in state politics, serving in the House of Delegates from 1884-1894 and in the Maryland Senate from 1900-1910.

The 1906 USGS Ellicott quadrangle is the first map to depict buildings at 18CR293 (Figure 3-5). The unnamed road shown in 1892 linking MD 32 to the APE still survived as an unimproved route following Piney Run to an unidentified occupation located south/southwest of the existing Piney Run Dam. This farmstead was built into the foot slopes of the Piney Run valley.



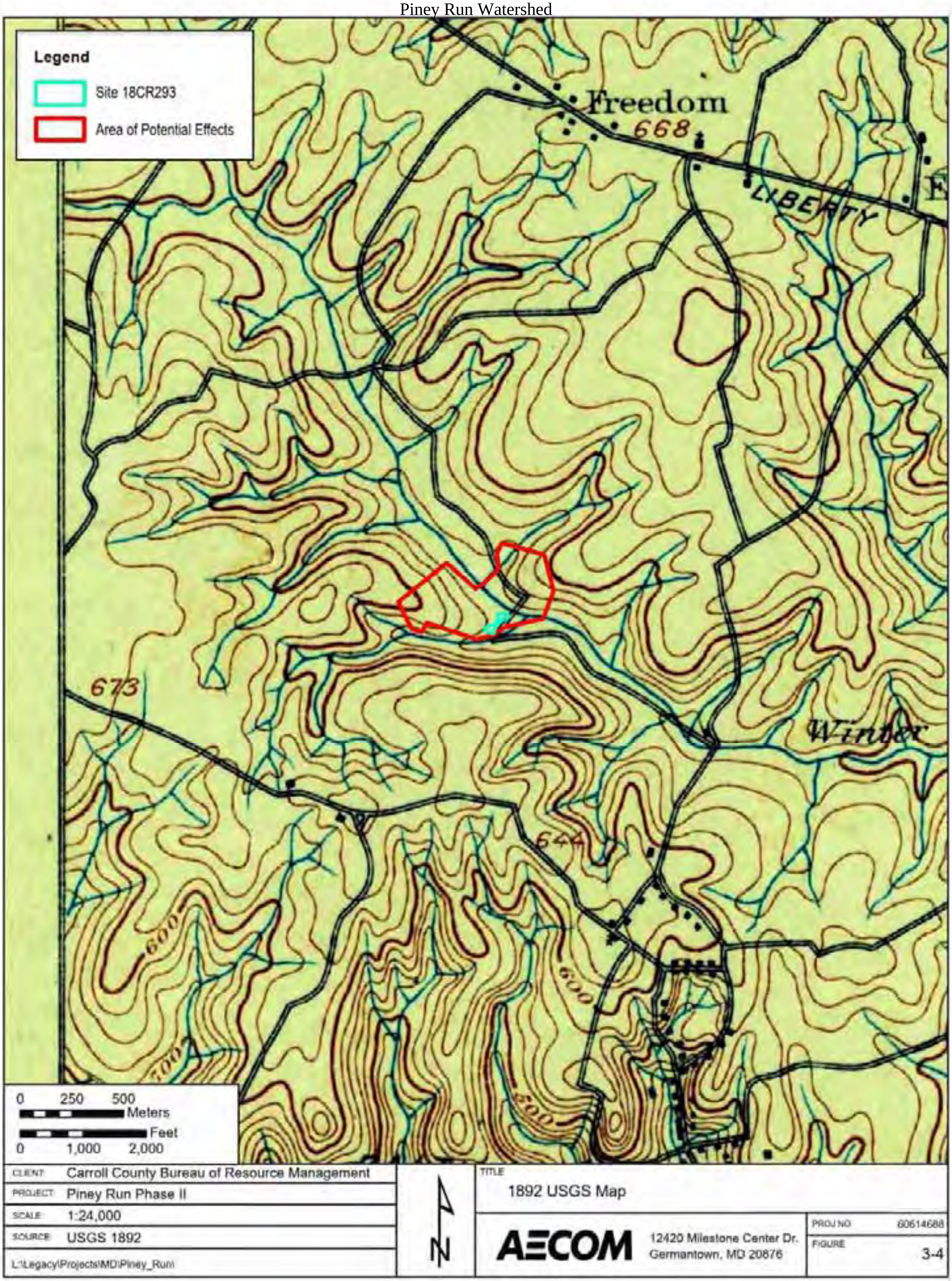
CLIENT	Carroll County Bureau of Resource Management
PROJECT	Piney Run Phase II
SCALE	1:30,000
SOURCE	Shearer 1863

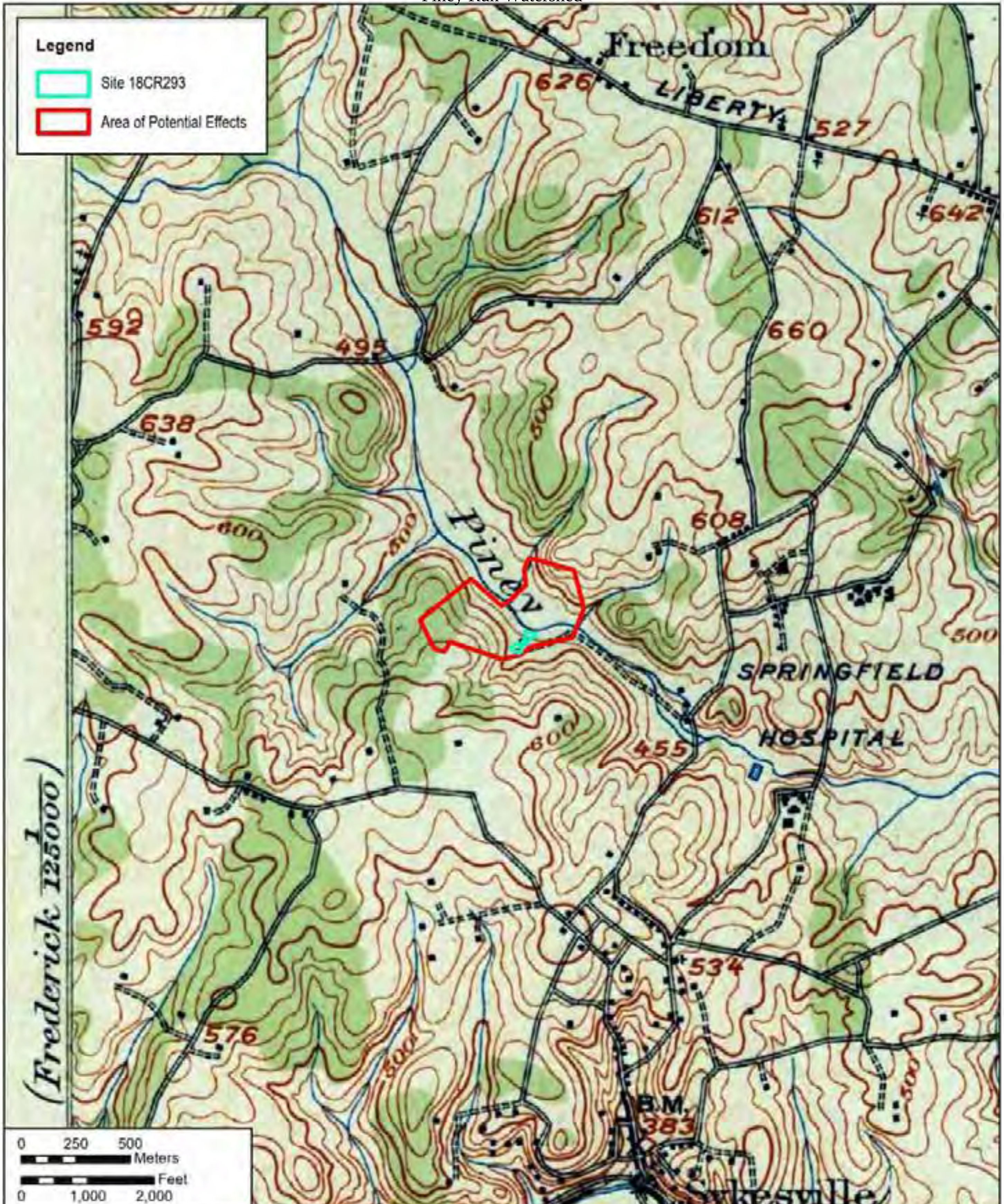
L:\Legacy\Projects\MD\Piney_Run\

TITLE
1863 Shearer Map

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-3


Legend
Site 18CR293
Area of Potential Effects
Freedom
668
LIBERTY
673
Winter
644
600
500
0 250 500 Meters
0 1,000 2,000 Feet
CLIENT Carroll County Bureau of Resource Management
PROJECT Piney Run Phase II
SCALE 1:24,000
SOURCE USGS 1892
L:\Legacy\Projects\MD\Piney_Run\
N
TITLE 1892 USGS Map
AECOM
12420 Milestone Center Dr.
Germantown, MD 20876
PROJ NO 60614688
FIGURE 3-4



CLIENT	Carroll County Bureau of Resource Management
PROJECT	Piney Run Phase II
SCALE	1:24,000
SOURCE	USGS 1906
L:\Legacy\Projects\MD\Piney_Run	

TITLE 1906 USGS Map

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688

FIGURE 3-5

In 1911, the United States Post Office Department (USPOD) issued a rural delivery service map of Carroll County, showing residences, delivery points, and the road network (Figure 3-6). No occupations are depicted within or adjacent to the APE. The unimproved road depicted on the 1906 USGS map is still shown, though the building at its northwestern terminus is not. Whether the building was unoccupied, or whether its isolation precluded its illustration, is not clear.

The 1910 and 1920 Census entries for Johnzie Beasman are very similar. In 1910 the Johnzie Beasman household is listed as a 51-year-old farmer, living with his wife, and 21-year-old son, Frank. Also in the household are two servants (United States Bureau of the Census 1910). The only difference in the 1920 census are a lack of servants in the household (United States Bureau of the Census 1920). Johnzie Beasman was also involved in state politics, serving in the House of Delegates from 1884-1894 and in the Maryland Senate from 1900-1910.

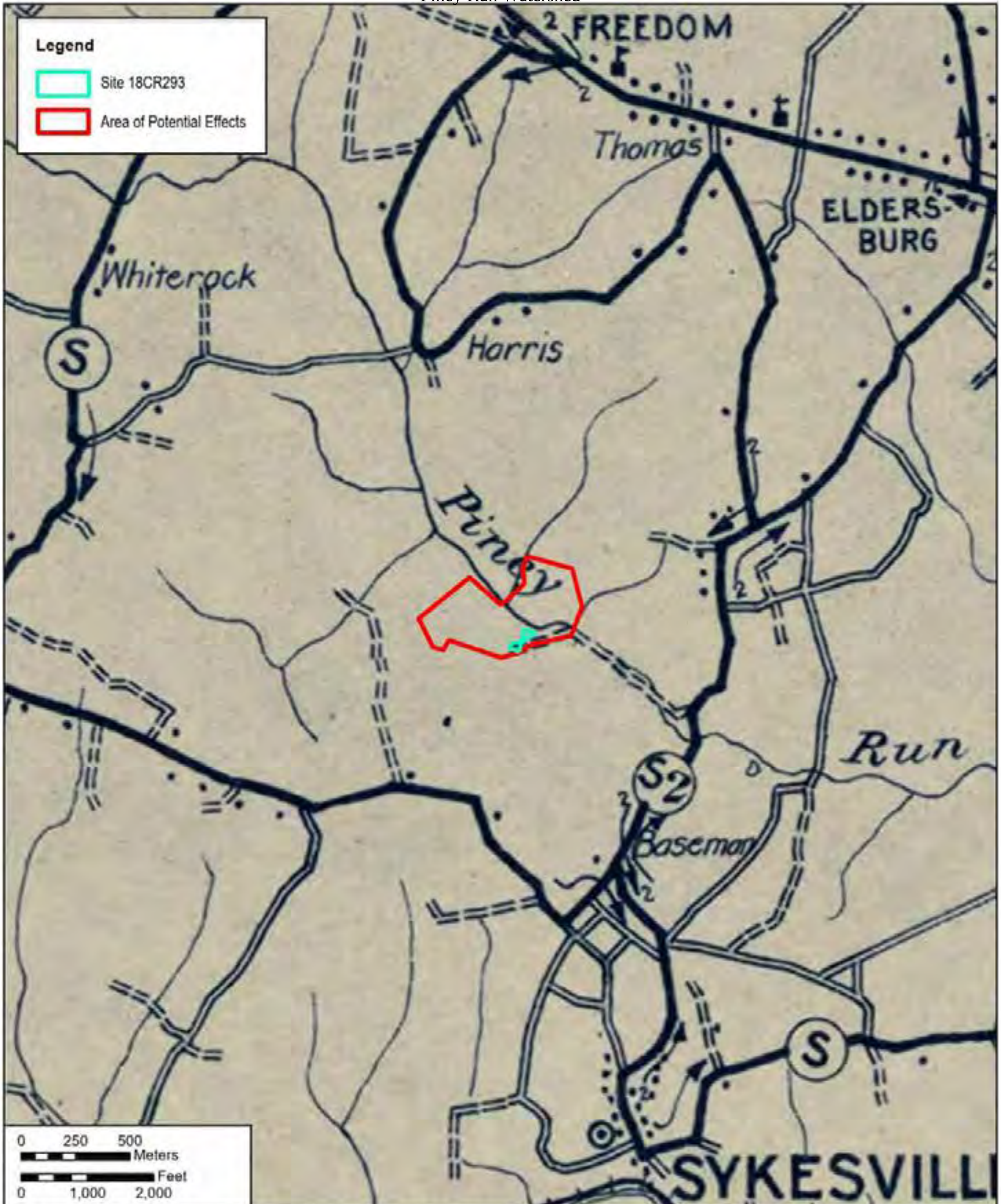
Johnzie Beasman died in 1922 and Fairhaven passed to his son, Frank, who was a Baltimore-based businessman who maintained Fairhaven as a summer home. Frank Beasman worked in construction and began his own company, which merged with the McLean Construction Company in the mid-twentieth century (Getty 1993). He also maintained a dairy farm at Fairhaven, with a large herd of pedigreed cows that had very good production records (The Evening Sun [Hanover, PA], September 21, 1960).

A 1943 aerial photograph depicts 18CR293 as a small complex accessed via a dirt road leading north-northeast from what is now Obrecht Road (Figure 3-7). Two barns/outbuildings are visible along either side of this road, with a dwelling surrounded by lawn located to the northeast on the opposite side of a small stream. The 1944 USGS Finksburg quadrangle is the earliest available 7.5-minute map and provides a simplified view of the built environment depicted in the 1943 aerial photograph (Figure 3-8). Each building is represented with the same generic solid black square symbol, making it impossible to differentiate between a range of possible functions (e.g., industrial, agricultural, domestic). However, the 1953 USGS Finksburg quadrangle used unique symbols to distinguish broad classes of building types (Figure 3-9). Site 18CR293 is shown as containing a large barn and a dwelling.

A 1958 aerial photograph shows that the farmstead may have fallen into disuse, though poor image quality and contrast makes it difficult to determine (Figure 3-10). While the two barns/outbuildings clearly visible on the 1943 aerial photograph are still evident, the location of the dwelling immediately to the northeast appears to be overgrown. A small access road linking the barns to the dwelling has all but faded by this time and no yard spaces are clearly visible. Additionally, some tree growth has returned to the far northern end of the agricultural fields surrounding this property, possibly indicating a lapse in agricultural activity.

A marked-up 1963 aerial photograph notes 18CR293 as vacant and associated with Frank Beaseman (Beasman) (Figure 3-11). At his death in 1960, Frank Beasman left his real estate to the Episcopal Church, Diocese of Maryland (CCDB 511:543). The church used the property to build a retirement community, also called Fairhaven, and sold the portion of the property containing 18CR293 to the County Commissioners of Carroll County for use in building the Piney Run Reservoir (CCDB 511:543). Beasman’s livestock, machinery, roughage, and equipment were sold after his death (The Evening Sun [Hanover, PA], September 21, 1960). A 1970 aerial photograph shows increasingly dense forest growth returning to the former agricultural fields that once dominated the central and eastern portions of the APE (Figure 3-12). The only remnant of 18CR293 visible is the large barn.

In 1972, as-built drawings were prepared for the construction of the Piney Run dam and reservoir, encompassing the APE (Figure 3-13). The site plan drawing provides coverage for most of the APE and clearly shows three structures located south/southeast of the emergency spillway (located on the southwest side of the dam embankment, collocated with “Borrow II”). The easternmost and westernmost buildings respectively correspond to the dwelling and barn within 18CR293, and a third building immediately southeast of the barn represents the outbuilding.

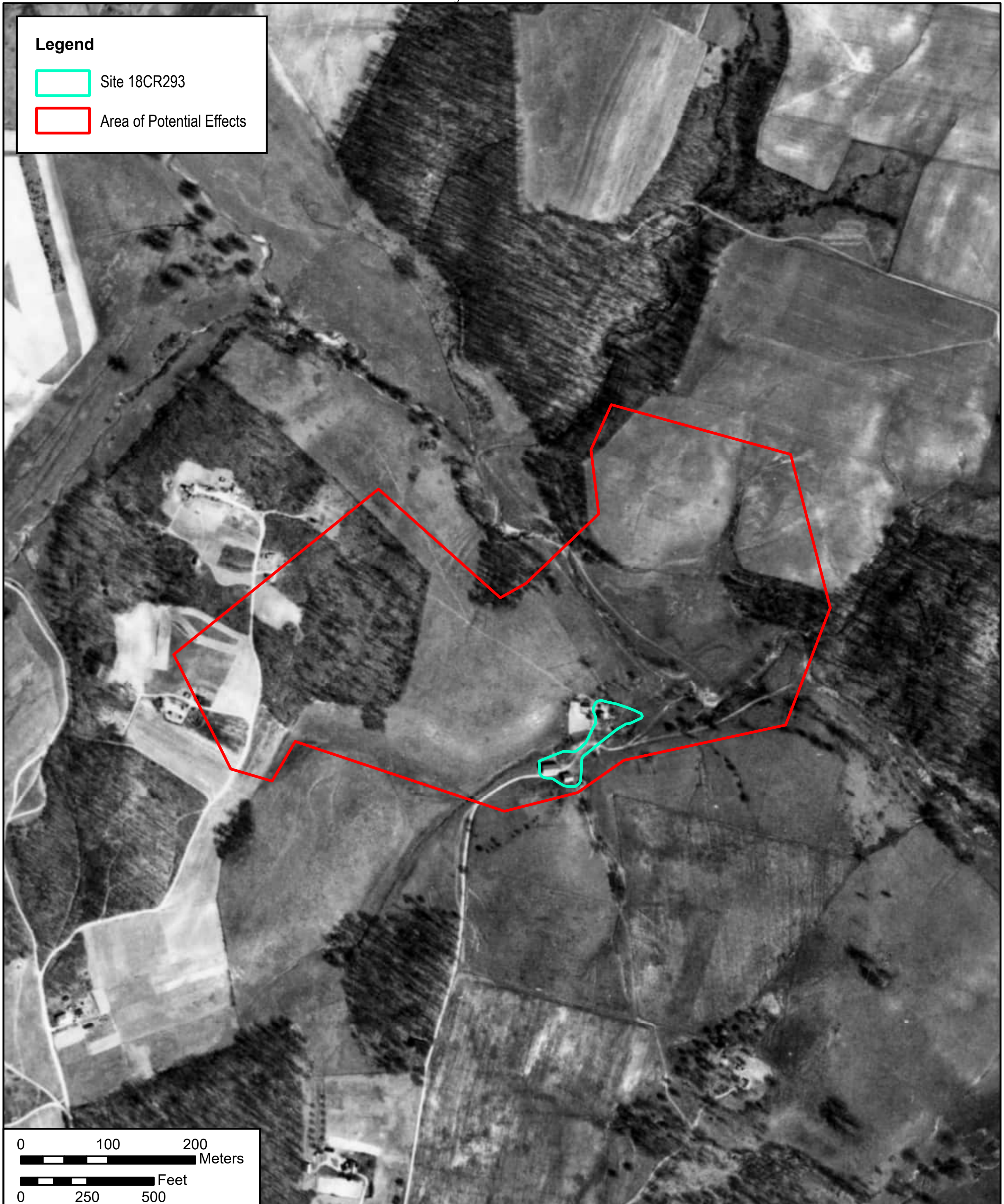


CLIENT	Carroll County Bureau of Resource Management
PROJECT	Piney Run Phase II
SCALE	1:24,000
SOURCE	USPOD 1911
L:\Legacy\Projects\MD\Piney_Run\	

TITLE
1911 USPOD Map

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-6



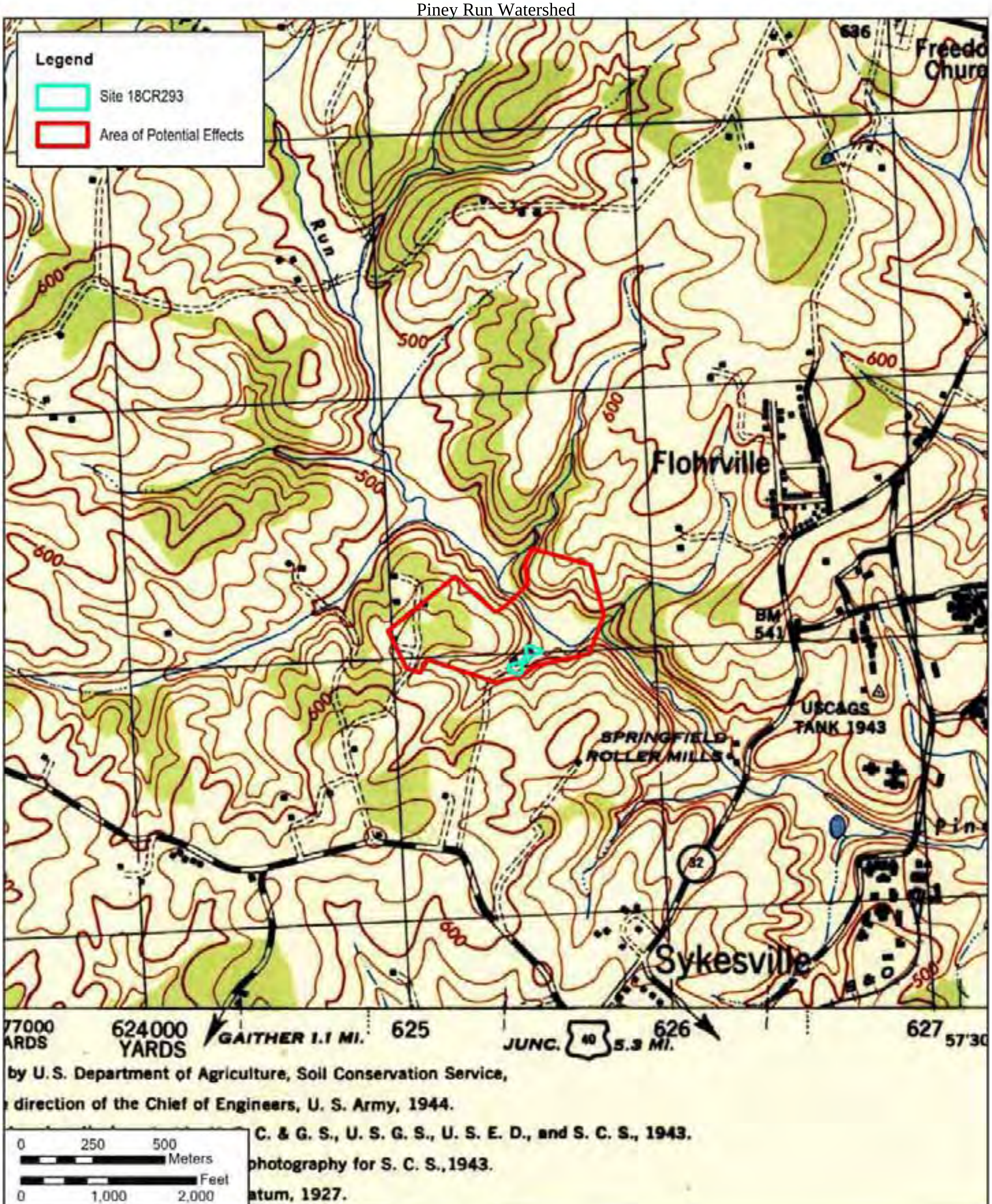
CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase II
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

L:\Legacy\Projects\MD\Piney_Run\

TITLE
1943 Aerial Photograph

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-7



CLIENT	Carroll County Bureau of Resource Management
PROJECT	Piney Run Phase II
SCALE	1:18,000
SOURCE	USGS 1944
L:\Legacy\Projects\MD\Piney_Run\	

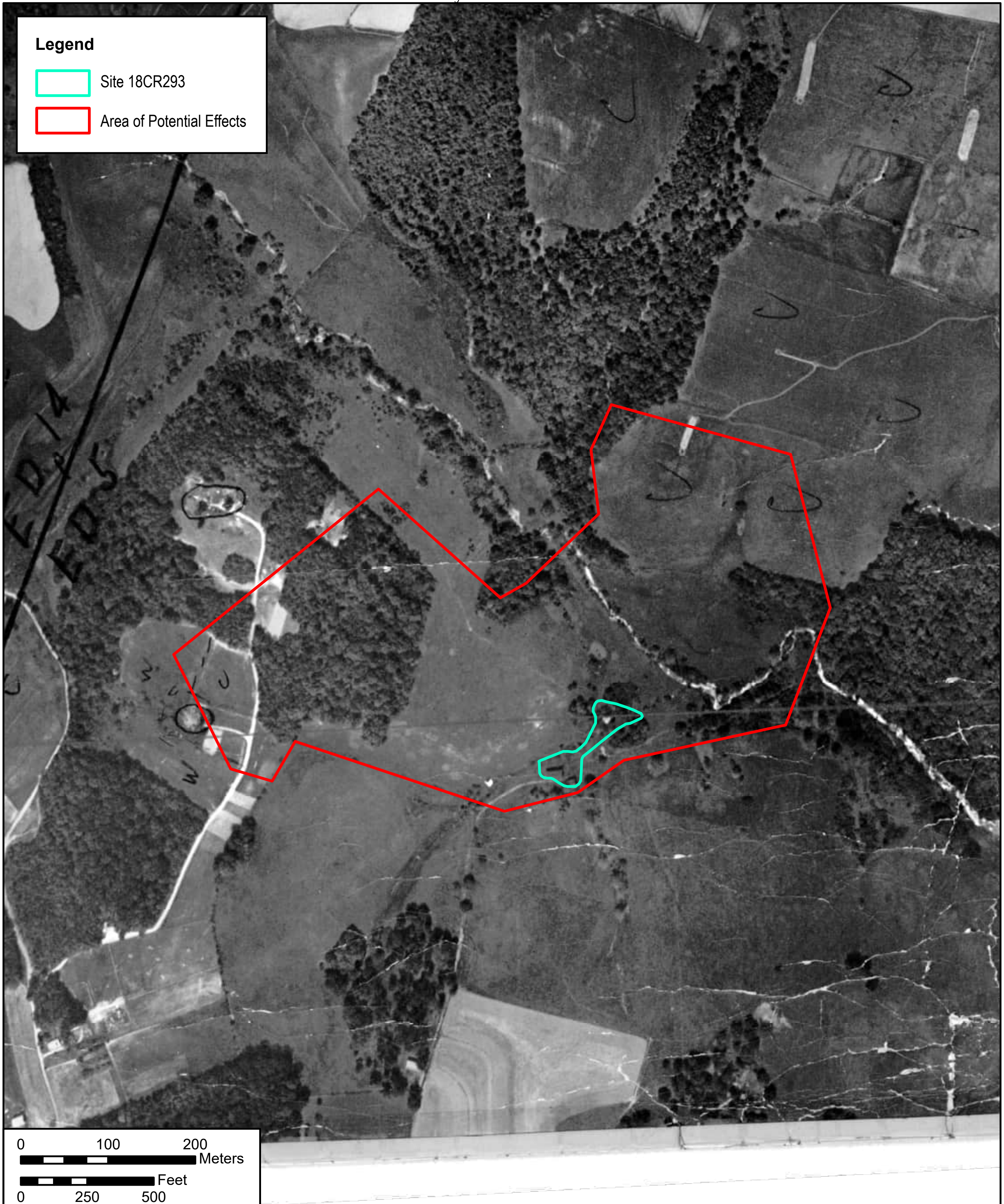
N

TITLE
1944 USGS Map

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-8

CLIENT: Carroll County Bureau of Resource Management	TITLE 1953 USGS Map	
PROJECT: Piney Run Phase II		
SCALE: 1:18,000	AECOM 12420 Milestone Center Dr. Germantown, MD 20876	PROJ NO. 60614688
SOURCE: USGS 1953		FIGURE 3-9
L:\Legacy\Projects\MD\Piney_Run\		



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase II
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

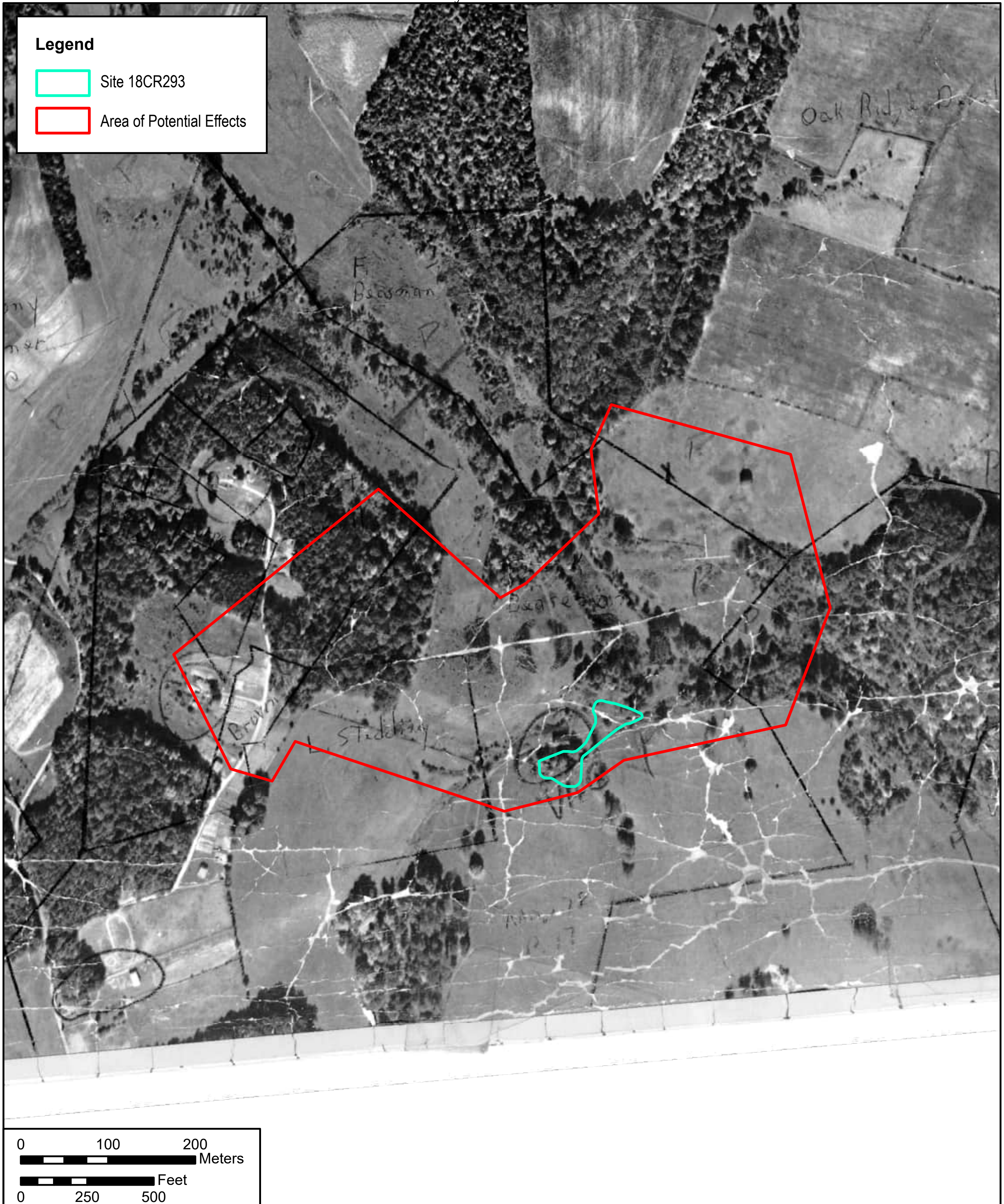
L:\Legacy\Projects\MD\Piney_Run\

N

TITLE
1958 Aerial Photograph

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-10



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase II
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

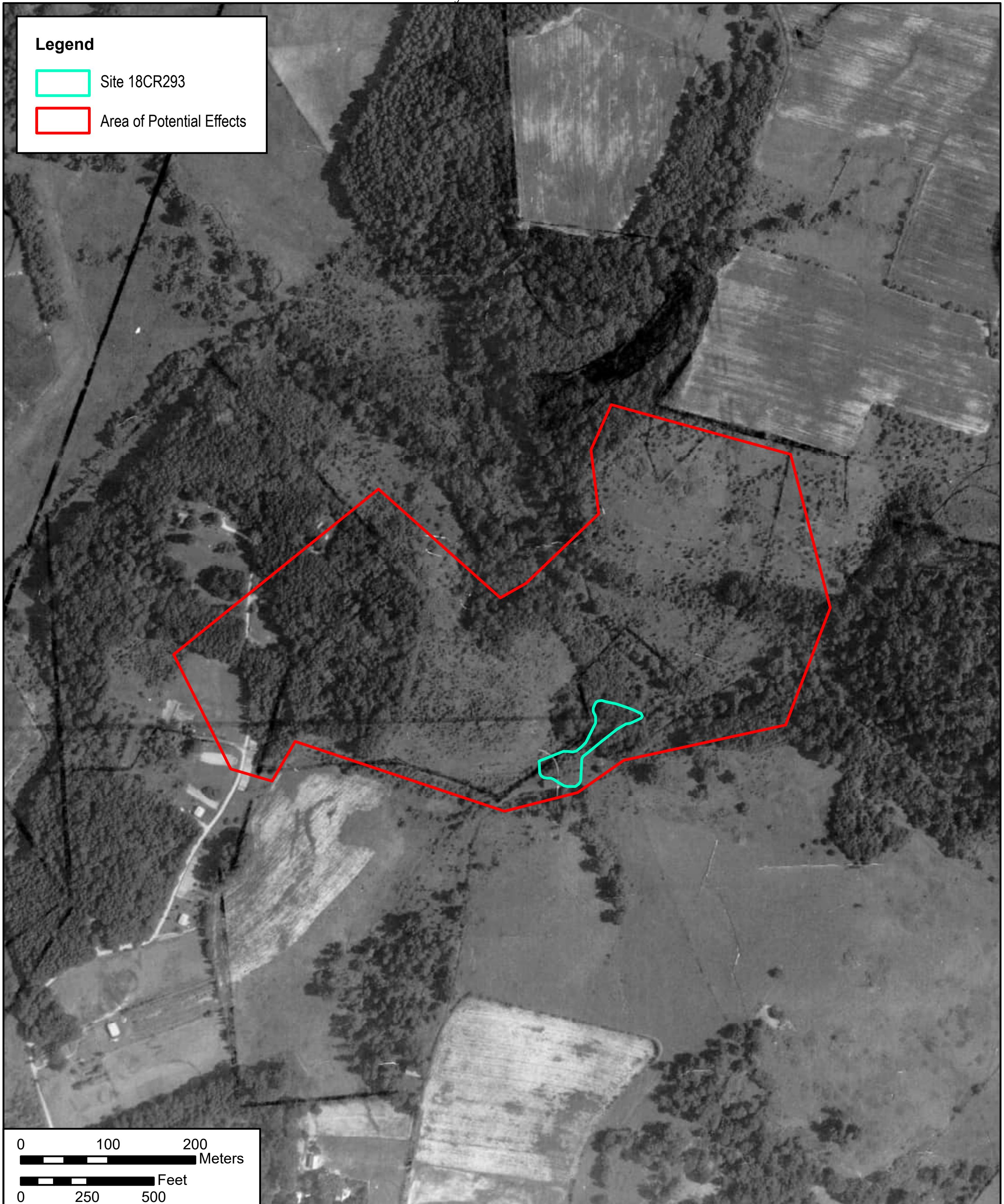
L:\Legacy\Projects\MD\Piney_Run\

N

TITLE
1963 Aerial Photograph

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-11



CLIENT:	Carroll County Bureau of Resource Management
PROJECT:	Piney Run Phase II
SCALE:	1:6,000
SOURCE:	Image Courtesy of BRM

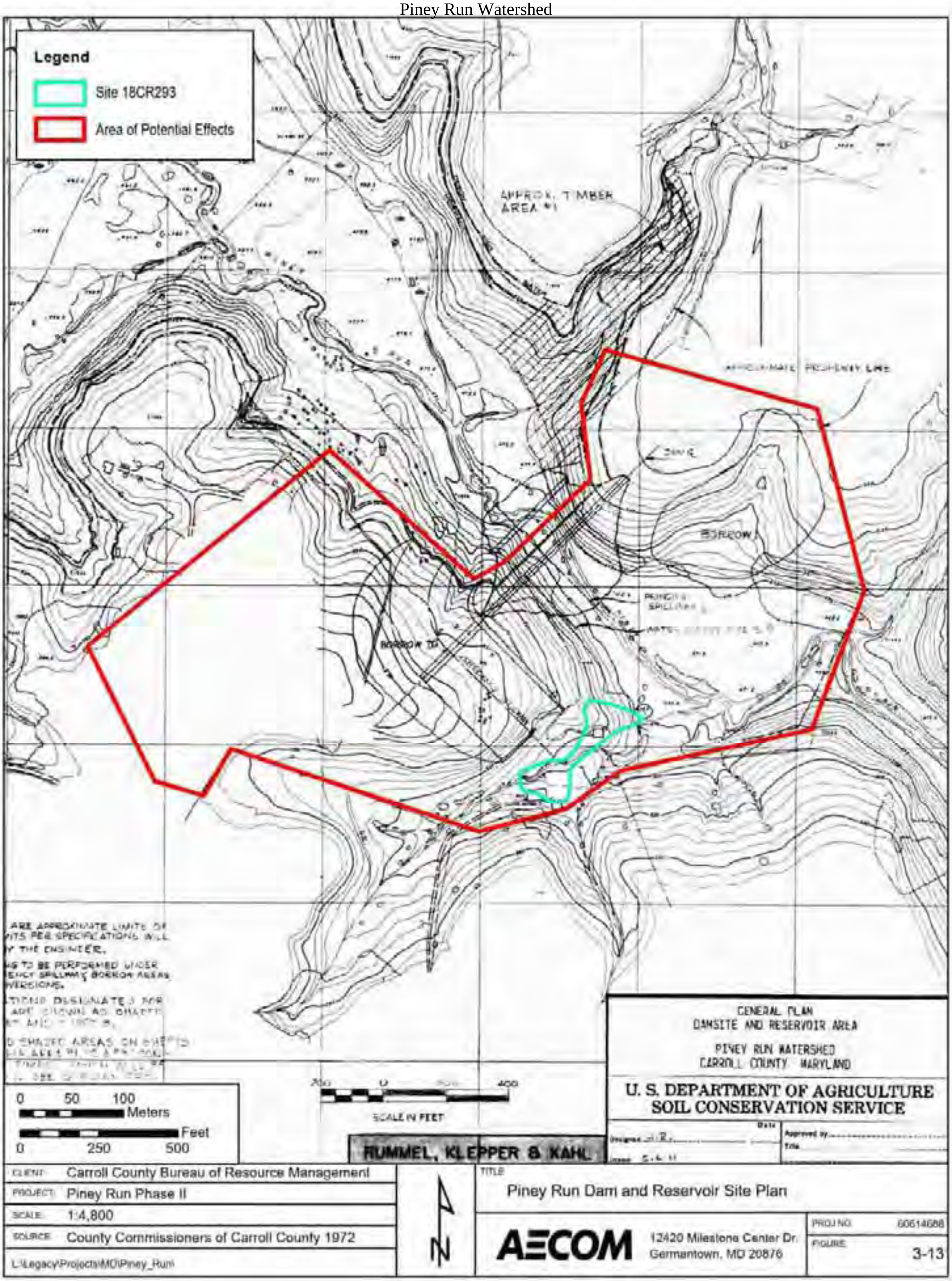
L:\Legacy\Projects\MD\Piney_Run\

N

TITLE
1970 Aerial Photograph

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 3-12


Legend
Site 18CR293
Area of Potential Effects
APPROX. TIMBER AREA #1
BORROW
BORROW
GENERAL PLAN
DAMSITE AND RESERVOIR AREA
PINEY RUN WATERSHED
CARROLL COUNTY MARYLAND
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SCALE IN FEET
RUMMEL, KLEPPER & KAHL
0 50 100 Meters
0 250 500 Feet
CLIENT Carroll County Bureau of Resource Management
PROJECT Piney Run Phase II
SCALE 1:4,800
SOURCE County Commissioners of Carroll County 1972
L:\Legacy\Projects\MD\Piney_Run
TITLE Piney Run Dam and Reservoir Site Plan
AECOM
12420 Milestone Center Dr.
Germantown, MD 20876
PROJ NO. 60614688
FIGURE 3-13

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4. Previous Investigations

AECOM conducted a review of available information, including NRHP listings, and historic maps and images (e.g., historic aerial photographs and historic topographic maps). The primary goal of this research was to identify previously recorded archaeological sites and above ground resources within 1 mile (mi) (1.6 kilometers [km]) of the project area and any associated archaeological survey reports. The records search included review of site-specific records using MHT's Maryland's Cultural Resource Information System (MEDUSA).

4.1 Previous Cultural Resource Investigations

Seven previous cultural resource investigations have been registered with MHT within a 1-mi (1.6-km) radius of the APE. In 1980, Wesler et al. conducted surveys along 326 systematically selected half-mile road segments across Maryland's piedmont region (Wesler et al. 1981). Two such segments were investigated along MD 32, resulting in the identification of no archaeological deposits.

In 1993, the American University conducted a Phase I survey of a 2-ha (5-ac) area for a proposed water treatment facility associated with Piney Run Reservoir (Dent and Jirikowic 1994). In total, 135 STPs were excavated, resulting in the recovery of an isolated quartz flake and the identification of a ruin immediately east of the project's limits and within the current APE. The ruin was depicted on an incomplete excavation plan map adjacent to a trail in the valley south of the spillway. While the investigators did not record it as a site, they described it as:

> the remains of what appears to have been a wooden barn constructed on a foundation of local micaceous schist fieldstone. The structure measures 30 x 60 feet, with 10 foot openings on both ends and a silo foundation just east of the ruins. The hardware used in the structure indicate it was constructed in the 20th century (Dent and Jirikowic 1994:26).

No subsurface investigation occurred within the ruins, and no evidence for additional structural features was observed. This building is the same as that which first appeared on the 1944 USGS map and identified as a Class 2 building on the 1953 USGS map (Figures 3-8 and 3-9).

In 2003, Robert Wall & Associates conducted a Phase I survey of the proposed reconstruction of MD 32 at Maryland Route 851 (Wall 2003). The project area encompassed approximately 6.9 ha (17 ac), most of which was agricultural fields. No archaeological sites or isolated artifacts were identified during pedestrian survey and systematic shovel testing.

In 2004, Charles Hall conducted a Phase I survey of 97 acres on the grounds of the Springfield State Hospital and Phase II evaluations of 18CR172, 18CR255, and 18CR256 (Hall 2005). Site 18CR172 represents a nineteenth century domestic occupation subsequently used as a hospital facility. Site 18CR255 is a low-density, nondiagnostic prehistoric lithic scatter. Site 18CR256 is an early to mid-twentieth century concentration of hospital dining hall refuse. Sites 18CR172 and 18CR256 were recommended eligible for listing in the NRHP, while 18CR255 was not.

In 2015, Applied Archaeology and History Associates, Inc. (AAHA) conducted a Phase I survey of 5.1 ha (12.61 ac) in advance of the construction of the proposed Freedom Readiness Center (AAHA 2015). Fifty-two STPs were excavated, and a systematic pedestrian survey was conducted, resulting in the identification of 18CR283, a collection of late historic concrete foundations. The site was recommended not eligible for listing in the NRHP.

In 2017, AECOM conducted a Phase I survey in advance of stream restoration efforts along Piney Run over 1 km (0.8 mi) east of the APE (Koziarski 2018). In total, 886 STPs were excavated, resulting in the identification of 18CR287 and 18CR288. Site 18CR287 represents the remnants of the eighteenth to twentieth century Elias Brown mill, while 18CR288 represents a nineteenth to twentieth century rock quarry. Neither site was determined to possess good research potential, and both were recommended not eligible for listing in the NRHP.

In 2019, AECOM conducted a Phase I survey in support of the Piney Run Watershed Study. The archaeological survey consisted of visual surface inspection for above-ground evidence of archaeological sites and the excavation of 217 shovel test pits (STPs). Primary STPs were excavated on a 20-m (65.6-ft) interval grid oriented to true north, radial STPs were excavated around positive primary STPs at 10-m (32.8-ft) intervals, and judgmental STPs were placed in opportunistic locations to test specific landforms and/or archaeological deposits as needed. This survey resulted in the recovery of one prehistoric artifact and 242 historic artifacts and the identification of four historic archaeological sites (18CR292 through 18CR295). The prehistoric artifact and one of the historic artifacts occurred as isolated finds, while the remaining 241 historic artifacts are attributed to three of the four newly recorded sites.

4.2 Previously Recorded Archaeological Resources

Ten archaeological sites have been registered with MHT within the 1-mi (1.6-km) radius of the APE (Table 4-1). These resources include one prehistoric and nine historic sites. Historic sites include domestic, industrial, and institutional sites dating from the late eighteenth to the early twentieth century. The prehistoric site represents a low-density lithic scatter lacking diagnostic material. MHT staff have determined 18CR172 and 18CR256 eligible for listing in the NRHP, while four sites have been determined not eligible by MHT and the other two have not been assessed.

Table 4-1. Previously Recorded Archaeological Resources within 1-mi of APE

DHR ID	Site Name	Site Type	NRHP Eligibility	Location
18CR172	Buttercup Cottage	Farmhouse/Hospital Building	Eligible	Outside APE
18CR173	Martin Gross “K” Cottage	Hospital Cottage/Ind. Site	Not Evaluated	Outside APE
18CR174	Patterson House	Mansion/Hospital Building	Not Evaluated	Outside APE
18CR255	Warfield Pre. Scatter #1	Lithic Scatter	Not Eligible	Outside APE
18CR256	Warfield Dump	Dining Hall Debris	Eligible	Outside APE
18CR283	Springfield North Gate	Hospital Structure	Not Eligible	Outside APE
18CR292	Piney Run 1	Refuse Pit	Not Eligible	Within APE
18CR293	Piney Run 2	Farmstead	Potentially Eligible	Within APE
18CR294	Piney Run 3	Spring Box	Not Eligible	Within APE
18CR295	Piney Run 4	Domestic Occupation	Not Evaluated	Outside APE

4.2.1 Site 18CR293

AECOM identified 18CR293 in 2019 in the south-central portion of the Phase I APE, southeast of the emergency spillway within the small, forested valley of an unnamed Piney Run tributary (Regan 2020). The site corresponds to the historic farmstead shown in the southcentral part of the APE on historic maps and aerial photographs presented in Section 3 of this report. The site was organized into two discrete loci on adjacent but distinct landforms.

Locus A was located on the south side of the unnamed tributary, partially within its floodplain and partially cut into a terrace on the toe slopes rising to the south. Locus B was located on the north side of the unnamed tributary, midway up the hillslopes rising northwest toward the emergency spillway. A road trace bisects Locus A along the floodplain’s southern margin. The site encompasses 0.33 ha (0.83 ac) and is defined by five features. Features 1 through 4, representing an agricultural complex, are located in Locus A, while Feature 5, the remnants of a farmstead dwelling, is located in Locus B.

The Phase I investigation of 18CR293 included surface inspection and the excavation of 27 STPs at 15 and 10-m intervals as well as judgmental STPs within features. Fourteen of the STPs yielded historic artifacts. The survey resulted in recovery of 224 historic artifacts and the identification of five features. Feature 1 was a concrete silo foundation adjacent to Feature 2, a large stone barn foundation. Feature 3 was a stone and concrete spring box. Feature 4 was the foundation of an outbuilding consisting of stone piers, and Feature 5 was a collapsed stone foundation of a dwelling. Artifacts dated to the late eighteenth to twentieth century. The site was recommended potentially significant and recommended for avoidance or Phase II evaluation.

4.3 Previously Recorded Above-Ground Resources

Over 80 above-ground resources have been registered within 1.6 km (1 mi) of the APE, most of which are associated with the Springfield Hospital Center to the east. The center was established in 1894 as a psychiatric hospital built on the “cottage design” that has grown to include 62 historic buildings (Bowlin 1986). Parts of the Sykesville Historic District also fall within a 1.6-km (1-mi) radius of the APE. The district includes 97 resources constructed between 1850 and 1925 and is listed in the NRHP.

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5. Research Design

5.1 Objectives

The objective of the Phase II archaeological evaluation was to determine if site 18CR293 is eligible for listing on the NRHP.

5.2 Methods

5.2.1 Research

Background research was undertaken using resources available from the MHT library and Maryland's cultural resource information system (MEDUSA) to characterize archaeological and above-ground resources within the vicinity of the APE. Digital archives, site forms, survey reports, and GIS data were examined to provide a depiction of the local archaeological record as part of this project's broader contextual framework. Electronic resources were utilized to compile cartographic data and supplementary historic context information to detail the area's cultural background more thoroughly. These include digital materials available from the Library of Congress, Johns Hopkins University, and other repositories as appropriate. Land records, wills, and census records available from the Maryland State Archives were also reviewed.

5.2.2 Field Methods

The Phase II survey consisted of STP and TU excavation. Each STP measured 40 centimeters (cm; 1.3 ft) in diameter and was excavated 10 cm (0.33 ft) into sterile subsoil. No STPs were excavated on slopes greater than 15 percent. STPs were assigned alphanumeric identifiers (JUD01 through JUD22). TUs measured 1 x 1 m (3.3 ft) square and were assigned sequential numbers starting from TU 1. Upon completion of TU excavation, units were documented through drawing and photography before being backfilled.

Field data were recorded on standard field forms and in general field notes. The forms included Munsell soil color, soil texture, profiles, features present, artifacts recovered, excavator's initials, and the date of excavation. The locations of STPs were noted on field maps and recorded using a global positioning system (GPS) unit. Archaeological features were documented on site plans, in photographs, and on feature forms describing the features' shapes and dimensions, location, and interpretation/feature types.

All soils were screened through 6.34-millimeter (mm) (0.25-inch [in]) hardware mesh to ensure uniform artifact recovery. Collected artifacts were bagged in plastic sealing bags labeled with all relevant provenience information, including project name, site name/locus (as appropriate), STP, TU, or feature number (as appropriate), stratum, level, the number of artifacts recovered, excavator initials, and date. Obviously modern artifacts (e.g., plastic) were generally noted on forms and discarded in the field. Brick fragments observed while screening was separated from other artifacts and weighed at the end of each stratum. Artifacts were placed in resealable plastic bags labeled with all relevant provenience information and transported to the AECOM archaeology laboratory in Gaithersburg, Maryland.

5.2.3 Laboratory Analysis

Artifacts were transported to the AECOM archaeological laboratory in Burlington, New Jersey, where they were cleaned, cataloged, and analyzed according to the Secretary of the Interior's Standards and Guidelines for Curation (United States Department of the Interior 1991) and the MHT's (2005) Standards and Guidelines for Archaeological Investigations in Maryland – Collections and Conservation Standards, Technical Update No. 1. Artifacts were cataloged using MDOT SHA's Artifact Database and Manual. The objectives of laboratory analysis and cataloging were to determine the date, function, cultural affiliation, and preliminary significance of the artifacts to the extent possible. Artifacts will be curated with the Maryland Archaeological Conservation Laboratory in St. Leonard, Maryland.

5.2.3.1 Prehistoric Artifacts

Prehistoric artifacts from the investigation included one quartz projectile point fragment. The following basic information was recorded for lithics: count, weight, class (lithic material), type, object, and lithic color. Weight was recorded to the nearest 0.01 g using a digital Sartorius scale calibrated to 800.00 g. A three-tiered system of classification (type, material, and object) was used; the broadest level of classification is the group. Lithic types include bifacial flaked tool, debitage, unifacial flaked tool, use modified, and other lithics. Interpretations of morphology and temporal affiliation follow nomenclature as outlined in MAC Lab's Diagnostic Artifacts in Maryland website.

5.2.4 Historic Artifacts

Many of the historic artifacts were identifiable as to material, form, and function, while others required research to determine their function and/or dates of manufacture. Numerous internet resources were helpful such as MAC Lab's Diagnostic Artifacts in Maryland (2019), the Florida Museum's Historical Archaeology Ceramic Type Collection (2019), and the BLM/SHA Historic Glass Bottle and Identification and Information (Lindsey 2019). Most artifact dating and identification were based on the following sources: Deetz (1996); Miller (2000); Noël Hume (1969); South (1977); and Visser (1997).

The same attributes were recorded for all artifacts, including count, material (i.e., the main material composition of the artifact), class, type, and object. The object was often difficult to determine given the fragmentary nature of artifacts. Additional group-specific attributes were recorded as appropriate.

Identical, or nearly identical, artifacts within a provenience were grouped together under the same catalog number (note: The catalog number is the bag number followed by artifact number.) For example, all the window glass fragments within a single bag number (i.e., all from the same provenience) would be given the same artifact number. Whenever possible, mendable artifacts were grouped together. An attempt was made to classify all historic ceramics according to published pottery types (e.g., whiteware, pearlware, stoneware). Those sherds not easily recognized were assigned a descriptive name based on surface treatment and paste. Diagnostic ceramic, glass, and metal artifacts were used to estimate dates for site activities.

Historic artifacts were classified using Orser's (1988) functional typology (Table 5-1), which provides a means for interpreting the function of specific historic artifact classes. Within Orser's system, historic artifacts were analyzed according to material type and function, when possible. One additional category (6 Unknown) was added to the functional typology to better capture unidentified artifacts. An additional subcategory was added to the labor category (5c Household) to capture artifacts used during household work (e.g., cleaning products).

Table 5-1. Functional Typology (Modified from Orser 1988)

1. Foodways	
	a. Procurement – Ammunition, fishhooks, fishing weights, etc.
	b. Preparation – Baking pans, cooking vessels, large knives, etc.
	c. Service – Fine earthenware, flatware, tableware, etc.
	d. Storage – Coarse earthenware, stoneware, glass bottles, canning jars, bottle stoppers, etc.
	e. General Foodways – Unidentified glass and ceramic containers
	f. Floral – Nut shells, seeds, fruit pits, phytoliths, pollen
	g. Faunal – Animal bones, antlers, horns, shells and other remains
2. Clothing	
	a. Fasteners – Buttons, eyelets, snaps, hooks, eyes, etc.
	b. Manufacture – Needles, pins, scissors, thimbles, etc.
	c. Other – Shoe leather, metal shoe shanks, clothes hangers, etc.
3. Household/Structural	
	a. Architectural/Construction – Nails, flat glass, spikes, mortar, bricks, slate, etc.
	b. Hardware – Hinges, tacks, nuts, bolts, staples, hooks, brackets, etc.
	c. Furnishings/Accessories – Stove parts, furniture pieces, lamp parts, fasteners, etc.
4. Personal	
	a. Medicinal – Medicine bottles, droppers, etc.
	b. Cosmetic – Hairbrushes, hair combs, jars, etc.
	c. Recreational – Smoking pipes, toys, musical instruments, souvenirs, etc.
	d. Monetary – Coins, etc.
	e. Decorative – Jewelry, hairpins, hatpins, spectacles, etc.
	f. Other – Pocketknives, fountain pens, pencils, ink wells, etc.
5. Labor	
	a. Agricultural – Barbed wire, horseshoes, harness buckles, hoes, plow blades, scythe blades, etc.
	b. Industrial – Tools, etc.
	c. Household – Household cleaning products, clothes, iron, etc.
6. Miscellaneous	
	a. Automotive – Car/vehicle components
	b. Unknown – Functionally unidentifiable or unassignable artifacts

5.3 Expected Results

Based on the identification of site 18CR293 during the Phase I survey, more detailed evidence of a homestead and agricultural complex was expected. A high number of historic resources both domestic and agricultural were expected based on initial findings during the Phase I. It was also expected that prehistoric sites may be present within the APE, possibly beneath layers associated with the historic occupation of the site.

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6. Results

The Phase II evaluation of 18CR293 included the excavation of 22 STPs and nine TUs, resulting in the identification of six features and recovery of 7,090 artifacts. STPs 1-2 and TUs 1-3 were placed within Locus A and the remaining STPs and TUs 4-9 were excavated in Locus B (Figures 6-1 through 6-3).

6.1 Features

Six features were identified within 18CR293. Five of the features were first described during the Phase I testing and are summarized here again. Feature 6 was identified in TU 1 during the Phase II investigation. No soil or other artifact-bearing features were found.

6.1.1 Feature 1

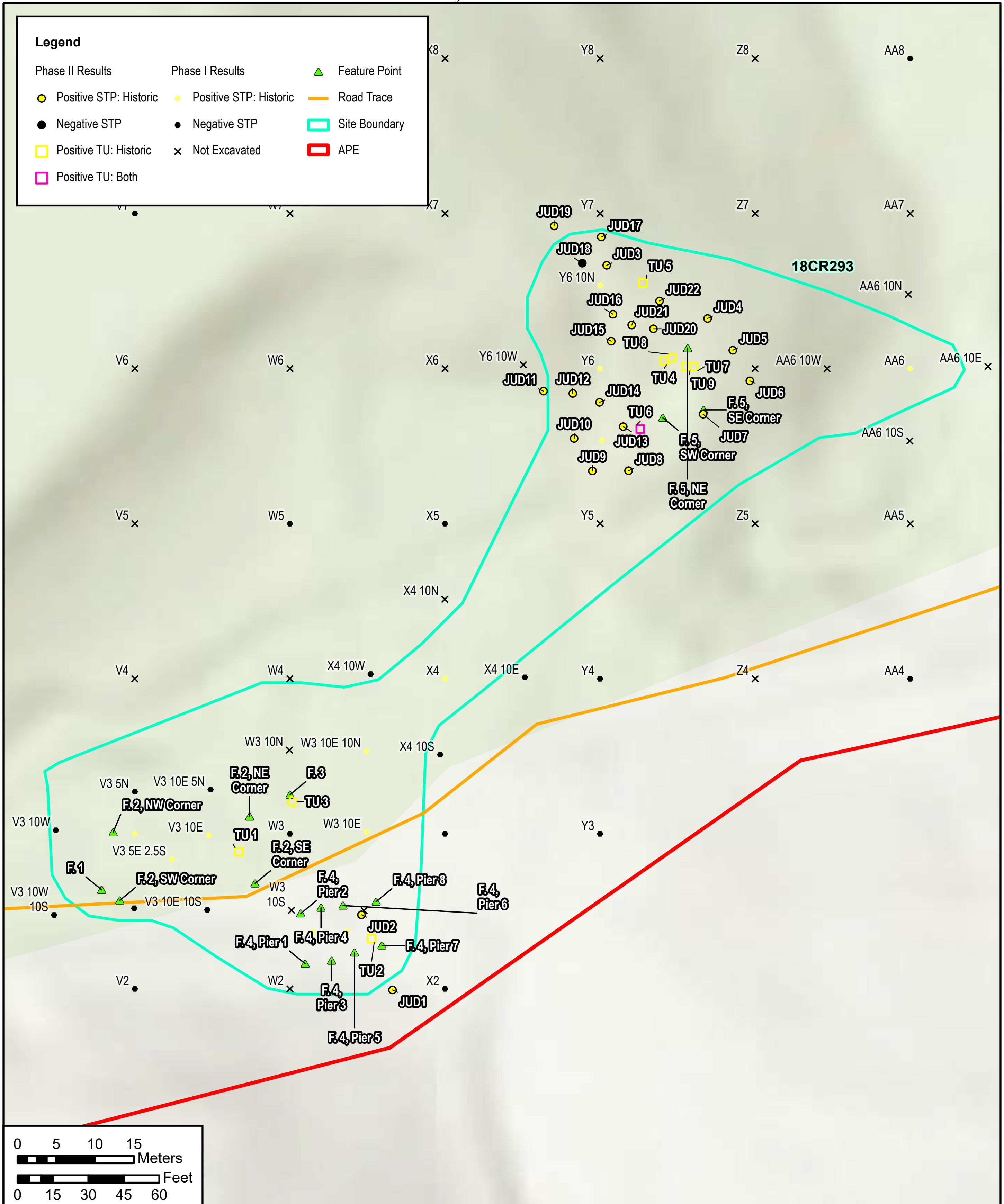
Feature 1 is a cylindrical concrete foundation at the edge of the unnamed tributary's floodplain (Figure 6-4). The feature is short, rising less than 1 m (3.3 ft) above the floodplain to an elevation nearly level with the grade of the road trace. Measuring approximately 2.5 m (8.2 ft) in diameter, the feature's upper surface is shallowly dished, forming a broad bowl shape less than 0.15 m (0.5 ft) deep and filled with leaf litter. While the concrete itself is not diagnostic, it features small, rounded pebbles in a medium-hard cement matrix which is likely of more recent construction (perhaps early twentieth century) than the stone-built features nearby. The 1972 Piney Run Dam and Reservoir site plan (Figure 3-13) identifies this feature as a capped well, although it is more likely a silo foundation. A small concrete-over-stone pad joins Feature 1 to the southwest corner of Feature 2, a large barn foundation.

6.1.2 Feature 2

Feature 2 is a large, rectilinear stone barn foundation in Locus A (Figure 6-5). Measuring 18.25 m (60 ft) east-west by 9.3 m (30.5 ft) north-south, Feature 2 exhibits mirrored 3-m (10-ft) wide openings on its east and west walls and directly abuts a road trace along its south wall. The foundation is composed of randomly coursed phyllite and/or schist rubble with several of the individual stones measuring more than 1 m (3.28 ft) in length. Small pockets of lime/sand mortar are still evident in the stonework, though much of it has disintegrated. While the wall fabric generally exhibits few modified stones, each of the exterior corners exhibit massive cut quoins. Large remnants of sawn lumber representing beams or rafters are strewn about Feature 2. In some locations, the remains of a timber sill plate survives intact on the uppermost course of stonework. This detail indicates that the feature's superstructure was of frame construction and possibly sheathed in timber siding (e.g., board and batten, lapboard). A large, nearby pile of standing-seam metal panels represents the building's roofing. The feature's size, dimensions, and wide parallel openings indicate that it almost certainly served as a barn, likely built in the style of a small transverse crib/frame barn (Mroszczyk 2007).

6.1.3 Feature 3

Feature 3 is located approximately 5 m (16.4 ft) northeast of the northeast corner of Feature 2 and represents an ell-shaped rubble stone and concrete spring box (Figure 6-6). The west side of the ell consists of a 1.3-m (4.25-ft) long, 0.4-m (1.3-ft) wide stone retaining wall built to prevent the surrounding floodplain from slumping into the head of the spring channel. The south side of the ell consists of the 1.1-by-0.75-m (3.6-by-2.5-ft) closed-top spring box flanked by small stone retaining walls. The stonework consists of randomly coursed phyllite and/or schist rubble that appears to have been set in highly degraded lime/sand mortar. The stone spring box has been resurfaced with the same kind of concrete used to build Feature 1. Stone construction similarities shared with Feature 2 suggest a nineteenth century origin. The concrete surfacing presumably indicates twentieth century maintenance. No historic or modern mapping depicts Feature 3.



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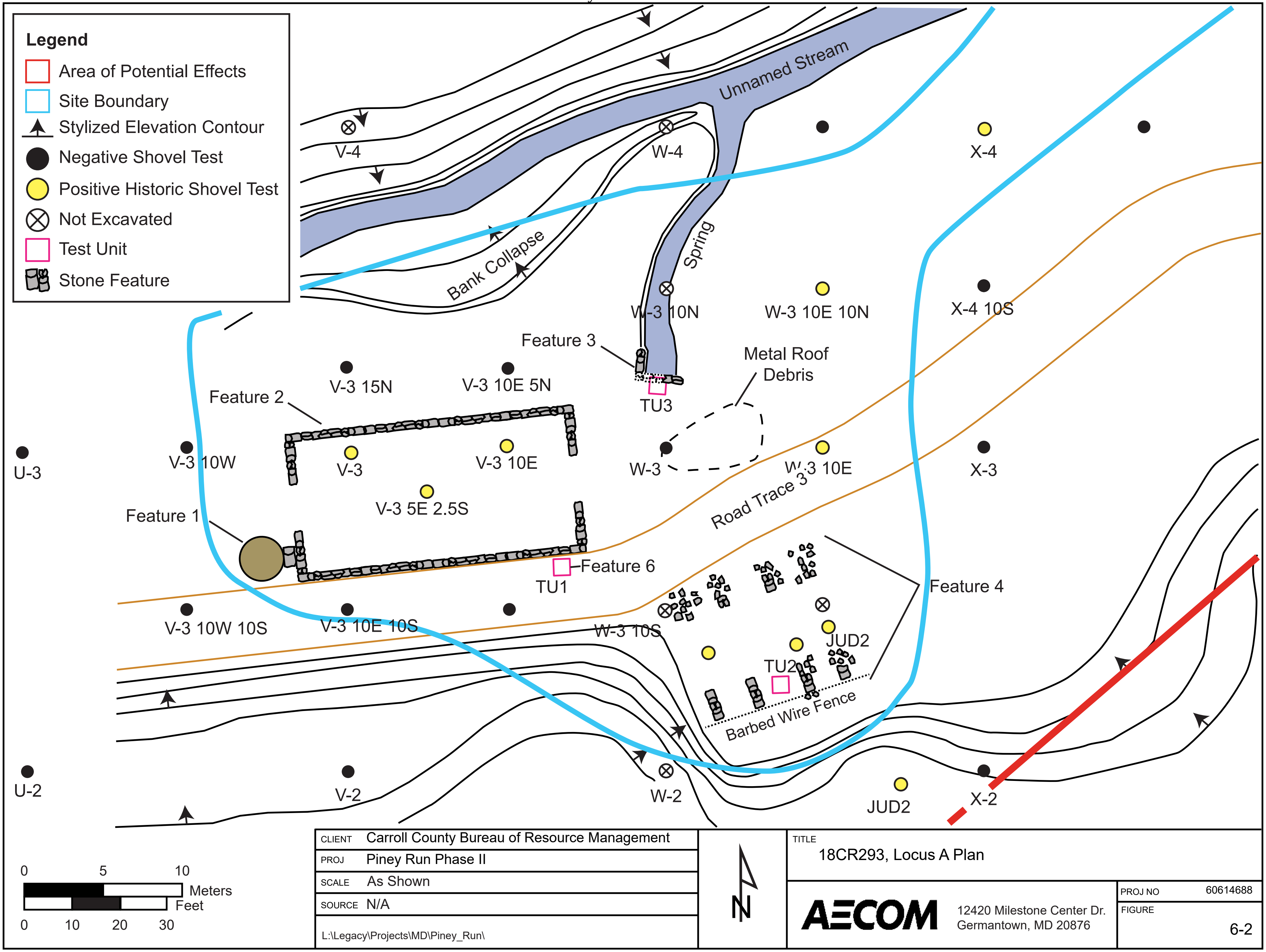
TITLE
Archaeological Survey Results

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-1



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18CR293, Locus A Plan

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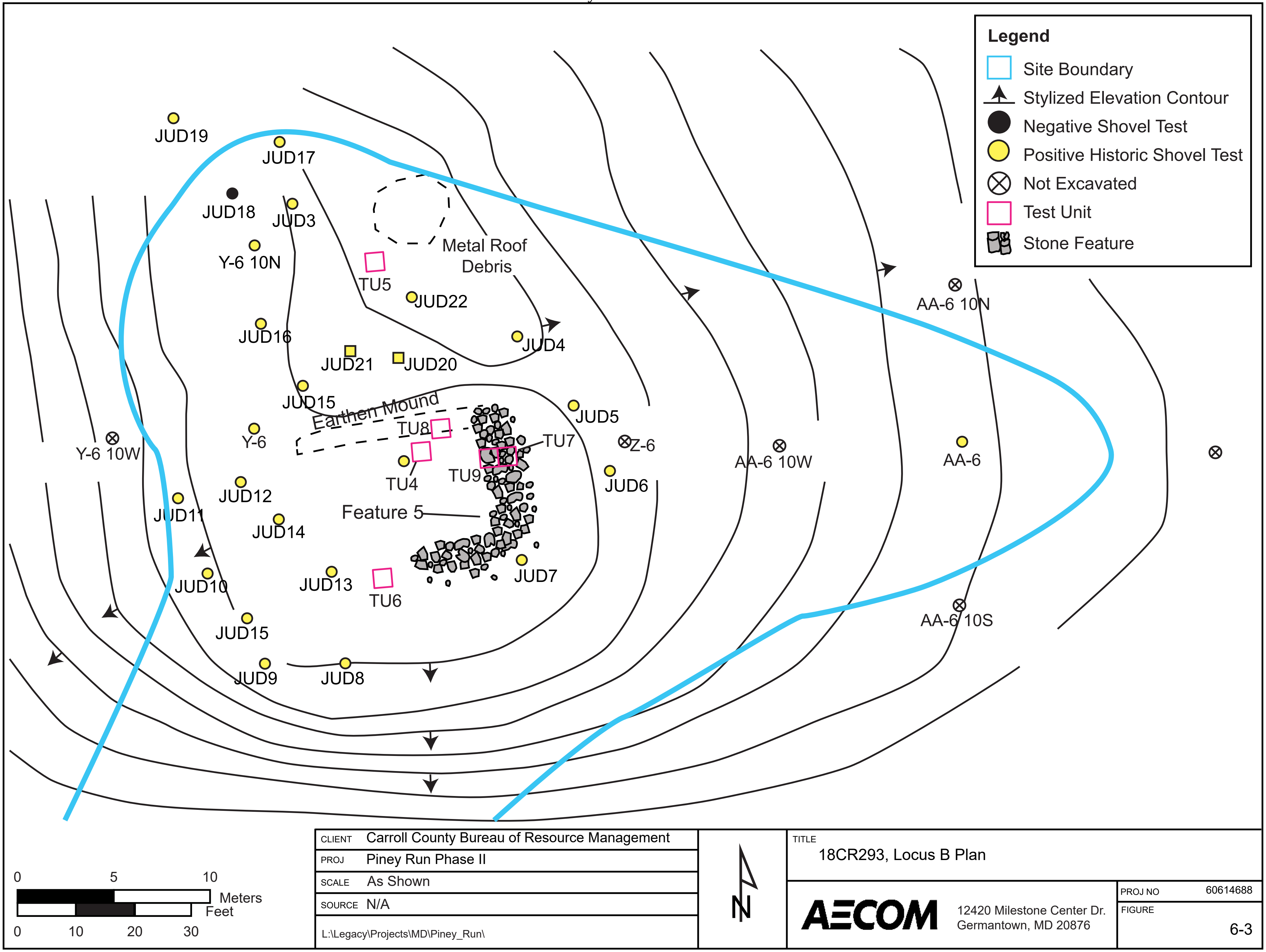
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-2

6-3



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18CR293, Locus B Plan

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Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-3

Figure 6-4. Feature 1 Facing South

Figure 6-5. Feature 2 Facing Southwest

Figure 6-6. Feature 3 Facing Southwest

6.1.4 Feature 4

Feature 4 represents the second outbuilding identified in Locus A (Figures 6-7). Built onto a modified terrace above the unnamed tributary's floodplain, Feature 4 is located approximately 10 m (33 ft) southeast of Feature 2 on a slightly different orientation that fronts the southern edge of a road trace. Parallel rows of four stone piers each define the building's footprint. The piers survive in varying states of completeness, with the intact ones each measuring 2.1 m (6.9 ft) north-south by 0.6 m (2 ft) east-west. The pier columns are spaced slightly more than 2 m (6.5 ft) apart and the rows are 4.8 m (15.75 ft) apart, producing a nearly square footprint measuring approximately 9.2 m (30.2 ft) east-west by 9 m (29.5 ft) north-south. Each pier is less than 0.5 m (1.6 ft) tall, built predominantly of phyllite and/or schist fieldstone that was once set in a lime/sand mortar that has heavily decayed. Two STPs excavated within the piers included the same A/Ap over B horizon profile found elsewhere.

6.1.5 Feature 5

Feature 5 is a collapsed stone foundation for a dwelling situated in Locus B approximately 70 m (230 ft) northeast of Feature 4 (Figures 6-8). The building was sited on a highly constrained, artificially leveled terrace approximately midway up a moderately inclined hillslope rising north above the unnamed tributary. Remnants of the building's outline were only visible along its north, east, and south sides, with each wall mound measuring approximately 7.5 m (24.6 ft) long and consisting of disarticulated phyllite/schist rubble. No evidence of the building's west foundation wall was observed, while the north side of the foundation appears to have partially banked into the hillslope. No clearly defined stone structure was visible on the north side, but a linear earthen berm suggests where the north foundation may have been. Approximately midway along this berm, a small concentration of disarticulated bricks may signify the location of a hearth/chimney. A pile of standing seam metal roofing is located 10 m (33 ft) to the north.

Figure 6-7. Feature 4 Facing Northwest

Figure 6-8. Feature 5 Facing South

6.1.6 Feature 6

Feature 6 is a stone road paving uncovered in TU 1 at the base of Stratum III (Figure 6-9). The historic road runs parallel to the south wall of the Feature 2 barn.

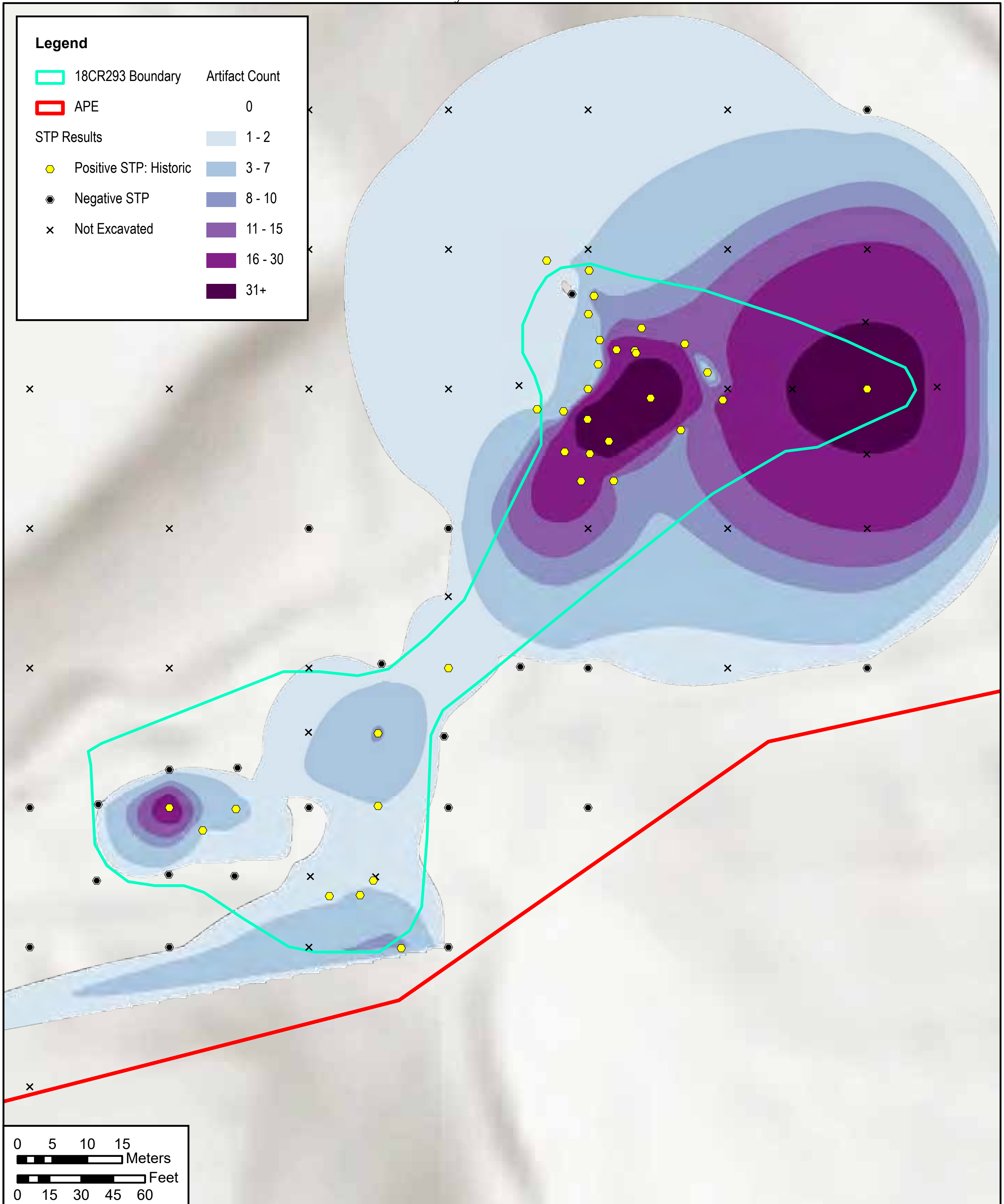
Figure 6-9. Feature 6 in TU 1, Facing West

6.2 Shovel Test Excavation

In total, 22 Phase II STPs were excavated to refine the Phase I results. Two STPs were judgmentally placed in Locus A in the vicinity of Feature 4. Twenty STPs were excavated judgmentally or at 5-m intervals in Locus B in the vicinity of the house in order to examine potential yard deposits and to gather more information about artifact distributions surrounding the house (Figures 6-1 and 6-3). Soil profiles of STPs exhibited two strata, representing the surface mineral horizon/plowzone (A/Ap horizon) atop the culturally sterile subsoil (B horizon). In several instances, an organic layer (O horizon) overlay the A/Ap horizon. STPs 20 and 21 were excavated as 0.5-meter square tests north of the house foundation. STP 20 was placed within a concentration of brick on the surface and TU 21 was placed across a concentration of stone on the surface (Figure 6-10). Both STPs showed that the architectural materials represent debris and not intact features. These materials may be the remains of a chimney and hearth that collapsed outward and north of the house.

Figure 6-10. STP 20 in Foreground and STP 21 vicinity in the Background

Of the 22 Phase II STPs, 21 were positive for historic artifacts. Figure 6-11 presents the distribution of artifacts recovered from both the Phase I and II STPs, and Figure 6-12 presents the distribution broken out into basic time periods. Historic artifacts were concentrated in the vicinity of the house and downslope from the house. Diagnostic artifacts from STPs in the vicinity of the outbuildings dated primarily to the late nineteenth to twentieth century with a low-density scatter of mid- to late nineteenth century artifacts. Diagnostic artifacts in the house area primarily dated to the mid- to late nineteenth century with eighteenth to early nineteenth century and late nineteenth to twentieth century artifacts also present. These results suggest that the house was present before the barns were built.



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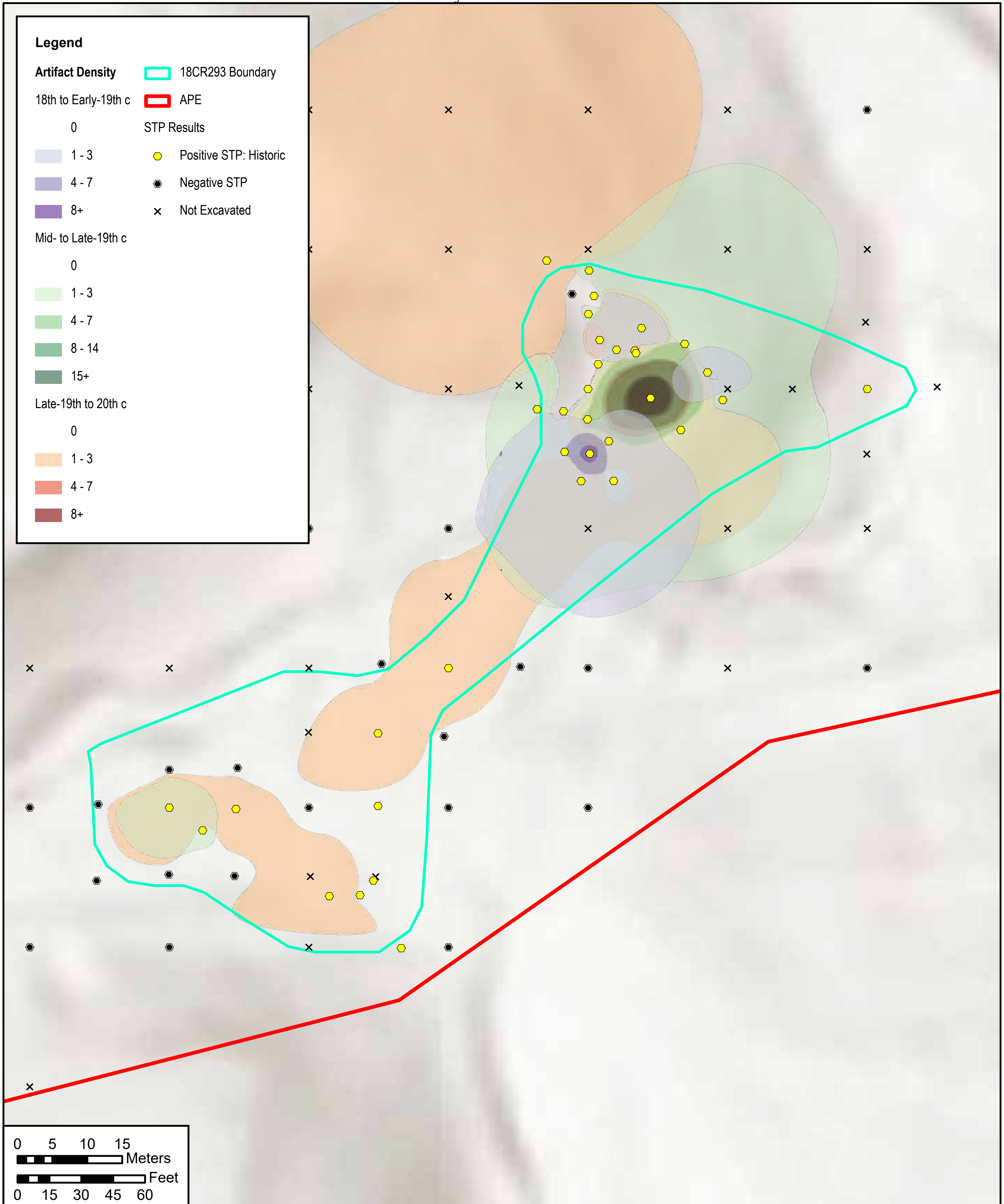
TITLE: Distribution of Artifacts from STPs within 18CR293

AECOM
12420 Milestone Center Dr.
Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-11



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TITLE
Distribution of Artifacts by Time Period

AECOM 12420 Milestone Center Dr. Germantown, MD 20876

PROJ NO 60614688
FIGURE 6-12

6.3 Test Unit Excavation

Nine TUs were placed with the boundary of 18CR293 (Figures 6-1 through 6-3). TU coordinates were determined in relation to features identified during the Phase I investigation in 2019. All nine TUs measured 1 x 1 m (3.3 x 3.3 ft) in size. TUs 1-3 were excavated in Locus A of site 18CR293 (agricultural complex), and TUs 4-9 were excavated in Locus B (farmstead dwelling).

6.3.1 Test Unit 1

TU 1 was placed just outside the southeast corner of Feature 2 barn to determine whether a builder's trench existed or if historic use extended outside the structure's walls. Feature 2 is a large, rectilinear stone foundation representing the predominant building in Locus A. A datum was set at the southwest corner of the unit. TU 1 documented a shallow O horizon 1-3 cm (0.03-0.1 ft) thick composed of a very dark brown (10YR 2/2) to brown (10YR 3/2) silty clay loam that had 5 percent rock, gravel, and root inclusions (Figure 6-13). One corroded, likely wire, nail was recovered from Stratum I (Table 6-1). Stratum II was a 13-cm (0.4 ft) thick brown (10YR 4/3 to 10YR 5/3) sandy clay loam with 20 percent rocks. Soil colors varied somewhat from the east to the west half of the unit. Stratum II was 8 to 9 cm (0.3 ft) deeper on the east side of the TU. Stratum II contained 12 bottle glass fragments, 29 corroded nails, a spike and 11 window glass fragments. Stratum III was 5-cm (0.2-ft) thick dark brown (10YR 3/3) sandy loam with 30 percent rock, gravel, and root inclusions. The stratum was deeper in the north half of the TU compared to the south half. Stratum III artifacts resembled those from Stratum II and included five bottle glass fragments, 17 rusted nails, and eight window glass fragments. Strata II and III appear to have been associated with collapse of the barn structure in the twentieth century. The TU terminated approximately 21 cm (0.7 ft) below the surface when a stone paving was encountered.

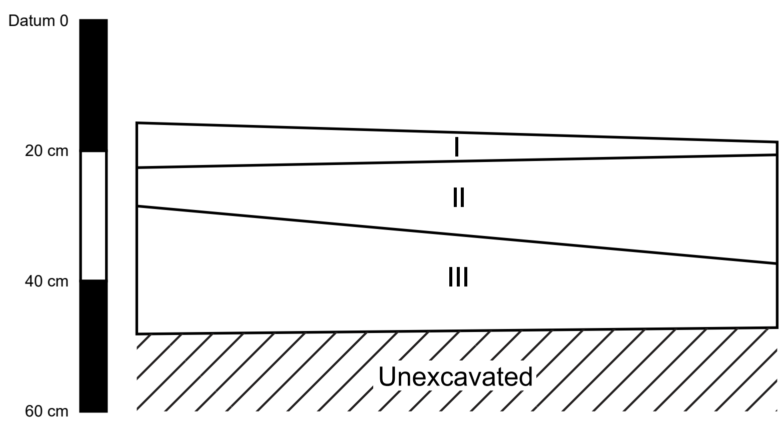
Table 6-1. Artifacts from TU 1

Group	Artifact	Strat. I	Strat. II	Strat. III	Total
Foodways	Container Glass		12	5	
Household/ Structural	Nail, Corroded	1	29	17	47
	Spike		1		1
	Window Glass		11	8	19
Total		**1**	**53**	**30**	**84**

Approximately 3 cm (0.1 ft) and directly under the O horizon a 2-x-8-in board was encountered running east-west across the unit. The board was very fragile and actively decaying. The board, presumed to have been part of the barn structure, rested on a layer of stone, which also underlay Stratum III to the south of the board. The stone (Feature 6) appeared to be part of the historic road running parallel to the south wall of the barn.

6.3.2 Test Unit 2

TU 2 was placed within Feature 4 to investigate what type of building may have existed during historic occupation of the site. Feature 4 represents the second building identified in Locus A. Feature 4 is located approximately 10 m (33 ft) southeast of Feature 2. TU 2 was placed between two of the surviving stone piers documented during the Phase I survey. Stratum I documented a brown (10YR 4/3) silt loam Ap horizon measuring 12 cm (0.4 ft) thick atop a yellowish brown (10YR 5/6) silty clay B horizon (Figure 6-14). The only artifacts recovered were 13 wire nails from Stratum I. No floor surface or burned layer was observed. The stratigraphy is representative of the non-modified landscape: a plowed level atop a culturally sterile B horizon. The frame outbuilding that had been present had rested on the stone piers without any type of cellar or foundational features below. Based on the presence of wire nails, the outbuilding may have been added at the end of the nineteenth century or early twentieth century when the property operated as a dairy farm.

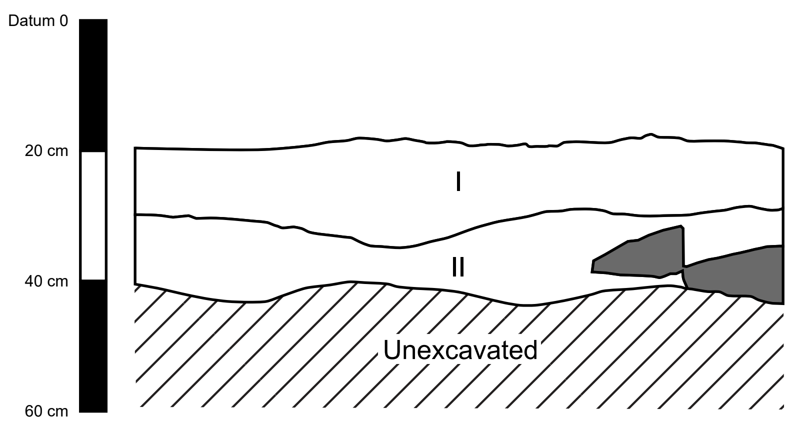


I Very Dark Grayish Brown (10YR 3/2) Silty Clay Loam

II Brown (10YR 4/3) NE/SE and
Brown (10YR 5/3) SW/NW Sandy Clay Loam

III Dark Brown (10YR 3/3) Sandy Loam

Figure 6-13. TU 1 North Wall Profile



I Brown (10YR 4/3) Silt Loam

II Yellow Brown (10YR 5/6) Silty Clay

Stone

Figure 6-14. TU 2 South Wall Profile

6.3.3 Test Unit 3

TU 3 began as STP JUD03 but was expanded into a 1-x-1-m unit to get a better picture of the spring box identified in the Phase I survey as Feature 3. Feature 3 is located approximately 5 m (16.4 ft) northeast of the northeast corner of Feature 2 and represents an L-shaped rubble stone and concrete spring box. The south side of the L consists of the 1.1-by-0.75-m (3.6-by-2.5-ft) closed-top spring box flanked by small stone retaining walls. The top of the spring box was partially obstructed by fill and a tree. Two strata were uncovered in the unit, though these layers were clearly redeposited layers of fill atop the concrete spring box top (Figure 6-15). Stratum I consisted of a yellowish brown (10YR 6/6) silty clay loam measuring 23 cm (0.8 ft) thick above a brown (10YR 4/3) silty loam Stratum II. In total, 120 artifacts were recovered, all from Stratum I (Table 6-2). Large roots from the tree obstructed complete excavation of the unit and were not removed.

Figure 6-15. TU 3 and Feature 3 Facing South

Table 6-2. Artifacts from TU 3

Group	Artifact	Date Range	Strat. I
Foodways	Ironstone/Stone China/White Granite	1842-1930	2
	North American Stoneware, Slip Glazed		1
	Bottle Glass, Machined	1903-Present	8
	Container Glass		102
Household/ Structural	Nail, Cut	1790-1910	4
	Nail, Wire	1890-Present	3
Total			**120**

6.3.4 Test Unit 4

TU 4 was one of the six TUs excavated in Locus B, within Feature 5, the collapsed stone foundation of a dwelling identified during the Phase I survey. Stone and earthen piles suggestive of the building outline were present on the north, east, and south walls, with each wall measuring approximately 7.5 m (24.6 ft) long and consisting of disarticulated phyllite/schist rubble and mounded dirt. No evidence of the building's west foundation wall was observed. The north side of the building appears to have banked into the hillslope.

TU 4 was placed on the interior of the building in order to determine if interior features or deposits are present, and to expose possible paved or dirt interior floors. TU 4 included four strata, and no evidence of a floor was found (Figure 6-16). Stratum I consisted of a dark yellowish brown (10YR 3/6) silty clay loam measuring 8 cm (0.3 ft) thick. Stratum II was a brown (7.5 YR 4/4) silty clay measuring 10 cm (0.3 ft) thick. Strata I and II appeared to be associated with the demise of the building and primarily contained structural remains, including 81 plaster fragments, 33 window glass, 12 nails, and 6 brick fragments (Table 6-3); an additional 1.6 kg of brick from Strata I and II were documented in the field. A concentration of charcoal, mortar, and plaster, including painted fragments, was found at the base of Stratum II confirming that Strata I and II likely were deposited after the primary occupation had ended and the building began to deteriorate. The quantity of charcoal suggests the building may have burned, although it is also possible that TU 4 was situated close to the historic hearth. Stratum III was a dark yellowish brown (10YR 3/6) silty clay measuring 11 cm (0.4 ft) thick. Artifacts from this stratum were primarily recovered from the transition to subsoils and consisted of bottle glass and architectural materials that could not be dated. Stratum IV was a brown (7.5YR 4/4) mottled with a dark yellowish brown (10YR 4/6) silty clay that contained no artifacts.

Table 6-3. Artifacts from TU 4

Group	Artifact	Date Range	Strat. I	Strat. II	Strat. III	Total
Clothing	Thimble		1			1
Foodways	Creamware	1762-1820	1			1
	Pearlware	1775-1840	3			3
	Redware, Brown Glazed		1			1
	Container Glass, Machined	1893-Present	2			2
	Container Glass		8	2	3	13
Household/ Structural	Brick			6	2	8
	Nail, Cut	1790-1910	9			9
	Nail, Wire	1890-Present	1			1
	Nail, Corroded			2		2
	Plaster/ Mortar		13	68	3	84
	Window Glass		21	12	1	34
Labor	Charcoal Fragment		1	9		10
Total			**61**	**99**	**9**	**169**

6.3.5 Test Unit 5

TU 5 was placed on a small terrace sloping north above Feature 5 to investigate structural stones and disarticulated bricks observed on the ground surface. Three strata were observed in TU 5 (Figure 6-17). Stratum I was a dark brown (10YR 3/3) silty loam with 10-15 percent rock and gravel inclusions measuring 10 cm (0.3 ft) in thickness. Stratum II was a yellowish brown (10YR 5/6) mottled with a reddish yellow (7.5YR 6/8) silty clay loam measuring 18 cm (0.6 ft) in thickness. Stratum III consisted of a strong brown (7.5YR 4/6) clay subsoil. Stone and brick were confined to the surface and Stratum I and appeared to represent wall/ chimney fall to the north of the house. In total, 111 artifacts were recovered from TU 5 (Table 6-4), with most found in Stratum I (n=85). In addition, less than 0.1 kg of brick were weighed in the field and discarded. Container glass and redware fragments were most numerous. Artifacts from both Strata I and II included items dating to the late eighteenth through twentieth century. In addition, a prehistoric projectile point fragment was found in Stratum II in association with the historic artifacts.

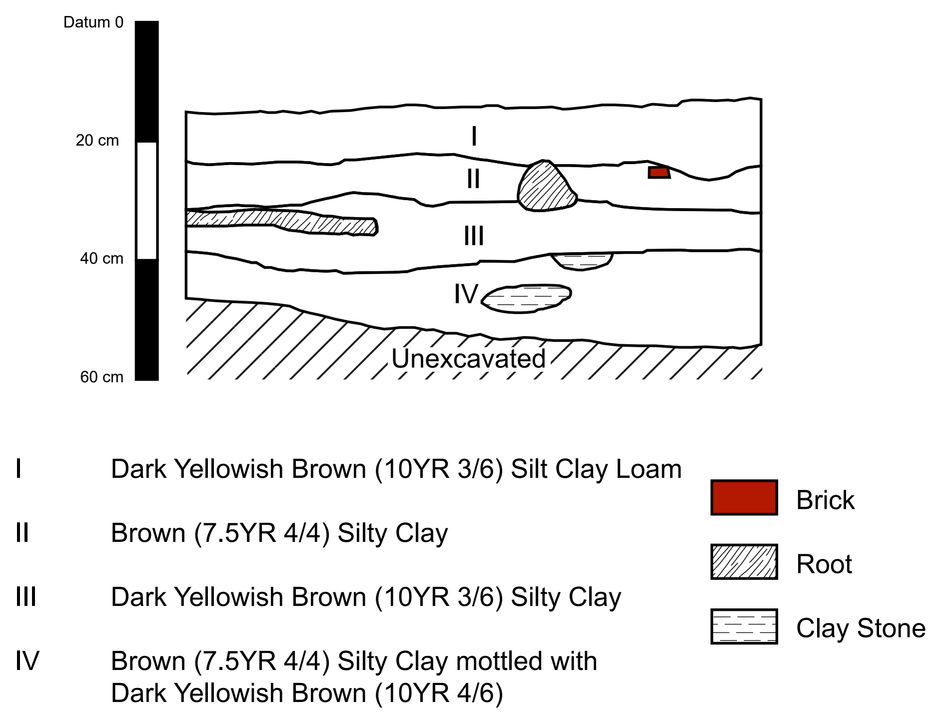
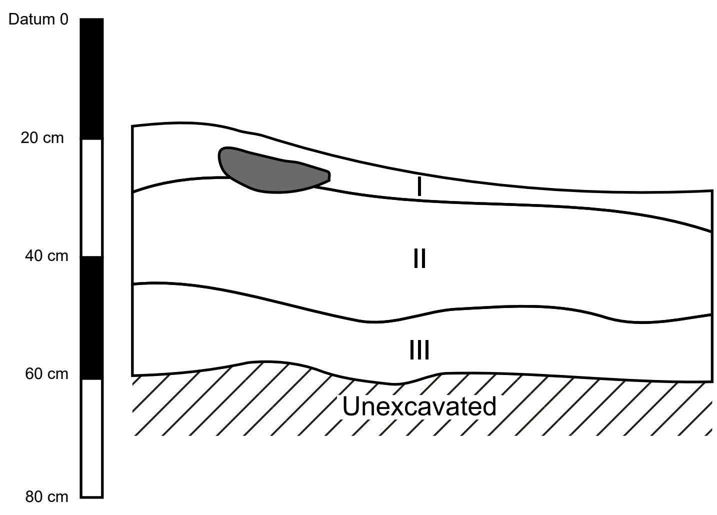


Figure 6-16. TU 4 North Wall Profile



I Dark Brown (10YR 3/3) Silt Loam

II Yellowish Brown (10YR 5/6) Silty Clay Loam

III Strong Brown (7.5YR 4/6) Clay

Stone

Figure 6-17. TU 5 East Wall Profile

Table 6-4. Artifacts from TU 5

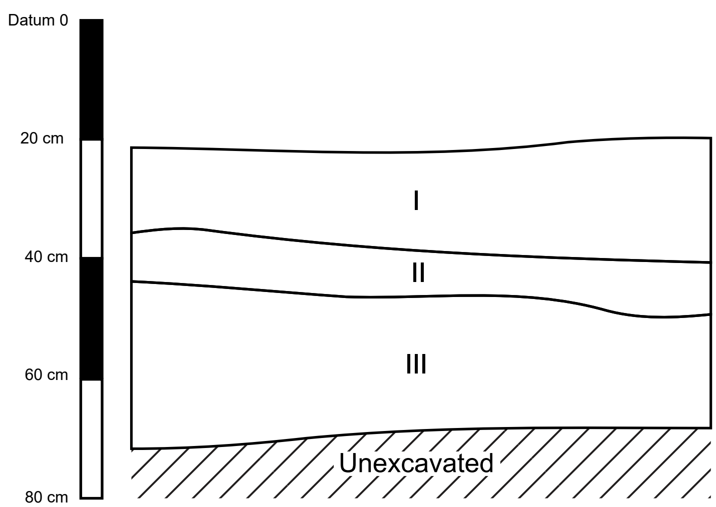
Group	Artifact	Date Range	Strat. I	Strat. II	Total
Foodways	Pearlware	1780-1830	1	10	11
	Whiteware	1820-Present		1	1
	Redware		20	3	23
	Container Glass		50	8	58
	Container Glass, Machined	1880-Present		1	1
	Cruet	1893-Present	1		1
Household/ Structural	Nail, Corroded		2	1	3
	Window Glass		10	1	11
Personal	Redware Flower Pot		1		1
Prehistoric	Projectile Point	Prehistoric		1	1
Total			85	26	111

6.3.6 Test Unit 6

TU 6 was placed within Feature 5 where an entryway was suspected in an apparent break in the collapsed south foundation wall. The unit produced nearly a third of the artifacts from the Phase II evaluation. Three strata were documented (Figure 6-18). Stratum I consisted of a dark brown (10YR 3/3) silt loam measuring 18 cm (0.6 ft) in thickness. This layer appeared to be associated with the late occupation and demise of the building and contained significant amounts of structural materials, including 1,389 pieces of window glass and109 nails. Approximately 5 kg of brick was also documented in Stratum I. Artifacts from Stratum I ranged in date from the late eighteenth through twentieth century (Table 6-5). Stratum II was a dark yellowish brown (10YR 3/4) to brown (7.5YR 4/4) silty clay measuring 20 cm (0.7 ft) in thickness. Stratum II contained artifacts primarily dating to the late eighteenth to late nineteenth century. Artifacts definitely dating to the twentieth century were notably absent from Stratum II. This layer is likely associated with occupation of the house throughout the nineteenth century. Stratum III documented a strong brown (7.5YR 4/6) silty clay. Artifacts from Stratum III were recovered from the transition from Stratum II to III; below the transition, Stratum III did not contain artifacts. Artifact density diminished with depth.

Table 6-5. Artifacts from TU 6

Group	Artifact	Date Range	Strat. I	Strat. II	Strat. III	Total
Clothing	Button, Rubber		1			1
	Button, Prosser	1840-1960	1			1
	Button, Shank	1861-1901	1			1
Foodways	Black Basalt	1750-1850	1	2		3
	Creamware	1762-1820			1	1
	Pearlware	1780-1840	6	72	3	81
	Castleford Stoneware	1780-1815		2		2
	North American Stoneware, Salt Glazed	1790-1940	1	9		10
	Whiteware	1820-Present	11	65		76
	Rockingham	1830-1940	2			2
	White Granite	1840-1930	6			6
	North American, Albany and Bristol Slipped	1890-1920	3			3
	North American, Bristol Slipped	Post 1920	1			1



I Dark Brown (10YR 3/3) Silt Loam

II Dark Yellowish Brown (10YR 3/4) Silty Clay Loam

III Strong Brown (7.5YR 4/6) Clay

Figure 6-18. TU 6 North Wall Profile

Table 6-5. Artifacts from TU 6 continued

Group	Artifact	Date Range	Strat. I	Strat. II	Strat. III	Total
Foodways	Porcelain, Hard Paste	1890-Present	1			1
	Redware		6	51		57
	Unidentified Refined Earthenware				1	1
	Artillery Shell	1866-Present	4			4
	Bullet, Lead		1			1
	Bone, Mandible			5		5
	Gun Flint			1		1
	Container Glass		282	17	3	302
	Container Glass, Machined	1893-Present	39			39
	Drinking Glass, Tumbler		3			3
	Bottle Cap, Iron		3			3
	Jar Lid, Metal		2			2
	Bottle Cap, Rubber		2			2
Household/ Structural	Brick			6		6
	Fence Staple		3			3
	Lamp Glass		8			8
	Nail, Cut	1790-1910	70		1	71
	Nail, Wire	1880-Present	2			2
	Nail, Corroded		37	16		53
	Washer		1			1
	Window Glass		1389	34	1	1424
Labor	Buckle, Slide		1			1
	Coal		4	3		7
	Slag		1			1
Miscellaneous	Glass		2			2
	Copper Alloy		1	1		2
	Iron		31	2		33
	Rubber		3			3
Personal	Tobacco Pipe			5		5
	Bead, Biconical		1			1
	Bottle, Medicine	1893-Present	9			9
	Comb, Plastic		1			1
	Pencil	1858-Present	1			1
	Pocket Watch		1			1
Total			**1,943**	**291**	**10**	**2,244**

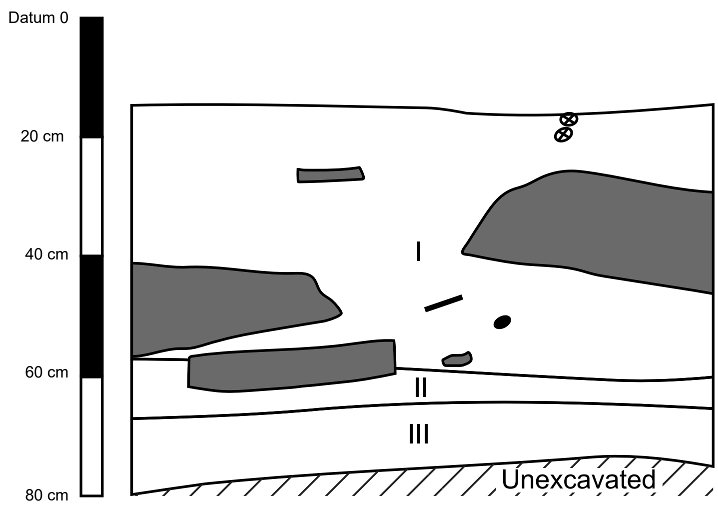
6.3.7 Test Unit 7

TU 7 was placed atop the east side of the stone rubble of Feature 5 to examine the potential wall foundation and to better understand the structure collapse and abandonment. The west wall of the TU fell on what appeared to be center of the stone rubble with the remaining unit extending to the exterior of the building. TU 7 had three strata (Figure 6-19). Stratum I consisted of large rocks in a matrix of very dark grayish brown (10YR 3/2) silt loam. Stratum I averaged 30 cm (1 ft) in thickness and came down on charcoal and a layer of twisted, metal standing seam roofing. The presence of charcoal atop the sheet metal suggests the building burned after or during collapse. Artifacts from Stratum I included a large number of architectural materials (n=931) and miscellaneous iron fragments (n=161) likely representing fragments of the roofing (Table 6-6). In addition to recovered materials, 5.9 kg of brick were documented from Stratum I. Datable artifacts ranged in date from the late eighteenth through twentieth century.

Stratum II was a dark yellowish brown (10YR 4/4) silty clay loam averaging 8 cm (0.3 ft) in thickness with large foundation rocks. No in-situ stone foundation was found. Artifacts resembled those recovered from Stratum I but were found in lower quantities. The Stratum II assemblage consisted of 78 percent architectural materials and iron fragments (n=175) and datable items ranged from the late eighteenth through twentieth century. Stratum III was a strong brown (7.5YR 4/6) silty clay representing the transition to subsoil. Artifacts from Stratum III were recovered from the upper level and primarily consisted of a low density scatter of window and container glass. The only datable artifacts from Stratum III were two sherds of whiteware. The foundation appears to have originally been placed on top of the soil with no subsurface component. The stacked-stone foundation had become disarticulated with no intact structural feature remaining.

Table 6-6. Artifacts from TU 7

Group	Artifact	Date Range	Strat. I	Strat. II	Strat. III	Total
Clothing	Grommet		1			1
	Shoe/ Boot Sole		1			1
Foodways	Pearlware	1780-Present	3	9		12
	Whiteware	1820-Present	1	6	2	9
	North American, Slip Glazed Stoneware	1805-1920	1	1		2
	White Granite	1840-1930	3			3
	Porcelain, Hard Paste			1		1
	Redware			2		2
	Container Glass, Machined	1893-Present	7	2		9
	Container Glass		178	14	2	194
	Drinking Glass, Stemware				1	1
	Bone		3	1		4
	Shell Casing		9			9
	Bullet, Lead		3	1	1	5
Household/ Structural	Brick		28	3		31
	Lightbulb	1879-Present	1			1
	Mortar		31			31
	Nail, Cut	1790-1910	2			2
	Nail, Corroded		385	8	2	395
	Nail, Wire	1885-Present	2			2
	Window Glass		482	153	17	652
Labor	Charcoal Fragment		24			24
	Coal Fragment		1			1



I	Very Dark Gray Brown (10YR 3/2) Silt Loam	■	Metal
II	Dark Yellowish Brown (10YR 4/4) Silty Clay Loam	⊗	Root
III	Strong Brown (7.5YR 4/6) Silty Clay	▪	Stone

Figure 6-19. TU 7 West Wall Profile

Table 6-6. Artifacts from TU 7 Continued

Group	Artifact	Date Range	Strat. I	Strat. II	Strat. III	Total
Miscellaneous	Rubber Fragment			1		1
	Iron Fragment		161	11		172
Personal	Redware Flower Pot		1	2		3
	White Ball Clay Tobacco Pipe		2			2
	Marble, Glass		1			1
	Ring, Copper Alloy		1			1
	Watering Can		1			1
Total			**1,333**	**224**	**25**	**1,582**

6.3.8 Test Unit 8

TU 8 was placed atop the north berm of Feature 5 in order to determine if the foundation is present. The north half of the unit was atop the crest of the berm and the south half was sloped down the hill toward the interior of Feature 5. The TU included two strata (Figure 6-20). Stratum I documented a dark yellowish brown (10YR 3/6 to 10YR 3/4) silty clay loam averaging 15 cm (0.5 ft) in thickness. This layer was associated with collapse of the building and included 74 percent architectural materials (n=1,152) and a variety of domestic artifacts dating to the late eighteenth to twentieth century (Table 6-7). In addition, 17.7 kg of brick from Stratum I was documented in the field. Stratum II Level 1 was a strong brown (7.5YR 4/6) silty clay loam that graded into a dark yellowish brown (10YR 4/6) silty clay. This stratum appeared to be the soil that was present when the building was erected. It appears that the slope was cut into to form the north wall of the house. Foundation stones would have been placed atop this stratum but are no longer present. As was found in other TUs, the upper level of Stratum II (III in other TUs) contained artifacts likely resulting from roots and other bioturbation at the interface.

Table 6-7. Artifacts from TU 8

Group	Artifact	Date Range	Strat. I	Strat. II	Total
Foodways	Pearlware	1780-1830	8	1	9
	North American, Salt Glazed, Gray/Buff Bodied	1790-1940	1		1
	North American, Albany Slip Glazed	1805-1920		5	5
	Whiteware	1820-Present	2		2
	Ironstone/ Stone China/ White Granite	1842-1930	1		1
	North American, Albany and Bristol Slip Glazed	1890-1920	2	2	4
	Redware		8		8
	Unidentified Refined Earthenware		2		2
	Container Glass, Machined	1892-Present	6		6
	Container Glass		245	4	249
	Bottle Cap		1		1
	Bullet, Lead			1	1
	Bullet Shell Casing		6		6
	Nut Shell		1		1
Household/ Structural	Brick		33	16	49
	Mortar, Lime		7	5	12
	Plaster		156		156
	Nail, Corroded		315	4	319

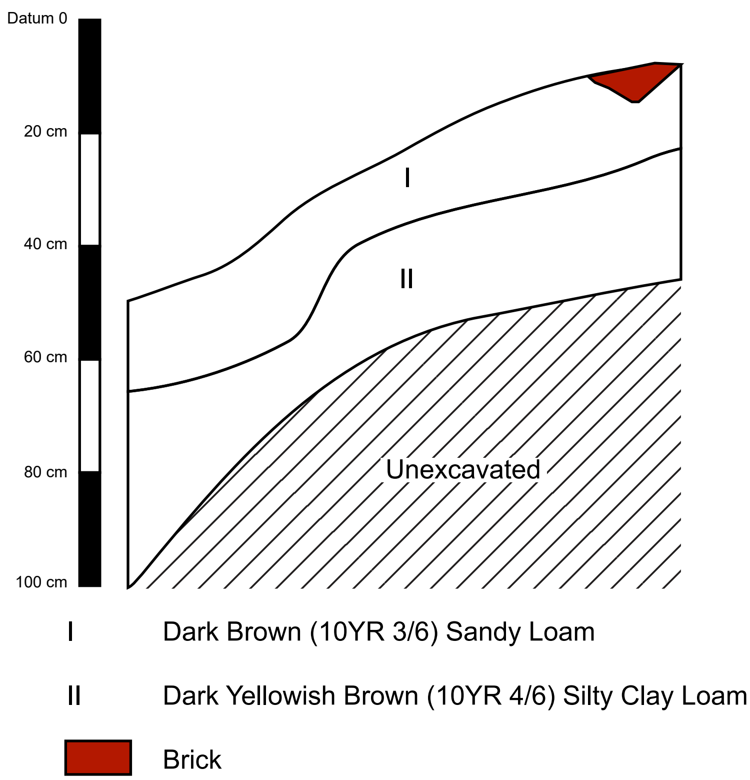


Figure 6-20. TU 8 West Wall Profile

Table 6-7. Artifacts from TU 8 Continued

Group	Artifact	Date Range	Strat. I	Strat. II	Total
Household/ Structural	Nail, Wire	1885-Present	10		10
	Screw			1	1
	Window Glass		631	37	668
Labor	Charcoal Fragment		40		40
	Coal Fragment		1	1	2
Miscellaneous	Iron Fragment		70		70
Personal	Redware Flower Pot		2		2
	White Ball Clay Tobacco Pipe		1		1
Total			**1,549**	**77**	**1,626**

6.3.9 Test Unit 9

TU 9 abutted the west wall of TU 7, with the east wall of TU 9 atop the center of the mound of stone rubble. The TU was placed at this location in order to determine if intact remains of the house foundation were present. TU 9 documented three strata, closely resembling TU 7 (Figure 6-21). Stratum I consisted of large rocks in a matrix of very dark grayish brown (10YR 3/2) silty clay loam. Stratum II was brown (10YR 4/3) mixed with a strong brown (10YR 5/8) silty clay loam with rocks. Strata I and II were somewhat mixed with pockets of Stratum I reappearing below parts of Stratum II. Artifacts from the strata were of similar type and date and the strata are considered together. In total, Strata I and II averaged 34 cm (1.1 ft) in depth. Artifacts ranged in date from the late eighteenth to twentieth century and primarily consisted of architectural materials and fragments of iron roofing (80%, n=647; Table 6-8). In addition to recovered artifacts, 1.9 kg of brick was found in Strata I and II. Stratum III was a strong brown (7.5YR 4/6) silty clay representing the transition to subsoil. Artifacts from Stratum III were recovered from the upper level and primarily consisted of a low density scatter of architectural materials. Datable artifacts from Stratum III included a sherd of pearlware and a sherd of whiteware.

No intact foundation was found in TUs 7 and 9. The stacked-stone foundation had become disarticulated. No subsurface features were found and the foundation stones appear to have originally been placed on top of the soil rather than in a builder's trench.

Table 6-8. Artifacts from TU 9

Group	Artifact	Date Range	Strat. I/II	Strat. III	Total
Foodways	Pearlware	1780-1830	12	1	13
	Refined Earthenware	1770-1900	1		1
	Whiteware	1820-Present	13	1	14
	Ironstone	1842-1930	4		4
	Redware		11		11
	North American, Slip Glazed		1		1
	Container Glass, Machined	1893-Present	4		4
	Container Glass		111	2	113
	Bullet, Lead		1		1
Household/ Structural	Brick		6		6
	Mortar, Lime		11		11
	Nail, Corroded		89	1	90
	Window Glass		460	14	474
Labor	Cinder		1		1
Miscellaneous	Iron Fragment		81	1	82
Personal	Redware Flower Pot		1		1
	White Ball Clay Tobacco Pipe		1		1
Total			**808**	**20**	**828**

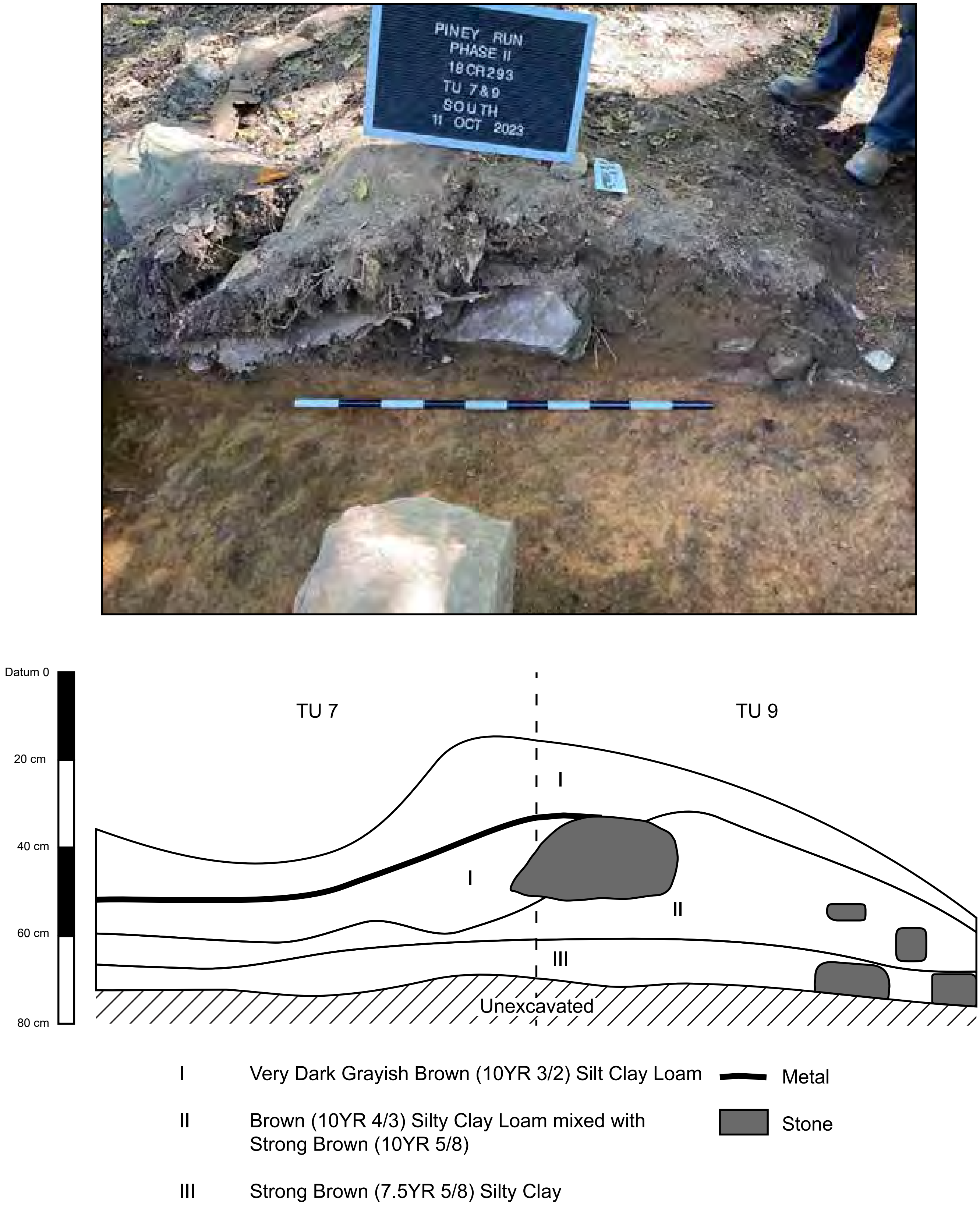


Figure 6-21. TU 7 & 9 South Wall Profile

6.4 Artifact Analysis

In total, one prehistoric and 7,089 historic artifacts were recovered from 18CR293 during the Phase II investigations (Table 6-9). These artifacts are in addition to the 224 historic artifacts recovered during the Phase I survey. Most retained artifacts represent structural remains (n=4,875, 69%). An additional 36.3 kilograms (kg) of brick were documented in the field and discarded.

Table 6-9. Functional Groups from 18CR293

Group	Count	Percentage
Clothing	7	0.10%
Foodways	1,693	23.88%
Household/ Structural	4,875	68.76%
Labor	102	1.44%
Miscellaneous	377	5.32%
Personal	35	0.49%
Prehistoric	1	0.01%
Total	**7,090**	**100.00%**

6.4.1 Prehistoric Artifacts

One quartz projectile point fragment was recovered from Stratum II of TU 5. The proximal section was not temporally diagnostic. The prehistoric artifact was found in association with historic artifacts in the area of the historic residence.

6.4.2 Household/ Structural Artifacts

Household/ structural artifacts made up approximately 69 percent of the overall Phase II site assemblage (n=4,875; Table 6-10). This count does not include the 36.3 kg of brick discarded in the field (note: a brick averages 2 kg in weight). The assemblage from the outbuilding areas comprised 84 percent structural artifacts (n=92). Artifacts included 4,859 architectural/ construction materials, nine furnishing/ accessory artifacts, and seven hardware. The furnishings consisted of four leaded glass lamp fragments, four glass lamp chimney fragments, and one lightbulb fragment recovered from the house area. Hardware included a copper alloy tack, three fence staples, an iron hinge, a screw, and a washer.

Table 6-10. Summary of Household/ Structural Artifacts

Subgroup	Material	Artifact	Date Range	Count
Architectural/ Construction	Brick	Brick		134
	Mortar	Mortar		125
	Plaster	Plaster		169
	Glass	Window Glass		3,357
	Iron	Nail, Cut	1790-1900	571
		Nail, Wire	1890-Present	30
		Nail, Indeterminate		472
		Spike		1
Furnishings/ Accessories	Lead Glass	Lamp Glass		4
	Glass	Lamp, Chimney		4
		Lightbulb	20th century	1
Hardware	Copper Alloy	Tack		1
	Iron	Fence Staple		3
		Hinge		1
		Screw		1
		Washer		1
Total				**4,875**

Architectural/ construction artifacts primarily consisted of window glass (n=3,357) representing 69 percent of the artifacts in this functional category. Most of the window glass was recovered from the house area (n=3,338), although 19 fragments were found in TU 1 adjacent to the barn foundation. Window glass was concentrated in TU 6 (n=1,424), excavated in the approximate area of the south wall of the house in an area that lacked significant amounts of foundation stone. The entrance to the house was likely located in this area. Significant amounts of window glass were found in TU 7 (n=652), TU 8 (n=668), and TU 9 (n=474), suggesting windows had been present on all sides of the house.

Retained brick fragments (n=134) weighed 16 kg, and 36.3 kg of brick were discarded in the field. In addition, 125 mortar and 169 plaster fragments were retained. These construction materials were all found in the house area, with TUs 7 and 8, excavated across the east and north remnants of the house foundation, yielding the highest counts. Some of the plaster fragments appear to have been painted.

Of the 1,073 nails, a little over half (n=571) were machine cut, likely dating to the nineteenth century, and 30 were wire, dating to the end of the nineteenth and twentieth century. An additional 472 nails were too rusted to identify the method of manufacture, although it is likely that most of these nails were wire as wire nails tend to corrode more quickly. All cut nails were found in the house area. Indeterminate and wire nails were found in the vicinity of the two barns and spring box. These results suggest that the house on the site were built in the nineteenth century and expanded or modified in the late nineteenth to twentieth century when the outbuildings were added. While the house appeared to have a stacked stone foundation and brick chimney, the large number of nails recovered, including from TUs placed across the remnants of the foundation, suggest most of the house was of frame construction. Most nails, including cut, wire, and indeterminate, were recovered from Stratum I (n=894). Indeterminate and cut nails were found in Stratum II and III, where present. In general, most architectural artifacts were found in Stratum I, which appeared to be associated with the collapse of the building, resulting in a mix of temporal artifacts.

6.4.3 Foodways Artifacts

Foodways artifacts make up approximately 24 percent of the site assemblage (n=1,693). These materials include faunal and floral remains, artifacts related to food procurement, food service and storage items, and general foodways (Table 6-11). General foodways artifacts dominate the assemblage because most artifacts were highly fragmented and therefore their form and specific function could not be determined. The distribution of foodways artifacts from the STPs suggests refuse was discarded downhill from the house, towards the slope to the drainage to the south and east. Foodways artifacts recovered from the outbuilding area (TUs 1 and 2) consisted of bottle glass. Artifacts from the spring box (TU 3) likewise primarily consisted of bottle glass, although three ceramic sherds were also recovered. Most foodways artifacts were recovered from TU 6 on the west side of the house (n=606).

Table 6-11. Summary and Distribution of Foodways Artifacts

		TU								STP	Total
Subgroup	**Class**	**1**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		
Faunal	Fauna					5	4			2	11
Floral	Flora							1			1
General Foodways	Ceramic		2	4	13	168	26	16	39	39	307
	Glass	17	102	15	57	299	200	252	113	59	1,114
Procurement	Lithic					1					1
	Metal					5	14	7	1	1	28
Service	Ceramic				1	21	1	1	1	3	28
	Glass				1	3	1				5
Storage	Ceramic		1	1	21	55	2	15	4	3	102
	Glass		8		2	42	12	3	4	16	87
	Metal					5		1		1	7
	Synthetic					2					2
Total		**17**	**113**	**20**	**95**	**606**	**260**	**296**	**162**	**124**	**1,693**

6.4.3.1 Faunal and Floral

Faunal remains consisted of 11 fragments of mammal bone. The bone included two large mammal bones, eight medium mammal bones, and one indeterminate bone fragment. Two medium mammal rib bone fragments had cut marks. Floral remains consisted of one nutshell; however, the site was surrounded by black walnut trees at the time of the survey, and the nut shell may represent incidental inclusion. Oyster and other mollusk shell was notably lacking.

6.4.3.2 Procurement

The 29 procurement artifacts included a gun flint fragment, nine lead bullets, and 19 shell casings. The bullet casings included small historic copper alloy casings to more modern shotgun shells. Most casings could not be definitively dated. Historic use as well as modern recreational activities may be reflected.

6.4.3.3 Service, Storage, and General Foodways

The service, storage, and general foodways artifacts primarily consisted of glass (n=1,206) and ceramics (n=437). Other artifacts included three crown bottle caps, two pieces of metal canning jar lightning closures (1882-present), two metal screw-top canning jar lids, and two hard rubber liquor bottle caps (c. 1890-1920).

Ceramics

The 437 ceramic fragments included a variety of coarse and refined wares spanning the mid eighteenth through twentieth centuries (Table 6-12; Figures 6-22 and 6-23). The dates of some ceramics with long manufacture ranges (e.g., whiteware) were refined where possible based on decoration. Most diagnostic ceramic sherds date to the early to late nineteenth century. The mean ceramic date is 1848.

Table 6-12. Ceramic Types

Date Range	Ware	Count
1750-1850	Stoneware, Black Basalt	3
1762-1820	Creamware, Plain	2
1770-1900	Refined Earthenware, Slip Decorated	12
1775-1840	Pearlware, Plain	95
1775-1840	Pearlware, Slip Decorated, Banded	2
1780-1815	Stoneware, Castleford	2
1783-1830	Pearlware, Transfer Printed, Blue	2
1790-1940	North American, Salt Glazed, Gray/Buff Bodied	11
1794-Present	Porcelain, Bone China	1
1795-1830	Pearlware, Painted, Polychrome and Earth Tone	35
1805-1920	Stoneware, Albany Slip	12
1809-1831	Pearlware, Edgeware, Neoclassical Straight Lines	4
1820-1859	Whiteware, Transfer Printed, Medium Blue	1
1820-1930	Whiteware, Sponged (General)	1
1820-Present	Whiteware, Plain	112
1830-1940	Rockingham	2
1840-1900	White Granite, Paneled	1
1840-1930	White Granite	8
1842-1930	Ironstone	13
1890-1920	Stoneware, Albany & Bristol Slip	6
1890-Present	Porcelain, Decal	2
1920-Present	Stoneware, Bristol Slip	1
Not datable	Redware	105
	Porcelain	1
	Refined Earthenware	3
Total		**437**

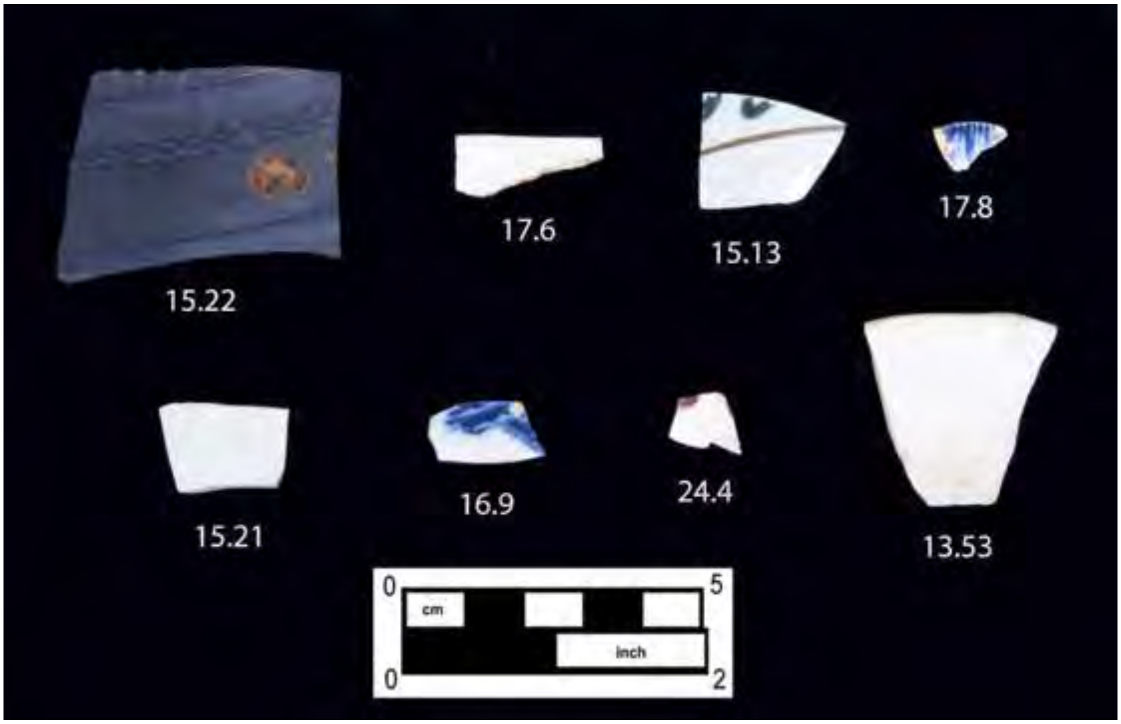


Figure 6-22. Sample of Refined Ceramics
15.22 = Basalt, 17.6 = Creamware, 15.13 and 17.8 = Pearlware, 15.21 = Castleford, 16.9 and 24.4 = Whiteware, 13.53 = White Granite

Figure 6-23. Sample of Utilitarian Ceramics
43.2 and 9.1 = Redware, 15.26 = Salt-Glazed Stoneware Bottle, 25.1 = Albany Slipped Stoneware, 23.19 = Albany/ Bristol Slipped Stoneware

As noted previously, few ceramic sherds were found outside of the immediate vicinity of the house, with two ironstone and one stoneware recovered from the spring box area (TU 3). In the vicinity of the house, no horizontal spatial distinction in ceramic date was present. Most of the ceramic sherds were recovered from TU 6 (n=244) with artifacts spanning the manufacture dates (Table 6-13). Few ceramics were found in TU 5 (n=35) upslope from the back of the house, and it appears refuse had been deposited downslope.

Table 6-13. Distribution of Ceramic Types

Ware	Simplified Date Range	TU							STPs	Total
		3	4	5	6	7	8	9		
Black Basalt	1750-1850				3					3
Bone China	1794-Present								1	1
Creamware	1762-1820		1		1					2
Castelford Stoneware	1780-1815				2					2
Pearlware	1775-1840		3	11	81	12	9	13	9	138
North American, Salt Glazed, Gray/Buff Bodied	1790-1940				10		1			11
North American Stoneware, Albany Slip	1805-1920	1			2	2	5	1	1	12
Whiteware	1820-Present			1	76	9	2	14	12	114
Rockingham	1830-1940				2					2
White Granite	1840-1930				6	3				9
Ironstone/Stone China/White Granite	1842-1930	2					1	4	6	13
North American Stoneware, Albany and Bristol Slip	1890-1920				1		4		1	6
Porcelain, Hard Paste	1890-Present				1				1	2
North American Stoneware, Bristol Slip	Post 1920				1					1
Porcelain						1				1
Redware			1	23	57	2	8	11	14	116
Unidentified Refined Earthenware					1		2	1		4
Total		**3**	**5**	**35**	**244**	**29**	**32**	**44**	**45**	**437**

Ceramics got older with depth to some extent, with Stratum III, where present, containing primarily late eighteenth to mid-nineteenth century artifacts and late nineteenth to twentieth century artifacts primarily recovered from upper levels of Stratum I. However, clear temporal stratification was not present (Table 6-14).

Table 6-14. Stratigraphic Distribution of Datable Ceramics from TUs

Date Range	Ware	Stratum I	Stratum II	Stratum III	Total
1750-1850	Black Basalt	1	2		3
1762-1820	Creamware	1		1	2
1770-1900	Unidentified Refined Earthenware		1		1
1775-1840	Pearlware	16	79	1	92
1780-1815	Castleford Stoneware		2		2
1783-1830	Pearlware, Blue Transfer Print		1		1
1795-1830	Pearlware, Polychrome Painted	4	22	2	28
1805-1920	North American, Slip Glazed	1	6		7
1809-1831	Pearlware, Shell Edged	1	2	1	4
1820-1859	Whiteware, Blue Transfer Print		1		1
1820-1930	Whiteware, Sponged	1			1
1820-Present	Whiteware	13	84	3	100
1830-1940	Rockingham	2			2
1840-1900	White Granite, Paneled	1			1
1840-1930	White Granite	8			8
1842-1930	Ironstone/Stone China/White Granite	3	4		7
1890-1920	North American, Albany and Bristol Slip Glazed	3	2		5
1890-Present	Porcelain, Hard Paste	1			1
1920-Present	North American, Bristol Slip Glazed	1			1
Pre 1870	Redware, Brown Glazed		11		11
Total		**57**	**217**	**8**	**282**

Most ceramic fragments were small, and therefore it was generally not possible to discern vessel forms. Thirty-four percent (n=148) of the ceramics are coarse earthenware, redware, and stoneware more often used for food storage and preparation. Most of the stoneware consisted of nineteenth century American-made types with Albany, Bristol, or a combination of slips. Discernable forms included bottles, storage jars, pans, and indeterminate hollowware vessels.

Sixty-six percent of the assemblage (n=289) are refined wares more often used for food serving and consumption. These include a variety of refined white ceramics and black basalt. Identifiable vessel forms consist primarily of table wares such as plates, bowls, and platters, and tea wares such as cups and saucers. Ironstone, white granite, and Rockingham ceramics, while technically refined wares, were often used for a variety of preparation, serving, and storage functions. Both refined and coarse wares were concentrated in TU 6; remaining TUs in the house area (TUs 5, 7, 8, and 9) included a low-density scatter of refined and coarse wares.

Glass

Like the ceramic fragments, glass from the site was highly fragmented. Glass fragments included 1,198 fragments likely from bottles or jars and eight fragments likely from tableware. Identifiable vessel forms included 25 fragments of milk bottles, nine jar fragments, six fragments of liquor bottles, and three flask fragments. Four milk glass lid liner fragments were also found.

Possible tableware includes six tumbler fragments, including one fragment of a Packer’s tumbler, which would have originally served as a jar containing goods and subsequently used as a drinking glass. One colorless fragment was from a stemware base, and one fragment was from a machine-molded paneled cruet.

Glass fragments with definitive evidence of the method of manufacture were primarily automatic machine-made, dating to the twentieth century (n=69). Six container glass fragments were mouth blown-in-mold, including one base made in a cup-bottom three-piece mold and one dip-molded bottle. These artifacts date to the nineteenth century. Table glass was press-molded. The glass fragments included a range of colors (Table 6-15). While the color of glass is not a definitive dating indicator because any color could have been made at any time, glass color can be used as a supporting indicator because certain colors were more commonly manufactured during certain periods (Lindsey 2019). Olive green glass generally dates to the eighteenth to mid-nineteenth centuries, colorless and aqua glass to the nineteenth to early twentieth centuries, and brown/ amber and green glass to the mid-nineteenth century to the present. Solarized glass indicates manufacture from the late nineteenth to early twentieth century. In general, the high numbers of container glass in comparison to ceramic fragments indicates the site was occupied into the late nineteenth to twentieth century after the advent of mass factory bottle production. Post-occupation use of the park and refuse disposal may also be represented.

Table 6-15. Glass Colors

Color	Count
Amber	416
Aqua	62
Aqua Green	5
Blue, Light	12
Cobalt	12
Colorless	670
Green	1
Olive Green	7
Solarized	1
White, Opaque	17
Yellow	3
Total	**1,206**

Glass fragments were dispersed across the site, with most glass recovered from the house and spring box areas (Table 6-16). While TU 6 contained the highest glass count, it was not as significantly different from the other TUs as was reflected in the ceramic distribution. I.e., while TU 6 yielded approximately 56 percent of the ceramics from the site, TU 6 contained only 28 percent of the site glass. Glass was primarily recovered from surface and Stratum I of the site (n=964, 81%), which is consistent with the artifacts reflecting the later occupation period of the site and potentially post-occupation deposition (Table 6-17).

Table 6-16. Horizontal Distribution of Foodways Glass

	TU									
Object	**1**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**STP**	**Total**
Bottle		8		2	9	4	2	4	7	36
Bottle, Liquor						6				6
Bottle, Milk					25					25
Bottle, Panel									1	1
Container Glass	12	15	10	47	283	165	248	58	7	845
Cruet				1						1
Drinking Glass, Stemware						1				1
Drinking Glass, Tumbler					3				3	6
Flask						2	1			3
Indeterminate	5	87	5	10	16	35	4	55	52	269
Jar					8				1	9
Lid Liner									4	4
Total	**17**	**110**	**15**	**60**	**344**	**213**	**255**	**117**	**75**	**1,206**

Table 6-17. Stratigraphic Distribution of Foodways Glass

Object	Stratum: Surface	I	II	III	Total
Bottle	6	25	5		36
Bottle, Liquor		6			6
Bottle, Milk		25			25
Bottle, Panel			1		1
Container Glass		763	79	3	845
Cruet		1			1
Drinking Glass, Stemware				1	1
Drinking Glass, Tumbler		5			5
Drinking Glass, Tumbler, Packer's			1		1
Flask		3			3
Indeterminate	8	126	123	12	269
Jar		9			9
Lid Liner	1	1	2		4
Total	**15**	**964**	**211**	**16**	**1,206**

6.4.4 Miscellaneous Artifacts

Miscellaneous artifacts represent materials of unknown form. This category primarily consisted of small flat iron fragments, potentially from foodways and other cans or metal roofing materials (Table 6-18). Miscellaneous artifacts were concentrated in TU 7 (n=173) and TU 9 (n=82), which included large pieces of metal roofing, suggesting the collected metal fragments primarily consisted of roofing materials.

Table 6-18. Miscellaneous Artifacts

Material	Object	Count
Glass	Stained glass.	2
Copper Alloy	"C" of rounded metal.	1
	Conical object open on both ends	1
Iron	Curved fragment	12
	Curved fragment with a small handle	1
	Flat Fragments.	309
	Conglomerate	22
	Indeterminate corroded objects	6
	Rods	12
	Large, flat circular object	1
	Rectangular bar	3
	Tube rim with internal threading. Possibly part of a hose, pipe, or fixture ring.	1
Lead	Flat circular top attached to a cylindrical hollow body	1
Rubber	Circular rubber cap	3
	Natural rubber handle	1
Slate	Indeterminate slate fragment	1
Total		**377**

6.4.5 Labor Artifacts

Labor artifacts from the site primarily consist of materials associated with heating and/ or cooking (Table 6-19). In addition, a porcelain electrical insulator and utilitarian slide buckle were found. Charcoal was concentrated on the north end of the house (TU 8) in the area suspected to have included the chimney. Coal was scattered across the house area.

Table 6-19. Labor Artifacts

Artifact	Count
Coal Fragment	24
Charcoal Fragment	74
Cinder	1
Slag	1
Iron Slide Buckle	1
Porcelain Insulator	1
Total	**102**

6.4.6 Personal Artifacts

Personal artifacts consisted of items owned or used by individuals. A variety of items were represented, including cosmetic, decorative, medicinal, recreational, and other items (Table 6-20; Figure 6-24). Most artifacts could not be dated, although the glass syringe and tobacco pipe fragments dated to the eighteenth to mid-nineteenth century, the pencil fragment and machined marble date to the mid-nineteenth century to present, and the machine-made medicine bottle dates to the late nineteenth to twentieth century. The decorative ring had been hand made.

Table 6-20. Personal Artifacts

			TU						
Subgroup	**Material**	**Object**	**5**	**6**	**7**	**8**	**9**	**STP**	**Total**
Cosmetic	Plastic	Comb		1					1
Decorative	Common Glass	Bead, Biconical		1					1
	Copper Alloy	Ring			1				1
Medicinal	Common Glass	Bottle, Medicine		9					9
	Non-Lead Glass	Syringe						1	1
Other	Copper Alloy	Pencil		1					1
		Pocket Watch		1					1
Recreational	Coarse Earthenware	Clay Pigeon						1	1
		Flowerpot	1		3	2	1		7
	Common Glass	Marble			1				1
	Copper Alloy	Indeterminate						1	1
	Iron	Watering Can			1				1
	White Ball Clay	Tobacco Pipe		5	2	1	1		9
Total			**1**	**18**	**8**	**3**	**2**	**3**	**35**

Figure 6-24. Sample of Personal Artifacts
18.23 = Ring, 58.13 = Tobacco Pipe Fragment, 13.63 = Plastic Comb, 13.77 = Watch

6.4.7 Clothing Artifacts

Seven clothing artifacts were recovered, including four buttons, a thimble, a grommet and a shoe sole (Table 6-21; Figure 6-25). Datable items dated to the mid-nineteenth to twentieth century.

Table 6-21. Clothing Artifacts

Subgroup	Material	Object	Date Range	TU			STP	Total
				4	6	7		
Fasteners	Common Glass	Button, Shank	1861-1901		1			1
	Porcelain	Prosser Button, 4 Hole	1840-1960		1		1	2
	Rubber	Button			1			1
Manufacture	Copper Alloy	Thimble		1				1
Other	Iron	Grommet				1		1
	Leather	Shoe/Boot Sole				1		1
Total				**1**	**3**	**2**	**1**	**7**

Figure 6-25. Clothing Artifacts
6.7 = Thimble, 49.6 = Prosser Button, 13.71 = Shank Button

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7. Summary and Recommendations

7.1 Summary

AECOM conducted a Phase II archaeological evaluation of 18CR293 as part of the Piney Run Watershed Study at the Piney Run Dam in Carroll County, Maryland. This study was undertaken in support of a concurrent Environmental Assessment and in advance of potential ground disturbing activities associated with the mitigation of design deficiencies identified at the dam. The APE for the archaeological survey is coterminous with the project area and encompasses approximately 20.47 ha (50.58 ac). AECOM identified 18CR293 during Phase I survey of the APE in 2019 and recommended the site potentially eligible for the NRHP (Regan 2020). The site could not be avoided and Phase II evaluation was conducted.

Site 18CR293 represents an early nineteenth to early twentieth century farmstead located in a small, unnamed stream valley near the southern edge of the APE. The archaeological evaluation consisted of the excavation of 22 STPs and 9 TUs. Judgmental STPs were placed in opportunistic locations to test specific landforms and/or features. Remaining STPs were excavated at 5-m intervals in the yard around the house. Three TUs were placed in the outbuilding area, with one TU placed in each of the three outbuildings (stone barn, agricultural building on piers, and the spring box).

The investigation resulted in the recovery of one prehistoric artifact and 7,089 historic artifacts ranging in date from the late eighteenth to twentieth century and the identification of six features. The site includes two loci, including an agricultural complex (Locus A) and a domestic area (Locus B). A small drainage separated the loci. Locus A features included a concrete silo foundation (Feature 1), a large stone barn foundation (Feature 2), a stone and concrete spring box (Feature 3), stone piers that supported an outbuilding (Feature 4), and a stone-paved road (Feature 6). The Locus B feature was the remains of a stone house foundation (Feature 5). No artifact-bearing soil features were found.

Most non-structural artifacts were small fragments, representing casual discard during occupation. The predominance of architectural artifacts in contrast to foodways indicates the site was likely abandoned with personal belongings removed prior to the building demise. The distribution of artifacts suggests that the residence was built in the early nineteenth century and the agricultural buildings were added in the late nineteenth century. While artifacts with manufacture date ranges extending back to the late eighteenth century were found, the predominance of pearlware and whiteware and lack of wrought nails is more indicative of a nineteenth century occupation.

The house appears to have had a stacked fieldstone foundation resting on subsoil. The large number of nails suggests the building had been of frame construction. Remnants of a metal standing seam roof were found to the north and on the east side of the house. The house likely fronted to the south, where significant amounts of window glass were recovered (TU 6). Window glass recovered from all TUs in the house area suggests windows may have been present on all sides. The presence of both cut and wire nails supports the interpretation that the house was built in the nineteenth century and maintained into the twentieth century. No interior features were found, and the house does not appear to have had a cellar. The north end of the house would have been partially below ground level, having been built into the slope. A large scatter of brick and stone rubble to the north of the house suggests that a chimney had been present on the rear of the building. The interior walls were finished with painted plaster. The presence of charcoal in TUs in the house suggests that the house had experienced a fire, although artifacts were not melted or significantly heat damaged, and the charcoal may have resulted from small-scale burning of refuse or clean-out of a hearth or stove.

A review of archival records suggests that the house was not the primary residence of the owners, but rather the home of a field hand, servant, or tenant farmer. No artifacts indicative of ethnicity were recovered. The house was built after 1783 when Samuel Smith patented “Charles Delight Enlarged”. William Patterson repatented the property as “Springfield” in 1827. There is no indication that Smith or Patterson lived on the property. William’s son, George Patterson, did live somewhere on the 1,759-acre property along with his wife and children, up to four free white people presumably working on the farm or mill on the property, and free and enslaved African Americans. The slave census lists up to 48 slaves in George Patterson's household prior to the Civil War. George Patterson was a wealthy farmer, and It is unlikely given the rudimentary construction of the house and its location on a narrow, low landform that the wealthy Patterson family lived at 18CR293.

When George Patterson died in 1869, the land passed to his daughter Florence Patterson Carroll. She died in 1879 and the property passed to her cousin, Frank Brown. Frank Brown sold the property to John Welbourn in 1886. The land changed hands multiple times in quick succession from 1886 through 1904. In 1904, the property was sold to Johnzie Beasman, who built a large Queen Anne-style home less than a mile southeast of 18CR293 and continued to work the farm. Beasman may have added the two stone farm buildings and spring box to support dairy farming, although one or more of the outbuildings may also have been added in the nineteenth century during the Carroll/ Brown ownership. The property passed to Johnzie Beasman's son, Frank, in 1922, who operated the dairy farm. While Frank Beasman continued to own the property, it appears based on aerial photographs that the house at 18CR293 had been abandoned by 1958. Artifacts suggest that the house was abandoned in the early twentieth century, although the barn may have remained in use later into the twentieth century by the Beasman family, who lived to the south.

7.2 NRHP Evaluation and Recommendations

To be eligible for inclusion in the NRHP, resources must meet one of four significance criteria outlined in 36 CFR 60. Properties may have local, regional, or national significance within these four criteria. The criteria are:

(a) Properties that are associated with events that have made a significant contribution to the broad patterns of our history; or
(b) Properties that are associated with the lives of persons significant in our past; or
(c) Properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
(d) Properties that have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one of the four National Register significance criteria, resources generally must be at least fifty years old, and possess integrity of location, setting, design, materials, workmanship, feeling, or association. Resources that possess integrity are able to convey important aspects of their past.

Site 18CR293 represents a nineteenth to twentieth century farmstead and is not associated with an event important to history (criterion a). The site had been occupied by unknown tenants and is not associated with a significant individual (criterion b). The domestic and agricultural foundations do not embody a distinctive or exceptional example or work of a master (criterion c).

While artifacts and features documented at 18CR293 provide information about the historic farmstead, artifacts were not well stratified. Soil layers were thin and included a mix of artifacts from the long occupation period. Most artifacts, ranging in date from the late eighteenth through twentieth century, were recovered from the upper stratum interpreted as associated with the demise of the building. Artifacts from Stratum II trended older than those from Stratum I, but the presence of small amounts of whiteware and machine-made glass indicates this stratum is also mixed. Investigation in the dwelling showed that the former stacked stone foundation had deteriorated with no intact foundation or subsurface features remaining. While the stone and concrete outbuilding foundations remain intact, artifact deposits in this area were minimal and primarily consisted of machine-made bottle glass and wire nails with limited research value. The site does not have potential to yield significant information about area history and the lives of the people who lived and worked on the site (criterion d) and does not retain a high level of integrity. Site 18CR293 is recommended not eligible for the NRHP.

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Appendix A Qualifications of Investigators

Scott Seibel, MSc, is a Registered Professional Archaeologist (RPA) with over 26 years of experience in cultural resources management who exceeds the Secretary of Interior (SOI) *Professional Qualifications Standards* for Archaeology and History and serves as a Deputy Department Manager for AECOM's Cultural Resources Department. Mr. Seibel has extensive experience in the design, management, and technical execution of cultural resources investigations throughout the United States. An archaeologist and AECOM-certified Project Manager, he routinely manages multi-disciplinary cultural resources projects with diverse project teams for a wide variety of private and public sector clients, and he has direct experience directly conducting and managing Phase I-Phase III cultural resources projects in Virginia and nationwide.

Heather Crowl, MA, RPA, has over 25 years of professional experience in prehistoric and historic archaeology, particularly in the Mid-Atlantic and East Coast regions of the United States. A majority of this experience is in cultural resources management for private, state, and federal compliance projects. She meets the Secretary of the Interior's Professional Qualification Standards for Archaeology (48FR44738-44739) and is a registered professional archaeologist. She received her BA in anthropology from the College of William & Mary in 1994 and MA in anthropology from American University in 2002. Ms. Crowl has extensive experience in the design, management, and technical execution of historical and archaeological investigations. She manages projects, directs archaeological field survey, evaluation, and excavation, and conducts cemetery delineations, artifact analysis, report writing, graphic preparation, and archival research.

Christine Nestleroth, MSc, RPA is a Registered Professional Archaeologist (RPA; #4901) with six years of experience in cultural resources management who exceeds the Secretary of Interior Standards for archaeology and history. She received a MSc in Conflict Archaeology and Heritage from the University of Glasgow in 2021 and a BS in Anthropology from Southern Methodist University in 2017. Ms. Nestleroth has experience in the Mid-Atlantic, Northeast, and Northwest regions of the United States. Most of this experience is in cultural resources management for the National Park Service and National Forest Service on federal compliance projects. Ms. Nestleroth has experience in the design, management, and execution of historical and archaeological investigations. As a Project Archaeologist/Field Director, she conducts monitoring, directs archaeological field survey, evaluation, and excavation, and conducts artifact analysis, report writing, graphic preparation, and archival research.

Sarah Traum, MA, is a senior architectural historian with over 23 years of experience as a cultural resources management professional who exceeds the Secretary of the Interior's (SOI) *Professional Qualifications Standards* for architectural history and history. Ms. Traum has extensive experience in conducting and managing historic architectural resource surveys, conducting historic research, and writing cultural resource surveys, preservation plans, historic structure reports, and National Register of Historic Places nominations. She has worked throughout the Mid-Atlantic and Midwest on projects for a variety of public sector and private clients.

Christina Sabol, MHP, is an architectural historian with over 6 years of experience as a cultural resources management professional who exceeds the Secretary of the Interior's (SOI) *Professional Qualifications Standards* for architectural history. Ms. Sabol has extensive experience in conducting historic architectural resource surveys; researching historic properties and communities; and writing architectural descriptions and historic contexts. At AECOM, she has conducted reconnaissance and intensive-level historic resource surveys, created GIS graphics, and prepared evaluations of significance and analysis of effects for projects on historic resources throughout the Mid-Atlantic.

Appendix B Artifact Catalog

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18CR293 Phase II Artifact Catalog

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0001.0001	1	-	I	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0002.0001	1	-	II	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0002.0002	1	-	II	10	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0002.0003	1	-	II	11	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0002.0004	1	-	II	1	Household/ Structural	Architectural/ Construction	Iron	Spike		
0002.0005	1	-	II	29	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0003.0001	1	-	III	1	Foodways	General Foodways	Common Glass	Indeterminate		Mold Blown, Indeterminate
0003.0002	1	-	III	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Mold Blown, Indeterminate
0003.0003	1	-	III	3	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0003.0004	1	-	III	8	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0003.0005	1	-	III	17	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0004.0001	2	-	I	12	Household/ Structural	Architectural/ Construction	Iron	Nail		Wire Wound
0004.0002	2	-	I	13	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0005.0001	3	-	I	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0005.0002	3	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0005.0003	3	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0005.0004	3	-	I	3	Foodways	Storage	Non-Lead Glass	Bottle		Machined
0005.0005	3	-	I	4	Foodways	Storage	Non-Lead Glass	Bottle		Machined
0005.0006	3	-	I	1	Foodways	Storage	Non-Lead Glass	Bottle		Machined
0005.0007	3	-	I	11	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0005.0008	3	-	I	3	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0005.0009	3	-	I	87	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0005.0010	3	-	I	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut, Hand Headed
0005.0011	3	-	I	3	Household/ Structural	Architectural/ Construction	Iron	Nail		Wire Wound
0006.0001	4	-	I	13	Household/ Structural	Architectural/ Construction	Coarse Earthenware	plaster		
0006.0002	4	-	I	9	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0006.0003	4	-	I	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Wire Wound
0006.0004	4	-	I	1	Labor	General	Wood	Charcoal		
0006.0005	4	-	I	20	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0006.0006	4	-	I	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		

18CR293 Phase II Artifact Catalog

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0006.0007	4	-	I	1	Clothing	Manufacture	Copper Alloy	Thimble		Indeterminate
0006.0008	4	-	I	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0006.0009	4	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Creamware	
0006.0010	4	-	I	3	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0006.0011	4	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Machined
0006.0012	4	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0006.0013	4	-	I	2	Foodways	General Foodways	Lead	Container Glass		Indeterminate
0006.0014	4	-	I	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0006.0015	4	-	I	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0007.0001	4	-	II	2	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0007.0002	4	-	II	12	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0007.0003	4	-	II	6	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0007.0004	4	-	II	2	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0007.0005	4	-	II	68	Household/ Structural	Architectural/ Construction	Composite	Mortar, Lime		
0007.0006	4	-	II	9	Labor	General	Wood	Charcoal Fragment		
0008.0001	4	-	III	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0008.0002	4	-	III	2	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0008.0003	4	-	III	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0008.0004	4	-	III	2	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0008.0005	4	-	III	3	Household/ Structural	Architectural/ Construction	Composite	Mortar, Lime		
0009.0001	5	-	I	19	Foodways	Storage	Coarse Earthenware	Jar, Storage	Redware, Brown Glazed	
0009.0002	5	-	I	1	Personal	Recreational	Coarse Earthenware	Flower Pot	Redware, Unglazed	
0009.0003	5	-	I	1	Foodways	Service	Refined Earthenware	Vessel, Flatware	Pearlware	
0009.0004	5	-	I	2	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0009.0005	5	-	I	10	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0009.0006	5	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0009.0007	5	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0009.0008	5	-	I	8	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0009.0009	5	-	I	12	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0009.0010	5	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0009.0011	5	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0009.0012	5	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0009.0013	5	-	I	1	Foodways	General Foodways	Lead	Container Glass		Indeterminate
0009.0014	5	-	I	1	Foodways	Service	Non-Lead Glass	Cruet		Machined
0009.0015	5	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0009.0016	5	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0009.0017	5	-	I	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0009.0018	5	-	I	12	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate

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CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0009.0019	5	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0010.0001	5	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0010.0002	5	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0010.0003	5	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0010.0004	5	-	II	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0010.0005	5	-	II	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0010.0006	5	-	II	5	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0010.0007	5	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0010.0008	5	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0010.0009	5	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0010.0010	5	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0010.0011	5	-	II	3	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0010.0012	5	-	II	2	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0010.0013	5	-	II	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0010.0014	5	-	II	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0010.0015	5	-	II	1	Prehistoric	Tools	Quartz	Projectile Point		
0011.0001	5	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0011.0002	5	-	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0012.0001	5	-	I & II	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Black Glazed	
0012.0002	5	-	I & II	2	Foodways	Storage	Common Glass	Bottle		Mold Blown, Indeterminate
0012.0003	5	-	I & II	3	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0012.0004	5	-	I & II	1	Foodways	General Foodways	Lead	Indeterminate		Indeterminate
0013.0001	6	-	I	1389	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0013.0002	6	-	I	155	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0013.0003	6	-	I	3	Foodways	General Foodways	Lead	Container Glass		Indeterminate
0013.0004	6	-	I	4	Household/ Structural	Furnishings/ Accessories	Lead	Lamp Glass		Indeterminate
0013.0005	6	-	I	1	Foodways	General Foodways	Lead	Container Glass		Indeterminate
0013.0006	6	-	I	1	Foodways	General Foodways	Lead	Container Glass		Mold Blown, Indeterminate
0013.0007	6	-	I	4	Foodways	Storage	Non-Lead Glass	Bottle, Milk		Mold Blown, Indeterminate
0013.0008	6	-	I	1	Foodways	Storage	Non-Lead Glass	Bottle, Milk		Machined
0013.0009	6	-	I	7	Foodways	Storage	Non-Lead Glass	Bottle, Milk		Machined
0013.0010	6	-	I	3	Foodways	Storage	Non-Lead Glass	Bottle, Milk		Mold Blown, Indeterminate
0013.0011	6	-	I	9	Foodways	Storage	Non-Lead Glass	Bottle, Milk		Machined
0013.0012	6	-	I	13	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0013.0013	6	-	I	1	Foodways	Storage	Non-Lead Glass	Bottle, Milk		Machined
0013.0014	6	-	I	4	Foodways	General Foodways	Non-Lead Glass	Container Glass		Machined
0013.0015	6	-	I	19	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0013.0016	6	-	I	3	Foodways	Service	Non-Lead Glass	Drinking Glass, Tumbler		Pressed
0013.0017	6	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Pressed
0013.0018	6	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Pressed
0013.0019	6	-	I	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0013.0020	6	-	I	4	Household/ Structural	Furnishings/ Accessories	Non-Lead Glass	Lamp, Chimney		Indeterminate

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CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0013.0021	6	-	I	7	Foodways	Storage	Non-Lead Glass	Bottle Closure		Mold Blown, Indeterminate
0013.0022	6	-	I	1	Foodways	Storage	Non-Lead Glass	Bottle Closure		Machined
0013.0023	6	-	I	10	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0013.0024	6	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0013.0025	6	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0013.0026	6	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0013.0027	6	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0013.0028	6	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Pressed
0013.0029	6	-	I	1	Labor	General	Common Glass	Slag		
0013.0030	6	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		mouth blown, general
0013.0031	6	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		mouth blown, general
0013.0032	6	-	I	8	Foodways	Storage	Common Glass	Jar, Unid.		Machined
0013.0033	6	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0013.0034	6	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Pressed
0013.0035	6	-	I	9	Personal	Medicinal	Common Glass	Bottle, Medicine		Machined
0013.0036	6	-	I	1	Foodways	Storage	Common Glass	Bottle		Indeterminate
0013.0037	6	-	I	4	Foodways	General Foodways	Common Glass	Container Glass		Machined
0013.0038	6	-	I	3	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0013.0039	6	-	I	50	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0013.0040	6	-	I	2	Miscellaneous	Unknown	Common Glass	Flat Glass		Indeterminate
0013.0041	6	-	I	1	Personal	Decorative	Common Glass	Bead, Biconical		Pressed
0013.0042	6	-	I	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0013.0043	6	-	I	2	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0013.0044	6	-	I	2	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0013.0045	6	-	I	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Black Glazed	
0013.0046	6	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	Black Basalt	
0013.0047	6	-	I	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Rockingham	
0013.0048	6	-	I	1	Foodways	General Foodways	Stoneware	Indeterminate	North American, Salt Glazed, Gray/ Buff Bodied	
0013.0049	6	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0013.0050	6	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0013.0051	6	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Slip Glazed	
0013.0052	6	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Slip Glazed	
0013.0053	6	-	I	1	Foodways	General Foodways	Refined Earthenware	Hollowware	White Granite	
0013.0054	6	-	I	1	Foodways	Service	Refined Earthenware	Plate, Dinner	White Granite	
0013.0055	6	-	I	1	Foodways	Service	Refined Earthenware	Saucer	White Granite	
0013.0056	6	-	I	3	Foodways	General Foodways	Refined Earthenware	Hollowware	White Granite	
0013.0057	6	-	I	10	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0013.0058	6	-	I	1	Foodways	General Foodways	Refined Earthenware	Hollowware	Whiteware	
0013.0059	6	-	I	1	Foodways	General Foodways	Refined Earthenware	Hollowware	Pearlware	
0013.0060	6	-	I	3	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0013.0061	6	-	I	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0013.0062	6	-	I	1	Foodways	General Foodways	Porcelain	Hollowware	Porcelain, Hard Paste	

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CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0013.0063	6	-	I	1	Personal	Cosmetic	Plastic	Comb		Molded
0013.0064	6	-	I	1	Miscellaneous	Unknown	Rubber	Indeterminate		Molded
0013.0065	6	-	I	1	Foodways	Storage	Rubber	Cap		Molded
0013.0066	6	-	I	1	Foodways	Storage	Rubber	Cap		Molded
0013.0067	6	-	I	2	Miscellaneous	Unknown	Rubber	Indeterminate		molded
0013.0068	6	-	I	4	Labor	General	Coal	Coal		
0013.0069	6	-	I	1	Clothing	Fasteners	Rubber	Button		Molded
0013.0070	6	-	I	1	Clothing	Fasteners	Porcelain	Button, 4 Holes		Pressed
0013.0071	6	-	I	1	Clothing	Fasteners	Common Glass	Button, Shank		Mold Blown, Indeterminate
0013.0072	6	-	I	1	Foodways	Procurement	Lead	Bullet		
0013.0073	6	-	I	2	Foodways	Procurement	Copper Alloy	Artillery Shell		Molded
0013.0074	6	-	I	1	Foodways	Procurement	Copper Alloy	Artillery Shell		Molded
0013.0075	6	-	I	1	Foodways	Procurement	Steel	Artillery Shell		Molded
0013.0076	6	-	I	1	Personal	Other	Copper Alloy	Pencil		Molded
0013.0077	6	-	I	1	Personal	Other	Copper Alloy	Pocket Watch		Indeterminate
0013.0078	6	-	I	3	Household/ Structural	Hardware	Iron	Fence Staple		Indeterminate
0013.0079	6	-	I	1	Labor	Agricultural	Iron	Buckle, Slide		Indeterminate
0013.0080	6	-	I	1	Miscellaneous	Unknown	Copper Alloy	Indeterminate		Indeterminate
0013.0081	6	-	I	1	Foodways	Storage	Copper Alloy	Jar		Molded
0013.0082	6	-	I	1	Foodways	Storage	Iron	Jar		Molded
0013.0083	6	-	I	2	Foodways	Storage	Iron	bottle, Closure		
0013.0084	6	-	I	1	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0013.0085	6	-	I	1	Foodways	Storage	Iron	Bottle Cap		Indeterminate
0013.0086	6	-	I	1	Household/ Structural	Hardware	Iron	Washer		Indeterminate
0013.0087	6	-	I	14	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0013.0088	6	-	I	16	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0013.0089	6	-	I	37	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0013.0090	6	-	I	2	Household/ Structural	Architectural/ Construction	Iron	Nail, Wire		Wire Wound
0013.0091	6	-	I	23	Household/ Structural	Architectural/ Construction	Iron	Nail, Cut		Cut
0013.0092	6	-	I	15	Household/ Structural	Architectural/ Construction	Iron	Nail, Cut		Cut
0013.0093	6	-	I	32	Household/ Structural	Architectural/ Construction	Iron	Nail, Cut		Cut
0015.0001	6	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0015.0002	6	-	II	14	Foodways	Storage	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0015.0003	6	-	II	9	Foodways	Storage	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0015.0004	6	-	II	2	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0015.0005	6	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0015.0006	6	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0015.0007	6	-	II	11	Foodways	Storage	Coarse Earthenware	Pan/ Dish	Redware, Brown Glazed	
0015.0008	6	-	II	4	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Unid.	
0015.0009	6	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0015.0010	6	-	II	1	Foodways	Service	Refined Earthenware	Vessel, Hollowware	Pearlware	
0015.0011	6	-	II	3	Foodways	Service	Refined Earthenware	Vessel, Hollowware	Pearlware	
0015.0012	6	-	II	9	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0015.0013	6	-	II	1	Foodways	Service	Refined Earthenware	Vessel, Hollowware	Pearlware	
0015.0014	6	-	II	2	Foodways	Service	Refined Earthenware	Vessel, Flatware	Pearlware	
0015.0015	6	-	II	1	Foodways	Service	Refined Earthenware	Vessel, Hollowware	Pearlware	
0015.0016	6	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0015.0017	6	-	II	40	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0015.0018	6	-	II	5	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0015.0019	6	-	II	51	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0015.0020	6	-	II	1	Foodways	Service	Stoneware	Vessel, Hollowware	White Feldspathic Stoneware, "Castleford"	
0015.0021	6	-	II	1	Foodways	Service	Stoneware	Vessel, Hollowware	White Feldspathic Stoneware, "Castleford"	
0015.0022	6	-	II	1	Foodways	Service	Stoneware	Vessel, Hollowware	Black Basalt	
0015.0023	6	-	II	1	Foodways	General Foodways	Stoneware	Indeterminate	Black Basalt	
0015.0024	6	-	II	4	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0015.0025	6	-	II	3	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0015.0026	6	-	II	1	Foodways	Storage	Stoneware	Bottle, Unid.	North American, Salt Glazed, Gray/ Buff Bodied	
0015.0027	6	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0015.0028	6	-	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0015.0029	6	-	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0015.0030	6	-	II	2	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0015.0031	6	-	II	10	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0015.0032	6	-	II	5	Personal	Recreational	Refined Earthenware	Tobacco Pipe	White Ball Clay	
0015.0033	6	-	II	31	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0015.0034	6	-	II	8	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0015.0035	6	-	II	1	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0015.0036	6	-	II	3	Labor	General	Coal	Coal Fragment		
0015.0037	6	-	II	1	Miscellaneous	Unknown	Copper Alloy	Indeterminate		
0015.0038	6	-	II	4	Foodways	Faunal	Bone	Bone, Mandible		
0016.0001	6	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0016.0002	6	-	II	3	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0016.0003	6	-	II	2	Foodways	General Foodways	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0016.0004	6	-	II	1	Foodways	General Foodways	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0016.0005	6	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Unglazed	
0016.0006	6	-	II	6	Foodways	Service	Refined Earthenware	Saucer	Pearlware	
0016.0007	6	-	II	2	Foodways	General Foodways	Refined Earthenware	Vessel, Hollowware	Pearlware	
0016.0008	6	-	II	5	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0016.0009	6	-	II	1	Foodways	General Foodways	Refined Earthenware	Vessel, Hollowware	Whiteware	
0016.0010	6	-	II	8	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	

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CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0016.0011	6	-	II	1	Foodways	General Foodways	Stoneware	Indeterminate	North American, Salt Glazed, Gray/ Buff Bodied	
0016.0012	6	-	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0016.0013	6	-	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0016.0014	6	-	II	3	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0016.0015	6	-	II	5	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0016.0016	6	-	II	8	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0016.0017	6	-	II	2	Miscellaneous	Unknown	Iron	Indeterminate		
0016.0018	6	-	II	1	Foodways	Faunal	Bone	Bone, Mandible		
0016.0019	6	-	II	1	Foodways	Procurement	Flint, English	Gun Flint		
0017.0001	6	-	III	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0017.0002	6	-	III	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0017.0003	6	-	III	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0017.0004	6	-	III	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0017.0005	6	-	III	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Unidentified Refined Earthenware	
0017.0006	6	-	III	1	Foodways	Service	Refined Earthenware	Plate	Creamware	
0017.0007	6	-	III	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0017.0008	6	-	III	1	Foodways	Service	Refined Earthenware	Plate	Pearlware	
0017.0009	6	-	III	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0018.0001	7	-	I	397	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0018.0002	7	-	I	188	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0018.0003	7	-	I	180	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0018.0004	7	-	I	134	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0018.0005	7	-	I	3	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0018.0006	7	-	I	1	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0018.0007	7	-	I	1	Personal	Recreational	Iron	Watering Can		Indeterminate
0018.0008	7	-	I	31	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Mortar		
0018.0009	7	-	I	26	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0018.0010	7	-	I	2	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0018.0011	7	-	I	1	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0018.0012	7	-	I	2	Household/ Structural	Architectural/ Construction	Iron	Nail, Wire		Wire Wound
0018.0013	7	-	I	5	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0018.0014	7	-	I	8	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0018.0015	7	-	I	1	Clothing	Other	Iron	Grommet		Indeterminate
0018.0016	7	-	I	1	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0018.0017	7	-	I	11	Labor	General	Wood	Charcoal Fragment		
0018.0018	7	-	I	1	Labor	General	Coal	Coal Fragment		
0018.0019	7	-	I	1	Foodways	Procurement	Copper Alloy	Shotgun Shell Casing		Indeterminate
0018.0020	7	-	I	7	Foodways	Procurement	Copper Alloy	Rimfire casing		Indeterminate
0018.0021	7	-	I	1	Foodways	Procurement	Copper Alloy	Rimfire casing		Indeterminate
0018.0022	7	-	I	1	Household/ Structural	Furnishings/ Accessories	Non-Lead Glass	Lightbulb		
0018.0023	7	-	I	1	Personal	Decorative	Copper Alloy	Ring		Hand Wrought
0018.0024	7	-	I	1	Personal	Recreational	Common Glass	Marble		Machined
0018.0025	7	-	I	2	Foodways	Faunal	Bone	Bone, Rib		
0018.0026	7	-	I	1	Foodways	Faunal	Bone	Bone		
0018.0027	7	-	I	2	Personal	Recreational	Refined Earthenware	Pipe, Smoking	White ball clay	Molded
0018.0028	7	-	I	1	Personal	Recreational	Coarse Earthenware	Flower Pot	Redware, Unglazed	
0018.0029	7	-	I	3	Foodways	General Foodways	Refined Earthenware	Indeterminate	white Granite	
0018.0030	7	-	I	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0018.0031	7	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Mouth Blown, Unid.
0018.0032	7	-	I	7	Foodways	General Foodways	Milk Glass	Container Glass		Indeterminate
0018.0033	7	-	I	60	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0034	7	-	I	3	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0035	7	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0036	7	-	I	2	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0037	7	-	I	5	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0038	7	-	I	6	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0039	7	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0018.0040	7	-	I	1	Foodways	Storage	Common Glass	Bottle, Liquor		Mold Blown, Indeterminate
0018.0041	7	-	I	2	Foodways	Storage	Common Glass	Bottle, Liquor		Mold Blown, Indeterminate
0018.0042	7	-	I	2	Foodways	Storage	Common Glass	Bottle, Liquor		Mold Blown, Indeterminate
0018.0043	7	-	I	1	Foodways	Storage	Common Glass	Bottle, Liquor		Machined
0018.0044	7	-	I	2	Foodways	Storage	Common Glass	Bottle		Machined
0018.0045	7	-	I	2	Foodways	Storage	Common Glass	Flask		Machined
0018.0046	7	-	I	1	Foodways	General Foodways	Lead	Container Glass		Indeterminate
0018.0047	7	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Cup-Bottom Mold
0018.0048	7	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0018.0049	7	-	I	51	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0020.0001	7	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Brown Bodied	
0020.0002	7	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0020.0003	7	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0020.0004	7	-	I	1	Foodways	Storage	Common Glass	Bottle, Unid.		Machined
0020.0005	7	-	I	19	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0020.0006	7	-	I	12	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0020.0007	7	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0020.0008	7	-	I	2	Foodways	Procurement	White Metal	Bullet		
0020.0009	7	-	I	1	Foodways	Procurement	White Metal	Bullet		
0020.0010	7	-	I	1	Clothing	Other	Leather	Shoe/ Boot Sole		

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CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0020.0011	7	-	I	1	Foodways	General Foodways	Milk Glass	Indeterminate		Indeterminate
0020.0012	7	-	I	85	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0020.0013	7	-	I	2	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0020.0014	7	-	I	12	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0020.0015	7	-	I	2	Miscellaneous	Unknown	Iron	Indeterminate		
0020.0016	7	-	I	11	Miscellaneous	Unknown	Iron	Indeterminate		
0020.0017	7	-	I	13	Labor	General	Wood	Charcoal Fragment		
0021.0001	7	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0021.0002	7	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Unid.	
0021.0003	7	-	II	1	Personal	Recreational	Coarse Earthenware	Flower Pot	Redware, Unglazed	
0021.0004	7	-	II	1	Personal	Recreational	Coarse Earthenware	Flower Pot	Redware, Unglazed	
0021.0005	7	-	II	1	Foodways	Service	Refined Earthenware	Vessel, Holloware	Pearlware	
0021.0006	7	-	II	8	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0021.0007	7	-	II	6	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0021.0008	7	-	II	1	Foodways	General Foodways	Stoneware	Indeterminate	North American, Salt Glazed, Gray/ Buff Bodied	
0021.0009	7	-	II	1	Foodways	General Foodways	Porcelain	Indeterminate	Porcelain, Hard Paste	
0021.0010	7	-	II	4	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0021.0011	7	-	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0021.0012	7	-	II	1	Foodways	General Foodways	Milk Glass	Indeterminate		Indeterminate
0021.0013	7	-	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0021.0014	7	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0021.0015	7	-	II	3	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0021.0016	7	-	II	1	Foodways	Storage	Non-Lead Glass	Bottle, Unid.		Machined
0021.0017	7	-	II	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Machined
0021.0018	7	-	II	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0021.0019	7	-	II	10	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0021.0020	7	-	II	1	Miscellaneous	Unknown	Rubber	Indetermina		
0021.0021	7	-	II	1	Foodways	Procurement	White Metal	Bullet		
0021.0022	7	-	II	1	Foodways	Faunal	Bone	Bone, Long Bone		
0021.0023	7	-	II	3	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0021.0024	7	-	II	153	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0021.0025	7	-	II	8	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0021.0026	7	-	II	7	Miscellaneous	Unknown	Iron	Indeterminate		
0021.0027	7	-	II	4	Miscellaneous	Unknown	Iron	Indeterminate		
0022.0001	7	-	III	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0022.0002	7	-	III	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0022.0003	7	-	III	1	Foodways	Service	Lead	Drinking Glass, Stemware		Indeterminate
0022.0004	7	-	III	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0022.0005	7	-	III	1	Foodways	Procurement	White Metal	Bullet		

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0022.0006	7	-	III	2	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0022.0007	7	-	III	17	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0023.0001	8	-	I	8	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0023.0002	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0023.0003	8	-	I	1	Foodways	Storage	Non-Lead Glass	Bottle		Indeterminate
0023.0004	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Mouth
0023.0005	8	-	I	1	Foodways	Storage	Common Glass	Bottle		Mold Blown, Indeterminate
0023.0006	8	-	I	4	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0023.0007	8	-	I	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0023.0008	8	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Unidentified Refined Earthenware	
0023.0009	8	-	I	1	Foodways	General Foodways	Refined Earthenware	Hollowware	Unidentified Refined Earthenware	
0023.0010	8	-	I	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0023.0011	8	-	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0023.0012	8	-	I	1	Personal	Recreational	Refined Earthenware	Pipe, Smoking	white Ball Clay	Molded
0023.0013	8	-	I	2	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0023.0014	8	-	I	3	Household/ Structural	Architectural/ Construction	Iron	Nail, Wire		Wire Wound
0023.0015	8	-	I	1	Foodways	Storage	Iron	Bottle Cap		Indeterminate
0023.0016	8	-	I	3	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0023.0017	8	-	I	3	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0023.0018	8	-	I	1	Labor	General	Coal	Coal Fragment		
0023.0019	8	-	I	2	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Slip Glazed	
0023.0020	8	-	I	156	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Plaster		
0023.0021	8	-	I	155	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0023.0022	8	-	I	106	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0023.0023	8	-	I	2	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0023.0024	8	-	I	2	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0023.0025	8	-	I	31	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0023.0026	8	-	I	38	Labor	General	Wood	Charcoal Fragment		
0023.0027	8	-	I	3	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Unglazed	
0023.0028	8	-	I	1	Foodways	Floral	Nut Shell	Nut		
0024.0001	8	-	I	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Unid.	
0024.0002	8	-	I	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0024.0003	8	-	I	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Colorless Glaze	

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0024.0004	8	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0024.0005	8	-	I	12	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0024.0006	8	-	I	3	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0024.0007	8	-	I	7	Household/ Structural	Architectural/ Construction	Composite	Mortar, Lime		
0025.0001	8	-	II	4	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0025.0002	8	-	II	2	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0025.0003	8	-	II	1	Foodways	Storage	Refined Earthenware	Vessel, Hollowware	Pearlware	
0025.0004	8	-	II	4	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0025.0005	8	-	II	1	Foodways	Procurement	White Metal	Bullet		
0025.0006	8	-	II	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0025.0007	8	-	II	2	Household/ Structural	Architectural/ Construction	Composite	Mortar, Lime		
0025.0008	8	-	II	35	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0026.0001		-JUD 01	I	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0026.0002		-JUD 01	I	1	Miscellaneous	Unknown	Lead	Indeterminate		
0026.0003		-JUD 01	I	5	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0026.0004		-JUD 01	I	2	Miscellaneous	Unknown	Iron	Indeterminate		
0027.0001		-JUD 02	I	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0028.0001		-JUD 03	I	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Black Glazed	
0028.0002		-JUD 03	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0028.0003		-JUD 03	I	2	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0028.0004		-JUD 03	I	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0028.0005		-JUD 03	I	1	Foodways	Faunal	Bone	Bone, Long Bone		
0029.0001		-JUD 17	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0029.0002		-JUD 17	II	1	Foodways	Storage	Non-Lead Glass	Drinking Glass, Tumbler, Packer's		Pressed
0029.0003		-JUD 17	II	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0030.0001		-JUD 19	II	1	Foodways	Service	Porcelain	Vessel, Hollowware	Porcelain, Hard Paste	
0031.0001		-Surface		1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0031.0002		-Surface		1	Foodways	Storage	Non-Lead Glass	Bottle, Unid.		Mold Blown, Indeterminate
0031.0003		-Surface		1	Foodways	Storage	Common Glass	Bottle, Unid.		Mold Blown, Indeterminate
0032.0001		-Surface		5	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0032.0002		-Surface		1	Foodways	Storage	Non-Lead Glass	Bottle, Unid.		Machined

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0032.0003		-Surface		1	Foodways	Storage	Non-Lead Glass	Bottle, Unid.		Machined
0032.0004		-Surface		1	Foodways	Storage	Non-Lead Glass	Bottle, Unid.		Machined
0032.0005		-Surface		1	Foodways	Storage	Non-Lead Glass	Bottle, Unid.		Machined
0032.0006		-Surface		3	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0032.0007		-Surface		1	Foodways	Storage	Common Glass	Lid Liner		Pressed
0032.0008		-Surface		3	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0032.0009		-Surface		1	Household/ Structural	Hardware	Iron	Hinge		
0033.0001	8	-	I	459	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0033.0002	8	-	I	188	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0033.0003	8	-	I	9	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0033.0004	8	-	I	7	Household/ Structural	Architectural/ Construction	Iron	Nail		Machined
0033.0005	8	-	I	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0033.0006	8	-	I	59	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0033.0007	8	-	I	6	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0033.0008	8	-	I	135	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0009	8	-	I	6	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0010	8	-	I	6	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0011	8	-	I	9	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0012	8	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0013	8	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0014	8	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Machined
0033.0015	8	-	I	3	Foodways	General Foodways	Common Glass	Container Glass		Machined
0033.0016	8	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0033.0017	8	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0033.0018	8	-	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0033.0019	8	-	I	5	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0033.0020	8	-	I	3	Foodways	General Foodways	Milk Glass	Container Glass		Indeterminate
0033.0021	8	-	I	2	Personal	Recreational	Coarse Earthenware	Flower Pot	Redware, Unglazed	
0033.0022	8	-	I	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0033.0023	8	-	I	4	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0033.0024	8	-	I	1	Foodways	Service	Refined Earthenware	Teaware, General	Pearlware	
0033.0025	8	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0033.0026	8	-	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0033.0027	8	-	I	1	Foodways	General Foodways	Refined Earthenware	Hollowware	Pearlware	
0033.0028	8	-	I	2	Labor	General	Wood	Charcoal		
0033.0029	8	-	I	6	Foodways	Procurement	Copper Alloy	Bullet Shell Casing		Indeterminate
0033.0030	8	-	I	52	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0033.0031	8	-	I	7	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate

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0033.0032	8	-	I	1	Foodways	Storage	Non-Lead Glass	Flask		Mold Blown, Indeterminate
0033.0033	8	-	I	2	Foodways	General Foodways	Non-Lead Glass	Container Glass		Machined
0033.0034	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Machined
0033.0035	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0033.0036	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0033.0037	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0033.0038	8	-	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0034.0001		-4	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0034.0002		-4	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0034.0003		-4	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0034.0004		-4	II	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0034.0005		-4	II	2	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0034.0006		-4	II	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0034.0007		-4	II	1	Miscellaneous	Unknown	Slate	Indeterminate		
0034.0008		-4	II	1	Labor	General	Coal	Coal Fragment		
0034.0009		-4	II	1	Foodways	Faunal	Bone	Bone		
0035.0001		-5	II	1	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0035.0002		-5	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0036.0001		-6	II	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0036.0002		-6	II	2	Foodways	General Foodways	Lead	Indeterminate		Indeterminate
0036.0003		-6	II	2	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0036.0004		-6	II	7	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0036.0005		-6	II	2	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0036.0006		-6	II	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0036.0007		-6	II	1	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0037.0001		-7	II	1	Foodways	General Foodways	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0037.0002		-7	II	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0037.0003		-7	II	2	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0037.0004		-7	II	1	Foodways	Storage	Milk Glass	Lid Liner		Pressed
0037.0005		-7	II	3	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0038.0001		-8	I	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0038.0002		-8	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0038.0003		-8	I	3	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0038.0004		-8	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0038.0005		-8	I	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0039.0001		-8	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0039.0002		-8	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0040.0001	8	-	II	1	Household/ Structural	Hardware	Iron	Screw		

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0040.0002	8	-	II	1	Foodways	General Foodways	Stoneware	Indeterminate	North American, Salt Glazed, Gray/ Buff Bodied	
0040.0003	8	-	II	2	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0040.0004	8	-	II	3	Household/ Structural	Architectural/ Construction	Composite	Mortar, Lime		
0040.0005	8	-	II	16	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0040.0006	8	-	II	1	Labor	General	Coal	Coal Fragment		
0041.0001		-9	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0041.0002		-9	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0041.0003		-9	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0041.0004		-9	II	1	Foodways	Service	Refined Earthenware	Vessel, Flatware	Ironstone/ Stone China/ White Granite	
0041.0005		-9	II	1	Foodways	General Foodways	Porcelain	Indeterminate	Bone China	
0041.0006		-9	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Mold Blown, Indeterminate
0041.0007		-9	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Mold Blown, Indeterminate
0041.0008		-9	II	1	Foodways	Storage	Milk Glass	Lid Liner		Pressed
0041.0009		-9	II	3	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0041.0010		-9	II	14	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0041.0011		-9	II	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0041.0012		-9	II	1	Miscellaneous	Unknown	Iron	Indeterminate		
0042.0001		-10	I	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0042.0002		-10	I	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0042.0003		-10	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0042.0004		-10	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0042.0005		-10	I	3	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0042.0006		-10	I	3	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0042.0007		-10	I	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0042.0008		-10	I	1	Personal	Recreational	Coarse Earthenware	Clay Pigeon	Unidentified Coarse Earthenware	
0043.0001		-10	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0043.0002		-10	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0043.0003		-10	II	3	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0043.0004		-10	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Unid.	
0043.0005		-10	II	1	Foodways	General Foodways	Refined Earthenware	Vessel, Hollowware	Pearlware	
0043.0006		-10	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0044.0001		-15	I	1	Foodways	Procurement	White Metal	Bullet		
0044.0002		-15	I	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0045.0001		-16	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate

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0045.0002		-16	I	3	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0045.0003		-16	I	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0046.0001		-16	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0047.0001		-20	I	18	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0047.0002		-20	I	1	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0047.0003		-20	I	1	Miscellaneous	Unknown	Iron	Indeterminate		Indeterminate
0048.0001		-20	I	1	Foodways	Storage	Aluminum	Bottle Cap		
0048.0002		-20	I	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0048.0003		-20	I	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0049.0001		-21	I	1	Foodways	General Foodways	Coarse Earthenware	Vessel, Holloware	Redware, Brown Glazed	
0049.0002		-21	I	1	Foodways	General Foodways	Refined Earthenware	Vessel, Holloware	Pearlware	
0049.0003		-21	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0049.0004		-21	I	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0049.0005		-21	I	3	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0049.0006		-21	I	1	Clothing	Fasteners	Porcelain	Button, 4 Holes		Pressed
0049.0007		-21	I	1	Household/ Structural	Hardware	Copper Alloy	Tack		
0049.0008		-21	I	1	Labor	General	Coal	Coal Fragment		
0049.0009		-21	I	10	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0049.0010		-21	I	7	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0050.0001		-22	I	4	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0050.0002		-22	I	1	Foodways	Service	Refined Earthenware	Vessel, Flatware	Pearlware	
0050.0003		-22	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0050.0004		-22	I	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0050.0005		-22	I	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Indeterminate
0050.0006		-22	I	1	Foodways	Storage	Non-Lead Glass	Jar		Mold Blown, Indeterminate
0050.0007		-22	I	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Pressed
0051.0001		-22	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Mold Blown, Indeterminate
0052.0001		-13	I	1	Personal	Medicinal	Non-Lead Glass	Syringe		Pressed
0052.0002		-13	I	2	Labor	General	Coal	Coal Fragment		
0052.0003		-13	I	8	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0052.0004		-13	I	12	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0052.0005		-13	I	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Cut
0052.0006		-13	I	1	Labor	Industrial	Porcelain	Insulator	Porcelain, American	
0053.0001		-13	II	2	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0053.0002		-13	II	6	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		

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0053.0003		-13	II	4	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0053.0004		-13	II	10	Labor	General	Charcoal	Coal Fragment		
0053.0005		-13	II	2	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0053.0006		-13	II	1	Miscellaneous	Unknown	Iron	Indeterminate		
0054.0001		-11	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0054.0002		-11	I	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0055.0001		-12	I	1	Personal	Recreational	Copper Alloy	Indeterminate		
0055.0002		-12	I	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0056.0001		-14	I	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0056.0002		-14	I	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0056.0003		-14	I	1	Foodways	Storage	Stoneware	Vessel, Hollowware	North American, Salt Glazed, Gray/ Buff Bodied	
0056.0004		-14	I	1	Foodways	Storage	Common Glass	Bottle, Unid.		Dip Mold
0056.0005		-14	I	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0056.0006		-14	I	2	Foodways	Storage	Non-Lead Glass	Drinking Glass, Tumbler		Pressed
0056.0007		-14	I	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Mold Blown, Indeterminate
0056.0008		-14	I	6	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0056.0009		-14	I	1	Foodways	Storage	Milk Glass	Lid Liner		Pressed
0056.0010		-14	I	11	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0056.0011		-14	I	3	Miscellaneous	Unknown	Iron	Indeterminate		
0057.0001		-14	II	1	Foodways	Storage	Common Glass	Bottle, Panel		Indeterminate
0057.0002		-14	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Mold Blown, Indeterminate
0057.0003		-14	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0057.0004		-14	II	1	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0057.0005		-14	II	1	Miscellaneous	Unknown	Iron	Indeterminate		
0058.0001	9	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0058.0002	9	-	II	3	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0058.0003	9	-	II	1	Personal	Recreational	Coarse Earthenware	Flower Pot	Redware, Unglazed	
0058.0004	9	-	II	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0058.0005	9	-	II	7	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0058.0006	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0058.0007	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0058.0008	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0058.0009	9	-	II	3	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0058.0010	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Unidentified Refined Earthenware	
0058.0011	9	-	II	2	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0058.0012	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	

18CR293 Phase II Artifact Catalog

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0058.0013	9	-	II	1	Personal	Recreational	Refined Earthenware	Tobacco Pipe	White Ball Clay	
0058.0014	9	-	II	1	Foodways	Storage	Common Glass	Bottle, Unid.		Mold Blown, Indeterminate
0058.0015	9	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0058.0016	9	-	II	3	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0058.0017	9	-	II	2	Foodways	General Foodways	Milk Glass	Indeterminate		Indeterminate
0058.0018	9	-	II	1	Foodways	Storage	Common Glass	Bottle, Unid.		Machined
0058.0019	9	-	II	1	Foodways	Storage	Common Glass	Bottle, Unid.		Machined
0058.0020	9	-	II	2	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0058.0021	9	-	II	3	Foodways	General Foodways	Common Glass	Container Glass		Mold Blown, Indeterminate
0058.0022	9	-	II	49	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0058.0023	9	-	II	2	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0058.0024	9	-	II	1	Foodways	General Foodways	Lead	Indeterminate		Indeterminate
0058.0025	9	-	II	1	Foodways	General Foodways	Lead	Indeterminate		Indeterminate
0058.0026	9	-	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0058.0027	9	-	II	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Machined
0058.0028	9	-	II	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate
0058.0029	9	-	II	26	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0058.0030	9	-	II	343	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0058.0031	9	-	II	1	Foodways	Procurement	White Metal	Bullet		
0058.0032	9	-	II	1	Labor	General	Wood	Cinder		
0058.0033	9	-	II	6	Household/ Structural	Architectural/ Construction	Coarse Earthenware	Brick		
0058.0034	9	-	II	11	Household/ Structural	Architectural/ Construction	Composite	Mortar, Lime		
0058.0035	9	-	II	77	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0058.0036	9	-	II	3	Miscellaneous	Unknown	Iron	Indeterminate		
0058.0037	9	-	II	76	Miscellaneous	Unknown	Iron	Indeterminate		
0059.0001	9	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Black Glazed	
0059.0002	9	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0059.0003	9	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0059.0004	9	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0059.0005	9	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0059.0006	9	-	II	1	Foodways	General Foodways	Coarse Earthenware	Indeterminate	Redware, Brown Glazed	
0059.0007	9	-	II	1	Foodways	Storage	Coarse Earthenware	Vessel, Hollowware	Redware, Brown Glazed	
0059.0008	9	-	II	9	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0059.0009	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Pearlware	
0059.0010	9	-	II	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Ironstone/ Stone China/ White Granite	
0059.0011	9	-	II	1	Foodways	General Foodways	Stoneware	Indeterminate	North American, Salt Glazed, Gray/ Buff Bodied	
0059.0012	9	-	II	1	Foodways	Storage	Common Glass	Bottle		Machined
0059.0013	9	-	II	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0059.0014	9	-	II	1	Foodways	General Foodways	Common Glass	Container Glass		Indeterminate
0059.0015	9	-	II	1	Foodways	General Foodways	Lead	Indeterminate		Indeterminate
0059.0016	9	-	II	1	Foodways	General Foodways	Non-Lead Glass	Container Glass		Mold Blown, Indeterminate

18CR293 Phase II Artifact Catalog

CatalogID	TUNum	STP	Strat	Artifact Count	Group_Orser	SubGroup_Orser	Material	Object	Ware	ManufactureTechnique
0059.0017	9	-	II	14	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Mold Blown, Indeterminate
0059.0018	9	-	II	2	Miscellaneous	Unknown	Iron	Indeterminate		
0059.0019	9	-	II	12	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0059.0020	9	-	II	117	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0060.0001	9	-	III	1	Foodways	Service	Refined Earthenware	Saucer	Pearlware	
0060.0002	9	-	III	1	Foodways	General Foodways	Refined Earthenware	Indeterminate	Whiteware	
0060.0003	9	-	III	1	Foodways	General Foodways	Common Glass	Indeterminate		Indeterminate
0060.0004	9	-	III	1	Foodways	General Foodways	Non-Lead Glass	Indeterminate		Indeterminate
0060.0005	9	-	III	14	Household/ Structural	Architectural/ Construction	Common Glass	Window Glass		
0060.0006	9	-	III	1	Household/ Structural	Architectural/ Construction	Iron	Nail		Indeterminate
0060.0007	9	-	III	1	Miscellaneous	Unknown	Iron	Indeterminate		

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Appendix F Evaluation of Potential Rehabilitation Projects and Population-at-Risk Worksheets

EVALUATION OF POTENTIAL REHABILITATION PROJECTS						
STATE	MD	DAM	Piney Run Dam	BY	AECOM	DATE 7/26/2021
YEAR BUILT	1974	DESIGN HAZARD CLASS	H	DRAINAGE AREA	10.6	mi^2
WORK PLAN DATE	5/1/1968	CURRENT HAZARD CLASS	H	DAM HEIGHT	73	ft
sht 1 of 5	CONSEQUENCES OF DAM FAILURE (ver. 2013-02)			NID ID	MD00139	

POTENTIAL DAM FAILURE:				
Total Failure Index			132	A
POTENTIAL LOSS OF LIFE:				
Maximum Population-at-Risk [PAR]		(number)	768	B
Total Risk Index			3,421	C
POTENTIAL LOSS OF PROPERTY:				
Identify major community affected by breach and rate impact as High (H), Medium (M), Low (L) or None(blank)				
Community	Sykesville, Marriotsville, Woodstock, Ellicott City, Elkridge	(H,M,L,-)	H	D
Number of homes, businesses, major buildings		(number)	181	E
POTENTIAL LIFELINE DISRUPTION:				
Water supply, identify community disrupted by dam failure, and estimate number/amount				
Municipal sole source	N/A	Users (number)	0	F
Supplemental source	Not currenlty, but potential future source	Users (number)	6,500	G
Irrigation water	N/A	Storage (Ac-Ft)	0	H
POTENTIAL INFRASTRUCTURE DISRUPTION:				
Transportation system crossings, identify major crossing rendered unusable by dam failure, and estimate number				
Major/Interstate	MD 32	Roads (number)	1	I
Secondary/County	County Roads, CSX Freight Rail Line	Roads (number)	45	J
POTENTIAL ADVERSE IMPACTS ON THE ENVIRONMENT:				
Describe impacts and rate each as High (H), Medium (M), Low (L), or None (blank)				
Threatened & endangered species		(H,M,L,-)	L	K
Sensitive riparian areas		(H,M,L,-)	L	L
Contaminated reservoir sediment	N/A	(H,M,L,-)	-	M
Wetland and wildlife habitat	Freshwater Emergent, Freshwater Forested/Shrub	(H,M,L,-)	L	N
Other	Trout habitat	(H,M,L,-)	M	O
POTENTIAL ADVERSE SOCIAL IMPACTS:				
Describe impacts and rate each as High (H), Medium (M), Low (L) or None(blank)				
Known cultural resources	Warfield Complex	(H,M,L,-)	M	P
Historic preservation issues	Warfield Complex	(H,M,L,-)	M	Q
Socially disadvantaged community	N/A	(H,M,L,-)	-	R
POTENTIAL ADVERSE ECONOMIC IMPACTS:				
Average annual benefits attributed to this dam, updated workplan value		($)	1.26M	S
Changes in benefits since workplan; Increase(I), No change(NC), Decrease(D)		(I,NC,D)	NC	T
Low income families impacted		(number)	0	U
INPUT BY STATE DAM SAFETY AGENCY:				
State dam safety order issued for repair, modification, removal issued, Yes(Y), No(N)		(Y,N)	N	V
State Dam Safety Agency Priority, High(H), Medium(M), Low(L), None(blank)		(H,M,L,-)	H	W
OTHER CONSIDERATIONS:				
Identify any other considerations and rate as High(H), Medium(M), Low(L) or None(blank)				
		(H,M,L,-)	-	X
		(H,M,L,-)	-	Y

EVALUATION OF POTENTIAL REHABILITATION PROJECTS

STATE	MD	DAM	Piney Run Dam	BY	AECOM	DATE	7/26/2021
sht 2 of 5			**FAILURE & RISK INDEXES**				ver 2013-02

Adopted from Bureau of Reclamation "Risk Based Profile System"

see: http://www.usbr.gov/dsis/risk/rbpsdocumentation.pdf

LIFE LOSS:

Population-at-Risk [PAR], see NRCS dams inventory definition (number of people)

Estimate PAR for static loading failure; typically assume water at or above invert of the lowest open channel auxiliary spillway	160	A
Estimate PAR for hydrologic loading failure; typically assume water at or above invert of the lowest open channel auxiliary spillway	768	B
Estimate PAR for seismic loading failure; typically assume water at or above invert of the lowest non-gated spillway (sunny day failure)	121	C

Fatality Rates [FR] from dam breach

Adopted from BuRec "A Procedure for Estimating Loss of Life Caused by Dam Failure" DSO-99-06

see: http://www.usbr.gov/research/dam_safety/documents/dso-99-06.pdf

Flood Severity/Lethality [DV] is the average depth [D] times velocity [V] across flood plain (ft2/sec)

DV= (breach discharge - bank full discharge) / breach floodplain width

Warning Time [T] between failure warning and flood wave at population (minutes)

Flood Severity Understanding [U] of the warning issuer of the likely flooding magnitude

Scenario	Breach Discharge (cfs)	Bankfull Discharge (cfs)	Breach Floodplain Width (ft)	DV (ft2/sec)	Warning Time, T (minutes)	Understanding, U (N/A or Vague)
Static	115,836	175	1100	105	57	Vague
Hydrologic	224,711	175	1300	173	36	Vague
Seismic	80,099	175	1100	73	58	Vague

For DV≥50	T≤60	U=vague	FR=0.04
	T>60		FR=0.03
For DV<50	T≤60	U=vague	FR=0.007
	T>60		FR=0.0003

Estimate FR for static loading failure scenario	0.04	D
Estimate FR for hydrologic loading failure scenario	0.04	E
Estimate FR for seismic loading failure scenario	0.04	F

Scenario	Load Factor	Response Factor	Failure Index	Fatality Rate	PAR	Risk Index
Static	1	25	25	0.04	160	160
Hydrologic	*	*	106	0.04	768	3,256
Seismic	0.15	7	1	0.04	121	5
		TOTAL=	132		TOTAL=	3,421

EVALUATION OF POTENTIAL REHABILITATION PROJECTS			
STATE MD **DAM** Piney Run Dam **BY** AECOM **DATE** 7/26/2021			
sht 3 of 5 — **STATIC FAILURE INDEX** — ver 2013-02			
PRINCIPAL SPILLWAY SYSTEM (60 points max): (total points)	10		A
Downstream filter or filter zone around conduit (yes=0 or no=10)		0	B
Conduit trench deep (>2d) and narrow (<3d) and steep sideslope (<2:1) (no=0 or yes=10)		0	C
Principal spillway system (inlet, pipe, or outlet) in deteriorated condition (no=0 or yes=10)		0	D
Conduit has seepage cutoff collars or other compaction adverse features (no=0 or yes=10)		10	E
Conduit contains open joints, open cracks, steady seepage (no=0 or yes=10)		0	F
Conduit founded on competent bedrock (yes=0 or no=10)		0	G
Reservoir control gate located at outlet of conduit (no=0 or yes=10)		0	H
RESERVOIR FILLING HISTORY (75 points max): (total points)	5		I
Reservoir has filled to x% of effective height (earth spillway crest minus original streambed)		100	J
(<50%=75 or 51-75%=50 or 76-90%=25 or 91-95%=10 or 96-100%=5 or >100%=0)		5	K
SEEPAGE AND DEFORMATION (85 points max): (total points)			L
Seepage carrying fines, or seepage increases with reservoir elevation increases, or sinkholes/jugholes exist in embankment (no=0 or yes=80)		0	M
Large amounts of seepage (no=0 or yes=6)		0	N
Visible and significant slope movement or sloughing (no=0 or yes=6)		0	O
Longitudinal or transverse embankment cracking greater than one foot in depth (no=0 or yes=6)		0	P
Sinkholes/depressions within two times effective height of the dam, either face (no=0 or yes=6)		0	Q
Poor top of dam condition, eroded, trees, rodent holes, settlement (no=0 or yes=6)		0	R
Abnormally wet areas at downstream toe/groin of embankment (no=0 or yes=6)		0	S
Inadequate slope protection against erosion by rainfall or waves (no=0 or yes=6)		0	T
FOUNDATION GEOLOGY (41 points max): (total points)	6		U
Highly fractures rock under core (no=0 or treated=3 or untreated=30)		3	V
Karst terrain and soluble rock (gypsum or limestone) (no=0 or treated=3 or untreated=30)		0	W
Collapsible soils (no=0 or treated=3 or untreated=30)		0	X
Significant stress relief fractures in abutments (no=0 or treated=3 or untreated=30)		0	Y
History of underground mining under embankment area (no=0 or treated=3 or untreated=30)		0	Z
Coarse grained and highly permeable soils (no=0 or yes=3)		0	AA
Presence of weak layers/conditions diminishing embankment stability (no=0 or yes=3)		0	AB
Erodible soils (sandy/silty materials) or weakly cemented rock (no=0 or yes=3)		3	AC
Reservoir area prone to landslides that could cause overtopping (no=0 or yes=3)		0	AD
EMBANKMENT DESIGN AND CONSTRUCTION (24 points max): (total points)	4		AE
Filters for core or foundation or incompatibility between zones (no=4 or yes=0)		0	AF
Embankment or foundation drainage system (yes=0 or no=4)		0	AG
Erodible core material (sands, silts, dispersive clays) (no=0 or yes=4)		4	AH
Incomplete or no foundation cutoff of shallow permeable layers (no=0 or yes=4)		0	AI
Poorly placed earthfill, inadequate density (no=0 or yes=4)		0	AJ
Gate features to drain reservoir (yes=0 or no=4)		0	AK
EMBANKMENT MONITORING (15 points max): (total points)			AL
Instruments (except surficial survey points) installed at dam (yes=0 or no=4)		0	AM
Installed instruments routinely read and evaluated (yes=0 or no=4)		0	AN
Visual inspection of dam by engineer less often than yearly (no=0 or yes=4)		0	AO
Good physical/visual access to downstream groin/toe for inspection (yes=0 or no=4)		0	AP
STATIC FAILURE INDEX: A+I+L+U+AE+AL		25	AQ

EVALUATION OF POTENTIAL REHABILITATION PROJECTS							
STATE	MD	DAM	Piney Run Dam	BY	AECOM	DATE	7/26/2021
sht 4 of 5	HYDROLOGIC FAILURE INDEX					ver 2013-02	

HYDROLOGIC LOADING:							
Total Spillway Capacity (PS&ES) for 6hr storm [Pfb], Work Plan Tbl 3 (rainfall inches)						24.2	A
Obtained from Work Plan Tbl 3, or dams inventory data, or computer routings							
100 year, 6hr rainfall [P100] (inches)						5.3	B
Probable Maximum Precipitation [PMP] (inches)						26.3	C
if Pfb <=	P100	=	5.29	enter	40		
if Pfb =	P100+0.2(PMP-P100)	=	9.49	enter	25		
if Pfb =	P100+0.4(PMP-P100)		13.69	enter	15		
if Pfb =	P100+0.6(PMP-P100)	=	17.90	enter	7		
if Pfb =	P100+0.8(PMP-P100)	=	22.10	enter	3		
if Pfb =>	PMP	=	26.30	enter	1		
Enter interpolated value						2	D
HYDROLOGIC UNCERTAINTY:							
Drainage Area [DA] (square miles)						10.6	E
DA<10 enter 1.5 ; 10<DA<20 enter 1.4 ; 20<DA<50 enter 1.3 ; DA=>50 enter 1.2						1.4	F
PIPE SPILLWAY PLUGGING:							
Pipe Diameter [D] (inches)						36	G
D<12 enter 1.1; 12<=D<24 enter 1.0; 24<=D enter 0.9						0.9	H
Riser & trash rack type:							
Non-standardized inlet enter 1.1, Open Top riser enter 1.0; Covered or Baffle Top enter 0.9						0.9	I
EARTH SPILLWAY FLOW:							
Earth spillway flow depth [Des] from top of dam to spillway crest (feet)(10' max)						10.0	J
DAM EROSION RESISTANCE:							
Non-plastic (PI<10) fill enter 2.0 ; Plastic core enter 1.7 ; Overtopping armoring enter 0.8						2.0	K
Vegetal Cover Factor [Cf], see SITES or AH667						0.9	L
http://www.pswcrl.ars.usda.gov/ah667/ah667.htm							
Cf <0.4 enter 1.1; Cf < 0.7 enter 1.0; Cf<1.0 enter 0.9; larger Cf enter 0.8						0.9	M
EARTH SPILLWAY EROSION RESISTANCE:							
Low, can be excavated with hand tools, enter 2.0							
PI>10 and SPT blows<8, PI<10 and SPT blows>8, Kh<0.10, seismic velocity<2000fps							
Moderate, can be excavated with construction equipment, easy ripping, enter 1.2							
PI>10 and SPT blows>8, PI<10 and SPT blows>30, Kh<10, seismic velocity<7000fps							
High, very hard ripping, requires drilling and blasting, enter 0.2							
moderately hard rock, Kh>10, seismic velocity>7000fps						2	N
Vegetal Cover Factor [Cf], see SITES or AH667						0.9	O
Cf <0.4 enter 1.1; Cf < 0.7 enter 1.0; Cf<1.0 enter 0.9; larger Cf enter 0.8						0.9	P
HYDROLOGIC FAILURE INDEX:							
dam overtopping breach: (2)(D)(F)(H)(I)(K)(M)						8	Q
earth spillway breach: (D+5J)(F)(H)(I)(N)(P)						106	R
larger of (2)(D)(F)(H)(I)(K)(M) or (D+5J)(F)(H)(I)(N)(P) but less than 300						106	S

EVALUATION OF POTENTIAL REHABILITATION PROJECTS									
STATE	MD	**DAM**	Piney Run Dam		**BY**	AECOM	**DATE**	7/26/2021	
sht 5 of 5	**SEISMIC FAILURE INDEX**							ver 2013-02	
SEISMIC LOADING:									
Latitude (degrees.decimal)								39.388	A
Longitude (degrees.decimal)								76.976	B
See "http://earthquake.usgs.gov/hazards/products/conterminous/2008/maps/" (MAP LINK)									
PGA [peak ground acceleration] for 2% chance in 50 years, see NSHM maps (%g)								19.00	C
if PGA is less than 10% g, enter 0									
if PGA is between 10% g and 19% g, enter 0.15									
if PGA is between 20% g and 39% g, enter 0.30									
if PGA is between 40% g and 59% g, enter 0.65									
if PGA is greater than 60% g, enter 1.0								0.15	D
FOUNDATION LIQUEFACTION:									
Select the following foundation conditions which best represents the site									
Loose alluvium, lacustrine, loess materials, enter 10									
Bedrock, glacial till, highly clayey materials, enter 5								5	E
EMBANKMENT FREEBOARD FOR FOUNDATION LIQUEFACTION:									
Dam height (ft)								73	F
Freeboard - Elevation difference from top of dam to assumed pool surface (ft)								17.5	G
Freeboard percent of dam height (%)								24	H
if Freeboard is less than 25% of dam height, enter 10									
if Freeboard is 25% to 50% of dam height, enter 5									
if Freeboard is more than 50% of dam height, enter 1								10	I
EMBANKMENT FREEBOARD FOR EMBANKMENT CRACKING:									
Freeboard is less than or equal to 15 feet (no=0 or yes=1)								0	J
EMBANKMENT CRACKING:									
Embankment contains self-healing filter zones (no=4 or yes=0)								0	K
SEISMIC FAILURE INDEX:									
IF E=10, L=(D)(E)(I) ; IF E=5, L=(D)(E)(J+1)(K+1)); but less than 100								1	L
	State Conservation Engineer's Signature								
	concurring with technical content of sheets 2 thru 5								

COMPUTATION OF POPULATION AT RISK (PAR) DURING DAM FAILURE

STATE	Maryland		BY	AECOM	DATE	7/26/21
DAM	Piney Run		CHECKED BY		DATE	
YEAR BUILT	1974	DESIGN HAZARD CLASS	H	DRAINAGE AREA	10.60	mi^2
WORK PLAN DATE	5/1/1968	CURRENT HAZARD CLASS	H	DAM HEIGHT	73	ft
sht 1 of 3	STATIC FAILURE SCENARIO (ver. 2013-01)				NID ID	MD00139

Structures (Elevated) Impacted by Potential Breach	Number of Structures			PAR per Exposure with Inundation Depths >=2.0 Ft.	PAR
	Inundation Depth Above Natural Ground		Total		
	<2.0 Ft	>=2.0 Ft.			
Mobile Homes	0	0		3	
Seasonal Use RV's	0	0		2	
Other	0	0			

Structures (With Foundations) Impacted by Potential Breach	Number of Structures			PAR per Exposure with Inundation Depths >=1.0 Ft.	PAR
	Inundation Depth Above Natural Ground		Total		
	<1.0 Ft	>=1.0 Ft.			
Homes	0	14	14	3	42
Seasonal Use Homes and Cabins	0	0		1.5	
Duplexes	0	0		5	
Apartments	0	0			
Commercial Buildings	0	13	13	4	52
Schools (In Use)	0	0			
Schools (Not in Use)	0	0			
Hospitals	0	0			
Church	0	1	1	25	25

Highways and Railroads	Number of Roads, Highways and Railways			PAR per Exposure with Inundation Depths >=1.0 Ft.	PAR
	Road Overflow Depth		Total		
	<1.0 Ft	>=1.0 Ft.			
Main Local Roads and Minor State Highways					
County Roads		16	16	2	32
Minor State Roads		1	1	2	2
Major State and Minor Federal Highways					
MD 32 (Sykesville Road)		1	1	4	4
				4	
Major Federal and Interstate Highways					
				8	
				8	
Railroads					
CSX		1	1	3	3
				20	
TOTAL NUMBER OF PEOPLE AT RISK (PAR)					**160**

COMPUTATION OF POPULATION AT RISK (PAR) DURING DAM FAILURE

STATE	Maryland		BY	AECOM	DATE	7/26/21
DAM	Piney Run		CHECKED BY		DATE	
YEAR BUILT	1974	DESIGN HAZARD CLASS	H	DRAINAGE AREA	10.60	mi^2
WORK PLAN DATE	5/1/1968	CURRENT HAZARD CLASS	H	DAM HEIGHT	73	ft
sht 3 of 3	SEISMIC FAILURE SCENARIO (ver. 2013-01)				NID ID	MD00139

Structures (Elevated) Impacted by Potential Breach	Number of Structures: Inundation Depth Above Natural Ground <2.0 Ft	Number of Structures: Inundation Depth Above Natural Ground >=2.0 Ft.	Total	PAR per Exposure with Inundation Depths >=2.0 Ft.	PAR
Mobile Homes	0	0		3	
Seasonal Use RV's	0	0		2	
Other	0	0			

Structures (With Foundations) Impacted by Potential Breach	Number of Structures: Inundation Depth Above Natural Ground <1.0 Ft	Number of Structures: Inundation Depth Above Natural Ground >=1.0 Ft.	Total	PAR per Exposure with Inundation Depths >=1.0 Ft.	PAR
Homes	0	14	14	3	42
Seasonal Use Homes and Cabins	0	0		1.5	
Duplexes	0	0		5	
Apartments	0	0			
Commercial Buildings	0	12	12	4	48
Schools (In Use)	0	0			
Schools (Not in Use)	0	0			
Hospitals	0	0			
Other	0	0			

Highways and Railroads	Number of Roads, Highways and Railways: Road Overflow Depth <1.0 Ft	Number of Roads, Highways and Railways: Road Overflow Depth >=1.0 Ft.	Total	PAR per Exposure with Inundation Depths >=1.0 Ft.	PAR
Main Local Roads and Minor State Highways					
County Roads		11	11	2	22
Minor State Roads		1	1	2	2
Major State and Minor Federal Highways					
MD 32 (Sykesville Road)		1	1	4	4
				4	
Major Federal and Interstate Highways					
				8	
				8	
Railroads					
CSX		1	1	3	3
				20	
TOTAL NUMBER OF PEOPLE AT RISK (PAR)					**121**

COMPUTATION OF POPULATION AT RISK (PAR) DURING DAM FAILURE

STATE	Maryland		BY	AECOM	DATE	7/26/21
DAM	Piney Run		CHECKED BY		DATE	
YEAR BUILT	1974	DESIGN HAZARD CLASS	H	DRAINAGE AREA	10.60	mi^2
WORK PLAN DATE	5/1/1968	CURRENT HAZARD CLASS	H	DAM HEIGHT	73	ft
sht 2 of 3	HYDROLOGIC FAILURE SCENARIO (ver. 2013-01)				NID ID	MD00139

Structures (Elevated) Impacted by Potential Breach	Number of Structures – Inundation Depth Above Natural Ground <2.0 Ft	Number of Structures – Inundation Depth Above Natural Ground >=2.0 Ft.	Total	PAR per Exposure with Inundation Depths >=2.0 Ft.	PAR
Mobile Homes	0	0		3	
Seasonal Use RV's	0	0		2	
Other	0	0			

Structures (With Foundations) Impacted by Potential Breach	Number of Structures – Inundation Depth Above Natural Ground <1.0 Ft	Number of Structures – Inundation Depth Above Natural Ground >=1.0 Ft.	Total	PAR per Exposure with Inundation Depths >=1.0 Ft.	PAR
Homes	5	53	58	3	159
Seasonal Use Homes and Cabins	0	0		1.5	
Duplexes	0	0		5	
Apartments	0	2	2	25	50
Commercial Buildings	6	81	87	5	405
Schools (In Use)	0	0			
Townhomes	1	14	15	2	28
Church	0	1	1	25	25
Uninhabited Buildings (e.g. Sheds)	0	30	30	0	0

Highways and Railroads	Number of Roads, Highways and Railways – Road Overflow Depth <1.0 Ft	Number of Roads, Highways and Railways – Road Overflow Depth >=1.0 Ft.	Total	PAR per Exposure with Inundation Depths >=1.0 Ft.	PAR
Main Local Roads and Minor State Highways					
County Roads		38	38	2	76
Minor State Roads		3	3	2	6
Major State and Minor Federal Highways					
MD 32 (Sykesville Road)		1	1	4	4
US 1 (Washington Boulevard)		1	1	4	4
Major Federal and Interstate Highways					
Interstate 895 (Harbor Tunnel Thruway)		1	1	8	8
				8	
Railroads					
CSX		1	1	3	3
				20	
TOTAL NUMBER OF PEOPLE AT RISK (PAR)					**768**