FERGUSON TOWNSHIP BOARD OF SUPERVISORS

Regular Meeting Agenda
Tuesday, November 15, 2022

7:00 PM

MEETING PARTICIPATION OPTIONS

VIRTUAL:

Join Zoom Meeting Link:
https://us02web.zoom.us/j/87031665680
Meeting ID: 870 3166 5680
Zoom Access Instructions

IN-PERSON:

Ferguson Township Municipal Building
Main Meeting Room
3147 Research Drive
State College, PA

I. **CALL TO ORDER**

II. **PLEDGE OF ALLEGIANCE**

III. **SWEARING IN OF COREY GRACIE-GRIFFIN AS AT-LARGE BOARD SUPERVISOR**

IV. **CITIZENS INPUT**

V. **APPROVAL OF MINUTES**

VI. **AUTHORITIES, BOARDS, AND COMMISSION REPORTS**

VII. **SPECIAL REPORTS**

VIII. **COG REGIONAL REPORTS**

IX. **STAFF REPORTS**

X. **UNFINISHED BUSINESS**

1. Continued Discussion of Millbrook Marsh Boardwalk Project
2. Review of CRCOG Structure and Park Governance
3. Conclude the review and discussion of the CRCOG 2023 Budget

XI. **NEW BUSINESS**

1. Consent Agenda
2. Public Hearing Resolution approving an amendment to CATA Articles of Incorporation
3. Recognition of Fire Chief Steve Bair
4. Contract 2022-C19 FTPW Building 3 Roof Replacement

XII. **COMMUNICATIONS TO THE BOARD**

XIII. **CALENDAR ITEMS**

XIV. **ADJOURNMENT**

TOWNSHIP OF FERGUSON
3147 Research Drive • State College, Pennsylvania 16801
Telephone: 814-238-4651 • Fax: 814-954-7642
www.twp.ferguson.pa.us

BOARD OF SUPERVISORS
Regular Meeting Agenda
Tuesday, November 15, 2022
7:00 p.m.

I. CALL TO ORDER

II. PLEDGE OF ALLEGIANCE

III. SWEARING IN OF COREY GRACIE-GRIFFIN AS AT-LARGE BOARD SUPERVISOR

IV. CITIZEN'S INPUT 5 minutes per resident

V. APPROVAL OF MINUTES

a. November 1, 2022 Board of Supervisors Regular Meeting Minutes

VI. AUTHORITIES, BOARDS, AND COMMISSIONS REPORT 15 minutes

1. University Area Joint Authority – Wes Glebe and Mark Kunkle

VII. SPECIAL REPORTS AND ACKNOWLEDGEMENTS 5 minutes

1. Diversity, Equity, and Inclusionary Acknowledgements – *National Native American, American Indian, and Alaskan Native Heritage Month, Veterans Day, Thanksgiving*
2. Township and Fiscal Responsibility – no report
3. Environment – no report.

VIII. COG AND REGIONAL COMMITTEE REPORTS 25 minutes

1. COG COMMITTEE REPORT
a. LUCI Committee
b. Joint Parks Capital Committee and CRPRA
c. Climate Action & Sustainability Committee
d. Joint Facilities, Parks Capital and CRPRA
e. Joint Public Safety, Land Use & Community Infrastructure committees
f. Human Resources Committee *cancellation notice*
g. Public Safety Committee *cancellation notice*

2. OTHER COMMITTEE REPORTS

IX. STAFF REPORTS

1. Township Manager's Report – *no written report*
2. Public Works Director Report
3. Planning and Zoning Report
4. Officer-In-Charge Report

X. UNFINISHED BUSINESS

1. CONTINUED DISCUSSION OF MILLBROOK MARSH BOARDWALK PROJECT 20 minutes
Chair Laura Dininni

Narrative
The Board is asked to review the Phase 2 feasibility study for further discussion.

Staff Recommendation
That the Board of Supervisors ***discuss*** the Millbrook Marsh Boardwalk Project.

2. REVIEW OF CENTRE REGION COUNCIL OF GOVERNMENTS (CRCOG) STRUCTURE AND PARK GOVERNANCE 45 minutes
Chair Laura Dininni

Narrative
The COG Park Governance Special Committee was established to work in concert with the Centre Region Parks and Recreation Authority and the municipalities to determine governance structure following a review of governing documents. Provided with the agenda are documents for the review and discussion of the Board.

Staff Recommendation
That the Board of Supervisors ***discuss*** the CRCOG structure and park governance.

3. CONCLUDE THE REVIEW AND DISCUSSION OF CENTRE REGION COUNCIL OF GOVERNMENTS (CRCOG) 2023 BUDGET 45 minutes
Chair Laura Dininni

Narrative
At the November 1, 2022, regular meeting, the Board decided to defer the review and discussion of the parks and recreation budgetary requests within the CRCOG 2023 Budget.

2023 DRAFT Centre Region Council of Governments Summary Budget

2023 DRAFT Centre Region Council of Governments Detailed Budget

Recommended Motion: That the Board of Supervisors direct the Township Manager to provide the Board's comments to the Executive Director of CRCOG.

Staff Recommendation
That the Board of Supervisors ***discuss*** the CRCOG 2023 budget.

XI. NEW BUSINESS

1. CONSENT AGENDA 5 minutes

a. Bike Pedestrian / Bike Lane Request Letter to PennDOT
b. Turnberry Master Plan Phasing Schedule Update
c. Foxpointe PRD Phasing Schedule Update
d. Landings PRD Phasing Schedule Update
e. August Treasurer's Report – *for acceptance*

2. PUBLIC HEARING ON A RESOLUTION OF THE TOWNSHIP OF FERGUSON, CENTRE COUNTY, PENNSYLVANIA, ADOPTING AND APPROVING AN AMENDMENT TO THE ARTICLES OF INCORPORATION OF THE CENTRE AREA TRANSPORTATION AUTHORITY, AS PROPOSED BY RESOLUTION OF THE BOARD OF SAID AUTHORITY; SETTING FORTH THE PROPOSED AMENDMENT; AND AUTHORIZING SAID AUTHORITY AND PROPER OFFICERS OF THE AUTHORITY TO EXECUTE, VERIFY AND FILE APPROPRIATE ARTICLES OF AMENDMENT. 15 minutes
Jaymes Progar, Assistant Township Manager

Narrative
The Articles of Incorporation under which CATA was organized as a municipal authority were approved by the Commonwealth of Pennsylvania on May 17, 1974. The Municipality Authorities Act sets a maximum term of existence of 50 years. An amendment to CATA's Articles of Incorporation is necessary to extend the life of the authority beyond 2024. Because amending the Articles is a multistep process requiring action on the part of all member municipalities, the process is being started now. It should be noted that this action is an administrative formality at the state level to continue CATA's existence and has no impact on ongoing discussions of local match shares.

Recommended Motion: That the Board of Supervisors adopt the resolution as proposed.

Staff Recommendation
That the Board of Supervisors ***adopt*** the resolution.

3. RECOGNITION OF SERVICE OF FIRE CHIEF STEVE BAIR 10 minutes
Centrice Martin, Township Manager

Narrative
The Board of Supervisors is asked to recognize Mr. Steven Bair, Fire Director for the Centre Region Council of Governments. Mr. Bair, who has served the Centre Region since 2007, will retire in December 2022. He is responsible for the Alpha Fire Company, the Centre Region Fire Marshal's Office, and Centre Region Emergency Management.

Staff Recommendation
That the Board of Supervisors ***recognize*** Fire Chief Steve Bair.

4. AWARD CONTRACT 2022-C19 FTPW BUILDING 3 ROOF REPLACEMENT 10 minutes
David Modricker, Public Works Director

Narrative
Due to the unresponsiveness of the low bidder for contract 2022-C19, staff recommends that the Board of Supervisors withdraw the award notice to the low bidder, and award the contract to the second low bidder. Details are included in the Public Works Director's memorandum to the Board dated November 8, 2022, and the Public Works Director's draft letter to the low bidder dated November 15, 2022.

Recommend Motion: That the Board of Supervisors withdraw the award of contract 2022-C19 FTPW Building 3 Roof Replacement to Jeffery S. Bickle dba J B Roofing in the amount of $24,336.00 due to unresponsiveness and award the contract to Mid-State Roofing and Coating, Inc., in the amount of $46,443.00.

Staff Recommendation
That the Board of Supervisors ***award*** Contract 2022-C19 as stated in the recommended motion.

XI COMMUNICATIONS TO THE BOARD

XII CALENDAR ITEMS – November/December

a. Pine Grove Mills SAP Advisory Committee - November 17, December 15
b. Tree Commission - November 21
c. Administrative Offices Closed in Observance of Thanksgiving, November 24, 25
d. Parks & Recreation Committee, December 8
e. Planning Commission, December 12

XIII. ADJOURNMENT

FERGUSON TOWNSHIP BOARD OF SUPERVISORS
Regular Meeting
Tuesday, November 1, 2022

ATTENDANCE

The Board of Supervisors held its first regular meeting of the month on Tuesday, November 1, 2022 as a hybrid meeting. In attendance were:

Board:	Laura Dininni, Chair	**Staff:**	Centrice Martin, Township Manager
	Lisa Strickland, Vice Chair		Dave Modricker, Director, Public Works
	Patti Stephens		Jaymes Progar, Assistant Township Manager
	Jeremie Thompson		Jenna Wargo, Director, Planning and Zoning
	Tierra Williams		Eric Endresen, Director, Finance

Others in attendance included: Rhonda Demchak, Recording Secretary; Eric Norenberg, Executive Director, COG; Bill Keough, Ferguson Township Planning Committee, and resident; Steve Miller, Ferguson Township resident; Joe Viglione, Finance Director, COG; Joe Lichty, Lichty Engineering

I. CALL TO ORDER

Ms. Dininni called the Tuesday, November 1, 2022, regular meeting to order at 7:05 p.m.

Ms. Martin thanked and welcomed everyone to the meeting and noted that the Board of Supervisors meeting had been advertised in accordance with the PA Sunshine Act as a hybrid meeting with an option to attend online utilizing zoom and the main meeting room for any public members to participant. Persons attending the meeting as members of the public and wanted to participate were asked to state their name, municipality, and topic. Members of the public are to be muted during the meeting and must be acknowledged by the Chair. Board members are asked to indicate their name when motioning or seconding a motion so that the minutes are accurate. Ms. Martin took Roll Call and there was a quorum.

Ms. Dininni reported that the Board of Supervisors held an Executive Meeting today regarding a property acquisition.

II. PLEDGE OF ALLEGIANCE

After the pledge, Ms. Dininni noted that tonight is Ms. Williams last Board of Supervisors meeting and thanked her for her service.

Ms. Williams stated that it was an honor to serve and hopes that more young diverse people take more interest in the community. Ms. Williams thanked the Board for all the equity and inclusion proposals that she suggested. Ms. Williams is moving to Delaware to take a new position. Ms. Williams wished Supervisor Thompson good luck and noted that she respected him for how he handled the 2021 election.

III. CITIZENS INPUT

There were no comments.

IV. APPROVAL OF MINUTES

Mr. Thompson noted that under Section 8 letter d, the word office should be officer.

Ms. Williams moved that the Board of Supervisors ***approve*** the regular meeting minutes of October 11, 2022, and the Worksession minutes of October 18, 2022. Ms. Stephens seconded the motion. The motion passed unanimously.

V. AUTHORITIES, BOARDS, AND COMMISIONS REPORT

1. State College Borough Water Authority
   Mr. Ford Stryker was not in attendance.

2. Centre Region Parks and Recreation Authority

   Mr. Bill Keough noted that his report is included in the agenda.

   Ms. Dininni thanked Mr. Keough for his detailed report and stated that the Facilities Committee will be scheduling an additional discussion regarding Whitehall Road Regional Park.

   Mr. Keough reported that maintenance staff for the Millbrook Marsh have been making small repairs on the walkway throughout the summer, but there are more sections that are deteriorated than first thought. Ms. Dininni reported that it was on the radar in the COG's CIP in 2015 as a liability and expressed concerns with the investment over time and who is responsible.

   Mr. Keough stated that it is a challenge to prepare the report because there are so many moving targets within the Parks and Recreation system regionally. Mr. Keough noted that if there is a certain topic the Board wants to hear about, he will prepare a report.

VI. SPECIAL REPORTS

1. Diversity, Equity, and Inclusionary Initiatives – National Native American, American Indian, and Alaskan Native Heritage Month, Veterans Day, Thanksgiving

2. Township and Fiscal Responsibility – Millbrook Marsh and Boardwalk Presentation

   Mr. Eric Norenberg, Executive Director, COG reported that the final report of the Phase II Feasibility Planning Study will be ready on November 9.

   A map of the Millbrook Marsh Nature Center was displayed, and Mr. Norenberg pointed out where the project will take place.

   Ms. Dininni asked who is on the Millbrook Marsh Nature Center Working Group. Mr. Norenberg noted the following:

   - Dr. Rick Marboe, PSU
   - Carla Stilson, College Township Council
   - Jere Northridge, College Township Staff
   - Amy Kerner, College Township Staff
   - Andrew Gutberlet, PSU
   - Kathy Matason, Parks and Recreation Authority
   - Melissa Kauffman, Supervisor, Millbrook Marsh Nature Center
   - Jim Carpenter, Manager, Centre Region Parks and Recreation
   - Pam Salokangas, Director, Centre Region Parks and Recreation

Mr. Norenberg noted the following are on the Millbrook Marsh Nature Center Advisory Committee:

- Kathy Matason Parks and Recreation Authority
- Tamea Kramer, PSU
- Deb Nardone. Clearwater Conservancy
- Deirdre Bauer, SCASD
- Trevor Burkenholt, PSU
- Joanne Sedwick, Centre County Historical Society
- Steve Lewinski, Bald Eagle Archeology Society
- Vacant - State College Borough
- Doug Wensel, Shaver's Creek Environmental

Members at large:

- Dr. Rick Marboe
- Jennifer Arndt
- Ian Salata
- Molly Hedrick
- Chris Hurley

Mr. Norenberg noted that 8 members can be part of the members at large and if someone from Ferguson Township would like to join, let him know.

Ms. Dininni suggested having the unit cost on the map at the Park Capital Committee Joint meeting so that the scope can be addressed.

Ms. Strickland stated that the estimates of $11 million and $6 million are very different.

Ms. Dininni noted that the correct players of the project should be included when the value of that asset and who it serves is talked about.

Mr. Keough stated that the staff at the authority are extremely busy with Whitehall Road Regional Park and the feedback that was mentioned tonight might not be able to get done by the joint meeting. Ms. Dininni stated that she concurs with Mr. Keough, but as an elected official then this project should not be brought to the elected officials because there will be questions that need to be answered.

Mr. Steve Miller, Ferguson Township resident, discussed the public access and the use as a park were taken on by the municipalities. All of the entities are involved in many different ways.

3. Community And Economic Development - Overview and Updates on the Chamber of Business and Industry of Centre County (CBICC) – no report.

4. Environment – no report.

VII. COG AND REGIONAL COMMITTEE REPORTS

1. COG COMMITTEE REPORTS

a. Facilities Committee

Ms. Stephens noted that the meeting was held that morning and the Whitehall Regional Park was pulled from the agenda. They discussed the COG Building Intermunicipal Agreement Modification and there was a vote to add additional language in which Ms. Stephens voted against. Ms. Stephens will write a report to be included in the next Board agenda.

b. Executive Committee

Ms. Strickland attended the meeting last month and noted that there is nothing to report that wasn't discussed at the General Forum.

2. OTHER COMMITTEE REPORTS

a. Public Safety

Ms. Stephens reported that the Public Safety meeting was cancelled but received an email about a fire extinguisher training system that is a $14,000 purchase. Ms. Stephens stated that she replied back to the email in support.

VIII. STAFF REPORTS

a. Township's Manger's Report

b. Public Works Director Report

c. Planning and Zoning Report

There were no comments made on the staff reports.

IX. UNFINISHED BUSINESS

1. Public Hearing – Amending Chapter 27, Zoning, Part 7, Supplemental Regulations, Section 710 Tower-Based Wireless Communications Facilities and Part 11, Section 1102

Ms. Wargo noted that the Small Wireless Facilities Deployment Act (Act 50) was signed into law on June 30, 2021 and was drafted in unison with the Pennsylvania Municipal League and telecommunications providers. The legislation provides for fair and equitable treatment of small wireless facilities and comprehensive protections for the municipality to ensure proper maintenance of public rights-of-way. At a Regular Meeting held on September 20, 2021, the Board of Supervisors authorized staff to prepare an amendment to the Wireless Communications Facilities Ordinance.

After further review by the Township Solicitor, staff has updated the draft amendments and included redlined drafts provided with the agenda for amendments to §27-710— Wireless Communications Facilities, §27-1102—Definitions and the establishment of Chapter 21, Streets and Sidewalks, Part 6, Non-Tower-Based or Small Wireless Communications Facilities in the Right-of-Way. The Board reviewed the drafts at their September 6, 2022 meeting and authorized the advertisement of a public hearing for November 1, 2022.

Planning Commission reviewed the draft amendments at the September 12, 2022, meeting and recommended approval to the Board of Supervisors. Provided with the agenda, is a copy of the ordinance as provided and reviewed by all local, regional and county reviewers and as advertised for public hearing. The document has been made available for inspection at the Township office.

Public Hearing – There we no comments and the hearing closed.

Mr. Thompson moved that the Board of Supervisors ***adopt*** the ordinance establishing Chapter 21, Streets and Sidewalks, Part 6, Non-Tower-Based or Small Wireless Communications Facilities in the Right-of-Way, and amending Chapter 27, Zoning, Part 7, Supplemental Regulations, Section 710,

Tower-Based Wireless Communication Facilities, and Part 11, Definitions, Section 1102 Definitions. Ms. Stephens seconded the motion.

ROLL CALL: MS. DININNI – YES; MS. STRICKLAND – YES; MS. STEPHENS- YES; MR. THOMPSON – YES

Please note that Ms. Williams left the meeting early.

The motion passed unanimously.

X. NEW BUSINESS

1. Consent Agenda

a. Voucher Report – August 2022
b. Voucher Report – September 2022
c. Contract 2016-C11, Pay App 5: $46,123.93
d. Contract 2022-C8, Pay App 5: $6,085.85
e. Acceptance of letter from the Pine Grove Mills Small Area Plan Advisory Committee

Ms. Stephens moved that the Board of Supervisors ***approve*** the Consent Agenda. Ms. Strickland seconded the motion. The motion passed unanimously.

2. 2023 Centre Region Council of Governments Summary Budget

Ms. Martin noted that at the October 24th COG General Forum Meeting, the draft 2023 COG Summary Budget was reviewed and referred to the member municipalities for consideration. Comments are due back to the COG Executive Director by November 17th. Eric Norenberg, COG Executive Director and Joe Viglione, COG Finance Director will be present to respond to any questions the Board may have. Below is a link to the 2023 Summary Budget. Attached with the agenda packet is the detailed budget municipal contributions analysis prepared by CRCOG Finance Committee.

2023 DRAFT Centre Region Council of Governments Summary Budget

2023 DRAFT Centre Region Council of Governments Detailed Budget

Mr. Norenberg, Executive Director, COG, reported that over the past couple months the Finance Committee did an extensive review of the budget.

Ms. Dininni started with the conversation on page 21 of the Summary Budget, Office Administration Budget. Ms. Dininni asked if funding was included for the Long-Range Facility Study. Mr. Norenberg noted that it was not included because it will be staff driven and working with the committee. Ms. Dininni stated that the Board strongly supports the endeavor.

Ms. Strickland asked about the Insurance Reserve Fund. Mr. Viglione stated that they are looking into changing the format in connection with the Comp. and Class Study.

Ms. Strickland inquired about the IT improvements/security and asked if any of the recommendations were not included. Mr. Viglione stated that they were included.

A discussion ensued about how we should prioritize the discussions.

On page 23 of the Summary Budget, COG Building Capital Budget, Mr. Viglione stated that a big change was moving from a 2% reinvestment strategy back to an inflationary increase.

Mr. Norenberg reviewed page 28 and 29, Code Administration – New Construction Program Budget and Existing Structures Program Budget.

Mr. Viglione reported that there was a steady decline with the fund balance on the Schlow Centre Region Library Operating Budget on page 31. Ms. Dininni asked what the status was for increasing the wages for the library staff. Mr. Norenberg reported they are still working on it, but they have a plan going forward for next year.

Mr. Norenberg noted that they will be preparing for the next bid for the Regional Refuse & Recycling that will be for five years.

Ms. Strickland commented that the volunteer stipends were under maintenance on the Regional Fire Protection Program's Operating Budget and that she had suggested moving it to personnel.

Ms. Dininni asked if the local fire stations are owned by COG or the municipalities where they are located. Mr. Viglione answered they are owned by the municipalities, but the maintenance of the facilities is done by the COG. Ms. Dininni discussed the possibility of collaborating on a storage facility. Mr. Viglione stated that it would be a good topic for the long-range facility plan.

Ms. Dininni suggested deferring the discussion on the Parks and Recreation Operating Budget until there is more information.

Ms. Strickland moved that the Board of Supervisors ***table*** the discussion on the Parks and Recreation Operating Budget until there is more information. Ms. Stephens seconded the motion. The motion passed unanimously.

3. Salvation Baptist Church Preliminary LDP

Ms. Wargo noted that provided with the agenda is the Salvation Baptist Church Preliminary Land Development Plan, last revised on October 19, 2022. This land development plan is located at 3645 West College Avenue (TP: 24-004-078-0000). The parcel is approximately 60.61 acres and is zoned Rural Agricultural (RA) and Corridor Overlay (COD).

This land development plan proposed a fellowship hall and garage, totaling 13,626 SF. At the time of the original land development plan, a fellowship hall and garage were proposed adjacent to the church and was never constructed. Since it has been more than (5) years since the original land development plan was approved, a new plan is required.

Staff has reviewed the resubmission and is recommending conditional approval of the plan. Provided with the agenda is a memorandum from the Director of Planning & Zoning dated October 26, 2022, describing the conditions.

Ms. Stephens moved that the Board of Supervisors ***conditionally approve*** the Salvation Baptist Church Preliminary Land Development Plan subject to the conditions described in the Planning Director's memorandum dated October 26, 2022. Mr. Thompson seconded the motion.

Ms. Strickland asked if the Planning Commission had any concerns. Ms. Wargo reported that their concerns were on the flood plain designation. Ms. Dininni asked about the lighting. Mr. Lichty, Lichty Engineering, reported there is no additional new lighting.

The motion passed unanimously.

4. Award contract 2018-C2OU, Park Hills Drainageway Utility Relocation

Mr. Modricker noted that on October 11, 2022, bids were opened publicly and read aloud for contract 2022-C20U. The bid was advertised in the Centre Daily Times and was sent to potential bidders. The contract involves the installation of underground conduit by directional boring necessary to relocate power and communication facilities in advance of the Park Hills Drainageway Improvement Project. Provided with the agenda is a memorandum from Ron Seybert, Township Engineer, dated October 18, 2022, recommending award of the contract.

Ms. Stephens moved that the Board of Supervisors ***award*** Contract 2018-C20U, Park Hills Drainageway Utility Relocation, to RAVAN INC., dba Tru-Tek Drilling in accordance with their bid in the amount of $453,016.83. Mr. Thompson seconded the motion.

Ms. Dininni noted that the estimates were significantly different. Mr. Modricker stated there was a lot of discussions regarding the estimate with contractors because it is work that is typically not done.

Ms. Strickland expressed her concerns with the high estimate and suggested putting the bid out early next year. Mr. Modricker stated that he didn't believe if we waited it would bring in a better estimate.

Ms. Strickland asked about the timeline. Mr. Modricker reported that it is scheduled for 2023. Ms. Martin noted that the project is highly visible for several years and there is a timeline that grants need to be utilized. Mr. Modricker stated that the other alternative would be to add this project to the drainage contract that will go out to bid.

The motion passed unanimously.

5. Award contract 2019-C21, Pine Grove Mills LED Street Light Conversion

Mr. Modricker reported on October 25, 2022, bids were opened publicly and read aloud for contract 2019-C21. The bid was advertised in the Centre Daily Times and was sent to potential bidders. The contract involves rewiring existing ornamental lights in Pine Grove Mills and installing new power supplies and new power cutoffs to allow them to be serviced by FTPW. This work removes the lights from the WPP tariff and installs meters. High-pressure sodium lamps will be removed and the light fixtures retrofitted with 2700K LED lamps. Work includes the installation of underground conduit by directional boring. Provided with the agenda is a memorandum from Ron Seybert, Township Engineer, dated October 25, 2022, recommending award of the contract.

Mr. Thompson moved that the Board of Supervisors award Contract 2019-C21, Pine Grove Mills LED Street Light Conversion, to M&B Services, LLC, in accordance with their bid in the amount of $292,792.86. Ms. Strickland seconded the motion.

Ms. Strickland stated that the engineer's estimate was close to the bid amount.

The motion passed unanimously.

XI. COMMUNICATIONS TO THE BOARD

There were no communications.

XII. CALENDAR ITEMS – NOVEMBER

a. Election Day, November 8
b. Fall 2022 Neighborhood Association Open Forum – November 9
c. Special Meeting on DRAFT 2023 Operating Budget, November 9
d. Special Meeting on DRAFT 2023 Operating Budget, November 10
e. parks & Recreation Committee, November 10

f. Administrative Offices Closed in Observance of Veterans Day, November 11
g. Planning Commission - November 14
h. Pine Grove Mills SAP Advisory Committee - November 17
i. Tree Commission - November 21
j. Administrative Offices Closed in Observance of Thanksgiving, November 24 & 25

Ms. Martin stated that the Administrative Offices will be closed the day after Thanksgiving, but staff will be working.

XIII. ADJOURNMENT

With no further business to come before the Board of Supervisors, Ms. Stephens motioned to ***adjourn*** the meeting. The meeting adjourned at 9:45 p.m.

Respectfully submitted,

Centrice Martin, Township Manager
for the Board of Supervisors

TO: Ferguson Township Board of Supervisors

CC: Centrice Martin, Township Manager

CC: Cory Miller, Executive Director, University Area Joint Authority

FROM: Wes Glebe and Mark Kunkle, UAJA Board Members

DATE: November 10, 2022

SUBJECT: UAJA Status Report November 2022

Date of last Authority meeting: October 19, 2022

1. Scott Road Pump Station Replacement

This project consists of replacement of the pump station and the entire force main to Research Drive, and an extension of the force main to Bristol Avenue. The force main has been completed by UAJA personnel. The pump station installation is nearing completion. An electrical component has been repeatedly delayed, but is finally installed. The pump station was tested November 9, and the final piping to connect the new station to the interceptor sewer will be complete before Thanksgiving. The backup generator is still delayed. The old pump station will be the backup until the generator arrives.

2. Ozone Disinfection

Currently UAJA uses Ultraviolet light for final disinfection for the water that goes to Spring Creek. UV disinfection is energy intensive. Ozone will not only reduce the energy requirements, but also provide enhanced disinfection and destruction of pharmaceuticals and endocrine disruptors. The contract has been awarded, equipment delivery delays are pushing the completion date to May 2023. The ozone building and the associated in ground concrete tank are under construction and progressing rapidly and will be ready long before the arrival of the ozone equipment. The ozone system will reduce annual operating expenses by $110,000, based on 2021 electric rates.

3. Anaerobic Digester and Sludge Dryer

This project will replace the current composting system with a digester and sludge dryer. The digester will produce biogas which can be sold or used at the treatment plant as a substitute for fossil fuels. The Centre Region Municipalities have approved an Act 537 Plan Special Study for the project. A delay in the design has been caused by the determination that the existing compost building cannot be used in the project because of corrosion and potential weakening of structural members. Two smaller buildings will replace the compost building, which will result in a lower carbon footprint. UAJA and the Centre County Recycling and Refuse Authority (CCRRA) are collaborating on including organics recycling in the project. The organics from CCRRA could potentially be separated and brought to UAJA for recycling into biogas. The recently passed Inflation Reduction Act appears to have created an opportunity for receiving a tax credit for much of the project. The tax credit can be sold to obtain a partial rebate for the cost of the project. Since this could result in significant savings on the cost of the project, the bid is being

delayed until the IRS publishes the rules for the tax rebate. UAJA anticipates a bid in January 2023. Pennsylvania recently added a grant program through the Commonwealth Financing Authority - COVID-19 ARPA H2O PA – which UAJA is pursuing which may further reduce the local share of the project if UAJA is successful.

Upon completion the project will reduce annual operating expenses by $500,000 per year.

4. Meeks Lane Act 537 Plan Special Study

This project is on hold. Based on the pending development of Toftrees, the Special Study is being revised to include an alternative which will serve that development, as well as require less electricity.

5. Sheep at the Solar Array

UAJA has contracted for vegetation management at the solar array. The grass will be "mowed" with a herd of sheep. This is a more environmentally friendly method of managing the vegetation. The sheep have finished their first growing season at UAJA, and have been moved to winter quarters. The program is quite successful.

6. Rate Dispute with State College Borough

UAJA has filed a complaint in the Court of Common Pleas of Centre County asking for the court to declare State College Borough's withholding of partial payments unlawful. In 2021, UAJA completed a rate study and adopted the rate in November 2021, to be effective January 1, 2022. The Pennsylvania Municipalities Authorities Act states that any customer that question the reasonableness or uniformity of the rates are to file suit in the Court of Common Pleas. The Borough has chosen instead to withhold full payment, and pay based on the volumetric rate they paid in 2021. To date the Borough has withheld more than $600,000.

The Borough's withholding, if it continues through the end of 2022, is likely to affect UAJA's debt service coverage ratio. If the ratio falls below 1.1 in any year, UAJA is required through the revenue bond indenture to raise rates for all customers. Unfortunately, this action by the Borough may result in sewer rate increases on Township property owners.

Overall Financial Impact of Major Energy and Treatment Plant Projects

- Total projected cost of construction (from bond issues) $36.4 Million
- Total avoided future capital costs (If we kept doing what we are doing now and replaced aging equipment) $10.5 Million
- Net of operating decreases and revenue increases $51.1 Million
- Net benefit of projects over 25 years $25.2 Million

UAJA Quarterly rates have not increased since 2014. UAJA staff does not anticipate needing to raise rates to support any of the capital projects.

Based on the current rate of inflation, it is possible that UAJA will need a rate increase in 2023, or because of Item 6 above.

CENTRE REGION COUNCIL OF GOVERNMENTS

2643 Gateway Drive, Suite 3
State College, PA 16801
Phone: (814) 231-3077 Fax: (814) 231-3083 Website: www.crcog.net

LAND USE AND COMMUNITY INFRASTRUCTURE COMMITTEE

Hybrid Meeting
Thursday, November 2, 2022
12:15 PM

GENERAL MEETING INFORMATION	
RSVP	**To ensure an overall quorum of members, please let us know how you intend to participate:** https://us02web.zoom.us/meeting/register/tZEvdumupzkjHND6-S0cq0X1Ck89JNoM4Lqj
Remote Participants	**To attend via Zoom:** https://us02web.zoom.us/meeting/register/tZEvdumupzkjHND6-S0cq0X1Ck89JNoM4Lqj To attend by phone: +1 301 715 8592 | Meeting ID: 852 1069 2964 | Passcode: 514049
In-Person Participants	**COG Building – Forum Room** 2643 Gateway Drive, State College PA 16801
Meeting Contact: Marcella Hoffman | email: mhoffman@crcog.net | 814-231-3050 **Click HERE to locate the AGENDA and ATTACHMENTS** *Should you desire to annotate any attachments, you must download them first*	

- The chat feature for this meeting will be disabled. A recording of the meeting will be made available on the COG website upon its conclusion.

- We ask that non-voting participants that are attending remotely remain muted with their video turned off unless recognized to speak. To reduce audio interference, please remain off of speakerphone during the meeting.

- **VOTING PROCEDURES:** Members will provide their vote by voice. Clarification will be sought by the Chair if the vote is unclear. For additional information on COG Voting Procedures, please click HERE.

- **PUBLIC COMMENT GUIDELINES:** Members of the public may comment on any items not already on the agenda (five minutes per person). Comments relating to specific items on the agenda should be deferred until that point in the meeting. For additional information on COG public meeting guidelines, please click HERE.

- To access agendas and minutes of previously held meetings, and to learn more about the Land Use and Community Infrastructure Committee on our website, please click HERE.

CENTRE REGION COUNCIL OF GOVERNMENTS

2643 Gateway Drive, Suite 4
State College, PA 16801
Phone: (814) 231-3077 Fax: (814) 231-3083 Website: www.crcog.net

AGENDA SUMMARY

1.	CALL TO ORDER AND ROLL CALL
2.	PUBLIC COMMENTS
3.	NEW AGENDA ITEMS
4.	APPROVAL OF MINUTES
5.	COG COMMITTEE REPORTS
6.	INITIAL UPDATE INFORMATION ON THE REGIONAL DEVELOPMENT CAPACITYREPORT
7.	PREPARING FOR THE COMPREHENSIVE PLAN UPDATE
8.	OTHER BUSINESS
9.	CALENDAR
10.	HELPFUL REFERENCE LINKS
11.	ADJOURNMENT

LAND USE AND COMMUNITY INFRASTRUCTURE (LUCI) COMMITTEE

Hybrid Meeting
Thursday, November 3, 2022
12:15 PM

AGENDA

1. CALL TO ORDER AND ROLL CALL

   Chair Hameister will call the meeting to order. Mrs. Hoffman will take a roll call of committee members.

2. PUBLIC COMMENTS

   Chair Hameister will invite members of the public to comment on any items not already on the agenda (five minutes per person time limit please). Comments relating to specific items on the agenda should be deferred until that point in the meeting. Submitted comments will be read into the record by the Recording Secretary at the appropriate time in the meeting.

3. NEW AGENDA ITEMS

   LUCI Committee members may request additional items of business be added to this meeting's agenda. If approved by a majority vote of the members, the proposed new agenda item(s) will be added at an appropriate place on the agenda at the discretion of the Chair. Ideally, items for future agendas should be proposed to the LUCI Committee through your municipal representative.

4. APPROVAL OF MINUTES **(action)** – *Enclosed* is a copy of the minutes of the October 13, 2022 joint meeting with the CRPC.

   All municipalities should vote to approve the meeting minutes.

5. COG COMMITTEE REPORTS

   At the January 12, 2022 meeting, the LUCI committee members agreed to include an item for Committee reports. The Chair should request any reports from members or staff.

6. INITIAL UPDATE INFORMATION ON THE REGIONAL DEVELOPMENT CAPACITY (REDCAP) REPORT – ***(information)*** *presented by Mark Boeckel*

   This item provides information on the status of the five-year review of the REDCAP Report, which assesses development capacity inside the Regional Growth Boundary and Sewer Service Area (RGB and SSA). The CRPA began updating the REDCAP report in the spring of 2022 but work on this project has been delayed due to staffing changes. The REDCAP Report update should be finalized in the first few months of 2023.

   The REDCAP Report was last updated in 2017 and estimates the total amount of remaining residential and non-residential development potential within the RGB and SSA of the Centre Region, assesses the ability of vacant lands to accommodate forecast growth, and examines the capacity of the Region's sewer system to support anticipated growth. CRPA staff have begun

the process of updating the REDCAP report by verifying the location of vacant properties within the RGB and SSA, identifying zoning district information for those properties, and quantifying development capacity based upon the methodology outlined in the 2017 REDCAP report. There are no changes proposed to the REDCAP methodology for this update.

Based upon previous feedback from elected and appointed officials, as well as staff observations during the initial review of REDCAP data, the CRPA intends to provide additional analysis within the REDCAP report on the following topics:

- Capacity vs. Realized Development Comparison – Staff was asked to examine previously vacant properties that were developed after the first REDCAP Report was prepared in 2012 and compare the development capacity of the property to the actual amount of development that occurred. This analysis will be conducted on several properties that did not have previously proposed or approved land development plans and capacity for which was based upon the zoning methodology outlined in the REDCAP Report.
- Impact of Municipal Actions on Development Capacity – As municipalities modify zoning district regulations, these actions can positively impact the development capacity of vacant properties within the RGB and SSA. The updated REDCAP Report will highlight and quantify the impacts of recent municipal actions on the development capacity of vacant properties.
- Impacts of Redevelopment on Forecast Growth and Development Capacity – Over the past decade, the Centre Region has experienced a significant amount of redevelopment activity within the RGB and SSA. This redevelopment activity has resulted in a significant net increase in units without a substantial loss of vacant lands. The updated REDCAP Report will quantify the impacts of redevelopment on development capacity within the RGB and SSA.

The LUCI Committee should receive a presentation from staff on the status of the REDCAP update and provide feedback as necessary. The *enclosed* presentation provides some additional information.

No action is required on this item.

7. PREPARING FOR THE COMPREHENSIVE PLAN UPDATE ***(discussion)*** – *Jim May*

This item presents general information to guide the development of the Centre Region Comprehensive Plan Update. This framework is a departure from how previous comprehensive plans were prepared in the Centre Region.

Previous comprehensive plans have been prepared to be traditional, all-inclusive models, including plan elements that addressed land use, transportation, housing, community services and facilities, sustainability, and other elements of community planning. Contemporary planners still use this model first established in the 1920s. This item proposes to prepare the latest update to the Comprehensive Plan utilizing another model.

The governance of the Centre Region is structured such that COG agencies and other authorities in the Region prepare their own long-range plans. In the past, goals, objectives, and policies of these plans were incorporated into the Comprehensive Plan using the traditional

model. This is a duplicative and time-consuming process. Staff wanted to explore potential alternatives and initially reviewed Lancaster County's comprehensive planning process with the CRPC and the COG LUCI Committee at the April 2022 joint meeting. Their process, entitled "Lancaster County 2040" was viewed by staff as a potential model for the Centre Region. It was determined upon more detailed review that the Lancaster County process is somewhat different than a traditional comprehensive plan, but it retained many aspects of the traditional approach that would require the CRPA to replicate work already completed in other planning documents.

The new proposed approach is for the CRPA to prepare a Regional Land Use Plan and Policies using previously adopted planning documents as the foundation for the Land Use Plan. CRPA staff believes the existing approved documents satisfy the requirements of the Pennsylvania Municipal Planning Code (MPC). Some aspects for this approach that are important include:

- Maintain consistency with the MPC to satisfy the requirements for Comprehensive Plans and Multi-Municipal Comprehensive Plans.
- Incorporate previous work that has been done with parks and recreation planning, transportation planning, water resources planning, housing planning, and transit planning to establish parameters for the Land Use Plan and satisfy MPC requirements.
- Maintain, and where necessary, strengthen relationships with residents, local governments, and other stakeholders in the Region.
- Develop a strong vision for the future of the Centre Region that is derived from the public outreach process. The vision will identify how and where the community wants to grow and identifies what the community is willing to support during implementation.
- Conduct a public outreach process that "meets people where they are".
- Strengthen the implementation of the Plan.

The COG LUCI Committee should receive a presentation from staff on the status of the Comprehensive Plan process and provide comments as necessary.

No action is required on this item.

8. OTHER BUSINESS

a. Matter of Record – The next meeting of the LUCI Committee will be a hybrid meeting on Thursday, December 1, 2022 at 12:15 p.m. in the COG Forum Room.

b. Matter of Record – At its meeting on October 19, 2022, the University Area Joint Authority (UAJA) agreed to have representatives of the UAJA meet with residents of Blueberry Crossing and other residents regarding the location of the Meeks Lane Pump Station. The CRPA will bring the item forward to the LUCI Committee for a recommendation to the COG General Forum after the UAJA and residents have had a chance to work through issues regarding the project.

c. Matter of Record – The fourth annual Cranksgiving event is scheduled for November 5, 2022. Cranksgiving is a bicycle powered food drive that donates food to the

local Youth Service Bureau. All you need is a bike, helmet, lock, bag(s), and $20+ to purchase groceries. The event is at Videon Central, 2171 Sandy Dr, November 5 from 10 a.m. to 2 p.m., with an after-party from 2 p.m. to 4 p.m. The rain date is November 12. For more information, see the *enclosed* flyer. For free registration go to https://cranksgivingstatecollege.com.

d. Matter of Record – The Centre County Solutions-Based Affordable Housing Study is nearing completion. CRPA staff has been invited to attend a meeting on December 1, 2022 to hear a presentation from the consultant on the final document. Staff will follow up the LUCI Committee regarding future implications and strategies for affordable housing in the Centre Region at a future meeting.

9. CALENDAR

A calendar with upcoming COG committee, General Forum, and municipal meetings can be found by clicking the following link: COG and Municipal Meeting Overlay Calendar

10. HELPFUL REFERENCE LINKS

Repositories of helpful COG information have been assembled for use by the elected officials and COG staff:

- Governance policies, procedures, and other related documents can be viewed on SharePoint by clicking here or going to https://www.crcog.net/governance.
- Updates on current COG Studies and Projects can be found by clicking here or going to https://bit.ly/3vZP8Zs.
- Land Use and Community Infrastructure on boarding information can be found here: 01 - LUCI Committee Onboarding Materials

11. ADJOURNMENT

ENCLOSURES

Item #	Description
4	October 13, 2022 Joint LUCI/CRPC Meeting Minutes
6	REDCAP Presentation
8c	Cranksgiving 2022 Flyer

JOINT MEETING OF THE CENTRE REGION COUNCIL OF GOVERNMENTS (COG) LAND USE AND COMMUNITY INFRASTRUCTURE (LUCI) COMMITTEE AND THE CENTRE REGIONAL PLANNING COMMISSION (CRPC)

Minutes
Thursday, October 13, 2022
(please refer to the COG audio/video meeting file website when referencing timestamps)

Mr. Hameister called the Thursday, October 13, 2022 hybrid joint meeting of Land Use and Community Infrastructure (LUCI) Committee and the Centre Regional Planning Commission (CRPC) to order at 12:15 p.m. A roll call by Mrs. Hoffman was conducted.

LUCI Members Present: Denny Hameister, Harris Township; Eric Bernier, College Township; Deanna Behring, State College Borough, Elliot Abrams, Patton Township; and Neil Sullivan, Penn State University

CRPC Members Present: Ray Forziat, College Township; Andrew Meehan, Halfmoon Township; Ellen Taricani, Ferguson Township; Chris Gamble, Harris Township; Brian Rater, Patton Township; Josh Portney, State College Borough; and Neil Sullivan Penn State University

Others Present: Jim May, Centre Regional Planning Agency (CRPA) Director; Jim Saylor, Principal Transportation Planner; Mark Boeckel, CRPA Principal Land Use Planner; Leslie Warriner, Senior Planner; Pam Adams, CRPA Sustainability Planner; Greg Kausch, CRPA Senior Transportation Planner; Anne Messner, Senior Transportation Planner; Marcella Hoffman, CRPA Office Manager; Lindsay Schoch, College Township Principal Planner; Shelby McVey, Herbert, Rowland & Grubic Inc.; Gretchen Brandt, State College Area School District Board Member

PUBLIC COMMENTS (00:02:25)

There were no comments from the public; however, Mr. May introduced the CRPA's newest planners: Mrs. Anne Messner, Senior Transportation Planner, and Mrs. Leslie Warriner, Senior Land Use Planner.

NEW AGENDA ITEMS (00:05:01)

There were no requested additions to the agenda.

CONSENT AGENDA (00:05:23)

Approval of Minutes

Motion was made by Mr. Portney and seconded by Mr. Meehan to approve the minutes of the September 1, 2022 meeting of the LUCI Committee and the September 1, 2022 meeting of the CRPC, as presented. The motion carried unanimously.

COG COMMITTEE REPORTS (00:5:54)

Mr. Portney provided an update to the CRPC members regarding the Signature Development Overlay Amendments. The State College Borough Council held a work session on the matter on Monday, October 10, 2022 to review the implications of the ordinance amendments, specifically the non-owner occupied bonus areas of the Commercial Incentive District's Signature Development Overlay District. Council will consider adopting the ordinance amendments at its October 17 meeting.

FIVE-YEAR REVIEW OF THE REGIONAL GROWTH BOUNDARY (RGB) AND SEWER SERVICE AREA (SSA) IMPLEMENTATION AGREEMENT (00:07:37)

The LUCI Committee and the CRPC received a report from Mr. May regarding the required five-year review of the RGB and SSA Implementation Agreement. The Agreement was initially adopted in 2006,

and was reviewed on a five-year cycle in 2013 and 2018. There were several changes to the Agreement in 2013, including the addition of a section authorizing municipalities to consider limited expansions of the RGB and SSA without requiring COG General Forum approval, and the inclusion of a project specific development agreement for projects that expanded the RGB and SSA. This provision also required the developer to obtain a building permit within five years of approval. This provision was inserted to assure that land in the expansion area was needed to accommodate growth and was being developed in a timely manner to serve that growth.

The primary emphasis of the CRPA changes proposed during this review cycle are to clarify the processes in the Agreement. Portions of the text in the Agreement that explained why the COG had an Implementation Agreement have been deleted from the Agreement and included in several appendices that will be included with the Agreement such as the flow charts of the processes and the Regional Growth Boundary and Sewer Service Area at a Glance document.

Several clarifying questions were asked by both LUCI Committee members and CRPC members; however, no specific comments were provided for staff to consider.

INTRODUCTION TO THE CENTRE COUNTY METROPOLITAN PLANNING ORGANIZATION (CCPMPO) STRATEGIC PLAN (00:17:05)

The LUCI Committee and the CRPC received a presentation from Mr. Saylor regarding the operations-based Strategic Plan being undertaken by the CCMPO. The presentation included a brief introduction and overview of the Strategic Plan, as well as a summary of the topics that is being considered and the timeline for completion. Currently, a survey has gone out to current MPO members to gauge the current environment and functions of the MPO. The survey results will be reviewed by a focus group consisting of current MPO members and staff, along with former staff and MPO members. In December, MPO staff and the consultant will host a half-day retreat with the CCMPO members to discuss the results of the survey and the plan moving forward.

MPO staff will keep the Committee and Commission apprised of the Strategic Plan moving forward.

STATE COLLEGE AREA CONNECTOR (SCAC) PROJECT UPDATE (00:28:08)

The LUCI Committee and the CRPC received a presentation from Mr. Saylor regarding the State College Area Connector (SCAC) project update that was provided to the September CCMPO Committee meetings. The SCAC project team has announced that they've received concurrence from cooperating resource agencies on the three alternatives to be recommended in the Planning and Environmental Linkages (PEL) Study for the project. The project team will share the information in a draft PEL Study to be released for public comment in October. The comment period is anticipated to run through November 19, 2022. Public meetings are also scheduled for October 19 and 20 from 5:00 to 8:30 PM at the Mount Nittany Middle School in State College. Mr. Saylor briefly went over the timeline of the project moving forward after the draft PEL study comment period has been completed.

In response to a question from Mr. Abrams, Mr. Saylor communicated that Harris, College, and Potter Townships are participating agencies within the PEL study. Mr. Saylor went on to say that the MPO will have the opportunity to provide formal comments on the draft PEL Study. Staff will draft comments and share them with the Technical and Coordinating Committee Chairs to make a decision on the content of the comments. Mr. Saylor added that the public comment period is open to anyone – municipalities, businesses, private citizens, etc. The comments provided will be incorporated into the PEL Study. The difference in being a participating municipality in the PEL study is that the municipality is invited to a wider range of meetings, such as the Agency Coordination Meetings. Mr. Saylor stated that PennDOT has been active in reaching out to all impacted parties since there are safety and economic development

concerns that may impact the entire county. Mr. Saylor emphasized that the PEL Study process is different than other processes that the CCMPO Committees have seen in the past. The proposed alternatives are out for public input much earlier in the process, whereas in the past, the public would typically see the proposed corridors once the engineering has already been done. The PEL Study is a draft assessment of where the design will go.

Mr. Saylor informed the Committee and Commission that MPO staff will continue to give updates regarding the draft PEL Study.

OTHER BUSINESS (00:47:11)

The next meeting of the LUCI Committee will be held on November 3, 2022 at 12:15 p.m. using hybrid meeting technology. Potential agenda items include an update on preparing for the Comprehensive Plan Update, a presentation on the Centre County Solutions-Based Affordable Housing Study, an update on the Regional Development Capacity Report, and review of the amended Meeks Lane Act 537 Special Study.

The next meeting of the CRPC will be held on November 3, 2022, at 7:00 p.m. The meeting will be a hybrid meeting. Potential agenda items include review and comments on the College Township Pedestrian Facilities Master Plan, an update on preparing for the Comprehensive Plan Update, a presentation on the Centre County Solutions-Based Affordable Housing Study, an update on the Regional Development Capacity Report, and review of the amended Meeks Lane Act 537 Special Study.

ADJOURNMENT

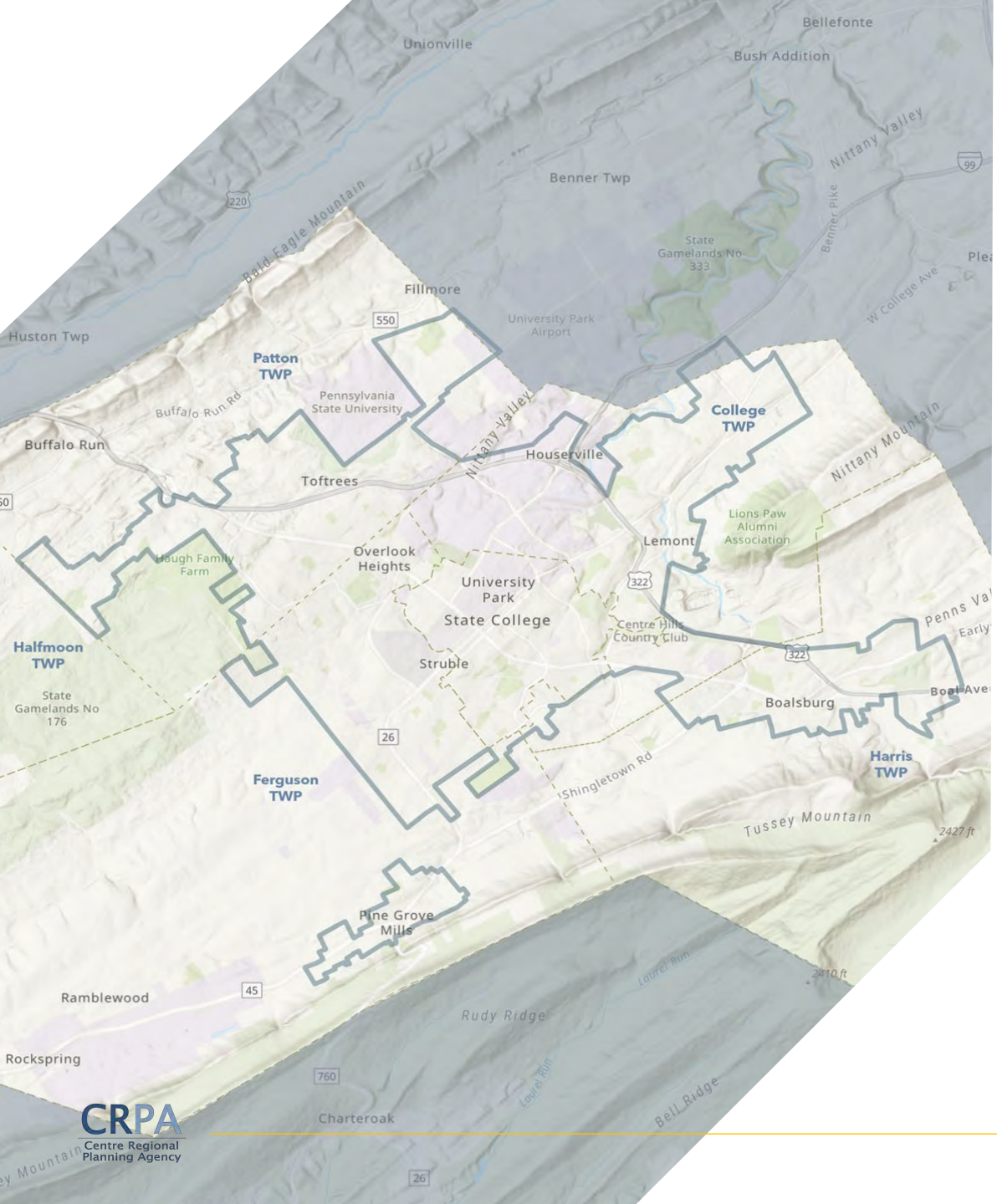
There being no other business, the October 13, 2022 joint LUCI Committee and CRPC meeting was adjourned at 1:05 p.m.

Respectfully submitted,

Marcella Hoffman
Recording Secretary

REDCAP REPORT UPDATE

LUCI Committee



BACKGROUND

Overview

- First REDCAP Report was published in 2012, updated every five years.
- Supports Regional Growth Boundary policies within the Centre Region Comprehensive Plan
- Useful in evaluating requests to expand the Regional Growth Boundary and Sewer Service Area, along with other policy decisions related to regional growth

OUTCOMES

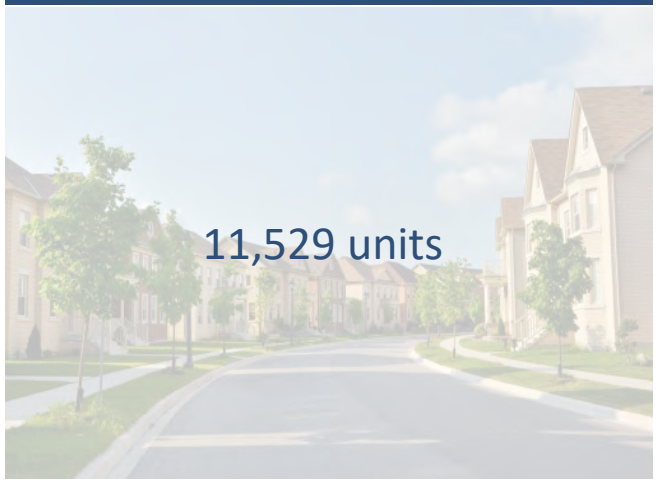
The REDCAP will answer:

- How much developable land exists within the existing RGB/SSA
- How much residential/nonresidential development could be supported by these developable properties
- If these developable properties are going to be able to meet the growth needs of the Region for the next 20 to 30 years
- Does sufficient sewer capacity exist to support development if the developable lands were completely built out

2017 RESULTS

Developable Land

Residential Capacity



Non-Residential Capacity

2022 UPDATE

Anticipated Findings

- Vacant land totals will have decreased slightly
  - Additional lands that were previously occupied are now vacant
- Residential Development Capacity may have decreased slightly
  - Redevelopment and rezonings have impacted remaining capacity
- Non-Residential Capacity unlikely to have changed significantly

CRPA
Centre Regional Planning Agency

2022 UPDATE

Additional Analyses

- **Capacity Vs. Realized Development** – Compare previous capacity estimations with actual development outcomes
- **Impact of Municipal Actions** – Examine how rezoning approvals have impacted development capacity
- **Impacts of Redevelopment** – Analyze how redevelopment has minimized the loss of vacant lands and extended the overall development capacity within the RGB/SSA

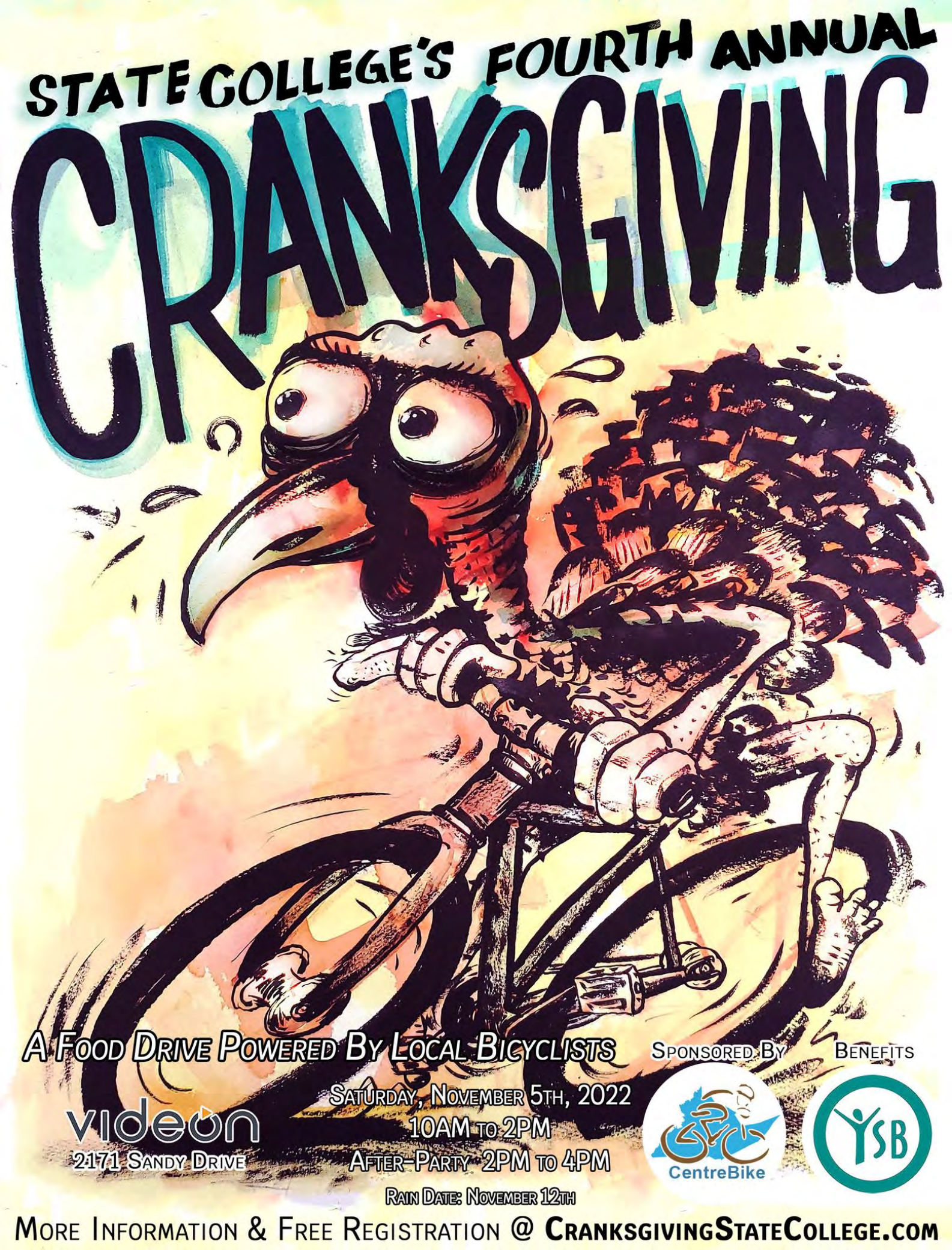
NEXT STEPS

LUCI Committee should provide feedback or comments on proposed additions.

- Staff will continue to work on the report and provide findings at a future meeting.

STATE COLLEGE'S FOURTH ANNUAL

CRANKSGIVING



A Food Drive Powered By Local Bicyclists

Sponsored By

Benefits

Saturday, November 5th, 2022

10AM to 2PM

After-Party 2PM to 4PM

Rain Date: November 12th

videon

2171 Sandy Drive

CentreBike

YSB

More Information & Free Registration @ CranksgivingStateCollege.com

CENTRE REGION COUNCIL OF GOVERNMENTS

Centre Region Parks and Recreation
2040 Sandy Drive, Suite A
State College, PA 16803
Phone: (814) 231-3071

JOINT MEETING BETWEEN THE COG PARKS CAPITAL COMMITTEE and the CENTRE REGION PARKS AND RECREATION AUTHORITY
Hybrid Meeting
Thursday, November 10, 2022 – 12:15 AM

GENERAL MEETING INFORMATION	
RSVP	**To ensure an overall quorum of members, please let us know how you intend to participate:** https://us02web.zoom.us/meeting/register/tZ0pceGqqDsoG9bJSGWnV8akB3BsGAs94vvj
Remote Participants	To attend via Zoom: https://us02web.zoom.us/meeting/register/tZ0pceGqqDsoG9bJSGWnV8akB3BsGAs94vvj To attend this meeting by phone: **+1 301 715 8592 (Washington, DC) | Meeting ID:** 894 6826 0212 Passcode: 627176
In-Person Participants	COG Building – Forum Room 2643 Gateway Drive, State College, PA 16801
Meeting Contact: Jada Light | email: jlight@crcog.net | 814-231-3072	
Click here to locate the AGENDA and ATTACHMENTS *Should you desire to annotate any attachments you must download them first.*	

- This meeting will be recorded, and electronic files of the meeting will be made available on the COG website upon its conclusion.

- The chat feature for this meeting will be limited to remote participants being able to communicate to meeting hosts. A recording of the meeting will be made available on the COG website upon its conclusion.

- We ask that non-voting participants that are attending remotely remain muted with their video turned off unless recognized to speak. To reduce audio interference, please remain off speakerphone during the meeting.

- **VOTING PROCEDURES:** Members will provide their vote by voice. Clarification will be sought by the Chair if the vote is unclear. Members opposed to a motion should vote "No." For additional information on COG Voting Procedures, please click https://bit.ly/2WKuIEX

- **PUBLIC COMMENT GUIDELINES:** Members of the public may comment on any items not already on the agenda (five minutes per person). Comments relating to specific items on the agenda should be deferred until that point in the meeting. For additional information on COG public meeting guidelines, please click https://bit.ly/3kUasIO. Please note, other COG meetings allow for five minutes per person.

- To access agendas and minutes of previously held joint meetings, and to learn more about the COG Parks Capital Committee, please click https://bit.ly/3DJlcSY. To learn more about the Centre Region Parks and Recreation Authority on our website, please click https://www.crpr.org/about-crpr-authority.

JOINT MEETING OF THE COG PARKS CAPITAL COMMITTEE AND THE CENTRE REGION PARKS AND RECREATION AUTHORITY

Written public comment or requests to speak to the COG Facilities Committee, COG Parks Capital Committee or Centre Region Parks and Recreation Authority for items not on the agenda, and requests to comment to specific agenda items listed below, may be submitted in advance by emailing enorenberg@crcog.net.

AGENDA

1. CALL TO ORDER AND ROLL CALL

   Ms. Dininni will convene the meeting for the Parks Capital Committee with a roll call by Ms. Jada Light. Ms. Kathy Matason will convene the meeting for the Centre Region Parks and Recreation Authority with a roll call by Ms. Jada Light.

2. PUBLIC COMMENTS

   Members of the public are invited to comment on any items not already on the agenda (five minutes per person time limit, please). Comments relating to specific items on the agenda should be deferred to that point in the meeting.

3. NEW AGENDA ITEMS

   The Parks Capital Committee and/or Authority members may request additional items of business be added to this meeting's agenda. If approved by a majority vote of the members, the proposed new agenda item(s) will be placed on the agenda at the discretion of the Chairs. Ideally, items for future agendas should be proposed to your Chairs at least two weeks prior to each meeting.

4. APPROVAL OF MINUTES

   A copy of the minutes from the January 13, 2022, and May 12, 2022, Joint Meeting of the COG Parks Capital Committee and Centre Region Parks and Recreation Authority is *enclosed* (attachment #1 & #2).

   Both groups should approve the minutes.

ACTION ITEMS

None

DISCUSSION ITEMS

5. PARKS AND RECREATION GOVERNANCE SPECIAL COMMITTEE STATUS REPORT (Eric Norenberg)

6. CENTRE REGION PARKS AND RECREATION CAPITAL IMPROVEMENT PROJECT STATUS REPORTS

   A. Whitehall Road Regional Park Phase II (Eric Norenberg)
      i. Construction Status Update
      ii. Next Steps for the Project

iii. Financial Review during Joint Facilities Committee, Parks Capital Committee and the Centre Region Parks and Recreation Authority at 8:30 AM on November 15

B. SPRING CREEK EDUCATION BUILDING (SCEB) PHASE II & DIANE KERLY WELCOME PAVILION (Melissa Kauffman & Kathy Bisko)

The contracts for the Spring Creek Education Phase II and Diane Kerly Welcome Pavilion, which include the general contractor, electrical, plumbing, and HVAC, were approved and executed by the Centre Region Parks and Recreation Authority at their September 15 regular meeting; all four signed contracts have been received along with bonds and insurance. A project kick-off meeting was held on October 27 at the Nature Center, and mobilization is scheduled to begin the week of November 14.

Rebidding for the fifth contract, Fire Protection for Phase II SCEB, opened on PennBid on September 26 with a mandatory pre-bid meeting on-site on October 4 at 1 PM. The deadline for questions was on Thursday, October 6, and none were received. Bids closed at 5 PM on Wednesday, October 12. Two bids were received, unfortunately, the low bidder did not attend the mandatory pre-bid meeting and the second bid was much higher than the estimated contract amount. As a result, the Centre Region Parks and Recreation Authority rejected both bids. Fire Protection will be re-bid before the end of the year; this delay does not impact the project construction timeline.

7. MILLBROOK MARSH NATURE CENTER – PART II BOARDWALK FEASIBILITY STUDY (Melissa Kauffman and Eric Norenberg)

A. Background and History of the Study Process

In 2021, the Millbrook Marsh Nature Center (MMNC) Part I Boardwalk Feasibility Study report was finalized and distributed for review and discussion to the Authority, the MMNC Advisory Committee, and through several COG Committees such as Facilities and Finance. That Part I report is *enclosed* (attachment #3) as a refresher for this group.

The Part I report documented current conditions and investigated public access and accessibility needs from the Nature Center's parking lots and trails and accessibility needs from the shared-use paths that border the facility. Additionally, the report focused on how the marsh and boardwalk are utilized by the public and staff members for programming, and the changes at the site to include water levels, boardwalk construction and material life span. A budget based on a full replacement of the boardwalk, improvement to certain access points, and the type of construction materials were also included in the report. The Part I report was funded by a grant from the Pennsylvania Department of Conservation and Natural Resources, and as a supplement to the Centre Region Parks, Recreation, and Open Space Comprehensive Plan.

The Part I plan noted that this information was preliminary and would most likely change after the Part II Feasibility Study was completed. The Part II of the Boardwalk Feasibility Study kicked off in February 2022 and includes a deeper dive into the site's history and archaeological requirements for a re-build, the site's plant inventory, bridges and how they play a role in the constructability of the re-build, and lastly, the stream modeling for current and predicted future water levels and 100-year rain events. Stream modeling was necessary to design the stream bank stabilization for the three existing bridge areas and for the fourth new bridge to better protect their footings from future erosion.

During the October 4 Facilities Committee, the Agency staff brought two budgets forward that were not final budgets, but for comparison purposes. These two budgets are based on different methods of construction and are *enclosed* for your review (attachment #4 and #5). The "Mud Mat" construction method requires first the demolition of the existing boardwalk, then placing mud mats down in the footprint where the boardwalk was located, and then driving the heavy equipment over the mud mats to reduce the impact on the marsh, while building the new boardwalk from the center of the marsh out to the access points to shared-use paths. The Top-Down construction method accounts for the demolition of the existing boardwalk and then building the new boardwalk to support heavy equipment used for the build, which will require more substructure and foundation materials than the Mud Mat method, resulting in a higher budget. Constructability is a crucial component of this rebuild due to the sensitive area and permitting requirements, and the bridges are key factors in the process. Each budget estimate is based on the type of build, and includes contingency, and a 15% escalator for a 2023 build due to material, fuel, and labor inflation.

Stream modeling/stream bank stabilization costs were not included in the two budgets as that work was not yet finalized at the time the budgets were presented. Using a design-build concept instead of a traditional bidding process is recommended for cost savings. Design-build projects are typically handled via a Request For Proposal (RFP) process and the proposals received are a not-to-exceed amount, and they bring the contractor onto a project at an early stage to work with the engineers in final design and constructability, thereby reducing the number of change orders and additional costs due to unforeseen challenges. Using a traditional bidding process for the boardwalk could present some challenges with constructability due to the contractor coming on after the bidding process and not being involved in the final stages of design.

The Part II study will be delivered to the Agency on November 9; it will be posted in the SharePoint folder and emailed to the COG Parks Capital Committee and the CRPR Authority members as it is received. The Part II final draft report will include all aspects of the study, including the final stream modeling/stream bank stabilization costs, as well as updated budgets with contingency funds and escalators for 2023. Agency staff will take comments back to LAN Associates from this and other committee meetings so they can finalize the document and present it to the Authority for their approval at a future meeting. Other committees and groups slated to review the final draft report and provide comments include (next page):

- Centre Region COG Facilities Committee
- Millbrook Marsh Nature Center Advisory Committee
- Millbrook Marsh Nature Center Feasibility Study Working Group
- Center Region COG General Forum
- ClearWater Conservancy (property easement holder)

As the end of 2022 draws to a close, it may be difficult to schedule meetings for all these groups to review and provide comment, so staff anticipates that the meetings for review and comments on the final draft report will continue into 2023. In addition, funding discussions will need to continue into 2023. Such consideration may include evaluation of grant opportunities, and assessment of possible financing options, in conjunction with a local fundraising program for private donations from this community.

B. Status of Current Boardwalk – General Update

8. OTHER BUSINESS

A. Matter of Record: The next scheduled Joint Meeting between the COG Parks Capital Committee and the Centre Region Parks and Recreation Authority will be announced soon.

9. ADJOURNMENT

Enclosures:
Attachment #1 – January 13, 2022 Joint Meeting Minutes
Attachment #2 – May 12, 2022 Joint Meeting Minutes
Attachment #3 – MMNC Part I Boardwalk Feasibility Study Report
Attachment #4 – MMNC Boardwalk Cost Estimate Mud-Mat Method
Attachment #5 – MMNC Boardwalk Cost Estimate Top-Down Construction Method

CENTRE REGION COUNCIL OF GOVERNMENTS

2643 Gateway Drive, Suite 4
State College, PA 16801
Phone: (814) 231-3077 Fax: (814) 231-3083 Website: www.crcog.net

CLIMATE ACTION AND SUSTAINABILITY COMMITTEE

Hybrid Meeting
November 14, 2022
12:15 PM

GENERAL MEETING INFORMATION	
RSVP	**To ensure an overall quorum of members, please let us know how you intend to participate:** **https://us02web.zoom.us/meeting/register/tZEsdeyhrD8sGdEjFUMj5V31KsJJV8UI11Op**
Remote Participants	**To attend via Zoom:** https://us02web.zoom.us/meeting/register/tZEsdeyhrD8sGdEjFUMj5V31KsJJV8UI11OpTo attend this meeting by phone: +1 929 205 6099 | Meeting ID: 851 2592 4635 | Passcode: 440155
In-Person Participants	**COG Building – Forum Room** 2643 Gateway Drive, State College, PA 16801
Meeting Contact: Shelly Mato | email: smato@crcog.net | 814-234-7198	
Click HERE to locate the AGENDA and ATTACHMENTS *Should you desire to annotate any attachments you must download them first.*	

- The chat feature for this meeting will be limited to remote participants being able to communicate with meeting hosts. A recording of the meeting will be made available on the COG website upon its conclusion.
- We ask that non-voting participants that are attending remotely remain muted with their video turned off unless recognized to speak. To reduce audio interference, please remain off speakerphone during the meeting.
- **VOTING PROCEDURES:** Members will provide their vote by voice. Clarification will be sought by the Chair if the vote is unclear. For additional information on COG Voting Procedures, click HERE.
- **PUBLIC COMMENT GUIDELINES:** Members of the public may comment on any items not already on the agenda (five minutes per person). Comments relating to specific items on the agenda should be deferred until that point in the meeting. For additional information on COG public meeting guidelines, please click HERE.

To access agendas and minutes of previously held meetings, and to learn more about the COG Climate Action and Sustainability Committee on our website, please click HERE.

AGENDA SUMMARY

1.	CALL TO ORDER AND ROLL CALL
2.	PUBLIC COMMENTS
3.	NEW AGENDA ITEMS
4.	CONSENT AGENDA CA-1 APPROVAL OF MINUTES
5.	COG COMMITTEE REPORTS
6.	REFUSE AND RECYCLING RATES FOR 2023
7.	MEMORANDUM OF UNDERSTANDING BETWEEN CENTRE REGION COG AND CCRRA
8.	REFUSE AND RECYCLING START TIME PILOT ANALYSIS
9.	REVIEW OF REGIONAL REFUSE AND RECYCLING CUSTOMER SURVEY
10.	OTHER BUSINESS
11.	HELPFUL REFERENCE LINKS
12.	ADJOURNMENT

CLIMATE ACTION AND SUSTAINABILITY COMMITTEE

Hybrid Meeting
Monday, November 14, 2022
12:15 PM

This Climate Action and Sustainability Committee meeting will be held via hybrid format. Written public comment or requests to speak to the CAS Committee for items not on the agenda, and requests to comment on specific agenda items listed below, may be submitted in advance by emailing smato@crcog.net.

Agenda

1. CALL TO ORDER AND ROLL CALL

   The Chair will call the meeting to order.

2. PUBLIC COMMENTS

   Members of the public are invited to comment on any items not already on the agenda (five minutes per person time limit please). Comments relating to specific items on the agenda should be deferred until that point in the meeting. Submitted comments will be read into the record by the Recording Secretary at the appropriate time in the meeting.

3. NEW AGENDA ITEMS

   Members may request additional items of business be added to this meeting's agenda. If approved by a majority vote of the members, the proposed new agenda item(s) will be placed on the agenda at the discretion of the Chair.

4. CONSENT AGENDA **(Action)**

   The following items listed on the Consent Agenda portion of the Climate Action and Sustainability (CAS) Committee agenda may be approved with a single motion by the CAS Committee unless a Committee member or member of the public requests that an item be removed from the Consent Agenda for a question or further discussion.

CA-1 APPROVAL OF MINUTES

The minutes of the October 10, 2022 meeting of the Climate Action and Sustainability Committee are *enclosed.*

Approval of this item approves the listed minutes of the previous meeting.

Consent Agenda Approval Motion:

"That the Climate Action and Sustainability Committee approves item CA-1 as listed on the November 14, 2022 CAS Committee Consent Agenda."

All municipalities should vote on the consent agenda.

5. COG COMMITTEE REPORTS

At the January 10, 2022 meeting, the CAS committee members agreed to include an item for Committee reports. The Chair should request any reports from members or staff.

6. REFUSE AND RECYCLING RATES FOR 2023 (Action) – *presented by Shelly Mato*

This agenda item asks the committee to accept the rates for refuse and recycling curbside collection for 2023.

On January 1, 2023, COG will enter the fourth year of its 5-year, 3-month contract for regional residential refuse and recycling collection services in Benner, College, Harris, Ferguson and Patton Townships. The bid was awarded to Advanced Disposal Services which was subsequently acquired by Waste Management, now WM.

Refuse Rate Adjustments
The refuse rates for this contract are adjustable annually by to two variables: tipping fees and fuel costs. Tipping fees are adjusted when the Centre County Recycling and Refuse Authority (CCRRA) sets new tipping rates for refuse and/or recyclables. Fuel costs are adjusted based on the variance between the previous contract year cost and the average fuel costs during the previous 12-month period. Either the contract hauler or the COG may request annual adjustments. WM requests fuel cost and tipping fee adjustments for all customers in the COG contract for 2023. *Enclosed* are the calculations for these adjustments.

a) **Fuel Adjustment**

A proposed increase is based on the fuel costs for CNG over the previous 12-month period (December 2021-November 2022). The contract bid price for fuel in 2022 was $2.82/dge. The average fuel cost over the past 12 months was $3.06/dge. The calculated total fuel adjustment for 2023 is $ 0.11 per month per residential contract for the refuse trucks.

b) **Tipping Fee Adjustment**

The tipping fee in 2023 for refuse per ton as set by the CCRRA is $84/ton. That is a change of $8/ton from 2022. The tipping fee adjustment for 2023 is $0.52 per month for regular use service and $0.13 per month for low use service.

Recycling Rate Adjustment
Through a Memorandum of Understanding with the COG, the CCRRA sets a rate for curbside collection of recycling. This rate is set through the Period Agreement Review – Reopener.

The CCRRA presented the COG with the financial data below used in determining rates for curbside collection of recycling for the COG contract in 2023. The CCRRA provided the *enclosed* financial data to

support the true cost per stop.

5-Year Rate History: COG Residential Curbside Recycling

	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Projected	2023 Projected
Rate Charged	$3.62	$3.89	$5.65	$5.93	$5.94	$8.50
True Cost per Stop	$6.24	$5.81	$5.91	$5.56	$8.14	$12.44

2023 Refuse and Recycling Rates

The fuel and tipping fee adjustments for refuse and the cost adjustment for recycling are combined in the table below.

Service	***2022 Invoice per month***	*Refuse Costs*		*Recycling Costs*		***2023 Invoice per month***
		2022 Refuse Collection	*2023 with Fuel and Tipping Adjustments*	*2022 Recycling Collection*	*2023 with cost adjustment*	
Regular (up to 8 bags/week) Service	**$20.19**	$14.25	$14.88	$5.94	$8.50	**$23.38**
Low-Use (1 bag/week) Service	**$16.58**	$10.64	$10.88	$5.94	$8.50	**$19.38**
Regular + At-Door Service	**$30.19**	$24.25	$24.87	$5.94	$8.50	**$33.38**
Low-Use + At-Door Service	**$26.58**	$20.64	$20.87	$5.94	$8.50	**$29.38**

Based on the fuel and tipping fee adjustments for refuse collection and disposal and the cost adjustment for recycling collection, the Climate Action and Sustainability Committee may want to consider the following motion:

That the Climate Action and Sustainability Committee accept the Regular 8-bag refuse and recycling service rate increase to $23.38 per month and the Low Usage Service rate increase to $19.38 per month.

Municipalities that participate in the COG Regional Contract should vote on this agenda item.

7. MEMORANDUM OF UNDERSTANDING BETWEEN CENTRE REGION COG AND CCRRA (Discussion) – *presented by Shelly Mato*

This item provides information for the CAS Committee to provide input on a proposed amendment to the Memorandum of Understanding (MOU) between the COG and the CCRRA. The proposed amendment is intended to clarify responsibility for establishing rates for recycling for customers.

Currently, requests to amend the MOU to change rates are made during the *Agreement Review – Reopener* process. The COG and CCRRA proposed amending this portion of the MOU to simplify and clarify responsibilities for annual rate changes. Other regional and county authority boards of directors have the responsibility to set rates in consultation with the professionals who operate each authority (UAJA, SCBWA, CATA). These authorities establish rates by action of the respective authority board of directors. No approval process is required by COG committees.

The CCRRA Solicitor suggested the following amendment:

Section 4 of the MOU shall be deleted in its entirety and the following new Section 4 shall be substituted in its place:

~~*4. Monthly Fee. The Authority monthly fee for Recycling Services provided hereunder shall be at the rate of five dollars and sixty-five cents ($5.65) per month for service for each Service Area Customer. The rate can be reviewed in accordance with any Periodic Agreement Review – Reopener (#11) - and can be adjusted during that time. All adjustments to the monthly fee by the Parties must be effective at the beginning of a billing cycle, and must be submitted to the Contractor thirty (30) days prior to the effective billing cycle.*~~

4. Monthly Fee. The Authority monthly fee for Recycling Services provided hereunder shall be at a rate per month for service for each Service Area Customer as determined annually by the Authority. In making its rate determination, the Authority shall take into account, without limitation, the Authority's costs and recycling collection rates in Centre County for areas outside of the Service Area. Any annual adjustment must be submitted to the Centre Region COG and the Contractor thirty (30) days prior to the first billing cycle of the next calendar year.

Initial items considered by staff that could be discussed by the CAS Committee are:

- How much representation should COG municipalities have on the CCRRA Board of Directors?
- The CCRRA should develop a uniform, transparent and public method to guide any rate changes for curbside recycling collection.

The CAS Committee should review proposed changes and provide any comments to staff.

No motion is required.

8. REFUSE AND RECYCLING START TIME PILOT ANALYSIS (Discussion) – *presented by Shelly Mato*

This agenda item asks the Climate Action and Sustainability Committee consider endorsing a permanent change to the start of collection of refuse and recycling from 7:00 a.m. to 6:00 a.m. between Memorial and Labor Days each summer.

The COG Executive Director approved a pilot program changing the start time for the summer of 2022. The COG and individual townships collected data on residents' comments, complaints received by WM's customer service, and missed pickups reported to WM and the CCRRA. *Enclosed* is the full report on the pilot. Provided here is a summary of the data.

- The majority of comments with concerns or opposing the pilot program were received prior to implementation. Residents' submitted comments appear in this table:

Dates Comments Submitted	Comments Opposed to Earlier Start Time	Comments in Support of Earlier Start Time	Other (comments on contract, climate change)
March – May 2022	15	7	3
June – September 2022	7	15	1

- There were very few "missed pickups" indicating that most customers had their trash and recycling at the curb prior to collection. The Data from WM's customer service for 2022 is provided below and includes a comparison to data from 2021.

MISSED PICKUPS AND COMPLAINTS BY MONTH						
	SOURCE	MISSED PICKUPS			COMPLAINTS	
Month	WM Customer Service	Total	Recycling	Also on "Not Out"*	Total	Missed Pick ups
June	5/31 thru 6/30 2022	40	13	1	14	3
July	7/1 thru 7/29 2022	22	4	2	10	3
August	7/30 thru 8/29 2022	28	7	3	15	4
September	8/30 thru 9/2 only 2022	6	2	0	2	0
TOTAL	2022	96	26	6	41	10
2021	June – August	105	6	8	34	7

- There are over 16,000 residents that have trash and recycling service. The very limited number of comments seems to indicate satisfaction with the pilot program.
- The results of the early pickup pilot program indicates that it was successfully implemented and well-received by customers, WM, CCRRA, and their drivers.

The CAS Committee should review the full report on the pilot, ask questions, and provide feedback to the COG Executive Director.

No motion is required.

9. REVIEW OF REGIONAL REFUSE AND RECYCLING CUSTOMER SURVEY (Discussion) – *presented by Shelly Mato*

This agenda item asks the CAS Committee to review and provide comments on the second draft survey for customers of WM through the COG's Regional Refuse and Recycling contract.

The regional refuse and recycling contract for curbside collection covers some 16,000 residences in Benner, College, Ferguson, Harris, and Patton Townships. The COG intends to enter into a contract with a waste hauler to begin April 1, 2025 through a competitive bidding process. The process includes a resident survey, as it has for previous contracts.

Enclosed is a second draft of the survey scheduled to be distributed in the beginning of 2023. The survey includes items on refuse collection, recycling services, customer service provided by the contract hauler, and community priorities in solid waste management. Outreach to get residents to complete the survey will be included in the quarterly billing insert sent out in December, social media, advertisements through local media, and mailings and emails to property management companies, HOAs, and COG's email alert system. Notice will also be sent to municipalities for inclusion in their newsletters. The committee should

review the draft survey and provide comments and feedback on the draft and the planned distribution.

No motion is required.

10. OTHER BUSINESS

A. Matter of Record – The next meeting of the CAS Committee will be held on December 12, 2022 at 12:15 p.m. This will be a hybrid meeting.

B. Matter of Record – On November 7, 2022 Mr. Norenberg and Ms. Mato attended the Benner Township Board of Supervisors' meeting to discuss the current and the upcoming contract for Refuse and Recycling curbside collection. The COG received useful feedback from the supervisors and from residents at the meeting. Benner Township has participated in the COG regional contract since 2010.

C. Matter of Record – Proposals for a SPPA were received on October 19, 2022 by SCASD. The Working Group will be receiving a recommendation at their November 30, 2022 meeting. The process for discussion and approval at COG will be for the Facilities Committee to make a recommendation at their December 6 meeting and then the CAS and Finance Committee will provide input for the Executive Committee to consider at their December 13 meeting.

D. Matter of Record – The Community Climate Action Conversation kit has been updated and all materials can be found on our website: https://www.crcog.net/ccac. Three groups are currently in the process of using the CCAC kit: the Delta Program's middle school science class, the Delta Program's Sustainability Committee and Foxdale. To assist groups in having these conversations, staff is working to train facilitators so that groups can have the option of requesting a facilitator to help with the process.

E. Matter of Record – Gabriela Mezeiová, a PSU Humphrey Fellow, will be working with CRPA for her local professional affiliation component of the program through April 2023. She has a background and interest in environmental education and will be supporting Ms. Adams with engagement and outreach activities.

F. Matter of Record – The CAAP Dashboard for local government actions has been created as a Google file. It can be viewed, and comments can be posted. It is a work in progress and staff is working to capture our current tasks completed. The purpose is to (1) share relevant information on successful actions so that we can report out to the community and (2) municipalities can learn from others about items of interest to them.

G. Matter of Record – *Enclosed* is the October 24, 2022 meeting summary of the CAAP Implementation Technical Advisory Group (TAG). The TAG's next meeting is November 28, 2022 at 12 PM as a hybrid meeting.

11. HELPFUL REFERENCE LINKS

Repositories of helpful COG information have been assembled for use by the elected officials and COG staff:

- Governance policies, procedures, and other related documents can be viewed on SharePoint by clicking here or going to https://www.crcog.net/governance.
- The Climate Action and Sustainability Onboarding folder provides information that committee members may find useful. It can be viewed on SharePoint by clicking here or going to this year's agenda folder at https://www.crcog.net/cascommittee

- The Climate Implementation Technical Advisory Group (I-TAG) webpage is on the COG website: https://www.crcog.net/i-tag

12. ADJOURNMENT

ENCLOSURES

Item #	Description
4-1	CAS Minutes 10.10.2022 DRAFT
6-1	2023 COG Refuse Adjustments
6-2	CCRRA COG Curbside Budget Details
8	2022 Start Time Pilot Report
9	Customer Survey Draft
10G	TAG Summary 10.24.2022

JOINT FACILITIES COMMITTEE,
PARKS CAPITAL COMMITTEE, AND CRPR AUTHORITY MEETING

Hybrid Meeting
November 15, 2022
8:30 AM

GENERAL MEETING INFORMATION	
RSVP	**To ensure an overall quorum of members, please let us know how you intend to participate:** https://us02web.zoom.us/meeting/register/tZEqd-utrDkvGdUi65OCA5VmG_BAE4_0h-yq
Remote Participants	**To attend via Zoom:** https://us02web.zoom.us/meeting/register/tZEqd-utrDkvGdUi65OCA5VmG_BAE4_0h-yq To attend this meeting by phone: +1 929 205 6099 | Meeting ID: 857 0252 2531
In-Person Participants	COG Building – Forum Room 2643 Gateway Drive, State College, PA 16801
Meeting Contact: Kathy Bisko | email: kbisko@crcog.net | 814-231-3077	
Click HERE to locate the AGENDA and ATTACHMENTS *Should you desire to annotate any attachments you must download them first.*	

- The chat feature for this meeting will be disabled. A recording of the meeting will be made available on the COG website upon its conclusion.
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- **VOTING PROCEDURES:** Members will provide their vote by voice. Clarification will be sought by the Chair if the vote is unclear. Members opposed to a motion should vote "No". For additional information on COG Voting Procedures, please click HERE.
- **PUBLIC COMMENT GUIDELINES:** Members of the public may comment on any items not already on the agenda (five minutes per person). Comments relating to specific items on the agenda should be deferred until that point in the meeting. Written public comment or requests to speak to the Facilities Committee for items not on the agenda, and requests to comment to specific agenda items listed below, may be submitted in advance by emailing kbisko@crcog.net. For additional information on COG public meeting guidelines, please click HERE.
- To access agendas and minutes of previously held meetings, and to learn more about the COG Facilities Committee on our website, please click HERE.

JOINT FACILITIES COMMITTEE, PARKS CAPITAL COMMITTEE, AND CRPR AUTHORITY MEETING

Hybrid Meeting
November 15, 2022
8:30 AM

AGENDA SUMMARY

1.	CALL TO ORDER
2.	PUBLIC COMMENTS
3.	NEW AGENDA ITEMS
4.	WHITEHALL ROAD: Regional Park Phase I Development
5.	CALENDAR
6.	HELPFUL REFERENCE LINKS
7.	ADJOURNMENT

CENTRE REGION COUNCIL OF GOVERNMENTS
2643 Gateway Drive, Suite 3
State College, PA 16801
Phone: (814) 231-3077 Fax: (814) 231-3083 Website: www.crcog.net

JOINT FACILITIES COMMITTEE, PARKS CAPITAL COMMITTEE, AND CRPR AUTHORITY MEETING

Hybrid Meeting
November 15, 2022
8:30 AM

AGENDA

1. CALL TO ORDER

Chair of the Facilities Committee will convene the meeting. Staff will perform a roll call of Committee members.

Chair of the Parks Capital Committee will convene the meeting. Staff will perform a roll call of Committee members.

Chair of the CRPR Authority will convene the meeting. Staff will perform a roll call of Committee members.

2. PUBLIC COMMENTS

Members of the public are invited to comment on any items not already on the agenda (five-minute per person time limit, please). Comments relating to specific items on the agenda should be deferred until that point in the meeting.

3. NEW AGENDA ITEMS (Discussion/Action)

Members may request additional items of business be added to this meeting's agenda. If approved by a majority vote of the members, the proposed new agenda item(s) will be placed on the agenda at the discretion of the Chair.

4. **WHITEHALL ROAD: Regional Park Phase I Development** (Discussion/Action)
Presented by Eric Norenberg and Joe Viglione

PROJECT HISTORY

During the fall of 2020, staff engaged the General Forum in a discussion of options for moving the Whitehall Road Regional Park project forward. COG staff conducted a special *Zoom and Learn* educational program for General Forum members to answer questions about the project and get direction and input. In additional, specific questions were presented to General Forum members and municipalities on Whitehall Road Regional Park and the decision-making process necessary to advance this project. Later that fall, feedback from

municipalities and Authority members was received and considered. A reduced scope of the project was considered for Phase I:

- 2 large grass rectangular playing fields with sports field lighting
- 2 medium grass rectangular playing fields
- "We Play Together" All-Ability Playground
- 12,000 LF Walking Trail
- Restroom Building
- Required infrastructure, utilities, the main driveway, roads, and parking lots

After discussion during the October meeting, it was the consensus of General Forum members to send the current (reduced) Phase 1 of Whitehall Road Regional Park to bid and present those numbers at a future meeting. Bids were received and then tallied on December 15, 2020.

As part of the bid process, contractors were asked to hold bids for 60 days. Bids were set to expire on February 13, 2021. In March, two contracts were awarded to the lowest, most qualified bidder, and rejected five contracts due to the on-going funding discussions that included consideration of refinancing options for both Regional Parks and Regional Pools loans.

In May 2021, the five Parks and Recreation partner municipalities approved a refinancing plan for the Regional Parks loan following months of extensive conversation regarding four options. During that General Forum meeting, several options including Option 1A, 1B, 4, and a Contingent Option were discussed for refinancing both the Regional Pools and Regional Parks loans. As discussion progressed it was focused significantly on the latter two options:

- **Option 1A –** Borrow the same amount as the existing debt service and return the reduction in debt service costs to the municipalities over the life of the debt service (repayment) schedule. This would result in approximately $870,000 in reduced debt service payments to the municipalities.
- **Option 1B –** Borrow the same amount as the existing debt service payments and apply the reduction in debt service costs to the project. This would result in approximately $770,000 in additional funding for the project.
- **Option 4 –** Borrow $9 million to complete Phase I of the project as bid in November 2020. This would result in approximately $1.6 million in additional funding to put toward the project and additional debt service payments of approximately $940,000.
- **Contingent Option –** Approve the borrowing of $9 million (loan to cover two borrowings, pools and parks) but only authorize the amount to be drawn by the CRPR Authority that equaled the existing debt service payments and apply the reduction in debt service costs to the WRRP project. This would result in approximately $770,000 in additional funding for the project. The remaining approximate $800,000 could be drawn following a unanimous vote of the participating municipalities of the Parks Agency at a later date, but prior to the close of the draw down window (36 months).

Ultimately, the Contingent Option was approved by a 5-0 unit vote and there was consensus of the General Forum members to support prioritizing the restrooms in this phase of the project. (Meeting minutes are *enclosed*.)

During the summer of 2021, construction documents were updated for a rebid in the fall. In December, bids were reviewed with a joint meeting of the CRPR Authority, Facilities Committee, Finance Committee, and Parks Capital Committee.

Staff presented the following related to the bid results:

- Total project cost (December 2021 Bids) = $8,516,944
- Total project funding (without restricted contingent funds) = $6,534,578, Difference = ($1,982,367)
- Total project funding (with restricted contingent funds) = $7,351,248, Difference = ($1,165,697)
- Restricted contingent funding established by the General Forum: $816,670

The total project cost based on the 2021 re-bid ($8,516,944) exceeded the total project funding (by $1,165,697 with and $1,982,367 without the restricted contingent funds). Options developed to fit the project cost with the available funding included variations of the following:

- Further reduction of the scope
  - Eliminate parking by 30% to 50%
  - Eliminate earthwork associated with a practice field
- Acceptance of some bid deductions
  - Electrical conduit
  - Construction fencing
- Reduction in contingency related line items
  - Construction and design allowance (CDA)
  - Project contingency
- Eliminate scope items
  - Irrigation system
  - Synthetic turf

While there was support for an option that would have required release of restricted contingency funds (option #2), the Authority was given direction to pursue Option #3 if there was not unanimous support from the five Parks and Recreation partners to release additional funds. Therefore, the Authority was left to purse Option #3 this included:

- a 46% with a reduction in parking spaces to 262
- removal of practice field
- removal of the irrigation system
- removal of the synthetic turf
- reduction of the construction and design allowance,
- acceptance of the site electrical bid deduct
- reduction in earthwork
- reduction in design and construction management

The total project budget was set at $6,534,578 to fit funding available. The project contingency was reduced to $75,000 (1.16% of total project budget-- which was recognized at the time to be much lower than would typically be needed for a project of WRRP's size and complexity). (Meeting minutes are *enclosed*.)

CONSTRUCTION AND FUNDING PROGRESS – *presented by Joe Viglione and Ed Bell*

Since the project broke ground on April 27, 2022, the Whitehall Road Regional Park (WRRP) project has continued to move forward. The restroom building is well underway. The drywall is installed and painted, interior plumbing and electric has been completed, fixtures are installed, and the building is substantially complete.

Two fields have been graded, seeded, and fertilized and the field lighting has been tested and installed. Site utility work including water, site electric, sanitary and storm sewer is well under way and nearing completion.

There has been progress on the permitting and approvals for the maintenance storage building, which is very similar to the pole building constructed for Oak Hall Regional Park. However, the installation of the pole building kit has been pushed to Spring 2023 due to permitting delays and the contractor's work schedule. Seeding of the two tournament-sized fields is also planned for Spring 2023.

The First Energy Foundation granted an additional $5,000 toward the playground; their total donation stands at $15,000. The Agency received a $75,000 grant from DCNR for the all-season pavilion as well as a $195,000 donation from Galen and Nancy Dreibelbis, payable in three installments. A $10,000 grant was also received for the Mascolo Gardens which will be at the park's entrance. These gardens will be near the park's sign and are part of a stormwater retention area that will have a pollinator focus, a bench, and Remembrance Trees.

In terms of the project costs, a summary of the project budget vs. actual expenses in shown in Table 1 on the following page (and included in the agenda packet). This table also shows an estimated percent complete for the construction trades/contracts (as well as professional services and owner supplied furnishing, fixtures, and equipment).

Overall, as shown in Table 1, the job costs as of 11/09/22 can be summarized as follows:

STARTING Project Budget	**$ 6,539,737.11**	
Invoiced and Paid-to-Date	$ 3,299,607.17	50.5%
Projected Payments Owed (For work complete but not yet invoiced)	$1,466,197.86	22.4%
TOTAL: Paid-to-Date + Owed	$4,765,805.03	72.9%
BALANCE Project Budget	**$1,773,932.08**	**27.1%**

Table 1

TABLE 1

Whitehall Road Regional Park — As of 11/09/22

PROJECT BUDGET VS. ACTUALS SUMMARY

C#	Contractor	Description	Committed Contract Amounts	% Work Complete	As of 11/9/22 BILLED & PAID TO DATE	As of 11/9/22 % PAID	PROJECTED Amount OWED Not Billed Yet	As of 11/9/22 TOTAL OWED + PAID TO DATE	PROJECTED BALANCE REMAINING
			A	B	C	D	E = (B - D) x A	F = (E + C)	(A - F)
	DESIGN AND RELATED PROFESSIONAL SERVICES, FEES, AND PERMITS								
	Design and Related Professional Services, and Permitting, Inspections, and Fees		$ 214,279.11	90%	$ 175,704.09	82%	$ 17,147.11	$ 192,851.20	$ 21,427.91
	CONSTRUCTION TRADES - BID AND CONTRACTS								
1	Sippel	Site Work	$ 3,004,642.00	75%	$ 1,320,254.94	44%	$ 933,226.56	$ 2,253,481.50	$ 751,160.50
2	RT Cont	Restroom Building	$ 432,238.00	95%	$ 292,497.61	68%	$ 118,128.49	$ 410,626.10	$ 21,611.90
3	Strouse Site	Site Electric	$ 517,422.00	40%	$ 132,976.25	26%	$ 73,992.55	$ 206,968.80	$ 310,453.20
4	Strouse Bldg	Building Electric	$ 93,470.00	95%	$ 35,530.00	38%	$ 53,266.50	$ 88,796.50	$ 4,673.50
5	Pioneer	Maintenance (pole)	$ 82,663.00	10%	$ 24,798.90	30%	$ 33,065.20	$ 57,864.10	$ 24,798.90
6	Green Valley	Landscaping	$ 508,024.00	45%	$ 86,457.60	17%	$ 142,153.20	$ 228,610.80	$ 279,413.20
7	Leibold	HVAC	$ 62,000.00	95%	$ 42,538.50	69%	$ 16,361.50	$ 58,900.00	$ 3,100.00
8	Montgomery	Plumbing	$ 109,000.00	95%	$ 75,097.50	69%	$ 28,452.50	$ 103,550.00	$ 5,450.00
9	ProMax Fencing	Amenities- Fencing	$ 182,931.00	0%	$ -	0%	$ -	$ -	$ 182,931.00
	OWNER SUPPLIED FURNISHINGS, FIXTURES & EQUIPMENT (FF&E)								
10	Willow Play		$ 125,000.00	0%	$ -	0%	$ -	$ -	$ 125,000.00
11	Musco	Field Lighting	$ 609,325.00	95%	$ 528,454.50	87%	$ 50,404.25	$ 578,858.75	$ 30,466.25
12	General Rec. Inc.	Playground Equip & Safety Surface	$ 560,475.00	100%	$ 560,475.00	100%	$ -	$ 560,475.00	$ -
13	Martuano		$ 5,473.00	94%	$ 5,147.28	94%	$ -	$ 5,147.28	$ 325.72
14	Genie/Sec Fence	Fencing	$ 32,795.00	60%	$ 19,675.00	60%	$ -	$ 19,675.00	$ 13,120.00
		TOTALS	**$ 6,539,737.11**		**$ 3,299,607.17**		**$ 1,466,197.86**	**$ 4,765,805.03**	**$ 1,773,932.08**
					50.5%		22.4%	72.9%	27.1%
			TOTAL COMMITTED		PAID TO DATE		PROJECTED OWED	TOTAL PAID + OWED	PROJECTED BALANCE As of 11/9/22

** Note: A full sized copy of this table and a more detailed spreadsheet are enclosed in the agenda packet*

CONSTRUCTION AND FUNDING CHALLENGES

- Presented by Joe Viglione, Kathy Bisko, and Ed Bell

Unexpected project impacts: A significant portion of the Whitehall Road Regional Park project involves site improvements. This includes site excavation, site grading, foundation excavation (for the restroom and site lighting), entrance road excavation and grading, and excavation for the installation for site utilities including sanitary sewer, storm sewer, site/field drainage, and electricity. This type of work must be consistent with the Land Development Plan (LDP) and the requirements set by the site utility providers (UAJA, SCBWA, and West Penn Power), and the local municipality (Ferguson Township). It also requires several permits and inspections and is often significantly impacted by uncertain and difficult to predict weather and subsurface conditions.

As site work commenced and was fully underway, numerous delays occurred due to inclement weather, muddy conditions, permitting delays, and cost and delays due to rock excavation and site utility work. An unknown pre-existing water line was found and had to be capped (per UAJA), two additional manholes and a drop inlet were required by UAJA and required rock excavation, rock excavation was also necessary for underground electrical and field lighting. Changes to sanitary sewer manhole rim elevations and a lower elevation

for storm sewer line and inlet (per UAJA) were required and additional rock excavation was also needed along sanitary sewer lines and manhole areas.

In September, the LED Sports Field Lighting project had to be put on hold until permitting issues were resolved. The excavation work and placement of topsoil for the tournament-sized fields also had to be delayed since a crane was needed on-site for the LED light installation. Although the light installation was completed, the seeding of the fields could not be completed and will be delayed to Spring 2023. Information is also still needed and pending from West Penn Power on the four electrical meters requested in May for this project.

Managing unexpected cost impacts: It is difficult to accurately quantify costs related to rock removal, weather, connection to existing site utilities, and other unexpected site and subsurface conditions prior to construction. Before the second bid for the project, testing and sampling was done at sites where foundations and other project components would be built to try to identify locations of rock to minimize this uncertainty. Contracts were bid with known work included and unit prices, where appropriate—but actual costs of related to this work are not in base contracts, so the costs are to be addressed through a contract change order process.

To manage this process Ed Bell, the site project manager, has been using the professional project management software ProCore to oversee project progress and receive, track, and review requests for information, etc. He also monitors site activities, holds regular progress meetings, and is in communication daily with contractors, utility representatives and inspectors, and the appropriate design professionals to determine if cost or schedule changes will be necessary.

- Possible cost and schedule changes are noted and tracked by the project manager.
- For any pending cost changes, an estimate is prepared by the project manager (and the appropriate design professionals, if applicable).
- If a cost impact looks likely and necessary, a cost estimate is requested from the affected contractors and/or professional service providers.
- If needed, the project manager further reviews the possible impacts and costs with the agency director (and their technical representative), project civil engineer, architect, mechanical engineer, and/or other design professionals.

The change order process: Site and construction changes that have cost impacts have been handled using the industry standard AIA Change Order form and process. The project manager prepares and documents the pending change order and includes documentation of the costs. It is forwarded to the appropriate design professional for review based on the project design and specifications. It is also reviewed with the agency director (and/or their technical representative) based on project scope, schedule, and budget. If there is agreement that the work and associated costs are necessary, the project manager will prepare an AIA Change Order Form for review and sign-off by project manager and the appropriate design professional. The Change Order is then forwarded to the agency director (or their technical representative) for review. If the Change Order is $4,000 and under, it can be approved and endorsed by the agency director and submitted with supporting documentation to the COG Finance Director for final review and authorization for payment. Change Orders over $4,000

(individually or in total) are to be forwarded to the CRPR Authority with supporting documentation for review, approval, and official endorsement by the Authority. Once approved and endorsed, Change Orders and supporting documentation are to be submitted to COG Finance Director for final review and authorization for processing and payment.

In response to the number of unexpected project costs and potential change orders, additional staff have also been included on the project team to more carefully review and evaluate project costs. This work is being done in close collaboration with COG leadership and the CRPR Authority.

In late September, it became apparent to COG management that the value of approved and pending change orders exceeded the project contingency budget of $75,000 and plans were made to report this information and present a request for additional funding. The report on the change order status and presentation regarding this need was made during a joint meeting of the Facilities Committee and CRPR Authority on October 4, 2022. As the month progressed, it became apparent that the initial request made at the October meeting was not going to be sufficient as other costs were being identified. As a result, the decision was made to gather and evaluate all project data and information and prepare for follow-up meetings with the Facilities Committee in November.

The following table displays a summary of the possible changes in cost Type/Status (approved, pending, and potential) on the left. The right-hand columns show costs by Reason for Change. As shown in the table, it is clear that Rock & Site conditions (49%) and Site Utility related requirement (43%) are the reason for the majority of unexpected (and unfunded) expenses for the project.

Table 2

Whitehall Road Regional Park		REASON FOR CHANGE					
SUMMARY of APPROVED, PENDING, AND POSSIBLE CHANGE ORDERS		Rock & Site Conditions	Inflationary Supply chain impacts	Site Utility (UAJA & SCBWA)	Permit Delays/ Addl Rqmts	Design Impacts	Agency /PM Changes
As of 11/09/2022							
TYPE/STATUS OF CHANGE	**AMOUNT**						
Amount of Committed Costs Greater Than Available Funding	$ 1,982	$ -	$ -	$ -	$ -	$ -	$ 1,982
APPROVED/SIGNED CHANGE ORDERS	$ 116,355	$ 4,639	$ 35,221	$ 102,170	$ -	$ -	$ (25,675)
PENDING CHANGES - WORK COMPLETE	$ 40,084	$ 34,500	$ -	$ -	$ 3,749	$ 935	$ 900
POTENTIAL CHANGES	$ 156,100	$ 114,209	$ -	$ 32,740	$ 1,651	$ 7,500	$ -
Total Known and Projected/Potential Cost Increase	**$ 314,521**	**$ 153,348**	**$ 35,221**	**$ 134,910**	**$ 5,400**	**$ 8,435**	**$ (22,793)**
(Additional Project Funding Needed) as of 11/9/22		49%	11%	43%	2%	3%	-7%

** Note: A full sized version of this table and a more detailed spreadsheet showing changes to project costs are enclosed in the agenda packet.*

GOING FORWARD - *Presented by Eric Norenberg and other staff as needed*

Staff project that in addition to funding the change orders and expenses shown above, additional change orders may be possible during the winter and spring phases of the project. So, additional funds are recommended to be approved to be allocated to cover future change orders. If funds are not provided, the CRPR Authority, as project developer, will need to allocate funds from existing resources (i.e., terminate contracts and open POs) to pay outstanding bills (see above) and to secure the site and completed work (e.g., restrooms, lighting, etc.) to prevent theft and vandalism.

Options

Tw primary options have been proposed and considered:

A. Additional Funding: Access funding from the Restricted (unreleased) loan funds to complete this Phase of the project as bid as follows:

• Current bills:	$ 314,251	
• Minus Present Contingency	($ 75,000)	1.15 %
	$ 239,521	**3.66%**
• Future Project Contingency: (* see below)	**$ 339,723**	**5.19 %**
TOTAL	**$ 578,974**	10.0 %

* Anticipated but not yet quantified additional costs may include:
- Asphalt cutting permit for water line tap
- Possible increase in cost for water tap due to project delays
- Additional rock excavation under playground surface
- Cost increase for playground surface due to project delays
- Pending invoice for cost increases for field lighting
- Possible cost increases for completion of access road

B. No Additional Funding: Current project funds will be reallocated to secure the construction site and completed portions of the project and mothball the project. This option is not recommended due to the significant impacts and the additional costs involved, including:
- Payout of project cost for work completed and not yet billed
- Return of grant funds to DCED and DCNR (including interest)
- Costs for surety for non-completion of improvements shown on the Preliminary Land Development Plan
- On-going costs to shut-down and secure unfinished construction site: (Demobilization, rented fencing, security cameras, rented jersey barriers, etc.)

These costs would be sunk and cannot be recovered if the project were to resume at a future date. In addition, to re-start the project, there would be remobilization costs and many costs (fuel, labor, materials, etc.) would need to be adjusted due to the time delay.

While it may be perceived that a portion of the current project scope could be further reduced to fund the change orders and other expenses, much of the project is significantly completed (see Table 1), and much of the remaining portions of the project are either grant or donor funded (which is restricted and cannot be used for other purposes) or are integral to use of the park (e.g., the road to access the site).

Recommendation

The assembled representatives for this joint meeting are asked to discuss this information and consider a consensus recommendation for the Finance Committee to receive and consider during its meeting on Thursday, November 17.

If the consensus is that additional funds for the project should be allocated from the restricted loan funds, the following motion could be considered:

The jointly assembled members of the Joint Facilities Committee, Parks Capital Committee, and CRPR Authority recommend that the Finance Committee recommend to the Executive Committee and General Forum that $578,974 funds be released from the restricted loan funds in order to ensure payments to contractors and the completion of the initial phase of Whitehall Road Regional Park and that any funds not needed to complete this project be held in reserve for upcoming projects at Oak Hall Regional Park and Hess Field.

5. CALENDAR

The next meeting of the Facilities Committee is scheduled for Tuesday, December 6, 2022.

A calendar with upcoming COG committee, General Forum, and municipal meetings can be found by clicking the following link: COG and Municipal Meeting Overlay Calendar.

6. HELPFUL REFERENCE LINKS

Repositories of helpful information have been assembled for use by the elected officials and COG staff:

- Governance policies, procedures, and other related documents can be viewed on SharePoint by clicking here or going to https://www.crcog.net/governance.
- Updates on current COG Studies and Projects can be found by clicking here or going to https://bit.ly/3vZP8Zs.

- The Whitehall Road Regional Park project site facilitates easy access to documents, resources, and current information about the project. Staff continues to develop and update the site which can be found at https://www.crcog.net/wrrpinfoguide.
- COG Facilities Reference information can be found at: https://bit.ly/3qnEbMA. The Facilities Committee uses this information as a collection point and serves as a resource for new members of the Committee as well as others. Please contact Kathy Bisko at kbisko@crcog.net for access.

Please contact Eric Norenberg with feedback and suggestions.

7. **ADJOURNMENT**

CENTRE REGION COUNCIL OF GOVERNMENTS

2643 Gateway Drive, Suite 3
State College, PA 16801
Phone: (814) 231-3077 ● Fax: (814) 231-3083 ● Website: www.crcog.net

JOINT MEETING
PUBLIC SAFETY COMMITTEE
LAND USE AND COMMUNITY INFRASTRUCTURE COMMITTEE

Hybrid
Tuesday, November 15, 2022
12:00 Noon

GENERAL MEETING INFORMATION	
RSVP	To ensure an overall quorum of members, please let us know how you intend to attend: https://us02web.zoom.us/meeting/register/tZIvceGhrjwuGNE0ZMsslyVQONnXNeZTKxlG
Remote Participants	To attend via ZOOM: https://us02web.zoom.us/meeting/register/tZIvceGhrjwuGNE0ZMsslyVQONnXNeZTKxlG To attend this meeting by phone: +1 929-205-6099 | Meeting ID: 862 6890 7425
In-Person Participants	COG Building – General Forum Room 2643 Gateway Drive, State College, PA 16801
Meeting Contact: Tammy Strouse | email: tes@crcog.net | 814-231-3069	
Click here to locate AGENDA and ATTACHMENTS: 11 -November 2022 - Joint PS LUCI Agenda Packet *Should you desire to annotate any attachments, you may need to download them first.*	

- The chat feature for this meeting will be disabled. Upon its conclusion, a recording of the meeting will be made available on the COG website.

- We ask non-voting participants attending remotely to remain muted with their video turned off unless recognized to speak. To reduce audio interference, please remain off speakerphone during the meeting.

- **VOTING PROCEDURES:** Members will provide their vote by voice. The Chair will seek clarification if the vote is unclear. For additional information on COG Voting Procedures, please click HERE.

- **PUBLIC COMMENT GUIDELINES:** Members of the public may comment on items not already on the agenda (five minutes per person). Comments relating to specific items on the agenda should be deferred until that point in the meeting. For additional information on COG public meeting guidelines, please click HERE.

- **NOTE**: To access agendas and minutes of previously held meetings and learn more about the COG Public Safety Committee on our website, please click HERE.

JOINT MEETING
PUBLIC SAFETY COMMITTEE
LAND USE AND COMMUNITY INFRASTRUCTURE COMMITTEE

Hybrid
Tuesday, November 15, 2022
12:00 Noon

AGENDA SUMMARY

1.	CALL TO ORDER
2.	PUBLIC COMMENTS
3.	APPROVAL OF MINUTES
4.	BACKGROUND INFORMATION
5.	CURRENT ISSUES IN THE CENTRE REGION
6.	OTHER BUSINESS
7.	ADJOURNMENT

JOINT MEETING
PUBLIC SAFETY COMMITTEE
PUBLIC SERVICES & ENVIRONMENTAL COMMITTEE

Hybrid
Tuesday, November 15, 2022
12:00 Noon

AGENDA

1. CALL TO ORDER

   Mr. Hameister, COG Land Use and Community Infrastructure Committee Chair, and Mr. Takac, COG Public Safety Committee Chair, will convene the meeting, provide introductory remarks, and introduce the participants.

2. PUBLIC COMMENTS

   Members of the public are invited to comment on any items not already on the agenda (five minutes per person time limit, please). Comments relating to specific items on the agenda should be deferred to that point in the meeting.

3. APPROVAL OF MINUTES

   Please find the enclosed minutes of the November 9, 2021, joint Public Safety and Public Services and Environmental Committee meeting.

4. BACKGROUND INFORMATION

   Mr. Kauffman, Centre Region Emergency Management Coordinator, will provide a brief overview of the history of this COG meeting that includes representatives from utility providers, PennDOT, emergency service providers, public safety, and local government.

   Mr. Kauffman will also discuss the organizational structure of the joint emergency management program that protects College, Ferguson, Halfmoon, Harris, Patton Townships, and the State College Borough.

5. CURRENT ISSUES IN THE CENTRE REGION

   This is the fifteenth annual meeting to discuss current issues related to the use of public safety resources for managing utility and road construction projects or incidents. Representatives from PennDOT, West Penn Power, Verizon, Comcast, Columbia Gas of PA, Pennsylvania State Police, and the Centre County 911 Communications Center have been invited to review their organization's emergency response plan. Local fire, police, fire police, emergency medical service providers, and public works departments will also be in attendance.

   The purpose of this meeting is to review changes in emergency preparedness planning, exchange information of shared interest, and identify opportunities for local government

and/or COG to support the response efforts of PennDOT and the utility and emergency service providers.

Background information: In August 2006, the Public Services Committee issued a report entitled "Use of Local Emergency Personnel for Extended Periods of Time" that documented the use of fire police for traffic and pedestrian control services for PennDOT and utility company emergencies for excessive amounts of time and offered a series of recommendations for improving the situation. (If you want a copy of this document, please get in touch with COG Administration staff).

The report noted that Section 101.3 of the Pennsylvania Code (the Public Utility Preparedness through Self Certification Law) requires all public utilities to have an emergency response plan. As part of this plan, these companies are expected to meet with municipal and county emergency services personnel to establish a plan of action when emergencies arise. Some municipalities have taken this joint meeting as an opportunity to discuss their specific policies regarding response practices and performance standards with the utility companies. The law mentioned above does not apply to PennDOT.

The August 2006 report recommended an annual meeting among utility companies, PennDOT officials, local emergency service providers, and municipal officials to review any changes in emergency management planning and preparation.

In these meetings, elected officials who serve on the COG Public Safety and Land Use and Community Infrastructure Committees represent the seven Centre Region municipalities

6. OTHER BUSINESS

7. ADJOURNMENT

CENTRE REGION COUNCIL OF GOVERNMENTS

2643 Gateway Drive, Suite 3
State College, PA 16801
Phone: (814) 231-3077 ● Fax: (814) 231-3083 ● Website: www.crcog.net

DATE: October 27, 2022

TO: Human Resources Committee
Centre Region Municipal Managers
COG Agency Directors

FROM: Becca Petitt, COG HR Officer

SUBJECT: November 2, 2022 HR Committee Cancellation Notice

Please note that Mr. Wilson has cancelled the Human Resources Committee meeting scheduled for Wednesday, November 2, 2022, as there are not any agenda topics that require the Committee's immediate attention.

Items to note in the interim:

- Staffing Updates for year-round positions:
  - **Admin** – HR Administrator – Interviews scheduled for November 8, 2022.
  - **Fire** – Fire Director – Virtual interviews with the Screening Committee are scheduled for Monday, October 31, 2022. Assessment Center tentatively scheduled for December 3, 2022.
  - **Parks** – Caretaker I – Offer of Employment has been extended.
  - **Planning** – Senior Planner – Second round interviews scheduled for November 8, 2022.
- MEETING DATE - The next meeting of the Human Resources Committee is tentatively scheduled to be a JOINT meeting with the Executive Committee at 12:15 PM on **Wednesday, November 22, 2022.**

The JOINT meeting was planned when GovHR anticipated sharing the preliminary findings from the Classification and Compensation Study. However, GovHR recently notified COG staff that they need more data from comparable communities to be able to properly complete the study. Unfortunately, despite the reminder efforts from GovHR and COG staff, many communities have not responded or been slow in responding to the survey. It is likely that more comparable communities will need to be identified and surveyed. This may potentially extend the timeline for project completion and delay the Joint Meeting. In the interim, the team continues to work on the Classification analysis.

Thank you.

CENTRE REGION COUNCIL OF GOVERNMENTS

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DATE: October 27, 2022

TO: Public Safety Committee
Centre Region Municipal Managers
COG Agency Directors

FROM: Eric Norenberg, COG Executive Director
Paul Takac, Public Safety Committee Chairperson

SUBJECT: November 3, 2022, Public Safety Committee Cancelation Notice

Please note that the Public Safety Committee scheduled for **November 3, 2022, has been canceled**. The Committee had requested in January to reschedule the meeting to November 3rd because the regular November meeting date fell on Election Day.

The Committee will meet jointly with the COG LUCI Committee on Tuesday, November 15, 2022. The purpose of the joint meeting is to review changes in emergency preparedness planning, exchange information of shared interest, and identify opportunities for local government and COG to support the response efforts of PennDOT and the utility and emergency service providers.

The joint meeting invitation and agenda package information will be sent in a later email.

The next regularly scheduled meeting of the Public Safety Committee is Tuesday, December 13, 2022.

EN/tes

TOWNSHIP OF FERGUSON

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Public Works Director's Report to the Board of Supervisors (BOS)

for the regular meeting on November 15, 2022

1. **Public Works Road Crew Activities:** Leaf collection started October 3rd and continues every working day until the week of December 12th or otherwise hampered by winter operations. We now have 3 leaf collection vehicles in our fleet that can be operated by one person per vehicle aka one-person leaf collectors. The 3 one-person leaf collectors are operating M-F 6:30am – 5:00pm and Saturday from 6:30am to 3:00pm. Starting the week of November 14th, a 5 person pull behind leaf collector crew will also be used to collect leaves.

2. **Arborist and Ferguson Township Tree Commission (FTTC) Activities-** The Tree Commission meets November 21st. Stump grinding at various street tree locations and within Fairbrook Park and Saybrook Park should be complete by November 14th. During the week of November 14th, the arborist will be removing dead wood and trimming trees at the Teener League Baseball Field.

    a. **Contract 2022-C15 Street Tree Pruning** – Each year a certain number of street trees are pruned. Work includes shaping while they are young, clearance over sidewalks and roadways, deadwood removal as the trees mature, and hazard mitigation. This contract is currently out to bid for an opening on November 29th.

    b. **Contract 2022-C14 Street Tree Planting** – Work involves replacing dead or damaged street trees as well as planting opportunities identified by the tree commission and arborist. Notices are sent to adjoining property owners regarding tree species. The contract should be advertised by December, 2022.

3. **Stormwater –** The stormwater fee implementation committee continues to meet biweekly to discuss issues and concerns. A presentation on the stormwater fee was provided to the BOS at a work-session on October 11th. A presentation is planned for the BOS at the December work-session to provide information and answer questions related to the planned Municipal Separate Storm Sewer (MS4) Pollutant Reduction Plan (PRP) projects. The stormwater engineer continues work on processing stormwater fee exemption applications, reviewing stormwater plans for development, responding to stormwater ordinance complaints, conceptual design and preliminary cost estimates for potential stream rehabilitation projects including a section of Slab Cabin run between Chestnut Street and Butternut Street, and a section of a tributary to Beaver Branch in the Piney Ridge neighborhood.

4. **Buildings, Work Orders and Asset Management –** Staff continues to develop and improve our work order system and is working with the mechanics and consultant to roll out a fleet

module. Rearranged the GIS offices and conference room 1. Reviewing building vendor contracts including a Preventative Maintenance (PM) contract with Westmatic for the vehicle wash system.

5. **Contract 2016-C11 Traffic Signal Performance Metrics –** Work resumed by Wyoming Electric and Signal Company to install poles and finalize the interconnect our traffic signals using radio signals to allow for more efficient and timelier optimization of signals from the Township office and PennDOT's Traffic Management Office. Work is substantially complete.

6. **Contract 2018-C20 Park Hills Drainageway** – A permit from PaDEP is pending easement acquisition. 11 of 11 claimants verbally accepted the offer of just compensation. 4 of 11 closings have occurred. 2 closings are pending. 5 closings need to be scheduled. Construction of the drainage project is expected in 2023 with final landscaping in spring of 2024. A supplement for additional work is being negotiated with the design professional.

7. **Contract 2018-C20U Park Hills Drainageway Utility relocations:** Prior to constructing channel improvements, certain utilities such as electric and communications must be relocated. This work is being bid separately to advance the channel construction work. Bids were opened for this work on October 11th. This contract was awarded to RAVAN Inc., dba Tru-Tek Drilling at the regular BOS meeting on November 1st.

8. **Contract 2019-C21 Pine Grove Mills Street Light Conversion:** This contract was awarded by the BOS to M&B Services at the regular meeting on November 1st. Work includes rewiring existing ornamental lights in Pine Grove Mills and installing new power supplies and new power cutoffs to allow them to be serviced by FTPW. This work removes the lights from the WPP tariff and installs meters. High pressure sodium lamps will be removed, and the light fixtures retrofitted with 2700K LED lamps. Work includes the installation of underground conduit by directional boring.

9. **Contract 2020-C4 Suburban Park** This project includes features shown in the master plan including play equipment, a perimeter walk path, restoration of a stream channel, installation of bridges. Design is in final review.

10. **Contract 2020-C18 Science Park and Sandy Drive Signal Design** – Design work was on hold during 2022 given other capital project priorities. This project was discussed during the CIP review by the BOS and final design and bidding is deferred to 2024.

11. **Contract 2021-C16 Chesapeake Bay Pollutant Reduction Plan (CBPRP) Design and Permitting** – In compliance with our MS4 permit and CBPRP, certain projects need to be advanced through the design and permitting phase. The stormwater engineer reviewed the MS4 Pollutant Reduction Plan and conducted site visits to evaluate projects. The section of Slab Cabin Run between Chestnut Street and SR45 and the tributary to Beaver Branch in the Piney Ridge neighborhood continue to be viewed favorably as candidate projects by the Stormwater Engineer and PaDEP. There may be a possibility for a partnership with Pa Fish and Wildlife on the Beaver Branch tributary project. An update to the Board is planned in December.

12. **Contract 2022-C3 Cured in Place Pipe Lining** – This contract includes repairing corrugated metal storm pipes with a pipe liner allowing pipe repair from the inside without the need for digging. The contract is prepared based on a completed video assessment of the pipes. The process includes ultraviolet light cured in place pipe lining. Spot repairs by FTPW are complete. This contract was awarded to Hydro-Klean, LLC. A preconstruction meeting was held on October 12th. Work should begin the last week in November.

13. **Contract 2022-C11 Sidewalk Repairs** – FTPW Engineering Section inspected a portion of the public sidewalks. Property owners were sent notices to fix deficient sidewalk sections and given an opportunity to fix it themselves or have the Township perform the work by contract and bill the property owner. Work is substantially complete.

14. **Contract 2022-C16 Audible Pedestrian Signal (APS) Push Buttons** – This project (in design) includes upgrades to the traffic signals at the College/Bristol intersection and the College/Blue Course intersection to install audible pedestrian signals. An APS provides audible information along with the visual indicators to let blind pedestrians know when to safely cross an intersection.

15. **Contract 2022-C19 FTPW Building 3 Roof Repair -**The existing rubber roof on FTPW building 3 has failed and the roof needs replaced. Refer to separate memorandum to the BOS regarding withdraw of award to low bidder and award to second low bidder.

16. **Contract 2022-C20 Admin Building HVAC –** Barton Associates has finalized drawings and submitted a permit application for work to the Code office. After the coder permit is issued, staff will then put together the "front end" specifications and put this project out to bid. This project includes replacing the existing energy recovery unit or direct outside air unit (DOAU) on the roof of the administration building.

17. **Contract 2022-C21 Pine Grove Mills Bike and Pedestrian Improvements (TASA grant) –** The Township received notice of a $700,000 grant award for construction and inspection of this project. A 2-part RFP process in accord with PennDOT procedures is utilized to select the design firm. 3 firms responded to the RFP. The selected design firm based on a scope of work developed by PennDOT and the Township is MTA. Ferguson Township, PennDOT, and MTA representatives met on 10/24/22 to review the scope of work of the project design to advance submission of a price proposal. An environmental and engineering review meeting led by PennDOT is planned for November 14th. The Township is still awaiting a cost proposal for the design work from MTA.

18. **Contract 2022-C23 Pine Grove Mills Lighting Design (18 new lights)** – Work includes the design of new ornamental lights in Pine Grove Mills mostly to the west of the flashing light. Work has started on the design of this project.

19. **Operating Budget for 2023** – The Public Works Director submitted the public works portions of the 2023 operating budget for review by the Manager, Finance Director, and BOS.

TOWNSHIP OF FERGUSON

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PLANNING & ZONING DIRECTOR'S REPORT

Tuesday, November 15, 2022

LAND DEVELOPMENT PLANS AND OTHER PROJECTS

1. Active Plans are listed below for the Board of Supervisors (11/8/2022).
    - **The Peace Center/Cemetery—Islamic Society Preliminary Land Development Plan** (24-004-078C-0000)
    - **Farmstead View Subdivision Plan** (24-022-306-0000)
    - **Imbt Preliminary Subdivision Plan** (24-004-017A-0000)
    - **1004 West College Avenue Vertical Mixed-Used Preliminary Land Development Plan** (24-002A-051-0000)
    - **MP Machinery Preliminary Land Development Plan** (24-433-007-0000)
    - **MP Machinery Minor Subdivision Plan** (24-433-007-0000 and 24-433-008-0000)
    - **165 Volos Lane Minor Land Development Plan** (24-007-016-0000)
    - **Salvation Baptist Church Preliminary Land Development Plan** (24-004-078-0000)
    - **All Washed Up Auto Spa** (24-012-023-0000 & 24-012-022-0000)
    - **Pine Grove Hall Preliminary Land Development Plan** (24-009A-030-0000)
    - **LeCrone—West College Avenue Replot Minor Subdivision Plan** (24-004-079H-0000 and 24-004-079I-0000)

2. PZ Director attended the TRAISR Oversight Committee Meeting, held bi-monthly evaluations with PZ Staff, met with the Manager, met with PW Director and PW Administrative Assistant to work on Small Cell Wireless Tower implementation, attended the Budget Work Sessions, Centre County Housing and Land Trust Meeting, Fall Neighborhood Associations Open Forum, and Leadership Team Meeting.

3. PZ Staff attended the PZ Weekly Meetings, PSU Land Use Webinar, met to review dwelling unit definitions, Planning Commission Meeting, Zoning Hearing Board Meeting, and the Pine Grove Mills Small Area Plan Advisory Committee Meeting.

PLANNING COMMISSION

The Planning Commission met November 14, 2022, to review the text amendment request to Chapter 27, Section 710—Wireless Communication Facilities for the AT&T Text Amendment request, 2022 State of Planning Report, 2023 Meeting Calendar, and the 2023 Work Program.

ZONING HEARING BOARD

The Zoning Hearing Board held a Zoning Officer Determination Appeal Hearing at the August 23, 2022, meeting:

1. **Nixon Road (24-003-007M-0000)**
   On June 29, 2022, C. Anthony Fruchtl, Penn Terra Engineering, Inc. submitted an application for an appeal hearing at 24-003-007M-0000, on behalf of the property owner, Lindsey Kiefer. The property is zone Rural Agricultural (RA), and the applicant is appealing the Zoning Administrator's application of the Riparian Buffer Overlay Zoning District regulations. The Zoning Administrator has determined that a storage of land clearing material is not a permitted use within the Riparian Buffer and as a result, denied the Zoning Permit Application. The applicant provided additional information that was requested by staff and the Board referred the review back to the Zoning Officer in light of the new information provided.
   The Zoning Hearing Board will be meeting *November 16, 2022*, to hear the appeal for the property located at 24-003-007M-0000.

PINE GROVE MILLS SMALL AREA PLAN ADVISORY COMMITTEE

The Pine Grove Mills Small Area Plan Advisory Committee will meet November 17, 2022 to review the draft streetlight banner designs, the 2023 Meeting Calendar and the 2023 Work Program.

Throughout the month of October and November, Committee members have been meeting with PZ Staff to discuss ordinance amendments and zoning map amendments. Staff are helping these members identify their specific purpose/goals for amending the zoning ordinance, identify their purpose/goals for creating an overlay zoning district, and review current regulations for Home Occupations/No-Impact Home Based Businesses.

The Committee reviewed season streetlight décor ideas and chose string lights to wrap around every other streetlight, a fall bow for every light, and a holiday wreath for every other streetlight. Concerns were expressed over the decorations that are lit up and how close the streetlights are to residential homes and opted to alternate every other pole to start.

The Committee is also working on developing educational materials for residents of Pine Grove Mills to inform them of different processes of obtaining a home occupation permit, zoning permits for additions, the minor alteration process and uses permitted in the Village Zoning District to help educate residents of the benefits of rezoning property to Village.

ROUTE 45 GETAWAYS COMMITTEE

The Committee met October 26, 2022 to review the organizational chart of economic development initiatives in Centre County, prepare information for the wrap up report, and discussed TOD signage regulations for municipalities that had participants in the Route 45 Getaways Event.

The Committee received notification that Happy Valley Agventure Bureau (HVAB) awarded the Committee $8,000.00 for infrastructure projects that will improve visitor/customer experience for businesses in Centre County. Funding for the grant program was made possible by the PA Department of Community and Economic Development (DCED) as part of its Marketing to Attract Tourists program.

The Committee will utilize the funds for installing Tourist Oriented Directional Signing (TODS) for businesses that participate in the Route 45 Getaways event and to purchase footers and poles to display event banners across Route 45. Ideally, with additional signage, tourists and visitors will support the local economy in the arts, entertainment, recreation, and agricultural sectors along the Route 45 corridor. PZ Staff completed an application for businesses interested in obtaining TOD Signage.

FERGUSON TOWNSHIP POLICE DEPT.

3147 Research Drive • State College, Pennsylvania 16801
Telephone: 814-237-1172 • Fax: 814-954-7906
www.twp.ferguson.pa.us

MEMO

TO: Centrice Martin, Township Manager

FROM: Sgt. Ryan L. Hendrick

DATE: November 2022

REFRENCE: October monthly report

Attached is a summary of the police department activity for the month of October 2022. Each member of the police department, sworn and unsworn, play a vital role in our agency's success.

Administrative Assistant Holliday completed all UCR reports and statistics and Administrative Assistant Harter compiled the departments traffic information. I obtained other pertinent information, assembled, finalized, and submitted this board report.

FERGUSON TOWNSHIP POLICE DEPARTMENT

October 2022 Calls for Service

Part I Crimes Summary	Previous Month Oct. 2021	Current Month Oct. 2022	Previous YTD Oct. 2021	Current YTD Oct. 2022
Homicide	0	0	0	0
Rape	0	0	7	8
Robbery	0	0	1	1
Assault	6	1	42	46
Burglary	0	0	5	3
Theft	9	1	76	54
Auto Theft	0	0	2	3
Arson	0	0	0	0
Total	**15**	**2**	**133**	**115**

Part II Crimes Summary	Previous Month Oct. 2021	Current Month Oct. 2022	Previous YTD Oct. 2021	Current YTD Oct. 2022
Forgery	0	1	5	1
Fraud	8	6	53	39
Embezzlement	0	0	0	1
Receiving Stolen Property	0	0	0	0
Criminal Mischief	8	1	27	32
Weapons Violation	0	0	0	0
Prostitution and Commercialized Vice	0	0	0	0
Sex Offense	1	0	5	0
Drug Violation	3	0	16	7
Offenses Against Family	0	0	1	0
DUI	3	4	26	19
Liquor Laws (minors law, furnishing, false ID)	3	3	8	12
Public Intoxication	3	1	17	10
Disorderly Conduct	38	34	249	219
Vagrancy	0	0	1	0
All Other Criminal	1	4	22	34
Total	**68**	**54**	**430**	**374**

Total Crimes	Previous Month Oct. 2021	Current Month Oct. 2022	Previous YTD Oct. 2021	Current YTD Oct. 2022
Part I Crimes	15	2	133	115
Part II Crimes	68	54	430	374
Total	**83**	**56**	**563**	**489**

FERGUSON TOWNSHIP POLICE DEPARTMENT

October 2022 Calls for Service

Other Calls for Service	Previous Month Oct. 2021	Current Month Oct. 2022	Previous YTD Oct. 2021	Current YTD Oct. 2022
Vehicle Code - Crashes	30	25	177	234
Vehicle Code - Other Traffic Incidents	48	38	373	406
Health and Safety – EMS Assist	74	63	631	677
Health and Safety – Fire Assist	5	16	85	86
Other Health and Safety Incidents	14	32	176	229
Alarms	13	15	152	157
Suspicious Activity	48	25	413	290
Unsecure Property	1	0	12	5
Found Property	2	2	41	35
Lost Property	3	4	32	35
Community Relations/ Crime Prevention	6	16	33	68
Car Seat Check	0	1	2	7
School Check	19	32	155	175
Township Ordinances	4	8	89	67
Request for Assistance – Attempt to locate	6	3	35	31
Request for Assistance – Can-Help	1	0	2	10
Request for Assistance – Civil Matter	10	17	65	89
Request for Assistance - Other	44	65	500	547
Missing Persons/ Runaways	1	0	3	6
Animal Complaints	10	14	131	136
Department Information	2	6	40	44
Assist Other Agencies	17	24	146	182
Total	**358**	**406**	**3293**	**3516**

Total Calls for Service	Previous Month Oct. 2021	Current Month Oct. 2022	Previous YTD Oct. 2021	Current YTD Oct. 2022
Part I Crimes	15	2	133	115
Part II Crimes	68	54	430	374
Other Calls for Service	358	406	3293	3516
Total	**441**	**462**	**3856**	**4005**

FERGUSON TOWNSHIP POLICE DEPARTMENT

OCTOBER 2022

	2021	2022	Previous YTD	Current YTD	Notes:
Traffic Citations	53	29	307	375	
Parking Tickets	41	122	441	411	
Traffic Stops	197	199	1565	1957	
Criminal Arrests	12	12	90	86	
Supplements	124	96	1199	1048	
Hearings	13	9	97	94	
Med Return	23.29	24.33	201.74	241.20	

Note:

- *Traffic Stops may not include pre scheduled selective enforcement details where two or more police vehicles are assigned for specific enforcement purposes (such as Aggressive Driving Grant details).*
- *Criminal Arrests are the number of people arrested, not the number of charges, counts or cases cleared. These include arrests made at the time of the incident as well as those filed after an extended investigation.*

Department Notes:

- Officers continue to work with Centre County Mental Health professionals on a daily basis. Most recently a Ferguson Twp resident has tried on more than one occasion to provoke suicide by cop situations stating he has a gun and is going to kill people.
- Officers assisted PSU Police with an event on campus. Ferguson Officers continue to assist PSU police at all football games. This co-operation with PSU is needed from all local agencies to assure the safety of all of those in attendance.

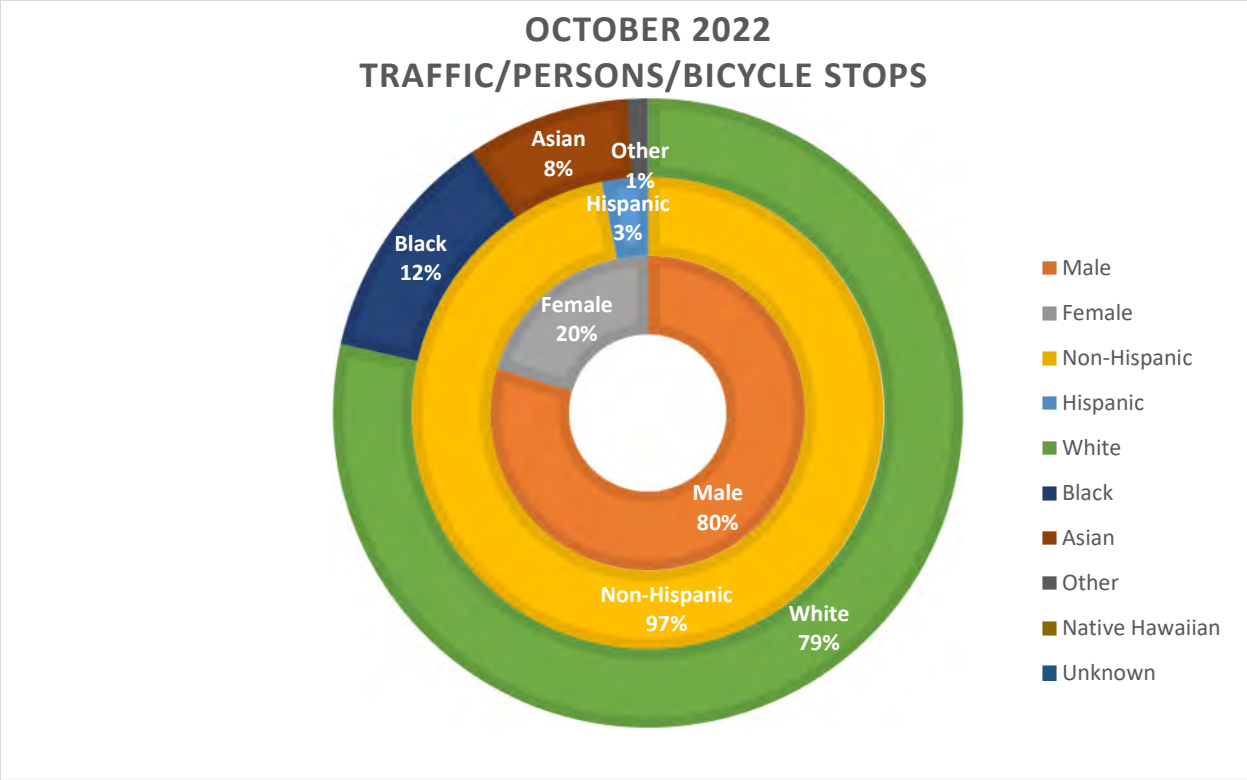
- Officers investigated a vehicle crash in which a 28 YOF lost control of her vehicle and went off the roadway into a house. She had a medical emergency while driving but only sustained minor injuries from the crash. The house had major damage done to it, but no one was injured inside of the house.

Investigations

- Detectives are investigating the death of a 48 YOM who is a State College resident. Initial investigations indicated that it was a suicide.
- Detectives investigated a case in which a dog sitter was issued a bad check for her services.
- Detectives investigated a reported sexual assault of a juvenile. This investigation was unfounded.

Community Relations:

- The Police department was present at the Coffee and conversation on Saturday Oct 15th which was well attended with many good group and individual conversations.
- The Police department assisted at a community event at a Ferguson Twp car dealership. The event was well attended and officers conducted car seat checks and interacted with members in attendance.
- Officers attended several daycares interacting with students, staff and parents.
- Officers handed out glow sticks on Trick or Treat night to help make kids that were Trick or Treating more visible. Prior to Trick or Treating we had each school in Ferguson Two hand out a glow stick to each student, again for them to be visible during trick or treat.
- Officer continued to participate in the Citizens Law Enforcement Academy. Graduation is scheduled for Monday Nov 7th and will graduate 14 community members who now have a better understanding of law enforcement and what its like to be an officer.



Total Stops	191
Male	152
Female	39
Non-Hispanic	185
Hispanic	6
White	150
Black	23
Asian	16
Native American	2
Native Hawaiian	0
Unknown	0

Arrest Distribution Report

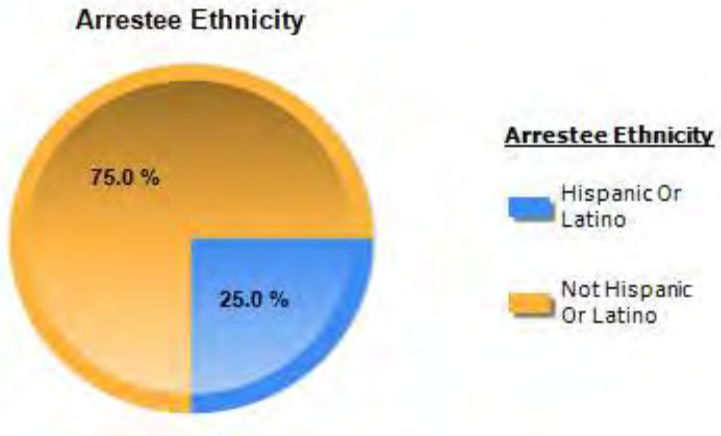
Beginning Date: 10/01/2022 **Ending Date:** 10/31/2022

Arrestee Ethnicity

Agency: FERGUSON TOWNSHIP

Offense: All

Offense	Hispanic Or Latino	Not Hispanic Or Latino	Total
Aggravated Assault	1	-	**1**
Other Assaults	-	3	**3**
Vandalism	1	-	**1**
DUI	-	1	**1**
Liquor Laws	-	2	**2**
Disorderly Conduct	-	3	**3**
All Other Offenses	1	-	**1**
Total	**3**	**9**	**12**



Arrest Distribution Report

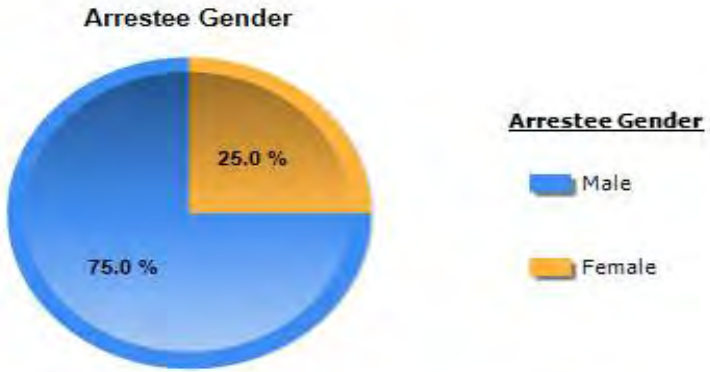
Beginning Date: 10/01/2022 **Ending Date:** 10/31/2022

Arrestee Gender

Agency: FERGUSON TOWNSHIP

Offense: All

Offense	Male	Female	Total
Aggravated Assault	-	1	**1**
Other Assaults	3	-	**3**
Vandalism	1	-	**1**
DUI	1	-	**1**
Liquor Laws	2	-	**2**
Disorderly Conduct	1	2	**3**
All Other Offenses	1	-	**1**
Total	**9**	**3**	**12**



Arrest Distribution Report

Beginning Date: 10/01/2022 **Ending Date:** 10/31/2022

Arrestee Race

Agency: FERGUSON TOWNSHIP

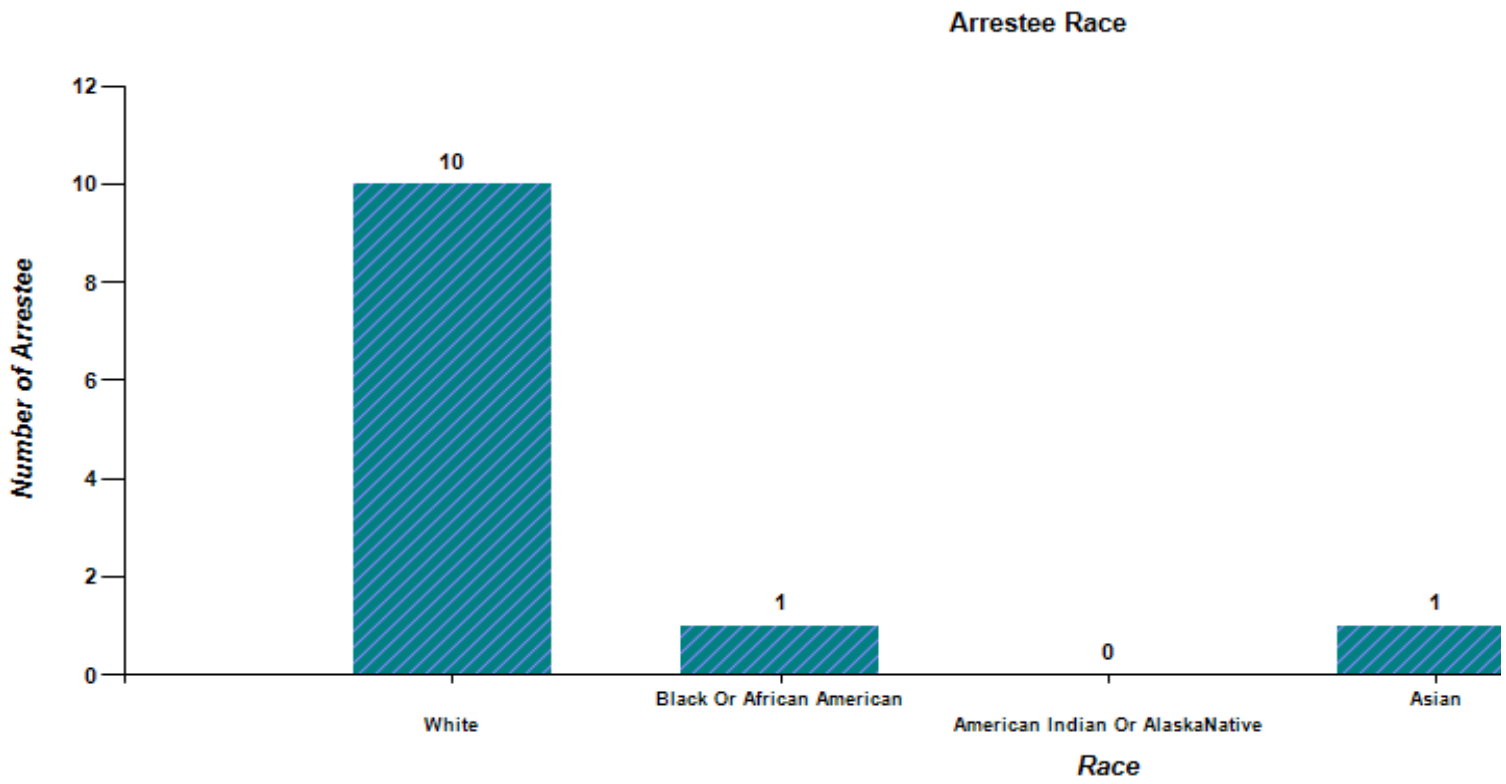
Offense: All

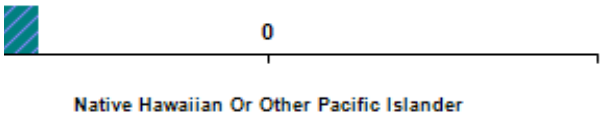
Offense	White	Black Or African America	American Indian Or	Asian	Native Hawaiian Or Other	Total
Aggravated Assault	1	-	-	-	-	**1**
Other Assaults	2	-	-	1	-	**3**
Vandalism	1	-	-	-	-	**1**
DUI	1	-	-	-	-	**1**
Liquor Laws	1	1	-	-	-	**2**
Disorderly Conduct	3	-	-	-	-	**3**
All Other Offenses	1	-	-	-	-	**1**
Total	**10**	**1**	**-**	**1**	**-**	**12**

Arrest Distribution Report

Printed On: 11/04/2022

Beginning Date: 10/01/2022 **Ending Date: 10/31/2022**





Record List - Total:656

Contact or caller	Nature	Area	Reported	Incident
800PHNMESS (1)				
	800PHNMESS		16:06:18 10/31/22	22FT05952
911DUP (6)				
911 DUPLICATE	911DUP	FT1B1	15:03:08 10/31/22	22FT05949
DISPATCHED IN ERROR	911DUP		05:11:19 10/31/22	22FT05930
PTPD CRASH	911DUP	PTPD	08:31:51 10/24/22	22FT05775
DISPATCHED TO INCIDENT BY MISTAKE	911DUP	SB2H5	14:57:32 10/22/22	22FT05741
PATTON CALL GIVEN TO US BY MISTAKE.	911DUP	PTPD	15:21:11 10/18/22	22FT05624
MISTAKEN DISPATCH	911DUP	SH6NA	02:51:16 10/12/22	22FT05489
911NOVOICE (1)				
911 NO VOICE; LAND LINE MALFUNCTION	911NOVOICE	FT3J1	01:08:47 10/05/22	22FT05363
ABANDVEHICL (1)				
ABANDONED VEHICLE CONCERNS	ABANDVEHICL	FT1C1	10:45:00 10/07/22	22FT05405
ALARM BURGLAR (14)				
COMMERCIAL ALARM	ALARM BURGLAR	FT1B1	07:21:04 10/31/22	22FT05931
CVS BURGLER ALARM	ALARM BURGLAR	FT1A1	21:14:50 10/27/22	22FT05858
BURGLAR ALARM	ALARM BURGLAR	FT1B1	20:47:28 10/19/22	22FT05651
ALARM CANCELLED PRIOR TO ARRIVAL	ALARM BURGLAR	FT1B1	16:31:20 10/15/22	22FT05568
BURG ALARM - NO EMERGENCY	ALARM BURGLAR	FT1C1	06:21:26 10/15/22	22FT05560
BURGLAR ALARM	ALARM BURGLAR	FT1D1	10:37:30 10/14/22	22FT05540
BURGLAR ALARM	ALARM BURGLAR	FT1B1	20:00:47 10/12/22	22FT05510
ACCIDENTAL TRIP BY HOMEOWNER	ALARM BURGLAR	FT1D1	16:24:05 10/10/22	22FT05462
BURG ALARM / CODE 4	ALARM BURGLAR	FT1B1	10:43:03 10/08/22	22FT05421
RESIDENTIAL BURGLAR ALARM	ALARM BURGLAR	FT1E1	01:38:57 10/06/22	22FT05380
BUSINESS ALARM	ALARM BURGLAR	FT1B1	05:08:27 10/05/22	22FT05365
BURGLAR ALARM	ALARM BURGLAR	FT1B1	02:33:29 10/05/22	22FT05364
FRONT DOOR ALARM	ALARM BURGLAR	FT1E1	12:33:47 10/01/22	22FT05310
BURGLAR ALARM	ALARM BURGLAR	FT1B1	02:54:25 10/01/22	22FT05306
ALARMPANIC (1)				
ALARM PANIC	ALARMPANIC	FT3J2	23:31:47 10/07/22	22FT05412
ALCOHOL (7)				
53 YOF DUI	ALCOHOL	FT1C1	19:26:41 10/30/22	22FT05927
24 YOM ARRESTED FOR DUI	ALCOHOL	SB2A1	02:09:20 10/30/22	22FT05915
18 YOM ALCOHOL OVERDOSE	ALCOHOL	FT1A1	22:49:06 10/29/22	22FT05906
69 YOM DUI	ALCOHOL	PTPD	21:08:06 10/27/22	22FT05857
19 YOM EJECTED FROM STADIUM	ALCOHOL	UUP05	23:53:51 10/22/22	22FT05752
DISORIENTED 20 YOF	ALCOHOL	FT2H1	23:06:00 10/15/22	22FT05575
DUI	ALCOHOL	FT1A1	02:36:42 10/08/22	22FT05415
ALCOHOLMINORSLW (1)				
20 YOM DRUNK IN PUBLIC	ALCOHOLMINORSLW	SB2H1	02:23:31 10/29/22	22FT05893
ALTEREDID (1)				
19 YOM HAD TWO FAKE ID	ALTEREDID	FT1B1	00:15:11 10/30/22	22FT05911
ANIMAL (14)				
INJURED DEER ALONG THE ROADWAY	ANIMAL	FT3Q1	23:47:57 10/30/22	22FT05928
DEER ON THE ROADWAY	ANIMAL	FT1F1	22:07:22 10/28/22	22FT05882
HANDLED BY OEO	ANIMAL		15:10:45 10/26/22	22FT05828
ONGOING ISSUE WITH DOG RUNNING AROUND NEIGHBORHOOD	ANIMAL	FT1A1	17:44:03 10/24/22	22FT05793
HANDLED BY OEO	ANIMAL	FT1B1	10:48:03 10/18/22	22FT05613
STRUCK DEER	ANIMAL	FT3Q1	07:36:20 10/18/22	22FT05606
CALLER REPORTS HER DOG SHE WAS WATCHING RAN AWAY, LATER FOUND	ANIMAL	FT1C1	13:12:05 10/15/22	22FT05565
HANDLED BY OEO	ANIMAL		14:16:35 10/14/22	22FT05547
HANDLED BY OEO	ANIMAL		13:11:26 10/14/22	22FT05545

HANDLED BY OEO	ANIMAL		15:57:43 10/11/22 22FT05479
HANDLED BY OEO	ANIMAL	FT3T1	11:11:35 10/11/22 22FT05472
FOUND DOGS	ANIMAL	FT1B1	16:46:04 10/10/22 22FT05463
RACOON ATTACK	ANIMAL	FT2G1	14:47:34 10/09/22 22FT05436
DOG GETS OUT OF APARTMENT	ANIMAL	FT2I2	15:31:40 10/01/22 22FT05312

ASSAULTEARLIER (1)

MALE CLAIMS HE WAS STUCK BY A KNOWN MALE CAUSING SWELLING TO HIS FACE	ASSAULTEARLIER	FT2H1	10:34:55 10/08/22 22FT05420

BICYCLESTOP (2)

	BICYCLESTOP		20:24:35 10/24/22 22FT05795
	BICYCLESTOP		20:24:16 10/24/22 22FT05794

CHILDCARSEATCHK (1)

CAR SEAT INSTALL	CHILDCARSEATCHK	FT2H1	09:39:14 10/21/22 22FT05693

COMMRELATIONS (16)

OFFICERS HANDED OUT GLOW STICKS DURING TRICK OR TREAT	COMMRELATIONS	FT2H1	17:06:03 10/31/22 22FT05954
SCHOOL VISIT	COMMRELATIONS	FT1E1	16:09:44 10/31/22 22FT05951
STATION TOUR FOR CUB SCOUT	COMMRELATIONS	FT2H1	11:15:08 10/28/22 22FT05866
RUN/HIDE/FIGHT AT SCHOOL	COMMRELATIONS	FT2G1	09:35:34 10/25/22 22FT05802
RUN/HIDE/FIGHT TRAINING @ SCHOOL	COMMRELATIONS	FT2H1	13:53:51 10/24/22 22FT05787
PSU CLASS PRESENTATION	COMMRELATIONS	FT2H1	10:36:11 10/20/22 22FT05661
DAYCARE VISIT	COMMRELATIONS	FT1E1	09:54:56 10/20/22 22FT05659
CAR SEAT CHECKS / SCHOOL WALKTHROUGH	COMMRELATIONS	FT1C1	08:01:19 10/20/22 22FT05656
DAYCARE VISIT	COMMRELATIONS	FT1A1	09:55:44 10/18/22 22FT05611
CITIZENS POLICE ACADEMY PRESENTATION	COMMRELATIONS	FT2H1	20:40:22 10/17/22 22FT05600
COFFEE AND CONVERSATION	COMMRELATIONS	FT1B1	13:50:25 10/15/22 22FT05566
RUN/HIDE/FIGHT TRAINING AT A BUSINESS	COMMRELATIONS	FT2E1	11:43:28 10/11/22 22FT05474
COMMUNITY RELATIONS - CAR SEAT CHECKS	COMMRELATIONS	FT2H1	13:52:32 10/08/22 22FT05423
SPOKE TO CHILDREN AT A DAYCARE	COMMRELATIONS	FT2G1	10:01:31 10/06/22 22FT05386
RUN/HIDE/FIGHT DRILL AT ELEMENTARY SCHOOL	COMMRELATIONS	FT3J1	08:51:55 10/06/22 22FT05382
THREAT ASSESMENT AT A SCHOOL	COMMRELATIONS	FT2H1	09:59:15 10/05/22 22FT05366

CRIMMISCHIEF (1)

BROKEN WINDOW	CRIMMISCHIEF	FT2G1	14:04:47 10/24/22 22FT05788

DEPTINFO (6)

MEGANS LAW NOTIFICATION	DEPTINFO	FT2H1	00:00:00 10/27/22 22FT05852
5K RACE IN TUDEK PARK	DEPTINFO	FT1B1	21:07:43 10/14/22 22FT05550
FTPD RECEIVED CHILDLINE	DEPTINFO	FT2H1	13:26:00 10/13/22 22FT05543
DUTY TO WARN FROM NJ HEALTH CENTER	DEPTINFO	FT2F1	12:48:28 10/10/22 22FT05453
FBI FORWARDS INFORMATION ABOUT POSSSIBLE MHID INFO	DEPTINFO	FT2F1	11:40:53 10/06/22 22FT05390
MALE RECEIVING LARGE PACKAGE OF AMMO	DEPTINFO	FT2H1	21:38:12 10/03/22 22FT05347

DISORDERLYCOND (28)

LOUD PARTY/PEOPLE	DISORDERLYCOND	FT1F2	02:26:04 10/30/22 22FT05917
LOUD PARTY	DISORDERLYCOND	FT2I2	23:43:43 10/29/22 22FT05910
LOUD PARTY	DISORDERLYCOND		23:27:13 10/29/22 22FT05908
LOUD MUSIC	DISORDERLYCOND	FT2G1	03:58:43 10/29/22 22FT05894
LOUD PARTY	DISORDERLYCOND	FT2I2	23:57:39 10/28/22 22FT05885
YELLING FROM A PARTY	DISORDERLYCOND	FT2E1	21:24:05 10/26/22 22FT05835
LOUD MUSIC	DISORDERLYCOND	FT1B2	22:41:24 10/24/22 22FT05797
LOUD PARTY	DISORDERLYCOND	FT2I2	01:40:05 10/23/22 22FT05757
LOUD PARTY	DISORDERLYCOND	FT2I2	01:25:22 10/22/22 22FT05729
LOUD PARTY	DISORDERLYCOND	FT2I2	00:55:01 10/21/22 22FT05686
LOUD TALKING	DISORDERLYCOND	FT2I2	22:46:21 10/20/22 22FT05679
LOUD MUSIC	DISORDERLYCOND	FT2I2	18:39:15 10/20/22 22FT05673
MALE SCREAMING AT QUALITY INN STAFF	DISORDERLYCOND	FT1B1	15:24:53 10/19/22 22FT05647
DC NOISE	DISORDERLYCOND	FT1F2	01:52:09 10/16/22 22FT05579
REPORT OF LOUD MUSIC BUT WAS NOT	DISORDERLYCOND	FT1B2	19:41:05 10/15/22 22FT05573
LOUD MUSIC	DISORDERLYCOND	FT1B2	18:10:23 10/15/22 22FT05570
LOUD VOICES	DISORDERLYCOND	FT1F2	01:37:06 10/15/22 22FT05557
LOUD PARTY / POSSIBLE FIGHT	DISORDERLYCOND	FT2I2	01:12:08 10/15/22 22FT05555
LOUD PARTY	DISORDERLYCOND	FT1B1	00:57:15 10/15/22 22FT05554

LOUD MUSIC	DISORDERLYCOND	FT2G1	02:22:09 10/14/22 22FT05532
VERBAL ARGUMENT IN THE STREET	DISORDERLYCOND	FT2I2	01:45:33 10/09/22 22FT05430
REPORT OF LOUD VOICES	DISORDERLYCOND	FT1F1	21:07:48 10/08/22 22FT05426
DC-LOUD PARTY	DISORDERLYCOND	FT2I2	00:59:06 10/08/22 22FT05417
D/C - NOISE / POSSIBLE FIGHT	DISORDERLYCOND	FT1F1	23:12:46 10/05/22 22FT05377
D/C - LOUD MUSIC / VOICES	DISORDERLYCOND	FT1F2	01:08:47 10/05/22 22FT05362
LARGE PARTY	DISORDERLYCOND	FT1A1	00:31:48 10/02/22 22FT05320
LOUD MUSIC IN PARKING LOT	DISORDERLYCOND	FT1B1	07:44:06 10/01/22 22FT05307
LOUD CARS IN AREA	DISORDERLYCOND	FT2I2	00:04:49 10/01/22 22FT05297

DOMESTICDISPUTE (5)

CONCERN FOR FEMALE SAFETY	DOMESTICDISPUTE	FT2I2	19:44:34 10/29/22 22FT05905
3RD PARTY REPORT OF A DOMESTIC	DOMESTICDISPUTE	FT1A1	02:46:16 10/23/22 22FT05761
MALE AND FEMALE ARGUING	DOMESTICDISPUTE	FT2I2	05:08:03 10/19/22 22FT05637
VERBAL DOMESTIC DISPUTE	DOMESTICDISPUTE	FT2G1	15:12:48 10/13/22 22FT05522
VERBAL DOMESTIC	DOMESTICDISPUTE	FT2E1	12:28:17 10/04/22 22FT05355

FRAUD (6)

UNPAID MOTEL BILL FOR TWO DAYS	FRAUD	FT1B5	19:18:41 10/18/22 22FT05633
BAD CHECKS	FRAUD	FT1E1	13:22:00 10/18/22 22FT05617
THEFT OF AIRLINE MILES	FRAUD	FT1C1	18:10:00 10/17/22 22FT05598
FAKE CHECK SCAM.	FRAUD	FT1F2	19:28:15 10/12/22 22FT05509
THEFT OF TV	FRAUD	FT1D1	14:24:37 10/10/22 22FT05460
MALE SCAMMED OUT OF MONEY OVER NUDE PICTURES	FRAUD	FT1B2	13:24:29 10/02/22 22FT05328

HARASSMENT (6)

FATHER V SON DOMESTIC	HARASSMENT	FT1D1	22:46:10 10/25/22 22FT05812
ROOMMATES ARE HARASSING HIM	HARASSMENT	FT1B1	11:23:29 10/21/22 22FT05700
THREATENING TEXT MESSAGES	HARASSMENT	FT2I2	20:22:21 10/20/22 22FT05678
CONCERNING EMAILS TO CATA ABOUT EMPLOYMENT	HARASSMENT	FT2H1	13:43:45 10/18/22 22FT05619
MALE IN APARTMENT THAT SHOULD NOT BE	HARASSMENT	FT1A1	18:28:17 10/16/22 22FT05582
HARASSMENT OVER MONEY	HARASSMENT	FT2I2	15:16:20 10/09/22 22FT05437

HLTHSFTY (24)

CONCERNING EMAIL FROM RESIDENT	HLTHSFTY	FT2I2	12:52:37 10/31/22 22FT05945
DRIVER STOPPED AND POSSIBLY SLEEPING IN TRAVEL LANE - GOA	HLTHSFTY	FT1B1	13:03:35 10/28/22 22FT05868
WELFARE CHECK	HLTHSFTY	FT3J1	14:52:04 10/26/22 22FT05827
48 YOM SUICIDE	HLTHSFTY	FT2H1	23:55:39 10/25/22 22FT05811
BMW CORP. REPORTING CUSTOMER ACTIVATED EMERCENCY SIGNAL	HLTHSFTY	FT1E1	10:46:26 10/24/22 22FT05778
ARGUMENT RESULTING IN 302	HLTHSFTY	FT3J1	14:55:19 10/22/22 22FT05740
302 SERVED AND TRANSPORT TO MNMC	HLTHSFTY	FT1A1	07:39:15 10/22/22 22FT05737
3RD PARTY REPORT OF AN ARGUMENT	HLTHSFTY	FT2I2	02:09:21 10/22/22 22FT05732
POSSIBLE DUI GOA	HLTHSFTY	FT1F2	01:02:18 10/21/22 22FT05687
WELFARE CHECK, CANCELLED PRIOR TO ARRIVAL	HLTHSFTY	FT1A1	16:40:10 10/20/22 22FT05672
HUSBAND MISTAKENLY REPORTED MISSING	HLTHSFTY	FT2G1	01:20:39 10/20/22 22FT05653
21 YOM SUICIDAL	HLTHSFTY	FT2H1	10:50:04 10/16/22 22FT05581
TWO CARS STOPPED AND FEMALE LAYING IN GRASS	HLTHSFTY	FT1C1	13:18:37 10/15/22 22FT05564
WELFARE CHECK	HLTHSFTY	FT1C1	08:34:53 10/15/22 22FT05562
MALE SLEEPING IN HIS CAR	HLTHSFTY	FT2I2	02:52:16 10/15/22 22FT05558
CHECK WELFARE OF 21 YOM	HLTHSFTY	FT1F2	12:51:20 10/13/22 22FT05520
CHECK THE WELFARE ON A 23 YOF	HLTHSFTY	FT1B4	20:51:21 10/12/22 22FT05512
12 YOM AUTISTIC STUDENT LEFT SCHOOL	HLTHSFTY	FT2H1	08:04:24 10/12/22 22FT05491
COMPLAINT ABOUT NEIGHBORS	HLTHSFTY	FT1A1	16:15:21 10/09/22 22FT05438
CALLER CONCERNED ABOUT A MALE SHE OBSERVED	HLTHSFTY	FT1A1	12:14:23 10/06/22 22FT05393
WELLNESS CHECK ON 31YOM	HLTHSFTY	FT3J1	15:24:16 10/05/22 22FT05372
MHID CONSUMER NOT COOPERATING W/STAFF.	HLTHSFTY	FT2H1	17:44:00 10/04/22 22FT05359
TREE FELL ON ADJACENT PROPERTY	HLTHSFTY	FT1C1	11:19:00 10/02/22 22FT05326
OPEN LINE WITH FIRE ALARM	HLTHSFTY	FT1F1	19:42:14 10/01/22 22FT05315

HLTHSFTYEMSASST (63)

86 YOF BREATHING ISSUES	HLTHSFTYEMSASST	FT1F2	15:49:42 10/31/22	22FT05950
3 Y/O/M CONGESTION	HLTHSFTYEMSASST	FT1A1	10:45:18 10/31/22	22FT05943
32 YOM GROIN PAIN	HLTHSFTYEMSASST	FT2H3	18:28:01 10/30/22	22FT05926
85YOF W/ BREATHING PROBLEMS	HLTHSFTYEMSASST	FT2H1	14:46:25 10/30/22	22FT05922
23 YOM ALCOHOL OVERDOSE, VOMITING	HLTHSFTYEMSASST	FT1B2	02:35:34 10/30/22	22FT05919
ADOMINAL PAIN	HLTHSFTYEMSASST	FT3K1	07:21:03 10/29/22	22FT05896
FEMALE 92 YOA CHEST PAIN	HLTHSFTYEMSASST	FT3T1	05:34:19 10/29/22	22FT05895
43 YOF-TROUBLE BREATHING	HLTHSFTYEMSASST	FT1B3	01:08:58 10/29/22	22FT05888
79 YOF WITH WEAKNESS	HLTHSFTYEMSASST	FT1E1	14:10:18 10/28/22	22FT05872
61 YOF NOT FEELING WELL	HLTHSFTYEMSASST	FT1B1	13:11:28 10/28/22	22FT05870
83 YOF WITH NOSE BLEED	HLTHSFTYEMSASST	FT3S1	09:57:43 10/28/22	22FT05864
MEDICAL ALARM	HLTHSFTYEMSASST		07:42:16 10/28/22	22FT05863
45 YOF SLEEPING IN CAR	HLTHSFTYEMSASST	FT1A1	11:10:25 10/27/22	22FT05851
83 YOM FELL OUT OF BED	HLTHSFTYEMSASST	FT2G1	08:28:06 10/27/22	22FT05848
78 YOM NOT ALERT WITH TROUBLE BREATHING.	HLTHSFTYEMSASST	FT1E1	07:03:22 10/27/22	22FT05845
86 YOM WITH BREATHING DIFFICULTY	HLTHSFTYEMSASST	FT1F2	17:02:40 10/26/22	22FT05829
20 YOM WITH RACING HEART	HLTHSFTYEMSASST	FT2I2	16:59:15 10/25/22	22FT05808
39 YOM ABNORMAL EKG	HLTHSFTYEMSASST	FT2F1	10:03:10 10/25/22	22FT05805
85 YOM GROUND LEVEL FALL WITH BLEEDING	HLTHSFTYEMSASST	FT3K1	12:07:50 10/24/22	22FT05783
PREGNANCY PAIN	HLTHSFTYEMSASST	FT1B3	11:33:49 10/24/22	22FT05782
FEBRILE SEIZURE	HLTHSFTYEMSASST	FT2H1	09:09:01 10/23/22	22FT05765
76 YOM FELL-COVID POSITIVE	HLTHSFTYEMSASST	FT1F2	19:10:57 10/22/22	22FT05748
65 YOM FAINTED - REFUSED EMS	HLTHSFTYEMSASST	FT2H1	12:45:20 10/22/22	22FT05739
26 YOM - CHEST PAIN	HLTHSFTYEMSASST	FT1C1	00:39:26 10/22/22	22FT05726
22YOM W/ CARDIAC SYMPTOMS	HLTHSFTYEMSASST	FT2E1	15:25:48 10/21/22	22FT05707
MEDICAL ALARM- RESET PRIOR TO ARRIVAL	HLTHSFTYEMSASST	FT2H1	13:10:15 10/21/22	22FT05704
71 YOF FELL AND NEEDED HELP GETTING BACK UP	HLTHSFTYEMSASST	FT2H1	15:17:49 10/20/22	22FT05667
EMS ASSIST 93YOM CARDIAC SYMPTOMS	HLTHSFTYEMSASST	FT2F1	15:12:40 10/20/22	22FT05668
20 YOF PASSED OUT AND INJURED HER NOSE	HLTHSFTYEMSASST	FT1B1	14:24:47 10/20/22	22FT05666
82YOM FELL WITH HIP PAIN.	HLTHSFTYEMSASST	FT2G1	11:11:23 10/20/22	22FT05663
GROUND LEVEL FALL / GENERAL ILLNESS	HLTHSFTYEMSASST		09:26:47 10/20/22	22FT05658
75 YOF FALL VICTIM	HLTHSFTYEMSASST	FT3J1	04:57:25 10/20/22	22FT05655
66 YOF FELL AND NOW HAS BACK PAIN	HLTHSFTYEMSASST	FT2H1	14:36:57 10/19/22	22FT05645

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25 YOF IN LABOR	HLTHSFTYEMSASST	FT1B3	13:39:15	10/19/22	22FT05643
EMS CANCELLED OUR RESPONSE	HLTHSFTYEMSASST	FT2H1	00:17:57	10/18/22	22FT05603
75 YO FEMALE FALL VICTIM	HLTHSFTYEMSASST	FT3J1	04:45:03	10/17/22	22FT05587
21 YO MALE CONSCIOUS ALCOHOL OVERDOSE	HLTHSFTYEMSASST	FT1B2	02:43:51	10/16/22	22FT05580
80 YOF FLUID IN HER LEGS	HLTHSFTYEMSASST	FT2G1	18:59:13	10/15/22	22FT05572
47 YOF PASSED OUT ON SIDEWALK	HLTHSFTYEMSASST	FT1B1	16:53:15	10/15/22	22FT05569
70 YOM CHEST PAIN	HLTHSFTYEMSASST	FT1B1	04:50:10	10/15/22	22FT05559
55 YOF CHEST PAIN	HLTHSFTYEMSASST	FT3J2	12:52:11	10/14/22	22FT05544
FALSE ASSISTED LIVING CORD PULL	HLTHSFTYEMSASST	FT2H1	11:31:12	10/14/22	22FT05542
MALE 86 YOA FALL VICTIM	HLTHSFTYEMSASST	FT3O1	01:30:11	10/14/22	22FT05531
18 YOM WANTS TO HARM HIMSELF	HLTHSFTYEMSASST	FT3J2	22:49:21	10/13/22	22FT05529
86 YOM GROUND LEVEL FALL	HLTHSFTYEMSASST	FT2H1	05:37:09	10/13/22	22FT05514
86 YOM LOSS OF CONSCIOUSNESS.	HLTHSFTYEMSASST	FT3O1	15:58:31	10/12/22	22FT05506
79 YOF-NEEDS HELP GETTING UP	HLTHSFTYEMSASST	FT2H1	06:24:52	10/12/22	22FT05490
FEMALE 23 YOA SEIZURE	HLTHSFTYEMSASST	FT1B1	05:10:35	10/11/22	22FT05468
22 YOF FEVER AND BODY PAIN	HLTHSFTYEMSASST	FT1B2	03:39:24	10/11/22	22FT05467
68 YOF ALTERED MENTAL STATUS	HLTHSFTYEMSASST	FT3N1	11:41:59	10/10/22	22FT05451
72 YOF NEEDED RIDE FOR SURGERY.	HLTHSFTYEMSASST	FT1B1	10:05:51	10/10/22	22FT05450
56 YOF TROUBLE BREATHING/BACK PAIN.	HLTHSFTYEMSASST	FT2H1	08:24:49	10/10/22	22FT05448
83 YOM WENT TO KNEE FEELING DIZZY, STRUCK HIS DEAD	HLTHSFTYEMSASST	FT2G1	07:09:41	10/10/22	22FT05446
87 YOF FELL AND BLEEDING FROM HEAD	HLTHSFTYEMSASST	FT2H1	19:58:07	10/09/22	22FT05441
79 YOM FALL VICTIM	HLTHSFTYEMSASST	FT1F1	14:12:49	10/09/22	22FT05434
18 YO MALE CONSCIOUS ALCOHOL OVERDOSE	HLTHSFTYEMSASST	FT2I2	00:36:50	10/09/22	22FT05429
GROUND LEVEL FALL / NO INJURIES	HLTHSFTYEMSASST	FT2G1	13:07:35	10/08/22	22FT05422
83 YOM GROUND LEVEL FALL	HLTHSFTYEMSASST	FT1D1	08:09:18	10/08/22	22FT05419
78 Y/O/F CHEST PAIN	HLTHSFTYEMSASST	FT1B3	07:31:31	10/06/22	22FT05381
89 YOM LIFT ASSIST.	HLTHSFTYEMSASST	FT1C1	17:08:47	10/05/22	22FT05374
64 YOF LEAKING FLUIDS FROM ABDOMEN	HLTHSFTYEMSASST	FT1A1	14:38:30	10/04/22	22FT05357
40 YOM CATHATER NOT DRAINING	HLTHSFTYEMSASST	FT1A1	22:12:03	10/03/22	22FT05348
76 YOM FELL, WAS NOT INJURED	HLTHSFTYEMSASST	FT1F2	18:51:15	10/03/22	22FT05343

HLTHSFTYFIREAST (16)

OVEN FIRE - OUT PRIOR TO ARRIVAL	HLTHSFTYFIREAST	FT1F1	11:40:27	10/29/22	22FT05899
FIRE ALARM DUE TO FOG MACHINE	HLTHSFTYFIREAST	FT2G1	18:43:51	10/26/22	22FT05831
MULCH SMOKING, FD ASSIST	HLTHSFTYFIREAST	FT1B2	11:38:21	10/24/22	22FT05781

CO2 ALARM WAS GOING OFF	HLTHSFTYFIREAST	FT3J1	21:03:41 10/23/22 22FT05772
ASSIST ALPHA WITH SMOKING OUTLET	HLTHSFTYFIREAST	FT2I2	14:12:23 10/23/22 22FT05768
SMOKE IN LAUNDRY ROOM	HLTHSFTYFIREAST	FT1B1	18:59:37 10/22/22 22FT05746
LAWN MOWER ON FIRE	HLTHSFTYFIREAST	FT1D1	17:10:03 10/22/22 22FT05744
FIRE ALARM SET OFF BY COOKING	HLTHSFTYFIREAST	FT2H1	18:27:02 10/19/22 22FT05648
ACCIDENTAL FIRE ALARM PULLED	HLTHSFTYFIREAST	FT3K1	04:26:33 10/18/22 22FT05605
TOASTER FIRE, FIRE OUT BEFORE ARRIVAL	HLTHSFTYFIREAST	FT2I2	18:57:07 10/17/22 22FT05599
ASSIST THE FIRE DEPARTMENT.	HLTHSFTYFIREAST	FT1E1	15:36:12 10/17/22 22FT05595
FIRE ALARM	HLTHSFTYFIREAST		08:38:09 10/17/22 22FT05589
FIRE ALARM, FALSE TRIP	HLTHSFTYFIREAST	FT1F2	13:55:48 10/13/22 22FT05521
CARBON MONOXIDE DETECTORS WENT OFF	HLTHSFTYFIREAST	FT2G1	19:01:50 10/12/22 22FT05508
FIRE ASSIST FOR FAULTY SMOKE ALARM.	HLTHSFTYFIREAST	FT2G1	21:24:55 10/06/22 22FT05401
ASSIST FD WITH FLUE FIRE.	HLTHSFTYFIREAST	FT3J1	15:31:05 10/03/22 22FT05340

HLTHSFTYPRSNAST (1)

83 YOM NEEDED LIFT ASSIST.	HLTHSFTYPRSNAST	FT2G1	16:41:32 10/08/22 22FT05424

OUTAGNCYASST (24)

CELL PHONE EXAM FOR STPD.	OUTAGNCYASST	FT2H1	21:46:24 10/31/22 22FT05957
ASSIST SCPD WITH RECKLESS OPERATION	OUTAGNCYASST	SC3JA	02:26:03 10/30/22 22FT05918
ASSISTED PTPD WITH A RETAIL THEFT/FOOT PURSUIT	OUTAGNCYASST	PTPD	20:48:59 10/28/22 22FT05881
OUTSIDE AGENCY ASSIST	OUTAGNCYASST	FT2I2	16:06:49 10/28/22 22FT05875
OUTSIDE AGENCY ASSIST-PTPD	OUTAGNCYASST	PTPD	19:45:54 10/27/22 22FT05856
ASSIST PTPD WITH SUICIDAL MALE	OUTAGNCYASST	PTPD	12:53:07 10/27/22 22FT05853
ASSIST SCPD - ANIMAL CRUELTY	OUTAGNCYASST	SC3KA	00:38:10 10/25/22 22FT05798
ORFA-PROUD BOYS EVENT	OUTAGNCYASST		15:03:56 10/24/22 22FT05790
OUTSIDE ASSIST WITH PTPD	OUTAGNCYASST	PTPD	18:41:27 10/20/22 22FT05674
ASSISTED PTPD WITH A 10-45 B	OUTAGNCYASST	PTPD	16:44:39 10/18/22 22FT05627
ORFA-SCPD	OUTAGNCYASST	FT2H1	15:50:28 10/18/22 22FT05625
ASSISTED PTPD WITH RETAIL THEFT	OUTAGNCYASST	PTPD	14:21:53 10/18/22 22FT05620
PSU OFFICER REQUESTED FTPD GO TO ADDRESS WITH THEM.	OUTAGNCYASST	FT1B1	19:53:27 10/15/22 22FT05574
ASSISTING PTPD-CANCELLED PRIOR TO ARRIVAL	OUTAGNCYASST	PTPD	13:07:28 10/12/22 22FT05500
PTPD REQUEST TO HANDLE AMBULANCE ASSIST.	OUTAGNCYASST	PTPD	18:09:23 10/05/22 22FT05376
ASSISTED PTPD WITH A CIVIL CUSTODY DISPUTE	OUTAGNCYASST	PTPD	18:09:16 10/05/22 22FT05375
ASSIST PTPD WITH FELONY ARREST	OUTAGNCYASST	PTPD	16:21:42 10/04/22 22FT05358
ATTEMPT TO CONTACT FOR WELLSBORO PD	OUTAGNCYASST	FT2H3	09:40:39 10/03/22 22FT05335
SCPD REQUEST SEARCH FOR MISSING PERSON	OUTAGNCYASST	FT2G1	18:00:00 10/02/22 22FT05330
ASS. PTPD WITH A DUI	OUTAGNCYASST	PTPD	08:39:20 10/02/22 22FT05324
PHONES FROM PTPD	OUTAGNCYASST	FT2H1	23:18:06 10/01/22 22FT05319
ASSIST PTPD W/ PED CRASH	OUTAGNCYASST	PTPD	20:01:48 10/01/22 22FT05316
SUBJECT STRANDED	OUTAGNCYASST	UUPSV	16:49:45 10/01/22 22FT05313
ORFA FOR SCPD	OUTAGNCYASST	FT2H2	01:25:00 10/01/22 22FT05302

PARKING (8)

VEHICLE PARKED IN FIELD	PARKING	FT3Q1	19:13:25 10/22/22 22FT05749
LEGALLY PARKED VEHICLE IN FRONT OF COMPLAINANTS HOUSE	PARKING	FT2H1	16:06:03 10/22/22 22FT05742
VEHICLES PARKED FACING WRONG DIRECTION	PARKING	FT1F2	17:35:59 10/21/22 22FT05713
ILLEGALLY PARKED VEHICLE	PARKING	FT2G1	18:35:17 10/20/22 22FT05675
VEHICLE PARKED ON WRONG SIDE OF ROAD	PARKING	FT3J1	21:39:26 10/19/22 22FT05652
HANDLED BY OEO	PARKING		12:02:45 10/10/22 22FT05452
VEHICLE PARKED ON PRIVATE PROPERTY/NOT AUTHORIZED	PARKING	FT2G1	12:29:55 10/06/22 22FT05394
SIGHT ISSUE FROM PARKED CARS AT NAKED EGG CAFE	PARKING	FT3J2	11:34:07 10/02/22 22FT05327

PERSONSTOP (5)

	PERSONSTOP		02:31:35 10/29/22 22FT05892
	PERSONSTOP		01:58:07 10/23/22 22FT05759
	PERSONSTOP		02:13:16 10/22/22 22FT05731
	PERSONSTOP		00:22:31 10/22/22 22FT05724
	PERSONSTOP		01:47:04 10/01/22 22FT05303

PFARECEIVED (3)

NOTICE OF HEARING AND ORDER	PFARECEIVED	FT2G1	00:00:00 10/18/22 22FT05616
NOTICE OF HEARING AND ORDER	PFARECEIVED		00:00:00 10/12/22 22FT05501
NOTICE OF HEARING AND ORDER	PFARECEIVED	FT1A1	00:00:00 10/11/22 22FT05615

PROPFOUND (2)

FOUND WALLET	PROPFOUND	FT2H1	21:24:57 10/24/22 22FT05796
FOUND WALLET, AND CARDS AT STORE	PROPFOUND	FT1B1	14:12:52 10/09/22 22FT05435

PROPLOST (4)

LOST WALLET	PROPLOST	FT1B1	11:47:09 10/31/22 22FT05944
LOST KEYS	PROPLOST	FT1B1	14:53:47 10/29/22 22FT05901
LOST PASSPORT	PROPLOST	FT2H1	15:18:05 10/11/22 22FT05477
LOST CHINA PASSPORT	PROPLOST	FT1F2	12:29:36 10/09/22 22FT05433

RFACIVILDISP (17)

TWO CONSTRUCTION PARTNERS FIGHTING OVER TOOLS AND PAY	RFACIVILDISP	FT2H3	16:21:47 10/31/22 22FT05953
HOTEL CANCELLATION ISSUES	RFACIVILDISP	FT1A1	20:59:08 10/26/22 22FT05834
LOANER CAR NOT RETURNED-CIVIL	RFACIVILDISP	FT2G1	12:42:34 10/24/22 22FT05784
RFA ROOMMATE DISPUTE	RFACIVILDISP	FT2I2	05:38:40 10/23/22 22FT05764
MAINTENCE BROKE WINE BOTTLES	RFACIVILDISP	FT2I2	15:46:40 10/20/22 22FT05671
PARKING LOT CRASH 6 DAYS EARLIER	RFACIVILDISP	FT2G1	13:29:33 10/20/22 22FT05664
VEHICLE W/ INVALID PERMIT AT HEIGHTS	RFACIVILDISP	FT1F2	22:22:24 10/18/22 22FT05635
DISPUTE OVER BUSINESS	RFACIVILDISP	FT1A1	14:32:22 10/18/22 22FT05621
CONTRACTOR NOT FINISHING THE JOB AFTER BEING PAID	RFACIVILDISP	FT2G1	13:37:05 10/17/22 22FT05594
CALLERS CAR WAS TOWED WITH VALID PERMIT	RFACIVILDISP	FT1B1	07:40:23 10/17/22 22FT05588
COMPLAINT OVER ITEM EXCHANGE AT STORE	RFACIVILDISP	FT1B1	16:29:31 10/13/22 22FT05524
DISPUTE OVER PAYMENT	RFACIVILDISP	FT2H3	18:48:10 10/10/22 22FT05464
RENT NOT PAID BY FRIEND	RFACIVILDISP	FT1A1	09:04:32 10/10/22 22FT05449
HUSBAND WIFE CUSTODY ISSUE	RFACIVILDISP	FT1B1	12:38:14 10/06/22 22FT05395
CIVIL DISPUTE WITH CONTRACTOR	RFACIVILDISP	FT3N1	10:19:24 10/06/22 22FT05388
CALLER WANTED DOG BACK	RFACIVILDISP	FT2H1	17:14:07 10/05/22 22FT05373
DRY CLEANER SHRUNK HIS SUIT	RFACIVILDISP	FT1A1	13:30:56 10/04/22 22FT05356

RFALOCATECONT (3)

WELFARE CHECK OF 26 YOM	RFALOCATECONT	FT1A1	18:32:27 10/31/22 22FT05956
MARITAL PARTNER LEFT REDSIDENCE	RFALOCATECONT	FT1C1	19:03:42 10/09/22 22FT05440
WELFARE CHECK ON 21YOM	RFALOCATECONT	FT1B2	21:41:11 10/07/22 22FT05411

RFAOTHER (51)

CALLERS HAD QUESTIONS ABOUT CRASH	RFAOTHER	FT1F2	13:33:11 10/30/22 22FT05923
SMALL CAMP FIRE AT THE LOOK OUT	RFAOTHER	FT3R1	01:18:07 10/30/22 22FT05914
FEMALE AT NURSING HOME CALLED 911 FOR HELP	RFAOTHER	FT1E1	20:30:55 10/28/22 22FT05880
CONCERN ABOUT SOCIAL MEDIA RUMORS	RFAOTHER	FT1F1	19:53:45 10/28/22 22FT05878
SIGNATURE WAS NEEDED TO REPLACE LICENSE PLATE	RFAOTHER	FT2H1	15:17:19 10/28/22 22FT05874
HANDLED BY OEO	RFAOTHER	FT2H1	13:11:38 10/28/22 22FT05869
QUESTION ABOUT CUTTING A TREE DOWN	RFAOTHER	FT1D1	12:36:26 10/28/22 22FT05867
LOUD VEHICLE	RFAOTHER	FT1F2	01:16:24 10/27/22 22FT05840
LOUD MUSIC COMPLAINT FROM DAYS AGO	RFAOTHER	FT2I2	12:23:30 10/26/22 22FT05822
QUESTIONS ABOUT A WARRANT	RFAOTHER	FT2G1	18:30:07 10/25/22 22FT05809
CALLER HAD CONCERNS ABOUT RETURNED PURSE	RFAOTHER	FT1B1	15:29:09 10/25/22 22FT05807
ASSISTANCE CHECKING VEHICLE REGISTRATION	RFAOTHER	FT2G1	15:32:35 10/24/22 22FT05792
WOMAN NEEDED HELP W/ SUICIDAL DAUGHTER IN TX	RFAOTHER	FT1B1	09:23:26 10/24/22 22FT05777
PACKAGE TAKEN OFF PORCH	RFAOTHER	FT2G2	20:12:22 10/23/22 22FT05770
NOISE FROM CAR SHOW	RFAOTHER	FT3K1	13:14:10 10/23/22 22FT05767
SISTER IS HARASSING THEIR MOTHER	RFAOTHER	FT1B1	14:46:16 10/22/22 22FT05743
RESIDENT NOT ALLOWED TO MOVE IN	RFAOTHER	FT2I2	14:15:01 10/22/22 22FT05747
ROOMMATES TOO LOUD	RFAOTHER	FT2I2	03:38:59 10/22/22 22FT05735
ROOMMATE SMOKING MARIJUANA	RFAOTHER	FT2I2	19:48:28 10/21/22 22FT05716
LOUD MUSIC	RFAOTHER	FT2H1	18:10:12 10/21/22 22FT05714
REQUEST TO SEE PFA AGAINST HER	RFAOTHER	FT2H1	16:07:01 10/21/22 22FT05710
DOG LOCKED IN CAR / NOT IN DISTRESS	RFAOTHER	FT1D1	10:18:43 10/21/22 22FT05698
CALLER'S SON WANTED TO USE HER CAR	RFAOTHER	FT2H1	02:27:47 10/21/22 22FT05689
QUESTIONS ABOUT DOG LAW	RFAOTHER	FT2H1	14:34:56 10/20/22 22FT05665
DROPPED PHONE SENT OUT NOT REAL CRASH CALL.	RFAOTHER	FT1F1	21:03:41 10/18/22 22FT05634
CALL FROM PAST FIRED EMPLOYEE	RFAOTHER	FT1B1	18:44:31 10/18/22 22FT05632
WORKERS TRESPASSING ON PROPERTY	RFAOTHER	FT3J1	16:57:39 10/18/22 22FT05628
COMP. THOUGHT HER CAR WAS STOLEN BUT THEN FOUND IT	RFAOTHER	FT1B4	15:01:33 10/18/22 22FT05623
ADVICE WITH POSSIBLE HARASSMENT	RFAOTHER	FT1D1	14:21:39 10/18/22 22FT05629
COMPLAINT OF NIGHT RANGE	RFAOTHER	FT3O1	21:11:17 10/17/22 22FT05601

WALK IN WITH PENN DOT FORM NEEDING PD SIGNATURE.	RFAOTHER	FT2H1	16:25:04 10/17/22 22FT05597
CALLER UPSET ABOUT A CAT ON ROAD NEAR DRIVEWAY	RFAOTHER	FT1C1	15:06:48 10/15/22 22FT05567
UNOCCUPIED PARKED CAR RUNNING	RFAOTHER	FT1F2	23:45:08 10/14/22 22FT05552
COMP. HAD QUESTIONS REGARDING HER PARKING TICKET	RFAOTHER	FT2G1	18:16:20 10/13/22 22FT05526
CALLER CONCERNED ABOUT NEIGHBOR	RFAOTHER	FT1B2	15:38:38 10/13/22 22FT05523
CALLER HAD QUESTIONS ABOUT AN ACCIDENT	RFAOTHER	FT1A1	12:08:34 10/13/22 22FT05518
DOCUMENT CONSUMER LEAVING PROGRAM	RFAOTHER	FT1E1	11:29:00 10/12/22 22FT05499
CONCERNS ABOUT FORMER EMPLOYEE	RFAOTHER	FT2H1	09:49:07 10/12/22 22FT05498
CAR HAD A FLAT TIRE	RFAOTHER	FT2G1	20:55:23 10/11/22 22FT05484
PERSON WANTED TO DROP OF MEDICATIONS	RFAOTHER	FT2H1	16:11:45 10/11/22 22FT05480
QUESTIONS ON TRANSFER OF CAR TITLE	RFAOTHER	FT2H3	11:36:04 10/11/22 22FT05473
CHILDLINE REPORT RECEIVED FROM DA'S OFFICE	RFAOTHER	FT1D1	20:30:00 10/10/22 22FT05590
VEHICLE PARKED IN ALLEY	RFAOTHER	FT2G1	14:47:27 10/10/22 22FT05461
CALLER WANTED TO ADVISE OF PFA	RFAOTHER	FT1B3	20:18:14 10/09/22 22FT05442
KNOWN FEMALE POUNDING ON FRONT DOOR	RFAOTHER	FT2I2	02:29:53 10/07/22 22FT05403
CALL CANCELLED PER COMPLAINANT	RFAOTHER	FT2H1	11:59:09 10/06/22 22FT05392
COMPLAINANT NEEDED ASSISTANCE WITH CONTACTING MECHANIC	RFAOTHER	FT1C1	11:15:34 10/05/22 22FT05368
SORORITY CAME TO STATION TO SAY THANK YOU.	RFAOTHER	FT2H1	21:15:09 10/03/22 22FT05345
LOCKED KEYS IN CAR/TRANSPORT	RFAOTHER	FT2H1	15:42:43 10/03/22 22FT05341
FENDER BENDER	RFAOTHER	FT1C1	13:50:08 10/03/22 22FT05337
CHILDREN RUNNING IN HALL	RFAOTHER	FT1A1	16:52:20 10/01/22 22FT05314

SCHOOLCHECK (32)

	SCHOOLCHECK		08:07:02 10/31/22 22FT05936
	SCHOOLCHECK		07:54:13 10/31/22 22FT05935
	SCHOOLCHECK		10:01:19 10/27/22 22FT05850
	SCHOOLCHECK		09:48:55 10/27/22 22FT05849
	SCHOOLCHECK		09:30:25 10/26/22 22FT05818
	SCHOOLCHECK		08:04:13 10/26/22 22FT05816
	SCHOOLCHECK		09:54:51 10/25/22 22FT05803
	SCHOOLCHECK		08:08:36 10/25/22 22FT05799
	SCHOOLCHECK		14:50:07 10/24/22 22FT05789
	SCHOOLCHECK		07:59:49 10/24/22 22FT05774
	SCHOOLCHECK		10:45:08 10/20/22 22FT05662
	SCHOOLCHECK		10:10:46 10/20/22 22FT05660
	SCHOOLCHECK		10:43:36 10/19/22 22FT05641
	SCHOOLCHECK		10:37:51 10/19/22 22FT05640
	SCHOOLCHECK		08:35:30 10/18/22 22FT05610
	SCHOOLCHECK		08:27:13 10/18/22 22FT05609
	SCHOOLCHECK		08:10:39 10/18/22 22FT05607
	SCHOOLCHECK		13:03:36 10/17/22 22FT05593
	SCHOOLCHECK		12:11:33 10/17/22 22FT05591
	SCHOOLCHECK		09:41:49 10/14/22 22FT05537
	SCHOOLCHECK		07:52:06 10/14/22 22FT05533
	SCHOOLCHECK		08:27:58 10/13/22 22FT05516
	SCHOOLCHECK		08:14:53 10/13/22 22FT05515
	SCHOOLCHECK		09:02:06 10/12/22 22FT05494
	SCHOOLCHECK		08:32:50 10/12/22 22FT05493
	SCHOOLCHECK		13:22:38 10/11/22 22FT05476
	SCHOOLCHECK		13:01:23 10/11/22 22FT05475
	SCHOOLCHECK		11:55:03 10/06/22 22FT05391
	SCHOOLCHECK		09:49:30 10/06/22 22FT05385
	SCHOOLCHECK		09:45:45 10/06/22 22FT05384
	SCHOOLCHECK		10:50:14 10/05/22 22FT05367
	SCHOOLCHECK		08:11:58 10/04/22 22FT05351

SUSPACTY (25)

INDIVIDUAL LOOKING INTO CLOSED BUSINESS	SUSPACTY	FT1B1	21:26:02 10/26/22 22FT05836
NEIGHBOR TAKING TRASH FROM TRASHCAN	SUSPACTY	FT2H1	11:08:26 10/26/22 22FT05821
REPORT OF PERSON WALKING WITH BODY ARMOR ON	SUSPACTY	FT2G1	10:14:07 10/26/22 22FT05819
ATTEMPTED INDECENT IMAGE SCAM	SUSPACTY	FT1F2	21:28:41 10/25/22 22FT05810
MALE BEING BLACKMAILED BY PERSON ONLINE	SUSPACTY	FT1B3	20:39:30 10/23/22 22FT05771

SUSPICIOUS MALES	SUSPACTY	FT1F2	18:26:01 10/22/22 22FT05745
UNKNOWN MALE ENTER HOME	SUSPACTY	FT1F2	19:27:43 10/21/22 22FT05715
SUSPICIOUS EMAILS	SUSPACTY	FT1F2	15:53:42 10/21/22 22FT05709
MALE ASKING COMP TO COMPLETE A POLITICAL SURVEY	SUSPACTY	FT1E1	15:27:43 10/21/22 22FT05708
SCAM CALL REQUESTING PAYMENT	SUSPACTY	FT1C1	12:14:32 10/21/22 22FT05702
COMPLAINANT SENT NUDE PHOTOS TO UKNOWN INDIVIDUAL	SUSPACTY	FT3J1	09:09:02 10/21/22 22FT05691
UNAUTHORIZED CREDIT ACCOUNT OPENED	SUSPACTY	FT2H3	14:31:09 10/19/22 22FT05644
UNKNOWN PEOPLE ON PROPERTY	SUSPACTY	FT1A1	00:14:47 10/18/22 22FT05602
UNKNOWN PERSON ON PROPERTY	SUSPACTY	FT1A1	04:37:14 10/17/22 22FT05586
CAR DID A WEIRD TURN	SUSPACTY	FT3J2	19:11:31 10/15/22 22FT05571
UNKNOWN PERSONS OBSERVED ON TRAIL CAMERA.	SUSPACTY	FT3I1	21:20:18 10/13/22 22FT05528
UNKNOWN VEHICLE IN DRIVEWAY	SUSPACTY	FT3T1	00:57:24 10/12/22 22FT05488
UTILITY WORKER CHECKING POLES	SUSPACTY	FT1A1	13:43:43 10/10/22 22FT05455
MONEY TAKEN THROUGH ZELE	SUSPACTY	FT2H1	14:13:20 10/07/22 22FT05406
UNKNOWN PERSONS KNOCKING ON DOOR.	SUSPACTY	FT1F2	21:18:17 10/06/22 22FT05400
SUSPICIOUS VEHICLE.	SUSPACTY	FT1A1	17:30:13 10/06/22 22FT05396
SUBJECT WALKING IN FRONT OF BUSINESS NAKED FROM WAIST DOWN.	SUSPACTY	FT1B1	09:31:02 10/04/22 22FT05353
MALES SITTING OUTSIDE BANK	SUSPACTY	FT1E1	17:34:55 10/03/22 22FT05342
WOMAN YELLING IN ANOTHER APARTMENT	SUSPACTY	FT1B1	09:10:39 10/03/22 22FT05334
UNKNOWN PERSON TURNING DOOR KNOB	SUSPACTY	FT1B3	10:07:45 10/01/22 22FT05309

THEFT (1)

STOLEN CELL PHONE	THEFT	FT2I2	01:30:00 10/15/22 22FT05556

TRAFFIC (37)

CHECKED FUNCTIONALITY OF TRAFFIC LIGHT	TRAFFIC	FT2G1	09:13:51 10/31/22 22FT05941
DISABLED VEHICLE	TRAFFIC	FT2E1	18:12:04 10/30/22 22FT05925
RECKLESS OPERATION-GOA	TRAFFIC	PTPD	20:35:00 10/28/22 22FT05879
CATA BUS CUT OFF THE COMP.	TRAFFIC	FT2G1	16:26:22 10/28/22 22FT05876
ASSISTED FT PUBLIC WORKS W/ TRAFFIC CONTROL	TRAFFIC	FT2G1	13:49:59 10/28/22 22FT05871
TRAFFIC LIGHT WAS NOT WORKING PROPERLY	TRAFFIC	FT2G1	14:15:56 10/27/22 22FT05854
BROKE DOWN VEHICLE ON ROAD	TRAFFIC	FT1B1	14:37:03 10/26/22 22FT05826
MCSAP DETAIL WITH PSP	TRAFFIC	RPSP	06:52:38 10/26/22 22FT05813
DISABLED VEHICLE	TRAFFIC	FT1A1	13:17:12 10/24/22 22FT05786
DISABLED VEHICLE / OUT OF GAS	TRAFFIC		11:39:03 10/23/22 22FT05766
ROAD RAGE INCIDENT	TRAFFIC	FT1B1	16:43:57 10/21/22 22FT05711
SCHOOL BUS VIOLATION	TRAFFIC	FT1E1	14:13:02 10/21/22 22FT05706
DRIVER UPSET OVER OTHER DRIVE TAKING A PICTURE OF HER PLATE	TRAFFIC	FT2G1	13:20:35 10/21/22 22FT05703
SPEEDING VEHICLES	TRAFFIC	FT1A1	23:21:46 10/20/22 22FT05680
RECKLESS OPERATION	TRAFFIC	FT1B1	15:26:42 10/20/22 22FT05669
RECKLESS OPERATION-GOA	TRAFFIC	FT1A1	15:24:37 10/20/22 22FT05670
SUSPENDED REGISTRATION, VEHICLE TOWED	TRAFFIC	FT2G1	15:29:05 10/19/22 22FT05646
TRAFFIC RUNNING STOP SIGN	TRAFFIC	FT2H1	10:20:01 10/19/22 22FT05639
SPEEDING VEHICLE	TRAFFIC	FT3H1	23:11:04 10/18/22 22FT05636
CATA CALLED IN BROKE DOWN VEHICLE	TRAFFIC	FT1A1	18:20:47 10/18/22 22FT05630
COMPLIAN OF RECKLESS OPERATION	TRAFFIC	FT1B1	16:02:40 10/17/22 22FT05596
RECKELSS OPERATION - GOA	TRAFFIC	FT1B1	21:25:13 10/16/22 22FT05583
VEHICLE WITH FLAT TIRE	TRAFFIC	FT1F1	10:28:38 10/14/22 22FT05539
SPEEDING COMPLAINT	TRAFFIC	FT2H3	18:32:47 10/12/22 22FT05507
TRAFFIC COMPLAINT	TRAFFIC	FT2G1	14:32:28 10/12/22 22FT05502
ERRATIC DRIVER	TRAFFIC	FT3L1	13:33:40 10/10/22 22FT05454
MCSAP DETAIL	TRAFFIC	RPSP	06:13:57 10/10/22 22FT05445
VEHICLE SPEEDING	TRAFFIC	FT2H1	22:04:34 10/08/22 22FT05427
CAR IN INTERSECTION W/ 4-WAYS ON	TRAFFIC	FT1A1	19:39:31 10/06/22 22FT05397
BUS DRIVER SAYS CARS PASS HIS FLASHING RED BUS	TRAFFIC	FT2G1	09:19:47 10/06/22 22FT05383
DEAD DEER IN THE ROADWAY	TRAFFIC	FT1F1	00:19:54 10/06/22 22FT05379
CATA BUS BROKEN DOWN IN TRAFFIC.	TRAFFIC	FT1B1	15:13:22 10/05/22 22FT05371
CALLER WAS BLINDSIDED BY WATER PUDDLE	TRAFFIC	FT1B1	18:21:41 10/04/22 22FT05360
PHONE WIRE HIT BY PW BRUSH COLLECTION	TRAFFIC	FT1C1	13:33:52 10/03/22 22FT05336
TEMPORARY YELLOW LINES MOVED	TRAFFIC	FT3I1	20:40:58 10/02/22 22FT05331
BLOCKING DRIVEWAY	TRAFFIC	FT1B1	13:50:52 10/01/22 22FT05311
CONTRUCTION VEHICLE IN ROADWAY	TRAFFIC	FT2H1	02:03:04 10/01/22 22FT05305

TRAFFIC STOP (192)

	TRAFFIC STOP	19:04:15 10/31/22 22FT05955
	TRAFFIC STOP	15:05:44 10/31/22 22FT05948
	TRAFFIC STOP	14:53:12 10/31/22 22FT05947
	TRAFFIC STOP	13:55:38 10/31/22 22FT05946
	TRAFFIC STOP	10:16:32 10/31/22 22FT05942
	TRAFFIC STOP	09:12:19 10/31/22 22FT05940
	TRAFFIC STOP	08:44:13 10/31/22 22FT05939
	TRAFFIC STOP	08:17:27 10/31/22 22FT05938
	TRAFFIC STOP	08:13:40 10/31/22 22FT05937
	TRAFFIC STOP	07:52:41 10/31/22 22FT05934
	TRAFFIC STOP	07:51:58 10/31/22 22FT05933
	TRAFFIC STOP	07:32:19 10/31/22 22FT05932
	TRAFFIC STOP	00:17:10 10/31/22 22FT05929
	TRAFFIC STOP	11:24:10 10/30/22 22FT05920
	TRAFFIC STOP	02:16:19 10/30/22 22FT05916
	TRAFFIC STOP	01:19:42 10/30/22 22FT05913
	TRAFFIC STOP	00:30:38 10/30/22 22FT05912
	TRAFFIC STOP	23:44:23 10/29/22 22FT05909
	TRAFFIC STOP	23:29:29 10/29/22 22FT05907
	TRAFFIC STOP	19:03:06 10/29/22 22FT05903
	TRAFFIC STOP	10:29:53 10/29/22 22FT05898
	TRAFFIC STOP	09:24:13 10/29/22 22FT05897
	TRAFFIC STOP	02:12:03 10/29/22 22FT05891
	TRAFFIC STOP	01:57:54 10/29/22 22FT05890
	TRAFFIC STOP	01:30:47 10/29/22 22FT05889
	TRAFFIC STOP	00:20:14 10/29/22 22FT05887
	TRAFFIC STOP	00:13:17 10/29/22 22FT05886
	TRAFFIC STOP	23:50:42 10/28/22 22FT05884
	TRAFFIC STOP	23:04:26 10/28/22 22FT05883
	TRAFFIC STOP	19:13:31 10/28/22 22FT05877
	TRAFFIC STOP	10:45:00 10/28/22 22FT05865
	TRAFFIC STOP	03:06:57 10/28/22 22FT05862
	TRAFFIC STOP	02:45:25 10/28/22 22FT05861
	TRAFFIC STOP	02:23:17 10/28/22 22FT05860
	TRAFFIC STOP	21:44:42 10/27/22 22FT05859
	TRAFFIC STOP	08:23:52 10/27/22 22FT05847
	TRAFFIC STOP	08:05:55 10/27/22 22FT05846
	TRAFFIC STOP	02:05:52 10/27/22 22FT05844
	TRAFFIC STOP	01:56:18 10/27/22 22FT05843
	TRAFFIC STOP	01:42:03 10/27/22 22FT05842
	TRAFFIC STOP	01:29:20 10/27/22 22FT05841
	TRAFFIC STOP	23:43:42 10/26/22 22FT05839
	TRAFFIC STOP	21:57:52 10/26/22 22FT05838
	TRAFFIC STOP	21:49:36 10/26/22 22FT05837
	TRAFFIC STOP	20:10:52 10/26/22 22FT05833
	TRAFFIC STOP	19:11:36 10/26/22 22FT05832
	TRAFFIC STOP	18:01:35 10/26/22 22FT05830
	TRAFFIC STOP	14:14:20 10/26/22 22FT05825
	TRAFFIC STOP	14:12:08 10/26/22 22FT05824
	TRAFFIC STOP	12:28:45 10/26/22 22FT05823
	TRAFFIC STOP	08:02:10 10/26/22 22FT05815
	TRAFFIC STOP	07:35:08 10/26/22 22FT05814
	TRAFFIC STOP	14:26:33 10/25/22 22FT05806
	TRAFFIC STOP	09:59:26 10/25/22 22FT05804
	TRAFFIC STOP	09:24:55 10/25/22 22FT05801
	TRAFFIC STOP	08:34:35 10/25/22 22FT05800
	TRAFFIC STOP	13:06:01 10/24/22 22FT05785
	TRAFFIC STOP	11:43:05 10/24/22 22FT05780
	TRAFFIC STOP	11:21:05 10/24/22 22FT05779
	TRAFFIC STOP	09:06:34 10/24/22 22FT05776

	TRAFFIC STOP	17:15:21 10/23/22 22FT05769
	TRAFFIC STOP	03:30:17 10/23/22 22FT05762
	TRAFFIC STOP	02:41:26 10/23/22 22FT05760
	TRAFFIC STOP	01:57:07 10/23/22 22FT05758
	TRAFFIC STOP	01:38:05 10/23/22 22FT05756
	TRAFFIC STOP	01:01:25 10/23/22 22FT05755
	TRAFFIC STOP	00:49:04 10/23/22 22FT05753
	TRAFFIC STOP	00:47:12 10/23/22 22FT05754
	TRAFFIC STOP	22:35:39 10/22/22 22FT05750
	TRAFFIC STOP	10:32:48 10/22/22 22FT05738
	TRAFFIC STOP	05:27:15 10/22/22 22FT05736
	TRAFFIC STOP	02:54:42 10/22/22 22FT05734
	TRAFFIC STOP	02:38:00 10/22/22 22FT05733
	TRAFFIC STOP	01:47:44 10/22/22 22FT05730
	TRAFFIC STOP	01:29:22 10/22/22 22FT05728
	TRAFFIC STOP	01:00:05 10/22/22 22FT05727
	TRAFFIC STOP	00:29:04 10/22/22 22FT05725
	TRAFFIC STOP	00:16:08 10/22/22 22FT05723
	TRAFFIC STOP	23:51:41 10/21/22 22FT05722
	TRAFFIC STOP	23:49:10 10/21/22 22FT05721
	TRAFFIC STOP	23:40:43 10/21/22 22FT05720
	TRAFFIC STOP	23:20:59 10/21/22 22FT05719
	TRAFFIC STOP	14:17:01 10/21/22 22FT05705
	TRAFFIC STOP	11:53:37 10/21/22 22FT05701
	TRAFFIC STOP	10:43:56 10/21/22 22FT05699
	TRAFFIC STOP	10:19:19 10/21/22 22FT05697
	TRAFFIC STOP	10:10:13 10/21/22 22FT05696
	TRAFFIC STOP	10:02:32 10/21/22 22FT05695
	TRAFFIC STOP	09:55:44 10/21/22 22FT05694
	TRAFFIC STOP	09:37:55 10/21/22 22FT05692
	TRAFFIC STOP	08:58:27 10/21/22 22FT05690
	TRAFFIC STOP	00:38:34 10/21/22 22FT05685
	TRAFFIC STOP	00:30:00 10/21/22 22FT05684
	TRAFFIC STOP	00:20:26 10/21/22 22FT05683
	TRAFFIC STOP	00:07:21 10/21/22 22FT05682
	TRAFFIC STOP	23:54:09 10/20/22 22FT05681
	TRAFFIC STOP	20:15:12 10/20/22 22FT05677
	TRAFFIC STOP	20:08:32 10/20/22 22FT05676
	TRAFFIC STOP	08:50:57 10/20/22 22FT05657
	TRAFFIC STOP	03:00:01 10/20/22 22FT05654
	TRAFFIC STOP	20:38:10 10/19/22 22FT05650
	TRAFFIC STOP	20:10:26 10/19/22 22FT05649
	TRAFFIC STOP	13:40:30 10/19/22 22FT05642
	TRAFFIC STOP	18:42:53 10/18/22 22FT05631
	TRAFFIC STOP	13:42:00 10/18/22 22FT05618
	TRAFFIC STOP	08:18:31 10/18/22 22FT05608
	TRAFFIC STOP	00:50:08 10/18/22 22FT05604
	TRAFFIC STOP	12:13:29 10/17/22 22FT05592
	TRAFFIC STOP	22:17:12 10/16/22 22FT05585
	TRAFFIC STOP	01:53:12 10/16/22 22FT05578
	TRAFFIC STOP	01:18:53 10/16/22 22FT05577
	TRAFFIC STOP	00:57:19 10/15/22 22FT05553
	TRAFFIC STOP	21:34:24 10/14/22 22FT05551
	TRAFFIC STOP	20:10:53 10/14/22 22FT05549
	TRAFFIC STOP	19:37:44 10/14/22 22FT05548
	TRAFFIC STOP	14:27:54 10/14/22 22FT05546
	TRAFFIC STOP	10:05:01 10/14/22 22FT05538
	TRAFFIC STOP	08:59:52 10/14/22 22FT05535
	TRAFFIC STOP	08:31:43 10/14/22 22FT05534
	TRAFFIC STOP	23:51:52 10/13/22 22FT05530
	TRAFFIC STOP	19:05:15 10/13/22 22FT05527
	TRAFFIC STOP	16:52:25 10/13/22 22FT05525

	TRAFFIC STOP	12:19:59 10/13/22 22FT05519
	TRAFFIC STOP	08:56:32 10/13/22 22FT05517
	TRAFFIC STOP	21:18:11 10/12/22 22FT05513
	TRAFFIC STOP	20:45:30 10/12/22 22FT05511
	TRAFFIC STOP	16:08:01 10/12/22 22FT05504
	TRAFFIC STOP	16:07:29 10/12/22 22FT05503
	TRAFFIC STOP	09:54:52 10/12/22 22FT05497
	TRAFFIC STOP	09:37:57 10/12/22 22FT05496
	TRAFFIC STOP	09:16:55 10/12/22 22FT05495
	TRAFFIC STOP	08:29:05 10/12/22 22FT05492
	TRAFFIC STOP	23:53:24 10/11/22 22FT05487
	TRAFFIC STOP	23:31:52 10/11/22 22FT05486
	TRAFFIC STOP	23:16:09 10/11/22 22FT05485
	TRAFFIC STOP	20:48:09 10/11/22 22FT05483
	TRAFFIC STOP	20:24:31 10/11/22 22FT05482
	TRAFFIC STOP	16:08:17 10/11/22 22FT05478
	TRAFFIC STOP	08:28:04 10/11/22 22FT05470
	TRAFFIC STOP	07:27:33 10/11/22 22FT05469
	TRAFFIC STOP	20:07:46 10/10/22 22FT05465
	TRAFFIC STOP	14:20:25 10/10/22 22FT05459
	TRAFFIC STOP	14:20:22 10/10/22 22FT05458
	TRAFFIC STOP	14:20:17 10/10/22 22FT05457
	TRAFFIC STOP	14:20:12 10/10/22 22FT05456
	TRAFFIC STOP	08:20:51 10/10/22 22FT05447
	TRAFFIC STOP	01:22:50 10/10/22 22FT05444
	TRAFFIC STOP	01:10:00 10/10/22 22FT05443
	TRAFFIC STOP	16:44:42 10/09/22 22FT05439
	TRAFFIC STOP	08:03:11 10/09/22 22FT05432
	TRAFFIC STOP	02:30:22 10/09/22 22FT05431
	TRAFFIC STOP	22:17:10 10/08/22 22FT05428
	TRAFFIC STOP	20:06:02 10/08/22 22FT05425
	TRAFFIC STOP	06:09:45 10/08/22 22FT05418
	TRAFFIC STOP	03:05:30 10/08/22 22FT05416
	TRAFFIC STOP	01:36:32 10/08/22 22FT05414
	TRAFFIC STOP	01:21:18 10/08/22 22FT05413
	TRAFFIC STOP	21:14:32 10/07/22 22FT05410
	TRAFFIC STOP	20:10:14 10/07/22 22FT05409
	TRAFFIC STOP	19:57:50 10/07/22 22FT05408
	TRAFFIC STOP	16:58:09 10/07/22 22FT05407
	TRAFFIC STOP	10:42:38 10/07/22 22FT05404
	TRAFFIC STOP	21:33:33 10/06/22 22FT05402
	TRAFFIC STOP	21:22:41 10/06/22 22FT05399
	TRAFFIC STOP	20:42:05 10/06/22 22FT05398
	TRAFFIC STOP	10:37:34 10/06/22 22FT05389
	TRAFFIC STOP	10:09:30 10/06/22 22FT05387
	TRAFFIC STOP	23:36:01 10/05/22 22FT05378
	TRAFFIC STOP	14:22:56 10/05/22 22FT05370
	TRAFFIC STOP	12:46:30 10/05/22 22FT05369
	TRAFFIC STOP	00:56:14 10/05/22 22FT05361
	TRAFFIC STOP	11:01:37 10/04/22 22FT05354
	TRAFFIC STOP	08:43:43 10/04/22 22FT05352
	TRAFFIC STOP	07:47:22 10/04/22 22FT05350
	TRAFFIC STOP	21:25:27 10/03/22 22FT05346
	TRAFFIC STOP	20:21:37 10/03/22 22FT05344
	TRAFFIC STOP	15:01:26 10/03/22 22FT05339
	TRAFFIC STOP	14:52:10 10/03/22 22FT05338
	TRAFFIC STOP	08:53:59 10/03/22 22FT05333
	TRAFFIC STOP	03:53:41 10/03/22 22FT05332
	TRAFFIC STOP	14:22:21 10/02/22 22FT05329
	TRAFFIC STOP	08:59:56 10/02/22 22FT05325
	TRAFFIC STOP	01:18:06 10/02/22 22FT05322
	TRAFFIC STOP	01:04:23 10/02/22 22FT05321

	TRAFFIC STOP		22:32:00 10/01/22 22FT05318
	TRAFFIC STOP		20:19:19 10/01/22 22FT05317
	TRAFFIC STOP		09:48:43 10/01/22 22FT05308
	TRAFFIC STOP		01:52:10 10/01/22 22FT05304
	TRAFFIC STOP		00:54:13 10/01/22 22FT05301
	TRAFFIC STOP		00:42:17 10/01/22 22FT05300
	TRAFFIC STOP		00:21:07 10/01/22 22FT05299
	TRAFFIC STOP		00:11:12 10/01/22 22FT05298

TRESPASS (4)

MALE AND FEMALE WENT INTO WRONG APT.	TRESPASS	FT1B2	03:58:14 10/23/22 22FT05763
FORMER TENANT SLEEPING IN PARKING LOT	TRESPASS	FT1B1	16:07:59 10/12/22 22FT05505
FEMALE REFUSED TO LEAVE APARTMENT	TRESPASS	FT1B2	20:51:28 10/10/22 22FT05466
MALE TRESPASSED	TRESPASS	FT1A1	03:32:30 10/04/22 22FT05349

VHCLCRSHHITRUN (1)

PARKING LOT ACCIDENT	VHCLCRSHHITRUN	FT1B1	09:01:06 10/14/22 22FT05536

VHCLCRSHNOINJ (20)

CAR VS. DEER	VHCLCRSHNOINJ	FT3T1	18:00:50 10/30/22 22FT05924
DEER RAN INTO SIDE OF VEHICLE	VHCLCRSHNOINJ	FT1B1	14:36:31 10/30/22 22FT05921
TWO VEHICLE MINOR REAR END CRASH	VHCLCRSHNOINJ	FT1B1	19:32:39 10/29/22 22FT05904
ONE VEHICLE REPORTABLE CRASH	VHCLCRSHNOINJ	FT1B1	15:01:34 10/29/22 22FT05902
10-45A OCCURRED YESTERDAY	VHCLCRSHNOINJ	FT2G1	12:57:41 10/29/22 22FT05900
PARKING LOT ACCIDENT TWO CARS	VHCLCRSHNOINJ	FT2I2	10:41:57 10/26/22 22FT05820
3 VEHICLE CRASH	VHCLCRSHNOINJ	FT1B1	14:57:54 10/24/22 22FT05791
VEHICLE VS DEER / 10-45A	VHCLCRSHNOINJ	FT3Q1	06:50:42 10/24/22 22FT05773
3 VEHICLE REPORTABLE CRASH	VHCLCRSHNOINJ	FT1B1	23:30:21 10/22/22 22FT05751
2 VEHICLE PARKING LOT CRASH	VHCLCRSHNOINJ	FT1B1	22:55:40 10/21/22 22FT05718
TWO VEHICLE NON REPORTABLE ACCIDENT	VHCLCRSHNOINJ	FT2I2	19:51:22 10/21/22 22FT05717
THREE VEHICLE REAREND TYPE CRASH	VHCLCRSHNOINJ	FT2G1	08:16:41 10/19/22 22FT05638
TWO VEHICLE NON REPORTABLE CRASH	VHCLCRSHNOINJ	FT1B1	14:44:45 10/18/22 22FT05622
TWO VEHICLE REPORTABLE CRASH	VHCLCRSHNOINJ	FT1C1	10:37:42 10/18/22 22FT05612
10-45A / REPORTABLE CRASH	VHCLCRSHNOINJ	FT2H1	09:57:18 10/15/22 22FT05563
CAR STUCK ON PARKING STALL WHEEL STOP	VHCLCRSHNOINJ	FT1A1	08:00:20 10/15/22 22FT05561
2 VEHICLE REPORTABLE CRASH	VHCLCRSHNOINJ	FT2G1	10:46:09 10/14/22 22FT05541
TWO VEHICLE CRASH, NO INJURIES	VHCLCRSHNOINJ	FT1A1	16:54:47 10/11/22 22FT05481
ONE VEHICLE INTO A TREE	VHCLCRSHNOINJ	FT3Q1	09:27:21 10/11/22 22FT05471
VEHICLE STRUCK DEER	VHCLCRSHNOINJ	FT2H1	02:52:34 10/02/22 22FT05323

VHCLCRSHUNKN (2)

VEHICLE INTO A HOUSE	VHCLCRSHUNKN	FT3J1	15:37:50 10/27/22 22FT05855
REPORTABLE ACCIDENT	VHCLCRSHUNKN	FT1D1	17:15:45 10/21/22 22FT05712

VHCLCRSHWINJ (2)

TWO CAR INTERSECTION ACCIDENT	VHCLCRSHWINJ	FT1A1	09:05:04 10/26/22 22FT05817
BICYCLE RAN INTO A VEHICLE	VHCLCRSHWINJ	FT1C1	16:19:51 10/18/22 22FT05626

Ferguson Township Use of Force Report October 2022 - Total:9

Contact or caller		Incident address	Reported	Incident
ALCOHOL (4)				
53 YOF DUI	Handcuffing	1448 W PARK HILLS AVE	19:26:41 10/30/22	22FT05927
24 YOM ARRESTED FOR DUI	Handcuffing	800 N ATHERTON ST; BLK	02:09:20 10/30/22	22FT05915
69 YOM DUI	Handcuffing	WADDLE RD & VAIRO BLVD	21:08:06 10/27/22	22FT05857
DUI	Handcuffing	W AARON DR & N ATHERTON ST	02:36:42 10/08/22	22FT05415
HLTHSFTY (3)				
ARGUMENT RESULTING IN 302	Handcuffing-MHID	166 S KIRK ST	14:55:19 10/22/22	22FT05740
12 YOM AUTISTIC STUDENT LEFT SCHOOL	open Hands-MHID	3081 ENTERPRISE DR	08:04:24 10/12/22	22FT05491
WELLNESS CHECK ON 31YOM	Handcuffing-MHID	166 S KIRK ST	15:24:16 10/05/22	22FT05372
OUTAGNCYASST (2)				
ASSISTED PTPD WITH A RETAIL THEFT/FOOT PURSUIT	Taser Display	1665 N ATHERTON ST	20:48:59 10/28/22	22FT05881
ASSIST PTPD WITH SUICIDAL MALE	Open Hands-MHID	472 SYLVAN DR	12:53:07 10/27/22	22FT05853

The heart
remembers
kind deeds
and thoughtfulness.

Thank you for everything you do!
Aly Sadl

My heart
remembers
special people
like all of you.

Thank You Bryan!!

Thank You So Much

Appreciate your support

Thank you for the support!

Thanks for your work with us and our clients — It never goes unrecognized!
- Jeff Lathrop

THANKS

Rich Blue Hair Guy

FEASIBILIY REPORT
MARSH BOARDWALK FEASIBILITY REVIEW
FOR THE
MILLBROOK MARSH NATURE CENTER
548 Puddintown Road
State College, Pennsylvania 16801

DCNR PROJECT: BRC-TAG-23-52.1

Submitted to:
Centre Region Parks & Recreation Authority
State College, Centre County, Pennsylvania
2040 Sandy Drive, Suite A
State College, PA 16803

Attention: Ms. Pamela J. Salokangas, CPRP, CPSI,
Director of Parks & Recreation

LAN Ref. #220354.01
June 25, 2021

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FEASIBILITY REPORT

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ACRONYMS AND ABBREVIATIONS

BFE	Base Flood Elevation
FEMA	Federal Emergency Management Agency
FHA	Flood Hazard Area
FHADFE	Flood Hazard Area Design Flood Elevation
FIRM	Flood Insurance Rate Map
PADEP	Pennsylvania Department of Environmental Protection
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Millbrook Marsh Nature Center (MMNC) Feasibility Study Working Group:

Dr. Rob Brooks – Penn State and MMNC Advisory Committee

Dr. Rick Marboe – Penn State and MMNC Advisory Committee

Carla Stilson – College Township Council

Jere Northridge – College Township Staff

Amy Kerner – College Township Staff

Andrew Gutberlet – Penn State

Kathy Matason – Centre Region Parks and Recreation Authority

Melissa Kauffman – MMNC Supervisor

Jim Carpenter – Centre Region Parks and Recreation Manager

Pam Salokangas – Centre Region Parks and Recreation Director

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This project was financed in part by a grant from the Community Conservation Partnerships Program, Keystone Recreation, Park and Conservation Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation.

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1.0 Executive Summary:

This section includes the executive summary of the findings and suggestions from the report, as well as a discussion of future investigations to be done to further understand the correct solutions.

The Centre Region Parks, Recreation, and Open Space Comprehensive Study was a Centre Region Parks and Recreation Authority project completed through funding provided by the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the participating municipalities within the Centre Region Council of Governments (COG); the Comprehensive Study project started in 2018 and was completed in March 2020. As a result of that project's completion, supplemental grant funding was available for a high-priority project. The Authority vetted six high-profile/high-priority projects with DCNR and based on the great need for repairs and a possible re-build of the Millbrook Marsh Nature Center's beloved boardwalk, the Millbrook Marsh Nature Center Boardwalk Part I Feasibility Study was chosen and supported by DCNR.

A Feasibility Study Working Group was formed, and the Centre Region Parks and Recreation Authority (CRPRA) chose a well-rounded committee made-up of local engineers, municipal officials, Centre Region Parks and Recreation Agency staff, Penn State representatives (as landowners), and members from the Millbrook Marsh Nature Center Advisory Committee. The complete list of membership can be found on page 2 of this report.

The members selected to be a part of the Feasibility Study Working Group were chosen because of the knowledge and experience that they bring to the project. Agency staff, of course, provide the history and the working knowledge of the facility's programming and general operations, maintenance needs, public use patterns, and budgetary information. The Millbrook Marsh Nature Center Advisory Committee members have a vested interested in the center and bring historical perspectives to the project—history of the original boardwalk installation, past patterns of public use, information related to stormwater changes, stream data, natural fen and wetland research, archaeological research, and more. The Advisory Committee has a direct link to the CRPRA as well, which provides a conduit of information since the CRPRA holds the lease for the property and manages the Center's operations in cooperation with COG. The facility is leased from The Pennsylvania State University, so it was very important to include representatives from Penn State who can guide the project based on university knowledge and experience to ensure that the project meets the landowner's needs and expectations. Lastly, the representatives from College Township provided many levels of expertise and guidance to include expectations from a municipal official's perspective, engineering and design expertise, permitting and research experience, and a deep well of data and information. The Working Group reviewed the boardwalk's condition, participated in drafting the Request for Proposal (RFP) used to choose the consultant who would complete the Part I Feasibility Study, and attended many meetings with the consultant, LAN Associates, to guide the process. Everyone who participated as part of the Feasibility Study Working Group contributed their time, expertise, and research to make this Part I study as broad-reaching and informative of the boardwalk's needs as possible.

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) was tasked with the investigation of the 62-acre Millbrook Marsh Nature Center boardwalk and trail system in order to identify feasible options for repair/replacement and possible enhancements to be made that can maintain and increase the educational and recreational use of the site. LAN also surveyed and reviewed the ADA improvements necessary to bring the boardwalk and path system, including the handicapped parking spaces along Puddintown Road, into compliance.

The existing boardwalk structure was found to have shifted both vertically and horizontally over the course of its life, which has led to The Thompson Run Bridge and a portion of the boardwalk being closed to visitors. It was found that the boardwalk structure will continue to deteriorate, making additional sections unsafe for visitor use in the coming years. Our investigations also showed that repair of the boardwalk was not a feasible option, as the system lacks foundational stability, and the deck and structural components are nearing the end of their useful lives.

LAN, with assistance of the MMNC working group, developed priorities for new design requirements and preferred materials to investigate. As a result, the following report centers on replacing and enhancing the existing boardwalk path with add-ons in key areas to foster additional educational activities, improve the estimated life span of the construction, minimize yearly maintenance requirements for staff, and adhere to the desired aesthetic with the use of natural materials.

Based upon LAN's review of the environmental factors, usage, and future goals of the facility, it is our recommendation that the boardwalk system be replaced with a helical pile foundation, pressure treated engineered wood substructure and black locust decking. Furthermore, we recommend the use of steel prefabricated bridges in lieu of timber constructed bridges due to their lower overall maintenance and substantial longer estimated useful life.

Additional investigations are required to fully ascertain the temporary and permanent impacts that would be caused by the construction of a new boardwalk system, and thus, the required permits needed. These are:

- Wetland Delineation
- Boundary and Topographic Survey
- Botanical Survey
- Archaeological Survey
- Geotechnical Borings
- Hydrologic and Hydraulic Stream Modeling
- Streambank Stabilization Options Analysis
- Additional Regulatory Review

The conservation easement in place on the project parcel requires advance review and written approval from ClearWater Conservancy to ensure the project complies with applicable restrictions and conservation objectives.

The following report provides additional detail and explanation of the areas investigated, along with four (4) concepts for the reconstruction of the boardwalk system options and their associated costs and lifespans.

The following page includes a comparative matrix of the lifecycle costs for each option for a 100 year period:

Comparative Life Cycle Cost

Millbrook Marsh Boardwalk Feasibility Study

Assuming a life span of approximately 100 years (inflation and escalation not included)

LAN Job # 2.20354.01

Description	Initial Life Expectancy in years	Number of Replacements over 100 years	Cost/ Replacement ($)	Subtotal ($)	Cost per year ($)
Decking					
Option 1 - Pressure treated 2x6 decking.*	10	10	$240,000	$2,400,000	$24,000
Option 2 - Pressure treated 3x8 timber decking.*	15	7	$450,000	$3,000,000	$30,000
Option 3 - 2x6 black locust decking.*	25	4	$660,000	$2,640,000	$26,400
Option 4 - 2x6 Ipe decking.*	25	4	$540,000	$2,160,000	$21,600
*All lumber quoted is #1 grade lumber					
Sub-structure					
Option 1 - Pressure treated sub-structure.	10	10	$75,000	$750,000	$7,500
Option 2 - Pressure treated timber sub structure.	30	3	$168,750	$562,500	$5,625
Option 3 - Pressure treated engineered wood sub-structure.	25	4	$64,500	$258,000	$2,580
Option 3 - Pressure treated engineered wood sub-structure.	25	4	$64,500	$258,000	$2,580
Foundations					
Option 1 - Pressure treated post foundations.	12	8	$150,000	$1,250,000	$12,500
Option 2 - Driven pile foundations.	30	3	$581,250	$1,937,500	$19,375
Option 3 - Helical pile foundations.	80	1	$537,500	$671,875	$6,719
Option 4 - Helical pile foundations.	80	1	$537,500	$671,875	$6,719
Bridges					
Option 1 - Pressure treated timber construction	40	3	$262,000	$655,000	$6,550
Option 2 - Pressure treated timber construction	40	3	$262,000	$655,000	$6,550
Option 3 - Pressure treated timber construction	40	3	$262,000	$655,000	$6,550
Option 4 - Steel Construction	100	1	$730,000	$730,000	$7,300
Life Cycle Totals					
Option 1 -Pressure treated 2x6 decking, sub-structure and post foundations.				$5,055,000	$50,550
Option 2 - Pressure treated 3x8 timber decking, sub-structure and riven pile foundations.				$6,155,000	$61,550
Option 3 - 2x6 black locust decking, pressure treated engineered wood sub-structure and helical pile foundations.				$4,224,875	$42,249
Option 4 - 2x6 Ipe decking, pressure treated engineered wood sub-structure and helical pile foundations.				$3,819,875	$38,199

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

2.0 Introduction and Site Description:

2.1 Introduction:

The Millbrook Marsh Nature Center is a 62-acre site located at 548 Puddintown Road in State College, PA owned by Penn State University (PSU) and leased to the Centre Region Parks and Recreation Authority to hold organized educational programs and events in addition to daily recreational use. The site consists of a 12-acre farmstead housing the Spring Creek Education Building, a bank barn, two sun shelters, a service building (staff offices), an additional outbuilding, and a picnic pavilion. The remaining 50 acres of the site consist of wetland areas hosting nearly 3,000 linear feet of timber boardwalk constructed mainly by volunteers and the Pennsylvania Conservation Corps in 2002, grassy walking trails, and bike paths. A conservation easement is in place on the 50-acre parcel between PSU and ClearWater Conservancy that protects the wetland from future development.

The site is primarily used for recreation and education, hosting over 20,000 participants annually, including organized events. Programs are offered to introduce people of all ages to the beauty and importance of our natural wetland systems. The boardwalk's bird blind also provides an exceptional opportunity to view and study the diverse marshland birds. The educational opportunity provided by the overall site is also used by PSU for college class research. In order to access the prospects of the marsh, visitors and staff rely largely on the boardwalk system which promotes viewing of the various important habitats, stream crossvanes, and confluences of the streams on site, while protecting the fragile ecosystem. Additionally, observation platforms allow for an elevated view of the three streams.

2.2 Purpose:

The boardwalk system has been damaged throughout its lifetime due to material longevity, lack of a long-term maintenance plan, and increasingly wet conditions attributed to development in the nearby areas and our changing climate. LAN Associates, Engineering, Planning, Architecture, Surveying, Inc, has been tasked to perform an analysis of the structural integrity of the system, and to develop conceptual design recommendations to repair, relocate, or replace the trail system. The following report outlines the evaluation to be performed to establish the recommended renovation or replacement of the system to ensure the vital educational and recreational opportunities provided by Millbrook Marsh Nature Center can continue to occur for years to come.

3.0 Existing Conditions Analysis:

In order to examine the existing conditions on site, LAN has included some information on the hydrology and hydraulics of the streams, flood information from FEMA and various local studies, the presence of threatened and endangered species, historic and archaeological importance of the site, and suitability of the soils in the project area.

3.1 Hydrology and Hydraulics:

The subject property contains two Class A streams that flow through the wetland areas. Slab Cabin Run flows underneath E. College Ave and enters the site at the southeast edge of the property. The stream flows northeast through the marsh and under Route 322. Thompson Run enters the property at the southwestern edge and joins Slab Cabin Run near the center of the property (See Figure 1, Waterway map). Both streams are contained in the West Branch Susquehanna Subbasin, and the Spring Creek HUC-10 watershed. The watershed drains 175 square miles of both surface-water and groundwater.

3.2 Flood Analysis:

Precipitation is the ultimate source of water within the watershed, as stated in the June 2005 USGS Hydrogeologic Setting and Conceptual Hydrologic Model of the Spring Creek Basin report. According to this study, rainfall in the State College

area is likely to become runoff due to the complete saturation of soils within the saturation zone. The voids within the soils are filled with water, and thus, water cannot infiltrate and instead becomes runoff. The Millbrook Marsh Nature Center is responsible for attenuating some peak flows due to the natural and artificial wetlands on site. Water is intended to drain to these areas, making the risk of flooding in Spring Creek much less, but lending the area itself to an increase in flooding.

The subject property is contained in FEMA Map Number 42027C0637F. Portions of the property are located in Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood, or, Zone AE, associated with both Slab Cabin Run and Thompson Run. The FEMA Base Flood Elevations (BFE) and peak discharges are summarized as follows:

FEMA Flood Information			
Location	1% Chance Flood Elevation (ft.)	1% Annual Chance Peak Discharge (cfs)	
US Route 322 Bypass	949.5	Slab Cabin Run (above Thompson Run)	1,810
Upper Border of Site	953.5		
Bridge over Slab Cabin Creek	951		
Confluence of Thompson Run and Slab Cabin Run	951	Thompson Run (At confluence with Slab Cabin Run)	1,070
Lower Border of Site	954.5		
Bridge Over Thompson Run	952.5		

Information obtained from the Spring Creek Water Resources Monitoring Project suggest that the elevation provided by FEMA may be underestimating the flooding events. The aforementioned project collects stage and discharge data from the two streams on site. The increase in these discharges from around 2015 when the FEMA study was published, to current day suggest that the Millbrook Marsh Nature Center property may be receiving more runoff then previously accounted for.

	FEMA 1% Annual Chance Flood Peak Discharge 2015 (cfs)	Water Resources Monitoring Project Peak Discharge (cfs)			
Slab Cabin Run	1,810	448.7	2015	1,056.01	2018
Thompson Run	1,070	179.99	2017	800.03	2019

It was recorded by the Millbrook Marsh Nature Center Feasibility Study Working Group that a channel is eroding under the boardwalk from the stretch of stream between the Thompson Run Bridge and the bird blind. Further evaluation is recommended during the design phase to evaluate the reason for this channel's formation and the correct associated solution. Historical aerial imagery suggests that the formation of this channel has been occurring for longer than the boardwalks existence, leading the cause to be more likely hydrological than anthropogenic. Creating a model of the stream using a hydrologic modeling program will give information to draw a conclusion about the origin and cause of the stream and provide a pathway to the correct solution.

3.3 Environmental Analysis:

The project site contains various environmentally regulated areas and species. These environmental constraints will prove to be a key driver in the permitting process and applicability of the repair options. Specific environmental and historical design constraints will be identified through conversations directly with the Pennsylvania Department of Environmental Protection (PADEP). For an overview, tools from the PADEP and the U.S. Fish and Wildlife Service were used to establish the key environmental drivers summarized below:

- Both Thompson Run and Slab Cabin Run are Class A Wild Trout Waters, establishing that the surrounding floodplains are of exceptional value as per Pennsylvania Code Chapter 93. Water Quality Standards.
- As per Pennsylvania Code Chapter 106. Floodplain Management, the absence of a delineated floodway by FEMA invokes an established floodway extending 50' from the top of bank on both sides of the stream.
- Slab Cabin Run and Thompson Run both contain protected uses in their waterways ranging from Category 2-5 for aquatic life. These use categories establish the status of the use and subject the waters to protection under Pennsylvania Code Chapter 93. Water Quality Standards.
- Four Threatened, Endangered, or Special Concern species have been identified on site through the Pennsylvania Natural Diversity Index tool.
- The Millbrook Marsh Nature Center property is in an archaeologically sensitive area that has previously unearthed historical artifacts of concern. Input from the Pennsylvania Historical and Museum Commission may be required for any work to be done on site.
- According to the National Wetlands Inventory, the site contains Freshwater Emergent Wetlands and Riverine habitat.

3.4 Threatened and Endangered Species:

The Pennsylvania Natural Diversity Index (PNDI) is a tool to provide insight into potential impacts to regulated areas as per the PA Game Commission, PA Department of Conservation and Natural Resources, PA Fish and Boat Commission, and U.S. Fish and Wildlife Service. A draft PNDI is included as Appendix B. A potential impact to four plant species regulated by the PA Department of Conservation and Natural Resources has been identified.

LAN has scheduled a pre-application conference call with PADEP to evaluate potential permitting requirements for the project alternatives. The draft PNDI and concept options have been provided to PADEP in preparation for the meeting.

3.5 Historic Preservation and Archaeology:

According to "An Early History of the Millbrook Marsh Area" prepared by the Bald Eagle Archaeology Society, the project site is located in the Houserville Archaeological District and has previously unearthed historical artifacts consisting of circa 750 AD jasper stone tools and other artifacts from 8000 BC. A cultural resource investigation may be required depending on the potential impact of the proposed activities to these resources. Approval from the Pennsylvania Historical and Museum Commission may be required for any work to be done on site.

3.6 Soil Suitability:

Various soil types exist across the entire Millbrook Marsh property. The following table summarizes the soil types that are present within the analyzed areas containing the boardwalk, trails, and bridges over Thompson Run and Slab Cabin Run:

Unity Symbol	Unit Name	Location on Site	Drainage Class	Hydrologic Soil Group	Frost Action	Depth to Water Table (cm)	Flooding Frequency
No	Nolin silt loam alluvium, 0 to 5 percent slopes	Small portion of boardwalk trails	Well Drained	B, Non-Hydric	Moderate	137	Rare
Mm	Malvin silt loam	Bridges over Thompson Run and Slab Cabin Run, boardwalk trails	Poorly Drained	B/D, Hydric	High	15	Frequent
Lx	Lindside soils	Boardwalk trails	Moderately Well Drained	C, Non-Hydric	High	69	Occasional

Drainage class describes the prevailing wetness condition of a soil. Poorly drained soils remain wet for long periods of time. Moderately well drained soils remove water from the soil somewhat slowly during some parts of the year. Well drained soils remove water from the soil readily, but not rapidly. These factors influence the depth to the water table and impact the suitability of the soil for compaction and soil disturbing uses.

Hydrologic soil groups describe the soils runoff potential. Group B soils have moderately low runoff potential when wet, Group C soils have moderately high runoff potential when wet, and Group D soils have the highest runoff potential when wet. The higher the infiltration rate, the lower the chance of runoff, which often leads to erosion and damage to aboveground structures. A rating of B/D indicates that the soil will have moderately low runoff potential when drained, but very high runoff potential when undrained. Hydric soils are those that are formed under conditions of saturation or flooding for a long enough period of time that the upper part of the soil developed anerobic conditions, or, without the presence of oxygen.

Frost action describes the likelihood of the expansion of soil caused by the formation of ice and the subsequent collapse of the soil and loss of strength on thawing. When water moves into the freezing zone of the soil, various characteristics like temperature and depth to water table contribute to the potential of frost action. Generally, the more frost action a soil receives, the less strength and stability the soil possesses.

Flooding frequency describes the prevalence of temporary inundation relative to soil types. “Rare” frequency means the chance of flooding is 1-5% in any year, “occasional” frequency means the chance of flooding is 5-50% in any year, and “frequent” frequency means the chance of flooding is more than 50% in any year, but less than 50% in all months as per the USDA Web Soil Survey

All these characteristics are important factors when considering the structural stability of the soil. High presence of water in a soil through a shallow water table, a poor drainage class, and a high flooding frequency, all of which are present in the Malvin silt loam soil, led to a weaker soil that may struggle to support above or below ground structures and components. This soil is also subject to more frost action. These factors combined lead to a higher chance of movement within the soil, rendering the bridges prone to damage.

3.7 Boardwalk System Structural Integrity:

The existing boardwalk is constructed with pressure-treated wood piers sunk directly into the ground to an approximate depth of 3 to 3½ feet. The depth of existing piers cannot be verified as no records of the construction exist. Piers appear to be a group of three (3) 6"x6" posts supporting 2x pressure-treated wood joists running parallel to the boardwalk, which in turn support 2"x6" pressure-treated decking. During multiple site visits, it was observed that the system has shifted vertically and horizontally from its original installation. Visual evidence of out-of-plane piers was noted throughout the length. It was also noted that the decking is showing signs of damage due to exposure and foot traffic. Large areas of decking replacement are needed to maintain an even and safe walking surface for visitors.

The bridges are constructed of similar pressure-treated wood materials with two (2) helical pile supports on each end with cross bracing added later to help stabilize the piles. The Thompson Run Bridge and associated boardwalk leading to the bird blind has been closed by the staff due to concerns over the structural stability of that portion of the boardwalk. This portion exhibits substantial vertical and horizontal shifting of the decking and its supporting structure. It was also noted that the stream below the Thompson Run Bridge has scoured a 4 – 5-foot portion of the west bank putting the stability of the existing bridge supports into question.

4.0 Design Parameters:

4.1 Areas of Interest:

Through field visits and communication with representatives from the Millbrook Marsh Nature Center and Feasibility Working Group, several areas within the marsh were identified as areas of concern. These primarily include the areas that provide educational benefit to the visitors of the nature center, such as the Thompson Run and Slab Cabin Run bridges, the bird blind, and the lookout to the stream vanes. Several locations along the boardwalk and along the grass paths were identified to be subject to frequent inundation. Additionally, the lack of a closed loop system was addressed as a possible opportunity to further enhance recreational and educational uses of the marsh.

The need for ADA compliance is necessary along the trail system to ensure the beauty and educational benefit of the marsh can be accessed by all. Several areas along the boardwalk do not currently meet ADA standards and have been identified in order to ensure compliance. Wherever feasible, the trail system shall include grades no steeper than 5%. Slopes greater than 5% and up to 8.33% (1:12) are permissible, but they qualify as ramps, and must meet all ADA and building code requirements for ramps, which includes handrails and intermediary landings. Also, wherever feasible, walking surfaces should be no higher than 30 inches above ground. Under building code, walking surfaces more than 30 inches above the adjacent ground surface require fall protection, which in this case would be code-compliant railings.

During the investigation process available construction methods and materials were reviewed for ease of construction, impact on surrounding environment, cost, availability, durability, anticipated life span within the marsh environment, maintenance considerations and aesthetic appeal. Final material selection concluded with natural materials such as pressure treated wood or hardwood species due to availability and natural appearance. Man-made materials were discounted due to possible variation in color from lot-to-lot manufacture. This is important as the timing and sequencing of construction may involve a prolonged period. It is also an important consideration when replacing or repairing sections over the life of the decking. New decking will be different from aged decking for long periods (longer than natural wood) and may cause a zebra-stripe effect. Man-made decking is also generally heavier than wood, which will increase the sub-structure requirement, thus increasing the cost of the project.

The following options have been selected with consideration to short, medium, and long anticipated useful life spans.

Boardwalk Material Alternative Matrix

Boardwalk Material	Cost*	Construction Method	Environmental Impact	Thermal Impacts	Aesthetic	Maintenance	Lifecycle
Pressure Treated Wood	$	No heavy machinery required	Chemical concern for soils (corrosive copper treated ground contact wood)	Retains minimal heat	Natural looking	High	Shorter (~10-15 years)
Pressure Treated Timber	$$	Heavy material, heavy machinery required	Chemical concern for soils (corrosive copper treated ground contact wood)	Maintains a cooler surface	Natural looking	Low	Shorter (~10-15 years)
High Density Hardwoods (Ipe, Cumaru)	$$	no heavy machinery required	No chemical treatment	Maintains a cooler surface	Natural looking	Low	Longer (~25-30 years)
Black locust	$$$	no machinery required	No chemical treatment	Maintains a cooler surface	Natural looking	Low	Longer (~20-30 years)

* = Cost is ranked on a scale with increasing $'s proportional to increasing cost of materials

Boardwalk Sub-structure Alternative Matrix

Boardwalk Material	Cost*	Construction Method	Environmental Impact	Thermal Impacts	Aesthetic	Maintenance	Lifecycle
Pressure Treated Wood	$	Typically requires hand tool installation methods	Minimal Ground Disturbance	Medium thermal expansion	Natural looking	High	Short (~15-20 years)
Pressure Treated Timber	$$	May require heavy machinery to be installed. Custom fasteners may be required.	Minimal Ground Disturbance	Medium-Low thermal expansion due to larger cross section	Natural looking	Low	Medium (~20-25 years)
Pressure Treated Pre-Engineered Wood	$$$	Larger heavier spans may require machinery for installation. Typically requires hand tool installation methods	Minimal Ground Disturbance	Low thermal expansion due to engineered fiber orientation	Natural looking	Low	Medium (~20-25 years)

* = Cost is ranked on a scale with increasing $'s proportional to increasing cost of materials

Boardwalk Foundation Alternative Matrix

Foundation Material	Cost*	Construction Method	Environmental Impact	Risk of flotation impacts	Maintenance	Lifecycle
Timber Posts	$	Typically requires heavy machinery to be installed	Large ground disturbance	Medium – not resistant	Medium	Short (~15-20 years)
Timber Piles	$$	Requires heavy machinery to be installed	Medium ground disturbance	Low – resistant to buoyant forces	Medium	Medium (~30-40 years)
Helical Piles	$$$	Requires machinery to be installed. Hand-held equipment is possible	Minimal Ground Disturbance	Low – resistant to buoyant forces	Low	Longer (~80-100 years)

* = Cost is ranked on a scale with increasing $'s proportional to increasing cost of materials

Walking Path Material Alternative Matrix

Path Material	Cost*	Construction Method	Thermal Impacts	Freezing Impacts	Aesthetic	Maintenance	Lifecycle
Trail Surface Aggregate	$	Some heavy machinery required	Maintains a cooler surface	Resistant to cracking	Somewhat natural	High; familiar material	Long lasting with proper maintenance
Asphalt	$$	Heavy machinery required	Retains heat	Known to crack due to freeze/thaw or substrate movement	Unnatural	Medium	Long lasting with proper maintenance

* = Cost is ranked on a scale with increasing $'s proportional to increasing cost of materials

5.0 Design Options

After consideration of the educational, recreational, and functional needs of the boardwalk system, LAN has detailed four concept options. These are options are provided with their relative advantages and disadvantages, along with estimated life expectancy, permitting requirements, relative cost to construct and anticipated environmental impact. It must be noted that the relative costs are based on available data and estimated provided from manufacturers and suppliers at the time of this report and based on certain assumptions on perceived effort for construction. Building material availability and demand, along with construction labor and general economic and trade conditions can severely alter the cost of construction. Escalation and inflation of labor and material costs have not been included.

5.1 Option 1

Design:

Option 1 proposes to re-construct the existing boardwalk in the same path as it currently exists using ground contact rated pressure-treated foundation posts, wet rated pressure-treated sub-structure, and 2x6 grade #1 decking.

The overall width of the boardwalk will be enlarged to a 6-foot width, areas of non-compliant slope will be adjusted to meet ADA requirements, and areas that are minimally above adjacent grade and prone to inundation will be raised to a maximum of 30 inches above adjacent grade.

Existing bridges will be rebuilt with the same wet rated pressure-treated wood framing and new galvanized helical piles will be used for the bridge foundations. Bank stabilization at the bridge supports will be included. Further discussion on bank stabilization is in Section 6.0 beginning on page 31.

This construction method is identical to that of the current structure. Foundation depth will be designed by a structural engineer and will likely be deeper than the existing posts. Pressure-treated wood is known to be reactive with certain fasteners. Even galvanized fasteners do not typically last long when used with pressure-treated materials. Use of stainless-steel or specially coated hardware and fasteners is highly recommended throughout at a premium cost increase. Typical life expectancy of pressure-treated decking is 10 years with ideal maintenance. Pressure-treated sub-structure will usually last 15-20 years before replacement becomes necessary.

This option of construction will involve hand digging for the installation of the foundation posts. Hand digging will be limited to the depth of around 4 feet. Similarly, the use of an auger will be limited in achievable depth for the posts. Any depth beyond that will require sloped sides for access or use of an excavator to dig a trench for each span. This causes a large disturbance in and around the foundation locations and creates excess spoils that will need to be dealt with. Alternatively, machine mounted augers may be used, but are limited in total depth to less than 5 feet in most cases. Other concerns are the intrusion of water into the excavated area making the process of foundation installation cumbersome and time consuming.

Permitting Requirements:

Permitting requirements were discussed with PADEP at the pre-application meeting. Upon acceptance of PADEP proposed rulemaking for Chapter 105. Dam Safety and Waterway Management, the actions under this option may qualify for Waivers 18 and 19. Proposed Waiver 18 applies to construction, operation, and maintenance of a water obstruction or encroachment associated with non-motorized recreational activities. Waiver 19 applies to the construction, operation, and maintenance of a walking path with an elevated boardwalk in a wetland for educational and interpretive purposes.

If the proposed waivers are not in place at the time of application, application for an amendment to the existing permit would have to be made in order to widen the boardwalk. Any associated maintenance activities would be covered under the existing permit or the amendment.

Operation and Maintenance:

Pressure-treated decking requires regular maintenance of power-washing and cleaning to maintain longevity. Debris and plant material will need to be removed from above and between the decking and sub-structure to avoid premature rot. Other issues to consider is algae growth on top of decking which can become slick when moist (i.e. early morning dew, light precipitation, etc.) Pressure-treated decking may also buckle and warp when subjected to repeated wetting and drying cycles. Ongoing maintenance will be required to replace severely distorted boards or sanding/planning of affected areas to keep an even walking surface. The gaps between boards will also need to be monitored so that ADA compliance is adhered to. Walking surfaces need to have gaps not exceeding ½". Visual bridge inspections shall be conducted on an annual basis, with a comprehensive inspection every five (5) years, and/or after major flood events to ensure stability and integrity.

Impacts:

The temporary disturbance associated to Option 1 would be limited to 20 feet around the boardwalk and grass path, and 40 feet around the bridges, as well as a 30 x 50 foot area laydown and/or crane near each bridge excluding the bridge over Bathgate Springs. Permanent impacts are limited to the footprint of the reconstructed boardwalk, bridge and abutments, grass paths, and observation areas.

Cost Estimate - Option 1

Millbrook Marsh Boardwalk Feasibility Study

Pressure treated post foundations, sub-structure and decking.

LAN Job # 2.20354.01

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
Boardwalk Decking (6' width) *	LF	3,000	$80	$240,000
Boardwalk Sub-structure (8' span)	SPAN	375	$200	$75,000
Boardwalk Foundation (8' span)	SPAN	375	$400	$150,000
Bridge Construction - Thompson Run	EA	1	$105,000	$105,000
Bridge Construction - Slab Cabin Run	EA	1	$75,000	$75,000
Bridge Construction - Bathgate Springs	EA	1	$10,000	$10,000
Bridge Abutments	EA	3	$24,000	$72,000
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	$727,000.00
			20% Contingency	$145,400.00
			A/E Fees (est. 7% of Construction Cost)	$50,890.00
			Construction Administration	$0.00
			Grand Total:	$923,290.00
Grass Trail Section E - TSA Upgrade (LF/path)	LF	765	$25	$19,125
Grass Trail Section D - TSA Upgrade (LF/path)	LF	342	$25	$8,550
Grass Trail Section C - TSA Upgrade (LF/path)	LF	793	$25	$19,825
Grass Trail Section B - TSA Upgrade (LF/path)	LF	158	$25	$3,950
Grass Trail Section A - TSA Upgrade (LF/path)	LF	488	$25	$12,200
		2,546	Total	$63,650.00
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	765	$155	$118,575
Grass Trail Section D - Upgrade (LF/Boardwalk)	LF	342	$155	$53,010
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	793	$155	$122,915
Grass Trail Section B - Upgrade (LF/Boardwalk)	LF	158	$155	$24,490
		2,058	Total	$318,990.00

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

PER PASDCS

LEGEND

- PROPERTY LINE (PQ)
- MINOR CONTOUR (2')
- MAJOR CONTOUR (10')
- BOARDWALK PATH
- GRASS PATH
- GRAVEL PATH
- FEMA FLOOD HAZARD LINE
- STREAM OR BROOK
- FLOODWAY LINE AS PER PADEP
- FLOODWAY AREA
- NWI WETLANDS BOUNDARY
- WETLANDS

OPTION 1 DESCRIPTION

- RECONSTRUCT EXISTING BOARDWALK IN THE SAME PATH AS IT CURRENTLY EXISTS USING GROUND CONTACT RATED PRESSURE TREATED FOUNDATION POSTS, PRESSURE TREATED SUB-STRUCTURE AND PRESSURE TREATED DECKING.
- THE OVERALL WIDTH OF THE BOARDWALK WILL BE ENLARGED TO A 6 FOOT WIDTH
- AREAS OF NON-COMPLIANT SLOPE WILL BE ADJUSTED TO MEET ADA REQUIREMENTS
- AREAS THAT ARE MINIMALLY ABOVE ADJACENT GRADE AND PRONE TO INUNDATION WILL BE RAISED TO A MAXIMUM OF 30 INCHES ABOVE ADJACENT GRADE.
- EXISTING BRIDGES WILL BE REBUILT WITH THE SAME TIMBER WOOD FRAMED PRE-MANUFACTURED UNITS AND NEW HELICAL PILES WILL BE USED FOR FOUNDATIONS. BANK STABILIZATION AT THE BRIDGE SUPPORTS WILL BE INCLUDED.

REFERENCES

1. CONTOUR DATA OBTAINED VIA THE PENNSYLVANIA IMAGERY NAVIGATOR, PAMAP PROGRAM "3.2 FT DIGITAL ELEVATION MODEL."
2. ELEVATIONS SHOWN HERIN ARE BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)
3. AERIAL IMAGERY OBTAINED VIA GOOGLE EARTH, IMAGERY DATE 9/22/2020
4. PROPERTY LINE INFORMATION OBTAINED VIA PENNSYLVANIA SPATIAL DATA ACCESS, "PENNSYLVANIA PARCELS" BY THE PENNSYLVANIA STATE UNIVERSITY (2020).
5. STREAM LOCATION OBTAINED VIA THE PADEP OPEN DATA PORTAL, "CHAPTER 93 EXISTING USE - STREAMS."
6. FEMA INFORMATION AS PER FEMA MAPS 42027C0629F AND 42027C0637F, EFFECTIVE MAY 4, 2009.
7. WETLAND INFORMATION OBTAINED VIA THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY.
8. BUILDING AND PARKING AREA LOCATION OBTAINED VIA THE MILLBROOK MARSH NATURE CENTER TRAIL MAP, APRIL 10, 2020

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

NJ Certificate of Authorization	
Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	12/22/20
Checked	CSG
Drawn	HLT

ERIK. E. BOE, P.E.
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Revisions:

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OPTION 1
MILLBROOK MARSH NATURE CENETR
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 20354.01

File No. 20354.01_C1

OPT.1

5.2 Option 2

Design:

Option 2 proposes to re-construct the existing boardwalk in the same path as it currently exists using pressure-treated piles, pressure-treated timber sub structure, and pressure-treated 3x8 grade #1 decking.

The overall width of the boardwalk will be enlarged to an 6-foot width (for machine access), areas of non-compliant slope will be adjusted to meet ADA requirements, and areas that are minimally above adjacent grade and prone to inundation will be raised to a maximum of 30 inches above adjacent grade. Two (2) new 8-foot x 20-foot lookout areas will be added at the upstream and downstream sides of the Thompson Run Bridge for educational opportunities. A new 8-foot x 20 foot gathering area will also be added at the T intersection leading to the bird blind and stream vanes. The lookout teaching area at the vanes will be expanded by a platform measuring approximately 6 feet x 12 feet to increase visitor accessibility and views of the vanes.

Existing bridges will be re-built with timber wood framed pre-manufactured units and new galvanized helical piles will be used for foundations. Bank stabilization at the bridge supports will be included. Further discussion on bank stabilization is in Section 6.0 beginning on page 31.

The use of pressure-treated piles will extend the useful life of the foundation structure and increase stability through the use of driven piles. Expected life expectancy on pressure-treated piles in wetland areas is about 30-40 years. Use of driven piles is also invasive to the surrounding environment due to increased noise and vibration during installation. There is still a concern with toxic preservatives that can leach into the surrounding soil. Pressure-treated wood is known to be reactive with fasteners. Even galvanized materials do not typically last long when used with pressure-treated materials. Use of stainless-steel or specially coated hardware and fasteners is highly recommended throughout at a premium cost increase. Typical life expectancy 3x8 pressure-treated decking is 10-15 years with maintenance. Pressure-treated sub-structure will usually last around 30 years before replacement becomes necessary.

Permitting Requirements:

Permitting requirements were discussed with PADEP at the pre-application meeting. Upon acceptance of PADEP proposed rulemaking for Chapter 105. Dam Safety and Waterway Management, the actions under this option may qualify for Waivers 18 and 19. Proposed Waiver 18 applies to construction, operation, and maintenance of a water obstruction or encroachment associated with non-motorized recreational activities. Waiver 19 applies to the construction, operation, and maintenance of a walking path with an elevated boardwalk in a wetland for educational and interpretive purposes. The enlargement of the boardwalk and addition of viewing platforms will fall under the waivers, as these are raised recreational platforms.

If the proposed waivers are not in place at the time of application, application for an amendment to the existing permit would have to be made in order to widen the boardwalk and construct the additional viewing platforms and congregation areas. Any associated maintenance activities would be covered under the existing permit or the amendment.

If the areas of proposed TSA placement upon the existing grass paths were to fall within a delineated wetland area, these activities will likely be covered with a PADEP and US Army Corps of Engineers Joint Permit due to the increase of impervious surface within a wetland.

Operation and Maintenance:

Pressure-treated decking requires regular maintenance of power-washing and cleaning to maintain longevity. Debris and plant material will need to be removed from above and between the decking and sub-structure to avoid premature rot. Other issues to consider is algae growth on top of decking becomes slick when moist (i.e. early morning dew, light precipitation,

etc.) Pressure-treated decking may also buckle and warp when subjected to repeated wetting and drying cycles. The use of large lumber in the decking will reduce but not eliminate the possibility of warpage. Ongoing maintenance will be required to replace severely distorted boards or sanding/planning of affected areas to keep an even walking surface. The gaps between boards will also need to be monitored so that ADA compliance is adhered to. Walking surfaces need to have gaps not exceeding ½". Visual bridge inspections shall be conducted on an annual basis, with a comprehensive inspection every five (5) years, and/or after major flood events to ensure stability and integrity.

Visual bridge inspections shall be conducted on an annual basis, with a comprehensive inspection every five (5) years, and/or after major flood events to ensure stability and integrity.

Impacts:

The temporary disturbance associated to Option 2 would be limited to 20 feet around the boardwalk and grass path, and 40 feet around the bridges, as well as a 30 x 50 foot area laydown and/or crane near each bridge excluding the bridge over Bathgate Springs. Permanent impacts are limited to the footprint of the reconstructed boardwalk, bridge and abutments, grass paths, and observation areas.

Cost Estimate - Option 2

Millbrook Marsh Boardwalk Feasibility Study

Driven pile foundations, pressure treated timber sub structure and decking. Timber bridges

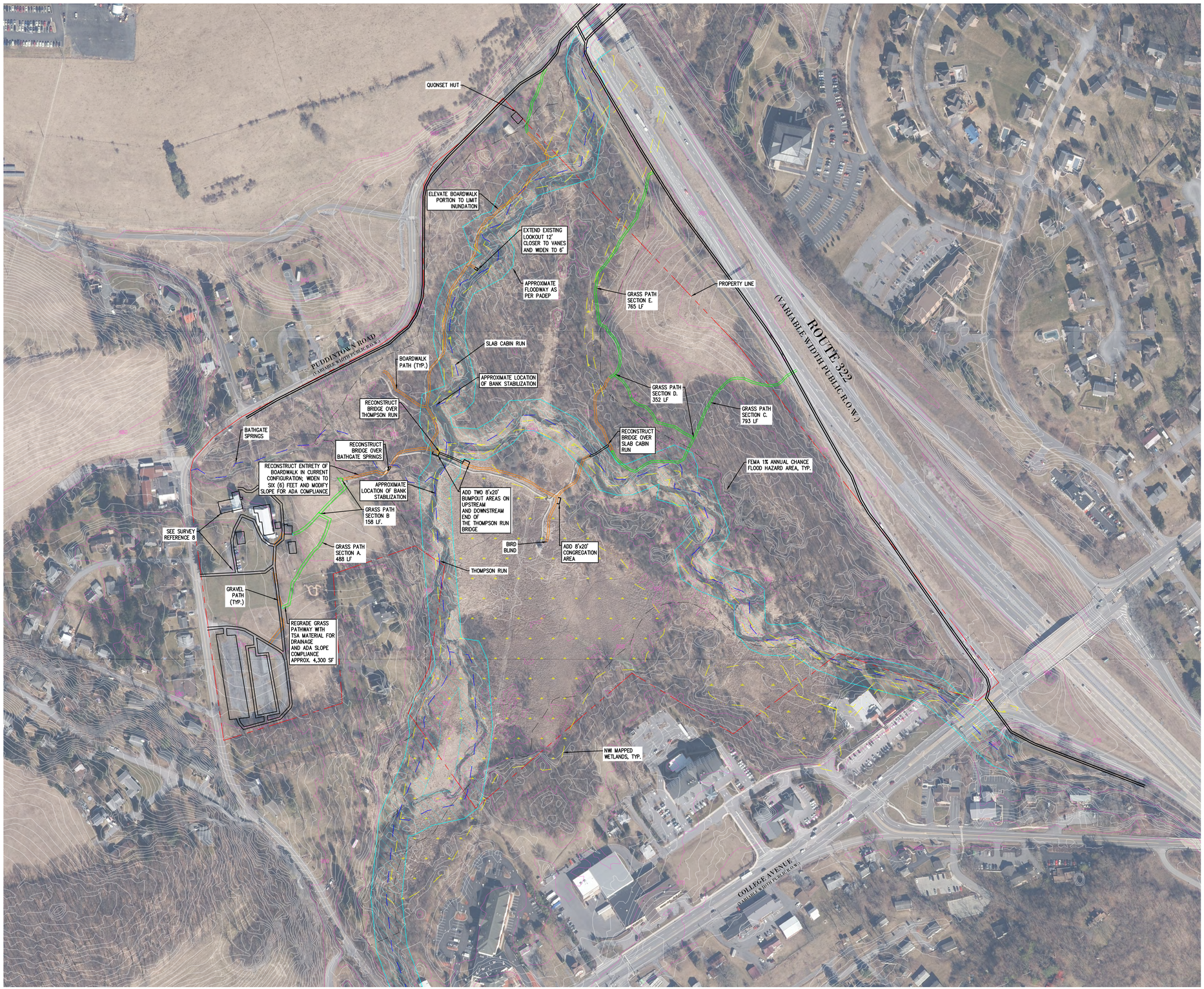
LAN Job # 2.20354.01

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
Boardwalk Decking (8' width)*	LF	3,000	$150	$450,000
Boardwalk Sub-structure (8' span)	SPAN	375	$450	$168,750
Boardwalk Foundation (8' span)	SPAN	375	$1,550	$581,250
Bridge Construction - Thompson Run	EA	1	$105,000	$105,000
Bridge Construction - Slab Cabin Run	EA	1	$75,000	$75,000
Bridge Construction - Bathgate Springs	EA	1	$10,000	$10,000
Bridge Abutments	EA	3	$24,000	$72,000
Observation Lookouts	EA	3	$10,667	$32,000
Lookout Expansion at Vanes	EA	1	$4,800	$4,800
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	$1,498,800.00
			20% Contingency	$299,760.00
			A/E Fees (est. 7% of Construction Cost)	$104,916.00
			Construction Administration	$0.00
			Grand Total:	$1,903,476.00
Grass Trail Section E - TSA Upgrade (LF/path)	LF	765	$25	$19,125
Grass Trail Section D - TSA Upgrade (LF/path)	LF	342	$25	$8,550
Grass Trail Section C - TSA Upgrade (LF/path)	LF	793	$25	$19,825
Grass Trail Section B - TSA Upgrade (LF/path)	LF	158	$25	$3,950
Grass Trail Section A - TSA Upgrade (LF/path)	LF	488	$25	$12,200
		2,546	Total	$63,650.00
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	765	$400	$306,000
Grass Trail Section D - Upgrade (LF/Boardwalk)	LF	342	$400	$136,800
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	793	$400	$317,200
Grass Trail Section B - Upgrade (LF/Boardwalk)	LF	158	$400	$63,200
		2,058	Total	$823,200.00

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.



PER PASPC

LEGEND

- PROPERTY LINE (PQ)
- MINOR CONTOUR (2')
- MAJOR CONTOUR (10')
- BOARDWALK PATH
- GRASS PATH
- GRAVEL PATH
- FEMA FLOOD HAZARD LINE
- STREAM OR BROOK
- FLOODWAY LINE AS PER PADEP
- FLOODWAY AREA
- NWI WETLANDS BOUNDARY
- WETLANDS

OPTION 2 DESCRIPTION

- RECONSTRUCT EXISTING BOARDWALK IN THE SAME PATH AS IT CURRENTLY EXISTS USING PRESSURE TREATED PILES AS FOUNDATION, PRESSURE TREATED TIMBER SUB-STRUCTURE AND PRESSURE TREATED DECKING.
- THE OVERALL WIDTH OF THE BOARDWALK WILL BE ENLARGED TO A 6 FOOT WIDTH
- AREAS OF NON-COMPLIANT SLOPE WILL BE ADJUSTED TO MEET ADA REQUIREMENTS
- AREAS THAT ARE MINIMALLY ABOVE ADJACENT GRADE AND PRONE TO INUNDATION WILL BE RAISED TO A MAXIMUM OF 30 INCHES ABOVE ADJACENT GRADE.
- TWO (2) NEW 8 FOOT BY 20 FOOT LOOKOUT AREAS WILL BE ADDED AT THE UPSTREAM AND DOWNSTREAM SIDES OF THE THOMPSON RUN BRIDGE FOR EDUCATIONAL OPPORTUNITIES.
- A NEW 8 FOOT BY 20 FOOT GATHERING AREA WILL ALSO BE ADDED AT THE T-INTERSECTION LEADING TO THE BLIND.
- THE LOOKOUT TEACHING AREA AT THE VANES WILL BE EXPANDED BY A PLATFORM MEASURING APPROXIMATELY 6 FEET BY 12 FEET TO INCREASE VISITOR ACCESSIBILITY AND VIEWS OF THE VANES.
- EXISTING BRIDGES WILL BE REBUILT WITH THE SAME TIMBER WOOD FRAMED PRE-MANUFACTURED UNITS AND NEW GALVANIZED HELICAL PILES WILL BE USED FOR FOUNDATIONS. BANK STABILIZATION AT THE BRIDGE SUPPORTS WILL BE INCLUDED.

REFERENCES

1. CONTOUR DATA OBTAINED VIA THE PENNSYLVANIA IMAGERY NAVIGATOR, PAMAP PROGRAM "3.2 FT DIGITAL ELEVATION MODEL."
2. ELEVATIONS SHOWN HERIN ARE BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)
3. AERIAL IMAGERY OBTAINED VIA GOOGLE EARTH, IMAGERY DATE 9/22/2020
4. PROPERTY LINE INFORMATION OBTAINED VIA PENNSYLVANIA SPATIAL DATA ACCESS, "PENNSYLVANIA PARCELS" BY THE PENNSYLVANIA STATE UNIVERSITY (2020).
5. STREAM LOCATION OBTAINED VIA THE PADEP OPEN DATA PORTAL, "CHAPTER 93 EXISTING USE - STREAMS."
6. FEMA INFORMATION AS PER FEMA MAPS 42027C0629F AND 42027C0637F, EFFECTIVE MAY 4, 2009.
7. WETLAND INFORMATION OBTAINED VIA THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY.
8. BUILDING AND PARKING AREA LOCATION OBTAINED VIA THE MILLBROOK MARSH NATURE CENTER TRAIL MAP, APRIL 10, 2020

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

NJ Certificate of Authorization

Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	12/22/20
Checked	CSG
Drawn	HLT

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Revisions:

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OPTION 2
MILLBROOK MARSH NATURE CENETR
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 20354.01

File No. 20354.01_C1

OPT.2

5.3 Option 3

Design:

Option 3 proposes to re-construct the existing boardwalk in the same path as it currently exists using galvanized helical piles as foundation, engineered wood wet rated sub-structure, and 2x6 grade #1 black locust decking.

The overall width of the boardwalk will be enlarged to a 6-foot width, areas of non-compliant slope will be adjusted to meet ADA requirements, and areas that are minimally above adjacent grade and prone to inundation will be raised to a maximum of 30 inches above adjacent grade. Two (2) new 8-foot x 20-foot lookout areas will be added at the upstream and downstream sides of the Thompson Run Bridge for educational opportunities. A new 8-foot x 20-foot gathering area will also be added at the T intersection leading to the bird blind and stream vanes. The lookout teaching area at the vanes will be expanded by a platform measuring approximately 6 feet x 12 feet to increase visitor accessibility and views of the vanes. A new 350-foot (approx.) loop connector trail portion is added along the north side of the marsh to tie in the boardwalk at the Quonset hut to the grass pathway near Rt 322.

Existing bridges will be rebuilt with timber wood framed pre-manufactured units and new helical piles will be used for foundations. Bank stabilization at the bridge supports will be included. Further discussion on bank stabilization is in Section 6.0 beginning on page 31.

The use of helical piles will greatly extend the useful life of the foundation structure and increase stability through the use of helical piles. Expected life expectancy on helical piles in wetland areas is 80-100 years. Use of helical piles is also less invasive to the surrounding environment due to less noise and vibration during installation and the elimination of toxic preservatives that can leach into the surrounding soil. Pressure-treated wood is known to be reactive with fasteners. Even galvanized materials do not typically last long when used with pressure-treated materials. Use of stainless-steel or specially coated hardware and fasteners is highly recommended throughout at a premium cost increase. Typical life expectancy of black locust is 20-30 years with maintenance. Wet rated (pressure treated) engineered wood sub-structure will usually last 20-25 years before replacement becomes necessary. The engineered wood allows for longer span length between helical piles which will result in less piles and less overall environmental disturbance.

Permitting Requirements:

Permitting requirements were discussed with PADEP at the pre-application meeting. Upon acceptance of PADEP proposed rulemaking for Chapter 105. Dam Safety and Waterway Management, the actions under this option may qualify for Waivers 18 and 19. Proposed Waiver 18 applies to construction, operation, and maintenance of a water obstruction or encroachment associated with non-motorized recreational activities. Waiver 19 applies to the construction, operation, and maintenance of a walking path with an elevated boardwalk in a wetland for educational and interpretive purposes. The enlargement of the boardwalk and addition of viewing platforms will fall under the waivers, as these are raised recreational platforms.

If the connector loop trail is to lie within a delineated wetland, and is to be constructed of boardwalk material, this action will be covered under the above waivers.

If the proposed waivers are not in place at the time of application, application for an amendment to the existing permit would have to be made in order to widen the boardwalk and construct the additional viewing platforms and congregation areas. Any associated maintenance activities would be covered under the existing permit or the amendment.

If the areas of proposed TSA placement upon the existing grass paths were to fall within a delineated wetland area, these activities will likely be covered with a PADEP and US Army Corps of Engineers Joint Permit due to the increase of impervious surface within a wetland.

Operation and Maintenance:

Black Locust decking requires regular maintenance of power-washing and cleaning to maintain longevity. Debris and plant material will need to be removed from above and between the decking and sub-structure to keep rot from setting in. Ongoing maintenance will be required to replace severely distorted boards or sanding/planning of affected areas to keep an even walking surface. The gaps between boards will also need to be monitored so that ADA compliance is adhered to for compliance. (Walking surfaces need to have gaps not exceeding ½".) The use of black locust decking over an exotic hardwood should be considered based on funding options (Buy American clauses), and long-term supply for maintenance. Since black locust is a material that originates from the United States, future availability and pricing should remain relatively stable. Visual bridge inspections shall be conducted on an annual basis, with a comprehensive inspection every five (5) years, and/or after major flood events to ensure stability and integrity.

Impacts:

The temporary disturbance associated to Option 3 would be limited to 20 feet around the boardwalk and grass path, and 40 feet around the bridges, as well as a 30 x 50 foot area laydown and/or crane near each bridge excluding the bridge over Bathgate Springs. Permanent impacts are limited to the footprint of the reconstructed boardwalk, bridge and abutments, grass paths, observation areas, and the new connector loop.

Cost Estimate - Option 3

Millbrook Marsh Boardwalk Feasibility Study

Helical pile foundations, engineered wood sub-structure, black locust decking. Timber bridges

LAN Job # 2.20354.01

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
Boardwalk Decking (6' width)*	LF	3,000	$220	$660,000
Boardwalk Sub-structure (14' span)	SPAN	215	$300	$64,500
Boardwalk Foundation (14' span)	SPAN	215	$2,500	$537,500
Bridge Construction - Thompson Run	EA	1	$105,000	$105,000
Bridge Construction - Slab Cabin Run	EA	1	$75,000	$75,000
Bridge Construction - Bathgate Springs	EA	1	$10,000	$10,000
Bridge Abutments	EA	3	$24,000	$72,000
Observation Lookouts	EA	3	$11,218	$33,653
Lookout Expansion at Vanes	EA	1	$5,048	$5,048
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	**$1,562,701.33**
			20% Contingency	**$312,540.27**
			A/E Fees (est. 7% of Construction Cost)	**$109,389.09**
			Construction Administration	**$0.00**
			Grand Total:	**$1,984,630.69**
Grass Trail Section E - TSA Upgrade (LF/path)	LF	765	$25	$19,125
Grass Trail Section D - TSA Upgrade (LF/path)	LF	342	$25	$8,550
Grass Trail Section C - TSA Upgrade (LF/path)	LF	793	$25	$19,825
Grass Trail Section B - TSA Upgrade (LF/path)	LF	158	$25	$3,950
Grass Trail Section A - TSA Upgrade (LF/path)	LF	488	$25	$12,200
		2,546	**Total**	**$63,650.00**
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	765	$421	$321,810
Grass Trail Section D - Upgrade (LF/Boardwalk)	LF	342	$421	$143,868
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	793	$421	$333,589
Grass Trail Section B - Upgrade (LF/Boardwalk)	LF	158	$421	$66,465
		2,058	**Total**	**$865,732.00**
Connector Loop (LF/Boardwalk)	LF	350	$421	$147,233
Bridge at Connector Loop	EA	1	$105,000	$105,000

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

PER PASPC

LEGEND

- PROPERTY LINE (PQ)
- MINOR CONTOUR (2')
- MAJOR CONTOUR (10')
- BOARDWALK PATH
- GRASS PATH
- GRAVEL PATH
- FEMA FLOOD HAZARD LINE
- STREAM OR BROOK
- FLOODWAY LINE AS PER PADEP
- FLOODWAY AREA
- NWI WETLANDS BOUNDARY
- WETLANDS

OPTION 3 DESCRIPTION

- RECONSTRUCT EXISTING BOARDWALK IN THE SAME PATH AS IT CURRENTLY EXISTS USING GALVANIZED HELICAL PILES AS FOUNDATION, ENGINEERED WOOD WET RATED SUB-STRUCTURE AND BLACK LOCUST DECKING.
- THE OVERALL WIDTH OF THE BOARDWALK WILL BE ENLARGED TO A 6 FOOT WIDTH
- AREAS OF NON-COMPLIANT SLOPE WILL BE ADJUSTED TO MEET ADA REQUIREMENTS
- AREAS THAT ARE MINIMALLY ABOVE ADJACENT GRADE AND PRONE TO INUNDATION WILL BE RAISED TO A MAXIMUM OF 30 INCHES ABOVE ADJACENT GRADE.
- TWO (2) NEW 8 FOOT BY 20 FOOT LOOKOUT AREAS WILL BE ADDED AT THE UPSTREAM AND DOWNSTREAM SIDES OF THE THOMPSON RUN BRIDGE FOR EDUCATIONAL OPPORTUNITIES.
- A NEW 8 FOOT BY 20 FOOT GATHERING AREA WILL ALSO BE ADDED AT THE T-INTERSECTION LEADING TO THE BLIND.
- THE LOOKOUT TEACHING AREA AT THE VANES WILL BE EXPANDED BY A PLATFORM MEASURING APPROXIMATELY 6 FEET BY 12 FEET TO INCREASE VISITOR ACCESSIBILITY AND VIEWS OF THE VANES.
- A NEW LOOP CONNECTOR PORTION IS ADDED ALONG THE NORTH SIDE OF THE MARSH TO TIE IN THE BOARDWALK AT THE QUONSET HUT TO THE GRASS PATHWAY NEAR RT. 322.
- EXISTING BRIDGES WILL BE REBUILT WITH THE SAME TIMBER WOOD FRAMED PRE-MANUFACTURED UNITS AND NEW HELICAL PILES WILL BE USED FOR FOUNDATIONS. BANK STABILIZATION AT THE BRIDGE SUPPORTS WILL BE INCLUDED.

REFERENCES

1. CONTOUR DATA OBTAINED VIA THE PENNSYLVANIA IMAGERY NAVIGATOR, PAMAP PROGRAM "3.2 FT DIGITAL ELEVATION MODEL."
2. ELEVATIONS SHOWN HERIN ARE BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)
3. AERIAL IMAGERY OBTAINED VIA GOOGLE EARTH, IMAGERY DATE 9/22/2020
4. PROPERTY LINE INFORMATION OBTAINED VIA PENNSYLVANIA SPATIAL DATA ACCESS, "PENNSYLVANIA PARCELS" BY THE PENNSYLVANIA STATE UNIVERSITY (2020).
5. STREAM LOCATION OBTAINED VIA THE PADEP OPEN DATA PORTAL, "CHAPTER 93 EXISTING USE - STREAMS."
6. FEMA INFORMATION AS PER FEMA MAPS 42027C0629F AND 42027C0637F, EFFECTIVE MAY 4, 2009.
7. WETLAND INFORMATION OBTAINED VIA THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY.
8. BUILDING AND PARKING AREA LOCATION OBTAINED VIA THE MILLBROOK MARSH NATURE CENTER TRAIL MAP, APRIL 10, 2020

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

NJ Certificate of Authorization	
Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	12/22/20
Checked	CSG
Drawn	HLT

ERIK. E. BOE, P.E.
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445 GODWIN AVENUE, MIDLAND PARK, N.J. 07432 (201)447-6400

Revisions:

OPTION 3
MILLBROOK MARSH NATURE CENETR
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 20354.01
File No. 20354.01_C1

OPT.3

5.4 Option 4

Design:

Option 4 proposes to re-construct the existing boardwalk in the same path as it currently exists using galvanized steel helical piles as foundation, wet rated engineered wood sub-structure, and 2x6 grade #1 hardwood decking (IPE).

The overall width of the boardwalk will be enlarged to a 6-foot width, areas of non-compliant slope will be adjusted to meet ADA requirements, and areas that are minimally above adjacent grade and prone to inundation will be raised to a maximum of 30 inches above adjacent grade. A new 8-foot x 20-foot gathering area will also be added at the T intersection leading to the bird blind and stream vanes. The lookout teaching area at the stream vanes will be expanded by a platform measuring approximately 6 feet x 12 feet to increase visitor accessibility and views of the vanes.

A new 350-foot (approx..) loop connector trail portion is added along the north side of the marsh to tie in the boardwalk at the Quonset hut to the grass pathway near Rt 322.

Existing bridges will be rebuilt as pre-fabricated steel and new concrete abutments for foundations. Bank stabilization at the bridge supports ***may*** be included. Further discussion on bank stabilization is in Section 6.0 beginning on page . The Thompson Run bridge will incorporate two (2) cantilevered lookouts as part of its structure, thus eliminating the need to construct two (2) boardwalk connected outlooks. The integral bridge outlooks increase the stream visibility during educational functions, as well as decreases impact on the surrounding soils by eliminating the foundations, decking and subsequent soil erosion that is associated with ground mounted structures.

The use of helical piles will greatly extend the useful life of the foundation structure and increase stability through the use of helical piles. Expected life expectancy on galvanized steel helical piles in wetland areas is 80-100 years. Use of helical piles is also less invasive to the surrounding environment due to less noise and vibration during installation and the elimination of toxic preservatives that can leech into the surrounding soil. Pressure-treated wood is known to be reactive with fasteners. Even galvanized materials do not typically last long when used with pressure-treated materials. Use of stainless-steel or specially coated hardware and fasteners will be used. Typical life expectancy of hardwood decking (IPE) is 25-30 years with maintenance. Wet rated (pressure treated) engineered wood sub-structure will usually last 20-25 years before replacement becomes necessary. The engineered wood allows for longer span length between helical piles which will result in less piles and less overall environmental disturbance. Steel bridges generally have a lifespan in excess of 100 years with proper maintenance. Considerations of the use of exotic hardwood decking should include any possible requirements with regard to funding sources (Buy American clauses), and long-term supply for maintenance. Since exotic hardwoods are imported from outside of the United States, future availability and pricing may be volatile.

Permitting Requirements:

Permitting requirements were discussed with PADEP at the pre-application meeting. Upon acceptance of PADEP proposed rulemaking for Chapter 105. Dam Safety and Waterway Management, the actions under this option may qualify for Waivers 18 and 19. Proposed Waiver 18 applies to construction, operation, and maintenance of a water obstruction or encroachment associated with non-motorized recreational activities. Waiver 19 applies to the construction, operation, and maintenance of a walking path with an elevated boardwalk in a wetland for educational and interpretive purposes. The enlargement of the boardwalk and addition of viewing platforms will fall under the waivers, as these are raised recreational platforms.

If the connector loop trail is to lie within a delineated wetland, and is to be constructed of boardwalk material, this action will be covered under the above waivers. If the proposed waivers are not in place at the time of application, application for an amendment to the existing permit would have to be made in order to widen the boardwalk and construct the additional

viewing platforms and congregation areas. Any associated maintenance activities would be covered under the existing permit or the amendment.

If the areas of proposed TSA placement upon the existing grass paths were to fall within a delineated wetland area, these activities will likely be covered with a PADEP and US Army Corps of Engineers Joint Permit due to the increase of impervious surface within a wetland.

Operation and Maintenance:

Hardwood decking requires regular maintenance of power-washing and cleaning to maintain longevity. Debris and plant material will need to be removed from above and between the decking and sub-structure to avoid premature rot. Ongoing maintenance will be required to replace severely distorted boards or sanding/planning of affected areas to keep an even walking surface. The gaps between boards will also need to be monitored so that ADA compliance is adhered to. Walking surfaces need to have gaps not exceeding ½". Visual bridge inspections shall be conducted on an annual basis, with a comprehensive inspection every five (5) years, and/or after major flood events to ensure stability and integrity.

Impacts:

The temporary disturbance associated to Option 4 would be limited to 20 feet around the boardwalk and grass path, and 40 feet around the bridges, as well as a 30 x 50 foot area laydown and/or crane near each bridge excluding the bridge over Bathgate Springs. Permanent impacts are limited to the footprint of the reconstructed boardwalk, bridge and abutments, grass paths, observation areas, and the new connector loop.

Cost Estimate - Option 4

Millbrook Marsh Boardwalk Feasibility Study

Helical pile foundations, engineered wood sub-structure, Ipe decking. Steel Bridges

LAN Job # 2.20354.01

Boardwalk Decking (6' width)*	LF	3,000	$180	$540,000
Boardwalk Sub-structure (14' span)	SPAN	215	$300	$64,500
Boardwalk Foundation (14' span)	SPAN	215	$2,500	$537,500
Bridge Construction - Thompson Run	EA	1	$500,000	$500,000
Bridge Construction - Slab Cabin Run	EA	1	$120,000	$120,000
Bridge Construction - Bathgate Springs	EA	1	$10,000	$10,000
Bridge Abutments	EA	2	$50,000	$100,000
Observation Lookouts	EA	1	$10,151	$10,151
Lookout Expansion at Vanes	EA	1	$4,568	$4,568
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	$1,886,719.11
			20% Contingency	$377,343.82
			A/E Fees (est. 7% of Construction Cost)	$132,070.34
			Construction Administration	$0.00
			Grand Total:	$2,396,133.27
Grass Trail Section E - TSA Upgrade (LF/path)	LF	765	$25	$19,125
Grass Trail Section D - TSA Upgrade (LF/path)	LF	342	$25	$8,550
Grass Trail Section C - TSA Upgrade (LF/path)	LF	793	$25	$19,825
Grass Trail Section B - TSA Upgrade (LF/path)	LF	158	$25	$3,950
Grass Trail Section A - TSA Upgrade (LF/path)	LF	488	$25	$12,200
		2,546	Total	$63,650.00
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	765	$381	$291,210
Grass Trail Section D - Upgrade (LF/Boardwalk)	LF	342	$381	$130,188
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	793	$381	$301,869
Grass Trail Section B - Upgrade (LF/Boardwalk)	LF	158	$381	$60,145
		2,058	Total	$783,412.00
Connector Loop (LF/Boardwalk)	LF	350	$381	$133,233
Bridge at Connector Loop	EA	1	$120,000	$120,000

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

PEAK PASSOC.

LEGEND

- PROPERTY LINE (PQ)
- MINOR CONTOUR (2')
- MAJOR CONTOUR (10')
- BOARDWALK PATH
- GRASS PATH
- GRAVEL PATH
- FEMA FLOOD HAZARD LINE
- STREAM OR BROOK
- FLOODWAY LINE AS PER PADEP
- FLOODWAY AREA
- NWI WETLANDS BOUNDARY
- WETLANDS

OPTION 4 DESCRIPTION

- RECONSTRUCT EXISTING BOARDWALK IN THE SAME PATH AS IT CURRENTLY EXISTS USING GALVANIZED STEEL HELICAL PILES AS FOUNDATION, WET RATED ENGINEERED WOOD SUB-STRUCTURE AND IPE HARDWOOD DECKING.
- THE OVERALL WIDTH OF THE BOARDWALK WILL BE ENLARGED TO A 6 FOOT WIDTH
- AREAS OF NON-COMPLIANT SLOPE WILL BE ADJUSTED TO MEET ADA REQUIREMENTS
- AREAS THAT ARE MINIMALLY ABOVE ADJACENT GRADE AND PRONE TO INUNDATION WILL BE RAISED TO A MAXIMUM OF 30 INCHES ABOVE ADJACENT GRADE.
- A NEW 8 FOOT BY 20 FOOT GATHERING AREA WILL ALSO BE ADDED AT THE T-INTERSECTION LEADING TO THE BLIND.
- THE LOOKOUT TEACHING AREA AT THE VANES WILL BE EXPANDED BY A PLATFORM MEASURING APPROXIMATELY 6 FEET BY 12 FEET TO INCREASE VISITOR ACCESSIBILITY AND VIEWS OF THE VANES.
- A NEW LOOP CONNECTOR PORTION IS ADDED ALONG THE NORTH SIDE OF THE MARSH TO TIE IN THE BOARDWALK AT THE QUONSET HUT TO THE GRASS PATHWAY NEAR RT. 322.
- EXISTING BRIDGES WILL BE REBUILT AS PRE-FABRICATED STEEL AND NEW CONCRETE ABUTMENTS FOR FOUNDATIONS. BANK STABILIZATION AT THE BRIDGE SUPPORTS MAY BE INCLUDED.

REFERENCES

1. CONTOUR DATA OBTAINED VIA THE PENNSYLVANIA IMAGERY NAVIGATOR, PAMAP PROGRAM "3.2 FT DIGITAL ELEVATION MODEL."
2. ELEVATIONS SHOWN HERIN ARE BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)
3. AERIAL IMAGERY OBTAINED VIA GOOGLE EARTH, IMAGERY DATE 9/22/2020
4. PROPERTY LINE INFORMATION OBTAINED VIA PENNSYLVANIA SPATIAL DATA ACCESS, "PENNSYLVANIA PARCELS" BY THE PENNSYLVANIA STATE UNIVERSITY (2020).
5. STREAM LOCATION OBTAINED VIA THE PADEP OPEN DATA PORTAL, "CHAPTER 93 EXISTING USE - STREAMS."
6. FEMA INFORMATION AS PER FEMA MAPS 42027C0629F AND 42027C0637F, EFFECTIVE MAY 4, 2009.
7. WETLAND INFORMATION OBTAINED VIA THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY.
8. BUILDING AND PARKING AREA LOCATION OBTAINED VIA THE MILLBROOK MARSH NATURE CENTER TRAIL MAP, APRIL 10, 2020

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

NJ Certificate of Authorization

Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	12/22/20
Checked	CSG
Drawn	HLT

ERIK. E. BOE, P.E.
License No. –
Title PROFESSIONAL ENGINEER

Revisions:

LAN ASSOCIATES
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OPTION 4
MILLBROOK MARSH NATURE CENETR
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 20354.01

File No. 20354.01_C1

OPT.4

5.5 Construction Methodology/Phasing

Other than Options 1 and 2, which have their own unique installation methods, there are two (2) main methods of constructing the boardwalk.

Variant 1 is the use of a low-impact machine that would have to cross the marsh for the installation of the helical pile foundations. Any disturbances made by this machine will have to be restored/corrected as part of the work which increases overall project cost. Any routes within the marsh will need to be assessed in advance to avoid any extremely sensitive and or delicate habitats.

Variant 2 is to construct the boardwalk in a top-down approach. This approach involves the machinery being transported or situated on the boardwalk as the foundation piles are installed. This variant has little to no impact on the surrounding habitat. It should be noted that the existing or new structure will have to be robust enough to handle the loads imposed by any machinery/equipment. There are a number of smaller machines that are available in the industry with weights as low as 2500 pounds that make this variant extremely appealing.

With both variants, materials for the sub-structure and decking can be transported along the existing or completed boardwalk without the need to disturb the surrounding environment. Construction foot traffic is anticipated along the length of the boardwalk and should be limited to within ten (10) feet of the centerline of the boardwalk.

For Options 1, 3 and 4 it is preferable that the contractor start on the point furthest into the marsh and work toward the main entrance to the boardwalk. This allows the contractor to repair any disturbed areas as construction progresses without repeatedly running over the same area causing increased damage to the eco-system. Option 2 will require the contractor to start from the outside-in, as the weight of the machine will preclude the use of the existing boardwalk without some sort of additional support or load distribution being installed. If variant 2 becomes feasible, then options 3 and 4 will follow the outside-in approach.

Since the Thompson Run section is currently closed to visitors, the reconstruction of this portion can start at any time, with additional thought given to staging, material storage and site access to the contractor, with minimal disruption to visitors. Other portions will be sequentially phased with consideration given to allowing use of at least one area for programs and educational activities. Phasing timelines and quantity of subsequent phases will also likely be impacted by funding sources and availability. Limiting subsequent phases that force a contractor to mobilize and de-mobilize several times, will decrease the overall cost of the project. It will also limit or avoid price increases for materials on subsequent phases and allow for greater uniformity.

Construction of new boardwalk areas around any overly sensitive areas that are found in subsequent investigations should take place during the “off-season”, which is anticipated to be November through March. This will minimize environmental impacts from construction activities. Advanced planning is required to ensure that long-lead items are either on site or arrive on site to avoid long term closures of boardwalk sections.

6.0 Streambank Stabilization

Various areas along both Thompson and Slab Cabin Runs are viable for streambank stabilization techniques to prevent further erosion and promote stability of the floodplain. The nature of both streams is a sinuous, relatively shallow streambed sensitive to development. The presence of vegetation along the streams acts to keep soil in place, however, areas without suitable vegetation require other means of stabilization. Below are viable options of bioengineering streambank stabilization techniques adapted from the PADEP Erosion and Sediment Pollution Control Manual Program.

Planting native, shade-tolerant wetland plants underneath the boardwalk may assist in stabilizing soil and preventing further erosion and channelized flow. Virginia Bluebells (*Mertensia virginica*), Solomon's Seal (*Polygonatum biflorum*) and Sweet White Violet (*Viola pallens)* are all perennial, shade-tolerant species that prefer very moist soils and are best left undisturbed.

Riprap: Riprap is constructed of crushed stone meeting certain requirements for gradation, weight, durability, and shape that can be applied across the toe of a slope to protect a streambank from erosion. Riprap stones shall be sized to withstand the 10-year storm event peak flow. The riprap should not extend more than 12" above the normal flow depth and shall be used in stream channels with bed slopes less than 0.10 feet/foot.

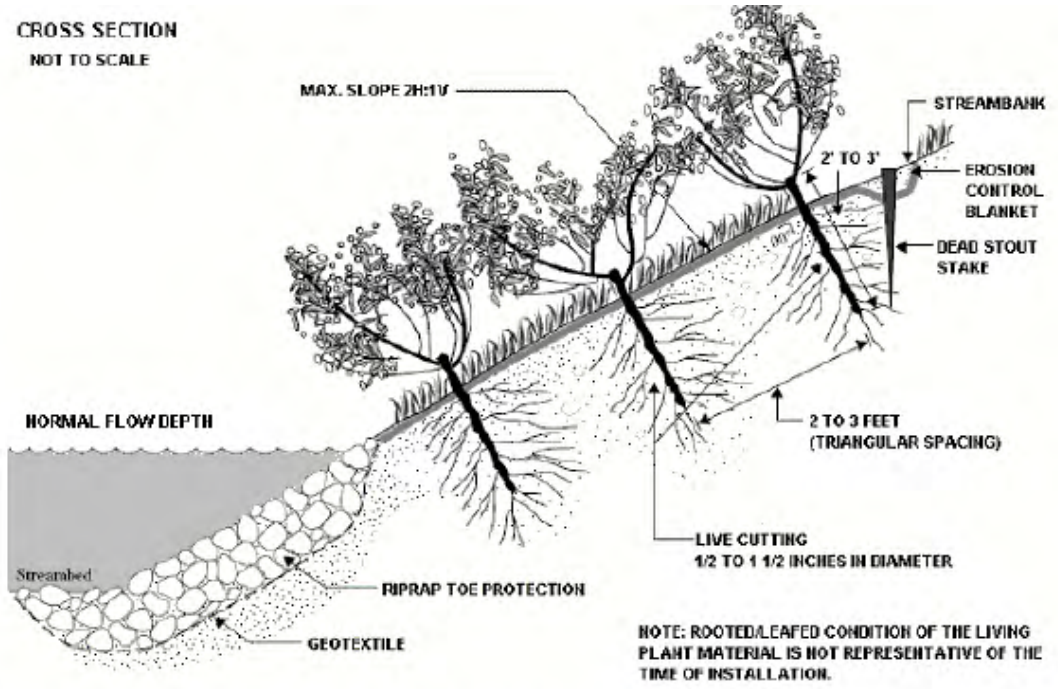


Figure 1 - Riprap from PADEP Erosion and Sediment Pollution Control Manual

Live Stakes: Live stakes are woody vegetation cuttings of a flood tolerant species ½- 1½ inches in diameter and 2-3 feet long installed along a slope subject to erosion. Before placement of the stakes, an erosion control blanket can be placed down on an actively erodible area. Cuttings must be kept fresh before installation and are tamped in perpendicular to the slope face and angled downstream. 1/5 of the cutting shall remain above grade, and stakes shall be spaced 2-3 feet apart. Riprap toe protection shall be placed below the stream-forming flow elevation.

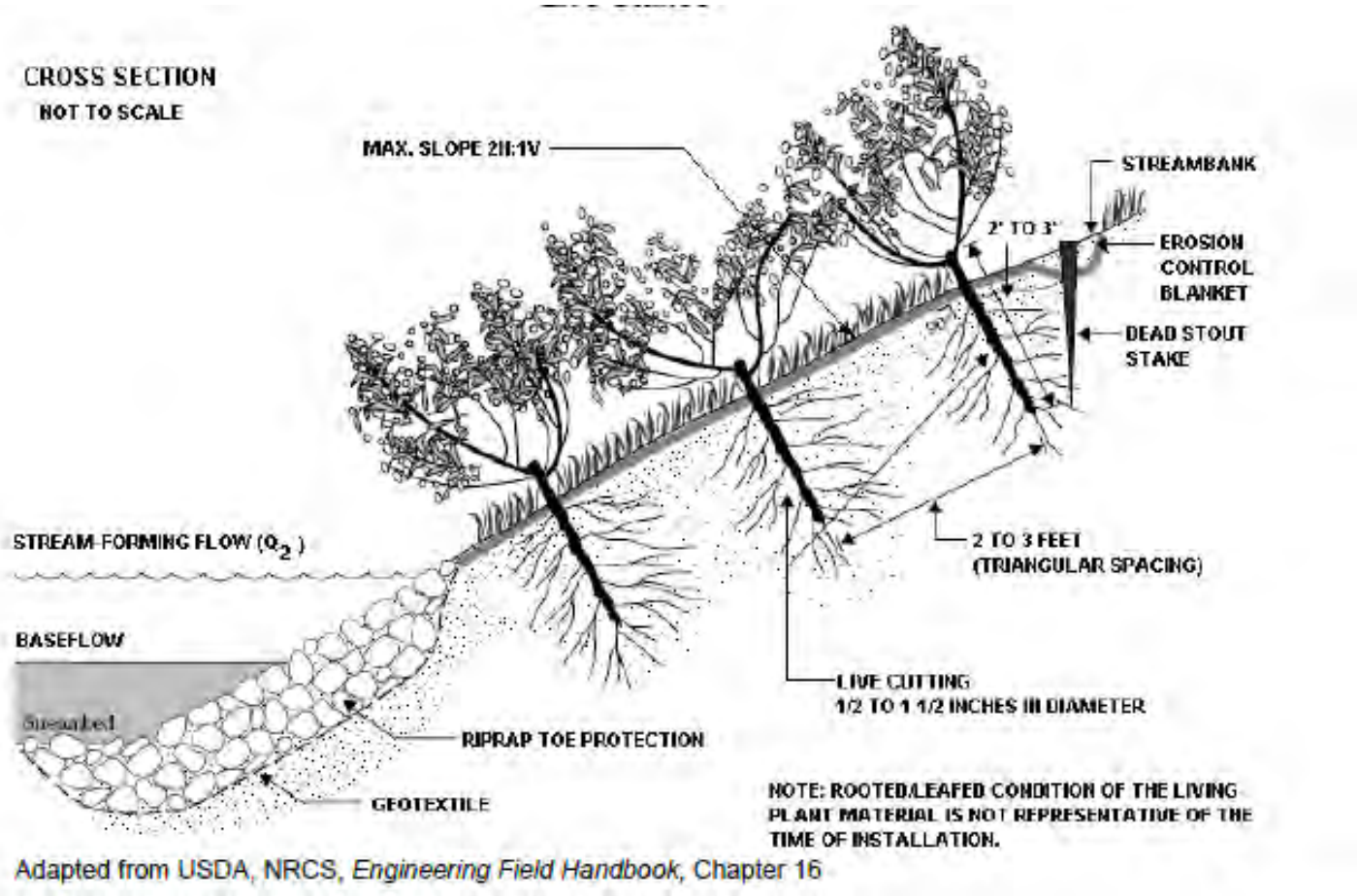


Figure 2- Live Stakes from PADEP Erosion and Sediment Pollution Control Manual Program

Live Fascines: Bundles of branches ¼-1 inch in diameter are cut from dormant species that root easily and are tied together with twine to form a live fascine 5-10 feet long and having a diameter of 6-8 inches. A 10"x10" trench is dug along the contour of the base of the streambank and the fascine is installed into the trench, keeping each fascine 2-3 feet apart and flush to the grade. Live stakes are installed downslope to the bundle and moist soil is placed along the sides. Spaces between fascines are stabilized with seed and mulch. Riprap toe protection shall be placed below the stream-forming flow elevation.

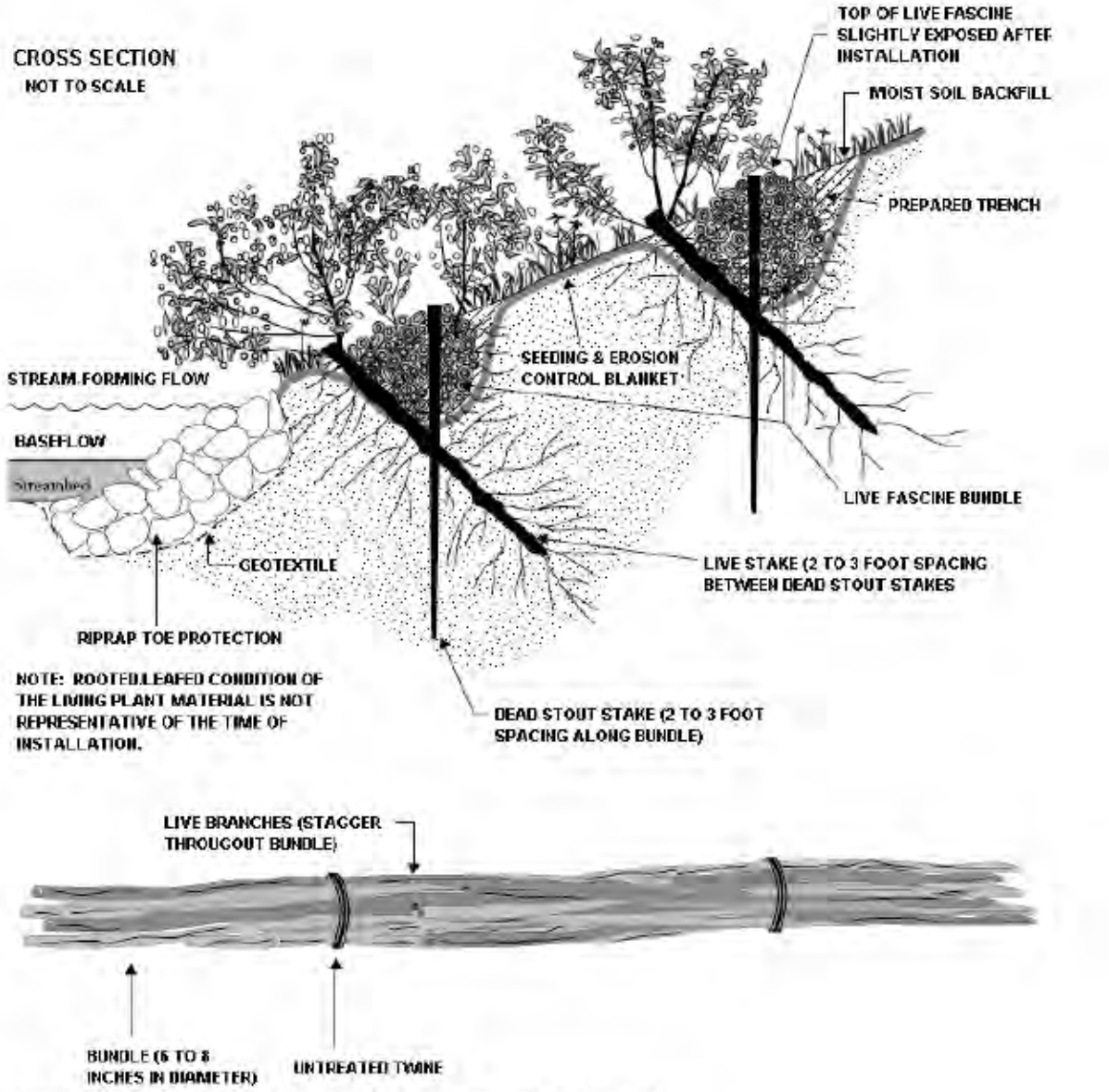
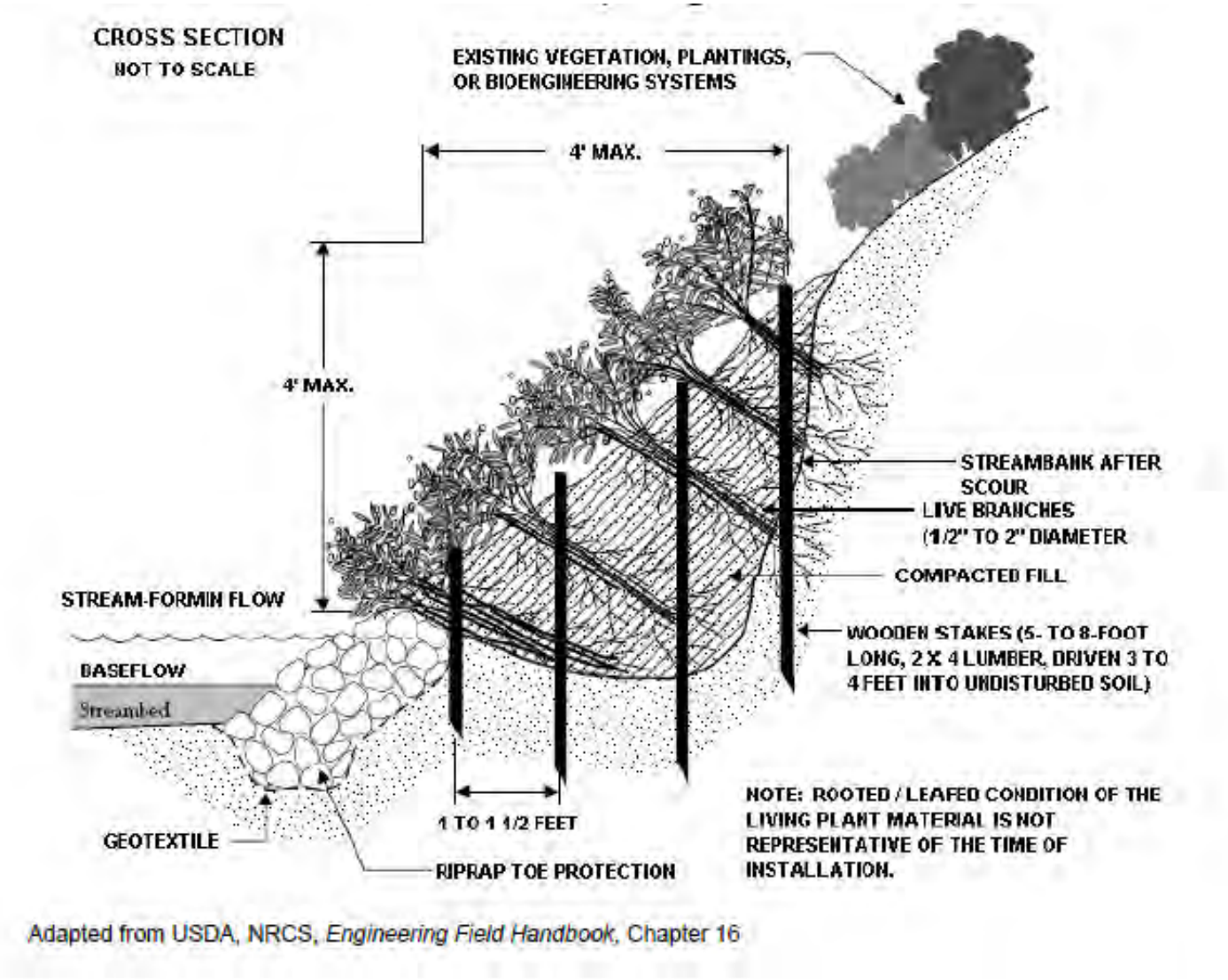


Figure 3- Live Fascines from the PADEP Erosion and Sediment Pollution Control Program Manual

Branch Packing: Effective in restoring holes in streambanks, branchpacking is the alternating of layers of branches and fill to rapidly establish a vegetated streambank. Stakes spaced 1-2 feet apart are installed into the streambank, and live branches ½-1 inch in diameter are bundled to a layer of 4-6 inches thick perpendicular to the slope face. Each layer of branches is covered with soil. Riprap toe protection shall be placed below the stream-forming flow elevation.



Adapted from USDA, NRCS, *Engineering Field Handbook*, Chapter 16

Figure 4- Branchpacking from the PADEP Erosion and Sediment Pollution Control Program Manual

7.0 Recommendations

7.1 Conclusion:

Based upon the information garnered through discussions with the working group, research into materials and construction methods and the comparative life cycle costs of the options described herein, LAN recommends that Options 3 and 4 be considered for future study and implementation. These options have the lowest environmental impact for the foundation of the boardwalk structure coupled with the longest component life expectancy, thus smallest life cycle cost.

The helical pile foundations minimize disturbance of the surrounding environment and do not pose a threat to leaching possibly harmful and corrosive chemicals into the soil and habitat. The pressure treated, engineered wood substructure allows for maximum span spacing, thus decreasing the number of helical piles needed. This will also provide a greater possibility of constructing the boardwalk from a top-down approach, reducing damage to the surrounding environment.

We also recommend the use of black locust decking due to its longevity, rot resistance and the fact that it is sourced and milled within the United States, while more expensive at the outset, the availability of the material will see minimal cost increases during the life of the structure. It is expected that Ipe will have a higher inflation rate due to it having to be imported into the United States. The use of black locust also reduces the possibility of material unavailability due to tariffs, embargos, or outside foreign state instability.

LAN recommends the selection of a steel bridge over Thompson Run as it provides for a structure that will likely exceed the 100-year project life span. It will also provide for a better educational experience with the integral outlook platforms. Additional investigation is needed on how this bridge would be constructed while minimizing surrounding impact. Special consideration should be given that any impact will be limited to once in a 100-year cycle, as opposed to several if using a wooden bridge. It is also likely that maintenance should generally be limited to painting, and deck replacement over the life of the structure. It is also feasible that the bridge abutments may be constructed using helical pile supports with a grade beam supporting the bridge structure, as opposed to constructing a concrete bridge abutment. This will likely be less disruptive than the concrete abutment but will require installation of streambank stabilization and erosion control around the piles. Additionally, continuous monitoring and periodic enhancement of streambank stabilization will be required.

The Millbrook Marsh Nature Center Feasibility Study Working Group makes the following recommendation regarding the report's options as presented. Based on the Nature Center's operations, programming, and research completed during the study, the Working Group is recommending to the municipal officials and to the Centre Region Parks and Recreation Authority to consider Option 3 which includes a full replacement of the existing boardwalk using the following materials: helical pile foundations, engineered wood sub-structure, Black Locust decking, and timber bridges. The base cost as noted in Option 3's Cost Estimate Table on page 24 is $1,984,630.69 (estimate includes installation costs).

Additionally, the Feasibility Study Working Group recommends the following alternate options be included in order to improve the boardwalk's connectivity within the property lines and to stabilize and improve some of the trails currently in use (noted in Option 3's Cost Estimate Table on page 24 and via the Option 3 Map on page 25):

• Grass Trail Section A – TSA Upgrade	$12,200
• Grass Trail Section B – TSA Upgrade	$3,950
• Grass Trail Section C – Boardwalk Upgrade	$333,589
• Grass Trail Section D – TSA Upgrade (LF/path) from Grass -	$8,550
• Grass Trail Section E - Boardwalk Upgrade (LF/boardwalk) from Grass -	$321,810
• Connector Loop (LF/Boardwalk) which would be a new addition -	$147,233
• Bridge at Connector Loop which would be a new addition -	$105,000
Total	$932,332

Upgrading Grass Trail Sections A and B to TSA will provide all ability access from the visitor parking lot to the boardwalk entrance; a feature that is not currently provided.

The Grass Trail Section C is a high-used area that floods multiple times a year; this boardwalk upgrade would provide improved access for all abilities to and through a unique forested area of the Nature Center that is explored by recreation users and for educational programming.

The Grass Trail Section D is a high-used area and remains a narrow path on which many people travel currently; this TSA trail surface upgrade would provide improved access for all abilities to reach the furthest region of the Marsh property including staff-led programming and self-guided walks and protect the plant life from trampling.

The Grass Trail Section E is a very wet area even well after heavy rains; it is a high-use area as well and damage is being done to the trail and plant life due to widening (off-trail users avoiding low, wet areas). A boardwalk upgrade would improve access to all abilities and also reduce the environmental impacts to this area.

The Connector Loop is a new trail that would be added which allows all Millbrook Marsh Nature Center users to remain on the property while exploring a fully-looped trail system. Currently, users have to leave the property, utilize the Puddintown Road and 322 Bypass shared-use paths, and then return to the property. A fully-looped trail system improves the programming opportunities for Nature Center staff and provides a much better customer experience.

The bridge across Slab Cabin Run at the new connector loop would be required to connect the new loop to the current boardwalk on the west side of the creek and the trail system on the east side.

These recommendations would bring the Option 3 plus alternates to a total of $2,916,962.69 (including installation costs based on Spring 2021 pricing). While this might seem to be a higher-than-expected replacement cost, the facility would receive a greater value and increased longevity for this options' materials selections.

The Feasibility Study Working Group endorses Option 3 and this combination of alternatives as the recommended project as the group investigates next steps with the Millbrook Marsh Nature Center Advisory Committee and the Centre Region Parks and Recreation Authority, in consultation with the Centre Region Council of Governments and the municipal officials.

7.3 Next Steps:

In order to design and construct a boardwalk system suitable to all needs, LAN recommends the following steps and processes to be made in the next phase of the Feasibility Study:

- Wetland Delineation: A Professional Wetland Scientist and/or wetland specialist needs to conduct a wetlands investigation of the site limited to the largest anticipated limit of earth disturbance.
- Boundary and Topographic Survey: conduct a boundary survey of the whole site, and partial topographic survey around the walkways, boardwalks, bridges, stream cross sections, parking lots and areas around the buildings, and wetland flag location.
- Botanical Survey: confirm and coordinate with PA DCNR to perform rare plant surveys if required. Surveys are to be performed between June 1 and July 31, 2021.
- Archaeological Survey: As the project is located in an archaeologically sensitive area a Phase IA archaeological survey is required. All options have the possibility for impacts on archaeological resources, however, Options 3 and 4 could have an increased potential for impacts due to the proposed installation of a new connector trail and bridge over Slab Cabin Run.
- Geotechnical Borings: conduct various soil probes to determine bearing and withdrawal capacity of soils for proper foundation selection and design.
- Hydrologic and Hydraulic Stream Modeling: necessary to determine erosion impact in and around the bridge locations.
- Streambank Stabilization Options Analysis
- Regulatory Review: detailed evaluation of the potential permitting requirements associated with the chosen option, including but not limited to: PADEP Regulations, Centre County Codes, US Army Corps of Engineers, College Township Zoning, etc.

- Construction Cost Estimates: more detailed and narrowed based upon chosen option, geotechnical information, partial structural design, bank stabilization recommendations and extents, and any other information obtained from previous investigations.
- Grant Funding Opportunities Research
- Conservation Easement Consulting: The conservation easement in place on the project parcel requires advance review and written approval from ClearWater Conservancy to ensure the project complies with applicable restrictions and conservation objectives.

8.o References

Bald Eagle Archaeological Society, “An Early History of the Millbrook Marsh Area.”

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“Map of Archaeological Sites at MMNC,” prepared by M.A. Gratzer, 3/22/21.

“Map of Archaeological Digs at MMNC for Construction Projects (SCEB not included)” received 3/6/21.

Penn State Cooperative Wetlands Center, “Wetland Hydrology for Millbrook Marsh Ref Sites Brooks.”

Penn State University Office of Physical Plant Engineering Services, “Water Resource Publication Thompson Run Watershed OPP-WRP-SR-TR:2013.”

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Pennsylvania Fish and Boat Commission, “The Fishery of Spring Creek – A Watershed Under Siege.” By Robert F. Carline, Rebecca L. Dunlap, Jason E. Detar, and Bruce A. Hollender; Technical Report Number 1.

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https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

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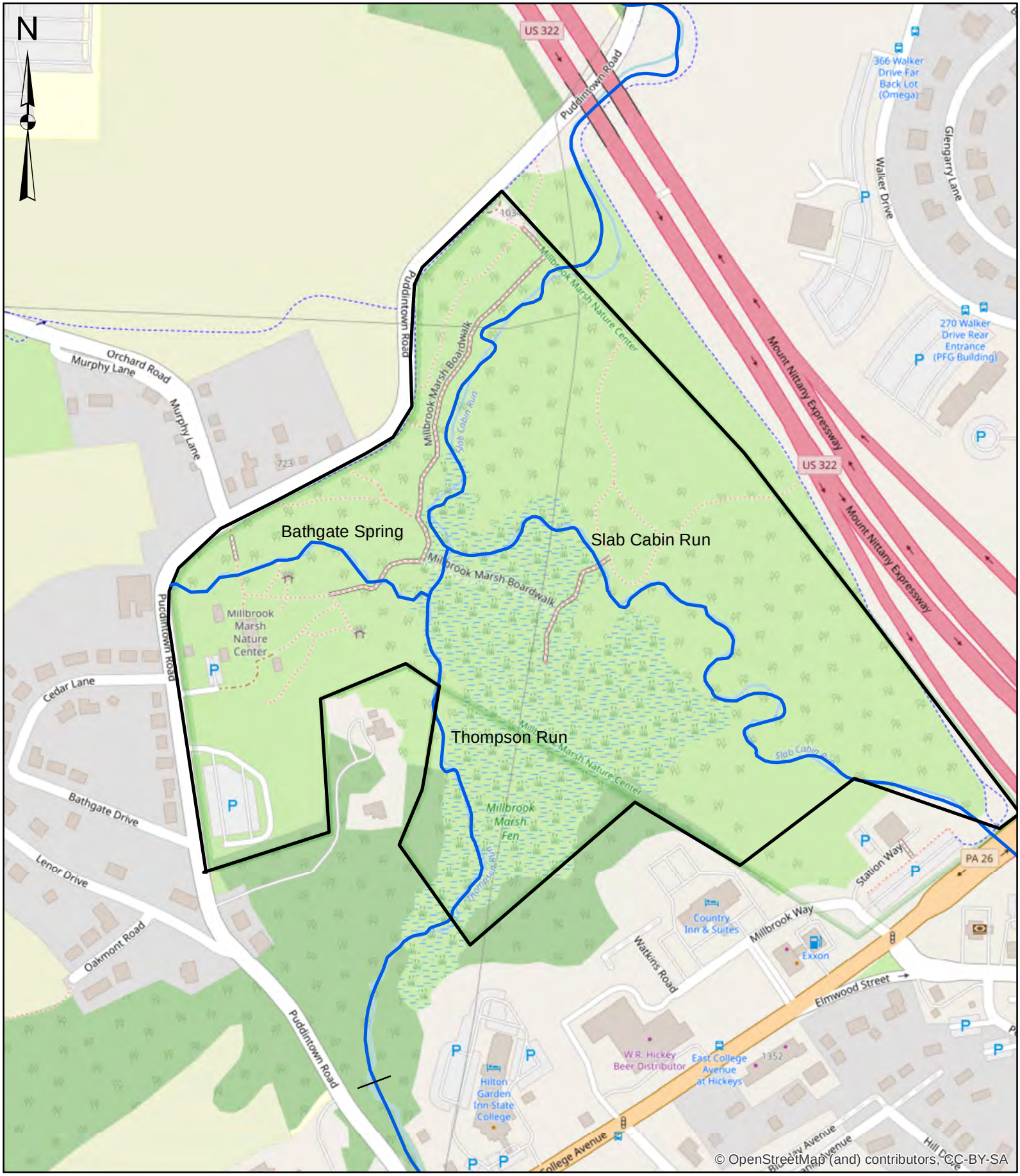
https://ecos.fws.gov/ipac/location/index

US Fish and Wildlife Service National Wetlands Inventory Mapper
Https://www.fws.gov/wetlands/data/mapper.html

Water’s Edge Hydrology Inc., “10-Year Evaluation of Slab Cabin Run Natural Channel Design Structures in Millbrook Marsh,” October 24, 2017, PSU Project No. 00-05773.00.

FIGURES



Waterway Map
Millbrook Marsh Nature Center
548 Puddintown Road
Township of State College
Centre County, PA

0 250 500 1,000 Feet

1 inch = 500 feet

LAN
LAN ASSOCIATES

APPENDICE A

FEMA Maps and Profiles

National Flood Hazard Layer FIRMette

FEMA

77°50'27"W 40°49'2"N

77°49'50"W 40°48'35"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/29/2020 at 11:05 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

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NGS Information Services
NOAA, N/NGS 12
National Geodetic Survey SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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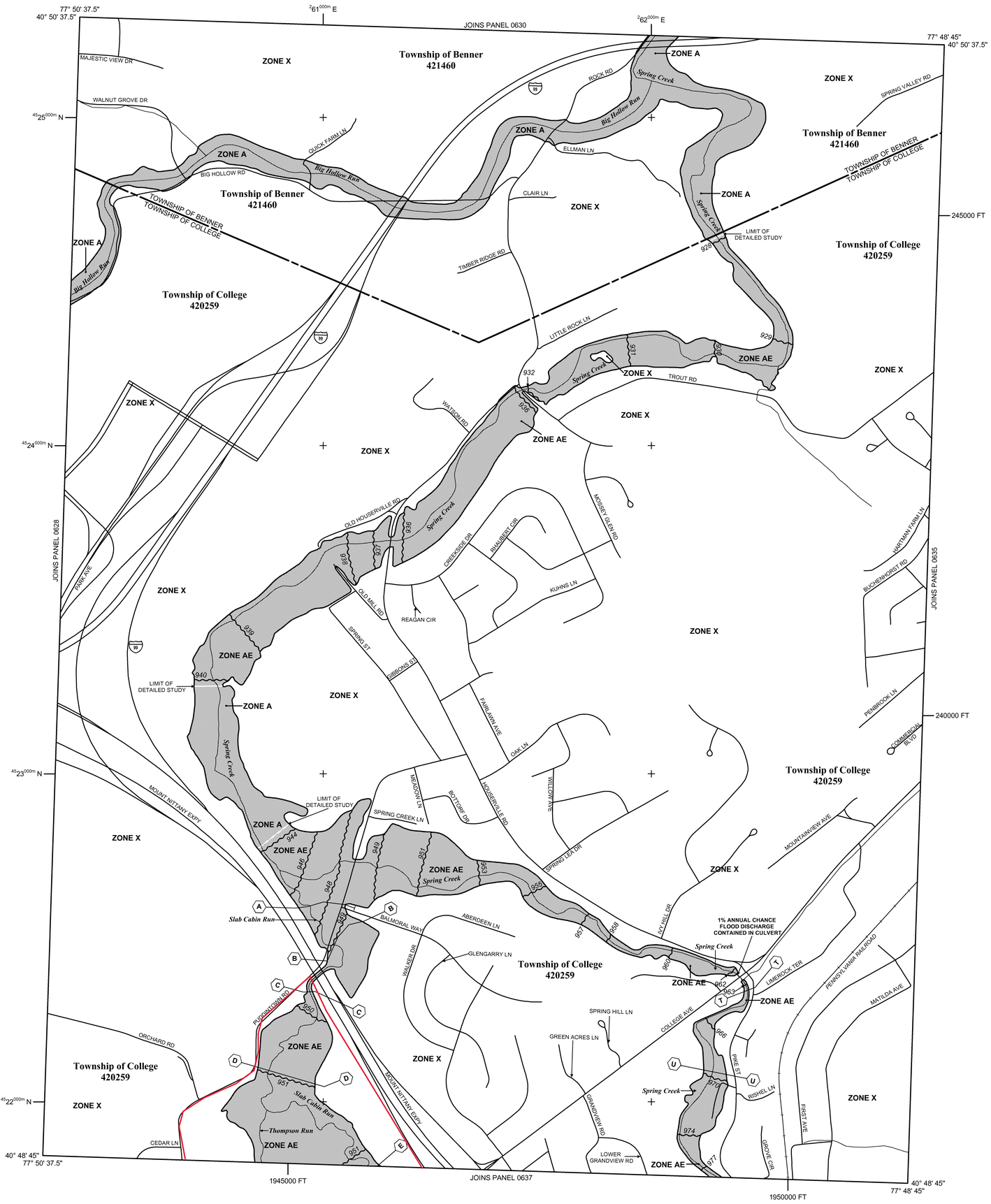

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000m	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks: Pennsylvania State Plane coordinate system, north zone (FIPSZONE 3701), Lambert Conformal Conic projection
DX5510×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP

MAY 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0629F

FIRM
FLOOD INSURANCE RATE MAP

CENTRE COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 629 OF 885
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BENNER, TOWNSHIP OF	421460	0629	F
COLLEGE, TOWNSHIP OF	420259	0629	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42027C0629F

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency

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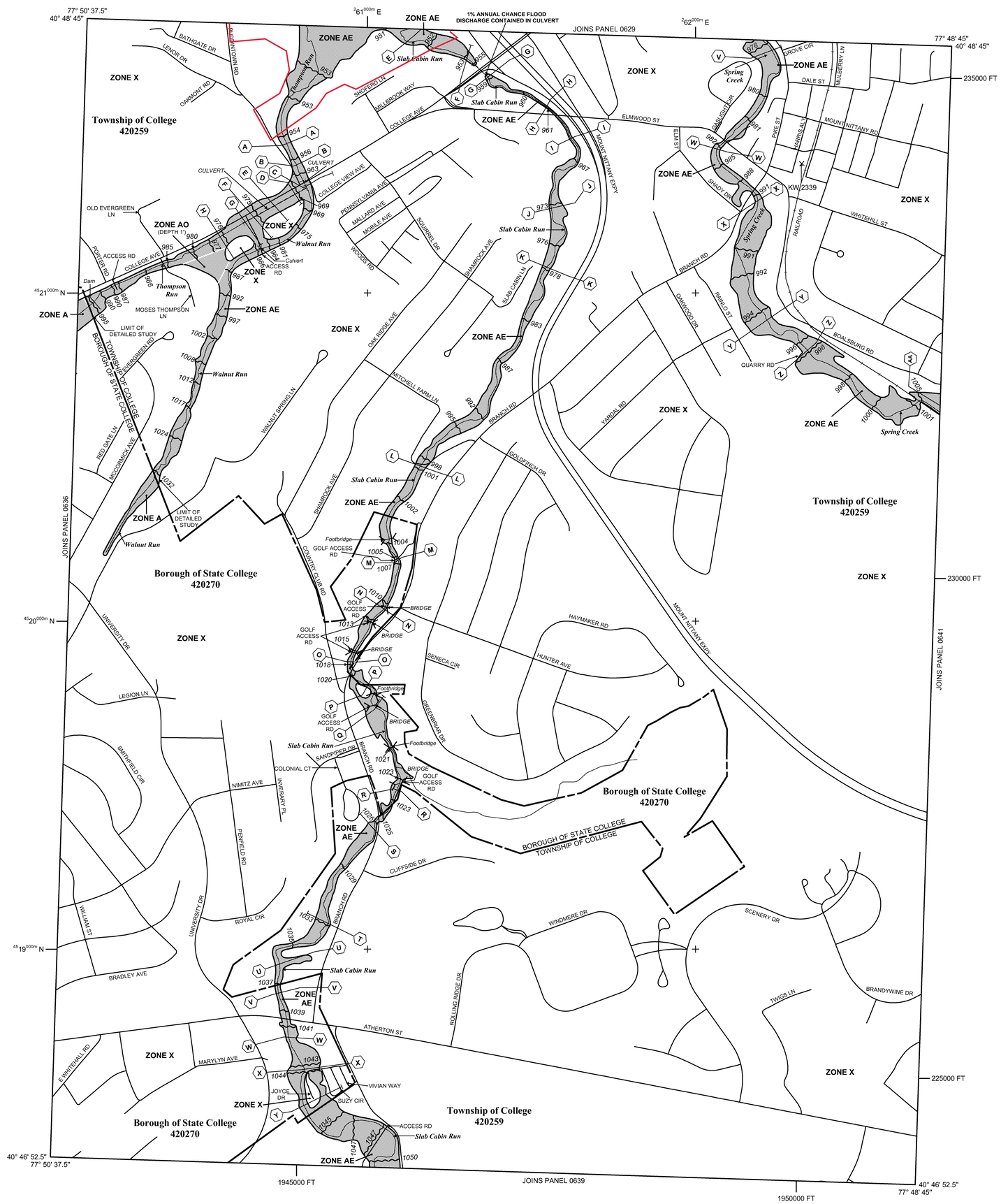

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	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A ⟷ A	Cross section line
23 ⟷ 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}76^{000m}$	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks: Pennsylvania State Plane coordinate system, north zone (FIPSZONE 3701), Lambert Conformal Conic projection
DX5510×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

MAY 4,2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0637F

FIRM
FLOOD INSURANCE RATE MAP

CENTRE COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 637 OF 885
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

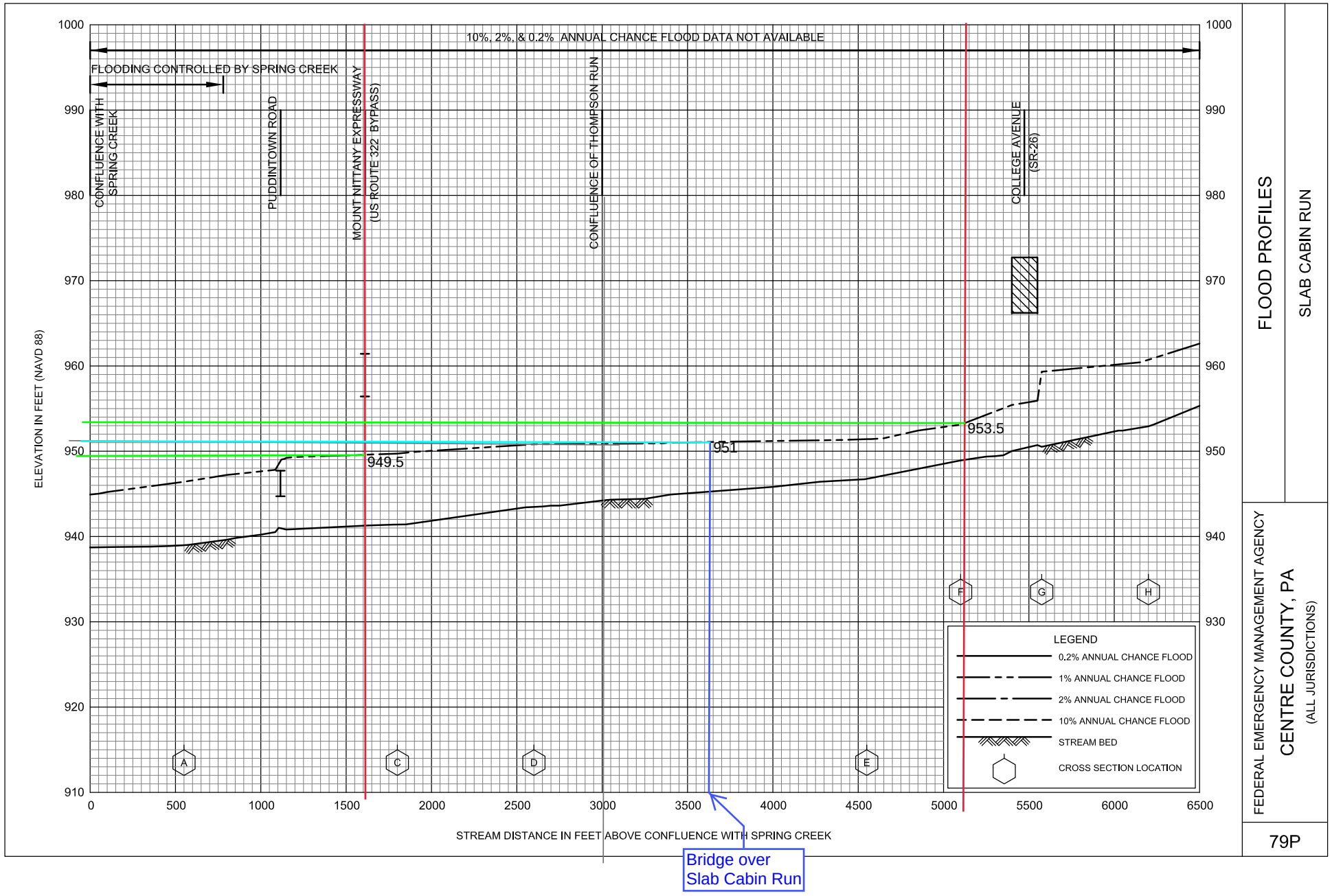
COMMUNITY	NUMBER	PANEL	SUFFIX
COLLEGE, TOWNSHIP OF	420259	0637	F
STATE COLLEGE, BOROUGH OF	420270	0637	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42027C0637F

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency



FLOOD PROFILES

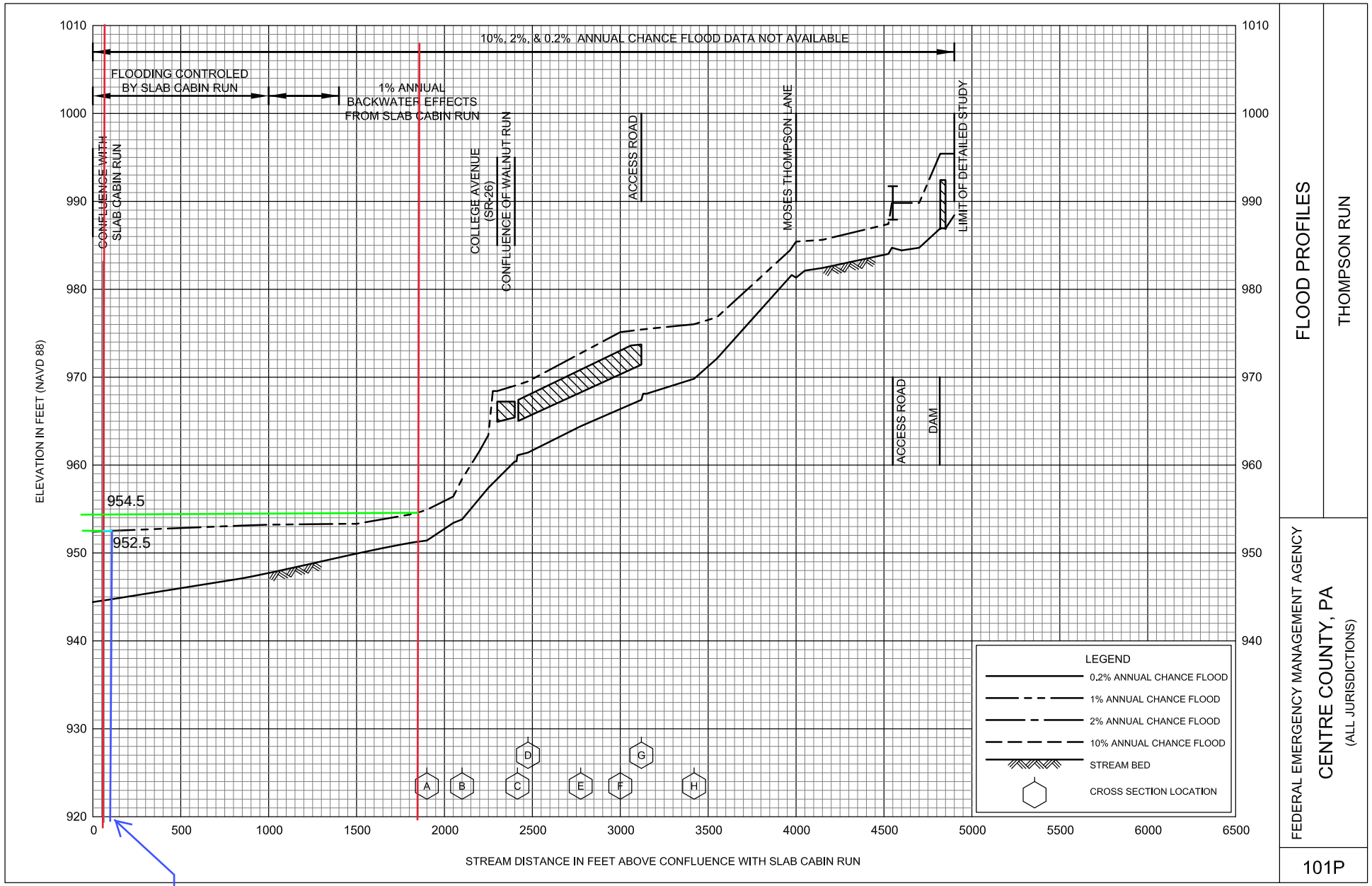
SLAB CABIN RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CENTRE COUNTY, PA

(ALL JURISDICTIONS)

79P



Bridge over Thompson Run

APPENDICE B

Draft Pennsylvania Natural Diversity Index

1. PROJECT INFORMATION

Project Name: **Millbrook Marsh Boardwalk Draft PNDI**
Date of Review: **2/8/2021 10:31:44 AM**
Project Category: **Recreation, Trails & Trailheads (parking, etc.)**
Project Area: **0.96 acres**
County(s): **Centre**
Township/Municipality(s): **COLLEGE TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **STATE COLLEGE**
Watersheds HUC 8: **Bald Eagle**
Watersheds HUC 12: **Slab Cabin Run**
Decimal Degrees: **40.813489, -77.834723**
Degrees Minutes Seconds: **40° 48' 48.5594" N, 77° 50' 5.29" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Millbrook Marsh Boardwalk Draft PNDI

Project Boundary

Buffered Project Boundary

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Millbrook Marsh Boardwalk Draft PNDI

Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Does the following statement apply to this project? The project area HAS been investigated by someone qualified to identify and delineate wetlands, and wetlands or streams were located, and some project activities will or might occur within 300 feet of a wetland or stream.
Your answer is: Yes

Q2: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: Someone qualified to identify and delineate wetlands has investigated the site, and determined that wetlands ARE located in or within 300 feet of the project area. (A written report from a wetland specialist, and detailed project maps should document this.)

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: https://conservationexplorer.dcnr.pa.gov/content/survey-protocols)

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Carex bebbii	Bebb's Sedge	Endangered	Threatened	Fruits June - July
Carex lasiocarpa	Slender Sedge	Special Concern Species*	Special Concern Species*	Fruits June - August
Carex prairea	Prairie Sedge	Threatened	Threatened	Fruits June - July

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Lathyrus palustris	Vetchling	Special Concern Species*	Endangered	Flowers June- August
Sedge - Mixed Forb Fen	Sedge - Mixed Forb Fen	Special Concern Resource*	Special Concern Resource*	

PA Fish and Boat Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:
No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION). For projects showing "Potential Impacts" with USFWS, please send project information to that agency by email IR1_ESPenn@fws.gov *(preferred) or regular mail.*

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

Cost Estimate - Top Down

Millbrook Marsh Boardwalk Feasibility Study

Helical pile foundations, engineered wood sub-structure, black locust decking. Timber bridges

LAN Job # 2.20354.02

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
General Conditions	ALLOW	1	$100,000	$100,000
Boardwalk Decking (6' width)*	LF	3,400	$360	$1,224,000
Boardwalk Sub-structure (10' span)	SPAN	375	$7,120	$2,670,000
Boardwalk Foundation (10' span)	EA	750	$1,100	$825,000
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	770	$1,388	$1,068,715
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	800	$1,388	$1,110,353
Bridge Construction - Thompson Run	EA	1	$175,000	$175,000
Bridge Construction - Slab Cabin Run	EA	1	$150,000	$150,000
Bridge Construction - Bathgate Springs	EA	1	$20,000	$20,000
Bridge at Connector Loop	EA	1	$150,000	$150,000
Bridge Foundations	EA	4	$30,000	$120,000
Observation Lookouts	EA	3	$37,012	$111,035
Lookout Expansion at Vanes	EA	1	$16,655	$16,655
Grass Trail Section D - TSA Upgrade (LF/path)	LF	50	$30	$1,500
Grass Trail Section B - TSA Upgrade (LF/path)	LF	160	$30	$4,800
Grass Trail Section A - TSA Upgrade (LF/path)	LF	500	$30	$15,000
Strreambank Stabilization	SF			$0
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	**$7,762,058.24**
			20% Contingency	**$1,552,411.65**
			15% Escalation	**$232,861.75**
			A/E Fees (est. 7% of Construction Cost)	**$668,313.21**
			Construction Administration	**$0.00**
			Grand Total:	**$10,215,644.84**

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

Cost Estimate - Mud Mats

Millbrook Marsh Boardwalk Feasibility Study

Helical pile foundations, engineered wood sub-structure, black locust decking. Timber bridges

LAN Job # 2.20354.02

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
General Conditions	ALLOW	1	$200,000	$200,000
Boardwalk Decking (6' width)*	LF	3,400	$360	$1,224,000
Boardwalk Sub-structure (16' span)	SPAN	275	$2,500	$687,500
Boardwalk Foundation (16' span)	EA	550	$1,100	$605,000
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	800	$740	$592,118
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	770	$740	$569,913
Bridge Construction - Thompson Run	EA	1	$175,000	$175,000
Bridge Construction - Slab Cabin Run	EA	1	$150,000	$150,000
Bridge Construction - Bathgate Springs	EA	1	$20,000	$20,000
Bridge at Connector Loop	EA	1	$150,000	$150,000
Bridge Foundations	EA	4	$30,000	$120,000
Observation Lookouts	EA	3	$19,737	$59,212
Lookout Expansion at Vanes	EA	1	$8,882	$8,882
Grass Trail Section D - TSA Upgrade (LF/path)	LF	350	$30	$10,500
Grass Trail Section B - TSA Upgrade (LF/path)	LF	160	$30	$4,800
Grass Trail Section A - TSA Upgrade (LF/path)	LF	500	$30	$15,000
Strreambank Stabilization	SF			$0
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	**$4,591,924.41**
			20% Contingency	**$918,384.88**
			15% Escalation	**$137,757.73**
			A/E Fees (est. 7% of Construction Cost)	**$395,364.69**
			Construction Administration	**$0.00**
			Grand Total:	**$6,043,431.72**

DRAFT PHASE II FEASIBILITY REPORT

Marsh Boardwalk Feasibility Review
at
Millbrook Marsh Nature Center
548 Puddintown Road
State College, PA 16801

DCNR Project: BRC-TAG-23-52.1

Submitted to:
Centre Region Parks & Recreation Authority
State College, Centre County, Pennsylvania
2040 Sandy Drive, Suite A
State College, PA 16803

Attention: Ms. Melissa Kauffman, Millbrook Marsh Nature Center Supervisor

LAN Job #2.20345.02
November 8, 2022

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MILLBROOK MARSH FEASIBILTY STUDY – PHASE II

LIST OF TABLES

LIST OF APPENDICES

E. Hydraflow Hydrographs Output
F. GeoHEC-RAS Floodway Analysis Report
G. GeoHEC-RAS Streambank Stability Analysis Report

LIST OF DRAWINGS

1. Partial Topographic Survey, Millbrook Marsh Nature Center, Sheets S.01 & S.02, prepared by LAN Associates, dated 07/22/22.
2. Marsh Boardwalk Feasibility at Millbrook Marsh Nature Center, Concept Plan, Sheet C.200, prepared by LAN Associates, dated 11/1/22.
3. Marsh Boardwalk Feasibility at Millbrook Marsh Nature Center, Streambank Stabilization Concept Plan, Sheet C.201, prepared by LAN Associates, dated 11/1/22.
4. Millbrook Marsh Boardwalk, Boardwalk Section – Top Down, Sheet SK-1, prepared by LAN Associates, dated 9/27/2022
5. Millbrook Marsh Boardwalk, Boardwalk Section – Top Down, Sheet SK-2, prepared by LAN Associates, dated 9/27/2022
6. Millbrook Marsh Boardwalk, Boardwalk Section – Mud Mats, Sheet SK-3, prepared by LAN Associates, dated 9/27/2022
7. Millbrook Marsh Boardwalk, Boardwalk Section – Mud Mats, Sheet SK-4, prepared by LAN Associates, dated 9/27/2022

ACRONYMS & ABBREVIATIONS

FEMA	Federal Emergency Management Agency
FHA	Flood Hazard Area
FHADFE	Flood Hazard Area Design Flood Elevation
FIRM	Flood Insurance Rate Map
NAVD88	North American Vertical Datum of 1988
NFIP	National Flood Insurance Program
PADEP	Pennsylvania Department of Environmental Protection
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Millbrook Marsh Nature Center (MMNC) Feasibility Study Working Group:

Dr. Rob Brooks – Penn State and MMNC Advisory Committee

Dr. Rick Marboe – Penn State and MMNC Advisory Committee

Carla Stilson – College Township Council

Jere Northridge – College Township Staff

Amy Kerner – College Township Staff

Andrew Gutberlet – Penn State

Kathy Matason – Centre Region Parks and Recreation Authority

Melissa Kauffman – MMNC Supervisor

Jim Carpenter – Centre Region Parks and Recreation Manager

This project was financed in part by a grant from the Community Conservation Partnerships Program, Keystone Recreation, Park and Conservation Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation.

LAN Associates:

3232 Easton Ave. #3308

Bethlehem, PA 18017

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James P. Mauer II, P.E. – Associate Civil Engineer; james.mauer@lanassociates.com

Karen L. Young, PWS – Senior Environmental Specialist; karen.young@lanassociates.com

1.0 Executive Summary:

This section includes the executive summary of the findings and suggestions from the report, as well as a discussion of future investigations to be done to further understand the correct solutions.

The Centre Region Parks, Recreation, and Open Space Comprehensive Study was a Centre Region Parks and Recreation Authority project completed through funding provided by the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the participating municipalities within the Centre Region Council of Governments (COG); the Comprehensive Study project started in 2018 and was completed in March 2020. As a result of that project's completion, supplemental grant funding was available for a high-priority project. The Authority vetted six high-profile/high-priority projects with DCNR and based on the great need for repairs and a possible re-build of the Millbrook Marsh Nature Center's beloved boardwalk, the Millbrook Marsh Nature Center Boardwalk Part I Feasibility Study was chosen and supported by DCNR.

A Feasibility Study Working Group was formed, and the Centre Region Parks and Recreation Authority (CRPRA) chose a well-rounded committee made-up of local engineers, municipal officials, Centre Region Parks and Recreation Agency staff, Penn State representatives (as landowners), and members from the Millbrook Marsh Nature Center Advisory Committee. The complete list of membership can be found on page 1 of this report.

The members selected to be a part of the Feasibility Study Working Group were chosen because of the knowledge and experience that they bring to the project. Agency staff, of course, provide the history and the working knowledge of the facility's programming and general operations, maintenance needs, public use patterns, and budgetary information. The Millbrook Marsh Nature Center Advisory Committee members have a vested interested in the center and bring historical perspectives to the project—history of the original boardwalk installation, past patterns of public use, information related to stormwater changes, stream data, natural fen and wetland research, archaeological research, and more. The Advisory Committee has a direct link to the CRPRA as well, which provides a conduit of information since the CRPRA holds the lease for the property and manages the Center's operations in cooperation with COG. The facility is leased from The Pennsylvania State University, so it was very important to include representatives from Penn State who can guide the project based on university knowledge and experience to ensure that the project meets the landowner's needs and expectations. Lastly, the representatives from College Township provided many levels of expertise and guidance to include expectations from a municipal official's perspective, engineering and design expertise, permitting and research experience, and a deep well of data and information. The Working Group reviewed the boardwalk's condition, participated in drafting the Request for Proposal (RFP) used to choose the consultant who would complete the Part I Feasibility Study, and attended many meetings with the consultant, LAN Associates, to guide the process. Everyone who participated as part of the Feasibility Study Working Group contributed their time, expertise, and research to make this Part I study as broad-reaching and informative of the boardwalk's needs as possible.

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) was tasked with the investigation of the 62-acre Millbrook Marsh Nature Center boardwalk and trail system in order to identify feasible options for repair/replacement and possible enhancements to be made that can maintain and increase the educational and recreational use of the site. LAN also surveyed and reviewed the ADA improvements necessary to bring the boardwalk and path system, including the handicapped parking spaces along Puddintown Road, into compliance.

The existing boardwalk structure was found to have shifted both vertically and horizontally over the course of its life, which has led to The Thompson Run Bridge and a portion of the boardwalk being closed to visitors. It was found that the boardwalk structure will continue to deteriorate, making additional sections unsafe for visitor use in the coming years. Our investigations also showed that repair of the boardwalk was not a feasible option, as the system lacks foundational stability, and the deck and structural components are nearing the end of their useful lives.

As a result of this Phase I Feasibility Analysis, a design option including the full replacement of the boardwalk and bridges, addition of a connector loop, addition of bumpout areas, and streambank stabilization was chosen.

LAN, with assistance of the MMNC working group, developed priorities for new design requirements and preferred materials to investigate. As a result, the following Phase II Feasibility Report centers on replacing and enhancing the existing boardwalk path with add-ons in key areas in order to foster additional educational activities, improve the estimated life span of the construction, minimize yearly maintenance requirements for staff, and adhere to the desired aesthetic with the use of natural materials.

Additional investigations were undertaken to fully ascertain the temporary and permanent impacts that would be caused by the construction of a new boardwalk system, and thus, the required permits needed. These were:

- Boundary and Topographic Survey
- Botanical Survey
- Archaeological Survey
- Geotechnical Borings
- Hydrologic and Hydraulic Stream Modeling
- Streambank Stabilization Options Analysis
- Additional Regulatory Review
- Constructability Review

The conservation easement in place on the project parcel requires advance review and written approval from ClearWater Conservancy to ensure the project complies with applicable restrictions and conservation objectives.

The following report provides additional detail and explanation of the areas investigated, along with two (2) methods of construction and their probable costs.

2.0 Introduction and Background Information:

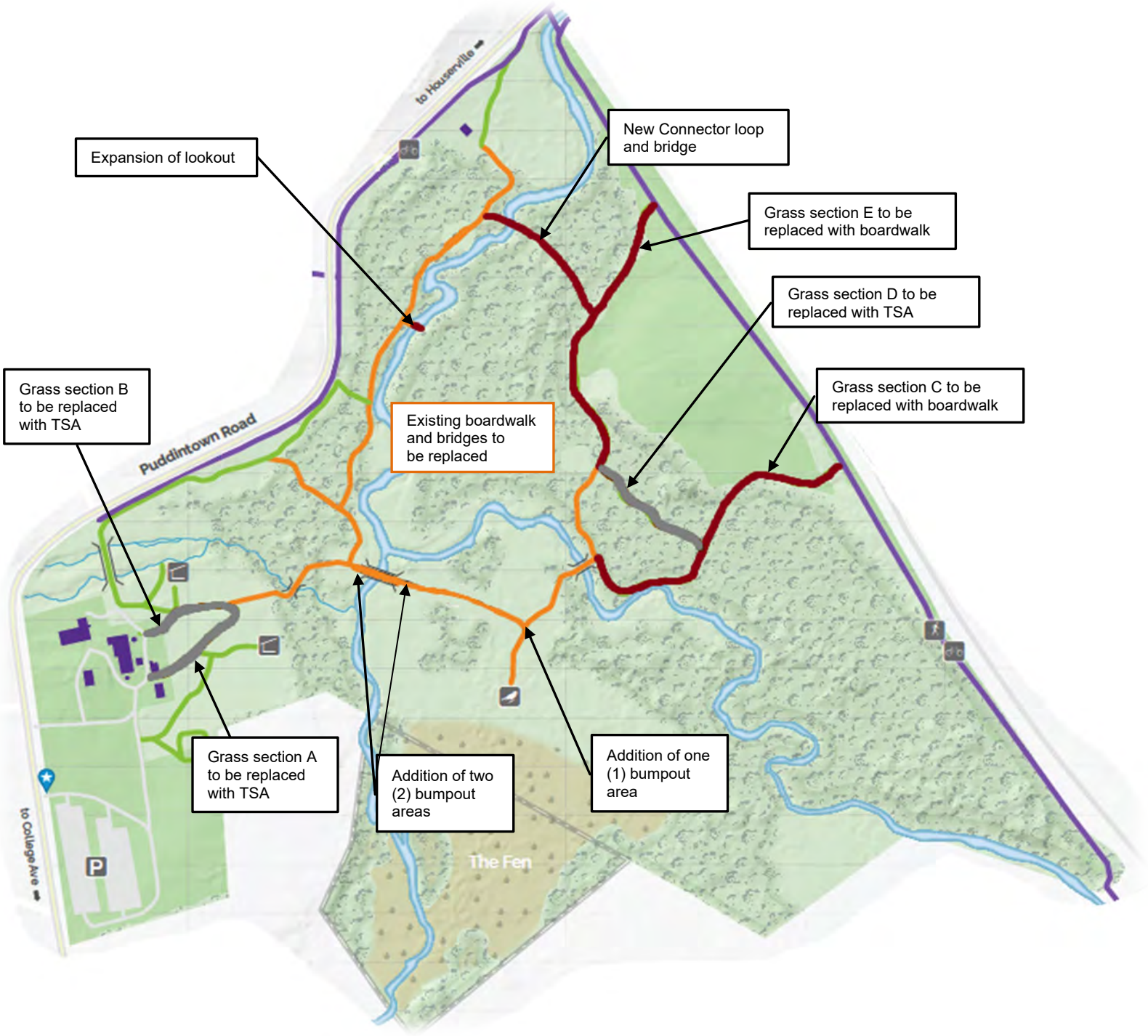
2.1 Introduction:

The Millbrook Marsh Nature Center is a 62-acre site located at 548 Puddintown Road in State College, PA owned by Penn State University (PSU) and leased to the Centre Region Parks and Recreation Authority to hold organized educational programs and events in addition to daily recreational use. The site consists of a 12-acre farmstead housing the Spring Creek Education Building, a bank barn, two sun shelters, a service building (staff offices), an additional outbuilding, and a picnic pavilion. The remaining 50 acres of the site consist of wetland areas hosting nearly 3,000 linear feet of timber boardwalk constructed mainly by volunteers and the Pennsylvania Conservation Corps in 2002, grassy walking trails, and bike paths. A conservation easement is in place on the 50-acre parcel between PSU and ClearWater Conservancy that protects the wetland from future development.

The site is primarily used for recreation and education, hosting over 20,000 participants annually, including organized events. Programs are offered to introduce people of all ages to the beauty and importance of our natural wetland systems. The boardwalk's bird blind also provides an exceptional opportunity to view and study the diverse marshland birds. The educational opportunity provided by the overall site is also used by PSU for college class research. In order to access the prospects of the marsh, visitors and staff rely largely on the boardwalk system which promotes viewing of the various important habitats, stream crossvanes, and confluences of the streams on site, while protecting the fragile ecosystem. Additionally, observation platforms allow for an elevated view of the three streams.

The boardwalk system has been damaged throughout its lifetime due to material longevity, lack of a long-term maintenance plan, and increasingly wet conditions attributed to development in the nearby areas and our changing climate. LAN Associates, Engineering, Planning, Architecture, Surveying, Inc, was previously tasked to perform an analysis of the structural integrity of the system, and to develop conceptual design recommendations to repair, relocate, or replace the trail system. The conceptual plan is included herein as "Drawing 2". The chosen option from the Phase I Feasibility Report includes the following updates:

- Replacement of the boardwalk decking with black locust decking
- Replacement of the boardwalk sub-structure with helical piles
- Replacement of observation lookouts
- Conversion of grass sections C and E to boardwalk
- Conversion of grass sections A, B, and D to Trail Surface Aggregate (TSA)
- Reconstruction of the bridges over Thompson Run, Slab Cabin Run, and Bathgate Springs
- Construction of a new boardwalk connector loop and bridge over Slab Cabin Run
- Expansion of the lookout at the Vanes
- Construction of two (2) bumpout areas on both sides of the Thompson Run Bridge
- Construction of one (1) bumpout area near the trail to the bird blind
- Streambank Stabilization where appropriate


Expansion of lookout
New Connector loop and bridge
Grass section E to be replaced with boardwalk
Grass section D to be replaced with TSA
Grass section C to be replaced with boardwalk
Grass section B to be replaced with TSA
Existing boardwalk and bridges to be replaced
Grass section A to be replaced with TSA
Addition of two (2) bumpout areas
Addition of one (1) bumpout area
Puddintown Road
to Houserville
to College Ave
The Fen

2.2 Purpose:

Phase II of the feasibility report intends to investigate and refine the chosen option from Phase I. With a decision of the general project scope, more specified steps can be taken towards developing a final design.

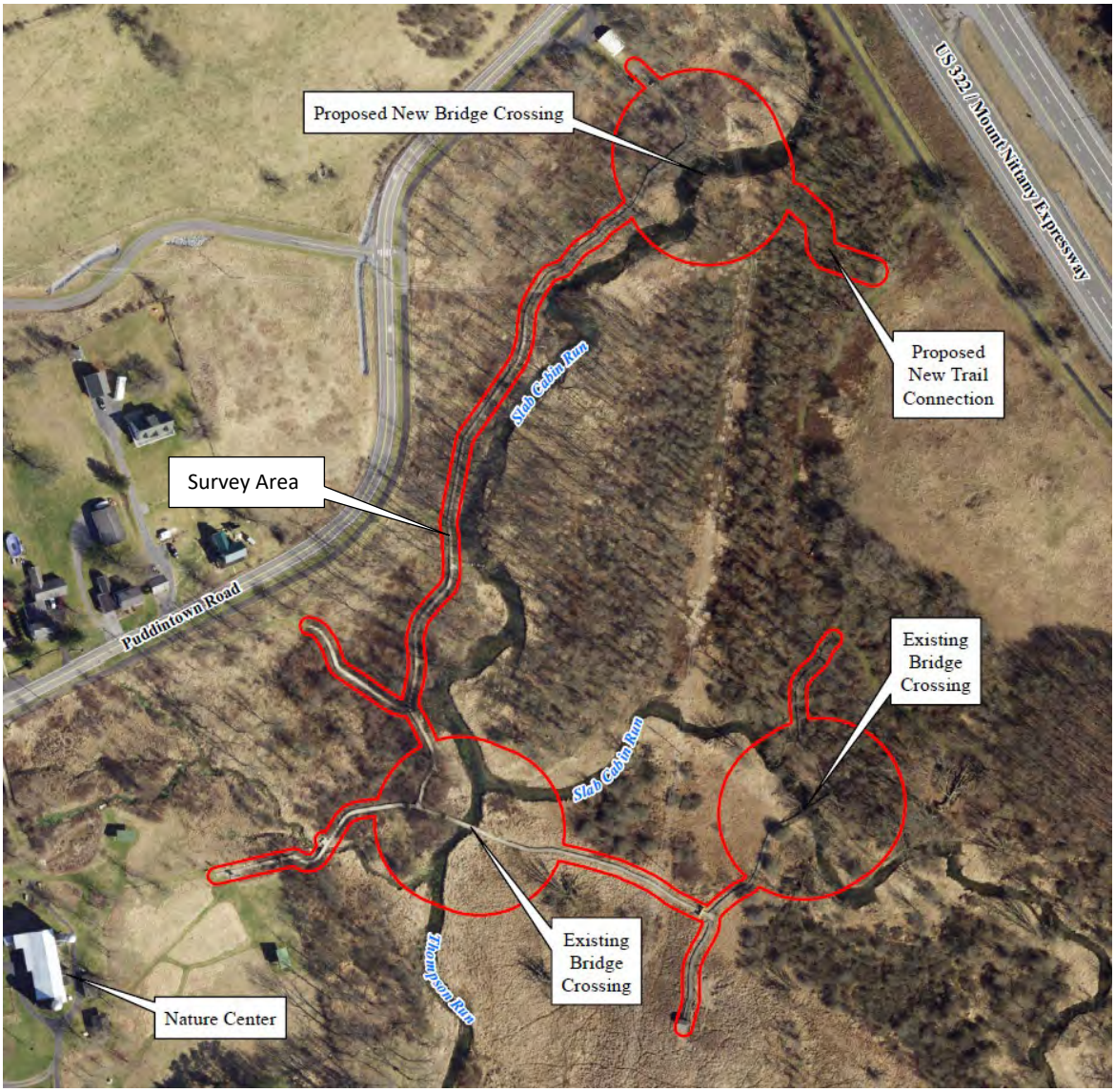
Survey information has been collected by LAN Associates to include the boundary of the whole site, topographic data 20 feet on either side of each walkway and boardwalk, topographic information 100 feet on either side of the bridges, cross sections of all the streams, topographic data of the parking lots and areas around the buildings, and a tree survey in the area of the proposed connector loop. With this information, the design of the boardwalk and associated upgrades can be improved upon through the creation of site-specific design plans and hydraulic calculations.

Additionally, with a general footprint of disturbance in place, the environmental and cultural impacts of development are able to be better understood and accounted for in the design process. Investigations into the presence of rare plant species, archaeological artifacts, wetland locations, soil composition, and stream conditions allow for better protection of our natural resources. A design constructed to work with the surrounding environment ensures that the vital educational and recreational opportunities provided by Millbrook Marsh Nature Center can continue to occur for years to come. The following report outlines the evaluation of the chosen option conducted during the Phase II feasibility study.

3.0 Botanical Survey:

In order to identify potential impacts to rare species and communities, LAN consulted Davey Resource Group to conduct a rare plant and community survey. The survey was conducted in July 2022 and included visual identification of possible rare species, sample collection for verification, and photo documentation of plants around the area of construction.

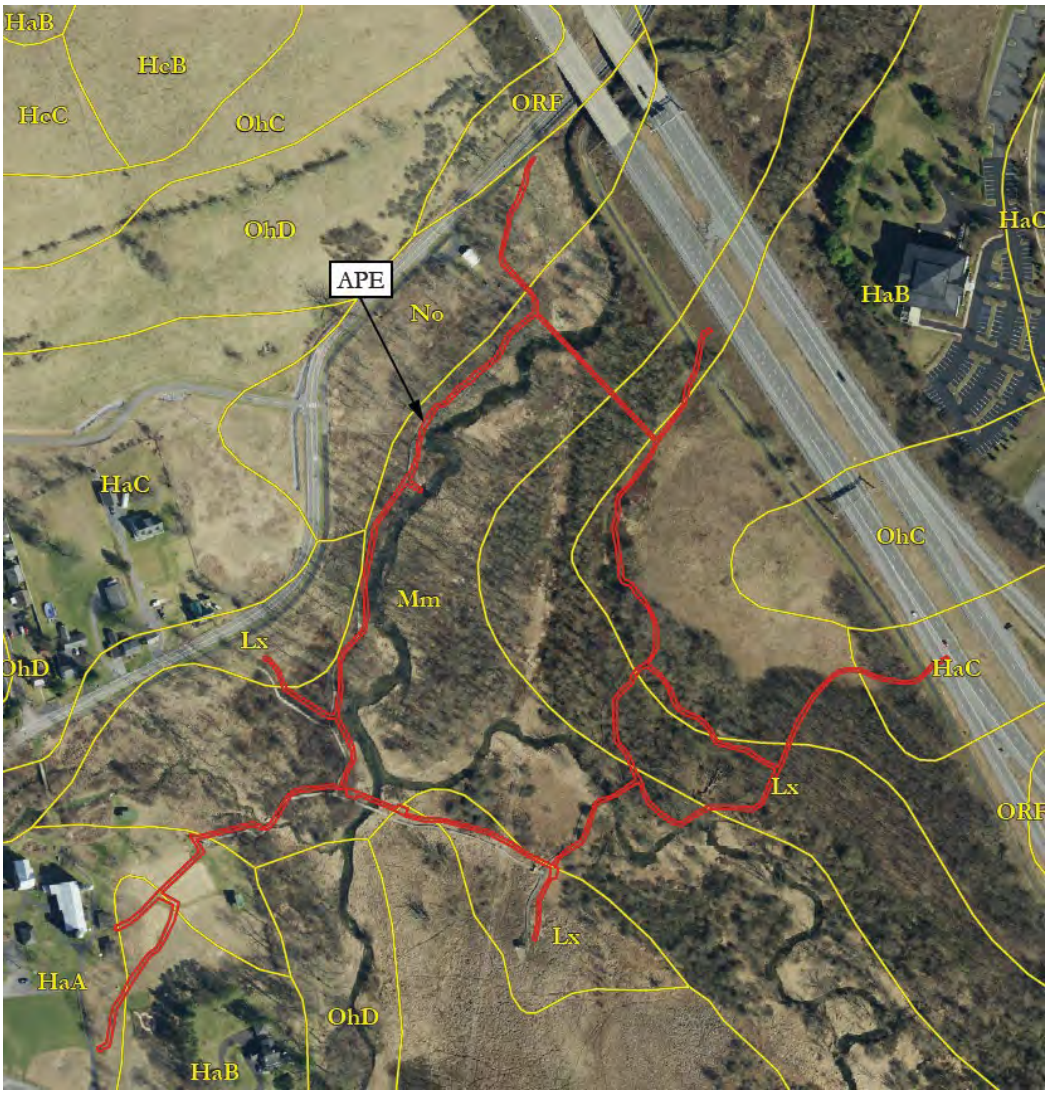
The results of the survey state that no Pennsylvania State-listed or Federal-listed plant species were observed within the survey area. The Sedge-Mixed Forb Fen community containing plants of concern is located far from the survey area. It is concluded that the boardwalk replacement and associated activities will not adversely impact rare plant species. The full report by Davey Resource Group is included herein as "Appendix A".



4.0 Phase 1A Archeological Survey:

In order to identify potential impacts to archaeological and cultural areas, LAN consulted Richard Grubb & Associates to conduct a Phase IA archaeological survey. According to the results of the background research, three (3) cultural resource investigations and eight (8) archaeological sites have been recorded within or near the area of potential effects (APE). Historic buildings within the APE include the Millbrook Site Farmstead, which are now part of the nature center. A field investigation was conducted in May 2022 to observe and document existing conditions within the APE. As a result of the study and fieldwork, all of the APE is assessed with a high to moderate probability for containing intact historic and/or pre-Contact archaeological resources.

As a result of this conclusion, a Phase IB archaeological survey is recommended for the areas of the APE that may sustain ground disturbing activities associated with the boardwalk improvements. Phase IB testing strategies are to be determined in conjunction with the Pennsylvania State Historic Preservation Office. The full report by Richard Grubb & Associates is included herein as “Appendix B”.



5.0 Geotechnical Borings

In order to confirm relative uniformity of soil conditions throughout the site, LAN consulted CMT Labs to conduct eleven (11) soil borings at various locations. Boring locations B-1 through B-5 were drilled with a conventional drilling rig and were extended to depths ranging between 11 and 15 feet below grade. Boring locations B-6 through B-11 were drilled with hand sampling techniques and were extended to depths ranging between 4 and 7 feet below grade. Groundwater was encountered within the test boring locations at the time of the field operations at approximate depths ranging between 0.5 and 9.5 feet below grade.

Based on the findings, it is recommended that helical piles are considered appropriate foundations for the boardwalk replacement project. The full report by CMT Laboratories is included herein as “Appendix C”.

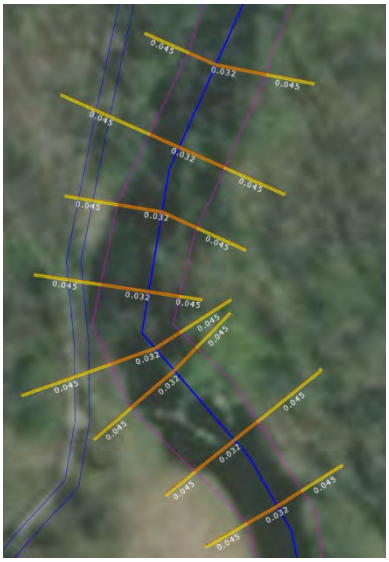
6.0 Hydrologic & Hydraulic Stream Model:

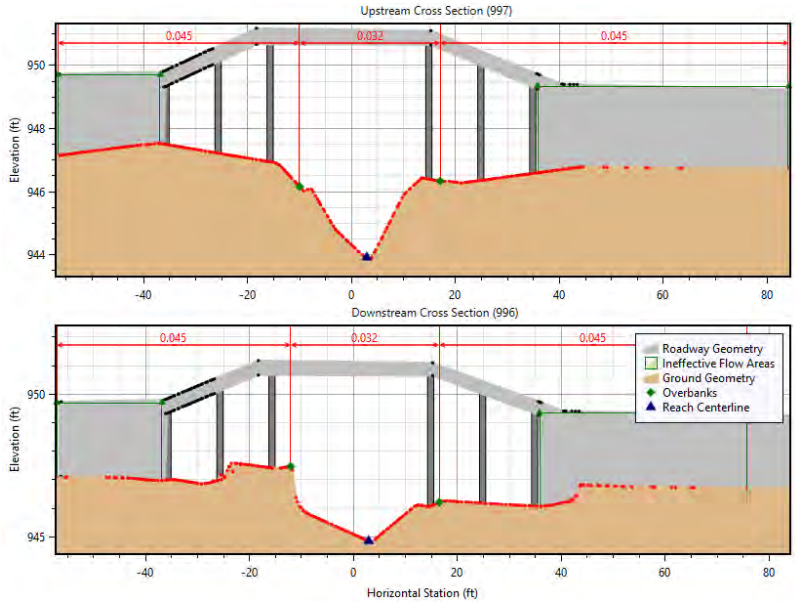
Flooding continues to pose serious issues to the integrity of the boardwalk system and the stability of the streambanks of Slab Cabin Run, Thompson Run, and Bathgate Springs. As the frequency of high intensity flood events is on the rise, it is important to understand and predict what the future could look like at the nature center. The creation of a stream system model allows for the design of a boardwalk system constructed to withstand or resist predicted flood waters, and for the identification of areas of high erosion along the streambanks.

6.1 GeoHECRAS Model:

Cross sectional data of Slab Cabin Run, Thompson Run, and their various reaches was obtained via survey investigation and was entered into CivilGEO© Engineering Software 2022 GeoHECRAS software. A terrain model was created based on topographic survey data and stream reaches and junctions were arranged accordingly.

Cross sections were laid out perpendicular to the banks and flow lines for each reach of each river. The existing bridges and the proposed bridge on the connector loop trail were modeled accordingly.





6.2 Runoff Analysis:

The rainfall depths summarized below were determined using the NOAA Atlas Precipitation Frequency Data Server, included herein as “Appendix D”. The following table summarizes the rainfall depths at the project location within Centre County:

Table 6.2.1
Summary of Design Storms

Rainfall Event	Rainfall Depth per 24-hr Period (inches)
1-Year	2.20
10-Year	3.81
100-Year	5.91

A drainage area for each river reach was established using a combination of USGS topographic information and the USGS StreamStats application. Ground coverage for each drainage area was determined via ESRI aerial imagery. Time of Concentration for each river reach was determined using the USDA TR-55 Urban Hydrology for Small Watersheds Manual. Open channel flow calculations utilize Manning’s Equation to determine the average velocity through the channel. Slope, hydraulic radius, and wetted perimeter were obtained via the GeoHECRAS model for each river reach.

The data was input into the hydrologic modeling software (Autodesk® Civil 3D® 2020 Hydraflow Hydrographs Extension) to determine the 1-, 10-, and 100-year peak discharges for the drainage areas. A Type II storm distribution with 24-hour rainfall frequency data was used in the SCS Unit Hydrograph Method analysis for the project. The following table summarizes the input data:

Table 6.2.2 Summary of Drainage Area Data			
River Reach	Drainage Area (ac.)	CN	Time of Concentration (min.)
Bathgate Springs – Reach 4	76.8	75	152
Bathgate Springs – Reach 3	192	75	201
Bathgate Springs – Reach 2	172.8	75	260
Bathgate Springs – Reach 1 (Junction)	4.61	75	52
Thompson Run Reach 2	2,496	75	669
Thomspon Run Reach 1 (Junction)	Flow determined by junction		
Slab Cabin Run – Reach 2	10,752	78	923
Slab Cabin Run – Reach 1 (Junction)	Flow determined by junction		

GeoHECRAS uses upstream flow conditions as the peak flow input into the program. Thompson Run Reach 1, Bathgate Springs Reach 1, and Slab Cabin Reach 1 utilized an input that combined peak flow values of the reaches exiting through the respective upstream junctions. Thompson Run Reach 1 also includes the peak flow generated by the small drainage area to Bathgate Springs Reach 1 upstream.

The following table summarizes the 1-, 10-, and 100-year peak discharges for each river reach:

Table 6.2.3 Summary of Peak Flow Values				
River Reach	1-Year (cfs)	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Bathgate Springs – Reach 4	9	14	31	70
Bathgate Springs – Reach 3	18	28	63	139
Bathgate Springs – Reach 2	13	21	47	103
Bathgate Springs – Reach 1 (Junction)	40	63	141	312
Thompson Run Reach 2	95	148	320	694
Thomspon Run Reach 1 (Junction)	137	213	466	1,016
Slab Cabin Run – Reach 2	410	611	1,231	2,528
Slab Cabin Run – Reach 1 (Junction)	547	824	1,697	3,544

The peak flows were input into the GeoHECRAS software to perform floodplain encroachment calculations and general streambank and stream system analyses. The Hydrographs output is enclosed herein as “Appendix E”.

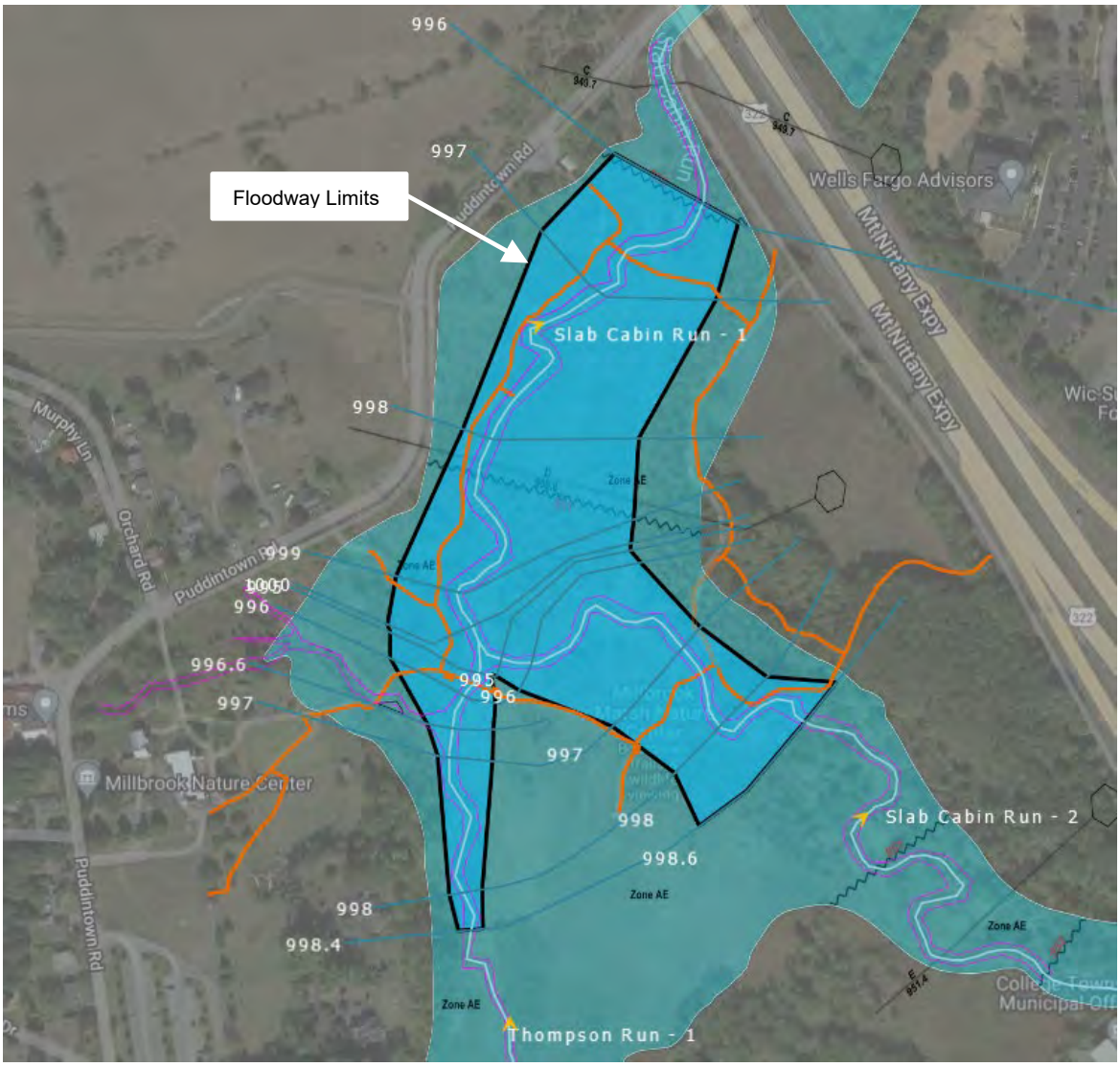
6.3 Floodplain Encroachment Analysis:

FEMA mapping shows the subject site on FIRM Panels 42027C0629F and 42027C0637F, having a base flood elevation ranging from 954 ft – 950 ft (NGVD29). Most of the site lies within the flood hazard area.

Although the FEMA flood map depicts the flood hazard area, it does not depict the floodway. The floodway is defined as “the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height.” Normally, the base flood is the one-percent chance event (100-year recurrence interval), and the designated height is one foot. The floodway is determined by an encroachment analysis, which uses an equal loss of conveyance on opposite sides of a stream.

FEMA floodway analysis requires cross sections to be generalized and expanded to the limits of the flood fringe. In this case, flow from Bathgate Springs is considered “additional flow” to Thompson Run and is modeled as such in the floodway analysis. As flooding occurs, meanders and streambank geometry is often ignored by floodwaters moving through the river system.

A Method 4 floodplain encroachment analysis was performed for the predicted area of disturbance, using an allowable water surface elevation change of 1 foot per PADEP. This elevation is then added to the stream elevation at the most downstream cross section. The program determines the increase in conveyance between the increased water surface and the base water surface (100-year storm elevation). One half of this increase in conveyance is removed from each side of the cross section. The program then goes through a process of encroaching the streambanks towards the channel to produce the computed floodway. The process is repeated until a water surface elevation change closest to but not exceeding 1 foot is obtained. A Method 1 analysis was then performed to check the encroachments and perform any additional smoothing of the floodway transitions. The floodway limits for the project area were determined as follows:



As predicted, most of the project area is located in the floodway. A discussion on permitting can be found in section 9.0. A detailed GeoHEC-RAS floodplain encroachment report is included herein as “Appendix F”.

Table 6.3.1
Summary of Floodway Elevations

River Reach	Elevation (ft) (NAVD88)
Slab Cabin Run Reach 1	951 – 951.43
Slab Cabin Run Reach 2	951.45 – 952.08
Thompson Run Reach 1	951.46 – 951.50

6.4 Streambank Stability Analysis:

The principal causes of streambank erosion are geological, climatic, cultural, vegetative, and hydraulic, often acting in an interrelated manner. Shear stresses from flow velocity are often the cause of erosion in natural river systems. Using the stream model in GeoHEC-RAS, shear stresses and velocities from the 100-year storm event can be identified at each river station along a reach. Average velocities and shear stresses were calculated for each reach. Cross sections that produced velocities and sheer stresses significantly greater than average are shown in the table below. A copy of the full GeoHEC-RAS output is enclosed herein as “Appendix G”.

Table 6.4.1
Cross Sections Exceeding Average Velocities and Sheer Stresses

River Reach	Average Velocity (ft/s)	Average Sheer Stress (lb/sqft)	Exceeding Cross Sections
Bathgate Springs – Reach 4	1.24	0.096	998, 999, 1000
Bathgate Springs – Reach 3	1.01	0.019	1005, 1007, 1008, 1009, 1013, 1013.3, 1013.6
Bathgate Springs – Reach 2	0.44	0.001	994, 1000
Bathgate Springs – Reach 1	0.85	0.010	998, 1001.3, 1001.4, 1003, 1004, 1005, 1007
Thompson Run Reach 2	2.03	0.068	1010.4, 1012.2, 1012.7, 1012, 1014.5, 1019.6, 1020, 1021, 1022, 1023, 1024, 1024.5, 1025, 1026, 1026.4, 1027, 1028, 1028.5, 1029
Thompson Run Reach 1	1.57	0.031	994, 995, 998, 999, 1000
Slab Cabin Run – Reach 2	5.30	0.393	1012, 1013.7, 1015, 1019, 1020, 1021, 1024, 1025, 1028, 1029, 1029,6, 1030, 1031, 1032, 1034, 1035, 1037, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052
Slab Cabin Run – Reach 1	6.57	0.063	1000, 1001, 1002, 1003, 1004 1004.5, 1005, 1007, 1007.6, 1010.6, 1012, 1013, 1015, 1016, 1016.3, 1018.2, 1020, 1025

Based on the analysis detailed above and geometry, the areas subject to streambank stabilization are outlined as follows:

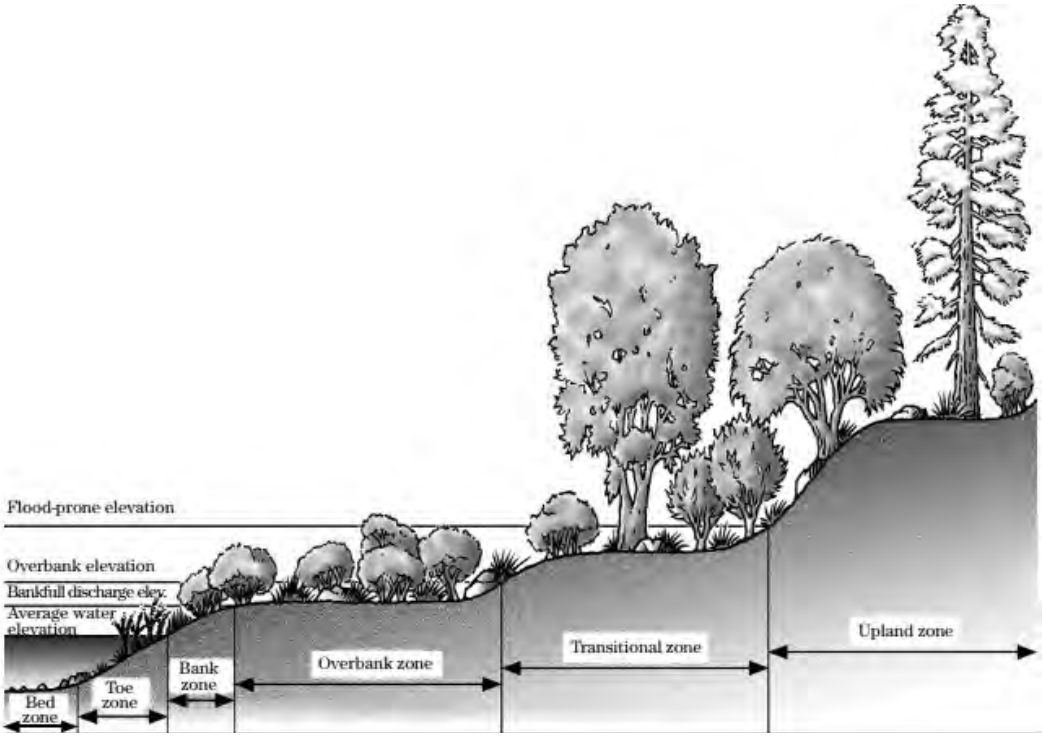
The areas deemed priorities are areas of high traffic, or areas identified by visual inspection. These areas will be the focus of the streambank stabilization.

7.0 Streambank Stabilization Recommendations:

7.1 Streambank Stabilization Options:

The principal causes of streambank erosion are geological, climatic, cultural, vegetative, and hydraulic, often acting in an interrelated manner. Streambank erosion is a natural process that occurs on many streams with vegetated banks. Loss of streamside vegetation reduces the resisting forces and increases the erodibility of the streambank. The goal of streambank stabilization projects is to mimic natural conditions, which allow for movement and erosion in large storm events.

Part 654 of the NRCS National Engineering Handbook offers insight into stream restoration design. The solutions to various problems with streambank stability are tied to certain cross sections through the riparian zone shown in the figure below.



Accelerated bank erosion and instability is tied to the Bank and Toe zones. The solutions most utilized in these zones include channel vegetation, plant-based soil bioengineering, and localized structural support. Structural based approaches intend to create a channel where movement is unacceptable and self-healing is not an option. The goal of a structural approach is to immediately and permanently stabilize a bank. Plant based approaches intend to create a flexible, dynamic channel, relying on plants to provide long term strength to the banks. The goal of a plant based approach is to slow changes to a bank to a more natural rate. Both approaches include proven ways to stabilize and restore streambanks. The following table contains information from Part 650 of the NRCS National Engineering Handbook that summarizes the benefits provided by each approach:

Table 7.1.1 Summary of Structural Based Bioengineering and Plant Based Bioengineering Approaches		
Treatment Features	Structural Based Approach	Plant Based Approach
Bankline	Defined by placement of hard, inert material	Defined over time by natural processes
Dynamism (Degree of bankline movement)	Low to moderate. Success is a relatively static bankline	Moderate to high. Success is as dynamic as a natural, unimpacted stream
Material used	Inert such as wood, rock, and manufactured products that can be enhanced with plantings	Living riparian plants. Inert materials may be used to provide stabilization until plant establishment
Ability to self-heal	Limited – once a structural component fails, treatment is compromised	Significant – plant material can be severely impacted and recover over time
Ecological benefits	Terrestrial and aquatic benefits provided by the inclusion of plants within inert material	Terrestrial and aquatic benefits provided by plants and the dynamic habitat
Typical applications	Areas where high value infrastructure, structures, or both are adjacent to the waterway or where life could be endangered - typically found in urban and suburban environments	Areas where some movement of the bankline will not endanger life or property - typically found in suburban, rural, or park environments
Example treatments	Riprap with live cuttings, vertical bundles or brush mattress with a rock toe, log cribs, rootwads, green gabions, permanent erosion control fabric, etc.	Live cuttings, vertical bundles, fascines, brush mattress, brush revetment, bio logs, wattles, vegetated stream barb, etc.

The selection of appropriate techniques involves a balance of required support, future storm predictions, environmental impacts, local landscape, and purpose of stabilization Due to the landscape of the Millbrook Marsh Nature Center, a primarily plant based approach is suggested, with the inclusion of some structural based riprap placement. The educational and recreational benefits provided by the site cannot be compromised by the placement of inert material that may impact the ecological benefits of the natural stream system. Plant based techniques allow for natural movement of the streams and promote recovery after storm events. Vegetation

The following recommended techniques are taken from the PADEP Erosion and Sediment Pollution Control Program Manual:

Table 7.1.2 Summary of Recommended Streambank Stabilization Techniques			
Technique	Description	Benefit	Permissible Velocity
Live stakes with optional riprap toe protection	Woody vegetative cuttings, typically willow, dogwood, or other flood-tolerant species, that are capable of rooting when inserted into the ground. Can be used to repair slumps in frequently wet areas.	When rooted and growing, stakes form a stabilizing root mat that binds soil particles, extracts excess moisture, and provides protective cover.	Initial: 5-10 ft/s Established: 12+ ft/s
Live fascines with optional riprap toe protection	Long bundles of branch cuttings bound together and staked into a shallow trench along a streambank.	Requires minimum site disturbance. Offers immediate protection from surface erosion and enhances conditions for native plant colonization.	Initial: 5-8 ft/s Established: 8-10+ ft/s

Live stakes growing on a streambank one season after installation.

Live fascines during installation (left) and after establishment (right).

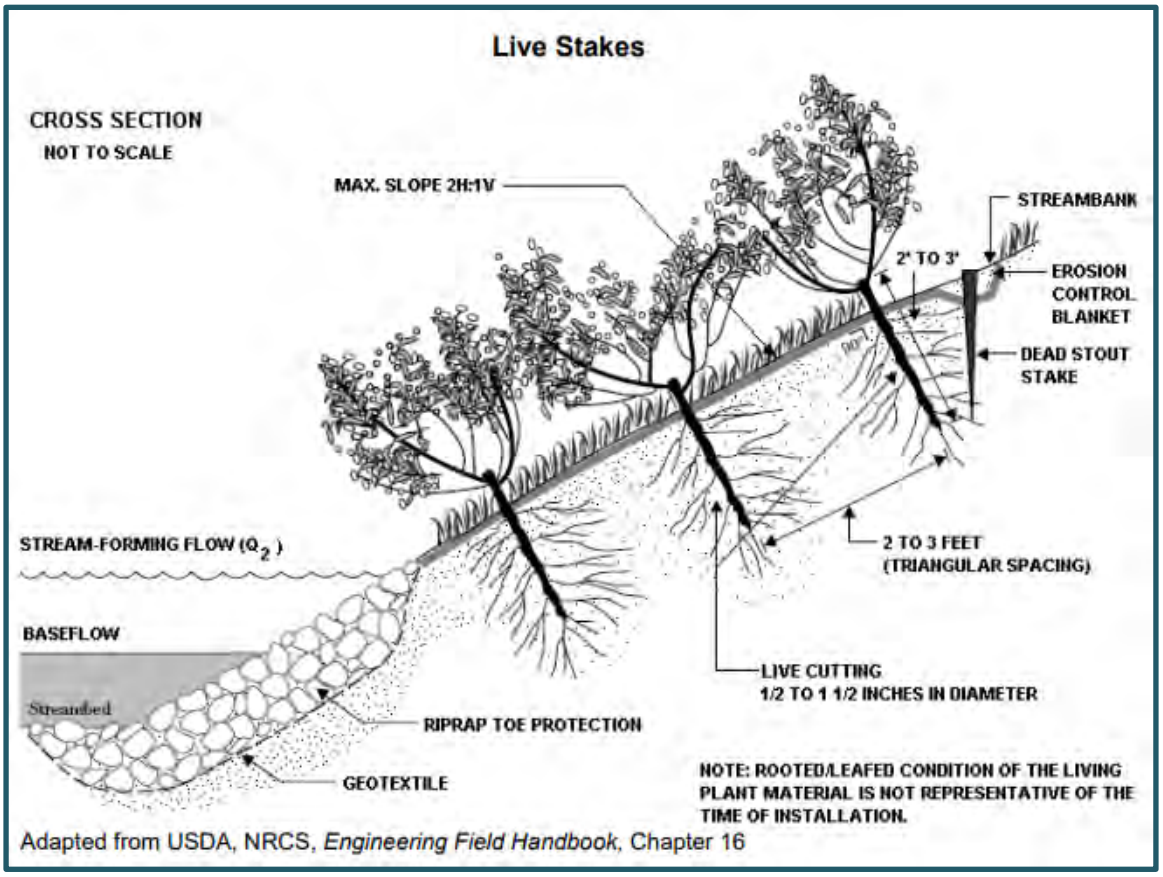


Table 7.1.3 Live Stakes - Installation		
Material	Size	Installation
Stakes should be freshly cut, healthy, and at least 1 year old. Side branches must be removed and bark must be intact. Bases cut cleanly at an angle. Tops square to aid in tamping.	½" – 1 ½" diameter 2 - 3 feet long	Insertion should occur during the dormant period within 24 hours of cutting. Riprap toe protection should be installed below the stream-forming flow elevation (2-year storm). Blanket erodible slopes before insertion. Tamp cuttings into the ground at 90 degrees to the slope and angle downstream. 4/5ths of the cutting should be inserted into the ground. 2-5 bud scars should remain aboveground. Place stakes 2-3 feet apart using triangular spacing.

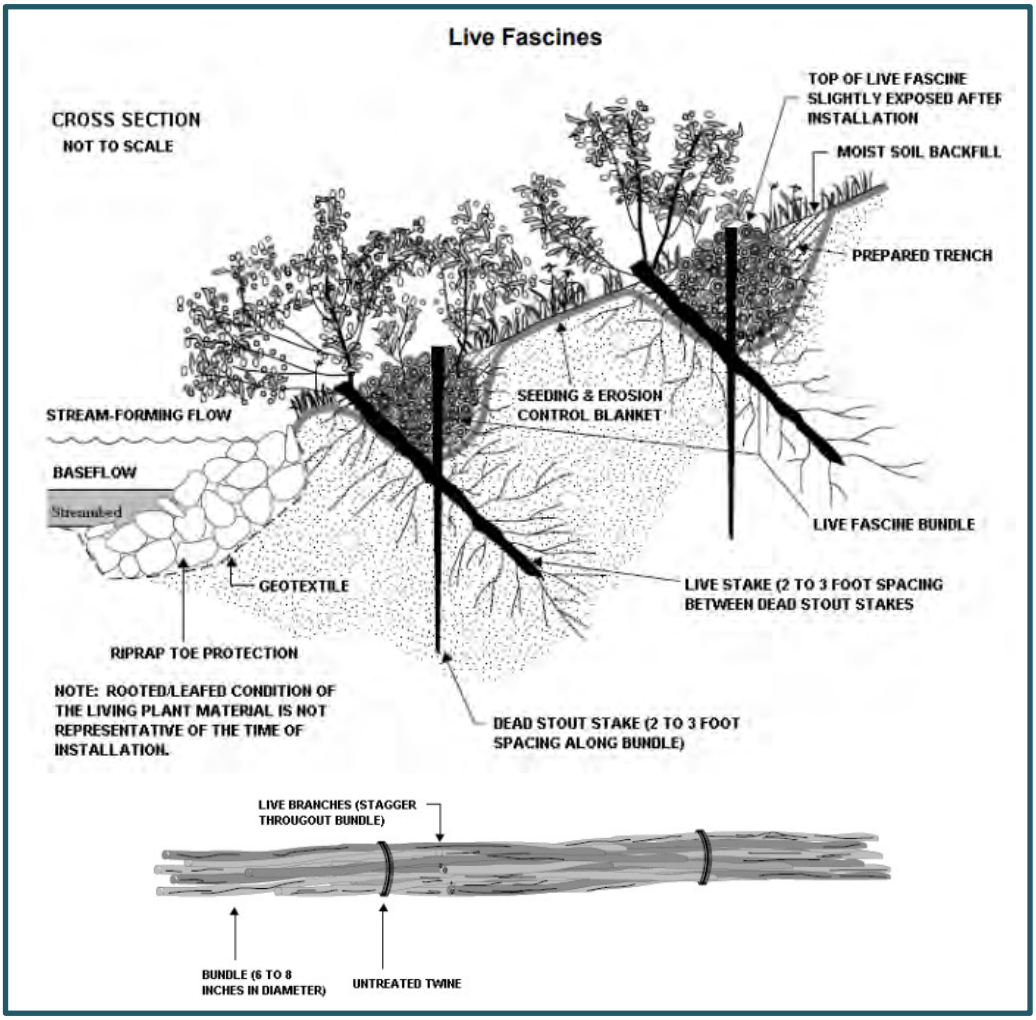


Table 7.1.4 Live Fascines - Installation		
Material	Size	Installation
Cuttings should be from an easily rooted species that have long, straight branches. Branches should be tied together with twine and all buds oriented in the same direction.	¼ "– 1" diameter 5 - 10 feet long Bundles: 6-8" diameter	Bundles should be tied together with twine. All buds are oriented in the same direction. Cuttings are staggered so that tops are evenly distributed along the length. Dig a 10" X 10" trench along the contour above the 2-year peak flow elevation and install riprap toe protection. Install fascine as shown and drive dead stakes through the bundle. Tamp in live stakes downslope to the bundle leaving top 3" exposed. Place moist soil along sides of bundle. Additional trenches spaced according to table below. Intervals between trenches should be seeded, mulched, and covered with a suitable erosion control blanket.

Table 7.1.5 Live Fascines Spacing			
Slope Steepness	Predominant Soils		
	Erosive	Non-erosive	Fill
3H:1V or flatter	3 to 5 ft	5 to 7 ft	3 to 5 ft
Up to 1H:1V	3 ft	3 to 5 ft	Not recommended

Both live stakes and live fascines work to preserve the ecological functions of the stream and preserve natural aesthetics while providing stabilization. Common, successful, and native species used in both techniques are as follows:

- *Salix sericea*, Silky Willow
- *Salix nigra,* Black willow
- *Cornus amomum*, Silky dogwood
- *Cornus racemosa,* Gray dogwood
- *Cornus sericea*, Red-osier dogwood
- *Cephalanthus occidentalis,* Buttonbush
- *Sambucus canadensis,* Elderberry
- *Physocarpus opulifolius,* Ninebark
- *Lindera benzoin,* Spicebush

Table 7.1.6
Native Species for Streambank Stabilization


Willows


Dogwoods


Buttonbush

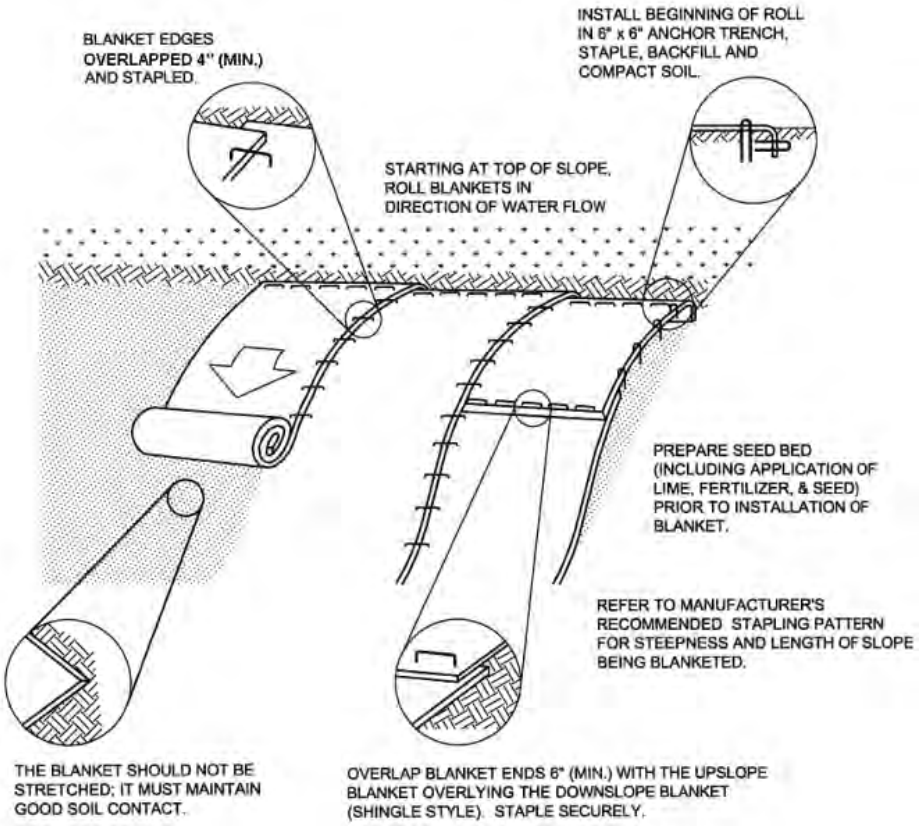

Elderberry


Ninebark


Spicebush

The abovementioned species are all flood-tolerant shrub species that display advantageous rooting. This process allows for roots to form from non-root tissues throughout the plant. The procedure of planting live cuttings stimulates the advantageous rooting process. It is important to not let live cuttings dry out or be exposed to heat. Cuttings must be installed as soon as possible after the pruning from the mother plant takes place. Installation is best accomplished in late fall at the onset of plant dormancy and before the ground begins to freeze.

The addition of erosion control blankets allows for natural soils to be held in place while the plantings are becoming established. There are various types of erosion control blankets, including both natural and artificial materials, that can be applied by hand, or by spray.



Riprap protection can be applied in areas where high velocities threaten the banks. Rock utilized for riprap should consist of sound, durable rock, insoluble in water. Individual pieces should be angular and blocky. Riprap application does not need to extend more than 12” above the normal flow depth but should extend horizontally along the stream to provide proper toe support as shown on figure 15.2 Extension of Primary Riprap Protection Area in the PADEP Erosion and Sediment Pollution Control Program Manual.

7.2 Streambank Stabilization Locations:

The abovementioned streambank stabilization options were assessed at the priority locations determined in section 6.4. The following table summarizes the linear feet of streambank stabilization that would be required in each area identified. Banks are referred to facing downstream.

Table 7.2.1
Summary of Linear Feet of Streambank Stabilization

Location of Stabilization (Priorities)	Left Bank (LF)	Right Bank (LF)	Live Stakes Quantity* (per 1 row)	Bundle Quantity~ (per 1 row)
SC-2	110	108	37 (L), 36 (R)	22 (L), 22 (R)
SC-4	278	233	93 (L), 82 (R)	56 (L), 17 (R)
SC-5	214	259	72 (L), 87(R)	43 (L), 52(R)
SC-6	587	476	197 (L), 160 (R)	40 (L), 32 (R)
Junction	319	301	107 (L), 101 (R)	22 (L), 21 (R)
BG-1	118	91	40 (L), 32 (R)	8 (L), 7 (R)

* Stakes are ½" – 1 ½" diameter, spaced 3 feet apart.

~Cuttings for bundle are ¼ "– 1" diameter. Bundle is 6" – 8" diameter and 5-10 feet long.

It is recommended that there be at least 2 rows of either live stakes, or live fascines in each area. Erosion control blanket sizes vary depending on the vendor. The following table summarizes the area of streambank stabilization per location, assuming 2 rows are used.

Table 7.2.2
Summary of Area of Streambank Stabilization (per 2 rows)

Location of Stabilization (Priorities)	Live Stakes (sqft) (3 ft apart)	Live Fascines (sqft) (5 ft apart)
SC-2	1,308	2,180
SC-4	3,066	5,110
SC-5	2,838	4,730
SC 6	6,378	10,630
Junction	3,720	6,290
BG-1	1,254	2,090

Riprap is recommended to be placed in areas around the bridges for extra scour protection. Riprap sections should be 1-1.5 feet thick and extend 3 feet in from top of bank. According to USDA Stone Sizing Criteria, 4-6” stone is appropriate for the velocities of the streambanks.

Table 7.2.3
Summary of Riprap Stabilization

Location of Stabilization	Area (sqft)	Volume (cuyd)
Slab Cabin Run Bridge	260	10
Thompson Run Bridge	445	27
Bathgate Springs Bridge	330	13

A visual depiction of the streambank stabilization recommendations are included herein as “Drawing 3”.

8.0 Boardwalk Constructability:

As part of the Phase II study, LAN has reviewed the possible methods of construction of the boardwalk and bridges. There are two methods involving different degrees of work and money laid out below.

The top-down method of construction involves engineering the boardwalk structure to carry the load of a mini-excavator. This would allow the machine to ride on the boardwalk as it is being constructed. This method would be beneficial as it would avoid disturbance to the marsh, however, the reach of the machine would limit the spacing between the helical pile foundations. The maximum spacing between the helical piles would be approximately eight (8) feet. This method would require a significant number of additional piles to handle the load of the equipment, which is significantly more than what is required of a pedestrian bridge. Although the top-down method would minimize impacts to the marsh, it does not alleviate the need to cross the stream for foundations to be set, nor does it have any effect on the ability to construct the bridge in place.

The mud mat method of construction utilizes mats made of pocketed, double-wall, high-strength fabric that have high tensile reinforcing ribs confined within each sleeve allowing for easy deployment and structural stability. The mats offer a unique customization benefit, as they can be connected to form the required size. Mud mats are used to spread the load of equipment and machinery on landscaping or soft ground surfaces to minimize the damage from a rut, sinkhole, or other impacts to the environment. The interlocking mats are designed to tolerate varying kinds of loads such as large cranes, fully loaded tractor trailers and other wheeled vehicles. The mud mat approach will allow the contractor to demolish the boardwalk structure and place mats along the existing “disturbed” pathway.

Because of the limitations on site, the boardwalk will be constructed from the center out versus the outside in. As is the case with both methods, a stream crossing will be required to install foundations for the bridges. Both methods will require some level of ground restoration for DEP compliance, however, neither method is anticipated to be extensive in nature. The mud mat method of construction allows for an increased spacing of the helical piles for the boardwalk supports. It also reduces the structural components necessary to support the pedestrian load. The use of mud mats will also make movement of materials for construction easier and faster, as more materials can be transported with less restrictions on weight. Mud mats would also allow for helical piles and engineered beams to be installed at the bird blind. Recent photographs have shown that the structure is at risk of lateral movement. Because of the reduction in overall cost, and the benefit of supporting the bird blind, LAN recommends the use of mud mats for construction.

Typical span structural designs are included herein as “Drawings 4-7”.

8.1 Bridge Construction

In order to construct the bridges, a temporary stream crossing will be required to transport equipment to the other side of the stream for installation of the helical piles. A temporary support structure placed within the stream will be required for construction of the bridges themselves. The structure will assist with the attachments of the bridge sections and foundations. These sections may consist of whole bridge sections, or of two main truss supports that are placed before the bridge is constructed on top. Exact size and weight will be dictated by the equipment and weight capacities of the mud mats.

The placement of both the temporary stream crossing structure and the in stream support structure are actions regulated by PADEP and can be permitted under a Joint Permit. See section 9.0 for further discussion.

8.2 Design-Build Approach

As this project moves further into the design and construction phase, LAN recommends that CPRP strongly consider the Design-Build approach for delivery. Design-build is a method of project delivery in which one entity - the design-build team - works under a single contract with the project owner to provide design and construction services. One entity, one contract, one unified flow of work from initial concept through completion. As opposed to the traditional design, bid, build approach, the design-build approach will have direct economic benefit for this project. In the traditional delivery method, the project will be designed with a set of construction documents that will be publicly bid. The design team has no control over the means and methods of construction but must rely on having similar thoughts as the contractor. Once bid, and awarded to the lowest responsible bidder, the project will then be permitted by DEP, DCNR and PHMC. There is a distinct possibility that changes, or modifications may be necessary, which will likely result in a change order to the contract sum. While it is hoped that the change will be equitable, CPRP is at the mercy of the contractor and may pay a premium for any changes. The process is linear in nature and the applications will likely be reviewed upon contract award, thus extending the overall duration of the project and will delay the construction start date.

In a design-build approach, the engineering team and contractor work together to discuss and decide the construction approach, sequence and equipment that will be utilized. These decisions and discussions will streamline design and permit applications. Since the permits can be submitted before the documents are 100% complete. This early filing will speed up the process of approvals and shorten the overall project timeline. A design-build firm can provide an owner with a GMAX (Guaranteed Maximum Price) upon 50% design completion, unlike the more traditional methods where project cost is not realized until after the bidding phase. This critical step allows CPRP to control costs and make important decisions early on in the design process.

9.0 Regulatory Review:

A meeting was held on October 27, 2022, with a representative from the Pennsylvania Department of Environmental Protection to discuss permitting requirements and options for the constructability of the project. It was determined that all aspects of the project can be permitted under a Water Obstruction and Encroachment US Army Corps of Engineers Section 404 Joint Permit (JP). Under this Joint Permit, all tasks involved with the reconstruction and expansion of the boardwalk system can be covered, as long as they are fully stated and included in the application package. The Joint Permit would also cover any future operation and maintenance to occur on the site.

9.1 Joint Permit Requirements:

The Joint Permit covers all activities that would otherwise be regulated under Chapter 105. Damn Safety and Waterway Management and Chapter 106. Floodplain Management. Information to be included in the joint permit application include the following:

- General Requirements
  - Permit application properly signed, sealed, and witnessed
  - Application fee
    - Chapter 105 Fee Calculation Worksheet
  - Copies and proof or receipt
    - Act 14 Municipal Notification 9 Acts 67/68/127
  - Location Map(s)
  - Color photographs and photo location map

- Cultural Resources
  - Cultural Resource Notice (notice, return receipt and PHMC review letter)
    - **Further PHMC approvals related to archeology may be required for JP approval**

- Environmental Assessment
  - Environmental Assessment Form
  - Wetland delineation data/ Wetland determination report
    - **Wetland delineation may be required for JP approval**
  - Pennsylvania Natural Diversity Index – avoidance measures, aquatic resources impact table, and signed PNDI receipt
  - Identification and characterization of aquatic resources (identifier, floodplain information, fishery designations, etc.)
  - Summary of quantified impacts
    - Permanent Impacts (i.e., footprint of helical piles, new TSA paths, streambank stabilization, etc.)
      - **Permanent impacts to wetlands must remain below 0.05 acres (2,178 square feet) to avoid mitigation requirements**
    - Temporary Impacts (i.e., access routes, mud mats, temporary erosion control structures, etc.)
  - Discussion of impacts including:
    - Resolution of temporary impacts
    - Antidegradation Analysis
    - Alternatives Analysis
  - Potential Secondary Impact Evaluation
  - Mitigation Plan (if required)

- Engineering Assessment
    - Site Plans
        - Including cross sections
    - Erosion & Sediment Control Plan and approval letter
        - **Approval from Centre County Conservation District is required for JP approval**
        - **NPDES approval is required if greater than 1 acre of land disturbance is to occur. (Disturbances permitted under Chapter 105 and 106 do *not* count towards this total).**
    - Hydrologic and hydraulic analysis
        - Rainfall determinations and runoff calculations
        - Hydraulic calculations (capacity of structures, flood water surface determinations, streambed/streambank stabilization study)
        - Narrative of compliance with Chapter 105.
    - Stormwater Management Analysis with consistency letter
        - **Municipal stormwater approval is required for JP Approval**
    - Floodplain Management Analysis with consistency letter
        - **Municipal floodplain approval is required for JP Approval**
        - Narrative of compliance with Chapter 106.
    - Risk Assessment
    - Professional Engineer's seal and certification

10.0 Construction Cost Estimate:

As noted earlier in the constructability section, there are two methods for constructing the boardwalk sections. Top-down and via the use of mud mats. LAN has prepared probable cost estimates for both methods to help ascertain whether the benefits or disadvantages of one outweigh the anticipated construction cost.

Please note that costs shown in the estimates are for 2023-2024. If the project is delayed beyond that timeframe, additional escalation and inflation should be included.

Cost Estimate - Top Down

Millbrook Marsh Boardwalk Feasibility Study

Helical pile foundations, engineered wood sub-structure, black locust decking. Timber bridges

LAN Job # 2.20354.02

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
General Conditions	ALLOW	1	$150,000	$150,000
Boardwalk Decking (6' width)*	LF	3,400	$360	$1,224,000
Boardwalk Sub-structure (10' span)	SPAN	375	$7,120	$2,670,000
Boardwalk Foundation (10' span)	EA	750	$1,100	$825,000
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	770	$1,388	$1,068,715
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	800	$1,388	$1,110,353
Bridge Construction - Thompson Run	EA	1	$175,000	$175,000
Bridge Construction - Slab Cabin Run	EA	1	$150,000	$150,000
Bridge Construction - Bathgate Springs	EA	1	$20,000	$20,000
Bridge at Connector Loop	EA	1	$150,000	$150,000
Bridge Foundations	EA	4	$30,000	$120,000
Observation Lookouts	EA	3	$37,012	$111,035
Lookout Expansion at Vanes	EA	1	$16,655	$16,655
Grass Trail Section D - TSA Upgrade (LF/path)	LF	50	$30	$1,500
Grass Trail Section B - TSA Upgrade (LF/path)	LF	160	$30	$4,800
Grass Trail Section A - TSA Upgrade (LF/path)	LF	500	$30	$15,000
Streambank Stabilization - Live Stakes	LF	18,564	$8	$148,512
Streambank Stabilization - Live Fascines (Bundle)	LF	18,564	$10	$185,640
Streambank Stabilization - Riprap	TON	50	$350	$17,500
Strreambank Stabilization - Erosion Control Blanket	SF	31,030	$3	$93,090
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	**$8,256,800.24**
			20% Contingency	**$1,651,360.05**
			15% Escalation	**$247,704.01**
			A/E Fees (est. 7% of Construction Cost)	**$710,910.50**
			Construction Administration	**$0.00**
			Grand Total:	**$10,866,774.79**

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

Cost Estimate - Mud Mats

Millbrook Marsh Boardwalk Feasibility Study

Helical pile foundations, engineered wood sub-structure, black locust decking. Timber bridges

LAN Job # 2.20354.02

Description	Unit	Quantity	Cost/Unit ($)	Subtotal ($)
General Conditions	ALLOW	1	$250,000	$250,000
Boardwalk Decking (6' width)*	LF	3,400	$360	$1,224,000
Boardwalk Sub-structure (16' span)	SPAN	275	$2,500	$687,500
Boardwalk Foundation (16' span)	EA	550	$1,100	$605,000
Grass Trail Section C - Upgrade (LF/Boardwalk)	LF	800	$740	$592,118
Grass Trail Section E - Upgrade (LF/Boardwalk)	LF	770	$740	$569,913
Bridge Construction - Thompson Run	EA	1	$175,000	$175,000
Bridge Construction - Slab Cabin Run	EA	1	$150,000	$150,000
Bridge Construction - Bathgate Springs	EA	1	$20,000	$20,000
Bridge at Connector Loop	EA	1	$150,000	$150,000
Bridge Foundations	EA	4	$30,000	$120,000
Observation Lookouts	EA	3	$19,737	$59,212
Lookout Expansion at Vanes	EA	1	$8,882	$8,882
Grass Trail Section D - TSA Upgrade (LF/path)	LF	350	$30	$10,500
Grass Trail Section B - TSA Upgrade (LF/path)	LF	160	$30	$4,800
Grass Trail Section A - TSA Upgrade (LF/path)	LF	500	$30	$15,000
Streambank Stabilization - Live Stakes	LF	18,564	$8	$148,512
Streambank Stabilization - Live Fascines (Bundle)	LF	18,564	$10	$185,640
Streambank Stabilization - Riprap	TON	50	$350	$17,500
Strreambank Stabilization - Erosion Control Blanket	SF	31,030	$3	$93,090
* All lumber quoted is #1 grade lumber				
			Construction Cost Subtotal	**$5,086,666.41**
			20% Contingency	**$1,017,333.28**
			15% Escalation	**$152,599.99**
			A/E Fees (est. 7% of Construction Cost)	**$437,961.98**
			Construction Administration	**$0.00**
			Grand Total:	**$6,694,561.66**

NOTE:

LAN Associates, Engineering, Planning, Architecture, Surveying, Inc. (LAN) has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor's methods of determining prices, or over competitive bidding or market conditions. LAN's opinions of probable total costs and construction costs provided herein are made on the basis of LAN's experience and qualifications and represent LAN's best judgment as an experienced and qualified professional architecture & engineering firm, familiar with the construction industry. LAN does not guarantee that the proposals, bids, or actual project or construction costs will not vary from the above estimated costs prepared by this office. Actual construction costs may vary substantially from this estimate for many reasons including, but not limited to the following:

1. The business climate at the time of bidding and construction.
2. Availablity of construction workers with necessary skills at the time of construction.
3. Contractor's workers compensation rates and insurance requirements.
4. Contractor's assessment of cost of warranted work, and;
5. Contractor's perception of risk.
6. Cost and availability of construction materials.

11.0 References:

Federal Emergency Management Agency (FEMA) Map Service Center, Map Number 42027C0637F
https://msc.fema.gov/portal/home

Pennsylvania Department of Environmental Protection eMapPA
https://gis.dep.pa.gov/emappa/

Pennsylvania Department of Environmental Protection "Erosion and Sediment Pollution Control Program Manual," March 2012, Technical Guidance Number 363-2134-008

National Oceanic and Atmospheric Administration (NOAA) National Weather Service Hydrometeorological Design Studies Center Precipitation Frequency Data Server
https://hdsc.nws.noaa.gov/hdsc/pfds/

The Pennsylvania Code, Chapter 105 Dam Safety and Waterway Management
http://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter105/chap105toc.html

The Pennsylvania Code, Chapter 106 Floodplain Management
http://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter106/chap106toc.html&d=

U.S. Army Corps of Engineers, Hydraulic Engineering Center, "HEC-RAS River Analysis Systems Applications Guide," Version 5.0, February 2016
https://www.caee.utexas.edu/prof/maidment/CE365KSpr16/HEC/HEC-RAS5.0ApplicationsGuide.pdf

U.S. Army Corps of Engineers, Section 404 Permit Application
http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4088

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U.S. Department of Agriculture, Natural Resource Conservation Service, Web Soil Survey
https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

U.S. Department of Agriculture, Urban Hydrology for Small Watersheds, TR-55 Manual, June 1986
https://www.hydrocad.net/pdf/TR-55%20Manual.pdf

U.S. Fish and Wildlife Service National Wetlands Inventory Mapper
Https://www.fws.gov/wetlands/data/mapper.html

U.S. Geological Survey, StreamStats
https://streamstats.usgs.gov/ss/

APPENDIX A

TARGETED RARE PLANT AND COMMUNITY REPORT BY DAVEY RESOURCE GROUP

Corporate Headquarters
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Kent, OH 44240
800-828-8312

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Flemington, NJ 08822
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Targeted Rare Plant and Community Survey Report
Millbrook Marsh Nature Center Boardwalk Replacement / PNDI #727028

State College, Centre County, Pennsylvania
October 11, 2022

Prepared for:
Karen Young
LAN ASSOCIATES
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Midland Park, NJ 07432
VIA EMAIL (Karen.Young@lanassociates.com)

DRGNJ 4797

Table of Contents

Attachments

Introduction

Millbrook Marsh Nature Center (hereafter referred to as the "Site") (see Figures – Attachment 1) is a 62-acre nature preserve operated by the Centre Region Parks and Recreation Authority. The Site contains 12 acres of former "farmstead" and 50 acres of wetlands that are protected by a conservation easement between Penn State University and the ClearWater Conservancy. The Nature Center is open to the public and hosts over 20,000 participants annually at its organized programs and events. The Site contains areas for picnicking, hiking and/or birdwatching along dirt paths and an extensive boardwalk and bridge system that traverses through the marsh into areas that would otherwise be inaccessible.

The boardwalk and bridges were constructed many years ago and are now in disrepair and in need of replacement. The Nature Center proposes to replace the existing boardwalk and add a new bridge crossing over Slab Cabin Run and an associated connector boardwalk trail in the northern portion of the Site. Thus, a Pennsylvania Department of Conservation and Natural Resources (PADCNR) Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review was conducted for this area (hereafter referred to as the "Project Area") to determine if the construction activities could affect current populations of rare species. PNDI letter #727028 (Attachment 2) indicates that four plant species of concern may occur within the Project Area, including *Carex bebbii* (Bebb's Sedge) – State Endangered*, Carex lasiocarpa* (slender sedge) – State Special Concern Species*, Carex prairea* (prairie sedge) – State Threatened*,* and *Lathyrus palustris* (vetchling) – State Special Concern Species. In addition, the PNDI Letter identified one Special Concern Resource, "Sedge – Mixed Forb Fen", as potentially occurring in the Project Area (Table 1). As a result, these four species and plant community became the targets of this survey.

Table 1. Target Rare Plant Species Reported Within the Vicinity of the Site.

Scientific Name	Common Name	Current Status	Proposed Status Survey Window	Survey Window
Carex bebbii	Bebb's Sedge	Endangered	Threatened	Fruits June - July
Carex lasiocarpa	Slender Sedge	Special Concern Species	Special Concern Species	Fruits June - August
Carex prairea	Prairie Sedge	Threatened	Threatened	Fruits June - July
Lathyrus palustris	Vetchling	Special Concern Species	Endangered	Flowers June-August
Sedge - Mixed Forb Fen	Sedge - Mixed Forb Fen	Special Concern Resource	Special Concern Resource	Not Applicable

Source: PNDI-727028

The Site is located in State College, Centre County, Pennsylvania within a synclinal valley of the Appalachian Mountain section of the Ridge and Valley Physiographic Province (PA DCNR, 2022). Underlying bedrock within the vicinity of the Site consists of dolomitic limestone of the Axemann

Formation, and variously grained dolomites of the Nittany and Bellefonte Formations (PA DCNR, 2022). The Site surrounds a large open riparian graminoid marsh centered around the confluence of Slab Cabin Run and Thompson Run that both drain from southwest to northeast in the direction of the synclinal bedrock layers. Onsite and surrounding landcover consists of emergent wetland, upland and wetland scrub-shrub/forest, fallow meadows, and residential and commercial development.

The underlying limestone bedrock of the Site imparts unique chemistry to the associated wetlands as they become enriched in calcium and magnesium and contain an elevated pH (~6.0 or greater) (Ciolkosz et al. 1990). These unique geochemical conditions often result in unique plant assemblages since only certain species can tolerate and/or be competitive under those conditions. A "Sedge – Mixed Forb Fen" (also known as a "calcareous fen") is a community type that forms where alkaline groundwater discharges to the ground surface, forming an open canopy wetland typically dominated by various species of *Carex* spp. (sedges), as well as other herbaceous plants that are often uncommon elsewhere, resulting in its DCNR classification as a Special Concern Resource in Pennsylvania. Sedge-mixed forb/calcareous fens usually contain an organic substrate (sedge peat) that is saturated throughout most of the year. These wetlands usually lack the distinct seepage areas associated with other fen types. Dominant sedge species include *Carex prairea* and *Carex sterilis* (Atlantic sedge). Other species present may include *Pycnanthemum virginianum* (mountain-mint), *Verbena hastata* (blue vervain), *Maianthemum stellatum* (starry false Solomon's-seal), *Typha latifolia* (broad leaf cat-tail), *Epilobium leptophyllum* (willow-herb), *Galium tinctorium* (bedstraw), *Onoclea sensibilis* (sensitive fern), *Impatiens capensis* (jewelweed), *Cirsium muticum* (swamp thistle), and *Polemonium reptans* (Greek valerian) (McPherson 2011). Descriptions of the rare species noted in the PNDI letter are described in more detail below.

Carex bebbii is classified in section Ovales of the *Carex* genus per the Rhoads and Block (2007) treatment. It forms clumps of vegetative and flowering stems that contains 3 to 14 spikes (average 6), each 4 to 10 mm, clustered tightly at the tip. The inflorescence is erect and approximately 1-3cm inch long, consisting of rust-colored perigynia that are less than 2mm wide. Leaves can reach up to 12 inches long, 2 to 4 mm wide, and are flat, hairless, mostly smooth, and usually shorter than the longest flowering/fruiting stem. Stem leaf sheaths are tight and are mostly green. Stem bases are wrapped in a brown sheath, with old leaves often persisting to the next season. Stems are hairless, erect to ascending, 3-sided in cross-section, mostly smooth except just below the spikes. *Carex bebbii* grows in calcareous or neutral wet meadows, moist sand flats and shores, typically known in the northwestern portion of the State, as well as in Centre, Huntington and Monroe Counties (Rhoads and Block, 2007; Minnesota Wildflowers, 2022).

Carex lasiocarpa is classified in section Paludosae of the *Carex* genus per Rhoads and Block (2007) treatment. It forms patches in wetlands due to its wide-spreading rhizomes. It has separate staminate and pistillate spikes, with 1 to 3 staminate spikes crowded together at the tip of the stem. Leaves are basally disposed, are sheathed in red, mostly near the base, and range from 0.7 to 2.2 mm wide. Leaves arch at maturity and may be much longer than the flowering stem. Fruit develops in late spring to mid-summer. The pistillate spikes form clusters of 15-50 perigynia that are ascending to widely spreading and usually tightly crowded on the spike. Perigynia are 2.8 to 5 mm long, 1.5 to 2.2 mm wide, densely hairy, many-nerved (obscured by the hairs), oval-elliptic, tapering to a very short, straight beak that has two

small teeth at the tip. *Carex lasiocarpa* has a transcontinental range across the cooler regions of North America. It can be found in a variety of freshwater wetland habitats such as in bogs, peaty wetlands, calcareous marshes, and shorelines. In Pennsylvania, it can be considered a northerly species and has been documented mostly in the northern, particularly the northeastern counties (PANHP 2019).

Carex prairea is classified in section Heleoglochin of the *Carex* genus per Rhoads and Block (2007) treatment. It has numerous erect to ascending spikes loosely arranged along the stem. Spikes typically have a few staminate flowers at the tip and pistillate flowers below (androgynous). Leaves are basally disposed with 3 to 5 leaves on the lower ¼ of the stem. They range from 1 to 3 mm in width, 20 inches in length, and do not usually overtop the flowering stems. Stem leaf sheaths tightly wrap the stem and are typically copper-colored. Bases are wrapped in a brown sheath that is not fibrous. *Carex prairea* fruits in the late spring through early summer. Spikes usually contain a few to several perigynia that are appressed to ascending and overlapping on the stalk. Perigynia are 2.5 to 4 mm long, 1.1 to 1.4 mm wide, light to dark brown or yellowish at maturity, convex, and strongly 6 to 9-veined on the outer surface. Achenes are 1.2 to 2 mm long, 0.7 to 1 mm wide, flattened, and taper to a stalk-like base. *Carex prairea* is typically found in Pennsylvania in wet calcareous marshes and fens, scattered throughout (Rhoads and Block, 2007; Minnesota Wildflowers, 2022).

Lathyrus palustris is a rhizomatous perennial in the Fabaceae (Pea Family). It has flowers in clusters of 2 to 6 that are on long, naked stems arising from the leaf axils. Individual flowers are ¾ of an inch long and vary from deep pink to purple to blue. Leaves are alternate and compound in two to four pairs. Each leaflet is generally elliptical, up to 2.5 inches long and 1.5 inches wide. There is a tendril at the end of the leaf stem that entwines around other plants. The pair of leafy appendages (stipules) attached to the stem at the leaf joint are small and narrow, pointed at both ends with the upper portion nearly twice as long as the lower, in outline shaped like half of an arrowhead. Stems are usually winged and hairless. *Lathyrus palustris* flowers from June until August and is reported along shores, within moist meadows, sandplains, swamps and thickets, scattered throughout Pennsylvania (Rhoads and Block, 2007; Minnesota Wildflowers, 2022).

Methods

A visual-encounter survey was performed by Davey Resource Group (DRG) botanists David M. Kunz and Jamie Morgan on July 5, 6, and 7 of 2022 for the four targeted rare plant species and single rare plant community. The "Survey Area" included 10 feet from the existing boardwalk edge, 20 feet from the center line of the proposed new connector trail, and 100 feet from the three boardwalk bridges (i.e. two existing and one proposed) to account for potential equipment staging areas (see Figures in Attachment 1). Mr. Kunz (Permit #21-619) and Ms. Morgan (Permit #22-520) are PA DCNR approved Pennsylvania Wild Plant Management Permitees, and the survey was conducted in accordance with the PA DCNR "Protocols for Conducting Surveys for Plant Species of Special Concern." Rhoads and Block (2007) and Gleason and Cronquist (1991) were referenced to confirm species identifications. Plant specimens were generally identified in the field using hand lenses (10x-20x magnification). Specimens not readily identifiable in the

field were photographed, collected, and examined further using low magnification dissecting microscopes (0.7x to 40x magnification). All plant species identifiable at the time survey were recorded and added to a comprehensive plant species inventory of the Survey Area. All plant species identified were checked for rarity status against the PA Natural Heritage Program List of rare plant species.

Results

The Project Area consists of emergent, riparian graminoid dominated marshes as well as scrub-shrub and forested wetlands toward the periphery of the overall wetland complex. The peripheral forested wetlands contain a canopy dominated by *Acer negundo* (box-elder maple), *Acer saccharinum* (silver maple), and *Salix nigra* (black willow). The scrub-shrub wetlands are dominated by *Cornus sericea* (red-osier dogwood), *Cornus amomum* (silky dogwood), *Ribes hirtellum* (northern wild gooseberry), *Viburnum opulus* (guelder rose), *Viburnum dentatum* (southern arrowwood), *Alnus incana* (speckled alder) and *Sambucus canadensis* (American black elderberry). The interior emergent marshes are dominated by *Phalaris arundinacea* (reed canarygrass), *Typha latifolia* (broadleaf cat-tail), and *Carex trichocarpa* (hairy-fruited sedge). *Symplocarpus foetidus* (skunk cabbage) and *Thelypteris palustris* (marsh fern) frequently occurred within the sedge dominated meadows. The edges of the marsh and forested and scrub-shrub wetlands contained *Pastinaca sativa* (wild parsnip), *Conium maculatum* (poison hemlock), *Angelica atropurpurea* (purple-stemmed angelica) and *Eutrochium purpureum* (Joe-pye-weed). Representative photographs from the survey are provided in Attachment 4 with an associated Photo Location Map provided in Attachment 1, Figure 3.

No rare, threatened or endangered species were observed within the Project Area. In total, 113 different plant species were identified to the species level and are collectively listed on the plant species inventory provided in Attachment 3. These included thirteen species of *Carex* spp., however none of these included the three Pennsylvania State-listed *Carex* spp. reported within the vicinity of the Project Area by PA DCNR. Some of the more unique species of *Carex* observed are discussed below.

Carex utriculata was common in portions of graminoid marsh occurring north of the western most boardwalk entrance from the Nature Center and southeast of the bridge over Thompson Run. This species is classified within section Vesicariae of the *Carex* genus (Rhoads and Block, 2007), which contains five Pennsylvania state listed *Carex* spp., including *Carex oligosperma*, *Carex retrorsa*, *Carex bullata*, *Carex schweinitzii* and *Carex pseudocyperus*. *Carex utriculata* was distinct from these relatives as it formed colonies from creeping rhizomes and exhibited smooth pistillate scale margins, flat leaves, perigynia bodies under 4mm wide and beaks under 2mm long, with distinctly separated staminate vs. pistillate spikes.

Carex trichocarpa dominated large areas of marsh in the central portions of the site, north of the boardwalk and adjacent to Slab Cabin Run. This species is classified within section Carex of the *Carex* genus (Rhoads and Block, 2007). *Carex trichocarpa* is distinguishable from similarly classified *Carex* spp. by its pubescent perigynia and vegetative shoots with a solid pith.

Two *Carex* spp. were observed from section Paludosae of Carex genus (Rhoads and Block, 2007): *Carex pellita* (woolly sedge) and *Carex lacustris* (lake-bank sedge). Of these, *Carex pellita* was observed in the southwestern portion of the Project Area. Although it is not a listed species, it is very similar to the target species *Carex lasiocarpa* (also in the Paludosae) but lacks the permanently folded and very narrow (not surpassing 1.5 mm when folded) leaves. *Carex lacustris* differs from both *Carex pellita* and *Carex lasiocarpa* by having glabrous perigynia, ligules up to 40mm long, and elongate perigynia from ~5 to 7mm long.

Two *Carex* spp. from section Ovales of the Carex genus were observed (*Carex cristatella* and Carex *festucacea*) but these differed from the target species *Carex bebbii* by having either globose spikes with loose leaf sheaths (*Carex cristatella*) or with tight sheaths, open inflorescences and perigynia greater than 2mm wide (*Carex festucacea*). No sedges meeting the description for *Carex bebbii* were observed in the Project Area.

A portion of the Site that was known by Millbrook Marsh staff to contain rare fen species was investigated for reference during the survey. In this location, species meeting the descriptions of the three target species (*Carex prairea*, *Carex bebbii*, and *Carex lasiocarpa*) were observed. Collectively forming the "Sedge - Mixed Forb Fen" plant community, this area represents the current special concern resource reported by PA DCNR per PNDI-727028. This Sedge - Mixed Forb Fen community is relatively small and isolated, and located more than 400 feet from the southern boardwalk terminus. Lastly, no sign of the target species *Lathyrus palustris* occurred at any location within the Survey Area or any other portion of the Site visited by the surveyors.

Conclusions

No Pennsylvania State-listed or Federal-listed plant species were observed within the Survey Area. The Sedge - Mixed Forb Fen community, where three of the target species were observed, is far removed from the Project's Survey Area. Therefore, it is not anticipated that the Millbrook Marsh Nature Center Boardwalk Replacement activities will adversely impact rare plant species or populations.

References

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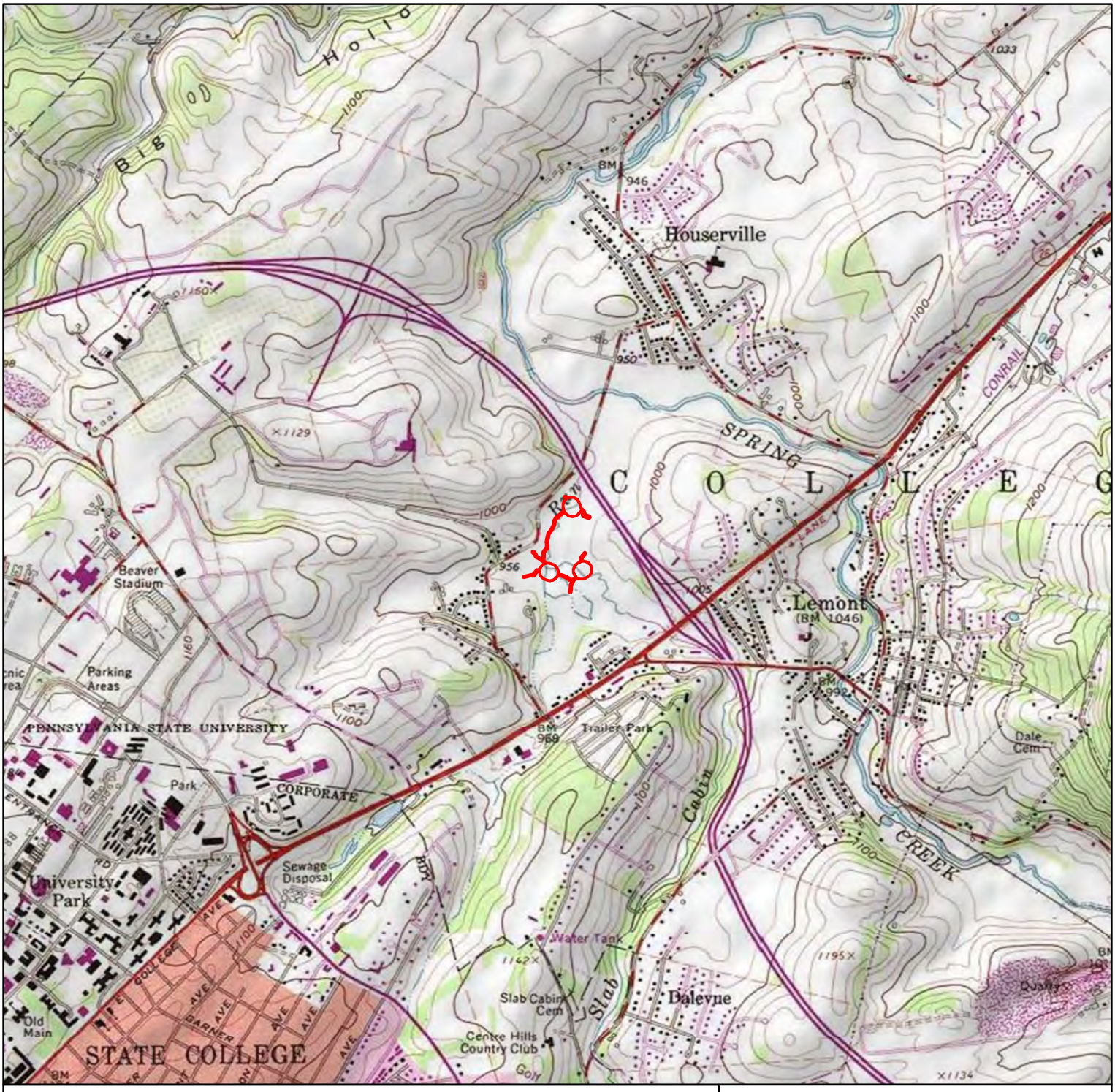
Attachment 1 – Figures

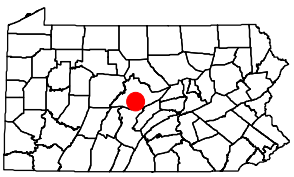


Legend

Survey Area

N
W E
S

Latitude and Longitude Coordinates in NAD83 for the approximate center of project - N: 40° 48‘ 52.740“ / W: 77° 50‘ 05.666“



Site Location

Source:
National Geographic Society (NGS) USA Topographic Maps, seamless, scanned images of United States Geological Survey (USGS) paper topographic maps, State College PA Quadrangle, copyright 2013, distributed as a web mapping service by ESRI® Data & Maps, California, 2021.

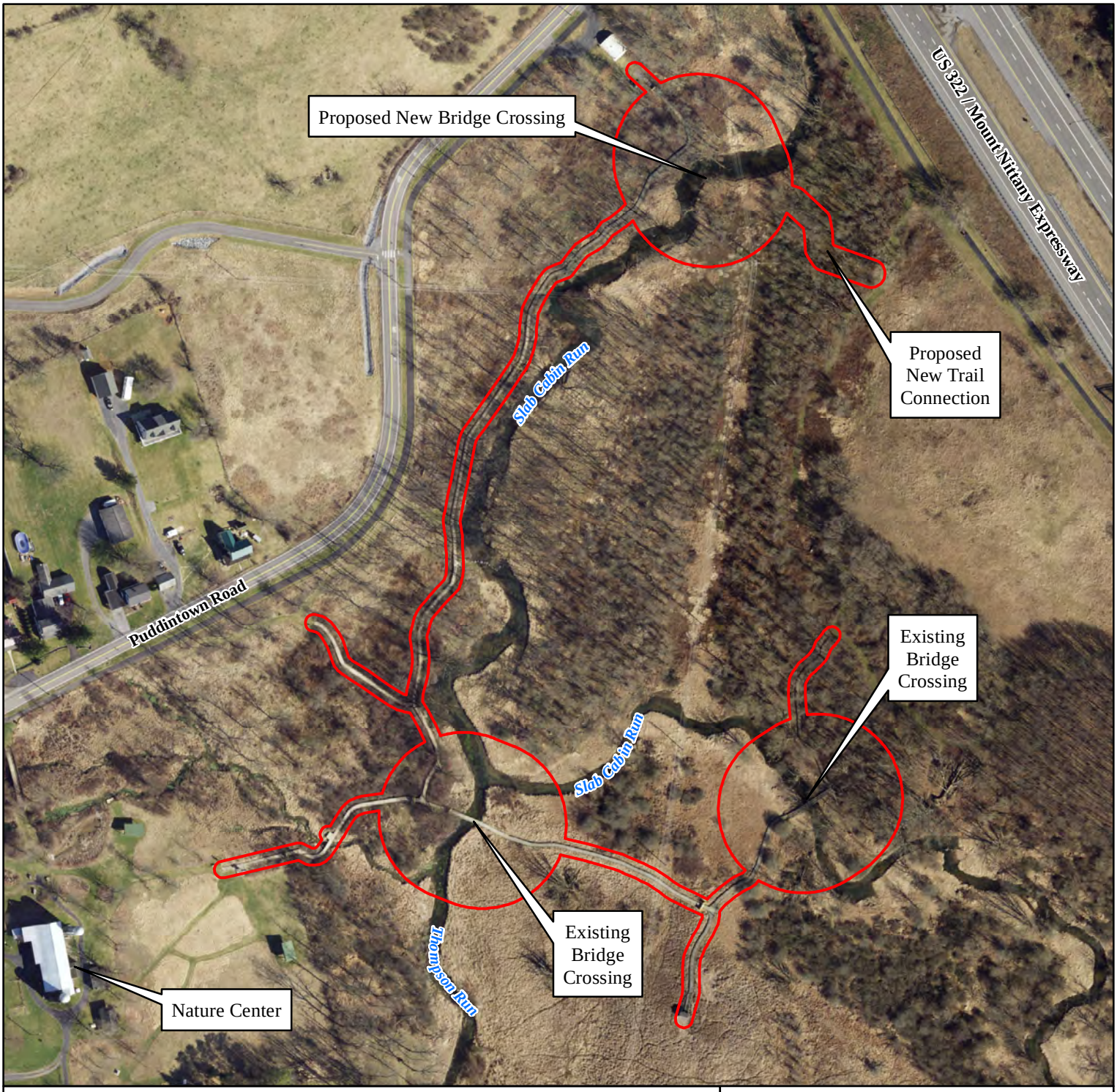
Figure 1
USGS Site Location Map

Millbrook Marsh Nature Center
548 Puddintown Road
State College
Centre County, Pennsylvania

DRGNJ Project #4797

2,000
Feet

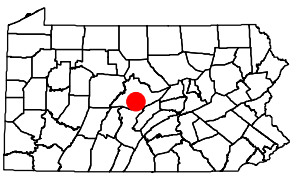
DAVEY Resource Group



Legend

Survey Area

N
W E
S



Site Location

Source:
2020 Color Orthophotos of Centre County, Pennsylvania, Pennsylvania Aerial Imagery Program, 4-band orthoimagery with a 15-cm (6-inch) ground pixel resolution, Pennsylvania Emergency Management Agency (PEMA), distributed by Pennsylvania Spatial Data Access (PASDA), 2022.

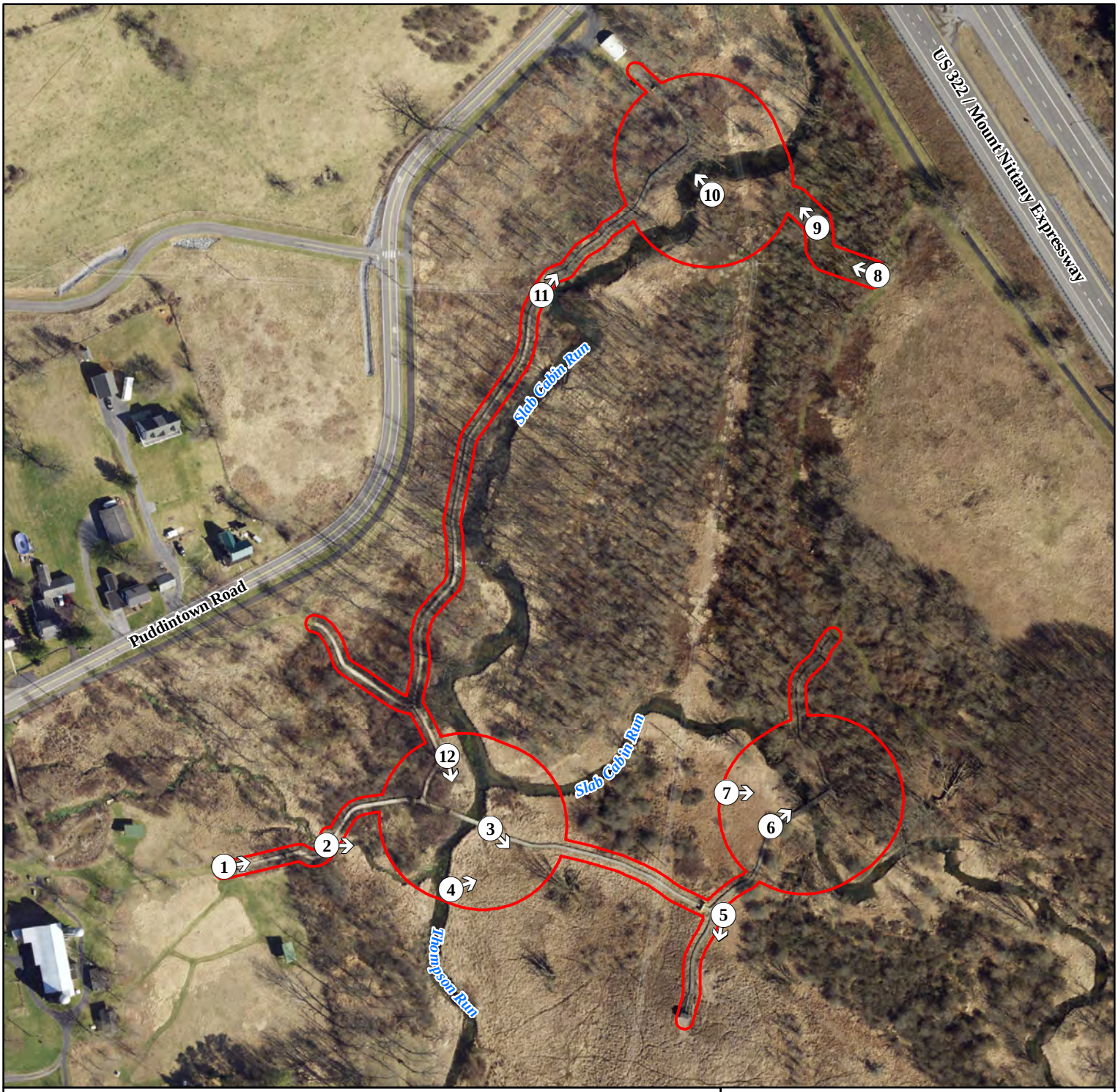
Figure 2
Survey Area Map

Millbrook Marsh Nature Center
548 Puddintown Road
State College
Centre County, Pennsylvania

DRGNJ Project #4797

200
Feet

DAVEY Resource Group



Legend

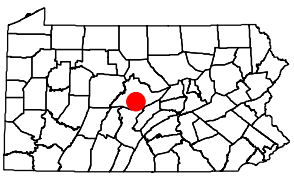
Survey Area

Photo Location

N

W E

S



Site Location

Source:
Photograph Locations provided by Davey Resource Group based on photographs taken in the field July 2022.
2020 Color Orthophotos of Centre County, Pennsylvania, Pennsylvania Aerial Imagery Program, 4-band orthoimagery with a 15-cm (6-inch) ground pixel resolution, Pennsylvania Emergency Management Agency (PEMA), distributed by Pennsylvania Spatial Data Access (PASDA), 2022.

Figure 3
Photo Location Map

Millbrook Marsh Nature Center
548 Puddintown Road
State College
Centre County, Pennsylvania

DRGNJ Project #4797

200

Feet

DAVEY Resource Group

Attachment 2 – Correspondence

1. PROJECT INFORMATION

Project Name: **Millbrook Marsh Boardwalk Draft PNDI**
Date of Review: **2/8/2021 10:31:44 AM**
Project Category: **Recreation, Trails & Trailheads (parking, etc.)**
Project Area: **0.96 acres**
County(s): **Centre**
Township/Municipality(s): **COLLEGE TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **STATE COLLEGE**
Watersheds HUC 8: **Bald Eagle**
Watersheds HUC 12: **Slab Cabin Run**
Decimal Degrees: **40.813489, -77.834723**
Degrees Minutes Seconds: **40° 48' 48.5594" N, 77° 50' 5.29" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Millbrook Marsh Boardwalk Draft PNDI

Project Boundary

Buffered Project Boundary

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Millbrook Marsh Boardwalk Draft PNDI

Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Does the following statement apply to this project? The project area HAS been investigated by someone qualified to identify and delineate wetlands, and wetlands or streams were located, and some project activities will or might occur within 300 feet of a wetland or stream.
Your answer is: Yes

Q2: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: Someone qualified to identify and delineate wetlands has investigated the site, and determined that wetlands ARE located in or within 300 feet of the project area. (A written report from a wetland specialist, and detailed project maps should document this.)

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: https://conservationexplorer.dcnr.pa.gov/content/survey-protocols)

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Carex bebbii	Bebb's Sedge	Endangered	Threatened	Fruits June - July
Carex lasiocarpa	Slender Sedge	Special Concern Species*	Special Concern Species*	Fruits June - August
Carex prairea	Prairie Sedge	Threatened	Threatened	Fruits June - July

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Lathyrus palustris	Vetchling	Special Concern Species*	Endangered	Flowers June- August
Sedge - Mixed Forb Fen	Sedge - Mixed Forb Fen	Special Concern Resource*	Special Concern Resource*	

PA Fish and Boat Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:
No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION). For projects showing "Potential Impacts" with USFWS, please send project information to that agency by email IR1_ESPenn@fws.gov *(preferred) or regular mail.*

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

Attachment 3 – Botanical Inventory List

Botanical Inventory List
Millbrook Marsh Nature Center Boardwalk Replacement
State College, Centre County, Pennsylvania
Recorded July 5, 6, and 7, 2022

Scientific Name	Common Name	Native (N) / Invasive (I)	Federal Status	State Status *	Proposed State Status
Acer ginnala	Amur maple	I	--	--	--
Acer negundo	Box-elder	N	--	--	--
Acer saccharinum	Silver maple	N	--	--	--
Ailanthus altissima	Tree-of-heaven	I	--	--	--
Alnus incana	Speckled alder	N	--	--	--
Ambrosia trifida	Giant ragweed	N	--	--	--
Angelica atropurpurea	Purple-stemmed angelica	N	--	--	--
Apocynum cannabinum	Indian-hemp	N	--	--	--
Arctium minus	Lesser burdock	I	--	--	--
Asclepias exaltata	Poke milkweed	N	--	--	--
Asclepias incarnata	Swamp milkweed	N	--	--	--
Bidens sp.	Beggarticks	N	--	--	--
Bromus inermis	Smooth brome	I	--	--	--
Calystegia sepium	Hedge false bindweed	N	--	--	--
Cardamine impatiens	Narrowleaf bitter cress	I	--	--	--
Carex annectens	Yellow fruited sedge	N	--	--	--
Carex cristatella	Crested sedge	N	--	--	--
Carex festucacea	Fescue sedge	N	--	--	--
Carex granularis	Limestone meadow sedge	N	--	--	--
Carex lacustris	Lake-bank sedge	N	--	--	--
Carex laxiflora	Loose-flowered sedge	N	--	--	--
Carex pellita	Woolly sedge	N	--	--	--
Carex radiata	Stellate sedge	N	--	--	--
Carex rosea	Rose sedge	N	--	--	--
Carex stricta	Tussock sedge	N	--	--	--
Carex trichocarpa	Hairy-fruited sedge	N	--	--	--
Carex utriculata	Bottle-shaped sedge	N	--	--	--
Carex vulpinoidea	Fox sedge	N	--	--	--
Celastrus orbiculatus	Oriental bittersweet	I	--	--	--
Cercis canadensis	Eastern redbud	N	--	--	--
Circaea lutetiana	Broad-leaf enchanter's-nightshade	N	--	--	--
Cirsium arvense	Canada thistle	I	--	--	--
Cirsium vulgare	Bull-thistle	I	--	--	--
Conium maculatum	Poison-hemlock	I	--	--	--

Botanical Inventory List
Millbrook Marsh Nature Center Boardwalk Replacement
State College, Centre County, Pennsylvania
Recorded July 5, 6, and 7, 2022

Scientific Name	Common Name	Native (N) / Invasive (I)	Federal Status	State Status *	Proposed State Status
Cornus amomum	Silky dogwood	N	--	--	--
Cornus rugosa	Round-leaved dogwood	N	--	--	--
Cornus sericea	Red-osier dogwood	N	--	--	--
Securigera varia	Crown-vetch	I	--	--	--
Dactylis glomerata	Orchardgrass	I	--	--	--
Desmodium canadense	Showy tick-trefoil	N	--	--	--
Dipsacus fullonum	Fuller's thistle	I	--	--	--
Elaeagnus umbellata	Autumn-olive	I	--	--	--
Epilobium parviflorum	Willowherb	N	--	--	--
Erechtites hieraciifolius	American burnweed	N	--	--	--
Erigeron strigosus	Daisy fleabane	N	--	--	--
Eupatorium perfoliatum	Boneset	N	--	--	--
Eutrochium purpereum	Joe-pye-weed	N	--	--	--
Galium aparine	Stickywilly	N	--	--	--
Galium tinctorium	Stiff marsh bedstraw	N	--	--	--
Glyceria grandis	American manna grass	N	--	--	--
Heliopsis helianthoides	Ox-eye	N	--	--	--
Hesperis matronalis	Dame's-rocket	I	--	--	--
Hydrilla verticillata	Hydrilla	I	--	--	--
Hypericum punctatum	Spotted St. John's-wort	N	--	--	--
Impatiens capensis	Jewelweed	N	--	--	--
Impatiens pallida	Pale jewelweed	N	--	--	--
Juglans nigra	Black walnut	N	--	--	--
Juncus effusus	Common rush	N	--	--	--
Juncus tenuis	Path rush	N	--	--	--
Lactuca sp.	Lettuce	N	--	--	--
Laportea canadensis	Wood-nettle	N	--	--	--
Lapsana communis	Nipplewort	I	--	--	--
Leersia oryzoides	Rice cutgrass	N	--	--	--
Ligustrum vulgare	Common privet	I	--	--	--
Lonicera maackii	Amur honeysuckle	I	--	--	--
Lonicera morrowii	Morrow's honeysuckle	I	--	--	--
Lycopus americanus	Water-horehound	N	--	--	--
Lysimachia nummularia	Creeping jenny	I	--	--	--

Botanical Inventory List
Millbrook Marsh Nature Center Boardwalk Replacement
State College, Centre County, Pennsylvania
Recorded July 5, 6, and 7, 2022

Scientific Name	Common Name	Native (N) / Invasive (I)	Federal Status	State Status *	Proposed State Status
Lythrum salicaria	Purple loosestrife	I	--	--	--
Melissa officinalis	Lemon-balm	I	--	--	--
Mentha spicata	Spearmint	I	--	--	--
Myosotis laxa	Wild forget-me-not	N	--	--	--
Nasturtium officinale	Watercress	I	--	--	--
Nepeta cataria	Catnip	I	--	--	--
Parthenocissus quinquefolia	Virginia-creeper	N	--	--	--
Pastinaca sativa	Wild parsnip	I	--	--	--
Persicaria amphibia var. *emersa*	Water smartweed	N	--	--	--
Persicaria sagittata	Arrowleaf tearthumb	N	--	--	--
Persicaria virginiana	Jumpseed	N	--	--	--
Phalaris arundinacea	Reed canary-grass	N	--	--	--
Phleum pratense	Timothy	I	--	--	--
Pilea pumila	Clearweed	N	--	--	--
Plantago lanceolata	English plantain	I	--	--	--
Potamogeton crispus	Curly pondweed	I	--	--	--
Pyrus calleryana	Callery pear	I	--	--	--
Quercus alba	White oak	N	--	--	--
Quercus palustris	Pin oak	N	--	--	--
Ranunculus acris	Tall buttercup	I	--	--	--
Ranunculus repens	Creeping buttercup	I	--	--	--
Rhamnus cathartica	Buckthorn	I	--	--	--
Ribes hirtellum	Northern wild gooseberry	N	--	N	--
Rosa multiflora	Multiflora rose	I	--	--	--
Rubus occidentalis	Black-cap raspberry	N	--	--	--
Rumex obtusifolius	Bitter dock	I	--	--	--
Salix nigra	Black willow	N	--	--	--
Sambucus canadensis	American black elderberry	N	--	--	--
Sanicula canadensis	Canadian sanicle	N	--	--	--
Scirpus hattorianus	Mosquito bulrush	N	--	--	--
Securigera varia	Crownvetch	I	--	--	--
Setaria faberi	Japanese bristlegrass	I	--	--	--
Solanum dulcamara	Bittersweet nightshade	I	--	--	--
Solidago gigantea	Giant goldenrod	N	--	--	--

Botanical Inventory List
Millbrook Marsh Nature Center Boardwalk Replacement
State College, Centre County, Pennsylvania
Recorded July 5, 6, and 7, 2022

Scientific Name	Common Name	Native (N) / Invasive (I)	Federal Status	State Status *	Proposed State Status
Symplocarpus foetidus	Skunk cabbage	N	--	--	--
Teucrium canadense	American germander	N	--	--	--
Typha latifolia	Broadleaf cattail	N	--	--	--
Urtica dioica	Great nettle	I	--	--	--
Verbascum blattaria	Moth mullein	I	--	--	--
Verbena hastata	Blue vervain	N	--	--	--
Verbena urticifolia	White vervain	N	--	--	--
Verbesina alternifolia	Wingstem	N	--	--	--
Viburnum dentatum	Southern arrowwood	N	--	--	--
Viburnum opulus	Guelder-rose	I	--	--	--
Vitis vulpina	Frost grape	N	--	--	--

*N = No current legal status, but is under study for future listing.

Attachment 4 – Site Photographs

Photo 1 – View east, entering the marsh from the Millbrook Marsh Nature Center.

Photo 2 – View east, of an emergent, *Carex* spp. dominated marsh where a small unnamed tributary to Thompson Run flows.

Photo 3 – View southeast, of the *Typha latifolia*, *Phalaris arundinacea,* and *Carex* spp. marsh, southeast of the proposed bridge replacement over Thompson Creek.

Photo 4 – View northeast, of the boardwalk bridge over Thompson Run to the left, surrounded by the *Carex utriculata* dominated sedge meadow.

Photo 5 – View south, of the *Carex trichocarpa* / *Phalaris arundinacea* dominated marsh and the bird blind at the southern terminus of the existing boardwalk. The dark green vegetation surrounding the bird blind is *Typha latifolia*.

Photo 6 – View northeast of the existing boardwalk bridge over Slab Cabin Run. The sedge meadow to the west (left side of the photo) is dominated by *Carex trichocarpa*.

Photo 7 – View southeast, with the boardwalk bridge over Slab Cabin Run visible in the background of the photo. This sedge meadow was dominated by *Carex trichocarpa* and *Phalaris arundinacea*, with *Conium maculatum* visible in the foreground.

Photo 8 – View of the declining *Fraxinus* spp. forest within the proposed new boardwalk connection Survey Area.

Photo 9 – View northwest, of the *Carex trichocarpa* dominated marsh surrounding the proposed new boardwalk connection over Slab Cabin Run, in the northern portion of the Survey Area. *Verbena urticifolia* is visible in the foreground.

Photo 10 – View west of the proposed new bridge crossing over Slab Cabin Run, in the northern portion of the Survey Area. The existing boardwalk that the bridge will tie into is visible in the right background of the photo.

Photo 11 – View north of the existing boardwalk where it parallels Slab Cabin Run, on the northwest side of the Survey Area. *Potamogeton crispus* is observed growing in the river channel. The riparian vegetation has been recently mowed.

Photo 12 – View south at the confluence of Slab Cabin Run and Thompson Run; the bridge over Thompson Run is visible in the background. *Veronica anagallis-aquatica* is visible in the water, and *Sagittaria latifolia* and *Phalaris arundinacea* dominate in the herbaceous marsh.

Photo 13 – Specimens of *Carex pellita* (top), *Carex utricularia* (middle), *Carex trichocarpa* (bottom) collected from the Survey Area for identification using a dissecting microscope.

APPENDIX B

PHASE IA ARCHEOLOGICAL SURVEY BY RICHARD GRUBB & ASSOCAITES

PHASE IA ARCHAEOLOGICAL SURVEY

MILLBROOK MARSH NATURE CENTER BOARDWALK

College Township, Centre County, Pennsylvania

PREPARED FOR:

LAN Associates
252 Main Street
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August 2022

RICHARD
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PHASE IA ARCHAEOLOGICAL SURVEY

MILLBROOK MARSH NATURE CENTER BOARDWALK

College Township, Centre County, Pennsylvania

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EXECUTIVE SUMMARY

Richard Grubb & Associates, Inc. conducted a Phase IA archaeological survey for proposed improvements to the Millbrook Marsh Nature Center in College Township, Centre County, Pennsylvania. The Area of Potential Effects (APE) for the project lies within the 62-acre nature center, which includes a 12-acre farmstead and an adjacent 50-acre wetlands area. The project may involve partial federal funding and therefore, require a permit from the U.S. Army Corps of Engineers (USACE). The project may also be subject to a Pennsylvania Department of Environmental Protection (PADEP) permit. As such, the Phase IA archaeological survey will be sufficient to initiate agency coordination under the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, and/or the appropriate Pennsylvania state regulation and the Pennsylvania History Code.

According to the results of the background research, eight archaeological sites have been previously recorded within the APE and three cultural resources investigations have been completed within or adjacent to the APE. The APE is relatively level and consists of floodplains and uplands adjacent to two streams (Slab Cabin Run and Thompson Run) that meander throughout the APE, intersecting in the southwestern portion. Map-documented historic buildings lie extant along the western edge of the APE and include those associated with the Millbrook Site Farmstead, which are now part of the nature center. Given the results of the background research and fieldwork, all of the APE is assessed with a high to moderate probability for containing intact historic and/or pre-Contact archaeological resources. This assessment is consistent with the PA-SHARE predictive model which designates the entire APE as having a high to moderate sensitivity for pre-Contact sites.

A Phase IB archaeological survey is recommended for the areas of the APE that may sustain ground disturbing activities associated with the proposed improvements. Any Phase IB archaeological survey testing strategy will be determined in consultation with the Pennsylvania State Historic Preservation Office.

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1.0 INTRODUCTION

Richard Grubb & Associates, Inc. (RGA) completed a Phase IA archaeological survey for proposed improvements to the Millbrook Marsh Nature Center in College Township, Centre County, Pennsylvania. The Area of Potential Effects (APE) for the project lies within the 62-acre nature center, which includes a 12-acre farmstead and an adjacent 50-acre wetlands area (Figures 1.1 and 1.2).

The Phase IA archaeological survey was conducted to assess the sensitivity of the APE to contain archaeological resources potentially eligible for listing in the National Register of Historic Places (NRHP) and to recommend further archaeological survey, if warranted (i.e., Phase IB survey) (Appendix A). The work included background research, a pedestrian reconnaissance of the APE, and report writing. Evan Robinson M.A., RPA conducted the fieldwork and authored the report. Alvin Banguilan and Catherine Smyrski served as report editors, Ms. Smyrski formatted the report with assistance from Stephanie Grubb, and Richard C. Grubb provided quality control oversight. Copies of the report and all field notes, photographs, and project maps are on file at the offices of RGA in Cranbury, New Jersey.

1.1 Regulatory Context

It is the understanding of RGA that consultation with the Pennsylvania State Historic Preservation Office (PA SHPO) has not been initiated. The project may involve federal funding and require a permit from the U.S. Army Corps of Engineers (USACE). The project may also be subject to a Pennsylvania Department of Environmental Protection (PADEP) permit. As such, the Phase IA archaeological survey will be sufficient to initiate agency coordination under the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, and/or the appropriate Pennsylvania state regulation, Environmental Rights Amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988). These regulations require that federal and state agencies consider the effects of their actions on historic properties.

1.2 Project Description

The proposed project is within the Millbrook Marsh Nature Center, which is a 62-acre area consisting of a 12-acre farmstead and adjacent 50-acre wetlands. There are walking paths, boardwalks, and bridges throughout the property. Thompson Run and Slab Cabin Run pass through the acreage from the north to the south. There is a mix of open meadows, wetlands, forest and lawn within the nature center. The property is bounded by State Route 322 to the northeast, East College Avenue to the southeast, and Puddintown Road along the entire western side of the property (Figure 1.3). The proposed improvements are related to trail maintenance and boardwalk construction and renovation; the linear nature of the APE relates to the locations of proposed work (see Figures 1.1, 1.2, and 1.3).

1.3 Area of Potential Effects

The APE is defined in 36 CFR 800.16(d) as "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 such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects cause[d] by the undertaking." The APE includes locations that potentially may be impacted by construction, or that may experience effects once construction is completed. The APE for the proposed undertaking is along linear transects within the 62-acre park where there will be reconstruction of a boardwalk along with other trail maintenance and renovations (Figure 1.4).

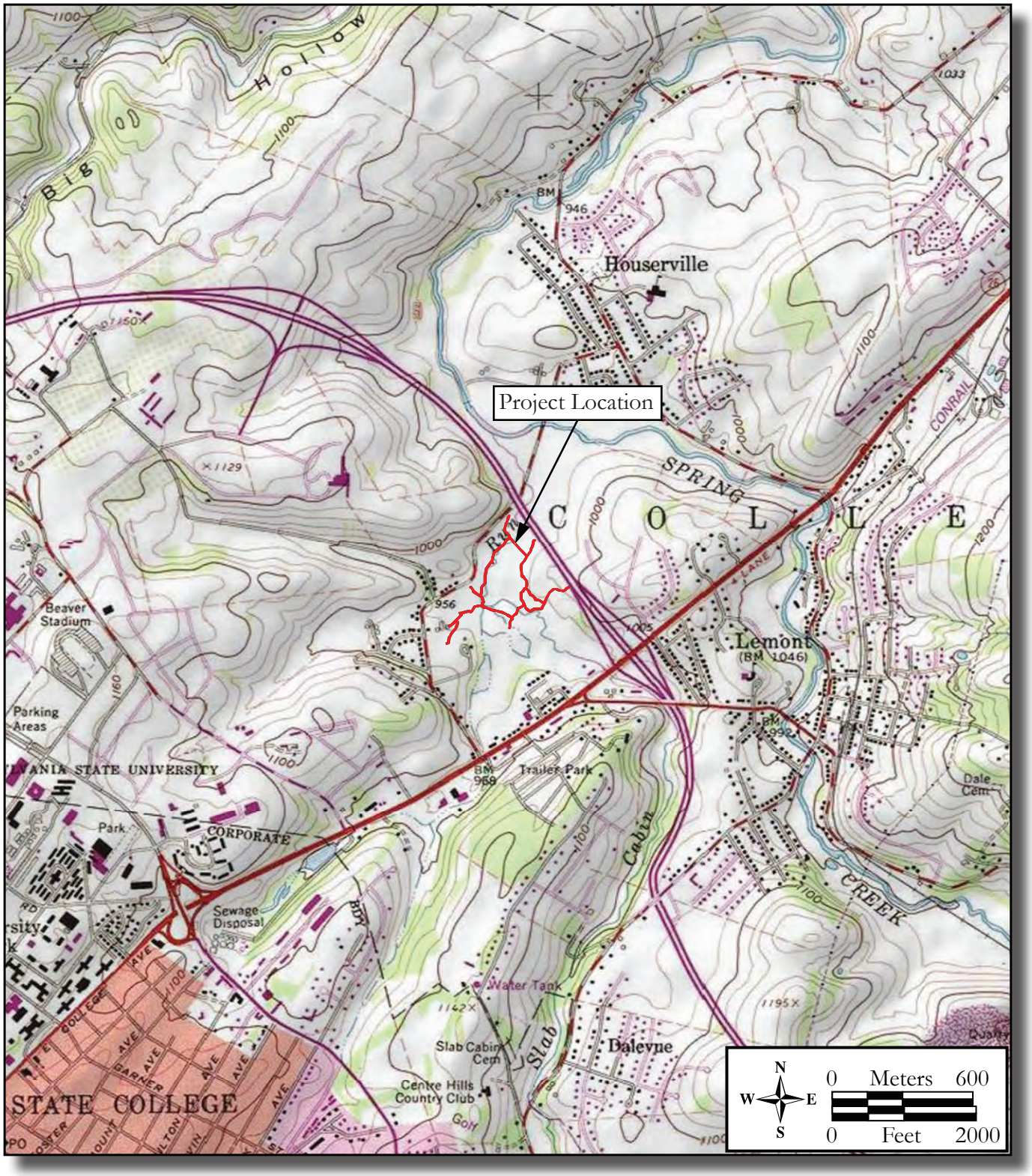


Figure 1.1: U.S.G.S. map
(1997 U.S.G.S. 7.5' Quadrangle: State College, PA).

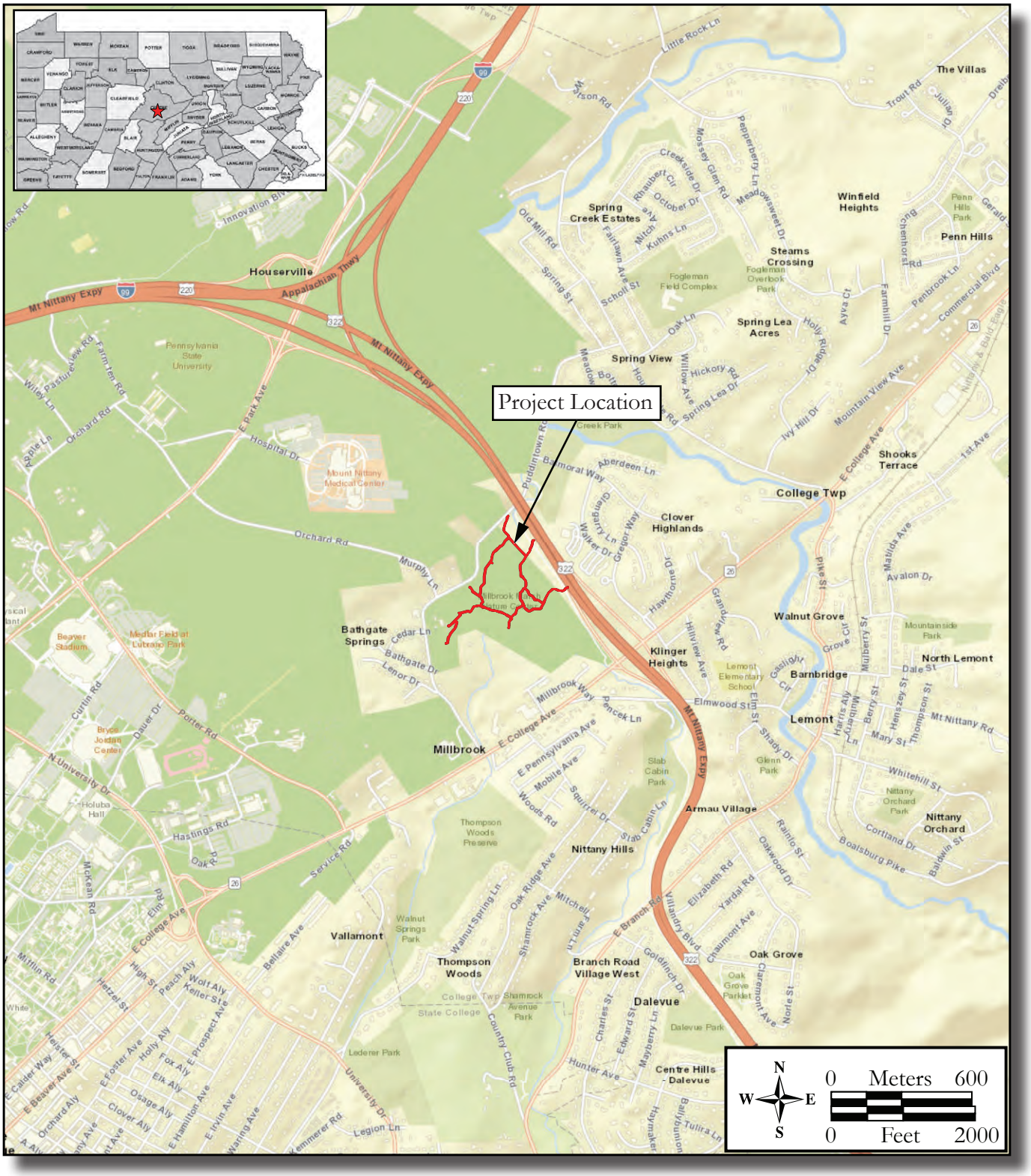


Figure 1.2: Road map
(World Street Map, ESRI 2013).

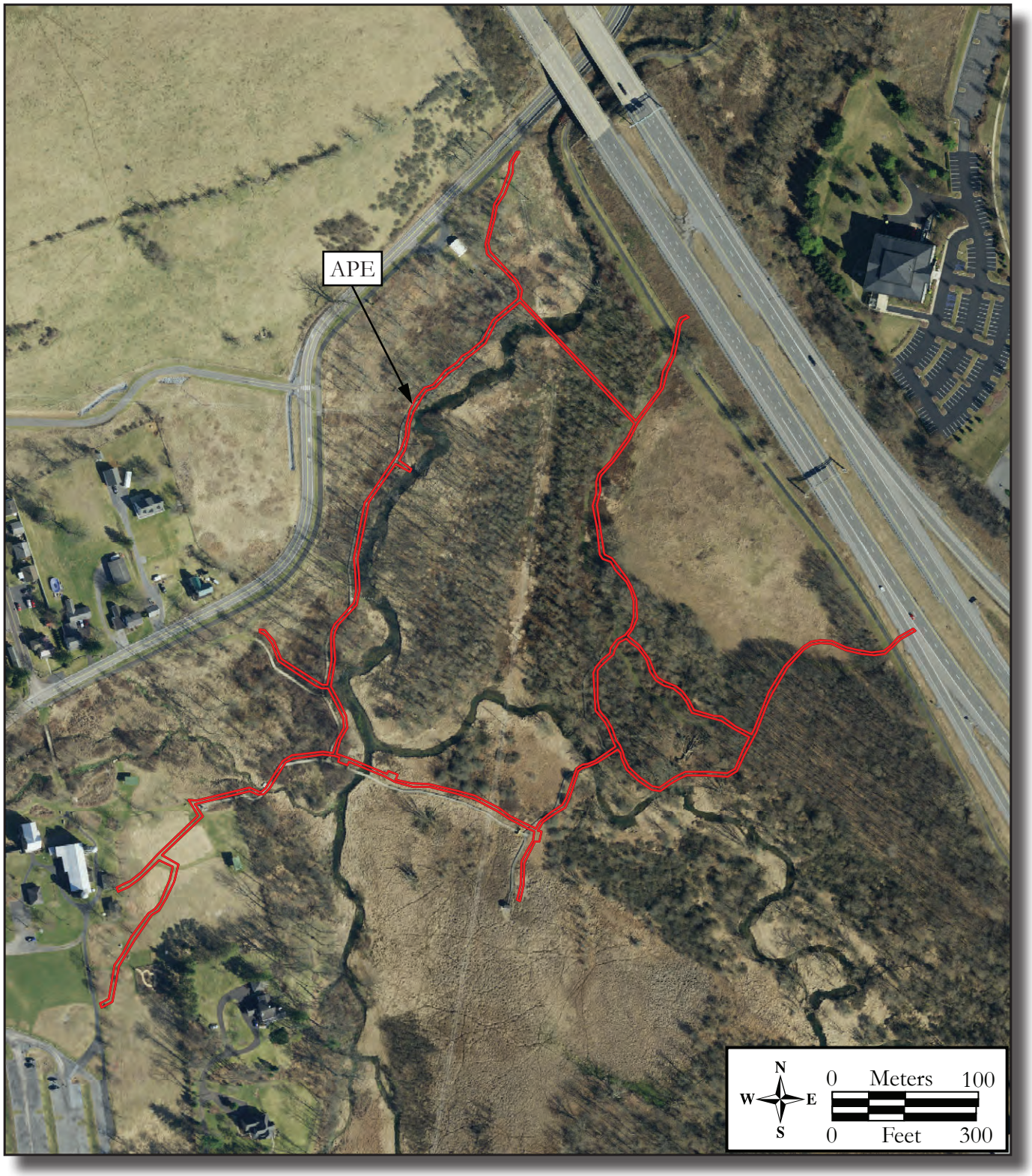


Figure 1.3: Aerial map
(Pennsylvania Emergency Management Agency, Aerial Images 2018-2020).

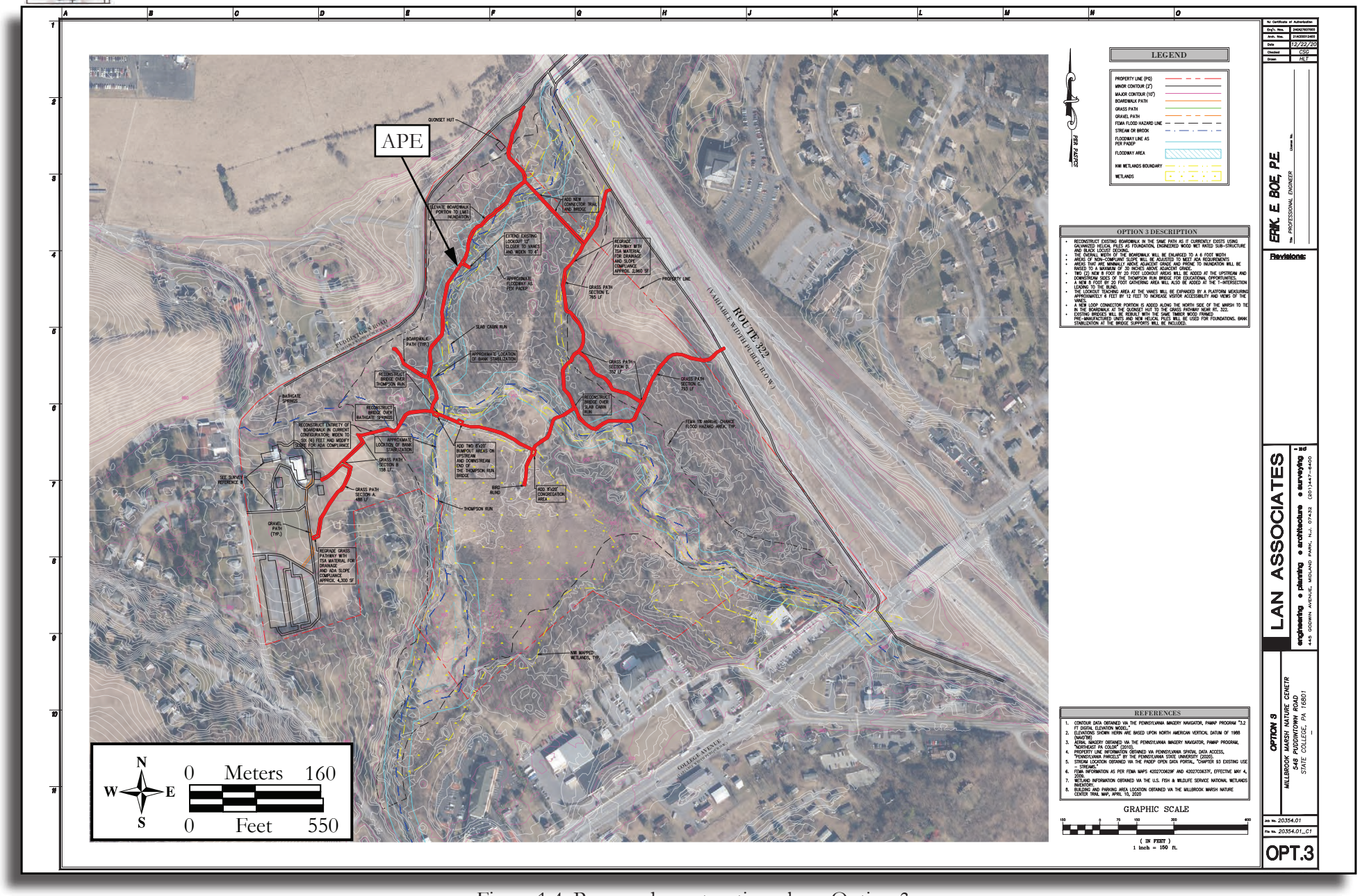


Figure 1.4: Proposed construction plans, Option 3 (from Lan Associates).

2.0 PROJECT APPROACH

The Phase IA archaeological survey was conducted in accordance with the requirements set forth by the PA SHPO (2017). The research design focused on determining the sensitivity for significant archaeological resources within the APE.

The Phase IA archaeological survey included documentary research and a map and atlas review to understand the pre-Contact and historic development and land use of the APE. Eighteenth- and nineteenth-century maps were georeferenced based on the location of present-day streets. Research at repositories and other facilities was not possible due to restrictions and closures associated with the COVID-19 pandemic. However, a good faith effort was made to conduct additional background research consisting of a review of pertinent primary and secondary sources that are available online. Recorded archaeological sites and previous cultural resources surveys completed in and near the APE were reviewed. The PA-SHARE database was consulted for information regarding documented site locations and reports on prior cultural resources surveys.

A pedestrian reconnaissance was conducted by Evan Robinson on May 19, 2022 to observe and document existing conditions within the APE. Historic maps along with other historic images were reviewed. This information was used to characterize existing conditions in the APE, to identify areas of disturbance as well as portions of the APE where undisturbed soils may be present, and to assess the likelihood for significant pre-Contact and/or historic archaeological resources.

3.0 ENVIRONMENTAL CONTEXT/DESCRIPTION OF THE AREA OF POTENTIAL EFFECTS

Slab Cabin Run and Thompson Run flow through the APE and drain into Spring Creek 0.67 kilometers (0.42 miles) north of the APE. Spring Creek flows generally northeast into Bald Eagle Creek and then into the West Branch Susquehanna River. This branch flows into the Susquehanna River, which empties into the Chesapeake Bay and ultimately the Atlantic Ocean. The APE has a generally level topography measuring 1,000 feet above mean sea level (see Figure 1.1). The vegetation in the APE consists primarily of various grasses, small bushes, and trees.

The APE is in the Appalachian Mountain section of the Ridge and Valley Province (Figure 3.1; Sevon 2000) and consists mainly of long narrow ridges and broad to narrow valleys with some karst. The underlying rock type consists of sandstone, siltstone, shale, conglomerate, limestone, and dolomite. The geologic structure consists of open and closed plunging folds having narrow hinges and planar limbs with a variety of faults. The rolling low hills and valleys developed on red sedimentary rock (Sevon 2000)

Bedrock geology consists of Limestone of the Axemann Formation and Dolomite of the Bellefonte Formation which both are of the Ordovican Age. The Axemann Formation is composed of light-gray, fossilferous, coarsely crystalline limestone interbedded with silty, fine-grained dolomitic limestone. Flint concretions and chert occur throughout the unit (Geyer and Wilshusen 1982). The Bellefonte Formation consists of light- to medium-gray, tan-weathering, very fine grained dolomite (the Tea Creek Member) at its top. At its base, it consists of minor sandstone beds, some chert, and medium-gray, medium-crystalline dolomite (Geyer and Wilshusen 1982).

According to the Natural Resource Conservation Service (NRCS), soils mapped within the APE consist of Hagerstown silt loam (HaA, HaB, HaC) which is well drained, Opequon-Hagerstown complex (OhB and OhD) which is well drained, Dunning silty clay loam (Du), Lindside soil (Lx) which is moderately well drained, Melvin silt loam (Mm) which is poorly drained, and Nolin silt loam (No) which is well drained (Figure 3.2; NRCS 2020).

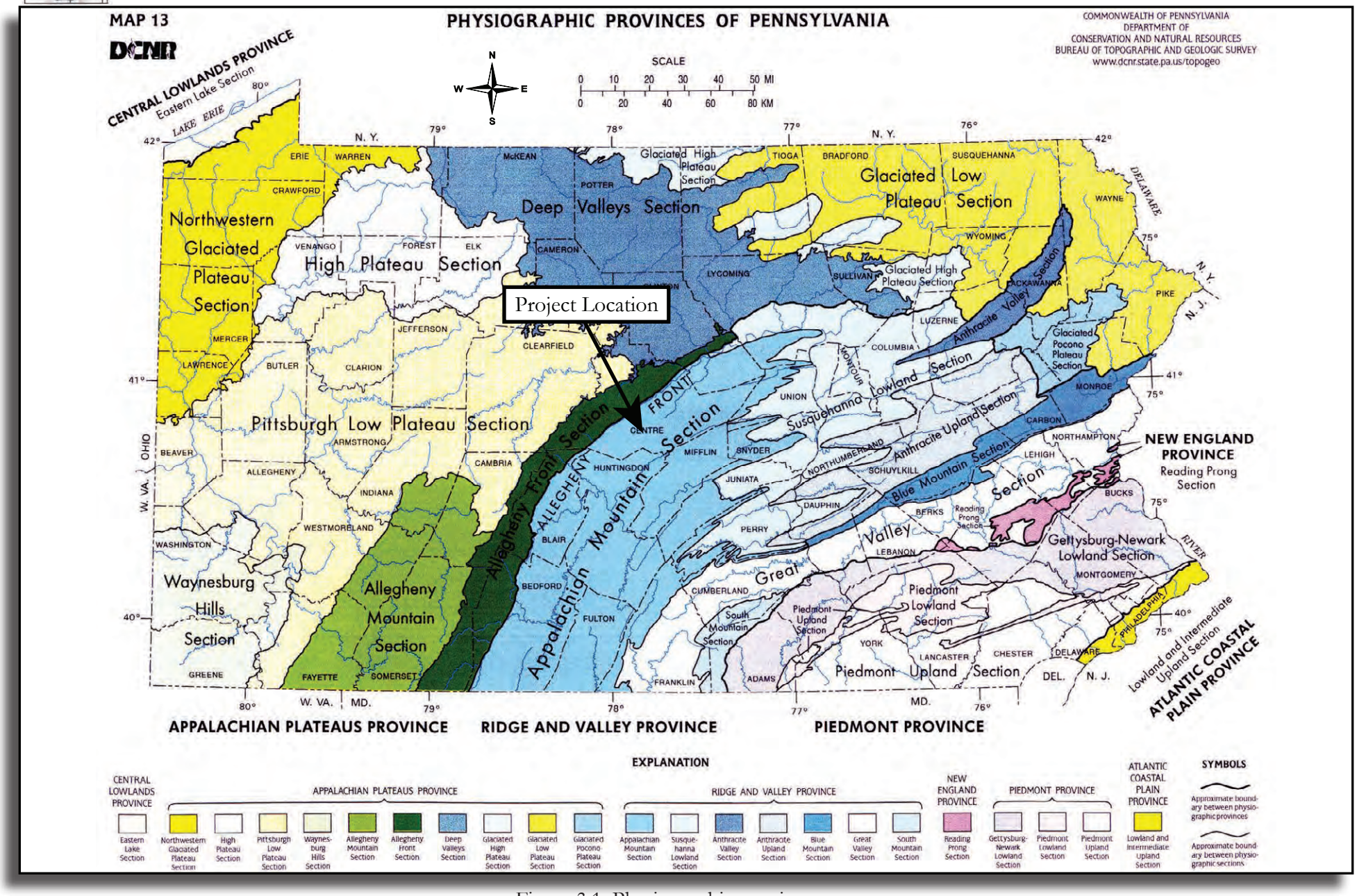


Figure 3.1: Physiographic provinces map
(adapted from W.D. Sevon).

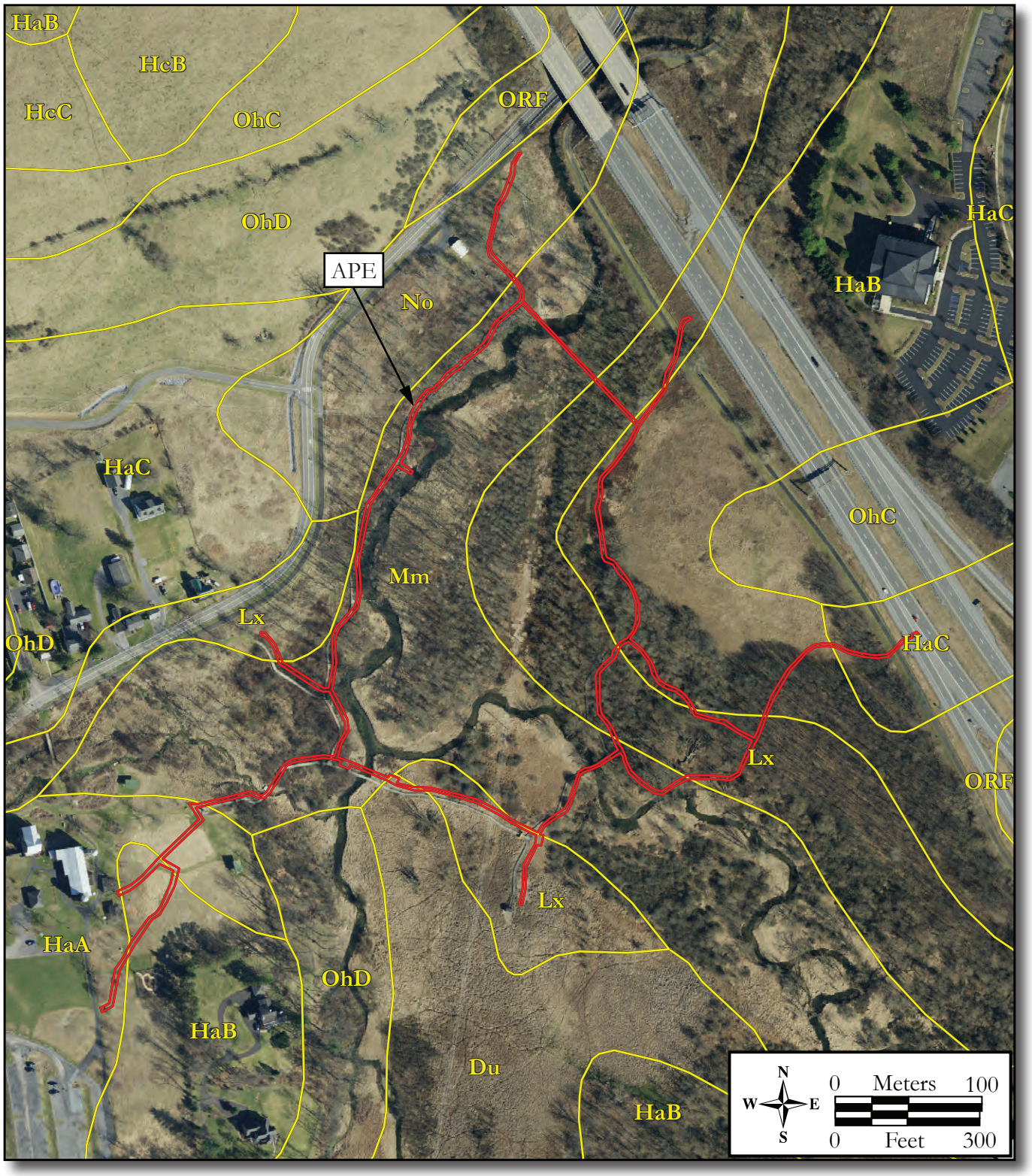


Figure 3.2: Soils map
(2020 Soil Survey Staff, Natural Resource Conservation Service, United States Department of Agriculture. Soil Survey Geographic [SSURGO]).

4.0 BACKGROUND RESEARCH

Background information was used to assess the potential for previously unidentified cultural resources and to establish appropriate cultural contexts that inform on expected archaeological sites and historic resource types. A review of environmental data, historic maps, local and county histories, and historic and modern aerial imagery was conducted to develop a land use history of the APE.

4.1 Regional Pre-Contact Native American Context

The pre-Contact archaeological sites in this region of Pennsylvania represent the remains of settlement and resource exploitation systems that developed over 12,000 years. Archaeologists have divided this time into periods based on hypothesized social and economic changes. Changes in these systems can be seen in site patterning across the landscape and physical changes in the artifacts recovered. Several publications provide an overview of pre-Contact cultures in southeastern Pennsylvania and the surrounding region (Bergman and Doershuk 1994; Carr and Adovasio 2002; Chesler 1982; Cowin 2002; Custer 1984, 1989, 1996; Grossman-Bailey 2001; Harris 2007; Kingsley et al. 1990; Kraft 2001; Raber 1985; Raber and Cowin 2003; Raber et al. 1998; Stewart et al. 1986; Wall et al. 1996). Extensive archaeological research conducted in Pennsylvania and the surrounding region has contributed to our understanding of pre-Contact cultures. Archaeologists have divided the prehistory of eastern North America into three broad periods for the purposes of study: Paleoindian (older than 8000 B.C.), Archaic (8000 B.C. to 1000 B.C.), and Woodland (1000 B.C. to A.D. 1500). The following pre-Contact context provides a brief summary of regional prehistory.

Paleoindian populations occupied Pennsylvania as glaciers retreated and a Holocene environment emerged. People adapted to these changing environmental conditions by living in small, mobile bands of hunter-gatherers, moving across the landscape to make use of the varied resources that were available. Known site patterning data indicates that these people preferred riverine environments, and tended to locate their sites on terraces overlooking rivers or stream valleys (Gingerich 2007). Known Paleoindian sites in Pennsylvania include the Meadowcroft Rockshelter in southwestern Pennsylvania (Carr and Adovasio 2002), the Shoop site in Dauphin County (Custer 1996:80), and the Shawnee-Minisink site in the Upper Delaware Valley (Gingerich 2007).

The Archaic period is marked by the emergence of a fully Holocene environment. Warmer, moister climatic conditions prevailed, and the grasslands familiar to the Paleoindian populations were replaced by mesic forests. Although the Middle Archaic period is not well understood (Custer 1996), certain trends have been identified as representative of the Archaic period. As the environment became more moderate, the available subsistence base expanded. Using specialized toolkits for various environments, Archaic peoples expanded their range of subsistence strategies (Raber et al. 1998; Custer 1996). An increase in the number and size of sites documented in the later portion of Archaic period likely reflects an increasing population. Settlement pattern data indicates that Archaic peoples were more sedentary than those who lived during the Paleoindian period, establishing base camps along major drainage systems and smaller procurement camps in upland areas. Increased social complexity during the Archaic period has been documented, including extensive evidence of trade and exchange, as well as burial ceremonialism.

Intensification of subsistence strategies and use of available resources characterizes the transition from the Archaic to the Woodland period in this area. This includes an increased use of aquatic resources, including fish and shellfish (Schindler 2005; Stewart 1998). Late Archaic groups inhabiting Pennsylvania added the use of quartz, quartzite, argillite, and rhyolite lithic materials to fashion their tools to the cryptocrystalline materials favored during the Paleoindian and Early/Middle Archaic periods (Custer 1996). The use of more varied material may reflect a decrease in band territory size (Custer 1996). Artifacts found at Terminal

Archaic or Transitional period sites include stone bowls and varying projectile point forms. Existing data suggest that there is an increase in the number of small Late Archaic sites found in a wide variety of environmental settings. This site patterning, as well as a reliance on an increased variety of lithic materials, may indicate that small bands were more mobile due to increased population pressure (Custer 1984, 1996). The presence of significant amounts of South Mountain rhyolite in the greater Mid-Atlantic region indicates that people of the Late Archaic/Transitional period in this region had become part of long-distance trade networks.

During the Woodland period, people became increasingly sedentary, establishing macro-band base camps in major drainage floodplains. Although their subsistence strategies shifted to rely increasingly on domesticated cultigens, Woodland populations continued seasonal movements in small groups, hunting and gathering in various environments, including uplands (Custer 1996; Harris 2007; Kraft 2001; Stewart 1995, 1998). The use of ceramic vessels and changes in ceramic technologies generally distinguish the Woodland period from the Archaic, although there is evidence for earlier dates for ceramics in the Delaware Valley (Stewart 2018). There is extensive evidence of trade and exchange by the Early Woodland peoples, as well as examples of extensive burial ceremonialism (Raber and Cowin 2003). A settlement pattern consisting of a series of transient camps and stations surrounding permanent settlements (sometimes surrounded by stockades) has been hypothesized for the Late Woodland cultures of the Delaware River Valley (Kraft 2001; Stewart 1995; Stewart et al. 1986:70-80).

The Woodland period ended with the arrival of Europeans, initially as explorers and traders and ultimately as settlers. During the seventeenth and eighteenth centuries, native populations were decimated by warfare and Old World diseases for which they possessed no biological immunity. Many of those who survived left eastern and central Pennsylvania (Kraft 2001).

4.2 Historic Context

The APE or project limits of disturbance is referred to as the "project location" to account for the imprecision in locating the APE on historic maps of various scales.

College Township, Centre County, in central Pennsylvania, lies in Nittany Valley west of Nittany Mountain. The region surrounding the project location had no written recorded of being visited or settled by European or European-Americans until 1728 when fur traders established a trading post at the headwaters of the Frankstown and Raystown Branches of the Juniata River, which is to the southwest of the project location. As fur-bearing animals were depleted in the east, the traders moved west. European and European-Americans initially used the pre-Contact routes of trade and communication for the movement of goods and people (Jennings 1978:364). Two of these paths passed through the region around the project location. The Penns Creek Path, connected Sunbury to Frankstown where one of the early trade posts was established. The second path, the Kishacoquillas Path, connected present-day Milesburg to present-day Lewistown (Wallace 1987). By 1764, James Potter came to the region, summited Nittany Mountain, and visited the Nittany Valley where the project location is situated. These two paths are mapped in Thomas and Richard Penn's Map of Pennsylvania in 1776. The paths can be seen going southwest towards the headwaters of the Juanita River (Penn and Penn 1776; Figure 4.1).

In 1792, the first iron blast furnace, Centre Furnace, went into production just a mile south of the project location. The iron ore was mined from multiple points in the Nittany Valley and along Bald Eagle Ridge, which is north of the project location. Limestone which is used as flux for the blast furnaces is the bedrock of the valley floors and outcropped in certain areas within the Nittany Valley. The Centre Furnace operated until 1858 and had two sets of owners during its operation. The region had an influx of iron works in the early nineteenth century with one account in 1826 listing nine furnaces, seven forges, two rolling mills, and a nail factory totaling 19 facilities (Linn 1883: 67; 79). These industries helped fuel smaller industries in Centre County like carding, spinning, and glass works. However, the iron industry was small in comparison to other industries in urban areas east of the region.

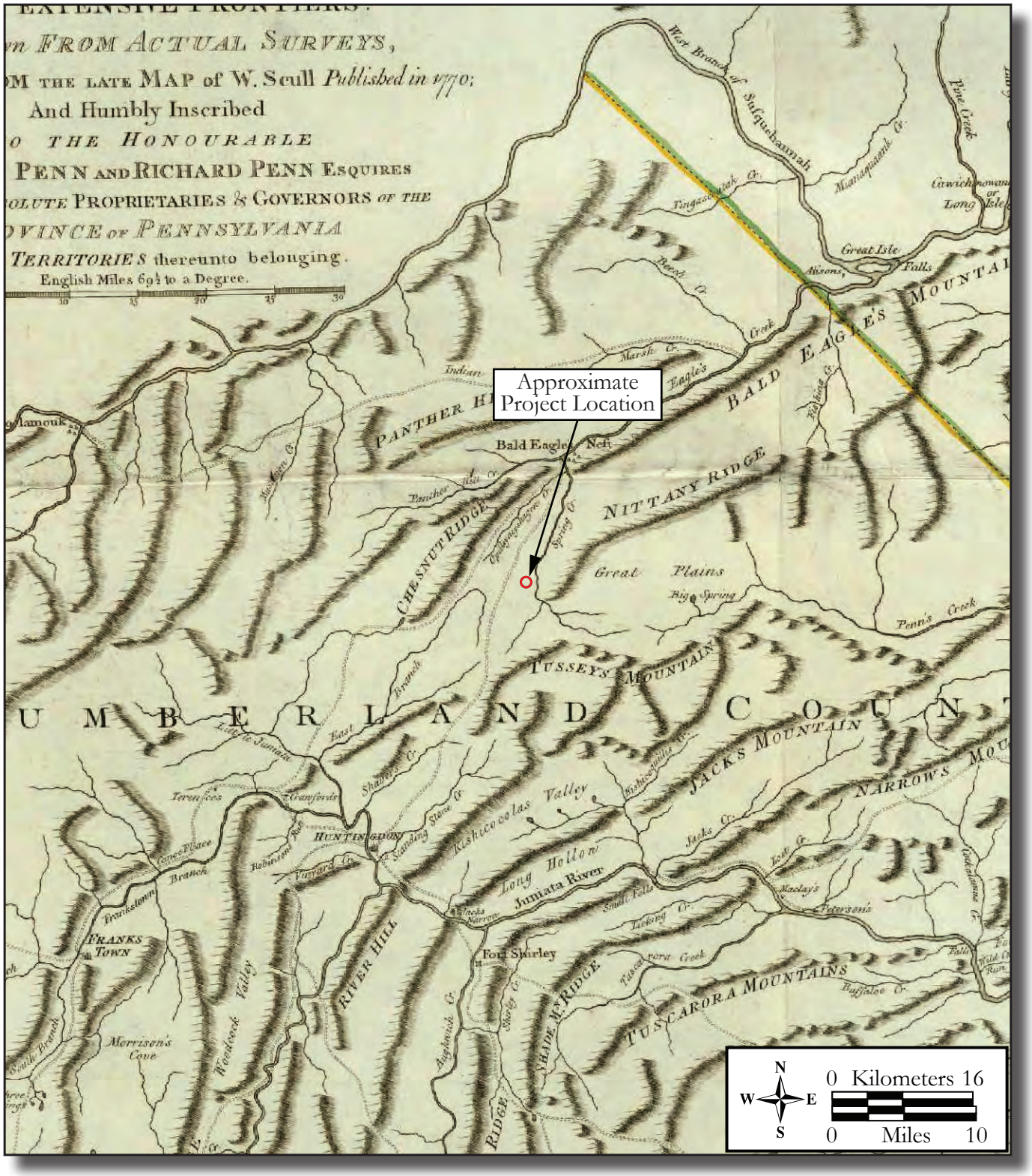


Figure 4.1: 1776 T. Penn and R. Penn, *A Map of Pennsylvania.*

One of the owners of the Centre Furnace was James Irvin who, in 1855, conveyed 250 acres of the land to the Pennsylvania State Agricultural Society for the establishment of a Farmer's High School of Pennsylvania. This institution later became Pennsylvania State University which was founded 1863. The development of the iron industry in the region spurred road and other infrastructure construction. This development is evident in Tilden's 1861 map of the region which depicts a system of roads and buildings near the project location (Tilden 1861; Figure 4.2). Centre Furnace and the Farmer's High School of Pennsylvania are both depicted southwest of the project location. Buildings associated with J. Ray, E. Wasson, and C. Wasson are visible within or adjacent to the project location (see Figure 4.2). Along what is now present-day East College Avenue, to the south of the project location, are a line of buildings with various owners. At what appears to be the present-day intersection of East College Avenue and Puddintown Road, a sawmill and a flour mill are depicted along Slab Creek Run. By 1874, development expanded with four more buildings visible along the edge of present-day Puddintown Road at the western edge of the project location (Pomeroy 1874; Figure 4.3). Associated owners of the buildings are H. Osman and H. Fisher (see Figure 4.3).

Coal outcroppings were mined in the Allegheny Front near Philipsburg about 20 miles west of the project location. Coal was increasingly mined starting in 1840 as it became the primary fuel for steam engines that were becoming more common. In the first half the nineteenth century, canals were built to move iron and other goods throughout the area. In 1834, the Bald Eagle and Spring Creek Navigation Company received a charter granting permission to build a canal connecting Bellefonte to Lock Haven, which lies about seven miles northeast of the project location. The canal was completed in 1847 and provided a cheaper and easier option for the transport of iron from Bellefonte and Milesburg to the rest of Pennsylvania (Linn 1883). By 1864, the Bald Eagle Valley Railroad line was completed which quickly made the canal obsolete (Linn 1883). The railroad is depicted in the 1874 Pomeroy atlas running parallel with Bald Eagle Creek to the northwest of the project location (Pomeroy 1874). By 1840, the appearance of the railroad allowed Bellefonte to become the economic and governmental center of Centre County; the community grew accordingly with the available infrastructure and resources.

The institution that started as the Farmer's High School of Pennsylvania quickly became the Agricultural College of Pennsylvania in 1860 and by 1882, it became the Pennsylvania State College, which is now present-day Pennsylvania State University. In 1880, the college had only 76 students enrolled and only grew to 320 students by the turn of the century. However, by 1920, there were 4,316 students enrolled as population grew during the twentieth century and a college education became more important. As the college grew in the twentieth century, it became the major economic focus of the region. By 1920, very few iron furnaces were in operation especially with the rise of the large-scale steel mills in larger urban cities like Pittsburgh and Scranton. By 1921, the last charcoal-fired iron furnace in Centre County closed after a fire.

By the turn of the twentieth century, a railroad line had been constructed to connect the State College area to Bellefonte with the Bellefonte Central Railroad (U.S.G.S 1908). In 1908, three mapped buildings are visible adjacent to the project location (U.S.G.S 1908; Figure 4.4). These buildings are along Puddintown Road at the western edge of the project location. By the mid-twentieth century, two farmsteads are visible within the project location on its western side near Puddintown Road (NETR 1957). These two farmsteads remain extant and are part of the Millbrook Marsh Nature Center (NETR 1961, 1971, 1983, 2004).

4.3 Previous Archaeological Research near the APE

An examination of the PA SHPO's PA-SHARE indicated that three archaeological surveys have been conducted within or adjacent to the APE. In 2000, Phase I and II archaeological investigations were completed in advance of improvements to PA Route 26 at State College. Numerous archaeological sites were recorded and evaluated as a result of these studies. Two sites from the survey were recommended eligible for listing in the NRHP; however, neither site is within or adjacent to the APE (Grele and Miller 2000).

Figure 4.2: 1861 S.D. Tilden, *A Topographical map of Centre County, Pennsylvania.*

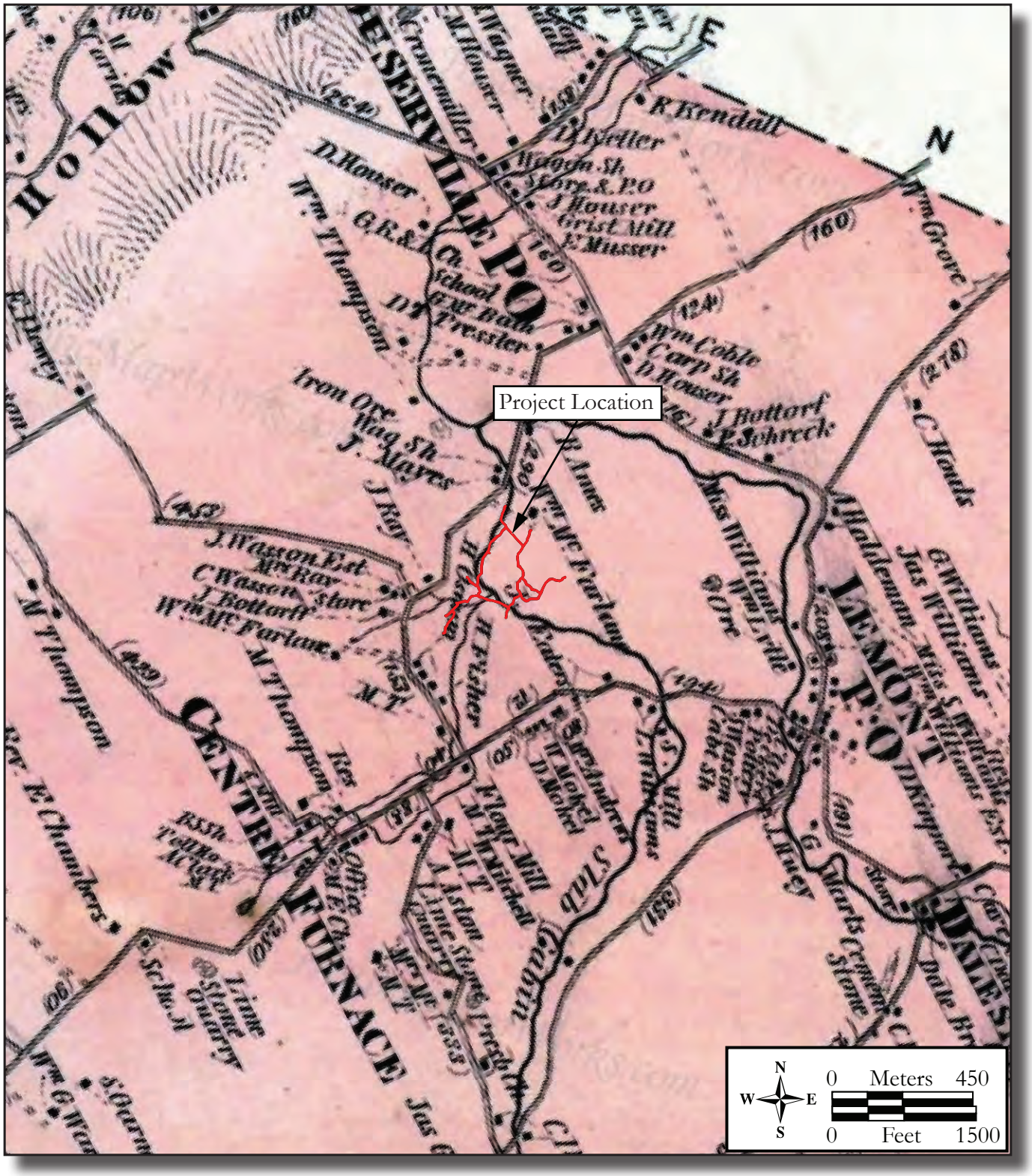


Figure 4.3: 1874 A. Pomeroy, *Atlas of Centre County Pennsylvania.*

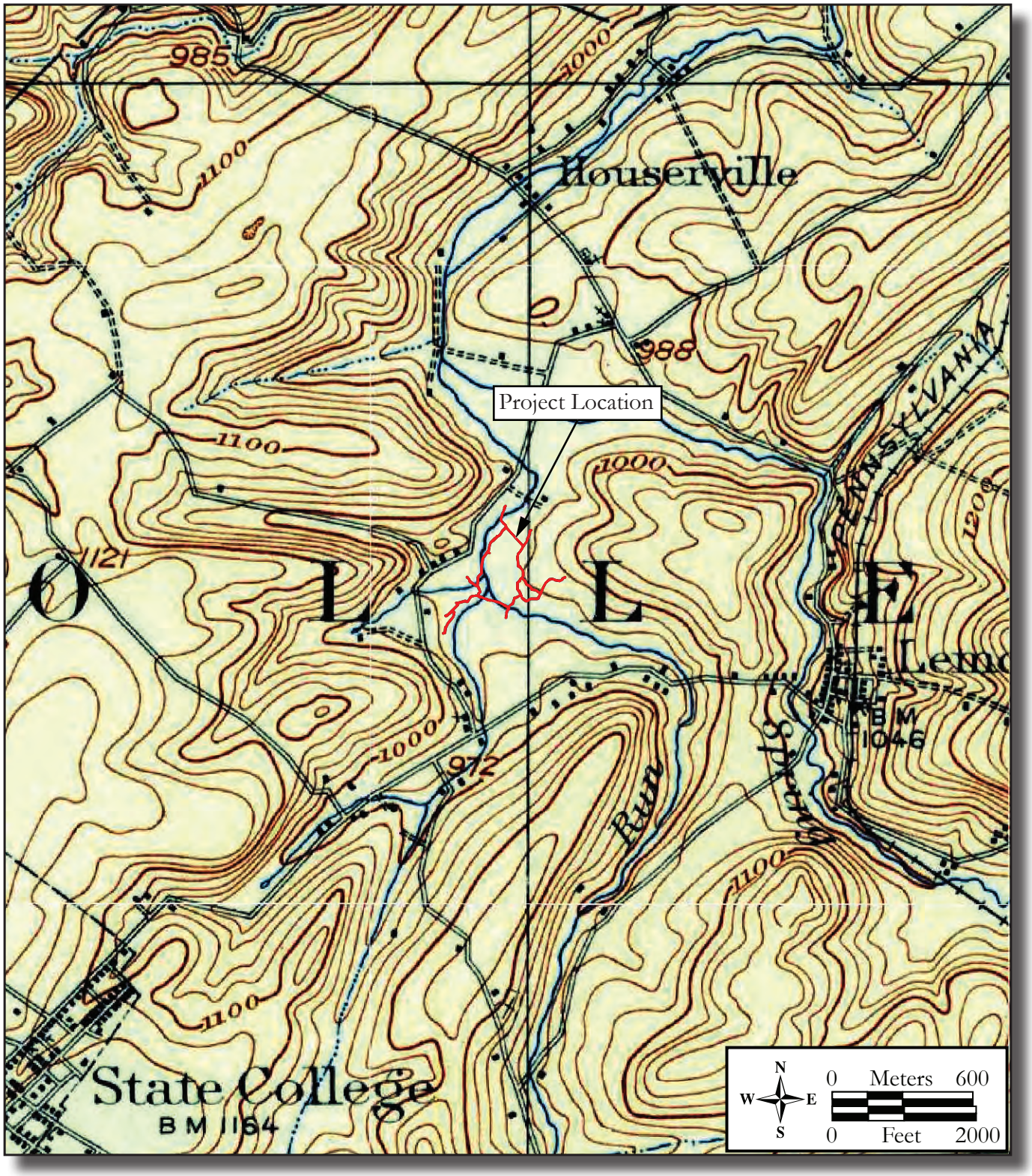


Figure 4.4: 1908 U.S.G.S. 15' minute map: Bellafonte, PA.

In 2009, a Phase I archaeological survey was completed for the education center, which is part of the Millbrook Marsh Nature Center. The survey identified lithic debitage but no chronologically diagnostic artifacts. The survey also identified historic material dating to the late nineteenth century to the mid-twentieth century (Graetzer and Bowman 2009).

In 2015, a Phase I and II archaeological investigation was conducted immediately northwest of the APE for a proposed drainage swale and bike path. The study identified three sites and two isolated finds. The largest site identified, 36-Ce-0544 (James W. Hatch Site), was a multicomponent site that contained pre-Contact material and historic material dating to the nineteenth and twentieth century. The pre-Contact material was not diagnostic but was interpreted as a jasper processing area (Shaffer 2016).

4.4 Historic Properties Near the APE

There are four historic properties within the western portion of the APE which include buildings previously owned by H. Ossman, J. Ray, J. Wasson, and J. Bottorff. The H. Ossman building was a historic farmstead and is now part of the Millbrook Marsh Nature Center. The NRHP eligibility of the H. Ossman building is undetermined. The three other buildings lie along Puddintown Road. An 1861 topographic map by S.D. Tilden notes the owners were J. Ray and J. Wasson (see Figure 4.2). J. Bottorff is depicted as an owner of a building adjacent to the APE on an 1874 map (see Figure 4.3). All three of the buildings have an undetermined NRHP eligibility status (PA-SHARE 2022).

To the south of the APE along East College Avenue are nine historic buildings. The buildings were all built in the early twentieth century and consist of bungalow, vernacular, and cubic styles. All nine buildings are currently deemed undetermined for eligibility for listing on the NRHP (PA-SHARE 2022).

The Houserville Historic District is approximately three quarters of a mile to the north of the APE. The historic district represents an early nineteenth-century market center with dates ranging from 1788 to 1920. The district consists of 14 residences and their associated outbuildings, a general store and post office, the remains of a bridge, the ruins of four mills, and one mill race. The architectural styles represented within the district are Georgian, Italianate, and Vernacular (PA-SHARE 2022).

The Lemont Historic District is approximately a half mile to the west of the APE. The historic district is significant as a late nineteenth-century commercial village. This historic district contains 81 principal structures, 33 outbuildings, and one barn. The principal buildings include the Spring Creek Presbyterian Church, the John H. Hahn House and Store, and the James I. Lytle House (PA-SHARE 2022).

4.5 Previously Recorded Archaeological Sites in the Vicinity of the APE

A review of the PA-SHARE website indicated that there are eight archaeological sites within the APE. There are an additional 43 archaeological sites within one mile of the APE, including Centre Furnace, and the James W. Hatch site (Table 4.1). The eight sites that are within the APE are 36CE0065 (Houserville Lithic Workshop), 36CE0123, 36CE0114, 36CE0117, 36CE0505 (Millbrook Farm), 36CE0124, 36CE0116, 36CE0122 (PA-SHARE 2022).

Site 36CE0065 (Houserville Lithic Workshop) is an NRHP-listed pre-Contact lithic site within the APE that has been destroyed. Artifacts recovered from the site consist entirely of lithics manufactured from jasper. The site represents an Early to Middle Archaic lithic workshop and contained various biface preforms, projectile points, scrapers, and drills.

Table 4.1: Registered archaeological sites within one mile of the APE.

Site Number	Site Name	Cultural Designation	Temporal Period	Site Function	Source
36CE0003	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0009	N/A	Pre-Contact and Historic	Woodland and 19th Century	Unknown	PA-SHARE
36CE0064	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0065	Houserville Lithic Workshop	Pre-Contact	Early to late Archaic	Lithic Reduction	PA-SHARE
36CE0063	Elmwood Ranch	Pre-Contact	Archaic	Open Habitation	PA-SHARE
36CE0132	C-7-23	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0116	C-7-3	Pre-Contact	Archaic	Open Habitation	PA-SHARE
36CE0123	C-7-13	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0129	C-7-19	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0130	C-7-21	Pre-Contact	Late Archaic	Open Habitation	PA-SHARE
36CE0127	C-7-17	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0119	C-7-6	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0117	C-7-4	Pre-Contact	Archaic to Late Archaic	Open Habitation	PA-SHARE
36CE0122	C-7-12	Pre-Contact	Paleoindian to Late Woodland	Open Habitation	PA-SHARE
36CE0121	C-7-10	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0124	C-7-14	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0343	Centre Furnace	Historic	19th Century	Industrial	PA-SHARE
36CE0126	C-7-16	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0125	C-7-15	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0115	C-7-2	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0114	C-7-1	Pre-Contact	Archaic to Transitional	Open Habitation	PA-SHARE
36CE0120	C-7-7	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0118	C-7-5	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0128	C-7-18	Pre-Contact	Woodland to Late Woodland	Open Habitation	PA-SHARE
36CE0131	C-7-22	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0238	Tudek	Pre-Contact	Archaic	Quarry	PA-SHARE
36CE0272	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0270	Lemont Crystal Field	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0271	Perkiomen Point	Pre-Contact	Archaic to Transitional	Isolated Find	PA-SHARE
36CE0273	Bathgate #1	Pre-Contact and Historic	Unknown	Unknown	PA-SHARE
36CE0274	Bathgate #2	Pre-Contact	Archaic to late Archaic	Open Habitation	PA-SHARE
36CE0236	Lemont Crystal Field #2	Pre-Contact	Archaic to late Archaic	Isolated Find	PA-SHARE
36CE0275	Bathgate #3	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0304	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0302	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0280	Ag Arena	Pre-Contact	Archaic	Open Habitation	PA-SHARE
36CE0287	Williams Field	Pre-Contact	Archaic to Late Woodland	Open Habitation	PA-SHARE
36CE0298	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0299	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0301	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0303	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE
36CE0062	Lemont	Pre-Contact	Archaic to Woodland	Open Habitation	PA-SHARE
36CE0300	N/A	Pre-Contact	Unknown	Open Habitation	PA-SHARE

Table 4.1: continued

Site Number	Site Name	Cultural Designation	Temporal Period	Site Function	Source
36CE0416	Psu	Pre-Contact	Woodland	Lithic Scatter	PA-SHARE
36CE0505	Millbrook Farm	Pre-Contact and Historic	Archaic and 19th Century	Lithic Scatter and Farmstead	PA-SHARE
36CE0511	Spring Creek Site 1	Pre-Contact	Unknown	Open Site, Unknown Function	PA-SHARE
36CE0521	First Knoll Site	Pre-Contact	Archaic and Late Woodland	Open Site, Unknown Function	PA-SHARE
36CE0237	Turner	Pre-Contact	Late Archaic	Open Site, Unknown Function	PA-SHARE
36CE0543	PHAST XXIX	Pre-Contact and Historic	Unknown and 20th Century	Open Habitation; Unknown	PA-SHARE
36CE0542	PHAST XXVII	Pre-Contact and Historic	Unknown	Unknown	PA-SHARE
36CE0544	James W. Hatch	Pre-Contact and Historic	Unknown and 19th and 20th century	Pre-Contact Quarry and Unknown	PA-SHARE

N/A - Not applicable
PA-SHARE – Pennsylvania State Historic and Archaeological Resource Exchange

Site 36CE0122 is a pre-Contact site in the northern corner of the APE. Chronometric dating yielded an occupational history extending from the Paleoindian to the Late Woodland periods. The site contained a Clovis point and several hearth features; however, its NRHP eligibility status remains undetermined.

Sites 36CE0116 and 26CE0124 are pre-Contact lithic scatters situated in the southern portion of the APE. The NRHP-eligibility status of both sites remains undetermined. Lithic raw material from 36CE0116 included jasper, black flint, and grey chert. The recovery of a Brewerton point suggests a late Middle Archaic to Late Archaic cultural affiliation. Raw material identified from 26CE0124 consisted entirely of jasper. No information regarding site chronology was available during research.

Site 26CE0505 (Millbrook Farm) is in the western portion of the APE and consists of a multicomponent site containing both historic and pre-Contact material. The pre-Contact component included lithic debitage and diagnostic artifacts dating to the Late Archaic Period. Lithic raw materials included jasper and flint. The historic component included nineteenth- and twentieth-century artifacts associated with an historic farmstead. The buildings associated with the farmstead are still standing. The NRHP eligibility status of the site is undetermined.

Site 36CE0117 is located along the eastern edge of the APE and consists of a pre-Contact lithic scatter dating to the general Archaic and Late Archaic period. Lithic material recovered from the site included jasper and black flint. The NRHP eligibility status of the site is undetermined.

Site 36CE0114 is situated in the northeastern part of the APE and consists of a pre-Contact lithic scatter containing terminal Middle Archaic, Late Archaic, and Early Woodland period occupations. Diagnostic artifacts included Otter Creek, Brewerton, and Susquehanna Broad point types. Lithic raw materials included jasper, grey chert, and black flint. The NRHP eligibility status of the site is undetermined.

Site 36CE0123 is in the northwestern corner of the APE and consists of a Late Archaic lithic scatter. Lithic raw material identified at the site consisted entirely of jasper. The NRHP eligibility status of the site is undetermined.

There are 43 other sites that are within a one-mile radius of the APE. These sites include Site 36CE0238 (Tudek) which is listed on the NRHP, however it is destroyed. The site was a pre-Contact quarry about 0.7 miles to the northwest of the APE. Site 36CE0343, the extant historic Centre Furnace, is the first iron furnace in the region. Including both the sites within the APE and within a one-mile radius there are a total of 44 pre-Contact sites, 1 historic site, and 6 multicomponent sites.

5.0 RESULTS

The assessment of archaeological sensitivity is determined based on the potential for archaeological sites to exist in a given area and the likelihood that intact cultural deposits are present. The potential presence of pre-Contact resources is based upon topographic setting, proximity to water, soil quality, and other environmental characteristics, as well as predictive models based upon pre-Contact land use patterns. The potential presence of historic archaeological resources is typically determined based on historic cartographic documentary evidence, historic land use, and proximity to historical roads or paths. Sensitivity is an evaluation of the probability that intact archaeological resources exist in a given area. An area's sensitivity is determined by assessing the extent to which disturbance associated with earthmoving activities may have affected the information value of undocumented archaeological resources in high potential areas. Sensitivity is ranked as high, medium, or low.

5.1 Pedestrian Reconnaissance

Pedestrian reconnaissance was performed on May 26, 2022 by Evan Robinson to observe existing conditions within the APE and in the immediate area (Figure 5.1; Plates 5.1-5.9). Mr. Robinson met with Melissa Kauffman, the Millbrook Marsh Nature Center Supervisor, to walk the APE.

The APE generally consists of wetlands and floodplains that surround Thompson Run and Slab Cabin Run. There are boardwalks that run parallel to Slab Cabin Run and Thompson Run and cross these streams at different points within the APE. The nature center and associated buildings are located at the western edge of APE along Puddintown Road. Some of the buildings associated with the nature center appear to be part of the former farmstead associated with the Millbrook Farm Site (26CE0505). In the northern section of the APE, a bridge is proposed for construction for the boardwalk on the western side of Slab Cabin Run and a grass path is proposed on the eastern side of the APE. This northern section of the APE consists of a floodplain. The eastern edge of the APE is characterized by floodplains and terraces associated with Slab Cabin Run. In contrast, the central portion of the APE is crisscrossed with a network of boardwalks and is composed entirely of wetlands associated with Slab Creek Run and Thompson Run. Overall, the APE consists of wetlands, floodplains, and terraces that are relatively undisturbed and show no discernable ground disturbance outside of the currently installed boardwalks.

5.2 Assessment of Pre-Contact Archaeological Resources Sensitivity

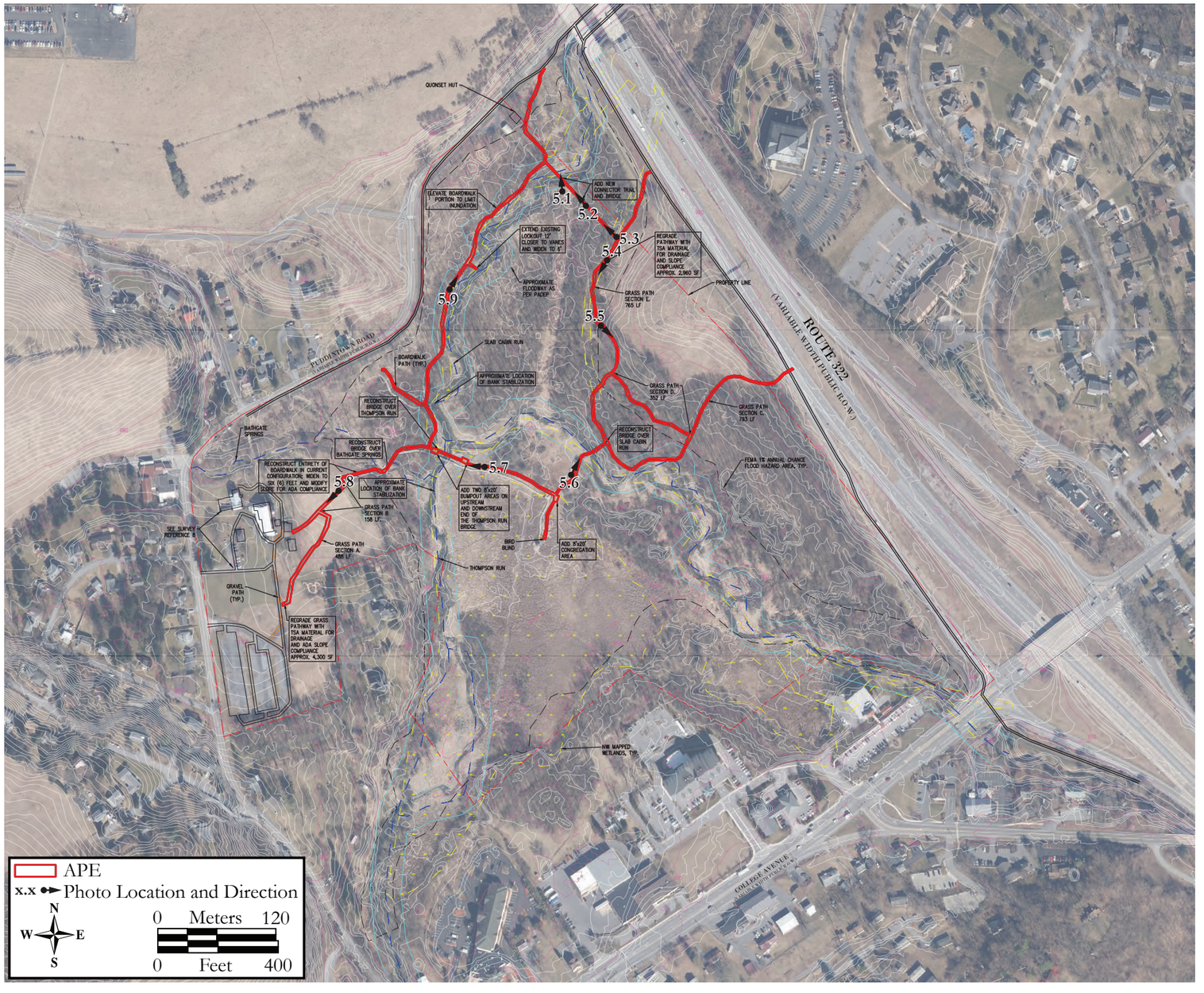
Background research was used in conjunction with the results of the fieldwork. Pre-Contact settlement patterns and predictive models based on recorded site locations can help assess the probability that pre-Contact cultural resources are present within the APE. Settlement pattern studies conducted in Pennsylvania and elsewhere in the Mid-Atlantic Region have defined areas of well-drained soils in proximity to water as prime loci for pre-Contact sites (Blomster et al. 2000: 19; Cavallo and Mounier 1982; Custer and Wallace 1982; Diamanti 1995; Grossman-Bailey 2001; Hay 1993; Lawrence and Weinberg 2000; Mooney et al. 1994: 12-13; Ranere and Hansell 1987; Young 2003: 8-154). A predictive model field test suggests that models developed elsewhere within the Mid-Atlantic region are also generally applicable in Pennsylvania (Young 2002: 8-4). In a previous cultural resources survey conducted for improvements to Route 202 in Bucks and Montgomery counties, zones of high sensitivity for pre-Contact archaeological resources were determined to be areas within 492 feet (150 meters) from all third- and higher-order streams, and 328 feet (100 meters) from low-order waterways (Hay 1993: 135-136; Diamanti 1995: ii). Although the proximity to water has been identified as a primary factor in predicting site location, other factors also exist, such as level terrain

and good soil drainage (Neumann 1992; Pagoulatos 1998; Walwer and Pagoulatos 1990). Historical and modern disturbances as well as erosion, however, can affect the degree to which pre-Contact archaeological resources survive intact.

There are eight previously recorded archaeological sites within the APE. All eight sites contain pre-Contact material including one multicomponent site (26CE0505 Millbrook Farm). Archaeological investigations at 36CE0122 indicated a long occupational history with radiocarbon dates ranging from the Paleoindian to the Late Woodland period. The site is also noted for the recovery of a Clovis projectile point and the presence of a hearth. The site remains 90 to 100 percent intact (PA-SHARE). Additionally, Slab Cabin Run and Thompson Run intersect in the southwestern portion of the APE, and are characterized by associated wetlands. It is in the drier elevated terraces of the APE where most of the previously recorded sites have been located. Given the environmental setting and the presence of many previously recorded sites, the APE is assessed to have a moderate to high sensitivity for pre-Contact archaeological resources.

5.3 Assessment of Historic Archaeological Resources Sensitivity

Early historic cartographic evidence indicates extensive historic development to the south of the APE where iron industries operated in the mid- to late nineteenth and early twentieth centuries. The Centre Furnace, which was the first iron furnace in Centre County, is approximately one mile south of the APE. Mapped buildings have existed within the APE since 1862 along the western edge next to Puddintown Road. Several nineteenth-century buildings remain extant within the APE. These buildings are part of the Millbrook Marsh Nature Center. Because of the presence of map-documented historic buildings within the APE, any area within 200 feet of them is assessed to have high sensitivity for historic archaeological resources.



FER EASTICS

LEGEND

- PROPERTY LINE (PG)
- MINOR CONTOUR (2')
- MAJOR CONTOUR (10')
- BOARDWALK PATH
- GRASS PATH
- GRAVEL PATH
- FEMA FLOOD HAZARD LINE
- STREAM OR BROOK
- FLOODWAY LINE AS PER PADEP
- FLOODWAY AREA
- NWI WETLANDS BOUNDARY
- WETLANDS

OPTION 3 DESCRIPTION

- RECONSTRUCT EXISTING BOARDWALK IN THE SAME PATH AS IT CURRENTLY EXISTS USING GALVANIZED HELICAL PILES AS FOUNDATION, ENGINEERED WOOD WET RATED SUB-STRUCTURE AND BLACK LOCUST DECKING.
- THE OVERALL WIDTH OF THE BOARDWALK WILL BE ENLARGED TO A 6 FOOT WIDTH.
- AREAS OF NON-COMPLIANT SLOPE WILL BE ADJUSTED TO MEET ADA REQUIREMENTS
- AREAS THAT ARE MINIMALLY ABOVE ADJACENT GRADE AND PRONE TO INUNDATION WILL BE RAISED TO A MAXIMUM OF 30 INCHES ABOVE ADJACENT GRADE.
- TWO (2) NEW 8 FOOT BY 20 FOOT LOOKOUT AREAS WILL BE ADDED AT THE UPSTREAM AND DOWNSTREAM SIDES OF THE THOMPSON RUN BRIDGE FOR EDUCATIONAL OPPORTUNITIES.
- A NEW 8 FOOT BY 20 FOOT GATHERING AREA WILL ALSO BE ADDED AT THE T-INTERSECTION LEADING TO THE BLIND.
- THE LOOKOUT TEACHING AREA AT THE VANES WILL BE EXPANDED BY A PLATFORM MEASURING APPROXIMATELY 6 FEET BY 12 FEET TO INCREASE VISITOR ACCESSIBILITY AND VIEWS OF THE VANES.
- A NEW LOOP CONNECTOR PORTION IS ADDED ALONG THE NORTH SIDE OF THE MARSH TO TIE IN THE BOARDWALK AT THE QUONSET HUT TO THE GRASS PATHWAY NEAR RT. 322.
- EXISTING BRIDGES WILL BE REBUILT WITH THE SAME TIMBER WOOD FRAMED PRE-MANUFACTURED UNITS AND NEW HELICAL PILES WILL BE USED FOR FOUNDATIONS. BANK STABILIZATION AT THE BRIDGE SUPPORTS WILL BE INCLUDED.

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2. ELEVATIONS SHOWN HERIN ARE BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)
3. AERIAL IMAGERY OBTAINED VIA THE PENNSYLVANIA IMAGERY NAVIGATOR, PAMAP PROGRAM, "NORTHEAST PA COLOR" (2010).
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7. WETLAND INFORMATION OBTAINED VIA THE U.S. FISH & WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY.
8. BUILDING AND PARKING AREA LOCATION OBTAINED VIA THE MILLBROOK MARSH NATURE CENTER TRAIL MAP, APRIL 10, 2020

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

NJ Certificate of Authorization
Eng'r. Nos. 24GA27837900
Arch. Nos. 21AC000124400
Date 12/22/20
Checked CSG
Drawn HLT

ERIK. E. BOE, P.E.
No. PROFESSIONAL ENGINEER License No.

Revisions:

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OPTION 3
MILLBROOK MARSH NATURE CENETR
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 20354.01
File No. 20354.01_C1

OPT.3

Figure 5.1: Proposed construction plans showing the APE and photograph locations and directions (from Lan Associates).

Plate 5.1: View of proposed crossing of Slab Cabin Run

Photo view: North

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.2: View of floodplain for proposed boardwalk

Photo view: Northwest

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.3: View of floodplain from current walking path

Photo view: Northwest

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.4: View of walking path along the edge of the floodplain

Photo view: South

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.5: View of walking path along the edge of the floodplain

Photo view: Southeast

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.6: View of boardwalk from boardwalk and marsh

Photo view: Northeast

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.7: View of bridge and boardwalk crossing Thompson Run

Photo view: West

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.8: View of barn

Photo view: Southeast

Photographer: Evan Robinson

Date: May 26, 2022

Plate 5.9: View of boardwalk along Slab Cabin Run

Photo view: Northeast

Photographer: Evan Robinson

Date: May 26, 2022

6.0 STATEWIDE PRE-CONTACT PROBABILITY MODEL COMPARISON

The PA SHPO has established a probability model for areas with pre-Contact period archaeological sensitivity (PA-SHARE 2021). The sensitivity model is primarily based on proximity to previously mapped Native American trails (Wallace 1998), distance to third-order or higher watercourses, landform, elevation, slope, aspect, terrain roughness, direction to streams, distance to lakes, soil, and other environmental factors (Harris, Kingsley, Sewell 2015). The PA-SHARE depicts areas of high and moderate pre-Contact probability within the APE. Based on this model, the APE consists of high and moderate probability for pre-Contact sites.

7.0 CONCLUSIONS AND RECOMMENDATIONS

A Phase IA archaeological survey was conducted for proposed improvements to the Millbrook Marsh Nature Center in College Township, Centre County, Pennsylvania. The Area of Potential Effects (APE) for the project lies within the 62-acre nature center, which includes a 12-acre farmstead and an adjacent 50-acre wetlands. The project may involve partial federal funding and therefore, require a permit from the U.S. Army Corps of Engineers (USACE). The project may also be subject to a Pennsylvania Department of Environmental Protection (PADEP) permit. As such, the Phase IA archaeological survey will be sufficient to initiate agency coordination under the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, and/or the appropriate Pennsylvania state regulation and the Pennsylvania History Code.

A review of the PA-SHARE website indicated that there are eight archaeological sites within the APE and an additional 43 archaeological sites within one mile of the APE. Three prior cultural resources investigations have been completed within or adjacent to the APE. Map-documented buildings lie along the western edge of the APE and include those associated with the Millbrook Site Farmstead, which are now part of the nature center. Based on the background research and fieldwork results, which documented little if any disturbances, all of the APE is assessed as having a high to moderate probability for containing intact historic and/or pre-Contact Native American resources. This assessment is supported by the PA-SHARE predictive model which determines the entire APE to have a high to moderate sensitivity for pre-Contact sites.

A Phase IB archaeological survey is recommended for the areas of the APE that may be subject to ground disturbing activities associated with the proposed improvements. Any Phase IB archaeological survey testing strategy will be determined in consultation with the Pennsylvania State Historic Preservation Office.

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APPENDIX A: SUMMARY OF NATIONAL REGISTER CRITERIA

Significant historic properties include districts, structures, objects, or sites that are at least 50 years of age and meet at least one National Register criterion. Criteria used in the evaluation process are specified in the Code of Federal Regulations, Title 36, Part 60, National Register of Historic Places (36 CFR 60.4). To be eligible for inclusion in the National Register of Historic Places, a historic property(s) must possess:

> the quality of significance in American History, architecture, archaeology, engineering, and culture [that] is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

a) that are associated with events that have made a significant contribution to the broad patterns of our history, or

b) that are associated with the lives of persons significant in our past, or

c) 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 lack individual distinction, or

d) that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

There are several criteria considerations. Ordinarily, cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register of Historic Places. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

a) a religious property deriving primary significance from architectural or artistic distinction or historical importance, or

b) a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event, or

c) a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his/her productive life, or

d) a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events, or

e) a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived, or

f) a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historic significance, or

g) a property achieving significance within the past 50 years if it is of exceptional importance. (36 CFR 60.4)

When conducting National Register evaluations, the physical characteristics and historic significance of the overall property are examined. While a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data is also required for individual components therein based on date, function, history, and physical characteristics, and other information. Resources that do not relate in a significant way to the overall property may contribute if they independently meet the National Register criteria.

A contributing building, site, structure, or object adds to the historic architectural qualities, historic associations, or archeological values for which a property is significant because a) it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period, or b) it independently meets the National Register criteria. A non-contributing building, site, structure, or object does not add to the historic architectural qualities, historic associations, or archeological values for which a property is significant because a) it was not present during the period of significance, b) due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important information about the period, or c) it does not independently meet the National Register criteria.

APPENDIX B: QUALIFICATIONS OF THE PRINCIPAL INVESTIGATOR

EVAN ROBINSON
ARCHAEOLOGIST (36 CFR 61)

YEARS OF EXPERIENCE
With this firm: 2021-Present
Other Firms: 5

EDUCATION
MA 2017
Rutgers University
Cultural Heritage and Preservation Studies

BA 2012
University of Chicago
Anthropology

PROFESSIONAL TRAINING

40-Hour HAZWOPER

10-Hour OSHA Construction Safety

30-Hour OSHA Construction Safety

PROFESSIONAL REGISTRATION:

Register of Professional Archaeologists

Mr. Robinson is a Registered Professional Archaeologist (RPA) and Secretary of Interior Qualified Archaeologist who has worked on multiple archaeological projects in the Northeast, Midwest, and South, including New York, New Jersey, Pennsylvania, Connecticut, Virginia, West Virginia, Rhode Island, Texas, Illinois, and Ohio. He has performed and supervised Phase I, II, and III archaeological surveys, along with monitoring construction projects. Mr. Robinson has also performed lithic and historic artifact analysis as well as database management for archaeological reports.

REPRESENTATIVE PROJECT EXPERIENCE:

Pemberton Development Project, Pemberton Township, Burlington County, NJ (Sponsor: Colliers Engineering) Principal Investigator for Phase IA and IB archaeological survey for proposed development project along Highway Route 206. Assessed the archaeological sensitivity for the 99-acre project area. Supervised the excavation with over 500 shovel test pits that were excavated which identified three pre-Contact archaeological sites and one historic archaeological site. The sites were considered potentially significant archaeological resources and further research was recommended.

River Park Redevelopment, Township of Hanover, Morris County, NJ (Sponsor: River Park Business Center) Principal Investigator for Phase I archaeological survey for proposed development. Oversaw the excavation of over 50 STPs and identified one historic archaeological site. The site was considered potentially significant and further research was recommended if the site could not be avoided.

Deserted Village of Feltville/Glenside Park, Berkeley Heights Township, Union County, NJ (Sponsor: Paragon Restoration Corp.) Archaeologist for Phase I survey and archaeological monitoring within the Historic Deserted Village of Feltville located in Glenside Park (NR: 6/6/1980; SR: 2/20/1980). Oversaw the excavation of 16 STPs around a historic building. Monitored excavation around and within a historic building for structural improvements and restoration. Low-density historic artifacts were identified during the excavation and the NJ State Museum site form was updated to reflect the new excavation that occurred in the village.

Exxon Mobil Refinery Cultural Resources Screening, City of Bayonne, Hudson County, NJ (Duke Realty) Archaeologist for a cultural resources screening at the Exxon Mobil Refinery property in the City of Bayonne. The property was a former refinery. Assessed the potential sensitivity for cultural resources and identified that there was low sensitivity within the property.

APPENDIX C: ANNOTATED BIBLIOGRAPHY

Author:	Evan B. Robinson, M.A., RPA
Title:	Phase IA Archaeological Survey, Millbrook Marsh Nature Center Boardwalk, College Township, Centre County, Pennsylvania
Date:	August 2022
RGA Database Title:	Millbrook Marsh Nature Ctr State College Phase IA
RGA Project No.:	2022-118PA
State:	Pennsylvania
County:	Centre County
Municipality:	College Township
U.S.G.S.	State College, PA
Drainage Basin:	Slab Creek Run, Susquehanna River, Chesapeake Bay, Atlantic Ocean
Regulation:	Section 106 of the NHPA, as amended; Pennsylvania History Code
Project Type:	Private Development: Trail Enhancement
Sponsor:	Millbrook Marsh Nature Center
Client:	LAN Associates
Level of Survey:	Phase IA archaeological survey
Cultural Resources:	36CE0065 (Houserville Lithic Workshop), 36CE0123, 36CE0114, 36CE0117, 36CE0505 (Millbrook Farm), 36CE0124, 36CE0116, 36CE0122

APPENDIX C

GEOTECHNICAL REPORT BY CMT LABORATORIES

GEOTECHNICAL REPORT

Millbrook Marsh Boardwalk
College Township, Centre County, Pennsylvania

CMT Laboratories File No. 2105600

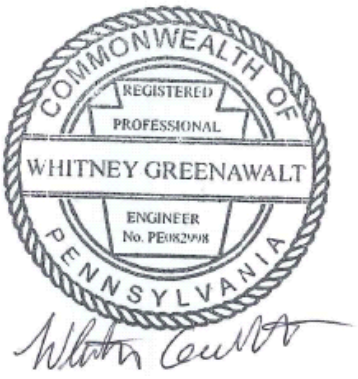
Prepared for:

LAN Associates
3232 Easton Avenue, #3308
Bethlehem, PA 18017

Prepared by:

CMT Laboratories, Inc.
2701 Carolean Industrial Drive
State College, PA 16801

May 6, 2022



Whitney E. Greenawalt, P.E.
Project Engineer

GEOTECHNICAL REPORT

Millbrook Marsh Boardwalk
College Township, Centre County, Pennsylvania

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2701 Carolean Industrial Drive
State College, PA 16801

May 6, 2022

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EXECUTIVE SUMMARY

Project Description

The proposed project will consist of renovations to the existing Millbrook Marsh Boardwalk. The boardwalk will be widened and four (4) bridges will be constructed. We understand that helical piles will be utilized to support the new boardwalk and bridges.

Geologic Information

The bedrock at the site consists of the Axemann Formation. The bedrock consists of light gray, fossiliferous and coarsely crystalline limestone with silty, fine-grained dolomitic limestone. Some oolitic and conglomeratic limestone is present within this formation. Flint concretions and chert occur throughout the unit.

Field Investigation

A total of eleven (11) test borings were drilled for this project. Boring locations B-1 through B-5 were drilled with a conventional drilling rig and were extended to depths ranging between 11 and 15 feet below grade. Boring locations B-6 through B-11 were drilled with hand sampling techniques and were extended to depths ranging between 4 and 7 feet below grade. Groundwater was encountered within the test boring locations at the time of our field operations at approximate depths ranging between 0.5 and 9.5 feet below grade.

Subsurface Conditions

The surface of the site consists of a layer of topsoil which measures 12 to 24 inches in thickness. Underlying the topsoil is a layer of natural alluvial soils, which extends to depths ranging between 7.5 and 10 feet below grade. The natural alluvial soils consist primarily of silt and sand-sized particles, with varying amounts of clay and gravel (USCS ML and SM). Underlying the natural alluvial soils, at boring locations B-1 through B-5, is a layer of decomposed to weathered limestone, which extends to the boring termination depths ranging between 11 and 15 feet below grade. The decomposed to weathered limestone consists primarily of gravel-sized particles, with varying amounts of silt and sand.

Recommendations

Based on the subsurface conditions encountered during our field exploration program and our understanding of the conditions of the site, helical piles are considered appropriate for this project. The final design of the helical pile elements should be accomplished by a Professional Engineer experienced in this type of design. The following table provides typical parameters to aid in the Helical Piles design:

CHANCE® Shaft Series	SS150
Shaft Size	1-1/2 inches
Torque Rating	7,000 ft-lb
Typical Helix Diameters	8 – 12 inches
Anticipated Termination Depth	10 – 15 feet
Estimated Allowable Axial Design Load	30 kips
Natural Gravel/Weathered Limestone Unit Weight	125 pcf
Natural Gravel/Weathered Limestone Cohesion	0 psf
Natural Gravel/Weathered Limestone Angle of Internal Friction	33°

1.0 INTRODUCTION

This report presents the results of a subsurface exploration and foundation analysis for the Millbrook Marsh Boardwalk project located in College Township, Centre County, Pennsylvania. Our services for this project were performed in accordance with CMT Proposal No. 2105600, dated February 16, 2022.

Authorization to perform this exploration and analysis was given in the form of a Proposal Acceptance and Work Authorization Agreement, signed by Mr. Vlad Potiyevsky, AIA, on April 19, 2022.

The purpose of the subsurface exploration program was to determine the pertinent subsurface conditions and to obtain information on which to base recommendations regarding foundation design and general site preparation. The scope of services for this report does not include an environmental assessment for the presence or absence of wetlands, hazardous, radioactive or toxic materials in the soil, surface water, groundwater, or air on, below or around the site. Any statements in this report or on the Test Boring Logs regarding odors, colors or unusual or suspicious items are strictly for the information of the client.

2.0 PROJECT AND SITE INFORMATION

The project is located in College Township, Centre County, Pennsylvania. Specifically, the proposed site is located at the Millbrook Marsh Nature Center, to the east of Puddintown Road. The location of the proposed project is shown on the Project Location Map presented in Appendix A.

The surface of the site, within the area of the proposed construction, consists of the existing boardwalk, marshland vegetation and a few mature trees. Surface drainage across the proposed site appears to be poor with runoff down slope towards Slab Cabin Run and Thompson Run.

Based on the topographical information provided, the marshland area within the proposed boardwalk footprint is at an approximate elevation of 950 feet and varies in elevation by approximately 3 feet.

General structural information was provided by others. We understand that the proposed project will consist of renovations to the existing Millbrook Marsh Boardwalk. The boardwalk will be widened and four (4) bridges will be constructed. We understand that helical piles will be utilized to support the new boardwalk and bridges.

The above information was utilized in our geotechnical analysis. Therefore, if any of this information has changed, is incorrect or becomes available, please inform CMT so that we may amend the recommendations presented in this report, if appropriate.

3.0 GENERAL

The following recommendations are based on general subsurface information shown on the Test Boring Logs provided in Appendix E. The descriptions shown on these logs represent the conditions only at the individual testing locations and variations may occur and should be expected between the testing locations. Conditions encountered during excavation procedures may not reflect the conditions presented on the boring logs. Therefore, it is imperative that a representative of CMT be present during excavation operations so that any variations may be presented to the geotechnical engineer. The geotechnical engineer may decide that the variations warrant a change to the recommendations presented in this report.

4.0 GEOLOGIC INFORMATION

According to the Department of Environmental Resources, Office of Resources Management, Bureau of Topographic and Geologic Survey (1982), the bedrock formation at the proposed site is classified as the Axemann Formation, as shown on the Geology Map provided in Appendix B.

The Axemann Formation consists of light gray, fossiliferous and coarsely crystalline limestone with silty, fine-grained dolomitic limestone. Some oolitic and conglomeratic limestone is present within this formation. Flint concretions and chert occur throughout the unit. The bedrock is moderately resistant to weathering and is slightly weathered to a shallow depth. The limestone is difficult to excavate and bedrock

pinnacles are particularly problematic. The cut-slope stability of the formation is good; however, steeply dipped beds inclined towards cuts may require moderate to gentle slopes. Foundation stability is good; however, the excavation should extend to uniformly sound material and the bedrock should be investigated for solution openings, which could lead to surface collapse.

5.0 FIELD INVESTIGATION

Prior to commencement of field operations, the project was registered with the Pennsylvania One-Call System, Inc., and this project was assigned Serial No. 20221162831. We recommend that the contractors verify the locations of any utilities prior to commencement of construction activities.

A total of eleven (11) test borings were drilled for this project. Test boring locations B-1 through B-5 were drilled with a conventional drilling rig and were extended to approximate depths ranging between 11 and 15 feet below the existing surface grades. Test boring locations B-6 through B-11 were drilled with hand sampling techniques and were extended to approximate depths ranging between 4 and 7 feet below the existing surface grades. The test borings were located in the field by a representative of CMT referencing site plans provided by others. The approximate locations of the test borings are shown on the Test Boring Location Plan provided in Appendix C.

The soil sampling with the drill rig was performed in accordance with ASTM D1586. A Dynamic Cone Penetrometer (DCP) was utilized to obtain “N-values” for the hand sampling borings. The DCP testing was performed in accordance with ASTM STP 399. All sampling intervals and Standard Penetration Test values were recorded and are shown on the Test Boring Logs. The results of the Standard Penetration Tests indicate the relative density and comparative consistency of the soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

The stratifications shown on the Test Boring Logs represent the conditions only at the actual boring locations. Variations should be expected between the boring locations. In addition, the Test Boring Logs show the approximate boundaries between subsurface materials. Actual transitions between subsurface materials may be gradual or abrupt.

5.1 Groundwater Conditions

Groundwater was encountered within the test boring locations at the time of our field operations. Note that groundwater levels fluctuate seasonally as a function of rainfall, the permeability of the soil/bedrock, and proximity to Slab Cabin Run and Thompson Run. Groundwater will have an effect on the excavation procedures during construction. We recommend evaluation of any perched conditions by the geotechnical engineer at the time of construction. The locations and depths of the groundwater encountered are shown on Table 5.1.

Table 5.1 Groundwater Depths Encountered

Test Boring Location	Depth of Groundwater Initially Encountered (ft)	Depth of Groundwater Upon Boring Completion (ft)
B-1	---	9.5
B-2	---	8.0
B-3	---	NE
B-4	---	6.5
B-5	---	5.4
B-6	0.8	0.5
B-7	3.0	1.5
B-8	1.0	0.8
B-9	0.8	0.6
B-10	1.5	1.0
B-11	3.3	3.0

NE – None Encountered

6.0 LABORATORY TESTING PROGRAM

The samples obtained during the drilling operation were sealed in labeled containers and transported to our laboratory for inspection, testing and classification. Remaining samples will be retained for a minimum of one (1) year for future reference.

In addition to the visual classification of the soil samples, moisture content determination tests were performed on representative split-spoon samples. The moisture content is the ratio of the weight of the water in the sample to the dry weight of the sample. This test was performed in general compliance with ASTM D2216.

Several test procedures were performed on composite soil samples taken from the site. A general description of each test is provided in the following paragraphs.

Moisture-plasticity characteristics of two (2) composite soil samples (CMT I.D. Nos. 17574 and 17575) were determined by means of the Atterberg Limit test. The test determines the moisture content at which the soil begins to act as a viscous liquid (Liquid Limit – LL) and the moisture content at which the soil changes from a plastic state to a semi-solid state (Plastic Limit – PL). The difference between the Liquid Limit and the Plastic Limit is the Plasticity Index (PI). The test procedures were performed in compliance with ASTM D4318.

Particle-size analyses were performed on the same composite soil samples in compliance with ASTM D422. The analysis includes a sieve analysis for particle sizes greater than the #200 sieve. Using this information, the samples were classified using the Unified Soil Classification System (USCS), ASTM D2487.

A summary of the moisture-plasticity characteristics and particles-size test results are shown on the following table.

Table 6.1 Moisture-Plasticity Characteristics and Particle-Size Test Results

CMT Sample Number	Test Boring	Depth (ft)	Liquid Limit (LL)	Plasticity Index (PI)	USCS	Description
17574	B-6	3.0 – 4.0	--	NP	ML	Silt w/ Sand
17575	B-10 & B-11	4.0 – 4.5	--	NP	SM	Silty Sand

A more detailed analysis of all laboratory testing is presented in Appendix F of this report.

7.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered in our field exploration are shown on the Test Boring Logs, included in Appendix E. A brief description of the materials encountered is presented in this section.

The surface of the site, at all test boring locations, consists of a layer of topsoil which measures approximately 12 to 24 inches in thickness. The topsoil contains organic matter due to the decay of vegetation and natural weathering processes and should be considered highly compressible. The intent of the test boring program was not to determine topsoil depths for cut/fill calculations and should not be referenced for estimating or bidding purposes.

Underlying the topsoil, at all test boring locations, is a layer of natural alluvial soils, which extends to approximate depths ranging between 7.5 and 10 feet below the existing surface grades. The natural alluvial soils consist primarily of silt and sand-sized particles, with varying amounts of clay and gravel. CMT Sample Numbers 17574 and 17575 were representative of this material and were classified as silt with sand and silty sand (USCS Classifications ML and SM). The natural alluvial soils have moisture contents ranging between 10 and 124 percent and generally exhibited a very soft to hard consistency and a very loose to very dense relative density based on the Standard Penetration Tests.

Underlying the natural alluvial soils, at test boring locations B-1 through B-5, is a layer of decomposed to weathered limestone, which extends to the boring termination depths ranging between 11 and 15 feet below the existing surface grades. The decomposed to weathered limestone consists primarily of gravel-sized particles, with varying amounts of silt and sand. The decomposed to weathered limestone has moisture contents ranging between 4 and 18 percent and generally exhibited a loose to very dense relative density based on the Standard Penetration Tests.

8.0 RECOMMENDATIONS

The conclusions and recommendations presented in this report are based on the data obtained from the field exploration and laboratory testing programs, information regarding the proposed construction and our knowledge of geomechanics. The subject site is considered suitable for the proposed construction, provided the geotechnical recommendations and suggested guidelines presented in this report are utilized in both the design and construction phases of this project.

Specific and detailed recommendations for the proposed construction are provided in the following sections.

8.1 Sinkholes

Sinkholes are a relatively common occurrence in the geologic formation at the site. The potential for sinkhole formation is high and will be especially high during construction activities. Therefore, every effort should be taken during construction to prevent the accumulation and infiltration of stormwater runoff in the vicinity of proposed structures (buildings, pavements, etc.).

In the event sinkholes develop during or after construction, a CMT geotechnical engineer should be consulted prior to any excavation and/or disturbance within the immediate vicinity of the sinkhole. A collaborative effort by CMT and the structural and civil engineers should be undertaken to determine the appropriate measures to repair the sinkholes.

Typically, repairs to sinkholes fit within two general repair types: Infiltration Repair and Structural Repair. Occasionally, a combination of repair types is required. The choice of repair type should be determined on a case-by-case basis after considering the sinkhole location and geometry, proximity to structures and utility lines, effects on stormwater management, preferences of the governing municipality, and other factors. The collaborative effort discussed above is essential in minimizing consequential problems resulting from the repair.

For illustrative and planning purposes, details depicting the two general repair techniques are included in Appendix G. These details show typical arrangements of materials that may be required, depending on the actual sinkhole geometry. For construction cost control purposes, it may be advisable to include provisions in the contract documents for sinkhole repair. Such provisions could include base quantities of typical repair materials, with line items for add/deduct based on actual quantities required during construction.

8.2 Groundwater Control

Groundwater should be expected during foundation construction. The geotechnical engineer should be consulted if groundwater removal is being considered for any purpose.

8.3 Drainage

Proper site drainage should be maintained during earthwork operations to minimize wet weather delays and reduce accumulation of additional moisture. If the surficial soils become softened during wet weather or frozen, these soils may need to be scarified and recompacted or removed before additional fill is placed. Also, the ground surface in the vicinity of the site should be graded so that surface water flows away from the construction areas.

We recommend that in the design and construction phases certain precautions should be taken relative to drainage. Final design plans should include precautions to reduce water infiltration into the subsoils in order to decrease excessive erosion and/or soil piping into voids in the carbonate bedrock, leading to sinkhole activity. These would include providing watertight storm drains and manholes, roof drains that tie directly into storm drainage systems, and utility lines that do not coincide with footings.

8.4 Foundation Recommendations

Based on the subsurface conditions encountered during our field exploration program and our understanding of the conditions of the site, helical piles are considered appropriate for this project. The helical piles should extend into the dense gravel or weathered limestone stratum, approximately 10 to 15 feet below the existing surface grades.

Helical piles are a deep foundation system consisting of a central shaft with one (1) to three (3) helical plates, typically. The shape of the helical plates minimize soil disturbance during installation and transfer the load to deeper soil bearing stratums. Helical piles can be designed as end bearing and friction elements extending into the underlying dense natural gravel stratum. Table 8.1 provides typical parameters to aid in the Helical Piles design:

Table 8.1 Typical Parameters for Helical Piles

CHANCE® Shaft Series	SS150
Shaft Size	1-1/2 inches
Torque Rating	7,000 ft-lb
Typical Helix Diameters	8 – 12 inches
Anticipated Termination Depth	10 – 15 feet
Estimated Allowable Axial Design Load	30 kips
Natural Gravel/Weathered Limestone Unit Weight	125 pcf
Natural Gravel/Weathered Limestone Cohesion	0 psf
Natural Gravel/Weathered Limestone Angle of Internal Friction	33°

The final design of the helical pile elements should be accomplished by a Professional Engineer experienced in this type of design. Additionally, the helical piles should adhere to the design requirements of IBC 2015 Section 1810.3.3.1.9.

8.5 Seismic Considerations

Table 8.2 lists the relevant seismic design criteria according to ASCE/SEI 7-22 and based on a Risk Category II.

Table 8.2 ASCE Hazards Report (ASCE/SEI 7-22)

Soil Class	D – Stiff Soil
Peak Ground Acceleration, PGA_M	0.056
Maximum Considered Earthquake Spectral Response for Short Periods (0.2 sec), S_{MS}	0.15
Maximum Considered Earthquake Spectral Response for a 1-Second Period, S_{M1}	0.081
Five Percent Damped Design Spectral Response for Short Periods (0.2 sec), S_{DS}	0.098
Five Percent Damped Design Spectral Response for a 1-Second Period, S_{D1}	0.054
Mapped Spectral Response Acceleration for Short Periods (0.2 sec), S_S	0.11
Mapped Spectral Response for a 1-Second Period, S_1	0.038
Long Period Transition Period, T_L	6
Average Shear Wave Velocity in Upper 30 meters, V_{S30} (m/s)	260

The ASCE 7 Hazards Report is presented in Appendix H for further reference.

9.0 EXCAVATIONS

The contractor is responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor is responsible for following the guidelines presented in the current version of the United States Department of Labor, Occupational Safety and Health Administration (OSHA), Part 1926, Subpart P, titled “Excavations.” This information is presented solely for the information of the client, and in no way is CMT Laboratories, Inc. responsible for the construction site safety or the Contractor’s activities.

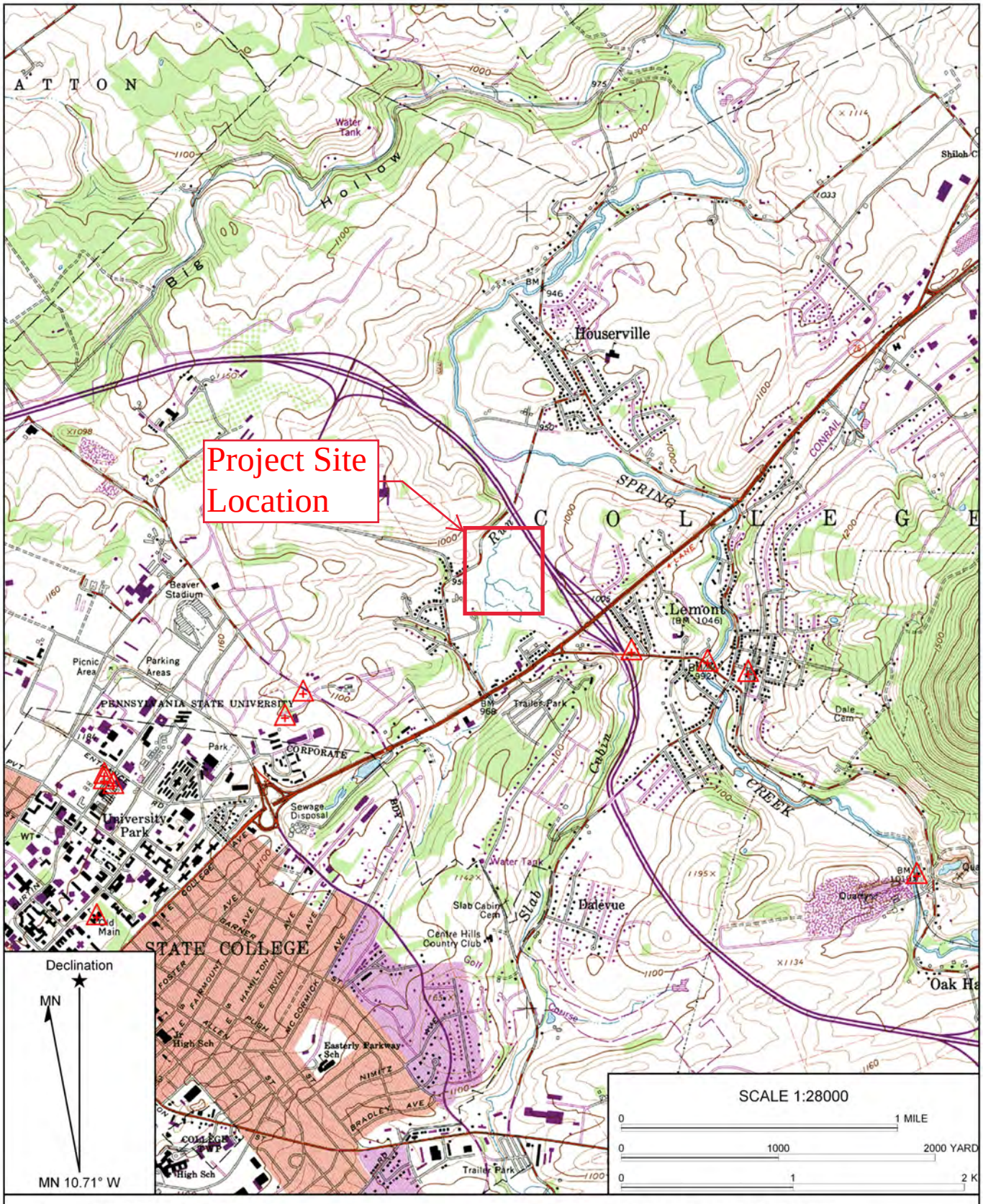
10.0 COMMENTS

This report has been prepared to assist in the design of foundations and to aid in the general site preparation for the proposed Millbrook Marsh Boardwalk project located in College Township, Centre County, Pennsylvania. The recommendations presented in this report are based on the subsurface information obtained by CMT and the general project information provided by others. The importance of inspection, consultation and testing during construction cannot be overemphasized.

We request that this office be consulted if, during design or construction, conditions are encountered which differ from those contained herein, thereby warranting a review of our recommendations. This report has been prepared for the exclusive use of LAN Associates.

APPENDIX A

USGS PROJECT LOCATION MAP



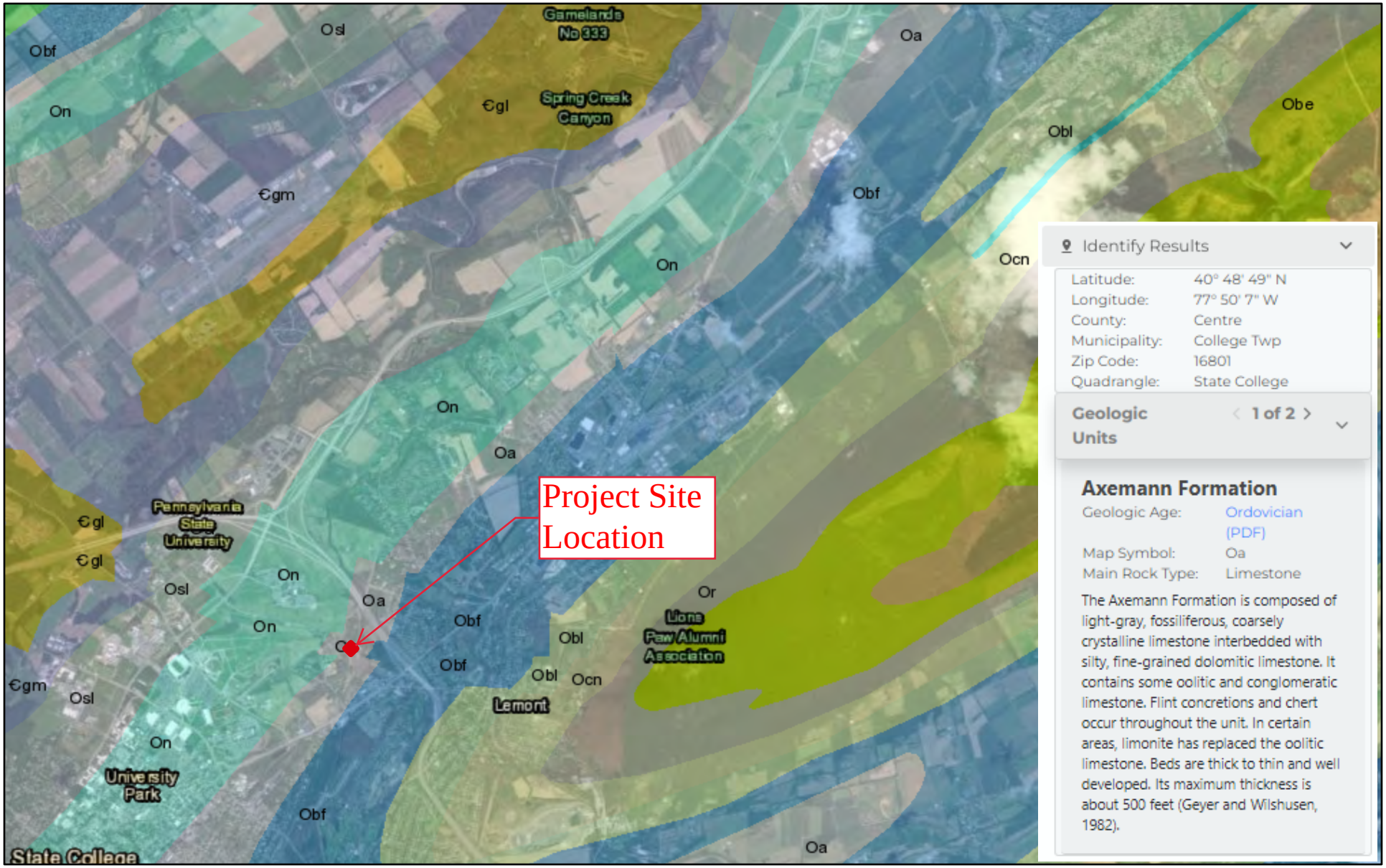
Name: STATE COLLEGE
Date: 05/05/22
Scale: 1 inch = 2,333 ft.

Location: 040° 48.7855' N 077° 50.1313' W

APPENDIX B

GEOLOGY MAP

2105600 - Geology



5/4/2022

1:72,224

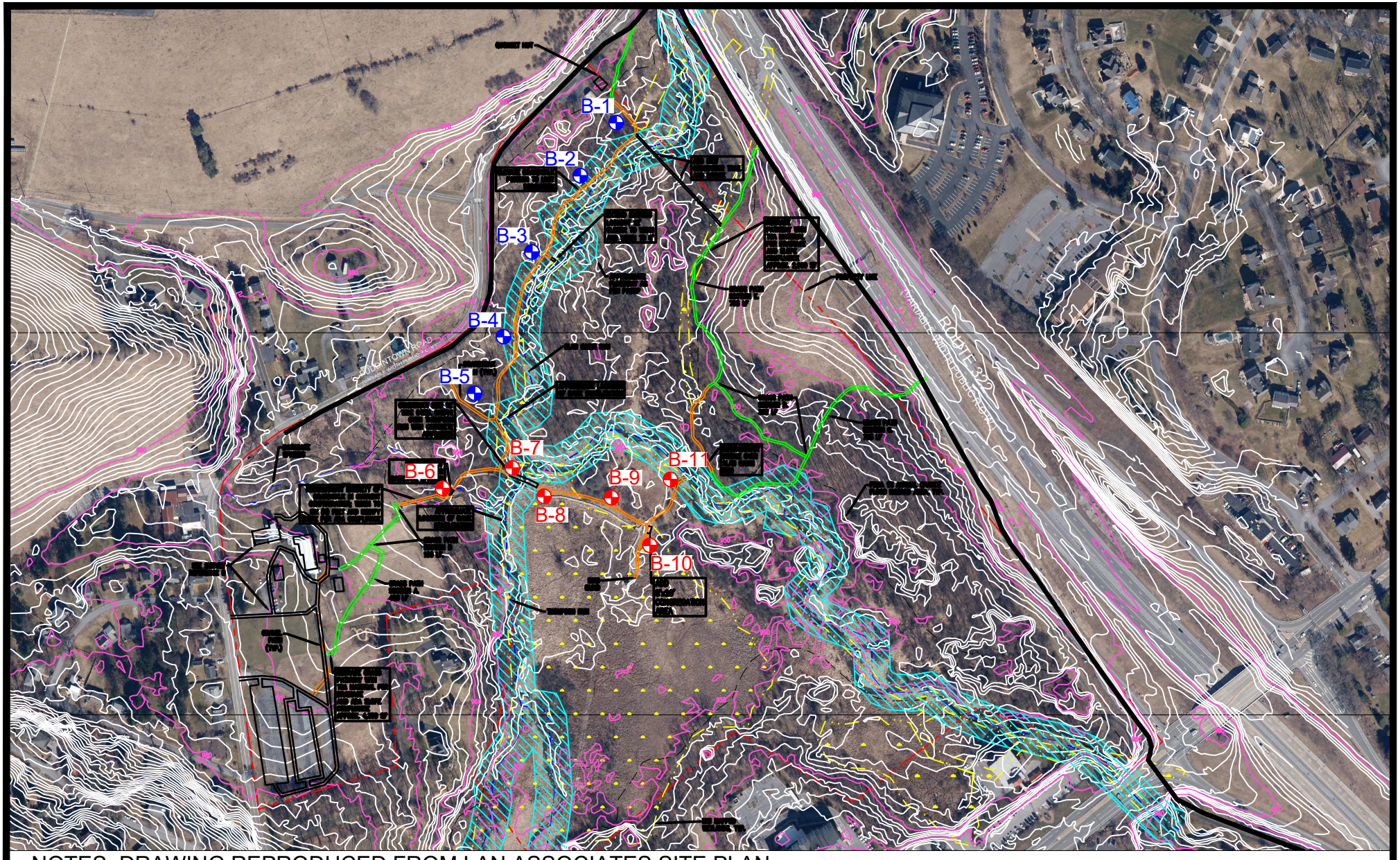
0 0.47 0.95 1.9 mi

0 0.75 1.5 3 km

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE,

APPENDIX C

TEST BORING LOCATION PLAN



NOTES: DRAWING REPRODUCED FROM LAN ASSOCIATES SITE PLAN.
NOT FOR CONSTRUCTION. NO SCALE.

cmt LABS
GEOTECHNICAL ENGINEERING
CONSTRUCTION MATERIALS TESTING
SOIL SCIENCE
SPECIALTY FOUNDATION DESIGN

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State College, PA 16801

Phone: 814-231-8845
Fax: 814-231-8846
wgreenawalt@cmtlabsinc.com

TITLE:
TEST BORING LOCATION PLAN

PROJECT:
MILLBROOK MARSH BOARDWALK

CMT PROJECT #:	DRAFTSPERSON:
2105600	NOT APPLICABLE
PROJECT ENGINEER:	DATE:
W. GREENAWALT, P.E.	MAY 5, 2022

APPENDIX D

GENERAL GEOTECHNICAL NOTES

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General Geotechnical Notes

SOIL DESCRIPTION

The soil descriptions are based on Standard Penetration Test (ASTM D 1586) results, visual inspection (ASTM D 2488) of samples, moisture content (ASTM D 2216) of samples, and results of additional laboratory testing. Soils are described by density or consistency, color, grain size distribution, moisture condition, and other properties, with the primary constituent in capital letters.

STANDARD PENETRATION TEST (ASTM D 1586)

The Standard Penetration Test consists of a 2.0 inch outside diameter and 1.375 inch inside diameter split-spoon sampler driven 18 inches into the soil by a 140 pound hammer falling freely a vertical distance of 30 inches. The sampler is typically driven in three successive 6 inch increments. The total number of blows required to drive the split-spoon sampler over 12 inches of penetration during the second and third successive increments is the Standard Penetration Test N-Value. If four 6 inch increments are achieved with the split-spoon, then the N-Value is the sum of the second and third increments. If the blow count for any 6 inch increment exceeds 50, the STP is stopped and the distance the sampler was driven is measured and recorded (e.g. 50/2" indicates 50 blows were recorded for a 2 inch penetration). Sampling achieved with CAT-Head driven safety hammer will have the designation N_{70}, indicating an approximate efficiency of 70%. Sampling achieved with an auto-trip hammer will have the designation N_{90}, indicating an approximate efficiency of 90%.

SAMPLING METHOD ABBREVIATIONS

AU – Auger Cuttings
SS – Split Spoon Sample
ST – Shelby Tube Sample
RC – Rock Core
VA – Vane Shear

SOIL RELATIVE PROPORTIONS

Descriptive Term	Percent
Trace	1 – 10
Little	11 – 20
Some	21 – 35
And	36 – 50

RELATIVE DENSITY OF GRANULAR/COHESIONLESS SOILS

Granular Soils	SPT "N" Value
Very Loose	0 – 4
Loose	5 – 14
Medium Dense	15 – 30
Dense	31 – 50
Very Dense	50+

CONSISTENCY OF COHESIVE SOILS

Cohesive Soils	q_p - (tsf)	SPT "N" Value
Very Soft	0.00 – 0.25	0 – 3
Soft	0.25 – 0.50	4 – 5
Firm (Medium)	0.50 – 1.00	6 – 9
Stiff	1.00 – 2.00	10 – 15
Very Stiff	2.00 – 4.00	16 – 30
Hard	4.00+	30+

COLOR

Soil color is described in basic terms such as brown, black, red, gray and yellow. If the soil is a uniform color throughout, the term is single, modified by adjectives such as light and dark. If the predominant color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled thoughout the soil, the colors are modified by the term "mottled".

WATER TABLE SYMBOLS


Groundwater depth at time of drilling
Groundwater depth at end of drilling

WC Water Content
% Laboratory Moisture Reading

MOISTURE CONDITION

Moisture contents may be written as dry, moist or wet. Dry indicates the absence of moisture; the material is dusty and dry to the touch. A moist condition is damp, but no visible moisture is present. Wet indicates visible free water and typically describes soil below the water table.

General Geotechnical Notes (Continued)

UNIFIED SOIL CLASSIFICATION SYSTEM

Primary Divisions for Field & Laboratory Identification			Laboratory Classification Criteria	Group Symbol	Typical Names
Coarse-Grained Soils More than 50% of the material is larger than No. 200 sieve size	Gravels: 50% or more of coarse fraction is larger than No. 4 sieve size	Clean gravels, less than 5% fines	$C_u>4$ and $1<C_c<3$	GW	Well-Graded Gravel
			$C_u<4$ and $C_c<1$ or $C_c>3$	GP	Poorly-Graded Gravel
		Gravels with fines, more than 12% fines	Fines classify as ML or MH	GM	Silty Gravels
			Fines classify as CL or CH	GC	Clayey Gravels
	Sands: 50% or more of coarse fraction is smaller than No. 4 sieve size	Clean sands, less than 5% fines	$C_u>6$ and $1<C_c<3$	SW	Well-Graded Sand
			$C_u<6$ and $C_c<1$ or $C_c>3$	SP	Poorly-Graded Sand
		Sands with fines, more than 12% fines	Fines classify as ML or MH	SM	Silty Sand
			Fines classify as CL or CH	SC	Clayey Sand
Fine-Grained Soils 50% or more of the material is smaller than No. 200 sieve size	Silts & Clays: Liquid Limit < 50	Inorganic	PI<4 or Plots below "A" line	ML	Inorganic Silt
			PI>7 and Plots on or above "A" line	CL	Inorganic Clay
		Organic	(LL – Oven Dried)/(LL – Not Dried) < 0.75	OL	Organic Clay/Silt
	Silts & Clays: Liquid Limit ≥ 50	Inorganic	PI Plots below "A" line	MH	Elastic Silt
			PI Plots on or above "A" line	CH	Inorganic Fat Clay, High Plasticity
		Organic	(LL – Oven Dried)/(LL – Not Dried) < 0.75	OH	Organic Clay/Silt
Highly Organic Soils	Primarily organic matter, organic color (dark) and odor		High ignition loss, LL & PI decrease after drying	PT	Peat, Muck, Highly Organic Soil

DESCRIPTION OF ROCK

Rock Quality Designation, RQD – This value is expressed in percent and is an indirect measure of rock soundness. It is obtained by summing the total length of all core pieces which are at least four inches long, and then dividing this sum by the total length of the core recovered.

The following terms are utilized to describe the strength of the rock specimen.

Strength	Field Test	Approximate Range of Uniaxial Compression Strength (psi)
Very High (Very Hard)	Many blows with geologic hammer required to break intact specimen. Does not leave a groove on the rock when scratched with knife.	> 32,000
High (Hard)	Hand held specimen breaks with hammer end of pick under more than one blow. Leaves a faint groove when scratched with knife.	8,000 – 32,000
Medium	Can just be scraped or peeled with knife (comparable to concrete).	2,000 – 8,000
Low (Soft)	Easily scratched with knife. Leaves a deep groove with broken edge.	500 – 2,000
Very Low (Very Soft)	Can be scratched with fingernail.	125 - 500

The following terms are utilized to describe the degree to weathering of the rock specimen relative to that of the comparable unweathered parent rock.

Weathering Grade	Symbol	Diagnostic Features
Fresh	F	No visible sign of decompostion or discoloration. Rings under hammer impact
Slightly Weathered	WS	Slight discoloration inwards from open fractures, otherwise similar to fresh.
Moderately Weathered	WM	Discoloration throughout. Weaker minerals decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped by knife. Texture preserved.
Highly Weathered	WH	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	WC	Minerals decomposed to soil but fabric and structure preserved (saprolite). Specimens easily crumbled or penetrated.
Residual Soil	RS	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

APPENDIX E

TEST BORING LOGS

CMT Laboratories, Inc.
2701 Carolean Industrial Drive
State College, PA 16801
cmtlabsinc.com

BORING NUMBER B-1

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION _____ **HOLE SIZE** 3-1/4"
DRILLING CONTRACTOR Mountain Research, LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 9.50 ft
NOTES Auto-Trip Hammer
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		12" TOPSOIL	SS 1	100	2-2-4 (6)		
		LEAN CLAY, (CL) brown, moist, firm					
2.5			SS 2	100	3-3-4 (7)		
5.0		SANDY LEAN CLAY WITH GRAVEL, (CL) brown, moist to wet, very soft to firm	SS 3	100	4-3-4 (7)		
7.5			SS 4	100	2-1-1 (2)		
10.0		SANDY SILT WITH GRAVEL, brownish gray, moist to wet, loose to medium dense (Decomposed to Weathered Limestone)	SS 5	100	5-8-9 (17)		
12.5							
15.0			SS 6	60	4-7-6 (13)		

Bottom of borehole at 15.0 feet.

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

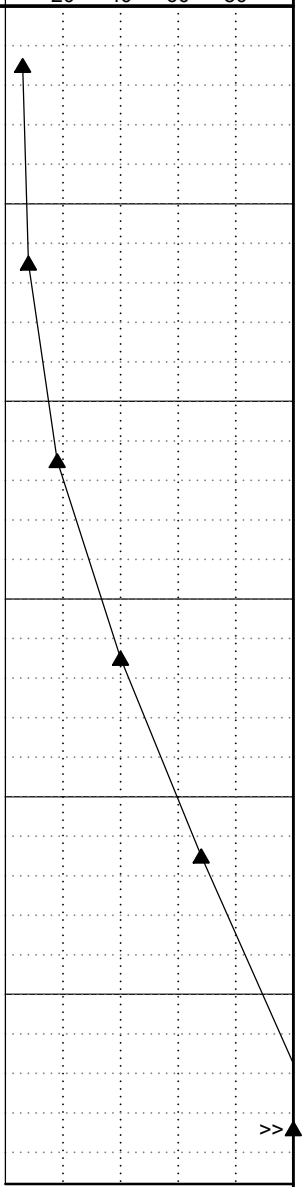
CMT Laboratories, Inc.
2701 Carolean Industrial Drive
State College, PA 16801
cmtlabsinc.com

BORING NUMBER B-2

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION _____ **HOLE SIZE** 3-1/4"
DRILLING CONTRACTOR Mountain Research, LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 8.00 ft
NOTES Auto-Trip Hammer
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		12" TOPSOIL	SS 1	100	0-3-3 (6)		
		SANDY LEAN CLAY WITH GRAVEL, (CL) brown, moist, firm to very stiff					
2.5			SS 2	100	3-4-4 (8)		
5.0			SS 3	100	7-6-12 (18)		
7.5		SILTY SAND WITH GRAVEL, brownish gray, dry to wet, dense to very dense (Decomposed to Weathered Limestone)	SS 4	67	20-26-14 (40)		
10.0			SS 5	67	6-22-46 (68)		
12.5		SILTY GRAVEL WITH SAND, dark gray, moist to wet, very dense (Decomposed to Weathered Limestone)	SS 6	71	6-27-50/5"		

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



Refusal at 14.9 feet.
Bottom of borehole at 14.9 feet.

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BORING NUMBER B-3

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION _____ **HOLE SIZE** 3-1/4"
DRILLING CONTRACTOR Mountain Research, LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING ---
NOTES Auto-Trip Hammer
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		18" TOPSOIL	SS 1	67	0-2-3 (5)		
2.5		SANDY LEAN CLAY WITH GRAVEL, (CL) brown, moist, firm to stiff	SS 2	100	2-5-7 (12)		
5.0			SS 3	33	3-4-3 (7)		
7.5		SILTY GRAVEL WITH SAND, light brownish gray, dry to moist, medium dense to very dense (Decomposed to Weathered Limestone)	SS 4	67	7-11-8 (19)		
10.0			SS 5	77	6-10-50/4"		

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

>>

Refusal at 11.3 feet.
Bottom of borehole at 11.3 feet.

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State College, PA 16801
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BORING NUMBER B-4

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION _____ **HOLE SIZE** 3-1/4"
DRILLING CONTRACTOR Mountain Research, LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 6.50 ft
NOTES Auto-Trip Hammer
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		18" TOPSOIL	SS 1	100	0-2-2 (4)		
2.5		SILTY SAND WITH GRAVEL, (SM) brown, moist to wet, very loose to medium dense	SS 2	100	4-4-6 (10)		
5.0			SS 3	100	4-8-7 (15)		
7.5			SS 4	13	0-0-2 (2)		
10.0		SILTY GRAVEL WITH SAND, light brown, moist to wet, loose to dense (Decomposed to Weathered Limestone)	SS 5	33	1-6-4 (10)		
12.5							
15.0			SS 6	100	6-14-26 (40)		

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 15.0 feet.

CMT Laboratories, Inc.
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BORING NUMBER B-5

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION _____ **HOLE SIZE** 3-1/4"
DRILLING CONTRACTOR Mountain Research, LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 5.40 ft
NOTES Auto-Trip Hammer
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		12" TOPSOIL	SS 1	33	0-0-1 (1)		
		SILT WITH SAND, (ML) brown, moist, very loose to loose					
2.5			SS 2	100	2-3-4 (7)		
5.0		SILTY SAND WITH GRAVEL, (SM) brown, moist to wet, very loose	SS 3	100	7-4-0 (4)		
7.5		SILTY GRAVEL WITH SAND, light brownish gray to gray, dry to wet, loose to medium dense (Decomposed to Weathered Limestone)	SS 4	67	4-5-7 (12)		
10.0			SS 5	100	10-13-17 (30)		
12.5			SS 6	100	7-10-12 (22)		
15.0		Bottom of borehole at 15.0 feet.					

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

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cmtlabsinc.com

BORING NUMBER B-6

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION ---- **HOLE SIZE** 3"
DRILLING CONTRACTOR CMT Laboratories, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Sampling
AT TIME OF DRILLING 0.80 ft
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 0.50 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0	12" TOPSOIL	AU 1		2-5-7 (12)		
	SILT WITH SAND, (ML) brown, moist to wet, loose to very dense	AU 2		44-14-20 (34)		
2.5		AU 3		11-27-50/5"		
	4.5' - Auger Refusal on Gravel					
5.0		AU 4		40-37-48 (85)		
	SILTY GRAVEL WITH SAND, (GM) brownish gray, moist to wet, very dense					

Bottom of borehole at 5.8 feet.

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

CMT Laboratories, Inc.
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cmtlabsinc.com

BORING NUMBER B-7

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION ___ **HOLE SIZE** 3"
DRILLING CONTRACTOR CMT Laboratories, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Sampling
AT TIME OF DRILLING 3.00 ft
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 1.50 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		18" TOPSOIL	AU 1		6-7-7 (14)		
2.5		SILTY SAND WITH GRAVEL, (SM) brown, moist to wet, medium dense to very dense	AU 2		4-8-20 (28)		
			AU 3		25-50/5"		
		3.9' - 'Spoon' Refusal 4.2' - Auger Refusal on Gravel					

Bottom of borehole at 4.2 feet.

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

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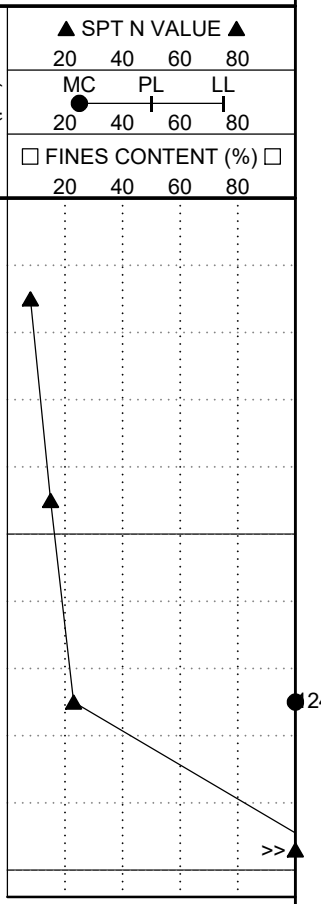
BORING NUMBER B-8

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION ---- **HOLE SIZE** 3"
DRILLING CONTRACTOR CMT Laboratories, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Sampling
AT TIME OF DRILLING 1.00 ft
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 0.80 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		24" TOPSOIL	AU 1		1-1-7 (8)		
2.5		SILTY SAND WITH GRAVEL, (SM) dark brownish gray to dark brown, wet, medium dense to very dense	AU 2		3-4-11 (15)		
			AU 3		2-7-16 (23)		
5.0		5.0' - Auger Refusal on Gravel 5.2' - 'Spoon' Refusal	AU 4		41-50/2"		

Bottom of borehole at 5.2 feet.



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State College, PA 16801
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BORING NUMBER B-9

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/2/22 **COMPLETED** 5/2/22
GROUND ELEVATION ---- **HOLE SIZE** 3"
DRILLING CONTRACTOR CMT Laboratories, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Sampling
AT TIME OF DRILLING 0.80 ft
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 0.60 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		18" TOPSOIL	AU 1		1-4-10 (14)		
		LEAN CLAY, (CL) dark brown, wet, hard	AU 2		5-12-19 (31)		
2.5		SILTY SAND WITH GRAVEL, (SM) grayish brown, moist to wet, loose to dense	AU 3		9-6-6 (12)		
5.0		5.7' - Auger Refusal on Gravel					
		SILTY GRAVEL WITH SAND, (GM) grayish brown, moist to wet, very dense	AU 4		47-40-38 (78)		

Bottom of borehole at 6.5 feet.

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

CMT Laboratories, Inc.
2701 Carolean Industrial Drive
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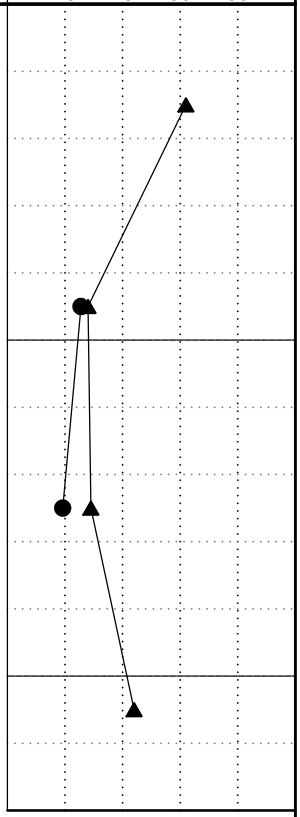
cmtlabsinc.com

BORING NUMBER B-10

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/3/22 **COMPLETED** 5/3/22
GROUND ELEVATION ___ **HOLE SIZE** 3"
DRILLING CONTRACTOR CMT Laboratories, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Sampling
AT TIME OF DRILLING 1.50 ft
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 1.00 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		16" TOPSOIL	SS 1	53	4-14-48 (62)		
		LEAN CLAY, (CL) dark brownish gray, moist to wet, very stiff to hard	AU 2		11-15-13 (28)		
2.5		SILTY SAND WITH GRAVEL, (SM) brownish gray, moist to wet, medium dense	SS 3	67	6-8-21 (29)		
		4.5' - Auger Refusal on Gravel					
5.0		SILTY GRAVEL WITH SAND, (GM) light brown, moist to wet, dense to very dense	SS 4	80	6-10-34 (44)		

Bottom of borehole at 6.0 feet.



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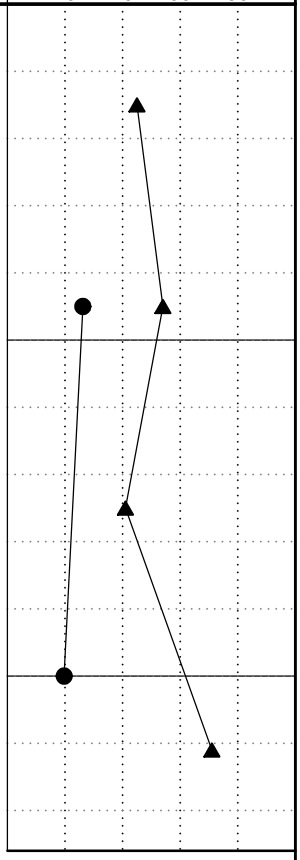
BORING NUMBER B-11

CLIENT LAN Associates
PROJECT NAME Millbrook Marsh Boardwalk
PROJECT NUMBER 2105600
PROJECT LOCATION College Twp., Centre Co., PA
DATE STARTED 5/3/22 **COMPLETED** 5/3/22
GROUND ELEVATION ---- **HOLE SIZE** 3"
DRILLING CONTRACTOR CMT Laboratories, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Sampling
AT TIME OF DRILLING 3.30 ft
LOGGED BY W. Greenawalt, P.E. **CHECKED BY** S. Hoover, P.E.
AT END OF DRILLING 3.00 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		12" TOPSOIL	AU 1		5-16-29 (45)		
		LEAN CLAY, (CL) brownish gray, moist to wet, hard	AU 2		9-17-37 (54)		
2.5			AU 3		11-17-24 (41)		
		SILTY SAND WITH GRAVEL, (SM) brownish gray, moist to wet, dense					
5.0		SILTY GRAVEL WITH SAND, (GM) brownish gray, moist to wet, very dense 5.9' - Auger Refusal on Gravel	SS 4	100	13-32-39 (71)		

Bottom of borehole at 6.3 feet.

▲ SPT N VALUE ▲
20 40 60 80
MC PL LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



APPENDIX F

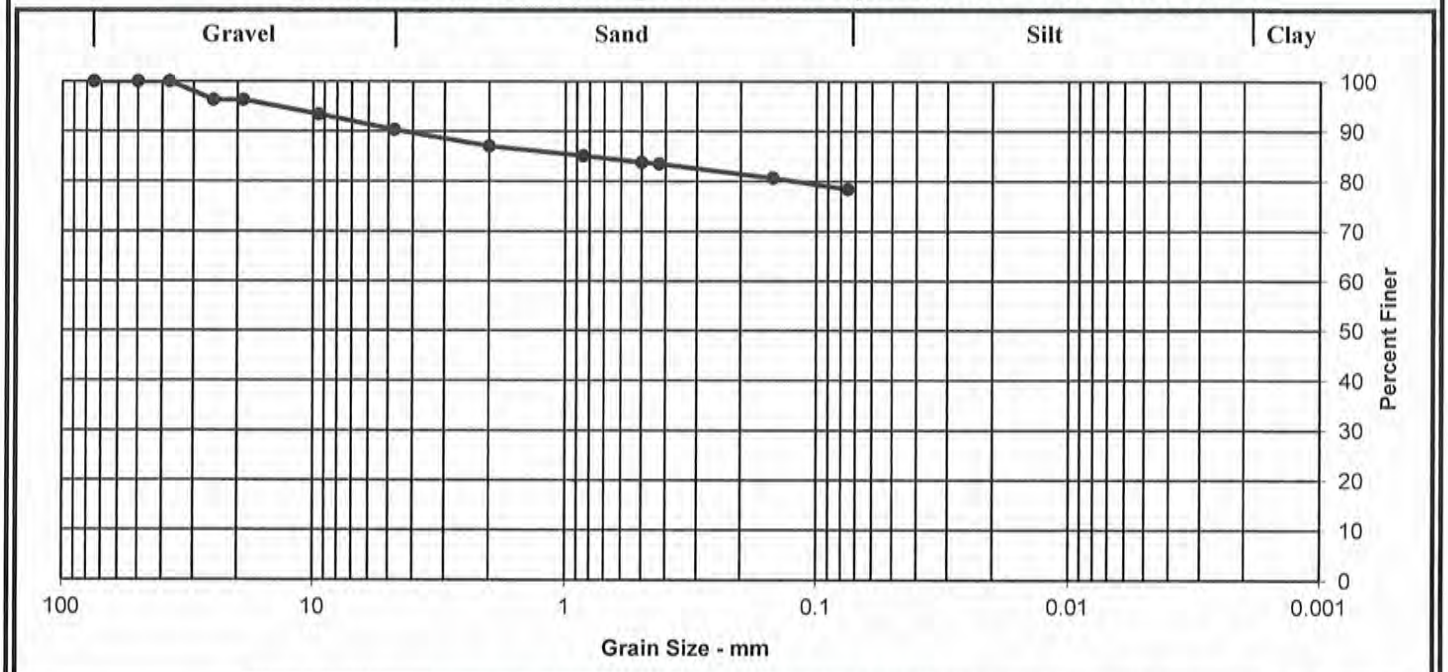
LABORATORY TESTING DATA

cmt LABS

GEOTECHNICAL ENGINEERING
CONSTRUCTION MATERIALS TESTING
SOIL SCIENCE
SPECIALTY FOUNDATION DESIGN

The groundwork for success.

Grain-Size Analysis Test Report without Hydrometer - ASTM D 422



% Gravel	% Sand	% Silt and Clay	USCS-ASTM D2487	LL-AASHTO T89	PI-AASHTO T90
9.7	11.9	78.4	ML	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	96.3
3/4	19.0	96.3
3/8	9.50	93.4
#4	4.75	90.3

Sieve Number	Sieve Size (mm)	Percent Finer
#10	2.00	87.0
#20	0.850	85.1
#35	0.500	83.8
#40	0.425	83.5
#100	0.150	80.7
#200	0.075	78.4

Percent +3 Inch : 0.0

Project: Millbrook Marsh Boardwalk
Location: State College, PA

File Number: 2105600

Date: 6-May-22

Sample Location: B-6 (3.0'-4.0')

CMT I.D. No.: 17574

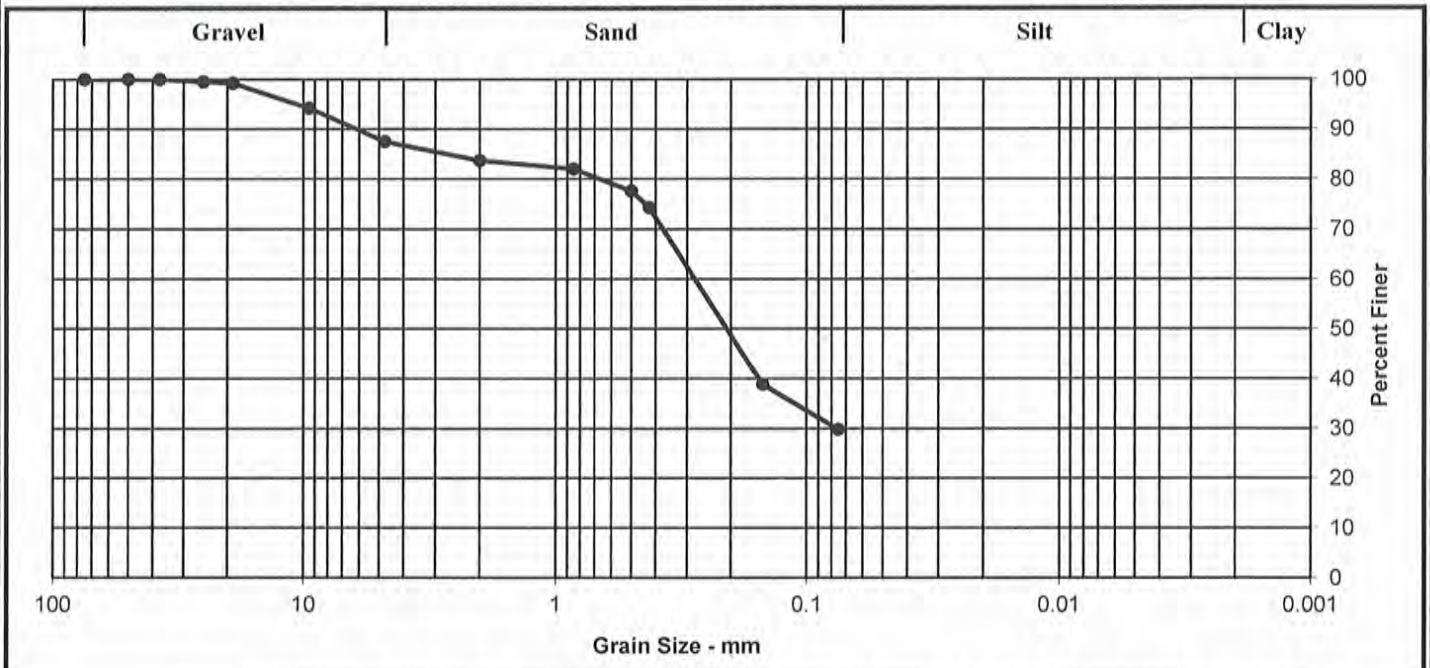
Material Description: Gray Silt with Sand

Client: LAN Associates

CMT Laboratories, Inc.

CMT Laboratories, Inc.
2701 Carolean Industrial Drive, State College, PA 16801 Phone: (814) 231-8845 Fax: (814) 231-8846
www.cmtlabsinc.com

Grain-Size Analysis Test Report without Hydrometer - ASTM D 422



% Gravel	% Sand	% Silt and Clay	USCS-ASTM D2487	LL-AASHTO T89	PI-AASHTO T90
12.5	57.7	29.8	SM	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	99.5
3/4	19.0	99.2
3/8	9.50	94.2
#4	4.75	87.5

Sieve Number	Sieve Size (mm)	Percent Finer
#10	2.00	83.7
#20	0.850	82.0
#35	0.500	77.6
#40	0.425	74.3
#100	0.150	38.9
#200	0.075	29.8

Percent +3 Inch : 0.0

Project: Millbrook Marsh Boardwalk
Location: State College, PA

File Number: 2105600

Date: 6-May-22

Sample Location: B-10 & B-11 (4.0'-4.5')

CMT I.D. No.: 17575

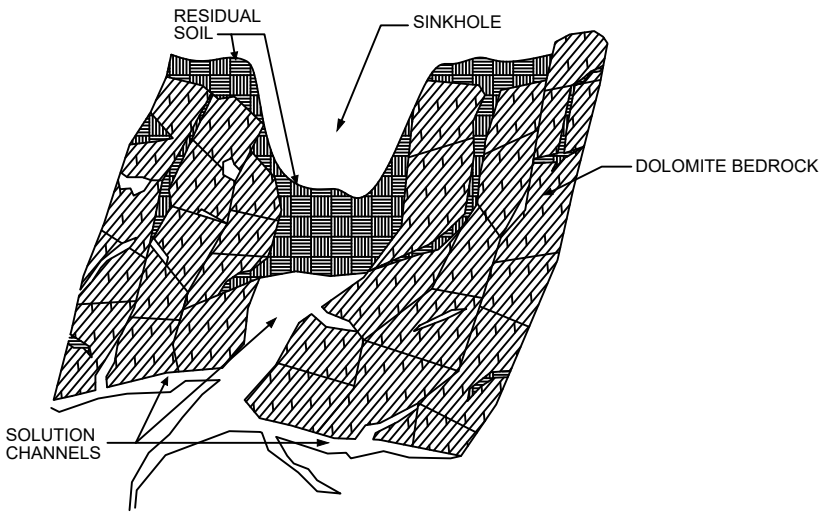
Material Description: Brownish Gray Silty Sand

Client: LAN Associates

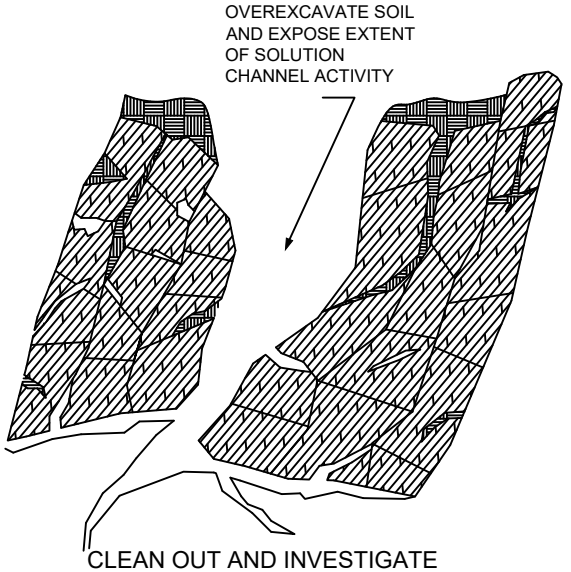
CMT Laboratories, Inc.

APPENDIX G

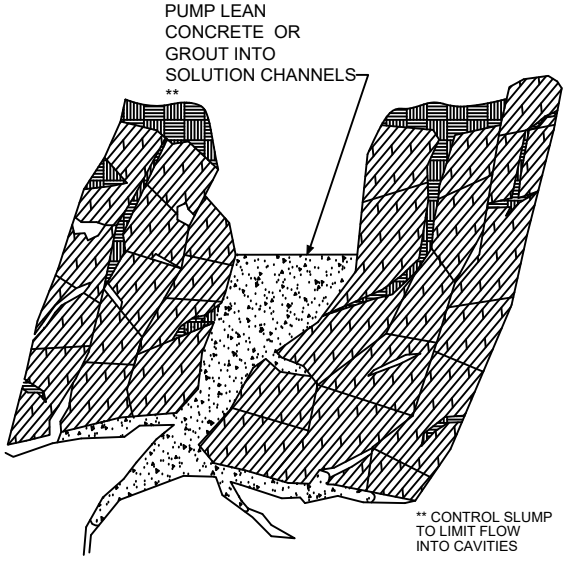
TYPICAL SINKHOLE REPAIR DETAILS



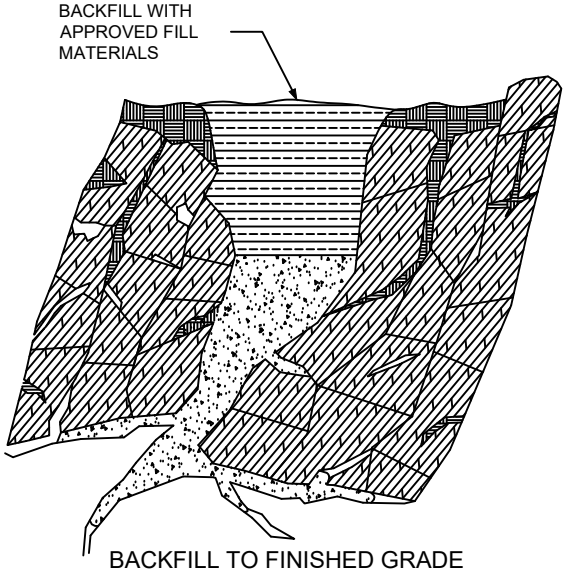
INITIAL COLLAPSE



CLEAN OUT AND INVESTIGATE



SEAL OPENINGS W/ CONCRETE OR GROUT



BACKFILL TO FINISHED GRADE

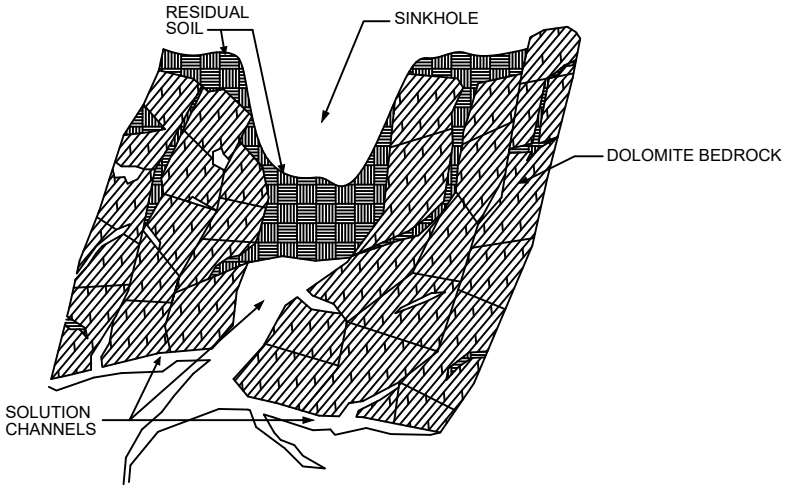
NOTE: THE GEOTECHNICAL ENGINEER SHOULD BE CONSULTED PRIOR TO THE INITIATION OF THE REPAIR PROCESS.
DRAWING IS TYPICAL AND CANNOT BE APPLIED IN EVERY SCENARIO. NOT TO SCALE.

cmt LABS
GEOTECHNICAL ENGINEERING
CONSTRUCTION MATERIALS TESTING
SOIL SCIENCE
SPECIALTY FOUNDATION DESIGN
CMT Laboratories, Inc.
2701 Carolean Industrial Drive
State College, PA 16801
Phone: 814-231-8845
Fax: 814-231-8846
wgreenawalt@cmtlabsinc.com

TITLE:
TYPICAL SINKHOLE REPAIR DETAIL - STRUCTURAL AREAS

PROJECT:
MILLBROOK MARSH BOARDWALK

CMT PROJECT #:	DRAFTSPERSON:
2105600	W. GREENAWALT, PE
PROJECT ENGINEER:	DATE:
W. GREENAWALT, P.E.	MAY 5, 2022



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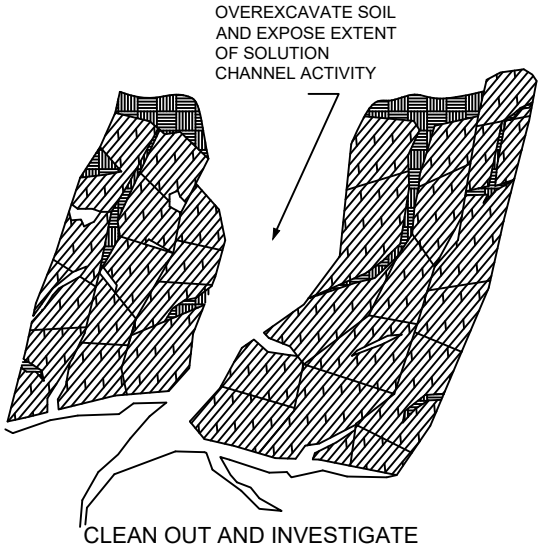
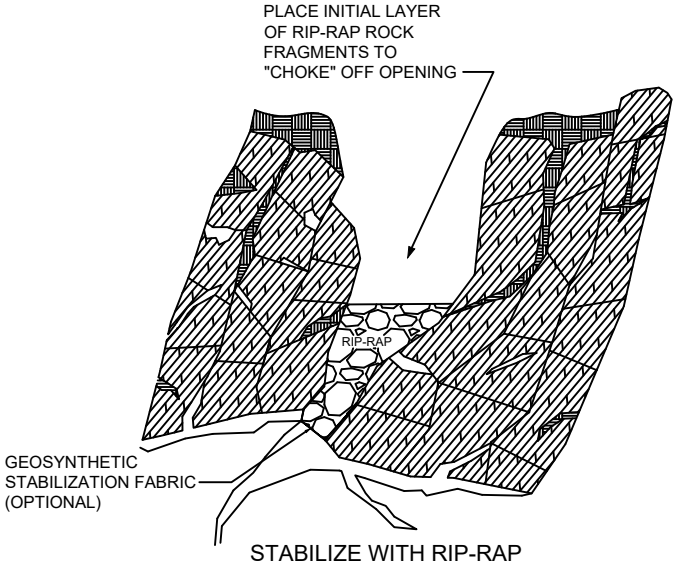
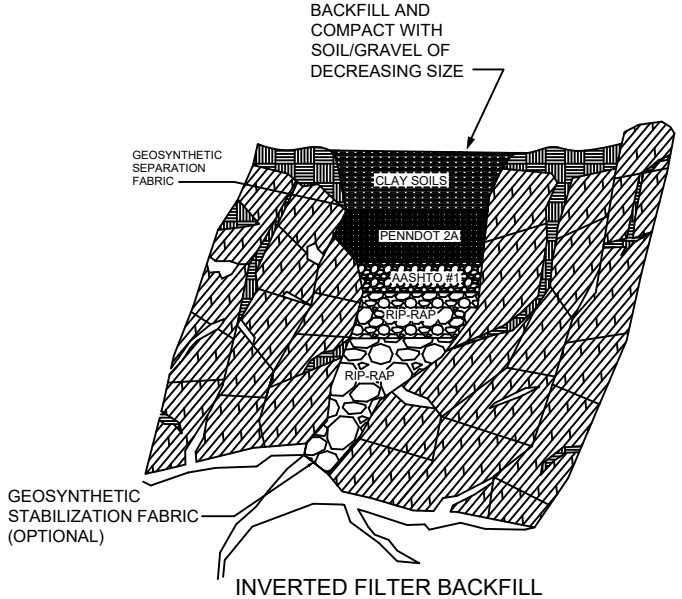


CLEAN OUT AND INVESTIGATE



STABILIZE WITH RIP-RAP



INVERTED FILTER BACKFILL

NOTE: THE GEOTECHNICAL ENGINEER SHOULD BE CONSULTED PRIOR TO THE INITIATION OF THE REPAIR PROCESS.
DRAWING IS TYPICAL AND CANNOT BE APPLIED IN EVERY SCENARIO. NOT TO SCALE.

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CONSTRUCTION MATERIALS TESTING
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CMT Laboratories, Inc.
2701 Carolean Industrial Drive
State College, PA 16801
Phone: 814-231-8845
Fax: 814-231-8846
wgreenawalt@cmtlabsinc.com

TITLE:
TYPICAL SINKHOLE REPAIR DETAIL - INFILTRATION AREAS

PROJECT:
MILLBROOK MARSH BOARDWALK

CMT PROJECT #:	DRAFTSPERSON:
2105600	W. GREENAWALT, PE
PROJECT ENGINEER:	DATE:
W. GREENAWALT, P.E.	MAY 5, 2022

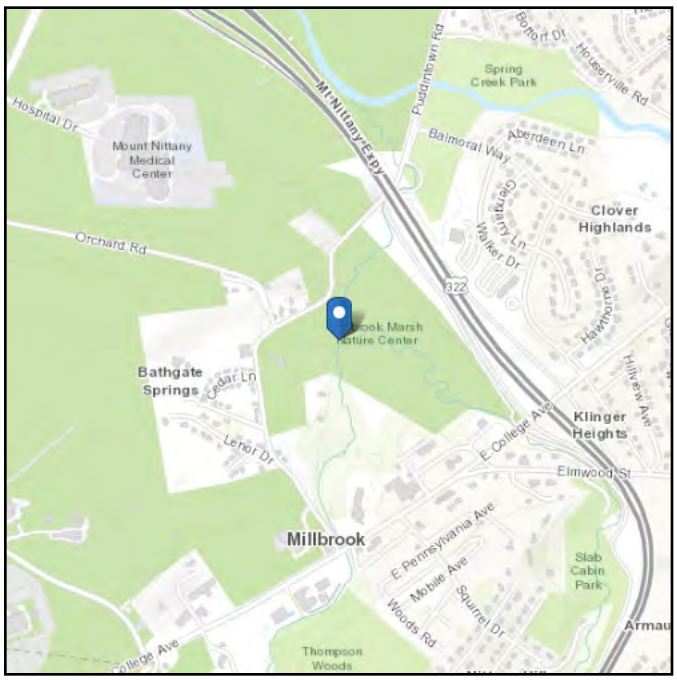
APPENDIX H

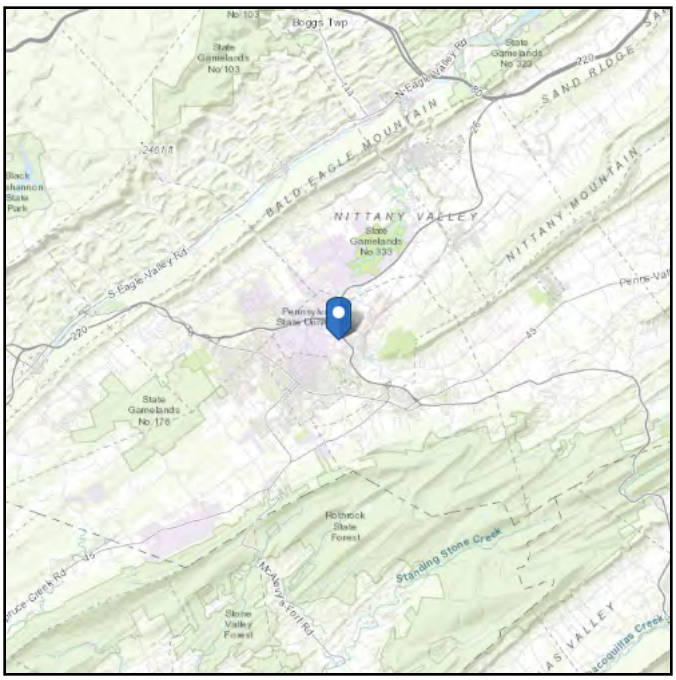
ASCE 7 HAZARDS REPORT

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-22	**Elevation:**	946.73 ft (NAVD 88)
Risk Category:	II	**Latitude:**	40.813835
Soil Class:	D - Stiff Soil	**Longitude:**	-77.835897





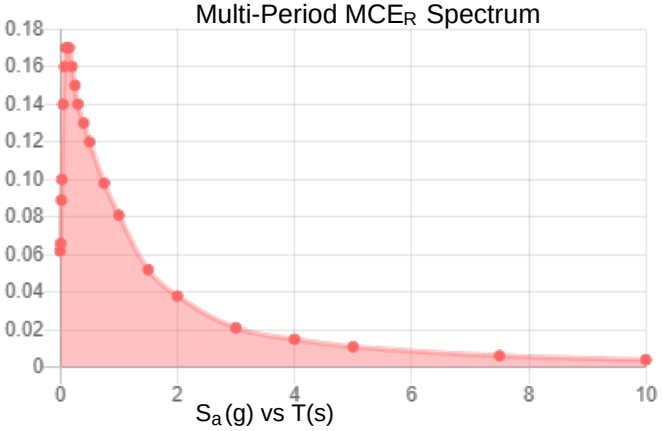
Seismic

Site Soil Class:

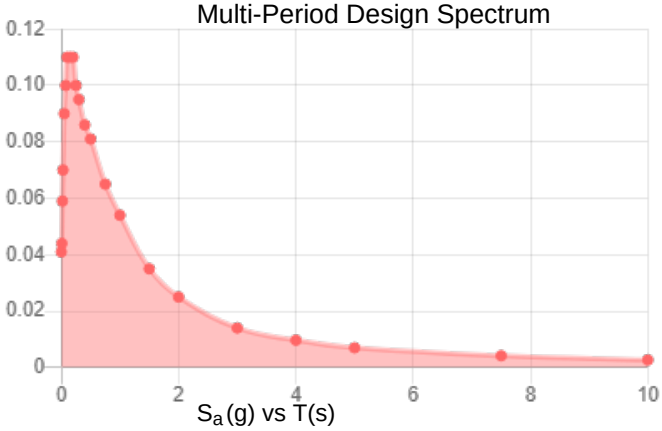
Results:

PGA_M :	0.056	T_L :	6
S_{MS} :	0.15	S_S :	0.11
S_{M1} :	0.081	S_1 :	0.038
S_{DS} :	0.098	S_{DC} :	
S_{D1} :	0.054	V_{S30} :	260

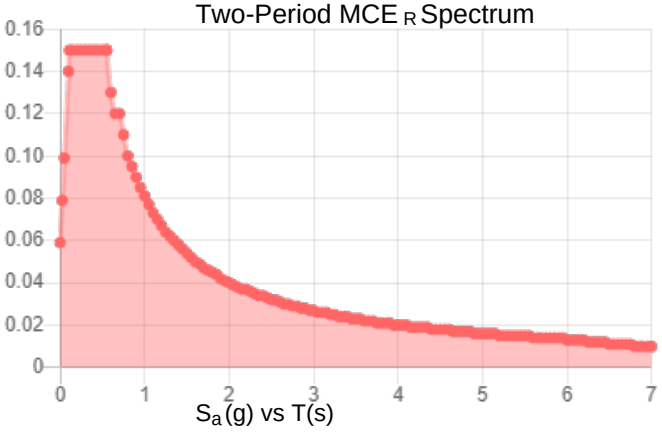
Multi-Period MCE_R Spectrum



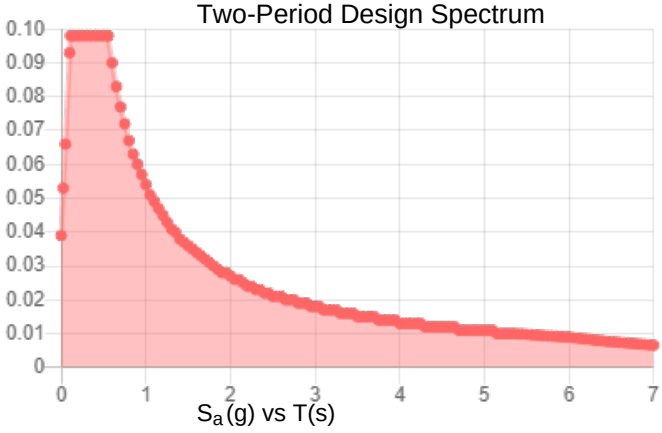
Multi-Period Design Spectrum



Two-Period MCE_R Spectrum



Two-Period Design Spectrum



MCE_R Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Thu May 05 2022

Date Source:
USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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APPENDIX I

BIBLIOGRAPHY

BIBLIOGRAPHY

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APPENDIX D

NOAA ATLAS PRECIPITATION FREQUENCY DATA SERVER

NOAA Atlas 14, Volume 2, Version 3
Location name: State College, Pennsylvania, USA*
Latitude: 40.8138°, Longitude: -77.8347°
Elevation: 946.45 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.309** (0.279-0.343)	**0.367** (0.331-0.408)	**0.448** (0.405-0.496)	**0.510** (0.460-0.564)	**0.593** (0.531-0.654)	**0.655** (0.584-0.720)	**0.719** (0.637-0.789)	**0.783** (0.689-0.857)	**0.872** (0.759-0.953)	**0.938** (0.810-1.02)
10-min	**0.480** (0.433-0.533)	**0.573** (0.516-0.637)	**0.697** (0.629-0.771)	**0.788** (0.711-0.871)	**0.907** (0.812-1.00)	**0.994** (0.886-1.09)	**1.08** (0.958-1.19)	**1.17** (1.03-1.28)	**1.28** (1.12-1.40)	**1.37** (1.18-1.49)
15-min	**0.588** (0.530-0.654)	**0.701** (0.632-0.779)	**0.856** (0.773-0.946)	**0.969** (0.874-1.07)	**1.12** (1.00-1.24)	**1.23** (1.10-1.35)	**1.34** (1.19-1.48)	**1.45** (1.28-1.59)	**1.60** (1.39-1.75)	**1.71** (1.47-1.87)
30-min	**0.778** (0.702-0.865)	**0.938** (0.845-1.04)	**1.17** (1.06-1.30)	**1.35** (1.21-1.49)	**1.58** (1.42-1.74)	**1.76** (1.57-1.93)	**1.94** (1.72-2.13)	**2.12** (1.87-2.32)	**2.37** (2.06-2.59)	**2.56** (2.21-2.80)
60-min	**0.950** (0.857-1.06)	**1.15** (1.04-1.28)	**1.47** (1.33-1.63)	**1.71** (1.55-1.89)	**2.05** (1.84-2.26)	**2.32** (2.07-2.54)	**2.60** (2.30-2.85)	**2.88** (2.53-3.15)	**3.28** (2.85-3.58)	**3.59** (3.10-3.93)
2-hr	**1.10** (0.977-1.22)	**1.33** (1.19-1.48)	**1.69** (1.51-1.89)	**1.98** (1.76-2.21)	**2.39** (2.12-2.65)	**2.73** (2.39-3.02)	**3.08** (2.69-3.39)	**3.45** (2.99-3.80)	**3.99** (3.42-4.39)	**4.43** (3.76-4.87)
3-hr	**1.18** (1.07-1.31)	**1.42** (1.28-1.59)	**1.80** (1.62-2.00)	**2.11** (1.89-2.33)	**2.54** (2.27-2.80)	**2.90** (2.57-3.18)	**3.28** (2.88-3.60)	**3.69** (3.21-4.04)	**4.28** (3.69-4.68)	**4.76** (4.06-5.20)
6-hr	**1.46** (1.33-1.62)	**1.76** (1.60-1.95)	**2.19** (1.99-2.43)	**2.55** (2.31-2.82)	**3.07** (2.75-3.37)	**3.49** (3.12-3.82)	**3.94** (3.49-4.31)	**4.42** (3.88-4.82)	**5.12** (4.44-5.57)	**5.68** (4.88-6.17)
12-hr	**1.82** (1.66-2.02)	**2.18** (1.99-2.43)	**2.71** (2.46-3.00)	**3.16** (2.85-3.49)	**3.80** (3.40-4.18)	**4.33** (3.86-4.75)	**4.91** (4.34-5.37)	**5.54** (4.84-6.03)	**6.45** (5.56-7.01)	**7.20** (6.12-7.81)
24-hr	**2.20** (2.05-2.36)	**2.64** (2.47-2.84)	**3.28** (3.06-3.53)	**3.81** (3.55-4.09)	**4.58** (4.24-4.90)	**5.22** (4.81-5.58)	**5.91** (5.40-6.31)	**6.65** (6.03-7.10)	**7.72** (6.92-8.25)	**8.61** (7.63-9.21)
2-day	**2.55** (2.38-2.74)	**3.05** (2.86-3.29)	**3.79** (3.53-4.07)	**4.40** (4.09-4.72)	**5.28** (4.88-5.65)	**6.02** (5.53-6.44)	**6.81** (6.21-7.29)	**7.67** (6.94-8.20)	**8.90** (7.95-9.54)	**9.93** (8.78-10.7)
3-day	**2.71** (2.53-2.91)	**3.24** (3.03-3.49)	**4.01** (3.74-4.30)	**4.64** (4.32-4.98)	**5.56** (5.15-5.96)	**6.33** (5.83-6.77)	**7.15** (6.54-7.65)	**8.03** (7.29-8.60)	**9.31** (8.34-9.99)	**10.4** (9.19-11.1)
4-day	**2.87** (2.68-3.08)	**3.43** (3.21-3.68)	**4.23** (3.95-4.53)	**4.89** (4.56-5.25)	**5.85** (5.42-6.26)	**6.64** (6.12-7.11)	**7.49** (6.87-8.01)	**8.40** (7.64-9.00)	**9.72** (8.73-10.4)	**10.8** (9.60-11.6)
7-day	**3.38** (3.18-3.60)	**4.03** (3.79-4.30)	**4.91** (4.61-5.24)	**5.62** (5.26-5.99)	**6.60** (6.15-7.04)	**7.40** (6.87-7.89)	**8.23** (7.60-8.78)	**9.09** (8.33-9.71)	**10.3** (9.35-11.0)	**11.3** (10.1-12.1)
10-day	**3.90** (3.68-4.16)	**4.64** (4.37-4.94)	**5.57** (5.24-5.93)	**6.31** (5.92-6.72)	**7.35** (6.87-7.83)	**8.18** (7.61-8.70)	**9.03** (8.36-9.62)	**9.91** (9.12-10.6)	**11.1** (10.1-11.9)	**12.1** (10.9-13.0)
20-day	**5.39** (5.10-5.71)	**6.35** (6.02-6.73)	**7.41** (7.02-7.85)	**8.24** (7.80-8.72)	**9.32** (8.79-9.86)	**10.1** (9.56-10.8)	**11.0** (10.3-11.6)	**11.8** (11.0-12.5)	**12.8** (11.9-13.6)	**13.6** (12.6-14.5)
30-day	**6.77** (6.44-7.12)	**7.94** (7.55-8.35)	**9.11** (8.66-9.58)	**10.0** (9.51-10.5)	**11.2** (10.6-11.8)	**12.1** (11.4-12.7)	**12.9** (12.2-13.6)	**13.7** (12.9-14.4)	**14.7** (13.8-15.6)	**15.5** (14.5-16.4)
45-day	**8.59** (8.20-9.02)	**10.0** (9.58-10.5)	**11.4** (10.9-12.0)	**12.4** (11.8-13.0)	**13.6** (13.0-14.3)	**14.5** (13.8-15.2)	**15.3** (14.5-16.1)	**16.1** (15.2-16.9)	**17.0** (16.1-17.9)	**17.7** (16.6-18.7)
60-day	**10.3** (9.86-10.8)	**12.0** (11.5-12.6)	**13.5** (12.9-14.1)	**14.6** (13.9-15.2)	**15.9** (15.1-16.6)	**16.8** (16.0-17.5)	**17.6** (16.8-18.4)	**18.4** (17.5-19.2)	**19.2** (18.3-20.2)	**19.8** (18.8-20.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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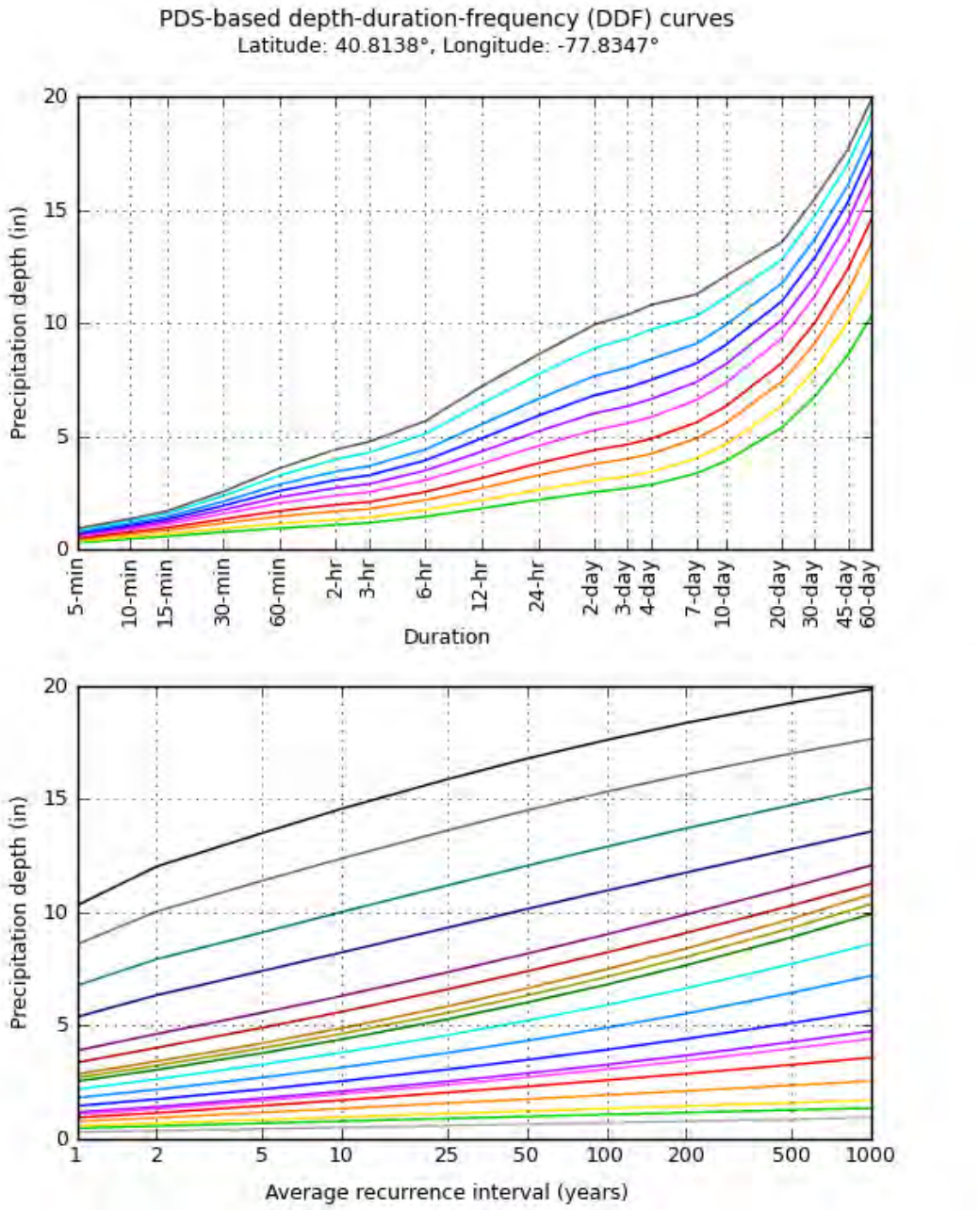
PF graphical



NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Mon Oct 10 16:57:45 2022

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Maps & aerials

Small scale terrain

APPENDIX E

HYDRAFLOW HYDROGRAPHS OUTPUT

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	410.64	-------	-------	-------	1231.50	-------	-------	2528.33	SC-2
2	SCS Runoff	------	94.92	-------	-------	-------	319.62	-------	-------	693.06	TR-2
3	SCS Runoff	------	12.78	-------	-------	-------	46.20	-------	-------	102.05	BG-2
4	SCS Runoff	------	17.02	-------	-------	-------	62.55	-------	-------	138.15	BG-3
5	SCS Runoff	------	8.399	-------	-------	-------	31.40	-------	-------	69.16	BG-4
6	SCS Runoff	------	1.094	-------	-------	-------	4.157	-------	-------	9.043	BG-1

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	410.64	2	1364	23,427,304	------	------	------	SC-2
2	SCS Runoff	94.92	2	1202	4,374,204	------	------	------	TR-2
3	SCS Runoff	12.78	2	896	302,530	------	------	------	BG-2
4	SCS Runoff	17.02	2	854	336,690	------	------	------	BG-3
5	SCS Runoff	8.399	2	818	134,676	------	------	------	BG-4
6	SCS Runoff	1.094	2	748	8,147	------	------	------	BG-1

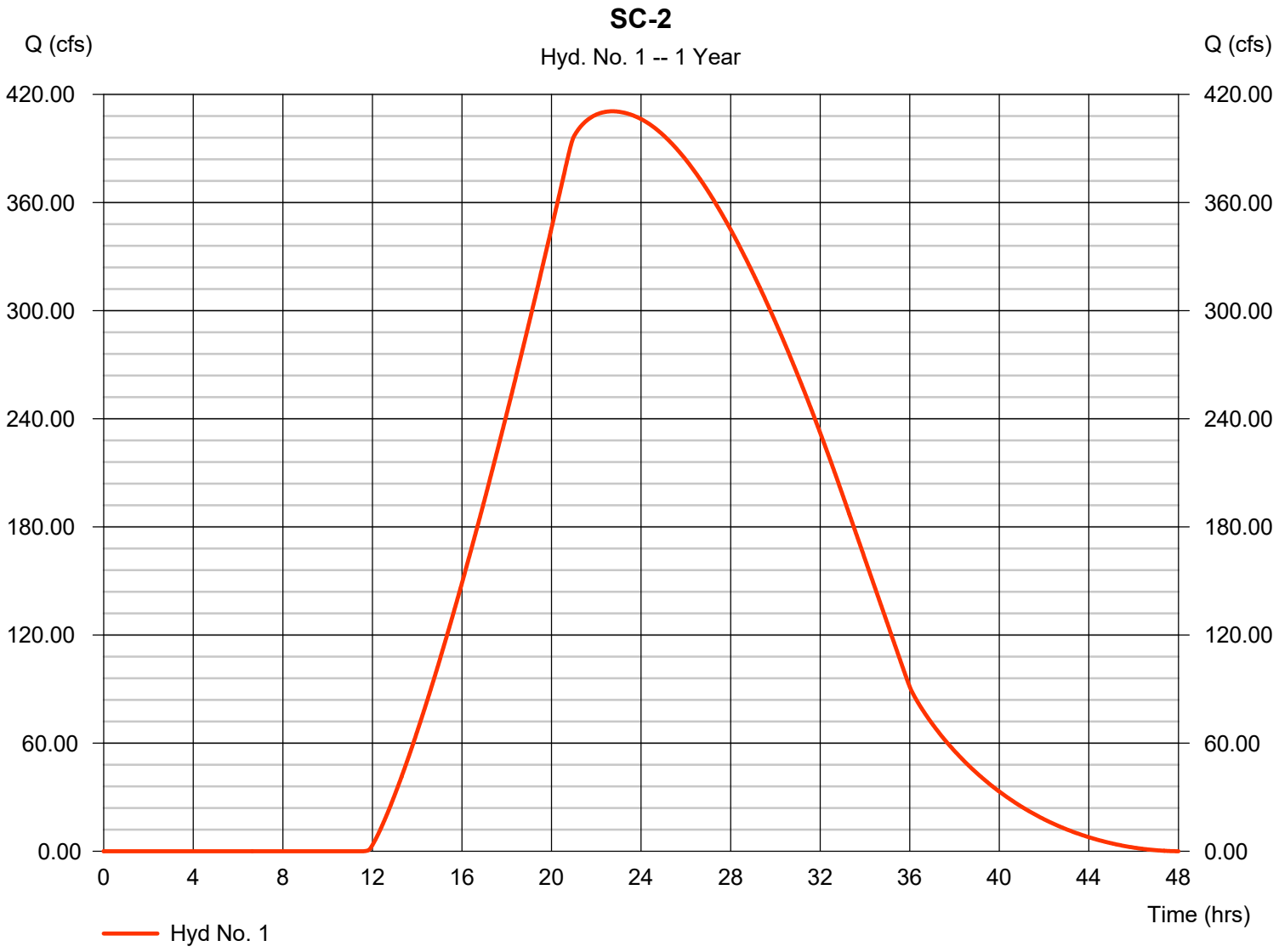
Hydrograph Report

Hyd. No. 1

SC-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	410.64 cfs
Storm frequency	=	1 yrs	Time to peak	=	22.73 hrs
Time interval	=	2 min	Hyd. volume	=	23,427,304 cuft
Drainage area	=	10752.000 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	923.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2000.000 x 75) + (8752.000 x 79)] / 10752.000



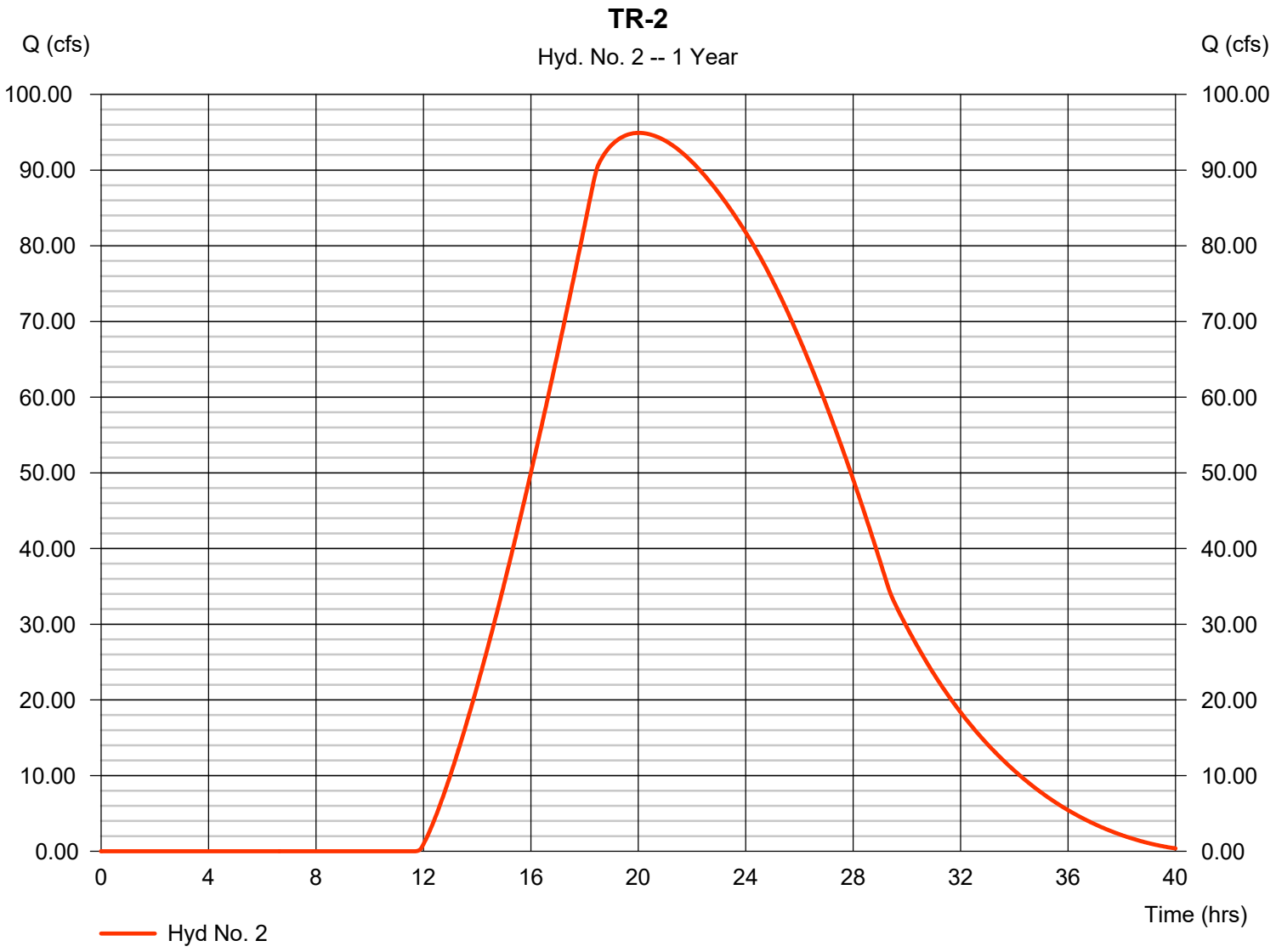
Hydrograph Report

Hyd. No. 2

TR-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	94.92 cfs
Storm frequency	=	1 yrs	Time to peak	=	20.03 hrs
Time interval	=	2 min	Hyd. volume	=	4,374,204 cuft
Drainage area	=	2496.000 ac	Curve number	=	75*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	669.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2496.000 x 75)] / 2496.000

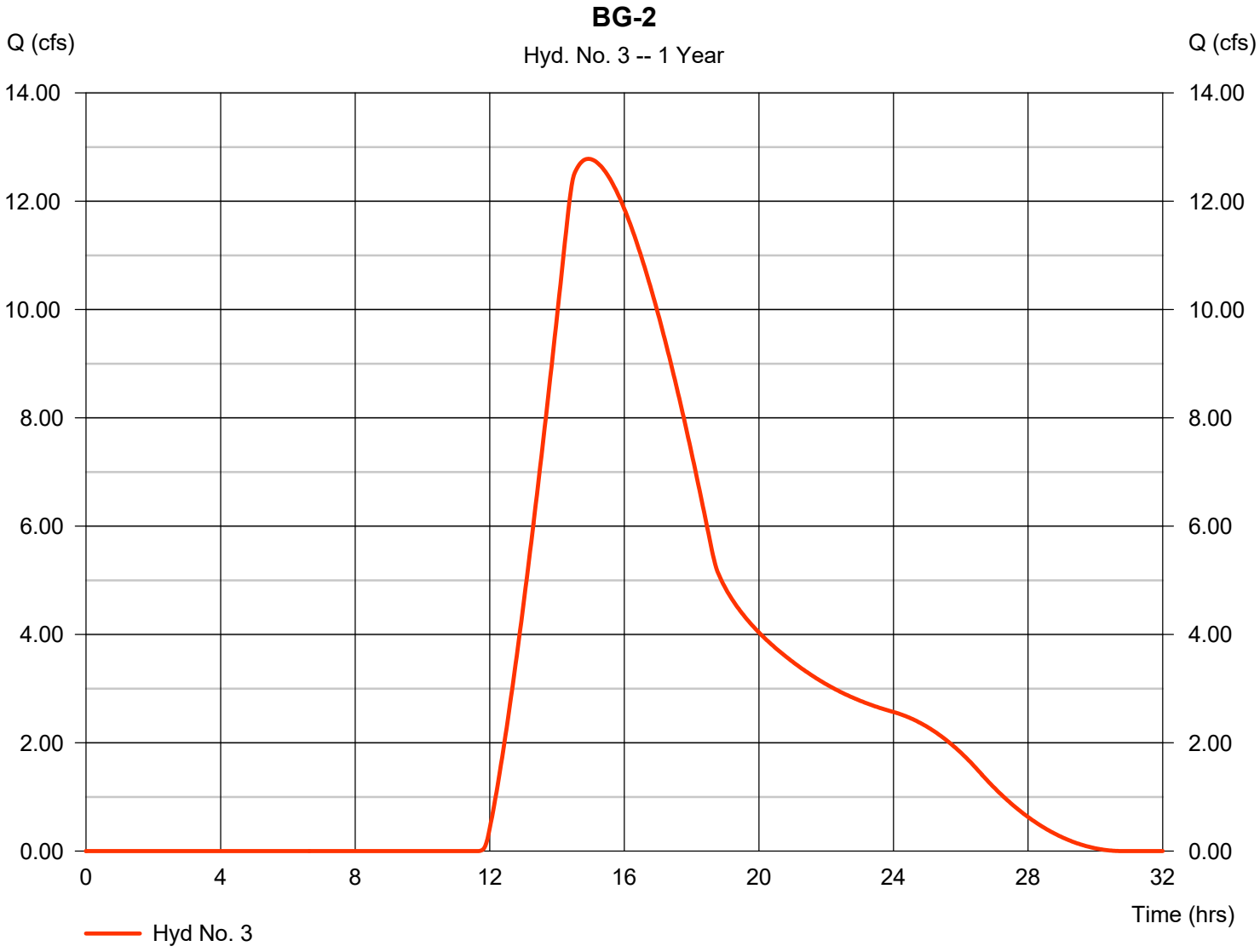


Hydrograph Report

Hyd. No. 3

BG-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.78 cfs
Storm frequency	=	1 yrs	Time to peak	=	14.93 hrs
Time interval	=	2 min	Hyd. volume	=	302,530 cuft
Drainage area	=	172.800 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	260.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

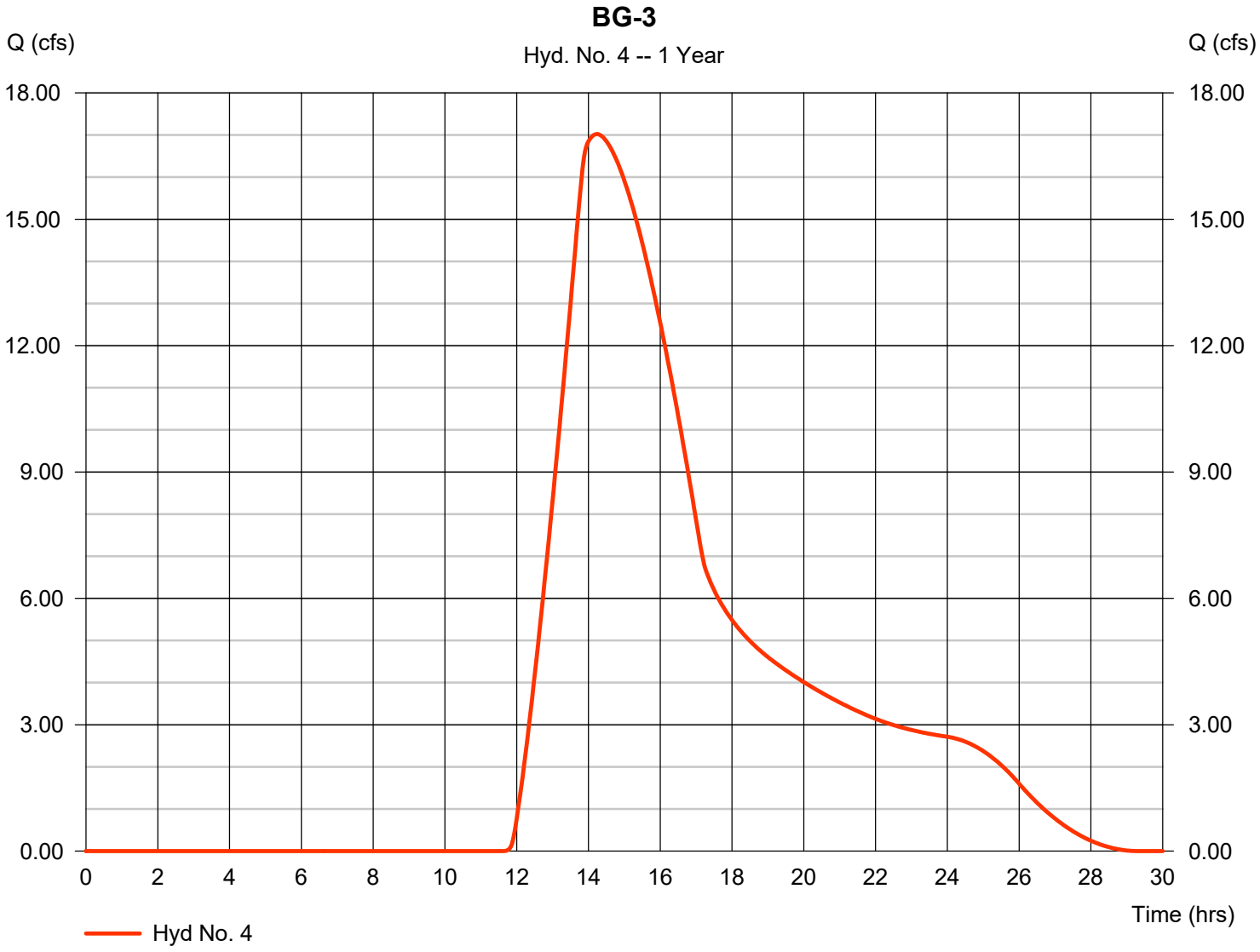


Hydrograph Report

Hyd. No. 4

BG-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.02 cfs
Storm frequency	=	1 yrs	Time to peak	=	14.23 hrs
Time interval	=	2 min	Hyd. volume	=	336,690 cuft
Drainage area	=	192.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	201.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

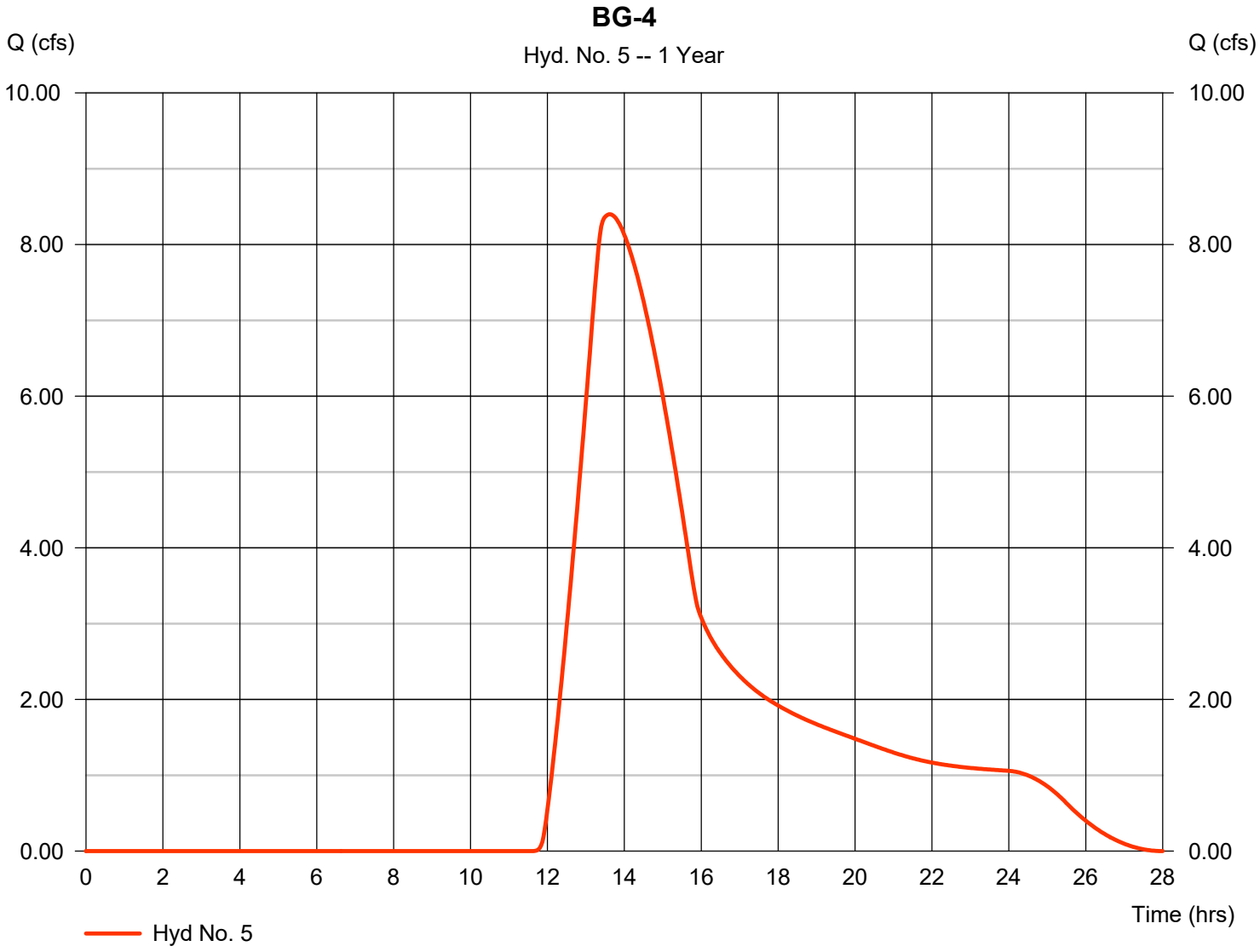


Hydrograph Report

Hyd. No. 5

BG-4

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.399 cfs
Storm frequency	=	1 yrs	Time to peak	=	13.63 hrs
Time interval	=	2 min	Hyd. volume	=	134,676 cuft
Drainage area	=	76.800 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	152.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

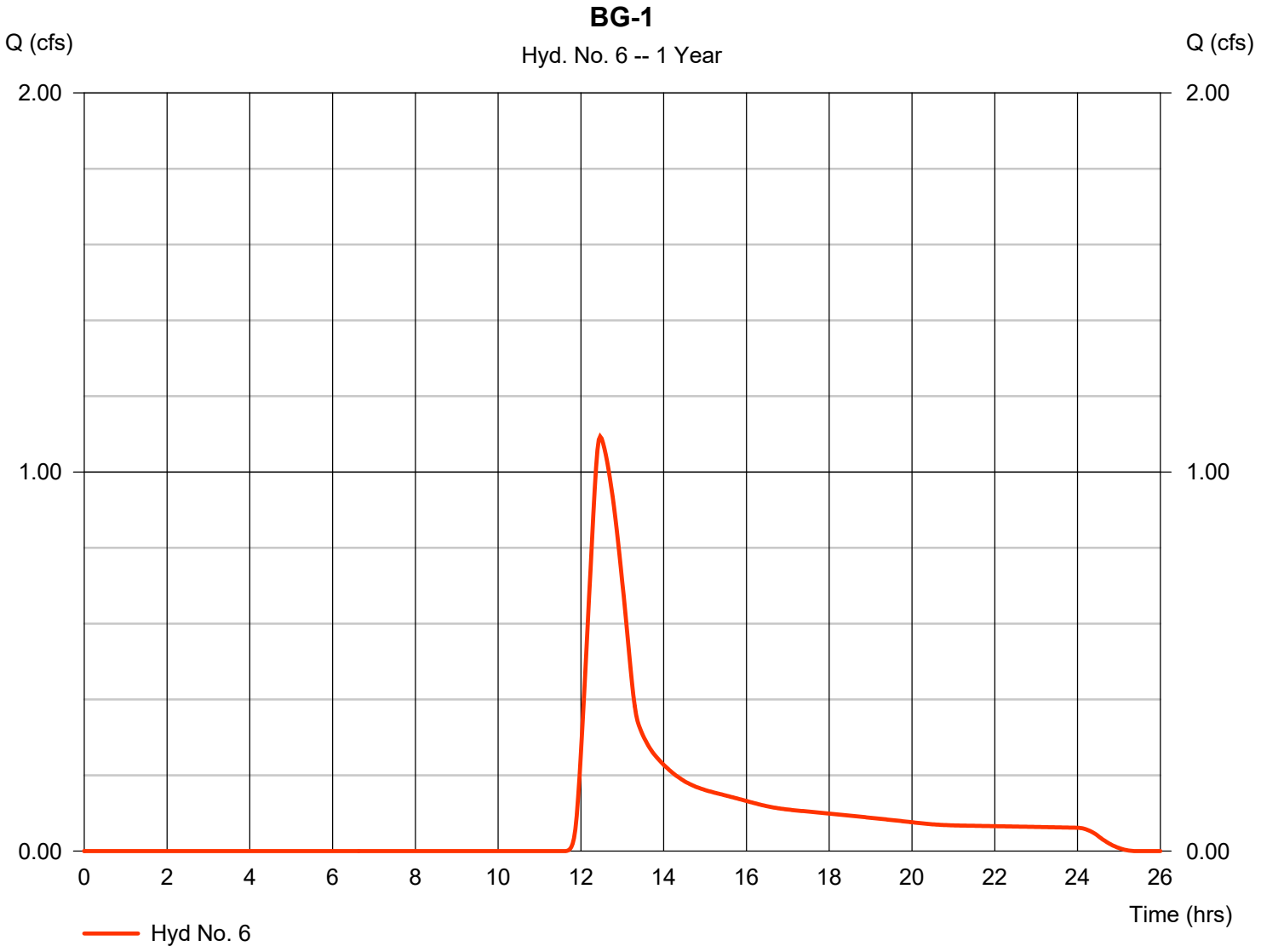


Hydrograph Report

Hyd. No. 6

BG-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.094 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.47 hrs
Time interval	=	2 min	Hyd. volume	=	8,147 cuft
Drainage area	=	4.610 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	52.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1231.50	2	1306	67,753,960	------	------	------	SC-2
2	SCS Runoff	319.62	2	1148	13,813,563	------	------	------	TR-2
3	SCS Runoff	46.20	2	876	955,377	------	------	------	BG-2
4	SCS Runoff	62.55	2	838	1,063,254	------	------	------	BG-3
5	SCS Runoff	31.40	2	806	425,302	------	------	------	BG-4
6	SCS Runoff	4.157	2	746	25,729	------	------	------	BG-1

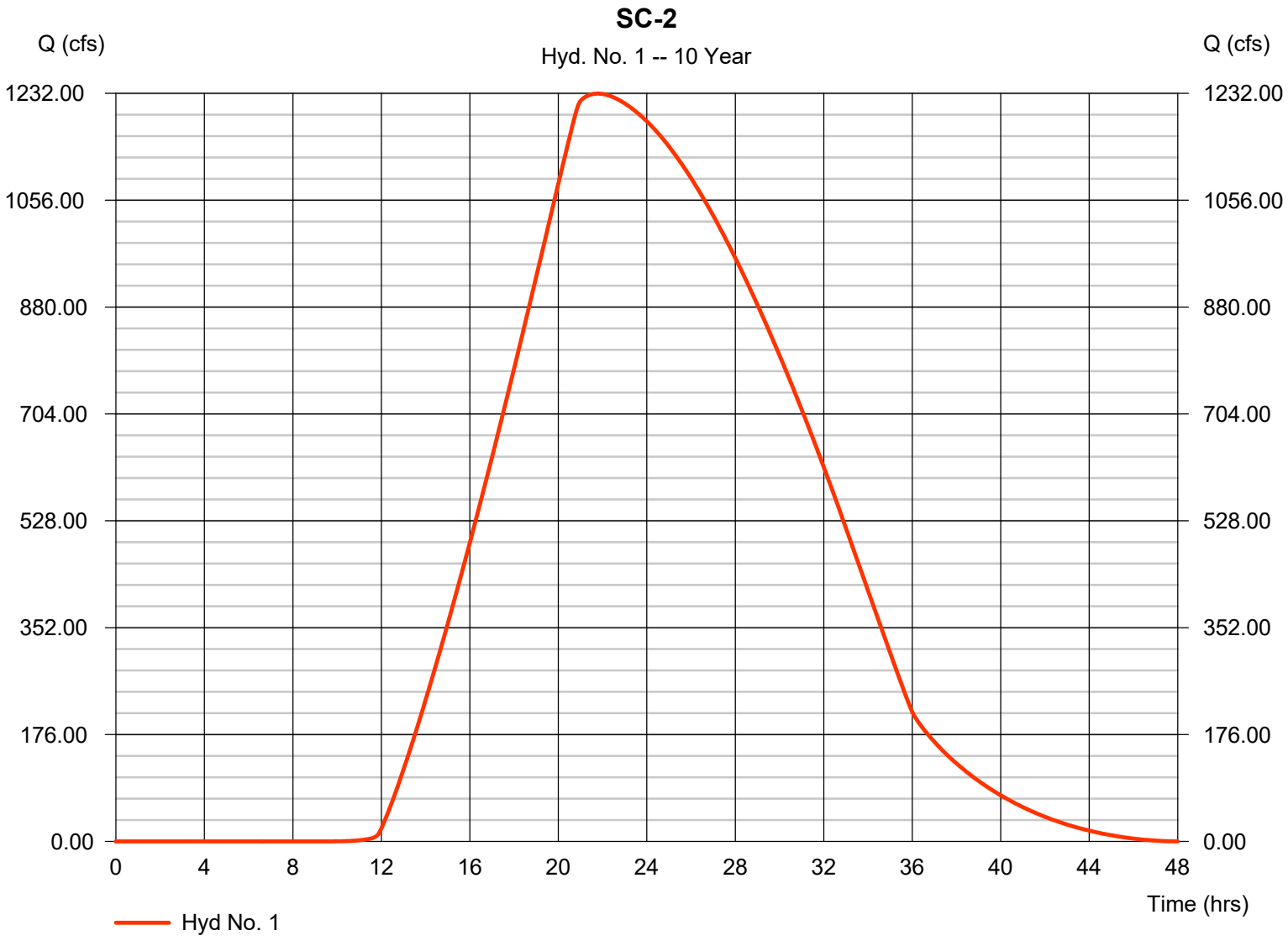
Hydrograph Report

Hyd. No. 1

SC-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1231.50 cfs
Storm frequency	=	10 yrs	Time to peak	=	21.77 hrs
Time interval	=	2 min	Hyd. volume	=	67,753,960 cuft
Drainage area	=	10752.000 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	923.00 min
Total precip.	=	3.81 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2000.000 x 75) + (8752.000 x 79)] / 10752.000



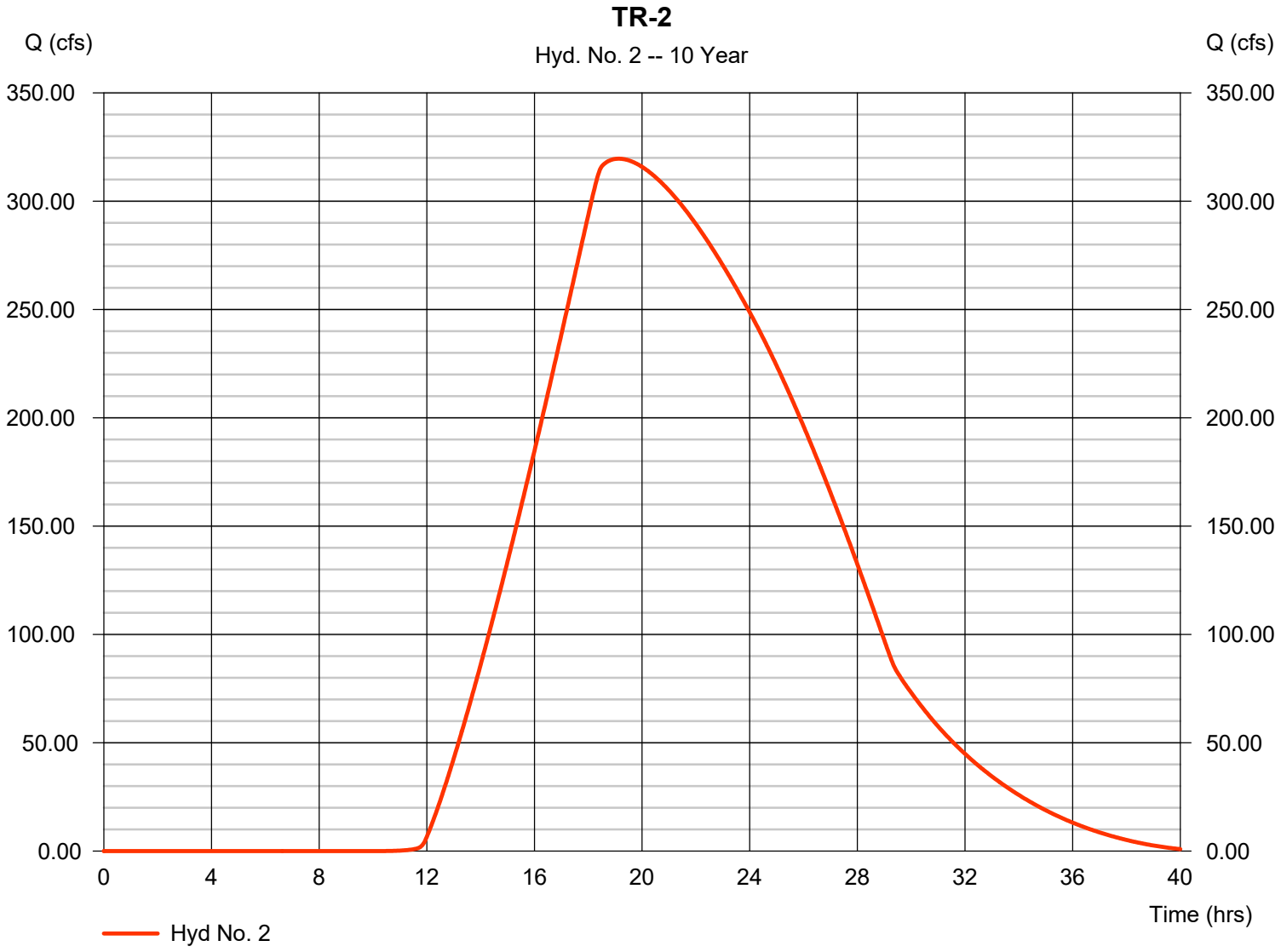
Hydrograph Report

Hyd. No. 2

TR-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	319.62 cfs
Storm frequency	=	10 yrs	Time to peak	=	19.13 hrs
Time interval	=	2 min	Hyd. volume	=	13,813,563 cuft
Drainage area	=	2496.000 ac	Curve number	=	75*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	669.00 min
Total precip.	=	3.81 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2496.000 x 75)] / 2496.000

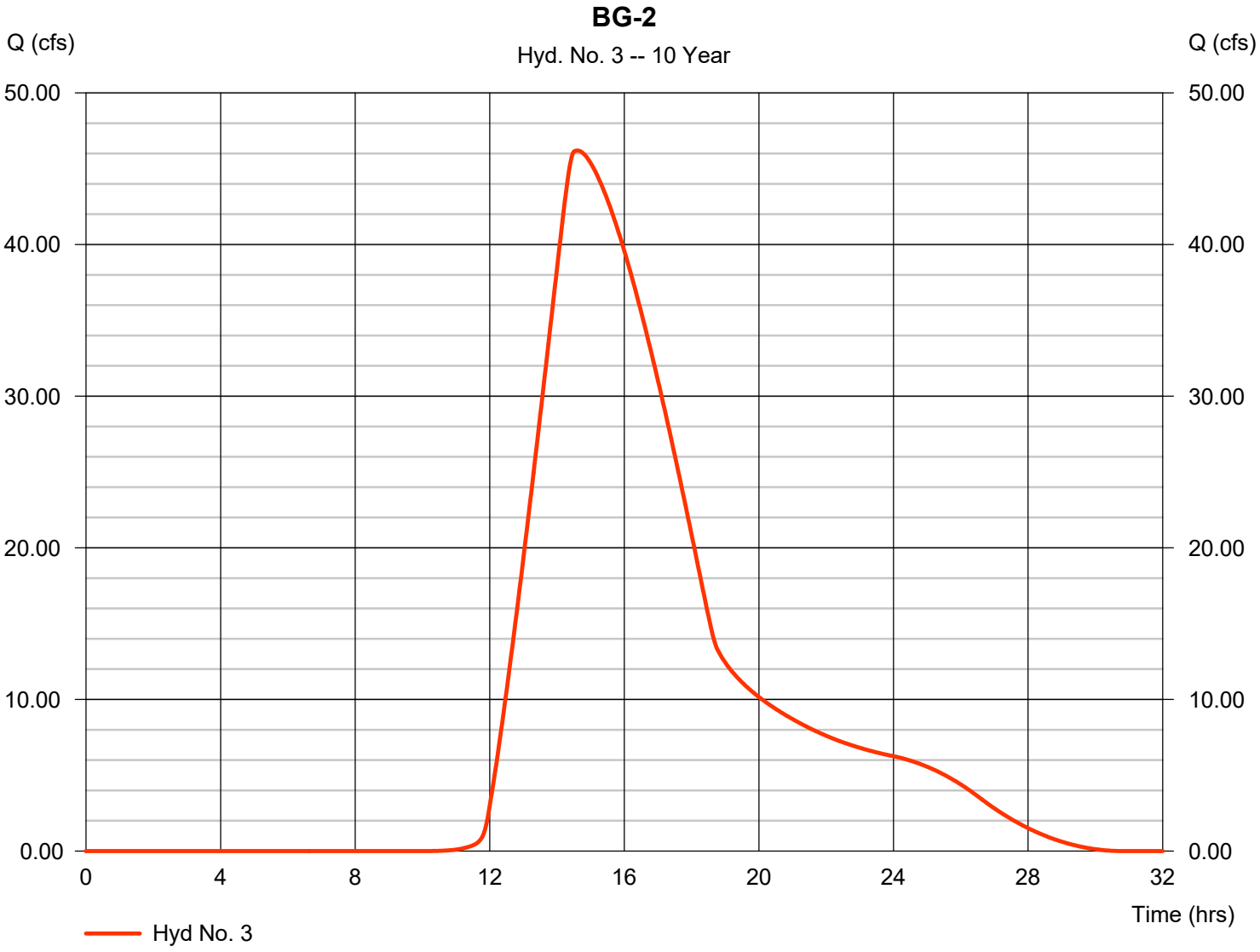


Hydrograph Report

Hyd. No. 3

BG-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.20 cfs
Storm frequency	=	10 yrs	Time to peak	=	14.60 hrs
Time interval	=	2 min	Hyd. volume	=	955,377 cuft
Drainage area	=	172.800 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	260.00 min
Total precip.	=	3.81 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

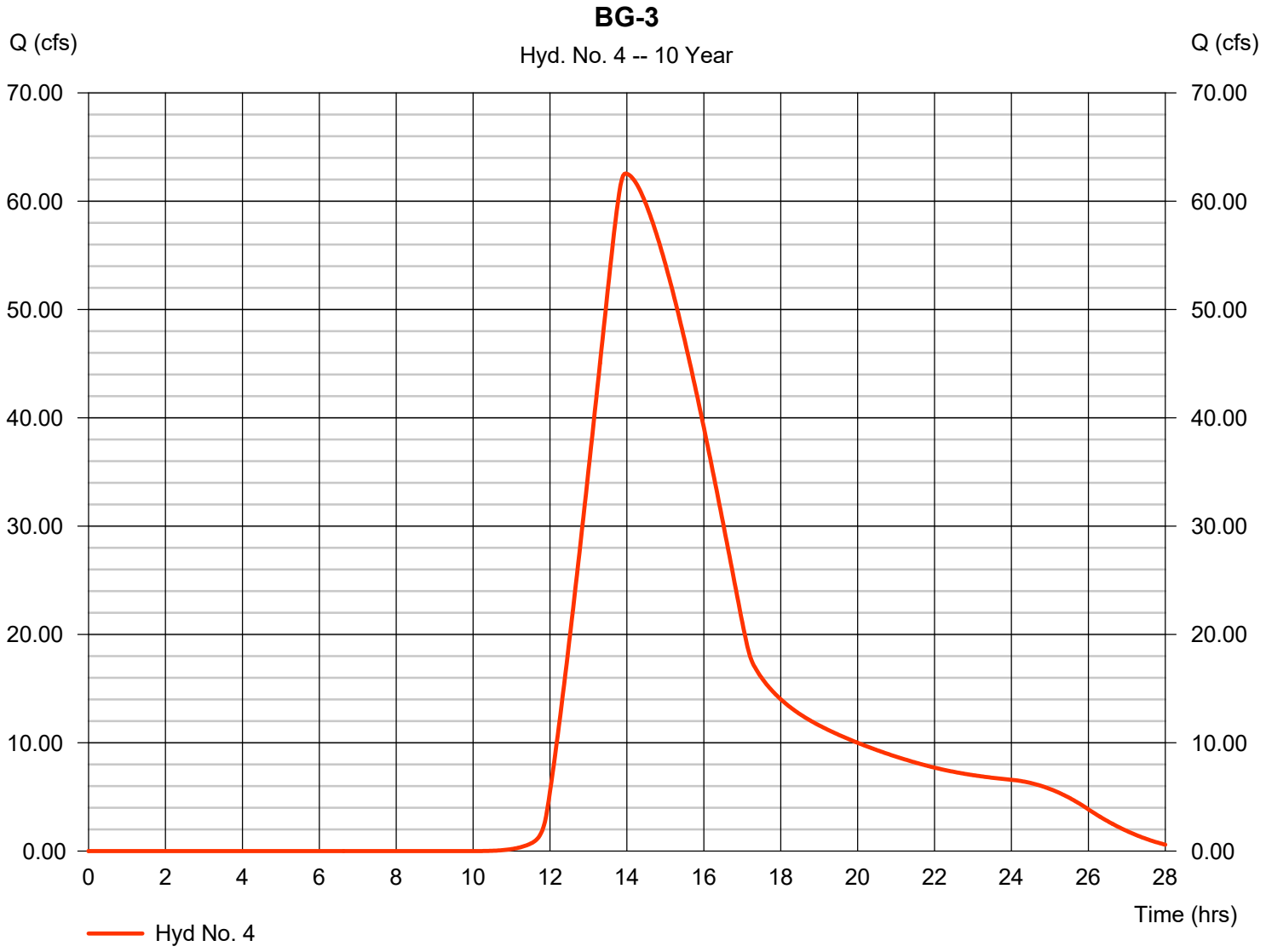


Hydrograph Report

Hyd. No. 4

BG-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	62.55 cfs
Storm frequency	=	10 yrs	Time to peak	=	13.97 hrs
Time interval	=	2 min	Hyd. volume	=	1,063,254 cuft
Drainage area	=	192.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	201.00 min
Total precip.	=	3.81 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

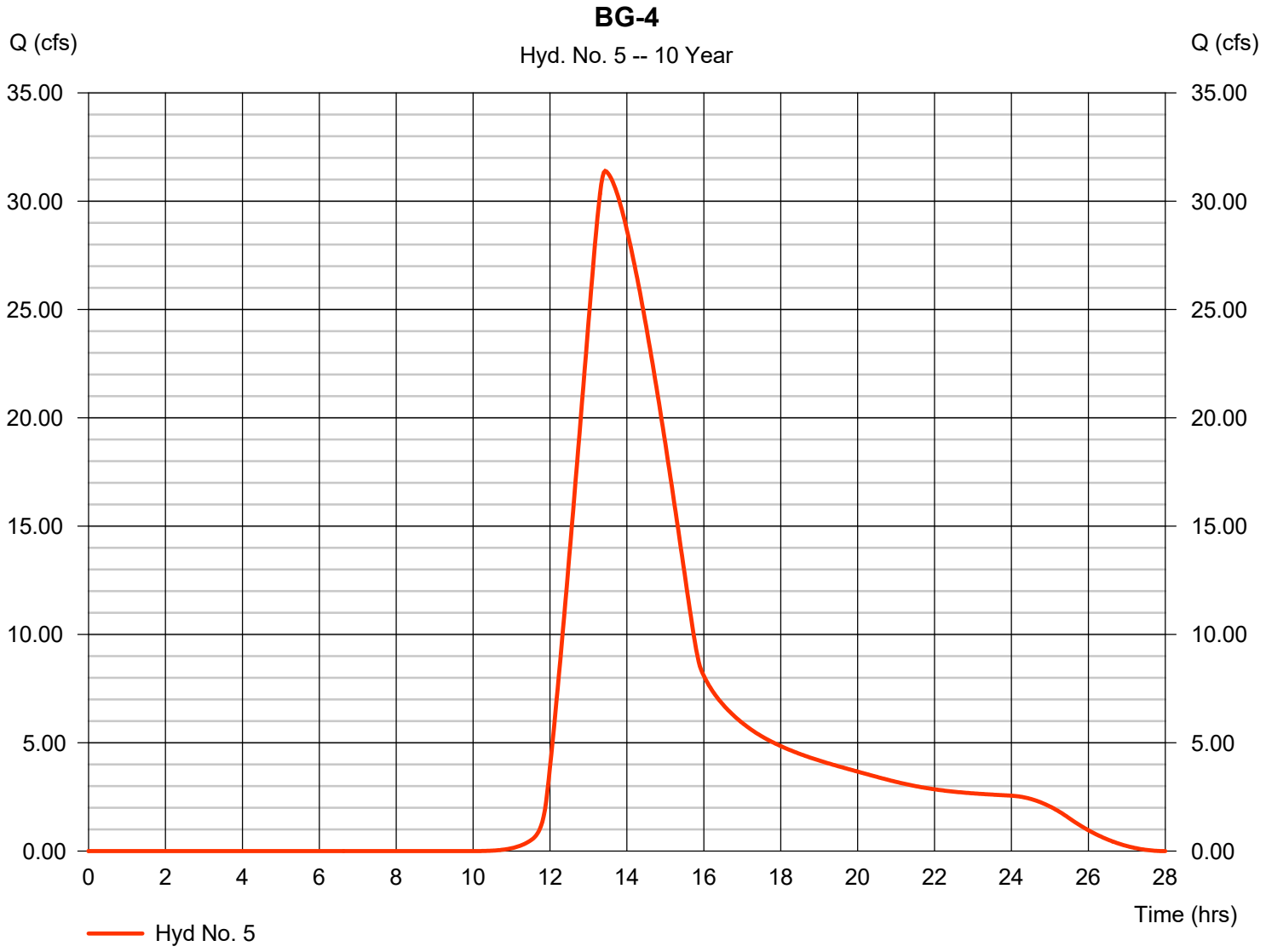


Hydrograph Report

Hyd. No. 5

BG-4

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.40 cfs
Storm frequency	=	10 yrs	Time to peak	=	13.43 hrs
Time interval	=	2 min	Hyd. volume	=	425,302 cuft
Drainage area	=	76.800 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	152.00 min
Total precip.	=	3.81 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

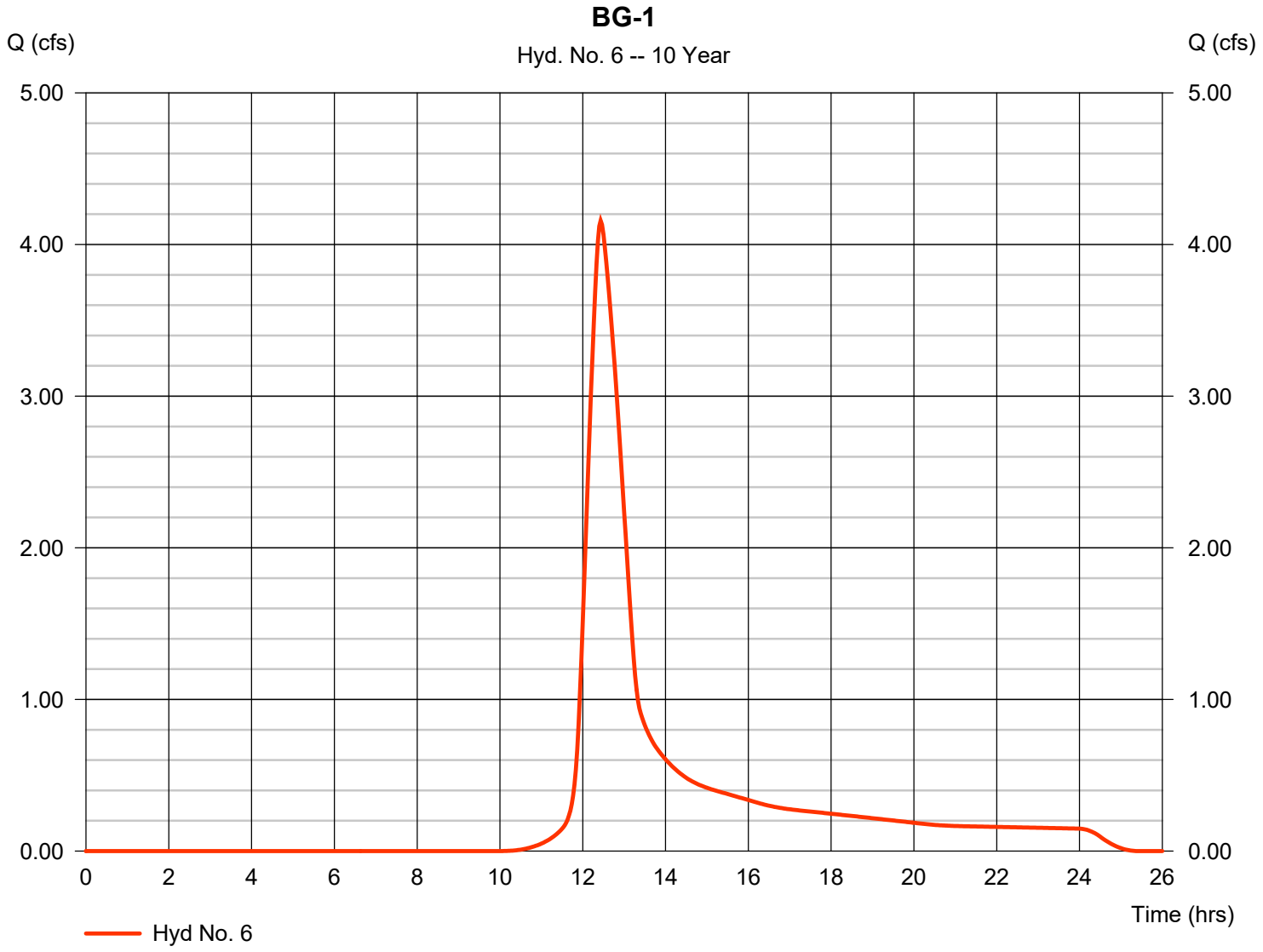


Hydrograph Report

Hyd. No. 6

BG-1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.157 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 25,729 cuft
Drainage area	= 4.610 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 52.00 min
Total precip.	= 3.81 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2528.33	2	1284	136,523,456	------	------	------	SC-2
2	SCS Runoff	693.06	2	1128	29,025,044	------	------	------	TR-2
3	SCS Runoff	102.05	2	870	2,007,437	------	------	------	BG-2
4	SCS Runoff	138.15	2	836	2,234,110	------	------	------	BG-3
5	SCS Runoff	69.16	2	804	893,644	------	------	------	BG-4
6	SCS Runoff	9.043	2	746	54,061	------	------	------	BG-1

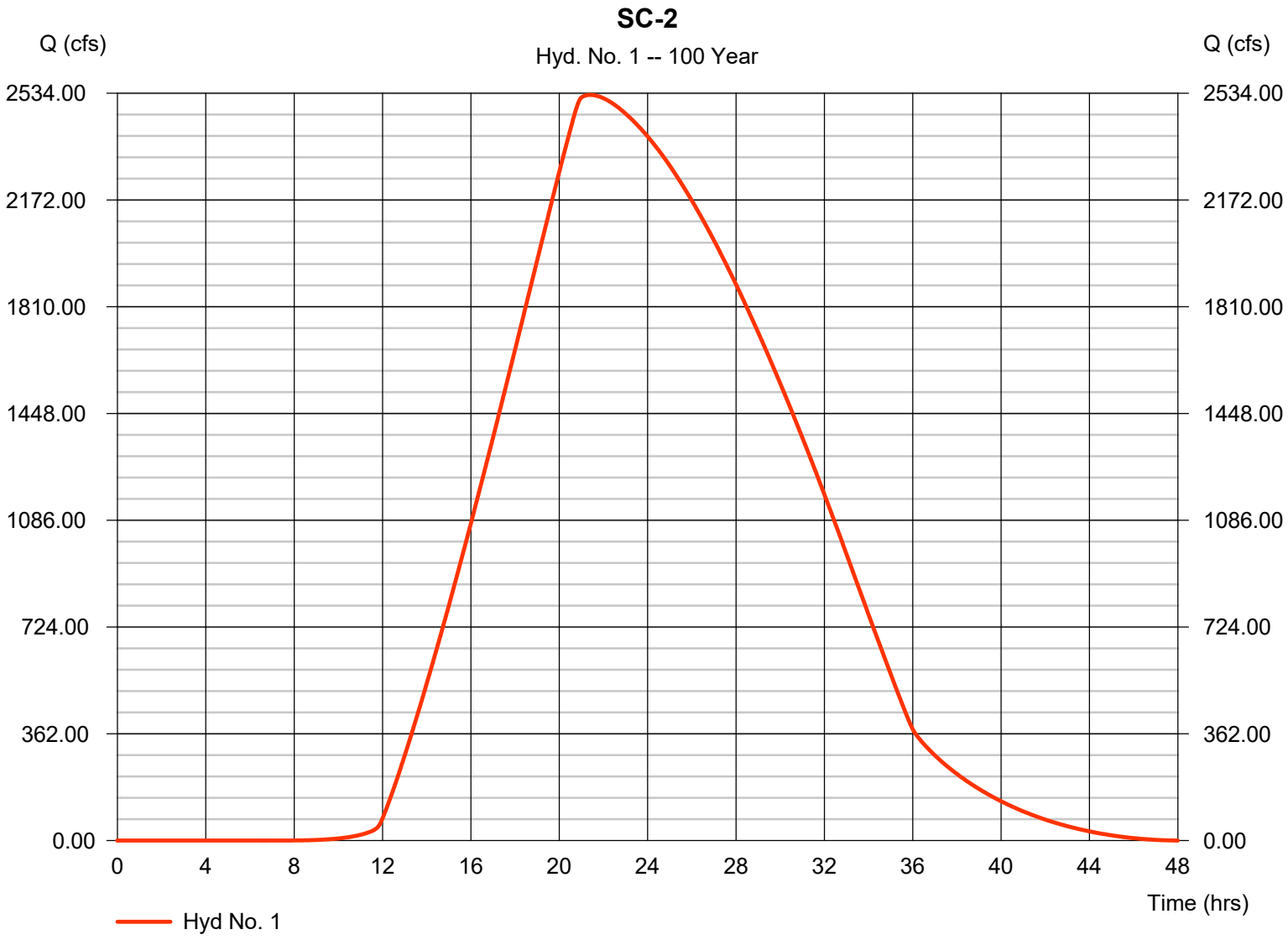
Hydrograph Report

Hyd. No. 1

SC-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	2528.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	21.40 hrs
Time interval	=	2 min	Hyd. volume	=	136,523,456 cuft
Drainage area	=	10752.000 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	923.00 min
Total precip.	=	5.91 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2000.000 x 75) + (8752.000 x 79)] / 10752.000



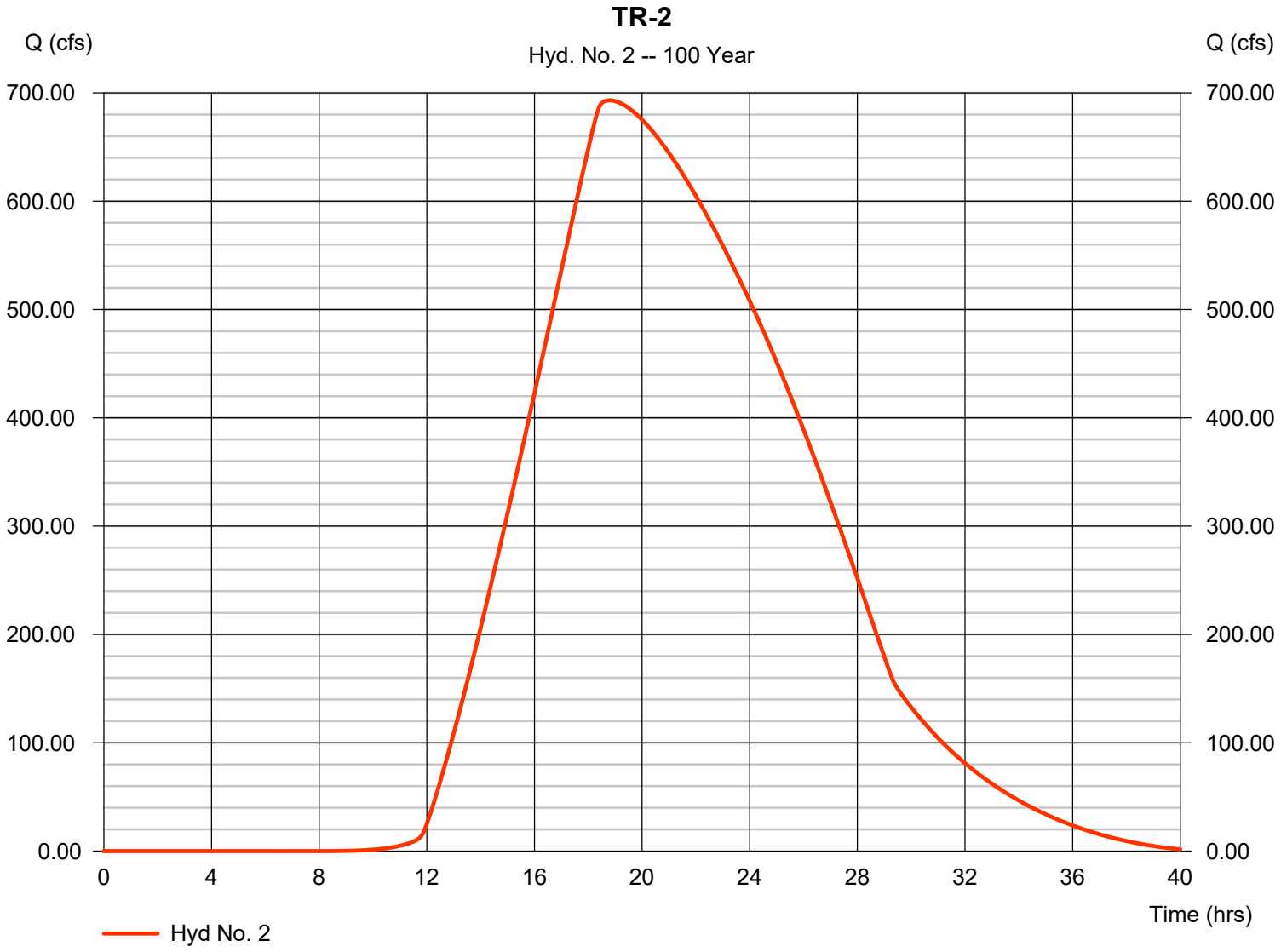
Hydrograph Report

Hyd. No. 2

TR-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	693.06 cfs
Storm frequency	=	100 yrs	Time to peak	=	18.80 hrs
Time interval	=	2 min	Hyd. volume	=	29,025,044 cuft
Drainage area	=	2496.000 ac	Curve number	=	75*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	669.00 min
Total precip.	=	5.91 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2496.000 x 75)] / 2496.000

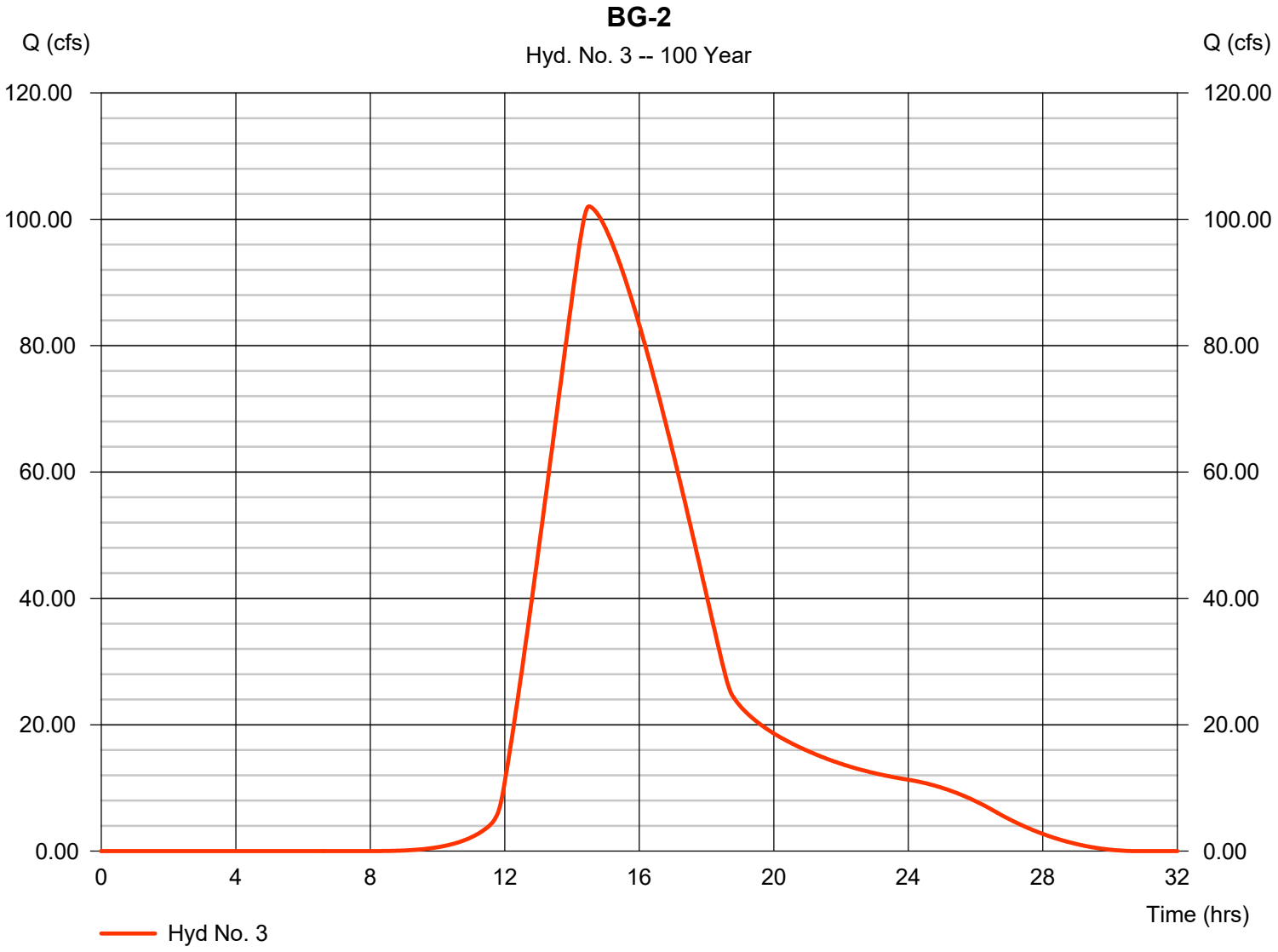


Hydrograph Report

Hyd. No. 3

BG-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	102.05 cfs
Storm frequency	=	100 yrs	Time to peak	=	14.50 hrs
Time interval	=	2 min	Hyd. volume	=	2,007,437 cuft
Drainage area	=	172.800 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	260.00 min
Total precip.	=	5.91 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

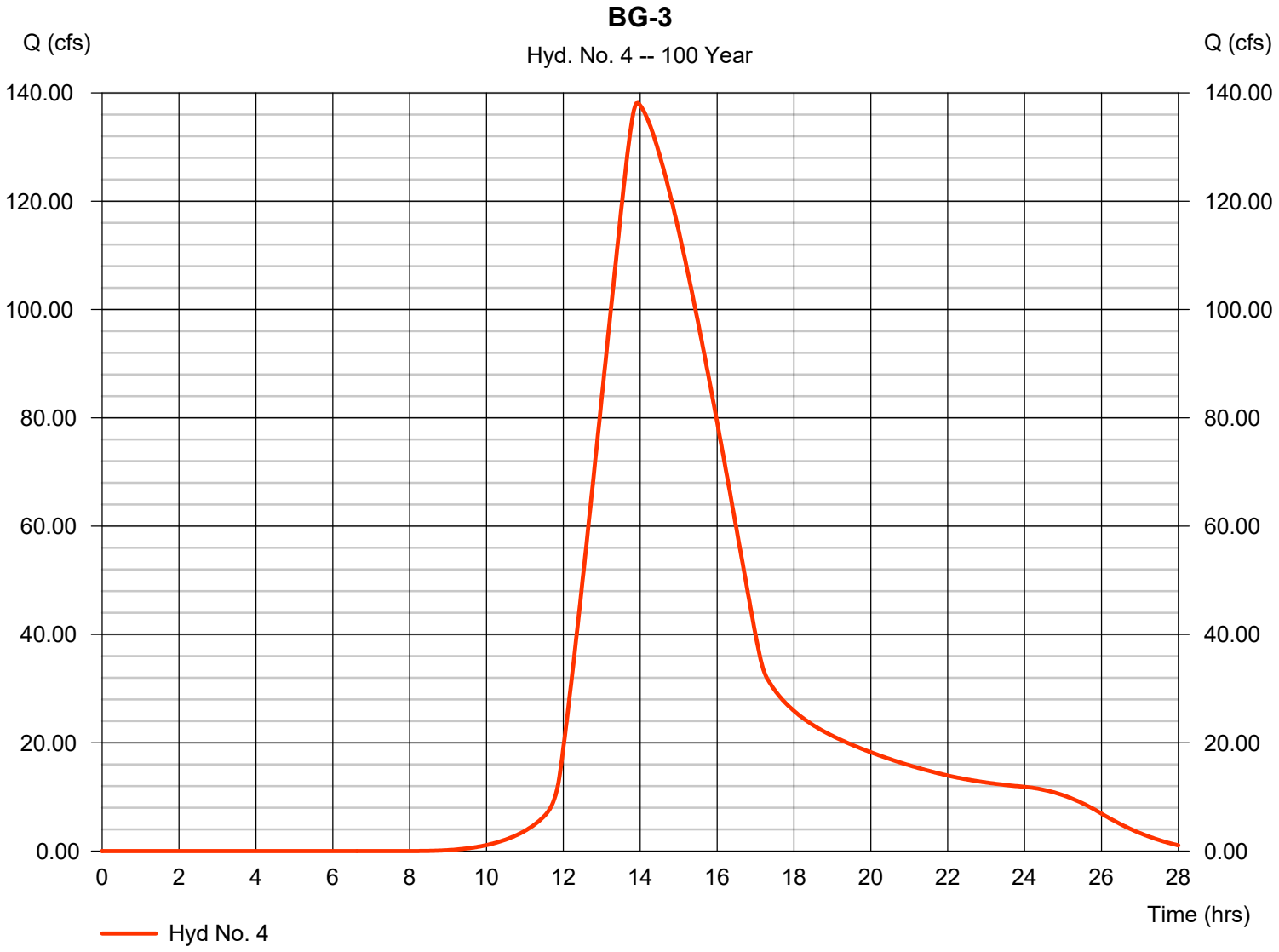


Hydrograph Report

Hyd. No. 4

BG-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	138.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	13.93 hrs
Time interval	=	2 min	Hyd. volume	=	2,234,110 cuft
Drainage area	=	192.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	201.00 min
Total precip.	=	5.91 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

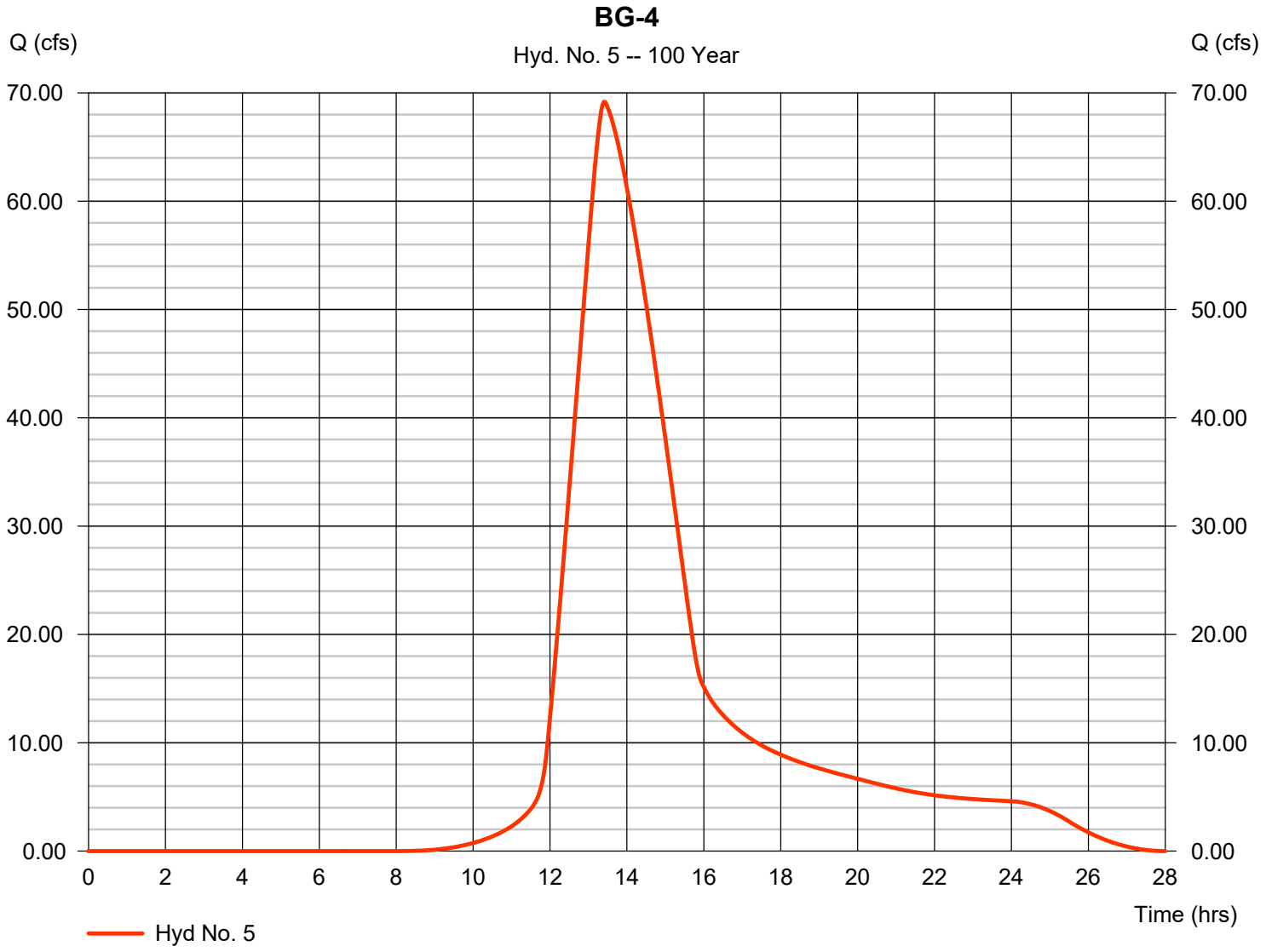


Hydrograph Report

Hyd. No. 5

BG-4

Hydrograph type	=	SCS Runoff	Peak discharge	=	69.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	13.40 hrs
Time interval	=	2 min	Hyd. volume	=	893,644 cuft
Drainage area	=	76.800 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	152.00 min
Total precip.	=	5.91 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

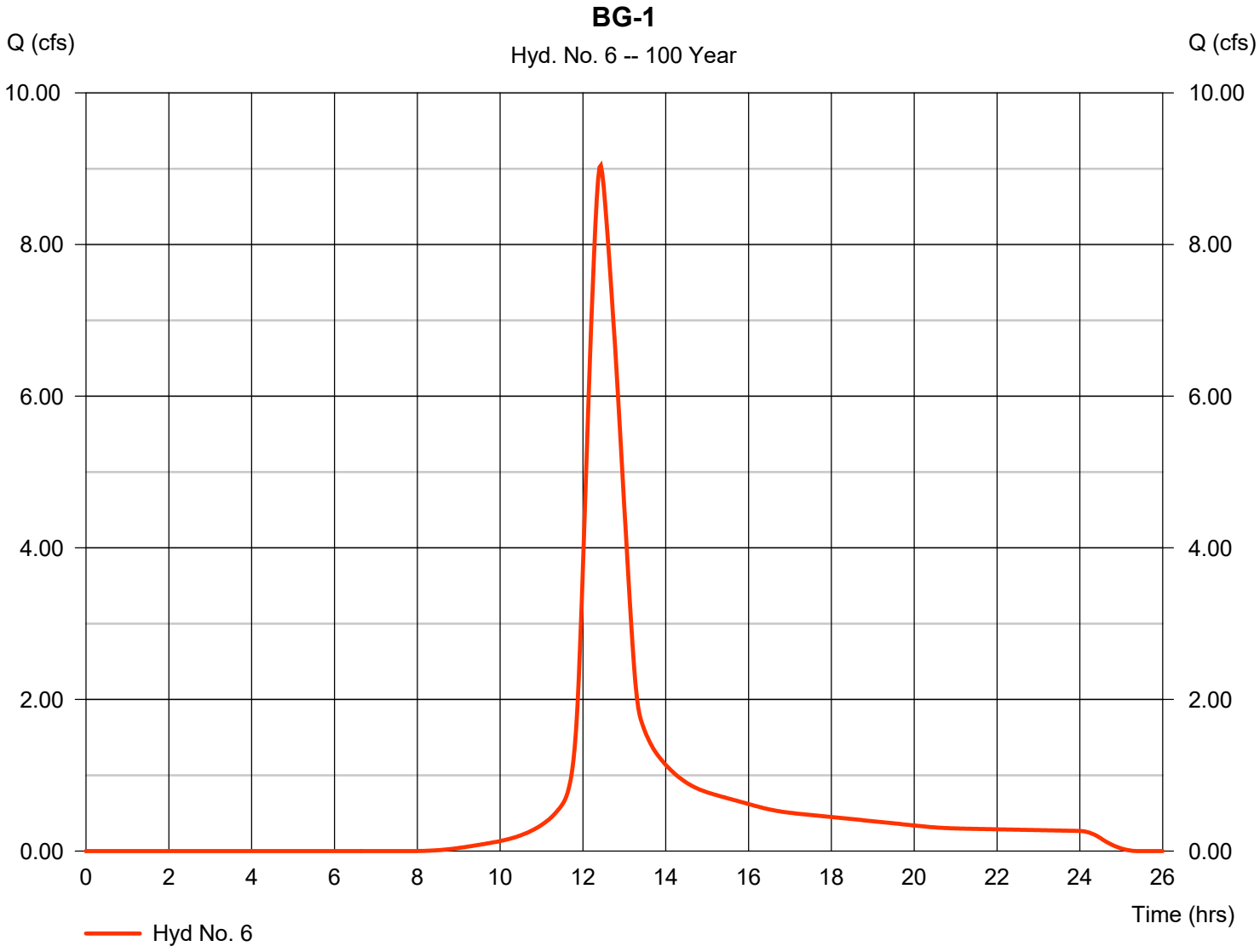


Hydrograph Report

Hyd. No. 6

BG-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.043 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.43 hrs
Time interval	=	2 min	Hyd. volume	=	54,061 cuft
Drainage area	=	4.610 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	52.00 min
Total precip.	=	5.91 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	68.2833	13.1000	0.8896	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	249.7597	21.8001	1.0961	--------
25	137.9648	17.1000	0.9324	--------
50	0.0000	0.0000	0.0000	--------
100	200.3578	20.2000	0.9583	--------

File name: NJidf.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.19	4.18	3.51	3.04	2.68	2.40	2.18	1.99	1.84	1.71	1.60	1.50
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.14	2.00
25	7.69	6.36	5.43	4.75	4.22	3.80	3.46	3.18	2.94	2.73	2.55	2.40
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	9.10	7.65	6.60	5.81	5.20	4.70	4.29	3.95	3.66	3.41	3.19	3.00

Tc = time in minutes. Values may exceed 60.

Precip. file name: W:\WORKSHEETS\Worksheets-Civil Eng\HydroFlowStorm Data\Monmouth.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.20	2.64	0.00	0.00	3.81	0.00	0.00	5.91
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX F

GEOHEC-RAS FLOODWAY ANALYSIS REPORT

HEC-RAS Plan: Default Scenario River: Slab Cabin Run Reach: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	1000	100 year	950.50	950.47	0.03	0.03	0.00	1220.44	427.88	1895.68	992.93
1	1000	Target 1	951.47	951.43	0.05	0.03	0.00	1049.99	554.52	1939.49	582.33
1	1000	Target 2	951.47	951.43	0.05	0.03	0.00	1049.99	554.52	1939.49	582.33
1	1000	Target 3	951.47	951.43	0.05	0.03	0.00	1049.99	554.52	1939.49	582.33
1	999	100 year	950.47	950.45	0.02	0.11	0.00	893.86	275.10	2375.04	919.47
1	999	Target 1	951.45	951.41	0.04	0.11	0.00	579.32	385.79	2578.89	541.73
1	999	Target 2	951.45	951.41	0.04	0.11	0.00	579.32	385.79	2578.89	541.73
1	999	Target 3	951.45	951.41	0.04	0.11	0.00	579.32	385.79	2578.89	541.73
1	998	100 year	950.36	950.33	0.03	0.12	0.00	388.96	446.66	2708.37	646.93
1	998	Target 1	951.33	951.27	0.06	0.12	0.00	326.33	630.66	2587.01	376.51
1	998	Target 2	951.33	951.27	0.06	0.12	0.00	326.33	630.66	2587.01	376.51
1	998	Target 3	951.33	951.27	0.06	0.12	0.00	326.33	630.66	2587.01	376.51
1	997	100 year	950.25	950.21	0.03	0.12	0.01	1117.05	639.47	1787.48	691.57
1	997	Target 1	951.20	951.16	0.05	0.10	0.01	1183.12	779.45	1581.43	430.01
1	997	Target 2	951.20	951.16	0.05	0.10	0.01	1183.12	779.45	1581.43	430.01
1	997	Target 3	951.20	951.16	0.05	0.10	0.01	1183.12	779.45	1581.43	430.01
1	996	100 year	950.12	950.00	0.12			1653.35	835.47	1055.17	432.63
1	996	Target 1	951.10	951.00	0.10			1972.36	834.97	736.68	300.50
1	996	Target 2	951.10	951.00	0.10			1972.36	834.97	736.68	300.50
1	996	Target 3	951.10	951.00	0.10			1972.36	834.97	736.68	300.50

HEC-RAS Plan: Default Scenario River: Slab Cabin Run Reach: 2

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
2	998.6	100 year	951.31	951.21	0.10	0.31	0.01	1457.64	553.27	517.09	521.83
2	998.6	Target 1	952.17	952.08	0.08	0.21	0.01	1397.37	570.23	560.40	374.98
2	998.6	Target 2	952.17	952.08	0.08	0.21	0.01	1397.37	570.23	560.40	374.98
2	998.6	Target 3	952.17	952.08	0.08	0.21	0.01	1397.37	570.23	560.40	374.98
2	998	100 year	951.00	950.84	0.15	0.18	0.03	894.05	749.73	884.22	507.35
2	998	Target 1	951.95	951.75	0.20	0.17	0.03	539.83	911.59	1076.58	250.63
2	998	Target 2	951.95	951.75	0.20	0.17	0.03	539.83	911.59	1076.58	250.63
2	998	Target 3	951.95	951.75	0.20	0.17	0.03	539.83	911.59	1076.58	250.63
2	997	100 year	950.79	950.73	0.06	0.22	0.01	1473.43	407.35	647.22	504.57
2	997	Target 1	951.75	951.64	0.10	0.21	0.02	1604.67	586.93	336.40	281.69
2	997	Target 2	951.75	951.64	0.10	0.21	0.02	1604.67	586.93	336.40	281.69
2	997	Target 3	951.75	951.64	0.10	0.21	0.02	1604.67	586.93	336.40	281.69
2	996	100 year	950.56	950.52	0.04	0.03	0.00	348.35	373.01	1806.64	605.31
2	996	Target 1	951.52	951.48	0.05	0.02	0.00	389.13	445.94	1692.93	414.32
2	996	Target 2	951.52	951.48	0.05	0.02	0.00	389.13	445.94	1692.93	414.32
2	996	Target 3	951.52	951.48	0.05	0.02	0.00	389.13	445.94	1692.93	414.32
2	995	100 year	950.53	950.49	0.04	0.03	0.00	116.30	367.17	2044.53	622.40
2	995	Target 1	951.50	951.46	0.05	0.03	0.00	152.16	450.18	1925.66	427.31
2	995	Target 2	951.50	951.46	0.05	0.03	0.00	152.16	450.18	1925.66	427.31
2	995	Target 3	951.50	951.46	0.05	0.03	0.00	152.16	450.18	1925.66	427.31

HEC-RAS Plan: Default Scenario River: Thompson Run Reach: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	998.4	100 year	950.54	950.54	0.01	0.01	0.00	66.07	138.15	489.78	534.48
1	998.4	Target 1	951.72	951.50	0.22	0.08	0.03		694.00		52.44
1	998.4	Target 2	951.72	951.50	0.22	0.08	0.03		694.00		52.44
1	998.4	Target 3	951.72	951.50	0.22	0.08	0.03		694.00		52.44
1	998	100 year	950.53	950.53	0.01	0.02	0.00	80.78	89.21	524.01	485.68
1	998	Target 1	951.61	951.49	0.12	0.08	0.03	135.85	376.75	181.40	70.71
1	998	Target 2	951.61	951.49	0.12	0.08	0.03	135.85	376.75	181.40	70.71
1	998	Target 3	951.61	951.49	0.12	0.08	0.03	135.85	376.75	181.40	70.71
1	997	100 year	950.51	950.51	0.01	0.00	0.00	79.17	137.97	476.86	519.51
1	997	Target 1	951.50	951.47	0.03	0.01	0.00	42.74	315.32	335.93	116.89
1	997	Target 2	951.50	951.47	0.03	0.01	0.00	42.74	315.32	335.93	116.89
1	997	Target 3	951.50	951.47	0.03	0.01	0.00	42.74	315.32	335.93	116.89
1	996.6	100 year	950.51	950.51	0.00	0.00	0.00	297.43	143.66	252.91	596.28
1	996.6	Target 1	951.49	951.47	0.02	0.01	0.00	90.89	350.68	252.44	141.49
1	996.6	Target 2	951.49	951.47	0.02	0.01	0.00	90.89	350.68	252.44	141.49
1	996.6	Target 3	951.49	951.47	0.02	0.01	0.00	90.89	350.68	252.44	141.49
1	996	100 year	950.51	950.50	0.01	0.01	0.00	545.46	171.54	299.00	555.43
1	996	Target 1	951.48	951.47	0.02	0.01	0.00	544.35	239.99	231.66	244.80
1	996	Target 2	951.48	951.47	0.02	0.01	0.00	544.35	239.99	231.66	244.80
1	996	Target 3	951.48	951.47	0.02	0.01	0.00	544.35	239.99	231.66	244.80
1	995	100 year	950.50	950.49	0.01	0.00	0.00	725.11	219.98	70.92	488.65
1	995	Target 1	951.48	951.46	0.02	0.00	0.00	666.81	291.59	57.61	235.41
1	995	Target 2	951.48	951.46	0.02	0.00	0.00	666.81	291.59	57.61	235.41
1	995	Target 3	951.48	951.46	0.02	0.00	0.00	666.81	291.59	57.61	235.41

APPENDIX G

GEOHEC-RAS STREAMBANK STABILITY ANALYSIS REPORT

HEC-RAS Plan: Default Scenario

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Thompson Run	2	1029	100 year	694.00	951.87	957.67		957.74	0.000298	2.54	360.94	66.70	0.19
Thompson Run	2	1029	10 Year	320.00	951.87	954.86		954.98	0.001025	2.99	129.17	47.71	0.31
Thompson Run	2	1029	1 Year	95.00	951.87	953.38		953.42	0.000927	1.75	64.43	54.37	0.26
Thompson Run	2	1028.5	100 year	694.00	951.16	957.56		957.71	0.000653	3.62	271.32	70.77	0.27
Thompson Run	2	1028.5	10 Year	320.00	951.16	954.17		954.82	0.007266	6.52	50.53	27.73	0.77
Thompson Run	2	1028.5	1 Year	95.00	951.16	953.10		953.32	0.005467	3.75	25.35	21.38	0.61
Thompson Run	2	1028	100 year	694.00	950.73	957.53		957.69	0.000593	3.65	262.26	61.61	0.26
Thompson Run	2	1028	10 Year	320.00	950.73	954.11		954.55	0.004075	5.44	64.60	30.91	0.60
Thompson Run	2	1028	1 Year	95.00	950.73	953.02		953.16	0.002378	2.94	32.69	25.27	0.42
Thompson Run	2	1027	100 year	694.00	950.78	957.54		957.64	0.000346	2.81	322.95	69.46	0.20
Thompson Run	2	1027	10 Year	320.00	950.78	954.05		954.30	0.002364	4.12	82.46	36.93	0.46
Thompson Run	2	1027	1 Year	95.00	950.78	952.95		953.03	0.001405	2.22	43.53	31.61	0.32
Thompson Run	2	1026.4	100 year	694.00	951.03	957.56		957.61	0.000245	2.32	407.39	82.92	0.17
Thompson Run	2	1026.4	10 Year	320.00	951.03	953.86		954.15	0.003703	4.56	83.93	53.94	0.56
Thompson Run	2	1026.4	1 Year	95.00	951.03	952.48	952.48	952.82	0.017031	4.73	20.33	30.41	1.00
Thompson Run	2	1026	100 year	694.00	949.99	957.54		957.60	0.000232	2.41	380.64	68.64	0.17
Thompson Run	2	1026	10 Year	320.00	949.99	953.86		954.03	0.001508	3.48	106.17	45.29	0.37
Thompson Run	2	1026	1 Year	95.00	949.99	952.31		952.41	0.002665	2.65	39.48	44.49	0.43
Thompson Run	2	1025	100 year	694.00	950.43	957.52		957.59	0.000286	2.75	353.68	59.54	0.19
Thompson Run	2	1025	10 Year	320.00	950.43	953.79		953.97	0.001758	3.91	105.14	43.72	0.41
Thompson Run	2	1025	1 Year	95.00	950.43	952.17		952.31	0.003599	3.23	35.94	43.01	0.51
Thompson Run	2	1024.5	100 year	694.00	950.42	957.51		957.57	0.000224	2.47	392.57	62.57	0.17
Thompson Run	2	1024.5	10 Year	320.00	950.42	953.73		953.86	0.001276	3.42	122.06	47.74	0.35
Thompson Run	2	1024.5	1 Year	95.00	950.42	951.76		951.98	0.007258	4.00	29.83	53.03	0.70
Thompson Run	2	1024	100 year	694.00	949.31	957.46		957.55	0.000310	3.03	320.10	47.38	0.20
Thompson Run	2	1024	10 Year	320.00	949.31	953.60		953.78	0.001320	3.80	107.38	36.08	0.36
Thompson Run	2	1024	1 Year	95.00	949.31	951.38		951.59	0.005216	3.85	29.13	40.29	0.60
Thompson Run	2	1023	100 year	694.00	949.10	957.48		957.53	0.000170	2.28	423.09	61.13	0.15
Thompson Run	2	1023	10 Year	320.00	949.10	953.64		953.72	0.000644	2.74	151.00	47.56	0.25
Thompson Run	2	1023	1 Year	95.00	949.10	951.38		951.47	0.002141	2.59	46.23	52.42	0.39
Thompson Run	2	1022	100 year	694.00	948.72	957.43		957.53	0.000290	2.97	328.84	46.57	0.19
Thompson Run	2	1022	10 Year	320.00	948.72	953.55		953.70	0.001056	3.52	117.44	36.08	0.32

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Thompson Run	2	1022	1 Year	95.00	948.72	951.27		951.41	0.003352	3.29	37.21	39.96	0.49
Thompson Run	2	1021	100 year	694.00	948.35	957.36		957.51	0.000415	3.57	267.37	36.90	0.23
Thompson Run	2	1021	10 Year	320.00	948.35	953.43		953.65	0.001457	4.14	95.22	28.31	0.38
Thompson Run	2	1021	1 Year	95.00	948.35	951.10		951.28	0.004011	3.58	31.87	31.61	0.53
Thompson Run	2	1020	100 year	694.00	948.48	957.40		957.48	0.000271	2.96	358.97	50.58	0.18
Thompson Run	2	1020	10 Year	320.00	948.48	953.46		953.58	0.000930	3.53	132.62	40.48	0.30
Thompson Run	2	1020	1 Year	95.00	948.48	950.71	950.71	951.08	0.008393	5.22	24.67	35.03	0.76
Thompson Run	2	1019.6	100 year	694.00	948.16	957.41		957.47	0.000177	2.47	418.99	55.80	0.15
Thompson Run	2	1019.6	10 Year	320.00	948.16	953.48		953.56	0.000516	2.78	164.19	44.73	0.23
Thompson Run	2	1019.6	1 Year	95.00	948.16	950.32	950.30	950.69	0.008593	5.07	23.46	42.90	0.77
Thompson Run	2	1019	100 year	694.00	947.68	957.41		957.46	0.000122	2.12	466.08	59.71	0.13
Thompson Run	2	1019	10 Year	320.00	947.68	953.48		953.53	0.000307	2.24	190.03	47.77	0.18
Thompson Run	2	1019	1 Year	95.00	947.68	950.37		950.47	0.001873	2.71	43.12	52.13	0.38
Thompson Run	2	1018.5	100 year	694.00	947.75	957.41		957.45	0.000102	1.91	522.75	67.18	0.12
Thompson Run	2	1018.5	10 Year	320.00	947.75	953.47		953.52	0.000271	2.06	212.02	54.24	0.17
Thompson Run	2	1018.5	1 Year	95.00	947.75	950.13	949.61	950.33	0.004966	3.72	31.47	58.98	0.58
Thompson Run	2	1018	100 year	694.00	947.76	957.40		957.44	0.000114	2.05	482.68	59.07	0.12
Thompson Run	2	1018	10 Year	320.00	947.76	953.46		953.50	0.000263	2.07	206.61	48.34	0.17
Thompson Run	2	1018	1 Year	95.00	947.76	950.01		950.12	0.003319	3.01	41.97	52.29	0.48
Thompson Run	2	1017.5	100 year	694.00	947.68	957.40		957.44	0.000106	2.01	475.70	56.95	0.12
Thompson Run	2	1017.5	10 Year	320.00	947.68	953.45		953.50	0.000232	1.99	205.63	46.01	0.16
Thompson Run	2	1017.5	1 Year	95.00	947.68	949.95		950.04	0.002186	2.54	47.42	50.11	0.40
Thompson Run	2	1017	100 year	694.00	947.13	957.40		957.44	0.000114	2.06	482.14	58.20	0.12
Thompson Run	2	1017	10 Year	320.00	947.13	953.45		953.49	0.000249	2.05	210.26	47.78	0.16
Thompson Run	2	1017	1 Year	95.00	947.13	949.82		949.96	0.003802	3.23	38.85	51.59	0.51
Thompson Run	2	1016.4	100 year	694.00	947.15	957.39		957.43	0.000100	1.98	490.31	57.89	0.12
Thompson Run	2	1016.4	10 Year	320.00	947.15	953.44		953.48	0.000204	1.93	216.37	47.08	0.15
Thompson Run	2	1016.4	1 Year	95.00	947.15	949.76		949.85	0.002088	2.64	45.13	51.07	0.39
Thompson Run	2	1016	100 year	694.00	947.44	957.39		957.43	0.000095	1.96	507.19	59.33	0.11
Thompson Run	2	1016	10 Year	320.00	947.44	953.44		953.48	0.000185	1.90	227.58	48.58	0.14
Thompson Run	2	1016	1 Year	95.00	947.44	949.72		949.80	0.001542	2.50	48.78	52.53	0.34

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Thompson Run	2	1015.6	100 year	694.00	947.26	957.38		957.43	0.000112	2.15	458.48	53.61	0.12
Thompson Run	2	1015.6	10 Year	320.00	947.26	953.42		953.47	0.000212	2.06	204.63	43.24	0.15
Thompson Run	2	1015.6	1 Year	95.00	947.26	949.68		949.77	0.001476	2.52	44.37	40.34	0.34
Thompson Run	2	1015	100 year	694.00	946.94	957.38		957.42	0.000103	2.04	493.05	57.61	0.12
Thompson Run	2	1015	10 Year	320.00	946.94	953.42		953.46	0.000197	1.95	222.97	47.04	0.15
Thompson Run	2	1015	1 Year	95.00	946.94	949.60		949.70	0.002059	2.74	45.61	45.33	0.39
Thompson Run	2	1014.5	100 year	694.00	947.12	957.35		957.41	0.000147	2.46	402.76	45.58	0.14
Thompson Run	2	1014.5	10 Year	320.00	947.12	953.39		953.45	0.000260	2.27	186.60	37.09	0.17
Thompson Run	2	1014.5	1 Year	95.00	947.12	949.55		949.64	0.001939	2.68	45.59	40.22	0.38
Thompson Run	2	1014	100 year	694.00	947.31	957.37		957.40	0.000096	1.98	512.81	56.86	0.11
Thompson Run	2	1014	10 Year	320.00	947.31	953.41		953.44	0.000169	1.81	242.96	47.96	0.14
Thompson Run	2	1014	1 Year	95.00	947.31	949.54		949.58	0.001269	2.06	61.23	51.25	0.31
Thompson Run	2	1013	100 year	694.00	947.31	957.35		957.40	0.000143	2.42	447.49	49.76	0.14
Thompson Run	2	1013	10 Year	320.00	947.31	953.39		953.43	0.000247	2.20	214.47	42.60	0.17
Thompson Run	2	1013	1 Year	95.00	947.31	949.48		949.55	0.002175	2.75	50.73	45.23	0.40
Thompson Run	2	1012.7	100 year	694.00	947.09	957.32		957.39	0.000194	2.84	370.42	40.79	0.16
Thompson Run	2	1012.7	10 Year	320.00	947.09	953.36		953.43	0.000325	2.56	176.63	34.37	0.19
Thompson Run	2	1012.7	1 Year	95.00	947.09	949.39		949.49	0.002565	3.05	42.67	36.76	0.44
Thompson Run	2	1012.4	100 year	694.00	946.98	957.34		957.38	0.000094	2.00	511.69	55.64	0.11
Thompson Run	2	1012.4	10 Year	320.00	946.98	953.38		953.41	0.000155	1.79	248.64	47.08	0.13
Thompson Run	2	1012.4	1 Year	95.00	946.98	949.39		949.43	0.001059	2.03	64.15	50.20	0.28
Thompson Run	2	1012.2	100 year	694.00	946.55	957.32		957.37	0.000117	2.24	451.84	48.41	0.13
Thompson Run	2	1012.2	10 Year	320.00	946.55	953.36		953.40	0.000186	1.99	219.55	40.67	0.15
Thompson Run	2	1012.2	1 Year	95.00	946.55	949.35		949.40	0.001037	2.10	60.11	43.57	0.28
Thompson Run	2	1012	100 year	694.00	946.28	957.33		957.37	0.000076	1.82	549.12	58.36	0.10
Thompson Run	2	1012	10 Year	320.00	946.28	953.37		953.40	0.000120	1.62	269.38	49.23	0.12
Thompson Run	2	1012	1 Year	95.00	946.28	949.36		949.39	0.000605	1.68	76.15	52.63	0.22
Thompson Run	2	1011	100 year	694.00	946.26	957.33		957.36	0.000081	1.90	539.83	56.08	0.11
Thompson Run	2	1011	10 Year	320.00	946.26	953.37		953.39	0.000120	1.66	270.38	47.81	0.12
Thompson Run	2	1011	1 Year	95.00	946.26	949.35		949.37	0.000454	1.57	83.40	50.96	0.19
Thompson Run	2	1010.4	100 year	694.00	946.39	957.29		957.36	0.000126	2.35	394.19	39.97	0.13
Thompson Run	2	1010.4	10 Year	320.00	946.39	953.33		953.39	0.000189	2.05	189.36	32.08	0.15

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Thompson Run	2	1010.4	1 Year	95.00	946.39	949.33		949.36	0.000519	1.60	69.69	36.83	0.20
Thompson Run	2	1010	100 year	694.00	946.38	957.32		957.34	0.000060	1.63	592.29	63.22	0.09
Thompson Run	2	1010	10 Year	320.00	946.38	953.35		953.37	0.000094	1.45	288.83	52.34	0.11
Thompson Run	2	1010	1 Year	95.00	946.38	949.32		949.35	0.000475	1.49	81.44	56.34	0.19
Thompson Run	2	1009	100 year	694.00	946.45	957.31		957.34	0.000073	1.82	552.55	58.55	0.10
Thompson Run	2	1009	10 Year	320.00	946.45	953.34		953.37	0.000110	1.60	272.93	48.97	0.11
Thompson Run	2	1009	1 Year	95.00	946.45	949.30		949.33	0.000499	1.63	78.40	52.51	0.20
Thompson Run	2	1008.4	100 year	694.00	946.52	957.32		957.34	0.000042	1.38	693.25	73.35	0.08
Thompson Run	2	1008.4	10 Year	320.00	946.52	953.35		953.36	0.000065	1.22	339.11	60.70	0.09
Thompson Run	2	1008.4	1 Year	95.00	946.52	949.30		949.31	0.000314	1.25	97.72	65.37	0.16
Thompson Run	2	1008	100 year	694.00	946.34	957.32		957.34	0.000034	1.27	723.51	74.73	0.07
Thompson Run	2	1008	10 Year	320.00	946.34	953.35		953.36	0.000051	1.11	356.90	61.17	0.08
Thompson Run	2	1008	1 Year	95.00	946.34	949.29		949.31	0.000177	1.01	114.71	66.19	0.12
Thompson Run	2	1007	100 year	694.00	946.20	957.31		957.33	0.000057	1.64	601.23	62.03	0.09
Thompson Run	2	1007	10 Year	320.00	946.20	953.34		953.36	0.000083	1.42	301.37	51.94	0.10
Thompson Run	2	1007	1 Year	95.00	946.20	949.28		949.30	0.000289	1.31	95.39	55.68	0.16
Thompson Run	2	1006.5	100 year	694.00	946.03	957.31		957.33	0.000045	1.46	665.00	67.79	0.08
Thompson Run	2	1006.5	10 Year	320.00	946.03	953.34		953.36	0.000064	1.26	335.02	56.81	0.09
Thompson Run	2	1006.5	1 Year	95.00	946.03	949.28		949.29	0.000201	1.13	110.27	60.94	0.13
Thompson Run	2	1006	100 year	694.00	945.84	957.31		957.33	0.000043	1.44	657.68	67.81	0.08
Thompson Run	2	1006	10 Year	320.00	945.84	953.34		953.35	0.000059	1.24	330.16	54.86	0.09
Thompson Run	2	1006	1 Year	95.00	945.84	949.27		949.28	0.000158	1.06	111.15	56.75	0.12
Thompson Run	2	1005	100 year	694.00	945.22	957.30		957.33	0.000045	1.45	651.14	67.58	0.08
Thompson Run	2	1005	10 Year	320.00	945.22	953.33		953.35	0.000062	1.25	326.04	54.67	0.09
Thompson Run	2	1005	1 Year	95.00	945.22	949.26		949.28	0.000164	1.05	108.11	53.44	0.12
Thompson Run	2	1004.5	100 year	694.00	945.06	957.30		957.33	0.000039	1.40	674.11	65.15	0.07
Thompson Run	2	1004.5	10 Year	320.00	945.06	953.33		953.35	0.000048	1.16	352.23	54.23	0.08
Thompson Run	2	1004.5	1 Year	95.00	945.06	949.26		949.27	0.000085	0.86	138.70	58.33	0.09
Thompson Run	2	1004	100 year	694.00	945.00	957.31		957.32	0.000025	1.13	803.50	77.37	0.06
Thompson Run	2	1004	10 Year	320.00	945.00	953.34		953.35	0.000031	0.94	419.93	63.76	0.06
Thompson Run	2	1004	1 Year	95.00	945.00	949.26		949.27	0.000053	0.68	168.90	68.80	0.07

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Thompson Run	2	1003	100 year	694.00	944.80	957.30		957.32	0.000032	1.27	731.01	72.26	0.07
Thompson Run	2	1003	10 Year	320.00	944.80	953.33		953.34	0.000041	1.07	375.72	59.08	0.07
Thompson Run	2	1003	1 Year	95.00	944.80	949.26		949.27	0.000077	0.82	141.01	64.00	0.08
Thompson Run	2	1002.2	100 year	694.00	944.50	957.30		957.32	0.000033	1.35	656.85	61.27	0.07
Thompson Run	2	1002.2	10 Year	320.00	944.50	953.33		953.34	0.000046	1.08	331.85	46.75	0.07
Thompson Run	2	1002.2	1 Year	95.00	944.50	949.26		949.26	0.000046	0.71	152.01	52.66	0.07
Thompson Run	2	1002	100 year	694.00	944.42	957.30		957.32	0.000026	1.19	773.63	75.05	0.06
Thompson Run	2	1002	10 Year	320.00	944.42	953.33		953.34	0.000030	0.97	403.17	60.20	0.06
Thompson Run	2	1002	1 Year	95.00	944.42	949.26		949.26	0.000042	0.69	163.54	65.59	0.06
Thompson Run	2	1001.3	100 year	694.00	944.20	957.30		957.31	0.000023	1.12	829.57	78.97	0.06
Thompson Run	2	1001.3	10 Year	320.00	944.20	953.33		953.34	0.000027	0.91	438.69	64.83	0.06
Thompson Run	2	1001.3	1 Year	95.00	944.20	949.26		949.26	0.000038	0.64	182.54	70.07	0.06
Thompson Run	2	1001.2	100 year	694.00	944.16	957.28		957.31	0.000047	1.64	531.75	47.37	0.08
Thompson Run	2	1001.2	10 Year	320.00	944.16	953.31		953.34	0.000051	1.29	273.48	35.98	0.08
Thompson Run	2	1001.2	1 Year	95.00	944.16	949.25		949.26	0.000046	0.76	142.51	43.04	0.07
Thompson Run	2	1001	100 year	694.00	944.05	957.29		957.31	0.000029	1.27	748.04	68.64	0.07
Thompson Run	2	1001	10 Year	320.00	944.05	953.32		953.33	0.000032	1.02	405.73	57.52	0.06
Thompson Run	2	1001	1 Year	95.00	944.05	949.25		949.26	0.000036	0.66	181.02	61.70	0.06
Thompson Run	2	1000	100 year	694.00	944.33	957.29		957.30	0.000032	1.31	730.85	66.19	0.07
Thompson Run	2	1000	10 Year	320.00	944.33	953.32		953.33	0.000035	1.03	398.30	55.09	0.07
Thompson Run	2	1000	1 Year	95.00	944.33	949.25		949.26	0.000040	0.65	183.86	59.41	0.06
Thompson Run	2	999	100 year	694.00	944.37	957.29		957.30	0.000015	0.89	983.45	90.37	0.05
Thompson Run	2	999	10 Year	320.00	944.37	953.32		953.33	0.000017	0.73	520.00	74.04	0.05
Thompson Run	2	999	1 Year	95.00	944.37	949.25		949.26	0.000022	0.48	233.55	80.39	0.05
Thompson Run	2	998	100 year	694.00	944.59	957.29		957.30	0.000009	0.68	1274.17	117.83	0.04
Thompson Run	2	998	10 Year	320.00	944.59	953.33		953.33	0.000009	0.51	761.68	110.92	0.03
Thompson Run	2	998	1 Year	95.00	944.59	949.25		949.26	0.000014	0.37	298.73	106.24	0.04
Thompson Run	1	1000	100 year	1016.00	944.66	957.26		957.30	0.000057	1.77	766.91	70.31	0.09
Thompson Run	1	1000	10 Year	466.00	944.66	953.31		953.33	0.000048	1.24	489.04	70.31	0.08
Thompson Run	1	1000	1 Year	137.00	944.66	949.25		949.25	0.000064	0.85	203.36	70.31	0.08
Thompson Run	1	999	100 year	1016.00	944.08	957.26		957.30	0.000057	1.79	795.14	72.63	0.09
Thompson Run	1	999	10 Year	466.00	944.08	953.31		953.33	0.000048	1.25	508.04	72.63	0.08

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Thompson Run	1	999	1 Year	137.00	944.08	949.24		949.25	0.000060	0.87	212.87	72.63	0.08
Thompson Run	1	998	100 year	1016.00	943.47	957.25		957.29	0.000073	2.05	702.49	63.51	0.10
Thompson Run	1	998	10 Year	466.00	943.47	953.30		953.32	0.000059	1.42	451.87	63.51	0.09
Thompson Run	1	998	1 Year	137.00	943.47	949.24		949.25	0.000067	0.95	193.96	63.51	0.08
Thompson Run	1	997	100 year	1016.00	943.86	957.27	948.33	957.28	0.000017	1.00	1505.17	140.69	0.05
Thompson Run	1	997	10 Year	466.00	943.86	953.31	947.36	953.32	0.000016	0.73	948.14	140.69	0.05
Thompson Run	1	997	1 Year	137.00	943.86	949.24	946.06	949.25	0.000053	0.83	217.03	140.69	0.07
Thompson Run	1	996.5		Bridge									
Thompson Run	1	996	100 year	1016.00	944.81	957.27	948.30	957.28	0.000019	1.03	1428.62	132.87	0.05
Thompson Run	1	996	10 Year	466.00	944.81	953.31	947.39	953.32	0.000017	0.74	902.55	132.87	0.05
Thompson Run	1	996	1 Year	137.00	944.81	949.24	946.48	949.25	0.000058	0.82	213.51	132.87	0.08
Thompson Run	1	995	100 year	1016.00	944.04	957.24		957.28	0.000060	1.86	754.88	67.82	0.09
Thompson Run	1	995	10 Year	466.00	944.04	953.30		953.31	0.000049	1.28	487.52	67.82	0.08
Thompson Run	1	995	1 Year	137.00	944.04	949.24		949.25	0.000054	0.85	212.33	67.82	0.07
Thompson Run	1	994	100 year	1016.00	943.73	957.23		957.27	0.000060	1.85	654.13	57.04	0.09
Thompson Run	1	994	10 Year	466.00	943.73	953.29		953.31	0.000051	1.30	404.68	53.17	0.08
Thompson Run	1	994	1 Year	137.00	943.73	949.24		949.25	0.000057	0.83	179.09	49.33	0.07
Thompson Run	1	993	100 year	1016.00	943.71	957.25		957.26	0.000022	1.15	964.70	80.29	0.06
Thompson Run	1	993	10 Year	466.00	943.71	953.30		953.31	0.000024	0.82	566.59	68.12	0.05
Thompson Run	1	993	1 Year	137.00	943.71	949.24		949.24	0.000017	0.47	290.15	68.12	0.04
Slab Cabin Run	2	1052	100 year	2528.00	948.84	959.37		959.86	0.001125	6.68	524.26	64.19	0.39
Slab Cabin Run	2	1052	10 Year	1231.00	948.84	955.38		955.82	0.002072	6.21	268.47	64.19	0.48
Slab Cabin Run	2	1052	1 Year	410.00	948.84	952.82		953.17	0.003622	5.21	103.66	64.19	0.57
Slab Cabin Run	2	1051	100 year	2528.00	948.64	959.38		959.80	0.000870	6.00	569.38	68.29	0.34
Slab Cabin Run	2	1051	10 Year	1231.00	948.64	955.37		955.73	0.001509	5.50	295.19	68.29	0.41
Slab Cabin Run	2	1051	1 Year	410.00	948.64	952.78		953.04	0.002137	4.31	118.28	68.29	0.44
Slab Cabin Run	2	1050	100 year	2528.00	947.97	959.37		959.75	0.000840	5.76	583.77	71.03	0.34
Slab Cabin Run	2	1050	10 Year	1231.00	947.97	955.31		955.67	0.001609	5.41	295.75	71.03	0.42
Slab Cabin Run	2	1050	1 Year	410.00	947.97	952.57		952.92	0.003776	4.97	100.77	71.03	0.57
Slab Cabin Run	2	1049	100 year	2528.00	948.45	959.26		959.71	0.000989	6.41	544.82	65.05	0.36
Slab Cabin Run	2	1049	10 Year	1231.00	948.45	955.19		955.60	0.001763	5.93	280.15	65.05	0.44

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	2	1049	1 Year	410.00	948.45	952.37		952.77	0.003716	5.35	96.67	65.05	0.57
Slab Cabin Run	2	1048	100 year	2528.00	947.66	959.20		959.62	0.000928	6.20	561.73	64.33	0.35
Slab Cabin Run	2	1048	10 Year	1231.00	947.66	955.09		955.45	0.001528	5.57	297.30	64.33	0.41
Slab Cabin Run	2	1048	1 Year	410.00	947.66	952.14		952.47	0.003062	4.93	107.68	64.33	0.51
Slab Cabin Run	2	1047	100 year	2528.00	947.90	959.18		959.56	0.000785	5.87	594.15	66.96	0.33
Slab Cabin Run	2	1047	10 Year	1231.00	947.90	955.05		955.36	0.001284	5.22	317.03	66.96	0.39
Slab Cabin Run	2	1047	1 Year	410.00	947.90	952.00		952.29	0.002938	4.74	113.08	66.96	0.51
Slab Cabin Run	2	1046	100 year	2528.00	947.14	959.08		959.53	0.000954	6.47	548.67	62.71	0.36
Slab Cabin Run	2	1046	10 Year	1231.00	947.14	954.91		955.30	0.001588	5.87	287.40	62.71	0.42
Slab Cabin Run	2	1046	1 Year	410.00	947.14	951.56	951.24	952.13	0.005537	6.33	77.38	57.95	0.69
Slab Cabin Run	2	1045	100 year	2528.00	947.46	959.12		959.47	0.000693	5.58	614.02	68.82	0.31
Slab Cabin Run	2	1045	10 Year	1231.00	947.46	954.93		955.23	0.001130	4.99	326.15	68.82	0.36
Slab Cabin Run	2	1045	1 Year	410.00	947.46	951.53		951.94	0.004027	5.30	91.79	68.82	0.59
Slab Cabin Run	2	1044	100 year	2528.00	946.99	958.87		959.43	0.001025	6.84	498.84	54.44	0.37
Slab Cabin Run	2	1044	10 Year	1231.00	946.99	954.76		955.18	0.001474	5.86	274.67	54.44	0.41
Slab Cabin Run	2	1044	1 Year	410.00	946.99	951.42		951.82	0.003322	5.29	93.04	54.44	0.55
Slab Cabin Run	2	1043	100 year	2528.00	947.06	959.07		959.31	0.000426	4.48	734.31	78.12	0.25
Slab Cabin Run	2	1043	10 Year	1231.00	947.06	954.89		955.07	0.000622	3.83	407.94	78.12	0.27
Slab Cabin Run	2	1043	1 Year	410.00	947.06	951.51		951.68	0.001482	3.46	143.73	78.12	0.37
Slab Cabin Run	2	1042	100 year	2528.00	947.58	959.00		959.29	0.000533	4.93	682.04	73.51	0.28
Slab Cabin Run	2	1042	10 Year	1231.00	947.58	954.82		955.04	0.000816	4.25	374.68	73.51	0.31
Slab Cabin Run	2	1042	1 Year	410.00	947.58	951.31		951.57	0.003030	4.43	116.55	73.51	0.51
Slab Cabin Run	2	1041	100 year	2528.00	947.46	959.01		959.26	0.000379	4.31	725.24	73.85	0.23
Slab Cabin Run	2	1041	10 Year	1231.00	947.46	954.83		955.00	0.000511	3.56	416.23	73.85	0.25
Slab Cabin Run	2	1041	1 Year	410.00	947.46	951.33		951.46	0.001066	3.00	158.12	73.85	0.32
Slab Cabin Run	2	1040	100 year	2528.00	947.18	959.02		959.23	0.000357	4.07	793.78	82.17	0.22
Slab Cabin Run	2	1040	10 Year	1231.00	947.18	954.82		954.97	0.000508	3.41	448.40	82.17	0.24
Slab Cabin Run	2	1040	1 Year	410.00	947.18	951.27		951.40	0.001429	3.19	156.34	82.17	0.35
Slab Cabin Run	2	1039	100 year	2528.00	945.31	958.92		959.20	0.000428	4.71	683.09	66.23	0.25
Slab Cabin Run	2	1039	10 Year	1231.00	945.31	954.77		954.95	0.000495	3.73	407.66	66.23	0.25
Slab Cabin Run	2	1039	1 Year	410.00	945.31	951.26		951.37	0.000655	2.74	175.46	66.23	0.25

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	2	1038	100 year	2528.00	947.16	958.92		959.19	0.000461	4.85	705.20	70.07	0.26
Slab Cabin Run	2	1038	10 Year	1231.00	947.16	954.75		954.94	0.000563	3.92	413.06	70.07	0.26
Slab Cabin Run	2	1038	1 Year	410.00	947.16	951.22		951.35	0.000930	3.14	165.33	70.07	0.30
Slab Cabin Run	2	1037	100 year	2528.00	947.11	958.74		959.15	0.000852	6.42	574.29	57.81	0.34
Slab Cabin Run	2	1037	10 Year	1231.00	947.11	954.62		954.89	0.001036	5.17	335.89	57.81	0.35
Slab Cabin Run	2	1037	1 Year	410.00	947.11	951.07		951.28	0.001972	4.38	130.48	57.81	0.43
Slab Cabin Run	2	1036	100 year	2528.00	946.63	958.77		959.08	0.000537	5.25	660.75	67.53	0.28
Slab Cabin Run	2	1036	10 Year	1231.00	946.63	954.60		954.83	0.000677	4.34	379.52	67.53	0.29
Slab Cabin Run	2	1036	1 Year	410.00	946.63	950.98		951.18	0.001340	3.79	134.54	67.53	0.36
Slab Cabin Run	2	1035	100 year	2528.00	946.38	958.69		959.06	0.000677	5.86	612.14	62.72	0.31
Slab Cabin Run	2	1035	10 Year	1231.00	946.38	954.53		954.80	0.000846	4.83	351.76	62.72	0.32
Slab Cabin Run	2	1035	1 Year	410.00	946.38	950.87		951.12	0.001771	4.34	121.85	62.72	0.41
Slab Cabin Run	2	1034	100 year	2528.00	945.85	958.57		959.01	0.000730	6.09	557.22	55.75	0.32
Slab Cabin Run	2	1034	10 Year	1231.00	945.85	954.46		954.75	0.000863	4.88	327.97	55.75	0.32
Slab Cabin Run	2	1034	1 Year	410.00	945.85	950.81		951.03	0.001566	4.05	124.19	55.75	0.39
Slab Cabin Run	2	1033	100 year	2528.00	944.77	958.64		958.95	0.000450	4.98	657.41	62.32	0.25
Slab Cabin Run	2	1033	10 Year	1231.00	944.77	954.50		954.69	0.000479	3.87	399.56	62.32	0.24
Slab Cabin Run	2	1033	1 Year	410.00	944.77	950.84		950.95	0.000577	2.79	171.72	62.32	0.24
Slab Cabin Run	2	1032	100 year	2528.00	945.55	958.36		958.91	0.000881	6.68	507.65	55.44	0.35
Slab Cabin Run	2	1032	10 Year	1231.00	945.55	954.23		954.65	0.001156	5.63	279.02	55.44	0.37
Slab Cabin Run	2	1032	1 Year	410.00	945.55	950.64		950.91	0.001746	4.30	106.75	38.78	0.41
Slab Cabin Run	2	1031	100 year	2528.00	945.45	958.13		958.85	0.001083	7.53	440.90	42.65	0.39
Slab Cabin Run	2	1031	10 Year	1231.00	945.45	954.16		954.60	0.001120	5.78	266.97	41.50	0.37
Slab Cabin Run	2	1031	1 Year	410.00	945.45	950.61		950.83	0.001246	4.00	120.00	40.03	0.35
Slab Cabin Run	2	1030	100 year	2528.00	945.36	958.32		958.73	0.000569	5.50	572.88	53.64	0.29
Slab Cabin Run	2	1030	10 Year	1231.00	945.36	954.27		954.51	0.000593	4.18	355.65	53.64	0.27
Slab Cabin Run	2	1030	1 Year	410.00	945.36	950.65		950.77	0.000735	2.94	161.26	53.64	0.27
Slab Cabin Run	2	1029.6	100 year	2528.00	945.83	958.15		958.69	0.000817	6.47	497.42	48.14	0.34
Slab Cabin Run	2	1029.6	10 Year	1231.00	945.83	954.15		954.48	0.000868	4.96	305.25	48.14	0.33
Slab Cabin Run	2	1029.6	1 Year	410.00	945.83	950.55		950.74	0.001190	3.64	131.85	48.14	0.34
Slab Cabin Run	2	1029	100 year	2528.00	945.26	958.25		958.60	0.000598	5.55	633.12	65.01	0.29
Slab Cabin Run	2	1029	10 Year	1231.00	945.26	954.18		954.42	0.000712	4.52	367.99	65.01	0.29

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	2	1029	1 Year	410.00	945.26	950.47		950.68	0.001284	3.84	130.83	56.13	0.35
Slab Cabin Run	2	1028	100 year	2528.00	945.44	958.21		958.58	0.000673	5.85	611.95	61.93	0.30
Slab Cabin Run	2	1028	10 Year	1231.00	945.44	954.15		954.39	0.000780	4.71	360.19	61.93	0.30
Slab Cabin Run	2	1028	1 Year	410.00	945.44	950.42		950.64	0.001474	4.08	129.41	61.93	0.37
Slab Cabin Run	2	1027	100 year	2528.00	945.37	958.22		958.53	0.000543	5.35	657.34	65.25	0.28
Slab Cabin Run	2	1027	10 Year	1231.00	945.37	954.14		954.35	0.000616	4.26	391.32	65.25	0.28
Slab Cabin Run	2	1027	1 Year	410.00	945.37	950.39		950.56	0.001145	3.63	146.39	65.25	0.33
Slab Cabin Run	2	1026	100 year	2528.00	945.90	958.28		958.48	0.000311	4.07	808.47	79.06	0.21
Slab Cabin Run	2	1026	10 Year	1231.00	945.90	954.18		954.31	0.000357	3.23	483.91	79.06	0.21
Slab Cabin Run	2	1026	1 Year	410.00	945.90	950.41		950.50	0.000663	2.68	185.77	79.06	0.26
Slab Cabin Run	2	1025	100 year	2528.00	945.15	957.89		958.43	0.000809	6.47	500.42	47.88	0.34
Slab Cabin Run	2	1025	10 Year	1231.00	945.15	953.95		954.26	0.000821	4.88	312.14	47.88	0.32
Slab Cabin Run	2	1025	1 Year	410.00	945.15	950.28		950.46	0.001113	3.55	136.50	47.88	0.33
Slab Cabin Run	2	1024	100 year	2528.00	945.77	957.91		958.37	0.000676	5.87	537.58	52.17	0.31
Slab Cabin Run	2	1024	10 Year	1231.00	945.77	953.95		954.22	0.000724	4.50	330.70	52.17	0.30
Slab Cabin Run	2	1024	1 Year	410.00	945.77	950.24		950.41	0.001164	3.45	137.21	52.17	0.34
Slab Cabin Run	2	1023	100 year	2528.00	944.35	958.06		958.28	0.000335	4.28	784.51	74.16	0.22
Slab Cabin Run	2	1023	10 Year	1231.00	944.35	954.02		954.15	0.000343	3.29	485.18	74.16	0.21
Slab Cabin Run	2	1023	1 Year	410.00	944.35	950.27		950.35	0.000459	2.47	206.71	74.16	0.21
Slab Cabin Run	2	1022	100 year	2528.00	944.42	958.09		958.25	0.000232	3.56	905.04	83.94	0.18
Slab Cabin Run	2	1022	10 Year	1231.00	944.42	954.04		954.13	0.000237	2.72	564.95	83.94	0.17
Slab Cabin Run	2	1022	1 Year	410.00	944.42	950.28		950.33	0.000312	1.99	248.93	83.94	0.18
Slab Cabin Run	2	1021	100 year	2528.00	944.69	957.82		958.22	0.000582	5.45	570.67	54.68	0.29
Slab Cabin Run	2	1021	10 Year	1231.00	944.69	953.88		954.11	0.000603	4.14	355.28	54.68	0.27
Slab Cabin Run	2	1021	1 Year	410.00	944.69	950.17		950.31	0.000875	3.07	152.77	54.68	0.29
Slab Cabin Run	2	1020	100 year	2528.00	945.12	957.64		958.18	0.000875	6.54	496.48	49.82	0.35
Slab Cabin Run	2	1020	10 Year	1231.00	945.12	953.71		954.07	0.001048	5.29	284.47	46.86	0.36
Slab Cabin Run	2	1020	1 Year	410.00	945.12	949.97		950.25	0.002318	4.46	104.67	43.92	0.45
Slab Cabin Run	2	1019	100 year	2528.00	945.64	957.75		958.09	0.000627	5.64	636.32	62.37	0.30
Slab Cabin Run	2	1019	10 Year	1231.00	945.64	953.78		953.99	0.000674	4.36	388.75	62.37	0.29
Slab Cabin Run	2	1019	1 Year	410.00	945.64	949.99		950.14	0.001292	3.64	151.85	62.37	0.35

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	2	1018	100 year	2528.00	943.94	957.84		958.02	0.000262	3.89	853.92	77.77	0.20
Slab Cabin Run	2	1018	10 Year	1231.00	943.94	953.84		953.94	0.000250	2.91	542.42	77.77	0.18
Slab Cabin Run	2	1018	1 Year	410.00	943.94	950.03		950.09	0.000296	2.07	246.34	77.77	0.18
Slab Cabin Run	2	1017	100 year	2528.00	944.40	957.78		958.01	0.000371	4.51	755.45	71.76	0.23
Slab Cabin Run	2	1017	10 Year	1231.00	944.40	953.79		953.93	0.000375	3.45	469.33	71.76	0.22
Slab Cabin Run	2	1017	1 Year	410.00	944.40	949.98		950.08	0.000534	2.65	196.13	71.76	0.23
Slab Cabin Run	2	1016	100 year	2528.00	944.66	957.76		958.00	0.000372	4.50	752.68	72.82	0.23
Slab Cabin Run	2	1016	10 Year	1231.00	944.66	953.77		953.92	0.000389	3.48	462.06	72.82	0.22
Slab Cabin Run	2	1016	1 Year	410.00	944.66	949.95		950.06	0.000629	2.79	183.79	72.82	0.25
Slab Cabin Run	2	1015	100 year	2528.00	945.07	957.63		957.97	0.000614	5.71	636.85	61.56	0.30
Slab Cabin Run	2	1015	10 Year	1231.00	945.07	953.69		953.89	0.000628	4.36	394.11	61.56	0.28
Slab Cabin Run	2	1015	1 Year	410.00	945.07	949.87		950.02	0.001050	3.51	159.24	61.56	0.32
Slab Cabin Run	2	1014	100 year	2528.00	945.20	957.66		957.94	0.000479	5.02	694.03	67.39	0.26
Slab Cabin Run	2	1014	10 Year	1231.00	945.20	953.69		953.87	0.000498	3.87	426.99	67.39	0.25
Slab Cabin Run	2	1014	1 Year	410.00	945.20	949.85		949.98	0.000850	3.18	168.26	67.39	0.29
Slab Cabin Run	2	1013.7	100 year	2528.00	945.18	957.58		957.93	0.000604	5.63	629.38	61.99	0.29
Slab Cabin Run	2	1013.7	10 Year	1231.00	945.18	953.64		953.86	0.000632	4.36	385.37	61.99	0.28
Slab Cabin Run	2	1013.7	1 Year	410.00	945.18	949.80		949.97	0.001153	3.67	147.09	61.99	0.33
Slab Cabin Run	2	1012.7	100 year	2528.00	945.17	957.67	951.29	957.87	0.000410	4.61	802.41	80.20	0.24
Slab Cabin Run	2	1012.7	10 Year	1231.00	945.17	953.69	950.10	953.82	0.000461	3.68	483.15	80.20	0.24
Slab Cabin Run	2	1012.7	1 Year	410.00	945.17	949.78	948.65	949.95	0.001294	3.77	150.24	80.20	0.35
Slab Cabin Run	2	1012.6		Bridge									
Slab Cabin Run	2	1012.5	100 year	2528.00	945.33	957.66	951.20	957.84	0.000379	4.34	839.94	84.84	0.23
Slab Cabin Run	2	1012.5	10 Year	1231.00	945.33	953.65	950.08	953.77	0.000448	3.50	499.78	84.84	0.23
Slab Cabin Run	2	1012.5	1 Year	410.00	945.33	949.75	948.77	949.92	0.001509	3.78	148.18	84.84	0.37
Slab Cabin Run	2	1012	100 year	2528.00	945.33	957.22		957.79	0.000939	6.67	487.85	49.40	0.36
Slab Cabin Run	2	1012	10 Year	1231.00	945.33	953.39		953.73	0.001017	5.14	298.61	49.40	0.35
Slab Cabin Run	2	1012	1 Year	410.00	945.33	949.59		949.86	0.002259	4.41	110.83	49.40	0.45
Slab Cabin Run	2	1011	100 year	2528.00	945.46	957.38		957.69	0.000594	5.31	651.70	66.72	0.29
Slab Cabin Run	2	1011	10 Year	1231.00	945.46	953.47		953.67	0.000682	4.19	390.74	66.72	0.28
Slab Cabin Run	2	1011	1 Year	410.00	945.46	949.58		949.79	0.002036	4.08	131.21	66.72	0.43

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	2	1010	100 year	2528.00	945.06	957.41		957.64	0.000383	4.51	751.54	72.71	0.24
Slab Cabin Run	2	1010	10 Year	1231.00	945.06	953.48		953.62	0.000398	3.45	466.07	72.71	0.22
Slab Cabin Run	2	1010	1 Year	410.00	945.06	949.58		949.69	0.000754	2.86	182.55	72.71	0.27
Slab Cabin Run	2	1009	100 year	2528.00	944.84	957.33		957.62	0.000487	5.12	683.55	66.28	0.27
Slab Cabin Run	2	1009	10 Year	1231.00	944.84	953.43		953.60	0.000494	3.90	424.95	66.28	0.25
Slab Cabin Run	2	1009	1 Year	410.00	944.84	949.52		949.66	0.000915	3.25	166.05	66.28	0.30
Slab Cabin Run	2	1008	100 year	2528.00	944.36	957.35		957.60	0.000394	4.61	741.91	70.49	0.24
Slab Cabin Run	2	1008	10 Year	1231.00	944.36	953.44		953.58	0.000387	3.49	466.08	70.49	0.22
Slab Cabin Run	2	1008	1 Year	410.00	944.36	949.53		949.63	0.000612	2.76	190.39	70.49	0.25
Slab Cabin Run	2	1007	100 year	2528.00	944.99	957.36		957.56	0.000317	4.09	810.23	77.96	0.22
Slab Cabin Run	2	1007	10 Year	1231.00	944.99	953.43		953.55	0.000330	3.12	504.04	77.96	0.21
Slab Cabin Run	2	1007	1 Year	410.00	944.99	949.49		949.58	0.000658	2.60	196.85	77.96	0.25
Slab Cabin Run	2	1006	100 year	2528.00	943.90	957.22		957.53	0.000435	4.85	652.02	61.04	0.25
Slab Cabin Run	2	1006	10 Year	1231.00	943.90	953.35		953.53	0.000414	3.60	415.95	61.04	0.23
Slab Cabin Run	2	1006	1 Year	410.00	943.90	949.44		949.54	0.000597	2.69	177.19	61.04	0.24
Slab Cabin Run	2	1005	100 year	2528.00	943.66	957.24		957.51	0.000377	4.52	690.48	64.36	0.23
Slab Cabin Run	2	1005	10 Year	1231.00	943.66	953.36		953.51	0.000359	3.36	440.88	64.36	0.21
Slab Cabin Run	2	1005	1 Year	410.00	943.66	949.44		949.53	0.000514	2.50	188.55	64.36	0.23
Slab Cabin Run	2	1004	100 year	2528.00	943.18	957.19		957.50	0.000480	4.99	657.32	62.32	0.26
Slab Cabin Run	2	1004	10 Year	1231.00	943.18	953.33		953.50	0.000466	3.73	416.54	62.32	0.24
Slab Cabin Run	2	1004	1 Year	410.00	943.18	949.40		949.52	0.000759	2.90	171.94	62.32	0.27
Slab Cabin Run	2	1003	100 year	2528.00	944.41	957.17		957.46	0.000499	5.17	685.19	64.03	0.27
Slab Cabin Run	2	1003	10 Year	1231.00	944.41	953.30		953.46	0.000469	3.82	437.63	64.03	0.24
Slab Cabin Run	2	1003	1 Year	410.00	944.41	949.36		949.46	0.000723	2.94	184.93	64.03	0.27
Slab Cabin Run	2	1002	100 year	2528.00	944.06	957.13		957.42	0.000496	5.20	684.23	64.75	0.27
Slab Cabin Run	2	1002	10 Year	1231.00	944.06	953.26		953.43	0.000472	3.88	433.90	64.75	0.24
Slab Cabin Run	2	1002	1 Year	410.00	944.06	949.28		949.40	0.000781	3.12	176.37	64.75	0.28
Slab Cabin Run	2	1001	100 year	2528.00	944.20	957.08		957.38	0.000547	5.36	667.52	62.94	0.28
Slab Cabin Run	2	1001	10 Year	1231.00	944.20	953.22		953.39	0.000522	3.97	424.85	62.94	0.26
Slab Cabin Run	2	1001	1 Year	410.00	944.20	949.22		949.34	0.000928	3.19	173.14	62.94	0.30
Slab Cabin Run	2	1000	100 year	2528.00	944.39	957.01		957.36	0.000533	5.36	626.72	58.92	0.28
Slab Cabin Run	2	1000	10 Year	1231.00	944.39	953.18		953.37	0.000503	3.97	400.97	58.92	0.25

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	2	1000	1 Year	410.00	944.39	949.18		949.31	0.000836	3.10	165.46	58.92	0.29
Slab Cabin Run	2	999	100 year	2528.00	944.25	957.09		957.31	0.000298	4.03	755.37	69.23	0.21
Slab Cabin Run	2	999	10 Year	1231.00	944.25	953.22		953.34	0.000283	2.98	487.51	69.23	0.19
Slab Cabin Run	2	999	1 Year	410.00	944.25	949.21		949.28	0.000444	2.24	209.58	69.23	0.21
Slab Cabin Run	2	998	100 year	2528.00	943.85	957.17		957.27	0.000120	2.69	1045.91	88.38	0.14
Slab Cabin Run	2	998	10 Year	1231.00	943.85	953.26		953.32	0.000106	1.95	685.04	85.84	0.12
Slab Cabin Run	2	998	1 Year	410.00	943.85	949.24		949.26	0.000111	1.28	339.24	85.84	0.11
Slab Cabin Run	1	1032	100 year	3544.00	944.13	957.08		957.25	0.000300	4.17	1187.50	108.16	0.21
Slab Cabin Run	1	1032	10 Year	1697.00	944.13	953.19		953.30	0.000369	3.12	680.25	94.85	0.19
Slab Cabin Run	1	1032	1 Year	547.00	944.13	949.17		949.24	0.000507	2.48	290.78	91.85	0.22
Slab Cabin Run	1	1031	100 year	3544.00	944.36	956.76		957.21	0.000710	6.28	765.34	71.64	0.33
Slab Cabin Run	1	1031	10 Year	1697.00	944.36	952.98		953.27	0.000729	4.89	448.44	63.95	0.31
Slab Cabin Run	1	1031	1 Year	547.00	944.36	949.05		949.21	0.000968	3.53	192.31	61.61	0.32
Slab Cabin Run	1	1030.3	100 year	3544.00	944.55	956.77		957.18	0.000634	5.91	803.01	73.28	0.31
Slab Cabin Run	1	1030.3	10 Year	1697.00	944.55	952.98		953.23	0.000643	4.56	476.70	65.95	0.29
Slab Cabin Run	1	1030.3	1 Year	547.00	944.55	949.04		949.17	0.000829	3.20	210.70	63.74	0.29
Slab Cabin Run	1	1030	100 year	3544.00	944.59	956.75		957.16	0.000662	6.02	791.87	73.49	0.31
Slab Cabin Run	1	1030	10 Year	1697.00	944.59	952.96		953.22	0.000689	4.68	464.48	65.98	0.30
Slab Cabin Run	1	1030	1 Year	547.00	944.59	949.01		949.16	0.000967	3.40	198.22	63.65	0.31
Slab Cabin Run	1	1029.5	100 year	3544.00	944.02	956.54		957.13	0.000889	6.91	662.37	61.59	0.36
Slab Cabin Run	1	1029.5	10 Year	1697.00	944.02	952.82		953.20	0.000899	5.33	387.49	54.11	0.34
Slab Cabin Run	1	1029.5	1 Year	547.00	944.02	948.95		949.13	0.001116	3.69	172.08	51.68	0.34
Slab Cabin Run	1	1029	100 year	3544.00	943.48	956.77		957.01	0.000417	4.70	1025.98	98.26	0.25
Slab Cabin Run	1	1029	10 Year	1697.00	943.48	952.96		953.12	0.000468	3.78	589.98	88.17	0.24
Slab Cabin Run	1	1029	1 Year	547.00	943.48	948.98		949.09	0.000836	3.03	232.62	85.12	0.29
Slab Cabin Run	1	1028.2	100 year	3544.00	943.62	956.47		956.97	0.000752	6.30	717.61	68.13	0.33
Slab Cabin Run	1	1028.2	10 Year	1697.00	943.62	952.76		953.08	0.000786	4.92	415.57	59.83	0.32
Slab Cabin Run	1	1028.2	1 Year	547.00	943.62	948.87		949.05	0.001089	3.54	177.65	57.22	0.33
Slab Cabin Run	1	1028	100 year	3544.00	943.83	956.56		956.91	0.000550	5.42	850.23	80.63	0.28
Slab Cabin Run	1	1028	10 Year	1697.00	943.83	952.81		953.05	0.000582	4.26	493.31	71.57	0.27
Slab Cabin Run	1	1028	1 Year	547.00	943.83	948.89		949.02	0.000854	3.15	206.48	68.80	0.29

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	1	1027	100 year	3544.00	944.97	956.68		956.84	0.000309	3.99	1219.35	118.81	0.21
Slab Cabin Run	1	1027	10 Year	1697.00	944.97	952.88		952.99	0.000359	3.23	699.21	106.82	0.21
Slab Cabin Run	1	1027	1 Year	547.00	944.97	948.89		948.97	0.000768	2.71	266.22	103.26	0.27
Slab Cabin Run	1	1026.4	100 year	3544.00	944.43	956.56		956.82	0.000442	4.75	992.16	97.84	0.25
Slab Cabin Run	1	1026.4	10 Year	1697.00	944.43	952.79		952.97	0.000515	3.86	561.87	87.18	0.26
Slab Cabin Run	1	1026.4	1 Year	547.00	944.43	948.80		948.94	0.001113	3.26	208.23	83.89	0.33
Slab Cabin Run	1	1026	100 year	3544.00	943.67	956.53		956.81	0.000522	5.32	950.45	92.95	0.28
Slab Cabin Run	1	1026	10 Year	1697.00	943.67	952.76		952.96	0.000573	4.29	546.70	82.88	0.27
Slab Cabin Run	1	1026	1 Year	547.00	943.67	948.77		948.92	0.001007	3.54	211.55	79.90	0.32
Slab Cabin Run	1	1025	100 year	3544.00	942.52	956.19		956.75	0.001006	7.14	684.26	66.63	0.38
Slab Cabin Run	1	1025	10 Year	1697.00	942.52	952.54		952.91	0.001039	5.59	399.97	59.66	0.36
Slab Cabin Run	1	1025	1 Year	547.00	942.52	948.62		948.85	0.001606	4.29	161.77	57.56	0.39
Slab Cabin Run	1	1024.5	100 year	3544.00	943.65	956.32		956.66	0.000565	5.54	871.65	83.58	0.29
Slab Cabin Run	1	1024.5	10 Year	1697.00	943.65	952.61		952.84	0.000592	4.37	507.87	74.52	0.28
Slab Cabin Run	1	1024.5	1 Year	547.00	943.65	948.64		948.79	0.000917	3.36	206.20	71.69	0.31
Slab Cabin Run	1	1024	100 year	3544.00	943.34	956.25		956.63	0.000591	5.68	820.83	77.69	0.30
Slab Cabin Run	1	1024	10 Year	1697.00	943.34	952.57		952.81	0.000595	4.40	482.47	68.83	0.28
Slab Cabin Run	1	1024	1 Year	547.00	943.34	948.61		948.75	0.000812	3.20	204.76	66.14	0.29
Slab Cabin Run	1	1023.8	100 year	3544.00	943.21	956.32		956.59	0.000456	5.03	990.93	96.70	0.26
Slab Cabin Run	1	1023.8	10 Year	1697.00	943.21	952.61		952.79	0.000486	4.03	573.13	86.28	0.25
Slab Cabin Run	1	1023.8	1 Year	547.00	943.21	948.61		948.74	0.000793	3.24	223.01	83.22	0.29
Slab Cabin Run	1	1023.5	100 year	3544.00	942.99	956.07		956.55	0.000735	6.36	737.27	70.82	0.33
Slab Cabin Run	1	1023.5	10 Year	1697.00	942.99	952.44		952.76	0.000726	4.94	428.95	61.74	0.31
Slab Cabin Run	1	1023.5	1 Year	547.00	942.99	948.54		948.71	0.000894	3.53	181.81	58.65	0.30
Slab Cabin Run	1	1023	100 year	3544.00	942.77	956.13		956.49	0.000554	5.60	847.78	79.51	0.29
Slab Cabin Run	1	1023	10 Year	1697.00	942.77	952.48		952.71	0.000527	4.29	505.40	70.53	0.26
Slab Cabin Run	1	1023	1 Year	547.00	942.77	948.55		948.67	0.000604	2.99	222.57	67.81	0.25
Slab Cabin Run	1	1022.6	100 year	3544.00	942.71	956.21		956.44	0.000381	4.67	1067.28	102.40	0.24
Slab Cabin Run	1	1022.6	10 Year	1697.00	942.71	952.52		952.68	0.000387	3.69	626.63	91.63	0.22
Slab Cabin Run	1	1022.6	1 Year	547.00	942.71	948.55		948.65	0.000534	2.82	256.18	88.41	0.24
Slab Cabin Run	1	1022	100 year	3544.00	943.12	955.95		956.40	0.000713	6.15	767.07	74.13	0.32
Slab Cabin Run	1	1022	10 Year	1697.00	943.12	952.36		952.64	0.000709	4.77	450.97	65.68	0.30

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	1	1022	1 Year	547.00	943.12	948.45		948.62	0.000956	3.49	189.25	63.09	0.31
Slab Cabin Run	1	1021	100 year	3544.00	943.55	955.93		956.36	0.000678	5.97	782.13	76.87	0.31
Slab Cabin Run	1	1021	10 Year	1697.00	943.55	952.33		952.61	0.000699	4.68	452.51	67.41	0.30
Slab Cabin Run	1	1021	1 Year	547.00	943.55	948.39		948.57	0.001068	3.55	182.68	64.58	0.33
Slab Cabin Run	1	1020	100 year	3544.00	943.48	955.21		956.26	0.001714	9.17	505.26	51.41	0.49
Slab Cabin Run	1	1020	10 Year	1697.00	943.48	951.88		952.54	0.001650	7.01	295.98	44.52	0.46
Slab Cabin Run	1	1020	1 Year	547.00	943.48	948.15		948.50	0.002135	4.98	126.14	42.36	0.46
Slab Cabin Run	1	1019.8	100 year	3544.00	943.23	955.84		955.97	0.000280	3.84	1334.77	132.71	0.20
Slab Cabin Run	1	1019.8	10 Year	1697.00	943.23	952.26		952.35	0.000304	3.10	781.46	120.18	0.20
Slab Cabin Run	1	1019.8	1 Year	547.00	943.23	948.32		948.39	0.000589	2.67	299.09	116.42	0.24
Slab Cabin Run	1	1019.6	100 year	3544.00	943.25	955.64		955.95	0.000518	5.21	920.26	90.74	0.28
Slab Cabin Run	1	1019.6	10 Year	1697.00	943.25	952.13		952.33	0.000525	4.07	541.59	80.66	0.26
Slab Cabin Run	1	1019.6	1 Year	547.00	943.25	948.24		948.37	0.000802	3.12	221.27	77.56	0.29
Slab Cabin Run	1	1019.3	100 year	3544.00	943.24	955.71		955.90	0.000313	4.08	1168.70	113.49	0.22
Slab Cabin Run	1	1019.3	10 Year	1697.00	943.24	952.17		952.29	0.000317	3.19	692.78	101.49	0.20
Slab Cabin Run	1	1019.3	1 Year	547.00	943.24	948.26		948.33	0.000483	2.44	286.79	97.85	0.22
Slab Cabin Run	1	1019	100 year	3544.00	943.21	955.61		955.87	0.000397	4.61	963.54	91.28	0.24
Slab Cabin Run	1	1019	10 Year	1697.00	943.21	952.11		952.28	0.000379	3.51	576.08	80.36	0.22
Slab Cabin Run	1	1019	1 Year	547.00	943.21	948.23		948.31	0.000471	2.44	256.00	76.95	0.22
Slab Cabin Run	1	1018.2	100 year	3544.00	942.08	954.72		955.76	0.001464	8.54	482.51	46.72	0.46
Slab Cabin Run	1	1018.2	10 Year	1697.00	942.08	951.58		952.20	0.001543	6.29	272.69	35.60	0.40
Slab Cabin Run	1	1018.2	1 Year	547.00	942.08	948.04		948.26	0.001198	3.76	145.38	34.99	0.33
Slab Cabin Run	1	1018	100 year	3544.00	942.12	955.06		955.59	0.000799	6.52	693.30	66.68	0.34
Slab Cabin Run	1	1018	10 Year	1697.00	942.12	951.78		952.09	0.000693	4.83	421.04	57.87	0.30
Slab Cabin Run	1	1018	1 Year	547.00	942.12	948.09		948.23	0.000648	3.11	200.45	54.90	0.26
Slab Cabin Run	1	1017.3	100 year	3544.00	941.66	955.15		955.53	0.000524	5.36	797.44	75.28	0.28
Slab Cabin Run	1	1017.3	10 Year	1697.00	941.66	951.83		952.05	0.000518	3.93	476.34	62.52	0.24
Slab Cabin Run	1	1017.3	1 Year	547.00	941.66	948.11		948.20	0.000409	2.45	237.79	59.28	0.20
Slab Cabin Run	1	1017	100 year	3544.00	941.57	954.94		955.51	0.000850	6.68	676.07	65.68	0.35
Slab Cabin Run	1	1017	10 Year	1697.00	941.57	951.70		952.03	0.000725	4.93	411.02	56.46	0.31
Slab Cabin Run	1	1017	1 Year	547.00	941.57	948.05		948.19	0.000645	3.12	198.54	53.33	0.26

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	1	1016.3	100 year	3544.00	942.23	954.19		955.40	0.001962	9.55	457.25	47.52	0.52
Slab Cabin Run	1	1016.3	10 Year	1697.00	942.23	951.27		951.96	0.002005	6.91	272.89	39.02	0.44
Slab Cabin Run	1	1016.3	1 Year	547.00	942.23	947.86		948.14	0.001535	4.33	135.42	36.81	0.37
Slab Cabin Run	1	1016	100 year	3544.00	942.68	954.59		955.19	0.001104	7.32	658.66	68.66	0.39
Slab Cabin Run	1	1016	10 Year	1697.00	942.68	951.47		951.84	0.000991	5.52	399.09	60.44	0.35
Slab Cabin Run	1	1016	1 Year	547.00	942.68	947.90		948.09	0.001096	3.82	178.36	57.97	0.33
Slab Cabin Run	1	1015	100 year	3544.00	942.89	953.83		955.07	0.002216	9.85	459.41	50.07	0.55
Slab Cabin Run	1	1015	10 Year	1697.00	942.89	951.04		951.76	0.001856	7.24	279.97	42.61	0.48
Slab Cabin Run	1	1015	1 Year	547.00	942.89	947.72		948.03	0.001722	4.61	134.04	40.25	0.41
Slab Cabin Run	1	1014.5	100 year	3544.00	941.90	954.45		954.76	0.000540	5.26	921.73	96.26	0.28
Slab Cabin Run	1	1014.5	10 Year	1697.00	941.90	951.38		951.57	0.000478	3.98	560.59	84.51	0.25
Slab Cabin Run	1	1014.5	1 Year	547.00	941.90	947.84		947.94	0.000491	2.73	254.36	80.96	0.23
Slab Cabin Run	1	1014	100 year	3544.00	942.74	954.30		954.72	0.000714	5.88	775.03	81.24	0.32
Slab Cabin Run	1	1014	10 Year	1697.00	942.74	951.29		951.54	0.000627	4.39	471.87	70.43	0.28
Slab Cabin Run	1	1014	1 Year	547.00	942.74	947.80		947.92	0.000642	2.91	219.57	67.18	0.26
Slab Cabin Run	1	1013.5	100 year	3544.00	942.59	954.44		954.65	0.000421	4.55	1105.92	120.21	0.25
Slab Cabin Run	1	1013.5	10 Year	1697.00	942.59	951.36		951.49	0.000408	3.57	660.52	106.39	0.23
Slab Cabin Run	1	1013.5	1 Year	547.00	942.59	947.80		947.89	0.000565	2.75	274.61	102.26	0.24
Slab Cabin Run	1	1013	100 year	3544.00	942.60	953.69		954.56	0.001892	8.95	552.22	63.46	0.50
Slab Cabin Run	1	1013	10 Year	1697.00	942.60	950.90		951.43	0.001699	6.79	334.32	55.62	0.45
Slab Cabin Run	1	1013	1 Year	547.00	942.60	947.54		947.85	0.002124	4.92	143.02	53.28	0.45
Slab Cabin Run	1	1012	100 year	3544.00	942.94	953.38		954.46	0.001907	9.06	488.67	54.87	0.52
Slab Cabin Run	1	1012	10 Year	1697.00	942.94	950.74		951.36	0.001568	6.63	297.88	46.02	0.44
Slab Cabin Run	1	1012	1 Year	547.00	942.94	947.50		947.76	0.001463	4.21	143.07	43.14	0.39
Slab Cabin Run	1	1011.6	100 year	3544.00	942.94	953.86		954.22	0.000690	5.66	849.85	94.23	0.31
Slab Cabin Run	1	1011.6	10 Year	1697.00	942.94	951.00		951.22	0.000617	4.29	515.91	82.07	0.28
Slab Cabin Run	1	1011.6	1 Year	547.00	942.94	947.57		947.69	0.000725	3.04	228.05	78.40	0.27
Slab Cabin Run	1	1010.7	100 year	3544.00	942.91	953.67	949.11	954.19	0.001005	6.74	700.91	78.28	0.38
Slab Cabin Run	1	1010.7	10 Year	1697.00	942.91	950.86	947.58	951.20	0.000916	5.16	413.69	65.19	0.34
Slab Cabin Run	1	1010.7	1 Year	547.00	942.91	947.52	945.81	947.68	0.000970	3.49	183.04	62.11	0.32
Slab Cabin Run	1	1010.65		Bridge									

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	1	1010.6	100 year	3544.00	942.87	953.44	949.33	954.04	0.001210	7.29	653.40	75.58	0.41
Slab Cabin Run	1	1010.6	10 Year	1697.00	942.87	950.58	947.74	950.97	0.001129	5.60	387.71	65.19	0.37
Slab Cabin Run	1	1010.6	1 Year	547.00	942.87	947.29	945.87	947.51	0.001401	4.06	159.21	62.11	0.37
Slab Cabin Run	1	1010.1	100 year	3544.00	941.61	953.45		954.00	0.000910	6.50	675.65	72.74	0.36
Slab Cabin Run	1	1010.1	10 Year	1697.00	941.61	950.60		950.93	0.000757	4.78	411.18	61.32	0.31
Slab Cabin Run	1	1010.1	1 Year	547.00	941.61	947.33		947.46	0.000623	2.95	203.63	57.61	0.25
Slab Cabin Run	1	1009.7	100 year	3544.00	941.87	953.51		953.94	0.000779	6.02	776.87	87.56	0.33
Slab Cabin Run	1	1009.7	10 Year	1697.00	941.87	950.62		950.89	0.000704	4.59	462.99	74.81	0.30
Slab Cabin Run	1	1009.7	1 Year	547.00	941.87	947.31		947.44	0.000720	3.11	209.01	71.10	0.27
Slab Cabin Run	1	1009.3	100 year	3544.00	942.68	953.61		953.88	0.000581	5.08	965.84	113.63	0.29
Slab Cabin Run	1	1009.3	10 Year	1697.00	942.68	950.67		950.85	0.000596	4.05	561.03	98.60	0.27
Slab Cabin Run	1	1009.3	1 Year	547.00	942.68	947.29		947.42	0.000935	3.23	221.96	94.23	0.31
Slab Cabin Run	1	1009	100 year	3544.00	943.19	953.62		953.85	0.000492	4.68	1037.59	121.44	0.26
Slab Cabin Run	1	1009	10 Year	1697.00	943.19	950.67		950.83	0.000506	3.74	602.91	105.32	0.25
Slab Cabin Run	1	1009	1 Year	547.00	943.19	947.28		947.39	0.000795	2.97	239.26	100.66	0.28
Slab Cabin Run	1	1008	100 year	3544.00	942.62	953.50		953.81	0.000722	5.73	905.03	107.53	0.32
Slab Cabin Run	1	1008	10 Year	1697.00	942.62	950.58		950.80	0.000739	4.62	526.88	94.04	0.30
Slab Cabin Run	1	1008	1 Year	547.00	942.62	947.16		947.34	0.001224	3.87	200.24	90.09	0.35
Slab Cabin Run	1	1007.6	100 year	3544.00	942.40	953.06		953.75	0.001505	8.03	618.39	73.89	0.45
Slab Cabin Run	1	1007.6	10 Year	1697.00	942.40	950.30		950.74	0.001392	6.19	368.95	63.98	0.41
Slab Cabin Run	1	1007.6	1 Year	547.00	942.40	947.02		947.29	0.001759	4.57	154.76	61.15	0.42
Slab Cabin Run	1	1007	100 year	3544.00	942.34	953.13		953.64	0.001194	7.27	713.89	86.27	0.41
Slab Cabin Run	1	1007	10 Year	1697.00	942.34	950.32		950.66	0.001158	5.74	420.53	74.80	0.38
Slab Cabin Run	1	1007	1 Year	547.00	942.34	946.95		947.21	0.001751	4.61	165.23	71.50	0.42
Slab Cabin Run	1	1006	100 year	3544.00	942.62	953.17		953.56	0.000996	6.61	807.58	101.65	0.37
Slab Cabin Run	1	1006	10 Year	1697.00	942.62	950.32		950.60	0.001043	5.37	464.65	86.29	0.36
Slab Cabin Run	1	1006	1 Year	547.00	942.62	946.85		947.13	0.002229	4.94	163.74	82.29	0.47
Slab Cabin Run	1	1005	100 year	3544.00	942.19	953.03		953.51	0.001382	7.75	722.26	94.40	0.43
Slab Cabin Run	1	1005	10 Year	1697.00	942.19	950.19		950.55	0.001459	6.39	410.29	77.67	0.42
Slab Cabin Run	1	1005	1 Year	547.00	942.19	946.63		947.02	0.003348	6.15	138.51	67.50	0.57
Slab Cabin Run	1	1004.5	100 year	3544.00	941.67	952.11		953.35	0.003019	10.98	468.85	63.04	0.63
Slab Cabin Run	1	1004.5	10 Year	1697.00	941.67	949.62		950.42	0.002669	8.40	278.91	51.64	0.57

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Slab Cabin Run	1	1004.5	1 Year	547.00	941.67	946.18		946.82	0.004681	6.99	101.24	46.58	0.67
Slab Cabin Run	1	1004	100 year	3544.00	941.14	952.33		953.11	0.001667	8.56	614.82	94.62	0.48
Slab Cabin Run	1	1004	10 Year	1697.00	941.14	949.70		950.25	0.001563	6.76	337.49	66.05	0.44
Slab Cabin Run	1	1004	1 Year	547.00	941.14	946.24		946.60	0.002078	5.09	129.69	51.41	0.46
Slab Cabin Run	1	1003.5	100 year	3544.00	940.95	952.52		952.98	0.000992	6.60	784.39	116.75	0.37
Slab Cabin Run	1	1003.5	10 Year	1697.00	940.95	949.81		950.16	0.000983	5.34	429.12	84.40	0.35
Slab Cabin Run	1	1003.5	1 Year	547.00	940.95	946.23		946.53	0.001658	4.46	135.72	63.51	0.40
Slab Cabin Run	1	1003	100 year	3544.00	941.47	952.35		952.93	0.001197	7.03	701.61	111.52	0.40
Slab Cabin Run	1	1003	10 Year	1697.00	941.47	949.68		950.11	0.001201	5.67	370.89	76.05	0.38
Slab Cabin Run	1	1003	1 Year	547.00	941.47	946.19		946.47	0.001747	4.30	128.33	43.03	0.41
Slab Cabin Run	1	1002	100 year	3544.00	941.61	952.05		952.83	0.001705	8.23	635.51	119.51	0.48
Slab Cabin Run	1	1002	10 Year	1697.00	941.61	949.27		949.99	0.002128	7.23	293.14	73.91	0.50
Slab Cabin Run	1	1002	1 Year	547.00	941.61	945.79		946.30	0.003757	5.73	97.03	38.03	0.59
Slab Cabin Run	1	1001	100 year	3544.00	940.32	950.86	950.86	952.67	0.004606	12.16	437.81	126.18	0.75
Slab Cabin Run	1	1001	10 Year	1697.00	940.32	947.61	947.61	949.77	0.008966	12.07	153.31	41.32	0.96
Slab Cabin Run	1	1001	1 Year	547.00	940.32	945.39		946.18	0.005621	7.17	78.68	28.31	0.71
Slab Cabin Run	1	1000	100 year	3544.00	940.19	948.47	947.68	949.54	0.005269	10.54	490.84	114.58	0.77
Slab Cabin Run	1	1000	10 Year	1697.00	940.19	947.25	946.55	947.98	0.004989	8.11	279.37	82.22	0.66
Slab Cabin Run	1	1000	1 Year	547.00	940.19	945.40	945.12	945.87	0.004983	6.02	120.44	75.69	0.63
Bathgate Springs	2	1000	100 year	103.00	949.25	957.31		957.31	0.000007	0.45	348.50	55.93	0.03
Bathgate Springs	2	1000	10 Year	47.00	949.25	953.34		953.34	0.000045	0.69	102.35	43.41	0.07
Bathgate Springs	2	1000	1 Year	13.00	949.25	950.40		950.48	0.004485	2.25	5.78	9.08	0.50
Bathgate Springs	2	999	100 year	103.00	949.61	957.31		957.31	0.000006	0.42	357.15	55.80	0.03
Bathgate Springs	2	999	10 Year	47.00	949.61	953.34		953.34	0.000033	0.59	109.15	42.76	0.06
Bathgate Springs	2	999	1 Year	13.00	949.61	950.20		950.29	0.009895	2.51	5.18	12.78	0.69
Bathgate Springs	2	998	100 year	103.00	949.34	957.31		957.31	0.000005	0.41	370.24	55.09	0.03
Bathgate Springs	2	998	10 Year	47.00	949.34	953.34		953.34	0.000024	0.53	122.87	42.93	0.05
Bathgate Springs	2	998	1 Year	13.00	949.34	950.06		950.14	0.005430	2.20	5.90	11.23	0.54
Bathgate Springs	2	997	100 year	103.00	948.82	957.31		957.31	0.000006	0.44	366.43	50.14	0.03
Bathgate Springs	2	997	10 Year	47.00	948.82	953.34		953.34	0.000018	0.50	138.63	40.87	0.04
Bathgate Springs	2	997	1 Year	13.00	948.82	949.57	949.57	949.79	0.020963	3.76	3.46	8.11	1.01

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Bathgate Springs	2	996	100 year	103.00	948.28	957.31		957.31	0.000005	0.42	386.00	48.62	0.03
Bathgate Springs	2	996	10 Year	47.00	948.28	953.34		953.34	0.000012	0.43	162.83	40.72	0.04
Bathgate Springs	2	996	1 Year	13.00	948.28	949.28		949.39	0.006308	2.70	4.81	7.33	0.59
Bathgate Springs	2	995	100 year	103.00	948.12	957.31		957.31	0.000005	0.41	396.10	47.39	0.02
Bathgate Springs	2	995	10 Year	47.00	948.12	953.34		953.34	0.000010	0.40	177.39	40.27	0.03
Bathgate Springs	2	995	1 Year	13.00	948.12	949.29		949.31	0.001443	1.45	14.32	40.27	0.29
Bathgate Springs	2	994	100 year	103.00	947.90	957.31		957.31	0.000007	0.54	294.65	33.84	0.03
Bathgate Springs	2	994	10 Year	47.00	947.90	953.34		953.34	0.000018	0.44	126.26	26.33	0.03
Bathgate Springs	2	994	1 Year	13.00	947.90	949.29		949.30	0.000385	0.89	19.69	26.33	0.15
Bathgate Springs	2	993	100 year	103.00	947.87	957.31		957.31	0.000005	0.43	282.22	31.46	0.03
Bathgate Springs	2	993	10 Year	47.00	947.87	953.34		953.34	0.000012	0.38	122.65	24.24	0.03
Bathgate Springs	2	993	1 Year	13.00	947.87	949.29		949.29	0.000138	0.53	24.57	24.24	0.09
Bathgate Springs	3	1013.6	100 year	139.00	953.16	957.33		957.35	0.000103	1.15	151.49	46.72	0.10
Bathgate Springs	3	1013.6	10 Year	63.00	953.16	954.39		954.52	0.004647	2.92	21.59	23.57	0.54
Bathgate Springs	3	1013.6	1 Year	18.00	953.16	953.88		953.93	0.004473	1.85	9.75	21.22	0.48
Bathgate Springs	3	1013.3	100 year	139.00	953.09	957.33		957.35	0.000104	1.17	141.26	40.82	0.10
Bathgate Springs	3	1013.3	10 Year	63.00	953.09	954.25		954.39	0.005183	2.96	21.28	24.89	0.56
Bathgate Springs	3	1013.3	1 Year	18.00	953.09	953.75		953.80	0.004990	1.95	9.25	20.17	0.51
Bathgate Springs	3	1013	100 year	139.00	952.79	957.32		957.34	0.000118	1.30	134.84	37.12	0.11
Bathgate Springs	3	1013	10 Year	63.00	952.79	953.89	953.82	954.18	0.012793	4.27	14.76	19.54	0.87
Bathgate Springs	3	1013	1 Year	18.00	952.79	953.40	953.40	953.56	0.021520	3.27	5.50	16.44	1.00
Bathgate Springs	3	1012	100 year	139.00	952.42	957.33		957.34	0.000029	0.68	288.43	84.97	0.06
Bathgate Springs	3	1012	10 Year	63.00	952.42	953.94		954.01	0.002068	2.18	29.92	32.76	0.37
Bathgate Springs	3	1012	1 Year	18.00	952.42	953.31		953.34	0.002303	1.47	12.24	22.72	0.35
Bathgate Springs	3	1011	100 year	139.00	952.26	957.33		957.34	0.000024	0.63	321.91	89.81	0.05
Bathgate Springs	3	1011	10 Year	63.00	952.26	953.88		953.96	0.002142	2.31	30.71	38.90	0.38
Bathgate Springs	3	1011	1 Year	18.00	952.26	953.24		953.28	0.003208	1.63	11.09	23.69	0.41
Bathgate Springs	3	1009	100 year	139.00	952.23	957.32		957.33	0.000092	1.28	154.63	35.19	0.10
Bathgate Springs	3	1009	10 Year	63.00	952.23	953.43	953.43	953.78	0.012251	4.94	14.99	22.10	0.87
Bathgate Springs	3	1009	1 Year	18.00	952.23	952.96		953.09	0.008739	2.83	6.63	14.24	0.68
Bathgate Springs	3	1008	100 year	139.00	951.83	957.32		957.33	0.000081	1.27	171.31	35.03	0.10
Bathgate Springs	3	1008	10 Year	63.00	951.83	953.36		953.47	0.003459	3.40	27.29	25.77	0.51

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Bathgate Springs	3	1008	1 Year	18.00	951.83	952.49	952.49	952.67	0.016575	3.90	6.35	18.33	0.94
Bathgate Springs	3	1007	100 year	139.00	951.11	957.31		957.33	0.000077	1.28	173.30	33.20	0.09
Bathgate Springs	3	1007	10 Year	63.00	951.11	953.34		953.41	0.001673	2.77	33.64	24.79	0.36
Bathgate Springs	3	1007	1 Year	18.00	951.11	952.04	952.04	952.26	0.020326	4.29	5.43	13.62	1.02
Bathgate Springs	3	1006	100 year	139.00	951.23	957.32		957.32	0.000029	0.82	263.70	47.26	0.06
Bathgate Springs	3	1006	10 Year	63.00	951.23	953.36		953.38	0.000426	1.48	61.99	36.71	0.19
Bathgate Springs	3	1006	1 Year	18.00	951.23	951.84		951.90	0.008748	2.41	9.37	22.95	0.66
Bathgate Springs	3	1005	100 year	139.00	950.03	957.31		957.32	0.000062	1.24	185.87	31.02	0.08
Bathgate Springs	3	1005	10 Year	63.00	950.03	953.33		953.36	0.000502	2.00	51.39	24.67	0.20
Bathgate Springs	3	1005	1 Year	18.00	950.03	951.33	951.33	951.61	0.011821	4.57	5.16	11.45	0.82
Bathgate Springs	3	1004	100 year	139.00	949.44	957.31		957.32	0.000035	0.92	226.41	35.18	0.06
Bathgate Springs	3	1004	10 Year	63.00	949.44	953.34		953.35	0.000188	1.26	71.26	28.15	0.12
Bathgate Springs	3	1004	1 Year	18.00	949.44	950.53	950.53	950.85	0.021769	4.54	3.97	6.38	1.01
Bathgate Springs	3	1003	100 year	139.00	948.38	957.31		957.32	0.000038	1.10	206.40	27.93	0.07
Bathgate Springs	3	1003	10 Year	63.00	948.38	953.33		953.35	0.000103	1.19	80.66	22.97	0.10
Bathgate Springs	3	1003	1 Year	18.00	948.38	949.37	949.37	949.75	0.019026	4.94	3.68	5.04	1.00
Bathgate Springs	3	1002	100 year	139.00	947.24	957.31		957.32	0.000010	0.63	352.54	43.39	0.04
Bathgate Springs	3	1002	10 Year	63.00	947.24	953.34		953.34	0.000022	0.63	152.66	36.24	0.05
Bathgate Springs	3	1002	1 Year	18.00	947.24	949.29		949.31	0.000543	1.35	13.96	12.12	0.19
Bathgate Springs	3	1001	100 year	139.00	947.70	957.30		957.31	0.000021	0.91	193.91	22.05	0.05
Bathgate Springs	3	1001	10 Year	63.00	947.70	953.33		953.34	0.000073	0.85	74.42	14.46	0.07
Bathgate Springs	3	1001	1 Year	18.00	947.70	949.28		949.30	0.000586	1.13	15.89	14.46	0.19
Bathgate Springs	3	1000	100 year	139.00	947.68	957.31		957.31	0.000014	0.73	228.46	25.91	0.04
Bathgate Springs	3	1000	10 Year	63.00	947.68	953.33		953.34	0.000041	0.67	94.20	18.72	0.05
Bathgate Springs	3	1000	1 Year	18.00	947.68	949.28		949.29	0.000505	0.98	18.32	18.72	0.18
Bathgate Springs	4	1000	100 year	70.00	956.62	957.89	957.89	958.17	0.012145	4.64	19.50	34.37	0.87
Bathgate Springs	4	1000	10 Year	31.00	956.62	957.53	957.53	957.80	0.018403	4.20	7.43	14.50	1.00
Bathgate Springs	4	1000	1 Year	9.00	956.62	957.19	957.14	957.31	0.015144	2.71	3.32	10.08	0.83
Bathgate Springs	4	999	100 year	70.00	956.42	957.37		957.52	0.008996	3.52	24.41	36.73	0.73
Bathgate Springs	4	999	10 Year	31.00	956.42	957.02	957.02	957.19	0.019694	3.63	10.42	30.18	0.99
Bathgate Springs	4	999	1 Year	9.00	956.42	956.82	956.82	956.90	0.017517	2.35	4.56	29.46	0.85

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Bathgate Springs	4	998	100 year	70.00	956.06	957.36		957.41	0.001705	2.08	41.12	40.09	0.34
Bathgate Springs	4	998	10 Year	31.00	956.06	956.74		956.81	0.006366	2.35	15.07	29.96	0.58
Bathgate Springs	4	998	1 Year	9.00	956.06	956.45		956.48	0.008153	1.65	6.39	28.34	0.58
Bathgate Springs	4	997	100 year	70.00	955.57	957.32		957.37	0.001520	1.92	44.10	43.32	0.32
Bathgate Springs	4	997	10 Year	31.00	955.57	956.48		956.59	0.009733	3.24	12.49	23.13	0.73
Bathgate Springs	4	997	1 Year	9.00	955.57	956.16	956.12	956.22	0.010516	2.46	5.24	21.77	0.71
Bathgate Springs	4	996	100 year	70.00	954.69	957.31		957.32	0.000332	1.29	73.71	41.26	0.16
Bathgate Springs	4	996	10 Year	31.00	954.69	955.67	955.67	955.88	0.015833	4.24	9.89	22.40	0.94
Bathgate Springs	4	996	1 Year	9.00	954.69	955.37	955.37	955.50	0.015234	3.01	3.60	16.43	0.85
Bathgate Springs	4	995	100 year	70.00	954.51	957.31		957.32	0.000161	1.03	93.03	45.44	0.12
Bathgate Springs	4	995	10 Year	31.00	954.51	955.36	955.36	955.57	0.014048	3.80	9.66	24.09	0.88
Bathgate Springs	4	995	1 Year	9.00	954.51	955.01	955.01	955.15	0.023304	2.94	3.06	11.30	1.00
Bathgate Springs	4	994	100 year	70.00	954.27	957.31		957.32	0.000082	0.78	124.53	52.98	0.09
Bathgate Springs	4	994	10 Year	31.00	954.27	954.91	954.91	955.09	0.019202	4.06	10.66	27.67	1.01
Bathgate Springs	4	994	1 Year	9.00	954.27	954.71	954.71	954.79	0.014330	2.61	4.99	27.20	0.81
Bathgate Springs	4	993	100 year	70.00	952.65	957.31		957.32	0.000010	0.37	252.55	65.80	0.03
Bathgate Springs	4	993	10 Year	31.00	952.65	953.29		953.38	0.014081	2.69	13.40	36.09	0.81
Bathgate Springs	4	993	1 Year	9.00	952.65	953.05	953.05	953.11	0.026571	2.32	4.97	31.95	0.99
Bathgate Springs	4	992	100 year	70.00	950.89	957.31		957.31	0.000004	0.29	346.48	61.83	0.02
Bathgate Springs	4	992	10 Year	31.00	950.89	953.34		953.34	0.000042	0.48	83.94	48.38	0.06
Bathgate Springs	4	992	1 Year	9.00	950.89	951.39		951.44	0.009395	2.00	5.97	29.98	0.65
Bathgate Springs	4	991	100 year	70.00	949.89	957.31		957.31	0.000002	0.25	421.62	65.32	0.02
Bathgate Springs	4	991	10 Year	31.00	949.89	953.34		953.34	0.000012	0.33	135.45	54.04	0.03
Bathgate Springs	4	991	1 Year	9.00	949.89	950.45	950.45	950.61	0.023129	3.18	2.83	9.39	1.02
Bathgate Springs	4	990	100 year	70.00	949.63	957.31		957.31	0.000001	0.21	470.23	69.49	0.01
Bathgate Springs	4	990	10 Year	31.00	949.63	953.34		953.34	0.000006	0.25	161.22	56.56	0.02
Bathgate Springs	4	990	1 Year	9.00	949.63	950.07		950.13	0.007034	1.87	4.81	14.25	0.57
Bathgate Springs	4	989	100 year	70.00	949.18	957.31		957.31	0.000001	0.19	508.87	72.79	0.01
Bathgate Springs	4	989	10 Year	31.00	949.18	953.34		953.34	0.000005	0.22	183.41	60.10	0.02
Bathgate Springs	4	989	1 Year	9.00	949.18	949.71	949.71	949.88	0.022014	3.39	2.66	7.60	1.01
Bathgate Springs	4	988	100 year	70.00	948.62	957.31		957.31	0.000001	0.18	573.62	70.43	0.01
Bathgate Springs	4	988	10 Year	31.00	948.62	953.34		953.34	0.000002	0.16	254.64	60.26	0.01

HEC-RAS Plan: Default Scenario (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Bathgate Springs	4	988	1 Year	9.00	948.62	949.30		949.31	0.000201	0.44	24.66	40.59	0.10
Bathgate Springs	4	987	100 year	70.00	947.93	957.31		957.31	0.000009	0.60	192.20	22.30	0.04
Bathgate Springs	4	987	10 Year	31.00	947.93	953.34		953.34	0.000012	0.46	101.88	21.90	0.04
Bathgate Springs	4	987	1 Year	9.00	947.93	949.28		949.29	0.000389	0.96	13.08	21.90	0.16
Bathgate Springs	1	1007	100 year	312.00	947.58	957.30		957.31	0.000021	0.93	463.17	52.14	0.05
Bathgate Springs	1	1007	10 Year	141.00	947.58	953.33		953.34	0.000027	0.73	256.12	52.14	0.06
Bathgate Springs	1	1007	1 Year	40.00	947.58	949.28		949.29	0.000373	1.10	44.66	52.14	0.16
Bathgate Springs	1	1006	100 year	312.00	947.41	957.30		957.31	0.000017	0.84	531.24	59.64	0.05
Bathgate Springs	1	1006	10 Year	141.00	947.41	953.33		953.34	0.000021	0.66	294.37	59.64	0.05
Bathgate Springs	1	1006	1 Year	40.00	947.41	949.27		949.29	0.000286	1.00	52.28	59.64	0.15
Bathgate Springs	1	1005	100 year	312.00	947.10	957.30		957.31	0.000022	0.98	485.11	53.35	0.05
Bathgate Springs	1	1005	10 Year	141.00	947.10	953.33		953.34	0.000026	0.75	273.25	53.35	0.05
Bathgate Springs	1	1005	1 Year	40.00	947.10	949.26		949.28	0.000254	1.06	56.30	53.35	0.14
Bathgate Springs	1	1004	100 year	312.00	946.78	957.30		957.31	0.000018	0.91	520.17	54.40	0.05
Bathgate Springs	1	1004	10 Year	141.00	946.78	953.33		953.34	0.000019	0.68	304.15	54.40	0.05
Bathgate Springs	1	1004	1 Year	40.00	946.78	949.26		949.27	0.000083	0.71	82.91	54.40	0.08
Bathgate Springs	1	1003	100 year	312.00	946.33	957.30		957.31	0.000016	0.89	539.48	54.59	0.05
Bathgate Springs	1	1003	10 Year	141.00	946.33	953.33		953.34	0.000016	0.64	322.70	54.59	0.04
Bathgate Springs	1	1003	1 Year	40.00	946.33	949.26		949.27	0.000048	0.58	100.70	54.59	0.07
Bathgate Springs	1	1002	100 year	312.00	946.08	957.30		957.31	0.000008	0.63	693.18	66.37	0.03
Bathgate Springs	1	1002	10 Year	141.00	946.08	953.33		953.33	0.000007	0.44	429.56	66.37	0.03
Bathgate Springs	1	1002	1 Year	40.00	946.08	949.26		949.27	0.000014	0.33	159.62	66.37	0.03
Bathgate Springs	1	1001.4	100 year	312.00	945.97	957.30		957.31	0.000018	0.95	474.68	46.94	0.05
Bathgate Springs	1	1001.4	10 Year	141.00	945.97	953.33		953.33	0.000017	0.68	288.37	46.94	0.05
Bathgate Springs	1	1001.4	1 Year	40.00	945.97	949.26		949.27	0.000036	0.55	97.47	46.94	0.06
Bathgate Springs	1	1001.3	100 year	312.00	945.89	957.30		957.31	0.000022	1.05	434.92	43.04	0.06
Bathgate Springs	1	1001.3	10 Year	141.00	945.89	953.33		953.33	0.000020	0.75	264.14	43.04	0.05
Bathgate Springs	1	1001.3	1 Year	40.00	945.89	949.26		949.26	0.000042	0.61	89.10	43.04	0.06
Bathgate Springs	1	1001.2	100 year	312.00	945.85	957.30	948.43	957.30	0.000011	0.75	616.64	61.67	0.04
Bathgate Springs	1	1001.2	10 Year	141.00	945.85	953.33	947.72	953.33	0.000012	0.56	357.95	59.30	0.04
Bathgate Springs	1	1001.2	1 Year	40.00	945.85	949.26	946.90	949.26	0.000042	0.59	82.49	59.30	0.06

HEC-RAS Plan: Default Scenario (Continued)

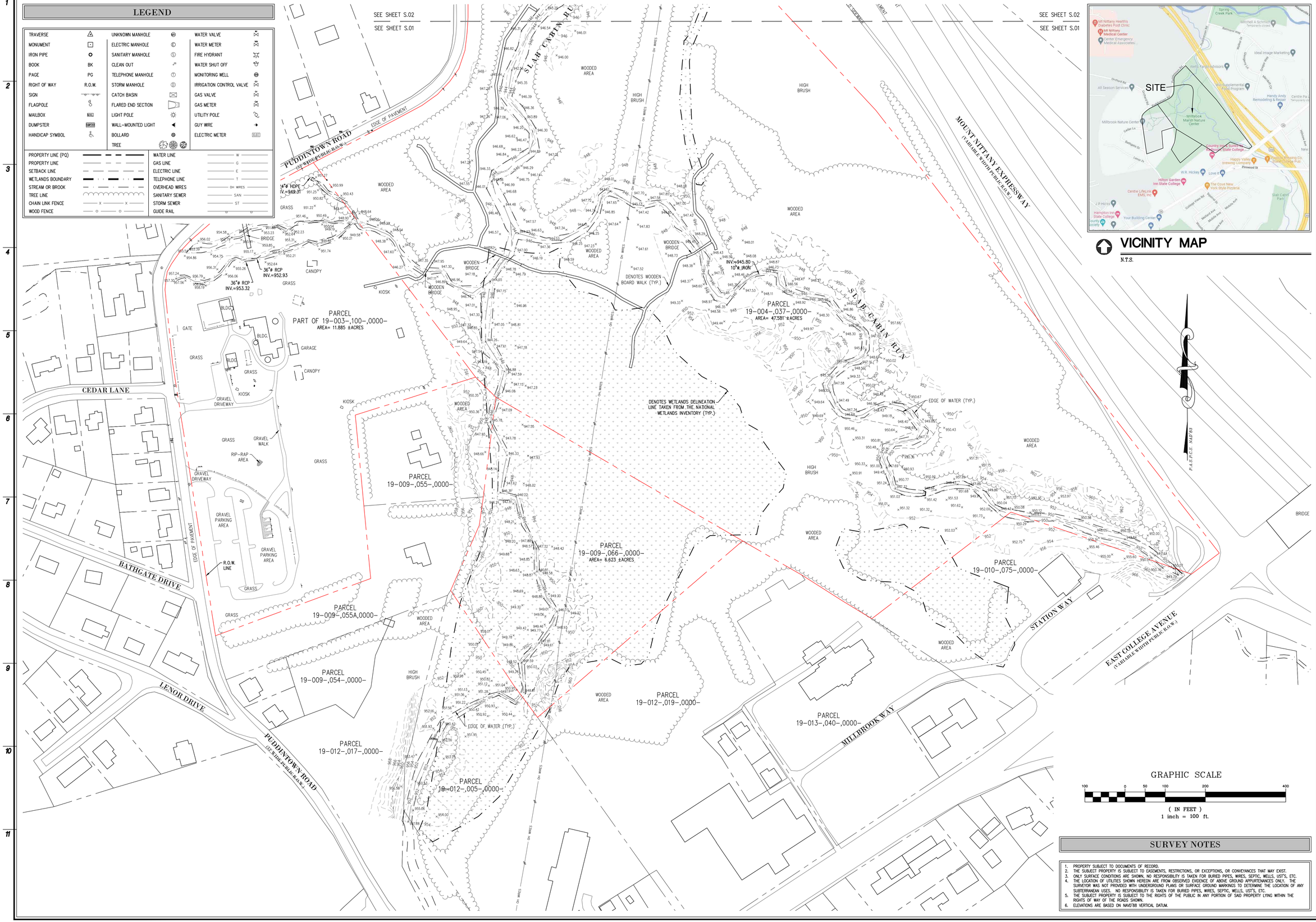
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Bathgate Springs	1	1001.1		Bridge									
Bathgate Springs	1	1001	100 year	312.00	946.01	957.30	948.33	957.30	0.000011	0.73	607.42	60.23	0.04
Bathgate Springs	1	1001	10 Year	141.00	946.01	953.33	947.65	953.33	0.000010	0.52	368.28	60.23	0.04
Bathgate Springs	1	1001	1 Year	40.00	946.01	949.26	946.89	949.26	0.000037	0.55	84.70	60.23	0.06
Bathgate Springs	1	1000	100 year	312.00	945.83	957.30		957.30	0.000011	0.74	605.30	59.99	0.04
Bathgate Springs	1	1000	10 Year	141.00	945.83	953.33		953.33	0.000010	0.54	367.11	59.99	0.04
Bathgate Springs	1	1000	1 Year	40.00	945.83	949.26		949.26	0.000024	0.45	122.86	59.99	0.05
Bathgate Springs	1	999	100 year	312.00	945.55	957.30		957.30	0.000010	0.72	620.36	60.71	0.04
Bathgate Springs	1	999	10 Year	141.00	945.55	953.33		953.33	0.000010	0.52	379.31	60.71	0.03
Bathgate Springs	1	999	1 Year	40.00	945.55	949.26		949.26	0.000021	0.41	132.12	60.71	0.04
Bathgate Springs	1	998	100 year	312.00	945.51	957.30		957.30	0.000014	0.85	560.83	54.46	0.05
Bathgate Springs	1	998	10 Year	141.00	945.51	953.33		953.33	0.000013	0.60	344.63	54.46	0.04
Bathgate Springs	1	998	1 Year	40.00	945.51	949.25		949.26	0.000024	0.48	122.88	54.46	0.05
Bathgate Springs	1	997	100 year	312.00	945.36	957.30		957.30	0.000012	0.81	582.93	55.26	0.04
Bathgate Springs	1	997	10 Year	141.00	945.36	953.33		953.33	0.000011	0.56	363.55	55.26	0.04
Bathgate Springs	1	997	1 Year	40.00	945.36	949.25		949.26	0.000017	0.41	138.53	55.26	0.04
Bathgate Springs	1	996	100 year	312.00	945.24	957.30		957.30	0.000009	0.71	584.41	53.59	0.04
Bathgate Springs	1	996	10 Year	141.00	945.24	953.33		953.33	0.000008	0.49	371.67	53.59	0.03
Bathgate Springs	1	996	1 Year	40.00	945.24	949.25		949.26	0.000010	0.32	153.46	53.59	0.03
Bathgate Springs	1	995	100 year	312.00	945.12	957.30		957.30	0.000003	0.39	1006.62	92.76	0.02
Bathgate Springs	1	995	10 Year	141.00	945.12	953.33		953.33	0.000002	0.27	638.24	92.76	0.02
Bathgate Springs	1	995	1 Year	40.00	945.12	949.26		949.26	0.000003	0.19	260.46	92.76	0.02

DRAWINGS

LEGEND

TRAVERSE		UNKNOWN MANHOLE		WATER VALVE	
MONUMENT		ELECTRIC MANHOLE		WATER METER	
IRON PIPE		SANITARY MANHOLE		FIRE HYDRANT	
BOOK	BK	CLEAN OUT		WATER SHUT OFF	
PAGE	PG	TELEPHONE MANHOLE		MONITORING WELL	
RIGHT OF WAY	R.O.W.	STORM MANHOLE		IRRIGATION CONTROL VALVE	
SIGN		CATCH BASIN		GAS VALVE	
FLAGPOLE		FLARED END SECTION		GAS METER	
MAILBOX	MAIL	LIGHT POLE		UTILITY POLE	
DUMPSTER		WALL-MOUNTED LIGHT		GUY WIRE	
HANDICAP SYMBOL		BOLLARD		ELECTRIC METER	
		TREE			

PROPERTY LINE (PQ)		WATER LINE	W
PROPERTY LINE		GAS LINE	G
SETBACK LINE		ELECTRIC LINE	E
WETLANDS BOUNDARY		TELEPHONE LINE	T
STREAM OR BROOK		OVERHEAD WIRES	OH WIRES
TREE LINE		SANITARY SEWER	SAN
CHAIN LINK FENCE	X X	STORM SEWER	ST
WOOD FENCE	O O	GUIDE RAIL	



VICINITY MAP

N.T.S.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

SURVEY NOTES

1. PROPERTY SUBJECT TO DOCUMENTS OF RECORD.
2. THE SUBJECT PROPERTY IS SUBJECT TO EASEMENTS, RESTRICTIONS, OR EXCEPTIONS, OR CONVEYANCES THAT MAY EXIST.
3. ONLY SURFACE CONDITIONS ARE SHOWN, NO RESPONSIBILITY IS TAKEN FOR BURIED PIPES, WIRES, Sseptic, WELLS, UST'S, ETC.
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6. ELEVATIONS ARE BASED ON NAVD'88 VERTICAL DATUM.

NJ Certificate of Authorization

Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	07/22/22
Checked	MMW
Drawn	ER

MATTHEW M. WEBB, PLS
The PROFESSIONAL LAND SURVEYOR License No. 24GS04330200

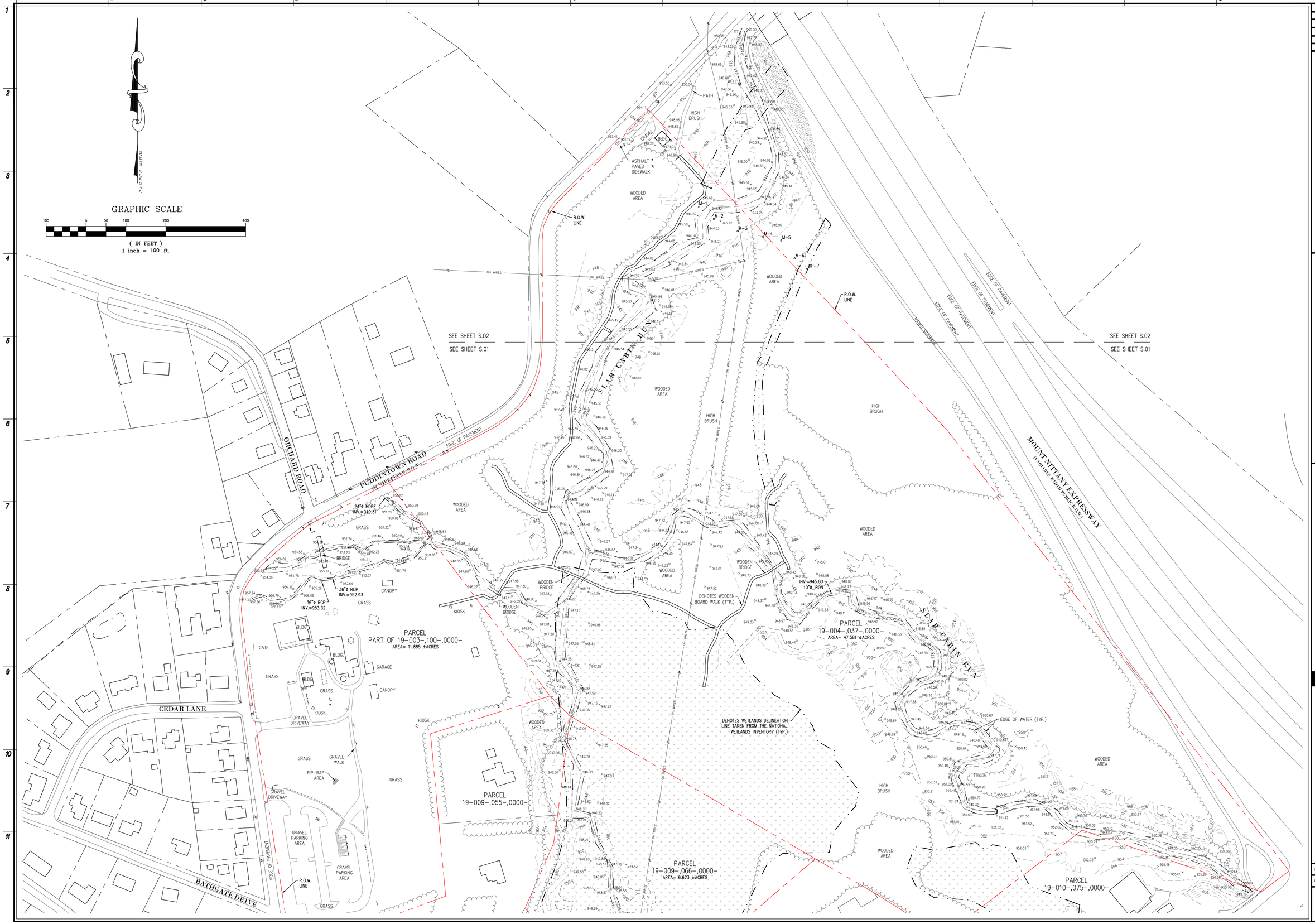
Revisions:

LAN ASSOCIATES
engineering • planning • architecture • surveying
445 GODWIN AVENUE, MIDLAND PARK, N.J. 07432 (201)447-6400

PARTIAL TOPOGRAPHIC SURVEY
PARCELS 19-004-,037-,0000-; 19-009-,066-,000- & P/O 19-003-,100-,0000-
ALSO KNOWN AS MILLBROOK MARSH NATURE CENTER
BOARDWALK TRAILS & WILDLIFE VIEWING
COLLEGE TOWNSHIP, COUNTY OF CENTRE, PA

Job No. 2.20354.02
File No. 20354025I

S.01



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BOARDWALK TRAILS & WILDLIFE VIEWING
COLLEGE TOWNSHIP, COUNTY OF CENTRE, PA

Job No. 2.20354.02

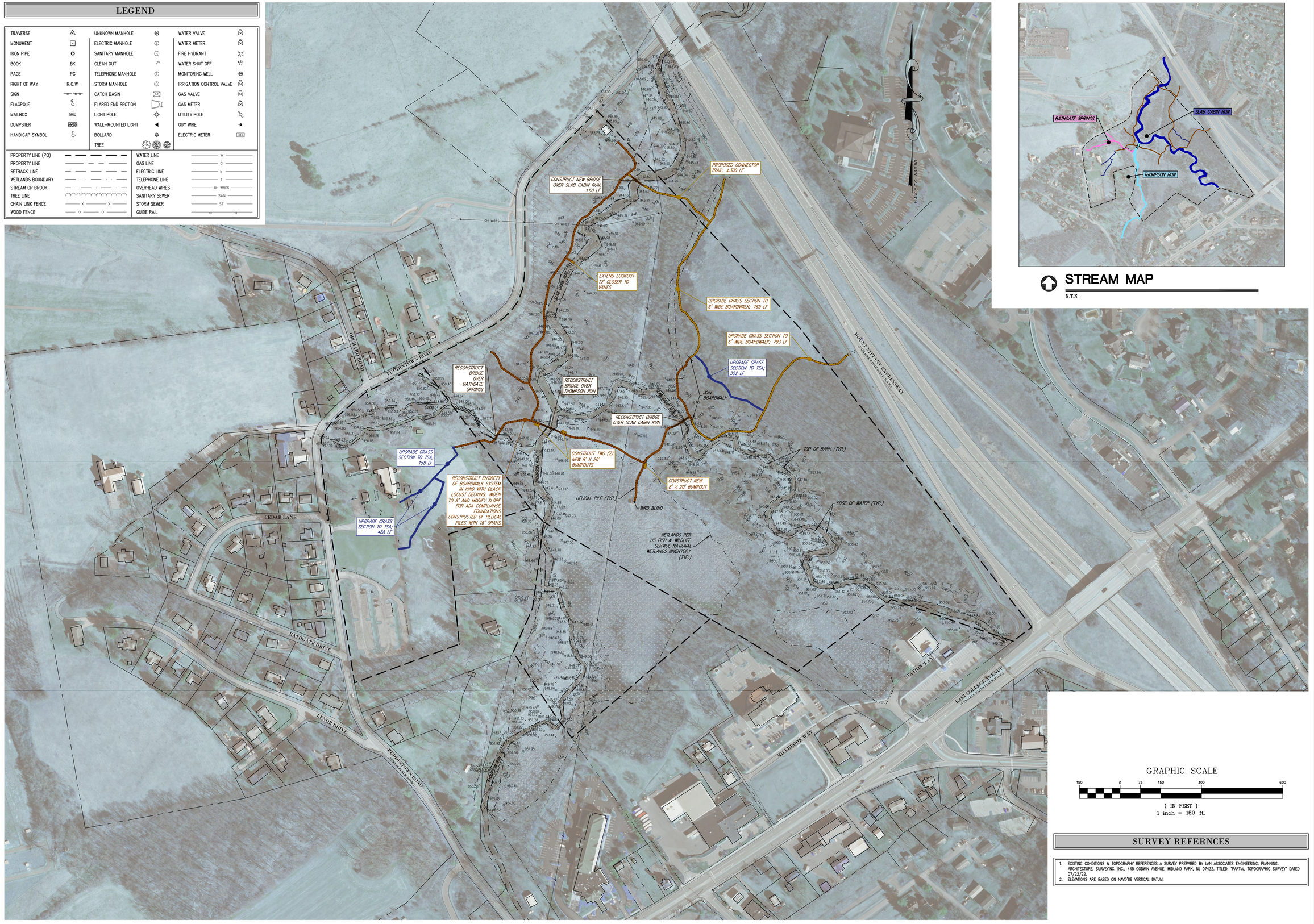
File No. 20354025 1

S.02

LEGEND

TRAVERSE		UNKNOWN MANHOLE		WATER VALVE	
MONUMENT		ELECTRIC MANHOLE		WATER METER	
IRON PIPE		SANITARY MANHOLE		FIRE HYDRANT	
BOOK	BK	CLEAN OUT		WATER SHUT OFF	
PAGE	PG	TELEPHONE MANHOLE		MONITORING WELL	
RIGHT OF WAY	R.O.W.	STORM MANHOLE		IRRIGATION CONTROL VALVE	
SIGN		CATCH BASIN		GAS VALVE	
FLAGPOLE		FLARED END SECTION		GAS METER	
MAILBOX	MBX	LIGHT POLE		UTILITY POLE	
DUMPSTER		WALL-MOUNTED LIGHT		GUY WIRE	
HANDICAP SYMBOL		BOLLARD		ELECTRIC METER	
		TREE			

PROPERTY LINE (PQ)		WATER LINE	W
PROPERTY LINE		GAS LINE	G
SETBACK LINE		ELECTRIC LINE	E
WETLANDS BOUNDARY		TELEPHONE LINE	T
STREAM OR BROOK		OVERHEAD WIRES	OH WIRES
TREE LINE		SANITARY SEWER	SAN
CHAIN LINK FENCE	X X	STORM SEWER	ST
WOOD FENCE	O O	GUIDE RAIL	



STREAM MAP

N.T.S.

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

SURVEY REFERNCES

1. EXISTING CONDITIONS & TOPOGRAPHY REFERENCES A SURVEY PREPARED BY LAN ASSOCIATES ENGINEERING, PLANNING, ARCHITECTURE, SURVEYING, INC., 445 GODWIN AVENUE, MIDLAND PARK, NJ 07432. TITLED: "PARTIAL TOPOGRAPHIC SURVEY" DATED 07/22/22.
2. ELEVATIONS ARE BASED ON NAVD'88 VERTICAL DATUM.

NJ Certificate of Authorization	
Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	11/01/22
Checked	JM
Drawn	HLT

ERIK E. BOE, P.E.
License No. 0390538
Title PROFESSIONAL ENGINEER

Revisions:

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445 GODWIN AVENUE, MIDLAND PARK, N.J. 07432 (201)447-6400

CONCEPT PLAN
MARSH BOARDWALK FEASIBILITY REVIEW AT MILLBROOK MARSH NATURE CENTER
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 2.20354.02

File No. 2035402C1

C.200

LEGEND

TRAVERSE		UNKNOWN MANHOLE		WATER VALVE	
MONUMENT		ELECTRIC MANHOLE		WATER METER	
IRON PIPE		SANITARY MANHOLE		FIRE HYDRANT	
BOOK	BK	CLEAN OUT		WATER SHUT OFF	
PAGE	PG	TELEPHONE MANHOLE		MONITORING WELL	
RIGHT OF WAY	R.O.W.	STORM MANHOLE		IRRIGATION CONTROL VALVE	
SIGN		CATCH BASIN		GAS VALVE	
FLAGPOLE		FLARED END SECTION		GAS METER	
MAILBOX	MAIL	LIGHT POLE		UTILITY POLE	
DUMPSTER		WALL-MOUNTED LIGHT		GUY WIRE	
HANDICAP SYMBOL		BOLLARD		ELECTRIC METER	
		TREE			

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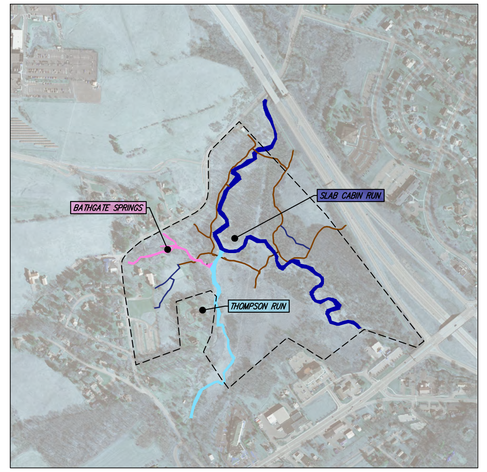
PROPERTY LINE		GAS LINE	G
SETBACK LINE		ELECTRIC LINE	E
WETLANDS BOUNDARY		TELEPHONE LINE	T
STREAM OR BROOK		OVERHEAD WIRES	OH WIRES
TREE LINE		SANITARY SEWER	SAN
CHAIN LINK FENCE	X X	STORM SEWER	ST
WOOD FENCE	O O	GUIDE RAIL	

SC-2 LEFT BANK: 110 LF
SC-2 RIGHT BANK: 108 LF
SC-4 RIGHT BANK: 128 LF
SC-4 RIGHT BANK: 114 LF
JUNCTION LEFT BANK: 239 LF
JUNCTION RIGHT BANK: 76 LF
SLAB CABIN BRIDGE: RIPRAP: 260 SQFT
BG-1 LEFT BANK: 118 LF
BATHGATE SPRINGS BRIDGE: RIPRAP: 330 SQFT
SC-5 RIGHT BANK: 55 LF
SC-5 RIGHT BANK: 204 LF
SC-4 LEFT BANK: 60 LF
BG-1 RIGHT BANK: 55 LF
SC-4 LEFT BANK: 218 LF
TOP OF BANK (TYP.)
BG-1 RIGHT BANK: 36 LF
THOMPSON RUN BRIDGE: RIPRAP: 445 SQFT
SC-5 LEFT BANK: 214 LF
SC-6 RIGHT BANK: 149 LF
JUNCTION LEFT BANK: 80 LF
JUNCTION RIGHT BANK: 225 LF
EDGE OF WATER (TYP.)
SC-6 LEFT BANK: 306 LF
SC-6 RIGHT BANK: 230 LF
SC-6 LEFT BANK: 281 LF
SC-6 RIGHT BANK: 97 LF

PUDDINTOWN ROAD
OHIO DEPT OF OHIO
CEDAR LANE
BATHGATE DRIVE
LENOR DRIVE
PUDDINTOWN ROAD
STATE COLLEGE PA
MOE'S NITTANY EXPRESSWAY
TURNPIKE NORTHBOUND
STATION WAY
EAST COLLEGE AVENUE
U.S. ROUTE 322 BUSINESS
MILLBROOK WAY
OH WIRES
P.A.S.P.C.S. N.D.F.B.S.



STREAM MAP

N.T.S.

STREAMBANK STABILIZATION LINEAR FEET SUMMARY

LOCATION	LEFT BANK (LF)	RIGHT BANK (LF)	TOTAL (LF)
SC-2	110	108	218
SC-4	278	233	511
SC-5	214	259	473
SC-6	587	476	1063
JUNCTION	319	301	620
BG-1	118	91	209

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

SURVEY REFERNCES

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NJ Certificate of Authorization	
Eng'r. Nos.	24GA27937500
Arch. Nos.	21AC00012400
Date	11/01/22
Checked	JM
Drawn	HLT

ERIK E. BOE, P.E.
Title PROFESSIONAL ENGINEER
License No. 0905538

Revisions:

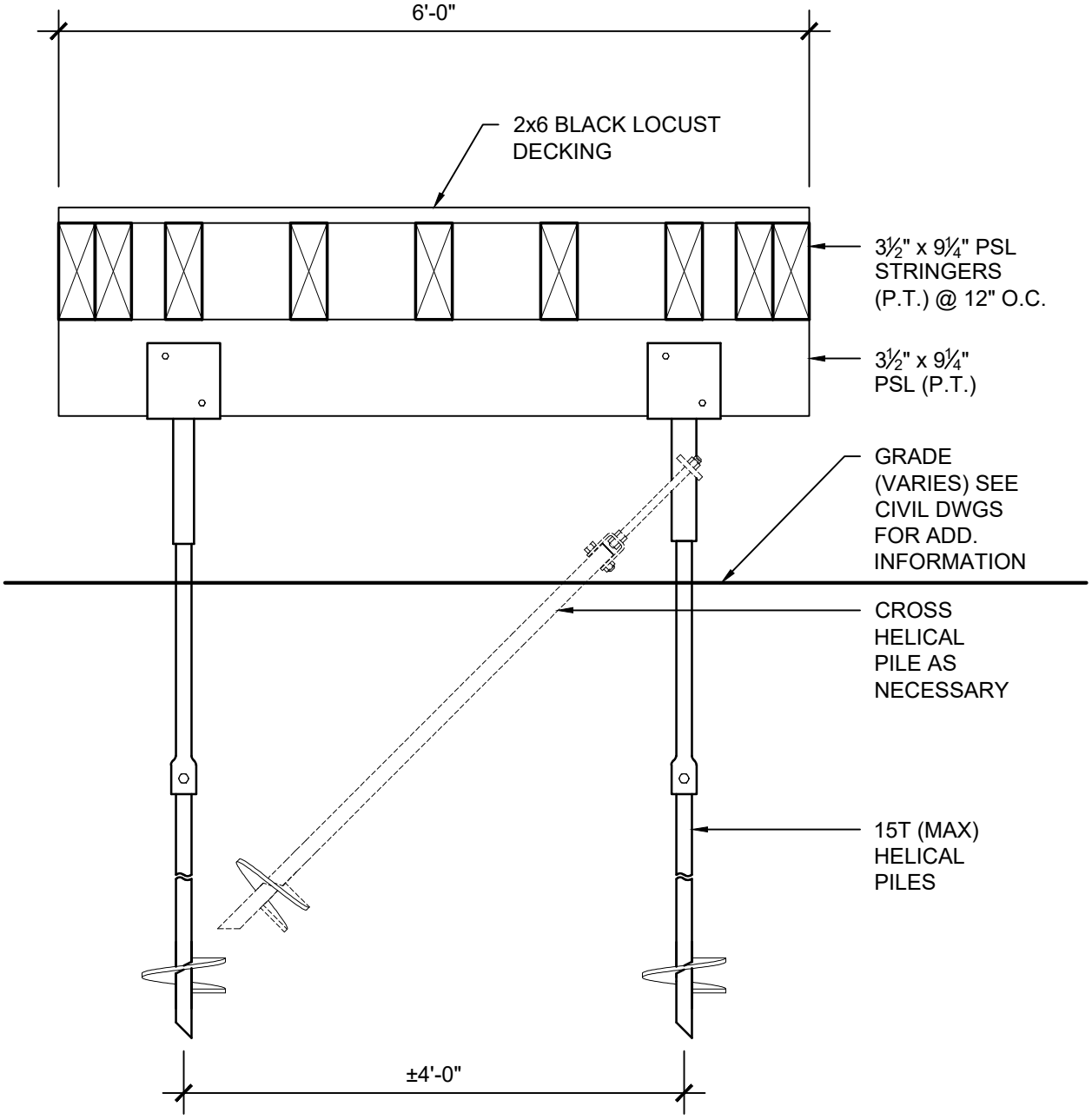
LAN ASSOCIATES
engineering • planning • architecture • surveying
445 GODWIN AVENUE, MIDLAND PARK, N.J. 07432 (201)447-6400

STREAMBANK STABILIZATION CONCEPT PLAN
MARSH BOARDWALK FEASIBILITY REVIEW AT
MILLBROOK MARSH NATURE CENTER
548 PUDDINTOWN ROAD
STATE COLLEGE, PA 16801

Job No. 2.20354.02
File No. 2035402C1

C.201

Certificate of Authorization	
24GA27937500	Eng'r. Nos.
21AC00012400	Arch. Nos.

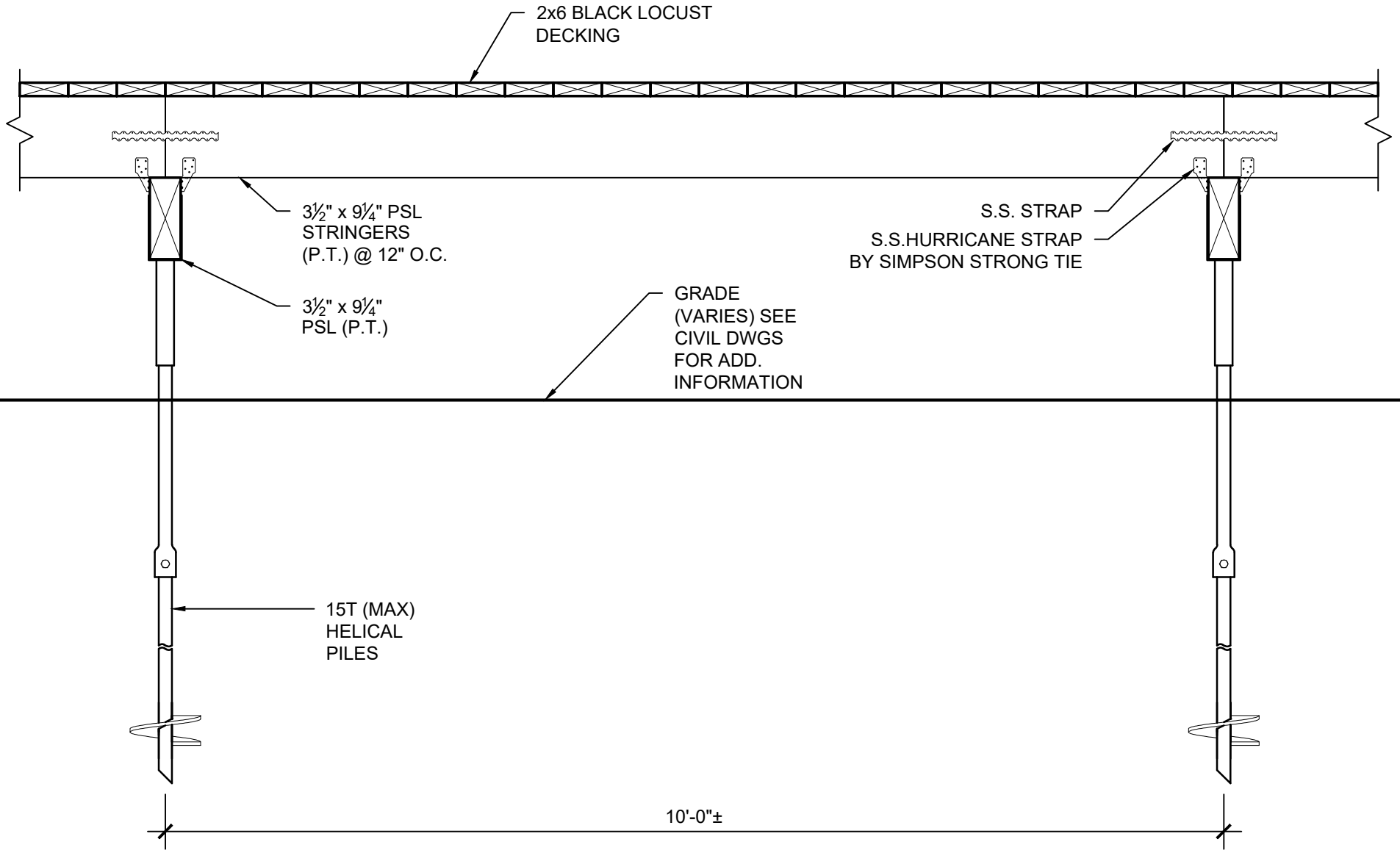


P:\200-AE\20300-20399\20354\20354.02\Cad\Dwgs\2035402-Boardwalk Detail.dwg, SK1, 11/8/2022 2:49:10 PM, Potiyevsky, Vlad

PROJECT MILLBROOK MARSH BOARDWALK	VLAD POTIYEVSKY, AIA Title: REGISTERED ARCHITECT License No. RA403225
DRAWING TITLE BOARDWALK SECTION – TOP DOWN	

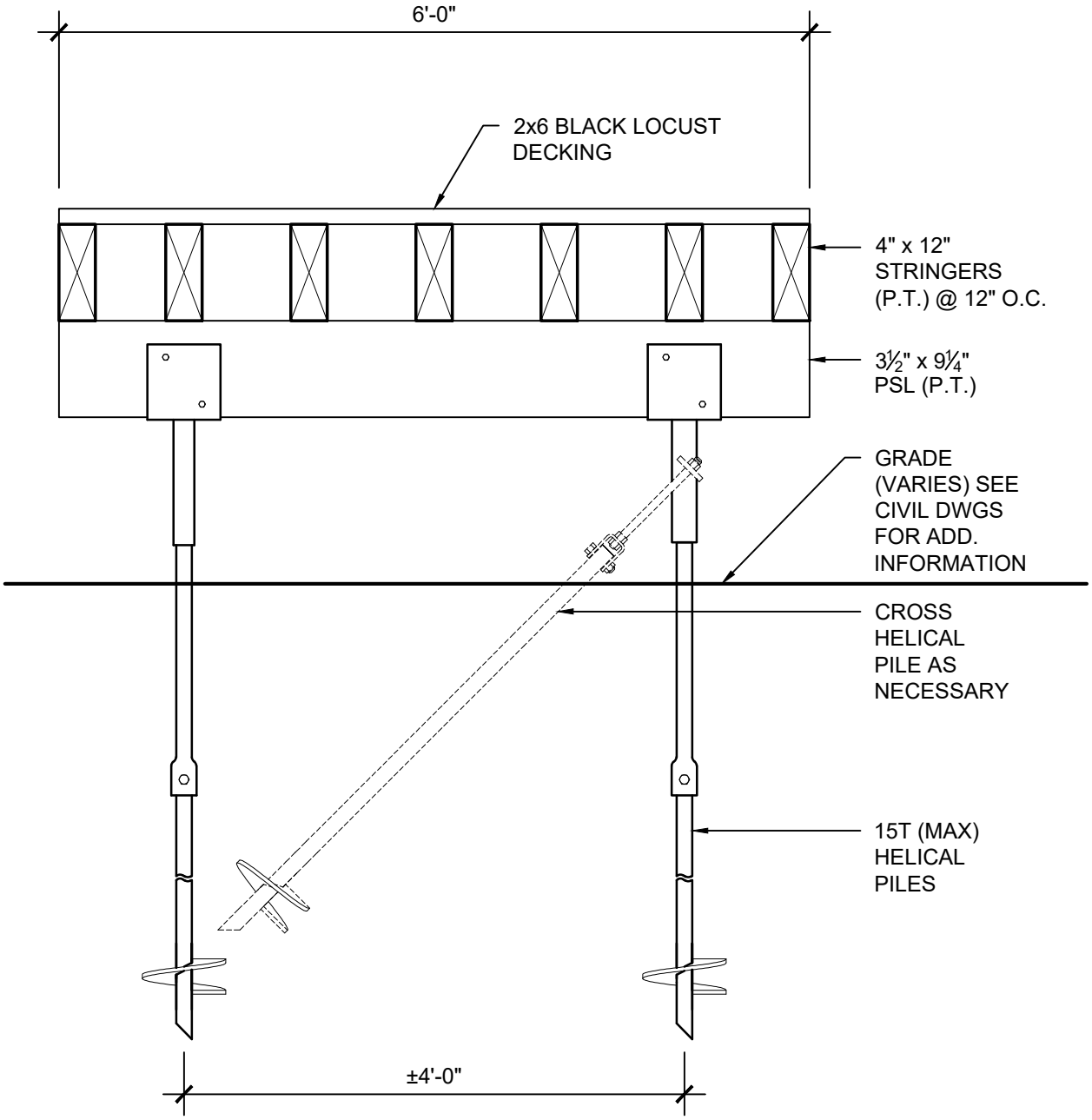
LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying Inc.
445 Godwin Ave Ste 9, Midland Park, NJ 07432 | t. 201-447-6400 | f. 201-447-1233

DWG. DATE	SCALE	DRAWING NO.
9/27/2022	3/4" = 1'-0"	SK-1
PROJECT NO. 2.20354.02	DWN. BY TT	



Certificate of Authorization	Eng'r. Nos.	Arch. Nos.	PROJECT: MILLBROOK MARSH BOARDWALK	VLAD POTIYEVSKY, AIA Title: REGISTERED ARCHITECT License No. RA403225
			DRAWING TITLE: BOARDWALK SECTION – TOP DOWN	
	24GA27937500	21AC00012400	LAN ASSOCIATES — Engineering, Planning, Architecture, Surveying Inc. 445 Godwin Ave Ste 9, Midland Park, NJ 07432 | t. 201-447-6400 | f. 201-447-1233	DWG. DATE: 9/27/2022 · SCALE: 3/4" = 1'-0" · DRAWING NO.: SK-2 PROJECT NO.: 2.20354.02 · DWN. BY: TT

Certificate of Authorization	
24GA27937500	Eng'r. Nos.
21AC00012400	Arch. Nos.



PROJECT
MILLBROOK MARSH BOARDWALK

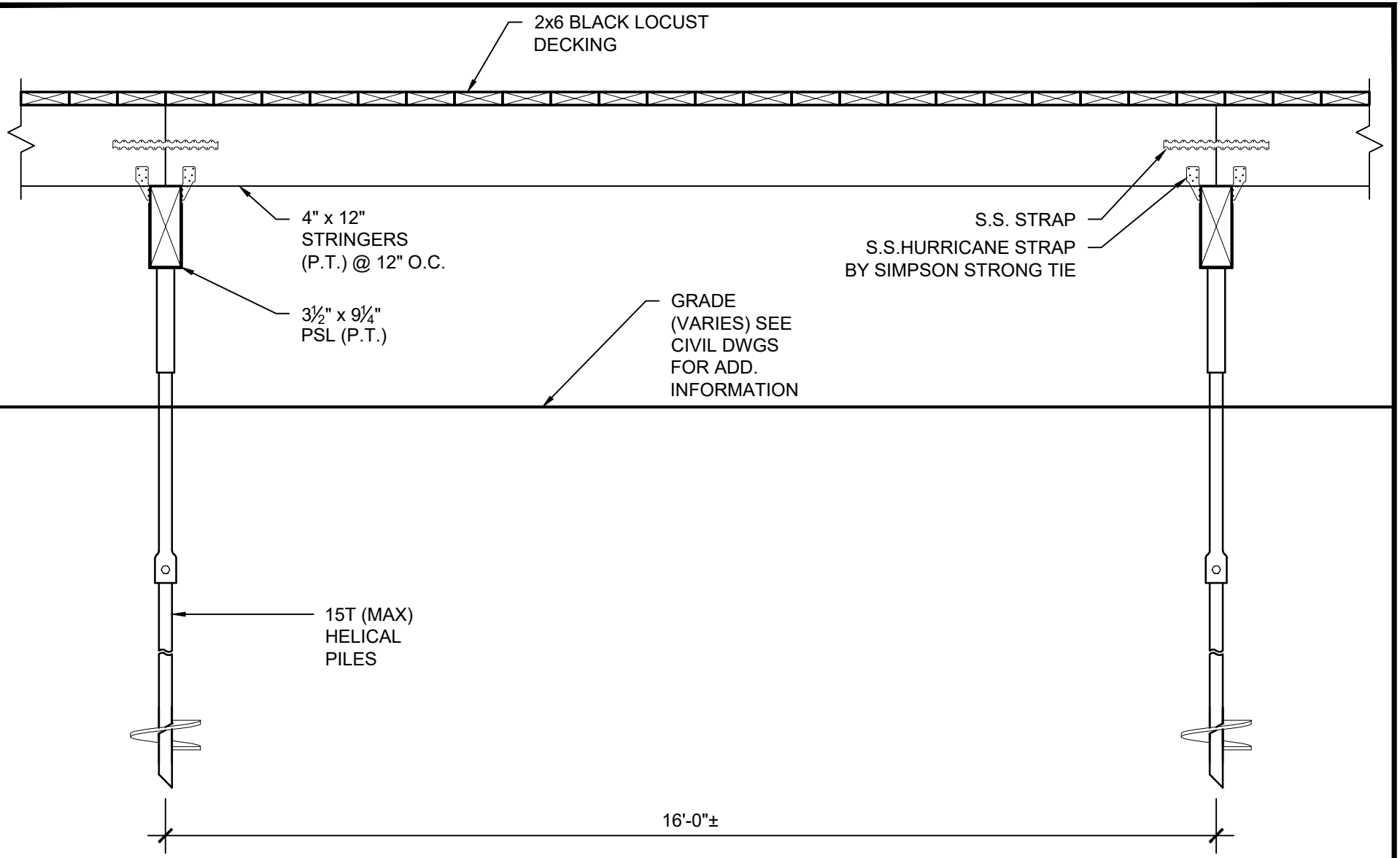
DRAWING TITLE
BOARDWALK SECTION – MUD MATS

LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying Inc.
445 Godwin Ave Ste 9, Midland Park, NJ 07432 | t. 201-447-6400 | f. 201-447-1233

VLAD POTIYEVSKY, AIA
Title: REGISTERED ARCHITECT License No. RA403225

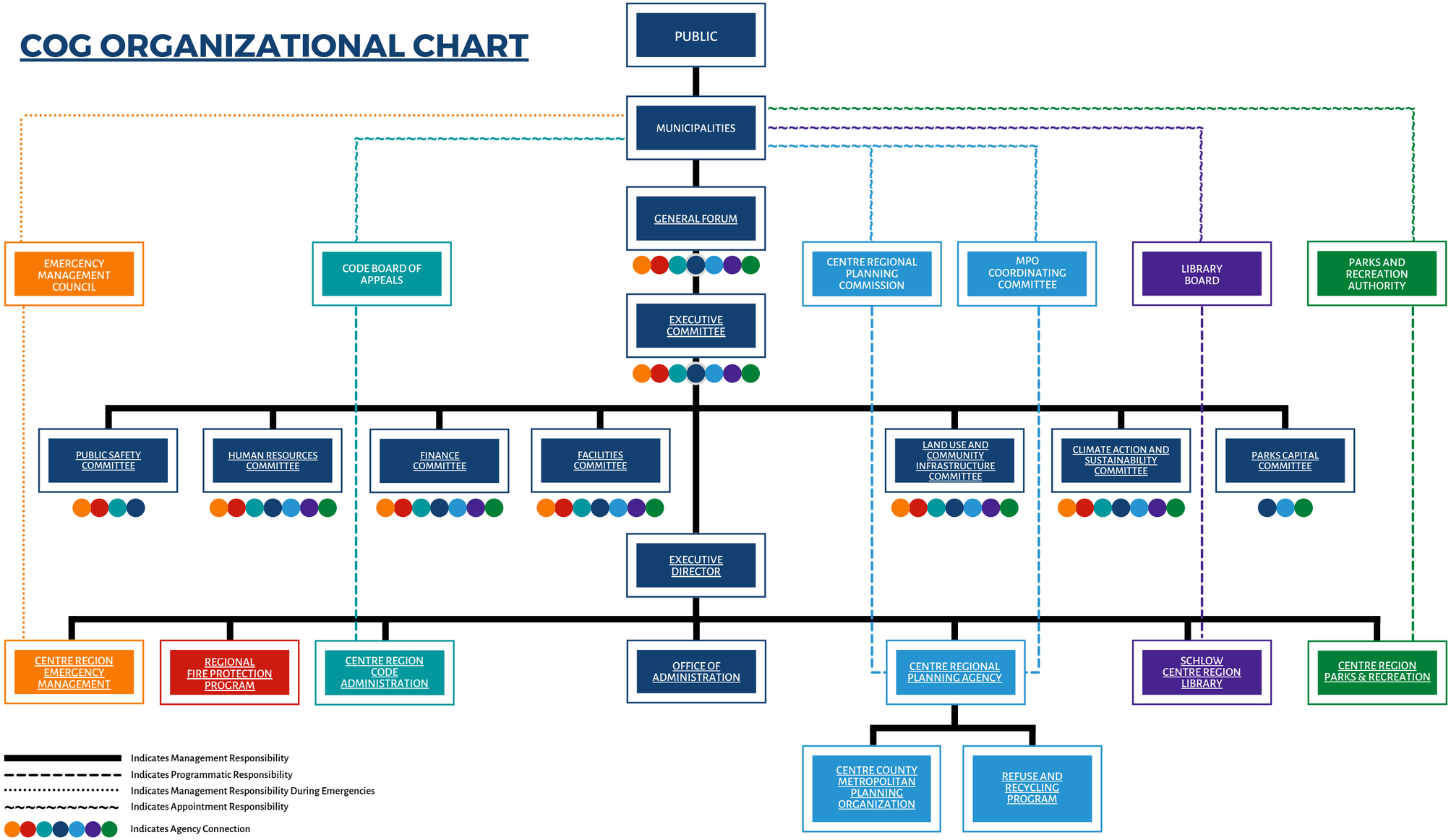
DWG. DATE	SCALE	DRAWING NO.
9/27/2022	3/4" = 1'-0"	SK-3
PROJECT NO. 2.20354.02	DWN. BY TT	

P:\200-AE\20300-20399\20354\20354.02\Cad\Dwgs\2035402-Boardwalk Detail.dwg, SK3, 11/8/2022 2:52:42 PM, Potiyevsky, Vlad



Certificate of Authorization	Eng'r. Nos.	Arch. Nos.	PROJECT: MILLBROOK MARSH BOARDWALK	VLAD POTIYEVSKY, AIA Title: REGISTERED ARCHITECT License No. RA403225
			DRAWING TITLE: BOARDWALK SECTION – MUD MATS	
	24GA27937500	21AC00012400	LAN ASSOCIATES — Engineering, Planning, Architecture, Surveying Inc. 445 Godwin Ave Ste 9, Midland Park, NJ 07432 | t. 201-447-6400 | f. 201-447-1233	DWG. DATE: 9/27/2022 · SCALE: 3/4" = 1'-0" · DRAWING NO.: SK-4 PROJECT NO.: 2.20354.02 · DWN. BY: TT

COG ORGANIZATIONAL CHART



2023 CRCOG Operating Budget Plan Comments Guide

November 1, 2022

Page	Topic	Discussion Notes
	ADMINISTRATION	
	Reinstitute guidelines for prioritization to inform the budget	
	How is the Insurance Reserve Fund replenished?	
	What IT policies have been replaced/removed?	
	SCHLOW	
	What is the status of wage evaluations for library employees?	
	Please explain the decreasing fund balance.	
	FIRE SAFETY & PROTECTION	
	Explore ownership of fire facilities in long-range planning.	
	Move volunteer stipends to personnel category.	

TOWNSHIP OF FERGUSON
3147 Research Drive • State College, Pennsylvania 16801
Telephone: 814-238-4651 • Fax: 814-238-3454
www.twp.ferguson.pa.us

November 15, 2022

Kristen Jones, Project Manager
PennDOT Engineering District 2-0
70 PennDOT Drive
Clearfield, PA, 16830

Re: Pine Grove Mills Bicycle and Pedestrian Improvement Project Contract 2022-C21
Ferguson Township Request for Design and Construction of Bicycle Lane

Dear Dean Ball, P.E., ADE-Design:

Ferguson Township requests the addition of a bicycle lane be considered in the design and construction of the above-mentioned upcoming project on SR45 in Centre County. Ferguson Township has identified this location as a need for bicycle accommodations through adoption of a comprehensive plan, and coordination with Centre Region Planning Agency, and Centre County Planning Agency and Centre County MPO.

Ferguson Township agrees to maintain the requested bicycle lane including pavement markings and associated signage per 67 PA Code § 212.5(b)1(v). By doing so, Ferguson Township is not accepting responsibility for repairs of the pavement surface which also serves as a paved shoulder. Ferguson Township understands it must obtain PennDOT's written approval before installing any new, revising or removing any existing traffic control device. Ferguson Township agrees to coordinate with PennDOT before working in State-designated right-of-way.

Please contact the undersigned at dmodricker@twp.ferguson.pa.us or 814-238-4651 to coordinate the proposed bicycle lane, pavement markings and signing request for design consideration and implementation.

Sincerely,

DRAFT

David J. Modricker, P.E.
Public Works Director

File: Pine Grove Mills Bicycle and Pedestrian Improvement Project Contract 2022-C21

Copy: Ferguson Township Board of Supervisors
Centrice Martin, Township Manager

Appendix C

PennDOT Connects Project Initiation Form

MEETING INFORMATION
Meeting Date
9/9/2021 @ 1:30 pm
Meeting Location
Virtual
Attendees
Dave Modricker, Trish Meek, Mark Schultz

LOCATION INFORMATION

Project Name

Pine Grove Mills Bike and Ped Improvements

Location Description

Centre Co. Pine Grove Mills. Project is located in Pine Grove Mills area of Ferguson Township, Centre County, PA as described further. Starting at Ross Street/SR45 intersection proceed east on SR45 to Nixon Road. Project is bound the north by Sunday Drive on Nixon Road, and to the south by Chestnut Street on SR26.

Map

Counties	Municipalities
Centre	Ferguson Twp.

PROPOSAL INFORMATION

Proposal Purpose

Pedestrian and bike connections are lacking between some neighborhoods in Pine Grove Mills. Pedestrian walkway on SR26 Water Street needs replacement. A concern exists for safety of pedestrians and bicyclists crossing Nixon Road between Sunday Drive and Chester Drive. Pedestrian and bike destinations include the Ferguson Elementary School, convenience store, local restaurants churches, neighbors, and nearby Cecil Irvin Park, and nearby Rothrock State Forest. (See attached location map) Pedestrians include all ages from school age to seniors. The need for the improvements were identified in the October 2019 Pine Grove Mills Small Area Plan. In addition, BicyclePA Route G travels through the study area along SR45 carrying bike enthusiasts. The proposed project will connect the Piney Ridge neighborhood with the greater Pine Grove Mills neighborhood.

Proposal Need

Connect more neighborhoods in Pine Grove Mills area with safe passageways for pedestrians and bicycles. Improve bike and pedestrian safety crossing Nixon Road.

Proposal Scope

1. Install approximately 890 linear feet of concrete sidewalk on the west side of SR6 Water Street from the flashing traffic light (SR26/SR45 intersection) south to Chestnut Street.
2. Perform shoulder widening to accommodate bike lanes on SR45 for approximately 4,125 linear feet both sides from a point 350 feet west of the St. Paul Lutheran Church to Ross Street. Paint bike legends on shoulder.
3. Install rectangular rapid flashing beacon at existing bike crossing on Nixon Road between Sunday Drive and Chester Drive.
4. Install signs and legends for sharrows from St Paul Lutheran Church on SR45 to the RRFB on Nixon Road to provide connectivity of bikepaths.

Project Length	Anticipated Construction Year
1/2 mile	

PAVEMENT INFORMATION

Existing Pavement Width:	0	Existing Bridge Width:	0	Existing Shoulder Width:	0
Proposed Pavement Width		Proposed Bridge Width		Proposed Shoulder Width	
Existing ROW					
Crash History					
Proposed Traffic Control					

PEDESTRIANS

Are there any pedestrian facilities or issues not mentioned in the scope of work that should be considered as part of this project? Some facilities will require a maintenance agreement before they are fully incorporated into the project, if warranted. An example would be a sidewalk maintenance agreement, where the responsibility of snow removal and future replacement is assumed by the municipality.

Pedestrian facilities WILL BE considered and maintenance obligations have been explained.

- [x] Yes
- [ ] No

Applicable if Yes:

- [ ] Shared roadway walk-able shoulder
- [x] Sidewalks
- [ ] Crosswalks
- [ ] Raised Crosswalks
- [x] Pedestrian Signalization
- [ ] Multi-use trail
- [ ] Additional element(s)

Applicable if No:

- [ ] Location is greater than .25 mile from any existing pedestrian facility or public transit stop, and is not recommended for a pedestrian connection in any local, county, or regional plan.
- [ ] Location has unique site constraints, such as steep slopes.
- [ ] Safe pedestrian accommodations would drastically increase the overall anticipated project cost (in such cases, consider opportunities to ensure future pedestrian accommodations are not precluded by the design)
- [ ] Additional Reason(s)

The Municipality is willing to execute sidewalk or other required maintence agreement (if applicable).

- [ ] Yes
- [ ] No

Have pedestrian facilities or needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, bicycle/pedestrian plan, etc)? If so, please list name of plan and year completed:

The Ferguson Township Board of Supervisors established a Pine Grove Mills Advisory Committee. At the request of the committee, the Board authorized McCormick Taylor to proceed with a Pine Grove Mills Mobility Study. The Committee and the Board support this project.

Is municipality agreeable to contribute funds?

Yes

Additional Notes (include location of potential accomodations if applicable)

1. Install approximately 890 linear feet of concrete sidewalk on the west side of SR6 Water Street from the flashing traffic light (SR26/SR45 intersection) south to Chestnut Street.
2. Perform shoulder widening to accommodate bike lanes on SR45 for approximately 4,125 linear feet both sides from a point 350 feet west of the St. Paul Lutheran Church to Ross Street. Paint bike legends on shoulder.
3. Install rectangular rapid flashing beacon at existing bike crossing on Nixon Road between Sunday Drive and Chester Drive.
4. Install signs and legends for sharrows from St Paul Lutheran Church on SR45 to the RRFB on Nixon Road to provide connectivity of bikepaths.

BICYCLISTS

Are there any other bicycle facilities or issues not mentioned in the scope of work that should be considered as part of this project? Some facilities will require a maintenance or other agreement before they are fully incorporated into the project if warranted. An example would be a Trail Crossing Agreement.

Bicycle facilities WILL BE considered and maintenance obligations have been explained.

☒ Yes
☐ No

Applicable if Yes:

☐ Multi-use trail

☐ Protected bike lane

☐ Striped bike lane (buffered or standard)

☒ Marked shoulder with supplemental pavement markings

☐ Share the Road Signage

☐ Additional element(s)

Shoulder widening to accomodate bike usage

Applicable if No:

☐ Location is greater than .25 mile from any existing pedestrian facility or public transit stop, and is not recommended for a bicycle connection in any local, county, regional, or state plan.

☐ Location has unique site constraints, such as steep slopes.

☐ Safe bicycle accommodations would drastically increase the overall anticipated project cost (in such cases, consider opportunities to ensure future bicycle accommodations are not precluded by the design)

☐ Additional reason(s)

The Municipality is willing to execute required maintenance or other agreement (if applicable)

☐ Yes
☐ No

Have bicycle facilities or needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, bicycle/pedestrian plan, etc)? If so, please list name Of plan and year completed:

Additional Notes (include location of potential accomodations if applicable)

PUBLIC TRANSIT

Is the location served by public transit routes or services? Are there other transit needs not mentioned in the scope of work that should be considered as part of this project? These may include elements like improved bus stops, sidewalks or other pedestrianways providing safe access to stops and stations, transit curb extensions, bus pullouts that are long enough for efficient transit operations, signal schemes that accommodate transit preferentially, etc. Some facilities may require a maintenance agreement before they are fully incorporated into the project, if warranted.

Public transit improvements WILL BE considered and maintenance obligations have been explained.

- ☐ Yes
- ☒ No

Applicable if Yes:

- ☐ Improve bus stops
- ☐ Sidewalks or pedestrianways providing access to stops or stations
- ☐ Transit curb extensions or bus pullouts
- ☐ Other transit-preferential elements, including signal treatments
- ☐ Additional element(s)

Applicable if No:

- ☐ Location is not served by any public transit routes and no new service is identified in any public transit agency plans.
- ☐ Location has unique site constraints, such as steep slopes
- ☒ Improved public transit accommodations would drastically increase the overall anticipated project cost (in such cases, consider opportunities to ensure future public transit improvements are not precluded by the design)
- ☐ Additional reason(s)

The Municipality is willing to execute required maintenance or other agreement (if applicable)

- ☐ Yes
- ☐ No

Have public transit facilities or needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, bicycle/pedestrian plan, public transit plan, etc)? If so, please list name of plan and year completed:

Additional Notes (include location of potential accomodations if applicable)

CONGESTION

Is congestion an issue within or adjacent to the project limits? Is there congestion during certain times of day? Do vehicles have trouble making turns or getting through intersections? Is the roadway designated as an official detour route, or is it an important parallel facility to a major corridor? Are there connected traffic signals along this corridor, or are there any plans to enhance signal connectivity? Some facilities may require a maintenance or other agreement before they are fully incorporated into the project, if warranted.

Congestion improvements WILL BE considered and maintenance obligation have been explained.

- [ ] Yes
- [x] No

Applicable if Yes:

- [ ] Congestion is an issue at peak rush hours.
- [ ] Vehicles have trouble making turns or getting through intersections.
- [ ] This roadway is designated as an official detour route, or is an important parallel facility to an arterial or transit corridor.
- [ ] Traffic signals on this roadway are connected, or enhancements to connectivity are being considered.
- [ ] Additional element(s)

Applicable if No:

- [x] Congestion is currently not an issue within the project's limits of adjacent to its limits.
- [ ] No opportunities currently exist to improve traffic signal operations.
- [ ] Improved accommodations would drastically increase the overall anticipated project cost (in such cases, consider opportunities to ensure TSMO and ITS Enhancements are not precluded by the design)
- [ ] Additional reason(s)

The Municipality is willing to execute required maintenance or other agreement (if applicable)

- [ ] Yes
- [ ] No

Have congestion or ITS/TSMO needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, bicycle/pedestrian plan, public transit plan, etc)? If so, please list name of plan and year completed:

Additional Notes (include location of potential accomodations if applicable)

FREIGHT/ECONOMIC ACTIVITY/MANUFACTURING (Truck, Rail, Ports, Pipeline)

Are the project limits or adjacent area currently used by freight operators, are there any significant freight generating facilities, or are any new operations identified in any development or freight plans? Should any freight improvements be considered on a project, such as vertical clearances, bridge weight allowances, pavement design, turning radii, intersection geometry, signage, pavement markings, highway-railroad grade crossings, designated pull/off waiting areas, alternate access, and traffic control devices. Some facilities may require a maintenance or other agreement before they are fully incorporated into the project, if warranted.

Freight improvements WILL BE considered and maintenance obligations have been explained:

- ☐ Yes
- ☒ No

Applicable if Yes:

- ☐ Freight operators currently use this roadway.
- ☐ There are existing freight generators adjacent to this facility.
- ☐ This project is a designated NHS intermodal freight connector and/or serves a concentration of freight generators like industrial parks.
- ☐ There is a future vision for freight operations on this transportation facility
- ☐ Additional element(s)

Applicable if No:

- ☐ Location is currently not used by any freight operators, there are no significant adjacent freight facilities, and no new operations are identified in any development or freight plans.
- ☒ Improved freight would drastically increase the overall anticipated project cost (in such cases, consider opportunities to ensure future freight improvements are not precluded by the design)
- ☐ Improved freight accommodations would pose significant conflict with other modes.
- ☐ Additional reason(s)

The Municipality is willing to execute required maintenance or other agreement (if applicable)

- ☐ Yes
- ☐ No

Have freight needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, freight management plan, economic development plan, etc)? If so, please list name of plan and year completed:

Additional Notes (include location of potential accomodations if applicable)

STORMWATER AND GREEN INFRASTRUCTURE

Is stormwater an issue within the project limits? Many stormwater retention and infiltration options are available to address flooding and drainage issues within the limits of a project. These may include elements like rain gardens, vegetated bioretention areas (retention basins), vegetated swales, vegetated infiltration gardens, storm water tree trenches, permeable pavements, etc. Some facilities may require a maintenance or other agreement before they are fully incorporated into the project, if warranted. A determination of appropriate stormwater elements will be made during project design.

Specific stormwater or green infrastructure improvements WILL BE considered and a determination on appropriate elements will be made during project design. The municipality would like the following element(s) considered:

☐ Yes
☒ No

Applicable if Yes:

☐ Appropriate stormwater elements to be determined. Determination on specific elements to be made during project design.

☐ Rain garden

☐ Vegetation bio-retention areas

☐ Vegetated swales

☐ Vegetated Infiltration gardens

☐ Additional element(s)

Applicable if No:

☐ Stormwater is currently not an issue within the project's limits or adjacent to its limits.

☒ Improved accommodations would drastically increase the overall anticipated project cost (in such cases, consider opportunities to ensure other improvements are not precluded by the design)

☐ Additional reason(s)

The Municipality is willing to execute required maintenance or other agreement (if applicable)

☐ Yes
☐ No

Have stormwater or green infrastructure needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, stormwater management plan, etc)? If so, please list name of plan and year completed:

Additional Notes (include location of potential accomodations if applicable)

SAFETY

Are there any known safety issues or concerns?

A concern exists for safety of pedestrians and bicyclists crossing Nixon Road between Sunday Drive and Chester Drive.

Have transportation safety needs been addressed in any local planning document (i.e. local comprehensive plan, corridor study, bicycle/pedestrian plan, safety audit, etc)? If so, please list name of plan and year completed:

Additional Notes (include location of potential accomodations if applicable)

1. Install approximately 890 linear feet of concrete sidewalk on the west side of SR6 Water Street from the flashing traffic light (SR26/SR45 intersection) south to Chestnut Street.
2. Perform shoulder widening to accommodate bike lanes on SR45 for approximately 4,125 linear feet both sides from a point 350 feet west of the St. Paul Lutheran Church to Ross Street. Paint bike legends on shoulder.
3. Install rectangular rapid flashing beacon at existing bike crossing on Nixon Road between Sunday Drive and Chester Drive.
4. Install signs and legends for sharrows from St Paul Lutheran Church on SR45 to the RRFB on Nixon Road to provide connectivity of bikepaths.

PUBLIC CONTROVERSY

Is there any anticipated substantial public controversy surrounding the project? Examples of reasons for public controversy include residential and commercial displacements, long detour routes, long construction times, and impacts to environmental, historic or community resources. Identifying potential public controversy early allows for the identification Of increased public involvement measures during project scoping.

Public controversy is expected

- [x] Yes
- [ ] No

Applicable if Yes:

- [ ] Likely residential and/or commercial displacements
- [ ] Long detour route/long construction time
- [x] Business impacts
- [ ] Impacts to environmental, historic, or community resources
- [ ] Other:

Applicable if No:

- [ ] Construction impacts will be minimal
- [ ] No/minimal detour involved
- [ ] No/minimal displacements
- [ ] Additional Reason(s):

Additional Notes:

OTHER PLANNED INFRASTRUCTURE OR DEVELOPMENT

Are there Other known planned future infrastructure or development projects within or adjacent to the project limits that could impact the project or project schedule? Examples could include a planned water/sewer replacement project, a planned business or residential development, planned trail construction projects, etc.

Anticipated future infrastructure or develop

☐ Yes
☐ No

☐ Gas, Sewer or Water infrastructure replacement or installation.

☐ New Business/Industrial park development or expansion of existing park.

☐ New residential development or expansion of existing development.

☐ Other:

Additional Notes:

OTHER (Utility, Health, Community/Culture Events, etc.)

Are there any other issues to consider that have not already been discussed? Is there an opportunity to incorporate nearby utilities into the project or is there a need to move them to a new location? Could the project improve public health through transportation by increasing physical activity, decreasing air and noise pollution, and increasing access to goods and services that Support public health? Are there an known community/cultural events that may be impacted by construction (farmers markets, parades, festivals, fairs, etc)?

Other improvements considered

☐ Yes
☐ No

Applicable if Yes:

☐ Utility relocation

☐ Public health improvements

☐ Timing of Community/Cultural events will be considered during construction

☐ Additional element(s)

Applicable if No:

☐ Utilities are currently not an issue within the projects limits or adjacent to its limits.

☐ No opportunities currently exist to improve healthy living within the project's limits or adjacent to its limits

☐ Improved accommodations would drastically increase the Overa II anticipated project cost (in such cases, consider opportunities to ensure Other improvements are not precluded by the design)

☐ No Community/Cultural Events currently take place within the project's limits or are impacted by the project and no known events are planned for the future

☐ Additional reason(s)

Additional Notes (including locations/dates/contacts of cultural events if applicable):

The Township sponsored Route 45 Getaways! https://route45getaways.com/ which promotes local businesses and tourism on SR45. One of the events, a local farm market, is held at the St Paul Lutheran Church, located within the project boundaries.

ADDITIONAL DISCUSSION ITEMS

Please document any additional items discussed that are relevant to the project. Please also discuss the anticipated project delivery schedule/process and any additional outreach that may be expected.

SOURCES/REFERENCES

Are there any other individuals or organizations that should be contacted for additional information on any of the items that were discussed? Are there any plans or documentation not already already discussed that may be helpfull in gathering additional contextual information about the project area?

Sources/References:

Organizations/Individuals:

SUMMARY

Comments and Notes:

Follow-Up Items

Completed By

Reviewed By: Form must be signed on website

LF: 1999-2-2

October 26, 2022

Jenna Wargo, AICP
Ferguson Township
3147 Research Drive
State College, PA 16801

RE: Turnberry Annual Phasing Plan Update

Dear Ms. Wargo:

Please find attached to this correspondence three (3) full size copies of the annual Master Plan Update for Turnberry Traditional Town Development for approval in accordance with the Ordinances of Ferguson Township.

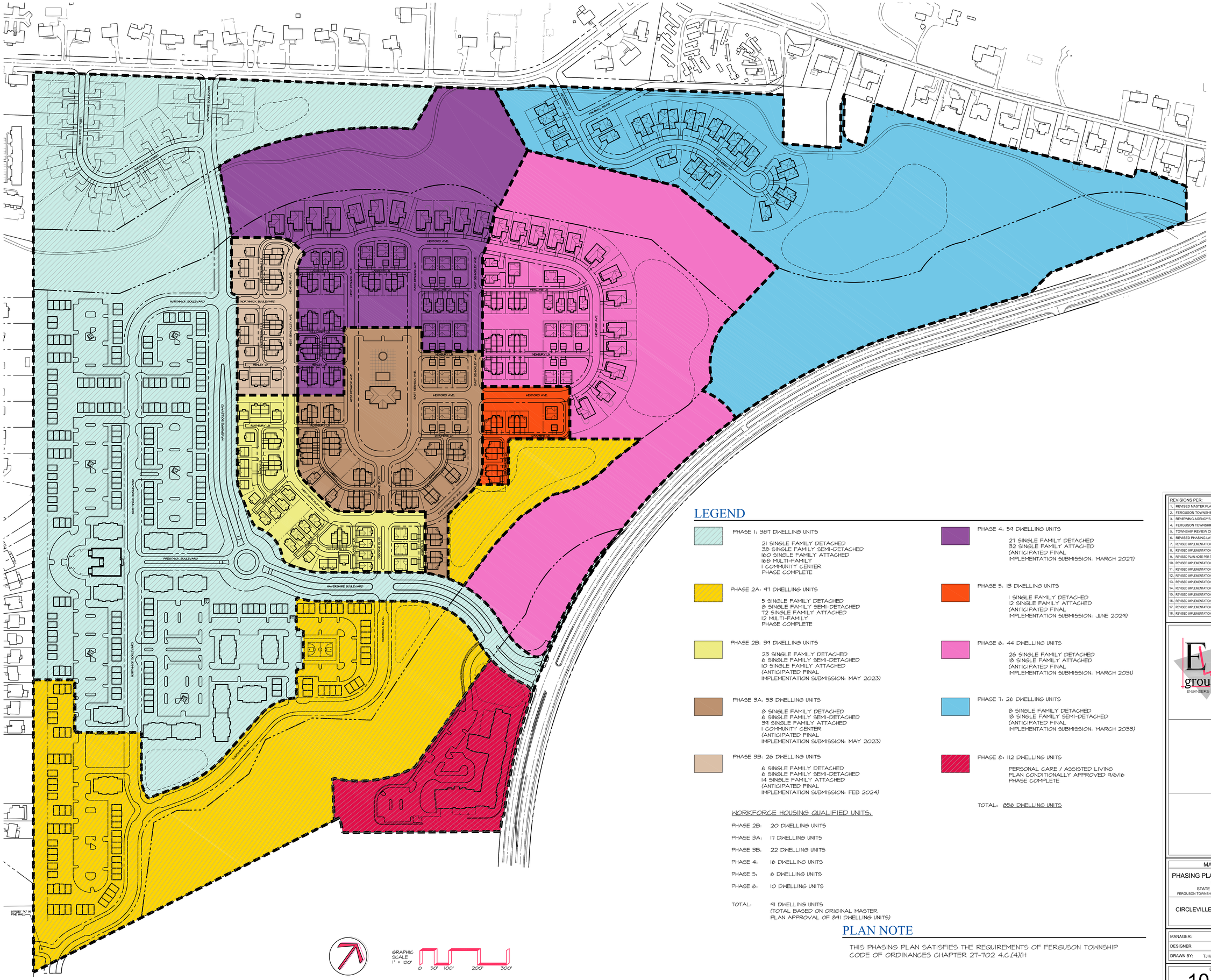
If you need to receive any additional information, please contact me at your convenience.

Sincerely,
ELA GROUP, INC.

Todd H. Smith
Project Manager
Central PA Office

Attachment: 3 each Full Size Turnberry Traditional Town Development Phasing Plan
Last Revised 10/26/22.

F:\PROJECTS\SC307 Circleville Road Partners, LP\SC307-001 Circleville\Phasing Plan Annual Update\11 October 2022\0 Submission 10-26-22 Turnberry Annual Phasing Plan Update.docx



LEGEND

PHASE 1: 387 DWELLING UNITS

21 SINGLE FAMILY DETACHED
38 SINGLE FAMILY SEMI-DETACHED
160 SINGLE FAMILY ATTACHED
168 MULTI-FAMILY
1 COMMUNITY CENTER
PHASE COMPLETE

PHASE 2A: 97 DWELLING UNITS

5 SINGLE FAMILY DETACHED
8 SINGLE FAMILY SEMI-DETACHED
72 SINGLE FAMILY ATTACHED
12 MULTI-FAMILY
PHASE COMPLETE

PHASE 2B: 39 DWELLING UNITS

23 SINGLE FAMILY DETACHED
6 SINGLE FAMILY SEMI-DETACHED
10 SINGLE FAMILY ATTACHED
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: MAY 2023)

PHASE 3A: 53 DWELLING UNITS

8 SINGLE FAMILY DETACHED
6 SINGLE FAMILY SEMI-DETACHED
34 SINGLE FAMILY ATTACHED
1 COMMUNITY CENTER
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: MAY 2023)

PHASE 3B: 26 DWELLING UNITS

6 SINGLE FAMILY DETACHED
6 SINGLE FAMILY SEMI-DETACHED
14 SINGLE FAMILY ATTACHED
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: FEB 2024)

PHASE 4: 59 DWELLING UNITS

27 SINGLE FAMILY DETACHED
32 SINGLE FAMILY ATTACHED
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: MARCH 2027)

PHASE 5: 13 DWELLING UNITS

1 SINGLE FAMILY DETACHED
12 SINGLE FAMILY ATTACHED
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: JUNE 2029)

PHASE 6: 44 DWELLING UNITS

26 SINGLE FAMILY DETACHED
18 SINGLE FAMILY ATTACHED
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: MARCH 2031)

PHASE 7: 26 DWELLING UNITS

8 SINGLE FAMILY DETACHED
18 SINGLE FAMILY SEMI-DETACHED
(ANTICIPATED FINAL
IMPLEMENTATION SUBMISSION: MARCH 2033)

PHASE 8: 112 DWELLING UNITS

PERSONAL CARE / ASSISTED LIVING
PLAN CONDITIONALLY APPROVED 9/6/16
PHASE COMPLETE

TOTAL: 856 DWELLING UNITS

WORKFORCE HOUSING QUALIFIED UNITS:

PHASE 2B: 20 DWELLING UNITS
PHASE 3A: 17 DWELLING UNITS
PHASE 3B: 22 DWELLING UNITS
PHASE 4: 16 DWELLING UNITS
PHASE 5: 6 DWELLING UNITS
PHASE 6: 10 DWELLING UNITS

TOTAL: 91 DWELLING UNITS
(TOTAL BASED ON ORIGINAL MASTER
PLAN APPROVAL OF 841 DWELLING UNITS)

PLAN NOTE

THIS PHASING PLAN SATISFIES THE REQUIREMENTS OF FERGUSON TOWNSHIP CODE OF ORDINANCES CHAPTER 27-702 4.C.(4)(H

GRAPHIC SCALE
1" = 100'
0 50' 100' 200' 300'

REVISIONS PER:		DATE:	BY:
1.	REVISED MASTER PLAN	4-18-11	ELA / HD
2.	FERGUSON TOWNSHIP REVIEW LETTER	7-22-11	TJH
3.	REVIEWING AGENCY'S REVIEW LETTERS	10-14-11	TJH
4.	FERGUSON TOWNSHIP	11-16-11	TJH / BLM
5.	TOWNSHIP REVIEW COMMENTS	2-09-12	BLM
6.	REVISED PHASING LAYOUT	12-28-12	MRH
7.	REVISED IMPLEMENTATION SUBMISSION DATES	11-25-13	THS
8.	REVISED IMPLEMENTATION SUBMISSION DATES	10-27-14	TJH
9.	REVISED PLAN NOTE PER TOWNSHIP	12-05-14	MRH
10.	REVISED IMPLEMENTATION SUBMISSION DATES	11-16-15	THS
11.	REVISED IMPLEMENTATION SUBMISSION DATES	5-11-16	THS
12.	REVISED IMPLEMENTATION SUBMISSION DATES	12-7-16	THS
13.	REVISED IMPLEMENTATION SUBMISSION DATES	11-15-17	THS
14.	REVISED IMPLEMENTATION SUBMISSION DATES	11-20-18	THS
15.	REVISED IMPLEMENTATION SUBMISSION DATES	10-22-19	THS
16.	REVISED IMPLEMENTATION SUBMISSION DATES	12-3-20	THS
17.	REVISED IMPLEMENTATION SUBMISSION DATES	11-24-21	THS
18.	REVISED IMPLEMENTATION SUBMISSION DATES	10-26-22	THS

ELA group, inc.
ENGINEERS & LANDSCAPE ARCHITECTS
2015 SANDY DRIVE, SUITE 103
STATE COLLEGE, PA 16803
(814) 861-6528 FAX (814) 861-5508
www.elagroup.com

MASTER PLAN

SUBJECT:
PHASING PLAN - ANNUAL UPDATE
TURNBERRY
STATE COLLEGE, PA 16803
FERGUSON TOWNSHIP, CENTRE COUNTY, PENNSYLVANIA

DEVELOPER:
CIRCLEVILLE ROAD PARTNERS, LP

MANAGER:	THS	DATE:	DECEMBER 27, 2012
DESIGNER:	THS	PROJECT NO.	SC307-001
DRAWN BY:	TJH/BLM	SCALE:	1" = 100'

DRAWING NO.
10 of 11

Penn Terra
ENGINEERING, INC.

LF:1990-2-2

Corporate Office:
3075 Enterprise Drive
State College, PA 16801
(814) 231-8285
www.pennterra.com

November 7, 2022

Jenna Wargo
Director of Planning and Zoning
Ferguson Township
3147 Research Drive
State College PA 16801

RE: Development Schedule for Foxpointe

Dear Jenna,

On behalf of our client, S&A Homes, we propose the attached development schedule for the Foxpointe PRD as follows:

Section	**Final Plan Submission Deadline**	**Description**
1A.1, 1A.2	December 31, 2027	96 Multi-family Residential
1E	December 31, 2027	111,800 sq. ft. Neighborhood Commercial
1B	December 31, 2028	106 Single-family Residential
1D	December 31, 2028	186 Single-family Residential
1C	December 31, 2033	195 Multi-family Residential
1F	December 31, 2033	82,400 sq. ft. Neighborhood Commercial, Foxpointe Drive Street ROW (9.53 acres), and Open Space/Detention of 13.59/9.43 acres.

This is no change from the schedule approved last year.

If you have any questions, please don't hesitate contact me.

Regards,

C. Anthony Fruchtl, P.E.
Project Manager

Cc: 15048

LF: 1946-1B-1

Penn Terra
ENGINEERING, INC.

Corporate Office:
3075 Enterprise Drive
State College, PA 16801
(814) 231-8285
www.pennterra.com

November 8, 2022

Jenna Wargo
Director of Planning and Zoning
Ferguson Township
3147 Research Drive
State College PA 16801

RE: Development Schedule for The Landings PRD

Dear Jenna,

On behalf of our client, S&A Homes, we propose the revised development schedules as follows:

The Landings:

Phase	**Final Plan Submission Deadline**	**Description**
9	December 31, 2026	140 multi-family
4	December 31, 2027	98 multi-family
5	December 31, 2027	138 multi-family
3	December 31, 2027	60 single family
8	December 31, 2028	60,000 sq. ft. NC
10	December 31, 2028	70,000 sq. ft. NC
1	Complete	44 single family

This is no change from the schedule approved last year.

If you have any questions, please don't hesitate contact me.

Regards,

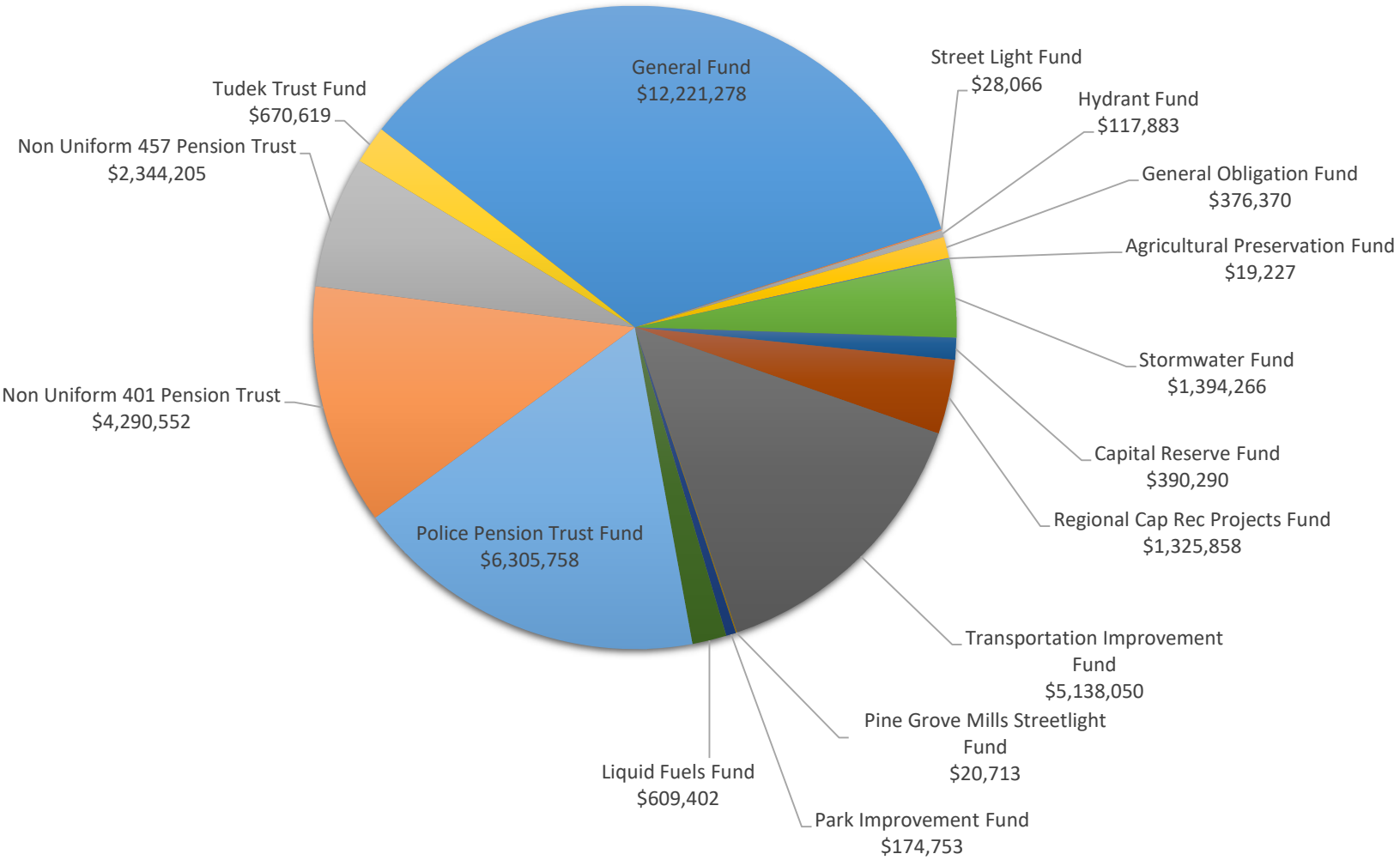
C. Anthony Fruchtl, P.E.
Project Manager

Cc: 15048

MONTHLY TREASURERS REPORT

AUGUST 2022

CASH BALANCES BY FUND - AUGUST 31, 2022



Ferguson Township Treasurer's Report
August 31, 2022
Statement of Cash Balances

General Fund	
Checking	
Jersey Shore State Bank Operating Checking (3245)	5,477,406.26
JSSB Flex Plan Checking (8757)	58,460.73
Jersey Shore State Bank Investment Checking (5531)	2,344,883.56
Ameriserv Money Market 2602	264,898.64
PLGIT General Fund Classs (3017)	271,323.53
PLGIT General Fund Prime (3017)	204,304.84
PLGIT General Fund Term (3017) (matures 2/10/23)	600,000.00
PLGIT General Fund Term (3017) (matures 2/10/23)	1,000,000.00
PLGIT General Fund Term (3017) (matures 5/15/23)	1,000,000.00
PLGIT General Fund Term (3017) (matures 8/15/23)	1,000,000.00
TOTAL GENERAL FUND	**12,221,277.56**
Other Funds	
Fund 02 Street Lights	
JSSB Checking (4836)	28,066.09
Fund 03 Fire Hydrant	
JSSB Checking (4844)	117,883.09
Fund 16 General Obligation	
JSSB Checking (4852)	376,369.31
JSSB 2019 Bond Checking	0.44
Fund 19 Agricultural Preservation	
JSSB Checking (4879)	19,227.09
Fund 20 Stormwater Fund	
JSSB Checking (1711)	1,394,265.97
Fund 30 Capital Reserve	
Paypal Account	21,404.64
JSSB Checking (Employee Wellness Sinking Fund)(4909)	7,036.20
JSSB Capital Reserve Checking (3555)	81,643.09
JSSB Checking (PW Equipment Sinking Fund)(4895)	11,363.35
JSSB Checking (Bldg Equipment Sinking Fund)(4887)	268,842.97
Fund 31 Regional Capital Recreation Projects	
JSSB Checking (3547)	1,060,959.58
Ameriserv Money Market 2818	264,898.64
Fund 32 Transportation Improvement	
JSSB Checking (3539)	2,048,445.55
PLGIT Checking Class & Plus (3261)	116,181.89
PLGIT Checking Prime (3261)	208,524.36
PLGIT Checking Term (3261) (matures 2/10/23)	500,000.00
PLGIT Checking Term (3261) (matures 2/10/23)	1,000,000.00
PLGIT Checking Term (3261) (matures 5/15/23)	500,000.00

Ferguson Township Treasurer's Report
August 31, 2022

Statement of Cash Balances

PLGIT Checking Term (3261) (matures 8/15/23)	500,000.00
Ameriserv Money Market 2693	264,898.64
Fund 33 Pine Grove Mills Street Lights	
JSSB Checking (4917)	20,713.44
Fund 34 Park Improvement	
JSSB Checking (4925)	174,753.32
Fund 35 Liquid Fuels	
JSSB Checking (4933)	27,166.30
PLGIT Checking Class (3020)	80,040.91
PLGIT Checking Prime (3020)	102,195.02
PLGIT Checking Term (3020) (matures 2/10/23)	400,000.00
Fund 93 Tudek Memorial Trust	
JSSB Checking (4976)	7,468.81
FNB Investments (@market)	155,110.00
Centre Foundation Investments	508,040.00
TOTAL OTHER FUNDS	**10,265,498.70**
TOTAL NON PENSION FUNDS	**22,486,776.26**

Employer Pension Trust Funds

Fund 60 Police Pension Trust	
JSSB Checking (4941)	36,458.25
PNC Enterprise Checking (9642)	8,904.68
PNC Investments (@market)(includes accrued interest)	6,260,395.53
Fund 65 Non Uniformed 401a Pension Trust	
JSSB Checking (4968)	13,480.25
Broadridge/VOYA-RHS Employee Retirement Health Savings Trust (@market)	22,853.69
Voya-401 (664582) Employee Pension Investment Trust (@ market)	4,254,218.44
TOTAL PENSION TRUST FUNDS	**10,596,310.84**
GRAND TOTAL	**33,083,087.10**

Employee Pension Trust Funds

Fund 66 Non Uniformed 457 Pension Trust	
Voya-457 (664581) Employee Pension Investment Trust (@ market)	2,261,393.11
IPX-Services IRA () Individual Retirement Accounts (@ market)	79,567.32
MissionSquare-ROTH IRA (706007) Employee Pension Investment Trust (@ mar	3,244.47
	2,344,204.90

Bank Reconciliation

Uncleared Checks by Fund

User: eendresen
Printed: 11/08/2022 - 1:57PM
Checks Before: 08/31/2022

Fund/Check No.	Check Date	Clear Date	System	Vendor/Employee No.	Vendor/Employee Name	Amount
01	GENERAL FUND					
9001	08/22/2019	Uncleared	AP	10263	CORMANS MAIL SERVICE	2,873.11
9183	10/15/2019	Uncleared	AP	11593	HOME DEPOT CREDIT SERVICES	288.05
9272	11/15/2019	Uncleared	AP	10035	ALS TECHNOLOGIES INC	1,145.00
9297	11/15/2019	Uncleared	AP	11253	INFRADAPT LLC	3,221.44
9340	11/29/2019	Uncleared	AP	11855	ANDERSON INDUSTRIAL MACHINERY	769.80
9437	12/31/2019	Uncleared	AP	10035	ALS TECHNOLOGIES INC	1,145.00
9562	01/20/2020	Uncleared	AP	11173	WALKER & WALKER EQUIPMENT II LLC	43.19
9725	02/28/2020	Uncleared	AP	11248	SOLV BUSINESS SOLUTIONS-SAFEGUARD	100.17
9806	03/15/2020	Uncleared	AP	11797	LANDPRO EQUIPMENT LLC	759.15
9874	03/31/2020	Uncleared	AP	11877	RUSSIAN CHURCH OF CHRIST	78.11
10091	05/31/2020	Uncleared	AP	11490	RECONYX, INC	970.51
10331	08/14/2020	Uncleared	AP	10244	COMCAST	1,050.00
10444	09/15/2020	Uncleared	AP	10208	CENTRE REGION COUNCIL OF GOVERNMENTS	22.50
10602	10/15/2020	Uncleared	AP	10893	PRINT O STAT INC	1,849.00
10774	12/15/2020	Uncleared	AP	10346	ECOLAWN	90.00
10908	01/15/2021	Uncleared	AP	10846	PENNSYLVANIA MUNICIPAL LEAGUE	2,264.32
10915	01/30/2021	Uncleared	AP	11239	ASAP HYDRAULICS STATE COLLEGE, INC	42.99
10920	01/30/2021	Uncleared	AP	11930	BUDS ELECTRIC	437.01
10974	01/30/2021	Uncleared	AP	10493	THE HITE COMPANY	75.84
11001	02/15/2021	Uncleared	AP	10247	COMMONWEALTH OF PA	35.00
11005	02/15/2021	Uncleared	AP	11445	GIANT FOOD STORES LLC	35.00
11034	02/15/2021	Uncleared	AP	11192	WEST PENN POWER	955.52
11098	03/31/2021	Uncleared	AP	10120	BORING COURT REPORTING	225.00
11219	04/30/2021	Uncleared	AP	11336	F.O.P. LODGE #37	205.00
11244	04/30/2021	Uncleared	AP	11139	UNIVERSITY AREA JOINT AUTHORITY	39.76
11321	05/31/2021	Uncleared	AP	11946	HUFFMAN CHELSEA	3,009.60
11358	05/31/2021	Uncleared	AP	11948	TANKNOLOGY INC.	588.50
11588	08/31/2021	Uncleared	AP	11751	NITRO SOFTWARE, INC.	749.85
11816	11/15/2021	Uncleared	AP	11930	BUDS ELECTRIC	241.74
11847	11/15/2021	Uncleared	AP	11593	HOME DEPOT CREDIT SERVICES	69.78

Fund/Check No.	Check Date	Clear Date	System	Vendor/Employee No.	Vendor/Employee Name	Amount
12032	11/30/2021	Uncleared	AP	10800	PA POLICE ACCREDITATION COALITION	235.00
12123	12/31/2021	Uncleared	AP	10661	MARTIN JOSH	750.00
12223	01/15/2022	Uncleared	AP	11159	VERIZON WIRELESS	206.03
12554	04/15/2022	Uncleared	AP	10373	NITTANY SUPPLY INC.	1,319.35
12700	05/31/2022	Uncleared	AP	11697	STEELE TIMOTHY	20.00
12744	06/15/2022	Uncleared	AP	10554	JARU ASSOCIATES INC	382.82
12792	06/30/2022	Uncleared	AP	11702	BLUE KNOB AUTO	350.00
12887	07/28/2022	Uncleared	AP	10561	JOHN DEERE FINANCIAL	1,016.38
12927	08/11/2022	Uncleared	AP	11376	B&I AUTO SUPPLY	118.23
12947	08/11/2022	Uncleared	AP	11253	INFRADAPT LLC	655.87
12963	08/11/2022	Uncleared	AP	10820	PBCI ALLEN MECHANICAL AND ELECTRICAL	42.25
					Fund 01Total:	28,475.87
02	STREET LIGHT FUND					
143	02/15/2021	Uncleared	AP	11192	WEST PENN POWER	21.71
					Fund 02Total:	21.71
93	TUDEK PARK TRUST FUND					
20200914	02/15/2021	Uncleared	AP	11192	WEST PENN POWER	81.75
					Fund 93Total:	81.75
					Grand Total:	28,579.33

RESOLUTION NO. _____

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE TOWNSHIP OF FERGUSON, CENTRE COUNTY, PENNSYLVANIA ADOPTING AND APPROVING AN AMENDMENT TO THE ARTICLES OF INCORPORATION OF THE CENTRE AREA TRANSPORTATION AUTHORITY, AS PROPOSED BY RESOLUTION OF THE BOARD OF SAID AUTHORITY; SETTING FORTH THE PROPOSED AMENDMENT; AND AUTHORIZING SAID AUTHORITY AND PROPER OFFICERS OF THE AUTHORITY TO EXECUTE, VERIFY AND FILE APPROPRIATE ARTICLES OF AMENDMENT.

WHEREAS, Centre Area Transportation Authority (the "Authority"), a municipal authority organized and existing under the Municipality Authorities Act of 1945, approved May 2, 1945, P.L. 382, as amended and supplemented (the "Act") of the Commonwealth of Pennsylvania (the "Commonwealth"), was incorporated pursuant to appropriate action of the Borough Council of the Borough of State College, Centre County, Pennsylvania (the "Borough"), and the Articles of Incorporation were approved by the Department of State of the Commonwealth of Pennsylvania on May 17, 1974; and

WHEREAS, On December 23, 1981, the Authority approved an application for joinder of the Township of College, the Township of Ferguson, the Township of Harris, and the Township of Patton, and a Certificate of Joinder was approved on February 11, 1982; and

WHEREAS, the Authority, by Resolution duly adopted on August 22, 2022 (the "Resolution"), has submitted to the Board of Supervisors, a proposed amendment to its Articles of Incorporation to increase its term of existence, which amendment is authorized and permitted by the Authorities Act; and

WHEREAS, the Authorities Act provides, among other things, that the Board of this Township, being a governing authority of the municipality composing the Authority, shall adopt or reject said proposed amendment by resolution.

NOW, THEREFORE, by the Board of the Township, as follows:

SECTION 1: The Board of Supervisors hereby adopts and approves the amendment to the Articles of Incorporation of the Authority as proposed by a Resolution duly adopted by the Board of the Authority, a copy of which Resolution has been submitted to the Board of Supervisors.

SECTION 2: The amendment to the Articles of Incorporation of the Authority, which hereby is adopted and approved, shall amend the Articles of Incorporation in order to increase the term of existence of the Authority by adding a new paragraph 8 to the Articles of Incorporation which shall read as hereinafter set forth in full:

> "8. The term of existence of said Centre Area Transportation Authority shall be for a period ending August 1, 2072."

SECTION 3. Proper officers of the Authority hereby are authorized to execute, verify and file appropriate Articles of Amendment with the Secretary of the Commonwealth of Pennsylvania and to take all other action and to do all other things which may be necessary in order to accomplish the amendment of the Articles of Incorporation of the Authority in the manner herein adopted and approved.

SECTION 4. All resolutions or parts of resolutions, insofar as the same shall be inconsistent herewith, shall be and the same hereby expressly are repealed.

RESOLVED this ____ day of _____, 2022.

TOWNSHIP OF FERGUSON

By: _____
Laura Dininni, Chair
Board of Supervisors

[S E A L]

ATTEST:

_____
Centrice Martin, Secretary

CATA

October 27, 2022

Via Email

Ms. Centrice Martin
Township Manager
Ferguson Township
3147 Research Dr.
State College, PA 16801

RE: Resolution Authorizing an Amendment to the Articles of Incorporation of the Centre Area Transportation Authority to Extend the Life of the Authority

Dear Centrice:

The Articles of Incorporation under which CATA was organized as a municipal authority were approved by the Commonwealth of Pennsylvania on May 17, 1974. Because the Municipality Authorities Act sets a maximum term of existence of 50 years, an amendment to CATA's Articles of Incorporation is necessary to extend the life of the authority beyond 2024. Because amending the Articles is a multistep process requiring action on the part of all member municipalities, the process is being started now.

Attached to this letter is a certified copy of the resolution adopted by the CATA Board of Directors by unanimous vote on August 22, 2022, to amend the Articles of Incorporation to extend the life of the Authority through August 1, 2072. Also attached is a draft resolution for consideration by the Ferguson Township Board of Supervisors to adopt and approve the amendment to the Articles as proposed. Similar correspondence is being transmitted to the Borough of State College and the Townships of College, Harris, and Patton, as required by the Municipality Authorities Act.

It should be noted that this action is an administrative formality at the state level to continue CATA's existence and has no impact on ongoing discussions of local match shares. Should you have any questions, please contact me by phone at 814-238-2282 extension 5156 or by e-mail at loliva@catabus.com.

Sincerely,

Louwana S. Oliva

Louwana S. Oliva
Executive Director/CEO

Attachments:

1. Certified Resolution of the CATA Board of Directors Authorizing an Amendment to the Articles of Incorporation of the Centre Area Transportation Authority to Extend the Life of the Authority
2. Draft Resolution of the Board of Supervisors of the Township of Ferguson Adopting and Approving an Amendment to the Articles of Incorporation of the Centre Area Transportation Authority as Proposed by the CATA Board

cc: CATA Board of Directors

CENTRE AREA TRANSPORTATION AUTHORITY

Centre County, Pennsylvania

A RESOLUTION AUTHORIZING AN AMENDMENT TO THE ARTICLES OF INCORPORATION OF THE CENTRE AREA TRANSPORTATION AUTHORITY TO EXTEND THE LIFE OF THE AUTHORITY.

WHEREAS, Centre Area Transportation Authority (the "Authority"), a municipal authority organized and existing under the Municipality Authorities Act of 1945, approved May 2, 1945, P.L. 382, as amended and supplemented (the "Act") of the Commonwealth of Pennsylvania (the "Commonwealth"), was incorporated pursuant to appropriate action of the Borough Council of the Borough of State College, Centre County, Pennsylvania (the "Borough"), and the Articles of Incorporation were approved by the Department of State of the Commonwealth of Pennsylvania on May 17, 1974; and

WHEREAS, On December 23, 1981, the Authority approved an application for joinder of the Township of College, the Township of Ferguson, the Township of Harris, and the Township of Patton, and a Certificate of Joinder was approved on February 11, 1982; and

WHEREAS, the Authority desires to amend its Articles of Incorporation to extend the life of the Authority, which amendment is authorized and permitted by the Act.

NOW, THEREFORE, BE IT RESOLVED, by the Board of the CENTRE AREA TRANSPORTATION AUTHORITY, Centre County, Pennsylvania, as follows:

1. The Authority proposes to amend the Articles of Incorporation in order to increase the term of existence of the Authority by adding a new paragraph 8 to the Articles of Incorporation which shall read as hereinafter set forth in full:

> "8. The term of existence of said Centre Area Transportation Authority shall be for a period ending August 1, 2072."

2. This Authority proposes that Articles of Amendment to its Articles of Incorporation shall be substantially in the form attached hereto as Exhibit "A".

3. The Chairman or Vice Chairman and Secretary or Assistant Secretary, as appropriate, of this Authority hereby are authorized and directed to certify a copy of this Resolution and to submit such certified copy of this Resolution to the Borough of State College, the Township of College, the Township of Ferguson, the Township of Harris, and the Township of Patton (collectively, the "Municipalities") as required by the Act, and proper offices of this Authority are hereby authorized and directed to do all things and to take all action which may be necessary in order to have the Municipalities act upon said proposed amendment, as the same is contained in this Resolution.

4. If each of the Municipalities shall duly adopt and approve the amendment to the Articles of Incorporation of this Authority, as proposed in this Resolution, the Chairman or Vice

Chairman and Secretary or Assistant Secretary of this Authority hereby are authorized and directed to execute and verify Articles of Amendment, substantially in the form set forth in Exhibit "A" attached to this Resolution, and the Secretary or Assistant Secretary of this Authority hereby is authorized and directed to affix thereto and attest thereon the official seal of this Authority.

5. If each of the Municipalities shall duly adopt and approve the amendment of the Articles of Incorporation of the Authority as proposed in this Resolution, the Chairman or Vice Chairman and Secretary or Assistant Secretary of this Authority hereby are authorized and directed to advertise, in the manner specified in and required by the Act, the intention of this Authority to file Articles of Amendment with the Secretary of the Commonwealth of Pennsylvania and to cause the Amendment, together with the necessary proofs of publication, to be filed with the Secretary of the Commonwealth of Pennsylvania, and to do all other acts and things necessary or appropriate in order to secure approval of the Articles of Amendment, including filing fees and charges required in connection therewith.

6. All resolutions or parts of resolutions, insofar as such shall be inconsistent herewith, shall be and the same expressly are repealed.

DULY ADOPTED by the Board of the CENTRE AREA TRANSPORTATION AUTHORITY, Centre County, Pennsylvania, this 22nd day of August, 2022.

CENTRE AREA TRANSPORTATION AUTHORITY
Centre County, Pennsylvania

By: John C. Spychalski
(Vice) Chairman

ATTEST:
Lawana S
(Assistant) Secretary

(SEAL)

Exhibit "A"

ARTICLES OF AMENDMENT

TO: THE SECRETARY OF THE COMMONWEALTH OF PENNSYLVANIA

In compliance with the requirements of the Municipalities Authority Act of 1945, approved May 2, 1945, P.L. 382, as amended (the "Act"), and pursuant to a resolution duly adopted by the Board of the CENTRE AREA TRANSPORTATION AUTHORITY (the "Authority"), proposing an amendment to the Articles of Incorporation of the Authority, which proposed amendment has been submitted to and approved by the Borough Council of the Borough of State College, Centre County, Pennsylvania (the "Council of the Borough"), the Council of the Township of College (the "Council of College Township"), the Board of Supervisors of the Township of Ferguson (the "Board of Ferguson Township"), the Board of Supervisors of the Township of Harris (the "Board of Harris Township"), and the Board of Supervisors of the Township of Patton (the "Board of Patton Township") the governing authorities of the municipalities composing the Authority, by a Resolution duly adopted, the Authority hereby does file these Articles of Amendment to its Articles of Incorporation and hereby does certify:

1. The name of the Authority is CENTRE AREA TRANSPORTATION AUTHORITY.

2. The registered office of the Authority is 2801 W. Whitehall Road, State College, Pennsylvania 16801.

3. The Authority was formed under the provisions of the Act.

4. The original Articles of Incorporation for the Authority were filed and approved by the Secretary of the Commonwealth of Pennsylvania on May 17, 1974, as amended and supplemented by an Application of Joinder on December 23, 1981.

5. A resolution of the Authority was adopted on _____, 20__, a certified copy of which is attached hereto and incorporated herein by reference.

6. A resolution of the Council of the Borough was adopted on _____, a certified copy of which is attached hereto and incorporated herein by reference.

7. A resolution of the Council of College Township was adopted on _____, a certified copy of which is attached hereto and incorporated herein by reference.

8. A resolution of the Board of Ferguson Township was adopted on _____, a certified copy of which is attached hereto and incorporated herein by reference.

9. A resolution of the Board of Harris Township was adopted on _____, a certified copy of which is attached hereto and incorporated herein by reference.

10. A resolution of the Board of Patton Township was adopted on _____, a

certified copy of which is attached hereto and incorporated herein by reference.

11. The amendment proposed by the Board of the Authority and adopted and approved by the Council of the Borough, the Council of College Township, the Board of Ferguson Township, the Board of Harris Township, and the Board of Patton Township, as aforesaid, is to amend the Articles of Incorporation to increase the term of existence of the Authority by adding a new paragraph 8 to the Articles of Incorporation which shall read as hereinafter set forth in full:

> "8. The term of existence of said Centre Area Transportation Authority shall be for a period ending August 1, 2072."

12. The appropriate proofs of advertisement of the intention of the Authority to file these Articles of Amendment are attached hereto and incorporated herein by reference.

IN WITNESS WHEREOF, the Centre Area Transportation Authority has caused these Articles of Amendment to be executed by its Chairman or Vice Chairman and its official seal to be affixed hereto and attested by its (Assistant) Secretary, all as of the ___ day of _____, 202__.

ATTEST:

CENTRE AREA TRANSPORTATION AUTHORITY

_____
Secretary

_____
Chairman

(SEAL)

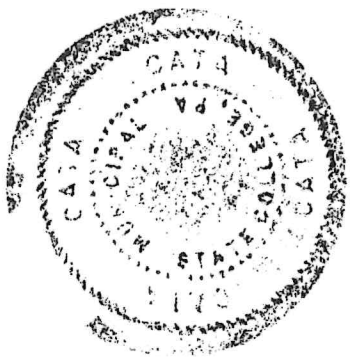
CERTIFICATE

We, the undersigned (Vice) Chairman and (Assistant) Secretary, respectively, of the CENTRE AREA TRANSPORTATION AUTHORITY, Centre County, Pennsylvania (the "Authority"), hereby certify that the foregoing Resolution is a true and correct copy of a Resolution duly adopted by majority vote of the entire Board of the Authority at a meeting of said Board duly convened and held according to law on August 22, 2022; that said Resolution was adopted by an aye and nay vote; that said Resolution and the vote thereon have been duly recorded in the minutes of said meeting; and that said Resolution remains in full force and effect, without alteration, amendment, modification or repeal, as of the date of this Certificate.

We further certify that the Board of the Authority met the advance notice requirements of the Sunshine Act, Act No. 1986-84 of the General Assembly of the Commonwealth of Pennsylvania, approved July 3, 1986, by advertising the time and place of said meeting and by posting prominently a notice of said meeting as required by law.

IN WITNESS WHEREOF, we hereunto affix our hands, and the Secretary affixes the official seal of the CENTRE AREA TRANSPORTATION AUTHORITY, Centre County, Pennsylvania, this 22 day of August, 2022.

Secretary



RESOLUTION OF THE BOARD OF SUPERVISORS OF THE TOWNSHIP OF FERGUSON, CENTRE COUNTY, PENNSYLVANIA

ADOPTING AND APPROVING AN AMENDMENT TO THE ARTICLES OF INCORPORATION OF THE CENTRE AREA TRANSPORTATION AUTHORITY, AS PROPOSED BY RESOLUTION OF THE BOARD OF SAID AUTHORITY; SETTING FORTH THE PROPOSED AMENDMENT; AND AUTHORIZING SAID AUTHORITY AND PROPER OFFICERS OF THE AUTHORITY TO EXECUTE, VERIFY AND FILE APPROPRIATE ARTICLES OF AMENDMENT.

WHEREAS, Centre Area Transportation Authority (the "Authority"), a municipal authority organized and existing under the Municipality Authorities Act of 1945, approved May 2, 1945, P.L. 382, as amended and supplemented (the "Act") of the Commonwealth of Pennsylvania (the "Commonwealth"), was incorporated pursuant to appropriate action of the Borough Council of the Borough of State College, Centre County, Pennsylvania (the "Borough"), and the Articles of Incorporation were approved by the Department of State of the Commonwealth of Pennsylvania on May 17, 1974; and

WHEREAS, On December 23, 1981, the Authority approved an application for joinder of the Township of College, the Township of Ferguson, the Township of Harris, and the Township of Patton, and a Certificate of Joinder was approved on February 11, 1982; and

WHEREAS, the Authority, by Resolution duly adopted on August 22, 2022 (the "Resolution"), has submitted to the Board of this Township, a proposed amendment to its Articles of Incorporation to increase its term of existence, which amendment is authorized and permitted by the Authorities Act; and

WHEREAS, the Authorities Act provides, among other things, that the Board of this Township, being a governing authority of the municipality composing the Authority, shall adopt or reject said proposed amendment by resolution;

NOW, THEREFORE, BE IT RESOLVED by the Board of this Township, as follows:

SECTION 1: The Board of this Township hereby adopts and approves the amendment to the Articles of Incorporation of the Authority as proposed by a Resolution duly adopted by the Board of the Authority, a copy of which Resolution has been submitted to the Board of this Township.

SECTION 2: The amendment to the Articles of Incorporation of the Authority, which hereby is adopted and approved, shall amend the Articles of Incorporation in order to increase the term of existence of the Authority by adding a new paragraph 8 to the Articles of Incorporation which shall read as hereinafter set forth in full:

"8. The term of existence of said Centre Area Transportation Authority shall be for a period ending August 1, 2072."

SECTION 3. Proper officers of the Authority hereby are authorized to execute, verify and file appropriate Articles of Amendment with the Secretary of the Commonwealth of Pennsylvania and to take all other action and to do all other things which may be necessary in order to accomplish the amendment of the Articles of Incorporation of the Authority in the manner herein adopted and approved.

SECTION 4. All resolutions or parts of resolutions, insofar as the same shall be inconsistent herewith, shall be and the same hereby expressly are repealed.

Duly adopted this ___ day of _____, 2022.

ATTEST:

TOWNSHIP OF FERGUSON,
Centre County, Pennsylvania

_____
Secretary

_____
(Vice) Chair of the
Board of Supervisors

TOWNSHIP OF FERGUSON
3147 Research Drive • State College, Pennsylvania 16801
Telephone: 814-238-4651 • Fax: 814-238-3454
www.twp.ferguson.pa.us

November15, 2022

JB Roofing
Jeffrey S. Bickle
3256 Zion Road
Bellefonte, PA 16823

Re: Contract 2022-C19 Ferguson Township Roof Replacement Building 3

Dear Mr. Bickle,

On September 6, 2022, the Ferguson Township Board of Supervisors approved a contract with J B Roofing.

On September 9, 2022, J B Roofing was provided notice of the award. The contract requires J B Roofing to provide a performance bond and a payment bond. J B Roofing was requested to bring the bonds to the pre-construction meeting held on October 5, 2022.

In addition to the bonds, the contract requires J B Roofing to submit proof of insurance with limits specified in the contract including evidence of worker's compensation insurance.

In addition, the contract required submission, with the bid, of any submittals for materials not specified in the contract. No product materials were submitted with the bid.

The contract requires evidence of compliance with the Public Works Employment Verification Act.

Also, the contract requires evidence of insurance coverage containing certain limits.

On October 19, 2022, J B Roofing was notified that within 10 days of receipt of the letter and no later than October 31, 2022, and in accordance with the contract, J B Roofing is required to provide to the Township the following information in writing:

1) Performance bond and Payment bond
2) Evidence of worker's compensation insurance
3) Written confirmation that J B Roofing shall use the exact materials specified in the contract and that no material substitutions are requested
4) Confirmation that work will be performed and completed in 60 days, and anticipated work start date
5) Evidence of compliance with the Public Works Employment Verification Act using the verification form provided online by the Department of Homeland Security

The October 19, 2022 letter stated that subject to submission and approval of the above, the Township will provide J B Roofing an executed contract which shall serve as your notice to proceed with the work.

The October 19, 2022 letter also stated that Ferguson Township has become concerned about the responsiveness of J B Roofing to perform work under this contract. In the event J B Roofing does not provide the required information above in writing in the time specified, Ferguson Township may terminate this contract.

As of the date of this letter, this office has received no communication from J B Roofing. Unfortunately, due to J B Roofing not being responsive, and as no written contract was provided to J B Roofing, the award of this contract to J B Roofing is withdrawn.

Sincerely,

David J. Modricker
Public Works Director
File: Contract 2022-C19 Bldg 3 Roof Replacement

Copy: Centrice Martin, Township Manager

TOWNSHIP OF FERGUSON
3147 Research Drive • State College, Pennsylvania 16801
Telephone: 814-238-4651 • Fax: 814-238-3454
www.twp.ferguson.pa.us

TO: Centrice Martin, Township Manager
Ferguson Township Board of Supervisors

FROM: David Modricker P.E., Public Works Director

DATE: November 8, 2022
SUBJECT: **CONTRACT 2022-C19 FTPW BUILDING 3 ROOF REPLACEMENT**
WITHDRAWL OF AWARD TO J B ROOFING
AWARD TO MID-STATE ROOFING AND COATING, INC.

On September 6, 2022, based on bids received and based on my recommendation, the Board of Supervisors authorized the award of contract 2022-C19 FTPW Building 3 Roof Replacement to the low bidder, Jeffery S. Bickle dba J B Roofing, in the amount of $24,336.00. Prior to actual award, the contractor was required to submit certain documents, including but not limited to bonds, proof of insurance, and evidence of compliance with the Public Works Employment Verification Act. Unfortunately, after multiple notifications, the contractor failed to provide the necessary documents and as such the Township has not formally entered into a contract. Attached find a letter indicating the reasons why and the need to withdraw the notice of award to J B Roofing.

On November 8, 2022, I contacted the second low bidder, Mid-State Roofing and Coating, Inc. who submitted a bid in the amount of $46,443.00. The contractor is willing and able to perform the work for the amount of their bid. The contractor indicated the ability to provide all the required submittals and did provide references for similar work. Given the onset of winter, it will be necessary to extend the period of performance to allow the work to be completed in the spring.

The budget for this work is $76,650.00.

I recommend that the Board of Supervisors withdraw the award of contract 2022-C19 FTPW Building 3 Roof Replacement to Jeffery S. Bickle dba J B Roofing in the amount of $24,336.00 for the reasons stated above and award the contract to Mid-State Roofing and Coating, Inc. in the amount of $46,443.00.

File: Contract 2022-C19 FTPW Building 3 Roof Replacement

Copy: Chris Leidy, Building and Asset Superintendent