BOGIA ENGINEERING INC.

TRANSMITTAL LETTER

To: Township of Roxbury Township Clerk
Amy Rhead
1715 Route 46,
Ledgewood, NJ 07852

Date: July 25, 2022

Re: County Concrete FHA and FWW

Item Number	Reference
01	Environmental Report
02	Plan and Figures
03	Engineering Report
04	FHA modeling reports
05	Idfe worksheet
06	SWM-E&S report
07	Project Plans
08	Response Letter
09	NJHPO approval
10	Property Owner Certification Form
11	Public Notice Form
12	Pineland Map
13	Highlands Map
14	Full municipal map

For Your Use ☒ As Requested ☐ For Review ☐
For Review & Approval ☐ For Approval ☐
Comments:

Sincerely,
Donald Haas

Donald A. Haas
Branch Manager

CC:
Client
File

Project No.: NJ1954-01

1340 Penn Avenue
Wyomissing, PA 19610
T: 610-678-3071
www.bogiaeng.com

1101 S. Broad Street
Lansdale, PA 19446
T: 215-362-3878
www.bogiaeng.com

667 Exton Commons
Exton, PA 19341
T: 484-872-8886
www.bogiaeng.com

BOGIA ENGINEERING INC.
1340 Penn Avenue
Wyomissing, PA 19160
Phone: 610.678.3071
Fax: 610.678.3517
www.bogiaeng.com

ENVIRONMENTAL REPORT
FLOOD HAZARD AREA INDIVIDUAL PERMIT
OPEN WATER FILL INDIVIDUAL PERMIT

BLACK RIVER RESTORATION

FOR COUNTY CONCRETE CORPORATION

MINE HILL AND ROXBURY TOWNSHIPS
MORRIS COUNTY
NEW JERSEY

Prepared by: A. Behbahani
Prepared by: C. Muldoon, PE
Date: April 2022

PROJECT: NJ1954-01

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APPENDICES

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

SEAL

______________________________________ ____________________

Signature Date

Project Introduction

Describe the site in the existing condition, including a summary of existing vs. proposed land coverage. Provide an inventory of the environmentally sensitive portions of the site (which portions of the site are located within the floodway, flood fringe, riparian zone, freshwater wetlands, and transition areas and which portions of the site or nearby properties contain threatened or endangered species habitat, etc.) Provide a brief summary of the project. Include any prior Department actions on site (approvals, denials, withdrawn applications, cancelled applications, Enforcement actions), and how they impact the proposed project, if at all.

The Black River in Morris County, New Jersey currently routes through man-made Rutgers Pond in Roxbury and Mine Hill Townships. The NAD 1983 NJ State Plane coordinates for the project area are 458117.001174, 741284.80268. The proposed project will reestablish the natural channel of the river, disconnecting it from Rutgers Pond. This will be accomplished by mainly using fine-grained materials that were separated from aggregates removed from the pond to build up land surface along the southwest edge of the pond. A naturalized stream channel will be constructed to directly connect the Black River to itself downstream of the existing pond. The new stream banks will be stabilized with gravel and vegetation. Landscaping and shade trees will be implemented along both sides of the new stream channel. The intended use of the new area around the restored stream channel is a vegetated, naturalized area.

A local aggregate quarry, County Concrete Corporation, will be undertaking this restoration project. They are willing to complete this restoration and beneficial re-use project. The fill material for the project will be quarry tailings from County Concrete operations. This material is comprised of native fine-grained materials removed from the pond and not used for making concrete. These have been mechanically separated on site using the pond water for washing and without the use of additives.

Rutgers Pond is approximately 56 acres, while the proposed fill area in open water (i.e., total disturbed area) is 16.4 acres, and the area where fill elevations will be higher than the existing normal pool elevation is 8.6 acres. The project site is located largely within the floodway and minimally impacts the flood fringe and riparian zone. There are freshwater wetlands along the banks of the Black River and Rutgers Pond. Impacts to these areas are minimal and temporary. The entire project site is within one drainage area. Stormwater from the site drains to the existing Black River channel along the south edge of Rutgers Pond.

This project is expected to be completed over the course of 7 to 10 years. The southwestern portion of Rutgers Pond will be incrementally filled in, starting along the bank to the north of the project site. The existing stream into the project site will continue to discharge into Rutgers Pond for the duration of the filling. A path along the existing shoreline of Rutgers Pond will be maintained to manage the flow of the Black River during the period of the project. As the area of fill is placed, the area will be graded to specified slopes and the designed channel will be stabilized with gravel and vegetation. A second stream channel will be created in the fill area to manage flows from the Lamington River, which enters at the north end of Rutgers Pond. During fill activities, a flow path will be maintained along the existing shoreline of Rutgers Pond until the designed channel has been stabilized with gravel and vegetation. Once the new channels have been determined to be stable, the former flow paths along the shoreline will be filled in to a specified grade, stabilized, and revegetated. Once the constructed channels have been stabilized, stream flows will be directed into the new stream channels. The new stream channels will be monitored and any necessary remediation and stabilization will be conducted.

To date there have been no Department actions for this project. A pre-application meeting was held on November 16, 2021.

The existing environmental conditions of the site were investigated with site and bathymetric surveys (Plan Sheet 2, Appendix D), a wetland delineation and report, a habitat assessment report, a NCRS Web Soil Survey Report, and a Natural Heritage Database letter (Appendix B), among others. The geotechnical report of the fill material is provided in Appendix B.

7:13-11.2 Requirements for a Regulated Activity in a Riparian Zone

The Black River through the project site is classified as FW2-NT(C1). The riparian zone is 300 feet. The Natural Heritage Database Search Report is presented in Appendix B. The boundaries of the regulated waters were identified during field surveys conducted by PLS and are presented on the existing conditions site plan in Appendix D. The top of bank was used to delineate the Black River channel and the normal water surface elevation was used to delineate the boundary of Rutgers Pond. The only disturbance to existing vegetated riparian zones is to gain access to the project site. Disturbance to the riparian zone has been minimized by utilizing existing private driveways for site access and minimizing the disturbance of vegetated areas. New riparian zone area, created by the placement of fill in Rutgers Pond, is also listed below. This area will be incrementally created and stabilized with vegetation throughout the construction phase of the project. Table 1 below lists the areas of disturbance and the allowable limits per Table 11.2.

Table 1: Areas of Riparian Zone Disturbance

Disturbance Location	Area of Proposed Riparian Zone Disturbance	Riparian Zone Disturbance Area Allowable per Table 11.2	Mitigation Required?
Northern Access	921 ft^2 (<50 ft) 703 ft^2 (>50ft)	1,000 ft^2 total (50-foot Riparian Zone)	No
Fill Area (**New** Riparian Area; stabilized with vegetation)	8.6 acres	No limit if disturbance is justified	No

One access area is required for the completion of this project. The northern access point will be the main point of access for equipment to move and place fill in the project area. An existing private road exists near the access point and the access area has been designed to minimize the impact to riparian areas. As this project is a stream restoration project, disturbance within 25 feet of the top of bank is permissible under 7:13-11.2(c)2.

The disturbed riparian zone areas will be revegetated in accordance with 7:13-11.2(z). As the proposed areas of disturbance are largely impacted by active disturbance, as indicated by the prevalence of non-native species and proximity to commercial operations, the area will be replanted with similar species and types of vegetation that is removed. Native vegetation has been proposed to the greatest extent possible. Details of this planting plan can be found in Appendix D.

7:13-11.5 Requirements for a Regulated Activity in or Along a Regulated Water with Fishery Resources

In order to protect general game fish in Rutgers Pond and downstream, no construction, excavation, filling or grading will be allowed in the channel or Rutgers Pond from May 1 through July 31 of each year. This is appropriate to protect spring spawning of general game fish as indicated in Table 11.5 in N.J.A.C. 7:13. Appropriate soil erosion and sediment control measures will be implemented to allow continued construction, excavation, filling, and grading in the riparian zone and newly created riparian zone during this time frame.

Temporary channels to transport flows from the Black River and the Lamington River, established along the existing bank of Rutgers Pond, will provide for continued aquatic passage through the regulated waters for the duration of the project. These temporary channels will maintain a similar average depth as the upstream branch to maintain a consistent connection for aquatic passage.

The existing stream configuration routes the Black River through Rutgers Pond. Impoundments typically heat up water as it passes through during warm months, which can degrade downstream water quality. Higher stream temperatures affect water quality parameters such as dissolved oxygen, which is important for fish and macroinvertebrate health. This restoration project will promote better water quality, lower summer temperatures, and improved fishery resources downstream in the Black River.

7:13-11.6 Requirements for a Regulated Activity in or Affecting a Present or Documented Habitat for Threatened or Endangered Species

The Natural Heritage Database letter is presented in Appendix B. A habitat assessment for the project site is presented in Appendix B. The proposed project is the restoration of the Black River stream channel and surrounding riparian areas. This project will increase the forested and wetland habitats that many of these species rely on by 8.6 acres. The surrounding habitat areas will be protected during construction using erosion and sediment control techniques, as outlined in the Erosion and Sediment Control Plan in Appendix C.

A field visit was conducted on December 16, 2021 to assess the existing conditions of the site and perform a habitat assessment and threatened and endangered species survey. This assessment can be found in Appendix B. The area of habitat that was observed during this assessment was approximately 40 acres. One observer spent approximately 3 hours walking the site looking for threatened and endangered species, including nests and other indicators, and assessing habitat conditions.

No threatened or endangered species were observed during this site visit. The area largely is composed of open water (Rutgers Pond). The surrounding area is largely impacted by commercial operations. Quarrying operations and wood storage piles greatly reduce the quality of habitat for threatened or endangered species. The invasive species phragmites occupies both sides of the channel, both upstream and downstream of the project site. The site scored a habitat score of 95 on the FIBI Field Data sheet, indicating a marginal habitat score. This score was largely supported by the lack of impacts along the left bank of Rutgers Pond. This bank will not be disturbed or altered during the proposed activities.

The existing proximity of commercial activities to the project site reduces the quality of this habitat for these species. The proposed project will increase the buffer between these commercial activities and the regulated waterway. An increased vegetated buffer will provide expanded habitat for the species of concerned listed in the on-site and proximity report.

The species listed on the Landscape Project 3.3 Species Based Patches report for the project site are presented in Table 2 below. The species of concern is listed with its feature type and potential impacts of the project.

Table 2: Summary Table of Species Identified in the Landscape Project 3.3

Species from Landscape Project 3.3	Feature Type	Project Impact Notes
Bald Eagle (*Haliaeetus leucocephalus*)	Foraging	The open water area, a potential foraging area, will be decreased by # acres. Currently, anthropogenic impacts along the western shore of Rutgers Pond degrade the quality of this foraging site, including noise pollution and limiting riparian zone quality. By increasing the buffer between the impacted areas (quarry/log storage) and Rutgers Pond, the quality of the foraging site for the Bald Eagle will be improved.
Barred Owl (*Strix varia*)	Breeding Sighting	Nesting usually occurs in a natural cavity in a tall tree, 20-40' above the ground. The existing project site is largely open water, and no large tree removal is proposed. The final project conditions have the potential to provide additional nesting habitat for the Barred Owl, after years of maturity. The project also will

		increase the quality of potential habitat located along the eastern side of Rutgers Pond, by increasing the buffer between the pond and mining/log storage impacts.
Brown Thrasher (*Toxostoma rufum*)	Breeding Sighting	Nesting usually occurs in dense shrub/low tree, 2-7' above the ground. Final project conditions will increase the nesting habitat of the Brown Thrasher by #acres.
Great Blue Heron (*Ardea herodias*)	Foraging	Shoreline disturbance will be phased, limiting total shoreline disturbance at any one time. Final project conditions propose an additional 1,115 LF of stream bank and only a minimal reduction (21 LF) of shoreline.
Arogos Skipper (*Atrytone arogos arogos*)	Breeding/Courtship	Reliant on relatively undisturbed prairie and grassland habitats, which are not present on the project site. Native planting plans may replace invasive vegetation with native host plants.
Indiana Bat (*Myotis soldalis*)	Active Season Sighting	During the active season, Indiana Bats feed on insects, both found in terrestrial and wetland habitats. During active seasons they can roost under the bark of large trees, among other structures. The final project conditions have the potential to provide additional roosting habitat for the Indiana Bat.
Northern Myotis (*Myotis septentrionalis*)	Active Season Sighting	During the active season, Northern Myotis feed on insects, both found in terrestrial and wetland habitats. During active seasons they can roost under the bark of large trees, among other structures. The final project conditions have the potential to provide additional roosting habitat for the Northern Myotis.
Wood Turtle (*Glyptemys insculpta*)	Occupied Habitat	Existing wetlands will be minimally impacted (access only). Final project conditions will provide 8.6 acres additional forested/wetland habitat and increase the buffer between existing anthropogenic impacts.

7:13-12.1 Requirements that Apply to All Regulated Activities

This project will not cause significant and adverse effects to the items listed in 7:13-12.1(b) as described below.

Water quality: This project will not cause significant and adverse effects to the water quality of Rutgers Pond and the Black River. Impoundments of water, such as Rutgers Pond, tend to heat water as it flows through during warm weather conditions. Disconnecting the Black River from Rutgers Pond is anticipated to have positive effects on stream health, including lower summer water temperatures. The placement of fill in Rutgers Pond will slightly reduce its overall area, from approximately 56 acres to 47.4 acres, and maximum depth in the project area from approximately 46 feet to 31 feet deep. The proposed area and depth of Rutgers Pond is sufficient to continue to support the warm water fishes and other aquatic organisms in this water body.

The risk of adverse effects to the water quality by construction activities will be mitigated with the use of appropriate technologies. During the construction phase of this project, there is the potential for unsettled sediment to be transported out of the fill area and downstream in the Black River. During all placement of fill in Rutgers Pond, turbidity curtains will be used to inhibit the transport of sediment downstream. The maintained water ways along the banks of Rutgers Pond to allow for passage of stream flows during construction periods will be monitored throughout the construction period for evidence of accelerated erosion. While the channel has been oversized to reduce flow velocities, if accelerated erosion conditions occur, the temporary channels will be reinforced with appropriate technologies including geotextile liner, erosion control matting, and/or rip rap.

Aquatic biota: The restoration of the Black River is likely to improve the stream health, including aquatic biota health, such as macroinvertebrates. Restoring the natural stream channel is likely to promote cooler summer water temperatures in the stream and the vegetated buffer will help to filter non-point source pollutants from stormwater entering the stream. Both of these factors are beneficial to aquatic biota in the stream.

Water supply: This project has no known impacts to water supply.

Flooding: As presented in other sections of this report, the post-construction conditions meet all of the regulations in N.J.A.C. 7:13. The amount and location of placed fill has been designed to manage flooding in accordance with N.J.A.C. 7:13. The #Engineering Report dated # presents the hydrologic calculations to assess impacts to flooding.

Drainage: The project site is within a single drainage area. Currently, the stormwater from the site drains to the Black River/Rutgers Pond and exits the project site along the southern edge of the project boundary through the existing outlet channel. This drainage area will not change due to this project.

Channel stability: The proposed channels to convey the flows from the Black River and the Lamington River have been designed for stability. Assessment of designed channel stability is provided in the Engineering Report prepared by Bogia Engineering, Inc.

Threatened and endangered species of their current or documented historic habitats: According to the NJDEP Landscape 3.3 Viewer, the project site is a part of the Skylands Species Based Habitat area. The 2012 existing uses for the areas involved in the project are "extractive mining" and "artificial lake". The 2012 Land use cover types are "barren land" and "water". The Natural Heritage Database letter, which includes the Landscape Report for on-site and proximity to the project site is provided in Appendix #. As further described in section 7:13-11.6 of this report, the project will improve the habitat conditions of the area by creating new forested habitat, increasing the width of the undisturbed riparian zone, and improving the habitat quality with native plantings. Temporary impacts to the habitat that supports threatened and endangered species will be mitigated by the extended construction timeline, which reduces the total disturbed area at any one time.

Navigation: The Black River is not a navigable water way. Existing upstream and downstream culverts and low base flows limit the navigability of this water way. This project will have no effect on the navigability of the Black River.

Energy production: This project has no known impacts to energy production.

Fishery resources: At the project site, the Black River is classified as FW2-NT. Warm water fishes, such as sunfish and bass, spawn in shallow areas when the water warms in the spring. In pond construction activities will be halted from May 1st through July 31st to protect spawning of general game fish species in Rutgers Pond. The placement of fill to restore the Black River channel will disturb some of these shallower areas. The total length of shoreline to be disturbed is less than 0.3 miles, while Rutgers Pond has approximately 1.4 total miles of shoreline. Additionally, as this project is expected to occur over 7 to 10 years, the disturbance to the shoreline will be disturbed in sections much less than the project total of 0.3 miles.

As the project site has a site disturbance of greater than 1 acre, a NJPDES permit will be applied for and obtained, in compliance with 7:13-12.1(c). Erosion and sediment control measures will be employed on the site and for the duration of construction activities. These measures will include a rock construction entrance, mulching and plantings of disturbed areas, and turbidity curtains. All backfill slopes will be graded and stabilized in accordance with the technical details to prevent post-construction erosion. Permanent, native and non-invasive vegetation will be established on the exposed fill after final grade is achieved. The maintenance of the proposed planting will be in accordance with the proposed maintenance schedule to monitor the plant health. Floodplain modeling and channel stability were analyzed and are addressed in the Engineering Report, prepared by Bogia Engineering, Inc.

7:13-12.14 Requirements for Bank Stabilization and Channel Restoration

According to neighboring property owners, the project site was initially farmland before quarrying operations removed significant amounts of sediments from the area. These quarrying operations created the water body that is now referred to as Rutgers Pond. The Black River is hydrologically connected to Rutgers Pond and has no defined channel through the project site.

To date, there have been no attempts to restore or stabilize the Black River channel through the project site. The causes of ecological degradation that led to the Black River connecting to Rutgers Pond were mechanical quarrying operations. Quarrying operations are no longer active in the project area, and this mechanical removal of restored stream channel and banks is not a concern.

The placement of fill into Rutgers Pond to restore the Black River channel is the only way to restore the Black River Channel to a typical cross section. The channel has been drastically reconfigured due to the historical quarrying operations. The addition of fill material will restore the Black River channel. Vegetated riparian zones created on both sides of the proposed channels will protect from erosion and enhance the habitat value of the area.

According to a custom StreamStats report, the drainage area of the proposed stream restoration is 6.08 square miles. That area is 13.3 percent storage area such as lakes, ponds, reservoirs, and wetlands and has a basin population density of 1,190 persons per square mile. Future development of the watershed may increase volume and pollutant loads in stormwater runoff. The proposed vegetated buffer around the proposed channel will help to slow stormwater runoff and filter pollutants before it reaches the Black River.

The restored channel will be a permanent improvement to the Black River. The channel will be monitored annually for three years following the completion of construction, at which point the channel will be considered established and permanent.

The fill area will be monitored for slope stability and settling using recurring bathymetric surveys. A bathymetric survey of the project area will be conducted every year that fill material has been placed, and one year after the completion of construction.

Changes to channel morphology can be expected for the short term after construction. Any areas of accelerated erosion or channel instability will be restored with embankment armoring such as erosion control matting or riprap. The most naturalized erosion control method should be chosen to remedy the instability. A qualified professional will assess the stream channel stability before any flows are directed into the constructed channels. Then, the stream channels will be assessed by a qualified professional for stream stability annually for three years following the completion of the project. Any areas of accelerated erosion or channel instability shall be noted during these inspections and remedied.

Vegetation, including native grasses planted along the upper banks of the constructed channel, will be monitored and maintained. During Year 1 following completion of the project, the vegetated channel banks and pond edges will be monitored for invasive and weed species, which will be removed. Pruning, reseeding, thatch removal, and pest control of the vegetated areas will be employed as needed. Newly planted trees and shrubs will be provided supplemental watering and dead/damaged branches will be pruned naturalistically in late fall or early spring. In Year 2 following construction, the grassed embankments and pond edge will be pruned, reseeded, thatch removed, and pests controlled, as needed. Trees and shrubs will have stakes removed. All bark protection shall be checked and repaired/replaced as needed. Any dead plant material will be replaced with live, healthy specimens. Damaged or dead branches will be pruned in early spring or late fall. In Year 3 post-construction, the channel banks and pond edge will be pruned, reseeded, thatch removed, and pests controlled, as needed. Trees and shrubs will have bark protection checked and repaired/replaced as needed. Damaged or dead branches will be pruned in early spring or late fall. In the subsequent years, bark protection shall be repaired or replaced for trees as needed, and any damaged or dead branches will be pruned in a naturalistic manner in early spring or late fall. This robust and well maintained vegetative buffer will reduce the likelihood of future erosion, instability, and ecological degradation on site.

7:7A:16.9(b)4.iv Analysis of Potential Adverse Impacts

The Black River Restoration project has the potential to cause temporary adverse environmental impacts, but the permanent positive environmental impacts of this project justify the temporary negative impacts. Additionally, these adverse impacts can be mitigated with proper construction techniques and planning.

This project will reconnect the Black River to itself by reestablishing channel flow through the area. This project will transform 8.6 acres of Rutgers Pond into a naturalized stream channel and surrounding riparian area. An additional 7.8 acres of the pond will be impacted by fill, to establish stable banks and slopes in Rutgers Pond. The 7.8 acres of open water disturbance is only temporary, as the area will be maintained as open water and will re-establish itself with littoral and benthic aquatic communities. The shoreline will be planted with native aquatic species to stabilize the bank and enhance the habitat qualities of the shoreline. Approximately 47.4 acres of Rutgers Pond will remain as an open water area.

During the construction phase of the project, before full stabilization is achieved, there is the potential for accelerated erosion of disturbed or newly placed sediments into the Black River. By maintaining a channel for flow along the existing bank, one side of the temporary channel is partially stabilized and the stream will be directed around the majority of the fill area. Additionally, the temporary channel is designed to be larger than required to handle existing flows, which will reduce the velocity, and therefore scour potential, through the channel. Erosion control matting or other reinforcement will be used along the temporary channel where accelerated erosion is anticipated or observed. The temporary channel allows for the constructed channel to be fully stabilized before the stream is directed into it. This phased approach limits interactions between the stream and unstabilized areas. Silt socks at key areas and turbidity curtain at the outlet of Rutgers Pond will be utilized to prevent sediments from entering the Black River downstream. Details of the erosion and sediment pollution control measures are presented in the E&SC report in Appendix C and plans provided in Appendix D.

As this project area is almost entirely in open waters, there will be limited disturbance to riparian zones. Access to the site will need to be achieved at the north of the project area, through an existing riparian zone. Minimal clearing and a rock construction entrance will be utilized to minimize impacts on the area. Existing private driveways will be used to minimize vegetative clearing. Temporary disturbance to riparian zones will be 1,624 sqft, and there will be 0 sqft of permanent disturbance. Due to the nature of this project, 8.6 acres of new vegetated riparian area will be created and stabilized with native plants and trees.

The Black River is listed as FW2-NT(C1). Restrictions on work in the water will be in place from May 1st through July 31st to protect spawning of general game fish species in Rutgers Pond. Erosion and sediment control technologies such as turbidity curtain and silt socks will be used to protect water quality in the project area and downstream. There are no adverse thermal impacts to the Black River expected during construction as fill will be placed incrementally over a period of 7 to 10 years.

As described in the habitat assessment report, the project site is impacted by existing anthropogenic impacts along the project boundary. Due to this, the likelihood of the site supporting sensitive species is reduced. From the list of identified threatened or endangered species, as developed by the Landscape Project 3.3 species based patches, Rutgers Pond may be a foraging site for two species: Bald Eagles and Great Blue Herons. The proposed project reduces the area of open water by 8.6 acres and 21 LF of pond shoreline. While overall area is slightly reduced, the quality of this foraging site will be improved. An additional 1,115 LF of stream will be developed, and a forested buffer will increase the separation between Rutgers Pond and the existing surrounding commercial activities.

7:7A-16.9(b)4.v Analysis of Alternatives

The restoration of the Black River is a beneficial reuse project. This project aims to restore the natural channel of the Black River, while also managing unmarketable materials currently stored by County Concrete Corp. There are two possible alternatives: conduct the restoration project, and do not conduct the restoration project. These alternatives are described below with expected impacts.

Alternative 1 – No Build

In this alternative, no effort to restore the Black River would be conducted. Rutgers Pond and the Black River would remain unchanged. In order to continue operations, County Concrete would have two main courses of action:

- Haul and properly dispose of the sifted native soils at an offsite location. The materials have no market or resale value. Relocating this material would require significant truck transportation of the material, resulting in increased truck traffic and air pollution. Disposing of this fill at regulated facilities would also incur significant costs.
- Continue to store the material on site, and acquire new land to conduct operations. This option would require the purchase of land currently not used for quarrying operations, clearing it, and establishing commercial operations. This has the potential to cause significant environmental degradation, as the lot would need to be cleared and

depending on its proximity to the main quarrying operations, could significantly increase truck traffic to conduct business.

Alternative 2 – Chosen Approach

The restoration of the Black River with open channel flow will be a beneficial reuse project and provide environmental benefits. The proposed alternative will utilize the sifted native soils as a fill material to restore the channel connectivity of the Black River. By relocating this material to its source, County Concrete Corporation will benefit by not having to maintain these stockpiles of valueless sediments. The restoration project will create 8.6 acres of new forested land, and is likely to improve water quality of the stream, including reducing summer water temperatures.

7:7A-16.9(b)4.vi Measures to Reduce Adverse Impacts

Measures to reduce the potential adverse impacts of the Black River Restoration project are addressed below.

Existing conditions analysis: The existing conditions of the site were thoroughly assessed to develop a baseline for the proposed channel and to assist in determining potential adverse impacts of the project. This included consultation with Dr. Melinda Daniels, a fluvial geomorphologist with the Stroud Water Research Center. She was present on-site during an initial site investigation and provided a review and input of the final design. ##what insights## Site investigations included a bathymetric survey, land survey, habitat assessment, threatened or endangered species survey, and wetland survey. The existing site condition assessment included a review of public environmental data including NRCS soil surveys, USGS StreamStats, NJHPO review, NJNHD review, and historical aerial imagery.

Utilization of existing site characteristics: The proposed design utilizes existing site conditions to minimize the adverse impacts. Access to the fill area was designed to minimize impacts to riparian zones by minimizing the area of impact. Addition of soils from the upstream side of the project site will allow sediments time to settle before the water exits the site at the outlet on the south end of the project site.

Construction Timing: In-pond construction will be ceased during the spawning season of May 1st through July 31st to reduce adverse impacts on game fish populations in the pond.

Erosion and Sediment Pollution Control Plan: An Erosion and Sediment Pollution Control Plan has been prepared for this project. BMPs including silt socks, erosion control matting, and turbidity curtains are used to prevent sediment transport out of the project area. Details of these measures can be found in the E&SC Report, presented in Appendix C.

Native plantings: The fill area will be restored to a forested condition. Native tree, shrub, and grass species will be planted to stabilize the area and enhance the habitat quality of the area. Existing patches of Common Reed exist both upstream and downstream of this project site. The placement of fill material is designed to create upland areas to minimize the potential for this species to spread throughout the new area.

Monitoring program: A monitoring program will be implemented during and after construction activities to monitor project success and the protection of downstream environments. During the time frames that fill is actively placed or moved in the project site monitoring will track project progress and monitor the extent of impacts. After completion of all construction and restoration efforts, post-construction monitoring will assess the long-term stability and success of the restoration project.

Monitoring actions during construction activities will include bathymetric and land surveys, monitoring of E&SC BMPs, and assessment of channel stability. The bathymetric and land surveys will be conducted to maintain the proposed project boundary, confirm conformance to the design, and track progress of the project. E&SC BMPs will be monitored and maintained throughout the construction phase, as presented in the E&SC Plans. The design channels will be stabilized and assessed by a qualified individual before any stream flows are directed into the channel. This assessment will include an evaluation of the constructed stream bed, materials, and vegetative cover along the banks.

Post-construction monitoring will include assessments of vegetative coverage, channel stability, and slope stability.

The monitoring activities will be performed according to the schedule presented in Table 3.

Table 3: Monitoring Actions Summary

Monitoring Action	Duration	Recurrence Interval
E&SC BMP Monitoring	When E&SC Measures are employed on site	Per E&SC Plan
Project Area Bathymetric Survey	During construction and 1 year post construction	Annually
Designed Channel Stability Assessment	During construction and 3 years post construction	Before flows are directed into designed channels and post-construction
Vegetation Monitoring	During construction and 3 years post construction	Annually

Appendix A

Site Information

1. USGS 7.5 Minute Quadrangle Location Map
2. Municipal Tax Maps
    a. Roxbury Township Tax Map
    b. Mine Hill Township Tax Map
    c. Randolph Township Tax Map
3. Municipal Street Maps
    a. Roxbury Township Street Map
    b. Mine Hill Township Street Map
    c. Randolph Township Street Map
4. FEMA FIRMs
    a. Roxbury Township FIRM
    b. Mine Hill Township FIRM
    c. Randolph Township FIRM
5. Property Documents
    a. Lot 30-10 Block 43 Map
    b. Property Deed

USGS

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

US Topo

MENDHAM QUADRANGLE
NEW JERSEY
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 18T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.

ROAD CLASSIFICATION

MENDHAM, NJ
2019

KEY MAP 3

REVISIONS		
DATE	L.S. NAME	NO.
10/31/01	MATTHEW L. MARTINI, PLS	30088
12/31/02	MATTHEW L. MARTINI, PLS	30088
12/31/03	MATTHEW L. MARTINI, PLS	30088
12/31/04	MATTHEW L. MARTINI, PLS	30088
12/31/05	MATTHEW L. MARTINI, PLS	30088
7/31/13	MATTHEW L. MARTINI, PLS	30088
3/31/15	MATTHEW L. MARTINI, PLS	30088

TO SHOW CONDITIONS AS OF MARCH 31, 2015.

DETAIL

BLOCK NUMBER 102

LOT NUMBER 2

LEGEND

KEY

51 DETAIL SHEET NUMBER

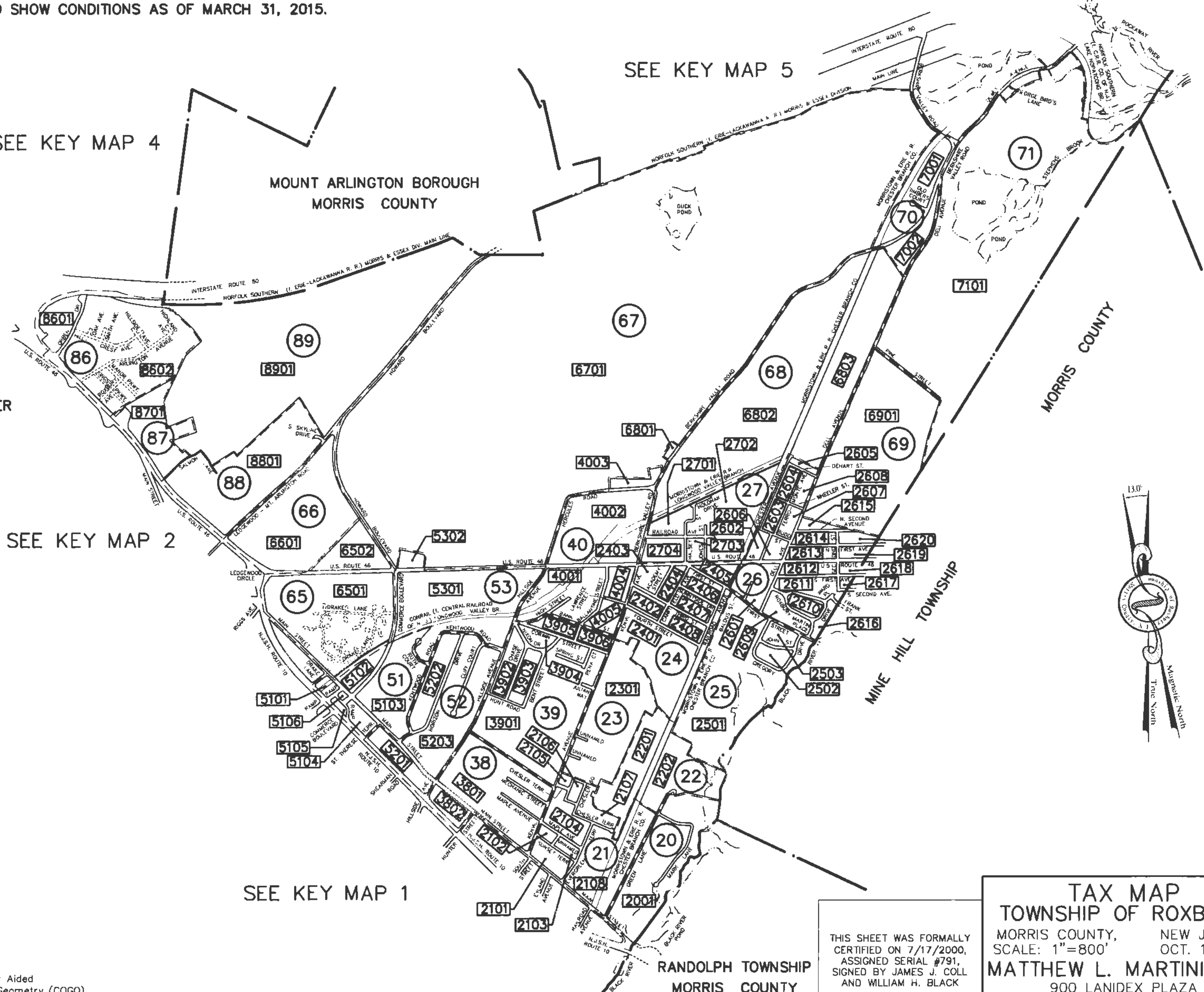
102 BLOCK NUMBER

SHEET LIMIT

BLOCK LIMIT

STREET NAME

PRIVATE STREET

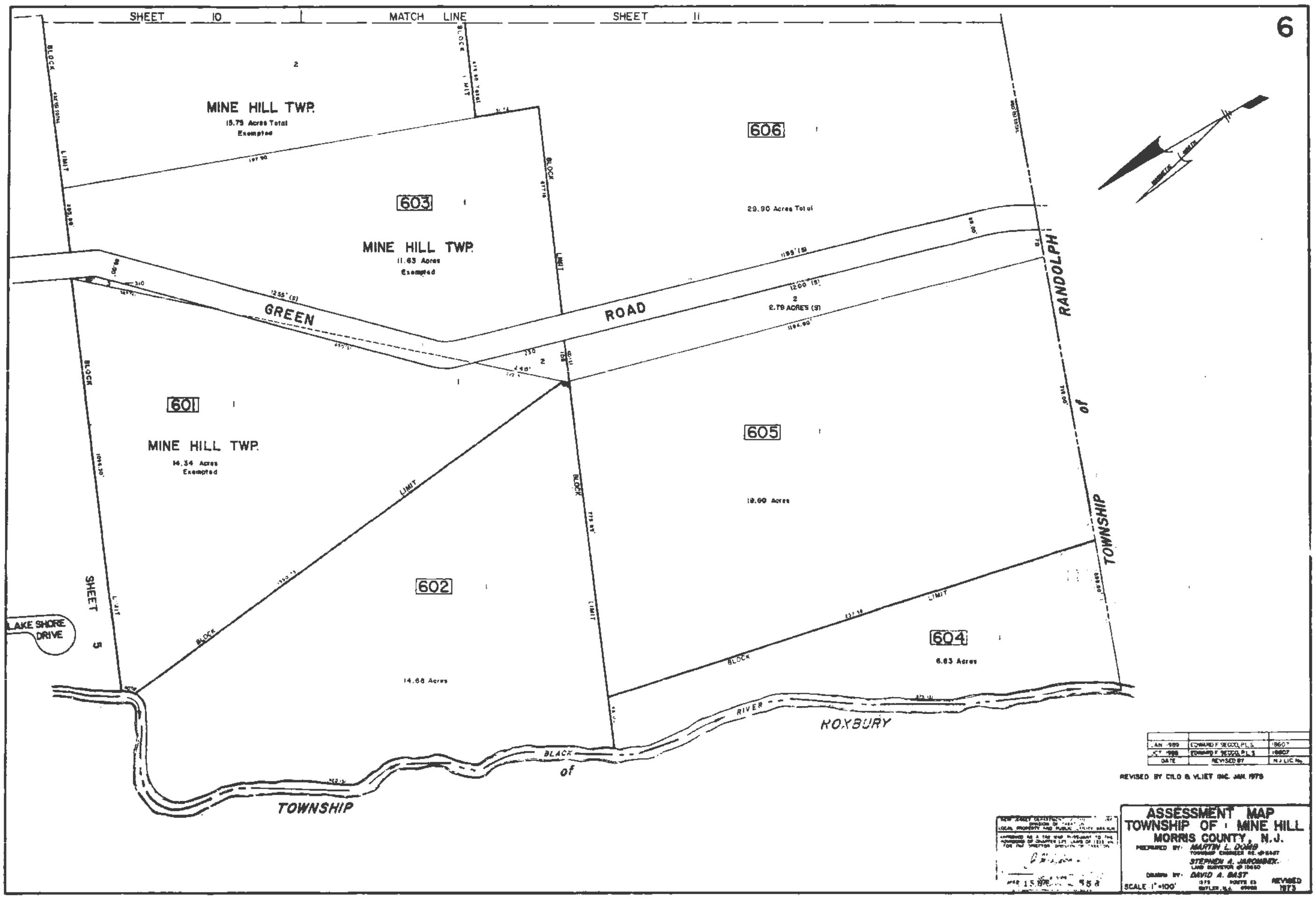


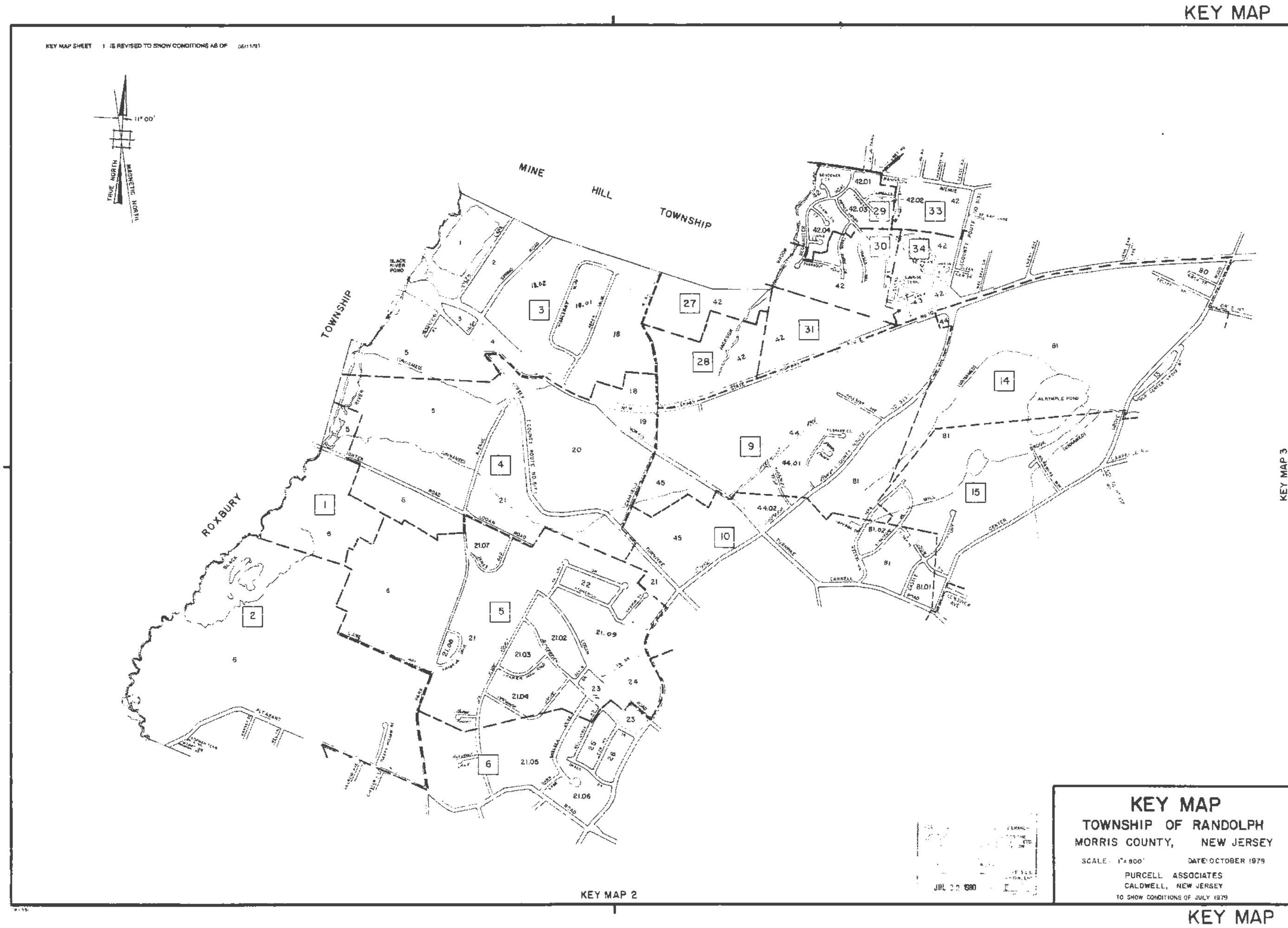
This map has been drawn using Computer Aided Drafting/Design (CAD/D) and Coordinate Geometry (COGO).

THIS SHEET WAS FORMALLY CERTIFIED ON 7/17/2000, ASSIGNED SERIAL #791, SIGNED BY JAMES J. COLL AND WILLIAM H. BLACK

TAX MAP
TOWNSHIP OF ROXBURY
MORRIS COUNTY, NEW JERSEY
SCALE: 1"=800' OCT. 1, 1998
MATTHEW L. MARTINI, L.S.
900 LANIDEX PLAZA
PARSIPPANY, NEW JERSEY

KEY MAP 3


SHEET 10
MATCH LINE
SHEET 11
6
MINE HILL TWP.
15.75 Acres Total
Exempted
606
29.90 Acres Total
603
MINE HILL TWP.
11.63 Acres
Exempted
GREEN
ROAD
2.79 ACRES (S)
RANDOLPH
601
MINE HILL TWP.
14.34 Acres
Exempted
605
10.60 Acres
602
14.68 Acres
604
6.63 Acres
TOWNSHIP
of
LAKE SHORE DRIVE
SHEET 5
BLACK
RIVER
ROXBURY
of
TOWNSHIP
REVISED BY CILO & VLIET INC. JAN. 1978
ASSESSMENT MAP
TOWNSHIP OF MINE HILL
MORRIS COUNTY, N.J.
SCALE 1"=100'
REVISED 1973


KEY MAP
KEY MAP SHEET 1 IS REVISED TO SHOW CONDITIONS AS OF
11° 00'
TRUE NORTH
MAGNETIC NORTH
MINE HILL TOWNSHIP
ROXBURY TOWNSHIP
1
2
3
4
5
6
9
10
14
15
27
28
29
30
31
33
34
KEY MAP 3
KEY MAP 2
KEY MAP
TOWNSHIP OF RANDOLPH
MORRIS COUNTY, NEW JERSEY
SCALE: 1"= 800'
DATE: OCTOBER 1979
PURCELL ASSOCIATES
CALDWELL, NEW JERSEY
TO SHOW CONDITIONS OF JULY 1979
KEY MAP 1

N

Roxbury Township Street Map

1:16,000

Disclaimer:

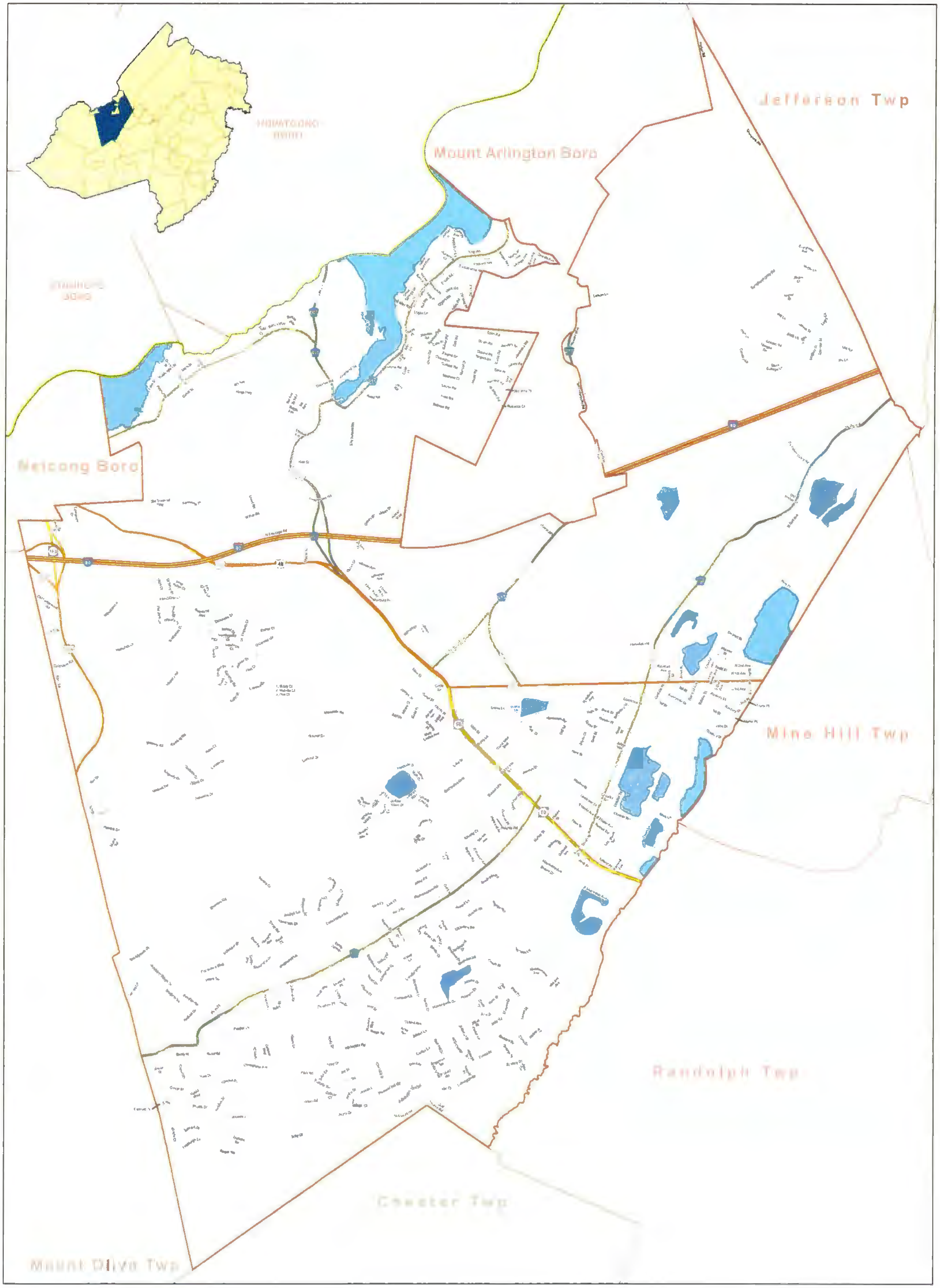
The street map is provided "as-is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the user accessing this information. The County of Morris makes no warranties, express or implied, as to the use of the map. In no event shall the County of Morris or its officers or employees assume any liability for the accuracy of the data delineated on any map. In no event shall the County of Morris or its officers or employees be liable for any damages arising in any way out of the use of this information.

Legend

- Morris County
- Municipalities
- Parcels
- Lakes/Ponds (> 5 Acres)
- County Road
- Interstate
- State Highway
- US Highway
- Local Street

September 2016

Map prepared by Morris County Office of Planning and Preservation



Mine Hill Township Street Map

1:12,500

Disclaimer:

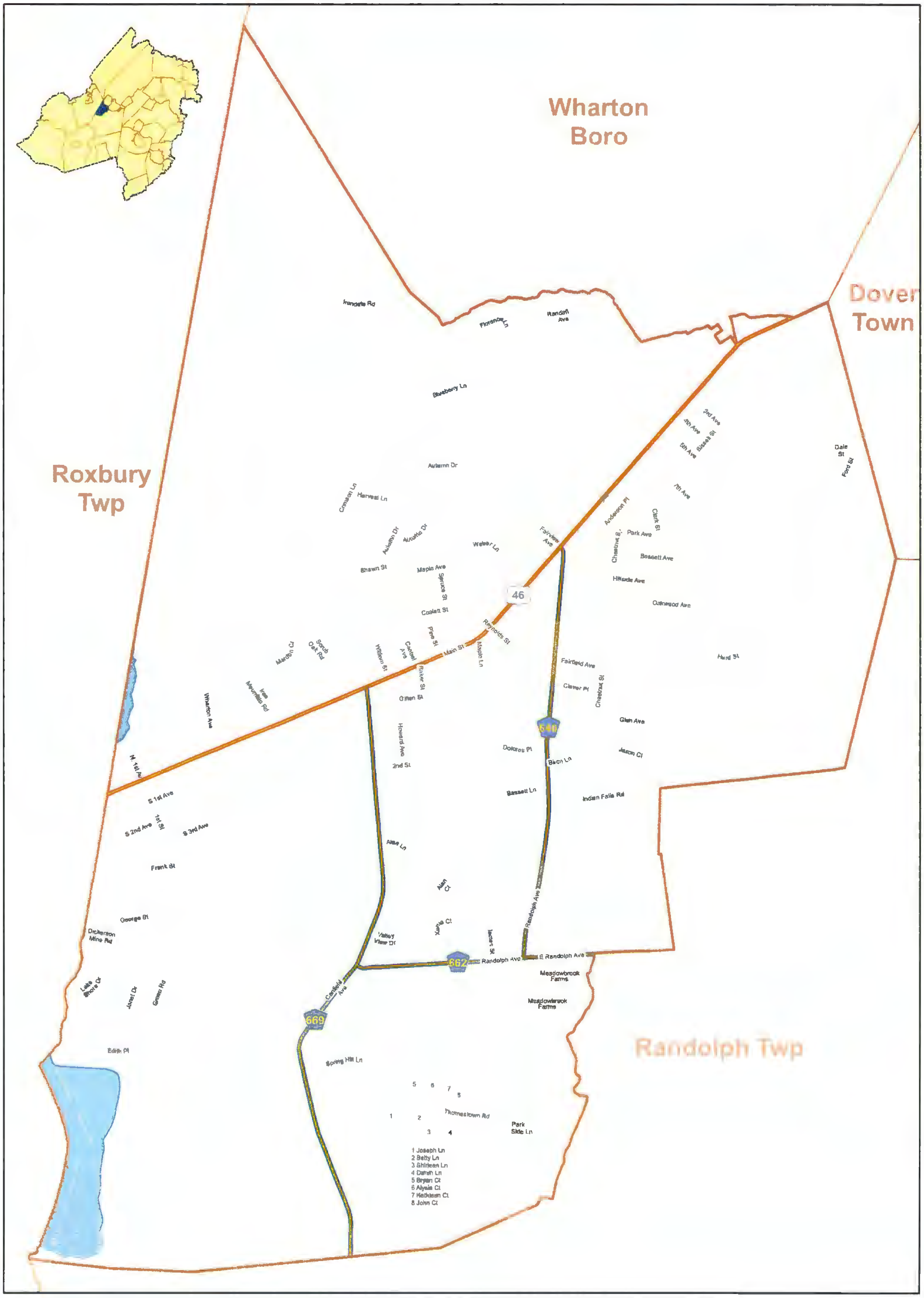
The street map is provided "as-is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the user accessing this information. The County of Morris makes no warranties, express or implied, as to the use of the map. In no event shall the County of Morris or its officers or employees assume any liability for the accuracy of the data delineated on any map. In no event shall the County of Morris or its officers or employees be liable for any damages arising in any way out of the use of this information.

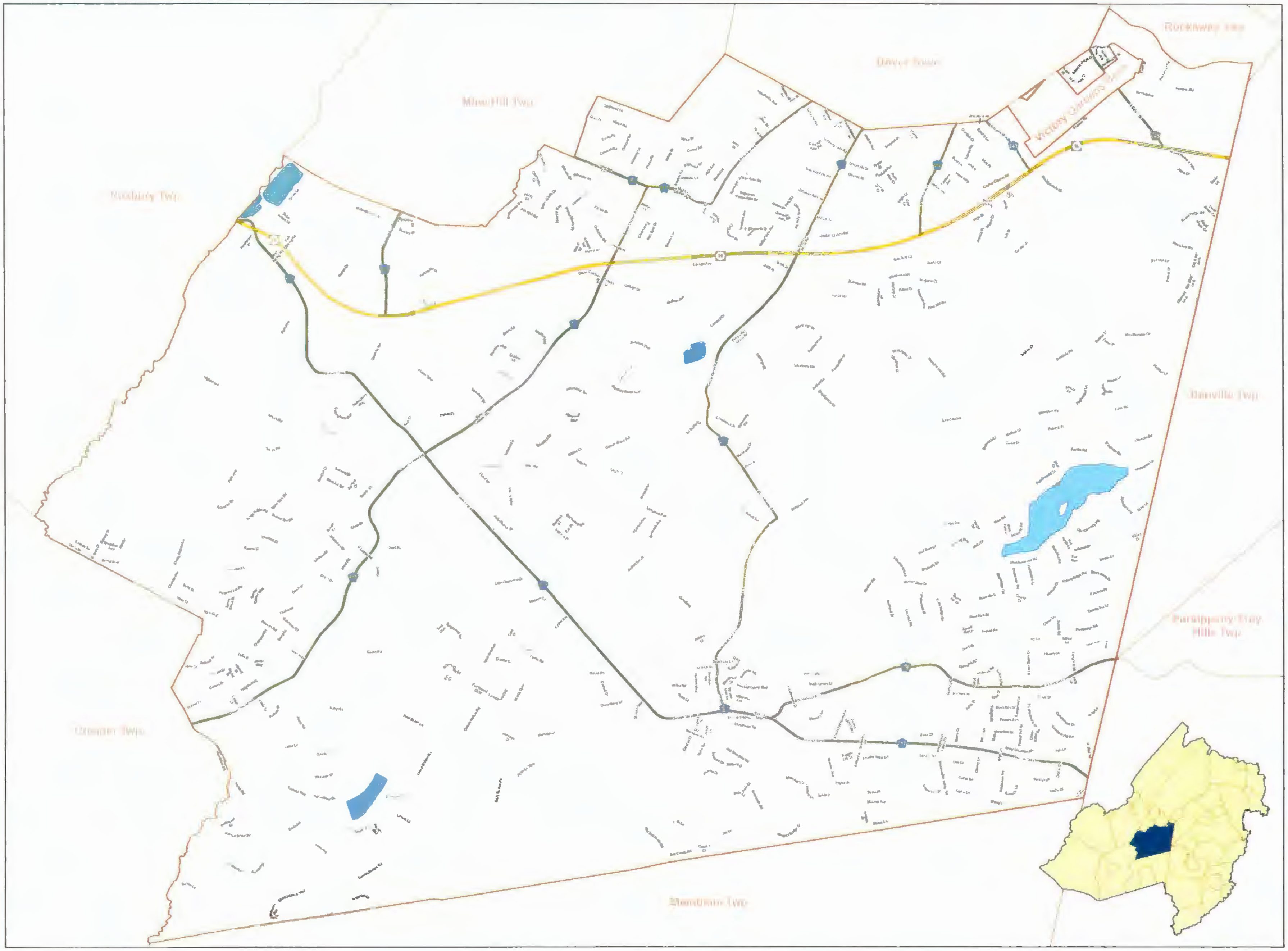
Legend

- Municipalities
- Morris County
- Parcels
- Lakes/Ponds (> 5 Acres)
- Interstate
- US Highway
- State Highway
- County Road
- Local Street

September 2016

Map prepared by Morris County Office of Planning and Preservation





N

Randolph Township Street Map

1:14,000

Disclaimer:

The street map is provided "as-is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the user accessing this information. The County of Morris makes no warranties, express or implied, as to the use of the map. In no event shall the County of Morris or its officers or employees assume any liability for the accuracy of the data delineated on any map. In no event shall the County of Morris or its officers or employees be liable for any damages arising in any way out of the use of this information.

Legend

- Morris County
- Municipalities
- Lakes/Ponds (> 5 Acres)
- Parcels
- Interstate
- US Highway
- State Highway
- County Road
- Local Street

Map prepared by Morris County
Office of Planning and Preservation
September 2016

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 6	706.81	[illegible]
RM 7	713.47	[illegible] Route 10 bridge over the [illegible] River

[1] National Geodetic Vertical Datum of 1929

KEY TO MAP

*EXPLANATION OF ZONE DESIGNATIONS

NOTES TO USER

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

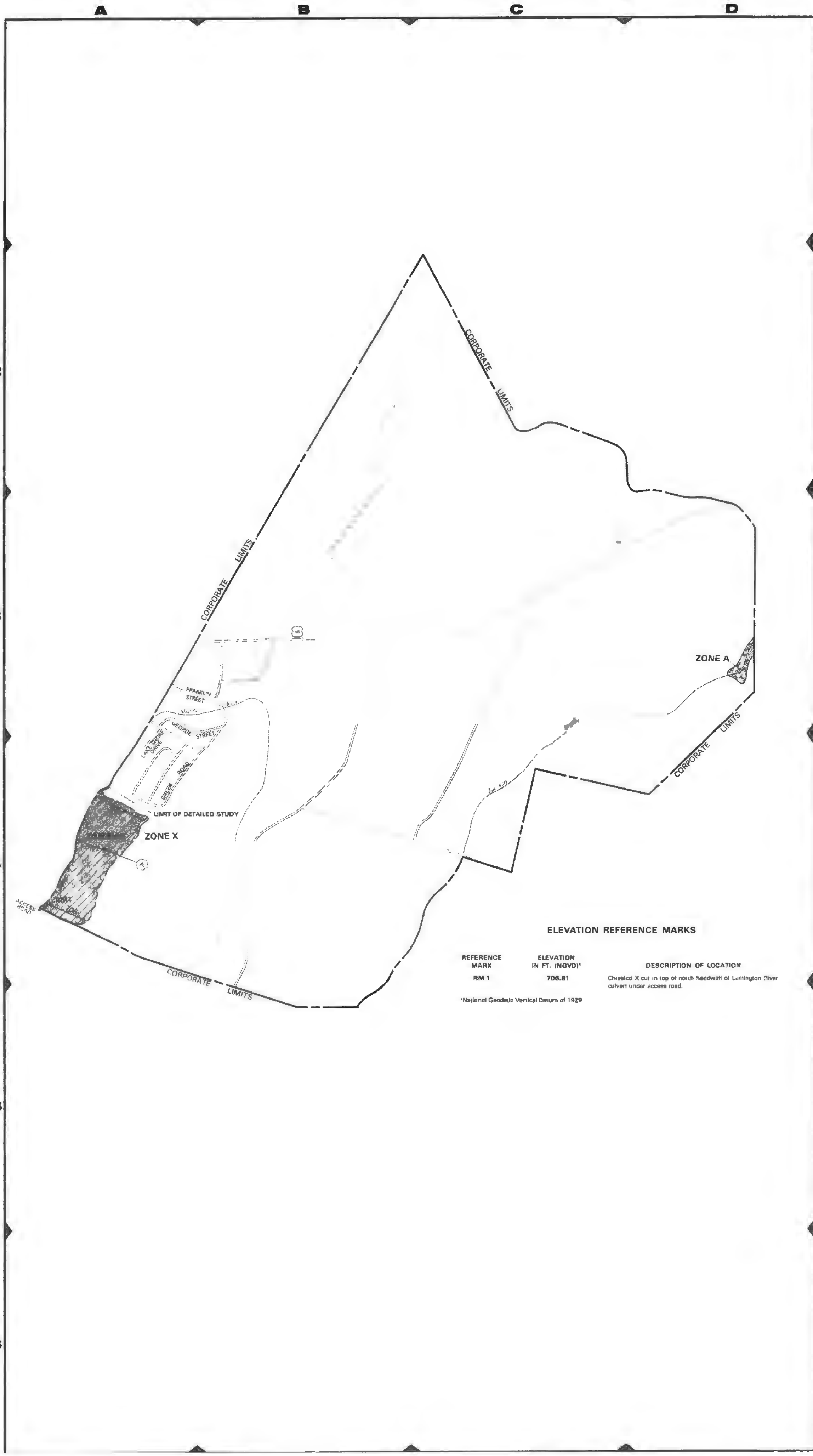
TOWNSHIP OF
ROXBURY,
NEW JERSEY.
MORRIS COUNTY

PANEL 7 OF 10
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
340362 0007 B

EFFECTIVE DATE:
DECEMBER 15, 1982

Federal Emergency Management Agency



ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 1	706.81	Chiseled X cut in top of north headwall of Lamington River culvert under access road.

[1]National Geodetic Vertical Datum of 1929

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR 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 A99** To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS†

Identified 1983 — Identified 1990 — Otherwise Protected Areas

†Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet*

(D)—(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM 7_x Elevation Reference Mark

•M1.5 River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

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, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

MAP REPOSITORY
Mine Hill Municipal Building, 10 Baker Street, Mine Hill, New Jersey 07801
(Maps available for reference only, not for distribution)

INITIAL IDENTIFICATION:
JANUARY 7, 1977

FLOOD HAZARD BOUNDARY MAP REVISIONS:
NONE

FLOOD INSURANCE RATE MAP EFFECTIVE:
SEPTEMBER 15, 1982

FLOOD INSURANCE RATE MAP REVISIONS:
May 3, 1993 - to add base flood elevations, to change special flood hazard areas, to change zone designations and to update map format.

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

N

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWNSHIP OF
MINE HILL,
NEW JERSEY
MORRIS COUNTY

ONLY PANEL PRINTED

COMMUNITY-PANEL NUMBER
340556 0005 C

MAP REVISED:
MAY 3, 1993

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 1	858.50	[illegible] Center Grove Road at C[illegible]
RM 2	838.72	Center Grove Road below Dalrymple Pond. Northwest cor of bridge abutment.
RM 3	773.21	[illegible] Fern Road [illegible] of Casa Marie prop
RM 4*	874.679	South Edge Parkway [illegible], approximately 2.15 [illegible] west of Salem Street

[1] National Geodetic Vertical Datum of 1929
*Not Shown - Located Outside Corporate Limits

KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations* With Date of Identification e.g., 12/2/74	
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7 x
River Mile	• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

[illegible] Zones A and V) [illegible] flood [illegible]

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

[illegible] separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
FEBRUARY 15, 1974
FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
DECEMBER 18, 1979

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

[illegible] flood insurance is available in this community, [illegible] insurance agent, or call the National Flood Insurance [illegible] 638-6620, or (800) 424-8872.

APPROXIMATE SCALE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWNSHIP OF
RANDOLPH,
NEW JERSEY
MORRIS COUNTY

PANEL 5 OF 20

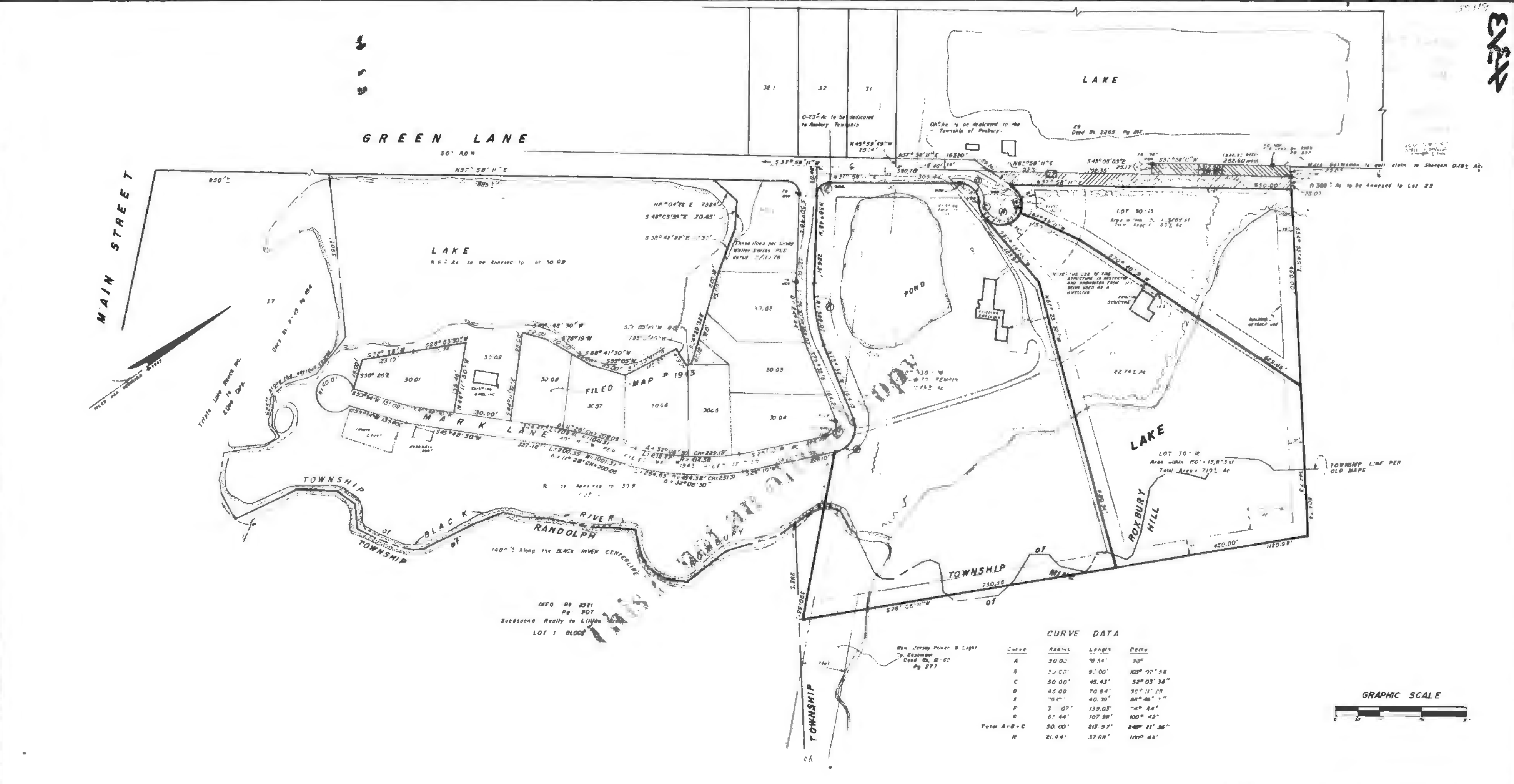
COMMUNITY-PANEL NUMBER
340358 0005 C

EFFECTIVE DATE:
DECEMBER 18, 1979

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Map No. 4313

4313



CERTIFICATION BY PROPERTY OWNER
THIS IS TO CERTIFY THAT TITLE TO THIS PROPERTY IS VESTED IN THE UNDERSIGNED AND THAT THE SUBDIVISION THEREOF AS SHOWN ON THIS MAP AND THE FILING OF SAME IS DONE WITH THE APPROVAL AND CONSENT OF THE UNDERSIGNED.

Mort Gottesman

Green Lane Holding Corp. President

Secretary

CERTIFICATION BY LAND SURVEYOR
I CERTIFY THAT THIS MAP AND SURVEY (see notes) HAVE BEEN MADE UNDER MY SUPEVISION AND COMPLIES WITH THE PROVISIONS OF "THE MAP FILING LAW." I DO FURTHER CERTIFY THAT THE MONUMENTS AS DESIGNATED AND SHOWN HERE ON HAVE BEEN SET.

Nicholas J. Wunner P.E & L.S. N.J. # 22704

CERTIFICATION BY MUNICIPAL ENGINEER
I HAVE CAREFULLY EXAMINED THIS MAP AND FIND IT CONFORMS WITH THE PROVISIONS OF "THE MAP FILING LAW" AND THE MUNICIPAL ORDINANCES AND REQUIRMENTS APPLICABLE THERETO.

Township Engineer

CERTIFICATION BY MUNICIPAL CLERK
THIS IS TO CERTIFY THAT GREEN LANE IS AN APPROVED TOWNSHIP ROAD
I CERTIFY THAT A BOND HAS BEEN GIVEN TO THE MUNICIPALITY, GUARANTEEING THE FUTURE SETTING OF THE MONUMENTS SHOWN ON THIS MAP AN SO DESIGNATED.

Township Clerk

APPROVAL BY PLANNING BOARD
THIS MAP WAS APPROVED BY THE PLANNING BOARD OF ROXBURY TOWNSHIP AT A REGULAR MEETING HELD ON ______, AND SHALL BE FILED ON OR BEFORE ______

Date Chairman

Date Secretary

FINAL PLAT

LOT 30-10 BLOCK 43

TOWNSHIP of ROXBURY.
MORRIS COUNTY NEW JERSEY

NICHOLAS J. WUNNER
Professional Engineer & Land Surveyor N.J. Lic. no. 22704
Professional Planner N.J. Lic. no. 1796

WUNNER ENGINEERING ASSOCIATES
ENGINEERS · LAND SURVEYORS · PLANNERS
132 LANDING ROAD LANDING, NEW JERSEY 07850
(201) 770-1353

Revised	10/23/84	SCALE: 1"=100'	DESIGNED BY: N.W.	DRAWN BY: N.W.
Revised	10/16/84	DATE: 6/12/84	SURVEYED BY: J.W. C.W.	FILE no: 83-632

4313

4313

THIS DEED, made the 26 day of April, 1978 56110

BETWEEN: HOUDAILLE CONSTRUCTION MATERIALS, INC., a corporation existing under and by virtue of the laws of the State of New Jersey, having its principal office at 10 Park Place, in the Town of Morristown, in the County of Morris and State of New Jersey, herein designated as the Grantor.

AND: COUNTY CONCRETE CORPORATION, a New Jersey corporation with its principal office and place of business at 355 Minnisink Road, Borough of Totowa, New Jersey 07512 herein designated as the Grantee:

WITNESSETH, that the Grantor, for and in consideration of

One Dollar and ~~00.100~~ ($1.00)

lawful money of the United States of America, to it in hand well and truly paid by the Grantee, at or before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged and the Grantor being therewith fully satisfied, does by these presents grant, bargain, sell and convey unto the Grantee forever.

ALL those tracts and parcels of land and premises situate, lying and being in the Townships of Roxbury and Mine Hill, County of Morris and State of New Jersey, described as follows:

TRACT ONE: Being part of the second tract of land described in a deed from John T. Lawrence and wife to William C. Sweney, dated July 14, 1902, and recorded in the Morris County Clerk's Office in W-16, page 485 &c., and also part of the first lot described in a deed from Miller Smith to William C. Sweney, dated August 25, 1891 and recorded in the Morris County Clerk's Office in M-13 on page 370 &c., and the tract hereby to be conveyed begins at the second corner of the above mentioned second tract conveyed by John T. Lawrence and wife to William C. Sweney, said beginning point being also the beginning corner of a lot of land conveyed by William D. Jardine and wife to Seguine-Bogert Company, Inc., by deed dated April 26, 1941 and recorded in S-36 of Deeds on page 152 &c., and from said beginning point runs thence (1) along a portion of the first line of the aforesaid John T. Lawrence tract North 54 degrees 22 minutes 30 seconds West 715 feet; thence (2) South 33 degrees 17 minutes 28 seconds West 571.08 feet to a point on the northerly bank of the Black River; thence (3) along the northerly and easterly bank of the Black River the following seven courses and distances South 45 degrees 53 minutes 38 seconds East 153.07 feet; thence (4) South 50 degrees 28 minutes 38 seconds East 144.07 feet; thence (5) South 9 degrees 15 minutes 52 seconds East 67.06 feet; thence (6) South 24 degrees 30 minutes 38 seconds East 146.95 feet; thence (7) South 1 degrees 06 minutes 08 seconds East 77.48 feet; thence (8) South 7 degrees 55 minutes 08 seconds East 194.04 feet; thence (9) South 10 degrees 53 minutes 53 seconds East 170.36 feet to a point in the second line of the first lot described in the aforesaid deed from Miller Smith to William C. Sweney, said point is about 10 feet from the edge of said river and

COUNTY OF MORRIS
CONSIDERATION 750,000.00
REALTY TRANSFER FEE 2,625.00
DATE APR 27 1978 BY CAH

Pd
30-
TAX Pd 2625-

INSTRUMENT REC'D IN DEED

BOOK 2452 PAGE 928

This is not an official copy

is also a corner of property now or formerly owned by Charles G. Warner; thence (10) along the second line of the first lot described in the above-mentioned deed from Miller Smith to William C. Sweney, and also along the second line of the second tract described in the aforesaid deed from John T. Lawrence to William C. Sweney, North 31 degrees 08 minutes 46 seconds East 1047.08 feet to the place of Beginning. Containing 12.09 acres of land.

NOTE: The tenth line of the above described parcel runs along a line of property now or formerly owned by Charles G. Warner, the first line of a tract of land conveyed by William D. Jardine and wife to Seguine-Bogert Company, Inc., by deed dated June 13, 1941 and recorded in the Morris County Clerk's Office in Book S-36 of deeds on page 153 &c., and also along the fourth line of a lot of land conveyed by William D. Jardine and wife to Seguine-Bogert Company, Inc., by deed dated April 26, 1941 and recorded in the Morris County Clerk's Office in Book S-36 on page 152 &c.

Together with all the lands lying between the easterly bank of the Black River and the center line thereof.

The foregoing description is in accordance with a survey by Frank Pesce, Surveyor dated November 1956.

TRACT TWO: BEING part of the land on Succasunna Plains that was conveyed to said John C. Jardine and James Jardine by deed from James B. Fisher and wife dated April 1, 1873 and recorded in the Morris County Clerk's Office in Book G-8 of deeds on page 346 &c., and the part hereby conveyed lies on the westerly side of the Chester Railroad and begins at a stake in the fifth line of the whole lot on the northeasterly bank of the Black River and runs thence on the said bank of said river and also crossing said river in a direct line as the needle traversed at this date (1) South 34 degrees East 4.80 chains to a stake in the seventh line of the whole lot East from said river; thence along the seventh line (2) North 30 degrees East 12 chains to a stake; thence (3) North 54 degrees West 4.27 chains to a stake in the said fifth line, being a corner to lands of Samuel T. Lawrence and William A. Leggett and distant on said fifth line 5.37 chains from the sixth corner of the whole lot said sixth corner being also a corner to said Lawrence's land and land of Thomas Post; thence along the said fifth line (4) South 30 degrees 45 minutes West 10.50 chains to the Beginning. Containing 4.83 acres. 692 -

TRACT THREE: BEGINNING at the fourth corner of a tract of land conveyed by John C. Jardine and wife to James Jardine and wife to David Jardine by Deed dated February 12, 1873 and recorded in the Morris County Clerk's Office in Book M-8 on page 546 &c., and from beginning point runs thence (1) North 30 degrees 45 minutes East 254.42 feet; thence (2) South 54 degrees 28 minutes East 100.00 feet; thence (3) North 30 degrees 45 minutes East 100.00 feet to a point in the outside line of the whole tract of which this is a part; thence (4) along said last mentioned outside line, South 54 degrees 28 minutes East 170.60 feet to the westerly right of way of the Chester Railroad; thence (5) along the said side line of Chester Railroad, old bearing, South 30 degrees West 354.42 feet to the third corner of the aforesaid Jardine tract; thence (6) North 54 degrees West, old bearing (calculated bearing being North 54 degrees 32 minutes West) 274.76 feet to the point or place of Beginning.

This is not an official copy

<u>TRACT FOUR</u>: BEGINNING at the sixth corner of a tract of land conveyed by James L. Fisher and wife to John C. Jardine and James Jardine by deed dated April 1, 1872 and recorded in the Morris County Clerk's Office in Book G-8 on page 346 &c., and from said beginning point runs along ths sixth line South 54 degrees 28 minutes East 100 feet; thence (2) South 30 degrees 45 minutes West 100 feet; thence (3) parallel to the first course herein, North 54 degrees 28 minutes West 100 feet to a point in the fifth line of the above whole tract of which this is a part; thence (4) along said fifth line, North 30 degrees 45 minutes East 100 feet to the place of Beginning.

Said four tracts being designated as Block 4[illegible], Lot 10 on the Roxbury Township Tax Map

<u>TRACT FIVE</u>: BEGINNING at a point in the southerly side line of a tract of land conveyed by the heirs of Andrew K. Baker, deceased, to Thomas Post by deed dated January 17, 1657 and recorded in the Morris County Clerk's Office in Deed Book M-5 on page 169 &c. Said point is also distant 40 feet on a course North 54 degrees 15 minutes West from the westerly line of the survey of the Chester Railroad, and in line of lands of the heirs of John C. Jardine, and runs thence (1) North 54 degrees 15 minutes West 150 feet along Jardine's line to a corner of Lot No. 3; thence (2) along a line of Lot No. 3, 160 feet to the southwesterly edge of Fourth Street; thence (3) along the edge of said street, 150 feet to a point at the edge of said street, and 40 feet distant from the line of the aforesaid Railroad; thence (4) parallel to the second line above described and also parallel to the said Railroad line and distant 40 feet therefrom 160 feet to the place of Beginning, containing 16,000 square feet of land.

Being Lots Nos. 1 and 2 as shown on map attached to deed from Thomas Post and Mary Adaline Post, his wife, to Joseph J. Corwin dated March 5, 1870 and recorded in the Morris County Clerk's Office in Deed Book V-7 on page 331 &c.

<u>TRACT SIX</u>: BEGINNING at the most westerly corner of Lot No. 4 as laid down on a map of Town lots owned by Thomas Post as was surveyed and laid out by H. A. Baken in 1869 and filed in the Morris County Clerk's Office, said point being distant 295.4 feet from the northwesterly side line of Railroad Avenue on a course of North 54 degrees 15 minutes West and runs thence as needle pointed in 1869 (1) North 54 degrees 15 minutes West 50 feet; thence (2) at right angles to the first line 160 feet to side line of Fourth Street; thence along the said line of said street and parallel to the first course herein described, 50 feet to a corner of Lot No. 4; thence along a line of Lot No. 4 and parallel with the second line herein described 160 feet to the place of Beginning. Containing 8,000 square feet of land.

Being Lot No. 5 as shown on map attached to deed from Thomas Post and Mary Adaline Post, his wife to Joseph J. Corwin, dated March 5, 1870 and recorded in the Morris County Clerk's Office in Book U-7, page 331 &c.

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TRACT SEVEN: BEING Lot No. 4 as shown on the below mentioned map and is bounded on the northeast by Fourth Street, on the southeast by Lot No. 3, on the southwest by land of John T. Lawrence, on the northwest by Lot No. 5 owned by Philip M. Wilcox, said lot being 160 feet in depth and 50 feet in front and rear and containing 8,000 square feet of land.

Being Lot No. 4 as shown on map attached to deed from Thomas Post and Mary Adaline Post, his wife, to Joseph J. Corwin, dated March 5, 1870 and recorded in U-7 on page 331 &c.

TRACT EIGHT: BEGINNING at the intersection of the dividing line between Lots 3 and 4 with the southerly side line of Fourth Street as shown on a "Map of property owned by Thomas Post at McCainsville (now Kenvil), Morris County, New Jersey, made by H. A. Baken, C.E., in the year 1869", said map being on file in the Morris County Clerk's Office, and runs thence (1) along the southerly side line of Fourth Street South 51 degrees East 78.5 feet to the corner of lot No. 2 as shown on said map; thence (2) along the dividing line between lots 1 and 2 and Lot No. 3 as shown on said map South 33 degrees 11 minutes West 160.82 feet to a corner of lot No. 1 in the outside line of the whole tract thence (3) along the outside line of the whole tract North 51 degrees West 94.5 feet to the corner of Lot No. 4; thence (4) along the dividing line between lots   and 4, North 39 degrees East 160 feet to the place of Beginning. Being Lot No. 3 shown on said map referred to above.

Being the same premises conveyed by Celia Walthall, Widow, to Seguine-Bogert Company, Inc., by deed dated November 30, 1943 and recorded in the Morris County Clerk's Office in Deed Book X37 on page 370.

Tracts five to eight are designated as Block 303, Lot 4 on the Roxbury Township Tax Map.

TRACT NINE: BEGINNING at a point in the middle of a new street said point being the southeast corner of a lot of land conveyed by George C. Eyland and wife to Mary Jane Foley, and runs thence along her line as the needle now points, (1) North 49 degrees West 6.29 chains to the south side of the Chester Railroad; thence along said south side line (2) North 30 degrees 30 minutes East 27.75 chains to Mulligan's corner in said Railroad line; thence along Mulligan's line (3) South 54 degrees 15 minutes East 7.61 chains to a stake for a corner; thence along a line of Shaw and Canfield's land, (4) South 34 degrees 30 minutes West 23.79 chains to the northeast corner of a long strip of land that was conveyed by Frank A. Canfield to George C. Eyland, which small piece was intended for and now is used for a street; thence (5) South 45 degrees 15 minutes East 25 feet to the middle of said street; thence along the middle of the same, (6) South 34 degrees 30 minutes West 4.16 chains to the place of Beginning. Containing 20 acres, be the same more or less.

EXCEPTING therefrom the following two lots:

Lot 1 - BEGINNING at a point in the most northerly line of Foley's land, said point being an iron pin standing in the westerly side line of an old road or lane leading past said Foley's house, and is on a course North 48 1/2 degrees West and distant 25 feet from the most easterly corner of said Foley's land; thence (1) along said Foley

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line North 48 1/2 degrees West 5.92 chains to the easterly side line of Chester Railroad; thence (2) along said Railroad, North 32 degrees East 7.40 chains to a point in said Railroad line; thence (3) South 22 1/2 degrees East 7.42 chains to thw westerly side line of said lane; thence (4) along the side line of said land South 36 degrees West 4.28 chains to the place of Beginning. Containing 3.60 acres strict measure.

Being premises conveyed by Mary Purcell to Jacob Ridner by deed dated July 15, 1905 and recorded in the Morris County Clerk's Office in Deed Book A-18 on page 282.

Lot 2 - BEGINNING at the fifth corner of the fourth tract as described in deed from North Jersey Quarry Company to Seguine-Bogert Company, Inc., dated December 21, 1948 and recorded in the Morris County Clerk's Office on December 22, 1948 in Deed Book Z-45 on page 129; thence (1) North 25 degrees 24 minutes 15 seconds West 492.90 feet to a concrete monument in the southeasterly side line of the Chester Railroad; thence (2) South 54 degrees 15 minutes East 422.81 feet to a point in the southeasterly line of the whole tract; thence (3) South 33 degrees 36 minutes 50 seconds West 237.94 feet to the point and place of Beginning. Containing one and one-eighth acres, more or less.

TRACT TEN - BEGINNING at a point in the road leading from Kenvil to Dickerson Mine distant 696 feet on a course of South 37 degrees 48 minutes West from the Kirkbridge monument placed by Frederick A. Canfield at the Pine Tree corner and from said beginning point runs (1) South 37 degrees 48 minutes West 1576.08 feet to a concrete monument, being the most westerly corner of the Forbes Shaw farm; thence (2) South 52 degrees 55 minutes East 912.95 feet to a concrete monument; thence (3) North 43 degrees 50 minutes East 1509.79 feet to an iron pin in the center of the stone arch bridge in the aforesaid road leading to Dickerson Mine; thence (4) North 51 degrees 21 minutes West 1068.88 feet to the Beginning. Containing 34.96 acres.

EXCEPTING therefrom the following:

Lot 1 - BEGINNING at a point in the road leading from Kenvil to Dickerson Mine, said Beginning point marking the fourth corner of a 34.96 acre tract, said tract being the first tract described in a deed from the North Jersey Quarry Company to Seguine-Bogert Co., Inc., dated December 21, 1948 and recorded in the Morris County Clerk's Office, said beginning corner being formerly marked by an iron pin in the center of the former stone arch bridge in the said road, and from said beginning point running thence (1) along the said road and along the fourth line mentioned in the first tract described in the said Seguine-Bogert Co., Inc. deed North 54 degrees 58 minutes 30 seconds West 1,018.88 feet to a point, said point being distant 50 feet on a course of South 54 degrees 58 minutes 30 seconds East from a point marking the first corner mentioned in the first tract described in the said Seguine-Bogert Co., Inc. deed; thence (2) by a new line across the Seguine-Bogert Co., Inc. lands, South 34 degrees 10 minutes 30 seconds West 883.68 feet to a point;

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thence (3) by another new line across the said Seguine-Bogert Co., Inc. lands South 55 degrees 34 minutes East 927.01 feet to a point in the third line mentioned in the first tract described in the said Seguine-Bogert Co., Inc. deed; thence (4) along the third line mentioned in the first tract described in the said Seguine-Bogert Co., Inc. deed North 40 degrees 10 minutes 40 seconds East 877.57 feet to the place of Beginning. Containing 19.625 acres.

This description is drawn in accordance with survey of Frank W. Dufford, Surveyor, dated February 8, 1950.

AND subject to Agreement of Easement to the following:

Lot 2 - BEGINNING at a point in the road leading from Kenvil to the old Dickerson Mine, now known as First Street, said point being also the second corner of a tract of land conveyed by Seguine-Bogert Co., Inc. to Gregory Grabovetz by deed recorded in the Morris County Clerk's Office in Deed Book Y-47, page 503 &c., and from the said Beginning point runs; thence (1) along the second line of the last mentioned tract South 34 degrees 10 minutes 30 seconds West 883.68 feet to third corner of said tract; thence (5) North 55 degrees 34 minutes West 50 feet; thence (3) parallel with the first course herein and distant 50 feet therefrom North 34 degrees 10 minutes 30 seconds East 884.19 feet to a point in the above mentioned road; thence (4) along said road South 54 degrees 58 minutes 30 seconds East 50 feet to the place of Beginning.

Being Agreement between Seguine-Bogert Co. Inc. and Roxbury Water Company, dated March 12, 1957 and recorded in the Morris County Clerk's Office in Deed Book 063 on page 541 &c.

TRACT ELEVEN: BEGINNING at the most westerly corner of the former Shaw tract and in the line of the former Purcell tract; both of said tracts being now owned by the Seguine-Bogert Company, Inc., thence (1) South 33 degrees 36 minutes 50 seconds West along the southeasterly line of said Purcell tract 1198.86 feet to a corner in the former Elijah Brotherton's line; thence (2) South 59 degrees 56 minutes East 1631.50 feet; thence (3) North 49 degrees 20 minutes East 1250.30 feet; thence (4) North 59 degrees 32 minutes West 1968.98 feet to the point and place of Beginning. Containing 48.08 acres of land, more or less; and deed from grantor to Township of Mine Hill in Book 2068 page 900 &c.

EXCEPTING therefrom so much as was conveyed to William M. Seguine, single, by deed dated September 30, 1952, recorded March 23, 1953 in Book A-54 page 91.

TRACT TWELVE: BEGINNING at a post and heap of stones near the head of the late Jonathan Dickerson's deceased, mill pond (said mill pond now being swamp land) in the said Dickerson's line, being a corner of lands formerly owned by Phineas Fitz Randolph; thence running (1) North 26 degrees 43 mintues East 1162 feet to a line of lands formerly owned by Edward Thomas, said line being the second course on the eleventh tract described above; thence (2) South 59 degrees 58 minutes East along said second course of said eleventh tract 726 feet to a point at the foot of Mine Hill, it being the third corner of the eleventh tract described above; thence (3) South 27 degrees 22 minutes West 1187.10 feet to the said Dickerson's line; thence (4) North 57 degrees 53 minutes West 714.50 feet to the point and place of Beginning. Containing 19.60 acres, more or less.

The above description is drawn in accordance with a survey by Francis J. Schindelar, C.E. and L.S., dated October 10, 1950.

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The above description is drawn in accordance with a survey by Francis J. Schindelar, C. E. and L. S., dated October 10, 1950.

BEING the same premises conveyed by the Trustees of Rutgers College in New Jersey to The Seguine-Bogert Company, Inc., by deed dated April 23, 1951 and recorded in the Morris County Clerk's Office in Deed Book F-50 on page 363.

Subject to right of way granted by Seguine-Bogert Co., Inc. to the New Jersey Power and Light Company dated July 2, 1956 and recorded in Book V-61 on page 30.

Tracts Nine, Ten, Eleven and Twelve excluding the exceptions are designated Block 43, Lot 8 on the Tax Map of Roxbury Township.

TRACT THIRTEEN: Being that tract or piece of land on the North side of the turnpike road called the Meadow and Orchard lot, at a corner of the late Silas Rigg's land; thence northerly in his line of the Morris Canal; thence to the line of Margaret Mill's land; thence in a line of said Margaret Mill's to a corner at a fence in a southerly range of the orchard and then out to the turnpike road at a pair of bars. The foregoing premises containing, however, 29 acres by actual survey with the courses and distances running North 48 degrees East 11.20 chains thence (2) South 78 degrees 30 minutes East 13 chains; thence (3) South 27 degrees East 10 chains; thence (4) South 73 degrees West 18.75 chains; thence (5) North 37 1/2 degrees West 13.70 chains to the place of Beginning.

BEING the same premises conveyed by Marshall W. Read, et als to Samuel C. Meyerson by deed dated December 21, 1926 and recorded in Deed Book F-30 on page 516. Also by deed of Edith M. Beatty, &c. to Samuel C. Meyerson on May 15, 1946, recorded in Book Z-40 on page 122.

EXCEPTING and reserving out of the said tract all lots and parcels heretofore conveyed to the following persons: Harold A. Langdon and wife, Grace Flatt, Harold Conover, Donald Cole and George P. Cole, and more particularly described as follows:

BEGINNING at a point in the northeasterly side line of the Old Morris Turnpike Road distant on a course of South 42 degrees East 50 feet from the Beginning corner of the first tract described above, and from said Beginning corner which is also the first corner in a deed from Marshall W. Read, et al to Harold A. Langdon and wife, dated December 19, 1947 and recorded in Deed Book G-44 on page 22; runs thence (1) along the fourth line reversed of the tract described in said deed G-44 page 22, North 48 degrees East 150 feet to a point; thence (2) at right angles to the first course South 42 degrees East 625 feet to a point; thence (3) at right angles to the second course herein South 42 degrees West 150 feet to a point in the northeasterly side line of the said Morris Turnpike Road; thence (4) along the Old Morris Turnpike Road North 42 degrees West (North 37 1/2 degrees West by course in deed) 625 feet to the place of Beginning.

TRACT FOURTEEN: Being the same tract conveyed by Marshall W. Read and wife to Alfred B. Culp and Samuel C. Meyerson by deed dated November 20, 1928 and recorded in Book N-31 on page 321 (the interest of Alfred B. Culp having thereafter been conveyed by deed from Edith M. Beatty, &c., recorded in Deed Book Z-40 on page 122, above stated). Being all that part of the Morris

Canal, its beds, banks, towpath and embankments, extending from the lands of A. R. Riggs on the West to the lands of Charles A. Baker on the East, a distance of approximately 1175 feet, and containing 2.04 acres, more or less; this section being a part of tract 482 on the Weir map of the Canal; it being the intent to transfer all that section of the Canal which adjoins his lands between the lands now or formerly of A. R. Riggs and Charles A. Baker.

Being the same premises conveyed by Morris Canal and Banking Company, a corporation of New Jersey to Marshall W. Read, by deed dated June 5, 1926 and recorded in Deed Book N-31 on page 320.

<u>TRACT FIFTEEN</u>: Being the same premises conveyed by Albert R. Riggs, widower, to Marshall W. Read and Samuel C. Meyerson dated March 20, 1946 and recorded in Deed Book E-41 on page 414.

BEGINNING at a set channel iron North of the right of way line of the High Bridge Branch of the Central R.R. of New Jersey, said channel iron being the most easterly corner of a tract of land known as "The Tone Lot" and runs thence (1) along the southerly line of said Tone lot South 73 degrees West 1150 feet more or less to a point in the same, which point is 50 feet easterly from the fourth corner of a lot conveyed by Nancy R. King and husband and others to Emma L. King by deed dated October 6, 1915 and recorded in Deed Book Y-23 on page 222; thence (2) at right angles to said Tone lot line about 90 feet in a southerly direction to the northerly right of way line of the said High Bridge Branch; thence (3) along the same in an easterly direction approximately 1150 feet to a point where the most easterly line of the said Tone lot intersects the said northerly railroad right of way line; thence (4) along said produced line in a northwesterly direction 25 feet more or less to the place of Beginning.

The premises described in Tract Fifteen are subject to a right of way granted to Albert R. Riggs to cross the said lands for the purpose of getting from lands owned by him on the south side of said Railroad to the highway known as the Morris and Sussex Turnpike. Said easement was not to prevent the said Marshall W. Read and Samuel C. Meyerson from changing the location of a road that existed at the time of the conveyance on March 20, 1946.

Being the premises conveyed by Don E. Area, et ux to Seguine Bogert by deed dated July 20, 1956, recorded in the Morris County Deed Book X-61, page 590.

<u>TRACT SIXTEEN</u>: Tract sixteen consists of three Parcels of land with the indicated exceptions therefrom:

<u>Parcel One</u>: BEGINNING at a white oak tree marked with seven notches the beginning corner of a lot of 164 acres Thomas Peterson purchased of Margaret Smith, March 1802, also a corner to lands late of Jacob Drake, deceased; thence (1) South 73 degrees East 15 chains; thence (2) South 32 degrees 30 minutes West 22 chains; thence (3) North 28 1/2 degrees West 22.70 chains; thence (4) South 54 degrees East 3.80 chains to a white oak tree; thence (5) North 54 degrees East 7.30 chains to the Beginning. Containing 24.35 acres.

EXCEPTING therefrom the following:

BEGINNING at a point in line of lands of William Corwin and lands of Margaret Mills, which point is in the road leading from McCainsville to Succasunna distant on a course South 27 degrees West 36.6 feet from the center line of the Longwood Valley Railroad which said point of beginning is distant on a course North 27 degrees East 347' 4" from a corner in said land in line of lands of said Margaret Mills and said William Corwin; thence (1) parallel with said center line and 30 feet distant therefrom South 82 degrees 10 minutes West 66 feet to a stake; thence (2) South 86 degrees 50 minutes West 100 feet to a stake; thence (3) North 86 degrees 10 minutes West 100 feet; thence (4) North 79 degrees 10 minutes West 44 feet; thence (5) North 79 degrees 34 minutes West 27 feet; thence (6) North 81 degrees 4 minutes West 100 feet; thence (7) North 82 degrees 34 minutes West 100 feet; thence (8) North 84 degrees 4 minutes West 100 feet; thence (9) North 85 degrees 34 minutes West 100 feet; thence (10) North 87 degrees 4 minutes West 100 feet; thence (11) North 88 degrees 34 minutes West 100 feet; thence (12) South 89 degrees 56 minutes West 100 feet; thence (13) South 88 degrees 26 minutes West 100 feet; thence (14) South 86 degrees 56 minutes West 100 feet; thence (15) South 85 degrees 26 minutes West 100 feet; thence (16) South 83 degrees 56 minutes West 100 feet; thence; (17) South 82 degrees 26 minutes West 100 feet; thence (18) South 88 degrees 56 minutes West 100 feet; thence (19) South 79 degrees 26 minutes West 100 feet; thence (20) South 77 degrees 56 minutes West 100 feet; thence (21) South 76 degrees 26 minutes West 100 feet; thence (22) South 74 degrees 56 minutes West 100 feet; thence (23) South 73 degrees 26 minutes West 100 feet; thence (24) South 72 degrees 50 minutes West 41 feet to a stake in line of lands of Margaret Mills and Albert R. Riggs; thence (25) along said line North 25 degrees 34 minutes West 60 feet to a stake; thence (26) North 72 degrees 50 minutes East parallel with said center line and 30 feet distant therefrom 41 feet to a stake; thence (27) South 73 degrees 26 minutes East 100 feet; thence (28) North 74 degrees 56 minutes East 100 feet; thence (29) North 76 degrees 26 minutes East 100 feet; thence (30) North 77 degrees 56 minutes East 100 feet; thence (31) North 79 degrees 26 minutes East 100 feet; thence (32) North 80 degrees 56 minutes East 100 feet; thence (33) North 82 degrees 26 minutes East 100 feet; thence (34) North 83 degrees 56 minutes East 100 feet; thence (35) North 85 degrees 26 minutes East 100 feet; thence (36) North 86 degrees 56 minutes East 100 feet; thence (37) North 88 degrees 26 minutes East 100 feet; thence (38) North 89 degrees 56 minutes East 100 feet; thence (39) South 88 degrees 34 minutes East 100 feet; thence (40) South 87 degrees 4 minutes East 100 feet; thence (41) South 85 degrees 34 minutes East 100 feet; thenee (42) South 84 degrees 4 minutes East 100 feet; thence (43) South 82 degrees 34 minutes East 100 feet; thence (44) South 81 degrees 4 minutes East 100 feet; thence (45) South 79 degrees 34 minutes East 27 feet to a stake; thence (46) South 79 degrees 10 minutes East still parallel with said center line and distant 30 feet therefrom 44 feet to a stake; thence (47) South 86 degrees 10 minutes East 100 feet to a stake; thence (48) North 86 degrees 50 minutes East 100 feet to a stake; thence (49) North 82 degrees 10 minutes East 66 feet to a stake thence (50) South 27 degrees West 73 feet to a place of Beginning. Containing 3 acres, more or less.

Being premises conveyed to The Longwood Valley Railroad Company by Margaret Mills by deed dated September 22, 1874, and recorded in the Morris County Clerk's Office in Deed Book Y-8 on page 287 &c.

Parcel Two: Beginning at a stone fence on the West side of the road that leads from Nathaniel Corwin's past Begnanik Peterson's still works at a corner of Calvin G. Corwin's land; thence (1) North 67 1/2 degrees West 1 Chain; thence (2) North 81 1/2 degrees

West 16.50 Chains; thence (3) North 32 1/2 degrees East 9 chains; thence (4) North 69 degrees East 7 chains; thence (5) South 53 degrees East 11.50 chains to said road; thence (6) South 27 degrees 30 minutes West 6.71 chains to the Beginning. Containing 15.75 acres of land.

EXCEPTING therefrom such part of Deed Book Y-8, page 287 described above, as lies within this lot.

Also excepting the following two lots:

Lot 1 - First Tract - Being a strip of land extending northwesterly from the center line of the road leading from Succasunna to Kenvil, and known as Hillside Avenue, as shown on a plan made for the Township of Roxbury in the County of Morris by P.E. Boomer, C.E., April 29, 1918, to a line parallel with and 23 feet distant from said center line measured at right angles thereto between the property of the Hercules Powder Company at Station 28 plus 00 and the southwesterly right-of-way line of the Central Railroad of New Jersey, the bearing of said center line being North 30 degrees 29 minutes East and the distance about 350 feet.

Second Tract - Being a strip of land extending southeasterly from the center line of the road leading from Succasunna to Kenvil and known as Hillside Avenue aforesaid, to a line parallel with and distant 22 feet 6 inches from said center line, measured at right angles thereto, between the property of the Morris Canal and Banking Company on the southwest and the property of John and George Seeger on the northeast, the bearing of said center line being North 49 degrees 22 minutes and the distance being about 187 feet.

It being the intention by this deed to dedicate for a public highway the lands and premises herein described, and as shown on the map annexed hereto and made part hereof.

Being the same premises conveyed to The Township of Roxbury, in the County of Morris, by Charles A. Baker and Elizabeth A. Baker, his wife, by deed dated August 21, 1918 and recorded in the Morris County Clerk's Office in Deed Book V-24 on page 369.

Lot 2 - Being a portion of the second lot of land described in a deed from Rachael Anne Tillison, et als to Charles A. Baker by deed dated May 8, 1902, recorded in the Morris County Clerk's Office in Book C-17 on page 127 &c., and said lot is described as follows:

BEGINNING at a point in Hillside Avenue a corner of property formerly owned by Calvin G. Corwin and now owned by the Hercules Powder Company, and from said beginning corner it runs along the line of the Hercules Powder Company (1) North 69 degrees West 142 feet to a corner, thence still along the line of the Hercules Powder Company (2) North 83 degrees West 882 feet to a point in said Powder Company line; thence at right angles to said line (3) North 7 degrees East 234 feet to a point in the southerly right of way line of the Long Valley Railroad Company as the same is now laid out and described in a deed from Margaret Mills dated September 22, 1874 and recorded in Deed Book Y-8 on page 287 &c.; thence in an easterly direction along the curves of said right of way line (4) a distance of 1157 feet to a point in Hillside Avenue; thence along said Hillside Avenue (5) South 29 degrees 31 minutes West 347.33 feet to the place of Beginning. Containing 6.82 acres.

AND excepting a lot conveyed by Deed Book X-57, page 530 fully set forth as an exception to Parcel 3, Second Tract, below:

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EXCEPTING therefrom that portion of Tract Sixteen, Parcel One which was conveyed by Houdaille Construction Materials, Inc. to Kentwood Construction Co., Inc. by deed dated March 6, 1972 and recorded March 30, 1972 in Book 2207 of Deeds page 1145 &c.

Parcel Three: That part of the Morris Canal, including the towpath, banks and embankments, lying between Baker's Bridge (No. 64) on the East and the boundary line between the Mills Estate and the Cook Estate on the West, a distance of 2236 feet, containing approximately 3.9 acres, being shown on the Weir map of the Canal as Tract 481, obtained by condemnation from Benjamin Peterson, and a part of tract 482, obtained by condemnation from Thomas Peterson July 14, 1831, together with the land for enlargement held in fee by deed from Margaret Mills dated June 18, 1845. Being the premises conveyed by the Morris Canal and Banking Company, a corporation of the State of New Jersey, &c. to Charles A. Baker by deed dated May 12, 1926 and recorded in the Morris County Clerk's Office in Deed Book C-30 on page 383 &c.; the said Charles A. Baker died on July 2, 1931, leaving a last will and testament probated before the Surrogate of the County of Morris on July 13, 1931 and recorded in Book Q-3 of Wills, on page 178 &c., wherein and whereby he devised all of his property to his wife Elizabeth A. Baker, for and during the term of her natural life. The said Elizabeth A. Baker died on May 8, 1941. In and by the 9th item of the last will and testament of the said Charles A. Baker, the property hereby conveyed was devised "After the decease of my said wife, all that remains of my estate wheresoever or whatsoever the same may be, I do hereby give, devise and bequeath unto my children then living, share and share alike, and in case any child of mine shall then be dead, leaving a child or children, such child or children shall receive his parents share." The said Charles A. Baker left him surviving his wife, the said Elizabeth A. Baker, 2 sons, Albert W. Baker and Charles A. Baker, Jr., and 2 daughters, Mary Baker Sturgis and Ethel A. Parmelee. The said Ethel A. Parmelee predeceased her mother, Elizabeth A. Baker, and left no issue.

EXCEPTING therefrom the following lot:

Being part of the second lot and part of the second tract of land as described in a deed from Albert W. Baker, individually &c., et al. to Seguine-Bogert Company, Inc., dated October 16, 1941 and recorded in the Morris County Clerk's Office in Book Y-36, page 272 &c., and the point hereby to be conveyed begins at a point on the westerly side of Hillside Avenue and in the northerly right of way line of the High Bridge Branch of the Central Railroad of New Jersey, and from said beginning point running along the northerly right of way line of said railroad the following 10 courses and distances; (1) South 87 degrees 46 minutes 30 seconds West 53.16 feet; thence (2) North 87 degrees 33 minutes 30 seconds West 96.95 feet; thence (3) North 80 degrees 33 minutes 30 seconds West 96.34 feet; thence (4) North 73 degrees 33 minutes 30 seconds West 42.27 feet; thence (5) North 73 degrees 57 minutes 30 seconds West 27.49 feet; thence (6) North 75 degrees 27 minutes 30 seconds West 100.78 feet; thence (7) North 76 degrees 57 minutes 30 seconds West 100.78 feet; thence (8) North 78 degrees 27 minutes 30 seconds West 100.78 feet; thence (9) North 79 degrees 57 minutes 30 seconds West 100.78 feet; thence (10) North 81 degrees 27 minutes 30 seconds West 25 feet; thence (11) leaving said railroad North 25 degrees 22 minutes 48 seconds East 416.03 feet; thence (12) parallel with the fifth line of the second lot above referred to and distant 50 feet therefrom, measured at right angles, South 47 degrees 15 minutes 40 seconds East 616.76 feet; thence (13)

South 78 degrees 16 minutes 15 seconds East 139.21 feet to a point on the westerly side of Hillside Avenue; thence (14) along the westerly side of Hillside Avenue, South 33 degrees 33 minutes 45 seconds West 66.94 feet to the place of Beginning. Containing 3.65 acres of land more or less.

Together with the right of ingress and egress over a strip of land 50 feet in width adjoining the 12th and 13th lines above described and extending from Hillside Avenue westerly, the entire depth of the above described parcel, a distance of 755.97 feet.

Being premises conveyed by Seguine-Bogert Co., Inc. to Campbell Dry Mix, by deed dated December 31, 1954 and recorded on January 5, 1955 in Deed Book X-57 on page 530, in the Morris County Clerk's Office.

Tracts Thirteen, Fourteen, Fifteen and Sixteen, less the exception are designated as Block 39 Lot 56 on the Tax Map of Roxbury Township.

Subject to the easement for a storm drain granted by Houdaille Construction Materials, Inc. to Kentwood Construction Co., Inc., dated March 30, 1972 and recorded on March 30, 1972 in Book 2207 page 1145 &c.

Subject to the easement from Charles A. Baker, et ux to the Township of Roxbury dated August 1, 1918 and recorded in Book V 24 of Deeds page 369 &c.

The foregoing sixteen tracts are a portion of the premises conveyed by Commonwealth Concrete Company to Houdaille Construction Materials, Inc. by deed dated March 29, 1957 and recorded December 31, 1957 in Book F65 of Deeds for Morris County page 256 &c.

TRACT SEVENTEEN: Being part of the 73 00/100, 21 39/100 and 23 34/100 acre tract which were conveyed to Phebe J. Corwin by George W. Forsyth, Special Master, by deed dated April 20, 1893 and recorded in the Morris County records in Book A-41, pages 263 &c., and the part hereby intended to be conveyed begins at the beginning corner of the seventy-three acre tract, being a stone heap where a black oak tree formerly stood and from thence runs (1) along the first line of said seventy-three acre tract, old bearing 1836, north seventy-three degrees west thirty-eight chains, more or less, to the east side line of Dell Avenue; thence (2) along the easterly side line of Dell Avenue north twenty-four degrees east twenty-one chains, more or less, to the southeasterly right of way of the Central Railroad of New Jersey; thence (3) along said right of way, north fifty-eight degrees and thirteen minutes east, nineteen chains to the intersection of the fourth line of the 21 39/100 acre tract being a point in the center line of Pine Street; thence (4) along the fourth line in part reversed south forty-nine degrees east 12.15 chains to the fourth corner of said 21 39/100 acre tract; thence (5) along the third line reversed south eighteen degrees west 10.60 chains to the third corner of the 21 39/100 acre tract; thence (6) along the second line of said 21 39/100 acre tract in part north forty-nine degrees west 2.85 chains to the third corner of the 23 34/100 acre tract; thence (7) south forty-nine degrees thirty minutes west

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10.40 chains to the fourth corner of said 23 34/100 acre tract, being a point in the third line of the seventy-three acre tract; thence (8) along the third line in part of the seventy-three acre tract south seventy-three degrees east 12.45 chains to the intersection of the west side of a proposed street forty feet wide; thence (9) along the west side of said proposed street south fifteen degrees and thirty minutes west 460 feet to the south side of another proposed street; thence (10) along the south side of said proposed street south seventy-three degrees east 360 feet to a point in the fourth line of the seventy-three acre tract; thence (11) along the fourth line south fifteen degrees and thirty minutes west 13.50 chains, more or less, to the place of beginning. Containing 103 acres. There is to be excepted and reserved from the above description one-half of a road way or street fifty feet in width from Pine Street to the ninth corner of this conveyance. This conveyance is made subject to the rights of the New Jersey Bell Telephone Company and the New Jersey Power & Light Company upon said premises. Also subject to the rights of the present tenant on said premises.

Being the same premises conveyed by Thomas Baker, et al to North Jersey Quarry Company by deed dated May 19, 1930 and recorded June 6, 1930 in Book E-32 of Deeds page 198 &c.

There is EXCEPTED therefrom that portion which was conveyed by North Jersey Quarry Company to John D. Seals, et ux by deed dated January 5, 1945 and recorded in Book O-38 of Deeds page 278 &c., wherein said exception is more particularly described as follows:

BEGINNING at a stake in the easterly side line of Dell Avenue, said stake being distant 277.59 feet on a course of North thirty-one degrees and forty minutes East from the intersection of the easterly side line of Dell Avenue with the northerly side line of North Second Avenue which point is fifty feet in a northeasterly direction from the southwest corner of the whole tract, and from said beginning point runs thence (1) along the said easterly side line of Dell Avenue North thirty-one degrees and forty minutes East one hundred thirty-seven feet to a stake; thence (2) South sixty-six degrees and fifteen minutes East one hundred seventy-five feet to a stake; thence (3) parallel with the easterly side line of Dell Avenue South thirty-one degrees and forty minutes West one hundred thirty-seven feet to a stake; thence (4) parallel with the second course and southerly line of the whole tract, North sixty-six degrees and fifteen minutes West one hundred seventy-five feet to the point or place of Beginning. Containing .545 acres more or less.

Being designated as Block 10, Lot 2 on the Roxbury Township Tax Map and Block 5, Lot 43 on the Mine Hill Township Tax Map.

TRACT EIGHTEEN: Being Lots Nos. 47, 48, 49, 50, 51, 52, 57, 58, 61, 62, 65, 66, 69, 70, 73, 74, 75, 76 and 77, also Lots Nos. 6 to 16, both inclusive on "Map of Property owned by Thomas Post at McCainsville, Morris County, New Jersey, H.A. Baker, C.E., 1869," said map being attached to deed recorded in Book U-7 of Deeds page 330.

Together with all the right, title and interest of grantors in property adjacent to the above mentioned lots dedicated or designated as streets or roadways.

Being the same premises conveyed by Joan Sweikow and Henry Sweikow, her husband to Houdaille Construction Materials, Inc. by deed dated October 9, 1959 and recorded November 24, 1959 in Book I-70 of Deeds page 502 &c.

Being designated as Block 301, Lot 10 and Block 302, Lot 10 on the Roxbury Township Tax Map.

TRACT NINETEEN: BEGINNING at the easterly corner of lands conveyed to Michael C. and John L. Gallo by The Central Railroad Company of New Jersey by deed dated May 21, 1935, one hundred feet northwesterly measured at right angles, from the center line of the Longwood Valley Railroad as filed in the Office of the Secretary of State at Trenton, said beginning corner being about one thousand seven hundred and fifty (1750) feet southwesterly from the Hopatcong Junction Station of said Railroad Company; thence (1) North thirty-four degrees forty-five minutes West (N. 34 deg. 45' W.) along the northeasterly line of the lands so conveyed as aforesaid, one thousand two hundred (1200) feet, more or less, to the northerly corner of said lands; thence (2) northerly, along the westerly line of lands of the Central Railroad Company of New Jersey, two hundred (200) feet to a point; thence (3) southeasterly through the lands of said railroad company one thousand one hundred and fifty (1150) feet, more or less, on a direct course to the westerly corner of lands conveyed to Alan Wood Mining Company by said Railroad company by deed dated February 6, 1931; thence (4) southerly along the westerly line of the lands last mentioned, five hundred one and eighty-seven one-hundredths (501.87) feet to another corner of said last mentioned lands; thence (5) southeasterly along a portion of another line of said last mentioned lands fifteen(15) feet to a point distant northwesterly one hundred (100) feet, measured at right angles from the center line of the Longwood Valley Railroad hereinbefore mentioned; thence (6) South fifty-five degrees fifteen minutes West (S. 55 deg. 15' W.) through lands of The Central Railroad Company of New Jersey, parallel with said center line, five hundred and fifty (550) feet more or less, to the beginning corner. Containing seventeen (17.0) acres of land, more or less.

TRACT TWENTY: BEGINNING in the westerly line of lands of the Central Railroad Company of New Jersey at the third corner of lands conveyed to General Concrete Corporation by Shelton Pitney and Walter P. Gardner, solely as Trustees of the property of said railroad company, by deed dated July 10, 1944, and recorded in the Morris County Clerk's Office on October 5, 1944, said point also being in the fifth line of the tract of 100 acres, more or less, conveyed by John Taylor Johnston to the Longwood Valley Railroad Company by deed dated September 24, 1875, and recorded in the Morris County Clerk's Office in Deed Book C-10, page 448 &c., thence (1) along the fifth course described in said last mentioned deed North nineteen degrees forty-five minutes East one thousand one hundred and twenty (1120) feet, more or less, to the sixth corner of said tract of 100 acres, more or less; thence (2) along the sixth course of said last mentioned deed, South sixty-five and one-fourth degrees East one thousand seven hundred and fifty-five (1755) feet, more or less, to a point distant northwesterly fifty (50) feet,

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measured at right angles from the center line of the Longwood Valley Railroad, as filed in the Office of the Secretary of State; thence (3) southwesterly, through the lands of said railroad company, six hundred and ten (610) feet, more or less, on a direct course to the easterly corner of lands conveyed by said railroad company to Alan Wood Mining Company by deed dated February 6, 1931, and recorded in the Morris County Clerk's Office in Deed Book O-32, page 287 &c.; thence (4) along the first course in said deed, North fifty degrees two minutes twenty seconds West four hundred and sixty feet (460) to the second corner of said lands; thence (5) along the second course in said deed South thirty-nine degrees fifty-seven minutes forty seconds West four hundred and eighty (480) feet to the third corner of said lands, being also fourth corner of lands conveyed to General Concrete Corporation by Shelton Pitney and Walter P. Gardner, solely as Trustees of the property of said railroad company by deed first above mentioned; thence (6) Northwesterly along the third line of said deed, one thousand one hundred and fifty (1150) feet, more or less, to the point or place of Beginning. Containing thirty-six (36) acres of land, more or less.

Tracts Nineteen and Twenty are the same premises conveyed by General Concrete Corporation to North Jersey Quarry Company by deed dated Marcy 2, 1945 and recorded March 5, 1945 in Book Q-34 of Deeds page 13 &c.

TRACT TWENTY-ONE: BEGINNING in the Northwesterly line of lands of the party of the first part, at the end of the line described in the second course of a deed from John Taylor Johnson and wife to The Longwood Valley Railroad Company, dated September 24, 1875, and recorded in the Clerk's Office of Morris County in Deed Book C-10 on pages 448 &c., said beginning point being distant Northwesterly three hundred feet measured at right angles from the center line of the Longwood Valley Railroad as filed in the Office of the Secretary of State at Trenton; thence (1) North fifty-five degrees and fifteen minutes East, along said Northwesterly line of lands of the party of the first part, being the line described in the third course of said deed above recited, eleven hundred and eighty-eight feet to the end thereof; thence (2) North thirty-four degrees and forty-five minutes West along another line of lands of the party of the first part, being the line described in the fourth course of said deed above recited, eight hundred and fifty-eight feet to the end thereof; thence (3) North nineteen degrees and forty-five minutes East, along another line of lands of the party of the first part, being the line described in the fifth course of said deed above recited, two hundred and fifty feet more or less, to a point distant Northeasterly two hundred and fifteen feet, measured at right angles from the line described in the second course hereof, if prolonged, thence (4) South thirty-four degrees and forty-five minutes East, through lands of the party of the first part, parallel with the line described in the second course hereof, and distant Northeasterly two hundred and five feet measured at right angles therefrom twelve hundred feet, more or less, to a point distant Northwesterly one hundred feet measured at right angles from the aforesaid filed center line of the Longwood Valley Railroad; thence (5) South fifty-five degrees and fifteen minutes West through lands of the party of the first part, parallel with said filed center line and distant Northwesterly one hundred feet at right angles therefrom, and also parallel with and distant Southeasterly two hundred feet at right angles from the line described in the first course hereof, thirteen hundred and ninety-three feet, more or less, to the line described in the second course of the deed hereinbefore recited; thence (6) North thirty-four

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degrees and forty-five minutes West, along the line last mentioned, two hundred feet to the point or place of BEGINNING. CONTAINING ten and ninety-five one-hundredths acres of land, more or less.

Being the same premises conveyed by Michael C. Gallo, et ux to North Jersey Quarry Company by deed dated September 26, 1935 and recorded September 27, 1935 in Book E-34 of Deeds page 463 &c.

<u>TRACT TWENTY-TWO:</u> BEGINNING at the beginning corner of the second tract of the ninth parcel mentioned and described as the ninth tract in a deed made by George W. Forsyth, Special Master, to Phebe J. Corwin, dated April 20, 1893, and recorded in the Clerk's Office of Morris County in Book A-14 of Deeds on pages 263 &c., and running thence (1) South eighty-seven degrees and thirty minutes West twelve hundred and eighty-nine and sixty-four one-hundredths feet to the second corner of said lot; thence (2) South thirty-six degrees East seven hundred and one and fifty-eight one-hundredths feet to the third corner of said lot; thence (3) South fifty-three degrees and thirty minutes West sixty-six feet to the fourth corner of the same; thence (4) South thirty-six degrees and thirty minutes East six hundred and fifty-two and eight one-hundredths feet to the fifty corner of the same; thence (5) North fifty-five degrees and fifteen minutes East eleven hundred and eighty-eight feet to the sixth corner of the same; thence (6) North twenty-seven degrees and thirty minutes West eight hundred and thirty-one and sixty one-hundredths feet to the point or place of BEGINNING.

EXCEPTING AND RESERVING, however, from and out of the said lands and premises all that part or portion thereof conveyed by Phebe J. Corwin and husband to Zigmund Kretoritz and wife, by deed dated November 22, 1916, and recorded in the Clerk's Office of Morris County in Book X-23 of Deeds, pages 165 &c., and also that part or portion thereof conveyed by Edward Dell to Elizabeth E. Dell, by deed dated February 23, 1880, and recorded in said Clerk's Office in Book H-10 of Deeds on pages 406 &c. CONTAINING twenty-three and forty-one one-hundredths acres.

The lands and premises aforesaid are conveyed expressly subject to the rights of the New Jersey Power and Light Co., whatever they may be, to cross said lands, or any part thereof, said lands and premises are also conveyed expressly subject to the rights-of-way over the same by the road or roads now and heretofore used.

<u>TRACT TWENTY-THREE:</u> All the right, title and interest of the party of the first part in and to the strip of land known as the "Tramway" running in part along the Southwesterly side of the First Tract above described, (being the SECOND TRACT in this deed.)

Being a portion of the premises conveyed by Michael C. Gallo, et al to North Jersey Quarry Company by deed dated September 26, 1935 and recorded on September 27, 1935 in Book E-34 of Deeds page 434 &c.

Being designated as Block 10, Lot 18 on the Roxbury Township Tax Map.

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TRACT TWENTY-FOUR: BEGINNING at a point in the southerly line of lands conveyed to the Chester Railroad Company by the Andover Iron Company by deed dated July 28, 1892, and recorded in the Morris County record of deeds in Book T-13 on page 192 &c., said point being distant northwesterly seventy-five (75) feet measured at right angles from the present center line of single main track of the Chester Railroad; thence (1) along lands of the said Chester Railroad Company and on a course of North thirty-four degrees and twelve minutes West (N. 34° 12' W.) for a distance of one hundred eighty-six and forty hundredths (186.40) feet to a corner in said lands of the Chester Railroad Company, thence (2) Northeasterly still along lands of said Chester Railroad Company and following the various courses thereof four hundred four (404) feet more or less to a point distant northwesterly seventy-five (75) feet measured at right angles from said center line of single main track thence (3) parallel to and distant northwesterly seventy-five (75) feet measured at right angles from said center line or present single main track on a course North thirty degrees East (N. 30° 00' N.) one and sixty-five hundredths (1.65) feet to a point in lands of said Chester Railroad Company; thence (4) along the southerly line of lands of the Chester Railroad Company and the northerly line of lands of the Morris and Essex Railroad Company on a course of South seventy-eight degrees and sixteen minutes West (S. 78° 16' W.) for a distance of*one hundred and twenty-four and seventeen hundredths (1124.17) feet to a corner in lands of said Morris and Essex Railroad Company; thence (5) still along lands of said Morris and Essex Railroad Company and on a course of South thirty-six degrees and fifty-two minutes East (S. 36° 52' E.) for a distance of nine hundred twelve and forty-four hundredths (912.44) feet to a point distant northwesterly seventy-five (75) feet measured at right angles from said center line of present single main track; thence (5) parallel to and distant northwesterly seventy-five (75) feet measured at right angles from said center line of present single main track on a course of North thirty degrees East (N. 30° 00' E.) for a distance of six hundred sixty-one and sixty-three hundredths (661.63) feet to the point or place of Beginning. Containing nine and thirty-two hundredths (9.32) acres of land be the same more or less.

*one thousand

EXCLUDING that portion lying north of the Berkshire Valley Road.

Being a portion of the premises conveyed by the Morris & Essex Railroad Co. to North Jersey Quarry Company by deed dated November 20, 1923 and recorded December 19, 1923 in Book W-28 of Deeds page 49 &c.

TRACT TWENTY-FIVE: BEGINNING at a point in the Northeasterly line of land of The Morris and Essex Railroad Company distant Northwesterly seventy-five (75) feet measured at right angles from the center line of present single main track of the Chester Railroad Company thence (1) along the aforesaid Morris and Essex Railroad Company on a course of North thirty-four degrees and twelve minutes West (N. 34° 12' W.) for a distance of one hundred eighty-six and forty one-hundredths feet (186.40') to a corner in said lands of The Morris and Essex Railroad Company; thence (2) Northeasterly still along said lands of said Morris and Essex Railroad Company following the various courses thereof four hundred four (404) feet more or less to a point distant northwesterly seventy-five (75) feet measured at right angles from said center line; thence (3) parallel to and distant northwesterly seventy-five feet measured at right angles from said center line and on a course of South thirty degrees West (S. 30° 00' W.) for a distance of four hundred forty-four and fifty-two hundred (442.52) feet to the point or place of Beginning.

Containing ninety seven hundredths (0.97) acres of land be the same more or less.

Being Parcel Three in a deed from The Chester Railroad Company to North Jersey Quarry Company by deed dated November 20, 1923 and recorded December 19, 1923 in Book W-28 of Deeds page 46 &c.

<u>TRACT TWENTY-SIX</u>: All the right, title and interest of the party of the first part to the following described property situate in the Township of Roxbury, County of Morris, State of New Jersey, more particularly described as follows:

That portion of the Morris Canal, its towpaths and embankments, situated between the southwesterly line of the property of the party of the second part, which line bears S 36° 52' E and measures 912.44 feet, and the northerly line of said property, which northerly line bears S 78° 16' W and measures 1124.17 feet, which portion to be conveyed is eight hundred ninety-five (895) feet more or less in length along its center line and contains one and fifty-four hundredths (1.54) acres more or less; being a portion of Tract 474 on the Weir map of the canal, obtained from Nathaniel Corwin by condemnation July 14, 1831, by deed dated November 16, 1839, recorded November 19, 1839, in Morris County Book U of Deeds page 287 &c., by unrecorded conveyance dated July 29, 1845.

Being the same premises conveyed by Morris Canal and Banking Company to North Jersey Quarry Company by deed dated June 9, 1926 and recorded July 27, 1926 in Book B-30 of Deeds page 264 &c.

Tracts 24, 25 and 26 are designated as Block 11, Lot 14 on the Roxbury Township Tax Map.

<u>TRACT TWENTY-SEVEN</u>: Beginning at the intersection of the southwesterly line of State Highway Route No. 46 and the northwesterly line of land described in a deed made May 13, 1868 between Thomas Post, et ux, and The Chester Railroad Company recorded in the Morris County Clerk's Office on November 14, 1868 in Book K-7 of Deeds, page 102; thence (1) South 30° 10' West along a portion of said last mentioned line three hundred sixty-one and sixty hundredths (361.60) feet to a point in the northeasterly line of First Street; thence (2) South 53° 20' East along said last mentioned line one hundred and fourteen hundredths (100.14) feet to a point ten (10) feet measured northwesterly from and at right angles to the center line of the Chester Branch of the railroad of The Delaware Lackawanna and Western Railroad Company; thence (3) North 30° 10' East parallel with and ten (10) feet measured northwesterly from and at right angles to said center line four hundred eighteen and thirty-five hundredths (418.35) feet to a point in said southwesterly line of State Highway Route No. 46; thence (4) North 84° 22' West along said last mentioned line one hundred nine and thirty-eight hundredths (109.38) feet to the point of beginning.

Containing 0.9 of an acre, more or less.

Being designated as Block 41, Lot 4 in the Township of Roxbury Tax Map.

Being the same premises conveyed by The Delaware Lackawanna and Western Railroad Company to Houdaille Construction Materials, Inc. dated May 4, 1959 and recorded on September 22, 1959 in Book X-69 of Deeds page 115 &c.

Subject to the reservations contained therein.

North Jersey Quarry Company changed its name to Houdaille Construction Materials, Inc. on February 1, 1957.

The within conveyance is subject to easements of record and to such facts as an accurate survey would reveal.

Together with all and singular the buildings, improvements, ways, woods, waters, watercourses, rights, liberties, privileges, hereditaments and appurtenances to the same belonging or in anywise appertaining; and the reversion and reversions, remainder and remainders, rents, issues and profits thereof, and of every part and parcel thereof; and also all the estate, right, title, interest, use, possession, property, claim and demand whatsoever, of the Grantor both in law and equity, of an in and to the premises herein described and every part and parcel thereof, with the appurtenances.

To Have and To Hold all and singular the premises herein described, together with the appurtenances, unto the Grantee and to Grantee's proper uses and benefit forever.

In all references herein to any parties, persons, entities or corporations, the use of any particular gender or the plural or singular number is intended to include the appropriate gender or number as the text of the within instrument may require.

Wherever in this instrument any part shall be designated or referred to by name or general reference, such designation is intended to and shall have the same effect as if the words "heirs, executors, administrators, personal or legal representatives, successors and assigns: had been inserted after each and every such designation.

IN WITNESS WHEREOF, the Grantor has caused these presents to be signed and attested by its proper corporate officers and its corporate seal to be hereto affixed the day and year first above written.

ATTEST: HOUDAILLE CONSTRUCTION MATERIALS, INC.

B. Zamrok, Jr., Ass't Sec. V. G. Aubry, Jr., President

HOUDAILLE CONSTRUCTION MATERIALS, INC. CORPORATE SEAL

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STATE OF NEW JERSEY)
ss.:
COUNTY OF MORRIS)

Be it Remembered, that on this 26 day of ~~January~~ April, 1978 before me the subscriber An Attorney at Law of the State of New Jersey personally appeared B. ZAMROK, JR., who, being by me duly sworn on his oath deposes and makes proof to my satisfaction, that he is the Assistant Secretary of Houdaille Construction Materials, Inc. the Corporation named in the within Instrument; that V. G. Aubry, Jr., is the President of said Corporation; that the execution, as well as the making of this Instrument, has been duly authorized by a proper resolution of the Board of Directors of the said Corporation; that deponent well knows the corporate seal of said Corporation; and that the seal affixed to said Instrument is the proper corporate seal and was thereto affixed and said Instrument signed and delivered by said President as and for the voluntary act and deed of said Corporation, in presence of deponent, who thereupon subscribed his name thereto as attesting witness.

Sworn to and subscribed before me,
the date aforesaid

An Attorney at Law of the State of New Jersey

B. Zamrok, Jr., Assistant Secretary

Prepared by: Clifford W. Starrett, Esq.

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NC 1645 AFFIDAVIT OF CONSIDERATION RTF-1 (Rev. 9/1/75)

ALL-STATE LEGAL SUPPLY CO. 269 Sheffield St., Mountainside, N. J. 07092 DGRVST

STATE OF NEW JERSEY
AFFIDAVIT OF CONSIDERATION OR EXEMPTION
(c. 49, P.L. 1968)
or
PARTIAL EXEMPTION
(c. 176, P.L. 1975)
To Be Recorded With Deed Pursuant to c. 49, P.L. 1968 (N.J.S.A. 46:15-5 et seq.)

STATE OF NEW JERSEY
COUNTY OF Essex } ss.

FOR RECORDER'S USE ONLY
Consideration $ ______
Realty Transfer Fee $ ______ *
Date ______ By ______
*Use symbol "C" to indicate that fee is exclusively for county use.

(1) PARTY OR LEGAL REPRESENTATIVE (See instruction #3)

JOHN C. CRIMI being duly sworn according to law upon his oath deposes and say that he is the President of Grantee Corporation
(State whether Grantor, Grantee or Legal Representative, if Legal Representative, specify in what capacity)

in the deed between HOUDAILLE CONSTRUCTION MATERIALS, INC., c/o Houdaille Industries, Inc. 1200 One Financial Plaza, Fort Lauderdale, Florida
(Name and Address of Grantor)

COUNTY CONCRETE CORPORATION, 355 Minnisink Road, Totowa Borough, N. J.
(Name and Address of Grantee)

dated April 26, 1978 and annexed hereto.

(2) OFFICER OF CORPORATE GRANTOR OR CORPORATE GRANTEE (See Instruction #4)

Deponent states that he is the President (Title of Corporate Officer) of COUNTY CONCRETE CORPORATION (Name of Corporate Grantor or Grantee), and that he is fully acquainted with the business of said corporation and knows the actual and full consideration paid or to be paid for the transfer of title to the premises described in the deed annexed hereto.

(3) OFFICER OF TITLE COMPANY OR LENDING INSTITUTION (See Instruction #5)

Deponent states that he is the ______ (Title) of ______ (Name of Title Company or Lending Institution) participating in the deed transaction herein described and that he knows the actual and full consideration paid or to be paid for the transfer of title to the premises described in the deed annexed hereto.

(4) CONSIDERATION (See Instruction #6)

Deponent states that, with respect to deed hereto annexed, the actual amount of money and the monetary value of any other thing of value constituting the entire compensation paid or to be paid for the transfer of title to the lands, tenements or other realty, including the remaining amount of any prior mortgage to which the transfer is subject or which is to be assumed and agreed to be paid by the grantee and any other lien or encumbrance thereon not paid, satisfied or removed in connection with the transfer of title is $ 750,000.00

(5) LOCATION OF PROPERTY

Deponent states that the real property transfered by the deed annexed hereto is located in Roxbury Township, Mine Hill Township, ~~Morris Township and Mount Olive Township~~ (Taxing District(s)) and Morris (County(ies))

(6) EXEMPTION FROM FEE (Complete only if exemption from fee or any part thereof is claimed.)
CHECK APPROPRIATE BLOCK BELOW.

Deponent claims that this deed transaction was exempt from the realty transfer fee imposed by c. 49, P.L. 1968 ☐ (See instruction #7) or is exempt from the increased fee imposed by c. 176, P.L. 1975 ☐ (See instruction #8) for the following reason(s):

Deponent makes affidavit to induce the County Clerk or Register of Deeds to record the deed and accept the fee submitted herewith in accordance with the provisions of c. 49, P.L. 1968.

Subscribed and Sworn to before me this 26th day of April 1978

John C. Crimi
JOHN C. CRIMI (Name of Deponent)

A. Michael Rubin
A. MICHAEL RUBIN
ATTY AT LAW OF N.J.

(Address of Deponent)

FOR OFFICIAL USE ONLY This space for use of County Clerk or Register of Deeds.
Instrument Number ______ County ______
Deed Number ______ Book ______ Page ______
Deed Dated ______ Date Recorded ______

IMPORTANT — BEFORE COMPLETING THIS AFFIDAVIT, PLEASE READ THE INSTRUCTIONS ON THE REVERSE SIDE HEREOF.

This form is prescribed by the Director, Division of Taxation in the Department of the Treasury, as required by law, and may not be altered or amended without the approval of the Director.
ORIGINAL — White copy to be retained by County.
DUPLICATE — Yellow copy to be forwarded by County to Division of Taxation, pursuant to N.J.A.C. 18:16—8.12.
TRIPLICATE — Pink copy is your file copy.

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R 287761

DEED

BETWEEN

HOUDAILLE CONSTRUCTION MATERIALS, INC.

AND

COUNTY CONCRETE CORPORATION

DATED: April 26, 1978

R+R

COMMONWEALTH LAND TITLE INS. CO.
24 BEECHWOOD ROAD
SUMMIT, N. J. 07901

~~SCHENCK, PRICE, SMITH & KING~~
~~COUNSELLORS AT LAW~~

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Appendix B

Site Investigation

1. Wetland Report and Map
2. Habitat Assessment and Survey for Threatened or Endangered Species
3. New Jersey Natural Heritage Database Search Reports
4. New Jersey Historic Preservation Office Approval
5. NCRS Soil Report
6. StreamStats Report
7. Geotechnical Evaluation and Report

D2252.001
February 3, 2022

FRESHWATER WETLAND DELINEATION REPORT

RAILROAD AVENUE PROPERTY
BLOCK 2202 * LOTS 4 & 5; BLOCK 2201 * LOT 13
BLOCK 604 * LOT 1; BLOCK 605 * LOT 1; BLOCK 602 * LOT 1
ROXBURY and MINE HILL TOWNSHIPS,
MORRIS COUNTY, NEW JERSEY

PREPARED FOR:

BOGIA ENGINEERING, INC.
667 EXTON COMMONS
EXTON, PA 19341

PREPARED BY:

DuBois
& ASSOCIATES
190 North Main Street
Manahawkin, NJ 08050

AMY JONES, PWS
SENIOR BIOLOGIST/PROJECT MANAGER

TABLE OF CONTENTS

APPENDICES

FIGURES

I. INTRODUCTION

A Freshwater Wetland Delineation Report has been prepared for land on and within the vicinity of the referenced site designated as Block 2202, Lots 4 and 5, Block 2201, Lot 13, and Block 2501, Lot 1 in Roxbury Township, and Block 604, Lot 1, Block 605, Lot 1, and Block 602, Lot 1 located within Mine Hill Township, Morris County, New Jersey ("the site"). The property and immediate surrounding areas were investigated for the presence or absence of freshwater wetlands and a subsequent delineation of wetland/upland boundaries were conducted. The methodology utilized to determine the presence of wetlands was the "Three Parameter Approach for Wetland Delineation" as described within the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*, published by the Federal Interagency Committee for Wetlands Delineation, January 1989. The Army Corp. of Engineers Regional Wetland Supplements and the most current U.S. Department of Agriculture Natural Resource Conservation Service *Field Indicators of Hydric Soil* manual were also utilized.

II. SITE LOCATION

The subject site is located on Sheets 20, 6, 22, and 25 of the official tax maps of Roxbury and Mine Hill Townships (refer to *Figure 1: Roxbury and Mine Hill Township Tax Maps*). The site is located with frontage along Railroad Avenue to the west, 1st Street to the north, and Green Lane to the south (*Figure 2: New Jersey Road Map*). The site can be found on the Mendham, Chester and Dover NJ U.S. Geological Survey Quadrangle with NAD 83 state plane coordinates of E(x) 458,379 N(y) 742,135 at the approximate center of the site (refer to *Figure 3: Mendham, Chester & Dover U.S.G.S Quadrangle Map*). It is situated in the North and South Branch Raritan Watershed Management Area (08), Lamington River watershed (08BA), and the Lamington River (above Rt 10) subwatershed (08BA01). The site drains to the Mine Hill Lake and Lamington River that traverses the lake feature on the site.

The site is composed of a large lake throughout the eastern section of the site, a mine/quarry facility in the northwest section of the site, residential development in the southwest, and areas of undeveloped forested and wetland communities. Refer to *Figure 4: Aerial Map* for a depiction of the land coverage present on and in the vicinity of the subject site. Surrounding land use includes additional quarry facilities opposite Railroad Avenue, residential development, forested wetland and upland communities to the east, and a utility right-of-way.

III. SOILS

According to the SSURGO GIS data layer provided by the USDA Natural Resources Conservation Service (NRCS), the site is underlain by five (5) soil map units of five (5) soil series (refer to *Figure 5: Morris County Soil Survey Map*). The following information is referenced directly from the Soil Survey of Morris County and the USDA, Natural Resources Conservation Service (NRCS) official soil series descriptions.

<u>Map Unit: UR - Urban land; PHG – Pits, Sand and Gravel</u>
The Urban land and Pits, Sand and Gravel are miscellaneous areas that are associated with developed and disturbed areas. These are not a natural soil series/units.

<u>AdrAt – Adrian muck, 0 to 3 percent slopes, frequently flooded</u>
The Adrian series consists of very deep, very poorly drained soils formed in herbaceous organic materials over sandy deposits on outwash plains, lake plains, lake terraces, flood plains, moraines, and till plains. The soil is very poorly drained. Depth to the top of an apparent seasonal high water table ranges from 30 cm (1 foot) above the surface to 30 cm (1 foot) below the surface between September and June in normal years. Potential for surface runoff is negligible. Saturated hydraulic conductivity is moderately high or high

in the organic material and high or very high in the sandy material. Permeability is moderately slow to moderately rapid in the organic material and rapid in the sandy material. In the flooded phase, areas are subject to frequent flooding for long periods between October and June.

Map unit: PrkAt – Preakness sandy loam, 0 to 3 percent slopes, frequently flooded
The Preakness series consists of very deep, poorly and very poorly drained soils on outwash plains and terraces. They occur in low positions and in swales. Slope ranges from 0 to 3 percent. Saturated hydraulic conductivity is moderately high or high in the surface and subsoil and high to very high in the substratum. Preakness soils are poorly or very poorly drained. Runoff is negligible or low.. Saturated hydraulic conductivity is moderately high or high in the surface and subsoil and high to very high in the substratum. The water table is at or near the surface from late autumn through winter and spring. The soils are often ponded in winter and during periods of high rainfall because of their low topographic position. In many places adjacent to streams, Preakness soils flood frequently for brief periods in late winter and early spring. They flood more extensively but less often following severe storms of low frequency in August through October.

Map unit: USROCC – Urban Land- Rockway complex, 3 to 15 percent slopes
The Urban land component of this complex is miscellaneous, indicating this area is composed of disurbed and developed areas. The Rockaway series consists of very deep well or moderately well drained soils. Surface runoff is medium or high. A perched water table on the fragipan is common in late winter and early spring and following periods of extended rainfall. They are moderately deep to a fragipan. The soils formed in till on uplands. Slope ranges from 3 to 60 percent. Permeability is moderately rapid or moderate above the fragipan and slow or very slow in the fragipan. Rockaway soils are on complex hilly to mountainous glaciated topography. Slope ranges from 3 to 60 percent, but commonly is 8 to 25 percent. The soils developed in coarse or moderately coarse textured till composed primarily of granitic gneiss with smaller amounts of quartzite, sandstone, and shale, and in some pedons, limestone.

IV. TOPOGRAPHY AND DRAINAGE

The site contains gentle to moderate to steep sloping throughout the site. Based on the plan prepared by Bogia Engineering, Inc. (Bogia) entitled "Wetland Delineation; County Concrete, LLC; 50 Railroad Avenue….Mine Hill, Roxbury Townships, Morris County, NJ" dated 2/3/2022, a high elevation of 715 feet is in the southwest section of the site on Block 605, Lot 1. The site slopes to a low elevation of 652 feet in the enter of the lake. The water limit is at elevation 700.7 at the time of survey, and wetland limits range from elevations 700 to 706 feet. The site drains to the Mine Hill Lake that is on the site, which is associated with the NJDEP mapped Lamington River and associated tributaries.

V. SURFACE WATER QUALITY

It is situated in the North and South Branch Raritan Watershed Management Area (08), Lamington River watershed (08BA), and the Lamington River (above Rt 10) subwatershed (08BA01). The site drains to the Mine Hill Lake and Lamington River that traverses the lake feature on the site. According to the NJDEP GIS digital data layer entitled "NJDEP Surface Water Quality Standards of New Jersey", the Lamington River/Mine Hill Lake is classified as a Freshwater Class 2, Non-Trout (FW2-NT) waterway according to the Surface Water Quality Standards at N.J.A.C.7:9B. Non-trout waters means "fresh waters that have not been designated in N.J.A.C. 7:9B-1.15(c) through (i) as trout production or trout maintenance. These waters are generally not suitable for trout because of their physical, chemical or biological characteristics, but are suitable for a wide variety of other fish species".

VI. STUDY METHODOLOGY

A field investigation was conducted by DuBois and Associates, LLC (DuBois) personnel in December of 2021. The methodology utilized to determine the presence or absence of wetlands and the delineation of a definitive line separating upland areas from wetland areas was the Three Parameter Approach set forth in a manual entitled *Federal Manual for Identifying and Delineating Jurisdictional Wetlands (Federal Manual)*, published under the Federal Interagency Committee for Wetland Delineation (FICWD), 1989. Three parameters were evaluated to determine the wetland limits, including hydrology, vegetation and soils. The Army Corp. of Engineers Regional Wetland Supplements, and the most current U.S. Department of Agriculture Natural Resource Conservation Service *Field Indicators of Hydric Soil* manual was also utilized. Three parameters were evaluated to determine the wetland limits, including hydrology, vegetation and soils.

A. Wetland Hydrology

The *Federal Manual* describes wetland hydrology as saturation to the surface when soils in the following natural drainage classes meet the following conditions:

1. Somewhat poorly drained mineral soils where the water table is less than six inches from the surface for one week or more during the growing season;

2. Low permeability soils (<6 inches/hour), poorly drained or very poorly drained mineral soils, water table is less than 1.5 feet from the surface for one week or more during the growing season;

3. Soils that are more permeable (>6 inches/hour), poorly drained, or very poorly drained mineral soils, water table is less than 1 foot from the surface for one week or more during the growing season

4. Water table is at a depth where saturation occurs more than rarely in poorly drained or very poorly drained organic soils;

5. An area is inundated at some time if ponded or frequently flooded with surface water for one week or more during the growing season.

Wetland hydrology is determined by the visual presence of drift lines, watermarks, sediment deposition, standing water, saturated soils, and buttressed tree trunks, among others. Hydrology varies with the season and amount of recent precipitation. Therefore, the hydrology criteria cannot always be a major determining factor, but it assists in the final verification of a wetland limit. Where appropriate, soil description and/or historical data were utilized to supplement field observations.

B. Hydrophytic Vegetation

As per the *Federal Manual*, hydrophytic vegetation is defined as "macrophytic plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content." Indicator statuses are used to designate a plant species' preference for occurrence in a wetland or upland. The vegetation on the project site was identified and classified in accordance with the 2016 National Wetland Plant List, which is a list compiled as an interagency effort between the U.S. Army Corp. of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service and the USDA NRCS to be utilized for all jurisdictional wetland determinations. Plants are assigned an indicator, and classifications listed are as follows:

Obligatory (OBL)	Almost always is a hydrophyte, rarely in uplands
Facultative Wetland (FACW)	Usually is a hydrophyte but occasionally found in uplands
Facultative (FAC)	Commonly occurs as either a hydrophyte or non-hydrophyte
Facultative Upland (FACU)	Occasionally is a hydrophyte but usually occurs in uplands
Upland (UPL)	Rarely is a hydrophyte, almost always in uplands
No Indicator (NI)	No indicator status

The *Federal Manual* states that there are two instances for an area to meet the hydrophytic vegetation criteria:

1. more than 50 percent of the composition of the dominant species from all strata are obligate wetland (OBL), facultative wetland (FACW), and/or facultative (FAC) species, or

2. a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, and UPL = 5.0)

C. Hydric Soils

The *Federal Manual* defines hydric soils as "soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part". The determination of hydric soils was evaluated by taking soil borings with a hand-held auger to a depth of 20+ inches. Where applicable, hydric soils were identified in accordance with the indicators established within the publication "*Field Indicators of Hydric Soils in the United States, A Guide for Identifying and Delineating Hydric Soils, Version 8.2*," published by the USDA NRCS in 2018. The soils were evaluated based on texture, color, structure and presence/absence of redoximorphic features (mottling). Soil color was evaluated using a Munsell color chart; soil texture was described using the USDA classification system; structure was estimated using the methods described in the Soil Survey Manual, prepared by the USDA, 1993; and any other indicators that assisted in the classification of soil types were recorded in the field.

Soil texture is the proportion of sand, silt and clay in the soil. This composition affects water content, water intake rates, aeration, root penetration and some chemical properties (Gardiner & Miller, 2004).

Redoximorphic features (mottling) occurs in soils that are seasonally inundated, creating a varying aerobic/anaerobic environment. When the water table fluctuates, iron (orange/reddish brown) or manganese (dark reddish-brown/black) becomes oxidized during the dry (aerobic) period. This process forms mottles, which appear as oxidized iron or manganese features in an otherwise reduced soil column. These features are typically insoluble and are commonly used as an indicator of a seasonal high water table and hydric soils.

Soil structure is described as angular blocky, subangular blocky, columnar, granular, platy and prismatic (Gardiner & Miller, 2004). The structure of the soil can influence factors such as water and air infiltration.

Soils are considered hydric if the chroma of the matrix was less than 2 or equal to 2 when mottling was present. Sandy soils were evaluated by observing streaking of subsurface horizons, high organic matter in the surface and/or the presence of organic peds. These features are required to be within 12 inches of the surface to meet hydric criteria.

VII. RESULTS OF ON-SITE ASSESSMENT

According to the NJDEP freshwater wetland GIS mappings, freshwater wetlands are mapped in the southern and western sections of the site associated with the Lamington River and associated tributaries (refer to *Figure 6: NJDEP Freshwater Wetlands Map*). The presence of freshwater wetlands was confirmed on the site during the field investigation. The extent of freshwater wetlands was flagged in the field by the staff of DuBois in December, 2021. The delineated wetlands are identified as primarily State open waters along the lake limit and tributaries, with wetland fringe areas that are generally consistent with the NJDEP GIS mapping. The flags were then surveyed and transcribed onto the plan prepared by Bogia entitled "Wetland Delineation; County Concrete, LLC; 50 Railroad Avenue….Mine Hill, Roxbury Townships, Morris County, NJ" dated 2/3/2022.

A. Wetland Hydrology

Within the areas identified as freshwater wetlands on the site, positive wetland hydrologic indicators were observed including inundation and water lines along the lake limits and the Lamington River tributaries, a high-water table, soil saturation, drainage patterns, and vegetative morphological adaptations such as multi-trunk trees and root buttressing of surrounding vegetation in the wetland fringe. Hydrology varies with the season and amount of recent precipitation; therefore, the hydrology criteria cannot always be a major determining factor, but it assists in the final verification of a wetland limit.

B. Hydrophytic Vegetation

A majority of the site is an open water feature, with surrounding disturbed quarry and mine area. The State open water limits of the lake do not exhibit any wetland fringe communities. The quarry/mine areas are not composed of any natural biotic community characteristics or vegetation composition.

The upland areas along the State open water (lake) features and surrounding other developed areas of the site are a late successional and mixed hardwood community. Overstory and subcanopy vegetation includes red maple (*Acer rubrum*, FAC), white oak (*Quercus alba*, FACU), American beech (*Fagus grandifolia*, FACU), northern red oak (*Quercus rubra*, FACU), American holly (*Ilex opaca*, FACU), and few planted white pine (*Pinus strobus*, NI). Understory vegetation is Japanese knotweed (*Polygonum cuspidatum*, FACU), olive (*Elaeagnus umbellata*, FACU), multiflora rose (*Rosa multiflora*, FACU), and arrowwood (*Viburnum dentatum*, FAC). Garlic mustard (*Alliaria petiolata*, FACU), goldenrod species (*Solidago spp.*), wild onion (*Allium cernuum*, FACU), and white snakeroot (*Ageratina altissima*, FACU) are herbaceous species. The overall vegetative composition of the upland areas did not exceed the 50 percent dominance criterion, and the hydrophytic vegetation parameter is not met.

The wetland areas on the site are classified as hardwood swamp and disturbed emergent communities. Overstory and subcanopy vegetation includes red maple (*Acer rubrum*, FAC), black gum (*Nyssa sylvatica*, FAC), sweet gum (*Liquidambar styraciflua*, FAC), and pin oak (*Quercus palustris* FACW). Understory vegetation includes Japanese knotweed, highbush blueberry (*Vaccinium corymbosum*, FACW), greenbriar (*Smilax rotundifolia*, FAC), and arrowwood. Herbaceous species identified are common reed (*Phragmites australis*, FACW), Japanese stiltgrass (*Microstegium vimineum*, FAC), softrush (*Juncus effusus*, FACW), Japanese honesysuckle (*Lonicera japonica*, FAC), sensitive fern (*Onoclea sensibilis*, FACW), and goldenrod species (*Solidago spp.*). The vegetation composition of wetland communities exceeds the 50 percent dominance criterion, and the hydrophytic vegetation parameter is met.

C. Hydric Soils

An on-site assessment was conducted to identify existing characteristics of the soils and to identify restrictive layers, seasonal high-water tables and groundwater levels. Soil borings were performed throughout the upland/wetland boundaries on the site with a handheld auger. Areas upland of the State open water limits along the lake, and surrounding undisturbed uplands areas, are composed of bright matrix soils with Munsell notations 10YR3/2 with no mottles, 10YR4/4, 10YR5/4 and 10YR4/6. Soils throughout wetland areas exhibited sections with muck conditions, and low chroma matrix colors of 10YR2/1 and 10YR4/2 Munsell notation with oxidized roots and evidence of mottling above 10 inches. Refer to *Appendix B* for a copy of the representative Field Data Sheets.

VIII. PROPOSED PROJECT

The applicant is applying for the appropriate land verification of the wetland and transition area limits on the site to determine the extent of unregulated uplands on the property.

IX. SUMMARY

A field investigation and subsequent wetland delineation was performed upon Block 2202, Lots 4 and 5; Block 2201, Lot 13 and Block 2501, Lot 1 in Roxbury Township, and Block 604, Lot 1; Block 605, Lot 1; and Block 602, Lot 1 located within Mine Hill Township, Morris County. Freshwater wetlands were identified and flagged within areas along the Lamington Creek tributaries, and State open waters along the Mine Hill Lake. Locations were then surveyed and transferred to the plan prepared by Bogia entitled "Wetland Delineation; County Concrete, LLC; 50 Railroad Avenue….Mine Hill, Roxbury Townships, Morris County, NJ" dated 2/3/2022.

This report is to be submitted to the NJDEP along with a Letter of Interpretation application package to be submitted by Bogia Engineering, Inc. requesting the verification of the delineated wetland and State open water line and establishment of the resource value and transition area width associated with the subject wetland areas.

X. REFERENCES

Bogia Engineering, Inc. 2/3/2022. "Wetland Delineation; County Concrete, LLC; 50 Railroad Avenue….Mine Hill, Roxbury Townships, Morris County, NJ"

Federal Interagency Committee for Wetland Delineation, 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Services, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative Technical Publication.

Gardiner, Duane T. and Miller, Raymond W. Soils In Our Environment, 10th Edition. Pearson Education, Inc. Upper Saddle River, NJ, 2004.

New Jersey Department of Environmental Protection, Bureau of Geographical Information Systems. Maps and Map Data. Accessed December, 2021 and January, 2022. http://www.nj.gov/dep/gis/

New Jersey Department of Environmental Protection, Division of Land Use Regulation. Amended 10.5.2020. Freshwater Wetlands Protection Act Rules (N.J.A.C.7:7A)

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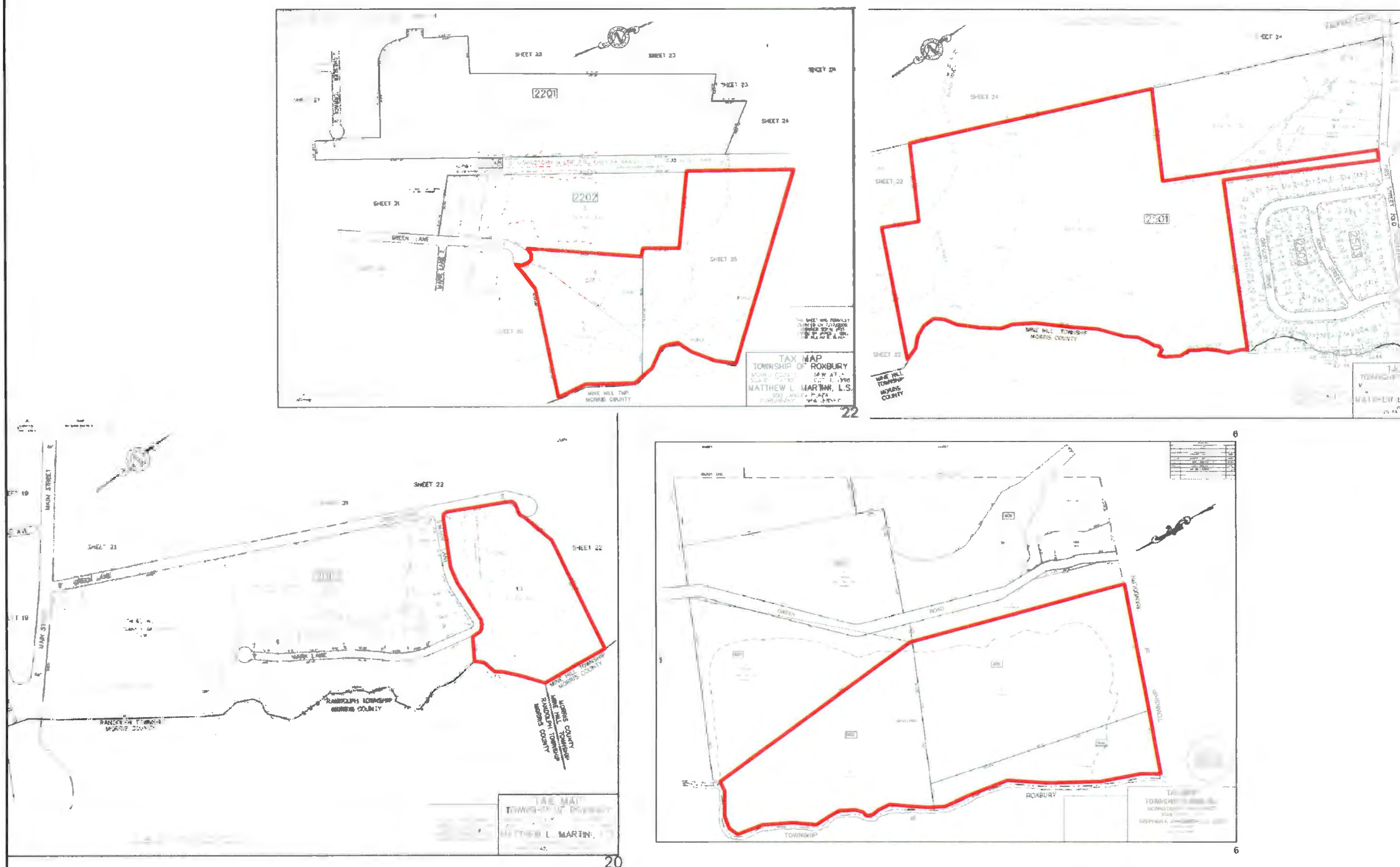
United States Department of Agriculture, Natural Resources Conservation Service, Soil Data Mart. December, 2021 and January, 2022. http://soildatamart.nrcs.usda.gov/State.aspx

United States Fish and Wildlife Service, United States Environmental Protection Agency, United States Army Corp. of Engineers, United States Department of Agriculture Natural Resources Conservation Service. 2018. National Wetland Plant List. Available Online at http://plants.usda.gov/wetland.html. Accessed May, 2021.

FIGURES



Roxbury and Mine Hill Township Tax Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

DuBois & ASSOCIATES

NORTH

Figure 1

Job No.: D2252.001	
Date: 2/2/2022	
Drawn By: HJ	

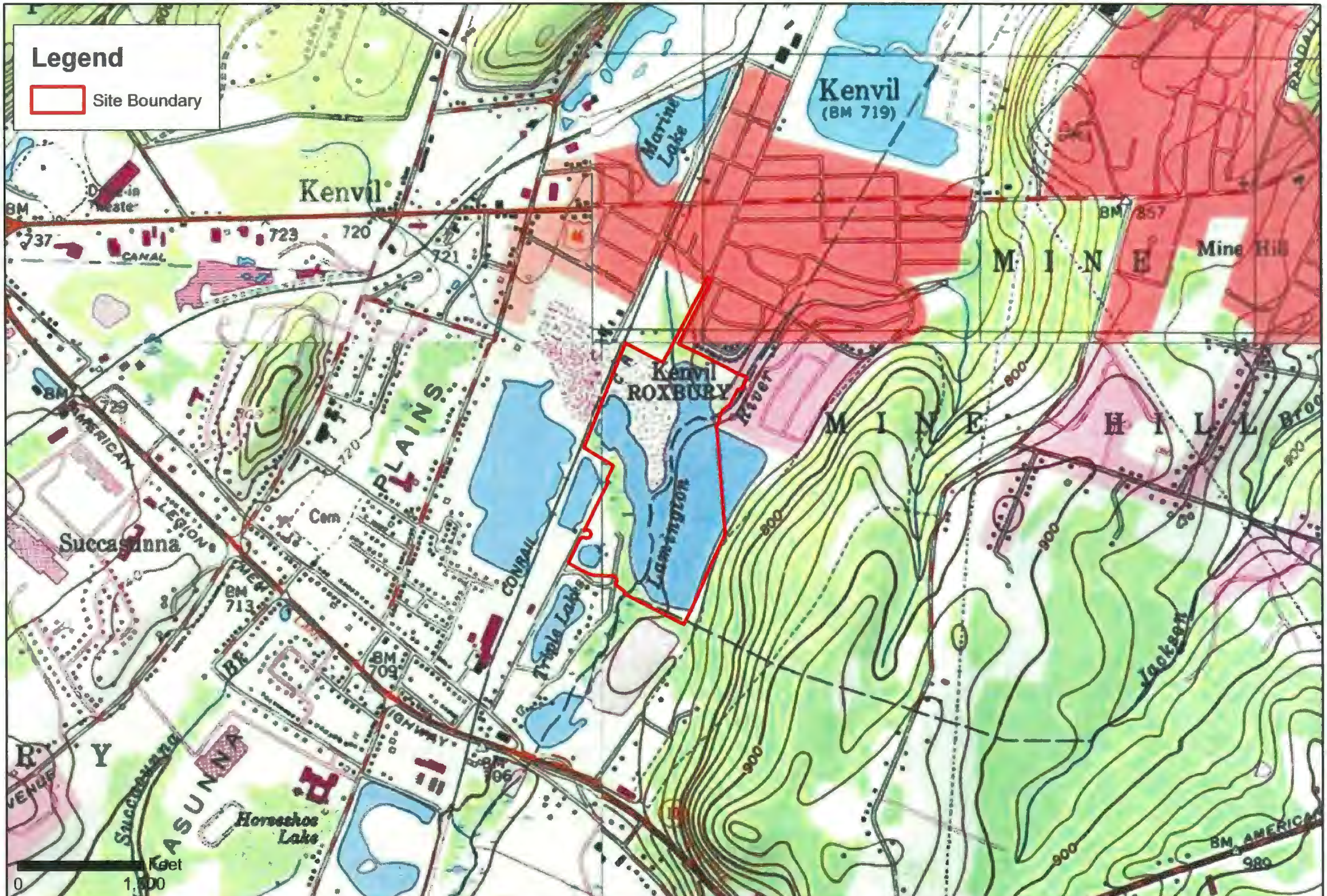
Document Path: S:\JOBS NUMBERS\D2252.001\Tax.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & ASSOCIATES	**New Jersey Road Map** Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1; Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1 Roxbury, Mine Hill & Randolph Townships, Morris County, NJ	NORTH Figure 2	Job No.: D2252.001 Scale: 1 in = 1,500 ft Date: 2/2/2022 Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D2252.001\Road.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



SW Dover & NW Mendham & NE Chester NJ USGS Quad Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

DuBois & ASSOCIATES

NORTH

Figure 3

Job No.: D2252.001	
Scale: 1 in = 1,500 ft	
Date: 2/2/2022	
Drawn By: HJ	

Document Path: S:\JOBS NUMBERS\D2252.001\Quad.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & Associates

Aerial Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 4

Job No.: D2252.001
Scale: 1 in = 600 ft
Date: 2/2/2022
Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D2252.001\Aerial..mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & ASSOCIATES

Morris County Soil Survey Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 5

Job No.: D2252.001	
Scale: 1 in = 600 ft	
Date: 2/2/2022	
Drawn By: HJ	

Document Path: S:\JOBS NUMBERS\D2252.001\Soil.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois & ASSOCIATES

NJDEP Freshwater Wetlands Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 6

Job No.: D2252.001	
Scale: 1 in = 600 ft	
Date: 2/2/2022	
Drawn By: HJ	

Document Path: S:\JOBS NUMBERS\D2252.001\Wet.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

APPENDIX A

SITE PHOTOGRAPHS

Photo 1: Representative view of the Mine Hill Lake at the State open limit in the vicinity of wetland point A3.

Photo 2: Representative view facing the upland area from the vicinity of wetland point A3.

Photo 3: View of the dock feature and minimal *Phragmites* fringe facing north at wetland point A37.

Photo 4: Representative view of the Lamington Creek tributary and surrounding wetland area, in the vicinity of wetland point A12 and A13.

Photo 5: Representative view of upland wooded areas surrounding the lake and State open water limits.

Photo 6: Representative view of the timber pile area upland of wetland points A37 to A44.

Photo 7: Facing north along the waterway and wetland complex between wetland points A40 and A98.

Photo 8: Representative view of the quarry/mine in the northwest section of the site that is absent of natural wetland and upland communities.

APPENDIX B

Field Data Logs

DuBois & ASSOCIATES

Project: D2252.001
Sample Point: A12/A13__

Wetland Delineation Data Form

Project Site: Railroad Avenue Property	**City/County/State:** Roxbury & Mine Hill/Morris/NJ
Client: Bogia Engineering, Inc.	
Investigators: Bryon DuBois, PWS & Amy Jones, PWS	

Vegetation

Dominant Plant Species	Indicator Status	Stratum
Quercus alba	FACU	Overstory
Acer rubrum	FAC	Overstory
Quercus rubra	FACU	Overstory
Polygonum cuspidatum	FACU	Understory
Rosa multiflora	FACU	Understory
Solidago spp.	--	Herbaceous

Percent of dominant species that are OBL, FACW and/or FAC: ___________17%___________________
Is the Hydrophytic Vegetation Criterion met? Yes: ___ No: _X__

Soils

Series: ___________AdrAt_____________________________________
Is the soil on the hydric soils list?: Yes: _X_ No: ___ Unknown: ____
Is the soil mottled? Yes: __ No: _X_ Gleyed?: Yes: ____ No: _X___

	DEPTH	MUNSELL NOTATION
MATRIX COLOR:	0-8 inches	10YR3/2
MATRIX COLOR:	8-12+ inches	10YR5/4

Other hydric soil indicators: ____
Is the hydric soil criterion met?: Yes: ___ No: _X__

Hydrology

Is the ground surface inundated?: Yes __ No: _X__ Surface water depth: _______________
Is the soil saturated?: Yes: __ No: _X_ Depth to saturation: ________________________
Other evidence of surface inundation or soil saturation: ___________________________________

Is the wetland hydrology criterion met?: Yes: ___ No: _X_

Is this observation point a wetland?: Yes: ___ No: _X_

Project: D2252.001
Sample Point: A12/A13__

Wetland Delineation Data Form

Project Site: Railroad Avenue Property	**City/County/State:** Roxbury & Mine Hill/Morris/NJ
Client: Bogia Engineering, Inc.	
Investigators: Bryon DuBois, PWS & Amy Jones, PWS	

Vegetation

Dominant Plant Species	Indicator Status	Stratum
Acer rubrum	FAC	Overstory
Liquidambar styraciflua	FAC	Overstory/Subcanopy
Viburnum dentatum	FAC	Understory
Rosa multiflora	FACU	Understory
Microstegium vimineum	FAC	Herbaceous
Juncus effusus	FACW	Herbaceous

Percent of dominant species that are OBL, FACW and/or FAC: ___________83%___________________
Is the Hydrophytic Vegetation Criterion met? Yes: _X__ No: ___

Soils

Series: ___________AdrAt___________________________________
Is the soil on the hydric soils list?: Yes: _X_ No: ___ Unknown: ____
Is the soil mottled? Yes: _X_ No: __ Gleyed?: Yes: ____ No: _X__

DEPTH MUNSELL NOTATION

MATRIX COLOR: _______0-6 inches___________10YR2/2 w/ 10YR4/6 mottles_____________

MATRIX COLOR: _______6-12+ inches_________10YR4/2 w/ 10YR4/6 mottles_____________

Other hydric soil indicators: _________oxidized roots_________________
Is the hydric soil criterion met?: Yes: _X__ No: ___

Hydrology

Is the ground surface inundated?: Yes _X_ No: ___ Surface water depth: __1-4" – adjacent stream_____
Is the soil saturated?: Yes: _X_ No: __ Depth to saturation: ______6"_________________
Other evidence of surface inundation or soil saturation:
___stream corridor, driftlines, shallow roots, topographic variation_________

Is the wetland hydrology criterion met?: Yes: _X__ No: __

Is this observation point a wetland?: Yes: _X_ No: __

DuBois & ASSOCIATES

Project: D2252.001
Sample Point: A28__

Wetland Delineation Data Form

Project Site: Railroad Avenue Property	**City/County/State:** Roxbury & Mine Hill/Morris/NJ
Client: Bogia Engineering, Inc.	
Investigators: Bryon DuBois, PWS & Amy Jones, PWS	

Vegetation

Dominant Plant Species	Indicator Status	Stratum
Quercus alba	FACU	Overstory
Acer rubrum	FAC	Overstory
Fagus grandifolia	FACU	Overstory/Subcanopy
Elaeagnus umbellata	FACU	Understory
Polygonum cuspidatum	FACU	Understory
Rosa multiflora	FACU	Understory
Ageratina altissima	FACU	Herbaceous
Alliaria petiolata	FACU	Herbaceous
Solidago spp.	--	Herbaceous

Percent of dominant species that are OBL, FACW and/or FAC: ____________13%__________________
Is the Hydrophytic Vegetation Criterion met? Yes: ___ No: _X__

Soils

Series: ___________AdrAt____________________________________
Is the soil on the hydric soils list?: Yes: _X_ No: ___ Unknown: ____
Is the soil mottled? Yes: __ No: _X_ Gleyed?: Yes: ____ No: _X___

	DEPTH	MUNSELL NOTATION
MATRIX COLOR:	0-6 inches	10YR2/2
MATRIX COLOR:	6-10 inches	10YR4/4
MATRIX COLOR:	10-12+ inches	10YR5/6

Other hydric soil indicators: _____________________________________
Is the hydric soil criterion met?: Yes: ___ No: _X__

Hydrology

Is the ground surface inundated?: Yes __ No: _X__ Surface water depth: _______________
Is the soil saturated?: Yes: __ No: _X_ Depth to saturation: ________________________
Other evidence of surface inundation or soil saturation: ___________________________________

Is the wetland hydrology criterion met?: Yes: ___ No: _X_

Is this observation point a wetland?: Yes: ___ No: _X_

**adjacent wetland State open water. No wetland data sheet*

Project: D2252.001
Sample Point: A40/A98__

Wetland Delineation Data Form

Project Site: Railroad Avenue Property	**City/County/State:** Roxbury & Mine Hill/Morris/NJ
Client: Bogia Engineering, Inc.	
Investigators: Bryon DuBois, PWS & Amy Jones, PWS	

Vegetation

Dominant Plant Species	Indicator Status	Stratum
Quercus alba	FACU	Overstory
Prunus serotina	FACU	Overstory
Quercus rubra	FACU	Overstory
Polygonum cuspidatum	FACU	Understory
Rosa multiflora	FACU	Understory
Alliaria petiolata	FACU	Herbaceous
Microstegium vimineum	FAC	Herbaceous
Allium cernuum	FACU	Herbaceous
Solidago spp.	--	Herbaceous

Percent of dominant species that are OBL, FACW and/or FAC: ____________13%____________________
Is the Hydrophytic Vegetation Criterion met? Yes: ___ No: _X__

Soils

Series: ___________AdrAt___________________________________
Is the soil on the hydric soils list?: Yes: _X_ No: ___ Unknown: ____
Is the soil mottled? Yes: __ No: _X_ Gleyed?: Yes: ____ No: _X___

DEPTH MUNSELL NOTATION

MATRIX COLOR: _______0-5 inches___________10YR2/2______________

MATRIX COLOR: _______5-10 inches__________10YR4/4______________

MATRIX COLOR: _______10-12+ inches________10YR4/6______________

Other hydric soil indicators: ____
Is the hydric soil criterion met?: Yes: ___ No: _X__

Hydrology

Is the ground surface inundated?: Yes __ No: _X__ Surface water depth: _______________
Is the soil saturated?: Yes: __ No: _X_ Depth to saturation: ________________________
Other evidence of surface inundation or soil saturation: ____________________________________

Is the wetland hydrology criterion met?: Yes: ___ No: _X_

Is this observation point a wetland?: Yes: ___ No: _X_

DuBois & ASSOCIATES

Project: D2252.001
Sample Point: A40/A98__

Wetland Delineation Data Form

Project Site: Railroad Avenue Property	**City/County/State:** Roxbury & Mine Hill/Morris/NJ
Client: Bogia Engineering, Inc.	
Investigators: Bryon DuBois, PWS & Amy Jones, PWS	

Vegetation

Dominant Plant Species	Indicator Status	Stratum
Acer rubrum	FAC	Overstory/Subcanopy
Quercus palustris	FACW	Overstory
Rosa multiflora	FACU	Understory
Solidago spp.	--	Herbaceous
Microstegium vimineum	FAC	Herbaceous
Onoclea sensibilis	FACW	Herbaceous
Lonicera japonica	FAC	Herbaceous

Percent of dominant species that are OBL, FACW and/or FAC: ____________83%____________________
Is the Hydrophytic Vegetation Criterion met? Yes: _X__ No: ___

Soils

Series: ___________AdrAt_____________________________________
Is the soil on the hydric soils list?: Yes: _X_ No: ___ Unknown: ____
Is the soil mottled? Yes: _X_ No: __ Gleyed?: Yes: ____ No: _X___

	DEPTH	MUNSELL NOTATION
MATRIX COLOR:	0-5 inches	10YR2/2
MATRIX COLOR:	5-10 inches	10YR2/2 w/ 10YR4/6 mottles
MATRIX COLOR:	10-12+ inches	10YR4/2 w/ 10YR4/6 and 10YR2/1 mottles

Other hydric soil indicators: _________oxidized roots__________________
Is the hydric soil criterion met?: Yes: _X__ No: ___

Hydrology

Is the ground surface inundated?: Yes _X_ No: ___ Surface water depth: __1-4" – adjacent stream_____
Is the soil saturated?: Yes: _X_ No: __ Depth to saturation: ______10"___________________
Other evidence of surface inundation or soil saturation:
___stream corridor, driftlines, shallow roots, topographic variation_________

Is the wetland hydrology criterion met?: Yes: _X__ No: __

Is this observation point a wetland?: Yes: _X_ No: __

APPENDIX C

STATEMENT OF QUALIFICATIONS

Amy Jones
Senior Biologist/Project Manager
ajones@denviro.com

DuBois & Associates
190 North Main Street
Manahawkin, NJ 08050
609-488-2857

Education:

B.S. Ecology
Juniata College – 2000

Certifications:

Professional Wetland Scientist- Society of Wetland Scientists

Qualified Specialist (Ecologist & Ornithologist) able to certify ESA Protection Plans

USFWS Recognized Qualified Bog Turtle Surveyor – NJ

NJDEP ENSP Recognized Qualified Venomous Snake Monitor

Continuing Education:

Rutgers University
Methodology for Delineating Wetland & Wetland Vegetation Identification

Threatened and Endangered Species of Northern and Southern New Jersey (field and classroom courses)

Richard Stockton College of NJ
Ornithology

Shepherd College
Shorebird Management & Ecology

Bowman's Hill Wildflower Preserve
Identification of Cool Season Grasses, Sedges and Rushes
Plant Stewardship Index (PSI)

Professional Affiliations:

The Wildlife Society
- National Member
- NJ Chapter Member
- NJ Chapter Secretary 2007 – 2014
- NJ Chapter Board Member 2014 – 2016
- NJ Chapter Newsletter Editor 2017 – present

Fields of Competence:

Amy Jones has over 20 years of experience in the fields of biology, ecology, wetland science, and land use regulatory compliance. She conducts various environmental site assessments, development feasibility studies, wetland delineations, rare species habitat evaluations and population surveys. She has extensive experience in managing a variety of projects from the initial field study stage through various regulatory application and approval processes, including extensive coordination with regulatory personnel. Mrs. Jones has a respected professional relationship with various municipal and county agencies, NJDEP, USFWS and USDA NRCS personnel.

Professional Experience:

Mrs. Jones is a senior biologist and project manager with the firm of DuBois and Associates. She manages all aspects of a project and coordinates specifically with a variety of clients to organize projects and proposals. Mrs. Jones manages each individual project to ensure all appropriate and applicable regulations and tasks are implemented to facilitate successful completion/approval of the project.

Mrs. Jones is responsible for conducting development feasibilities, wetland delineations, natural resource inventories, threatened/endangered species habitat assessments and directed surveys, and monitoring activities. Mrs. Jones has extensive experience with the survey and sampling protocols required under the jurisdiction of the USFWS, NJDEP, PAFBC, and Pinelands Commission for threatened and endangered species surveys. This survey work includes experience in various snake and salamander species drift fence trapping, numerous raptor and woodpecker nest investigations and breeding vocalization broadcast surveys, shorebird and colonial waterbird nesting and monitoring surveys, opportunistic and visual encounter turtle surveys, amphibian monitoring and call detection/playback surveys, and bat studies. Mrs. Jones has received numerous scientific collection permits from regulatory agencies as both the primary permittee and sub-permittee.

Specific experience and responsibilities includes ecological and environmental monitoring activities for various linear development and improvement projects. This monitoring oversight and coordination ensures the construction activities are in compliance with county, state, and federal conditions and standards, and all best management practices are implemented as required. Monitoring activities also serve to ensure the construction activities will not result in adverse impacts to environmentally sensitive areas, or rare faunal or floral habitats and/or populations.

Mrs. Jones conducts vegetation inventories within a variety of biotic communities throughout New Jersey. These have included species specific surveys for numerous target plants considered rare or State and/or Federally listed. Mrs. Jones has conducted numerous botanical investigations for rare plant species within the jurisdiction of the Pinelands Commission and NJDEP. Specifically, these directed evaluations have included surveys for the Federally listed swamp pink, sea beach amaranth, and Knieskern's beaked rush plants, results of which have been accepted by all regulatory state agencies and the USFWS.

Mrs. Jones is responsible for performing wetland delineations under the jurisdiction of multiple agencies, which are conducted pursuant to the interagency evaluation procedures. This includes expertise in analyzing the vegetation and technical indicators of hydrology and soils. She authors Freshwater Wetland Delineation Reports and prepares Freshwater Wetland Letter of Interpretation applications for submittal to the NJDEP for verification of the delineated wetland limits.

Amy Jones
Senior Biologist/Project Manager
ajones@denviro.com

DuBois & Associates

190 North Main Street
Manahawkin, NJ 08050
609-488-2857

<u>NJ Builders Association</u>
-Environmental Commission
2016 – present

<u>The Society of Women Environmental Professionals</u>
-Greater Philadelphia
2017 - present

Career Positions:

U.S. Fish & Wildlife Service
E.B. Forsythe NWR
Brigantine, NJ-
Wildlife Biologist
2000-2002

Habitat Management & Design, Inc.
Trenton, NJ-
Sr. Environmental Consultant
2002-2007

Water's Edge Environmental, LLC
Ocean City, NJ-
Senior Biologist
2007-2014

DuBois and Associates, LLC
Manahawkin, NJ –
Sr. Biologist/Environmental Scientist
2014 – Present

Mrs. Jones coordinates directly with professional engineers, attorneys, clients, and regulatory agencies to evaluate compliance and design of projects pursuant to various environmental regulations, inclusive of the Freshwater Wetlands Protection Act Rules, Flood Hazard Area Control Act Rules, and coastal/waterfront development regulations. Based on these permit analyses and project designs, she prepares the applicable permit applications pursuant to the NJDEP and USACOE regulations.

Mrs. Jones has also conducted numerous volunteer survey efforts in coordination with the NJDEP, NJ Audubon Society, and NJ Conserve Wildlife Foundation. These survey efforts include State directed Bog Turtle surveys, participation in grassland bird surveys as part of the Landowner Incentive Program, the Calling Amphibian Monitoring Program (CAMP), and regional Wood Turtle monitoring surveys.

Representative Projects of Relevance:

Burlington County Park Projects
Ecological and environmental work was completed to assist Burlington County in conducting environmental constraints evaluations and permit analyses for improvements on numerous County owned park and greenway projects. Mrs. Jones works directly with the landscape architects and engineers in assisting with design of the project to ensure compliance of proposed improvements pursuant to State waterfront development, freshwater wetlands, and flood hazard regulations. Mrs. Jones also coordinates with the NJDEP and USACOE with regard to permit requirements and to ensure no adverse impacts to documented state and federal threatened and endangered species habitat, including the bald eagle and bog turtle. Mrs. Jones prepared all necessary permit applications and ensured continued cooperative coordination with the regulatory agencies to ensure receipt of the applicable permit approvals for the park projects. Mrs. Jones has respected professional relationship with Burlington County and is involved in ongoing and future park improvement projects.

Holly Realty Project
Conducted red-headed woodpecker, barred owl, red-shouldered hawk, and northern long eared bat surveys in order to determine presence/absence and evaluate compliance with the New Jersey coastal regulations. These included nest cavity searches and call playback surveys for the red-headed woodpecker, barred owl, and red-shouldered hawk, and mist net surveys for the northern long-eared bat. These surveys were conducted pursuant to accepted state and federal survey methods. Survey methodology and results summaries have been prepared for the client and state agency review for continued impact and mitigation review.

New Jersey Department of Transportation Roadway Improvement Projects
Coordination with the NJDOT and project engineer to conduct the necessary field investigations and prepare full permit applications pursuant for various roadway and bridge improvement and development projects throughout the state. This has included wetland delineations, vegetation and wildlife inventories, and preparation and submission of state wetland and flood hazard permit and waiver applications, USACOE permit applications, and coastal and waterfront development permit applications.

Atlantic Cape Community College – Cape May Campus
Mrs. Jones conducted extensive monitoring of habitat mitigation measures implemented as part of CAFRA approval for construction the Cape May campus facilities. This included eastern tiger salamander trapping to evaluate success of the constructed breeding pond on the site. Monitoring resulted in the positive capture and identification of juvenile tiger salamanders, demonstrating success of the breeding pond. Additional monitoring and surveys included barred owl call playback surveys and long term avian point count surveys to evaluate impacts.

Bryon DuBois
Principal Senior Biologist
bdubois@denviro.com

190 North Main Street
Manahawkin, NJ 08050
609-488-2857

Education:

B.S. Biology & Ecology,
West Chester University, 1993

Professional Affiliations:

NJ Department of Environmental Protection Wetland Mitigation Council 2003 – 2013; 2016 - Present

New Jersey Builders Association 1999 – Present

Shore Builders Association 2001 – 2013

Builders League of South Jersey 2013 - Present

Member: Society of Wetland Scientists 1997 – Present

Member: The Ecological Society of America 1998 – Present

Member: New Jersey Division of Fish, Game and Wildlife Conservation Corps. 2000 – Present

Member: Pine Beach Environmental Commission 1995 – 2003

Association of N.J. Environmental Commission (ANJEC) 1995 – 2010

N.J. Concrete & Aggregate Society 2003 – 2013

Southern Ocean County Chamber of Commerce 2014 - Present

Fields of Competence:

Mr. Bryon DuBois has over 27 years' experience in the fields of regulatory compliance, ecology, biology, wetland science, wildlife management, hydrology and habitat restoration. He has managed numerous large scale projects through the approval process in New Jersey, Pennsylvania, Maryland and Delaware. Mr. DuBois is highly respected by the regulatory agencies in N.J. and surrounding states. He has made positive contributions to policies effecting protected species (both state and federal), wetland mitigation, regulation and coastal zone policies through NJDEP, PADEP, MDDNR, DEDNR and ACOE. These contributions have also been through invited participation and professional guidance provided in regulatory agency stakeholder processes.

Professional Experience:

After seven (7) early years in the consulting business Mr. Bryon DuBois created an environmental consulting firm in 2000 that focused on ecological and environmental issues that the regulated community was facing. Mr. DuBois has applied logical and objective solutions to some of the most difficult environmental projects and has constantly found a balance between environmentalists and developers alike. Mr. DuBois operates the firm and ensures successful completion of projects through management and coordination of numerous employees. Mr. DuBois operates the firm to promote the client's interest while providing the regulatory agencies with the documentation they require for approvals. The end result is typically a project or product that is both environmentally sound and in the best interest of the client.

Mr. DuBois has been requested to present topics related to environmental regulations at the Atlantic City Builders Convention, the Eastern Region Airports Conference in Hershey, Pennsylvania, the U.S. Fish and Wildlife Bog Turtle Convention, the N.J. Pinelands Commission, the Louisiana Fish and Game and dozens of planning boards in towns across N.J. and P.A. His diverse experience has made him a respectable candidate to speak publicly on projects that require many different issues from ecology to water quality.

Mr. DuBois is responsible for performing wetland delineations under the jurisdiction of multiple agencies and has more than 25 years of experience performing wetland delineations on more than 1,800 acres of land over three states. Mr. DuBois authors Freshwater Wetland Delineation Reports and has prepared more than 1,000 Freshwater Wetland Letter of Interpretation applications for submittal to the NJDEP for verification of the delineated wetland limits.

Mr. DuBois began designing and managing the construction of wetland mitigation projects tailored to a specific habitat type or land use in 1998. Over the years his projects were approved and exceeded the standard requirements without increasing costs for the client. These mitigation projects helped Mr. DuBois become nominated to the State of New Jersey's Wetland Mitigation Council in 2003 by the Governor of New Jersey. Mr. DuBois has reviewed and received approval for numerous mitigation related projects and banks in New Jersey, Pennsylvania and Maryland.

From 2003 to the present-day Mr. DuBois has successfully managed, designed and received approval for projects ranging from airports to industrial centers, wastewater management facilities and large commercial areas along with thousands of residential dwellings. This has involved performing numerous long term studies on several influential species such as Bog Turtles, Pine Snakes, and Indiana Bats along with assessments of habitat and creation of mitigation measures. Mr. DuBois has held over 320 scientific collecting permits for surveys performed within the Mid-Atlantic States, many of which involve a telemetry component.

Mr. DuBois also has extensive experience coordinating with various utility companies to provide wetland, ecological surveys and monitoring services necessary to support utility line improvement and upgrade projects, which also involves regulatory agency coordination through implementation of both Pennsylvania Fish and Boat Commission and New Jersey Department of Environmental Protection standards

Bryon DuBois
Principal Senior Biologist
bdubois@denviro.com

190 North Main Street
Manahawkin, NJ 08050
609-488-2857

Certifications:

Professional Wetland Scientist
Society of Wetland Scientist

Certified Sr. Ecologist, The Ecological Society of America

Recognized Qualified Bog Turtle Surveyor – N.J., N.Y., P.A., D.E., M.D.

Recognized Qualified Indiana and Northern Long Eared Bat Surveyor – N.J., N.Y., P.A.

Certified Subsurface Evaluator NJDEP# 0001940

Recognized Qualified Delmarva Fox Squirrel Surveyor – M.D., D.E.

Pennsylvania Qualified Herpetologist for Various Species

The projects of relevance presented below have been successfully completed through the management and coordination of Mr. DuBois with the client and regulatory agencies.

Projects of Relevance:

NEW JERSEY:

- *NJ DOT Permitting and Threatened and Endangered Species*
  - Route 206 – Taylor, Wiseman, Taylor and NJDOT, Atlantic County, NJ
  - Route 46 - Taylor, Wiseman & Taylor and NJDOT, Warren County, NJ
- *Ecological Monitoring, Threatened/Endangered Species Studies & Wetlands Assessments*
  - A.C. Electric Co. South Jersey Multiple Transmission Line Upgrades
    - BL England Transmission Line Upgrade, Atlantic, Burlington & Salem Counties
    - Cove Road Transmission Line Upgrade, Cape May County
    - Orchard to Lewis Transmission Line Upgrades, Atlantic County
    - Oyster-Creek Cardiff Transmission Line Wetland Mitigation, Ocean County
- *Threatened/Endangered Species Studies & Permitting- Pinelands*
  - NJNG Southern Reliability Line – Townships of Manchester, Jackson, Lakehurst, Plumsted, Chesterfield, and North Hanover, Ocean and Burlington Counties, NJ
  - Clayton Companies - Shulton Property, Glidden Sand Mine & Woodmansie Sand Mine – Ocean and Burlington Counties, NJ
  - Cutt Brothers Farm Service Restoration project- Burlington County
- *Federal Involvement/Federal Oversight*
  - Swamp Pink Monitoring at Various Sites – Atlantic, Warren Counties, NJ
  - Various Distribution Center Applications; Bat Studies – Warran Township, Montville Township, Morris Co, NJ, Mt. Pocono, Northampton Co, PA.
  - Bear Creek Construction Monitoring- Burlington County, NJ.
- *Wetland Mitigation Approvals/Monitoring*
  - GEHR Mitigation Bank - Evergreen Environmental, Gloucester County, NJ
  - MBB Mitigation Bank - Evergreen Environmental
  - Bell Labs –Riparian Mitigation - Toll Brothers, Inc. Monmouth County, NJ
  - Bamm Hollow – Wetland Mitigation - Toll Brothers, Inc., Monmouth County, NJ

PENNSYLVANIA:

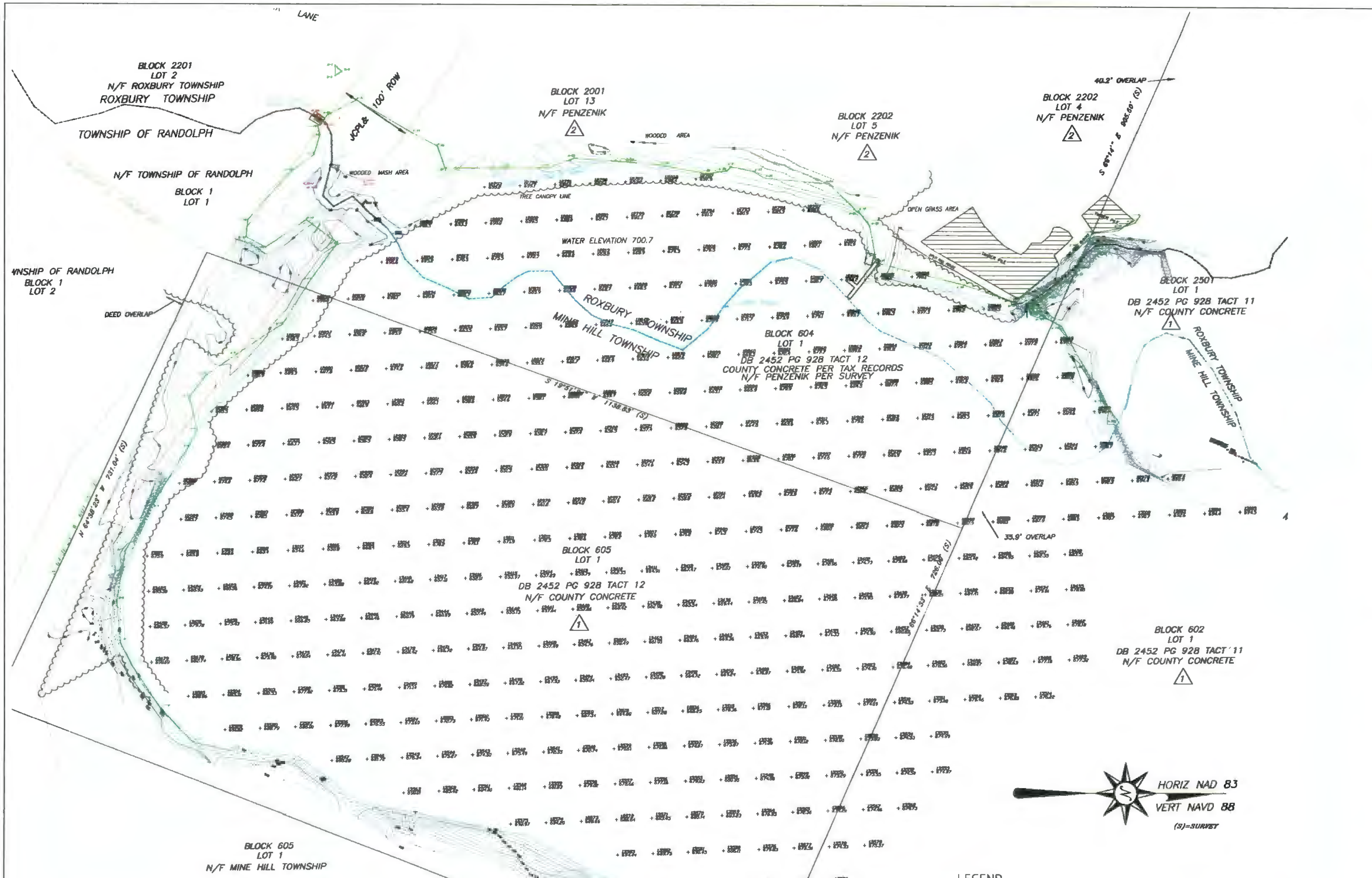
- *Threatened/Endangered Species Studies*
  - Westtown Lake Turtle Relocation, Westtown School, Chester County, PA
  - Haverford College Red Bellied Turtle Relocation, Delaware County, PA
- *Threatened/Endangered Species Studies & ACOE Permitting*
  - Scudder Falls Bridge Replacement, Michael Baker Inc., Yardley, PA
- *Permitting and Jurisdictional Determinations*
  - Brookdale – 1200 Acre wetland delineation, SK Design Group, Monroe County PA
  - Shartlesville – 520-acre wetland delineation in Burkes County, PA
  - 2016 PPL Reliability Project – Surveyed approximately 100 Miles of PPL Right of way throughout Lancaster, Lebanon and Berks County.

DELAWARE:

- *Threatened/Endangered Species Studies, Permitting & Wetlands*
  - DPL - Church to Wye Mills Transmission Line Upgrade, Kent County, DE
  - DPL - MD Transmission Line Upgrades from 2009-2014 Kent County to Sussex County DE

MARYLAND:

- *Threatened/Endangered Species Studies, Permitting & Wetlands*
  - Pepco – Bald Eagle Hazing and Nest Construction, Brandywine MD.
  - Kent County Wetland Mitigation Project, Delineation and Assessment



NOTES:

1: SURVEY AND BATHYMETRIC DATA IS FROM THE JUNE 2, 2021 AND AUGUST 5, 2021 SURVEYS BY PROPERTY LINE SURVEYING LLC. THE HORIZONTAL DATUM IS NAD83 AND VERTICAL DATUM IS NAVD88.

2: WETLAND DELINEATION WAS PERFORMED BY DUBOIS & ASSOCIATES ON DECEMBER 15, 2021. MARKED WETLAND FLAGS WERE SURVEYED BY PROPERTY LINE SURVEYING LLC.

LEGEND

- PROPERTY LINE
- CONTOURS
- EXISTING POND EDGE
- WETLAND LIMIT
- Δ A-36 WETLAND FLAG

GRAPHIC SCALE

120' 60' 0 60' 120'

1" = 60'

BEI

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BOGIA ENGINEERING INC.
1340 PENN AVE WYOMISSING, PA 19610
PHONE: 610-678-9071 - FAX: 610-678-3517
WWW.BOGIAENG.COM

WETLAND DELINEATION
BLACK RIVER RESTORATION

WETLAND DELINEATION

COUNTY CONCRETE LLC
50 RAILROAD AVENUE
KENVIL, NJ 07847

JOB:	MINE HILL, ROXBURY TOWNSHIPS MORRIS COUNTY NJ
PIN:	
CHECKED BY:	
DRAWN BY:	AEB
DATE:	2/3/2022
SCALE:	1" = 60'
DRAWING:	
PROJECT:	NJ1954 01

Black River Restoration Habitat Assessment and Survey for Threatened or Endangered Species

Conducted by A. Bateman; BS in Environmental Resources Engineering from SUNY ESF
Bogia Engineering, Inc.
1101 South Broad St
Lansdale, PA 19446

December 12, 2021
9:00am-12:30pm
57°F; 80% cloud cover
Last rain: 0.1" on 12/11/21
No noticeable wind

Site Name: Black River Restoration Project Site
Watershed: 08BA01
Latitude/Longitude: 40° 52' 11.87N 74°37'20.38"W to 40° 52' 01.89"N 74° 37' 23.21"
Segment Length: approx. 300m

Water Notes: The water in Rutgers Pond was clear, indicating low turbidity. There was no observed coating on the surface of the water. The flow regime through the entire project area is slow and deep.

Substrate Notes: The bottom of Rutgers Pond along the banks in the project area had a layer of leaf litter and fine particles. The bottom gravel and stones were fully surrounded by fine sediments. Upstream substrate was fine, dark sediments. The substrate at the downstream section had loose, less embedded gravels and sands. Lots of freshwater mollusk shells were found in the downstream section.

Bank Notes: The banks upstream and just downstream of the project site are populated by dense stands of common reed (*Phragmites australis*). The shoreline along the right hand side of the project area has a shallow slope.

Invasive Species Notes: Many invasive plant species were noted on the site during the field visit. These include common reed (*Phragmites australis*), Japanese Knotweed, Japanese honeysuckle (*Lonicera japonica*), Multiflora rose (*Rosa multiflora*) and Japanese stiltgrass (*Microstegium viminuem*). These species can displace native species and reduce the vegetative biodiversity of the area.

Litter Notes: Some indication of dumping was seen in the project area. A bathtub and old couch were found along southern edge of Rutgers Pond. The property owner indicated that he frequently pulls out large debris from the area.

Land Use Notes: The left bank (facing downstream) is forested and there is a wide buffer along the entire project area. The land along the right bank has significant anthropogenic impacts. The area at the north end of the section has no riparian buffer and the area is used as a storage area for logs and wood products. The width of the riparian buffer fluctuates from ~0 to 150' along the segment, and there are commercial and residential activities that occur along the entire length. To the north of the project site, there is an active quarry with private dirt roads and settling ponds.

Pipe Outfalls: There are no pipe outfalls along the project area. There is a permitted discharge (NJ0002861) that discharges into Rutgers Pond to the east of the project site. Other structures identified were two RCP culverts approx. 120' downstream of the project site and an old weir structure approximately 30' downstream of Rutgers Pond.

Threatened or Endangered Species Notes: During the 3.5-hour survey, there were no sightings of the species of concern. The area adjacent to the project site (right bank) had no observed established nests.

General Notes and Photos:

Alicia Bateman (BEI), Melinda Daniels (Stroud Water Research Center) and Angleo DeRose (PLS) met at the site at 9am. The Project area (approx. 40 acres) was assessed during the site visit, including shoreline, wetlands, riparian areas, and open water. An additional 300 feet both upstream and downstream in the Black River were observed during this site visit. The northern-most end of the lake was observed for additional stream inputs (the Lamington River) and stormwater drainage paths.

The area has significant existing impairment from anthropogenic factors. Active operations of a local quarry and firewood supply storage area can be seen and heard from some areas of the site.

	
The right bank of the project area; forested.	Substrate of Rutgers Pond; fine sediment with leaf litter and branches.

The bypassed weir structure at the outlet of Rutgers Pond.

The two RCP culverts downstream of the project site.

Channel upstream of the project site surrounded by dense phragmites stand.

Substrate found in stream bed downstream of project site.

<table>
<tr><td></td><td></td></tr>
<tr><td>Existing land use of the area north of the project site is largely dirt roads, active operations, sediment storage piles, and settling ponds.</td><td>Existing channel upstream of project site. A phragmites stand along left bank and wood storage pile along right bank.</td></tr>
</table>

<table>
<tr><td></td><td></td></tr>
<tr><td>A large metal basin and plastic trash found just downstream of Rutgers Pond.</td><td></td></tr>
</table>

Department of Environmental Protection
Office of Natural Lands Management
Mail Code 501-04, P.O. Box 420
Trenton, New Jersey 08625-0420
Tel. (609) 984-1339; Fax. (609) 984-1427

Invoice

Date	Invoice #
12/9/2021	23583

Bill to:
Bogia Engineering, Inc.
667 Exton Commons
Exton, PA 19341

Make check payable to:
DEP - Office of Natural Lands Management

Include this invoice with payment & send to:
NJDEP Office of Natural Lands Management
Mail Code 501-04, P.O. Box 420
Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 21-4007475-23583	$ 70.00	$ 70.00
Ali Behbahani Project Name: County Concrete 28 Green Lane		**Total**	$ 70.00

NHP File No. 21-4007475-23583

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

December 9, 2021

Ali Behbahani
Bogia Engineering, Inc.
667 Exton Commons
Exton, PA 19341

Re: County Concrete 28 Green Lane
Block(s) - 2001, Lot(s) - 13
Roxbury Township, Morris County

Dear Mr. Behbahani:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the map(s) submitted with the Natural Heritage Data Request Form into our GIS. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted in order to make a riparian zone width determination as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species is also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 21-4007475-23583

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
Insecta								
	Arogos Skipper	Atrytone arogos arogos	Breeding/Courtship	4	NA	State Endangered	G3T1T2	S1
Mammalia								
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
	Northern Myotis	Myotis septentrionalis	Active Season Sighting	5	Federally Listed Threatened	NA	G1G2	S1
Reptilia								
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	Yes	1 page(s) included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Immediate Vicinity of the Project Site
Based on Search of Natural Heritage Database
Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Regional Status	Grank	Srank	Identified	Last Observed	Location
Vascular Plants									
Verbena simplex	Narrow-leaf Vervain		E	LP, HL	G5	S1	Y	2012-06-20	Succasunna, Roxbury Township, Morris County. Approximately 1.5 mi. south-southeast of the intersection of Highways 10 and 46. East side of the Conrail railroad tracks, approximately 0.25 mi. north-northeast of Highway 10.

Total number of records: 1

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
Insecta								
	Arogos Skipper	Atrytone arogos arogos	Breeding/Courtship	4	NA	State Endangered	G3T1T2	S1
Mammalia								
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
	Northern Myotis	Myotis septentrionalis	Active Season Sighting	5	Federally Listed Threatened	NA	G1G2	S1
Reptilia								
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Table 3: Within 1 Mile for Riparian Zone Width Determination (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences for Riparian Zone Width Determination (Flood Hazard Area Control Act Rule Appplication) - Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites for Riparian Zone Width Determination - Within One Mile of the Project Site	Yes	See emailed attachments
3. Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination
Within One Mile of the Project Site
Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Red-shouldered Hawk	Buteo lineatus	Breeding Sighting	4	NA	State Endangered	G5	S1B,S3N
	Veery	Catharus fuscescens	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Insecta								
	Arogos Skipper	Atrytone arogos arogos	Breeding/Courtship	4	NA	State Endangered	G3T1T2	S1
	Arogos Skipper	Atrytone arogos arogos	Casual Flyby	4	NA	State Endangered	G3T1T2	S1
	Arogos Skipper	Atrytone arogos arogos	Nectaring	4	NA	State Endangered	G3T1T2	S1
Mammalia								

Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination
Within One Mile of the Project Site
Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Bobcat	Lynx rufus	Live Individual Sighting	4	NA	State Endangered	G5	S2
	Bobcat	Lynx rufus	On Road	4	NA	State Endangered	G5	S2
	Bobcat	Lynx rufus	Physical evidence	4	NA	State Endangered	G5	S2
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
	Northern Myotis	Myotis septentrionalis	Active Season Sighting	5	Federally Listed Threatened	NA	G1G2	S1
	Northern Myotis	Myotis septentrionalis	Hibernaculum	5	Federally Listed Threatened	NA	G1G2	S1
Reptilia								
	Eastern Box Turtle	Terrapene carolina carolina	Occupied Habitat	2	NA	Special Concern	G5T5	S3
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Vernal Pool Habitat for Riparian Zone Width Determination
Within One Mile of the Project Site
Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Vernal habitat area	2960
Vernal habitat area	2964
Vernal habitat area	2968
Vernal habitat area	2971

Total number of records: 4

Other Animal Species for Riparian Zone Width Determination
Within One Mile of the Project Site
Based on Additional Species Tracked by
Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Vertebrate Animals					
Eptesicus fuscus	Big Brown Bat			G5	S3

Total number of records: 1

From: Maresca, Vincent [DEP] <Vincent.Maresca@dep.nj.gov> Sent: Mon 1/31/2022 11:29 AM
To: ali@bogiaeng.com
Cc: Baratta, Meghan [DEP]
Subject: HPO Project No. 22-0248, Black Creek Stream Restoration, Township of Roxbury-NJHPO data request

**This e-mail serves as the official correspondence of the New Jersey Historic Preservation **

HPO Project No. 22-0248-1
HPO-A2022-173

Re:
Morris County, Roxbury Township
Black Creek Stream Restoration
Block 20001, Lot 13
Block 2401, Lot 9
Block 2501, Lot 1
Technical Assistance Review

Dear Mr. Behbahani:

Thank you for providing the Historic Preservation Office (HPO) with the opportunity for review and comment on the potential for the above-referenced project to affect historic and archaeological resources. The project proposes stream habitat rehabilitation of Black Creek (Lamington River) through Rutgers Pond and the southwestern outlet including reestablishing the natural stream channel, new stream banks, landscaping, and shade trees. Upon review, there are no districts, buildings, or structures listed in, or identified on HPO maps as eligible for listing in, the New Jersey or National Registers of Historic Places within the project site. While the project site is located within an area of high archaeological sensitivity for pre-Contact period archaeological resources, the work is confined to existing, modified stream channels through previous mining operations. Therefore, the work, as currently understood, has a low potential to effect any archaeological deposits.

The HPO reviews projects for their effects on historic resources when federal funding, licensing, or permitting is involved. The HPO also reviews projects requiring Freshwater Wetlands, Waterfront Development, Upland Development, CAFRA and Highland Preservation Area Approval permits issued by the State of New Jersey's Division of Land Resource Protection, as well as environmental assessments under Executive Order 215. *Upon review, if subject to any of the above-referenced regulations, the HPO would not recommend any further consideration of project effects on historic and archaeological resources prior to permit issuance.*

Additional Comments

This information is provided as informal notes to you and does not constitute identification level cultural resources survey under Section 106 of the National Historic Preservation Act or other law or regulation. These notes do not constitute project review under any state or federal law. The absence of previously identified cultural resources does not imply that there are no eligible historic properties in the requested area. Further identification of cultural resources may be required under one or more historic preservation review processes depending on project funding, licensing, or permitting.

From: Maresca, Vincent [DEP] <Vincent.Maresca@dep.nj.gov> Sent: Mon 1/31/2022 11:29 AM
To: ali@bogiaeng.com
Cc: Baratta, Meghan [DEP]
Subject: HPO Project No. 22-0248, Black Creek Stream Restoration, Township of Roxbury-NJHPO data request

Thank you again for providing this opportunity for review and comment on the potential for this project to affect historic and archaeological resources. Please reference the HPO project number 22-0121in any future calls, emails, or written correspondence to help expedite your review and response. If you have any questions, please feel free to contact me at Vincent.maresca@dep.nj.gov with questions.

Regards,

Vincent Maresca, M.A.
Historic Preservation Specialist 2
Historic Preservation Office
Department of Environmental Protection
501 East State Street, Trenton, NJ 08625-0420
vincent.maresca@dep.nj.gov **Ph: (609) 633-2395 , F: (609) 984-0578**

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Morris County, New Jersey

County Concrete

July 9, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morris County, New Jersey
Survey Area Data: Version 15, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 31, 2014—Apr 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdrAt	Timakwa muck, 0 to 2 percent slopes, frequently flooded	15.4	23.5%
NerB	Netcong gravelly sandy loam, 3 to 8 percent slopes	0.5	0.8%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	6.9	10.5%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	4.8	7.3%
PHG	Pits, sand and gravel	1.0	1.5%
UR	Urban land	3.6	5.5%
WATER	Water	33.5	51.0%
Totals for Area of Interest		**65.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morris County, New Jersey

AdrAt—Timakwa muck, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w671
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Timakwa, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 37 inches: muck
2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand
2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very high (about 14.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Minor Components

Catden, frequently flooded

Percent of map unit: 7 percent
Landform: Fens, depressions, swamps, bogs, marshes, kettles, flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Preakness, frequently flooded, poorly drained

Percent of map unit: 4 percent
Landform: Outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Parsippany, frequently flooded

Percent of map unit: 4 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

NerB—Netcong gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0mj
Elevation: 280 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Netcong and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Netcong

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 7 inches: gravelly sandy loam
BA - 7 to 13 inches: gravelly sandy loam
Bw1 - 13 to 21 inches: gravelly sandy loam
Bw2 - 21 to 30 inches: gravelly sandy loam
BC - 30 to 41 inches: sandy loam
C - 41 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rockaway, moderately well drained, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hibernia, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PauDc—Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc5
Elevation: 250 to 1,250 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent
Gladstone, extremely stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam
Bt - 10 to 22 inches: gravelly sandy clay loam
BC - 22 to 37 inches: gravelly sandy loam
C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 5 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PawE—Parker-Rock outcrop complex, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: b0mt
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 75 percent
Rock outcrop: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly sandy loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 25 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

R - 0 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Gladstone, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PHG—Pits, sand and gravel

Map Unit Setting

National map unit symbol: b0n3
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, sand and gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Sand And Gravel

Setting

Parent material: Sandy material disturbed by human activity

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

UR—Urban land

Map Unit Setting

National map unit symbol: b0nx
Elevation: 0 to 170 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

WATER—Water

Map Unit Setting

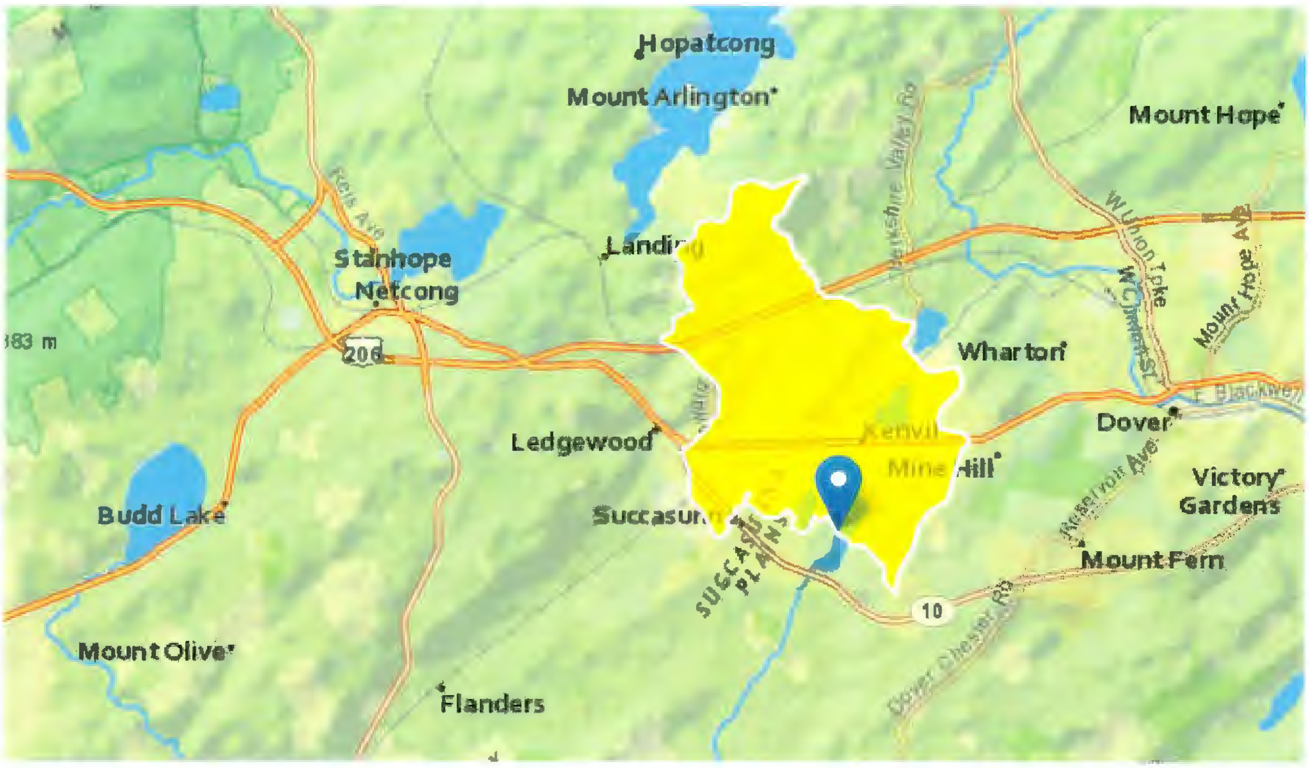
National map unit symbol: b0p9
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

StreamStats Report - NEW analysis

Region ID: NJ
Workspace ID: NJ20220301195132474000
Clicked Point (Latitude, Longitude): 40.86718, -74.62308
Time: 2022-03-01 14:51:47 -0500



New report using newly refined methods of stream stats, to better characterize small watersheds.

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	6.08	square miles
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	13.3	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	64.7	feet per mi

Parameter Code	Parameter Description	Value	Unit
POPDENS	Basin Population Density	1190	persons per square mile
PERMSSUR	Area-weighted average soil permeability from NRCS SSURGO database	4.7	inches per hour
JUNAVPRE	Mean June Precipitation	4.66	inches

Peak-Flow Statistics Parameters [Peak Valley and Ridge Region 2009 5167]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.87	763
STORAGE	Percent Storage	13.3	percent	2.36	30.1
CSL10_85	Stream Slope 10 and 85 Method	64.7	feet per mi	2.56	268
POPDENS	Basin Population Density	1190	persons per square mile	35	1493

Peak-Flow Statistics Flow Report [Peak Valley and Ridge Region 2009 5167]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp	Equiv. Yrs.
50-percent AEP flood	326	ft^3/s	50.3	1
20-percent AEP flood	523	ft^3/s	50.9	2
10-percent AEP flood	676	ft^3/s	52.2	3
4-percent AEP flood	891	ft^3/s	54.5	4
2-percent AEP flood	1060	ft^3/s	56.8	5
1-percent AEP flood	1240	ft^3/s	59.5	5
0.2-percent AEP flood	1700	ft^3/s	66.3	6

Peak-Flow Statistics Citations

Watson, K.M.,and Schopp, R.D.,2009, Methodology for estimation of flood magnitude and frequency for New Jersey streams, U.S. Geological Survey Scientific Investigations Report 2009-5167, 51 p. (http://pubs.usgs.gov/sir/2009/5167/)

Monthly Flow Statistics Parameters [Lowflow Non Coast baseline SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.6	159.88
PERMSSUR	Average Soil Permeability from SSURGO	4.7	inches per hour	0.43	6.99
JUNAVPRE	Mean June Precipitation	4.66	inches	3.79	4.81

Monthly Flow Statistics Parameters [Lowflow Non Coast current SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.35	159.88
PERMSSUR	Average Soil Permeability from SSURGO	4.7	inches per hour	0.38	6.73
JUNAVPRE	Mean June Precipitation	4.66	inches	3.79	4.76

Monthly Flow Statistics Flow Report [Lowflow Non Coast baseline SIR 2014 5004]

Statistic	Value	Unit
Jan_7_Day_10_Year_Low_Flow_Baseline	3.96	ft^3/s
Feb_7_Day_10_Year_Low_Flow_Baseline	4.73	ft^3/s
Mar_7_Day_10_Year_Low_Flow_Baseline	7.2	ft^3/s
Apr_7_Day_10_Year_Low_Flow_Baseline	7.04	ft^3/s
May_7_Day_10_Year_Low_Flow_Baseline	4.79	ft^3/s
Jun_7_Day_10_Year_Low_Flow_Baseline	2.45	ft^3/s
Jul_7_Day_10_Year_Low_Flow_Baseline	1.01	ft^3/s
Aug_7_Day_10_Year_Low_Flow_Baseline	0.738	ft^3/s
Sep_7_Day_10_Year_Low_Flow_Baseline	0.701	ft^3/s
Oct_7_Day_10_Year_Low_Flow_Baseline	0.9	ft^3/s
Nov_7_Day_10_Year_Low_Flow_Baseline	2.09	ft^3/s

Statistic	Value	Unit
Dec_7_Day_10_Year_Low_Flow_Baseline	3.24	ft^3/s

Monthly Flow Statistics Flow Report [Lowflow Non Coast current SIR 2014 5004]

Statistic	Value	Unit
Jan 7 Day 10 Year Low Flow	3.98	ft^3/s
Feb 7 Day 10 Year Low Flow	4.24	ft^3/s
Mar 7 Day 10 Year Low Flow	5.77	ft^3/s
Apr 7 Day 10 Year Low Flow	6.15	ft^3/s
May 7 Day 10 Year Low Flow	3.75	ft^3/s
Jun 7 Day 10 Year Low Flow	1.44	ft^3/s
Jul 7 Day 10 Year Low Flow	0.679	ft^3/s
Aug 7 Day 10 Year Low Flow	0.382	ft^3/s
Sep 7 Day 10 Year Low Flow	0.41	ft^3/s
Oct 7 Day 10 Year Low Flow	0.591	ft^3/s
Nov 7 Day 10 Year Low Flow	1.16	ft^3/s
Dec 7 Day 10 Year Low Flow	2.48	ft^3/s

Monthly Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Jan_7_Day_10_Year_Low_Flow_Baseline	3.96	ft^3/s
Feb_7_Day_10_Year_Low_Flow_Baseline	4.73	ft^3/s
Mar_7_Day_10_Year_Low_Flow_Baseline	7.2	ft^3/s
Apr_7_Day_10_Year_Low_Flow_Baseline	7.04	ft^3/s
May_7_Day_10_Year_Low_Flow_Baseline	4.79	ft^3/s
Jun_7_Day_10_Year_Low_Flow_Baseline	2.45	ft^3/s
Jul_7_Day_10_Year_Low_Flow_Baseline	1.01	ft^3/s
Aug_7_Day_10_Year_Low_Flow_Baseline	0.738	ft^3/s
Sep_7_Day_10_Year_Low_Flow_Baseline	0.701	ft^3/s
Oct_7_Day_10_Year_Low_Flow_Baseline	0.9	ft^3/s
Nov_7_Day_10_Year_Low_Flow_Baseline	2.09	ft^3/s

Statistic	Value	Unit
Dec_7_Day_10_Year_Low_Flow_Baseline	3.24	ft^3/s
Jan 7 Day 10 Year Low Flow	3.98	ft^3/s
Feb 7 Day 10 Year Low Flow	4.24	ft^3/s
Mar 7 Day 10 Year Low Flow	5.77	ft^3/s
Apr 7 Day 10 Year Low Flow	6.15	ft^3/s
May 7 Day 10 Year Low Flow	3.75	ft^3/s
Jun 7 Day 10 Year Low Flow	1.44	ft^3/s
Jul 7 Day 10 Year Low Flow	0.679	ft^3/s
Aug 7 Day 10 Year Low Flow	0.382	ft^3/s
Sep 7 Day 10 Year Low Flow	0.41	ft^3/s
Oct 7 Day 10 Year Low Flow	0.591	ft^3/s
Nov 7 Day 10 Year Low Flow	1.16	ft^3/s
Dec 7 Day 10 Year Low Flow	2.48	ft^3/s

Monthly Flow Statistics Citations

Watson, K.M., and McHugh, A.R.,2014, Regional regression equations for the estimation of selected monthly low-flow duration and frequency statistics at ungaged sites on streams in New Jersey: U.S. Geological Survey Scientific Investigations Report 2014–5004, 59 p. (baseline, period-or-record statistics) (http://dx.doi.org/10.3133/sir20145004StreamStatsDB\2019_12_13_DataSource_table.xlsxDa

Seasonal Flow Statistics Parameters [Lowflow Non Coast baseline SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.6	159.88

Seasonal Flow Statistics Parameters [Lowflow Non Coast current SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.35	159.88

Seasonal Flow Statistics Flow Report [Lowflow Non Coast baseline SIR 2014 5004]

Statistic	Value	Unit

Statistic	Value	Unit
Aug_Sep_75_Pct_Dur_Min_1_Day_Low_Flow_Ba	2.17	ft^3/s
Aug_Sep_90_Pct_Dur_Min_1_Day_Low_Flow_Ba	1.47	ft^3/s
Aug_Sep_99_Pct_Dur_Min_1_Day_Low_Flow_Ba	0.738	ft^3/s

Seasonal Flow Statistics Flow Report [Lowflow Non Coast current SIR 2014 5004]

Statistic	Value	Unit
Aug Sep 75 Pct Dur Min 1 Day Low Flow	1.48	ft^3/s
Aug Sep 90 Pct Dur Min 1 Day Low Flow	0.968	ft^3/s
Aug Sep 99 Pct Dur Min 1 Day Low Flow	0.561	ft^3/s

Seasonal Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Aug_Sep_75_Pct_Dur_Min_1_Day_Low_Flow_Ba	2.17	ft^3/s
Aug_Sep_90_Pct_Dur_Min_1_Day_Low_Flow_Ba	1.47	ft^3/s
Aug_Sep_99_Pct_Dur_Min_1_Day_Low_Flow_Ba	0.738	ft^3/s
Aug Sep 75 Pct Dur Min 1 Day Low Flow	1.48	ft^3/s
Aug Sep 90 Pct Dur Min 1 Day Low Flow	0.968	ft^3/s
Aug Sep 99 Pct Dur Min 1 Day Low Flow	0.561	ft^3/s

Seasonal Flow Statistics Citations

Watson, K.M., and McHugh, A.R.,2014, Regional regression equations for the estimation of selected monthly low-flow duration and frequency statistics at ungaged sites on streams in New Jersey: U.S. Geological Survey Scientific Investigations Report 2014–5004, 59 p. (baseline, period-or-record statistics) (http://dx.doi.org/10.3133/sir20145004StreamStatsDB\2019_12_13_DataSource_table.xlsxDa

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.07722	940.1535

Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	32.1	ft
Bieger_D_channel_depth	1.88	ft
Bieger_D_channel_cross_sectional_area	61.4	ft^2

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	41.9	ft
Bieger_P_channel_depth	2.05	ft
Bieger_P_channel_cross_sectional_area	86.9	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	23.4	ft
Bieger_USA_channel_depth	1.77	ft
Bieger_USA_channel_cross_sectional_area	45.3	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	32.1	ft
Bieger_D_channel_depth	1.88	ft
Bieger_D_channel_cross_sectional_area	61.4	ft^2
Bieger_P_channel_width	41.9	ft

Statistic	Value	Unit
Bieger_P_channel_depth	2.05	ft
Bieger_P_channel_cross_sectional_area	86.9	ft^2
Bieger_USA_channel_width	23.4	ft
Bieger_USA_channel_depth	1.77	ft
Bieger_USA_channel_cross_sectional_area	45.3	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_can

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Application Version: 4.7.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

DYNAMIC
ENGINEERING EARTH SURVEY TRAFFIC

Dynamic Earth, LLC
245 Main Street, Suite 110
Chester, NJ 07930
T. 908-879-7095

Date: April 4, 2022
Via email:

County Concrete Corp.
50 Railroad Avenue,
Kenvil, NJ 07847

Attn: John Crimi

RE: Slope Stability Analysis
Black River Restoration
Mine Hill and Roxbury Township, Morris County, New Jersey
Dynamic Earth Project No.: 1949-99-001EC

Dear Mr. Crimi;

Dynamic Earth, LLC (Dynamic Earth) has completed the laboratory testing of the fill material and the slope stability analysis. The results of our slope stability analysis are detailed herein.

Project Details:

The subject site located in the Morris County identified as the Rutgers Pond, a man-made pond located within both Roxbury and Mine Hill Townships. The proposed restoration area is bound to the north by the existing County Concrete Corporation; east by undeveloped wooded area and Canfield Avenue beyond; to the south by Randolph Park beach and Rt. 10 beyond and on the west by Cutting Edge Sawmill and residential developments beyond. Based on Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc., the approximate area of the reclamation is 40,655 square feet. The proposed restoration includes reclamation of partial land area from the existing Rutgers pond by filling the pond with quarry tailings from the nearby County Concrete Corporation. The proposed restoration to reestablish the natural channel of the Black River within the reclaimed land mass.

Site Geology:

Based on the Bedrock Geologic Map of Northern New Jersey prepared by the United States Department of the Interior, U.S. Geologic Survey, the site is located within the Valley and Ridge Province of Northern New Jersey. Specifically, the site is underlain by the Middle and Lower Cambrian-aged Leithville Formation. This formation reportedly consists of light- to dark-gray and light-olive-gray fine- to medium-grained thin- to medium-bedded dolomite grading downward through medium-gray, grayish-yellow, or pinkish-gray dolomite and dolomitic sandstone, siltstone and shale to medium-gray, medium-grained, medium bedded dolomite containing quartz sand grains as stringers and lenses near the base. Overburden materials include glacial deposits associated with the Wisconsinan Glacial Cycle which reached its most southerly advance thousands of years ago and alluvial deposits.

Historical Document Review:

As part of the slope stability analysis, historical and available data was obtained using sources such as *New Jersey Geoweb*, and *New Jersey Department of Transportation Geotechnical Data Management System*. The data obtained using above sources were used in the development of the finite element models utilized to evaluate the slope stability of the proposed land reclamation.

Laboratory Analysis:

A representative sample of the material proposed to be utilized during the land reclamation was subjected to a laboratory testing program which included, natural moisture content determinations (ASTM D-2216), Atterberg limits (ASTM D-4318), and washed gradation analyses (ASTM D-6913) in order to perform engineering soil classifications in general accordance with ASTM D-2487.

Finite Element Analysis:

Dynamic Earth performed slope stability analysis using Midas SoilWorks (2020) version 1.1, a finite element modeling software. The proposed landmass cross sections were provided on a drawing labeled Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc. The aforementioned drawing presented four proposed cross sections of the land mass. Each cross section was modeled in SoilWorks in one to one scale in order to mimic expected conditions once completed. The model considered the long-term stability of the slopes during the analysis.

The historical data and the results from the laboratory investigation were used to generate the soil parameters used in the analysis. See the accompanying finite element analysis output summary for the results.

Slope Stability Review:

The stability of the conceptual slopes was performed and the factor of safety obtained through the finite element analysis of the crucial slopes are summarized in the table below.

SUMMARY OF SLOPE STABILITY ANALYSIS	
Cross Section	**Factor of Safety**
A - A	5.55
B - B	3.08
C - C	1.40
D - D	1.31

The long-term slope stability obtained using the finite element analysis for the critical conceptual slopes are larger than the industrial minimum factor of safety of 1.3.

Please feel free to contract us with any questions regarding these matters.

Sincerely,

DYNAMIC EARTH, LLC

Peter H. Howell, P.E.
Principal
NJ PE License No. 24GE04728700

Janitha Batagoda, Ph.D.
Geotechnical Engineer

Enclosures: Slope Stability Analysis Summary

CC: Kurt Peters

SLOPE STABILITY ANALYSIS

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

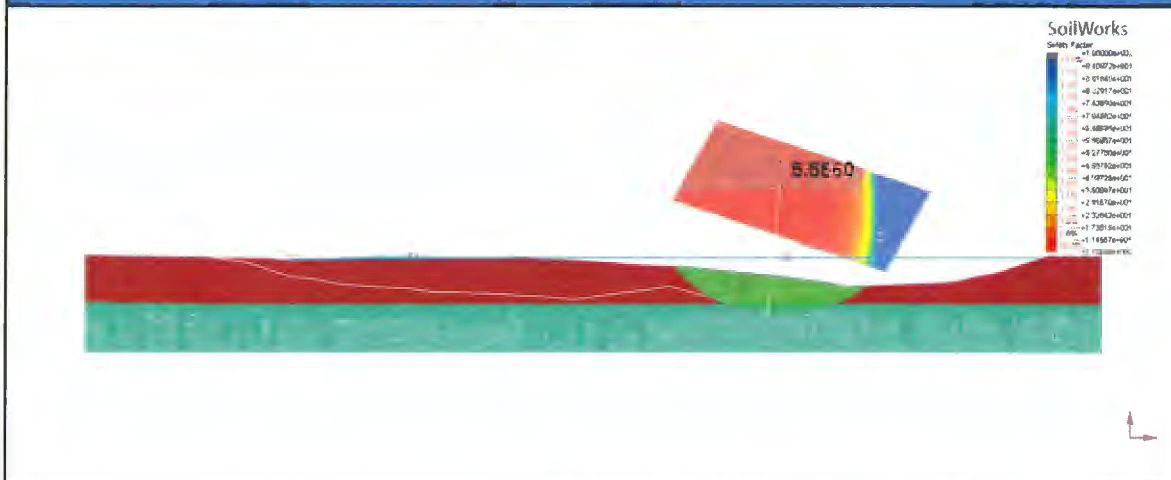
1. Soil Properties

Section	Wet unit weight (lbf/ft^3)	Saturated unit weight (lbf/ft^3)	Cohesion (lbf/ft^2)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft^2)	Poisson's ratio
Pond Fill Material	115.000	130.000	-	17.00	-	-
Natural MD sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	5.556	**OK**

Critical Embankment region slope stability check: In case of Slope Stability analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

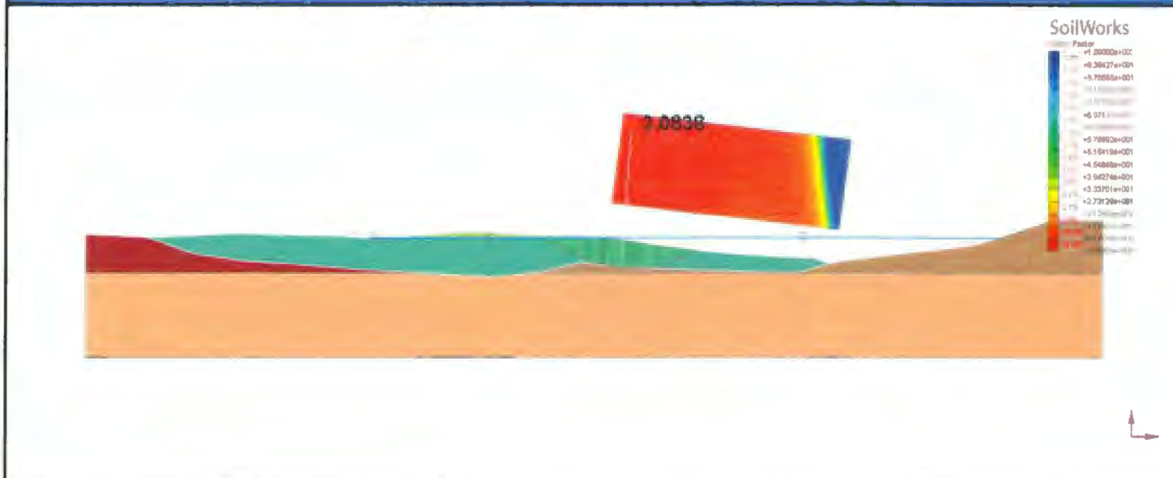
1. Soil Properties

Section	Wet unit weight (lbf/ft^3)	Saturated unit weight (lbf/ft^3)	Cohesion (lbf/ft^2)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft^2)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	3.084	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

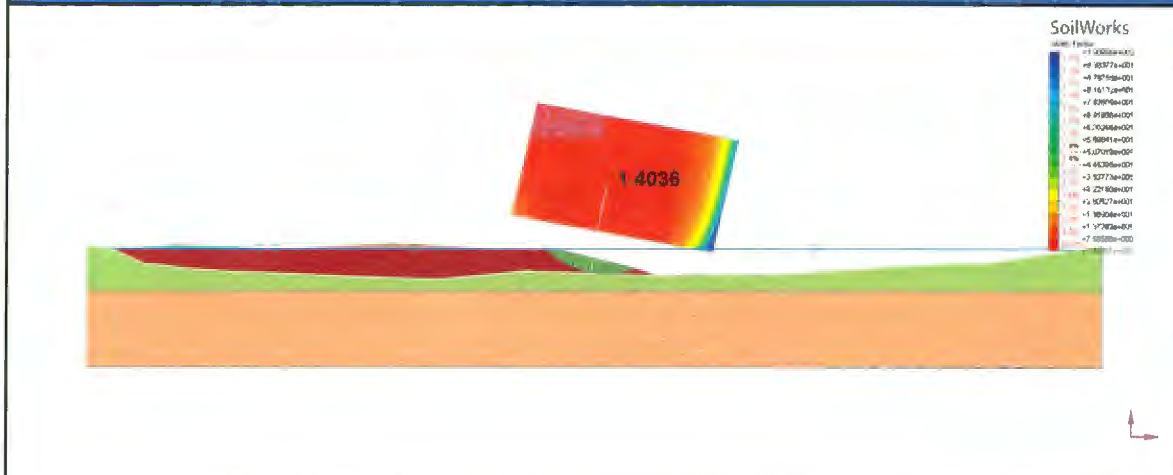
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.030	-	16.00	-	-
Natural MD Sand	120.000	128.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	1.404	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

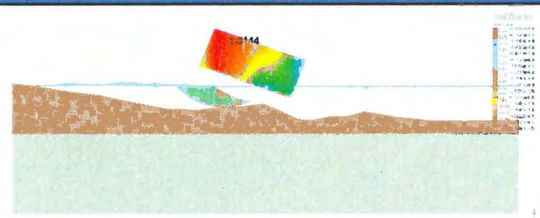
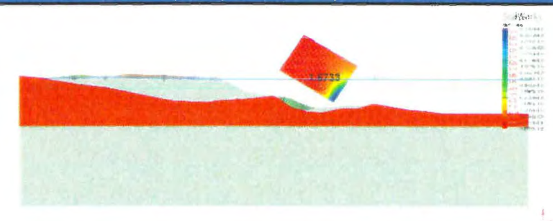
II. Applied Properties

1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	130.000	-	28.00	-	-
Dense Sand	125.000	130.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

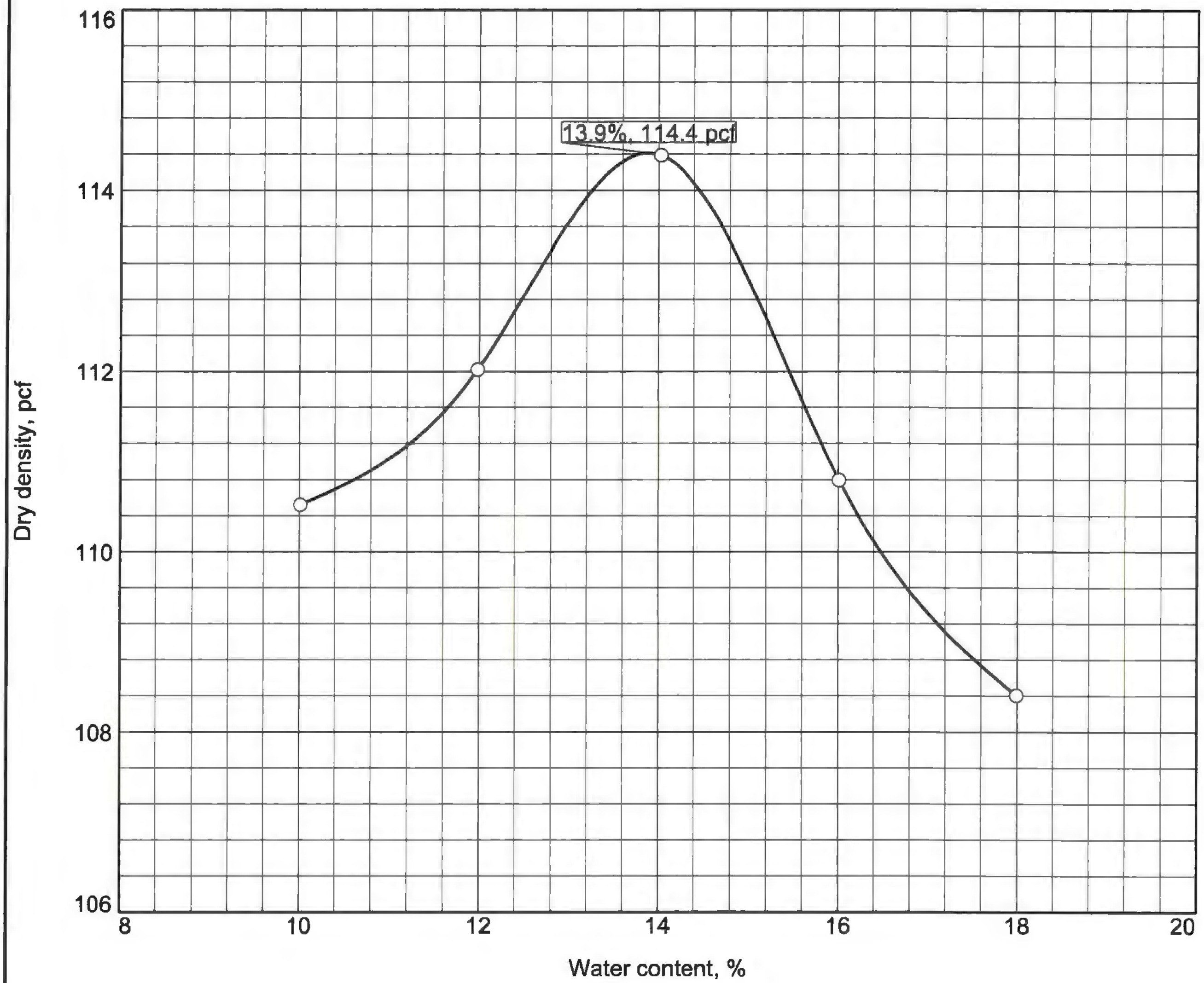
Slope Stability Slope 1			Slope Stability Slope 2		
					
Standard safety factor	1.300	Evaluation	Standard safety factor	1.300	Evaluation
Analysis safety factor	1.314	**OK**	Analysis safety factor	1.673	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Slope 1,Slope Stability Slope 2 allowable safety factor 1.3 has been satisfied.

Determined to be safe.

LABORATORY TESTING

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
N/A	ML	N/A	11.7	N/A	17	NP	0.3	54.7

TEST RESULTS

Maximum dry density = 114.4 pcf

Optimum moisture = 13.9 %

MATERIAL DESCRIPTION

Brown Silt, and c-f sand, trace f gravel

Project No. 1949-99- **Client:** County Concrete

Project: Existing Concrete Plant

50 Railroad Avenue, Kenvil, New Jersey

○ **Source of Sample:** Pond Fill **Sample Number:** BS-1

DYNAMIC EARTH

Remarks:

Figure 1

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.3	5.9	38.2	54.3	

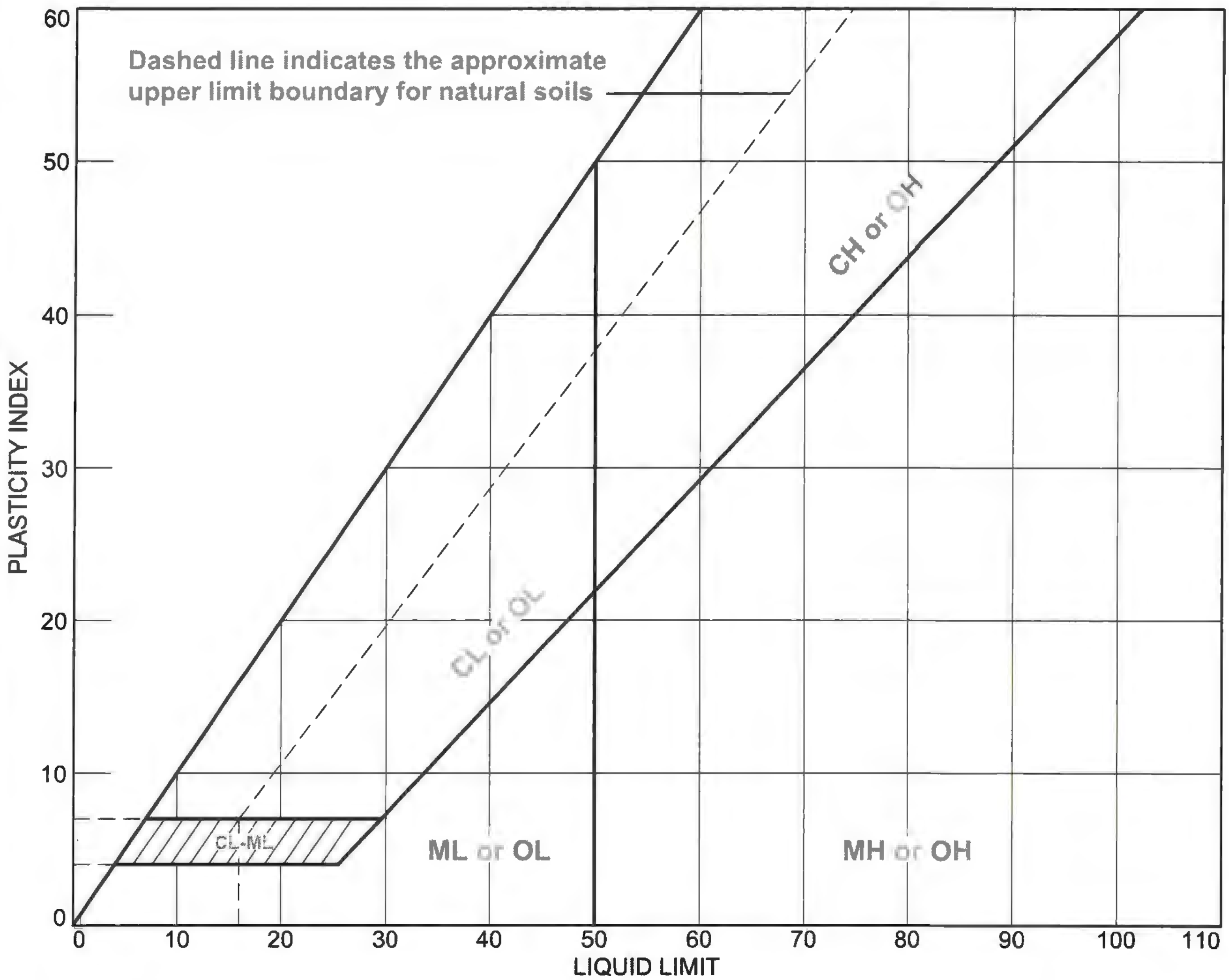
	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	B-1	--	--	2/22/22	ML	Brown silt, and c-f sand, trace f gravel	11.7	17	19

Client County Concrete
Project Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No. 1949-99-001EC Figure 2

DYNAMIC EARTH

Stockpiled Processed - Pond Fill

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1	--	--	11.7	19	17	NP	ML

DYNAMIC EARTH

Client: County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No.: 1949-99- **Figure** 3

APPENDIX C

Stormwater and E&SC Report

BEI
BOGIA ENGINEERING INC.

1340 Penn Avenue

Wyomissing, PA 19160

Phone: 610.678.3071

Fax: 610.678.3517

www.bogiaeng.com

STORMWATER MANAGEMENT AND E&S REPORT

BLACK RIVER RESTORATION

FOR COUNTY CONCRETE CORPORATION

MINE HILL AND ROXBURY TOWNSHIPS
MORRIS COUNTY
NEW JERSEY

Prepared by: A. Behbahani

Checked by: C. MULDOON

Date: April 2022

Project: NJ1954-01

BLACK RIVER RESTORATION

Contents

APPENDICES

General Description

The Black River in Morris County, New Jersey currently routes through man-made Rutgers Pond in Roxbury and Mine Hill Townships. The NAD 1983 NJ State Plane coordinates for the project area are 458117.001174, 741284.80268 feet. The proposed project will reestablish the natural channel of the river, disconnecting it from Rutgers Pond. This will be accomplished by mainly using fine-grained materials that were separated from aggregates removed from the pond to build up land surface along the southwest edge of the pond. A naturalized stream channel will be constructed to directly connect the Black River to itself downstream of the existing pond. The new stream banks will be stabilized with gravel and vegetation. Landscaping and shade trees will be implemented along both sides of the new stream channel. The intended use of the new area around the restored stream channel is a vegetated, naturalized area.

A local aggregate quarry, County Concrete Corporation, will be undertaking this restoration project. They are willing to complete this restoration and beneficial re-use project. The fill material for the project will be quarry tailings from County Concrete operations. This material is comprised of native fine-grained materials removed from the pond and not used for making concrete. These have been mechanically separated on site using the pond water for washing and without the use of additives.

The total project area is 16.4 acres. Rutgers Pond is approximately 56 acres. The proposed fill area in open water is 16.3 acres, and the area where fill elevations will be higher than the existing normal pool elevation is 8.6 acres. The project site is located largely within the floodway and minimally impacts the flood fringe and riparian zone. There are freshwater wetlands along the banks of the Black River and Rutgers pond. Impacts to these areas are minimal and temporary. The entire project site is within one drainage area. Stormwater from the site drains to the existing Black River channel along the south edge of Rutgers Pond.

This project is expected to be completed over the course of 7 to 10 years. The southwestern portion of Rutgers Pond will be incrementally filled in, starting along the bank to the north of the project site. The existing stream into the project site will continue to discharge into Rutgers Pond for the duration of the filling. As the area of fill is placed, the area will be graded to specified slopes and the designed channel will be stabilized with gravel and vegetation. A second stream channel will be created in the fill area to manage flows from the Lamington River, which enters at the north end of Rutgers Pond. During fill activities, a flow path will be maintained along the existing shoreline of Rutgers Pond until the designed channel has been stabilized with gravel and vegetation. Once the new channels have been determined to be stable, the former flow paths along the shoreline will be filled in to a specified grade, stabilized, and revegetated. Once the constructed channels have been stabilized, stream flows will be directed into the new stream channels. The new stream channels will be monitored and any necessary remediation and stabilization will be conducted.

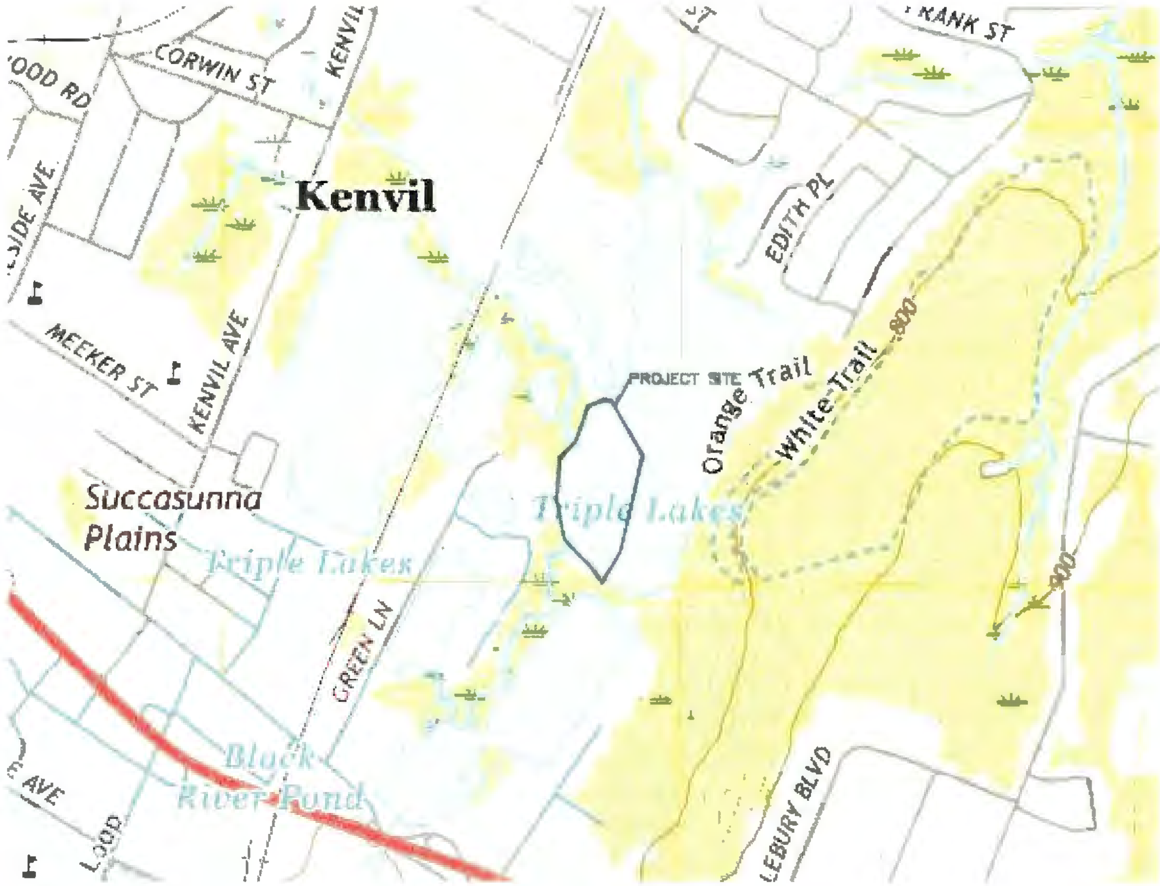


Figure 1. USGS 7.5 Minute Quad Map with project site.

Stormwater Analysis

The existing conditions of the site are largely open water (CN= 100). The proposed condition restores 8.6 acres of vegetative cover. With a conservative soil hydrologic group classification of "D", the CN of the interim condition lowers with additional soil placed. The CN of dirt is 89, lower than the CN of open water. As the site matures and vegetation is established, the CN will further reduce. The curve number for the proposed land area is 77. The existing conditions have a weighted CN of 99.92. The proposed conditions have a weighted CN of 87.88. As the proposed condition of the site has a lower CN than the existing conditions, stormwater runoff will be reduced in the post construction conditions from the existing conditions. Dense vegetative buffers will be established along both sides of the proposed channels. This vegetative buffer will filter and cool stormwater runoff before it enters the Black River.

A discussion of floodplain modeling and compliance with Flood Hazard Area requirements can be found in the Engineering Report prepared by Bogia Engineering, Inc.

E&SC Measures

The construction methods, phasing, and temporary BMPs have been designed to mitigate erosion and sediment control concerns from the project site.

Transport of placed sediments within Rutgers Pond will be controlled by the following methods. The placement of fill will begin at the north edge of the project site, upstream. Starting on the upstream side will allow settling time for fine particles through the water column of the pond as the soils are placed into the project site. A turbidity curtain will be placed across the full width of the outlet channel. This will help to filter suspended particles as the placement edge gets closer to the southern edge of the project site.

As soils are placed and graded above the normal water surface elevation, on land E&SC BMPs will be implemented to limit the sediments entering the Rutgers Pond from stormwater runoff during construction. Coffer dams will be constructed at the inlet of both constructed channels to prevent stream flows from entering the constructed channel before the downslope area is fully stabilized. Any new shoreline that will not be added to or manipulated for a time period of greater than 3 days, compost filter sock shall be installed along the shoreline. Erosion control matting will be installed along the channel banks and steep slopes above the normal water surface elevation.

Conclusion

The post-construction conditions reduce the volume of stormwater runoff from the site from existing conditions by reducing the impervious area by 8.6 acres. Quality of stormwater runoff will be improved by vegetated riparian zones, which will filter, cool, and slow stormwater runoff flows from the site. Erosion and sediment control measures will be implemented throughout the construction process to protect the project site and the Black River from erosion and sediment pollution.

APPENDIX A

Storm Drainage Calculations

Stormwater Drainage Calculation

The pre-development and post-development conditions at the site were evaluated for a single point of investigation (POI) that was determined based on the current and proposed topography of the existing site. The POI was the existing outlet of Rutgers Pond, located along the south edge of the project area.

The stormwater calculations were conducted using the NRCS method. The existing site condition was considered as wooded in good condition for soil group D and open water, therefore, the curve number 99.92 was used. In the post-development condition the proposed stream restoration replaces open water with pervious land cover, increasing the area of wooded cover type to 8.65 acres. The post-construction conditions have a weighted CN of 87.88.

Existing Conditions:

Cover Type	***Curve Number***	***Area (acres)***
Open Water	100	16.36
Woods in Good Condition	77	0.06

Proposed Conditions:

Cover Type	***Curve Number***	***Area (acres)***
Open Water	100	7.77
Woods in Good Condition	77	8.65

The CN is lower in the post construction condition than the existing condition. Therefore, all storms analyzed using the NCRS method will indicate a reduction in stormwater runoff from existing conditions to proposed conditions.

Water Quality Assessment

Generally, vegetated areas provide water quality tools such as filtration, settlement, uptake and adsorption that can enhance water quality before it reaches downstream surface water bodies and groundwater. The vegetated banks of the proposed channel will act as a vegetated buffer to filter, cool, and slow stormwater runoff from the site. Nutrient removal via plant uptake may also improve the water quality.

BMP Operation and Maintenance Plan

EROSION CONTROL DEVICE MAINTENANCE AND INSPECTION PROCEEDURES

1. THE MAINTENANCE PROCEDURES BELOW ARE COMPREHENSIVE AND INCLUDE DEVICES PROPOSED FOR THIS SPECIFIC PROJECT OR MAY BE NEEDED TO SUPPLEMENT UNFORESEEN EROSIVE CONDITIONS. SHOULD EROSION CONTROL DEVICES BE IMPLEMENTED OUTSIDE OF THOSE DEPICTED WITHIN THESE EROSION CONTROL PLANS, THE DEVICES AND MAINTENANCE PROCEDURES SHALL BE APPROVED BY THE CONSERVATION DISTRICT PRIOR TO IMPLEMENTATION.

2. IT SHALL BE THE RESPONSIBILITY OF THE O/RP TO ENSURE THAT ALL DEVICES ARE INSTALLED AND MAINTAINED ACCORDING TO THE PROVIDED DETAILS OR MANUFACTURES SPECIFICATION.

3. ALL EROSION CONTROL DEVICES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT UNLESS OTHERWISE SPECIFIED BELOW. NECESSARY REPAIRS SHALL BE PERFORMED IMMEDIATELY.

4. SEDIMENT REMOVED FROM EROSION CONTROL DEVICES SHALL BE REDISTRIBUTED/REPLACED ON SITE AND IMMEDIATELY STABILIZED.

ROCK ENTRANCE

· ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.

· DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK.

· ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK FILTER OUTLET

· SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

FILTER FENCE

· NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

· SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

· ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET.

SILT SOCK

- SILT SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE.
- ENDS OF SOCK SHALL BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
- ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND MUST BE DISPOSED IN THE MANNER ACCEPTABLE TO THE CONSERVATION DISTRICT AND NJDEP.

ROCK FILTERS

- CLOGGED FILTER STONE (AASHTO # 57) SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.
- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/ 2 THE HEIGHT OF THE FILTERS.
- IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

PUMP WATER FILTER BAGS

- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED
- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED.
- FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

INLET FILTER BAGS

- FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS ½ FULL.
- DAMAGED FILTER BAGS SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

WETLAND MATS

- INSTALL MATS ON TOP OF NON-WOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
- USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
- INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS.
- IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS.
- UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.

APPENDIX B

NRCS Custom Soil Resource Report

USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Morris County, New Jersey

County Concrete

July 9, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,190 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morris County, New Jersey
Survey Area Data: Version 15, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 31, 2014—Apr 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdrAt	Timakwa muck, 0 to 2 percent slopes, frequently flooded	15.4	23.5%
NerB	Netcong gravelly sandy loam, 3 to 8 percent slopes	0.5	0.8%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	6.9	10.5%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	4.8	7.3%
PHG	Pits, sand and gravel	1.0	1.5%
UR	Urban land	3.6	5.5%
WATER	Water	33.5	51.0%
Totals for Area of Interest		**65.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morris County, New Jersey

AdrAt—Timakwa muck, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w671
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Timakwa, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 37 inches: muck
2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand
2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very high (about 14.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Minor Components

Catden, frequently flooded

Percent of map unit: 7 percent
Landform: Fens, depressions, swamps, bogs, marshes, kettles, flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Preakness, frequently flooded, poorly drained

Percent of map unit: 4 percent
Landform: Outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Parsippany, frequently flooded

Percent of map unit: 4 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

NerB—Netcong gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0mj
Elevation: 280 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Netcong and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Netcong

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 7 inches: gravelly sandy loam
BA - 7 to 13 inches: gravelly sandy loam
Bw1 - 13 to 21 inches: gravelly sandy loam
Bw2 - 21 to 30 inches: gravelly sandy loam
BC - 30 to 41 inches: sandy loam
C - 41 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rockaway, moderately well drained, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hibernia, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PauDc—Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc5
Elevation: 250 to 1,250 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent
Gladstone, extremely stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam
Bt - 10 to 22 inches: gravelly sandy clay loam
BC - 22 to 37 inches: gravelly sandy loam
C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 5 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PawE—Parker-Rock outcrop complex, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: b0mt
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 75 percent
Rock outcrop: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly sandy loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 25 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

R - 0 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Gladstone, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PHG—Pits, sand and gravel

Map Unit Setting

National map unit symbol: b0n3
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, sand and gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Sand And Gravel

Setting

Parent material: Sandy material disturbed by human activity

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

UR—Urban land

Map Unit Setting

National map unit symbol: b0nx
Elevation: 0 to 170 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

WATER—Water

Map Unit Setting

National map unit symbol: b0p9
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

APPENDIX C

Erosion and Sediment Control Report

Site:

The project site is a section of Rutgers Pond, located at 50 Railroad Ave, Kenvil, NJ. The site is mostly open water with some woods as the existing condition. The proposed conditions will restore the Black River channel and 8.6 acres of riparian zone. There are wetlands along the shoreline of Rutgers Pond and the stream banks.

Soils:

The majority of project site consists of open water area. The edges of the project site are Timakwa muck (AdrAt) with 0 to 2 percent slopes and hydrologic soil group B/D, and pits, sand and gravel (PHG), which is sandy material disturbed by human activity. The Appendix D of this report contains the Geotechnical investigation of the fill material and slope stability analysis.

Construction Sequence:

1. INSTALL CONSTRUCTION ACCESS AREA (ROCK ENTRANCE/WETLAND MATTING)
2. CLEARLY DELINEATE THE LIMIT OF DISTURBANCE IN THE FIELD WITH STAKES. INSTALL WETLAND PROTECTION FENCING AND TREE PROTECTION FOR WETLANDS AND TREES WITHIN THE LIMIT OF DISTURBANCE.
3. INSTALL PERMIETER E&S CONTROLS FOR THE FILL AREA.
   A. AS FILL AREA EXPANDS, E&S CONTROLS MUST BE MODIFIED TO PROTECT ENTIRE FILL AREA FROM EROSION AND SEDIMENT POLLUTION.
4. PLACE FILL MATERIAL IN LAKE WHILE LEAVING A FLOW PATH ALONG EXISTING SHORELINE. SEDIMENTS SHALL NOT BE PLACED WITHIN 30 FEET OF THE EXISTING SHORELINE WHERE THE TEMPORARY CHANNEL IS PROPOSED.
5. ONCE FILL IS AT PROPOSED GRADE, PERMANENTLY STABILIZE THE AREA. NO MORE THAN 15,000 SQ. FT OF DISTURBED AREA ABOVE THE NORMAL WSE (700.7') SHALL BE AT FINAL GRADE WITH OUT INITIATING SEEDING AND MULCHING. PLANTING OF SHADE TREES AND FINAL VEGETATIVE COVER SHALL BE INITIATED AT ALL AREAS WHICH ARE AT FINAL GRADE AND FARTHER THAN 10' FROM THE EDGE OF ANY CURRENT OR FUTURE CONSTRUCTION TRAFFIC.
6. CONSTRUCT NEW STREAM CHANNELS WITHIN FILL PLACEMENT AREA. INSTALL COFFER DAMS #1 AND #2 TO ISOLATE FLOW FROM THE NEWLY CONSTRUCTED CHANNELS UNTIL CHANNEL AREA HAS BEEN FULLY STABILIZED. STABILIZE CONSTRUCTED CHANNELS WITH GRAVEL AND VEGETATION.

7. REMOVE COFFER DAMS# 1 AND #2. INSTALL COFFER DAM #3 AND #4. REDIRECT EXISTING STREAM FLOWS INTO NEW STREAM CHANNELS.
8. MONITOR FOR STABILITY. WHEN DEEMED STABLE, CONSTRUCT TEMPORARY STREAM CROSSINGS #1 AND #2. FILL IN FORMER FLOW PATHS ALONG SHORELINE, STABILIZE AND VEGETATE.
9. PLANT REMINGING SHADE TREES AND OTHER STREAMBANK RESTORATION VEGETATION AND STABILIZE.
10. REMOVE ALL REMAINING TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.
11. MONITOR NEW STREAM CHANNEL REGULARLY AND PROVIDE ANY NECESSARY REMEDIATION.

Temporary Seeding:

Apply limestone at a rate of 40 pounds per acre for sandy loam soils.
Apply fertilizer (10-20-10) at a rate of 500 pounds per acre.
Apply mulch at a rate of 2.0 tons per acre and use crimper to prevent loss due to wind.
Apply seed (Perennial Rye Grass) at a rate of 40 pounds per acre

Permanent Seeding:

Provide limestone and fertilizer as noted in temporary seeding. Final seeding is to consist of grain rye (30lbs/acre) and "Floodplain Mix" (20 lbs/acre), or approved alternative. Floodplain mix is a mixture of grasses and wildflowers that are native to the mid-atlantic region, including the following species: Viginia Wildrye, Deertounge, Aster, Indiangrass, and Swamp Milkweed.

"Floodplain Mix" is available through Ernst Seeds, 8884 Mercer Pike, Meadville, PA 16335.

Seed Bed Preparation:

Optimum seeding dates are between 2/15-5/01 and 8/15-10/15. Seed beds are to be uniformly tilled or mixed to incorporate the limestone and fertilizer. Spread seed uniformly across the seedbed area and incorporate into the soil by raking to a depth of ¼" to ½" and firm with a roller or light drag. Seeding operations are to be done on the contour. Mulch the seeded areas immediately with mulch consisting of unrotted hay or small grain straw spread uniformly by hand or mechanically at a rate of two tons per acre and anchored immediately after placement.

Permanent Vegetation:

The project location is along the border of zone 6a and 6b per Figure 4-1 of NJ E&S control standards in the Highlands physiographic province. The native underlying soil is classified as poor and moderately drained. For the pond edge, upland areas, and channel banks, species from Table 7-3, 7-5 and 7-7 of the NJ E&S control standards, respectively, were adopted. The following tables describe the corresponding detail for each planting area along with the proposed maintenance activities.

Table 7-3: Common Emergent Wetland Plant Species Used for Stormwater Wetlands and on Aquatic Benches of Stormwater Ponds

Common Name	Scientific Name	Inundation Tolerance
Arrow arum	Peltandra virginica	up to 12"
Arrowhead/Duck potato	Saggitaria latifolia	up to 12"
Pickerelweed	Pontederia cordata	up to 12"
Blunt spike rush	Eleocharis obtusa	up to 3"
Bushy beardgrass	Andropogon glomeratus	up to 3"
Common three-square	Scirpus pungens	up to 6"
Iris (blue flag)	Iris versicolor	up to 6"
Marsh hibiscus	Hibiscus moscheutos	up to 3"
Spatterdock	Nuphar luteum	up to 36"
Sedges	Carex spp.	up to 6"
Soft rush	Juncus effusus	up to 6"
Switchgrass	Panicum virgatum	up to 3"

Note 1: Inundation tolerance is maximum inches below the normal pool; most plants prefer shallower depths than the maximum indicated.

Note 2: For additional plant options, consult the stormwater planting list in Section 5. Other good sources include the NJDA Standards for Soil Erosion and Sediment Control in New Jersey, Design of Stormwater Wetland Systems (Schueler 1992), and Wetland Planting Guide for the Northeastern United States (Thunhorst 1993).

Table 7-5: Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
Acer rubrum Red maple	*Clethra alnifolia* Sweet pepperbush	*Andropogon glomeratus* Lowland broomsedge
Betula nigra River birch	*Ilex verticillata* Winterberry	*Eupatorium purpureum* Sweet-scented Joe Pye weed
Juniperus virginiata Eastern red cedar	*Cephalathus occidentalis* Buttonbush	*Scripus pungens* Three square bulrush
Chionanthus virginicus Fringe-tree	*Hamemelis virginiana* Witch hazel	*Iris versicolor* Blue flag
Nyssa sylvatica Black gum	*Vaccinium corymbosum* Highbush blueberry	*Lobelia cardinalis* Cardinal flower
Diospyros virginiana Persimmon	*Ilex glabra* Inkberry	*Panicum virgatum* Switchgrass
Platanus occidentalis Sycamore	*Ilex verticillata* Winterberry	*Dichanthelium clandestinium* Deertongue
Quercus palustris Pin oak	*Viburnum dentatum* Arrowwood	*Rudbeckia laciniata* Cutleaf coneflower
Quercus phellos Willow oak	*Lindera benzoin* Spicebush	*Scirpus cyperinus* Woolgrass
Salix nigra Black willow	*Morella pennsylvanica* Bayberry	*Vernonia noveboracensis* New York ironweed
Note: For more plant section options for bioretention, consult Design Manual for Use of Bioretention in Stormwater Management (ETA&B 1993) or Design of Stormwater Filtering Systems (Claytor and Schueler 1997).		

Table 7-7: Common Grass Species for Open Channels

Common Name	Scientific Name	Notes
Alkali saltgrass	Puccinellia distans	Cool, good for wet, saline swales
Fowl bluegrass	Poa palustris	Cool, good for wet swales
Canada bluejoint	Calamagrostis canadensis	Cool, good for wet swales
Creeping bentgrass	Agrostis palustris	Cool, good for wet swales, salt tolerant
Red fescue	Festuca rubra	Cool, not for wet swales
Redtop	Agrostis gigantea	Cool, good for wet swales
Rough bluegrass	Poa trivialis	Cool, good for wet, shady swales
Switchgrass	Panicum virgatum	Warm, good for wet swales, some salt tolerance
Wildrye	Elymus virginicus/riparius	Cool, good for shady, wet swales
Notes: These grasses are sod forming and can withstand frequent inundation, and are ideal for the swale or grass channel environment. A few are also salt-tolerant. Cool refers to cool season grasses that grow during the cooler temperatures of spring and fall. Warm refers to warm season grasses that grow most vigorously during the hot, mid-summer months. Where possible, one or more of these grasses should be in the seed mixes. For a more thorough listing of seed mixes see Table 7-8 in Part 5 or consult the Standards for Soil Erosion and Sediment Control in New Jersey.		

Maintenance shall be conducted according to the table presented below.

RIPARIAN CORRIDOR MAINTENANCE SCHEDULE

NEWLY SEEDED GRASSES AND POND EDGE:	YEAR 1	YEAR 2	YEAR 3	YEAR 4+
INSPECT FOR INVASIVE/WEED SPECIES. IF WEED SPECIES APPEAR IN THE SEEDED AREA, SPOT TREAT BY PULLING.	X			
PRUNING, RESEEDING, THATCH REMOVAL OF VEGETATED AREAS, AS NEEDED	X	X	X	
PEST CONTROL, AS NEEDED	X	X	X	
NEWLY PLANTED TREES AND SHRUBS:				
SUPPLEMENTAL WATER, IF NEEDED. NATURALISTIC PRUNING OF DEAD/DAMAGED BRANCHES IN LATE FALL OR EARLY SPRING.	X			
REMOVE STAKES, IF UTILIZED. CHECK TREE BARK PROTECTION AND REPAIR/REPLACE AS NEEDED. REPLACE DEAD PLANT MATERIAL. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.		X		
CHECK TREE BARK PROTECTION AND REPAIR/REPLACE AS NEEDED. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.			X	X
EXISTING VEGETATION AREAS:				
REMOVE OR SPOT TREAT INVASIVE SPECIES. PRUNE POTENTIALLY HAZARDOUS MATERIAL FROM EXISTING PLANT MATERIAL.	X	X	X	

Erosion Control Measures:

The erosion control measures included on the site are a stabilized construction entrance, compost filter sock at the downslope perimeter of the project, turbidity curtain, temporary stream crossings, and erosion control matting. Temporary and permanent seeding and stabilization are also part of the controls used to prevent downstream erosive conditions. Should water infiltration into trenches or into other excavations require water pumping, it shall be done per the Standard for Dewatering, Chapter 14 of the Standards for Soil Erosion and Sediment Control in New Jersey manual.

Should any erosive conditions occur not anticipated at the time of this report, the county conservation district and the design engineer are to be contacted immediately.

APPENDIX D

Fill Material Geotechnical Report

Dynamic Earth LLC
245 Main Street, Suite 110
Chester, NJ 07930
T. 908-879-7095

Date: April 4, 2022
Via email:

County Concrete Corp.
50 Railroad Avenue,
Kenvil, NJ 07847

Attn: John Crimi

RE: Slope Stability Analysis
Black River Restoration
Mine Hill and Roxbury Township, Morris County, New Jersey
Dynamic Earth Project No.: 1949-99-001EC

Dear Mr. Crimi;

Dynamic Earth, LLC (Dynamic Earth) has completed the laboratory testing of the fill material and the slope stability analysis. The results of our slope stability analysis are detailed herein.

Project Details:

The subject site located in the Morris County identified as the Rutgers Pond, a man-made pond located within both Roxbury and Mine Hill Townships. The proposed restoration area is bound to the north by the existing County Concrete Corporation; east by undeveloped wooded area and Canfield Avenue beyond; to the south by Randolph Park beach and Rt. 10 beyond and on the west by Cutting Edge Sawmill and residential developments beyond. Based on Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc., the approximate area of the reclamation is 40,655 square feet. The proposed restoration includes reclamation of partial land area from the existing Rutgers pond by filling the pond with quarry tailings from the nearby County Concrete Corporation. The proposed restoration to reestablish the natural channel of the Black River within the reclaimed land mass.

Site Geology:

Based on the Bedrock Geologic Map of Northern New Jersey prepared by the United States Department of the Interior, U.S. Geologic Survey, the site is located within the Valley and Ridge Province of Northern New Jersey. Specifically, the site is underlain by the Middle and Lower Cambrian-aged Leithville Formation. This formation reportedly consists of light- to dark-gray and light-olive-gray fine- to medium-grained thin- to medium-bedded dolomite grading downward through medium-gray, grayish-yellow, or pinkish-gray dolomite and dolomitic sandstone, siltstone and shale to medium-gray, medium-grained, medium bedded dolomite containing quartz sand grains as stringers and lenses near the base. Overburden materials include glacial deposits associated with the Wisconsinan Glacial Cycle which reached its most southerly advance thousands of years ago and alluvial deposits.

Historical Document Review:

As part of the slope stability analysis, historical and available data was obtained using sources such as *New Jersey Geoweb*, and *New Jersey Department of Transportation Geotechnical Data Management System*. The data obtained using above sources were used in the development of the finite element models utilized to evaluate the slope stability of the proposed land reclamation.

Laboratory Analysis:

A representative sample of the material proposed to be utilized during the land reclamation was subjected to a laboratory testing program which included, natural moisture content determinations (ASTM D-2216), Atterberg limits (ASTM D-4318), and washed gradation analyses (ASTM D-6913) in order to perform engineering soil classifications in general accordance with ASTM D-2487.

Finite Element Analysis:

Dynamic Earth performed slope stability analysis using Midas SoilWorks (2020) version 1.1, a finite element modeling software. The proposed landmass cross sections were provided on a drawing labeled Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc. The aforementioned drawing presented four proposed cross sections of the land mass. Each cross section was modeled in SoilWorks in one to one scale in order to mimic expected conditions once completed. The model considered the long-term stability of the slopes during the analysis.

The historical data and the results from the laboratory investigation were used to generate the soil parameters used in the analysis. See the accompanying finite element analysis output summary for the results.

Slope Stability Review:

The stability of the conceptual slopes was performed and the factor of safety obtained through the finite element analysis of the crucial slopes are summarized in the table below.

SUMMARY OF SLOPE STABILITY ANALYSIS	
Cross Section	**Factor of Safety**
A - A	5.55
B - B	3.08
C - C	1.40
D - D	1.31

The long-term slope stability obtained using the finite element analysis for the critical conceptual slopes are larger than the industrial minimum factor of safety of 1.3.

Please feel free to contract us with any questions regarding these matters.

Sincerely,

DYNAMIC EARTH, LLC

Peter H. Howell, P.E.
Principal
NJ PE License No. 24GE04728700

Janitha Batagoda, Ph.D.
Geotechnical Engineer

Enclosures: Slope Stability Analysis Summary

CC: Kurt Peters

SLOPE STABILITY ANALYSIS

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

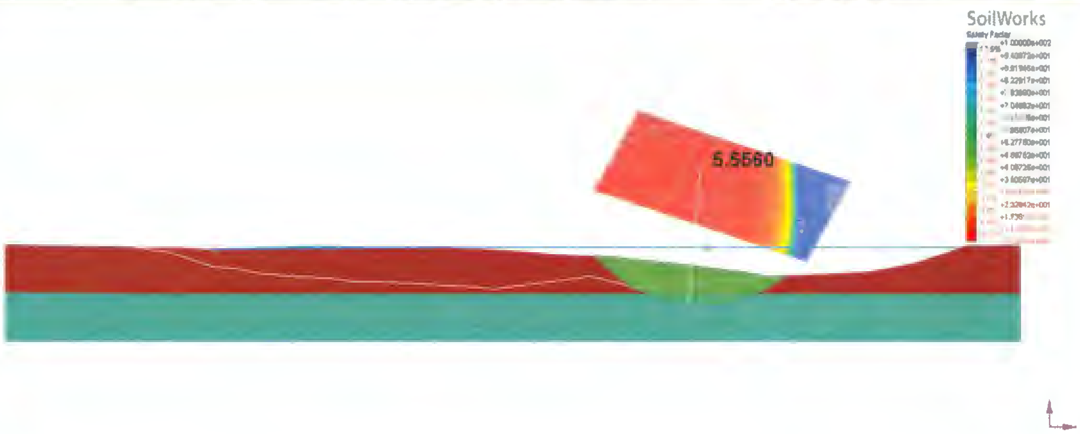
1. Soil Properties

Section	Wet unit weight (lbf/ft^3)	Saturated unit weight (lbf/ft^3)	Cohesion (lbf/ft^2)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft^2)	Poisson's ratio
Pond Fill Material	115.000	130.000	-	17.00	-	-
Natural MD sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	5.556	**OK**

Critical Embankment region slope stability check: In case of Slope Stability analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

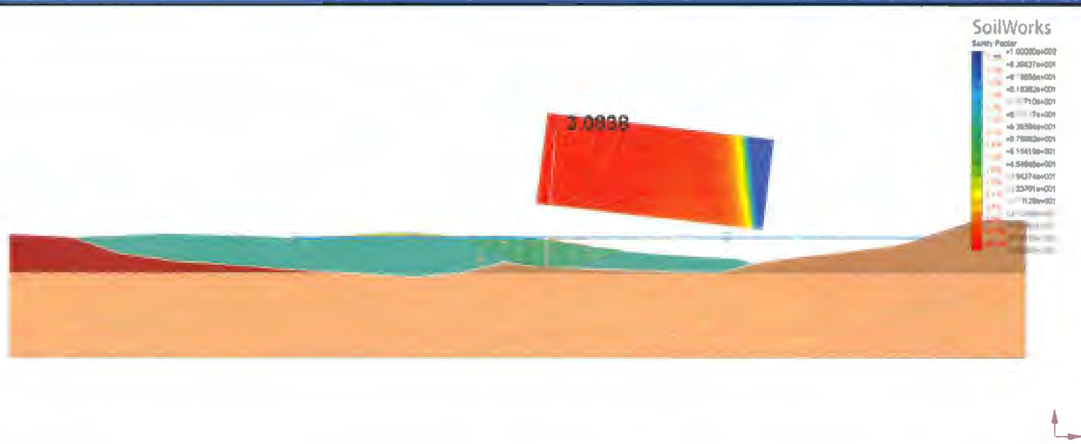
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	3.084	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

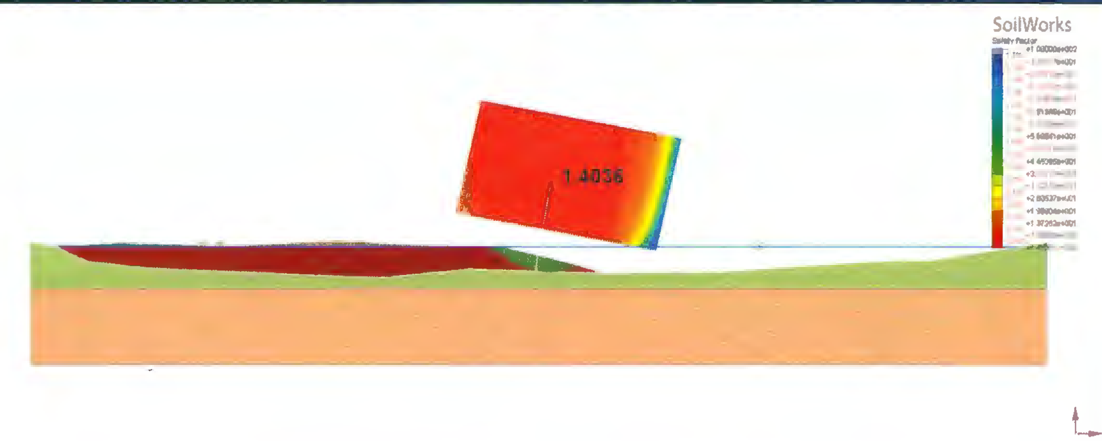
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.030	-	16.00	-	-
Natural MD Sand	120.000	128.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	1.404	OK

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

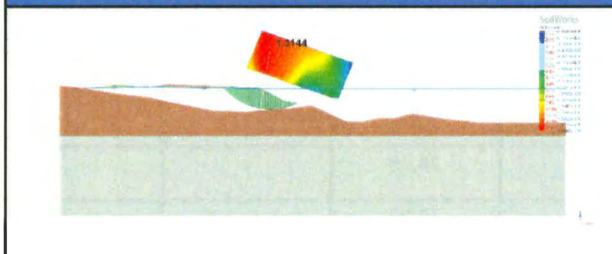
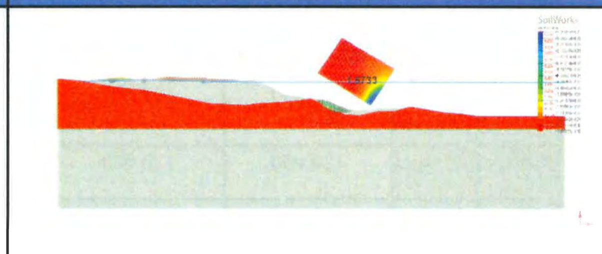
II. Applied Properties

1. Soil Properties

Section	Wet unit weight (lbf/ft^3)	Saturated unit weight (lbf/ft^3)	Cohesion (lbf/ft^2)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft^2)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	130.000	-	28.00	-	-
Dense Sand	125.000	130.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

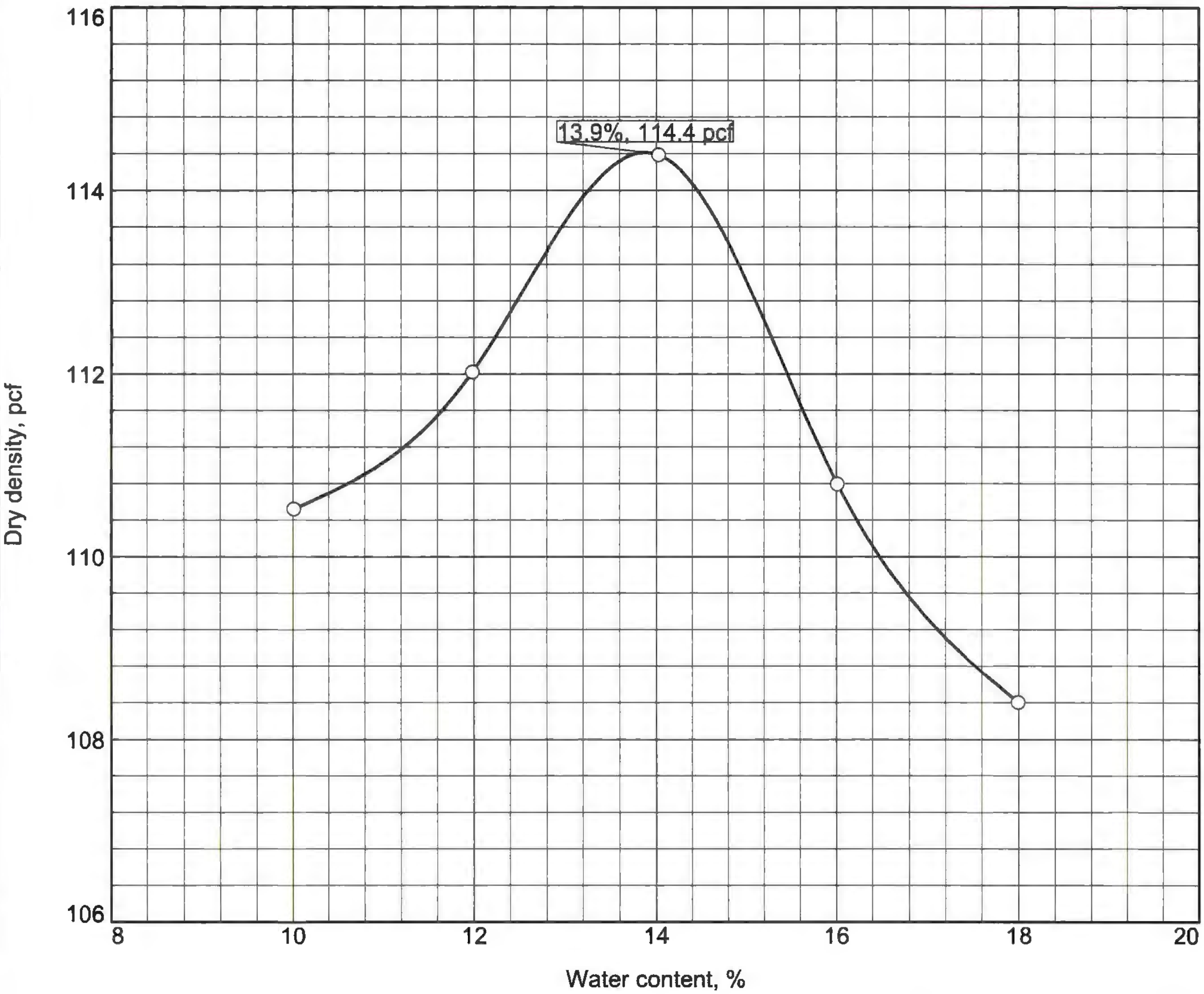
Slope Stability Slope 1			Slope Stability Slope 2		
					
Standard safety factor	1.300	Evaluation	Standard safety factor	1.300	Evaluation
Analysis safety factor	1.314	**OK**	Analysis safety factor	1.673	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Slope 1,Slope Stability Slope 2 allowable safety factor 1.3 has been satisfied.

Determined to be safe.

LABORATORY TESTING

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
N/A	ML	N/A	11.7	N/A	17	NP	0.3	54.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 114.4 pcf Optimum moisture = 13.9 %	Brown Silt, and c-f sand, trace f gravel

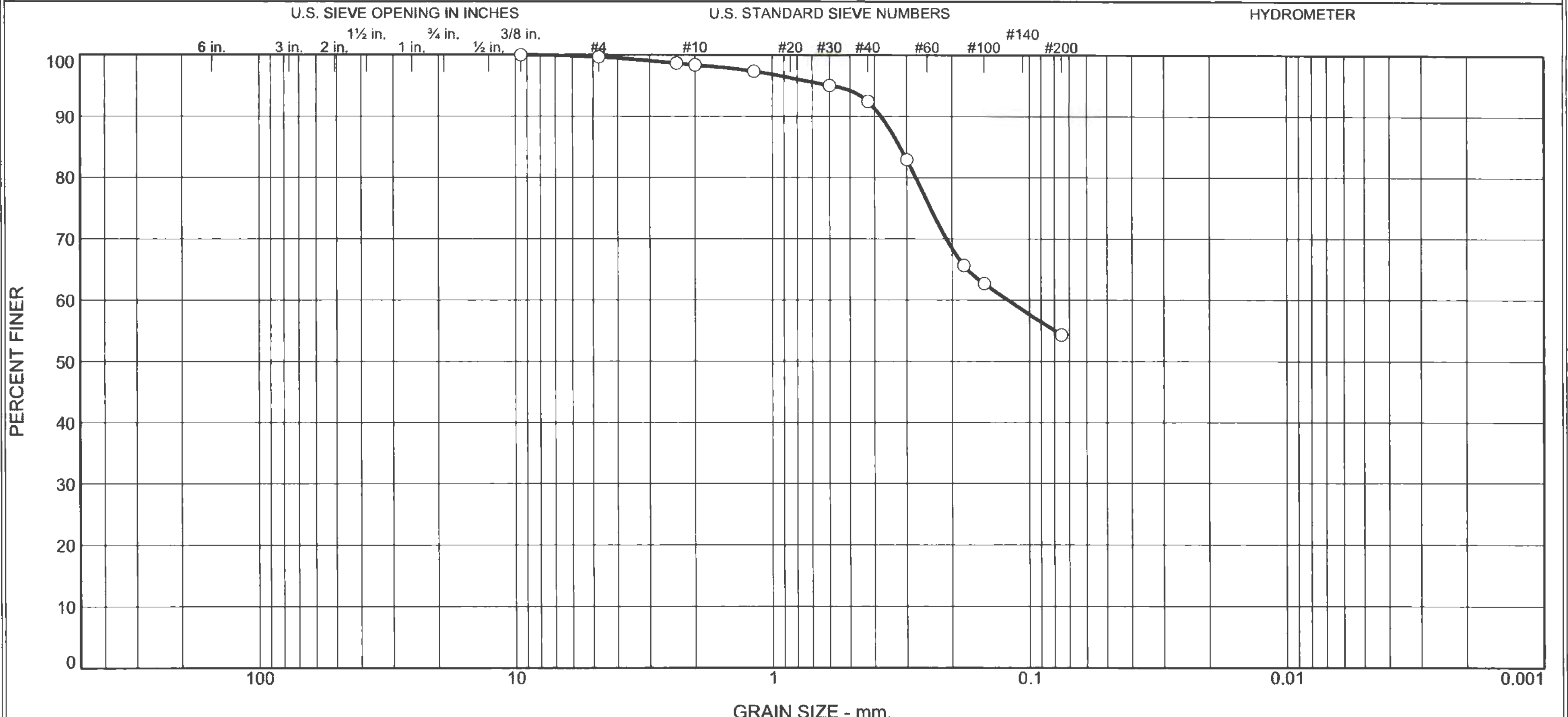
Project No. 1949-99- **Client:** County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
○ **Source of Sample:** Pond Fill **Sample Number:** BS-1

DYNAMIC EARTH

Remarks:

Figure 1

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.3	5.9	38.2	54.3	

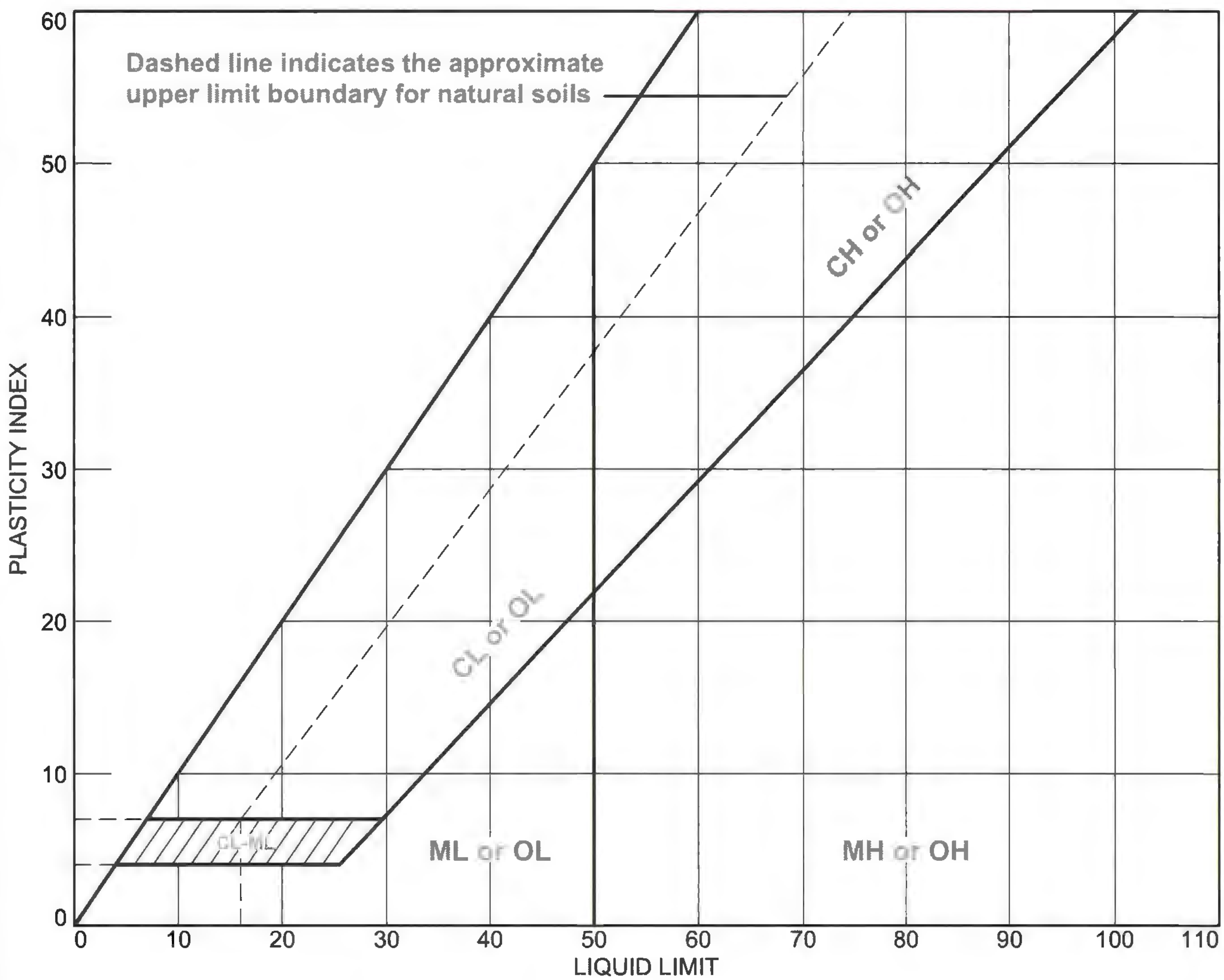
	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	B-1	--	--	2/22/22	ML	Brown silt, and c-f sand, trace f gravel	11.7	17	19

Client County Concrete
Project Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No. 1949-99-001EC Figure 2

DYNAMIC EARTH

Stockpiled Processed - Pond Fill

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	**SOURCE**	**SAMPLE NO.**	**DEPTH**	**NATURAL WATER CONTENT (%)**	**PLASTIC LIMIT (%)**	**LIQUID LIMIT (%)**	**PLASTICITY INDEX (%)**	**USCS**
●	B-1	--	--	11.7	19	17	NP	ML

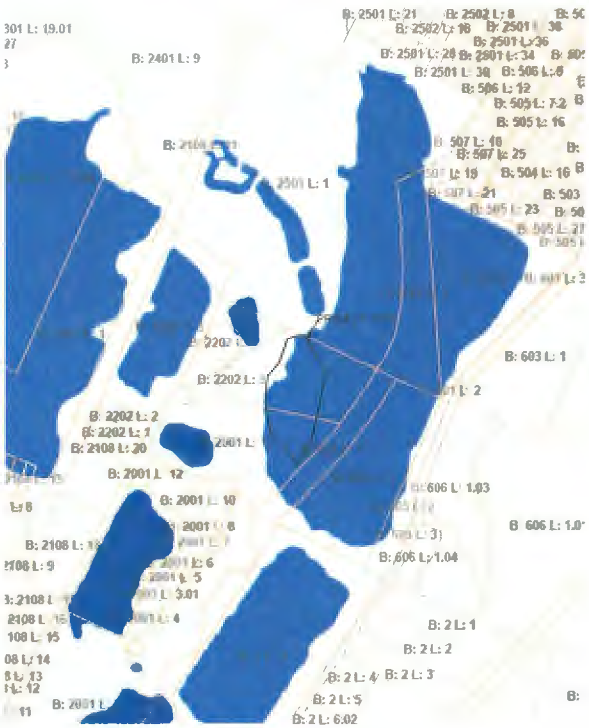
DYNAMIC EARTH

Client: County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No.: 1949-99-
Figure 3

APPENDIX D

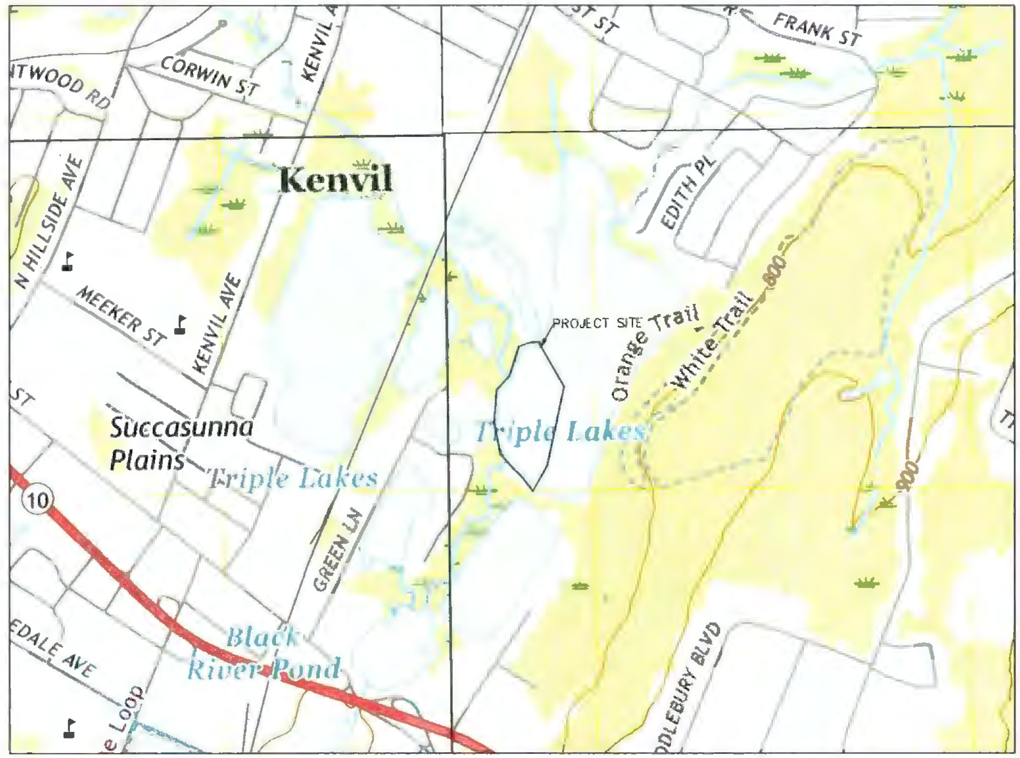
Site Plans

PROJECT TITLE: BLACK RIVER RESTORATION



ADJOINING PROPERTIES MAP

NJ-GEOWEB
NTS



LOCATION MAP

USGS TOPO MAP 2019 QUADRANGLE
CHESTER, DOVER, MENDHAM, STANHOPE NJ
1"·1000'

TABLE OF CONTENTS

SITE DATA:
BLOCK-LOT: 2501-1
RECORD OWNER: COUNTY CONCRETE CORP
LOCATION: 50 RAILROAD AVE, KENVIL NJ

BLOCK-LOT: 607-1
RECORD OWNER: COUNTY CONCRETE CORP
LOCATION: GREEN LN, KENVIL NJ

BLOCK-LOT: 605-1
RECORD OWNER: COUNTY CONCRETE CORP
LOCATION: GREEN LN, KENVIL NJ

BLOCK-LOT: 2001-13
RECORD OWNER: STEPHEN D PENZENIK
LOCATION: 28 GREEN LN, SUCCASUNNA NJ

BLOCK-LOT: 2202-5
RECORD OWNER: STEPHEN D PENZENIK & PATRICIA A PENZENIK
LOCATION: 30 GREEN LN, SUCCASUNNA NJ

BLOCK-LOT: 604-1
RECORD OWNER: MINE HILL TOWNSHIP
LOCATION: GREEN RD, KENVIL NJ

STREAM CLASSIFICATION:
THE PROJECT'S RECEIVING WATERCOURSE IS THE BLACK RIVER/LAMINGTON RIVER. THE SITE IS LOCATED IN THE NORTH AND SOUTH BRANCH RARITAN WATERSHED MANAGEMENT AREA, LAMINGTON RIVER (ABOVE RT 10) SUBWATERSHED (00DA01). THE NJ CHAPTER 9B: SURFACE WATER QUALITY CLASSIFICATION IS FRESHWATER 2-NON-TROUT (FW2-NT(C1))

EXISTING CONDITIONS DATA:
EXISTING SITE CONDITIONS ARE FROM A SURVEY CONDUCTED BY PROPERTY LINE SURVEYING LLC ON 06/02/2021.

LIMIT OF AREA OF DISTURBANCE:
THIS LIMIT OF DISTURBANCE OF THIS PROJECT IS 16.4 ACRES (715,102 SQFT).

THE AREA SHOWN AS THE LIMIT OF DISTURBANCE ON THIS PLAN SHALL BE DELINEATED IN THE FIELD BY ORANGE CONSTRUCTION FENCING OR STAKES AND ROPE TO PREVENT ANY DISTURBANCE OUTSIDE THIS AREA. ANY DELINEATING DEVICES USED THAT ARE KNOCKED DOWN BY CONSTRUCTION EQUIPMENT SHALL BE IMMEDIATELY RESTORED AND REPLACED AS NECESSARY. DISTURBANCE OUTSIDE THIS AREA IS PROHIBITED.

GEOLOGIC FORMATIONS/SOIL CONDITIONS:
THE SITE IS UNDERLAIN BY MIDDLE AND LOWER CAMBRIAN-AGED LEITHSVILLE FORMATION, WHICH CONSISTS OF LIGHT TO DARK GRAY AND LIGHT-OLIVE-GRAY FINE- TO MEDIUM GRAINED THIN TO MEDIUM BEDDED DOLOMITE GRADING DOWNWARD THROUGH MEDIUM GRAY, GRAYISH YELLOW, OR PINKISH GRAY DOLOMITE AND DOLOMITE SANDSTONE, SILTSTONE AND SHALE TO MEDIUM GRAY, MEDIUM GRAINED, MEDIUM BEDDED DOLOMITE CONTAINING QUARTZ SAND GRAINS AS STRINGERS AND LENSES NEAR BASE. OVERBURDEN MATERIALS INCLUDE GLACIAL DEPOSITS ASSOCIATED WITH WISCONSINAN GLACIAL CYCLE, WHICH REACHED ITS MOST SOUTHERLY ADVANCE THOUSANDS OF YEARS AGO AND ALLUVIAL DEPOSITS.

POTENTIAL THERMAL IMPACTS TO SURFACE WATER:
THE THERMAL IMPACTS ASSOCIATED WITH THIS PROJECT ARE AVOIDED, MINIMIZED, AND MITIGATED BY FILTERING STORMWATER RUNOFF THROUGH A VEGETATED BUFFER AND ISOLATING THE BLACK RIVER STREAM FLOWS FROM RUTGERS POND.

[illegible]

SOIL TABLE

USDA NRCS REPORT

BEI

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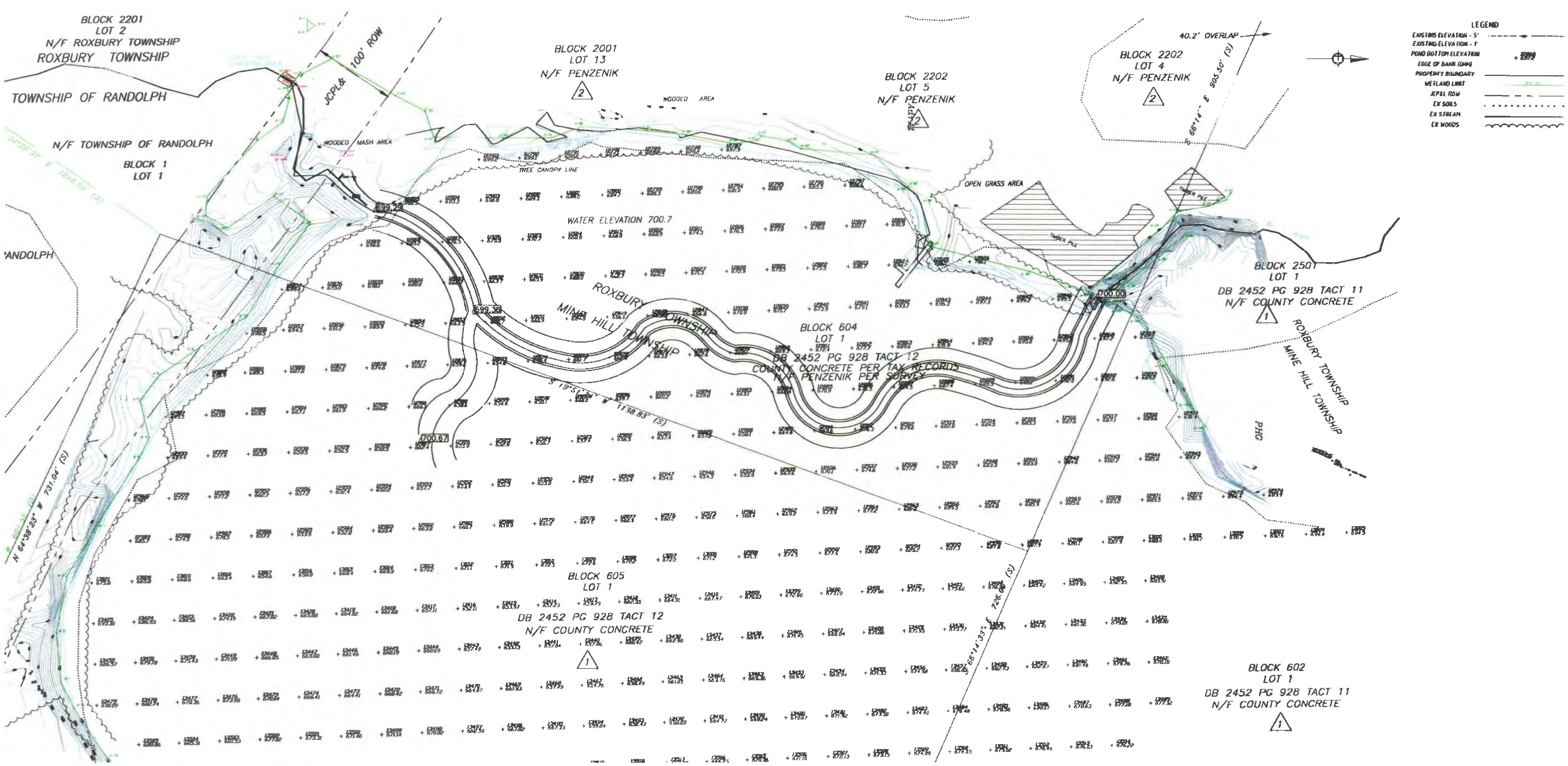
FINAL PLANS
BLACK RIVER RESTORATION
COVER SHEET

COUNTY CONCRETE CORPORATION	
	50 RAILROAD AVE
	KENVIL, NJ 07847
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
	MORRIS
	NJ
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C100
PROJECT:	NJ1954-01
SHEET:	1 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



NOTES:

1. SURVEY AND BATHYMETRIC DATA IS FROM THE JUNE 2, 2021 AND AUGUST 5, 2021 SURVEYS BY PROPERTY LINE SURVEYING LLC. THE HORIZONTAL DATUM IS NAD83 AND VERTICAL DATUM IS NAVD88.
2. WETLAND DELINEATION WAS PERFORMED BY DUBOIS & ASSOCIATES ON DECEMBER 15, 2021. MARKED WETLAND FLAGS WERE SURVEYED BY PROPERTY LINE SURVEYING LLC.

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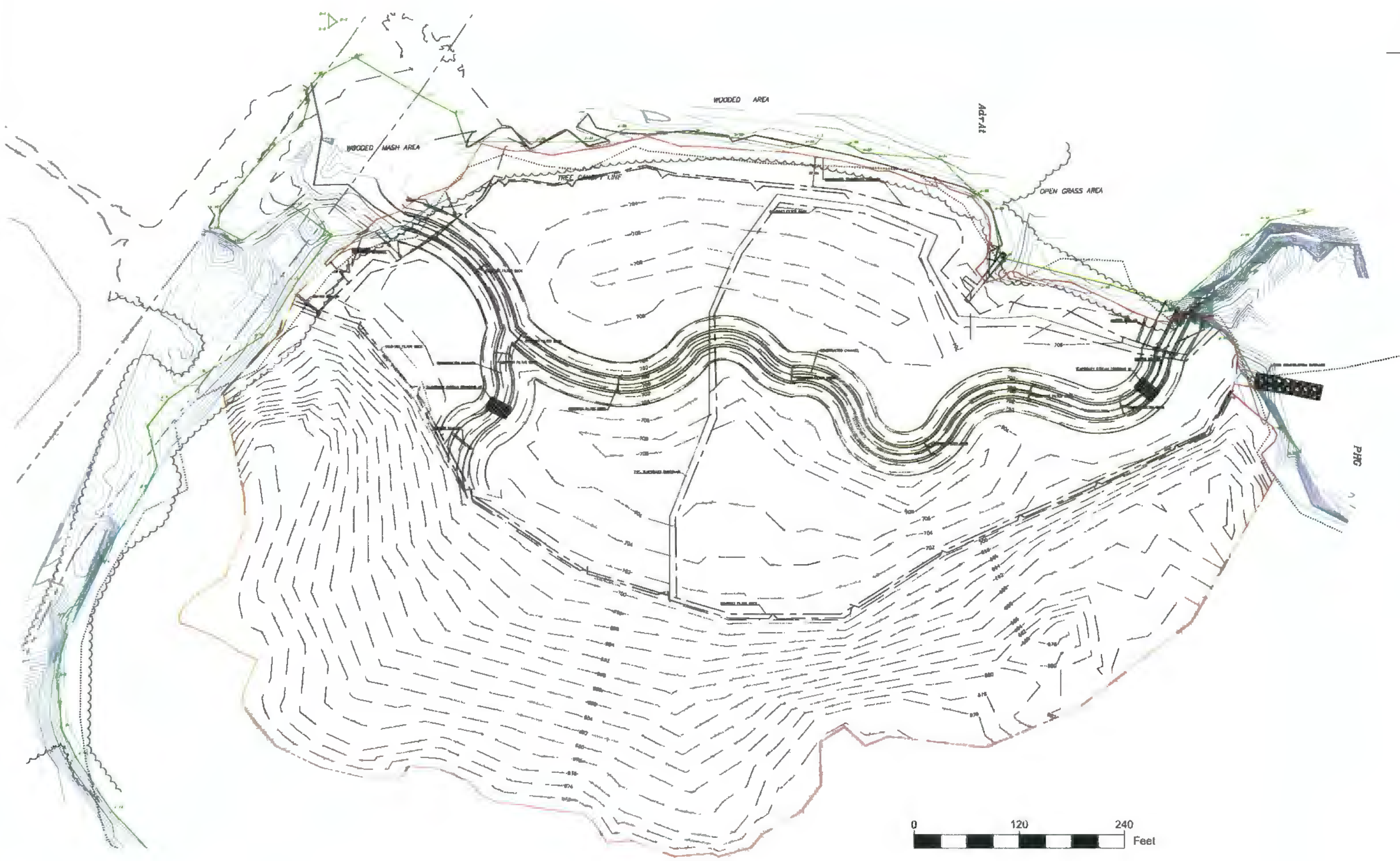
FINAL PLANS
BLACK RIVER RESTORATION
EXISTING CONDITIONS

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL NJ 07847

JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
MORRIS	
NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	1"=60'
DRAWING:	C101
PROJECT:	NJ1954-01
SHEET:	2 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



LEGEND

- EX. 1' CONTOURS
- EX. EDGE OF BANK (DMH)
- PROPERTY BOUNDARY
- WETLAND LIMIT
- JCP&L ROW
- EX. SOILS
- EX. STREAM
- EX. WOODS
- LIMIT OF DISTURBANCE
- PROPOSED 2' CONTOURS
- PROPOSED SHORELINE
- TYP. TEMPORARY SHORELINE
- TEMPORARY CHANNEL
- ROCK CONSTRUCTION ENTRANCE
- COFFER DAM
- COMPOST FILTER SOCK
- TURBIDITY CURTAIN
- TEMPORARY STREAM CROSSING

LIMIT OF AREA OF DISTURBANCE:

THE AREA SHOWN AS THE LIMIT OF CONSTRUCTION ON THIS PLAN SHALL BE DELINEATED IN THE FIELD BY ORANGE CONSTRUCTION FENCING OR STAKES AND ROPE TO PREVENT ANY DISTURBANCE OUTSIDE THIS AREA. ANY DELINEATING DEVICES USED THAT ARE KNOCKED DOWN BY CONSTRUCTION EQUIPMENT SHALL BE IMMEDIATELY RESTORED AND REPLACED AS NECESSARY. DISTURBANCE OUTSIDE THIS AREA IS PROHIBITED.

SITE FEATURE NOTES:

1. IT IS MANDATORY FOR THE CONTRACTOR TO FOLLOW AND COMPLY WITH THE APPROVED EROSION AND SEDIMENTATION PLAN EXCEPT FOR WHERE THE CONTRACTOR IS FOLLOWING AMENDMENTS THAT HAVE BEEN APPROVED BY THE CONSERVATION DISTRICT.
2. OFFSITE DISPOSAL OF MATERIALS TO BE IN DEP APPROVED MANNER OR AT FACILITIES PERMITTED TO HANDLE MATERIALS.
3. ALL ENVIRONMENTAL CLEAN UP, ASBESTOS REMOVAL OR HAZARDOUS WASTE TO BE HANDLED BY EPA AND DEP GUIDELINES AND DISPOSED OF OFF-SITE AT AN APPROVED FACILITY.
4. FEATURES AND UTILITIES SHOWN ON THIS PLAN ARE THE RESULT OF FIELD SURVEY. DIFFERENCES BETWEEN THIS PLAN AND THE PREVIOUSLY RECORDED PLAN FOR UTILITY LOCATION IS A NON-RECORDED CONSTRUCTION CHANGES. THIS PLAN REPRESENTS THE KNOWN FACILITIES AT THE TIME THE SURVEY WAS PERFORMED

NOTES:

1. SOILS DATA AND BOUNDARIES ARE FROM A CUSTOM NRCS SOIL RESOURCE REPORT. SOILS WITHIN THE PROJECT AREA ARE TIMAKWA MUCK (AdrAt) AND PITS, SAND, AND GRAVEL (PHG).
2. VOLUME OF FILL IS 590,100 CUYD.
3. PLACED FILL SHALL HAVE A MAXIMUM SLOPE OF 22.5%.

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FINAL PLANS
BLACK RIVER RESTORATION
E&SC PLAN

COUNTY CONCRETE CORPORATION	
	50 RAILROAD AVE
	KENVIL, NJ 07847
JOB-BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
	MORRIS
	NJ
PIN-	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	1"=60'
DRAWING:	C102
PROJECT:	NJ1954-01
SHEET:	3 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION

GENERAL NOTES

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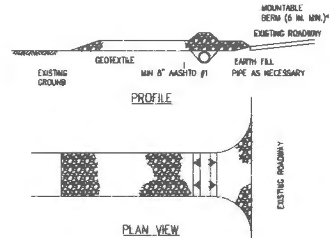
FINAL PLANS
BLACK RIVER RESTORATION
NOTES

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP MORRIS NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AEB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C103
PROJECT:	NJ1954-01
SHEET:	4 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:
REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.

RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.

MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.

MAINTENANCE:
ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.

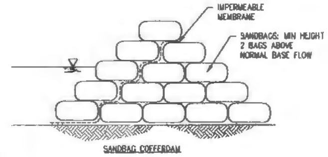
ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK.

WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK CONSTRUCTION ENTRANCE

N.T.S.

COFFER DAM SCHEDULE			
I.D.	LENGTH (FT)	MIN. TOP BARRIER	RECOMMENDED TYPE
1	15	2.98	SANDBAGS
2	15	2.98	SANDBAGS
3	30	2.98	SANDBAGS
4	30	2.98	SANDBAGS

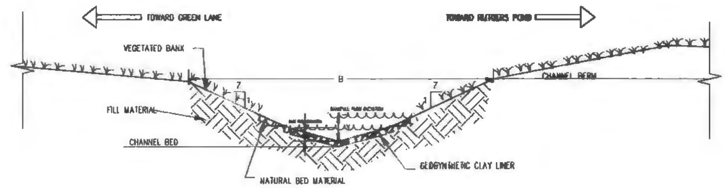


SANDBAG COFFERDAM

NOTES:
1. COFFERDAMS SHALL BE INSTALLED BY DIVERS OR QUALIFIED PERSONNEL TO ASSURE PROPER FUNCTIONALITY.
2. COFFERDAMS SHALL BE INSTALLED VIA WATERWAY ACCESS ONLY AND TIED INTO THE IMMEDIATE EMBANKMENT.
3. OTHER APPROVED EQUAL COFFERDAM SYSTEMS MAY BE USED ONCE APPROVED BY THE OWNER, ENGINEER AND NJDEP, OR OTHER JURISDICTIONAL AGENCIES, AS REQUIRED.

COFFER DAM DETAILS

N.T.S.



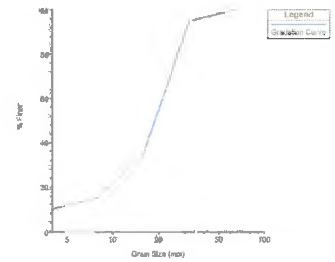
RESTORED CHANNEL CROSS SECTION

NTS

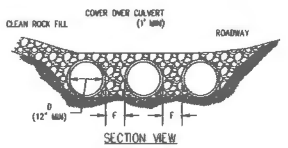
RESTORED CHANNEL

CHANNEL	TOP WIDTH (B)	BASE FLOW DEPTH (y)	BANKFULL FLOW DEPTH (Y)	SIDE SLOPE (Z)	LONGITUDINAL SLOPE (%)
BLACK RIVER	50'	1.7	2.3	5	0.06
BRANCH	50'	1.7	2.3	5	0.08

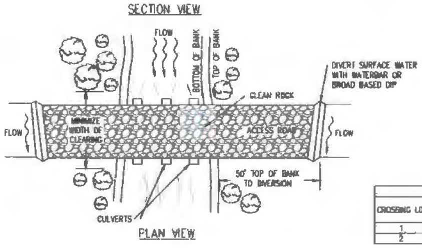
GENERAL NOTES:
1. THE RESTORED CHANNEL IS EXCAVATED THROUGH THE FILL MATERIAL.
2. MANNING'S AND CHANG'S EQUATIONS ALONG WITH HEC-RAS SIMULATION WERE EMPLOYED TO DESIGN THE CHANNEL.
3. A 2.5' OF FREE BOARD IS PROVIDED ABOVE BASE FLOW WATER POOL.
4. THE REPRESENTATIVE SIZE (d50) OF THE BED LAYER IS 0.8".
5. INSPECTION OF BED AND SIDEWALLS, PARTICULARLY AFTER INTENSE STORMS, SHALL BE CONDUCTED TO ASSESS POTENTIAL EROSION/DEPOSITION PATTERNS.
6. STABILIZATION METHODS SHALL BE CONDUCTED IN ACCORDANCE TO NJ SOIL AND EROSION SEDIMENT CONTROL MANUAL AND PER DESIGN DETAILS.
7. BANKFULL DISCHARGE IS 45 CFS FOR BLACK RIVER.
8. BASE FLOW IS 14 CFS FOR BLACK RIVER.
9. GEOSYNTHETIC CLAY LINER SHALL BE INSTALLED ACROSS THE THE STREAM BED AND BANKS UP TO BASE FLOW ELEVATION.
10. NATURAL BED MATERIAL COVERS THE BED AND BANKS UP TO BANKFULL ELEVATION.



NATURAL CHANNEL LINING SIZE DISTRIBUTION (mm)



SECTION VIEW



PLAN VIEW

NOTES:

1. WATERBARS AND BROAD-BASED DIPS SHALL DISCHARGE TO SEDIMENT REMOVAL FACILITY.
2. CLEAN ROCK SHALL CONFORM TO PERMITTING REQUIREMENTS.
3. FOLLOW PERMIT CONDITIONS REGARDING REMOVAL OF CROSSING.
4. PROVIDE 50' STABILIZED ACCESS TO CROSSING ON BOTH SIDES OF STREAM CHANNEL.
5. PIPES SHALL EXTEND BEYOND THE TOE OF THE ROADWAY.
6. RUNOFF FROM THE ROADWAY SHALL BE DIVERTED OFF THE ROADWAY AND INTO A SEDIMENT REMOVAL BMP (COMPOST FILTER SOCK) BEFORE IT REACHES THE ROCK APPROACH TO THE CROSSING.

MAINTENANCE

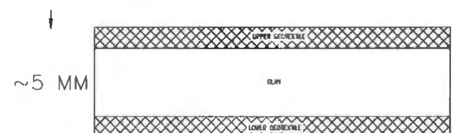
1. TEMPORARY STREAM CROSSINGS SHALL BE INSPECTED ON A DAILY BASIS.
2. DAMAGED CROSSINGS SHALL BE REPAIRED WITHIN 24 HOURS OF THE INSPECTION AND BEFORE ANY SUBSEQUENT USE.
3. SEDIMENT DEPOSITS ON THE CROSSING OR ITS APPROACHES SHALL BE REMOVED WITHIN 24 HOURS OF THE INSPECTION.

AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED, IT SHALL BE REMOVED. ALL MATERIALS SHALL BE DISPOSED OF PROPERLY AND DISTURBED AREAS STABILIZED.

CULVERT SCHEDULE					
CROSSING I.D.	QTY	SIZE 'D' (IN)	MAT'L TYPE	SEPARATION 'F' (FT)	COVER (FT)
1	4	18	HDPE	1.5	1.5
2	4	18	HDPE	1.5	1.5

TEMPORARY STREAM CROSSING / ACCESS ROAD CROSSING

N.T.S.



GCL CROSS SECTION

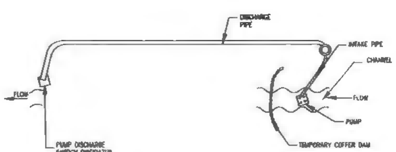
NOTES:
1. GCL MAY BE CLAY BOUND WITH ADHESIVE TO UPPER AND LOWER GEOTEXTILES, CLAY STITCHBONDED BETWEEN UPPER AND LOWER GEOTEXTILES, OR CLAY NEEDLEPUNCHED THROUGH UPPER AND LOWER GEOTEXTILES.
2. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
3. UPSTREAM EDGE MUST BE ADEQUATELY TOED IN.

GEOSYNTHETIC CLAY LINER (GCL)

N.T.S.

NOTES:
A FILTER BAG IS REQUIRED TO BE INSTALLED PRIOR TO THE PUMPING OF ANY SEDIMENT-LADEN WATER.

PUMPING EQUIPMENT AND FILTER BAGS ARE TO BE SIZED APPROPRIATELY TO HANDLE ANTICIPATED FLOWS.



TEMPORARY BYPASS (PUMP-AROUND)

N.T.S.

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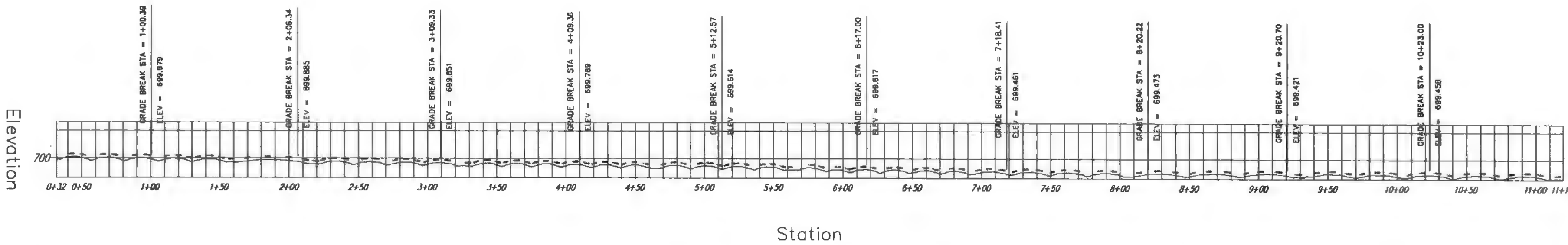
FINAL PLANS
BLACK RIVER RESTORATION
CONSTRUCTION DETAILS

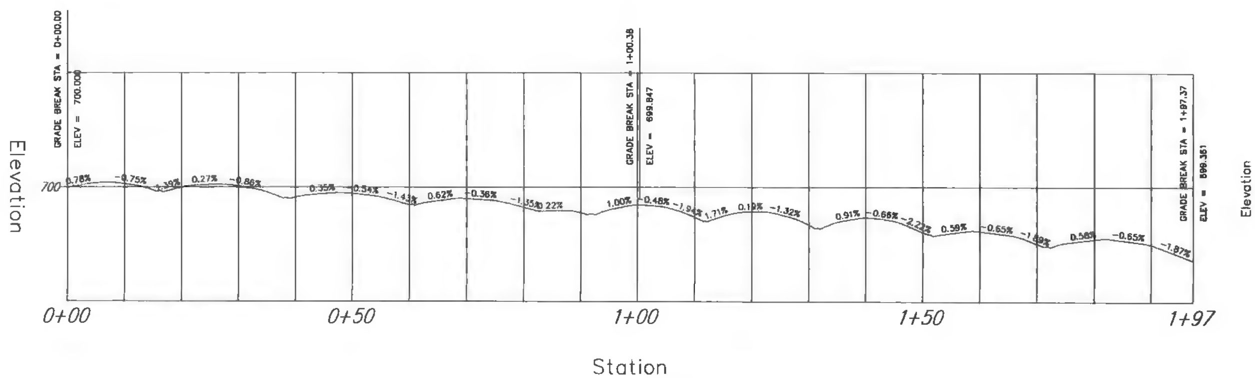
COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847

JOB:	BLACK RIVER RESTORATION
	MINE HILL & ROXBURY TWP
	MORRIS
	NJ
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C104
PROJECT:	NJ1954-01
SHEET:	5 OF 11

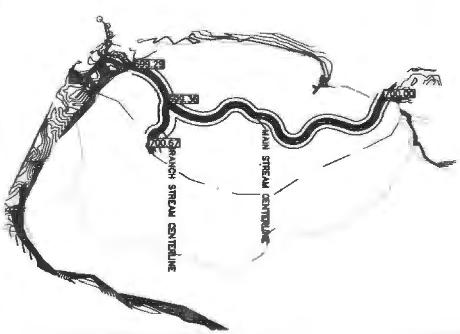
PROJECT TITLE: BLACK RIVER RESTORATION



PROFILE VIEW OF MAIN STREAM
SC: 1"=35' VERTICAL EXAGGERATION: 20



PROFILE VIEW OF BRANCH STREAM
SC: 1"=10' VERTICAL EXAGGERATION: 20



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FINAL PLANS
BLACK RIVER RESTORATION
PROFILES - 2

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847
JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

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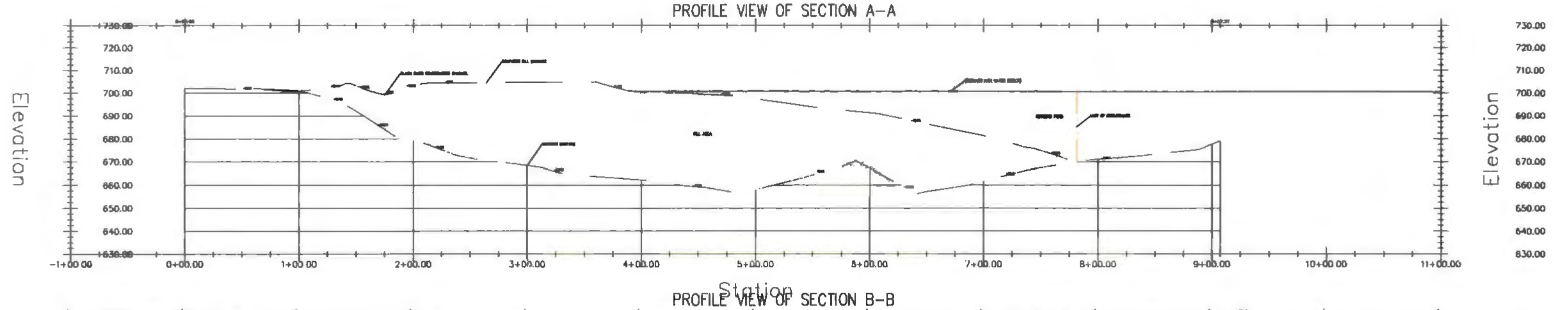
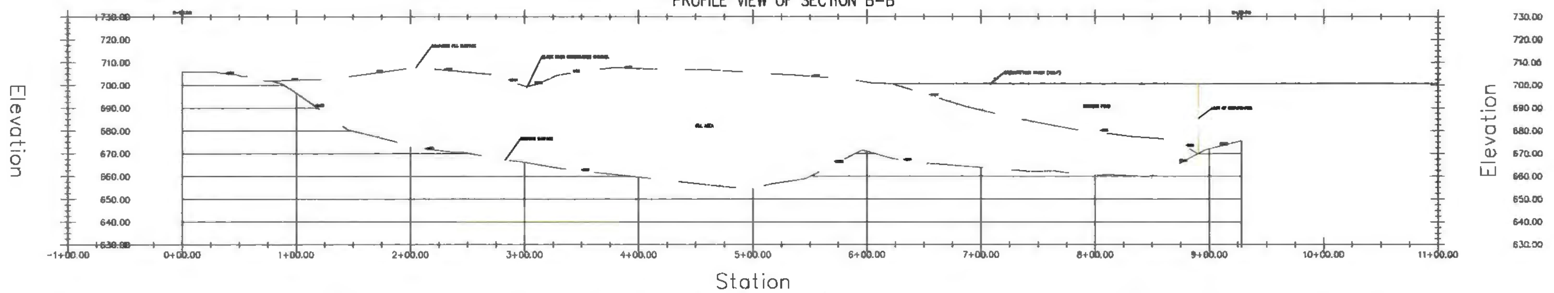
DRAWING:	C105
PROJECT:	NJ1954-01
SHEET:	6 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION

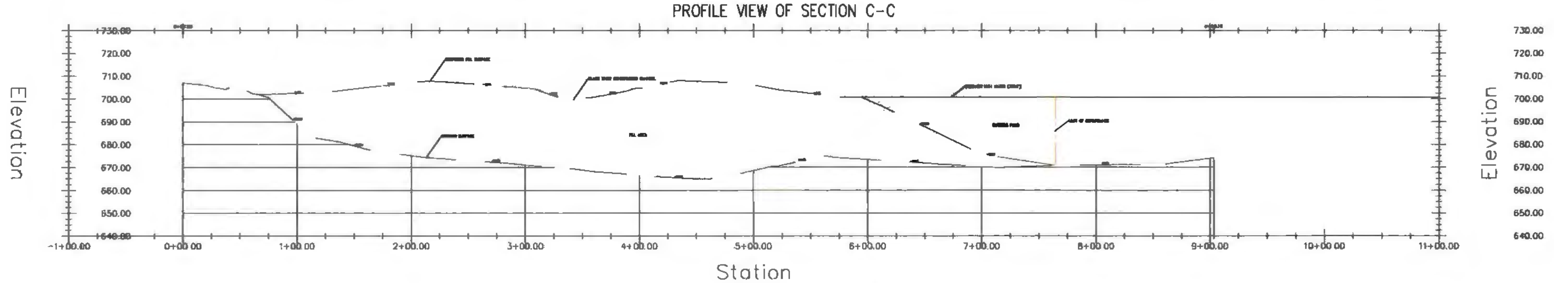
PROFILE VIEW OF SECTION A-A



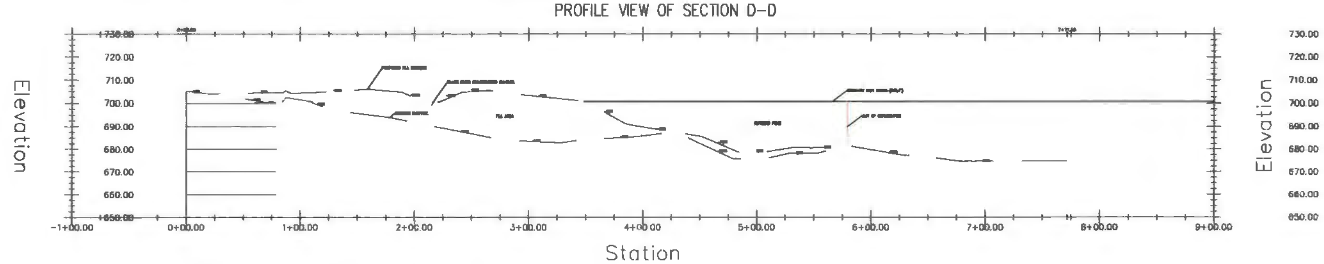
PROFILE VIEW OF SECTION B-B

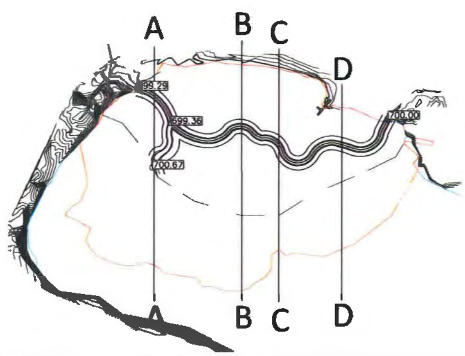


PROFILE VIEW OF SECTION C-C



PROFILE VIEW OF SECTION D-D





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FINAL PLANS
BLACK RIVER RESTORATION
PROFILES - 2

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847

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MORRIS, NJ	
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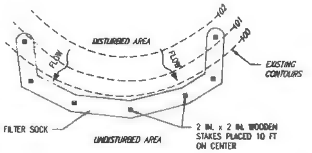
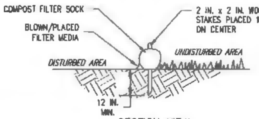
DRAWING:	C106
PROJECT:	NJ1954-01
SHEET:	7 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



PLAN VIEW



SECTION VIEW

INSTALLATION NOTES:

1) SILT SOCKS SHALL BE 18"
2) A SILT SOCK SHALL BE INSTALLED ALONG THE SLOPE CONTOUR WITHIN 2 FEET OF THE WATER EDGE FOR ANY AREA ALONG A NEWLY CREATED SHORELINE THAT WILL NOT BE DIRECTLY ADDED TO WITHIN THREE (3) DAYS OF PLACEMENT.
3) SILT SOCKS SHALL BE PLACED IN THE EXCAVATED CONSTRUCTED CHANNEL BEFORE FINAL STABILIZATION IS ACHIEVED TO MINIMIZE TRANSPORT OF SEDIMENTS ALONG THE CHANNEL LENGTH, AS DEPICTED ON THE E&SC PLAN SHEET. THESE MAY BE REMOVED AS THE NATURAL CHANNEL LINING IS INSTALLED.

COMPOST SOCK MATERIAL SPECIFICATIONS (4.1)

FABRIC TYPE	MATERIAL	MATERIAL CHARACTERISTICS	SOCK DIAMETERS	MESH OPENING	TENSILE STRENGTH	ULTRAVIOLET STABILITY	MINIMUM LONGEVITY
TYPE I	3 mil HDPE	PHOTO-DEGRADEABLE	12", 18"	3/8"	–	23% at 1000 HR	6 MONTHS
TYPE II	5 mil HDPE	PHOTO-DEGRADEABLE	12", 18", 24", 32"	3/8"	26 PSI	23% at 1000 HR	9 MONTHS
TYPE III	5 mil HDPE	BIO-DEGRADABLE	12", 18", 24", 32"	3/8"	26 PSI	–	6 MONTHS
TYPE IV	MULTI-FILAMENT POLYPROPYLENE (MFPP)	PHOTO-DEGRADEABLE	12", 18", 24", 32"	3/8"	44 PSI	100% at 1000 HR	1 YEAR
TYPE V	HEAVY DUTY MFPP	PHOTO-DEGRADEABLE	12", 18", 24", 32"	1/8"	202 PSI	100% at 1000 HR	2 YEARS

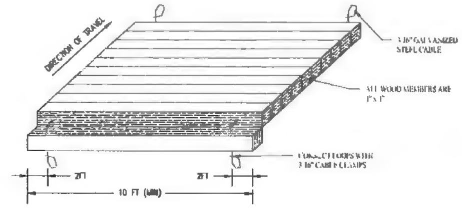
NOTES:

1. SOCK FABRIC AND COMPOST SHALL MEET STANDARDS OF THE CONSERVATION DISTRICT AND NJDEP.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST STANDARDS (4.2)	
ORGANIC MATTER CONTENT	25%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 – 8.5
MOISTURE CONTENT	30% – 60%
PARTICLE SIZE	30%-50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS/m (mmhos/cm) MAXIMUM

COMPOST FILTER SOCK

N.T.S.



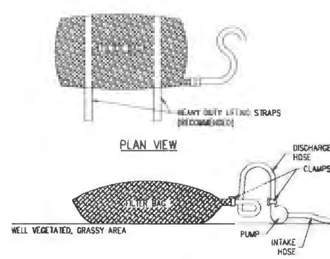
NOTES:

1. USE WOOD MATS ON WETLAND SOILS OR EXISTING ROAD BEDS. THE SURFACE SHOULD BE FLAT AND FREE OF HIGH SPOTS (E.G. STUMPS AND LARGE ROCKS).
2. INSTALL MATS ON TOP OF NONWOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
3. USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
4. IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS.
5. UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.

MAINTENANCE: INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS.

WETLAND MATS

N.T.S.



ELEVATION VIEW

NOTES:

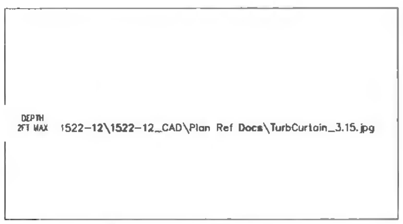
- LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
- NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

PUMPED WATER FILTER BAG (FOR E&S CONTROL)

N.T.S.



NOTES:

1. INSTALL CURTAIN IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
2. BOTH ENDS OF THE CURTAIN SHOULD BE SECURELY ANCHORED TO THE SHORELINE.
3. BARRIER MATERIAL WILL BE A POLYETHYLENE PLASTIC SHEET, 10 MIL., OR SUITABLE ALTERNATIVE.
4. ROPE WILL BE ½" NYLON OR MANILA.
5. BARRIER WILL EXTEND PARALLEL TO THE DISTURBED SHORELINE FOR THE FULL LENGTH OF THE WORK AREA.
6. BARRIER WILL EXTEND ACROSS THE ENTIRE CHANNEL WHEN WORK IS PERFORMED WITHIN THE CHANNEL

DESIGN CONSIDERATIONS:

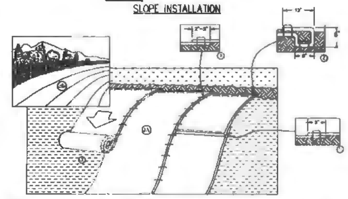
1. FOR PONDS AND OTHER RELATIVELY STILL WATER BODIES, THE FABRIC SHOULD BE RELATIVELY IMPERMEABLE SO AS TO PROVIDE A BARRIER BETWEEN THE CLEAN WATER AND THE SEDIMENT-LADEN WATER. RUNOFF INTO THIS TYPE OF CURTAIN SHOULD BE MINIMIZED, DUE TO LIMITED AVAILABLE CAPACITY.
2. FOR MOVING WATER, SUCH AS IN LAKES AND STREAM CHANNELS, PROVISION SHOULD BE MADE TO ALLOW PASSAGE OF WATER THROUGH THE CURTAIN. THIS IS NORMALLY DONE BY CONSTRUCTING AT LEAST PART OF THE CURTAIN FROM A HEAVY FILTER FABRIC. WHILE SUCH CURTAINS ALLOW FOR SOME WATER MOVEMENT THROUGH THE CURTAIN, THE FLOW RATE IS LOW. THEREFORE, THESE CURTAINS SHOULD NOT BE INSTALLED ACROSS FLOWING WATERCOURSES. TURBIDITY BARRIERS PLACED IN STREAM CHANNELS SHOULD BE PLACED PARALLEL TO THE FLOW DIRECTION.
3. WHENEVER THE WATER BODY IS NOT SUBJECT TO TIDAL AND/OR WIND AND WAVE ACTION, THE CURTAIN SHOULD EXTEND THE ENTIRE DEPTH OF THE WATER AND REST ON (OR BE ANCHORED TO) THE BOTTOM. FAILURE TO MAINTAIN CONTACT WITH THE BOTTOM WILL ALLOW SEDIMENT TO MOVE UNDER THE CURTAIN. IT IS RECOMMENDED THAT THE HEIGHT OF THE CURTAIN BE 20% GREATER THAN THE DEPTH OF THE WATER TO ALLOW FOR FLUCTUATIONS.
4. WHEREVER THE WATER BODY IS SUBJECT TO SIGNIFICANT TIDE, WIND, OR WAVE ACTION, THE WEIGHTED BOTTOM OF THE CURTAIN SHOULD NOT EXTEND TO THE BOTTOM OF THE WATER BODY. WIND AND WAVE ACTION CAN CAUSE THE BOTTOM OF THE CURTAIN TO MOVE ALONG THE BOTTOM, STIRRING UP SEDIMENT. THEREFORE, A MINIMUM 1-FOOT GAP SHOULD BE PROVIDED BETWEEN THE BOTTOM OF THE CURTAIN AND THE BOTTOM OF THE WATER BODY AT MEAN LOW WATER
5. CURTAIN HEIGHTS BEYOND 12 FEET ARE GENERALLY NOT PRACTICAL. CURTAINS INSTALLED DEEPER THAN THIS ARE SUBJECT TO VERY LARGE LOADS WITH CONSEQUENT STRAIN ON CURTAIN MATERIALS AND THE ANCHORING SYSTEM.
6. THE OVERALL LENGTH OF THE CURTAIN SHOULD BE 10-20% GREATER THAN THE STRAIGHT-LINE MEASUREMENT OF THE PERIMETER TO FACILITATE INSTALLATION AND REDUCE STRESS CAUSED BY WIND AND/OR WAVES.
7. BOTH ENDS OF THE CURTAIN SHOULD BE SECURELY ANCHORED TO THE SHORELINE
8. AN EXCESSIVE NUMBER OF JOINTS SHOULD BE AVOIDED. A MINIMUM CONTINUOUS SPAN OF 50 FEET BETWEEN JOINTS IS RECOMMENDED. FOR STABILITY PURPOSES, THE MAXIMUM SPAN BETWEEN JOINTS SHOULD BE 100 FEET.
9. FOR APPLICATIONS WHERE IT IS DESIRABLE FOR WATER TO PASS THROUGH THE CURTAIN (E.G. WHEN USED INSTEAD OF A BAFFLE IN A SEDIMENT BASIN), A CURTAIN WITH ONE OR MORE PANELS OF SCREEN FABRIC SHOULD BE USED. IN THIS APPLICATION, THE CURTAIN MAY REMAIN IN PLACE OVER WINTER MONTHS.

TURBIDITY CURTAIN

N.T.S.

NORTH AMERICAN GREEN

SLOPE INSTALLATION



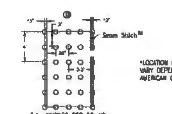
NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5cm-12.5cm) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5cm) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30cm) APART ACROSS ENTIRE BLANKET WIDTH.

NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL MATTING

N.T.S. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SEQUENCE OF CONSTRUCTION.



*LOCATION OF SEAM STITCH WILL VARY DEPENDING ON NORTH AMERICAN GREEN PRODUCT TYPE.

NORTH AMERICAN GREEN

NOTES:

1. BLANKETS WITH THE OPTIONAL NORTH AMERICAN GREEN DOT SYSTEM PLACE STAPLES/STAKES THROUGH EACH OF THE WHITE COLORED DOTS.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
3. APPROX. 8" SEAM OVERLAP FOR DANDY EROSION CONTROL BLANKETS

EROSION CONTROL MATTING STAPLE PATTERN

N.T.S.

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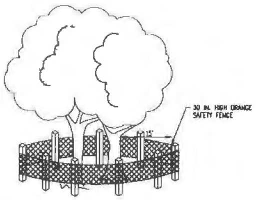

NOTES:
1. TREE PROTECTION FENCE TO BE LOCATED AT THE EDGE OF DRIPLINE (TO BE VERIFIED BY PROJECT MANAGER).
2. BOARDS SHALL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
3. ANY TREES NOT SCHEDULED TO BE REMOVED THAT ARE IRREPARABLY DAMAGED DURING CONSTRUCTION OR DIE WITHIN 18 MONTHS OF COMPLETION OF CONSTRUCTION SHALL BE REPLACED IN ACCORDANCE WITH THE PROVISIONS OF TOWNSHIP ORDINANCE

TREE PROTECTION FENCE

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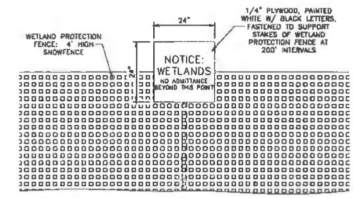

WETLAND PROTECTION SIGNAGE DETAIL

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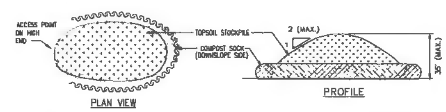
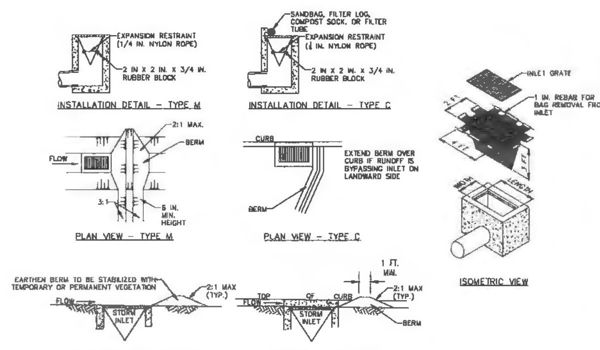


COMPOST SOCK MUST BE PLACED AROUND THE PERIMETER OF ALL STOCKPILES. IMMEDIATELY APPLY TEMPORARY SEEDING TO ALL STOCKPILES WHICH WILL BE IN PLACE FOR 20 DAYS OR MORE.

TEMPORARY TOPSOIL STOCKPILE

N.T.S.



MAINTENANCE:
1. MAXIMUM DRAINAGE AREA = 1/2 ACRE
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLETS TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS NOT LOCATED AT A LOW POINT.
3. EARTHEN BERM SHALL BE INSTALLED & MAINTAINED IN LIEU OF ASPHALT BERMS UNTIL ROADWAY IS STONED. 6" MINIMUM HEIGHT ASPHALT BERM TO BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LB, BURST STRENGTH OF 200 PSI, AND TRAPEZOIDAL TEAR STRENGTH OF 50 LB. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A #40 SIEVE.
5. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET.
6. DAMAGED OR CLOGGED BAGS SHALL BE REPAIRED OR REPLACED IMMEDIATELY UPON INSPECTION. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.
7. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

FILTER BAG INLET PROTECTION DETAIL (TYPE C & TYPE M)

NTS

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FINAL PLANS
BLACK RIVER RESTORATION
E&SC DETAILS 2

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847

JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

PIN:	SEE COVER SHEET
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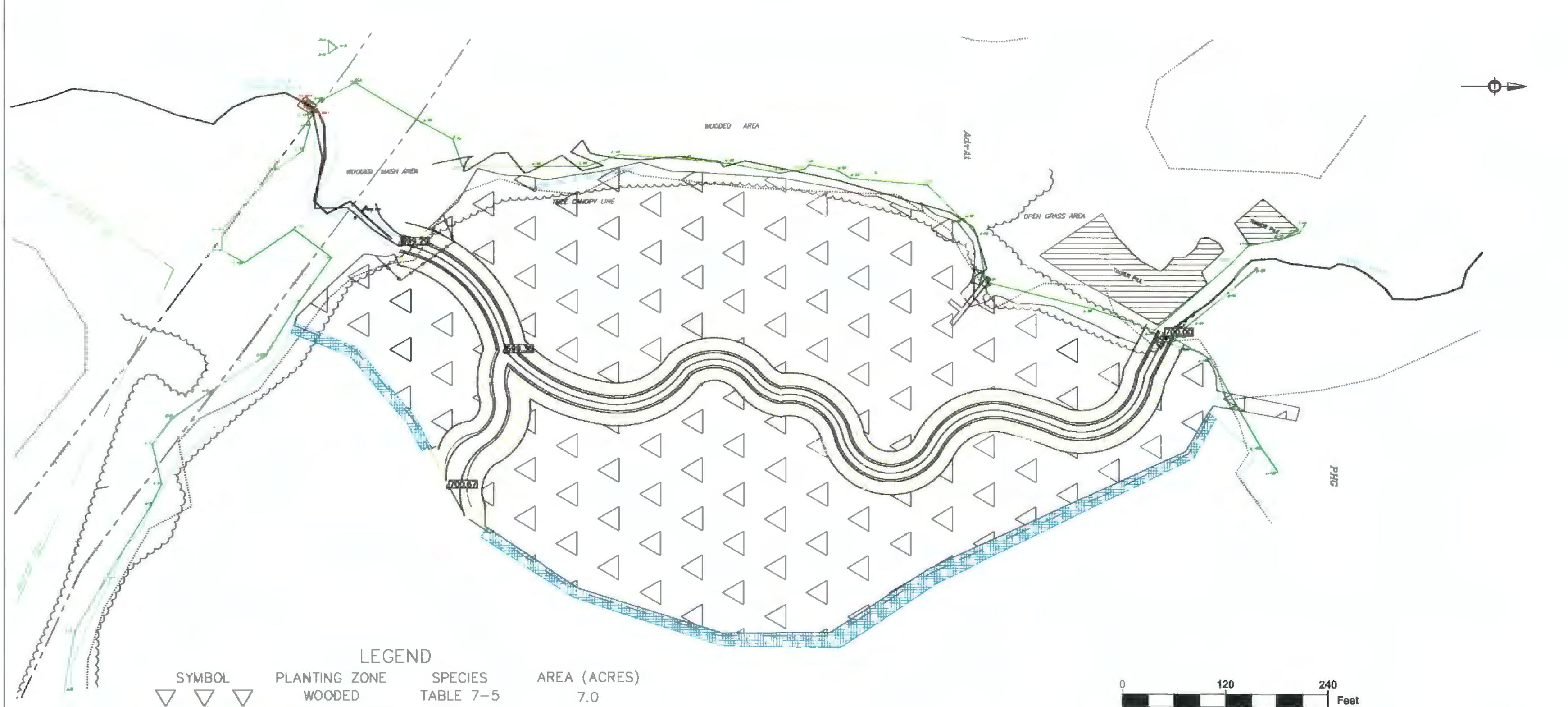
DRAWN BY	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C108
PROJECT:	NJ1954-01
SHEET:	9 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



LEGEND

SYMBOL	PLANTING ZONE	SPECIES	AREA (ACRES)
▽ ▽ ▽	WOODED	TABLE 7-5	7.0
	CHANNEL BANKS	TABLE 7-7	1.1
	POND SHORE	TABLE 7-3	0.4

Table 7-3: Common Emergent Wetland Plant Species Used for Stormwater Wetlands and on Aquatic Benches of Stormwater Ponds

Common Name	Scientific Name	Inundation Tolerance
Arrow arum	Peltandra virginica	up to 12"
Arrowhead/Duck potato	Sagittaria latifolia	up to 12"
Pickerelweed	Pontederia cordata	[illegible] to 12"
Blunt spike rush	Eleocharis obtusa	up to [illegible]
Bushy beardgrass	Andropogon glomeratus	up to 3"
Common three-square	Scirpus pungens	up to 6"
Iris (Blue flag)	Iris versicolor	up to 6"
Marsh hibiscus	Hibiscus moscheutos	up to 3"
Spatterdock	Nuphar luteum	up to 18"
Sedges	Carex spp.	up to 6"
Soft rush	Juncus effusus	up to [illegible]
Switchgrass	Panicum virgatum	up to [illegible]

Note 1: Inundation tolerance is maximum inches below the normal pool. Most plants prefer shallower depths than the maximum indicated.

Note 2: For additional plant options, consult the stormwater planting list in Section 5. Other good sources include the NRCS Standards for Soil Erosion and Sediment Control in New Jersey, Design of Stormwater Wetland Systems (Schueler 1992), and Wetland Planting Guide for the Northeastern United States (Thunhorst 1993).

Table 7-5: Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
Acer rubrum Red maple	*Clethra alnifolia* Sweet pepperbush	*Andropogon glomeratus* Lowland broomsedge
Betula nigra River birch	*Ilex verticillata* Winterberry	*Eupatorium purpureum* Sweet-scented Joe Pye weed
Juniperus virginiana Eastern red cedar	*Cephalanthus occidentalis* Buttonbush	*Scirpus pungens* Three square bulrush
Chionanthus virginicus Fringe-tree	*Hamamelis virginiana* Witch hazel	*Iris versicolor* Blue flag
Nyssa sylvatica Black gum	*Vaccinium corymbosum* Highbush blueberry	*Lobelia cardinalis* Cardinal flower
Diospyros virginiana Persimmon	*Ilex glabra* Inkberry	*Panicum virgatum* Switchgrass
Platanus occidentalis Sycamore	*Ilex verticillata* Winterberry	*Dichanthelium clandestinium* Deertongue
Quercus palustris Pin oak	*Viburnum dentatum* Arrowwood	*Rudbeckia lachiniata* Cutleaf coneflower
Quercus phellos Willow oak	*Lindera benzoin* Spicebush	*Scirpus cyperinus* Woolgrass
Salix nigra Black willow	*Morella pennsylvanica* Bayberry	*Vernonia noveboracensis* New York ironweed

Note: For more plant section options for bioretention, consult Design Manual for Use of Bioretention in Stormwater Management (ETA&B 1993) or Design of Stormwater Filtering Systems (Claytor and Schueler 1997).

Table 7-7: Common Grass Species for Open Channels

Common Name	Scientific Name	Notes
Alkali saltgrass	Puccinellia distans	Cool, good for wet, saline swales
Fowl bluegrass	Poa palustris	Cool, good for wet swales
Canada bluejoint	Calamagrostis canadensis	Cool, good for wet swales
Creeping bentgrass	Agrostis palustris	Cool, good for wet swales, salt tolerant
Red fescue	Festuca rubra	Cool, not for wet swales
Redtop	Agrostis gigantea	Cool, good for wet swales
Rough bluegrass	Poa trivialis	Cool, good for wet, shady swales
Switchgrass	Panicum virgatum	Warm, good for wet swales, some salt tolerance
Wildrye	Elymus virginicus/riparius	Cool, good for shady, wet swales

Notes: These grasses are sod forming and can withstand frequent inundation, and are ideal for the swale or grass channel environment. A few are also salt-tolerant. Cool refers to cool season grasses that grow during the cooler temperatures of spring and fall. Warm refers to warm season grasses that grow most vigorously during the hot, mid-summer months.

Where possible, one or more of these grasses should be in the seed mixes. For a more thorough listing of seed mixes see Table 7-8 in Part 5 or consult the Standards for Soil Erosion and Sediment Control in New Jersey.

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LANDSCAPING PLAN

COUNTY CONCRETE CORPORATION
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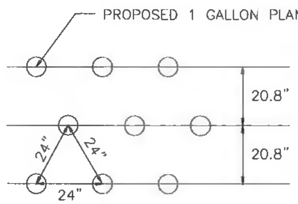
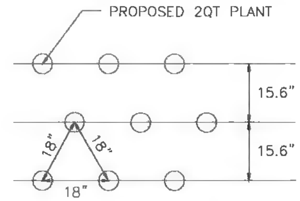


PERENNIAL PLANT SPACING DETAIL
NOT TO SCALE



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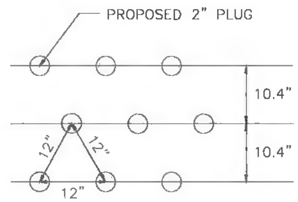

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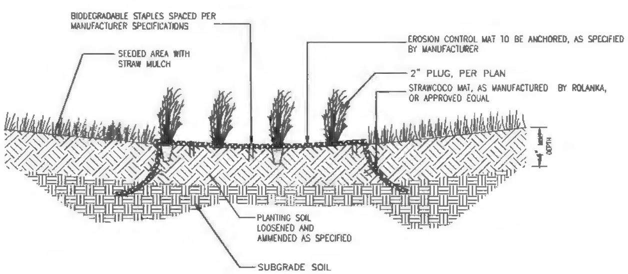

PLUG PLANTING DETAIL
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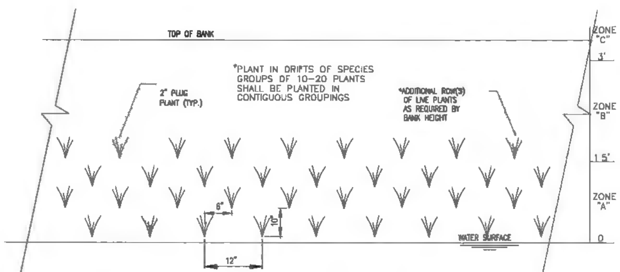
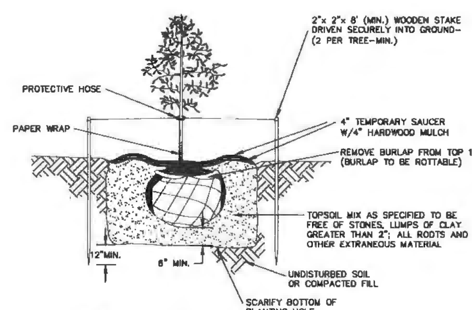


TYPICAL BANK PLANTINGS
NOT TO SCALE

PLANTING ZONES:
ZONE A: 0'-1.5' ABOVE WATER SURFACE
ZONE B: 1.5'-3' ABOVE WATER SURFACE
ZONE C: 3+' ABOVE WATER SURFACE



NOTES:

1. REMOVE DEAD AND DAMAGED BRANCHES BY PRUNING ACCORDING TO RECOGNIZED HORTICULTURAL PRACTICES. DO NOT CUT LEADER.
2. ENCASE NON-CORRODIBLE CABLE IN REINFORCED RUBBER GARDEN HOSE AT POINTS OF CONTACT WITH TRUNK OF TREE. FLAG EACH GUY CABLE WITH FLUOURESCENT MATERIAL FOR SAFETY.

TREE PLANTING DETAIL
NOT TO SCALE

RIPARIAN SEEDING NOTES:

AREAS ALONG SHORELINE AND PROPOSED CHANNELS (15' FROM EDGES OF TOP OF BANK AND SHORELINE) SHALL BE SEEDED WITH THE FOLLOWING NATIVE SEED MIX: (OR APPROVED EQUAL)

"FLOODPLAIN MIX" IS A MIXTURE OF GRASSES AND WILDFLOWERS WHICH ARE NATIVE TO THE MID-ATLANTIC REGION, INCLUDING THE FOLLOWING SPECIES: VIRGINIA WILDRYE, DEERTOUNGE, ASTER, INDIANGRASS, AND SWAMP MILKWEED

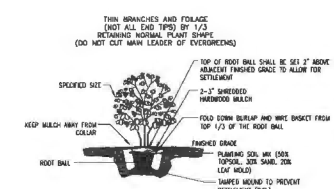
"FLOODPLAIN MIX" SHOULD BE SEEDED AT A RATE OF 20LBS./ACRE WITH COVER CROP OF GRAIN RYE AT 30LBS./ACRE.

"FLOODPLAIN MIX" IS AVAILABLE THROUGH:

ERNST SEEDS
8884 MERCER PIKE
MEADVILLE, PA 16335
(800) 873-3321

RIPARIAN CORRIDOR MAINTENANCE SCHEDULE

NEWLY SEEDED GRASSES AND POND EDGE:	YEAR 1	YEAR 2	YEAR 3	YEARS 4 PLUS
INSPECT FOR INVASIVE/WEED SPECIES. IF WEED SPECIES APPEAR IN THE SEEDED AREA, SPOT TREAT BY PULLING.	X			
PRUNING, RESEEDING, THATCH REMOVAL OF VEGETATED AREAS, AS NEEDED	X	X	X	
PEST CONTROL, AS NEEDED	X	X	X	
NEWLY PLANTED TREES & SHRUBS:				
MONITOR WEATHER CONDITIONS AND PROVIDE SUPPLEMENTAL WATERING, IF NEEDED. NATURALISTIC PRUNING OF DEAD/DAMAGED BRANCHES IN LATE FALL OR EARLY SPRING.	X			
REMOVE STAKES, IF UTILIZED. CHECK TREE BARK PROTECTION AND REPAIR/ REPLACE AS NEEDED. REPLACE DEAD PLANT MATERIAL. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.		X		
CHECK TREE BARK PROTECTION AND REPAIR/ REPLACE AS NEEDED. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.			X	X
VEGETATED AREAS:				
INSPECT FOR INVASIVE/WEED SPECIES. PHYSICALLY REMOVE OR SPOT TREAT INVASIVE SPECIES. PRUNE POTENTIALLY HAZARDOUS BRANCHES FROM EXISTING PLANT MATERIAL.	X	X	X	X



SHRUB PLANTING AND
SHRUB BED PREPARATION
NOT TO SCALE

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FINAL PLANS
BLACK RIVER RESTORATION
LANDSCAPING DETAILS

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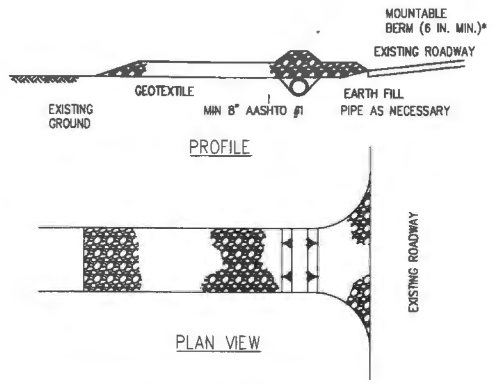
PROJECT TITLE: BLACK RIVER RESTORATION



* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:
REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.

RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.

MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF OITCH BEING CROSSED.

MAINTENANCE:
ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.

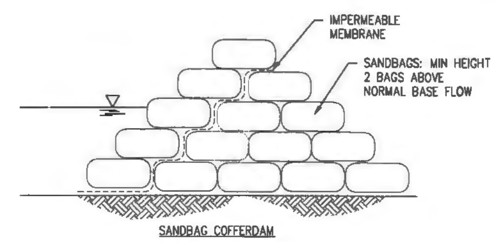
ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK.

WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK CONSTRUCTION ENTRANCE
N.T.S.

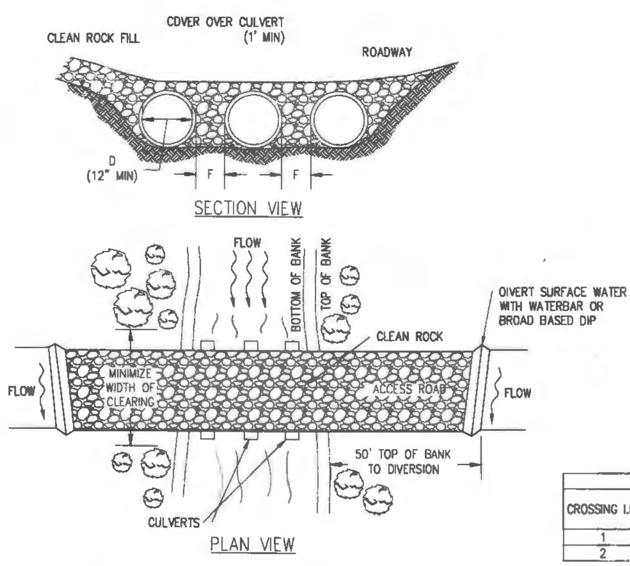
COFFER DAM SCHEDULE

I.D.	LENGTH (FT)	MIN. TOP BARRIER	RECOMMENDED TYPE
1	15	2.98	SANDBAGS
2	15	2.98	SANDBAGS
3	30	2.98	SANDBAGS
4	30	2.98	SANDBAGS



NOTES:
1. COFFERDAMS SHALL BE INSTALLED BY DIVERS OR QUALIFIED PERSONNEL TO ASSURE PROPER FUNCTIONALITY.
2. COFFERDAMS SHALL BE INSTALLED VIA WATERWAY ACCESS ONLY AND TIED INTO THE IMMEDIATE EMBANKMENT.
3. OTHER APPROVED EQUAL COFFERDAM SYSTEMS MAY BE USED ONCE APPROVED BY THE OWNER, ENGINEER AND NJDEP, OR OTHER JURISDICTIONAL AGENCIES, AS REQUIRED.

COFFER DAM DETAILS
N.T.S.



NOTES:

1. WATERBARS AND BROAD-BASED DIPS SHALL DISCHARGE TD SEDIMENT REMOVAL FACILITY.
2. CLEAN ROCK SHALL CONFORM TO PERMITTING REQUIREMENTS.
3. FOLLOW PERMIT CONDITIONS REGARDING REMOVAL OF CROSSING.
4. PROVIDE 50' STABILIZED ACCESS TO CROSSING ON BOTH SIDES OF STREAM CHANNEL.
5. PIPES SHALL EXTEND BEYOND THE TOE OF THE ROADWAY.
6. RUNOFF FROM THE ROADWAY SHALL BE DIVERTED OFF THE ROADWAY AND INTO A SEDIMENT REMOVAL BMP (COMPOST FILTER SOCK) BEFORE IT REACHES THE ROCK APPROACH TO THE CROSSING.

MAINTENANCE

1. TEMPORARY STREAM CROSSINGS SHALL BE INSPECTED ON A DAILY BASIS.
2. DAMAGED CROSSINGS SHALL BE REPAIRED WITHIN 24 HOURS OF THE INSPECTION AND BEFORE ANY SUBSEQUENT USE.
3. SEDIMENT DEPOSITS ON THE CROSSING OR ITS APPROACHES SHALL BE REMOVED WITHIN 24 HOURS OF THE INSPECTION.

AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED, IT SHALL BE REMOVED. ALL MATERIALS SHALL BE DISPOSED OF PRDPERLY AND DISTURBED AREAS STABILIZED.

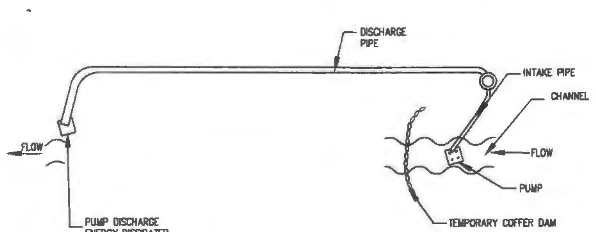
CULVERT SCHEDULE

CROSSING I.D.	QTY	SIZE 'D' (IN)	MAT'L TYPE	SEPARATION 'F' (FT)	COVER (FT)
1	4	18	HDPE	1.5	1.5
2	4	18	HDPE	1.5	1.5

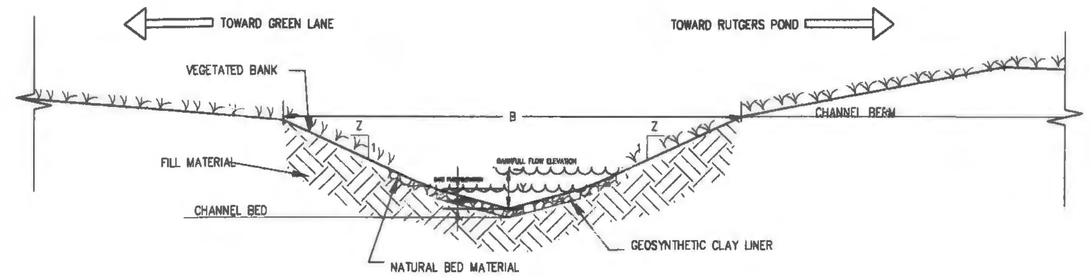
TEMPORARY STREAM CROSSING / ACCESS ROAD CROSSING
N.T.S.

NOTES:
A FILTER BAG IS REQUIRED TO BE INSTALLED PRIOR TO THE PUMPING OF ANY SEDIMENT-LADEN WATER.

PUMPING EQUIPMENT AND FILTER BAGS ARE TO BE SIZED APPROPRIATELY TO HANDLE ANTICIPATED FLOWS.



TEMPORARY BYPASS (PUMP-AROUND)
N.T.S.

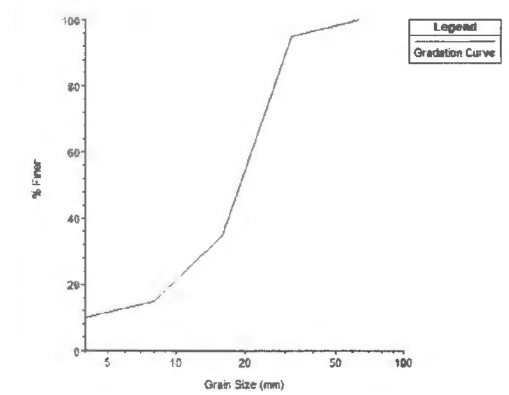


RESTORED CHANNEL CROSS SECTION
NTS

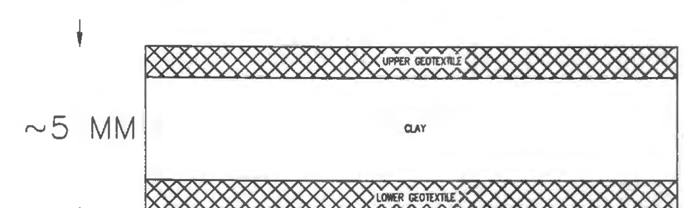
RESTORED CHANNEL

CHANNEL	TOP WIDTH (B)	BASE FLOW DEPTH (y)	BANKFULL FLOW DEPTH (Y)	SIDE SLOPE (Z)	LONGITUDINAL SLOPE (%)
BLACK RIVER	50'	1.7	2.3	5	0.06
BRANCH	50'	1.7	2.3	5	0.08

GENERAL NOTES:
1. THE RESTORED CHANNEL IS EXCAVATED THROUGH THE FILL MATERIAL.
2. MANNING'S AND CHANG'S EQUATIONS ALONG WITH HEC-RAS SIMULATION WERE EMPLOYED TO DESIGN THE CHANNEL.
3. A 2.5' OF FREE BOARD IS PROVIDED ABOVE BASE FLOW WATER POOL.
4. THE REPRESENTATIVE SIZE (d50) OF THE BED LAYER IS 0.8".
5. INSPECTION OF BED AND SIDEWALLS, PARTICULARLY AFTER INTENSE STORMS, SHALL BE CONDUCTED TO ASSESS POTENTIAL EROSION/DEPOSITION PATTERNS.
6. STABILIZATION METHODS SHALL BE CONDUCTED IN ACCORDANCE TO NJ SOIL AND EROSION SEDIMENT CONTROL MANUAL AND PER DESIGN DETAILS.
7. BANKFULL DISCHARGE IS 45 CFS FOR BLACK RIVER.
8. BASE FLOW IS 14 CFS FOR BLACK RIVER.
9. GEOSYNTHETIC CLAY LINER SHALL BE INSTALLED ACROSS THE THE STREAM BED AND BANKS UP TO BASE FLOW ELEVATION.
10. NATURAL BED MATERIAL COVERS THE BED AND BANKS UP TO BANKFULL ELEVATION.



NATURAL CHANNEL LINING SIZE DISTRIBUTION (mm)



GCL CROSS SECTION

NOTES:
1. GCL MAY BE CLAY BOUND WITH ADHESIVE TO UPPER AND LOWER GEOTEXTILES, CLAY STITCHBONDED BETWEEN UPPER AND LOWER GEOTEXTILES, OR CLAY NEEDLEPUNCHED THROUGH UPPER AND LOWER GEOTEXTILES.
2. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
3. UPSTREAM EDGE MUST BE ADEQUATELY TOED IN.

GEOSYNTHETIC CLAY LINER (GCL)
N.T.S.

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FINAL PLANS
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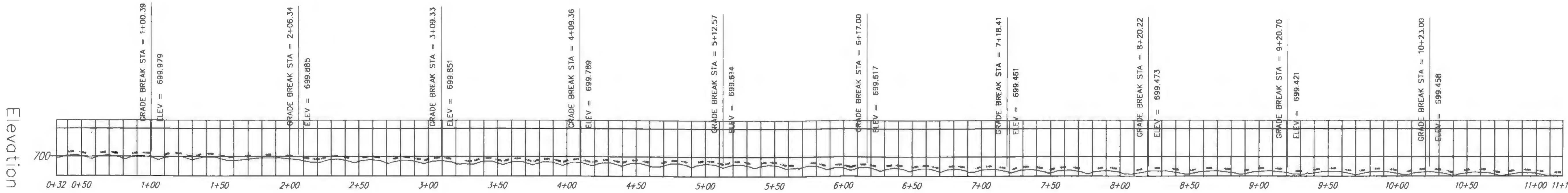
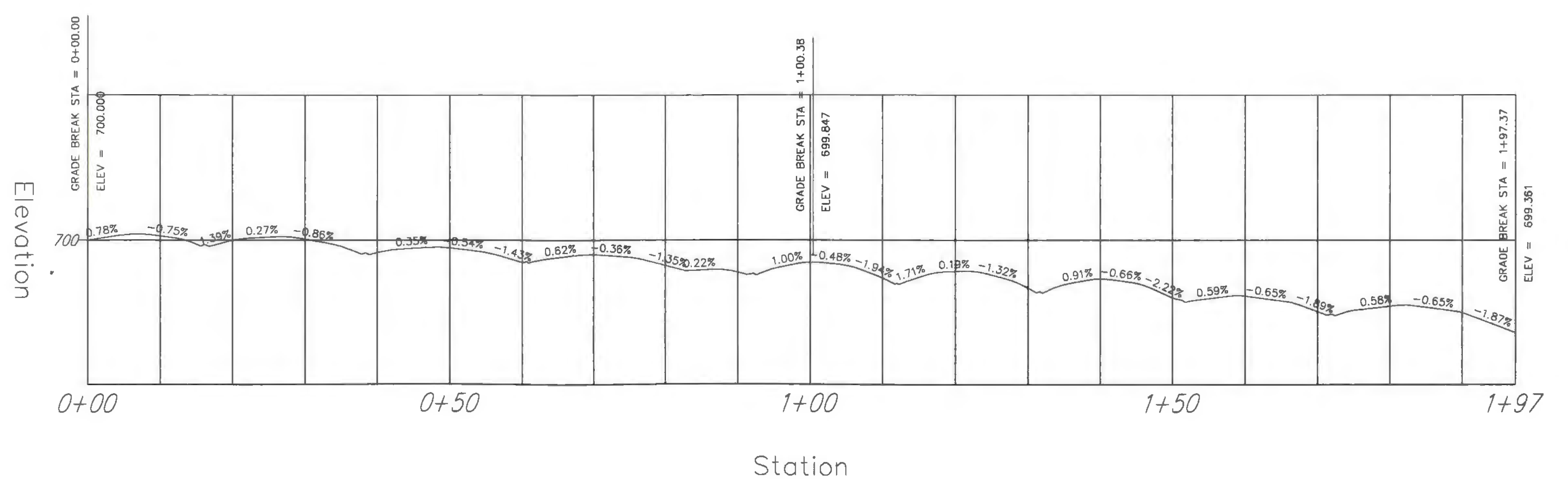
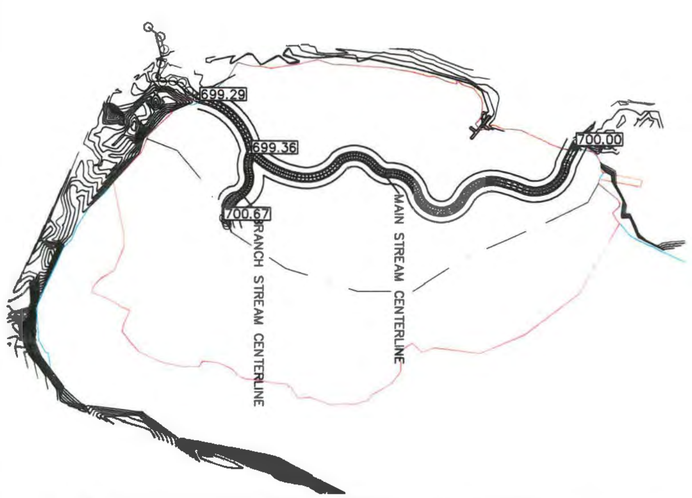


PROFILE VIEW OF MAIN STREAM
SC: 1"=35' VERTICAL EXAGGERATION: 20



PROFILE VIEW OF BRANCH STREAM
SC: 1"=10' VERTICAL EXAGGERATION: 20



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FINAL PLANS
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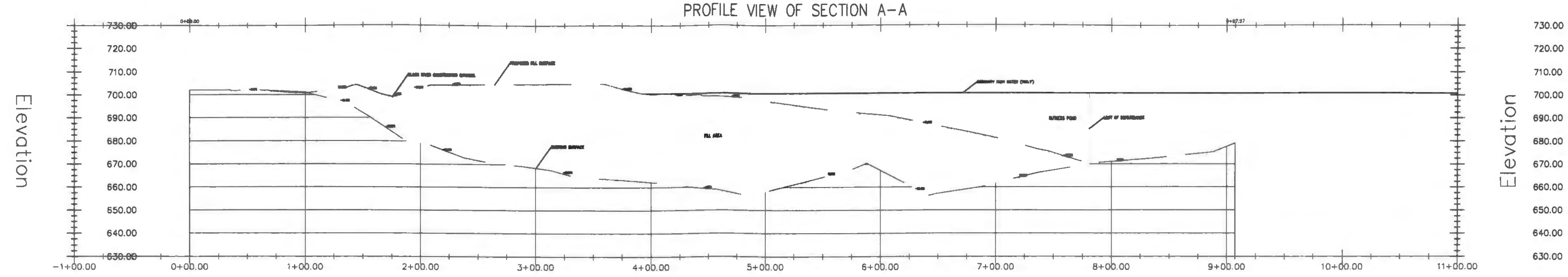
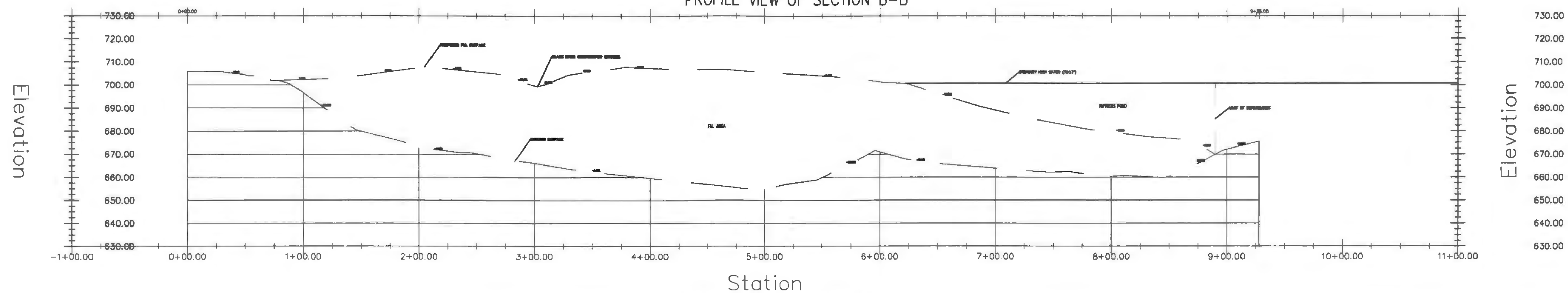
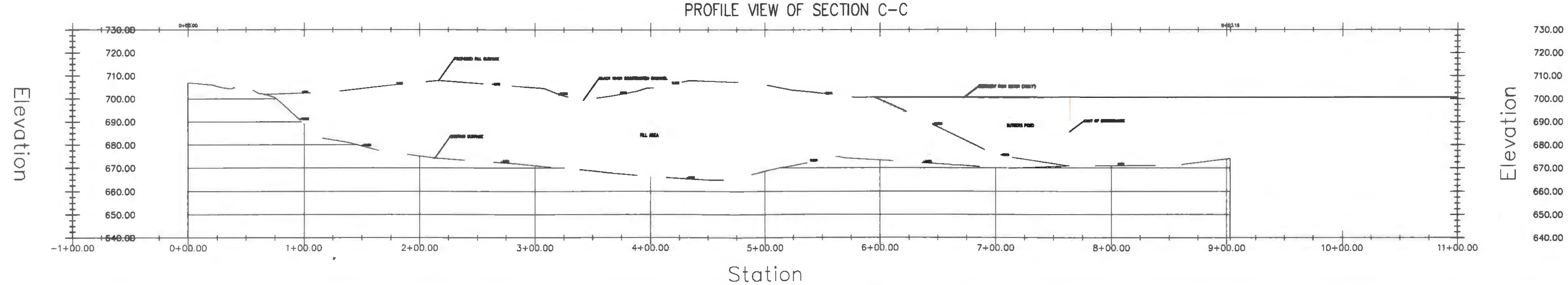
PROFILE VIEW OF SECTION A–A



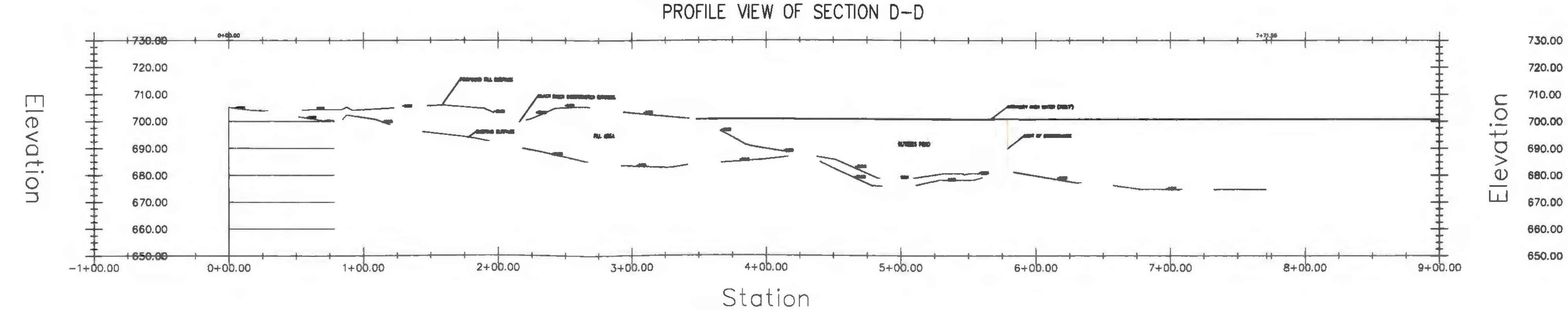
PROFILE VIEW OF SECTION B–B

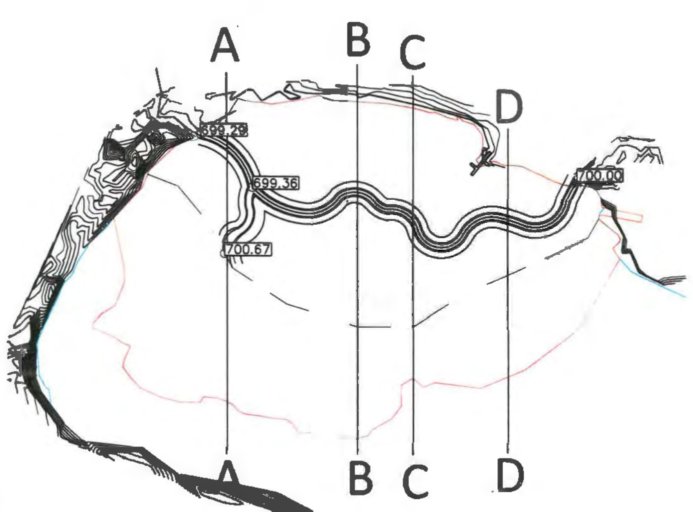


PROFILE VIEW OF SECTION C–C



PROFILE VIEW OF SECTION D–D





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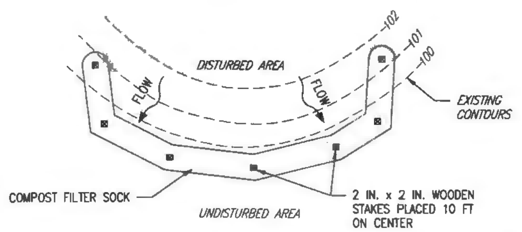
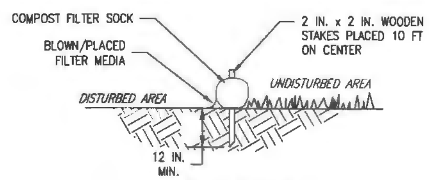
JOB:	BLACK RIVER RESTORATION
	MINE HILL & ROXBURY TWP
	MORRIS
	NJ
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C106
PROJECT:	NJ1954-01
SHEET:	7 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



PLAN VIEW



SECTION VIEW

INSTALLATION NOTES:

1) SILT SOCKS SHALL BE 18"
2) A SILT SOCK SHALL BE INSTALLED ALONG THE SLOPE CONTOUR WITHIN 2 FEET OF THE WATER EDGE FOR ANY AREA ALONG A NEWLY CREATED SHORELINE THAT WILL NOT BE DIRECTLY ADDED TO WITHIN THREE (3) DAYS OF PLACEMENT.
3) SILT SOCKS SHALL BE PLACED IN THE EXCAVATED CONSTRUCTED CHANNEL BEFORE FINAL STABILIZATION IS ACHIEVED TO MINIMIZE TRANSPORT OF SEDIMENTS ALONG THE CHANNEL LENGTH, AS DEPICTED ON THE E&SC PLAN SHEET. THESE MAY BE REMOVED AS THE NATURAL CHANNEL LINING IS INSTALLED.

COMPOST SOCK MATERIAL SPECIFICATIONS (4.1)

FABRIC TYPE	MATERIAL	MATERIAL CHARACTERISTICS	SOCK DIAMETERS	MESH OPENING	TENSILE STRENGTH	ULTRAVIOLET STABILITY	MINIMUM LONGEVITY
TYPE I	3 mil HDPE	PHOTO-DEGRADEABLE	12", 18"	3/8"	–	23% at 1000 HR	6 MONTHS
TYPE II	5 mil HDPE	PHOTO-DEGRADEABLE	12", 18", 24", 32"	3/8"	26 PSI	23% at 1000 HR	9 MONTHS
TYPE III	5 mil HDPE	BIO-DEGRADABLE	12", 18", 24", 32"	3/8"	26 PSI	–	6 MONTHS
TYPE IV	MULTI-FILAMENT POLYPROPYLENE (MFPP)	PHOTO-DEGRADEABLE	12", 18", 24", 32"	3/8"	44 PSI	100% at 1000 HR	1 YEAR
TYPE V	HEAVY DUTY MFPP	PHOTO-DEGRADEABLE	12", 18", 24", 32"	1/8"	202 PSI	100% at 1000 HR	2 YEARS

NOTES:

1. SOCK FABRIC AND COMPOST SHALL MEET STANDARDS OF THE CONSERVATION DISTRICT AND NJDEP.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST STANDARDS (4.2)	
ORGANIC MATTER CONTENT	25%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 – 8.5
MOISTURE CONTENT	30% – 60%
PARTICLE SIZE	30%-50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS/m (mmhos/cm) MAXIMUM

COMPOST FILTER SOCK

N.T.S.

DEPTH
2FT MAX 1522-12\1522-12_CAD\Plan Ref Dacs\TurbCurtain_3.15.jpg

NOTES:

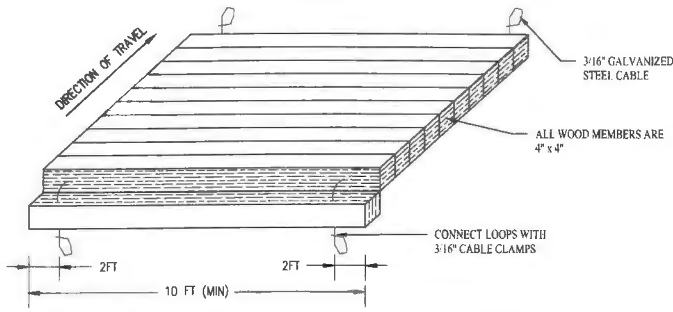
1. INSTALL CURTAIN IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
2. BOTH ENDS OF THE CURTAIN SHOULD BE SECURELY ANCHORED TO THE SHORELINE.
3. BARRIER MATERIAL WILL BE A POLYETHYLENE PLASTIC SHEET, 10 MIL., OR SUITABLE ALTERNATIVE.
4. ROPE WILL BE ¾" NYLON OR MANILA.
5. BARRIER WILL EXTEND PARALLEL TO THE DISTURBED SHORELINE FOR THE FULL LENGTH OF THE WORK AREA.
6. BARRIER WILL EXTEND ACROSS THE ENTIRE CHANNEL WHEN WORK IS PERFORMED WITHIN THE CHANNEL.

DESIGN CONSIDERATIONS:

1. FOR PONDS AND OTHER RELATIVELY STILL WATER BODIES, THE FABRIC SHOULD BE RELATIVELY IMPERMEABLE SO AS TO PROVIDE A BARRIER BETWEEN THE CLEAN WATER AND THE SEDIMENT-LADEN WATER. RUNOFF INTO THIS TYPE OF CURTAIN SHOULD BE MINIMIZED, DUE TO LIMITED AVAILABLE CAPACITY.
2. FOR MOVING WATER, SUCH AS IN LAKES AND STREAM CHANNELS, PROVISION SHOULD BE MADE TO ALLOW PASSAGE OF WATER THROUGH THE CURTAIN. THIS IS NORMALLY DONE BY CONSTRUCTING AT LEAST PART OF THE CURTAIN FROM A HEAVY FILTER FABRIC. WHILE SUCH CURTAINS ALLOW FOR SOME WATER MOVEMENT THROUGH THE CURTAIN, THE FLOW RATE IS LOW. THEREFORE, THESE CURTAINS SHOULD NOT BE INSTALLED ACROSS FLOWING WATERCOURSES. TURBIDITY BARRIERS PLACED IN STREAM CHANNELS SHOULD BE PLACED PARALLEL TO THE FLOW DIRECTION.
3. WHENEVER THE WATER BODY IS NOT SUBJECT TO TIDAL AND/OR WIND AND WAVE ACTION, THE CURTAIN SHOULD EXTEND THE ENTIRE DEPTH OF THE WATER AND REST ON (OR BE ANCHORED TO) THE BOTTOM. FAILURE TO MAINTAIN CONTACT WITH THE BOTTOM WILL ALLOW SEDIMENT TO MOVE UNDER THE CURTAIN. IT IS RECOMMENDED THAT THE HEIGHT OF THE CURTAIN BE 20% GREATER THAN THE DEPTH OF THE WATER TO ALLOW FOR FLUCTUATIONS.
4. WHEREVER THE WATER BODY IS SUBJECT TO SIGNIFICANT TIDE, WIND, OR WAVE ACTION, THE WEIGHTED BOTTOM OF THE CURTAIN SHOULD NOT EXTEND TO THE BOTTOM OF THE WATER BODY. WIND AND WAVE ACTION CAN CAUSE THE BOTTOM OF THE CURTAIN TO MOVE ALONG THE BOTTOM, STIRRING UP SEDIMENT. THEREFORE, A MINIMUM 1-FOOT GAP SHOULD BE PROVIDED BETWEEN THE BOTTOM OF THE CURTAIN AND THE BOTTOM OF THE WATER BODY AT MEAN LOW WATER
5. CURTAIN HEIGHTS BEYOND 12 FEET ARE GENERALLY NOT PRACTICAL. CURTAINS INSTALLED DEEPER THAN THIS ARE SUBJECT TO VERY LARGE LOADS WITH CONSEQUENT STRAIN ON CURTAIN MATERIALS AND THE ANCHORING SYSTEM.
6. THE OVERALL LENGTH OF THE CURTAIN SHOULD BE 10-20% GREATER THAN THE STRAIGHT-LINE MEASUREMENT OF THE PERIMETER TO FACILITATE INSTALLATION AND REDUCE STRESS CAUSED BY WIND AND/OR WAVES.
7. BOTH ENDS OF THE CURTAIN SHOULD BE SECURELY ANCHORED TO THE SHORELINE.
8. AN EXCESSIVE NUMBER OF JOINTS SHOULD BE AVOIDED. A MINIMUM CONTINUOUS SPAN OF 50 FEET BETWEEN JOINTS IS RECOMMENDED. FOR STABILITY PURPOSES, THE MAXIMUM SPAN BETWEEN JOINTS SHOULD BE 100 FEET.
9. FOR APPLICATIONS WHERE IT IS DESIRABLE FOR WATER TO PASS THROUGH THE CURTAIN (E.G. WHEN USED INSTEAD OF A BAFFLE IN A SEDIMENT BASIN), A CURTAIN WITH ONE OR MORE PANELS OF SCREEN FABRIC SHOULD BE USED. IN THIS APPLICATION, THE CURTAIN MAY REMAIN IN PLACE OVER WINTER MONTHS.

TURBIDITY CURTAIN

N.T.S.



NOTES:

1. USE WOOD MATS ON WETLAND SOILS OR EXISTING ROAD BEDS. THE SURFACE SHOULD BE FLAT AND FREE OF HIGH SPOTS (E.G. STUMPS AND LARGE ROCKS).
2. INSTALL MATS ON TOP OF NONEWOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
3. USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
4. IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS.
5. UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.

MAINTENANCE: INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS.

WETLAND MATS

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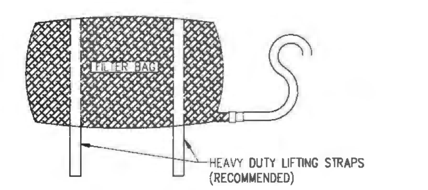
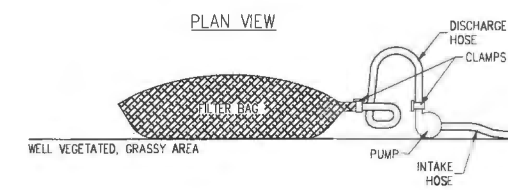


PLAN VIEW



ELEVATION VIEW

NOTES:

- LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

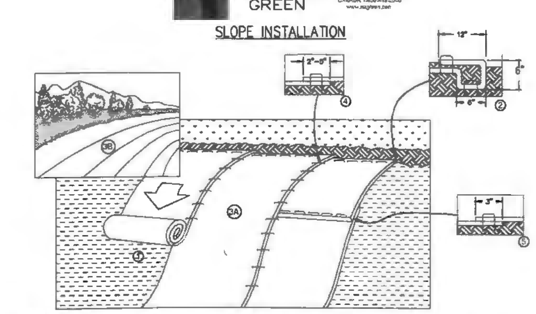
- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
- NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

PUMPED WATER FILTER BAG (FOR E&S CONTROL)

N.T.S.

NORTH AMERICAN GREEN

SLOPE INSTALLATION

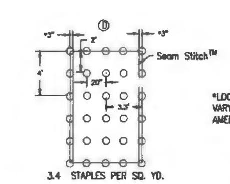


NOTES:
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5cm-12.5cm) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5cm) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30cm) APART ACROSS ENTIRE BLANKET WIDTH.

NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL MATTING

N.T.S. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SEQUENCE OF CONSTRUCTION.



*LOCATION OF SEAM STITCH WILL VARY DEPENDING ON NORTH AMERICAN GREEN PRODUCT TYPE.

NORTH AMERICAN GREEN

NOTES:
1. BLANKETS WITH THE OPTIONAL NORTH AMERICAN GREEN DOT SYSTEM PLACE STAPLES/STAKES THROUGH EACH OF THE WHITE COLORED DOTS.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
3. APPROX. 5" SEAM OVERLAP FOR BIONET EROSION CONTROL BLANKETS

EROSION CONTROL MATTING STAPLE PATTERN

N.T.S.

REVISION | DATE

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BOGIA ENGINEERING INC.
1340 PENN AVE WYOMISSING, PA 19610
PHONE: 610-678-3071 - FAX: 610-678-3517
WWW.BOGIAENG.COM

FINAL PLANS
BLACK RIVER RESTORATION
E&SC DETAILS - 1

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE	
KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
MORRIS	
NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
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DRAWING:	C107
PROJECT:	NJ1954-01
SHEET:	8 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION

EROSION CONTROL DEVICE MAINTENANCE AND INSPECTION PROCEEDURES

1. THE MAINTENANCE PROCEDURES BELOW ARE COMPREHENSIVE AND INCLUDE DEVICES PROPOSED FOR THIS SPECIFIC PROJECT OR MAY BE NEEDED TO SUPPLEMENT UNFORESEEN EROSIVE CONDITIONS. SHOULD EROSION CONTROL DEVICES BE IMPLEMENTED OUTSIDE OF THOSE DEPICTED WITHIN THESE EROSION CONTROL PLANS, THE DEVICES AND MAINTENANCE PROCEDURES SHALL BE APPROVED BY THE CONSERVATION DISTRICT PRIOR TO IMPLEMENTATION.
2. IT SHALL BE THE RESPONSIBILITY OF THE O/RP TO ENSURE THAT ALL DEVICES ARE INSTALLED AND MAINTAINED ACCORDING TO THE PROVIDED DETAILS OR MANUFACTURES SPECIFICATION.
3. ALL EROSION CONTROL DEVICES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT UNLESS OTHERWISE SPECIFIED BELOW. NECESSARY REPAIRS SHALL BE PERFORMED IMMEDIATELY.
4. SEDIMENT REMOVED FROM EROSION CONTROL DEVICES SHALL BE REDISTRIBUTED/REPLACED ON SITE AND IMMEDIATELY STABILIZED.

ROCK ENTRANCE

- ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.
- DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK.
- ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE

ROCK FILTER OUTLET

- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET

FILTER FENCE

- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION
- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.
- ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET

SILT SOCK

- SILT SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE.
- ENDS OF SOCK SHALL BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT
- ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND MUST BE DISPOSED IN THE MANNER ACCEPTABLE TO THE CONSERVATION DISTRICT AND NJDEP.

ROCK FILTERS

- CLOGGED FILTER STONE (AASHTO # 57) SHOULD BE REPLACED
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.
- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/ 2 THE HEIGHT OF THE FILTERS.
- IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT. REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

PUMP WATER FILTER BAGS

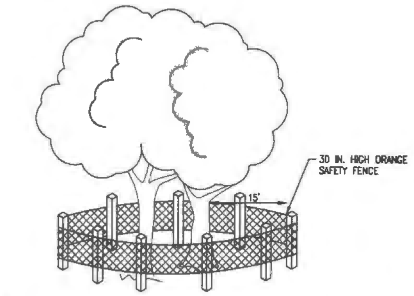
- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED
- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED.
- FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

INLET FILTER BAGS

- FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS ½ FULL
- DAMAGED FILTER BAGS SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION

WETLAND MATS

- INSTALL MATS ON TOP OF NON-WOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
- USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
- INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS
- IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS
- UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.



NOTES:
1. TREE PROTECTION FENCE TO BE LOCATED AT THE EDGE OF DRIPLINE (TO BE VERIFIED BY PROJECT MANAGER).
2. BOARDS SHALL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
3. ANY TREES NOT SCHEDULED TO BE REMOVED THAT ARE IRREPARABLY DAMAGED DURING CONSTRUCTION OR DIE WITHIN 18 MONTHS OF COMPLETION OF CONSTRUCTION SHALL BE REPLACED IN ACCORDANCE WITH THE PROVISIONS OF TOWNSHIP ORDINANCE

TREE PROTECTION FENCE

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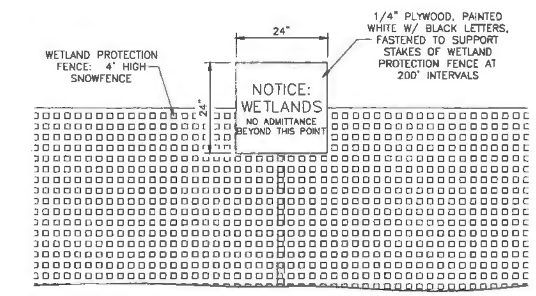

WETLAND PROTECTION SIGNAGE DETAIL

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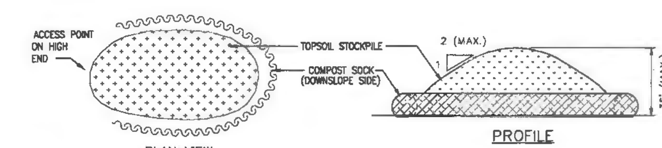

COMPOST SOCK MUST BE PLACED AROUND THE PERIMETER OF ALL STOCKPILES. IMMEDIATELY APPLY TEMPORARY SEEDING TO ALL STOCKPILES WHICH WILL BE IN PLACE FOR 20 DAYS OR MORE.

TEMPORARY TOPSOIL STOCKPILE

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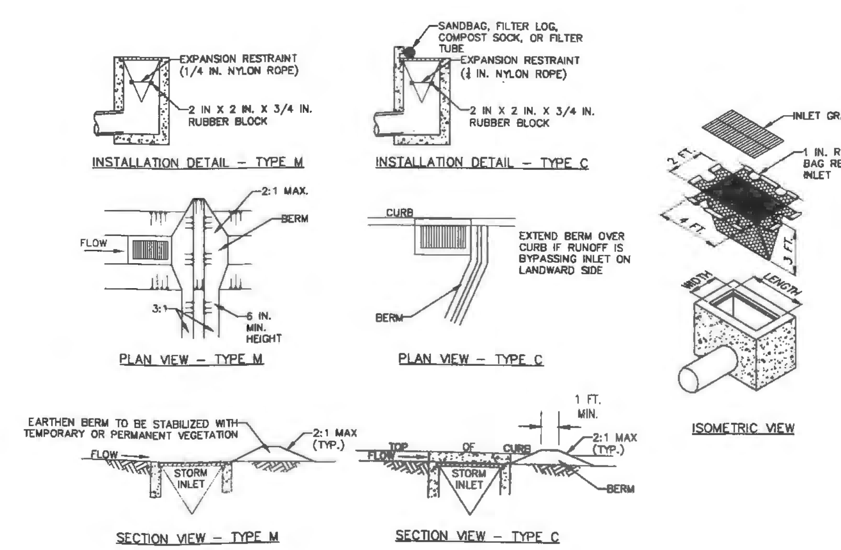

MAINTENANCE:
1. MAXIMUM DRAINAGE AREA = 1/2 ACRE
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLETS TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS NOT LOCATED AT A LOW POINT.
3. EARTHEN BERM SHALL BE INSTALLED & MAINTAINED IN LIEU OF ASPHALT BERMS UNTIL ROADWAY IS STONED. 6" MINIMUM HEIGHT ASPHALT BERM TO BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LB, BURST STRENGTH OF 200 PSI, AND TRAPEZOIDAL TEAR STRENGTH OF 50 LB. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A #40 SIEVE.
5. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET.
6. DAMAGED OR CLOGGED BAGS SHALL BE REPAIRED OR REPLACED IMMEDIATELY UPON INSPECTION. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.
7. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

FILTER BAG INLET PROTECTION DETAIL (TYPE C & TYPE M)

NTS

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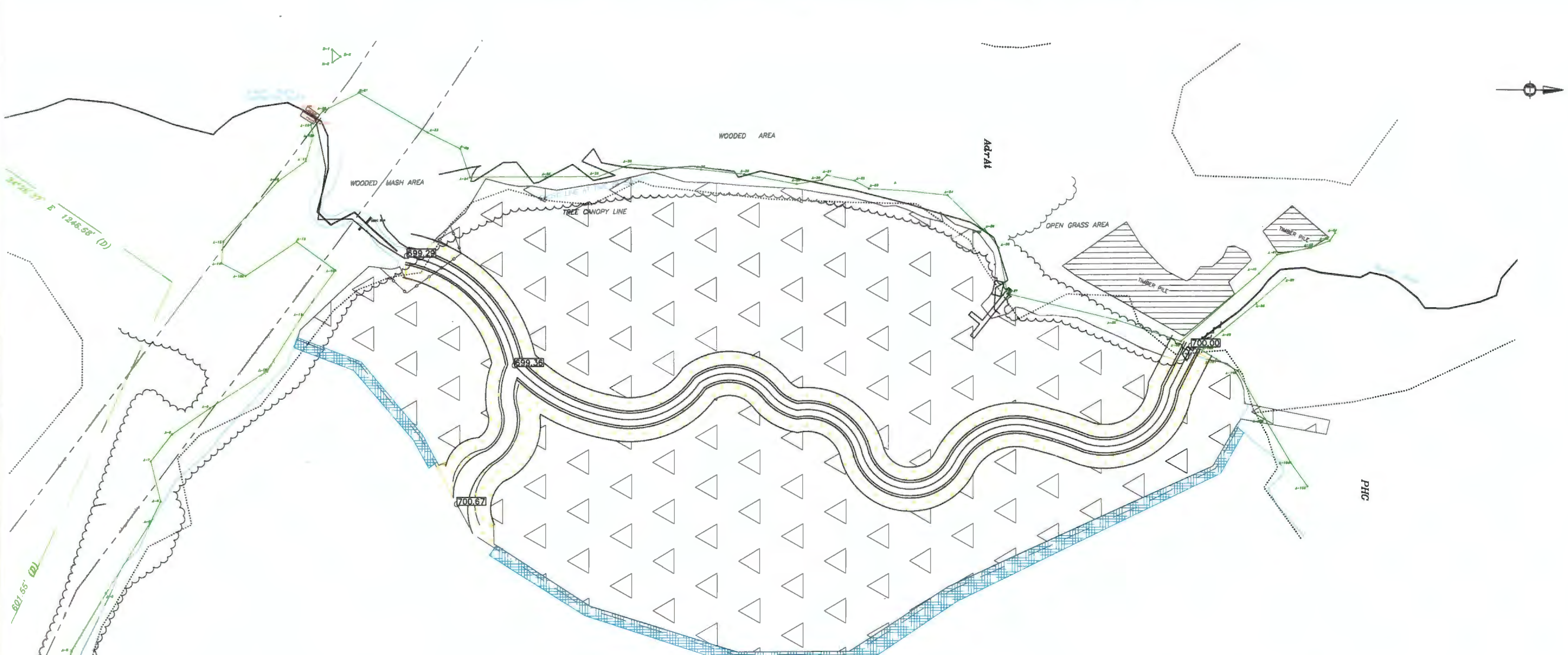
FINAL PLANS
BLACK RIVER RESTORATION
E&SC DETAILS 2

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE	
KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
MORRIS	
NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C108
PROJECT:	NJ1954-01
SHEET:	9 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



LEGEND

SYMBOL	PLANTING ZONE	SPECIES	AREA (ACRES)
▽ ▽ ▽	WOODED	TABLE 7–5	7.0
	CHANNEL BANKS	TABLE 7–7	1.1
	POND SHORE	TABLE 7–3	0.4

0 120 240 Feet

Table 7-3: Common Emergent Wetland Plant Species Used for Stormwater Wetlands and on Aquatic Benches of Stormwater Ponds

Common Name	Scientific Name	Inundation Tolerance
Arrow arum	Peltandra virginica	up to 12"
Arrowhead/Duck potato	Saggitaria latifolia	up to 12"
Pickerelweed	Pontederia cordata	up to 12"
Blunt spike rush	Eleocharis obtusa	up to 3"
Bushy beardgrass	Andropogon glomeratus	up to 3"
Common three-square	Scirpus pungens	up to 6"
Iris (blue flag)	Iris versicolor	up to 6"
Marsh hibiscus	Hibiscus moscheutos	up to 3"
Spatterdock	Nuphar luteum	up to 36"
Sedges	Carex spp.	up to 6"
Soft rush	Juncus effusus	up to 6"
Switchgrass	Panicum virgatum	up to 3"

Note 1: Inundation tolerance is maximum inches below the normal pool: most plants prefer shallower depths than the maximum indicated.

Note 2: For additional plant options, consult the stormwater planting list in Section 5. Other good sources include the NJDA Standards for Soil Erosion and Sediment Control in New Jersey, Design of Stormwater Wetland Systems (Schueler 1992), and Wetland Planting Guide for the Northeastern United States (Thunhorst 1993).

Table 7-5: Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
Acer rubrum Red maple	*Clethra alnifolia* Sweet pepperbush	*Andropogon glomeratus* Lowland broomsedge
Betula nigra River birch	*Ilex verticillata* Winterberry	*Eupatorium purpureum* Sweet-scented Joe Pye weed
Juniperus virginiata Eastern red cedar	*Cephalathus occidentalis* Buttonbush	*Scripus pungens* Three square bulrush
Chionanthus virginicus Fringe-tree	*Hamemelis virginiana* Witch hazel	*Iris versicolor* Blue flag
Nyssa sylvatica Black gum	*Vaccinium corymbosum* Highbush blueberry	*Lobelia cardinalis* Cardinal flower
Diospyros virginiana Persimmon	*Ilex glabra* Inkberry	*Panicum virgatum* Switchgrass
Platanus occidentalis Sycamore	*Ilex verticillata* Winterberry	*Dichanthelium clandestinium* Deertongue
Quercus palustris Pin oak	*Viburnum dentatam* Arrowwood	*Rudbeckia lacinlata* Cutleaf coneflower
Quercus phellos Willow oak	*Lindera benzoin* Spicebush	*Scirpus cyperinus* Woolgrass
Salix nigra Black willow	*Morella pennsylvanica* Bayberry	*Vernonia noveboracensis* New York ironweed

Note: For more plant section options for bioretention, consult Design Manual for Use of Bioretention in Stormwater Management (ETA&B 1993) or Design of Stormwater Filtering Systems (Claytor and Schueler 1997).

Table 7-7: Common Grass Species for Open Channels

Common Name	Scientific Name	Notes
Alkali saltgrass	Puccinellia distans	Cool, good for wet, saline swales
Fowl bluegrass	Poa palustris	Cool, good for wet swales
Canada bluejoint	Calamagrostis canadensis	Cool, good for wet swales
Creeping bentgrass	Agrostis palustris	Cool, good for wet swales, salt tolerant
Red fescue	Festuca rubra	Cool, not for wet swales
Redtop	Agrostis gigantea	Cool, good for wet swales
Rough bluegrass	Poa trivialis	Cool, good for wet, shady swales
Switchgrass	Panicum virgatum	Warm, good for wet swales, some salt tolerance
Wildrye	Elymus virginicus/riparius	Cool, good for shady, wet swales

Notes: These grasses are sod forming and can withstand frequent inundation, and are ideal for the swale or grass channel environment. A few are also salt-tolerant. Cool refers to cool season grasses that grow during the cooler temperatures of spring and fall. Warm refers to warm season grasses that grow most vigorously during the hot, mid-summer months.

Where possible, one or more of these grasses should be in the seed mixes. For a more thorough listing of seed mixes see Table 7-8 in Part 5 or consult the Standards for Soil Erosion and Sediment Control in New Jersey.

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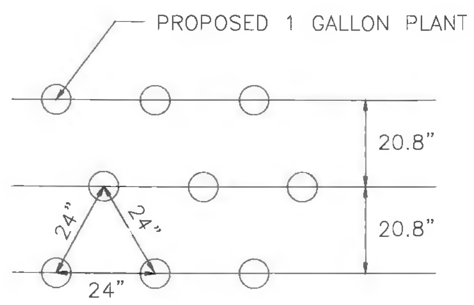
FINAL PLANS
BLACK RIVER RESTORATION
LANDSCAPING PLAN

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847

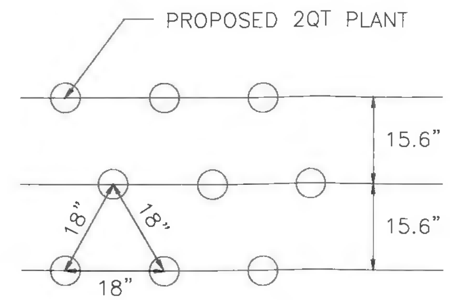
JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	1"=60'
DRAWING:	C109
PROJECT:	NJ1954-01
SHEET:	10 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



PERENNIAL PLANT SPACING DETAIL
NOT TO SCALE



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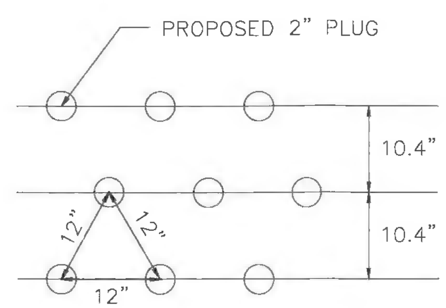

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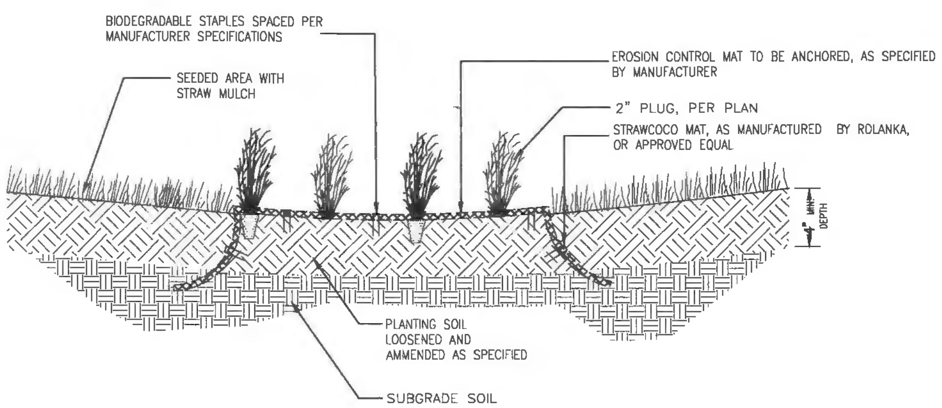
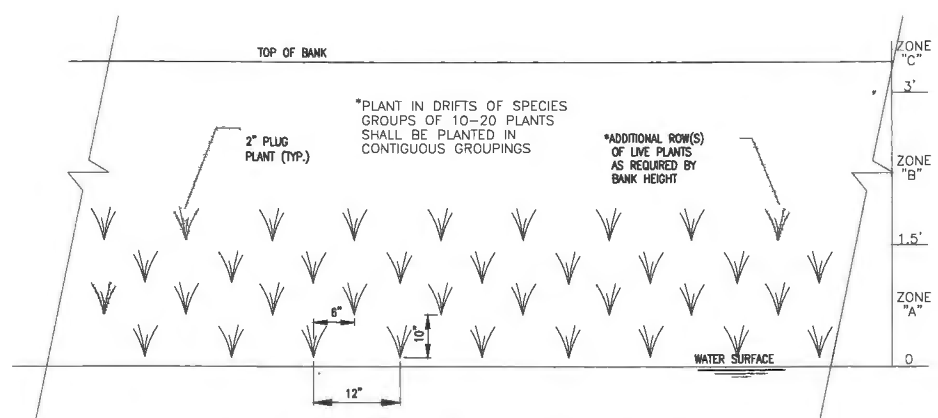
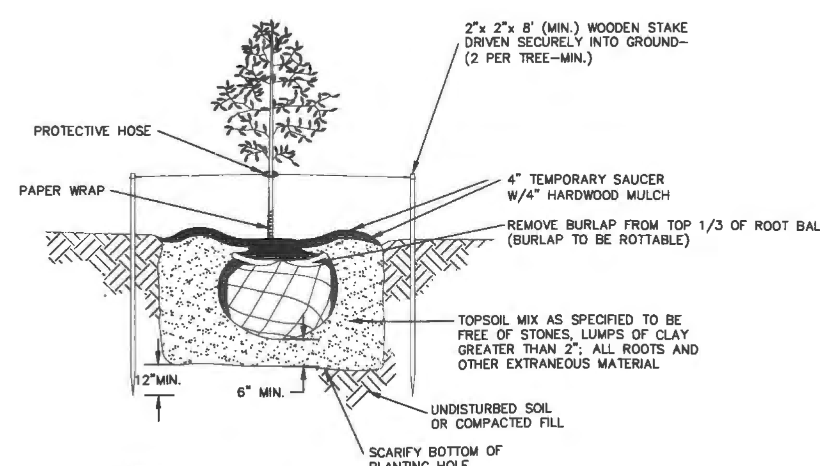


PLUG PLANTING DETAIL
NOT TO SCALE



TYPICAL BANK PLANTINGS
NOT TO SCALE

PLANING ZONES:
ZONE A: 0'-1.5' ABOVE WATER SURFACE
ZONE B: 1.5'-3' ABOVE WATER SURFACE
ZONE C: 3+' ABOVE WATER SURFACE



NOTES:

1. REMOVE DEAD AND DAMAGED BRANCHES BY PRUNING ACCORDING TO RECOGNIZED HORTICULTURAL PRACTICES. DO NOT CUT LEADER.
2. ENCASE NON-CORRODIBLE CABLE IN REINFORCED RUBBER GARDEN HOSE AT POINTS OF CONTACT WITH TRUNK OF TREE. FLAG EACH GUY CABLE WITH FLUOURESCENT MATERIAL FOR SAFETY.

TREE PLANTING DETAIL
NOT TO SCALE

RIPARIAN SEEDING NOTES:

AREAS ALONG SHORELINE AND PROPOSED CHANNELS (15' FROM EDGES OF TOP OF BANK AND SHORELINE) SHALL BE SEEDED WITH THE FOLLOWING NATIVE SEED MIX: (OR APPROVED EQUAL)

"FLOODPLAIN MIX" IS A MIXTURE OF GRASSES AND WILDFLOWERS WHICH ARE NATIVE TO THE MID-ATLANTIC REGION, INCLUDING THE FOLLOWING SPECIES: VIRGINIA WILDRYE, DEERTOUNGE, ASTER, INDIANGRASS, AND SWAMP MILKWEED

"FLOODPLAIN MIX" SHOULD BE SEEDED AT A RATE OF 20LBS./ACRE WITH COVER CROP OF GRAIN RYE AT 30LBS./ACRE.

"FLOODPLAIN MIX" IS AVAILABLE THROUGH:

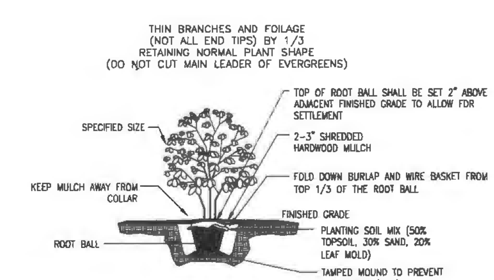
ERNST SEEDS
8884 MERCER PIKE
MEADVILLE, PA 16335
(800) 873-3321

RIPARIAN CORRIDOR MAINTENANCE SCHEDULE

NEWLY SEEDED GRASSES AND POND EDGE:	YEAR 1	YEAR 2	YEAR 3	YEARS 4 PLUS
INSPECT FOR INVASIVE/WEED SPECIES. IF WEED SPECIES APPEAR IN THE SEEDED AREA, SPOT TREAT BY PULLING.	X			
PRUNING, RESEEDING, THATCH REMOVAL OF VEGETATED AREAS, AS NEEDED	X	X	X	
PEST CONTROL, AS NEEDED	X	X	X	
NEWLY PLANTED TREES & SHRUBS:				
MONITOR WEATHER CONDITIONS AND PROVIDE SUPPLEMENTAL WATERING, IF NEEDED. NATURALISTIC PRUNING OF DEAD/DAMAGED BRANCHES IN LATE FALL OR EARLY SPRING.	X			
REMOVE STAKES, IF UTILIZED. CHECK TREE BARK PROTECTION AND REPAIR/ REPLACE AS NEEDED. REPLACE DEAD PLANT MATERIAL. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.		X		
CHECK TREE BARK PROTECTION AND REPAIR/ REPLACE AS NEEDED. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.			X	X
VEGETATED AREAS:				
INSPECT FOR INVASIVE/WEED SPECIES. PHYSICALLY REMOVE OR SPOT TREAT INVASIVE SPECIES. PRUNE POTENTIALLY HAZARDOUS BRANCHES FROM EXISTING PLANT MATERIAL.	X	X	X	X

PLANTING SPECIFICATIONS

1. NAME OF PLANTS - SHALL AGREE WITH THE NOMENCLATURE OF "STANDARD PLANT NAMES" AS ADOPTED BY AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMENCLATURE; SIZE AND GRADING STANDARDS SHALL CONFORM TO THOSE SPECIFIED BY THE AMERICAN ASSOCIATION OF NURSERYMEN IN THE LATEST EDITION OF THE "U.S.D.A. STANDARDS FOR NURSERY STOCK".
2. QUALITY - ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY; THEY SHALL HAVE NORMAL, WELL-DEVELOPED BRANCHES AND VIGOROUS FIBROUS ROOT SYSTEMS. ALL PLANTS SHALL BE NURSERY-GROWN UNLESS OTHERWISE STATES; THEY SHALL HAVE BEEN GROWN UNDER THE SAME CLIMATE CONDITIONS AS THE SUBJECT SITE FOR AT LEAST TWO (2) YEARS PRIOR TO DATE OF PLANTING ALL PLANTS WHICH ARE FOUND UNSUITABLE IN GROWTH OR CONDITION OR WHICH ARE NOT TRUE TO NAME SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE PLANTS.
3. MEASUREMENTS - PLANTS SHALL BE MEASURED AS THEY STAND IN THEIR NATURAL POSITION. STOCK FURNISHED SHALL BE A FAIR AVERAGE OF THE MINIMUM SIZES SPECIFIED OR OF THE RANGE GIVEN IN THE "U.S.D.A. STANDARDS FOR NURSERY STOCK".
4. PREPARATION OF PLANTS - ALL PRECAUTIONS CUSTOMARY IN GOOD TRADE PRACTICE SHALL BE TAKEN IN PREPARING PLANTS FOR MOVING. ALL BALLED AND BURLAPPED PLANTS SHALL BE DUG TO MEET OR EXCEED THE "U.S.D.A. STANDARDS FOR NURSERY STOCK".
5. SOIL EXCAVATIONS - THE EXCAVATION MUST BE NOT LESS THAN 12 INCHES WIDER OR ANY DEEPER THAN NECESSARY TO ACCOMMODATE THE BALL OF THE TREE.
6. PLANTING - TREES SHALL BE PLANTED AT THE SAME DEPTH AS THEY WERE IN THE NURSERY. PLANTING SOIL SHALL BE COMPOSED OF ONE PART PEAT MOSS AND THREE PARTS TOPSOIL THOROUGHLY MIXED. EACH TREE SHALL BE WATERED THOROUGHLY AT TIME OF PLANTING.
7. PRUNING - TREES SHALL BE PRUNED AFTER PLANTING, OR BY THE NURSERYMAN AT THE TIME OF DIGGING, TO BALANCE TOP GROWTH WITH ROOTS AND TO PRESERVE THEIR NATURAL CHARACTER AND SHAPE. PRUNING SHALL BE RESTRICTED IN GENERAL TO THE SECONDARY BRANCHES AND SOFT AND SUCKER GROWTH
8. WRAPPING - ALL TREES SHALL BE WRAPPED WITH SIX TO TEN INCH WIDE 8-OUNCE BURLAP OR KRAFT TREE PAPER AT THE TIME OF PLANTING FROM THE GROUND TO THE FIRST BRANCHES
9. MULCHING - ALL TREES SHALL BE MULCHED WITHIN THREE DAYS OF PLANTING WITH WOOD CHIPS, LICORICE ROOT, GROUND CORNCOBS OR OTHER SUITABLE MULCH MATERIAL.
10. STAKING AND GUYING -
    a. TREES SHALL BE STAKED WITH AT LEAST ONE RED OR WHITE CEDAR STAKE THE SAME DAY OF PLANTING. STAKES SHALL BE A MINIMUM OF 9 FEET IN HEIGHT AND NOT LESS THAN TWO INCHES IN SMALLEST DIAMETER. STAKES ARE TO BE DRIVEN INTO THE GROUND AT A DEPTH OF 12 INCHES BELOW THE BOTTOM OF THE EXCAVATION. THIS SHOULD BE DONE BEFORE SETTING THE TREE OR, IF AFTER SETTING, IN SUCH A MANNER AS NOT TO INJURE THE ROOTS.
    b. TREES SHALL BE GUYED TO THE STAKES AT A HEIGHT OF ABOUT FIVE FEET USING NO. 10 GAGE GALVANIZED STEEL WIRE IN A PIECE OF RUBBER HOSE THE WIRE SHALL BE FASTENED TO THE STAKE IN SUCH A MANNER THAT THE WIRE WILL NOT SLIP NOR COME IN CONTACT WITH THE TREE TRUNK. GUYS BROKEN (BUT NOT DELIBERATELY BROKEN THROUGH VANDALISM) WITHIN A YEAR OF PLANTING SHALL BE REPLACED.
11. REMOVAL OF ALL PLANTING DEBRIS - REMOVAL OF DEBRIS IS REQUIRED. THE PROPERTY MUST BE LEFT IN A NEAT AND ORDERLY CONDITION IN ACCORDANCE WITH GOOD AND ACCEPTED PLANTING PRACTICES.
12. HERBIVORY PROTECTION - WIRE CAGES MUST BE INSTALLED AROUND ALL TREES AND SHRUBS IN ORDER TO PROTECT THEM FROM WILDFIRE BROWSING WHILE THEY BECOME ESTABLISHED
13. GUARANTEE -
    a. TREES SHALL BE GUARANTEED FOR ONE YEAR FOR FALL PLANTED AND 13 MONTHS FOR SPRING PLANTED TREES FROM DATE OF ACCEPTANCE BY THE OWNER OR HIS REPRESENTATIVE. THE TREES ARE TO BE ALIVE AND IN A SATISFACTORY GROWING CONDITION AS DETERMINED BY OWNER OR HIS REPRESENTATIVE AT THE END OF THE GUARANTEE PERIOD.
    b. REPLACEMENT WILL BE MADE ACCORDING TO THESE SAME SPECIFICATIONS AND DURING THE NORMAL PLANTING PERIOD. REPLACEMENTS SHALL BE SUBJECT TO THE SAME GUARANTEE AND REPLACEMENT AS THE ORIGINAL MATERIAL THE REPLACEMENTS SHALL BE MADE WITHIN 60 DAYS FOLLOWING WRITTEN DEMAND FROM THE OWNER OR HIS REPRESENTATIVE.



SHRUB PLANTING AND SHRUB BED PREPARATION
NOT TO SCALE

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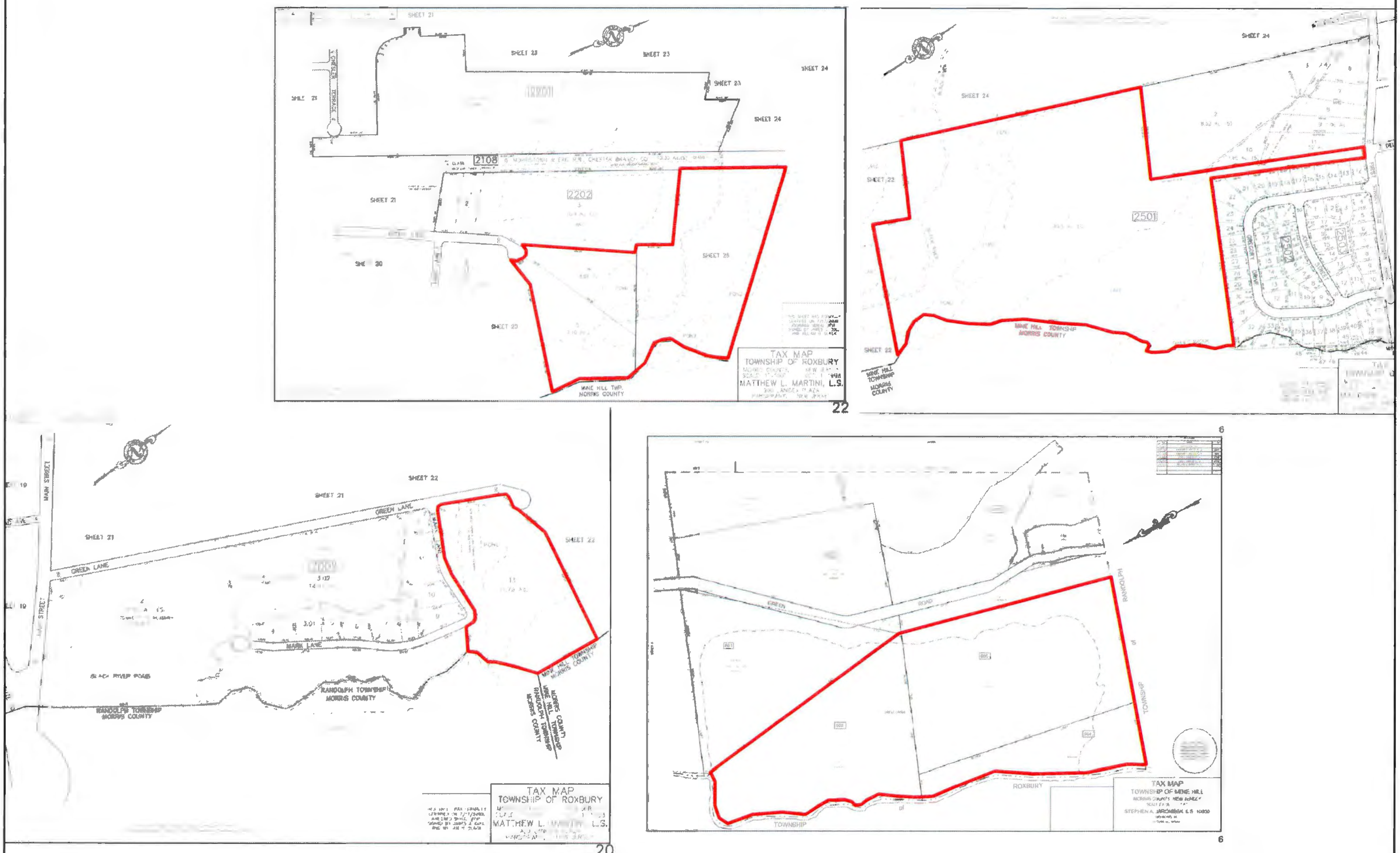
FINAL PLANS
BLACK RIVER RESTORATION
LANDSCAPING DETAILS

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP MORRIS NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C110
PROJECT:	NJ1954-01
SHEET:	11 OF 11

FIGURES



DuBois & ASSOCIATES

Roxbury and Mine Hill Township Tax Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1; Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1

Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 1

Job No.: D2252.001

Date: 2/2/2022

Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D2252.001\Tax.mxd

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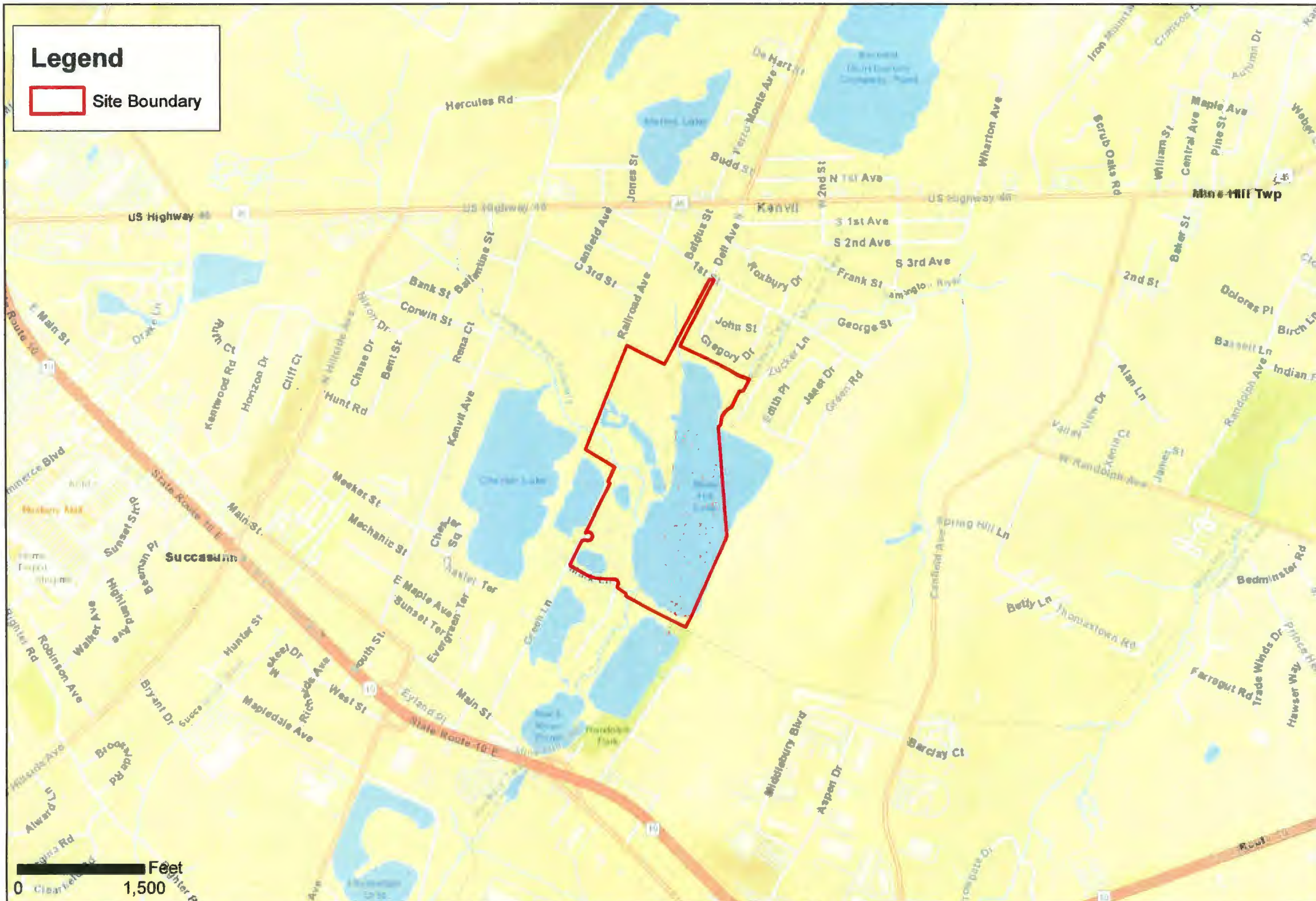

New Jersey Road Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

DuBois & ASSOCIATES

NORTH

Figure 2

Job No.: D2252.001	
Scale: 1 in = 1,500 ft	
Date: 2/2/2022	
Drawn By: HJ	

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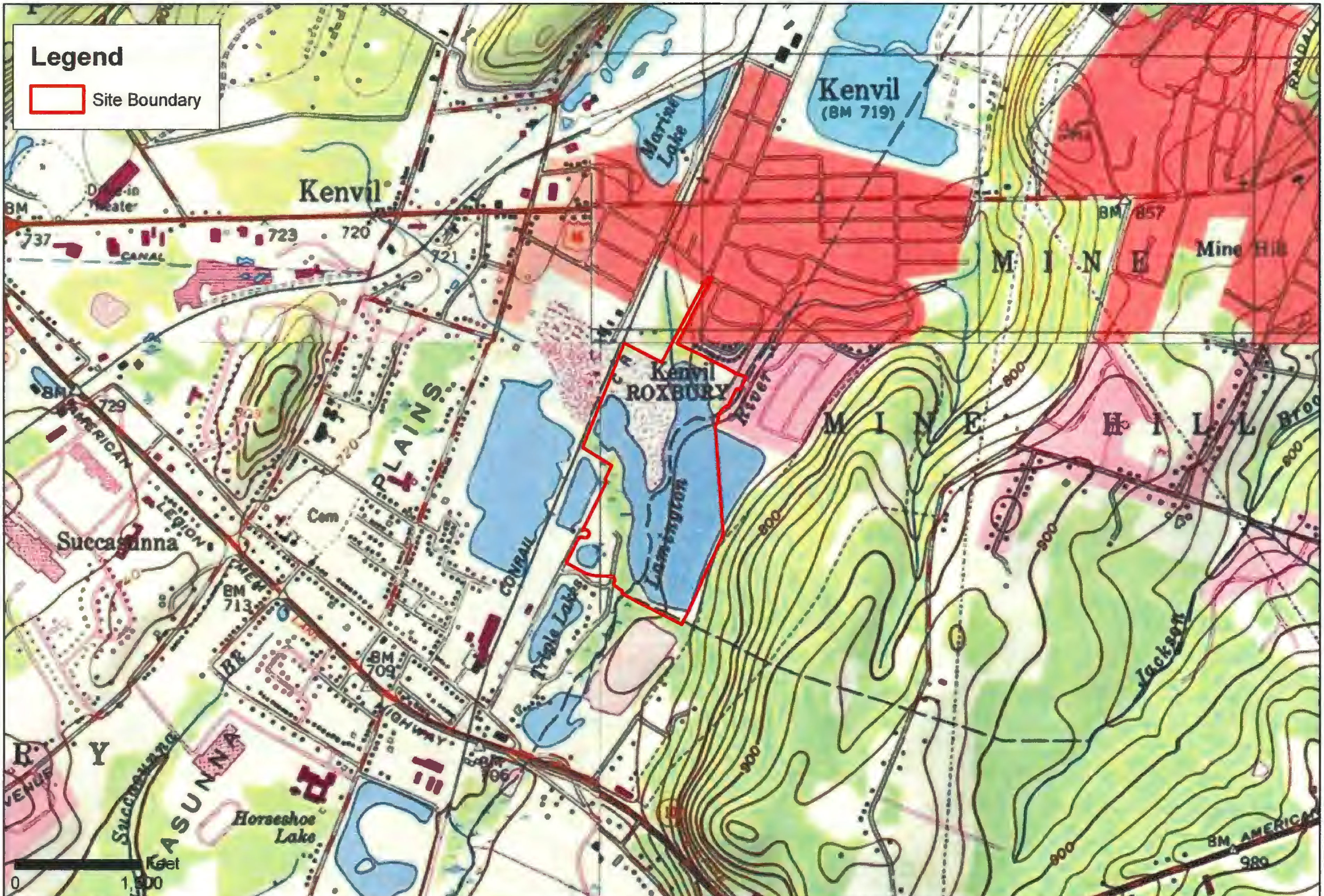

SW Dover & NW Mendham & NE Chester NJ USGS Quad Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

DuBois & ASSOCIATES

NORTH

Figure 3

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Date: 2/2/2022	
Drawn By: HJ	

Document Path: S:\JOBS NUMBERS\D2252.001\Quad.mxd

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Aerial Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1; Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 4

Job No.: D2252.001	
Scale: 1 in = 600 ft	
Date: 2/2/2022	
Drawn By: HJ	

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Morris County Soil Survey Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 6

Job No.: D2252.001
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Date: 2/2/2022
Drawn By: HJ

Document Path: S:\JOBS NUMBERS\D2252.001\Soil.mxd

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NJDEP Freshwater Wetlands Map

Block 2202 * Lots 4 & 5; Block 2001 * Lot 13; Block 2501 * Lot 1;
Block 604 * Lot 1; Block 605 * Lot 1; Block 602 * Lot 1
Roxbury, Mine Hill & Randolph Townships, Morris County, NJ

NORTH

Figure 6

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Drawn By: HJ	

Document Path: S:\JOBS NUMBERS\D2252.001\Wet.mxd

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APPENDIX A

SITE PHOTOGRAPHS

Photo 1: Representative view of the Mine Hill Lake at the State open limit in the vicinity of wetland point A3.

Photo 2: Representative view facing the upland area from the vicinity of wetland point A3.

Photo 3: View of the dock feature and minimal *Phragmites* fringe facing north at wetland point A37.

Photo 4: Representative view of the Lamington Creek tributary and surrounding wetland area, in the vicinity of wetland point A12 and A13.

Photo 5: Representative view of upland wooded areas surrounding the lake and State open water limits.

Photo 6: Representative view of the timber pile area upland of wetland points A37 to A44.

Photo 7: Facing north along the waterway and wetland complex between wetland points A40 and A98.

Photo 8: Representative view of the quarry/mine in the northwest section of the site that is absent of natural wetland and upland communities.

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1340 Penn Avenue
Wyomissing, PA 19160
Phone: 610.678.3071
Fax: 610.678.3517
www.bogiaeng.com

ENGINEERING REPORT
FLOOD HAZARD AREA INDIVIDUAL PERMIT
FLOOD HAZARD AREA VERIFICATION
FRESHWATER WETLANDS INDIVIDUAL PERMIT

BLACK RIVER RESTORATION

FOR COUNTY CONCRETE CORPORATION

BLOCK 2001 AND LOT 13
MINE HILL AND ROXBURY TOWNSHIPS
MORRIS COUNTY
NEW JERSEY

Prepared by: A. Behbahani
Prepared by: C. Muldoon, PE

April 2022

PROJECT: NJ1954-01

TABLE OF CONTENTS

APPENDICES

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

SEAL

_______________________________ _______________________

Signature Date

Project Introduction

The Black River in Morris County, New Jersey currently routes through man-made Rutgers Pond in Roxbury and Mine Hill Townships. The NAD 1983 NJ State Plane coordinates for the project area are 458117.001174, 741284.80268. The proposed project will reestablish the natural channel of the river, disconnecting it from Rutgers Pond. This will be accomplished by mainly using fine-grained materials that were separated from aggregates removed from the pond to build up land surface along the southwest edge of the pond. A naturalized stream channel will be constructed to directly connect the Black River to itself downstream of the existing pond. The new stream banks will be stabilized with gravel and vegetation. Landscaping and shade trees will be implemented along both sides of the new stream channel. The intended use of the new area around the restored stream channel is a vegetated, naturalized area.

A local aggregate quarry, County Concrete Corporation, will be undertaking this restoration project. They are willing to complete this restoration and beneficial re-use project. The fill material for the project will be quarry tailings from County Concrete operations. This material is comprised of native fine-grained materials removed from the pond and not used for making concrete. These have been mechanically separated on site using the pond water for washing and without the use of additives. These materials are assessed for general and structural suitability.

Rutgers Pond is approximately 56 acres, while the proposed fill area in open water (i.e., total disturbed area) is 16.4 acres, and the area where fill elevations will be higher than the existing normal pool elevation is 8.6 acres. The project site is located largely within the floodway and minimally impacts the flood fringe and riparian zone. There are freshwater wetlands along the banks of the Black River and Rutgers Pond. Impacts to these areas are minimal and temporary. The entire project site is within one drainage area. Stormwater from the site drains to the existing Black River channel along the south edge of Rutgers Pond.

This project is expected to be completed over the course of 7 to 10 years. The southwestern portion of Rutgers Pond will be incrementally filled in, starting along the bank to the north of the project site. The existing stream into the project site will continue to discharge into Rutgers Pond for the duration of the filling. A path along the existing shoreline of Rutgers Pond will be maintained to manage the flow of the Black River during the period of the project. As the area of fill is placed, the area will be graded to specified slopes and the designed channel will be stabilized with gravel and vegetation. A second stream channel will be created in the fill area to manage flows from the Lamington (Black) River, which enters at the north end of Rutgers Pond. During fill activities, a flow path will be maintained along the existing shoreline of Rutgers Pond until the designed channel has been stabilized with gravel and vegetation. Once the new channels have been determined to be stable, the former flow paths along the shoreline will be filled in to a specified grade, stabilized, and revegetated. Once the constructed channels have been stabilized, stream flows will be directed into the new stream channels. The new stream channels will be monitored and any necessary remediation and stabilization will be conducted. Details of the proposed fill area and channels are provided in this report as well as in Drawings.

To date there have been no Department actions for this project. A pre-application meeting was held on November 16, 2021.

7:13-3 DETERMINING THE FLOOD HAZARD AREA AND FLOODWAY

Flood hazard area and flood hazard area elevations were determined using various sources and methods. At first, the initial evaluation was performed based on existing NJDEP and FEMA maps (i.e., methods 1 and 3, respectively). The associated flood maps are presented in Appendix A. Since the project needed evaluation of post-construction flood hazard area and flood hazard area elevation for onsite and offsite, Method 4 was adopted to analyze the potential impacts of the proposed project. It should be mentioned that the flood elevations that are reported in the NJDEP and FEMA maps have used NGVD29 as datum, while the results from method 4 are reported in NAVD83 datum (the datum used for the land survey). According to https://vdatum.noaa.gov/runapp_agreement.php, the following formula can be used to convert NGVD29 elevation to NAVD83 elevation for the project region:

NAVD88 = NGVD29 – 0.72'

Additionally, the floodway limits were not determined in the existing FEMA flood maps. Encroachment analysis of the model developed for method 4 was employed to determine the floodway limits per requirements of this chapter (i.e., equal loss of conveyance on both sides and 0.2 foot increase in flood elevation after encroachment).

7:13-3.2 Selecting a Method for Determining the Flood Hazard Area and Floodway along a Regulated Water

(c)

The NJDEP delineation of 100-year flood hazard area (FHA) and FHA design flood elevation are available for the project site. These delineations are dated prior to January 24, 2013 (September 1982). Therefore, they cannot be the only reference for the delineation. The FEMA 100-year flood boundary delineation with 100-year flood elevations is available for the project site and was incorporated into the analysis. However, method 4 (FEMA hydraulic method) was adopted to model the flood because a comparison between existing and post-construction flood hazard area and its elevation was required. As it has been used in NJDEP delineation, 125% of 100-year storm mentioned in the FEMA Flood Insurance Report (FIS) was applied in Method 4.

(e)

The floodway limits are not delineated in the FEMA maps, therefore, method 4, as described in the NJDEP Flood Hazard Area Control Act Rules, was utilized to determine the floodway limits. Encroachment analysis was used to determine the floodway, and it was performed by considering equal loss of conveyance on both sides and 0.2 foot increase in flood elevation after encroachment. The 125% flow rate reported in the FEMA FIS (Flood Insurance Study; presented in Appendix B) was employed for the hydraulic modeling. This flowrate is 630 cfs for 100- year storm (i.e., 787.5 cfs was used for modeling purposes) associated with the upstream of Black River (equal to a drainage area of 4.54 sq.miles). Hydraulic modelimg was also used to simulate the post-development changes in the FHA elevation and floodway limit.

7:13-3.3 Limit of Flood Hazard Area – Floodway Limit and Flood Hazard Area Design Flood Elevation

(b)
The flood hazard area and design flood elevation from the NJDEP delineation per method 1 for the project site are presented in Appendix A. According to the NJDEP flood profile, the FHA design flood elevation is ~ 707' in NGVD29 datum (i.e., ~ 706.28' in NAVD83 datum) for the project site. Additionally, per NJDEP flood maps, the project site is partially located within the floodway boundaries.

(e)
The project proposes construction (adding fill) within the NJDEP delineated floodway. Therefore, hydraulic modeling was employed to demonstrate the compatibility of the post-development changes in FHA and floodway with the NJDEP requirements. The hydraulic calculations were based on the flow rate that was used for NJDEP delineation of FHA design flood elevation and floodway limit. This flow rate is 125% of the 100-year flow reported in the FIS.

Method 4 (hydraulic calculation using 125% of the FIS 100-year flow) was employed to compare the flood elevations corresponding to the pre- and post-development conditions and check the compatibility of the regulated activity within the floodway with the NJDEP requirements.

The FEMA Flood Insurance Study for the Township of Mine Hill, New Jersey, Morris County, dated May 3, 1993, indicates that the 100-year flow rate for the upstream of Black River (Lamington River) at the confluence of the Succasunna Brook has a 100-year peak discharge of 630 cfs.

Cross sections of the project site and flood areas were developed using detailed survey and bathymetry data of the project site provided by Professional Land Surveyors, LLC from field surveys conducted in 2021. Additional topographic information for surrounding areas was sourced from the 2019 Chester, Dover, Mendham, and Stanhope NJ USGS Topographic Maps.

7:13-3.4 Flood Hazard Area and Floodway Mapping based on FEMA Flood Mapping (Method 4)

(f)
The project site is located within the floodway boundaries of the FHA based on the NJDEP delineation (method 1), but the date of the delineation requires additional sources. Method 4 (FEMA hydraulic method) was used to calculate the changes in the flood elevation after regulated activity in the floodway.

This section provides the details of the flood modeling. Hydraulic modeling was based on backwater analysis and was performed using HEC-RAS. The hydraulic modeling consisted of two main parts; encroachment analysis to confirm that the project site is located within the floodway based on the method 4, and determining pre- and post-construction FHA and flood elevation onsite and offsite. The floodway limits were determined using the encroachment approach. The equal loss of conveyance on both sides and 0.2 foot increase in flood elevation after encroachment were used to determine the floodway limit. In cases where the encroached section was smaller than the main channel, the entire channel section was considered as the floodway. The boundary condition used was normal depth, which was set according to the average ground slope at upstream and downstream ends of the modeled area. Moreover, model was set to analyze both subcritical and supercritical flows to simulate any flow regime that might occur.

The hydrological data for the hydraulic modeling were derived from the FIS report. The flood flow used in the modeling was 787.5 cfs, which corresponded to 125% of the 100-year flood flow reported in the FIS report (i.e., 630 cfs). It should be mentioned that drainage area that was considered in the FIS report corresponds to the entire FHA of the region (i.e., upstream of the project site). The drainage area corresponding to the construction and disturbance area is 1.14 square miles, while the FIS flow data is calculated based on a drainage area of 4.54 square miles. Nonetheless, the flow rate was **not** adjusted based on the drainage area, which creates a more conservative scenario and modeling. Appendix B presents the FIS as well as the StreamStats report for the entire floodplain and construction site, respectively. Also, per the specifications of this chapter, 100-year flow rate from the FEMA FIS report (i.e., 630 cfs) could be used to determine the floodway limits but 125% of this flow (i.e., 787.5 cfs) is used for encroachment analysis to conduct a more conservative estimation of floodway limits.

The proposed project does not add any impervious surface because it includes restoration of a stream by placement of pervious fill material in a pond. Characteristics of the fill material, including size distribution, are reported in Appendix C. The total land disturbance of the proposed restoration, which is placement of the porous fill and green landscape on it, is 16.4 acres.

No impervious surface is added to the system, therefore, the changes in the stormwater runoff is expected to be non (or even reduction in runoff owing to replacement of water surface with pervious surface). The installed pervious surface would capture the storm and the majority of the storm infiltrates to the remainder of the pond. The minimal runoff that may form would drain into the restored channel. One of the advantages of the proposed restoration is utilizing the filtration, retention, and evapotranspiration capabilities of the proposed green landscape in water quality improvement before it reaches to the pond, groundwater, or any other downgradient water bodies. There is no proposed structural BMP or other types of structures in this restoration project. Stormwater calculations are presented in Appendix D, and described further in section 7:13-12.2 of this report.

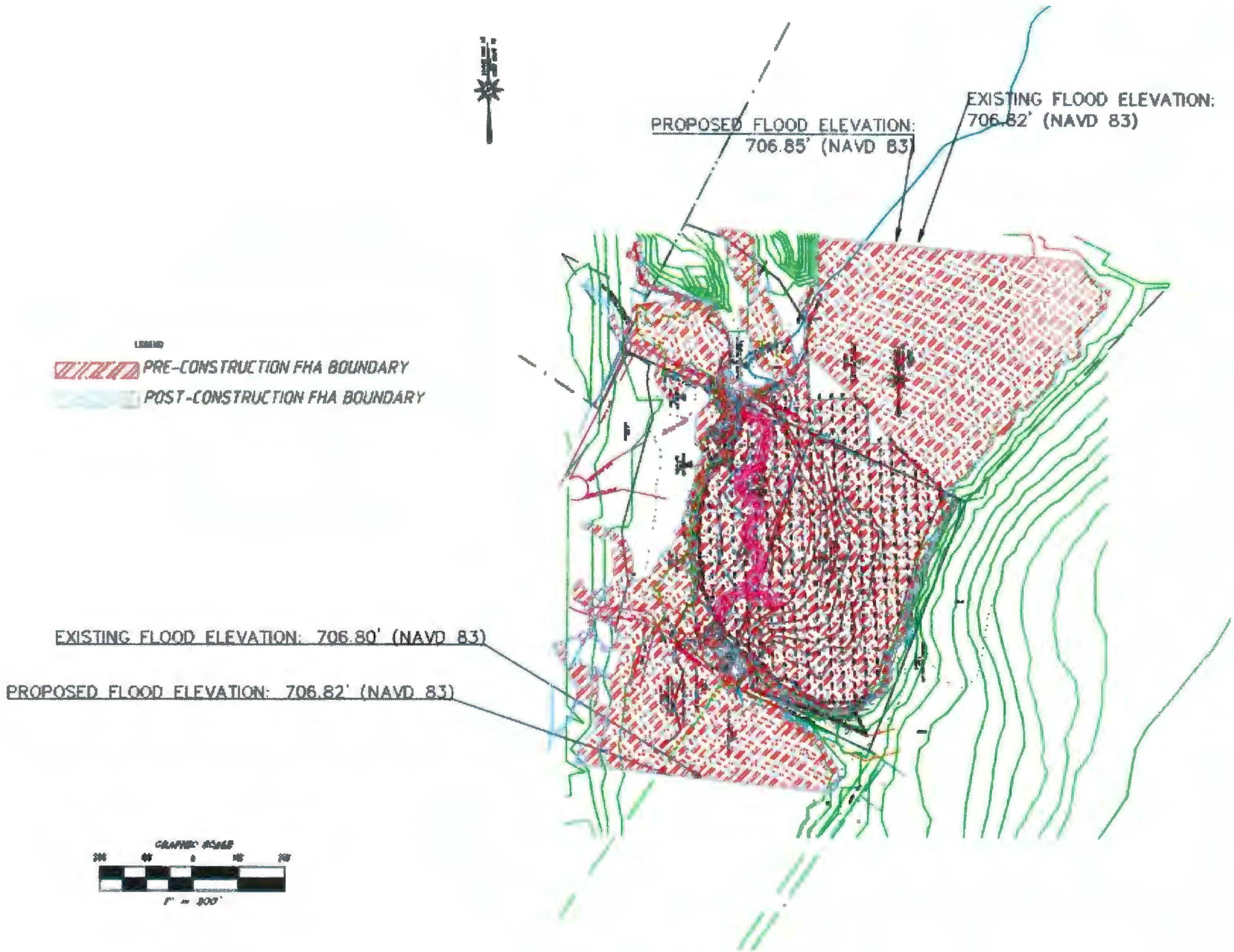
The full set of hydraulic modeling results are presented in tables and figures in Appendix E. As depicted in Appendix E, the amount of added fill material to the floodway is controlled and designed so that the post-construction increase in design flood elevation does not exceed 1' onsite (within the project site) and 0.2' offsite (more than 500' away from the project site boundaries), therefore, the impact on the flood storage volume is minimal and within the regulated threshold.

The modeling of the existing condition showed that the project site is partially located within the floodway and partially within the flood fringe (similar to what NJDEP indicates). The FHA from the model was delineated and is reported in Appendix E. It should be noted the modeled FHA in few of the sections is wider than the FHA shown in NJDEP maps. The existing FHA flood elevation onsite was modeled 706.82' and it was relatively constant for the offsite location, except for the downstream that has a FHA flood elevation of 706.80'. As a reminder the model elevations are reported in NAVD83.

The modeling demonstrated that it is feasible to add ~ 590,180 cubic yards of the fill material to the project site while retaining the FHA and its elevation in compliance with flood control requirements. The total volume was assessed by replacing the existing surface and terrain with the proposed one in HEC-RAS model, followed by iterations to identify a proposed terrain that can meet the aforementioned requirements. In addition to flood elevation control, the amount and shape of fill material placement was planned to retain the existing FHA boundaries to the maximum extent feasible. The post-construction model revealed that the FHA boundary and flood elevation had trivial changes compared to the existing condition in both offsite and onsite locations. The existing and post-construction boundaries are depicted in Appendix E. The FHA flood elevation onsite as well as offsite sides and upstream increased to 706.85' (i.e., a rise of 0.03'), while the offsite downstream flood elevation increased to 706.82' (i.e., a rise of 0.02').

The total fill volume was estimated by comparing the existing and proposed surfaces using Autodesk Civil 3D. Cut and fill coefficients were assumed 1 in this estimation. It should be noted that the porosity of the fill material, which mitigates the post-construction impact on the flood elevation by providing storage volume, is **not** considered in the model to create a more conservative flooded scenario.

The following plan reports the FHA boundaries and elevations for the pre-construction as well as post-construction conditions.


PROPOSED FLOOD ELEVATION:
706.85' (NAVD 83)
EXISTING FLOOD ELEVATION:
706.82' (NAVD 83)
PRE-CONSTRUCTION FHA BOUNDARY
POST-CONSTRUCTION FHA BOUNDARY
EXISTING FLOOD ELEVATION: 706.80' (NAVD 83)
PROPOSED FLOOD ELEVATION: 706.82' (NAVD 83)

7:13-11 AREA-SPECIFIC REQUIREMENTS FOR INDIVIDUAL PERMITS

The regulated activity is restoration of a channel by placement of fill within the floodway and flood fringe, hence, N.J.A.C. 7:13-11.3 and N.J.A.C. 7:13-11.4 items are applicable.

7:13-11.3 Requirements for a Regulated Activity in a Floodway

The Department may issue an individual permit for the placement of fill in a floodway per 7:13-11.3(c)7ii. The proposed project is restoration/stabilization of Black River banks and channel in accordance with N.J.A.C.7:13-12.14. This activity requires placement of fill in the floodway. The placement of fill is necessary for this restoration to connect the upstream of the Black River to its downstream branch (outlet from the Rutgers Pond at the southern side) as well as to pass the stormwater safely and protect the adjacent area from runoff. Placement of fill followed by proposed planting will also improve the habitat value of the area and restore the Black River to its previous natural condition.

7:13-11.4 Requirements for a Regulated Activity in a Flood Fringe

The Department can issue an individual permit for this regulated activity in a flood fringe by 7:13-11.4(c)1. This project is not subject to the flood storage volume displacement limits, as the activity is not associated with a major Highlands development and is the restoration of a regulated water to a natural condition, per 7:13-11.4(d)7. This project is the restoration of a regulated water to a natural condition that meets the requirements of N.J.A.C. 7:13-12.14. The proposed stream restoration requires minimal placement of fill in the flood fringe. The overwhelming majority of the fill placement is within the floodway. Terracing of the proposed stream banks is designed to minimize the lost and displaced flood storage volume.

7:13-11.4 Requirements for a Regulated Activity in or along a Regulated Water with Fishery Resources

The project site is in Rutgers Pond and is a restoration of the Black River channel through this area. The project site is in the Lamington River subwatershed (08BA01). The waters on site (also referred to as the Lamington River and Mine Hill Lake) are classified as a Freshwater Class 2, Non-Trout waterway according to N.J.A.C. 7:9B. The site is also not a waterway listed in the report "Locations of Anadromous American Shad and River Herring During Their Spawning Period in New Jersey's Freshwaters Including Known Migratory Impediments and Fish Ladders."

In order to protect general game fish in Rutgers Pond and downstream, no construction, excavation, filling or grading will be allowed in the channel from May 1 through July 31 of each year. This is appropriate to protect spring spawning of general game fish as indicated in Table 11.5 in N.J.A.C. 7:13. Appropriate soil erosion and sediment control measures will be implemented to allow continued construction, excavation, filling, and grading in the riparian zone and newly created riparian zone during this time frame.

7:13-12 ACTIVITY-SPECIFIC REQUIREMENTS FOR INDIVIDUAL PERMITS

The proposed regulated activity is placement of fill in portions of a manmade pond (Rutgers Pond) to restore the natural stream channel of the Black River, hence N.J.A.C 7:13-12.1, N.J.A.C. 7:13-12.2, N.J.A.C. 7:13-12.3, and N.J.A.C. 7:13-12.14 items are applicable.

7:13-12.1 Requirements that Apply to All Regulated Activities

This project will not cause significant and adverse effects to the items listed in 7:13-12.1(b) as described below.

Water quality: This project will not cause significant and adverse effects to the water quality of Rutgers Pond and the Black River. Impoundments of water, such as Rutgers Pond, tend to heat water as it flows through during warm weather conditions. Disconnecting the Black River from Rutgers Pond is anticipated to have positive effects on stream health, including lower summer water temperatures. The placement of fill in Rutgers Pond will slightly reduce its overall area, from approximately 56 acres to 48.2 acres, and maximum depth in the project area from approximately 46 feet to 31 feet deep. The proposed area and depth of Rutgers Pond is sufficient to maintain the warm water fishes and other aquatic organisms in this water body.

The risk of adverse effects to the water quality by some construction activities will be mitigated with the use of appropriate technologies. During the construction phase of this project, there is the potential for unsettled sediment to be transported out of the fill area and downstream in the Black River. During all placement of fill in Rutgers Pond, turbidity curtains will be used to inhibit the transport of sediment downstream. The maintained water ways along the banks of Rutgers Pond to allow for passage of stream flows during construction periods will be monitored throughout the construction period for evidence of accelerated erosion. While the channel has been oversized to reduce flow velocities, if accelerated erosion conditions occur, the temporary channels will be reinforced with appropriate technologies including geotextile liner, erosion control matting, and/or rip rap.

Aquatic biota: The restoration of the Black River is likely to improve the stream health, including aquatic biota health, such as macroinvertebrates. Restoring the natural stream channel is likely to promote cooler summer water temperatures in the stream and the vegetated buffer will help to filter non-point source pollutants from stormwater entering the stream. Both of these factors are beneficial to aquatic biota in the stream.

Water supply: This project has no known impacts to water supply.

Flooding: As presented in other sections of this report, the post-construction conditions meet all of the regulations in N.J.A.C. 7:13. The amount, location, and form of placed fill has been designed to manage flooding in accordance with N.J.A.C. 7:13.

Drainage: The project site is within a single drainage area. Currently, the stormwater from the site drains to the Black River/Rutgers Pond and exits the project site along the southern edge of the project boundary through the existing outlet channel. This drainage area will not change due to this project.

Channel stability: The proposed channels to convey the flows from the Black River have been designed for stability. The design was based on providing enough hydraulic capacity for bankfull discharge, and the bed and bamk material were designed to maintain the morphology of the cross sections by controlling the sediment transport through the restored channel. Design details are presented later in this report (section *7:13-12.14)*.

Threatened and endangered species of their current or documented historic habitats: According to the NJDEP Landscape 3.3 Viewer, the project site is a part of the Skylands Species Based Habitat area. The 2012 existing uses for the areas involved in the project are "extractive mining" and "artificial lake". The 2012 Land use cover types are "barren land" and "water". The Landscape project report is provided in Appendix F.

The project area was identified as potential habitat for the species listed in the following table.

Species	Status
Indiana Bat	Federally listed endangered; State endangered
Great Blue Heron	State special concern
Bald Eagle	State Endangered

Navigation: The Black River is not a navigable water way. Existing upstream and downstream culverts and low base flows limit the navigability of this water way. This project will have no effect on the navigability of the Black River.

Energy production: This project has no known impacts to energy production.

Fishery resources: At the project site, the Black River is classified as FW2-NT. Warm water fishes, such as sunfish and bass, spawn in shallow areas when the water warms in the spring. The placement of fill to restore the Black River channel will disturb some of these shallower areas. The total length of shoreline to be disturbed is less than 0.3 miles, while Rutgers Pond has approximately 1.4 total miles of shoreline. Additionally, as this project is expected to occur over 7 to 10 years, the disturbance to the shoreline will be disturbed in sections much less than the project total of 0.3 miles.

As the project site has a site disturbance of greater than 1 acre, a NJPDES permit will be applied for and obtained, in compliance with 7:13-12.1(c). Erosion and sediment control measures will be employed on the site and for the duration of construction activities. These measures will include a rock construction entrance, mulching and plantings of disturbed areas, and turbidity curtains. All backfill slopes will be graded and stabilized in accordance with the technical details to prevent post-construction erosion. Permanent, native and non-invasive vegetation will be established on the exposed fill after final grade is achieved. The maintenance of the proposed planting will be in accordance with the proposed maintenance schedule to monitor the plant health.

As this project involves change to the cross-sectional area of the channels in the project site, hydrologic calculations have been performed to identify adversely impacted properties, as required by 7:13-12.1(h). Additional properties have potential of being "adversely impacted" by this project by 7:13-12.1(g)1 and 7:13-12.1(g)4iii. These properties are ### in Mine Hill Township and ### in Roxbury Township, NJ. This project has received written permission from all owners of the adversely impacted properties in accordance with 7:13-12.1(f), as shown in Appendix G.

It should be noted that the potential adverse impacts of the proposed backfill on the offsite flood elevation is assessed through hydraulic analysis for the FHA design flood (i.e., 125% of 100-year flood, per 7:13-12.1(i). The amount and form of fill placement and channel cross sections are designed to control the post-construction increase in flood elevation to less than 0.2' offsite as well as to maintain the current FHA boundaries. The results of this hydraulic analysis are presented in Appendix E.

7:13-12.2 Requirements for Stormwater Management

The proposed project is considered a "major development" by N.J.A.C. 7:8-1.2, as it will result in the disturbance of one or more acres of land since February 2, 2004. The project will be in compliance with all requirements of N.J.A.C. 7:8-1.2. A stormwater report for this project is provided in Appendix D.

Nonstructural Design: There are no proposed stormwater outfall structures associated with this project. This project will create ~ 8.6 acres of new vegetated land. This vegetated area will provide natural infiltration, filtration, retention, and evapotranspiration to manage stormwater on the site.

Quality: The creation of the vegetated areas will provide additional filtration of stormwater runoff from the project site and surrounding properties before it enters the Black River. Vegetated buffers are very effective at removing suspended stormwater pollutants and can slow down stormwater runoff. The reduced velocity of the runoff can reduce peak discharges and therefore reduce erosion potential of the stream banks and channel. This vegetated area will also help to reduce non-point pollution loads in the stormwater runoff, including metals, nutrients, pesticides, and suspended sediments.

Quantity: This proposed project will reduce the quantity of stormwater runoff from the project site. The existing conditions of the project site are largely open water, which has a CN of 100 (per the TR-55 method). The post-construction conditions will transform 8.6 acres of this open water area into woods. The end goal of this project is to develop good condition woods; with a CN of 61 (based on hydrologic soil group B, which is reported in the USDA soil report, Appendix H, for the native soil in the project site). Even considering the construction phases, before the vegetated areas have been fully developed, the area can conservatively be considered poor condition grasslands with a CN of 61 (hydrologic soil group B). Additionally, this project will be completed over an estimated 7 to 10 years, and each area will be stabilized and vegetated as it is placed.

Stormwater modeling based on the NRSC-CN method shows that peak stormwater rates and volumes will decrease in the post-construction condition. Per NJ stormwater manual, the 2-, 10-, and 100-year storms with Region D distribution (for Morris County) were modeled to check the pre- and post-construction runoff peaks and hydrographs. The precipitation data was extracted from NOAA atlas 14 for Roxbury, Morris County, NJ. Time of concentration were estimated using TR-55 with assuming Manning's roughness coefficient of 0.011 and 0.15 for pre- and post-development conditions, respectively. This modeling can be found in the attached stormwater report in Appendix D. Following tables summarize the results of the stormwater modeling.

storm	pre-development peak rate (cfs)	post-development peak rate (cfs)	pre-development to post-development ratio
2-year	16.37	1.58	Controlled to < 50%
10-year	24.07	4.84	Controlled to < 75%
100-year	38.49	12.83	Controlled to < 80%

storm	pre-development volume (cf)	post-development volume (cf)	reduction in runoff volume (cf)
2-year	101,729	18,317	83,412
10-year	152,546	45,920	106,626
100-year	247,290	112,529	134,761

As can be see through the tables, the stormwater runoff associated with the disturbed land in the post-construction condition is substantially controlled via the proposed landscape.

Recharge: The recharge effects of this project will be minimal. Most of the stormwater will filter through the vegetated areas and enter the Black River. Therefore, no impact on the groundwater recharge is anticipated for the proposed project.

Soil Permeability/Testing Methods Utilized: No stormwater BMPs are proposed for this project. Analyses of the sediments to be used as the fill for this project indicate that the placed fill will is categorized as ML (Appendix C), and the native soil in the project area can be categorized as hydrologic group B per USDA report (Appendix H).

Evaluation of Seasonal high Groundwater Table/Methodology Utilized: No stormwater BMPs are proposed for this project. The existing seasonal high groundwater table is the normal water surface elevation of Rutgers Pond. Depth to seasonal high groundwater table of the proposed land areas will vary throughout the site and is not anticipated to change because the water elevation in the pond is controlled through the outflow invert elevation of the downstream end of Black river.

7:13-12.3 Requirements for Excavation, Fill and Grading Activities

The proposed project is designed in a way that the overland stormwater freely enters and leaves the disturbed area. Hydraulic modeling of the post-construction site is presented in Appendix E. This modeling indicates that the FHA boundaries and elevation are controlled in the post construction condition, therefore overland flow of stormwater is not impeded and floodwaters can freely enter and exit the disturbed area, as required by 7:13-12.3(b)1. Additionally, the proposed land disturbance consists of entirely pervious surfaces planted with native vegetation and trees, which improves the stormwater quality and quantity control by providing natural infiltration, filtration, retention, and evapotranspiration. There will be no additional runoff in the post-development condition that may require employing structural stormwater management practices.

No slopes greater than 50% (a ratio of two horizontal to one vertical) are proposed for any area on the project site (7:13-12.3 (b)2).

The proposed earthwork will not endanger the integrity of any existing structure. An old, defunct weir that has been bypassed by the outflow at the outlet of Rutgers Pond will be removed, as it currently is an obstruction to flow (7:13-12.3 (b)3).

There are no proposed excavation activities or excavation material associated with this project (7:13-12.3 (b)4).

7:13-12.14 Requirements for Bank Stabilization and Channel Restoration

(b)

For decades, manmade Rutgers Pond has disconnected upstream and downstream branches of the Black River. Rutgers Pond is an area that was used as agricultural land and then excavated away for quarrying operations. This proposed stream restoration project is the only attempt that has been made to restore this section of the Black River to date. The removal of the earth material that created Rutgers Pond was from heavy equipment excavating the material for quarrying operations.

As the stream enters the pond in the northern side, changes in the hydraulics (e.g., changes in the cross-sectional area and flow velocity) result in sudden flow regime changes. Such changes are accompanied with uncontrolled sedimentation and erosion patterns that causes undesired changes in the morphology of the stream and pond. For instance, the sudden increase in the flow cross section in the entrance section, where the Black River discharges into Rutgers Pond, results in sudden reduction in flow velocity that can increase sedimentation in that area. Sedimentation can gradually fill the entrance area inside the pond in an uncontrolled manner, and more notably, this deposition spot can act as an erosion hot spot (i.e., sediment source) under high flow and flooding conditions. Another example is the section where the pond drains into the downstream branch of the Black River along the southern edge. The sudden reduction in the cross section causes the flow velocity and consequently shear stress to increase in that area. Higher shear stress results in substantially higher erosion potential, posing risk for the downgradient of the Black River and the downstream watershed. In addition to the abovementioned potential morphological issues, the existing riparian area on the west of the pond is not stabilized. This area is also susceptible to erosive forces caused by high flow and flood rates.

The proposed project restores the Black River by placing fill in the Rutgers Pond and connecting the upstream branch to the downstream one through a stable channel. The channel is designed analogous to the existing upstream Black River cross section. The channel longitudinal slope was determined from connecting the upstream bed elevation to that of downstream. By designing the stable channel, the sediment transport in the stream is controlled by considering the balance between suspended particles and the channel bed and bank characteristics. Also, the proposed stream cross section is designed to have sufficient capacity to convey the bankfull discharge (from upstream reach of Black River) within its main channel. The bed material size was designed based on the sediment transport modeling, and it was placed on a clay liner. The clay liner separates the channel bed from the fill material to maintain the discharge through the restored channel during low flow conditions. Stabilization measures, such as mulching and planting) on the channel floodplains are proposed to not only reduce the potential for erosion but also improve the stability of the riparian areas. Placement of fill in the pond and channelizing the stream on it will eliminate the abrupt existing changes in the cross section and bed elevation of the existing flow path. Changes in the bed elevation (i.e., head cut) as well as changes in flow path width are both existing stressors that increase the erosional potential. A restored and stabilized channel would mitigate the erosional potential of the stream by eliminating these features through providing a uniform cross-sectional area to safely convey the stream.

Any future development in the watershed contributing to the Black River, which adds to the impervious area without proper stormwater management practice or alters the existing drainage patterns, may change the Black River flow rate, and subsequently may require modifying the channel cross-sectional area. Future land developments in the watershed should be designed with proper stormwater management practices, as required by N.J.A.C.7:8. The channel area has been designed in a terraced manner to increase channel cross section with higher flowrates. In addition to the flow, any development that changes the characteristics of the suspended particles in the Black River may affect the sedimentation and erosion potential of the channel. The channel will be monitored to ensure a stable channel over time.

It is anticipated that the restored channel can be functional for an infinite amount of time under the current hydraulic and hydrologic conditions, with proper monitoring and maintenance. A proposed monitoring and maintenance plan is presented in Appendix I. The plan includes an action plan for the failure scenario and a plan to reduce the likelihood of future erosion, instability, and ecological degradation.

(c)

Channel bed and banks will be stabilized with the following measures per the design details:

- Placement of clay liner on the fill material to maintain discharge through the channel during low flow conditions and create a basis for the bed material.
- Designed bank slopes are 5 horizontal to 1 vertical.
- Longitudinal bed slope is 0.06 % (dictated based on the existing upstream and downstream invert elevations).
- Establishment of native and non-invasive plant species that are suitable for stabilization.
- Placement of bed material with designed size distribution to stabilize the bed and banks.

The proposed channel was designed based on the following criteria:

- Mimic the existing upstream cross section
- Safely convey the bankfull discharge
- Selection of bed material size to minimize the potential cross-sectional morphologic changes over time

The initial channel design was performed using the following equations and steps, and then the results were modeled using HEC-RAS to simulate the erosion/deposition pattern in a ~ 4-year period. The data for HEC-RAS simulation (i.e., flow data, temperature, suspended sedeiment concentration, etc.) were extracted from USGS station #01399500 Lamington (Black) River near Pottersville, NJ. It should be noted that the project-specific flow data were estimated proportional to the ratio of station drainage area to the project drainage area.

The known (i.e., given) parameters were Q (discharge), S (main channel slope), top channel width (b), and bank slope (z). The goal was to find a bed rock size (d_{50}) that could result in minimal bed erosion. At this initial step incoming suspended sediments from the upstream of Black River were not considered, therefore, the sediment discharge (Q_s) was set to be zero in order to create a no erosion condition.

In order to calculate Qs , Chang's transport model, which is described below, was used:

$$\varphi = \frac{(s-1)d}{RS}$$

$$q_s = 6.62\left(\frac{1}{\varphi} - 0.03\right)^5 \varphi^{3.9}[(s-1)gd^3]^{1/2}$$

It should be mentioned that this sediment transport model is in SI units and the transport rate is computed for unit width.

The hydraulics of the channel was modeled by Manning's equation (described in SI system below):

$$Q = \frac{1}{n}AR^{2/3}S^{1/2}$$

Bank slope (z) was chosen as 5 on both sides of the channel and a sediment representative size was selected as an initial guess to estimate the Manning's roughness coefficient from the below empirical equation:

$$n = \frac{d^{\frac{1}{6}}}{10}$$

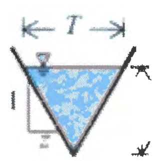
By following below steps, the bed material representative size (d_{50}) for the given scenario was estimated:

Step 1- for the given T, calculate y until calculated Q according to Manning equations converges to given bankfull Q

Step 2- according to step 1, calculate d_{50} until input Qs converges to zero.

These operations which consist of two different iterative stages were conducted using goal seek function of excel and the results are presented in following table:

It should be noted that the bankfull discharge was ~ 45 cfs, which is equal to ~ 1.3 cms.

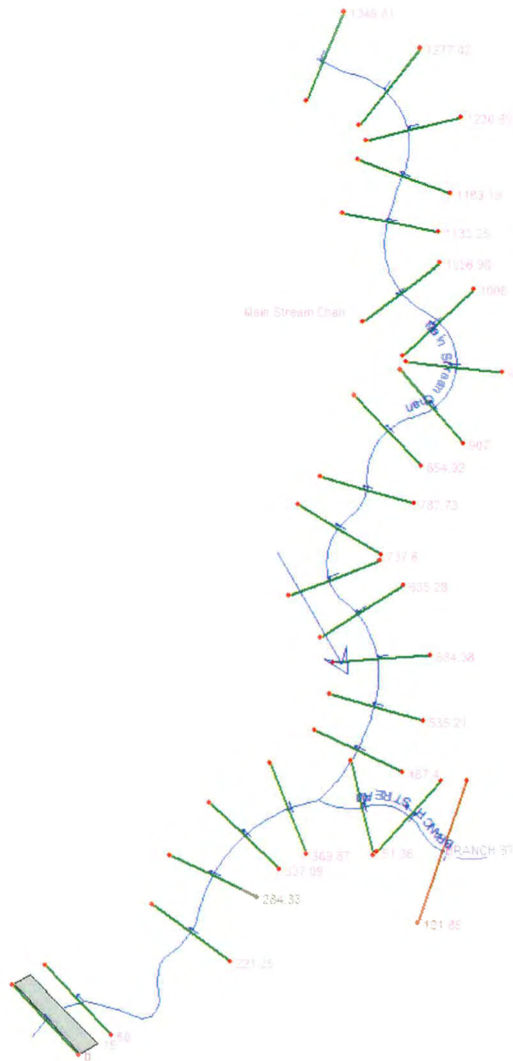


T(m)	z	y (m)	A (m2)	P (m)	R (m)	S	*d (m)*	n	Q (m3/s)	φ	qs (m2/s)	Qs (m3/s)
15.00	5.00	0.31	3.07	3.13	0.98	0.0006	***0.0183***	0.06	1.30	51.45	-0.00004	-0.0006

As can be seen bed material with a d_{50} of 0.018 m (i.e., 0.8") would prevent bed erosion, while maintain the target discharge rate. However, this is a theoretical calculation for a straight reach and needs to be modeled to account for meandering as well as for the long-term impacts of the sediment transport on the channel morphology.

At the next step, different bed material gradation with various size distribution were developed in way that the d_{50} in all of them equaled to the abovementioned size. These gradations along with the incoming suspended particle load were applied in the HEC-RAS model to study the temporal changes in the bed and banks as a result of deposition and erosion.

As described before, the flow data and suspended sediment concentration data were extracted form a nearby USGS gauge in the Black River. The suspended sediment size distribution was assumed as below (which is adopted from typical suspended particle size distribution in streams):
Clay (0.002 mm to 0.004 mm): 15 %
VFM (0.004 mm to 0.008 mm): 20 %
FM (0.008 mm to 0.016 mm): 25 %
MM (0.016 mm to 0.032 mm): 25 %
CM (0.032 mm to 0.0625 mm): 10 %
VFS (0.0625 mm to 0.125 mm): 5%
Below figure depicts the proposed meandering restored main channel along with its branch that connects the remainder of the pond to the restored channel. In all the simulation steps, the discharge through this branch was assumed to be 1/3 that of the restored channel. It should be noted that the proposed main channel starts from station 1349.01 to station 221.25, and the downgradient stations are modeled to simulate two 72" and 48" circular culverts that exist downstream of the project site.

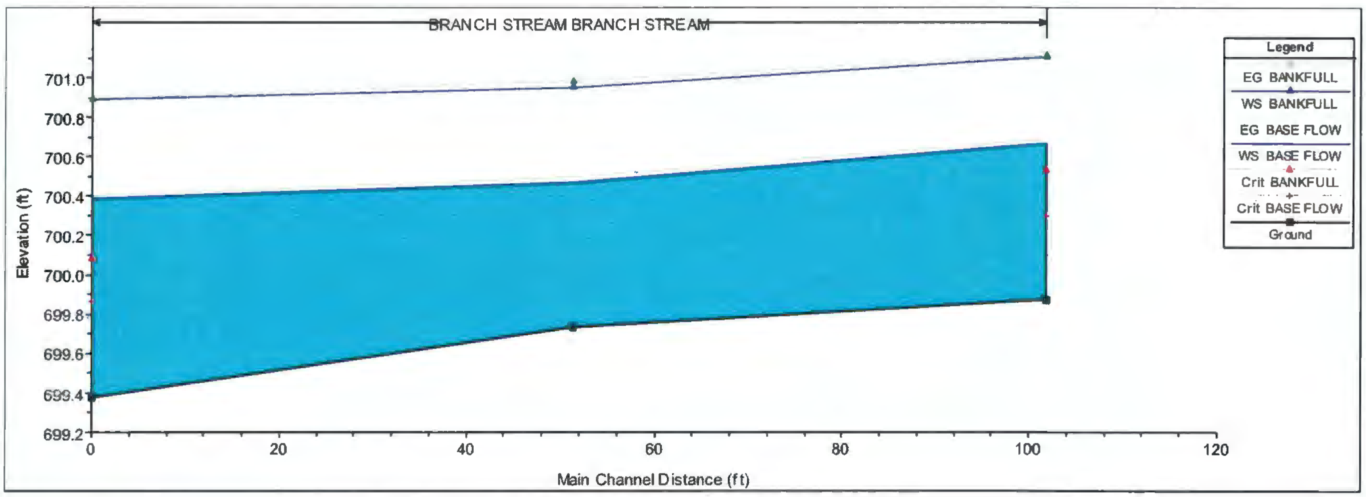


The HEC-RAS modeling had two stages of 1) checking the hydraulic capacity of the proposed channel and 2) checking the adequacy of the proposed bed material to maintain the channel morphology.

Hydraulics was modeled using backwater analysis, bankfull and base flow discharges, proposed channel geometry, and the boundary condition for both upstream and downstream was set as normal water depth. The slope associated with normal water depth was 0.0006, which is dictated by existing invert elevations at the upstream and downstream of the proposed channel. The slope for the branch reach was slightly higher (i.e., 0.0008), and it was also dictated by the existing conditions. The flow in the branch was assumed to be 1/3 of the main reach, which is a conservative scenario. Bankfull discharge in the main channel was calculated ~ 45 cfs from the geometry of the upstream reach of Black River (details in Appendix J), while the base flow was calculated ~ 15 cfs from the average flow measured in USGS upstream gauge (station #01399500) after adjusting for the drainage area (Appendix J). A mix of both subcritical and supercritical flow regimes were considered during the simulations. Full report of the hydraulic model results is presented in Appendix J, and the highlights from the results is summarized in the following tables and figures:

Summary of Branch stream hydraulics.

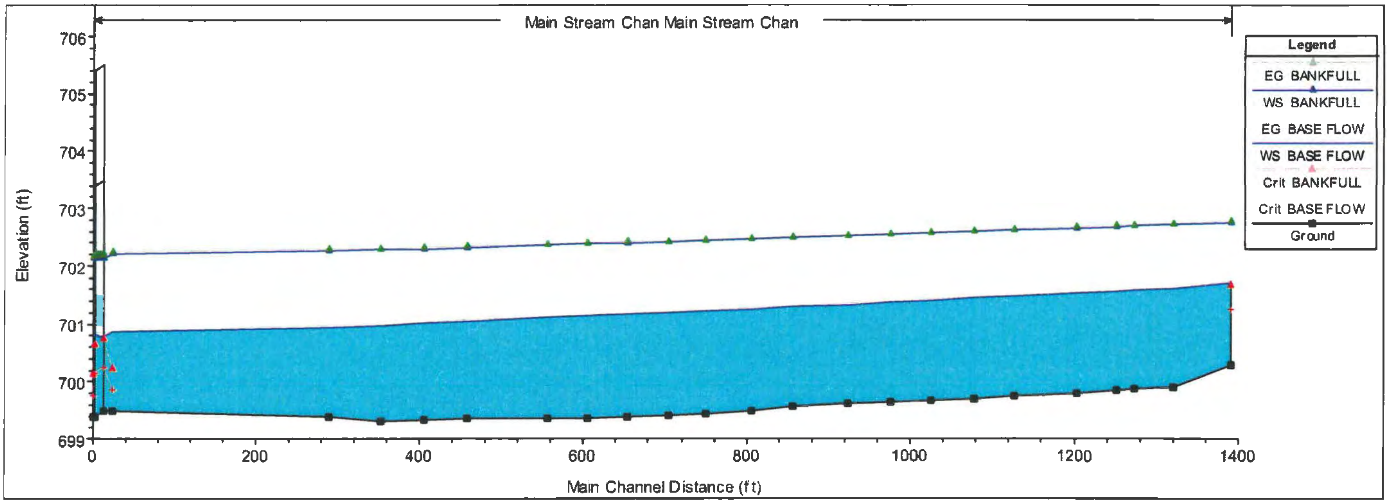
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
BRANCH STREAM	101.85	BASE FLOW	5.00	699.87	700.67	700.30	700.68	0.002302	0.74	6.74	17.01	0.21
BRANCH STREAM	101.85	BANKFULL	15.00	699.87	701.10	700.53	701.11	0.001909	0.95	15.79	23.81	0.21
BRANCH STREAM	51.36	BASE FLOW	5.00	699.73	700.47		700.49	0.007068	1.22	4.10	11.31	0.36
BRANCH STREAM	51.36	BANKFULL	15.00	699.73	700.95		700.98	0.004032	1.34	11.16	17.46	0.30
BRANCH STREAM	0	BASE FLOW	5.00	699.38	700.39	699.87	700.39	0.000801	0.47	10.59	22.72	0.12
BRANCH STREAM	0	BANKFULL	15.00	699.38	700.89	700.08	700.89	0.000801	0.51	29.62	58.44	0.13



Profile view of the Branch channel hydraulics.

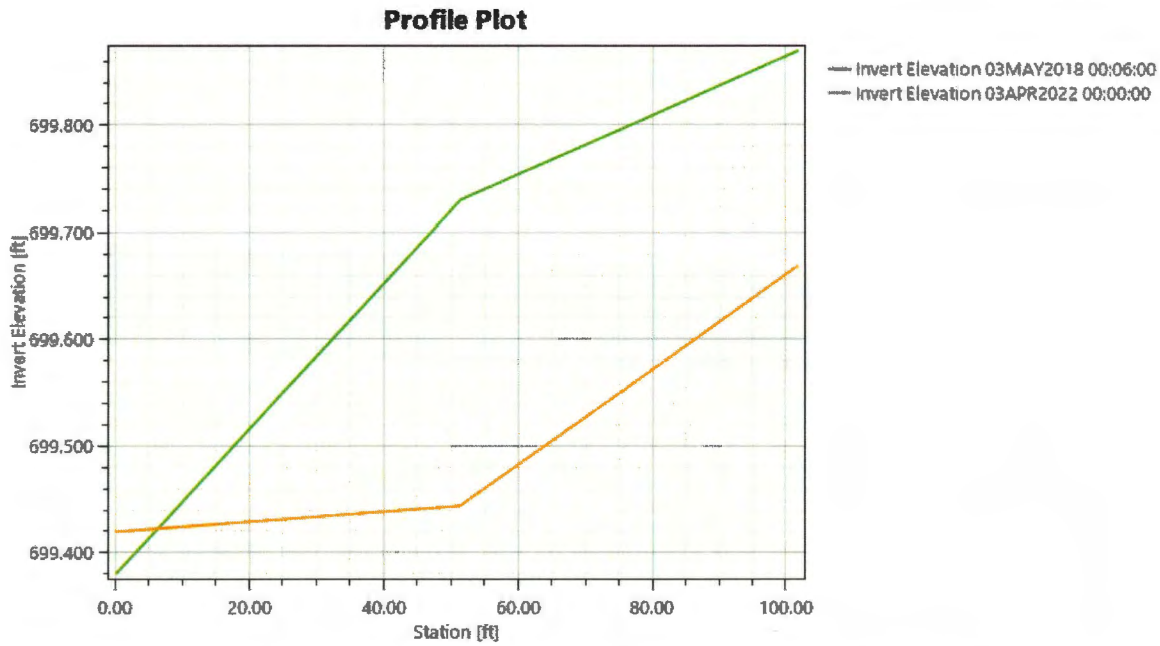
Summary of Main stream hydraulics.

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)	
Main Stream Chan	1349.01	BASE FLOW	15.00	700.29	701.70	701.25	701.73	0.004843	1.30	11.52	20.70	0.31
Main Stream Chan	1349.01	BANKFULL	45.00	700.29	702.76	701.66	702.78	0.001242	1.16	38.89	29.70	0.18
Main Stream Chan	1277.02	BASE FLOW	15.00	699.90	701.61		701.61	0.000699	0.72	20.72	21.99	0.13
Main Stream Chan	1277.02	BANKFULL	45.00	699.90	702.71		702.72	0.000538	0.90	50.14	31.50	0.13
Main Stream Chan	1230.69	BASE FLOW	15.00	699.88	701.58		701.58	0.000674	0.71	21.16	22.53	0.13
Main Stream Chan	1230.69	BANKFULL	45.00	699.88	702.68		702.70	0.000505	0.88	51.15	31.58	0.12
Main Stream Chan	1183.19	BASE FLOW	15.00	699.84	701.56		701.57	0.000686	0.72	20.80	21.87	0.13
Main Stream Chan	1183.19	BANKFULL	45.00	699.84	702.67		702.68	0.000527	0.89	50.39	31.39	0.12
Main Stream Chan	1133.25	BASE FLOW	15.00	699.79	701.53		701.54	0.000648	0.71	21.20	21.97	0.13
Main Stream Chan	1133.25	BANKFULL	45.00	699.79	702.65		702.66	0.000504	0.88	51.13	31.52	0.12
Main Stream Chan	1056.98	BASE FLOW	15.00	699.74	701.48		701.48	0.000706	0.73	20.47	21.44	0.13
Main Stream Chan	1056.98	BANKFULL	45.00	699.74	702.61		702.62	0.000528	0.89	50.49	31.59	0.12
Main Stream Chan	1008.15	BASE FLOW	15.00	699.71	701.44		701.45	0.000626	0.69	21.61	22.46	0.12
Main Stream Chan	1008.15	BANKFULL	45.00	699.71	702.58		702.59	0.000467	0.85	52.84	32.32	0.12
Main Stream Chan	956.78	BASE FLOW	15.00	699.68	701.41		701.42	0.000729	0.74	20.29	21.51	0.13
Main Stream Chan	956.78	BANKFULL	45.00	699.68	702.56		702.57	0.000518	0.89	50.70	31.45	0.12
Main Stream Chan	907	BASE FLOW	15.00	699.65	701.37		701.38	0.000695	0.73	20.64	21.65	0.13
Main Stream Chan	907	BANKFULL	45.00	699.65	702.53		702.54	0.000491	0.87	51.70	31.73	0.12
Main Stream Chan	854.92	BASE FLOW	15.00	699.62	701.34		701.34	0.000688	0.72	20.77	21.84	0.13
Main Stream Chan	854.92	BANKFULL	45.00	699.62	702.51		702.52	0.000477	0.86	52.18	31.80	0.12
Main Stream Chan	787.73	BASE FLOW	15.00	699.57	701.29		701.30	0.000738	0.74	20.17	21.38	0.13
Main Stream Chan	787.73	BANKFULL	45.00	699.57	702.48		702.49	0.000489	0.87	51.87	31.94	0.12
Main Stream Chan	737.6	BASE FLOW	15.00	699.49	701.26		701.26	0.000575	0.67	22.24	22.63	0.12
Main Stream Chan	737.6	BANKFULL	45.00	699.49	702.45		702.46	0.000407	0.81	55.51	32.96	0.11
Main Stream Chan	681.54	BASE FLOW	15.00	699.45	701.22		701.23	0.000642	0.71	21.22	21.84	0.13
Main Stream Chan	681.54	BANKFULL	45.00	699.45	702.43		702.44	0.000439	0.83	53.95	32.49	0.11
Main Stream Chan	635.28	BASE FLOW	15.00	699.41	701.20		701.20	0.000561	0.67	22.41	22.64	0.12
Main Stream Chan	635.28	BANKFULL	45.00	699.41	702.41		702.42	0.000391	0.80	56.34	33.18	0.11
Main Stream Chan	584.38	BASE FLOW	15.00	699.38	701.17		701.17	0.000528	0.65	23.03	23.19	0.12
Main Stream Chan	584.38	BANKFULL	45.00	699.38	702.39		702.40	0.000365	0.78	57.89	33.73	0.10
Main Stream Chan	535.21	BASE FLOW	15.00	699.36	701.14		701.15	0.000572	0.68	22.18	22.39	0.12
Main Stream Chan	535.21	BANKFULL	45.00	699.36	702.37		702.38	0.000389	0.80	56.26	32.91	0.11
Main Stream Chan	487.4	BASE FLOW	15.00	699.36	701.11		701.12	0.000619	0.69	21.60	22.25	0.12
Main Stream Chan	487.4	BANKFULL	45.00	699.36	702.35		702.36	0.000398	0.81	55.88	32.93	0.11
Main Stream Chan	389.87	BASE FLOW	15.00	699.35	701.05		701.05	0.000726	0.74	20.30	21.46	0.13
Main Stream Chan	389.87	BANKFULL	45.00	699.35	702.31		702.32	0.000427	0.83	54.30	32.29	0.11
Main Stream Chan	337.09	BASE FLOW	15.00	699.33	701.00		701.01	0.000809	0.77	19.41	20.80	0.14
Main Stream Chan	337.09	BANKFULL	45.00	699.33	702.29		702.30	0.000448	0.85	53.17	31.75	0.12
Main Stream Chan	284.33	BASE FLOW	15.00	699.31	700.96		700.97	0.000771	0.75	19.97	21.55	0.14
Main Stream Chan	284.33	BANKFULL	45.00	699.31	702.27		702.28	0.000406	0.81	55.38	32.71	0.11
Main Stream Chan	221.25	BASE FLOW	15.00	699.40	700.95		700.95	0.000164	0.32	46.58	55.77	0.06
Main Stream Chan	221.25	BANKFULL	45.00	699.40	702.27		702.27	0.000052	0.28	160.17	96.71	0.04

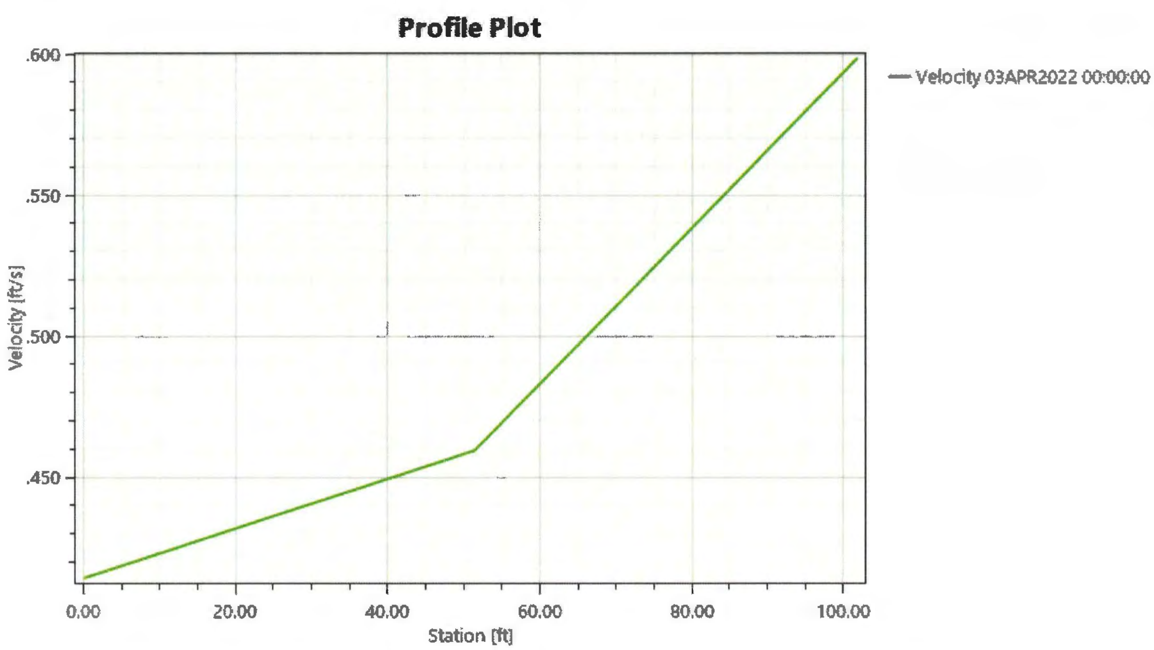


Profile view of the Main channel hydraulics.

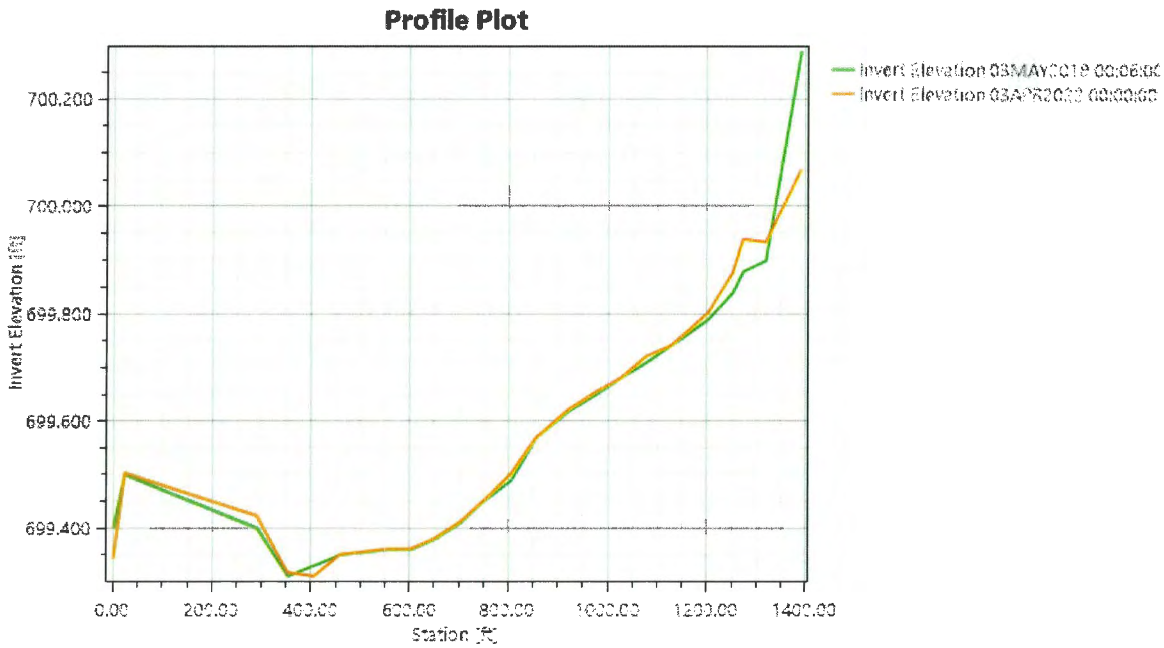
Sediment transport simulation was conducted by introducing the abovementioned suspended sediment and flow data from USGS station #01399500 (May 2018 to Apr 2022), and the bed material size distribution was determined by iterations in a way that the changes in the cross-section morphology (i.e., erosion/deposition) would be minimal. For both main and branch reaches, the upstream boundary condition of sediment transport model was flow data, while it was the normal depth (i.e., in form of slope) for the downstream ends. The sediment transport simulation employed backwater analysis for the hydraulic part. A maximum moveable bed of 2' was assumed for the simulation, and the moveable bed was considered at bed as well as at banks. Laursen, Copeland, and Rubey were selected as transport function, sorting method, and settlement velocity method, respectively. An annual average temperature of 55 °F was adopted to estimate water characteristics such as viscosity etc. The flow data was introduced on a daily basis, while the transport model computation increment was set to 0.1 day (i.e., 2.4 hours) to increase the resolution and accuracy of the simulation. Full report of the sediment transport model results is presented in Appendix J, and the highlights from the results is summarized in the following figures:



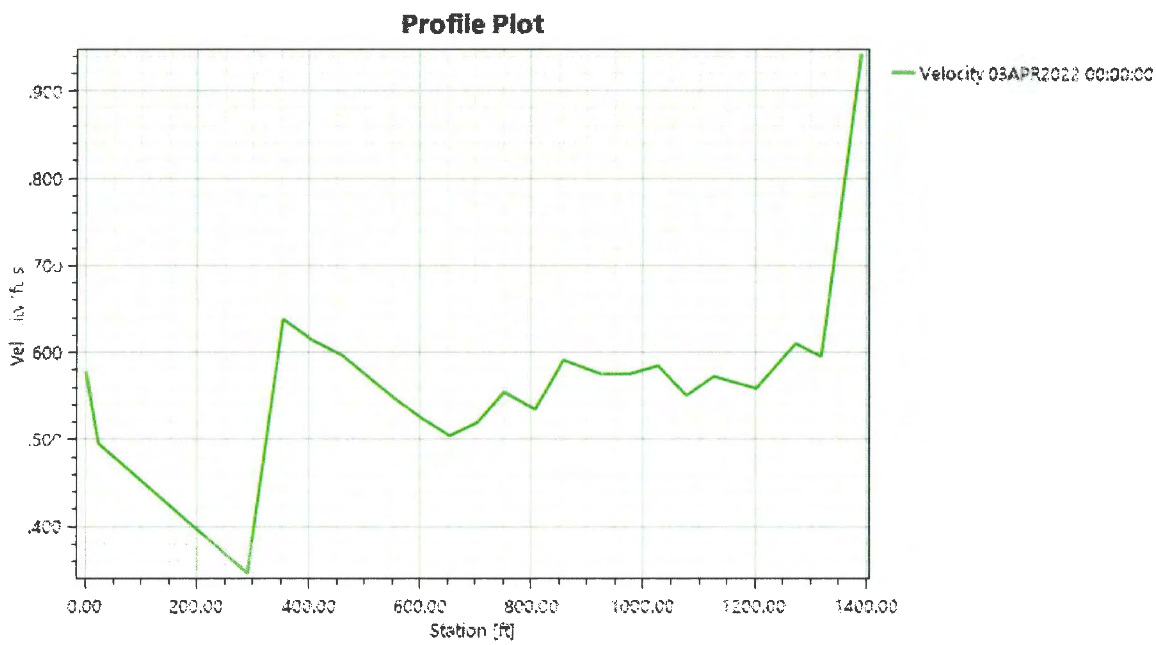
Profile view of the Invert elevations at the beginning and end of Branch channel sediment transport simulation.



Profile view of the stream velocities at bed elevation at the end of Branch channel sediment transport simulation.

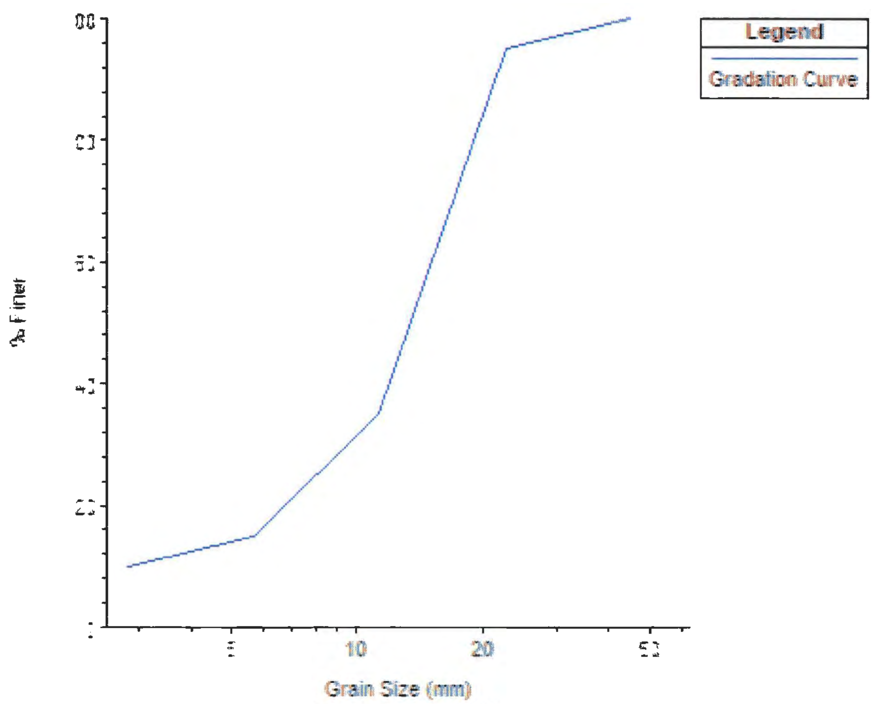


Profile view of the Invert elevations at the beginning and end of Main channel sediment transport simulation.



Profile view of the stream velocities at bed elevation at the end of Main channel sediment transport simulation.

A can be seen through the figure for both channels, the elevation change after almost 4 years simulation is very minimal and is combination of trivial (less than 0.2') scouring or deposition. Moreover, the stream velocity profiles at bed elevation indicated that the velocities do not exceed 1 ft/s. Table 11-1 of Standards for Soil Erosion and sediment Control in NJ has reported allowable stream velocities in channels. The restored channel is considered stable because the simulated velocities are below the lowest allowable velocities listed in the table (which is 1.8 ft/s for a sand texture). It should be noted that the proposed bed material is cobble with the following size distribution. The allowable velocity on this type of bed is 5.5 ft/s per table 11-1, and the velocities in the proposed channel are much less than this threshold.



Size distribution of the proposed bed and banks material (the chart is in mm; 25.4 mm = 1 inch).

(d)

The proposed restoration would benefit the habitat by creating a stabilized green landscape adjacent to the remaining pond area. The placement of fill is designed in accordance with riparian zone restoration guidelines set forth in N.J.A.C. 7:13-13.10 and N.J.A.C. 7:13-13.11. The proposed stream path is an attempt to maintain the historic pathway of the Black River to restore the natural condition, as feasible. The proposed channel bed and banks and backfill in riparian zones are stabilized through variety of measures, described in E&S control plan and in this report. The total amount of the fill material that can be placed on the floodplain is determined based on meeting the following criteria:

- No habitable building is impacted by increased depth or frequency of flooding.
- The proposed project does not increase onsite flood elevation more than 1 foot in areas within 500 feet upstream and downstream of the project site
- The proposed project does not increase offsite flood elevation more than 0.2' in areas located more than 500 feet away from upstream and downstream of the project site

7:13-13 Riparian Zone Mitigation

7:13-12.14 Requirements for Bank Stabilization and Channel Restoration

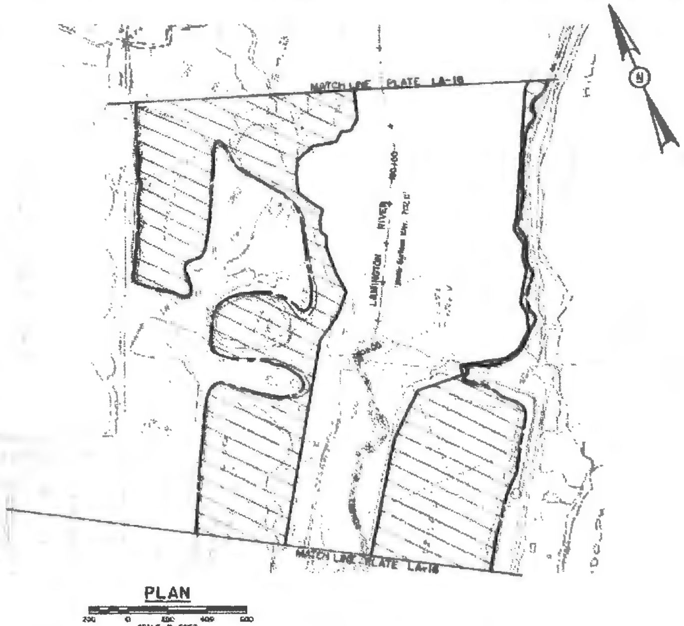
This project will not require any mitigation for regulated activity within a riparian zone. Table 11.2 presented in N.J.A.C. 7:13-11.2 indicates that up to 1,000 sf of 50-foot riparian zone vegetation can be cleared, cut, and/or removed without mitigation for channel restoration projects. The riparian zone disturbance area is limited to access for this project.

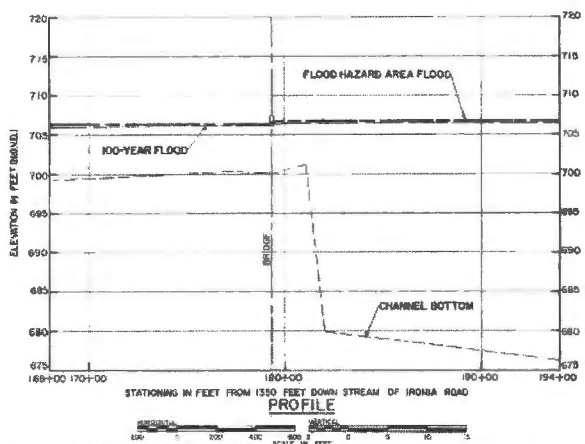
Prepared by or under the supervision of: ____________________

SEAL

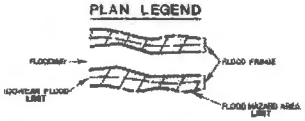
APPENDIX A

NJ&FEMA Flood Maps





PLAN LEGEND



NOTES

STATE OF NEW JERSEY
DEPARTMENT of ENVIRONMENTAL PROTECTION
DIVISION of WATER RESOURCES
BUREAU of FLOODPLAIN MANAGEMENT

Delineation of Floodway and Flood Hazard Area

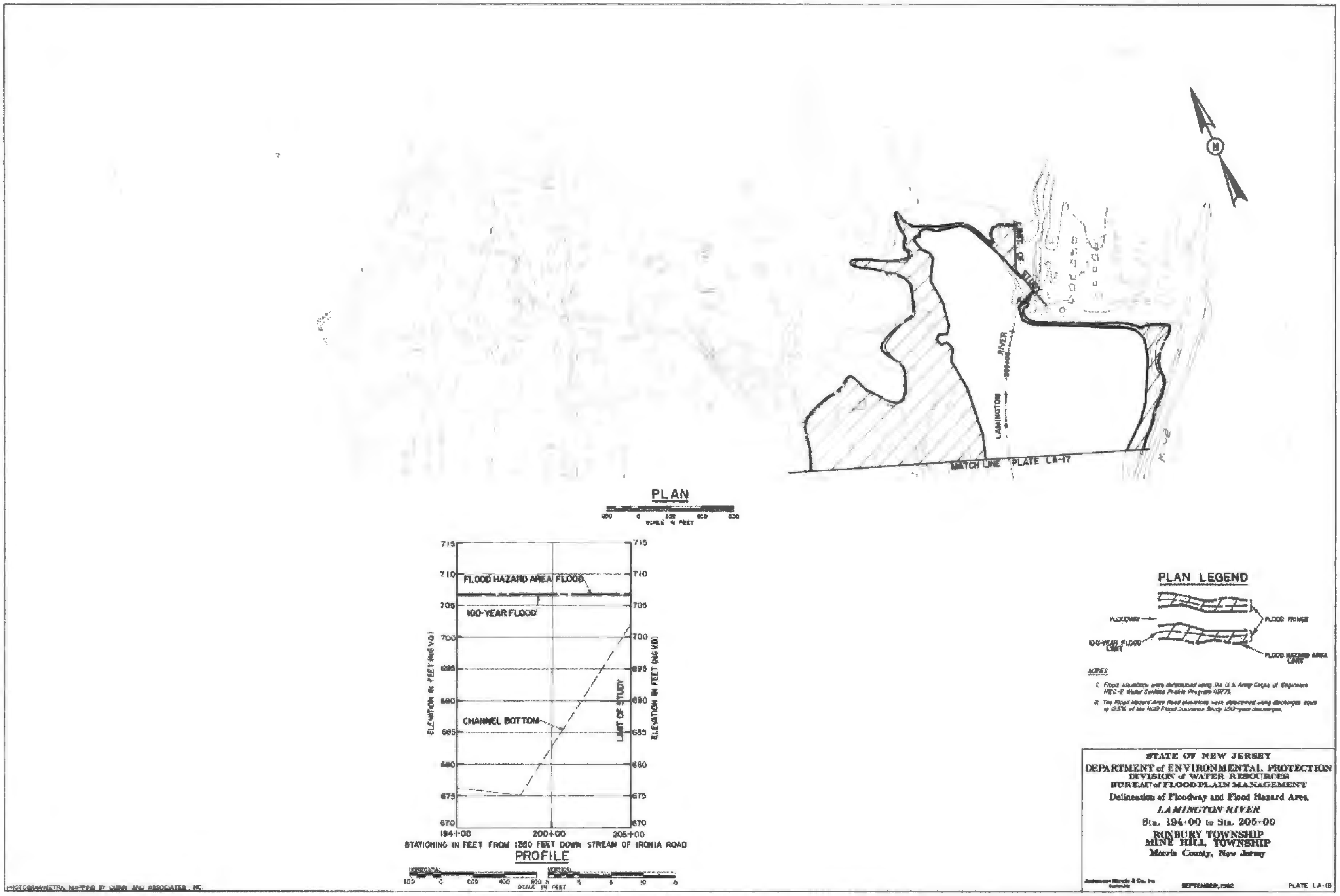
LAMINGTON RIVER

Sta. 168+00 to Sta. 194+00

ROXBURY TOWNSHIP
RANDOLPH TOWNSHIP
MINE HILL TOWNSHIP
Morris County, New Jersey

SEPTEMBER 1982

PLATE LA-17



LAMINGTON RIVER
MATCH LINE PLATE LA-17
PLAN
SCALE IN FEET
FLOOD HAZARD AREA FLOOD
100-YEAR FLOOD
CHANNEL BOTTOM
LIMIT OF STUDY
ELEVATION IN FEET (NGVD)
194+00
200+00
205+00
STATIONING IN FEET FROM 1360 FEET DOWN STREAM OF IRONIA ROAD
PROFILE
PLAN LEGEND
FLOODWAY
FLOOD FRINGE
100-YEAR FLOOD LIMIT
FLOOD HAZARD AREA LIMIT
STATE OF NEW JERSEY
DEPARTMENT of ENVIRONMENTAL PROTECTION
DIVISION of WATER RESOURCES
BUREAU of FLOOD PLAIN MANAGEMENT
Delineation of Floodway and Flood Hazard Area
LAMINGTON RIVER
Sta. 194+00 to Sta. 205+00
ROXBURY TOWNSHIP
MINE HILL TOWNSHIP
Morris County, New Jersey
PLATE LA-18

FIRM
FLOOD INSURANCE RATE MAP

TOWNSHIP OF
ROXBURY,
NEW JERSEY
MORRIS COUNTY

PANEL [illegible] OF 10

COMMUNITY-PANEL NUMBER
340362 0007 B

APPENDIX B

FEMA FIS & StreamStats Reports

FLOOD INSURANCE STUDY

TOWNSHIP OF
MINE HILL, NEW JERSEY
MORRIS COUNTY

MAY 3, 1993

Federal Emergency Management Agency

COMMUNITY NUMBER - 340556

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMa) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial FIS Effective Date: September 10. 1982
(Flood Insurance Rate Map only)

Revised FIS Date: May 3, 1993

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FIGURES

TABLES

EXHIBITS

FLOOD INSURANCE STUDY
TOWNSHIP OF MINE HILL, MORRIS COUNTY, NEW JERSEY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Township of Mine Hill, Morris County, New Jersey. This information will be used by the Township of Mine Hill to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the Lamington River were taken from the Flood Insurance Study for the Township of Roxbury (Reference 1).

1.3 Coordination

The purpose of an initial Consultation Coordination Officer's (CCO) meeting is to discuss the scope of the Flood Insurance Study. A final CCO meeting is held to review the results of the study.

On January 15, 1992, the Federal Emergency Management Agency (FEMA) notified the Township of Mine Hill of the initiation of a revised Flood Insurance Study. A final CCO meeting was held on April 3, 1992. This meeting was attended by representatives of FEMA and the township.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Mine Hill, Morris County, New Jersey.

The Lamington River, previously known as the Black River, was studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the Flood Insurance Rate Map (Exhibit 2). The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Allor portions of Jackson Brook and Shaw's Brook were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

2.2 Community Description

The Township of Mine Hill occupies approximately 3.0 square miles of Morris County in northern New Jersey. It is located approximately 40 miles west of New York City and approximately 70 miles northeast of Philadelphia, Pennsylvania.

Mine Hill is bordered by the Borough of Wharton to the north, the Townships of Dover to the east, Roxbury to the west, and Randolph to the south,

The 1990 population was 3,333, yielding a population density of 1,111 persons per square mile. Data from the 1990 census indicates that for the period 1980-1990, the population increased by approximately 0.2 percent (Reference 2). The township is predominantly a residential community with several scattered commercial establishments.

The Township of Mine Hill lies within the New Jersey Highlands, which are a portion of the Reading prong of the New England physiographic province. The Highlands consist of a series of flat-topped ridges separated by narrow, deep valleys. The hills are composed of hard, crystalline, resistant Precambrian igneous and metamorphic rocks, and the valleys are underlain by easily eroded shale and limestone (Reference 3). Elevations in the community range from 620 feet near St. Mary's Cemetery in the eastern part of the township to 960 feet east of Randall Road in the northeastern part of the township.

The Township of Mine Hill is well drained. In the southern and eastern portions the drainage pattern is characterized by fairly well defined valleys of rivers and brooks. The northern part of the township has an irregular drainage pattern.

Vegetation consists mainly of wooded areas. These areas consist of broadleaf species of white and pin oak, as well as willow, river birch, boxelder, sugar maple, red maple, beech, and basswood, along with various conifer species.

The climate in this area is mostly continental due to the predominance of winds from the interior. Winter climate is controlled by polar continental air masses; the summer climate is controlled by tropical air masses moving up over the United States from the Gulf of Mexico. Seasonal temperatures range from 29.2 degrees Fahrenheit (^{0}F) in January to 74.5^{0}F in July. The average annual precipitation is 44.1 inches, which is relatively high as compared to many sections of the North American continent (Reference 4).

The floodplains of the Lamington River, branch of the Lamington River, Granny Brook, and portions of Jackson Brook are generally undeveloped. The westerly side of Jackson Brook, between Route 46 and the southerly municipal boundary are lightly developed, mostly residential structures.

2.3 Principal Flood Problems

The history of flooding in Mine Hill indicates that flooding of various origins may be experienced in any season of the year since New Jersey lies along the major storm tracks of North America. Flooding during winter months is less frequent, but spring flooding compounded by snow melt and ice has occurred. The more extensive floods have occurred primarily in late summer and early fall, and are usually associated with tropical disturbances moving north along the Atlantic coast.

On August 27-28, 1971, New Jersey was hit by Hurricane Doria, rendering the state a natural disaster area. An extensive high water mark survey was conducted jointly by the State of New Jersey and the U. S. Geological Service (USGS) following Doria; these data are on file with the Division of Water Resources.

The streams and rivers in Mine Hill contribute to the South Branch Raritan River basin, the Musconetcong River basin, or the Lamington River basin. There are no USGS recording or crest-stage gaging stations on Drakes Brook, which is part of the South Branch Raritan River system. However, it is probable that major floods which have occurred downstream of Drakes Brook also reflect flooding in the Drakes Brook basin. USGS gaging station No. 01396500 on the South Branch Raritan River near High Bridge, New Jersey, is approximately 16 miles downstream of the mouth of Drakes Brook in Mount Olive. According to this gage, which has continuous records from 1918 to the present, the dates of ten major flooding events are as follows: October 9, 1903; March 15, 1940; July 19, 1945; November 7, 1951; August 19, 1955; October 14, 1955; April 2, 1970; August 28, 1971; December 1, 1974; and January 26, 1979. The January 26, 1979, flood was the flood of record at the High Bridge gage, with a flow of 6,360 cubic feet per second (cfs), which has been assigned a 100-year recurrence interval using a log-Pearson Type III analysis of the gage data (Reference 5).

USGS gaging station No. 01398500 is located on the North Branch Raritan River near Far Hills, New Jersey. Based on data collected from this gage, which began recording peak stages and discharges in 1919, probable dates of ten major floods are as follows: July 23, 1919; March 7, 1922; September 30, 1934; September 21, 1938; March 15, 1940; August 10, 1942; October 14, 1955; April 2, 1970; August 28, 1971; and May 31, 1972. For the Far Hills gage the July 23, 1919, flood was the flood of record with a flow of 7,000 cfs, which has been assigned a 100-year recurrence interval (Reference 6).

The recorded gage history of flooding in the Musconetcong River basin near Mine Hill began in 1929. Since then, several major floods have occurred and minor floods have been a common occurrence. Based on peak stages and discharges at USGS gaging station No. 01455500 at the outlet of Lake Hopatcong near Mine Hill, the dates of five major flooding events are as follows: March 19, 1936; October 20, 1936; August 20, 1955; October 3, 1955; and August 5, 1969. The August 20, 1955, flood was the flood of record at the gage at the outlet of Lake Hopatcong, with a flow of 795 cfs, which has been assigned a 50-year recurrence interval using a log-Pearson Type III analysis adjusted to account for flow regulation of the gage data (Reference 7).

There are no USGS recording or crest-stage gaging stations located on any of the remaining detailed studied streams, including the Lamington River. However, it is probable that major floods which have been recorded at nearby gaging stations influenced by similar climatic and physiographic factors would reflect flooding along the studied streams.

2.4 Flood Protection Measures

There are no flood protection structures in existence or being planned in the Township of Mine Hill. No formal written Civil Defense plans exist in the event of a flood. The Township Civil Defense Officer is responsible for alerting citizens of impending disasters, and for coordinating any emergency operations with community, county, and state public service agencies.

In an effort to minimize flood damages, the Division of Water Resources of the New Jersey Department of Environmental Protection, under authority of NJSA S8:16A-SO, has adopted rules, regulations and minimum standards concerning development and use of land within the floodway. Also, the use of the Flood Insurance Rate Map for the Township of Mine Hill in a manner consistent with sound floodplain zoning and the possible acquisition of land for open-space application are potential non-structural measures for mitigating future flood damages (Reference 8).

In addition, one of the goals of the National Weather Service is to provide municipalities with an early warning of expected flooding, particularly in the case of intense hurricanes. However, to be effective, these warnings must be implemented with sound civil defense protection and evacuation measures.

Non-structural measures of flood protection are also available to aid in the prevention of future flood damage. These are in the form of land use regulations adopted from the Code of Federal Regulations which control building within areas that have a high risk of flooding.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, SO-, 100-, or SOO-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, SO-, 100-, and SOO-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

No gage data were available for the Lamington River. For this stream, peak discharges for the selected recurrence intervals were calculated from the regional relationships developed by Stephen J. Stankowski of the USGS, in cooperation with the Division of Water Resources (Reference 9). These relationships were developed through a statistical regression analysis of data collected at over 100 gages across the State of New Jersey. This analysis accounts for urban development as well as natural retention in lakes and swamps.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
LAMINGTON RIVER					
Downstream of the confluence of Succasunna Brook	6.55	465	755	915	1,355
Upstream of the confluence of Succasunna Brook	4.54	315	520	630	935

The Stankowski regional equation was also used to determine flood flow for Jackson Brook (Reference 10). The drainage area, slope, storage and urbanization index were used to estimate the Mean Annual Flood.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

The overbank portions of the cross sections used for the hydraulic analysis for the Lamington River was obtained from mapping prepared by Geod Aerial Mapping, Inc. (Reference 11). The below-water sections were obtained by field measurement.

All bridges, dams, and culverts were field checked to obtain elevation data and structural geometry. In undeveloped stream segments, or long segments between structures, cross sections were located at regular intervals and changes in valley configuration. At structures, to determine their ability to pass flood flows, cross sections were taken at close intervals upstream and downstream of the structure and used in conjunction with the significant hydraulic features of the structure.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 12). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Lamington River were obtained from the Flood Insurance Study for the Township of Chester (Reference 13).

Roughness factors (Manning's "nlt) used in the hydraulic computations were chosen based on engineering judgment. Roughness values for the main channel of the tamington River ranged from 0.028 to 0.040, and the overbank values ranged from 0.060 to 0.080.

For the stream studied by approximate methods, the depth of flooding was determined using the Depth-Discharge-Frequency Curve for Non-Coastal Plain Sites in New Jersey with utilization of the discharges determined in the hydrologic analyses (Reference 14).

The hydraulic analysis for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study, and their descriptions, are shown on the maps.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 5 feet (Reference 15). Flooding along the upper reach of the Lamington River and Shaw's Brook were delineated using topographic maps at a scale of 1:360 and 1:600 (Reference 16).

For Jackson Brook which was studied by approximate methods, the 100-year floodplain boundary remains essentially unchanged from the delineation shown on the previously printed Flood Insurance Study for the Township of Mine Hill (Reference 8). The special flood hazard area delineated for Shaw's Brook, designated as Zone A, on the previously printed Flood Insurance Study for the Township of Mine Hill, has been removed based on topographic data at a scale of 1:360 and 1:600 both with a 2 foot contour interval (Reference 16). The remaining Zone A was to small to show at the printed scale.

The 100- and 500-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundaries correspond to the boundaries of the areas of special flood hazard (Zones A and AE), and the 500-year floodplain boundaries correspond to the boundaries of areas of moderate flood been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the stream studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. However, the State of New Jersey has established criteria limiting the increase in flood heights to 0.2 foot. Thus, a floodway having no more than a 0.2-foot surcharge has been delineated for this study. The floodway in this study is presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

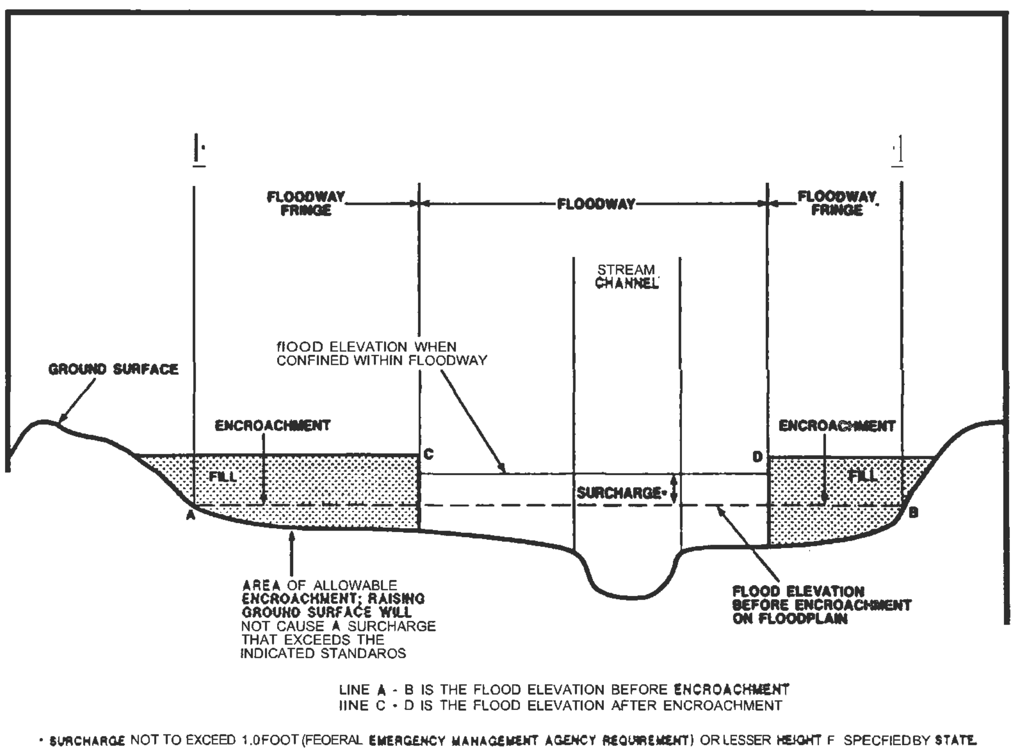
The floodway presented in this study is based on riverine flows and was determined using Methods 1 and 6 of the Encroachment Option of the HEC-2 computer program (Reference 12). To ensure hydraulic continuity within the study reach, the floodway limits were tested through Method 1, which is a continuous general encroachment along the water course. At each cross section, if maximums were exceeded, the encroachments were adjusted so that the water-surface elevation did not rise above the 0.2-foot limit at any location in the study reach. Because of the effect of downstream encroachments on upstream water-surface elevations, only minimal encroachment is permitted at some cross sections. This "domino" effect imposes an additional constraint on floodplain encroachments and results in a water-surface or energy grade line increase of less than 0.2 foot. Encroachments were made at natural valley sections and not onto roadways at bridges or along the crest of dams.

The floodway presented in this study was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated.

The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodway is shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 2, "Floodway Data." In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.



Floodway Schematic - Figure 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Lamington River								
A	18,025	1,120/820	34,373	0.1	706.7	706.7	706.9	0.2

1Feet above corporate limits for Township of Roxbury
2Yidth/width within corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MINE HILL, NJ
(MORRIS CO.)

FLOODWAY DATA

LAMINGTON RIVER

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the lOa-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the SaO-year floodplain, areas within the SaO-year floodplain, and to areas of lOa-year flooding where average depths are less than 1 foot, areas of lOa-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the lOa-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map (FIRM) is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section S.O and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and SOO-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the Townships of Roxbury, Randolph, Dover, and the Borough of Wharton (References 1, 17, 18, and 19).

Because it is based on more up-to-date analyses, this Flood Insurance Study supersedes the previously printed Flood Insurance Study for the Township of Mine Hill (Reference 8).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

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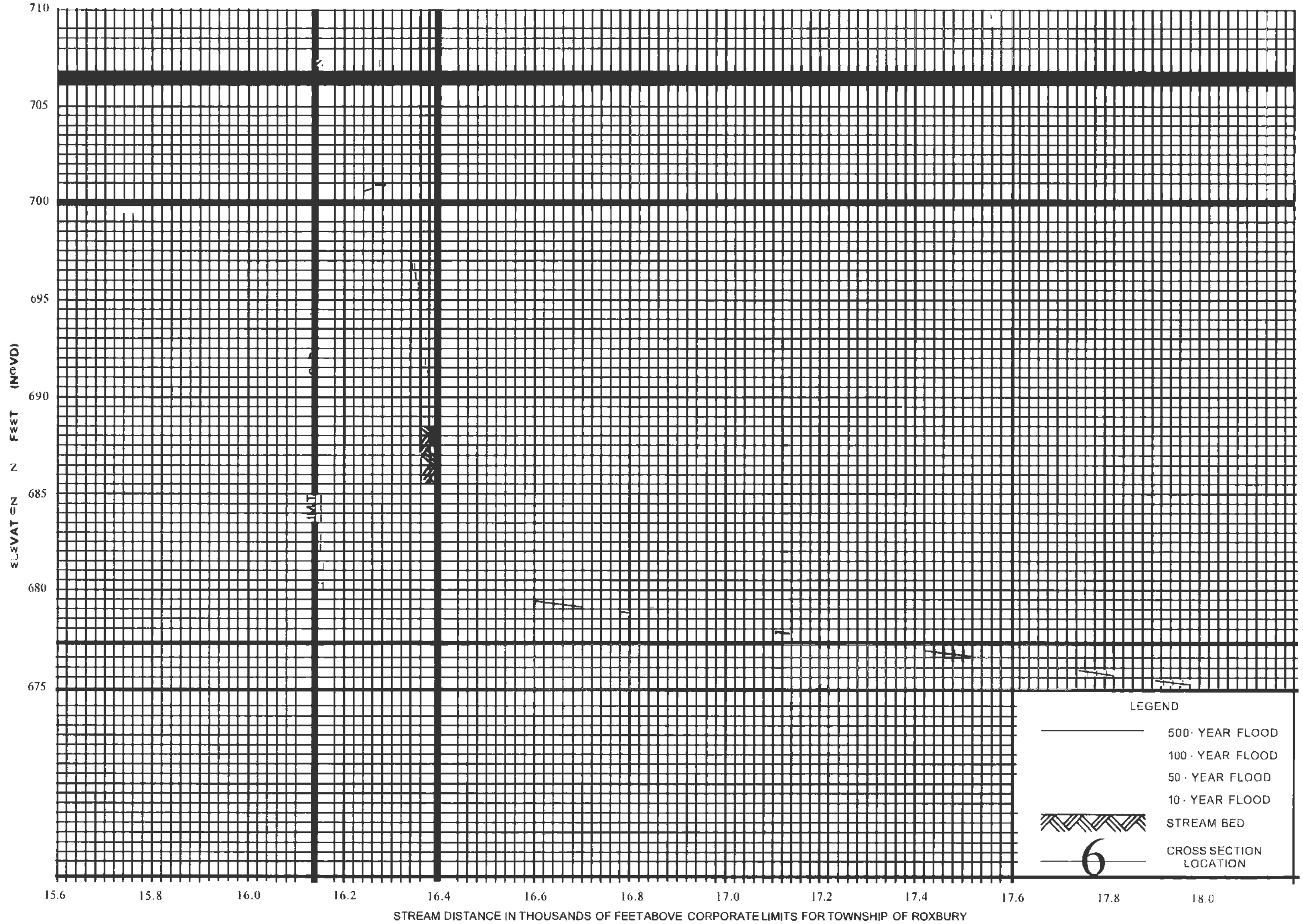


FLOOD PROFILES

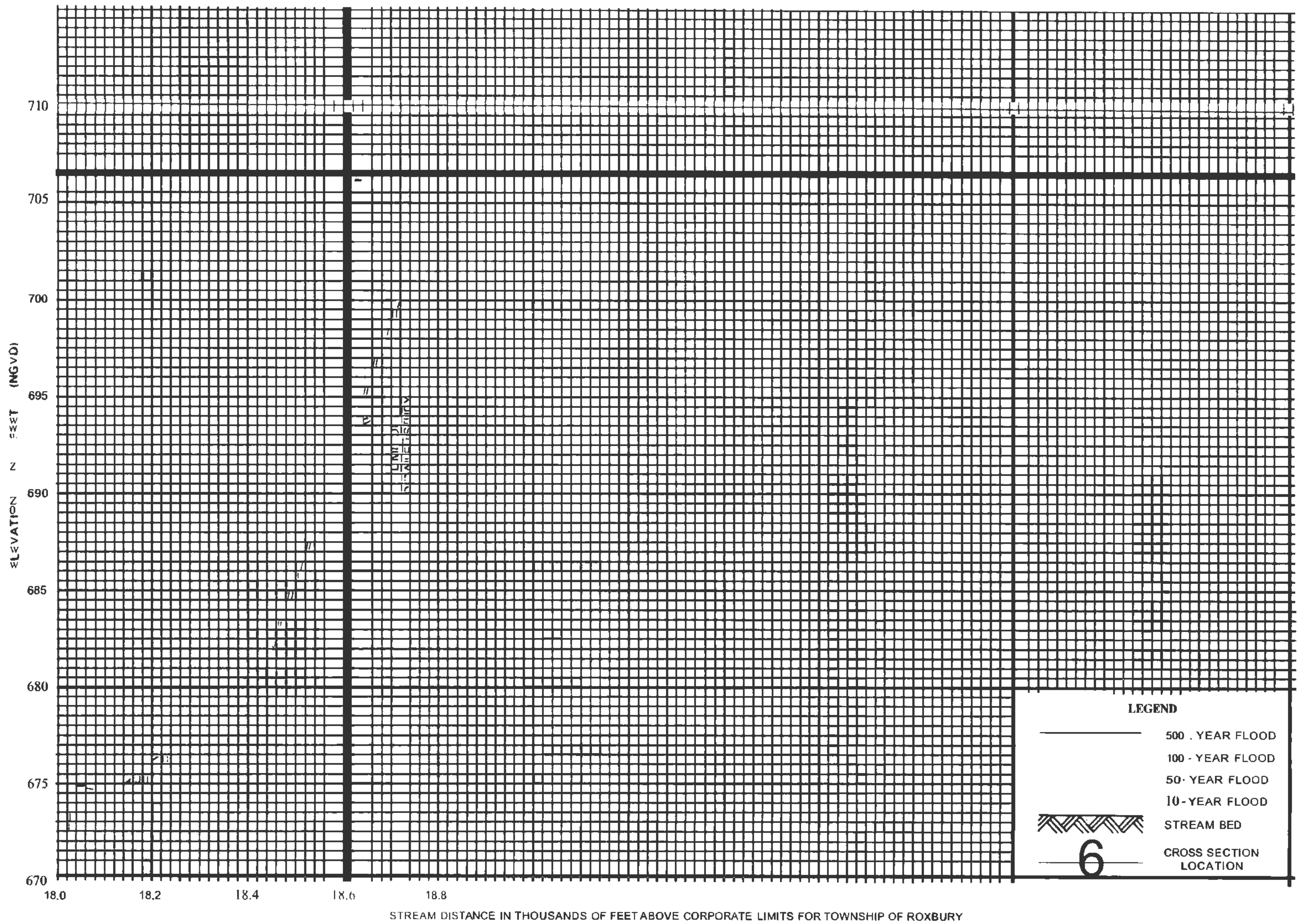
LAMINGTON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MINE HILL, NJ

(MORRIS CO.)

01P



FLOOD PROFILES

LAMINGTON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

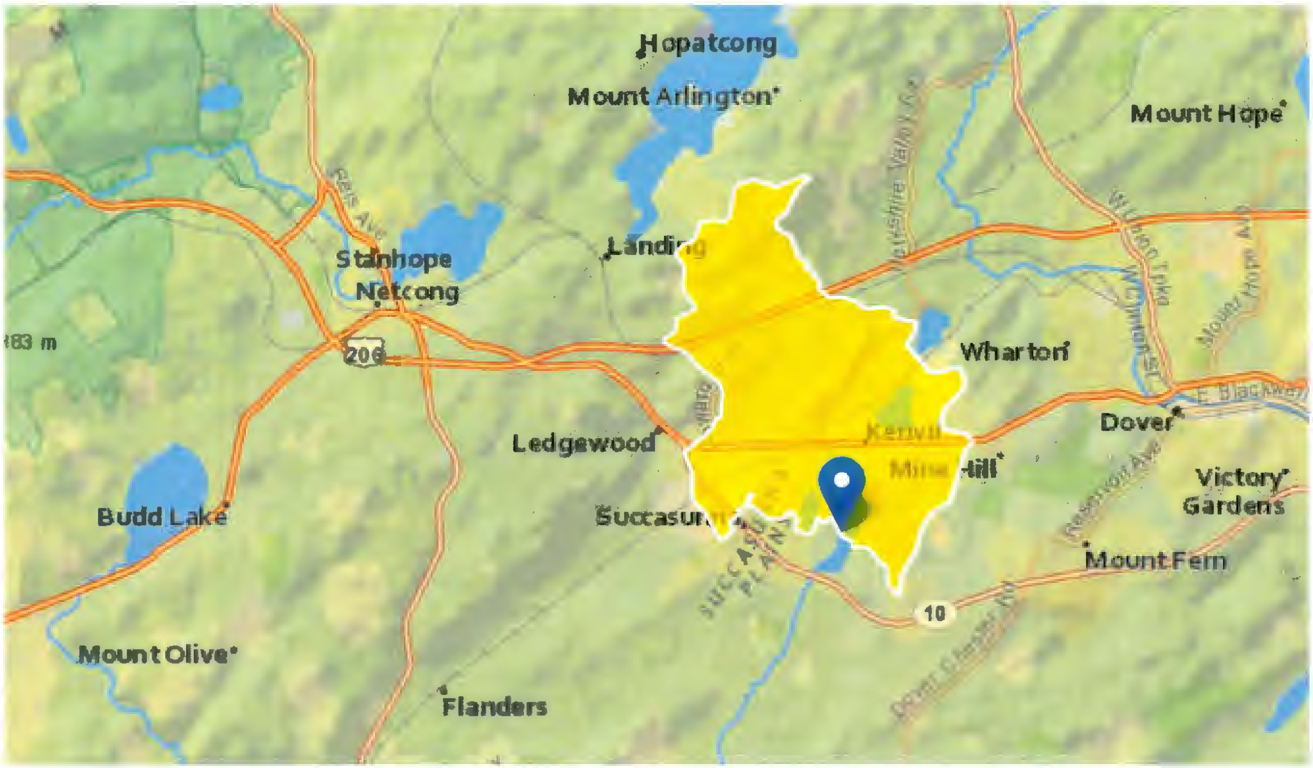
TOWNSHIP OF MINE HILL, NJ

(MORRIS CO.)

02P

StreamStats Report - NEW analysis

Region ID: NJ
Workspace ID: NJ20220301195132474000
Clicked Point (Latitude, Longitude): 40.86718, -74.62308
Time: 2022-03-01 14:51:47 -0500



New report using newly refined methods of stream stats, to better characterize small watersheds.

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	6.08	square miles
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	13.3	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	64.7	feet per mi

Parameter Code	Parameter Description	Value	Unit
POPDENS	Basin Population Density	1190	persons per square mile
PERMSSUR	Area-weighted average soil permeability from NRCS SSURGO database	4.7	inches per hour
JUNAVPRE	Mean June Precipitation	4.66	inches

Peak-Flow Statistics Parameters [Peak Valley and Ridge Region 2009 5167]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.87	763
STORAGE	Percent Storage	13.3	percent	2.36	30.1
CSL10_85	Stream Slope 10 and 85 Method	64.7	feet per mi	2.56	268
POPDENS	Basin Population Density	1190	persons per square mile	35	1493

Peak-Flow Statistics Flow Report [Peak Valley and Ridge Region 2009 5167]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp	Equiv. Yrs.
50-percent AEP flood	326	ft^3/s	50.3	1
20-percent AEP flood	523	ft^3/s	50.9	2
10-percent AEP flood	676	ft^3/s	52.2	3
4-percent AEP flood	891	ft^3/s	54.5	4
2-percent AEP flood	1060	ft^3/s	56.8	5
1-percent AEP flood	1240	ft^3/s	59.5	5
0.2-percent AEP flood	1700	ft^3/s	66.3	6

Peak-Flow Statistics Citations

Watson, K.M.,and Schopp, R.D.,2009, Methodology for estimation of flood magnitude and frequency for New Jersey streams, U.S. Geological Survey Scientific Investigations Report 2009-5167, 51 p. (http://pubs.usgs.gov/sir/2009/5167/)

Monthly Flow Statistics Parameters [Lowflow Non Coast baseline SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.6	159.88
PERMSSUR	Average Soil Permeability from SSURGO	4.7	inches per hour	0.43	6.99
JUNAVPRE	Mean June Precipitation	4.66	inches	3.79	4.81

Monthly Flow Statistics Parameters [Lowflow Non Coast current SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.35	159.88
PERMSSUR	Average Soil Permeability from SSURGO	4.7	inches per hour	0.38	6.73
JUNAVPRE	Mean June Precipitation	4.66	inches	3.79	4.76

Monthly Flow Statistics Flow Report [Lowflow Non Coast baseline SIR 2014 5004]

Statistic	Value	Unit
Jan_7_Day_10_Year_Low_Flow_Baseline	3.96	ft^3/s
Feb_7_Day_10_Year_Low_Flow_Baseline	4.73	ft^3/s
Mar_7_Day_10_Year_Low_Flow_Baseline	7.2	ft^3/s
Apr_7_Day_10_Year_Low_Flow_Baseline	7.04	ft^3/s
May_7_Day_10_Year_Low_Flow_Baseline	4.79	ft^3/s
Jun_7_Day_10_Year_Low_Flow_Baseline	2.45	ft^3/s
Jul_7_Day_10_Year_Low_Flow_Baseline	1.01	ft^3/s
Aug_7_Day_10_Year_Low_Flow_Baseline	0.738	ft^3/s
Sep_7_Day_10_Year_Low_Flow_Baseline	0.701	ft^3/s
Oct_7_Day_10_Year_Low_Flow_Baseline	0.9	ft^3/s
Nov_7_Day_10_Year_Low_Flow_Baseline	2.09	ft^3/s

Statistic	Value	Unit
Dec_7_Day_10_Year_Low_Flow_Baseline	3.24	ft^3/s

Monthly Flow Statistics Flow Report [Lowflow Non Coast current SIR 2014 5004]

Statistic	Value	Unit
Jan 7 Day 10 Year Low Flow	3.98	ft^3/s
Feb 7 Day 10 Year Low Flow	4.24	ft^3/s
Mar 7 Day 10 Year Low Flow	5.77	ft^3/s
Apr 7 Day 10 Year Low Flow	6.15	ft^3/s
May 7 Day 10 Year Low Flow	3.75	ft^3/s
Jun 7 Day 10 Year Low Flow	1.44	ft^3/s
Jul 7 Day 10 Year Low Flow	0.679	ft^3/s
Aug 7 Day 10 Year Low Flow	0.382	ft^3/s
Sep 7 Day 10 Year Low Flow	0.41	ft^3/s
Oct 7 Day 10 Year Low Flow	0.591	ft^3/s
Nov 7 Day 10 Year Low Flow	1.16	ft^3/s
Dec 7 Day 10 Year Low Flow	2.48	ft^3/s

Monthly Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Jan_7_Day_10_Year_Low_Flow_Baseline	3.96	ft^3/s
Feb_7_Day_10_Year_Low_Flow_Baseline	4.73	ft^3/s
Mar_7_Day_10_Year_Low_Flow_Baseline	7.2	ft^3/s
Apr_7_Day_10_Year_Low_Flow_Baseline	7.04	ft^3/s
May_7_Day_10_Year_Low_Flow_Baseline	4.79	ft^3/s
Jun_7_Day_10_Year_Low_Flow_Baseline	2.45	ft^3/s
Jul_7_Day_10_Year_Low_Flow_Baseline	1.01	ft^3/s
Aug_7_Day_10_Year_Low_Flow_Baseline	0.738	ft^3/s
Sep_7_Day_10_Year_Low_Flow_Baseline	0.701	ft^3/s
Oct_7_Day_10_Year_Low_Flow_Baseline	0.9	ft^3/s
Nov_7_Day_10_Year_Low_Flow_Baseline	2.09	ft^3/s

Statistic	Value	Unit
Dec_7_Day_10_Year_Low_Flow_Baseline	3.24	ft^3/s
Jan 7 Day 10 Year Low Flow	3.98	ft^3/s
Feb 7 Day 10 Year Low Flow	4.24	ft^3/s
Mar 7 Day 10 Year Low Flow	5.77	ft^3/s
Apr 7 Day 10 Year Low Flow	6.15	ft^3/s
May 7 Day 10 Year Low Flow	3.75	ft^3/s
Jun 7 Day 10 Year Low Flow	1.44	ft^3/s
Jul 7 Day 10 Year Low Flow	0.679	ft^3/s
Aug 7 Day 10 Year Low Flow	0.382	ft^3/s
Sep 7 Day 10 Year Low Flow	0.41	ft^3/s
Oct 7 Day 10 Year Low Flow	0.591	ft^3/s
Nov 7 Day 10 Year Low Flow	1.16	ft^3/s
Dec 7 Day 10 Year Low Flow	2.48	ft^3/s

Monthly Flow Statistics Citations

Watson, K.M., and McHugh, A.R.,2014, Regional regression equations for the estimation of selected monthly low-flow duration and frequency statistics at ungaged sites on streams in New Jersey: U.S. Geological Survey Scientific Investigations Report 2014–5004, 59 p. (baseline, period-or-record statistics) (http://dx.doi.org/10.3133/sir20145004StreamStatsDB\2019_12_13_DataSource_table.xlsxDa

Seasonal Flow Statistics Parameters [Lowflow Non Coast baseline SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.6	159.88

Seasonal Flow Statistics Parameters [Lowflow Non Coast current SIR 2014 5004]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.35	159.88

Seasonal Flow Statistics Flow Report [Lowflow Non Coast baseline SIR 2014 5004]

Statistic	Value	Unit

Statistic	Value	Unit
Aug_Sep_75_Pct_Dur_Min_1_Day_Low_Flow_Ba	2.17	ft^3/s
Aug_Sep_90_Pct_Dur_Min_1_Day_Low_Flow_Ba	1.47	ft^3/s
Aug_Sep_99_Pct_Dur_Min_1_Day_Low_Flow_Ba	0.738	ft^3/s

Seasonal Flow Statistics Flow Report [Lowflow Non Coast current SIR 2014 5004]

Statistic	Value	Unit
Aug Sep 75 Pct Dur Min 1 Day Low Flow	1.48	ft^3/s
Aug Sep 90 Pct Dur Min 1 Day Low Flow	0.968	ft^3/s
Aug Sep 99 Pct Dur Min 1 Day Low Flow	0.561	ft^3/s

Seasonal Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Aug_Sep_75_Pct_Dur_Min_1_Day_Low_Flow_Ba	2.17	ft^3/s
Aug_Sep_90_Pct_Dur_Min_1_Day_Low_Flow_Ba	1.47	ft^3/s
Aug_Sep_99_Pct_Dur_Min_1_Day_Low_Flow_Ba	0.738	ft^3/s
Aug Sep 75 Pct Dur Min 1 Day Low Flow	1.48	ft^3/s
Aug Sep 90 Pct Dur Min 1 Day Low Flow	0.968	ft^3/s
Aug Sep 99 Pct Dur Min 1 Day Low Flow	0.561	ft^3/s

Seasonal Flow Statistics Citations

Watson, K.M., and McHugh, A.R.,2014, Regional regression equations for the estimation of selected monthly low-flow duration and frequency statistics at ungaged sites on streams in New Jersey: U.S. Geological Survey Scientific Investigations Report 2014–5004, 59 p. (baseline, period-or-record statistics) (http://dx.doi.org/10.3133/sir20145004StreamStatsDB\2019_12_13_DataSource_table.xlsxDa

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.07722	940.1535

Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	6.08	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	32.1	ft
Bieger_D_channel_depth	1.88	ft
Bieger_D_channel_cross_sectional_area	61.4	ft^2

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	41.9	ft
Bieger_P_channel_depth	2.05	ft
Bieger_P_channel_cross_sectional_area	86.9	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	23.4	ft
Bieger_USA_channel_depth	1.77	ft
Bieger_USA_channel_cross_sectional_area	45.3	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	32.1	ft
Bieger_D_channel_depth	1.88	ft
Bieger_D_channel_cross_sectional_area	61.4	ft^2
Bieger_P_channel_width	41.9	ft

Statistic	Value	Unit
Bieger_P_channel_depth	2.05	ft
Bieger_P_channel_cross_sectional_area	86.9	ft^2
Bieger_USA_channel_width	23.4	ft
Bieger_USA_channel_depth	1.77	ft
Bieger_USA_channel_cross_sectional_area	45.3	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_can

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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Application Version: 4.7.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

APPENDIX C

Geotechnical Report

Dynamic Earth, LLC
245 Main Street, Suite 110
Chester, NJ 07930
T. 908-879-7095

Date: April 4, 2022
Via email:

County Concrete Corp.
50 Railroad Avenue,
Kenvil, NJ 07847

Attn: John Crimi

RE: Slope Stability Analysis
Black River Restoration
Mine Hill and Roxbury Township, Morris County, New Jersey
Dynamic Earth Project No.: 1949-99-001EC

Dear Mr. Crimi;

Dynamic Earth, LLC (Dynamic Earth) has completed the laboratory testing of the fill material and the slope stability analysis. The results of our slope stability analysis are detailed herein.

Project Details:

The subject site located in the Morris County identified as the Rutgers Pond, a man-made pond located within both Roxbury and Mine Hill Townships. The proposed restoration area is bound to the north by the existing County Concrete Corporation; east by undeveloped wooded area and Canfield Avenue beyond; to the south by Randolph Park beach and Rt. 10 beyond and on the west by Cutting Edge Sawmill and residential developments beyond. Based on Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc., the approximate area of the reclamation is 40,655 square feet. The proposed restoration includes reclamation of partial land area from the existing Rutgers pond by filling the pond with quarry tailings from the nearby County Concrete Corporation. The proposed restoration to reestablish the natural channel of the Black River within the reclaimed land mass.

Site Geology:

Based on the Bedrock Geologic Map of Northern New Jersey prepared by the United States Department of the Interior, U.S. Geologic Survey, the site is located within the Valley and Ridge Province of Northern New Jersey. Specifically, the site is underlain by the Middle and Lower Cambrian-aged Leithville Formation. This formation reportedly consists of light- to dark-gray and light-olive-gray fine- to medium-grained thin- to medium-bedded dolomite grading downward through medium-gray, grayish-yellow, or pinkish-gray dolomite and dolomitic sandstone, siltstone and shale to medium-gray, medium-grained, medium bedded dolomite containing quartz sand grains as stringers and lenses near the base. Overburden materials include glacial deposits associated with the Wisconsinan Glacial Cycle which reached its most southerly advance thousands of years ago and alluvial deposits.

Historical Document Review:

As part of the slope stability analysis, historical and available data was obtained using sources such as *New Jersey Geoweb*, and *New Jersey Department of Transportation Geotechnical Data Management System*. The data obtained using above sources were used in the development of the finite element models utilized to evaluate the slope stability of the proposed land reclamation.

Laboratory Analysis:

A representative sample of the material proposed to be utilized during the land reclamation was subjected to a laboratory testing program which included, natural moisture content determinations (ASTM D-2216), Atterberg limits (ASTM D-4318), and washed gradation analyses (ASTM D-6913) in order to perform engineering soil classifications in general accordance with ASTM D-2487.

Finite Element Analysis:

Dynamic Earth performed slope stability analysis using Midas SoilWorks (2020) version 1.1, a finite element modeling software. The proposed landmass cross sections were provided on a drawing labeled Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc. The aforementioned drawing presented four proposed cross sections of the land mass. Each cross section was modeled in SoilWorks in one to one scale in order to mimic expected conditions once completed. The model considered the long-term stability of the slopes during the analysis.

The historical data and the results from the laboratory investigation were used to generate the soil parameters used in the analysis. See the accompanying finite element analysis output summary for the results.

Slope Stability Review:

The stability of the conceptual slopes was performed and the factor of safety obtained through the finite element analysis of the crucial slopes are summarized in the table below.

SUMMARY OF SLOPE STABILITY ANALYSIS	
Cross Section	**Factor of Safety**
A - A	5.55
B - B	3.08
C - C	1.40
D - D	1.31

The long-term slope stability obtained using the finite element analysis for the critical conceptual slopes are larger than the industrial minimum factor of safety of 1.3.

Please feel free to contract us with any questions regarding these matters.

Sincerely,

DYNAMIC EARTH, LLC

Peter H. Howell, P.E.
Principal
NJ PE License No. 24GE04728700

Janitha Batagoda, Ph.D.
Geotechnical Engineer

Enclosures: Slope Stability Analysis Summary

CC: Kurt Peters

SLOPE STABILITY ANALYSIS

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

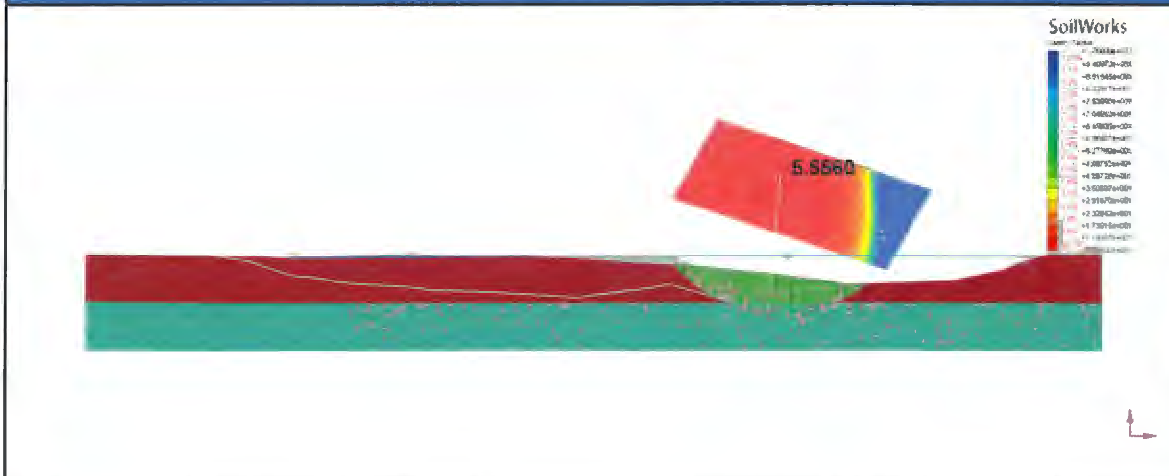
1. Soil Properties

Section	Wet unit weight (lbf/ft^3)	Saturated unit weight (lbf/ft^3)	Cohesion (lbf/ft^2)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft^2)	Poisson's ratio
Pond Fill Material	115.000	130.000	-	17.00	-	-
Natural MD sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	5.556	**OK**

Critical Embankment region slope stability check: In case of Slope Stability analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

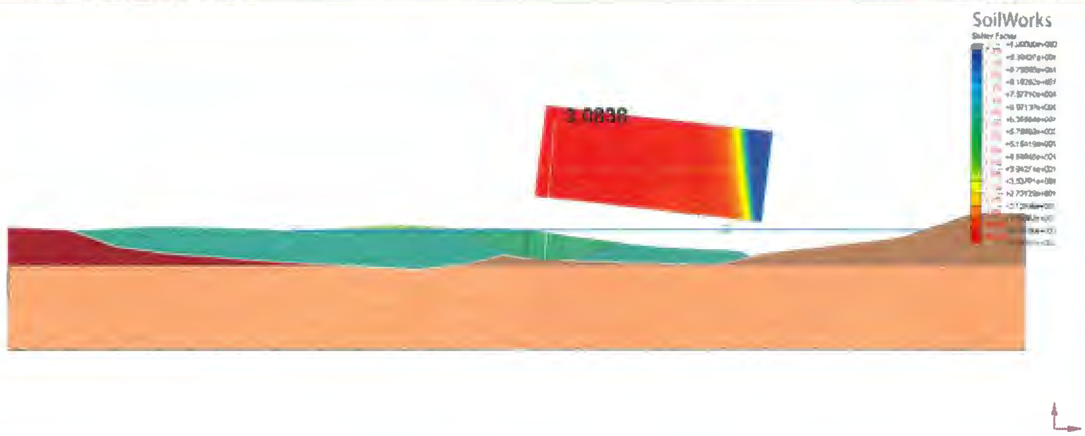
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis		



Standard safety factor	1.300	Evaluation
Analysis safety factor	3.084	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

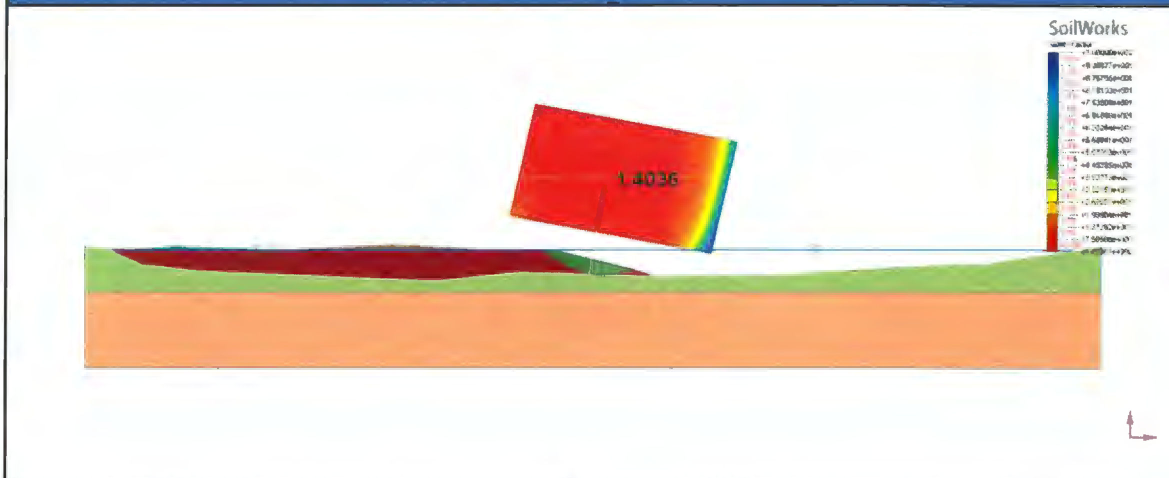
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.030	-	16.00	-	-
Natural MD Sand	120.000	128.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	1.404	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

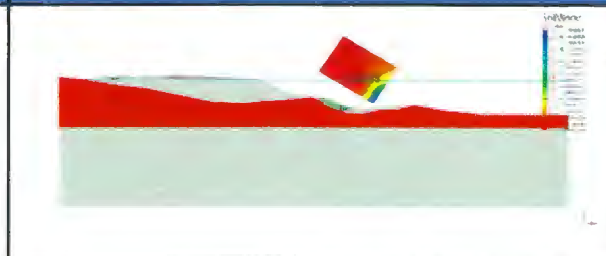
II. Applied Properties

1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	130.000	-	28.00	-	-
Dense Sand	125.000	130.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

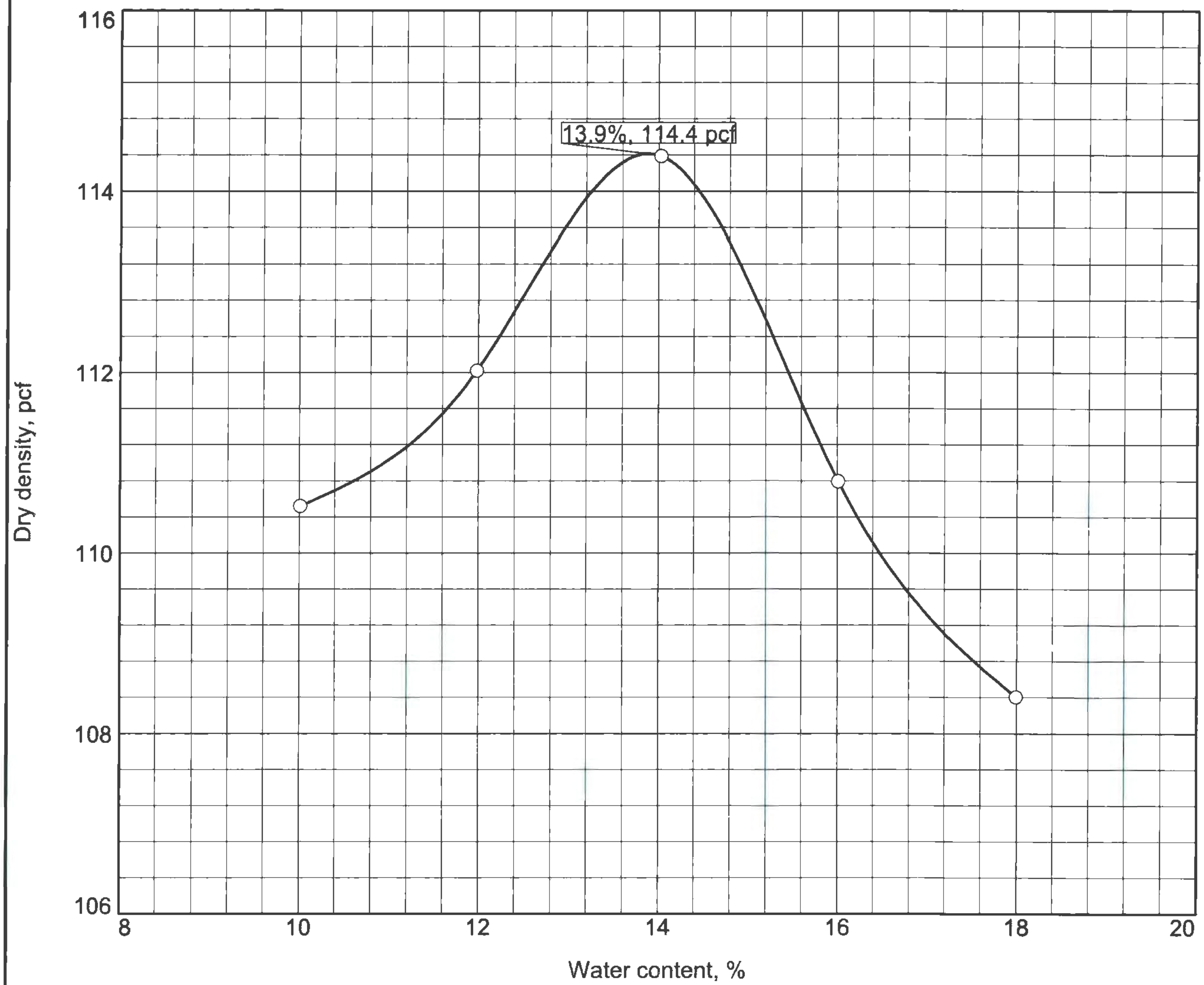
Slope Stability Slope 1			Slope Stability Slope 2		
					
Standard safety factor	1.300	Evaluation	Standard safety factor	1.300	Evaluation
Analysis safety factor	1.314	**OK**	Analysis safety factor	1.673	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Slope 1,Slope Stability Slope 2 allowable safety factor 1.3 has been satisfied.

Determined to be safe.

LABORATORY TESTING

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
N/A	ML	N/A	11.7	N/A	17	NP	0.3	54.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 114.4 pcf Optimum moisture = 13.9 %	Brown Silt, and c-f sand, trace f gravel

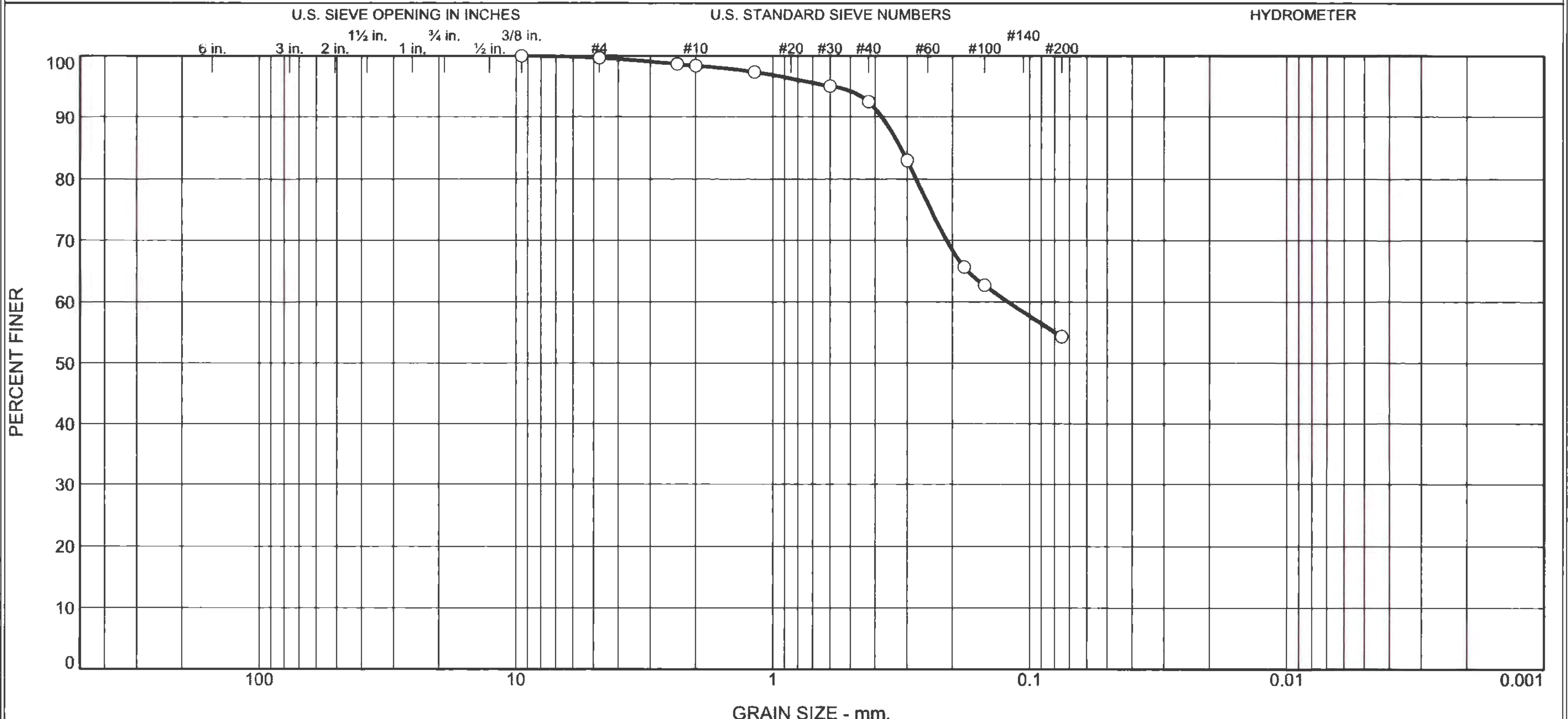
Project No. 1949-99- **Client:** County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
○ **Source of Sample:** Pond Fill **Sample Number:** BS-1

DYNAMIC EARTH

Remarks:

Figure 1

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.3	5.9	38.2	54.3	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	B-1	--	--	2/22/22	ML	Brown silt, and c-f sand, trace f gravel	11.7	17	19

Client County Concrete

Project Existing Concrete Plant

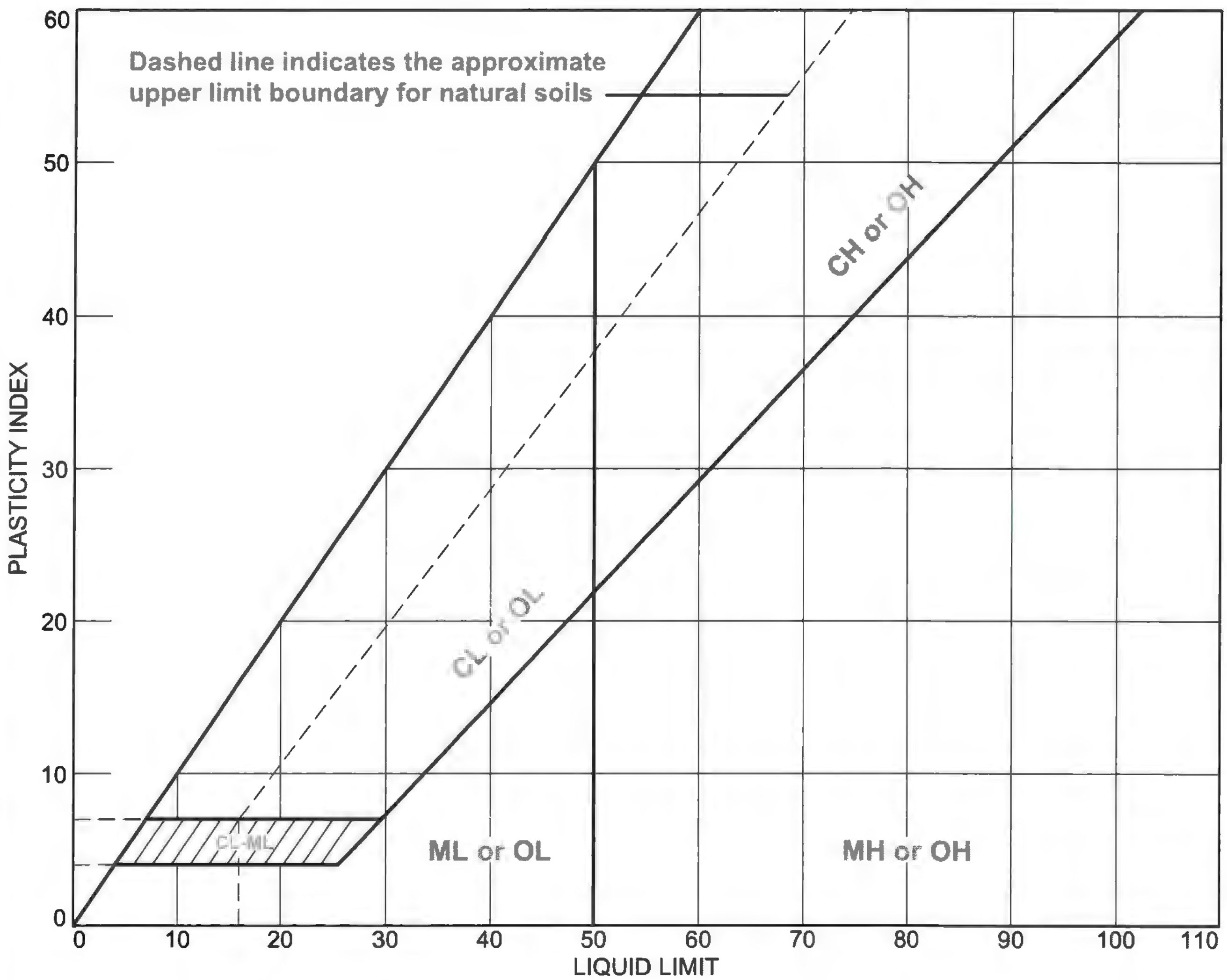
50 Railroad Avenue, Kenvil, New Jersey

Project No. 1949-99-001EC Figure 2

DYNAMIC EARTH

Stockpiled Processed - Pond Fill

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1	--	--	11.7	19	17	NP	ML

DYNAMIC EARTH

Client: County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No.: 1949-99- **Figure** 3

APPENDIX D

Stormwater Report

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Legend

Hyd.	Origin	Description
1	SCS Runoff	EXISITNG POND SURFACE
2	SCS Runoff	PROPOSED LANDSCAPE

Project: hydrographs.gpw	Tuesday, 04 / 26 / 2022

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	------	-------	16.30	-------	-------	24.07	-------	-------	38.49	EXISITNG POND SURFACE
2	SCS Runoff	------	-------	1.582	-------	-------	4.838	-------	-------	12.83	PROPOSED LANDSCAPE

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	16.30	2	740	101,729	------	------	------	EXISITNG POND SURFACE
2	SCS Runoff	1.582	2	780	18,317	------	------	------	PROPOSED LANDSCAPE

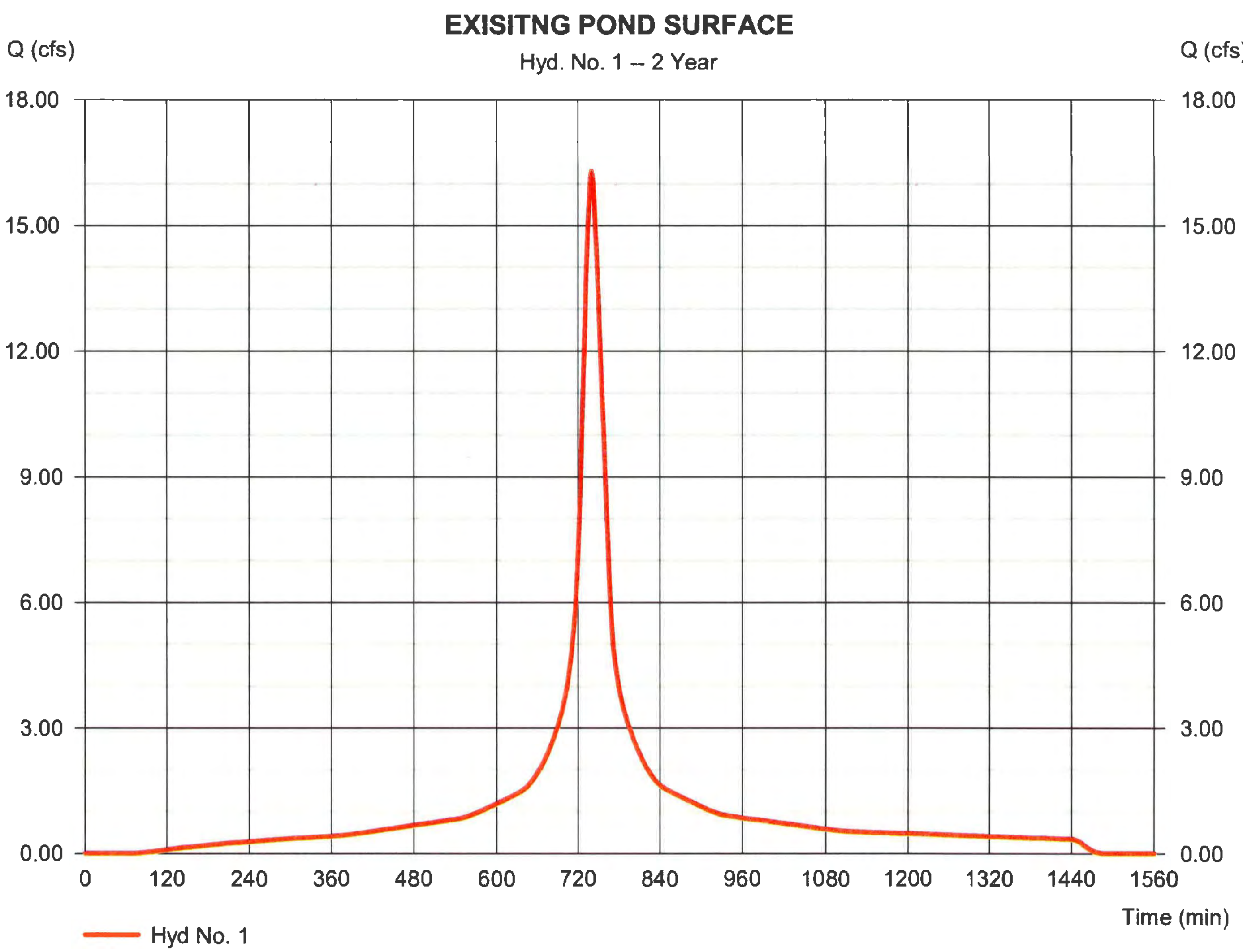
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Tuesday, 04 / 26 / 2022

Hyd. No. 1

EXISITNG POND SURFACE

Hydrograph type	= SCS Runoff	Peak discharge	= 16.30 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 101,729 cuft
Drainage area	= 8.400 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 27.50 min
Total precip.	= 3.57 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood Stora[illegible]\ENG\STORM\stormwater modeling\TYPE D DI	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

EXISITNG POND SURFACE

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	300.0		300.0		300.0		
Two-year 24-hr precip. (in)	=	3.57		3.57		3.57		
Land slope (%)	=	0.10		0.10		0.10		
Travel Time (min)	**=**	**9.16**	**+**	**9.16**	**+**	**9.16**	**=**	**27.47**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=0.00			0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00							
				0.00				
						0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 27.50 min

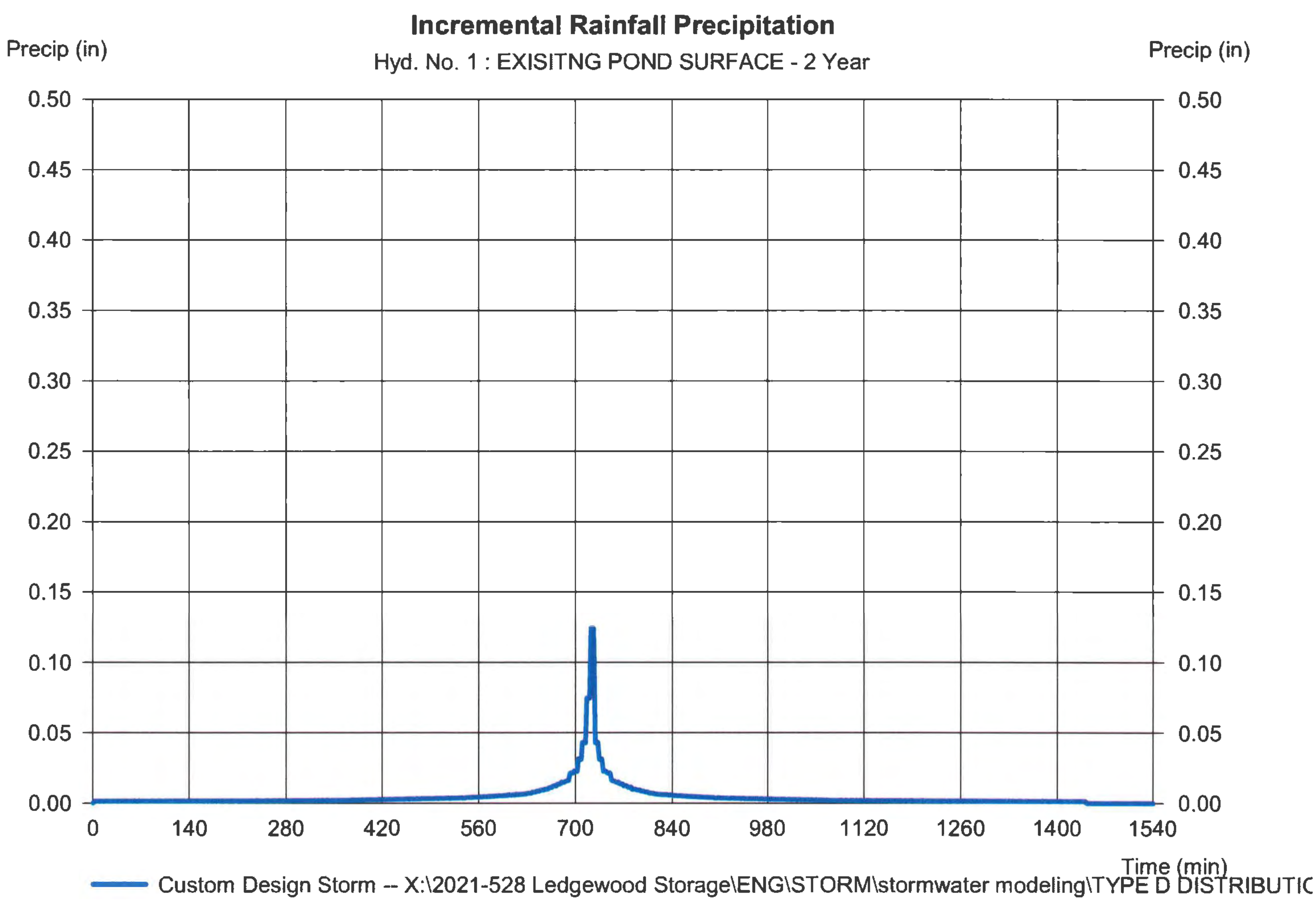
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 1

EXISITNG POND SURFACE

Storm Frequency	= 2 yrs	Time interval	= 2 min
Total precip.	= 3.5700 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood Storage\ENG\STORM\stormwater modeling\TYPE D D		



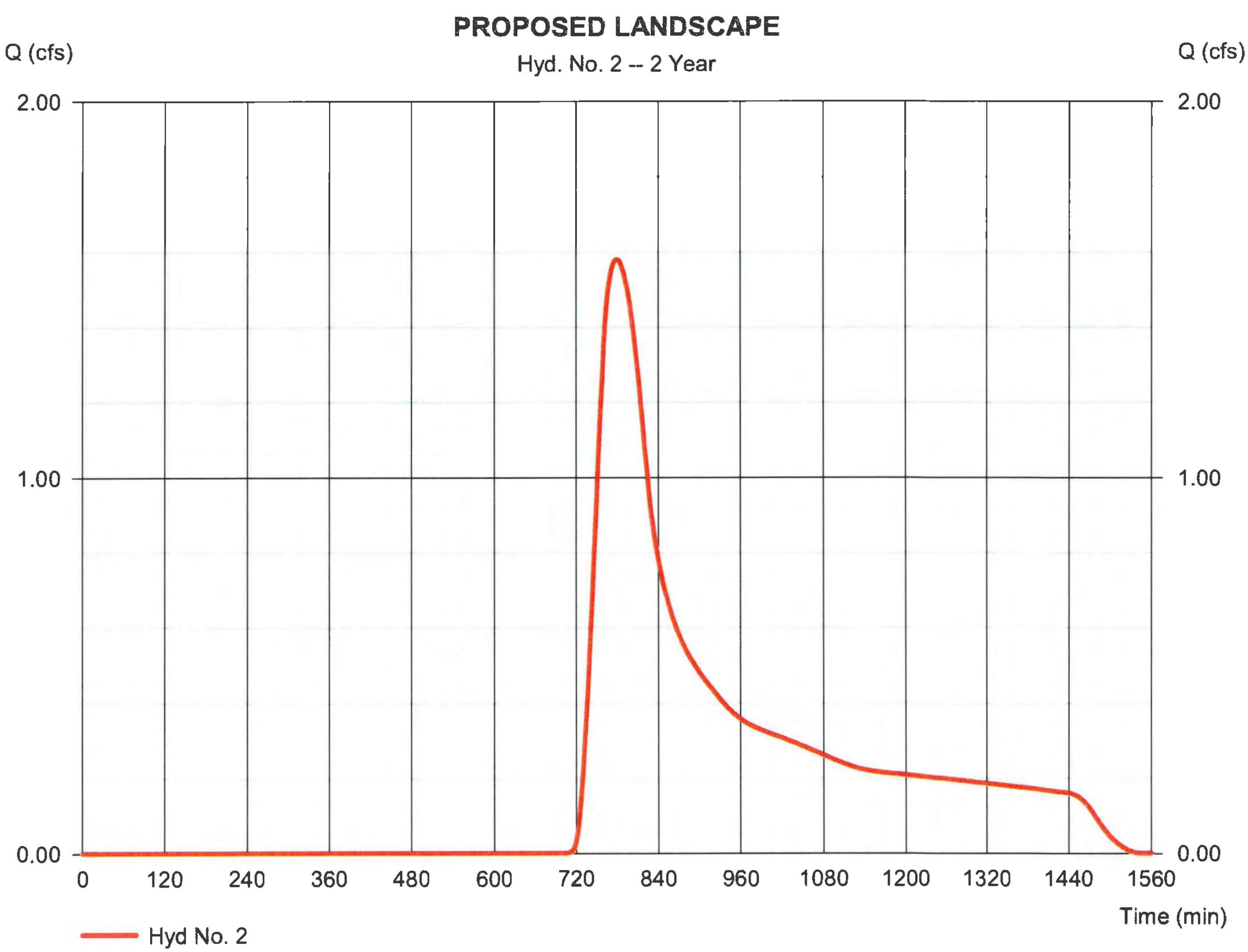
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 2

PROPOSED LANDSCAPE

Hydrograph type	= SCS Runoff	Peak discharge	= 1.582 cfs
Storm frequency	= 2 yrs	Time to peak	= 780 min
Time interval	= 2 min	Hyd. volume	= 18,317 cuft
Drainage area	= 8.400 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 67.00 min
Total precip.	= 3.57 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood StoraShapeGastORM\stormwater484modeling\TYPE D DI		



TR55 Tc Worksheet

Hyd. No. 2

PROPOSED LANDSCAPE

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.150		0.150		
Flow length (ft)	=	300.0		300.0		300.0		
Two-year 24-hr precip. (in)	=	3.57		3.57		3.57		
Land slope (%)	=	2.00		2.00		2.00		
Travel Time (min)	**=**	**22.34**	**+**	**22.34**	**+**	**22.34**	**=**	**67.02**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	({0})	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Total Travel Time, Tc								**67.00 min**

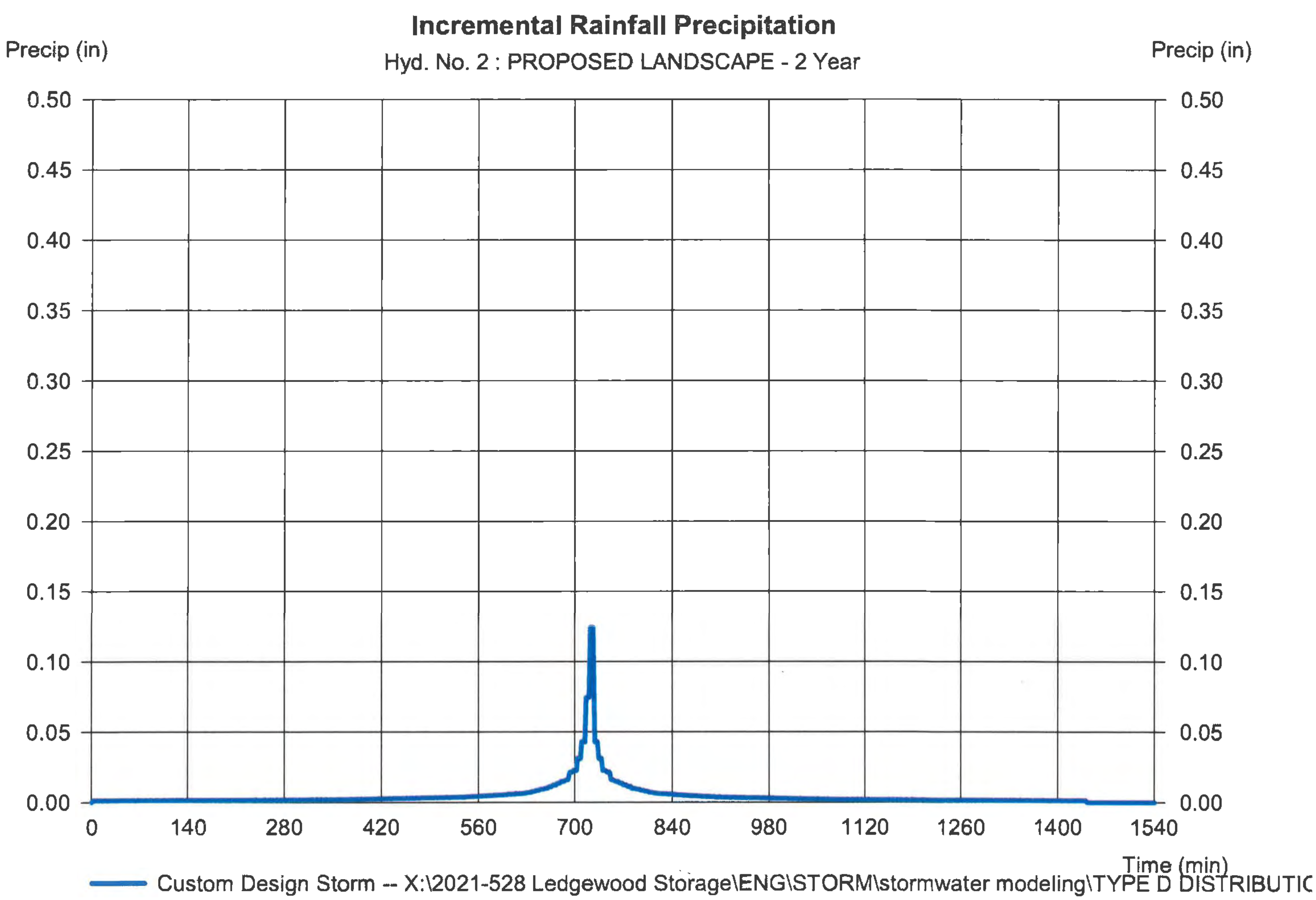
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 2

PROPOSED LANDSCAPE

Storm Frequency	= 2 yrs	Time interval	= 2 min
Total precip.	= 3.5700 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood Storage\ENG\STORM\stormwater modeling\TYPE D D		



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	24.07	2	740	152,546	------	------	------	EXISITNG POND SURFACE
2	SCS Runoff	4.838	2	770	45,920	------	------	------	PROPOSED LANDSCAPE

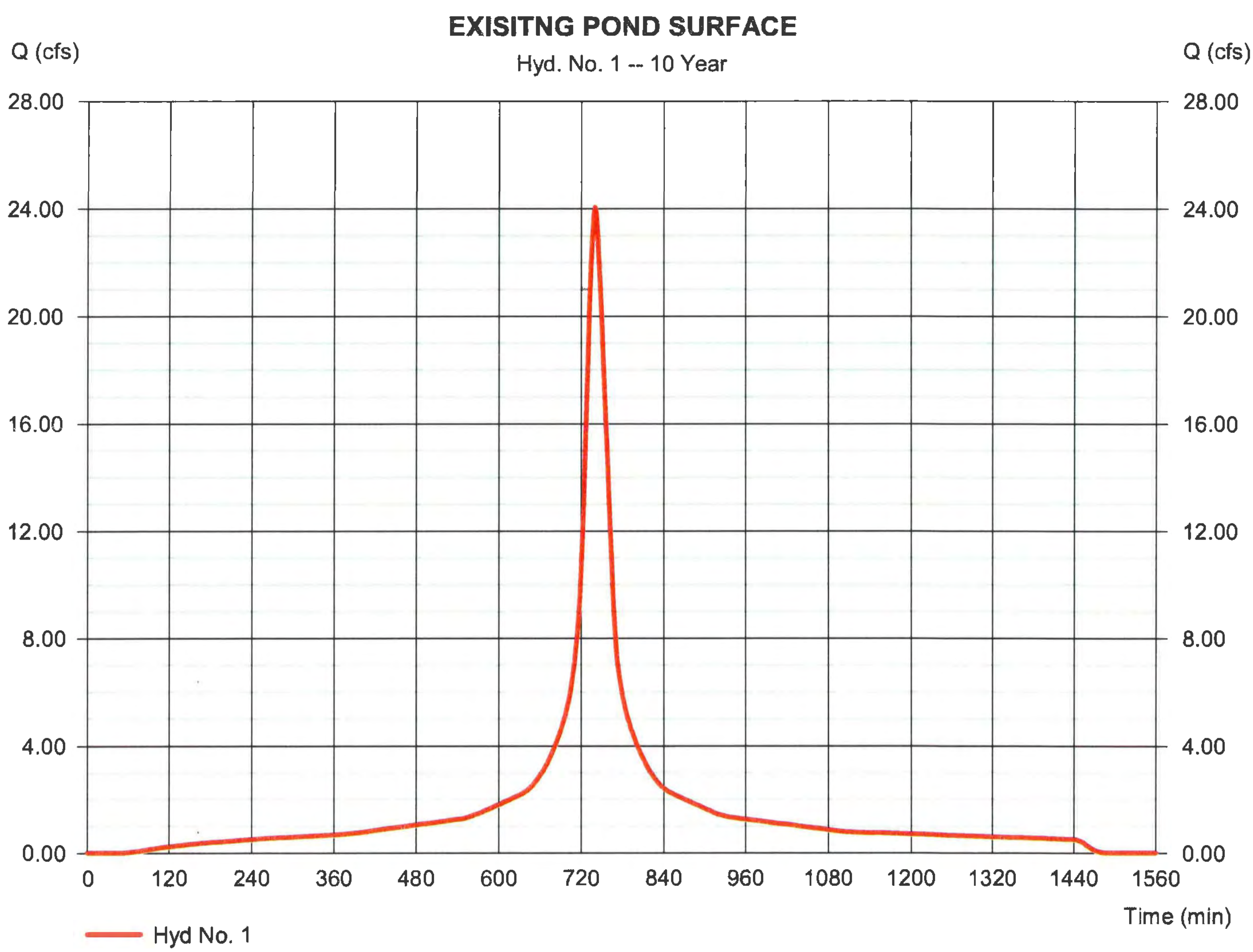
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Tuesday, 04 / 26 / 2022

Hyd. No. 1

EXISITNG POND SURFACE

Hydrograph type	= SCS Runoff	Peak discharge	= 24.07 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 152,546 cuft
Drainage area	= 8.400 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 27.50 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood StoraShapeGastORM\stormwater4modeling\TYPE D DI:		



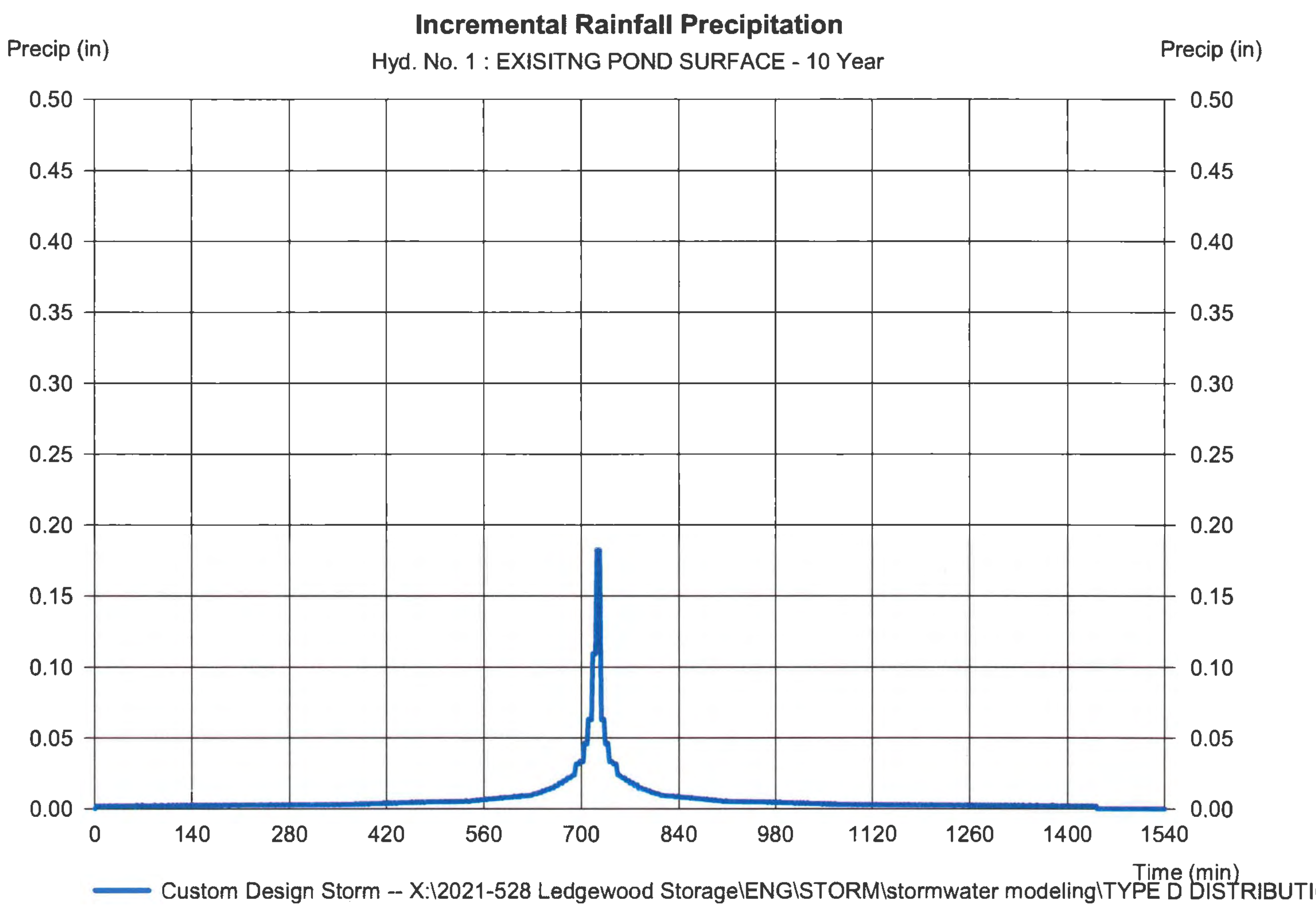
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 1

EXISITNG POND SURFACE

Storm Frequency	=	10 yrs	Time interval	=	2 min
Total precip.	=	5.2400 in	Distribution	=	Custom
Storm duration	=	X:\2021-528 Ledgewood Storage\ENG\STORM\stormwater modeling\TYPE D D			



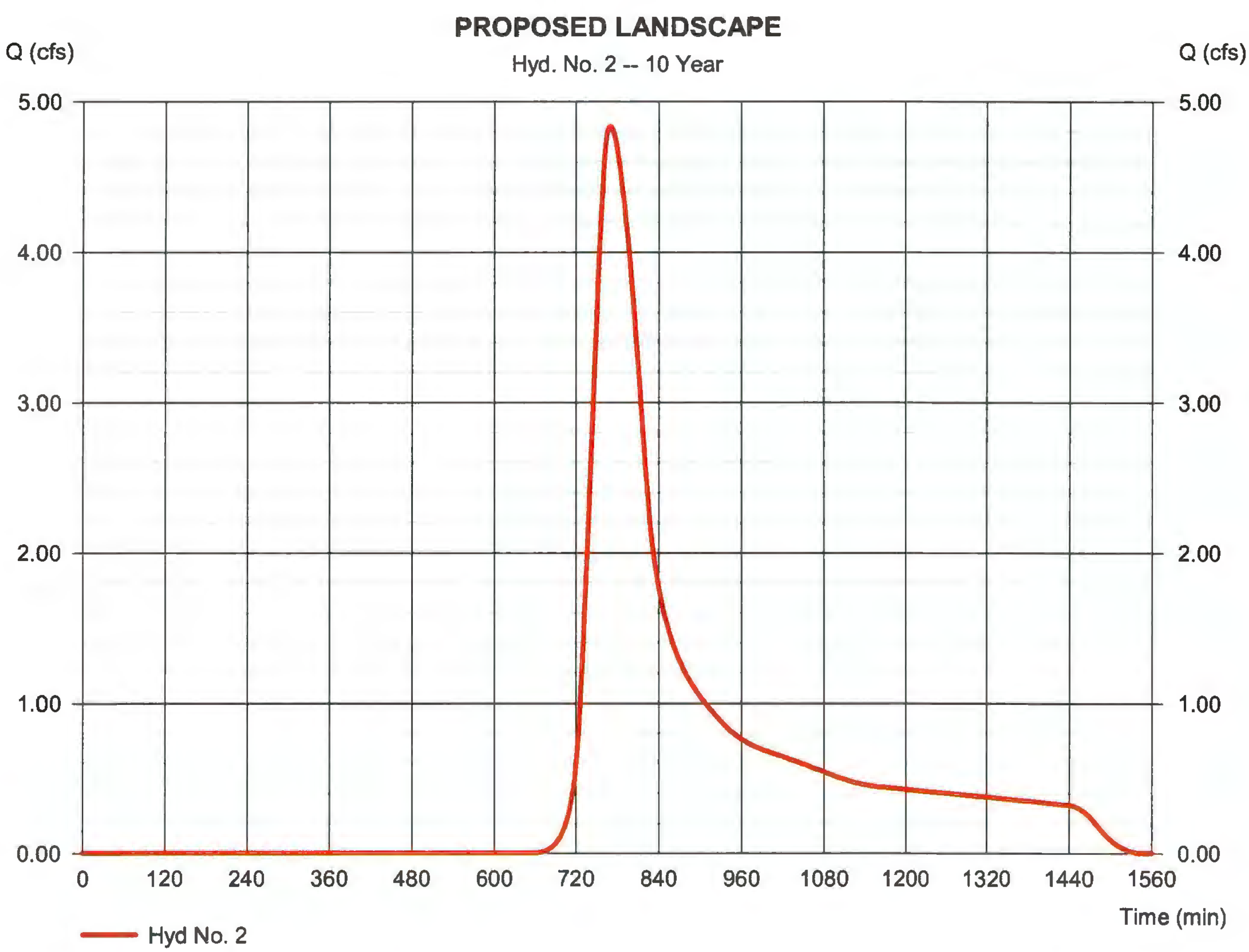
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Tuesday, 04 / 26 / 2022

Hyd. No. 2

PROPOSED LANDSCAPE

Hydrograph type	= SCS Runoff	Peak discharge	= 4.838 cfs
Storm frequency	= 10 yrs	Time to peak	= 770 min
Time interval	= 2 min	Hyd. volume	= 45,920 cuft
Drainage area	= 8.400 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 67.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood StorageapeGaStORM\stormwater4modeling\TYPE D DI		



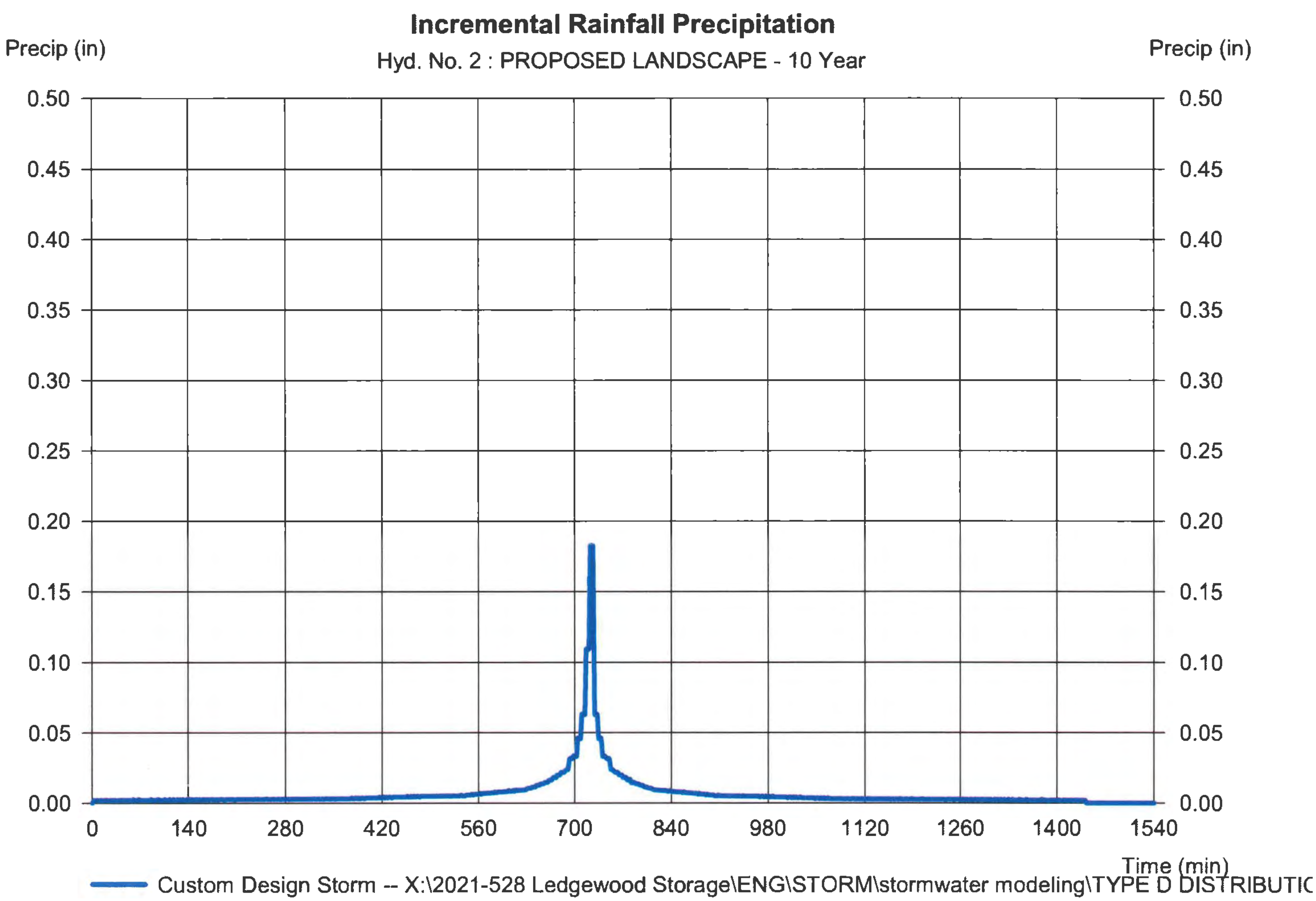
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 2

PROPOSED LANDSCAPE

Storm Frequency	= 10 yrs	Time interval	= 2 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood Storage\ENG\STORM\stormwater modeling\TYPE D D		



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	38.49	2	740	247,290	------	------	------	EXISITNG POND SURFACE
2	SCS Runoff	12.83	2	764	112,529	------	------	------	PROPOSED LANDSCAPE

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

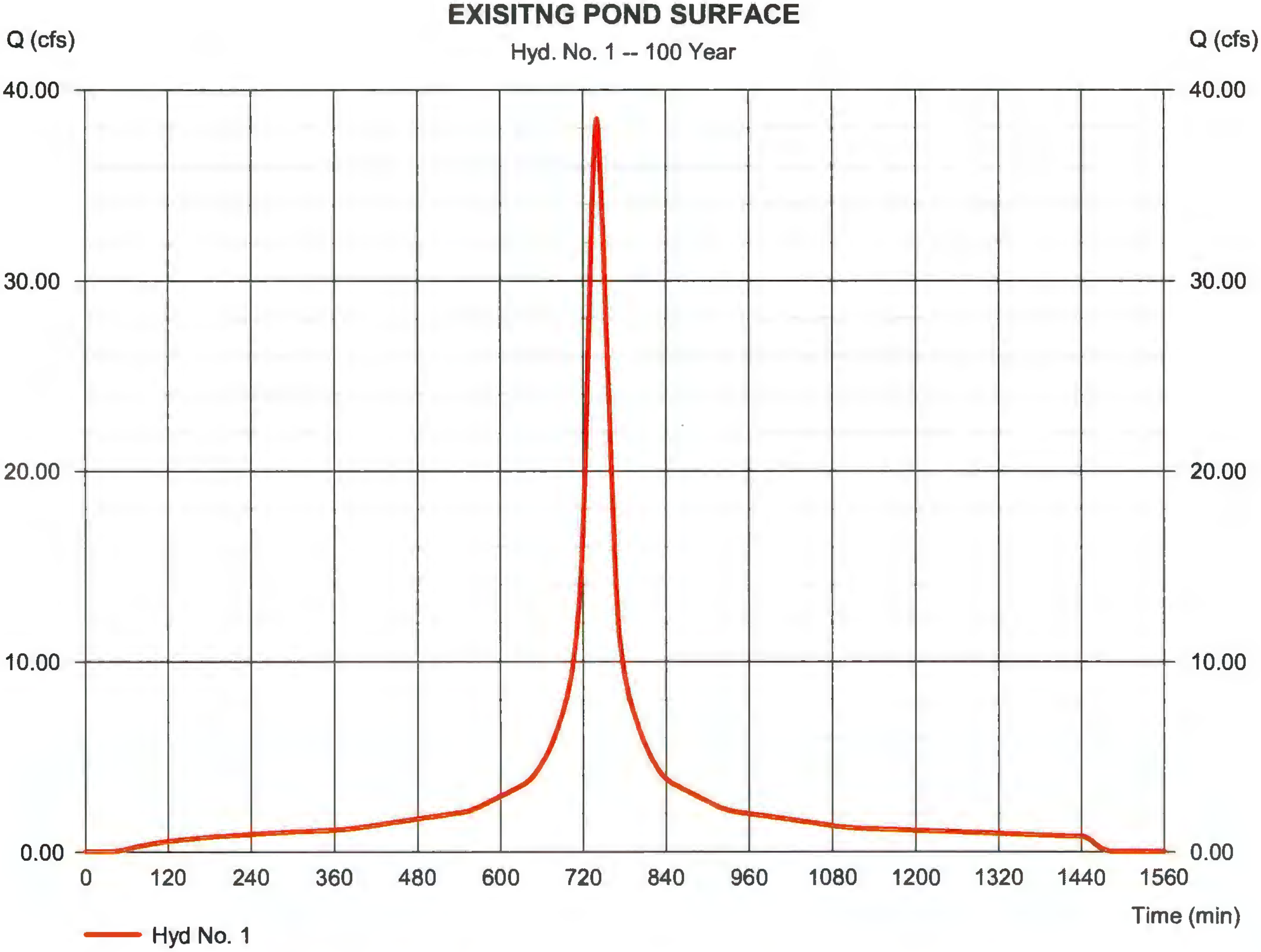
Hyd. No. 1

EXISITNG POND SURFACE

Hydrograph type	= SCS Runoff	Peak discharge	= 38.49 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 247,290 cuft
Drainage area	= 8.400 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 27.50 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood StorageShape factor\ENG\STORM\stormwater = 484modeling\TYPE D DI		

EXISITNG POND SURFACE

Hyd. No. 1 -- 100 Year



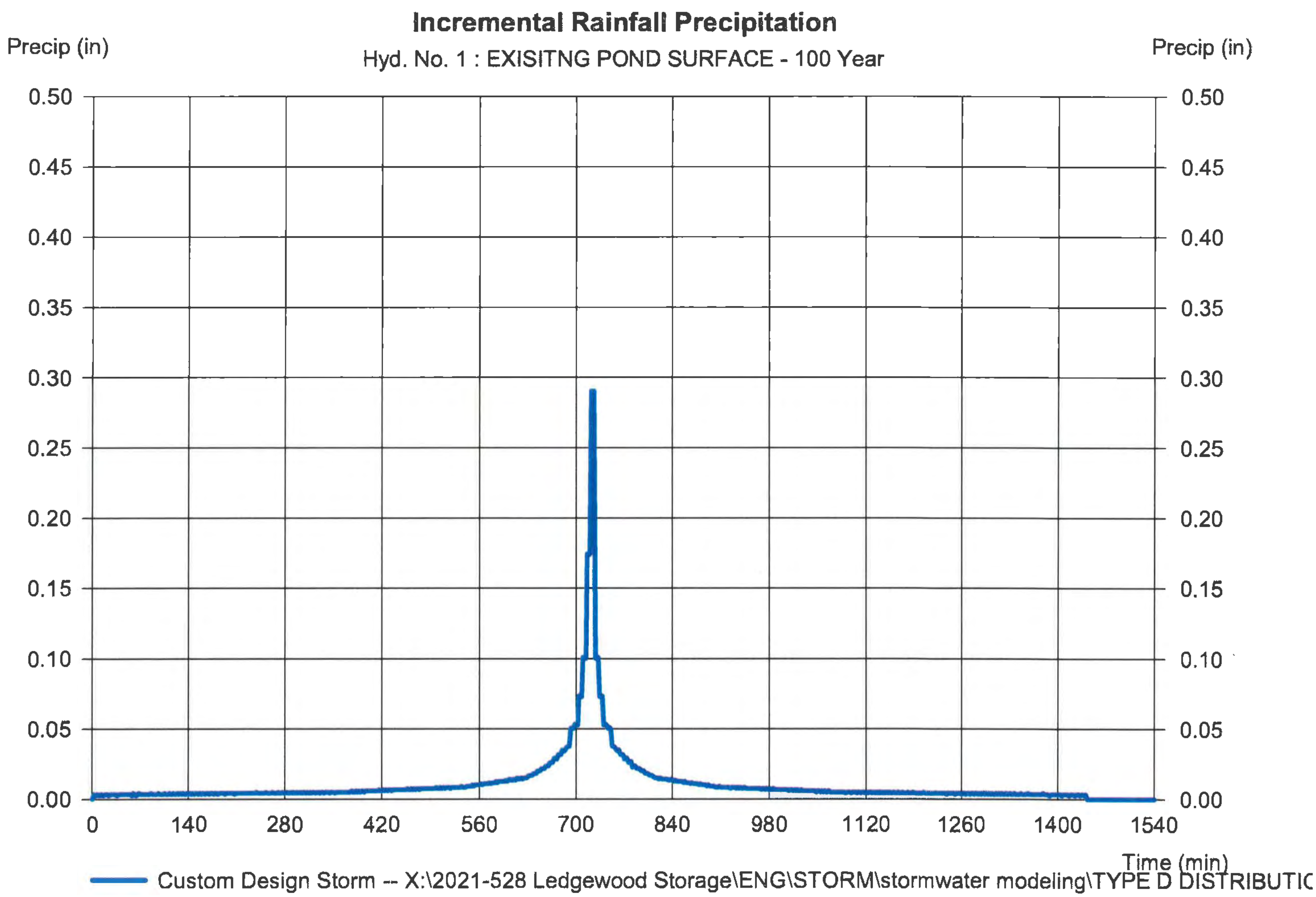
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Tuesday, 04 / 26 / 2022

Hyd. No. 1

EXISITNG POND SURFACE

Storm Frequency	= 100 yrs	Time interval	= 2 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood Storage\ENG\STORM\stormwater modeling\TYPE D D		



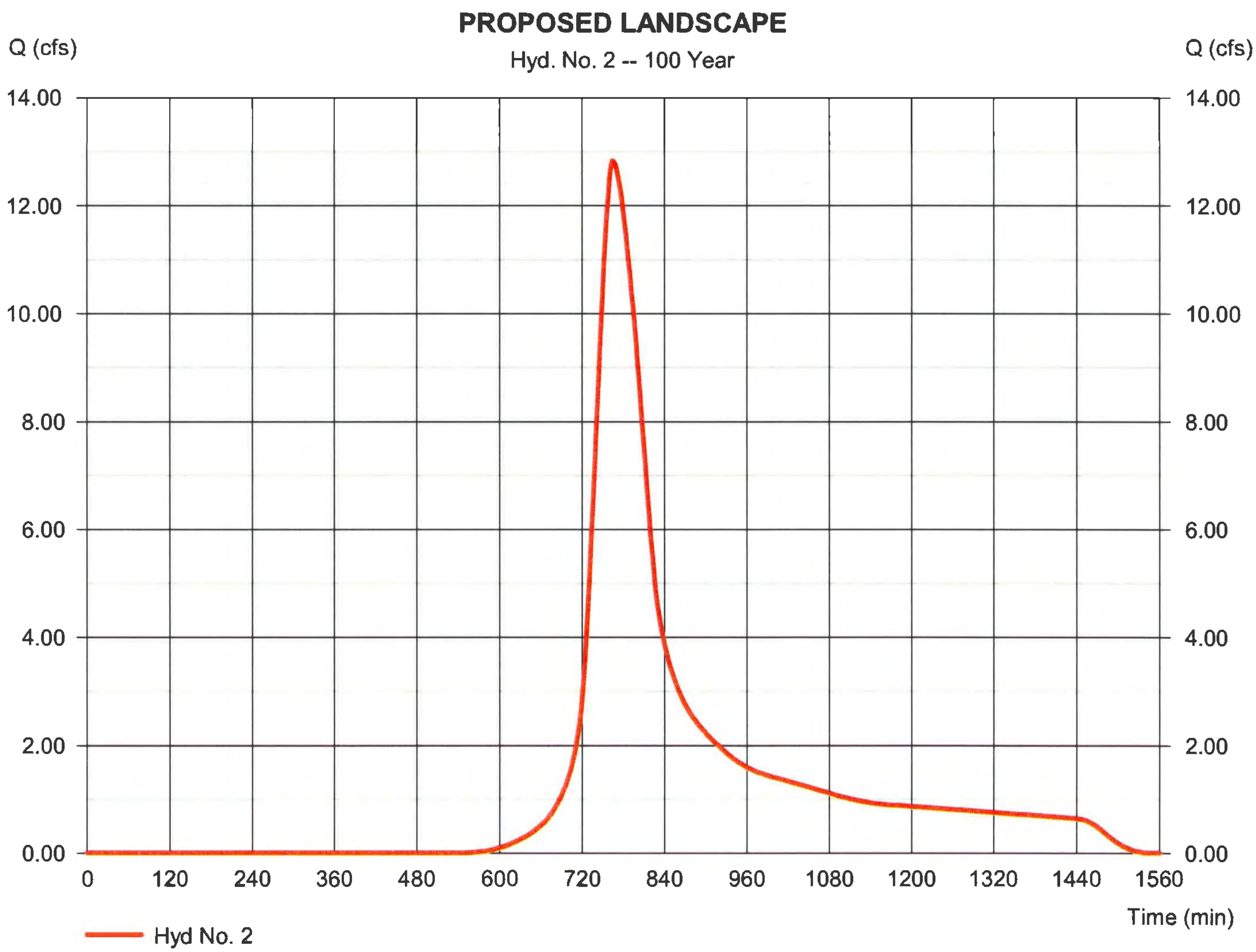
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 2

PROPOSED LANDSCAPE

Hydrograph type	= SCS Runoff	Peak discharge	= 12.83 cfs
Storm frequency	= 100 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 112,529 cuft
Drainage area	= 8.400 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 67.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= X:\2021-528 Ledgewood StoraSheEpeG\STORM\stormwa484modeling\TYPE D DI:		



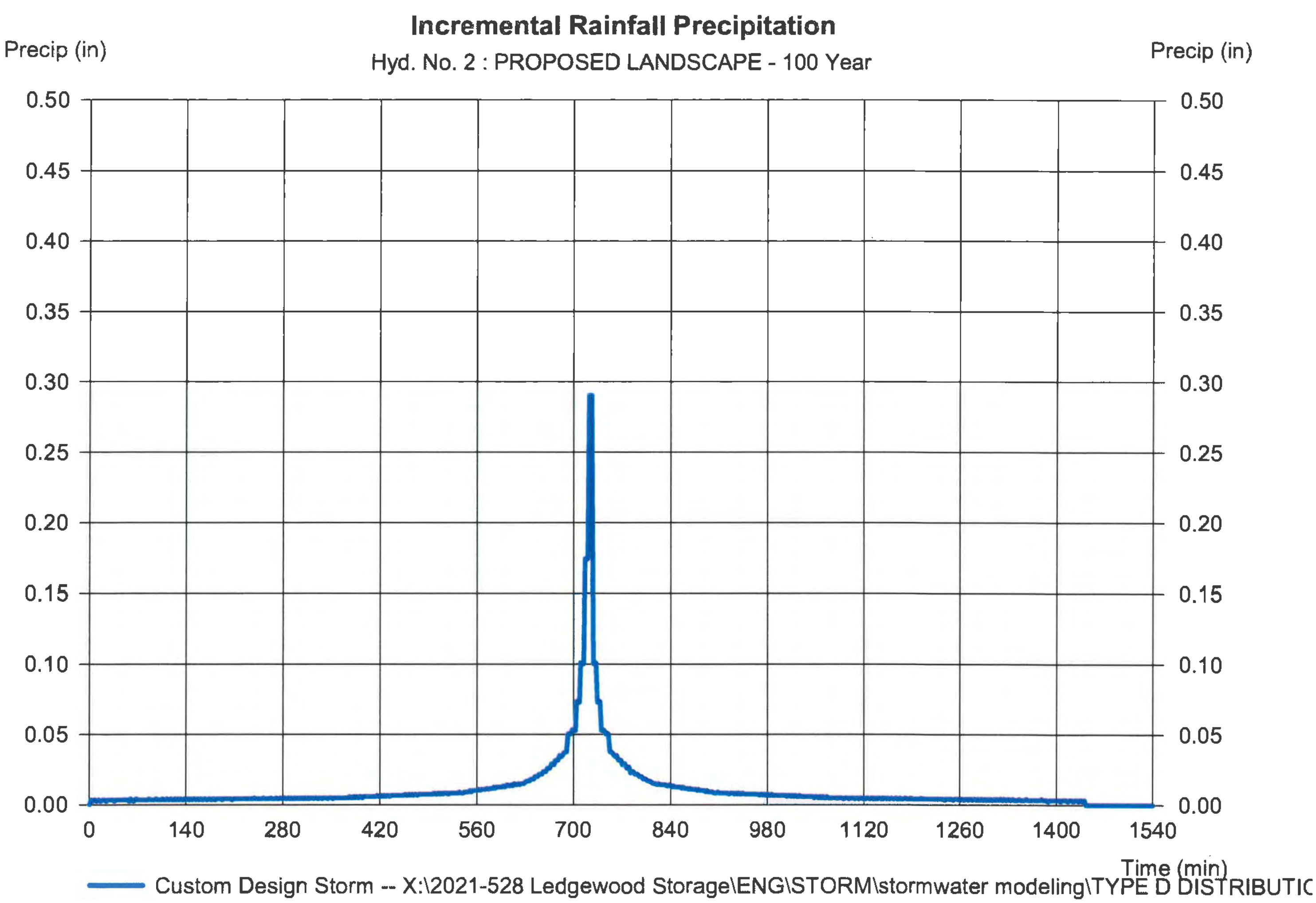
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 04 / 26 / 2022

Hyd. No. 2

PROPOSED LANDSCAPE

Storm Frequency	=	100 yrs	Time interval	=	2 min
Total precip.	=	8.3500 in	Distribution	=	Custom
Storm duration	=	X:\2021-528 Ledgewood Storage\ENG\STORM\stormwater modeling\TYPE D D			



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	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.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	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
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	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

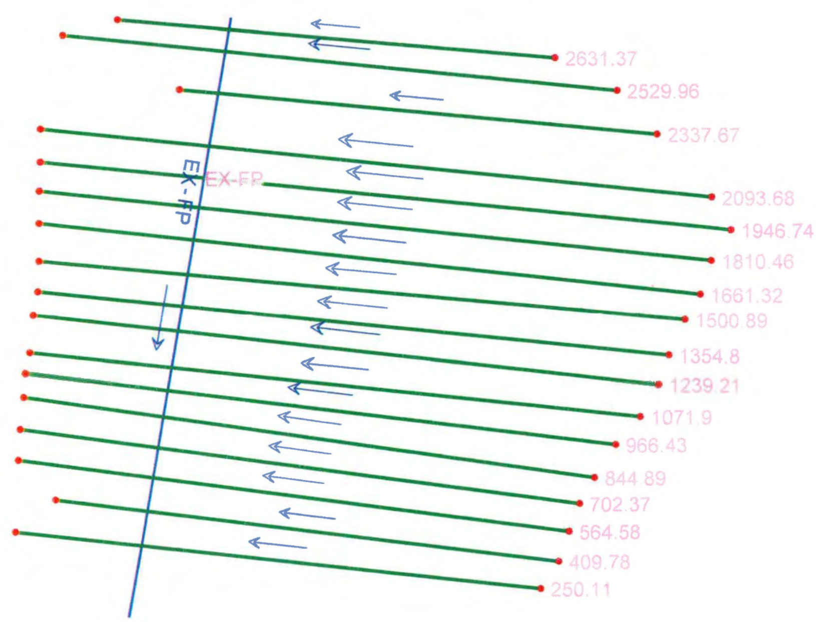
Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	1.25	3.57	0.00	4.47	5.24	6.37	7.32	8.35

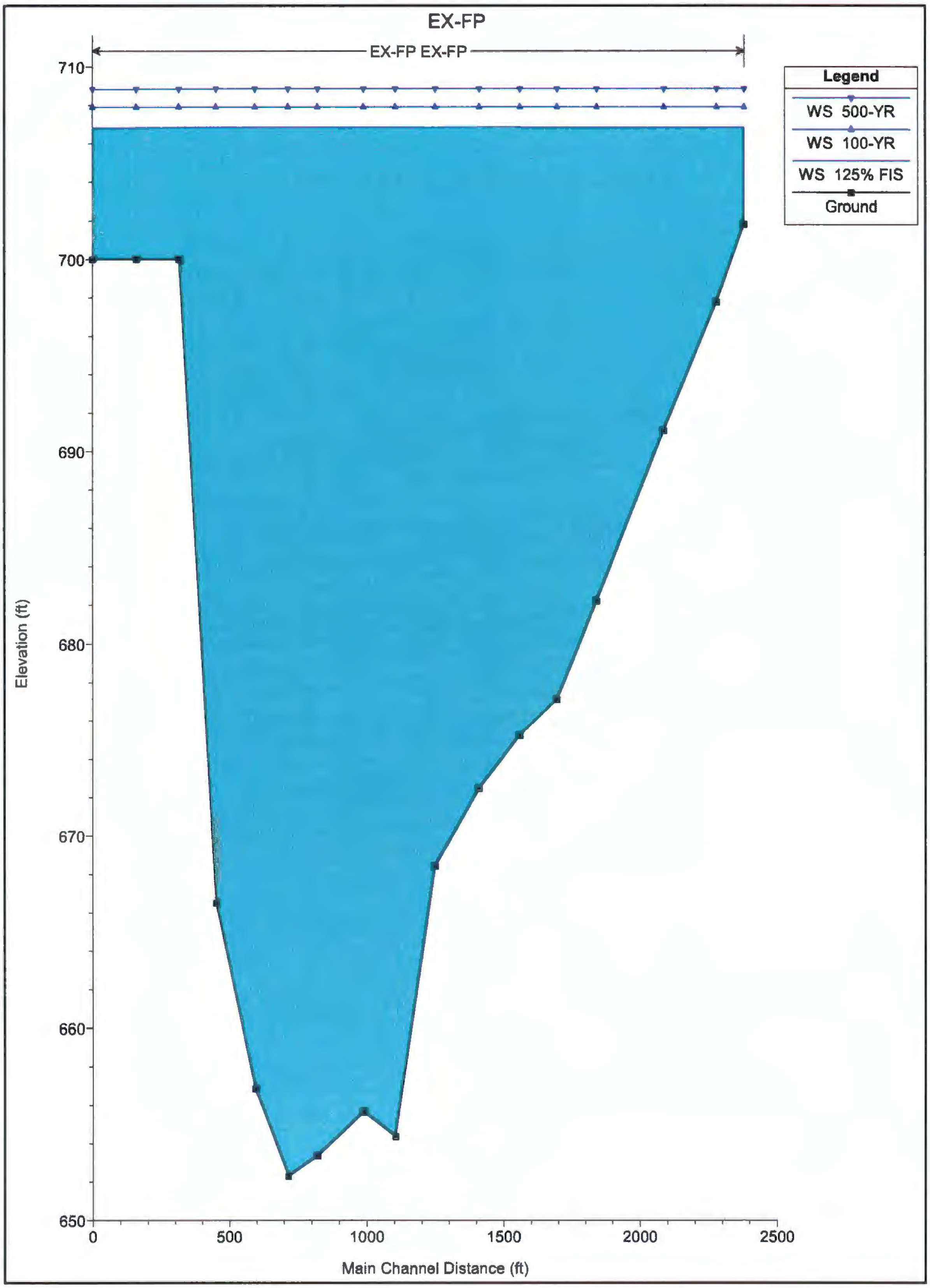
Hydraflow Table of Contents

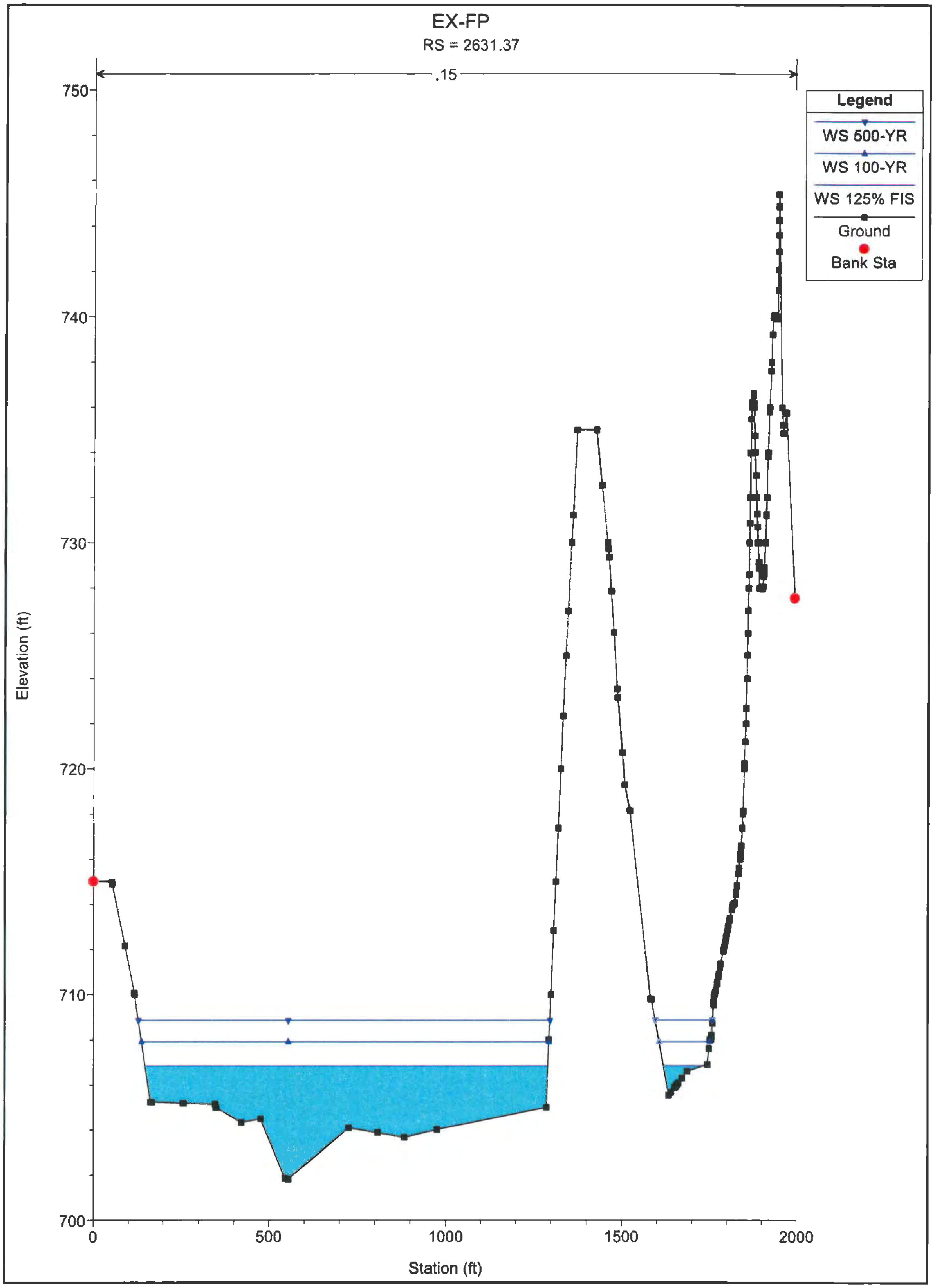
APPENDIX E

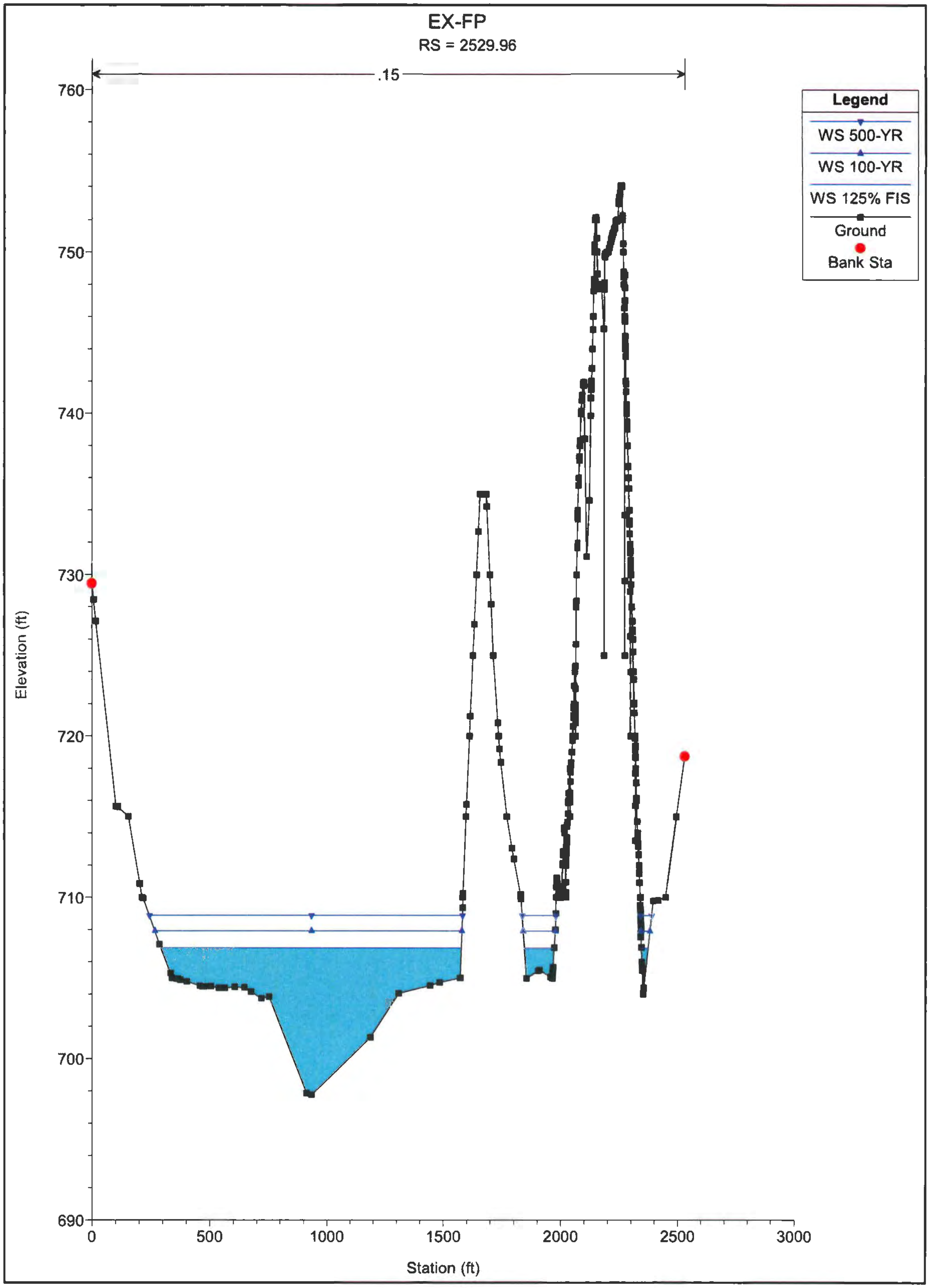
Flood Modeling Results (Method 4)

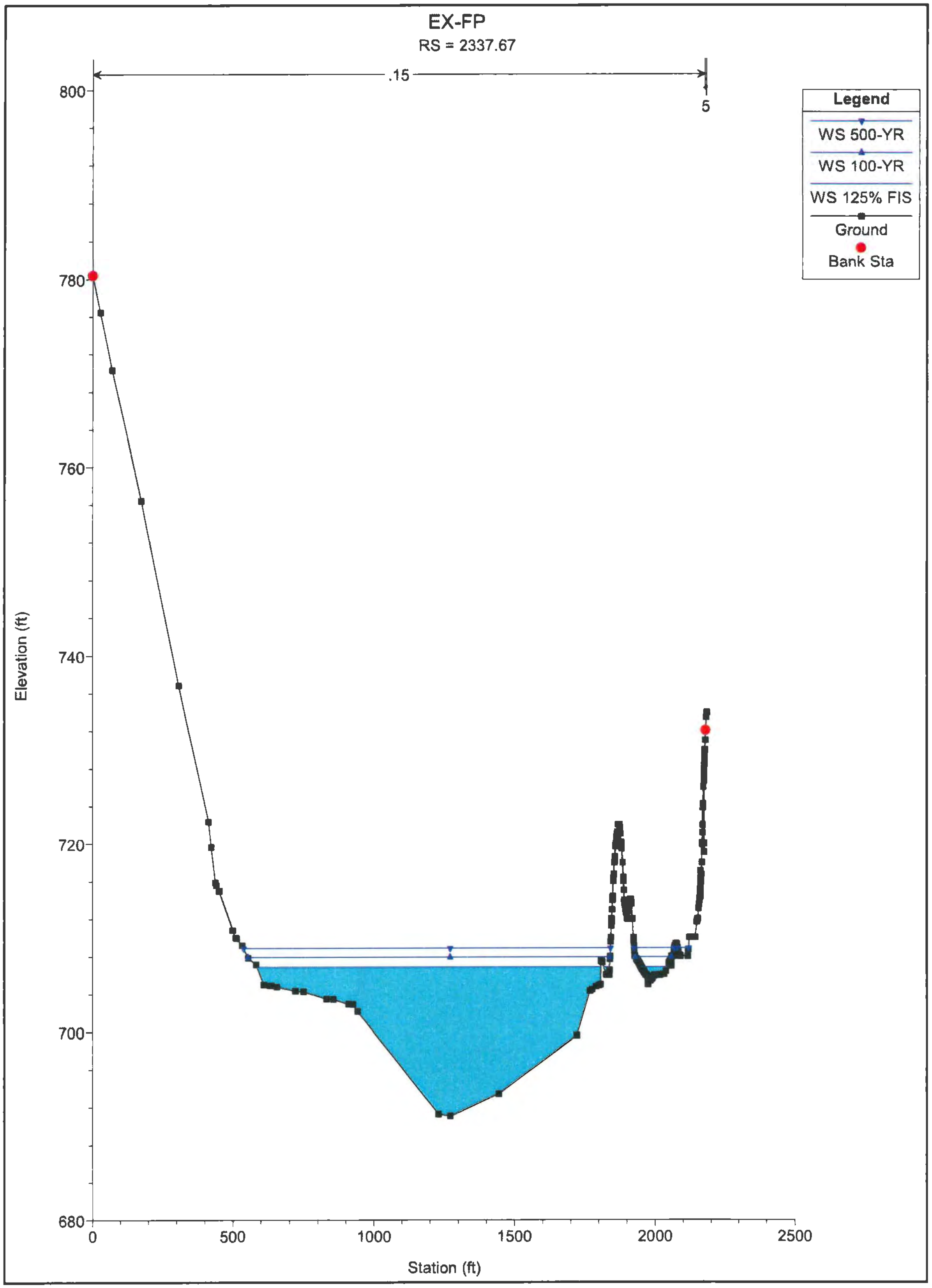
Existing condition stations

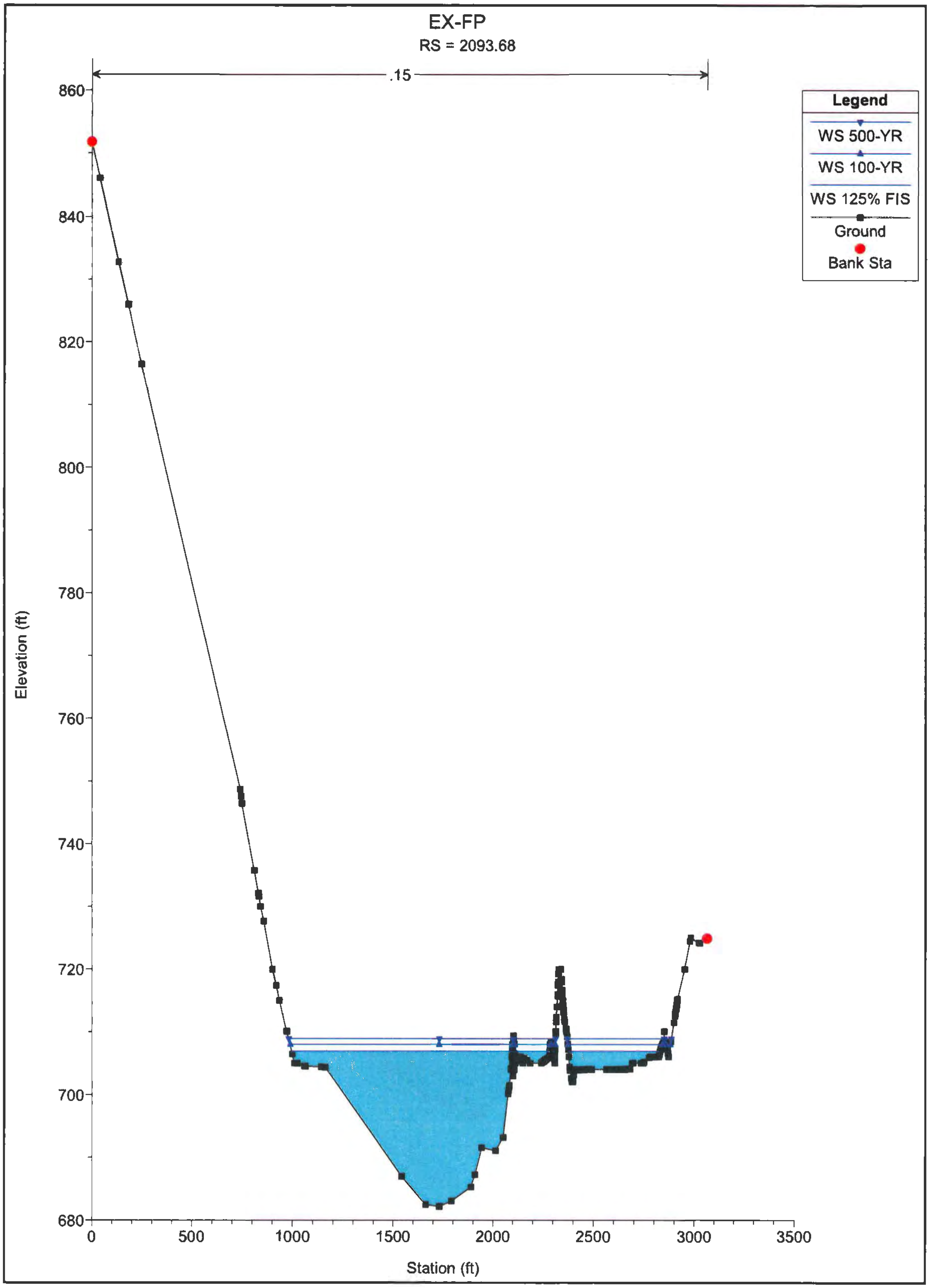


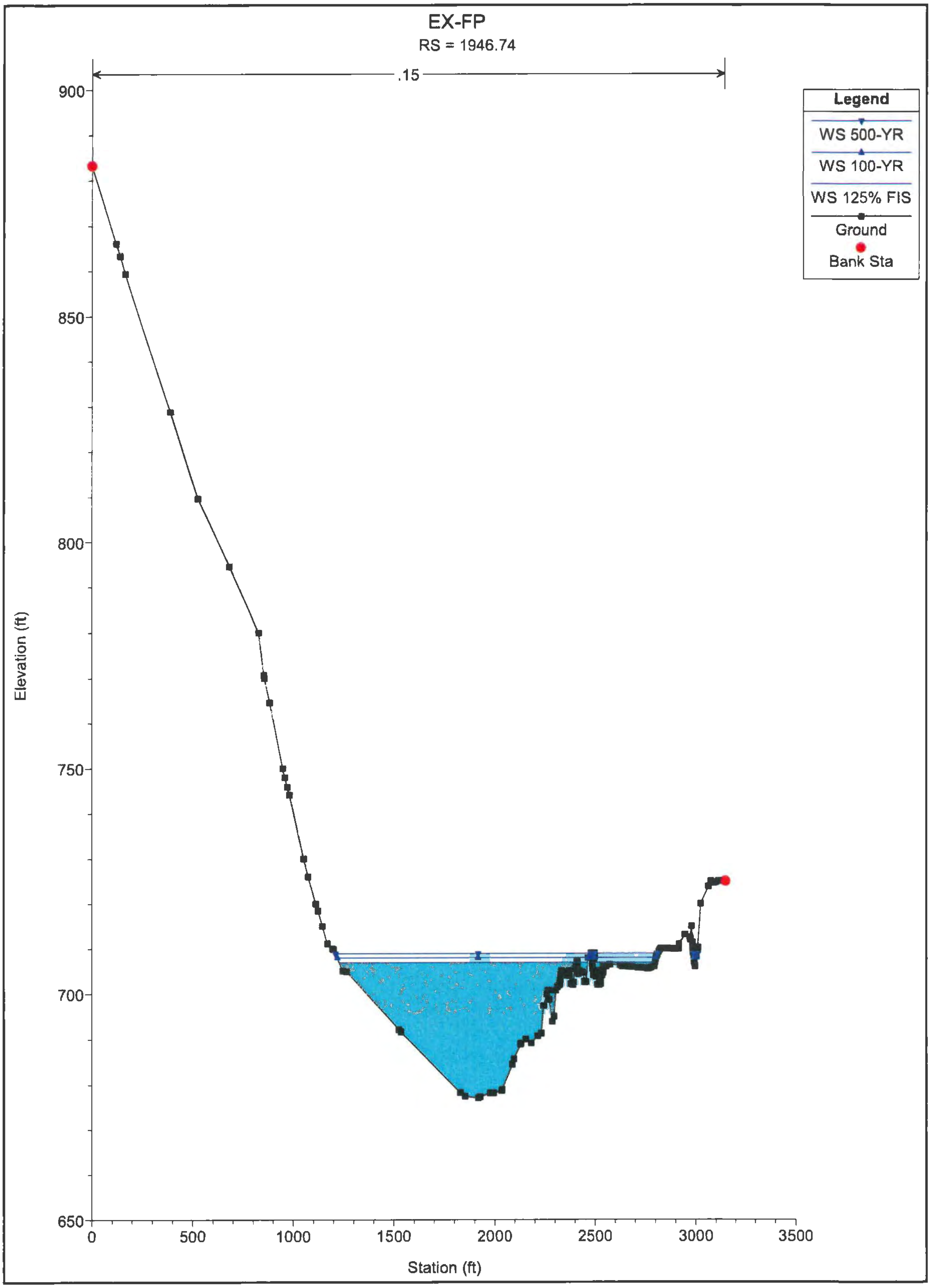

EX-FP
EX-FP EX-FP
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Elevation (ft)
710
700
690
680
670
660
650
0
500
1000
1500
2000
2500
Main Channel Distance (ft)

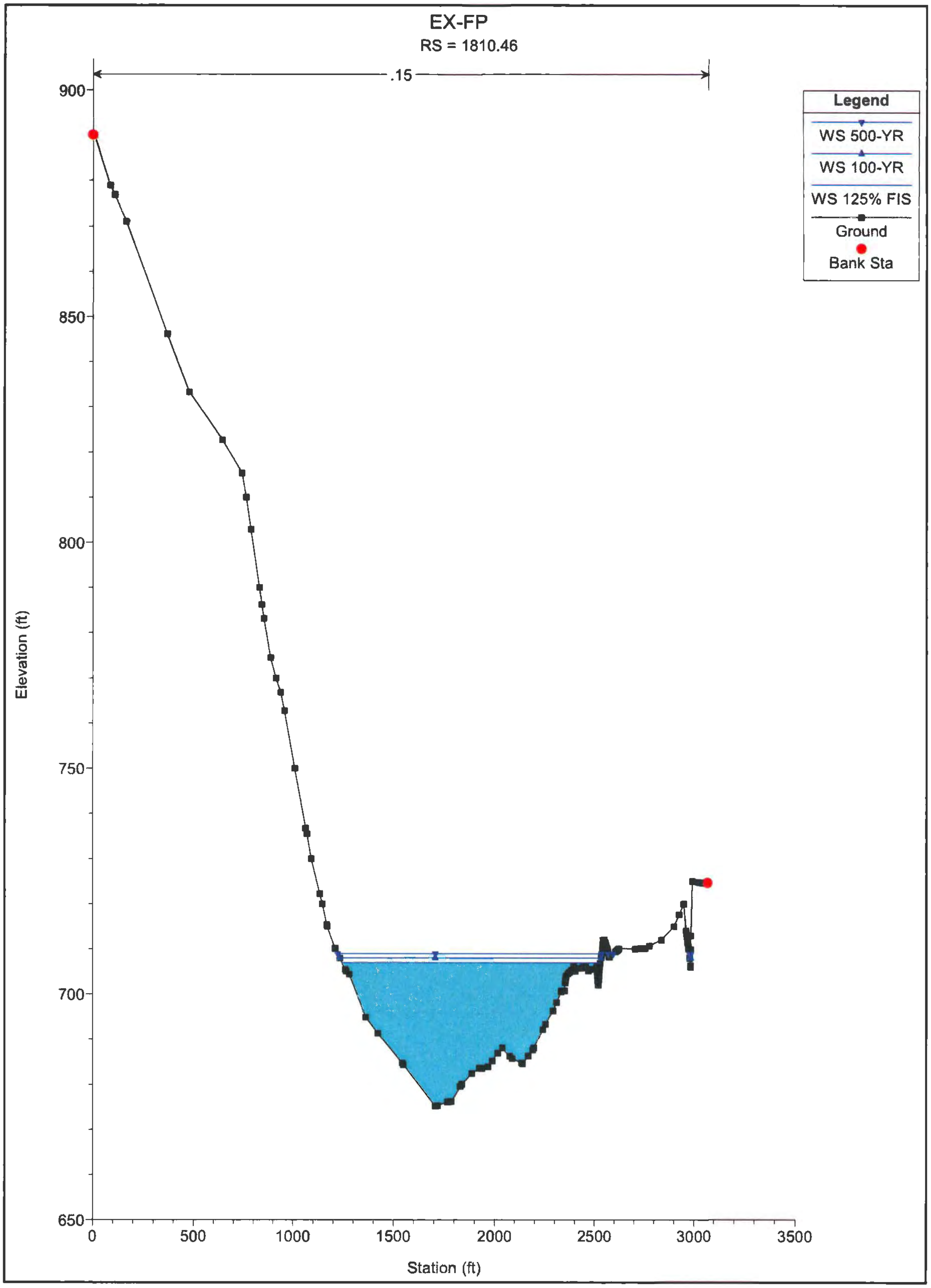

EX-FP
RS = 2631.37
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
750
740
730
720
710
700
Elevation (ft)
0
500
1000
1500
2000
Station (ft)

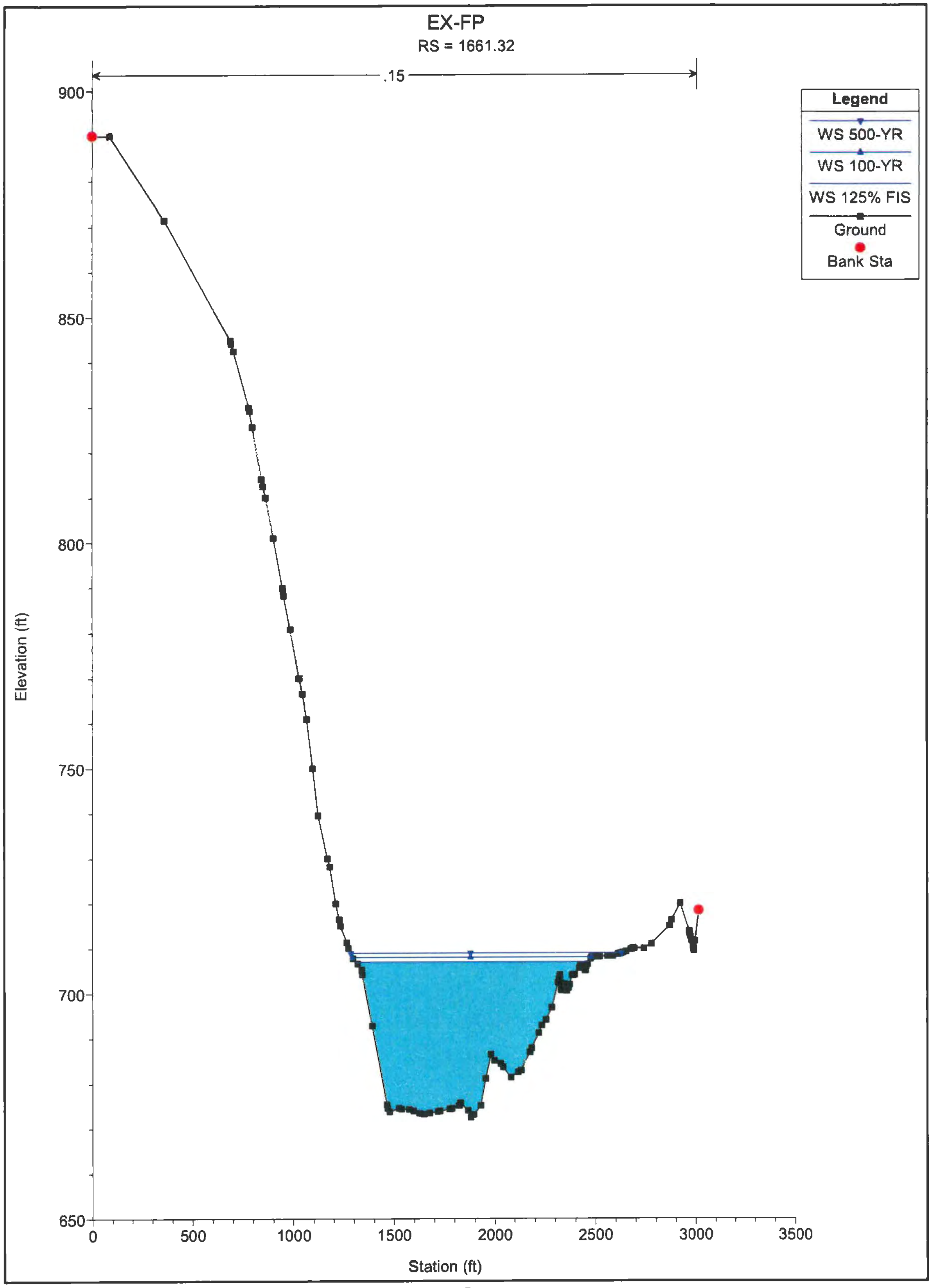

EX-FP
RS = 2529.96
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
760
750
740
730
720
710
700
690
0
500
1000
1500
2000
2500
3000
Station (ft)


EX-FP
RS = 2337.67
.15
5
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
800
780
760
740
720
700
680
0
500
1000
1500
2000
2500
Station (ft)

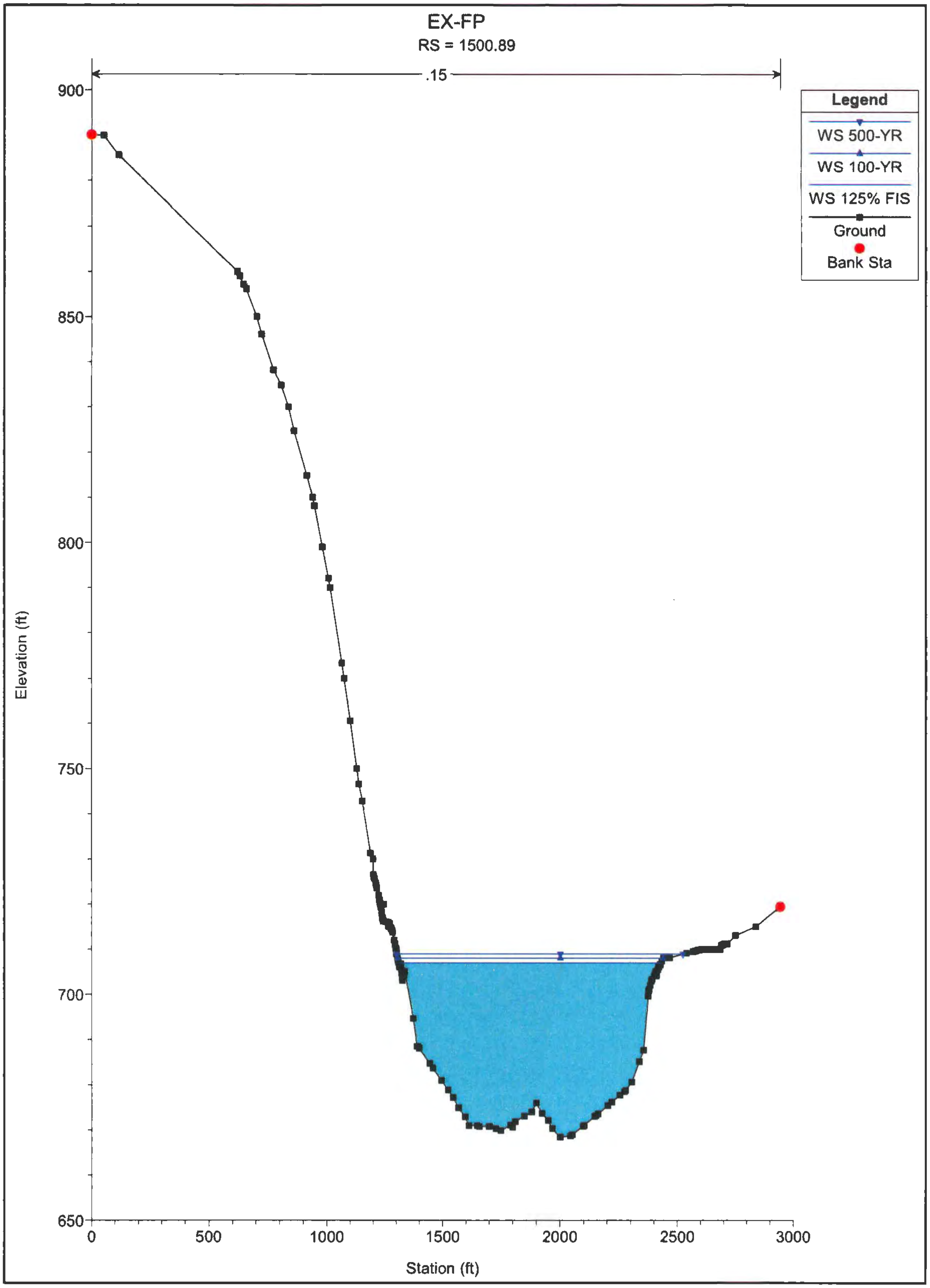

EX-FP
RS = 2093.68
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
860
840
820
800
780
760
740
720
700
680
0
500
1000
1500
2000
2500
3000
3500
Station (ft)


EX-FP
RS = 1946.74
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
3500
Station (ft)

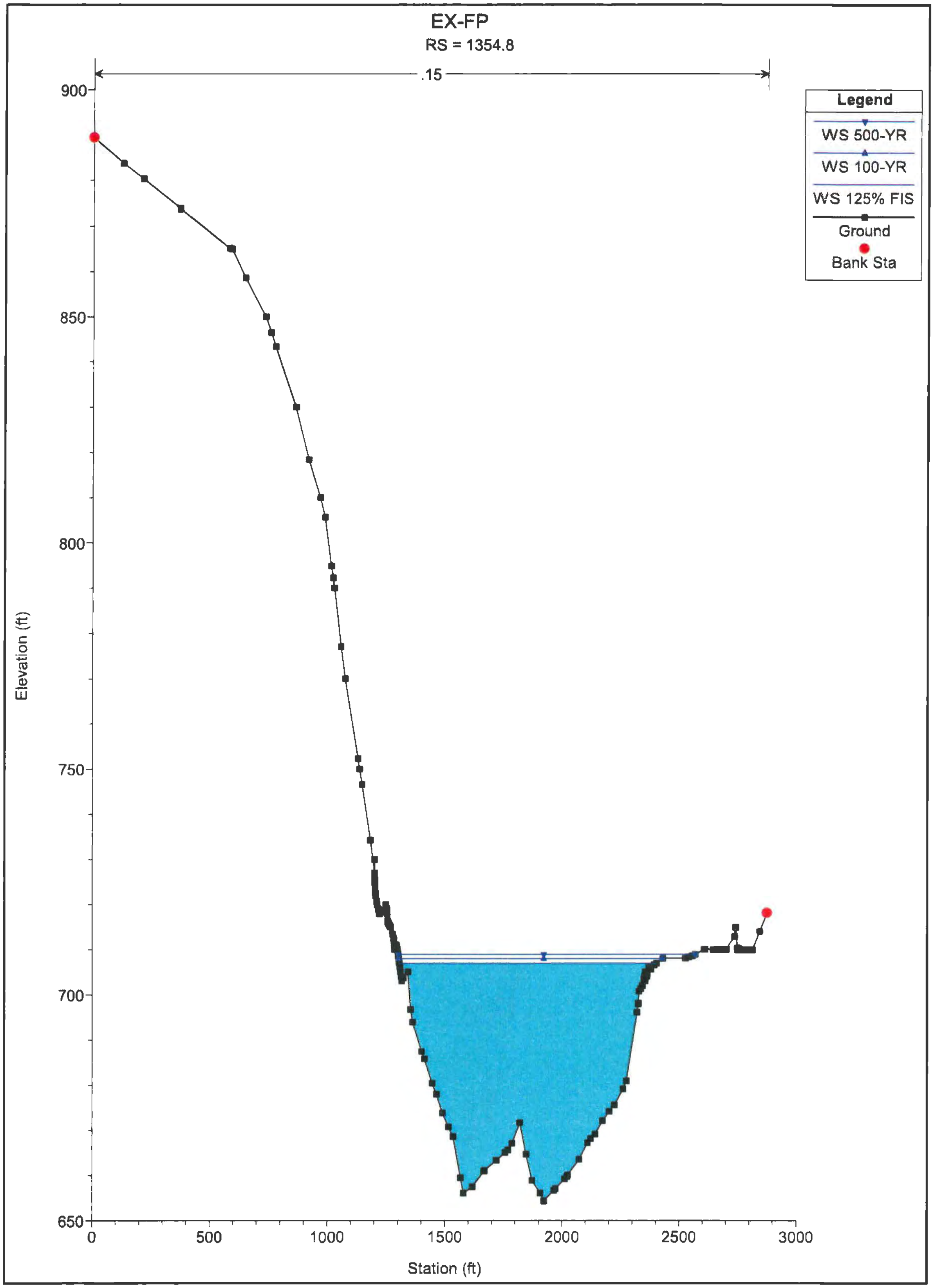

EX-FP
RS = 1810.46
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
900
850
800
750
700
650
Elevation (ft)
0
500
1000
1500
2000
2500
3000
3500
Station (ft)



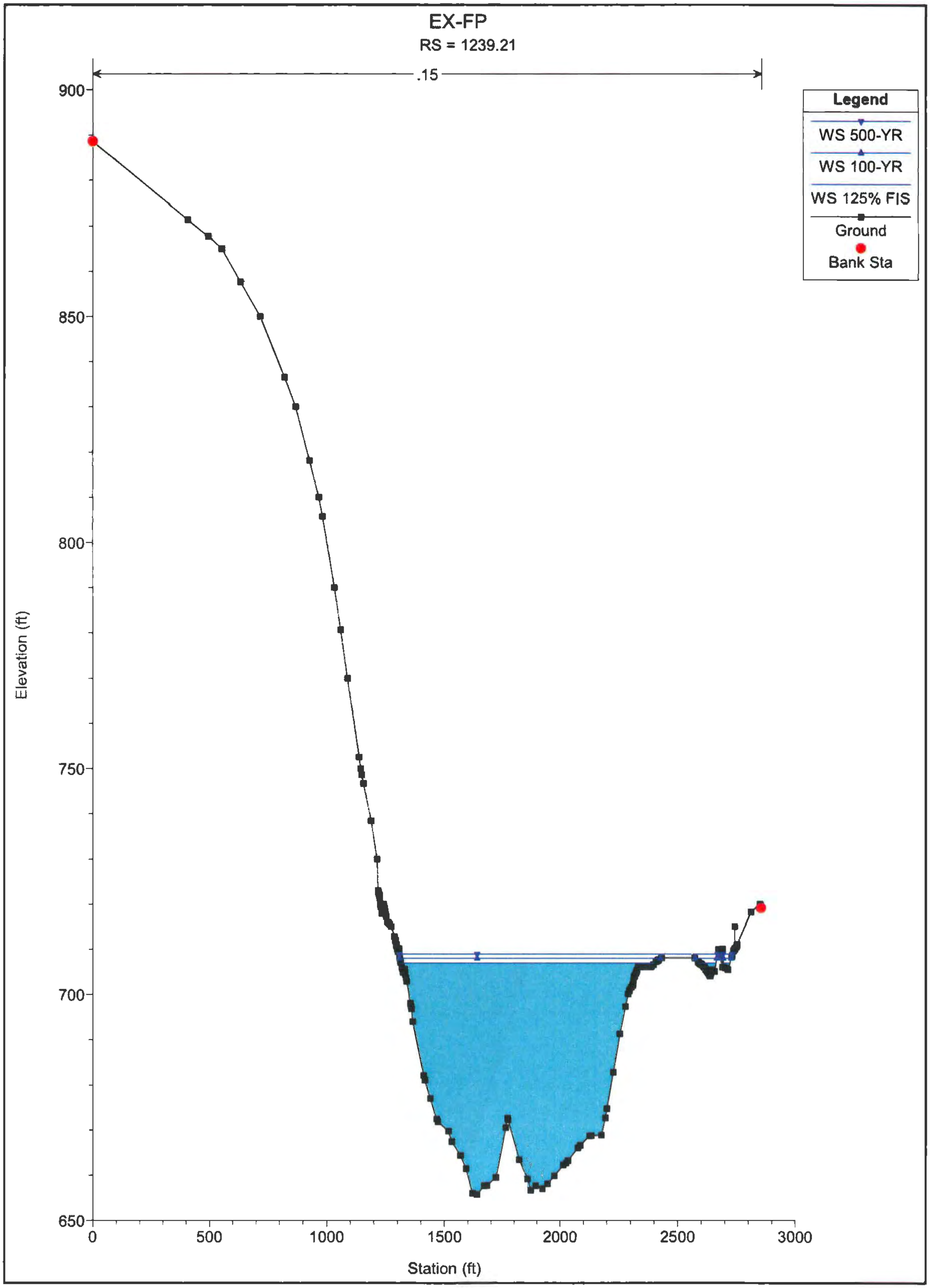
EX-FP
RS = 1661.32
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
900
850
800
750
700
650
Elevation (ft)
0
500
1000
1500
2000
2500
3000
3500
Station (ft)



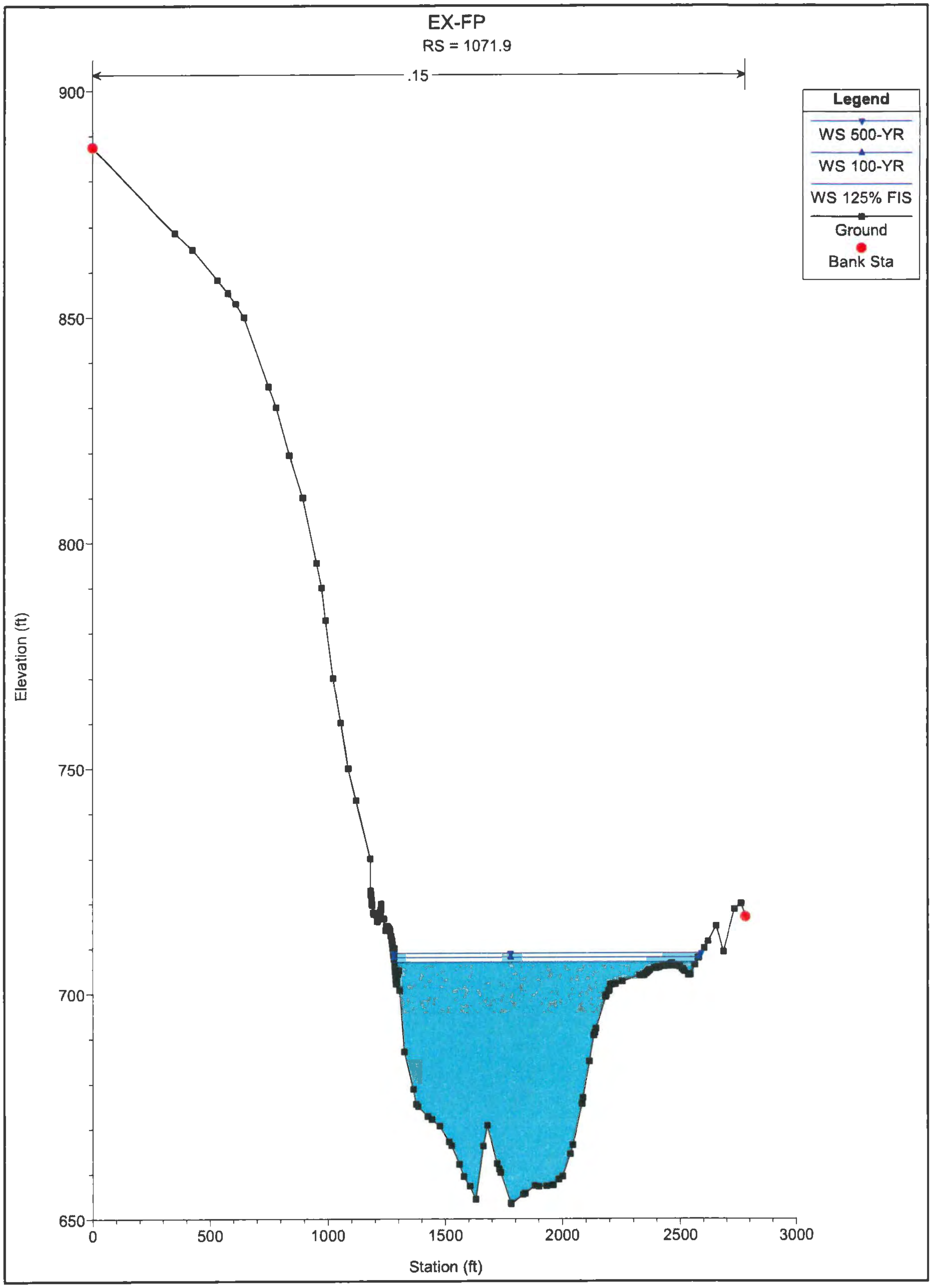
EX-FP
RS = 1500.89
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)



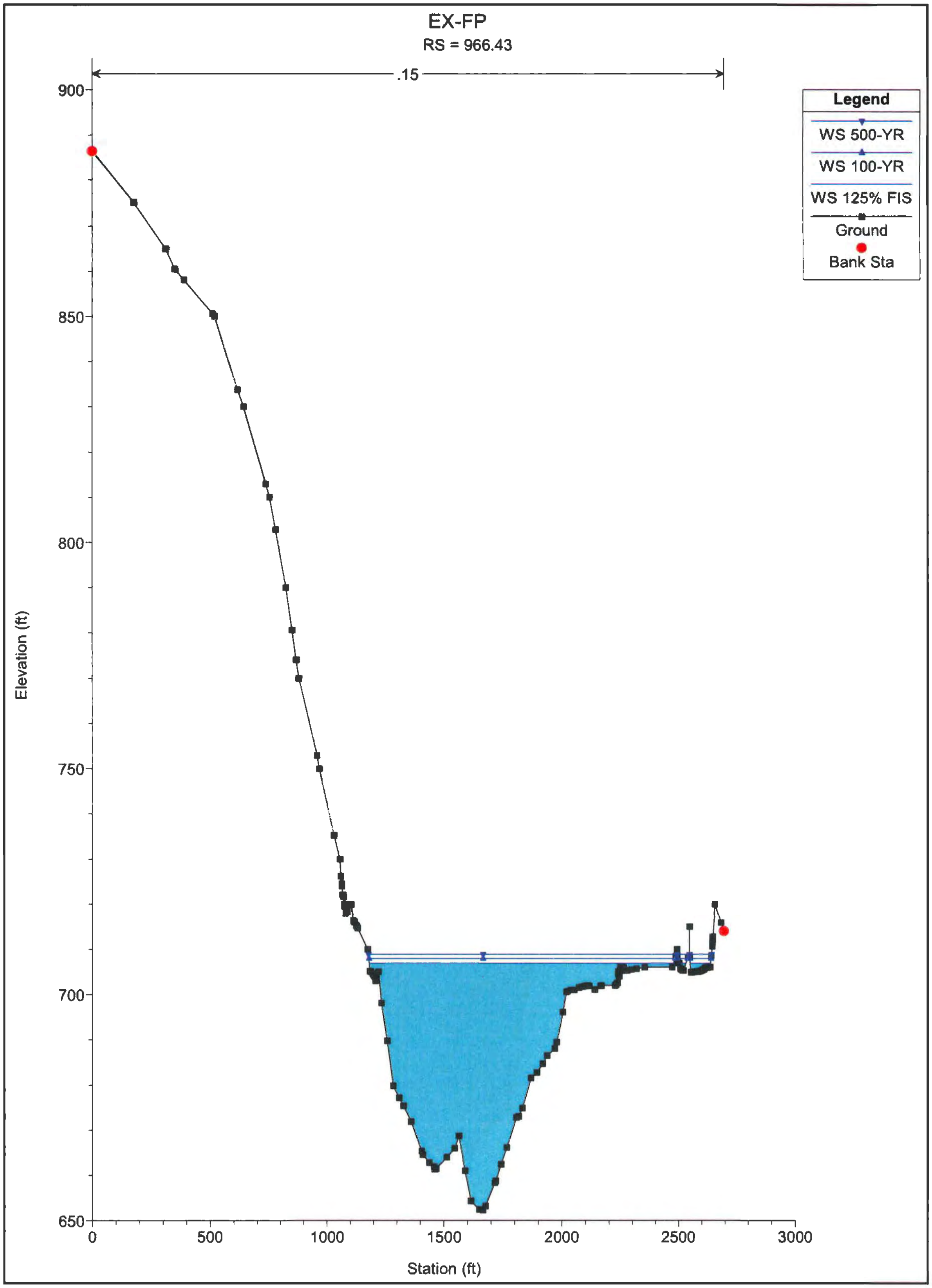
EX-FP
RS = 1354.8
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000

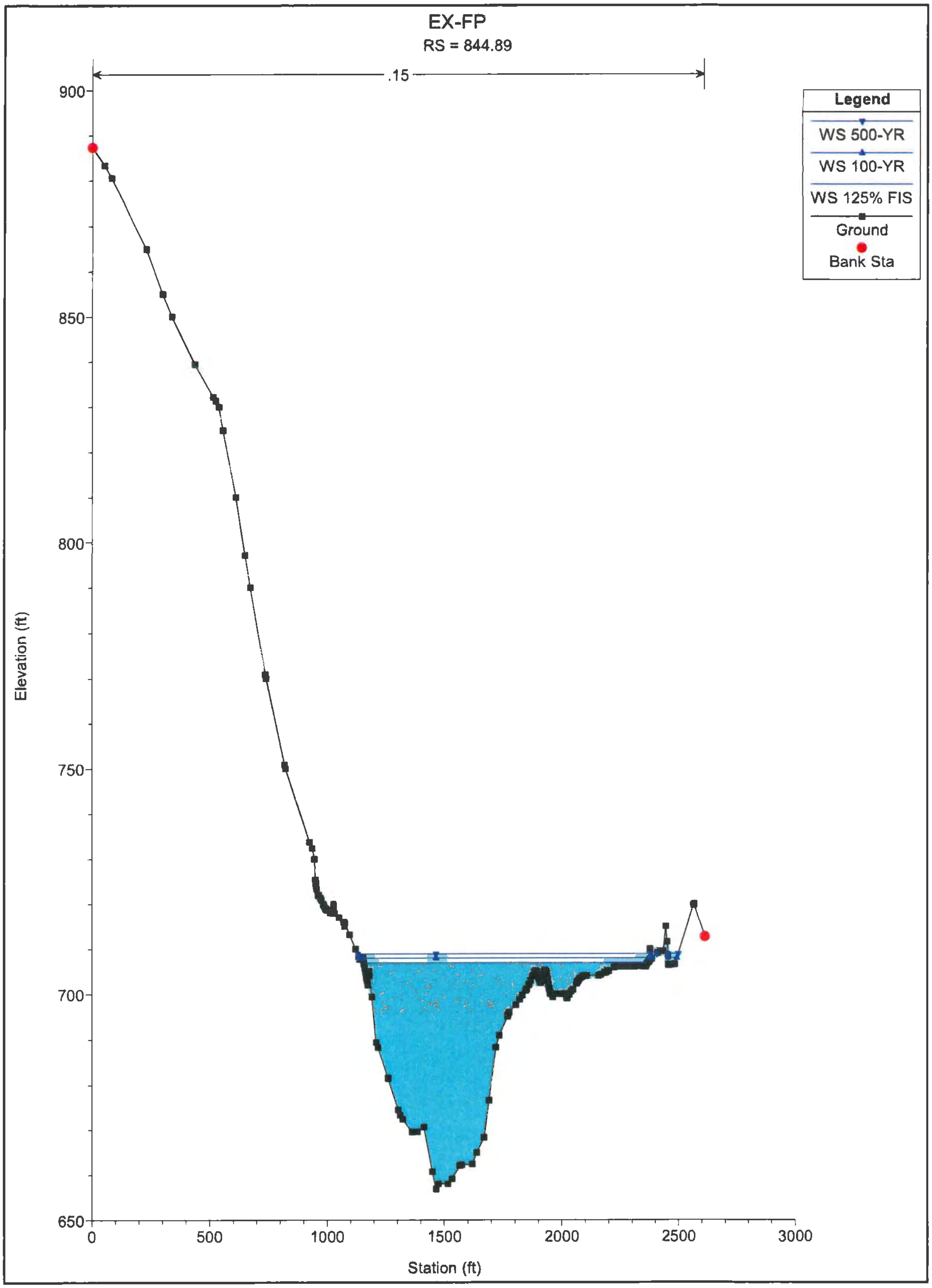


EX-FP
RS = 1239.21
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000

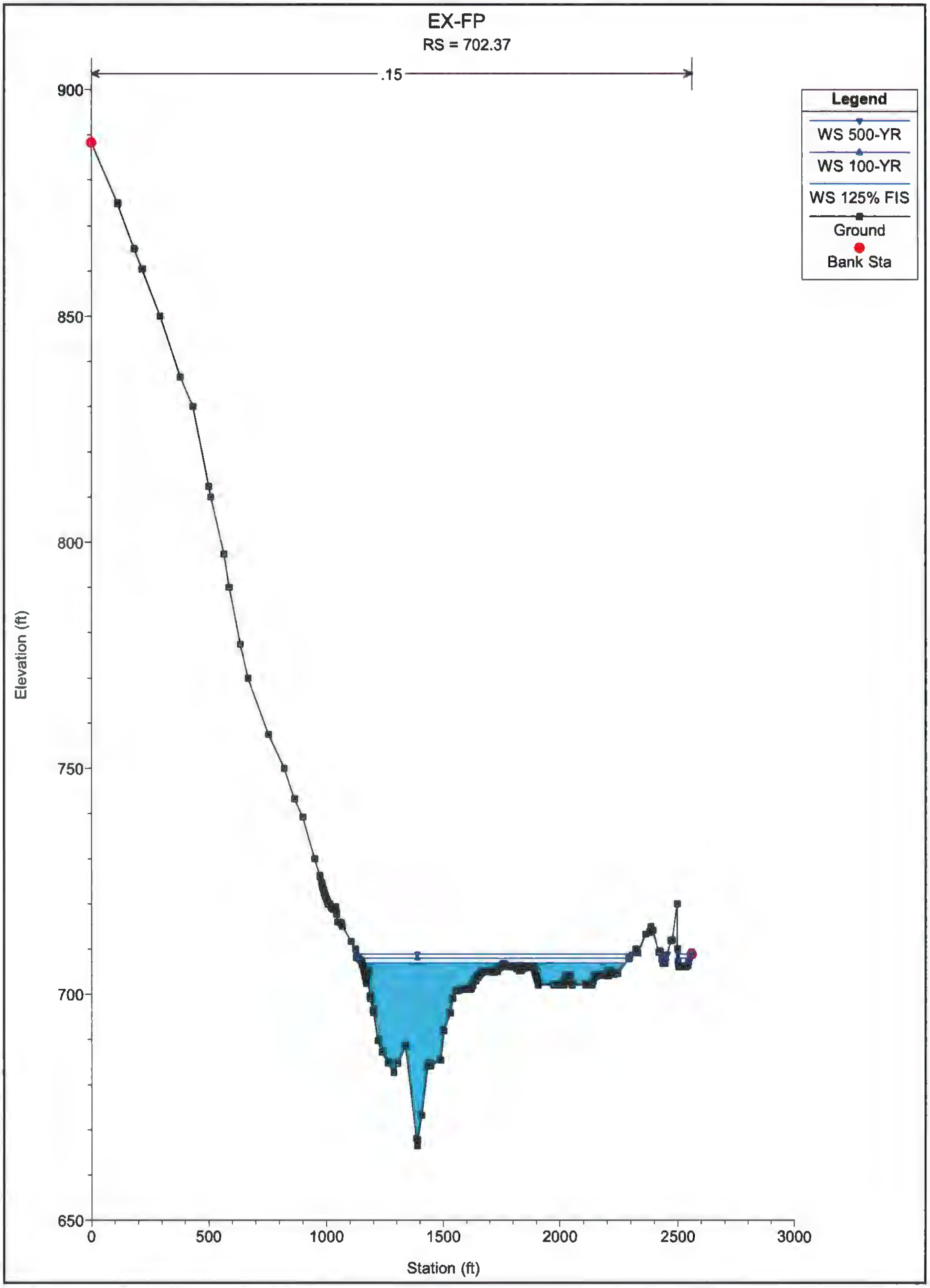


EX-FP
RS = 1071.9
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
900
850
800
750
700
650
Elevation (ft)
0
500
1000
1500
2000
2500
3000
Station (ft)

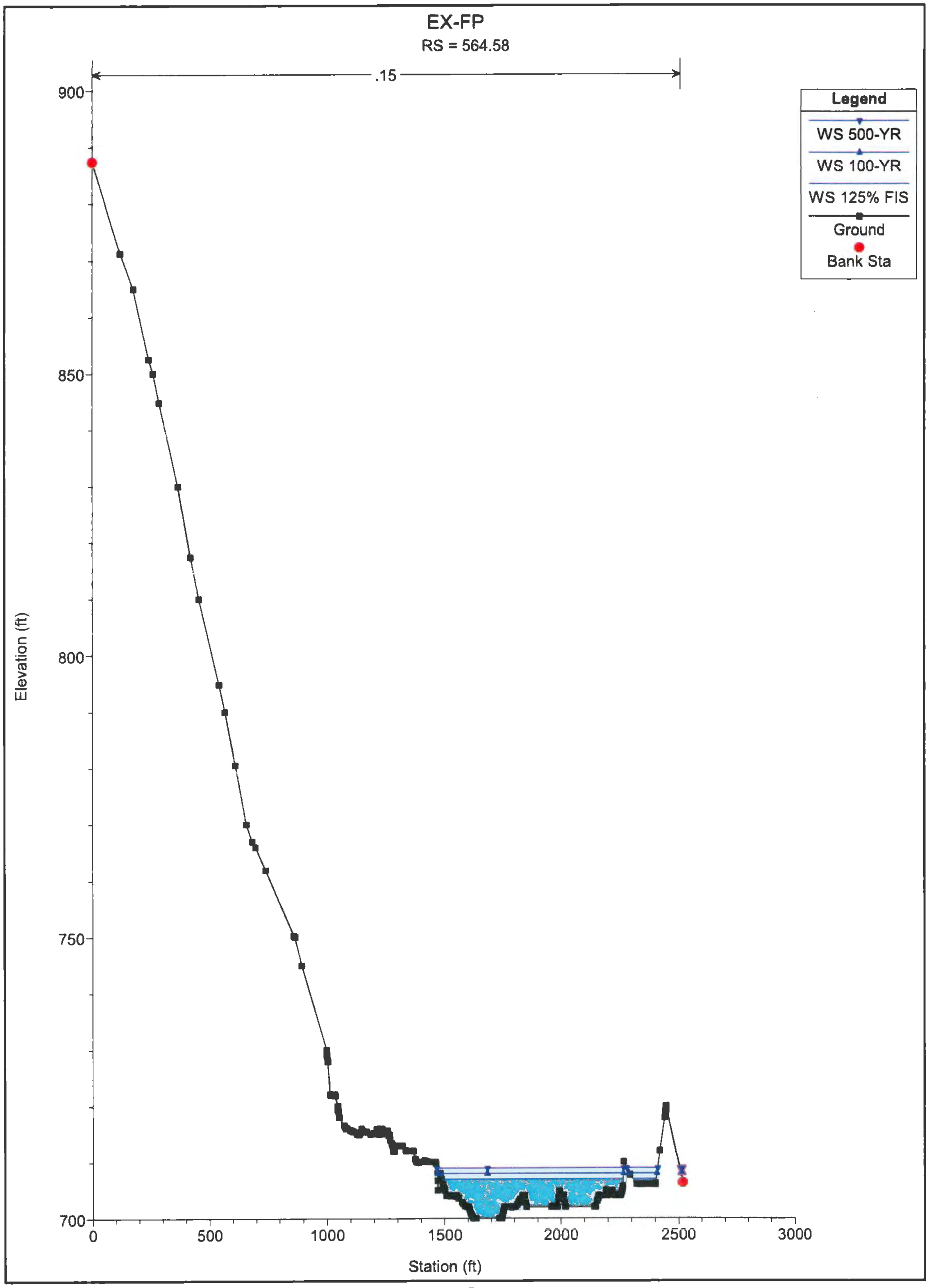

EX-FP
RS = 966.43
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

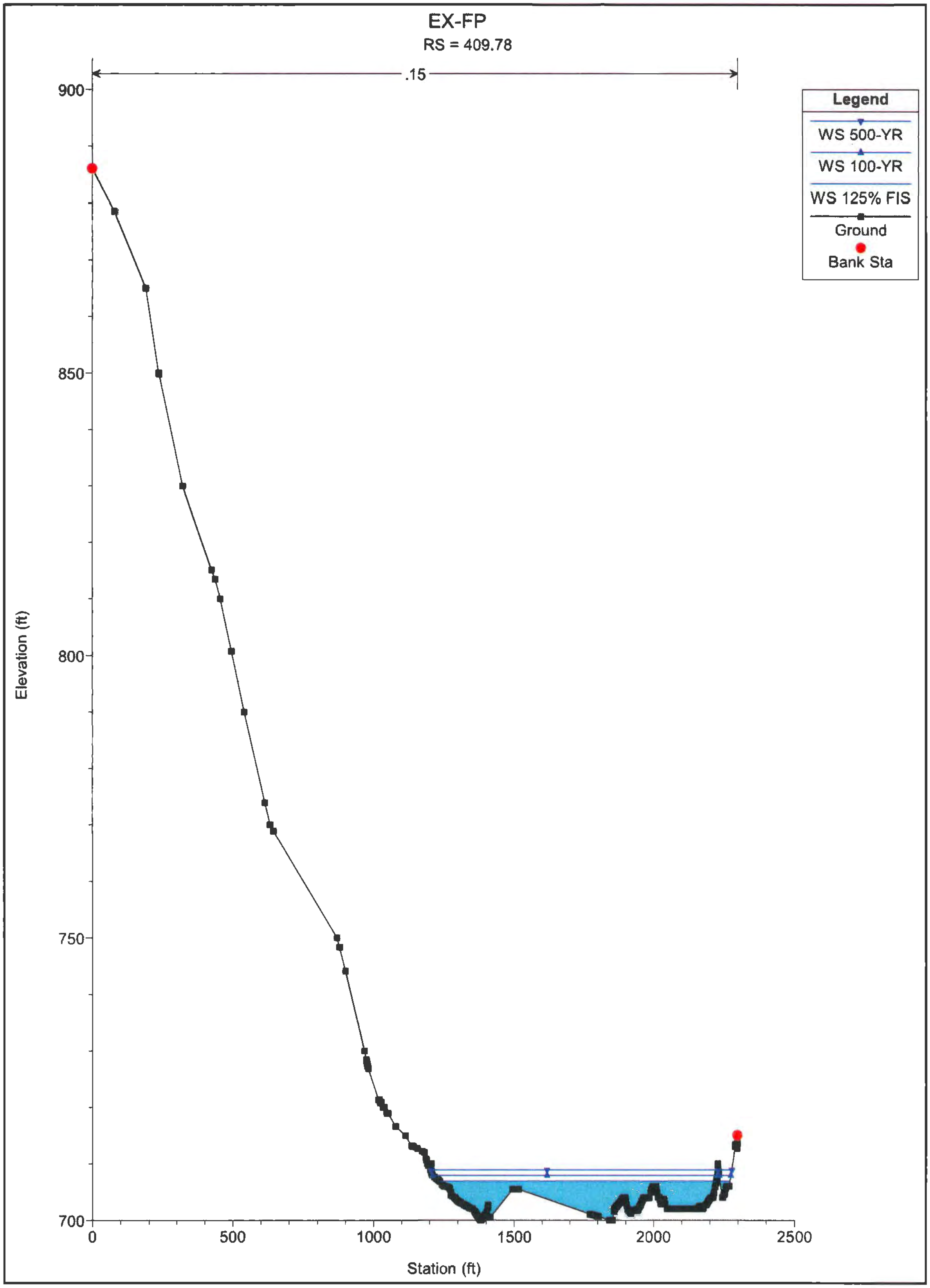


EX-FP
RS = 844.89
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

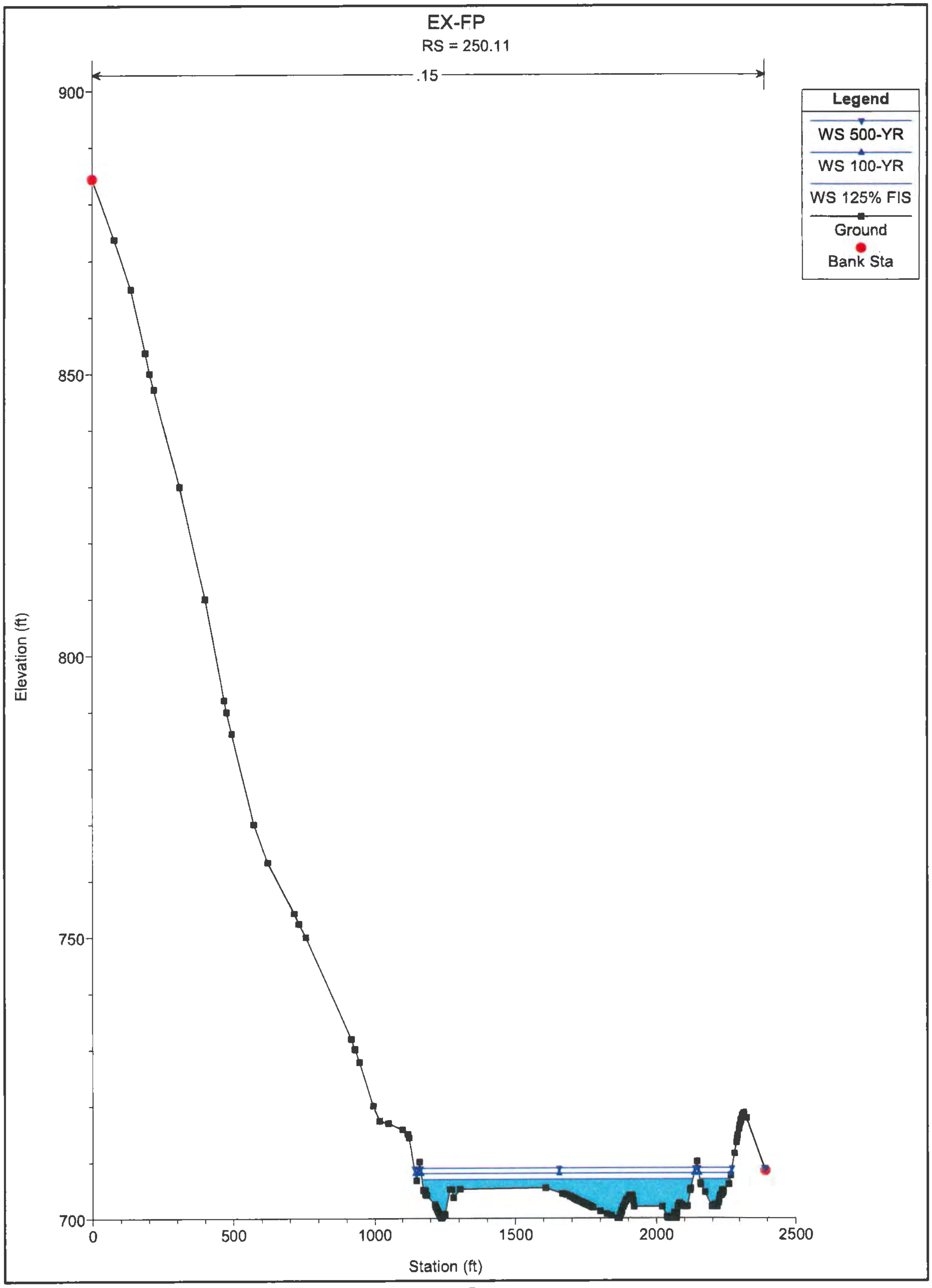


EX-FP
RS = 702.37
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000


EX-FP
RS = 564.58
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
0
500
1000
1500
2000
2500
3000
Station (ft)



EX-FP
RS = 409.78
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
0
500
1000
1500
2000
2500



EX-FP
RS = 250.11
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
0
500
1000
1500
2000
2500
Station (ft)

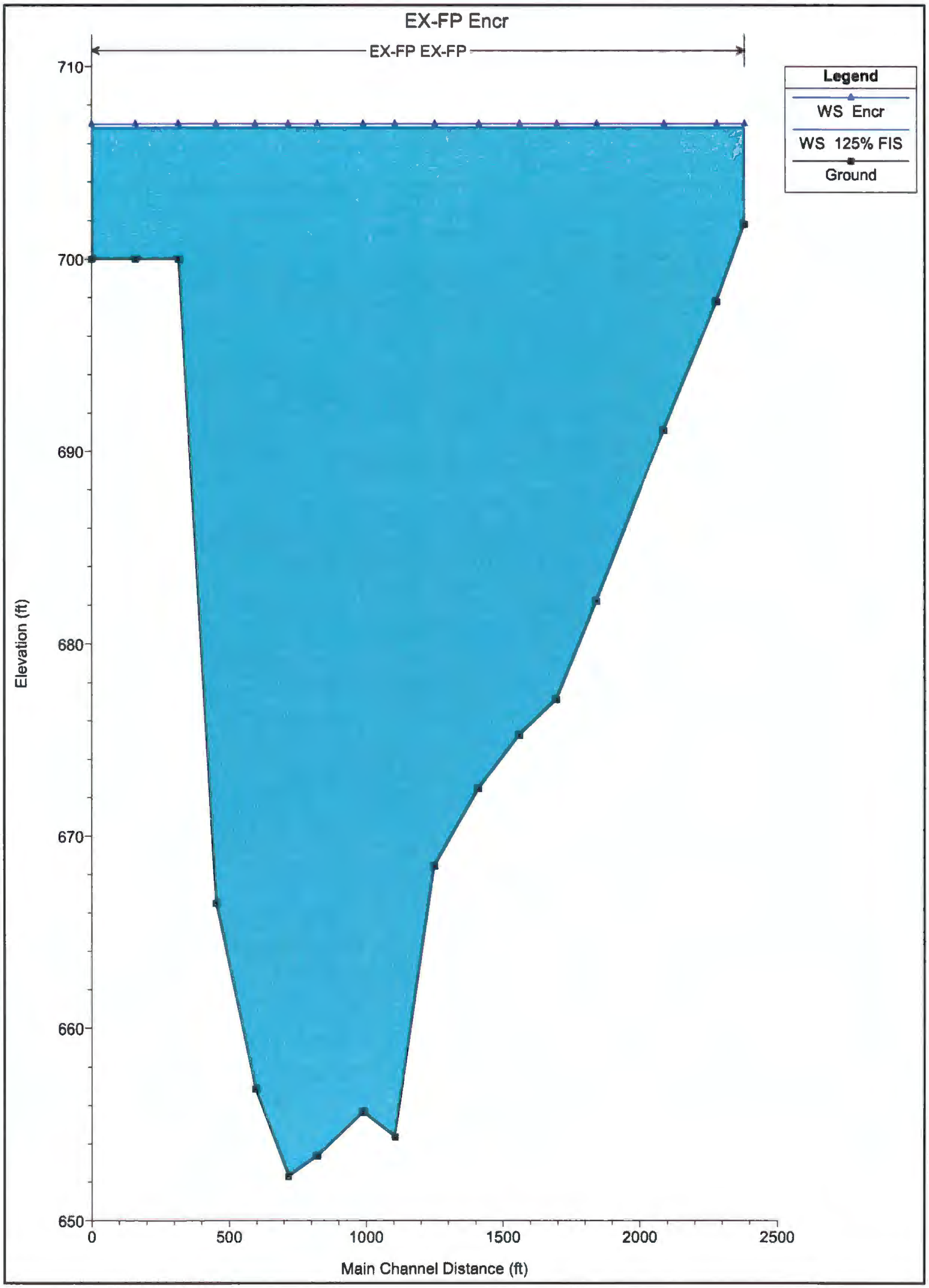
HEC-RAS Plan: VER2 River: EX-FP Reach: EX-FP

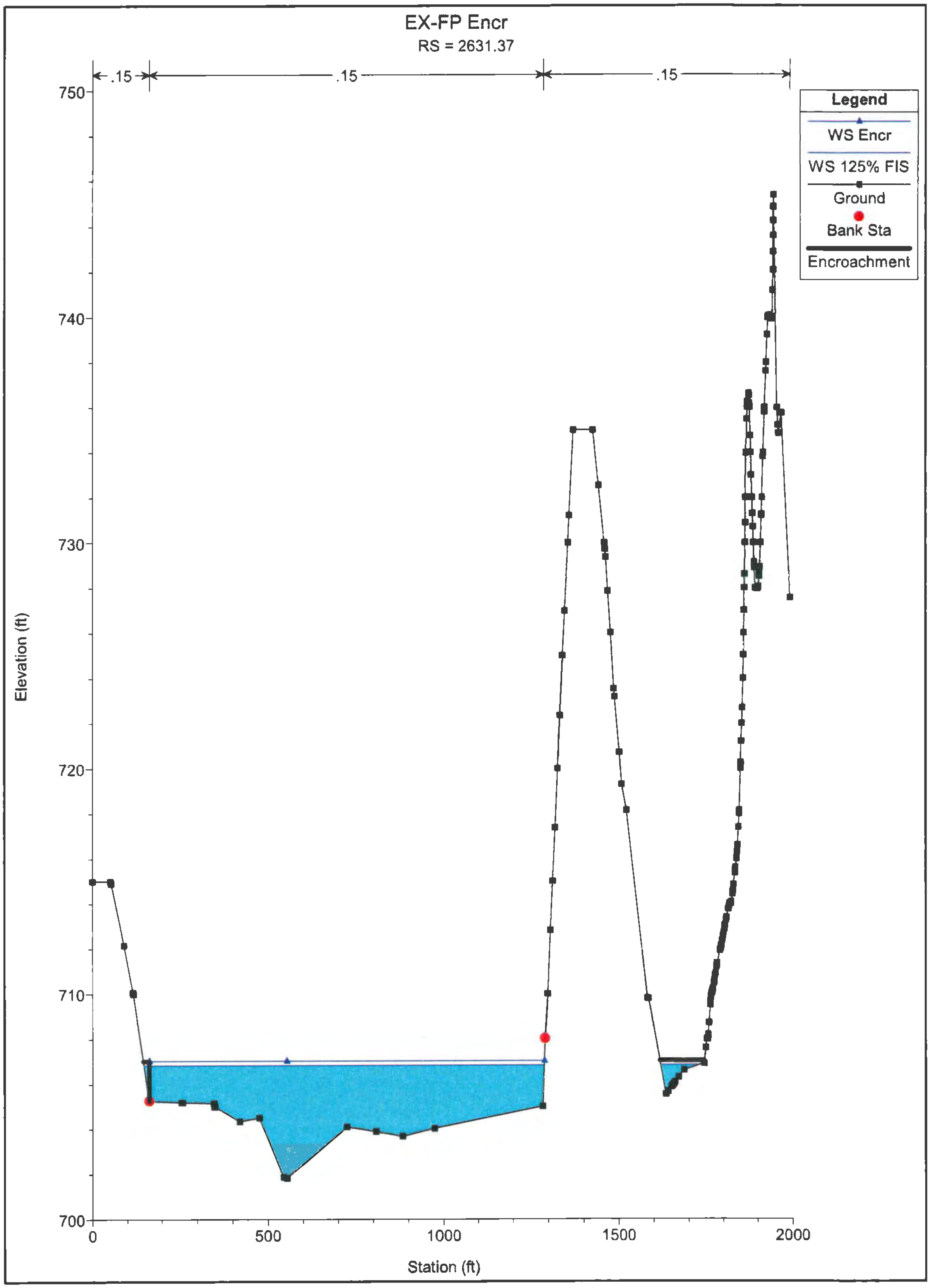
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
EX-FP	2631.37	125% FIS	0.10	701.82	706.82	701.85	706.82	0.000000	0.00	3065.69	1250.53	0.00
EX-FP	2631.37	100-YR	0.10	701.82	707.90	701.85	707.90	0.000000	0.00	4441.88	1298.16	0.00
EX-FP	2631.37	500-YR	0.10	701.82	708.84	701.85	708.84	0.000000	0.00	5684.72	1329.86	0.00
EX-FP	2529.96	125% FIS	0.10	697.77	706.82		706.82	0.000000	0.00	5363.26	1435.27	0.00
EX-FP	2529.96	100-YR	0.10	697.77	707.90		707.90	0.000000	0.00	6931.19	1483.75	0.00
EX-FP	2529.96	500-YR	0.10	697.77	708.84		708.84	0.000000	0.00	8353.05	1524.79	0.00
EX-FP	2337.67	125% FIS	0.10	691.08	706.82		706.82	0.000000	0.00	10299.34	1332.77	0.00
EX-FP	2337.67	100-YR	0.10	691.08	707.90		707.90	0.000000	0.00	11772.70	1413.27	0.00
EX-FP	2337.67	500-YR	0.10	691.08	708.84		708.84	0.000000	0.00	13153.88	1482.39	0.00
EX-FP	2093.68	125% FIS	0.10	682.19	706.82		706.82	0.000000	0.00	16924.47	1747.26	0.00
EX-FP	2093.68	100-YR	0.10	682.19	707.90		707.90	0.000000	0.00	18828.26	1799.87	0.00
EX-FP	2093.68	500-YR	0.10	682.19	708.84		708.84	0.000000	0.00	20555.42	1841.99	0.00
EX-FP	1948.74	125% FIS	0.10	677.10	706.82		706.82	0.000000	0.00	20170.49	1541.66	0.00
EX-FP	1948.74	100-YR	0.10	677.10	707.90		707.90	0.000000	0.00	21844.71	1573.64	0.00
EX-FP	1948.74	500-YR	0.10	677.10	708.84		708.84	0.000000	0.00	23349.60	1613.94	0.00
EX-FP	1810.46	125% FIS	787.50	675.23	706.82		706.82	0.000000	0.04	22055.03	1285.19	0.00
EX-FP	1810.46	100-YR	1240.00	675.23	707.90		707.90	0.000001	0.05	23445.22	1303.66	0.00
EX-FP	1810.46	500-YR	1700.00	675.23	708.84		708.84	0.000001	0.07	24695.07	1343.93	0.00
EX-FP	1661.32	125% FIS	787.50	672.46	706.82		706.82	0.000000	0.03	25410.40	1152.99	0.00
EX-FP	1661.32	100-YR	1240.00	672.46	707.90		707.90	0.000000	0.05	26667.94	1186.61	0.00
EX-FP	1661.32	500-YR	1700.00	672.46	708.84		708.84	0.000001	0.06	27886.51	1344.24	0.00
EX-FP	1500.89	125% FIS	787.50	668.42	706.82		706.82	0.000000	0.02	31767.29	1116.61	0.00
EX-FP	1500.89	100-YR	1240.00	668.42	707.90		707.90	0.000000	0.04	32973.87	1130.35	0.00
EX-FP	1500.89	500-YR	1700.00	668.42	708.84		708.84	0.000000	0.05	34089.82	1218.64	0.00
EX-FP	1354.8	125% FIS	787.50	654.35	706.82		706.82	0.000000	0.02	37421.01	1092.21	0.00
EX-FP	1354.8	100-YR	1240.00	654.35	707.90		707.90	0.000000	0.03	38610.17	1121.94	0.00
EX-FP	1354.8	500-YR	1700.00	654.35	708.84		708.84	0.000000	0.04	39772.54	1265.58	0.00
EX-FP	1239.21	125% FIS	787.50	655.64	706.82		706.82	0.000000	0.02	36527.61	1188.49	0.00
EX-FP	1239.21	100-YR	1240.00	655.64	707.90		707.90	0.000000	0.03	37837.39	1252.55	0.00
EX-FP	1239.21	500-YR	1700.00	655.64	708.84		708.84	0.000000	0.04	39150.27	1412.96	0.00
EX-FP	1071.9	125% FIS	787.50	653.36	706.82		706.82	0.000000	0.02	35623.61	1283.94	0.00
EX-FP	1071.9	100-YR	1240.00	653.36	707.90		707.90	0.000000	0.03	37008.52	1295.95	0.00
EX-FP	1071.9	500-YR	1700.00	653.36	708.84		708.84	0.000000	0.04	38239.36	1309.95	0.00
EX-FP	966.43	125% FIS	787.50	652.29	706.82		706.82	0.000000	0.03	29578.84	1408.63	0.00
EX-FP	966.43	100-YR	1240.00	652.29	707.90		707.90	0.000000	0.04	31110.35	1437.70	0.00
EX-FP	966.43	500-YR	1700.00	652.29	708.84		708.84	0.000000	0.05	32480.15	1459.69	0.00
EX-FP	844.89	125% FIS	787.50	656.86	706.82		706.82	0.000000	0.03	22582.40	1238.62	0.00
EX-FP	844.89	100-YR	1240.00	656.86	707.90		707.90	0.000001	0.05	23928.87	1272.12	0.00
EX-FP	844.89	500-YR	1700.00	656.86	708.84		708.84	0.000001	0.07	25156.88	1319.56	0.00
EX-FP	702.37	125% FIS	787.50	666.50	706.82		706.82	0.000003	0.08	10299.12	1177.44	0.00
EX-FP	702.37	100-YR	1240.00	666.50	707.90		707.90	0.000006	0.11	11587.54	1224.57	0.01
EX-FP	702.37	500-YR	1700.00	666.50	708.84		708.84	0.000008	0.13	12765.98	1263.93	0.01
EX-FP	564.58	125% FIS	787.50	700.00	706.82		706.82	0.000080	0.22	3537.70	876.50	0.02
EX-FP	564.58	100-YR	1240.00	700.00	707.89		707.89	0.000094	0.28	4496.97	911.17	0.02
EX-FP	564.58	500-YR	1700.00	700.00	708.84		708.84	0.000102	0.32	5374.71	942.53	0.02
EX-FP	409.78	125% FIS	787.50	700.00	706.81		706.81	0.000069	0.20	3922.58	1020.38	0.02
EX-FP	409.78	100-YR	1240.00	700.00	707.88		707.88	0.000078	0.25	5033.80	1055.74	0.02
EX-FP	409.78	500-YR	1700.00	700.00	708.82		708.82	0.000081	0.28	6036.20	1069.22	0.02
EX-FP	250.11	125% FIS	787.50	700.00	706.80	701.43	706.80	0.000100	0.22	3571.99	1070.03	0.02
EX-FP	250.11	100-YR	1240.00	700.00	707.87	701.77	707.87	0.000100	0.26	4728.72	1092.27	0.02
EX-FP	250.11	500-YR	1700.00	700.00	708.81	702.18	708.81	0.000100	0.29	5768.47	1115.99	0.02

Errors Warnings and Notes for Plan : VER2

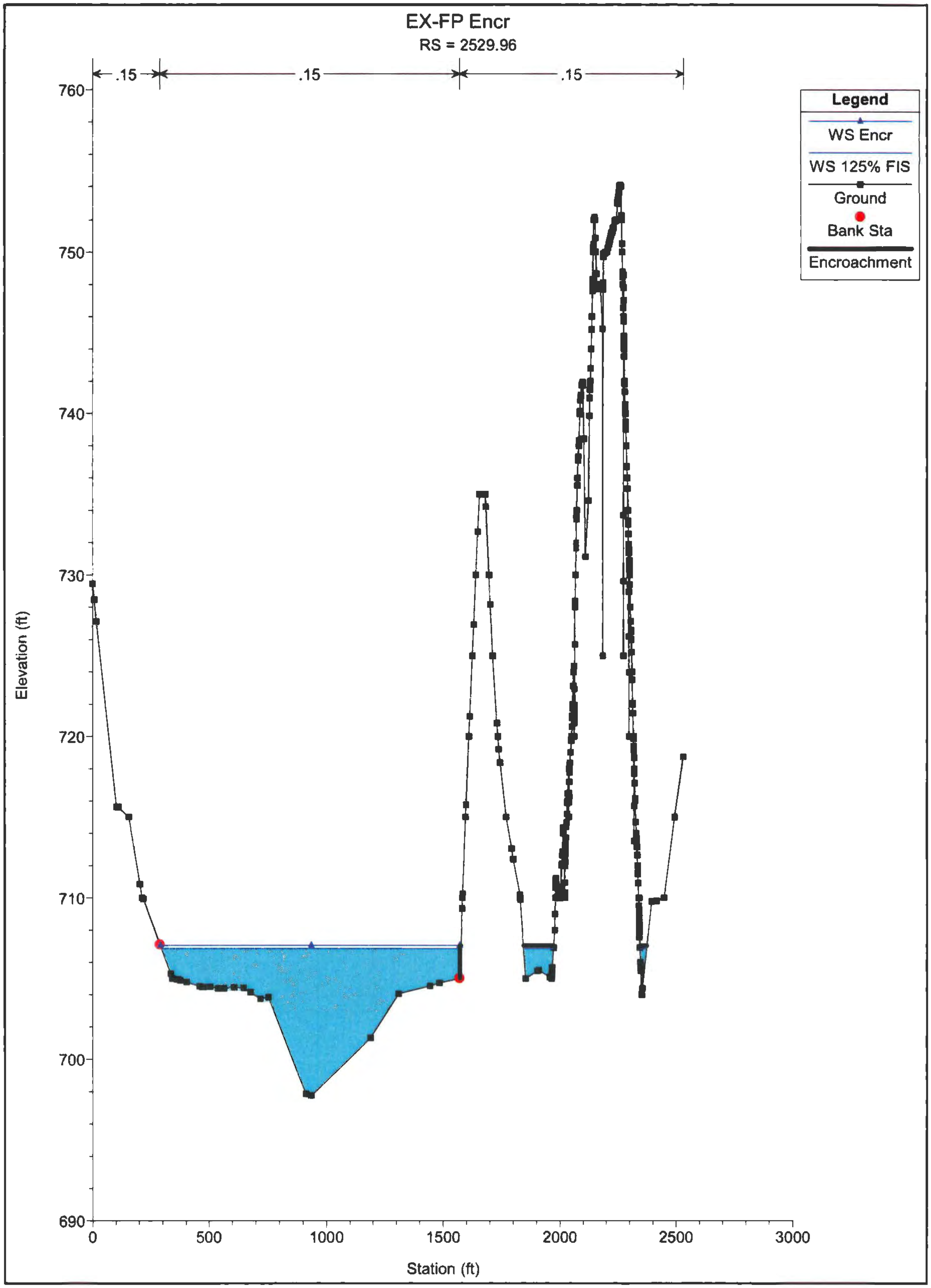
Location:	River: EX-FP Reach: EX-FP RS: 2631.37 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 2529.96 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 2337.67 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 2093.68 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 1946.74 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: EX-FP Reach: EX-FP RS: 1810.46 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: EX-FP Reach: EX-FP RS: 1661.32 Profile: 125% FIS
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 1239.21 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: EX-FP Reach: EX-FP RS: 1071.9 Profile: 125% FIS
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 966.43 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 844.89 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 702.37 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: EX-FP Reach: EX-FP RS: 564.58 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The cross-section end points had to be extended vertically for the computed water surface.
Location:	River: EX-FP Reach: EX-FP RS: 409.78 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: EX-FP Reach: EX-FP RS: 250.11 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.

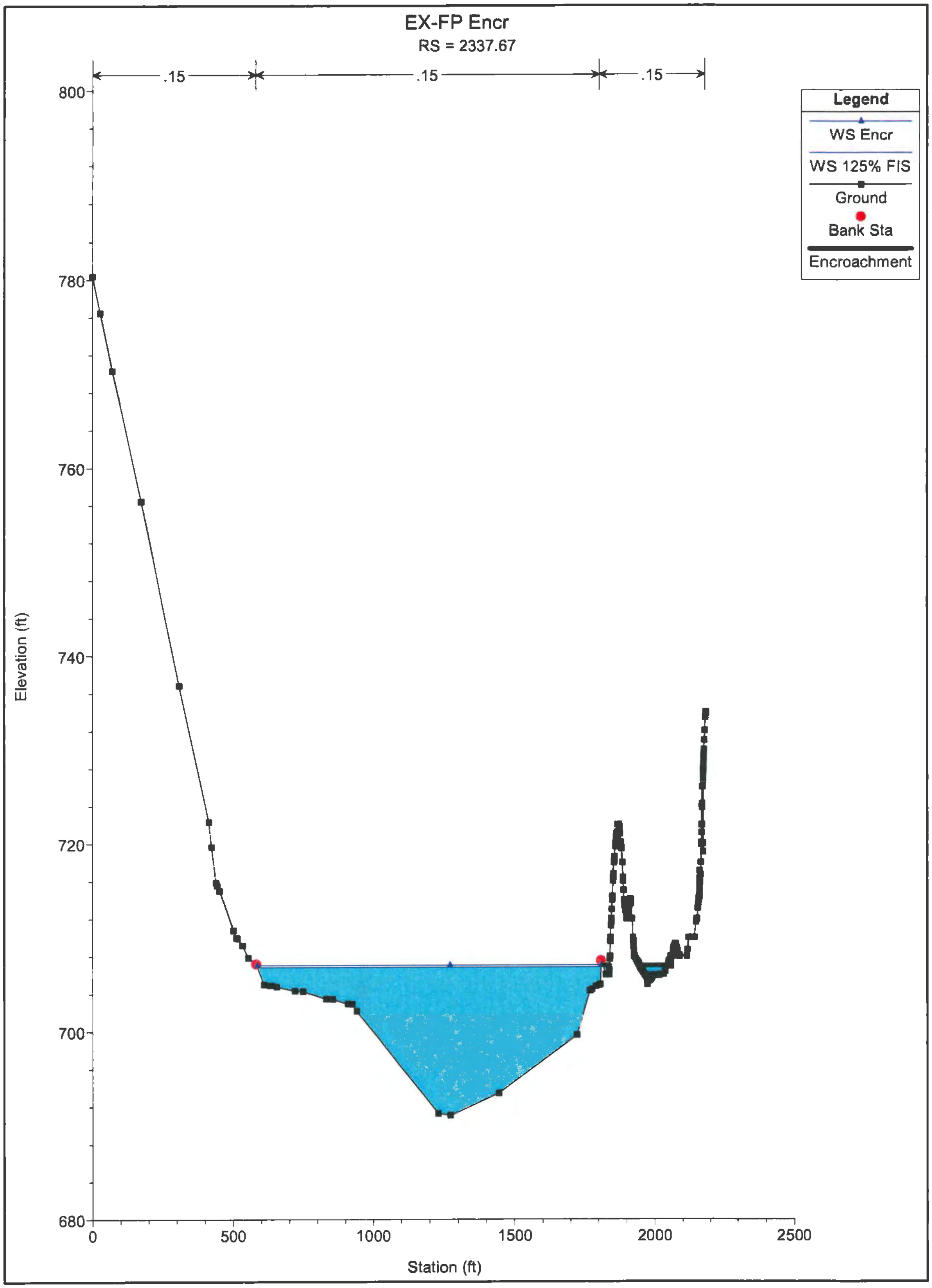
Encroachment analysis



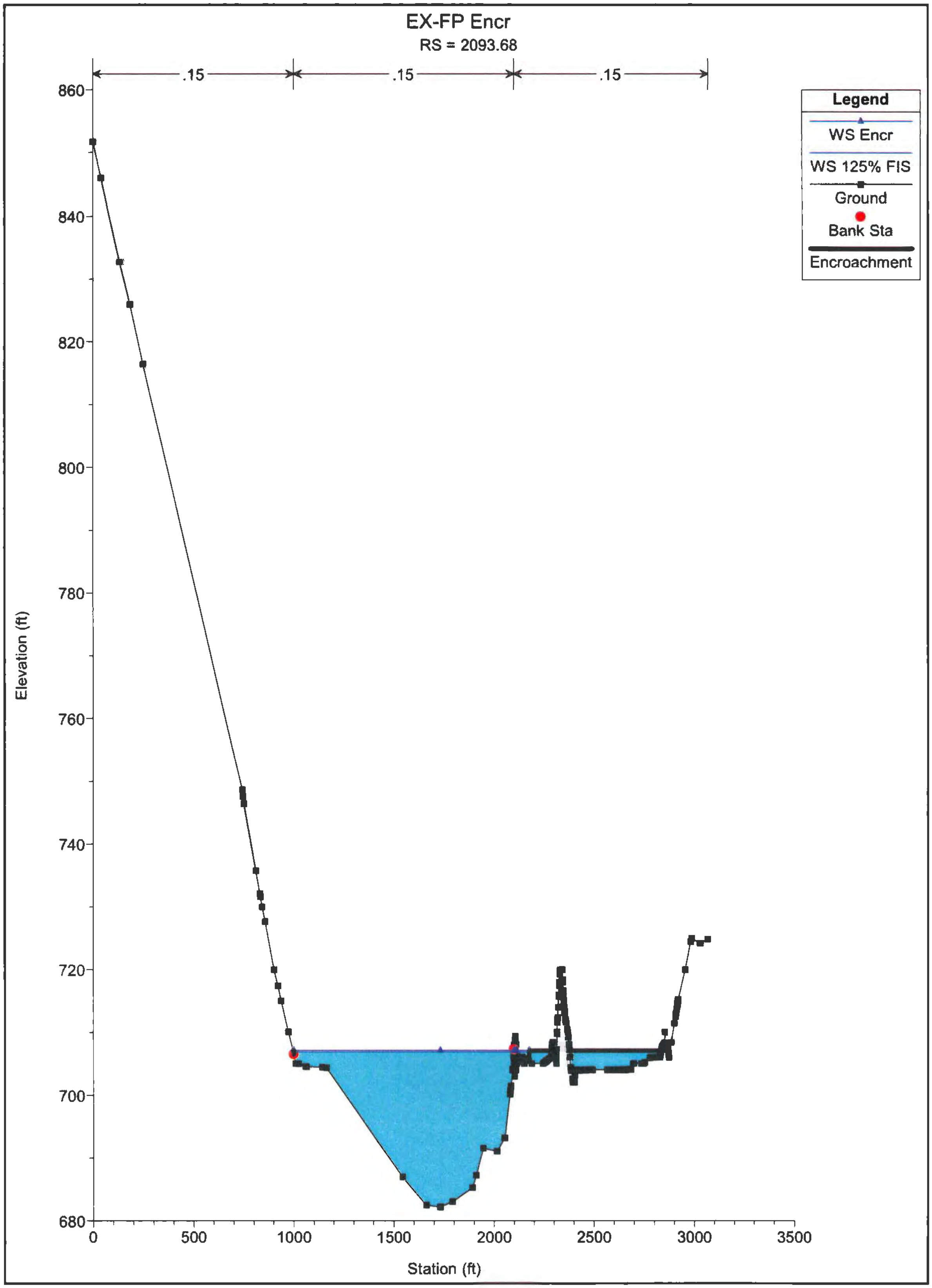


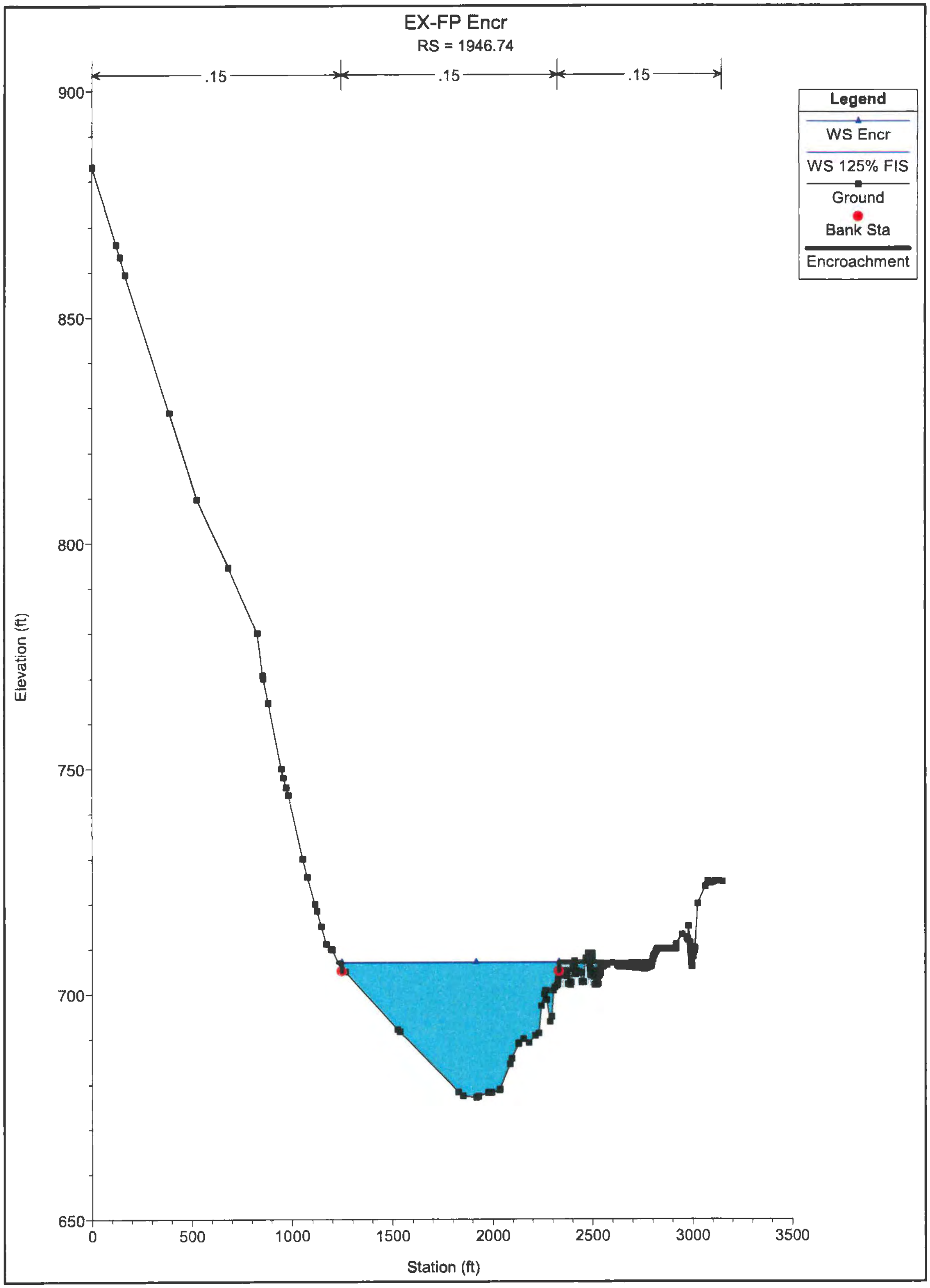
EX-FP Encr
RS = 2631.37
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
750
740
730
720
710
700
0
500
1000
1500
2000
Station (ft)

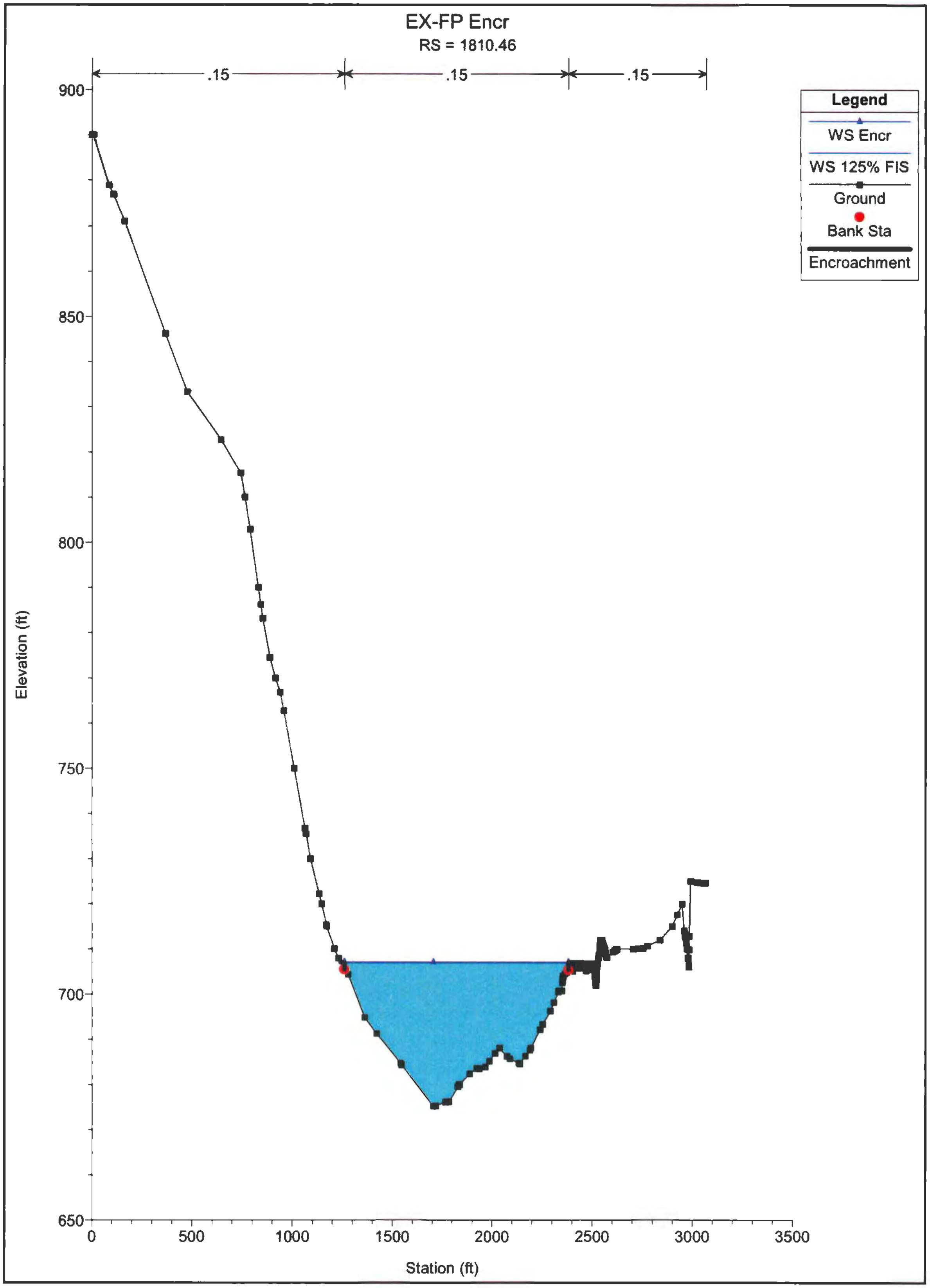

EX-FP Encr
RS = 2529.96
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
760
750
740
730
720
710
700
690
0
500
1000
1500
2000
2500
3000

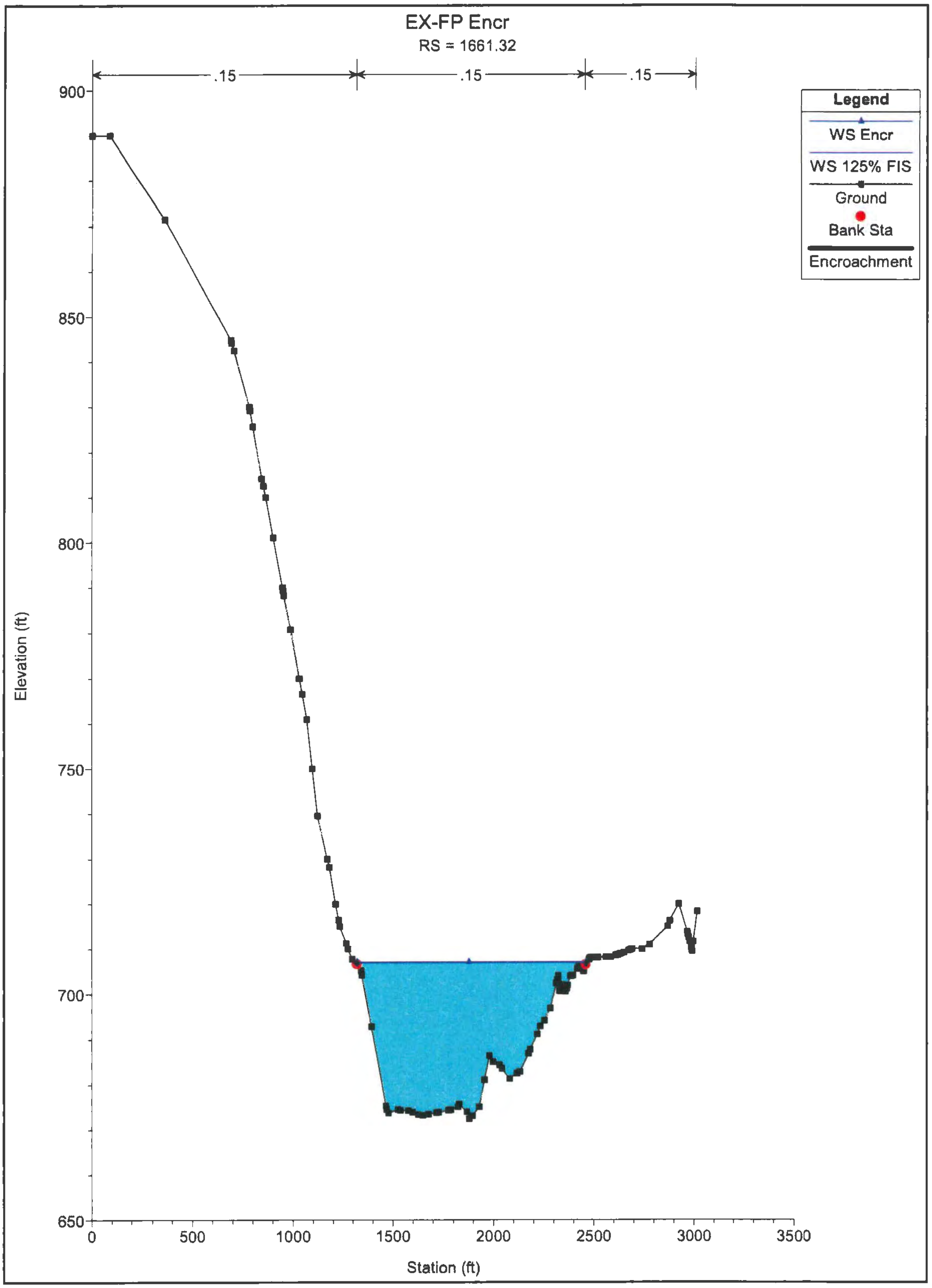


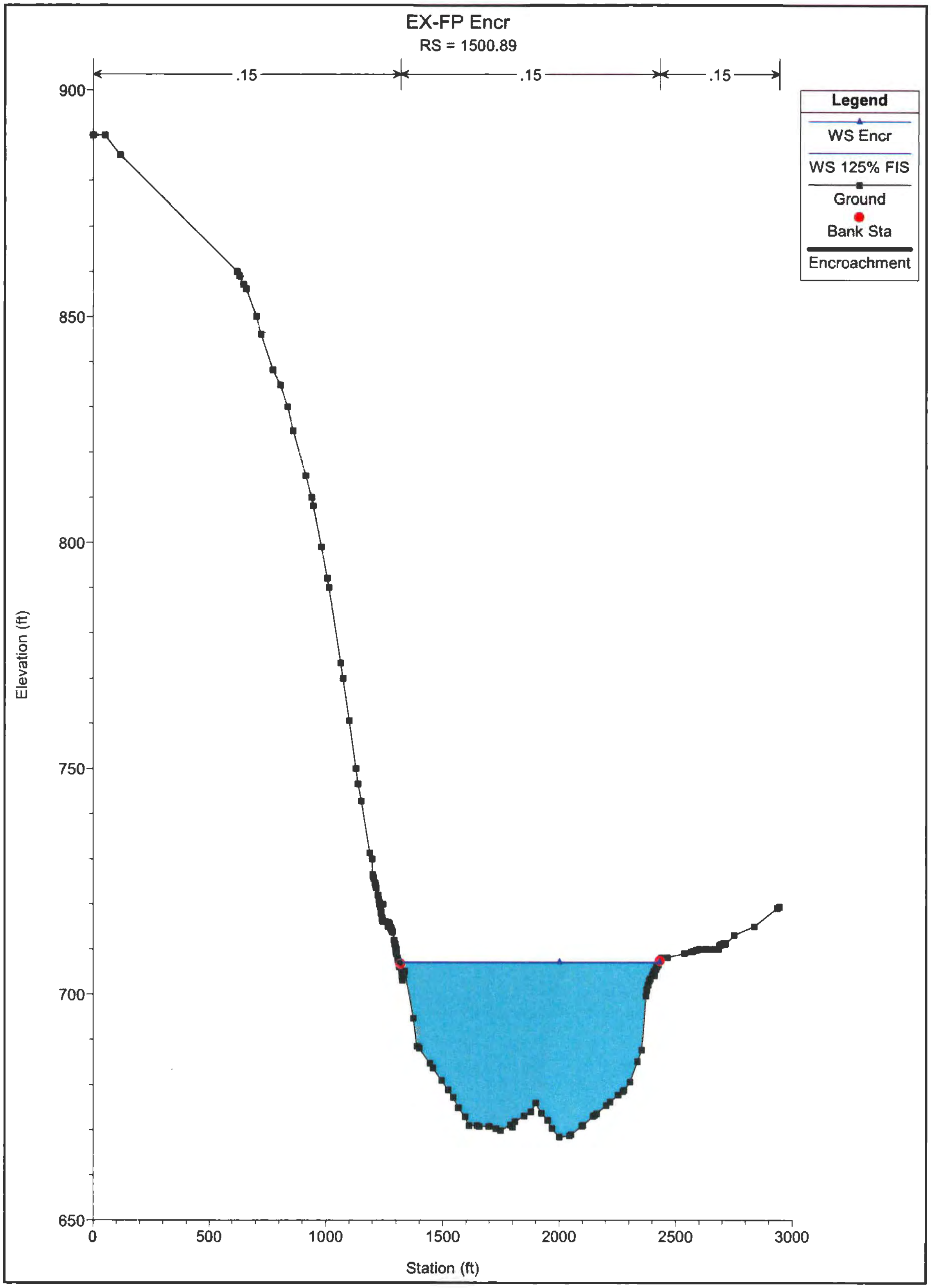
EX-FP Encr
RS = 2337.67
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
800
780
760
740
720
700
680
0
500
1000
1500
2000
2500
Station (ft)

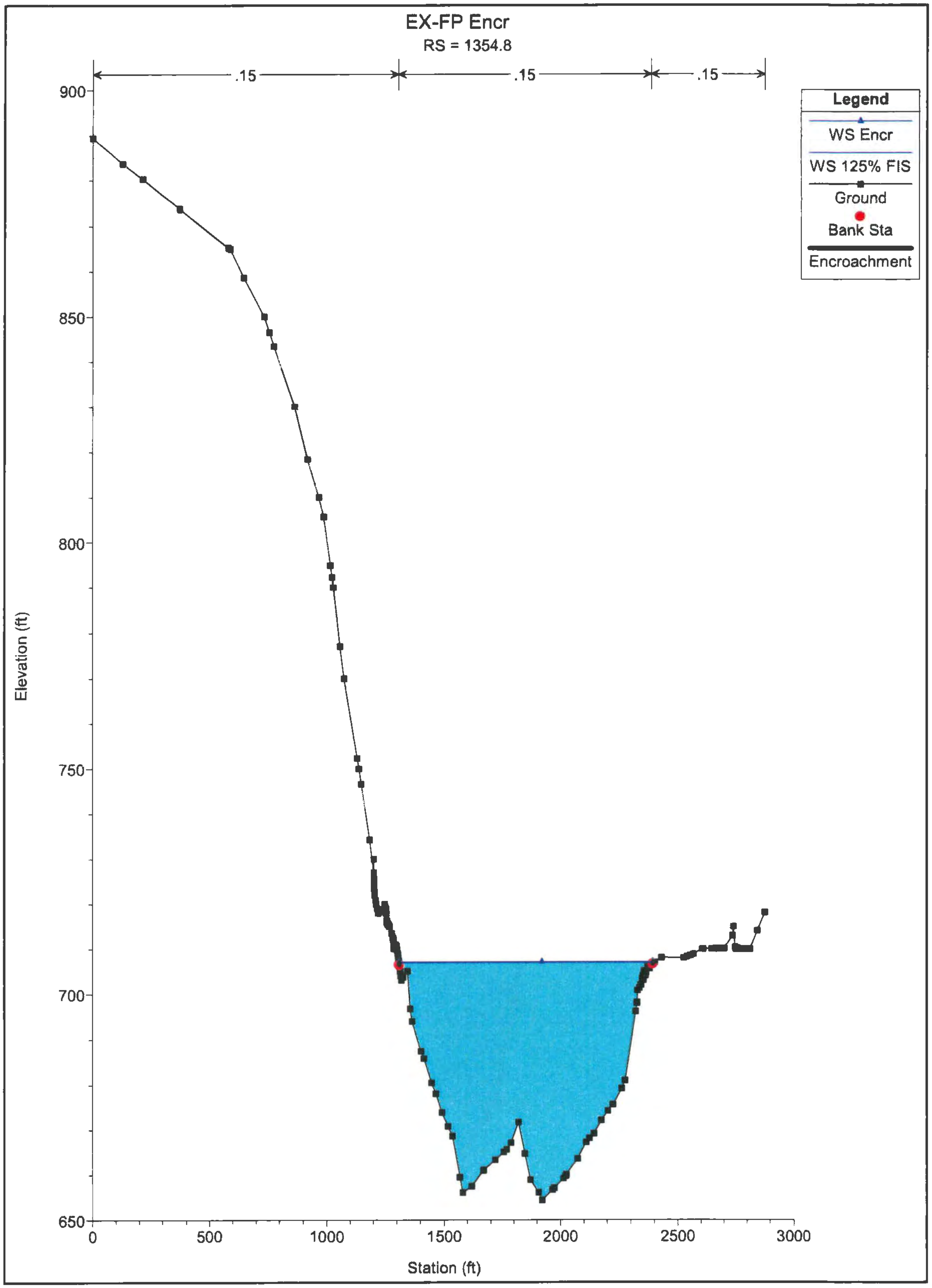

EX-FP Encr
RS = 2093.68
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
860
840
820
800
780
760
740
720
700
680
0
500
1000
1500
2000
2500
3000
3500
Station (ft)


EX-FP Encr
RS = 1946.74
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
3500
Station (ft)

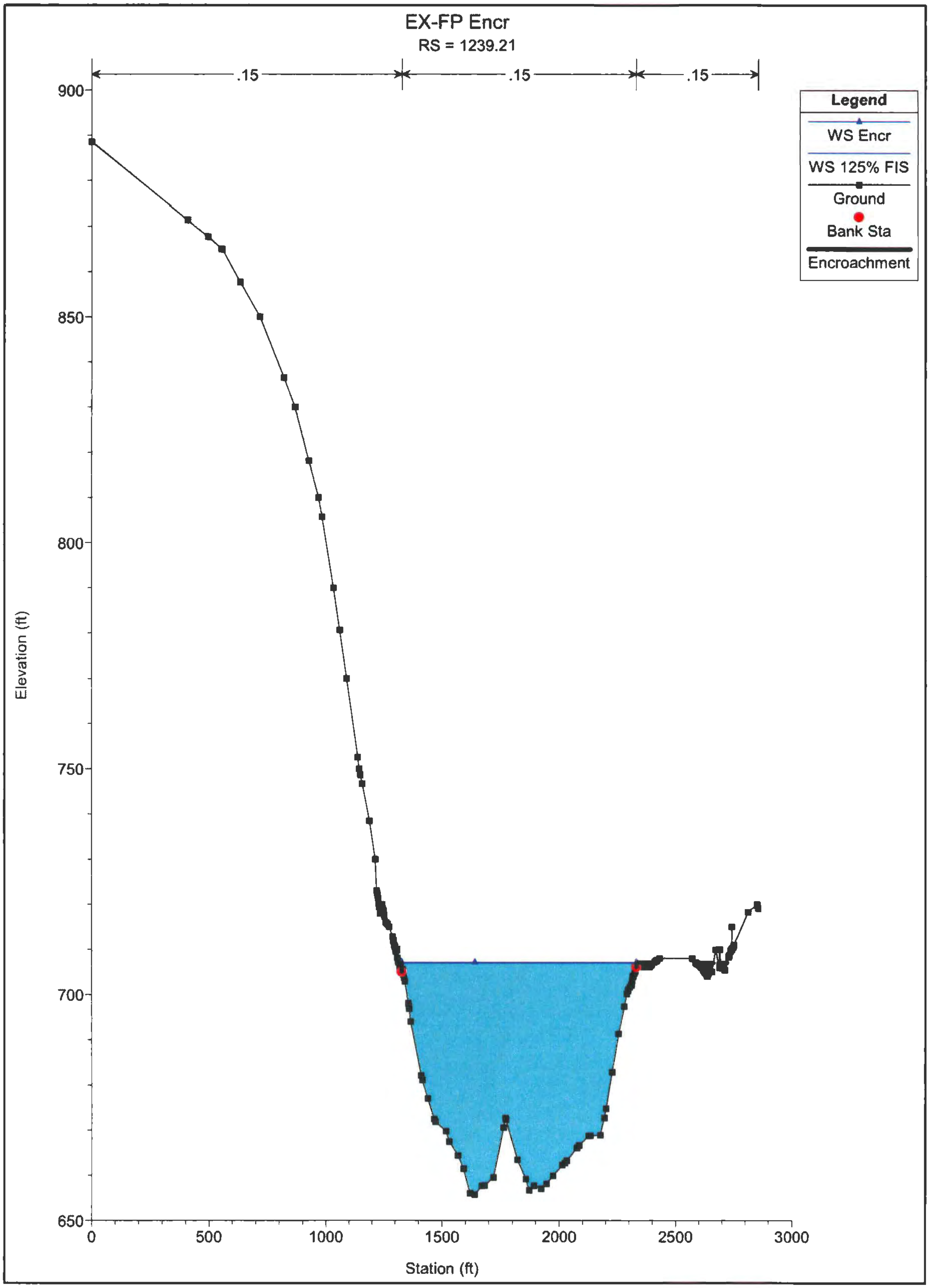

EX-FP Encr
RS = 1810.46
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
Station (ft)
0
500
1000
1500
2000
2500
3000
3500


EX-FP Encr
RS = 1661.32
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
Station (ft)
0
500
1000
1500
2000
2500
3000
3500

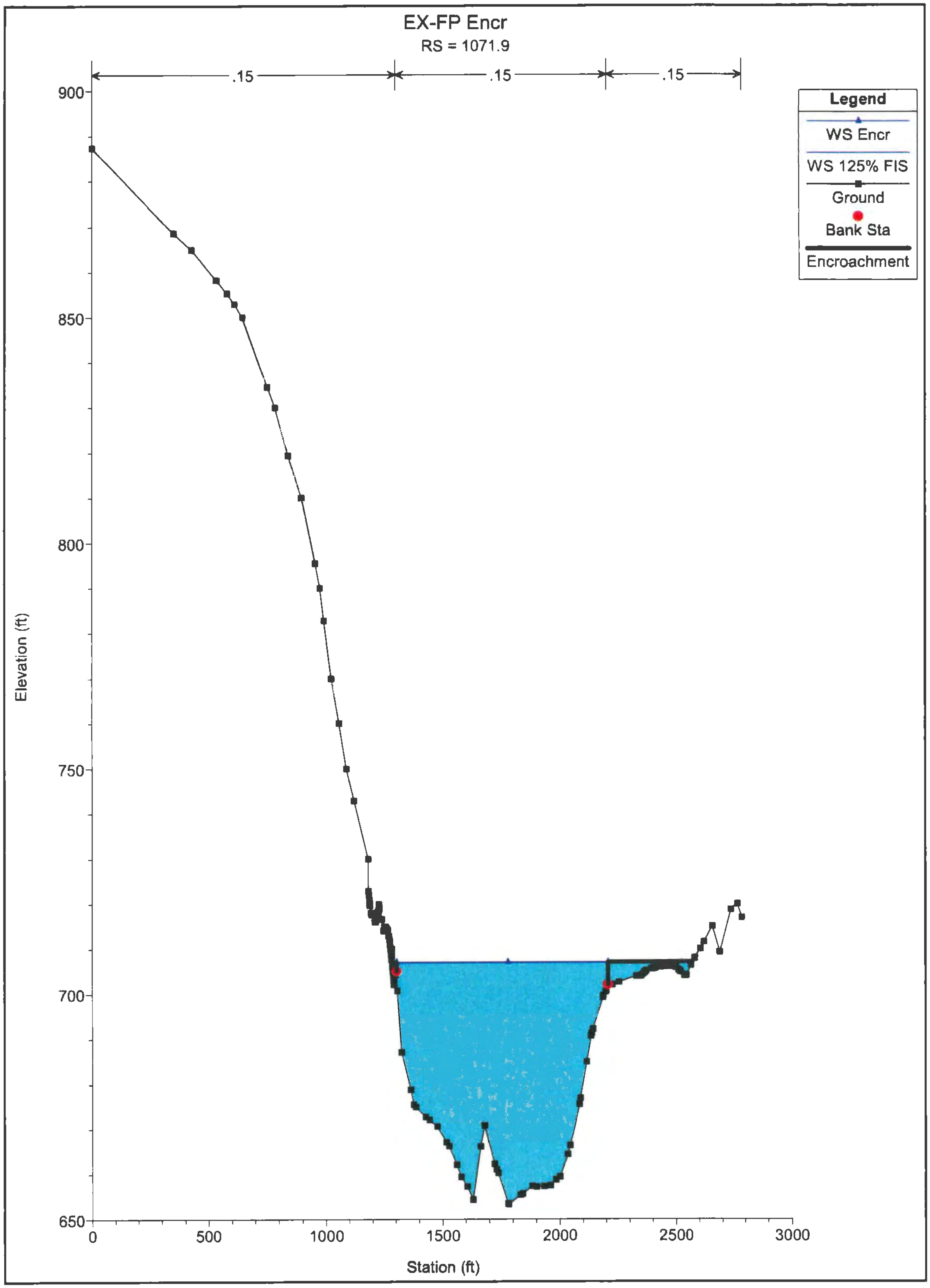

EX-FP Encr
RS = 1500.89
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000



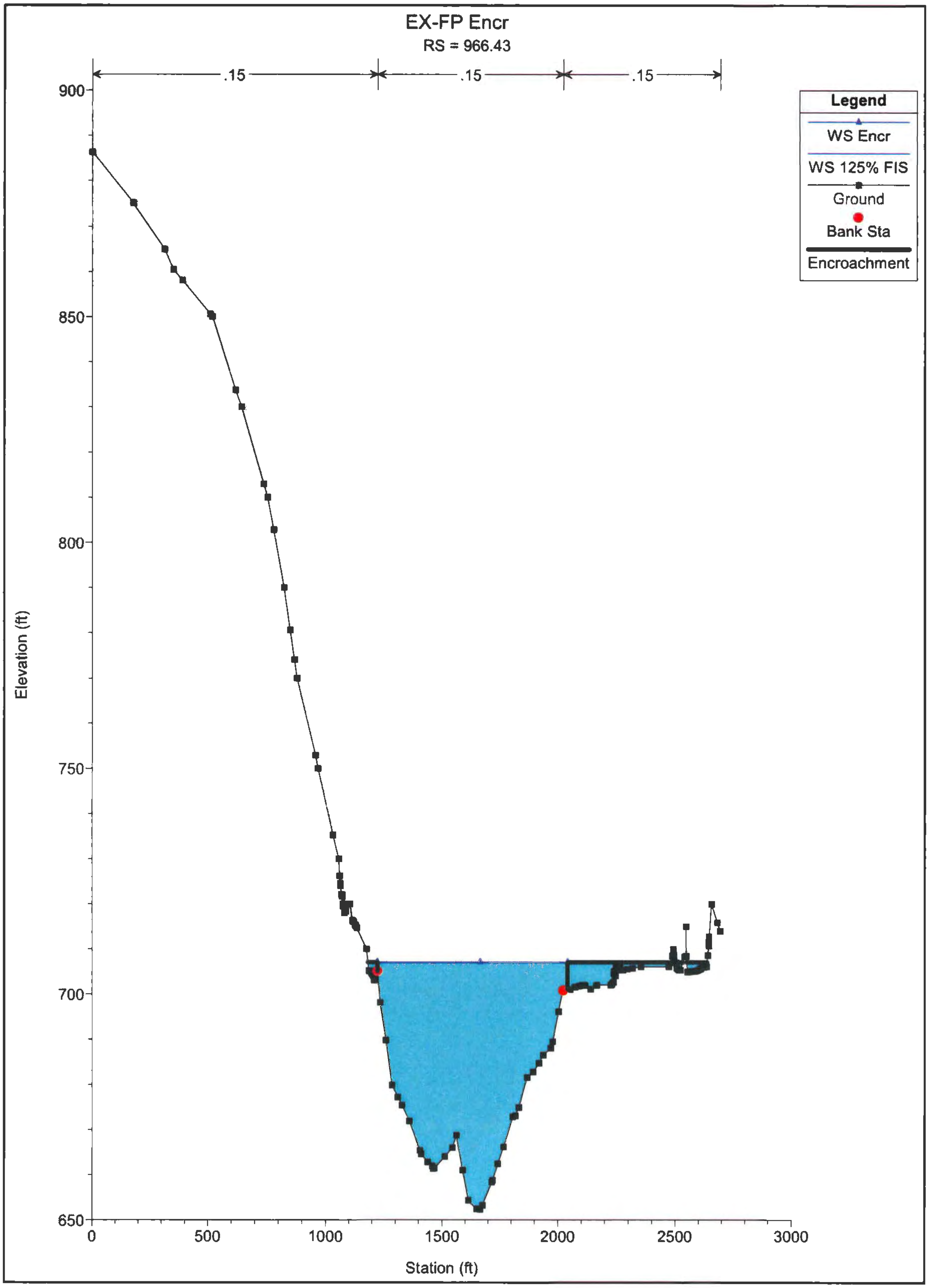
EX-FP Encr
RS = 1354.8
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
900
850
800
750
700
650
Elevation (ft)
0
500
1000
1500
2000
2500
3000
Station (ft)



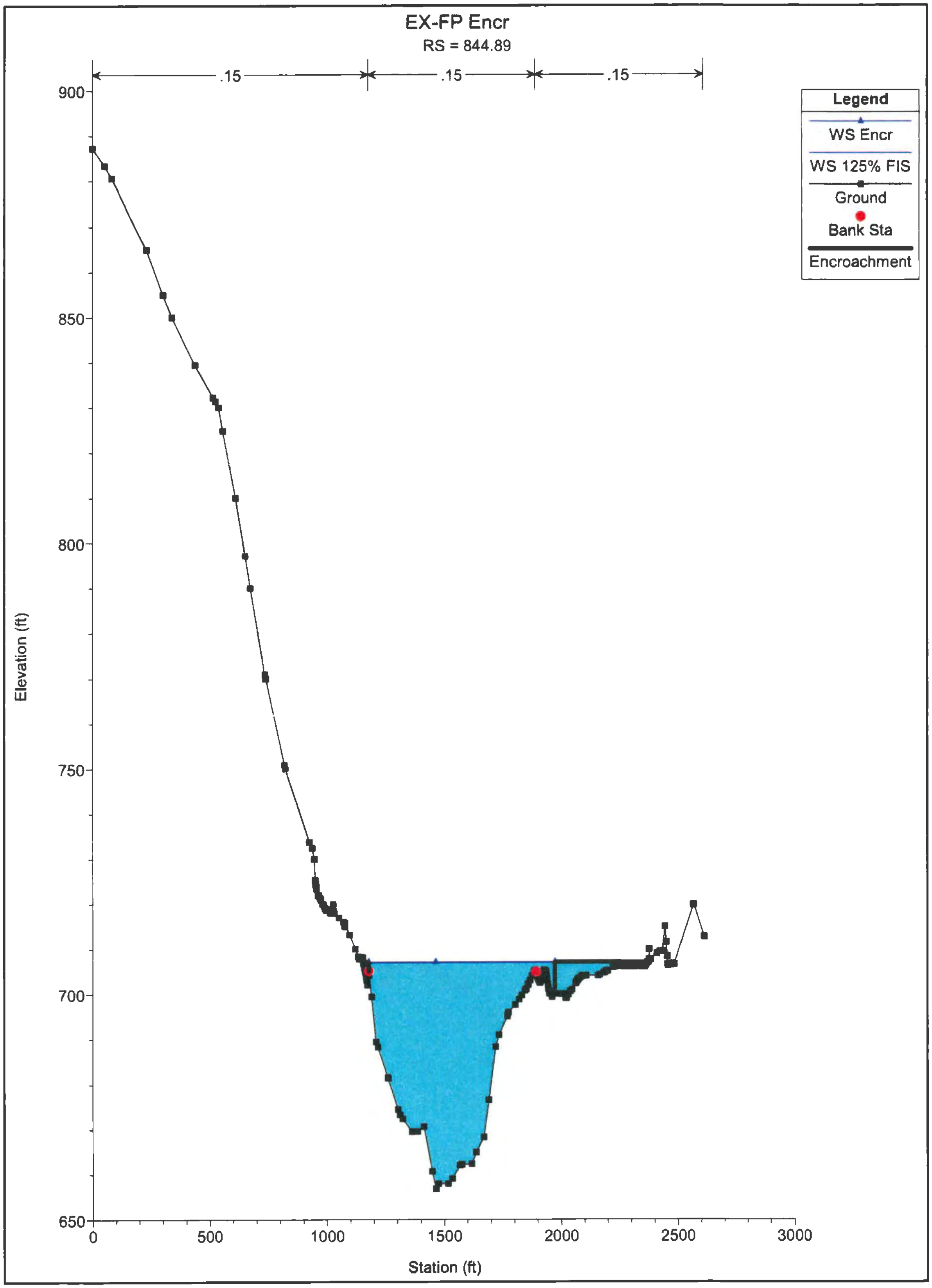
EX-FP Encr
RS = 1239.21
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)



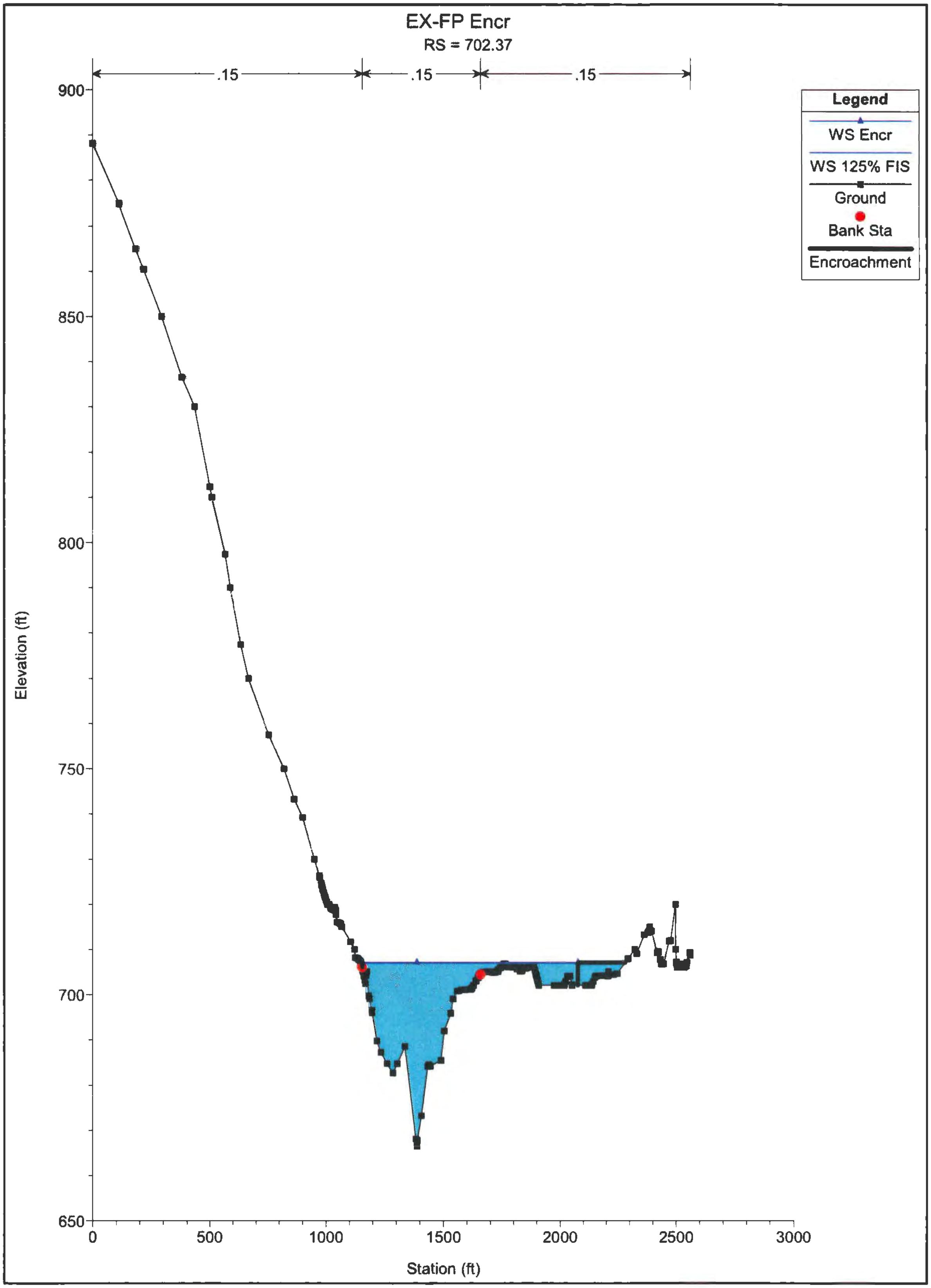
EX-FP Encr
RS = 1071.9
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)



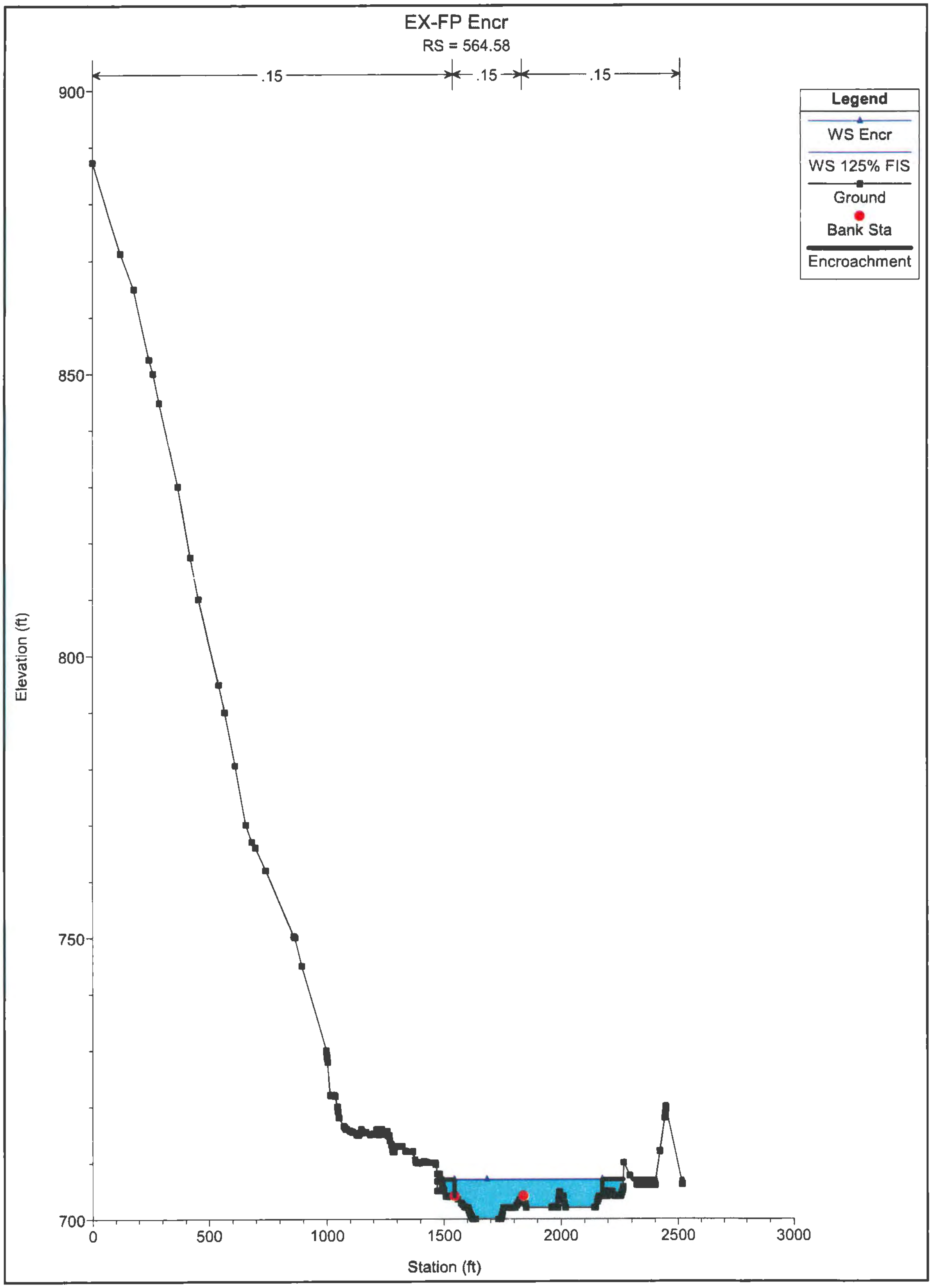
EX-FP Encr
RS = 966.43
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

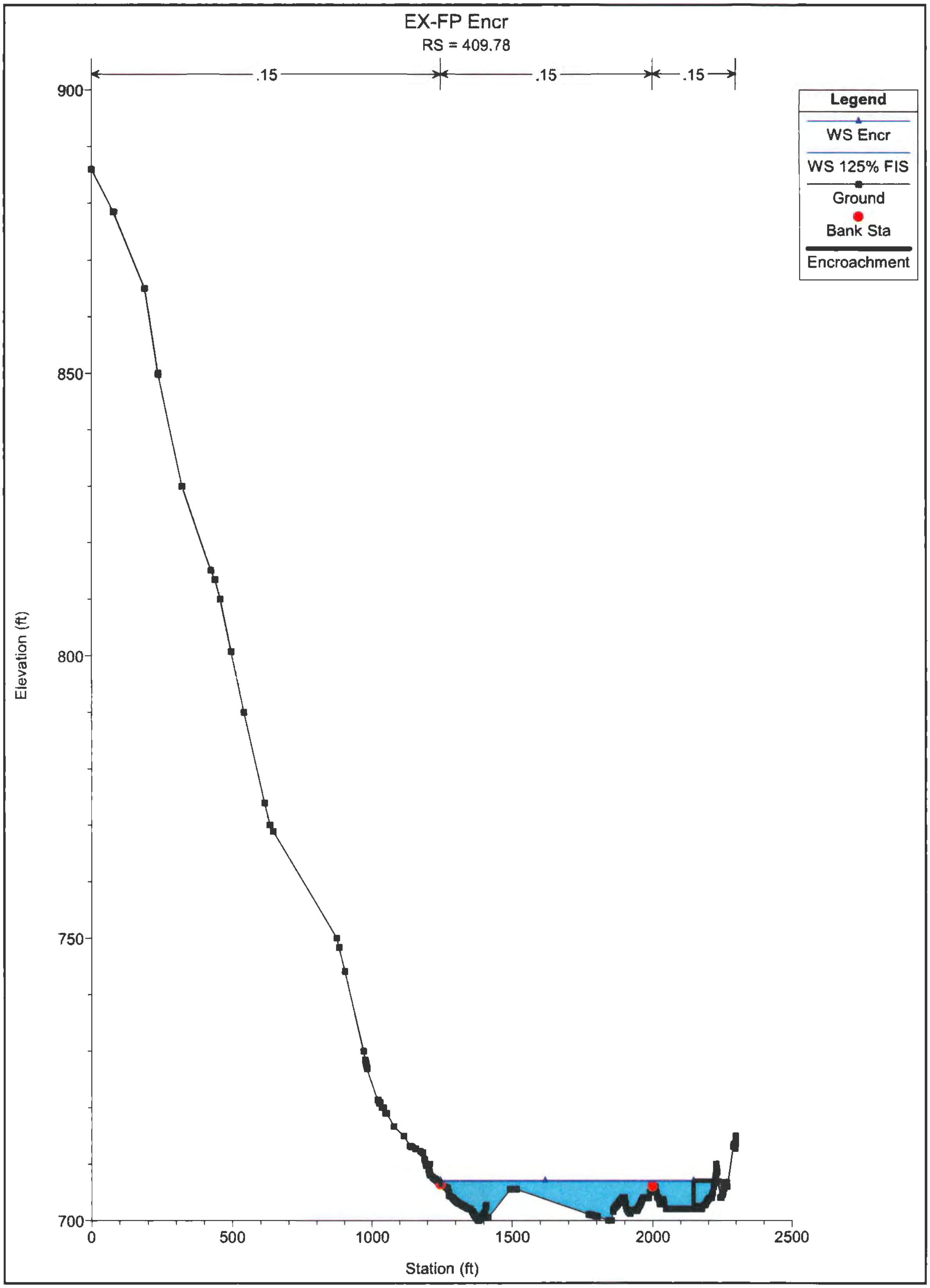


EX-FP Encr
RS = 844.89
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

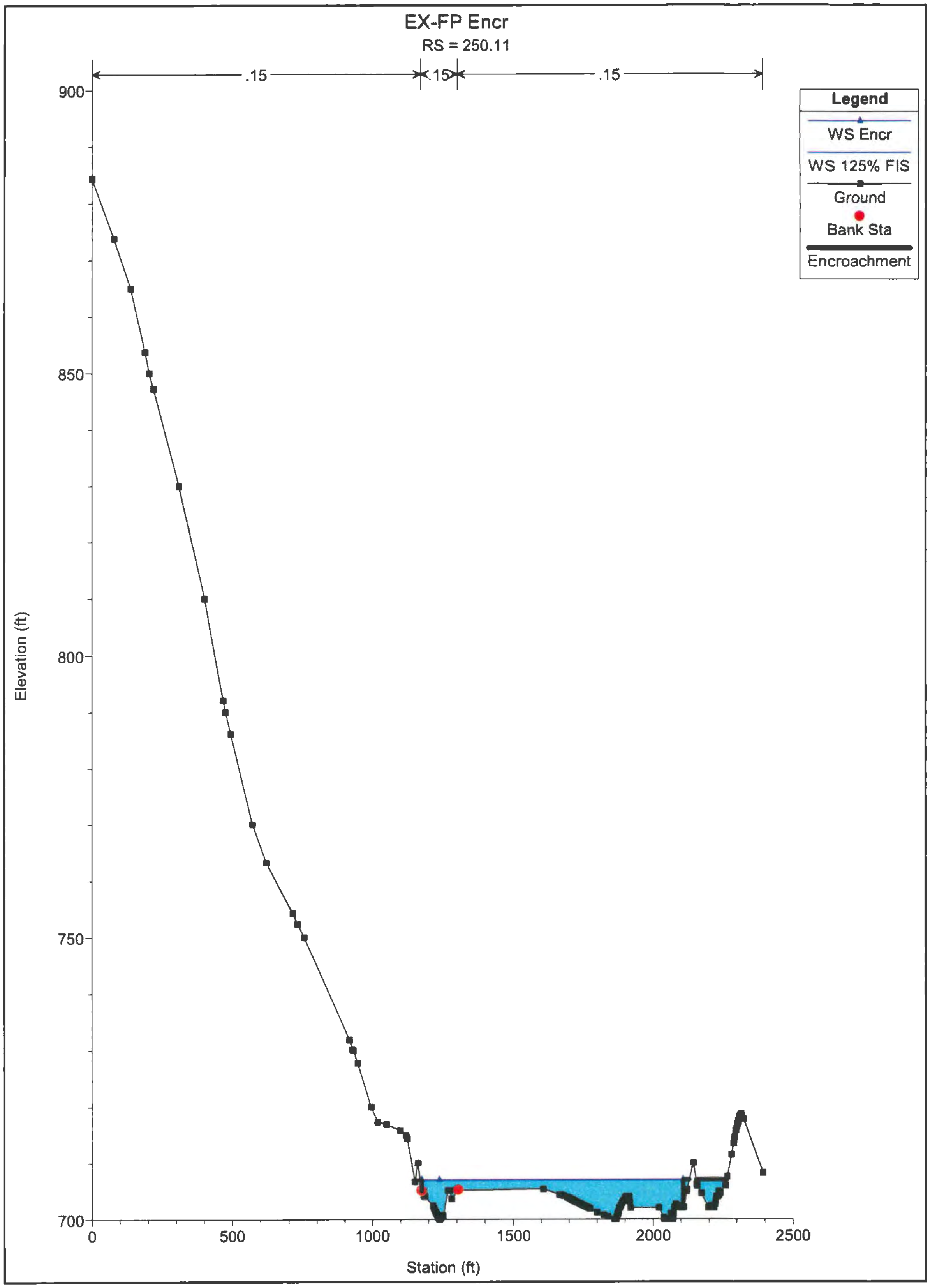


EX-FP Encr
RS = 702.37
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)


EX-FP Encr
RS = 564.58
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
Station (ft)
0
500
1000
1500
2000
2500
3000



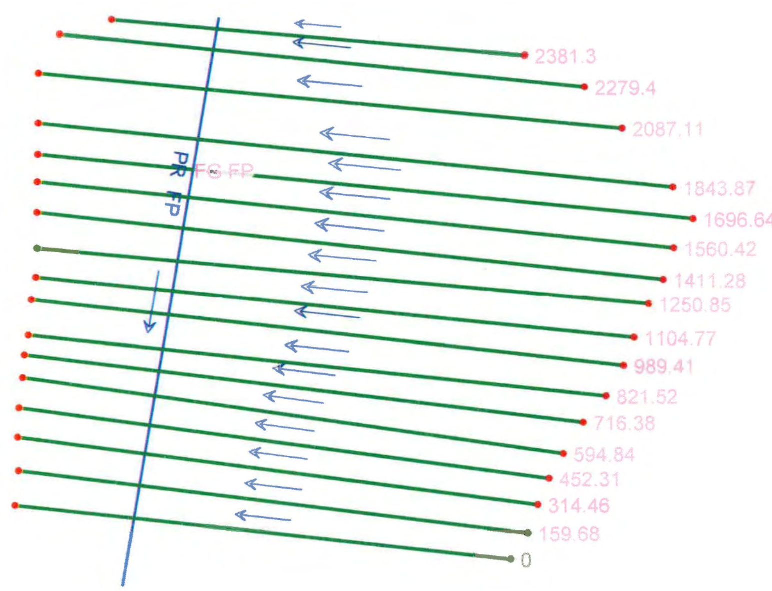
EX-FP Encr
RS = 409.78
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
900
850
800
750
700
Elevation (ft)
0
500
1000
1500
2000
2500
Station (ft)

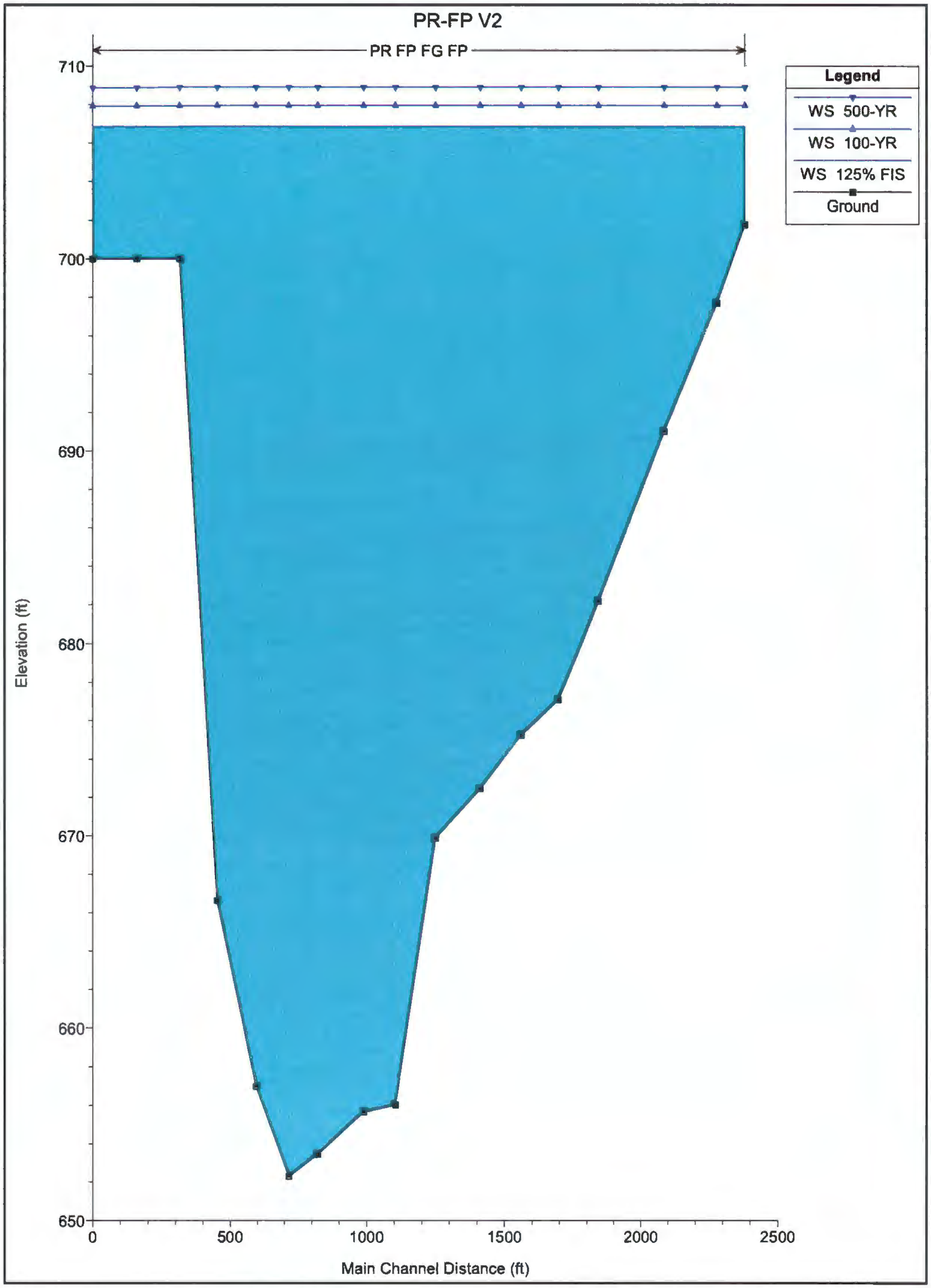

EX-FP Encr
RS = 250.11
.15
.15
.15
Legend
WS Encr
WS 125% FIS
Ground
Bank Sta
Encroachment
Elevation (ft)
900
850
800
750
700
Station (ft)
0
500
1000
1500
2000
2500

HEC-RAS Plan:

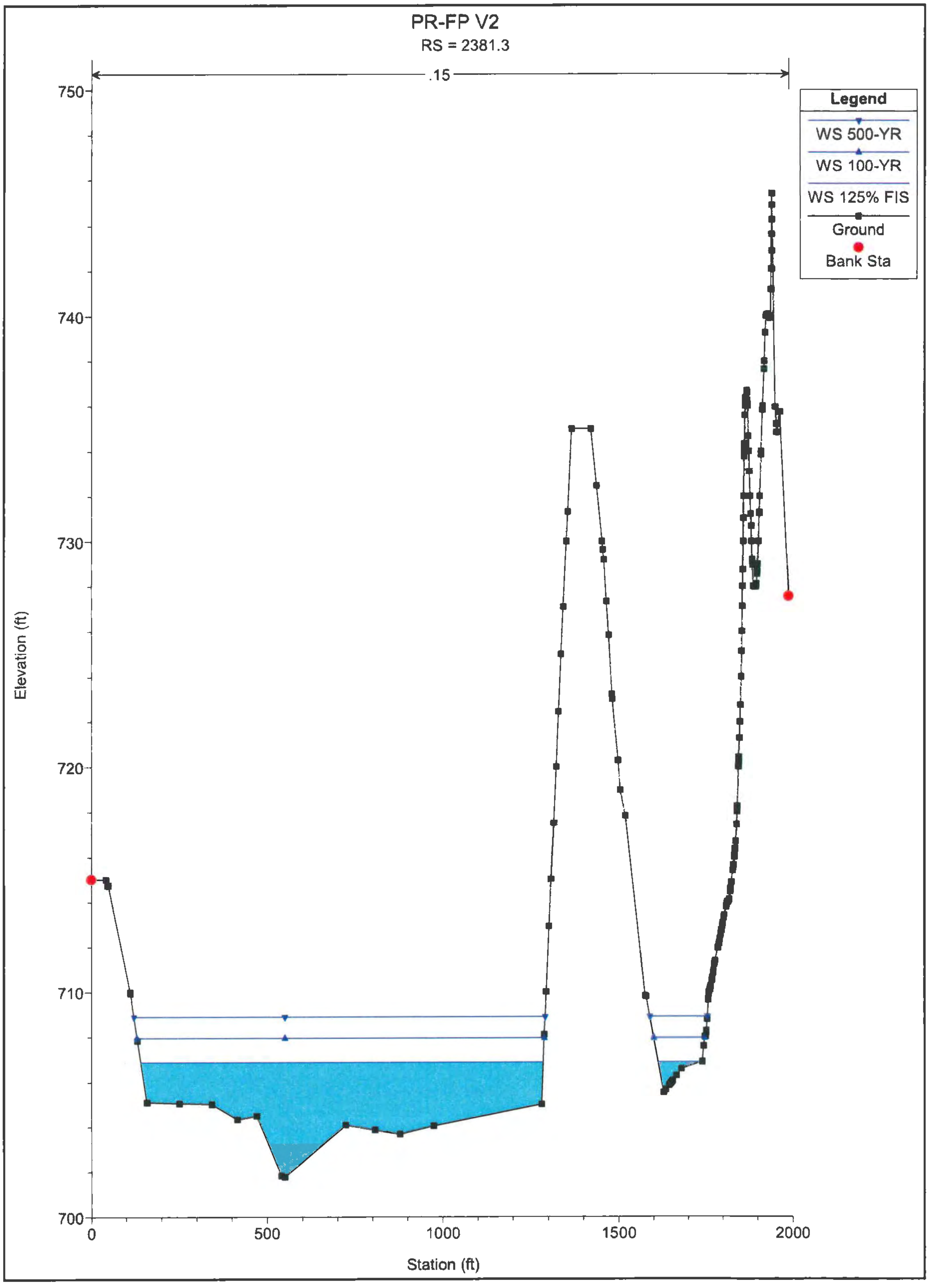
Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
EX-FP	2631.37	125% FIS	706.81		706.81	1247.83	0.00	0.10	0.00		164.17	1292.82	
EX-FP	2631.37	Encr	707.02	0.20	707.02	1126.31		0.10		164.17	164.17	1292.82	1292.82
EX-FP	2529.96	125% FIS	706.81		706.81	1434.69		0.10	0.00		287.43	1570.77	
EX-FP	2529.96	Encr	707.02	0.20	707.02	1281.62		0.10		287.43	287.43	1570.77	1570.77
EX-FP	2337.67	125% FIS	706.81		706.81	1332.05		0.10	0.00		584.99	1809.80	
EX-FP	2337.67	Encr	707.02	0.20	707.02	1222.83		0.10		584.99	584.99	1809.80	1809.80
EX-FP	2093.68	125% FIS	706.81		706.81	1746.73	0.00	0.10	0.00		999.54	2097.64	
EX-FP	2093.68	Encr	707.02	0.20	707.02	1165.13		0.10	0.00	999.54	999.54	2097.64	2174.25
EX-FP	1946.74	125% FIS	706.81		706.81	1541.25	0.00	0.10	0.00		1248.50	2332.41	
EX-FP	1946.74	Encr	707.02	0.20	707.02	1083.91		0.10		1248.50	1248.50	2332.41	2332.41
EX-FP	1810.46	125% FIS	706.81		706.81	1284.98	0.04	786.29	1.17		1260.75	2380.81	
EX-FP	1810.46	Encr	707.02	0.20	707.02	1120.06		787.50		1260.75	1260.75	2380.81	2380.81
EX-FP	1661.32	125% FIS	706.81		706.81	1152.58	0.00	787.50	0.00		1321.45	2463.26	
EX-FP	1661.32	Encr	707.02	0.20	707.02	1141.81		787.50		1321.45	1321.45	2463.26	2463.26
EX-FP	1500.89	125% FIS	706.81		706.81	1116.46	0.01	787.49			1320.36	2432.12	
EX-FP	1500.89	Encr	707.02	0.20	707.02	1109.53		787.50		1320.36	1320.36	2432.12	2432.12
EX-FP	1354.8	125% FIS	706.81		706.81	1091.82	0.00	787.50	0.00		1311.39	2394.19	
EX-FP	1354.8	Encr	707.02	0.20	707.02	1082.80		787.50		1311.39	1311.39	2394.19	2394.19
EX-FP	1239.21	125% FIS	706.81		706.81	1187.64	0.03	787.11	0.35		1328.21	2330.71	
EX-FP	1239.21	Encr	707.02	0.20	707.02	1002.50		787.50		1328.21	1328.21	2330.71	2330.71
EX-FP	1071.9	125% FIS	706.81		706.81	1283.81	0.21	784.39	2.90		1304.70	2208.50	
EX-FP	1071.9	Encr	707.02	0.20	707.02	903.80		787.50		1304.70	1304.70	2208.50	2208.50
EX-FP	966.43	125% FIS	706.81		706.81	1408.37	0.44	779.25	7.80		1222.44	2023.65	
EX-FP	966.43	Encr	707.02	0.20	707.02	818.88		786.71	0.79	1222.44	1222.44	2023.65	2041.32
EX-FP	844.89	125% FIS	706.81		706.81	1238.21	0.44	775.06	12.00		1181.82	1894.27	
EX-FP	844.89	Encr	707.02	0.20	707.02	792.73		783.82	3.68	1181.82	1181.82	1894.27	1974.55
EX-FP	702.37	125% FIS	706.81		706.81	1176.59	0.01	741.61	45.88		1155.58	1659.29	
EX-FP	702.37	Encr	707.02	0.20	707.02	920.42		756.15	31.35	1155.58	1155.58	1659.29	2076.00
EX-FP	564.58	125% FIS	706.81		706.81	876.11	19.48	406.65	361.37		1545.92	1840.48	
EX-FP	564.58	Encr	707.01	0.20	707.01	630.85		430.58	356.92	1545.92	1545.92	1840.48	2176.78
EX-FP	409.78	125% FIS	706.80		706.80	1020.11	0.09	602.74	184.68		1246.05	1998.88	
EX-FP	409.78	Encr	707.00	0.20	707.00	899.48		654.39	133.11	1246.05	1246.05	1998.88	2145.53
EX-FP	250.11	125% FIS	706.79		706.79	1069.82	0.37	116.21	670.91		1175.33	1305.19	
EX-FP	250.11	Encr	706.99	0.20	706.99	932.18		125.62	661.88	1175.33	1175.33	1305.19	2107.51

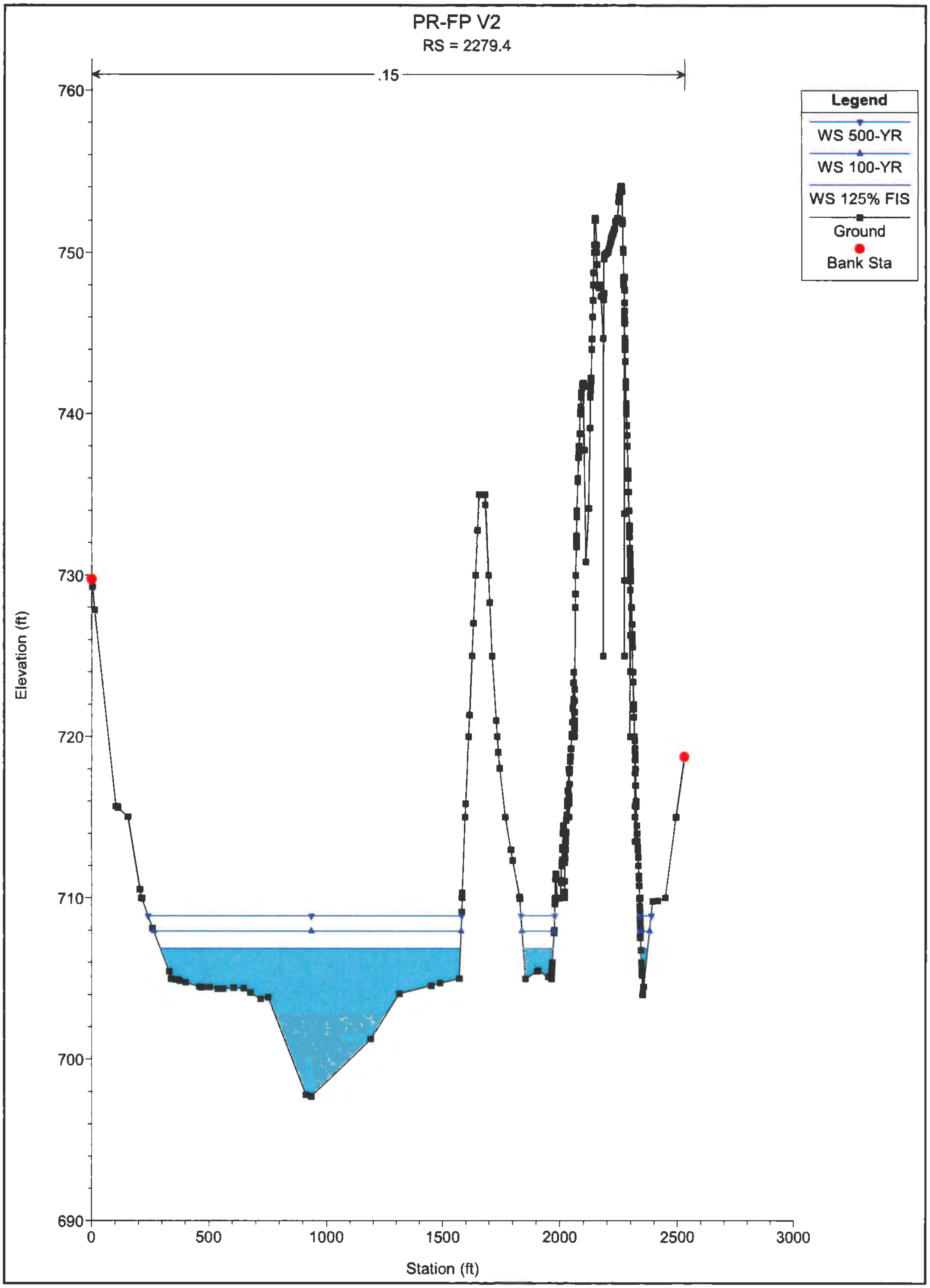
Proposed condition stations

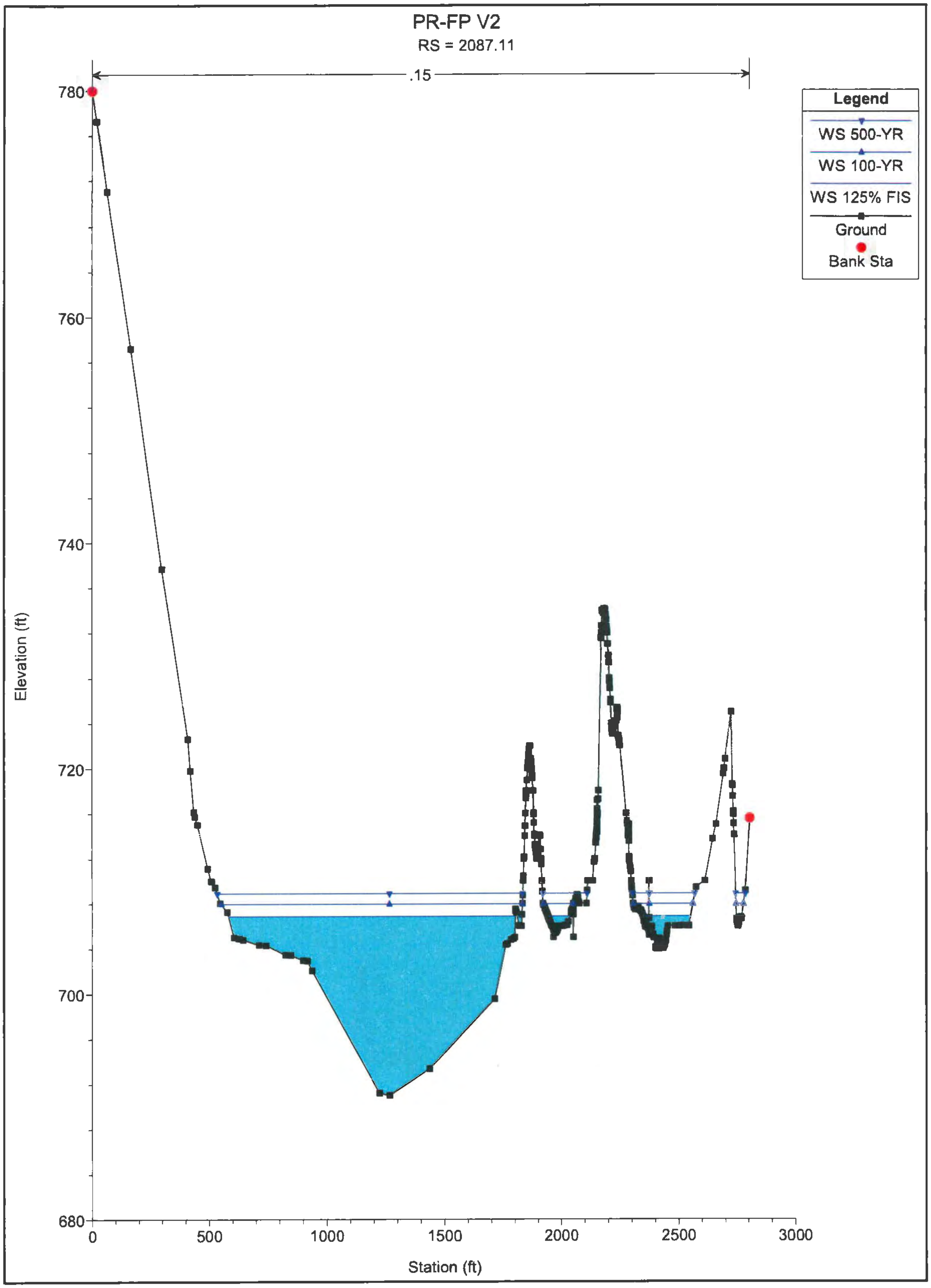




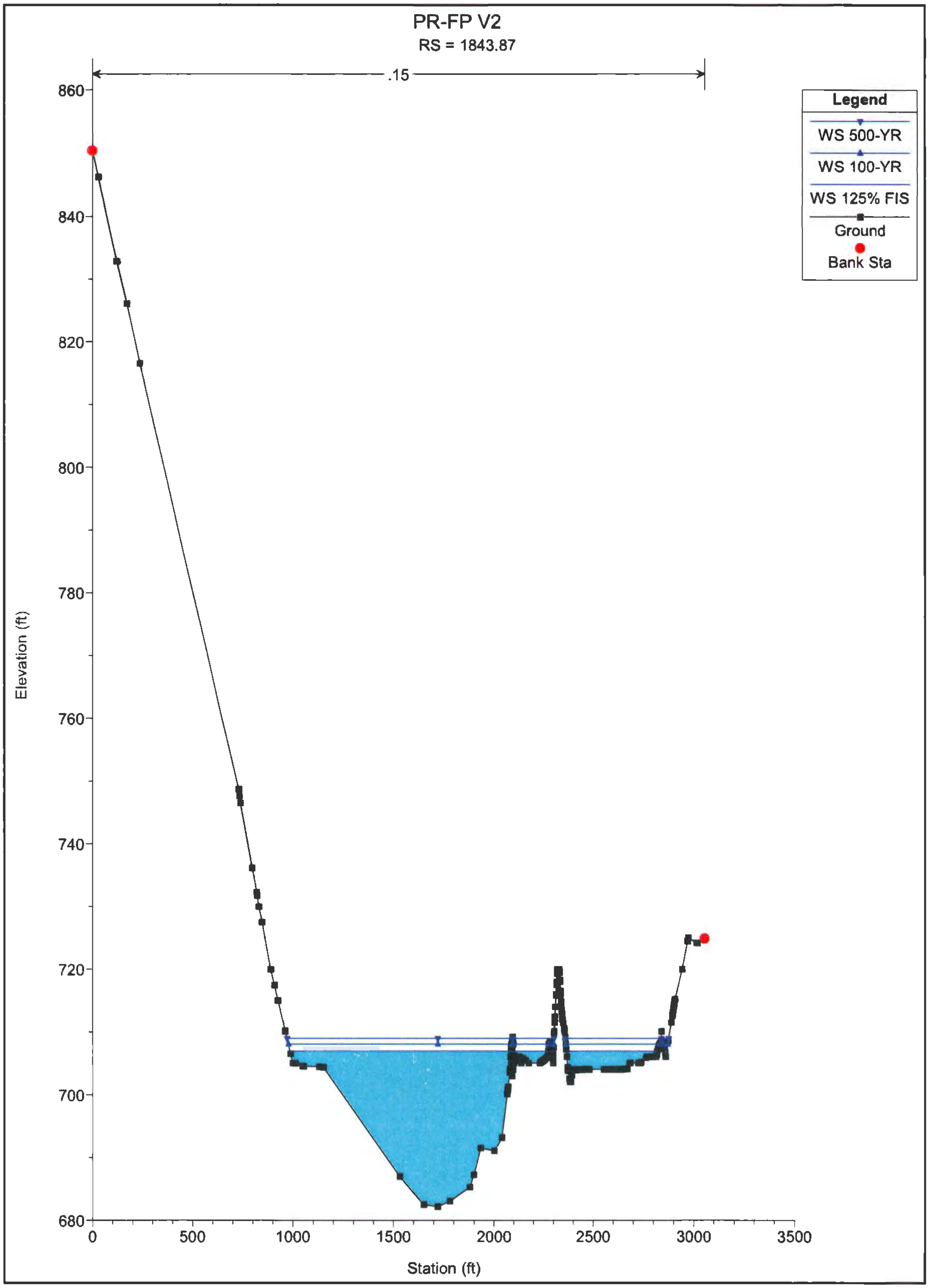
PR-FP V2
PR FP FG FP
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Elevation (ft)
710
700
690
680
670
660
650
Main Channel Distance (ft)
0
500
1000
1500
2000
2500


PR-FP V2
RS = 2381.3
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
750
740
730
720
710
700
0
500
1000
1500
2000

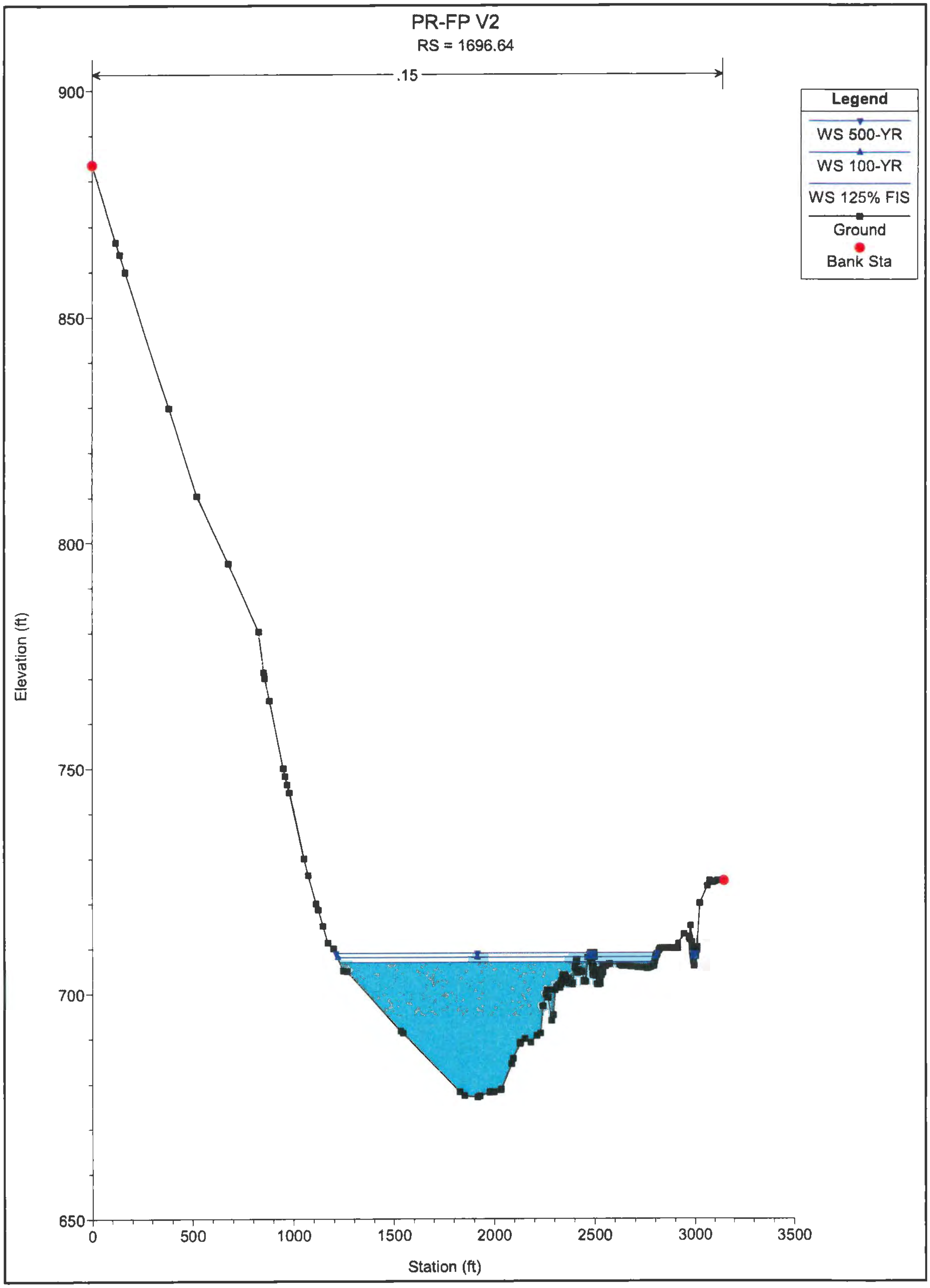

PR-FP V2
RS = 2279.4
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
760
750
740
730
720
710
700
690
0
500
1000
1500
2000
2500
3000
Station (ft)



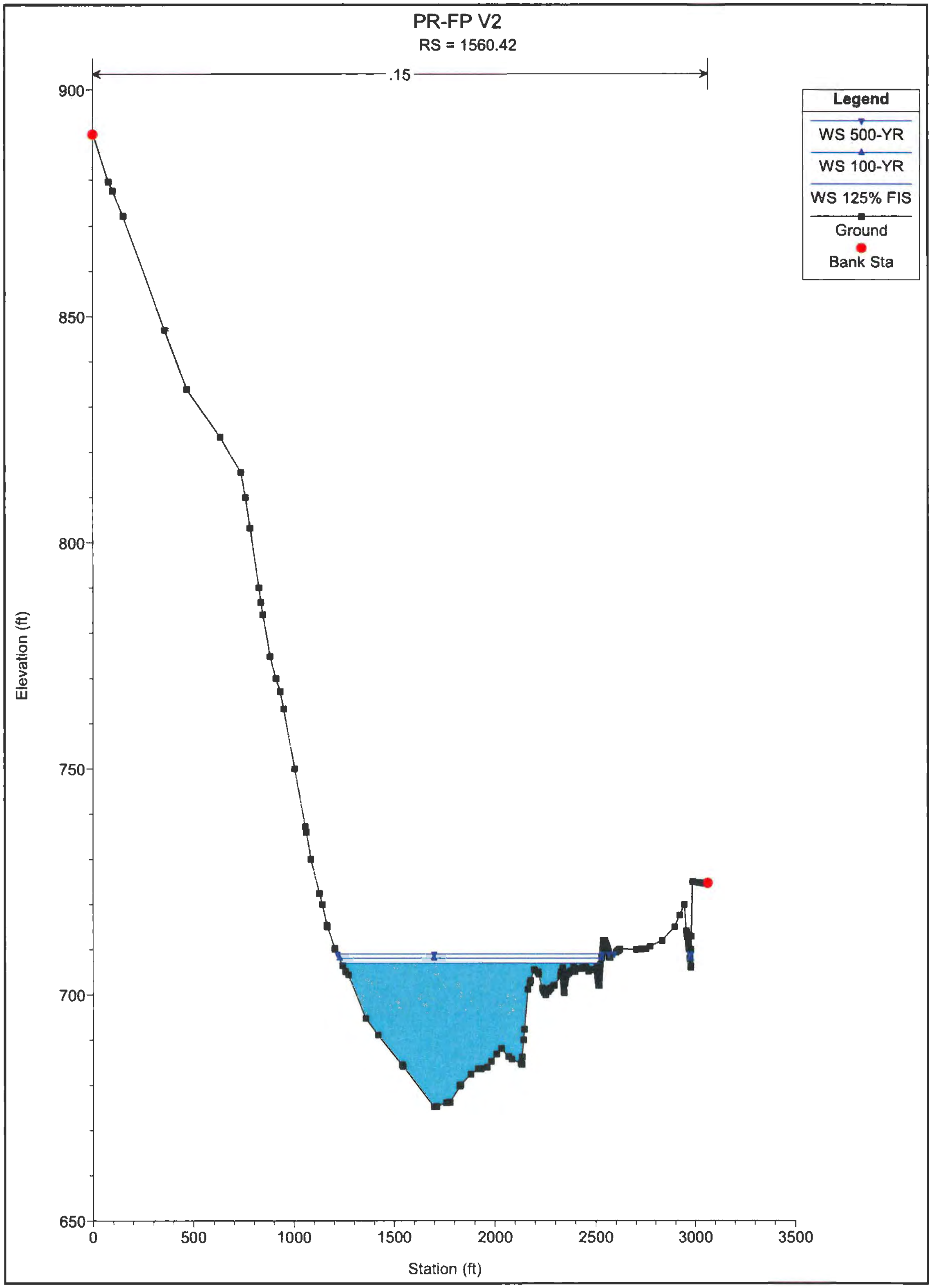
PR-FP V2
RS = 2087.11
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
780
760
740
720
700
680
0
500
1000
1500
2000
2500
3000
Station (ft)



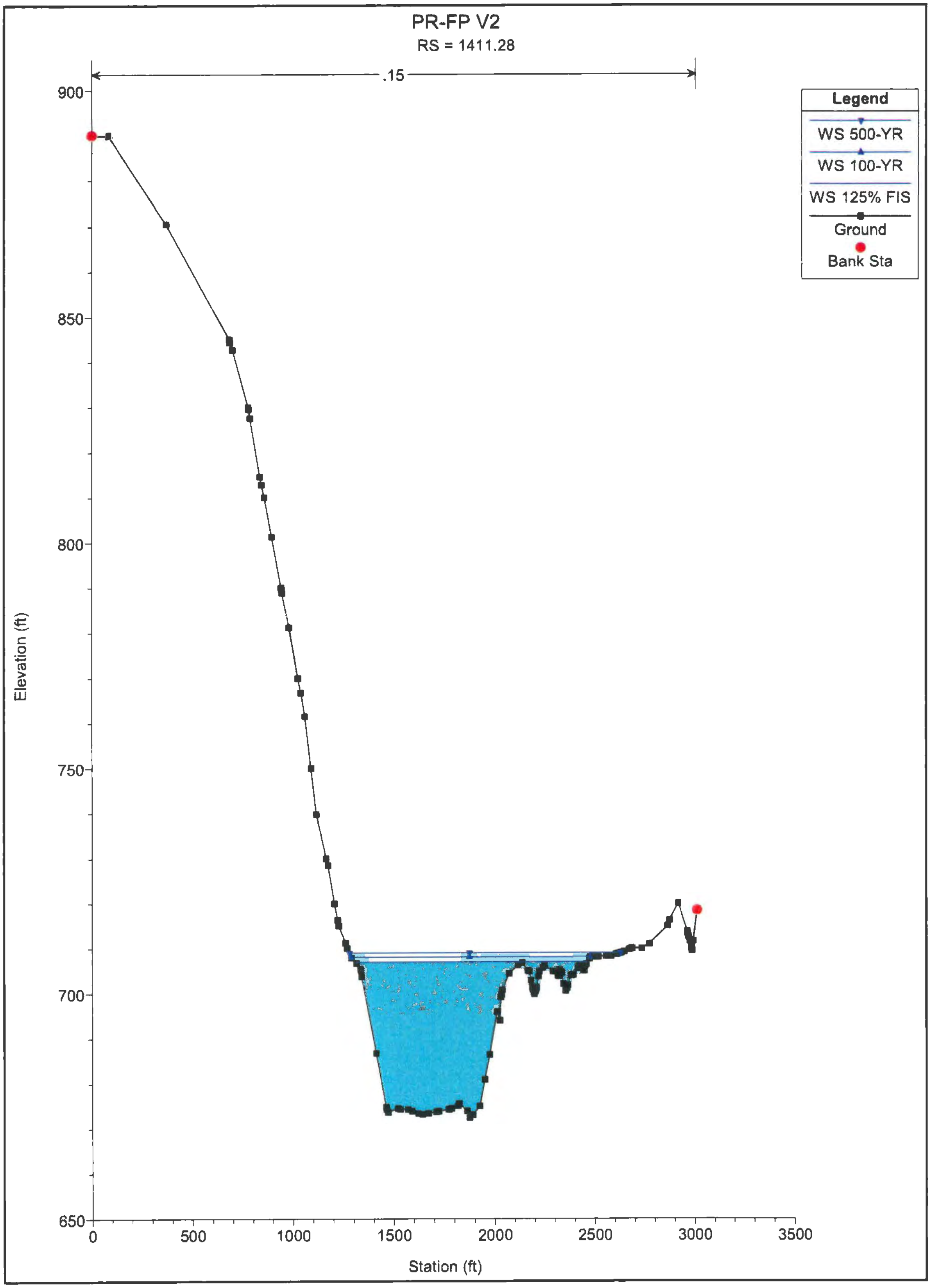
PR-FP V2
RS = 1843.87
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
860
840
820
800
780
760
740
720
700
680
0
500
1000
1500
2000
2500
3000
3500
Station (ft)



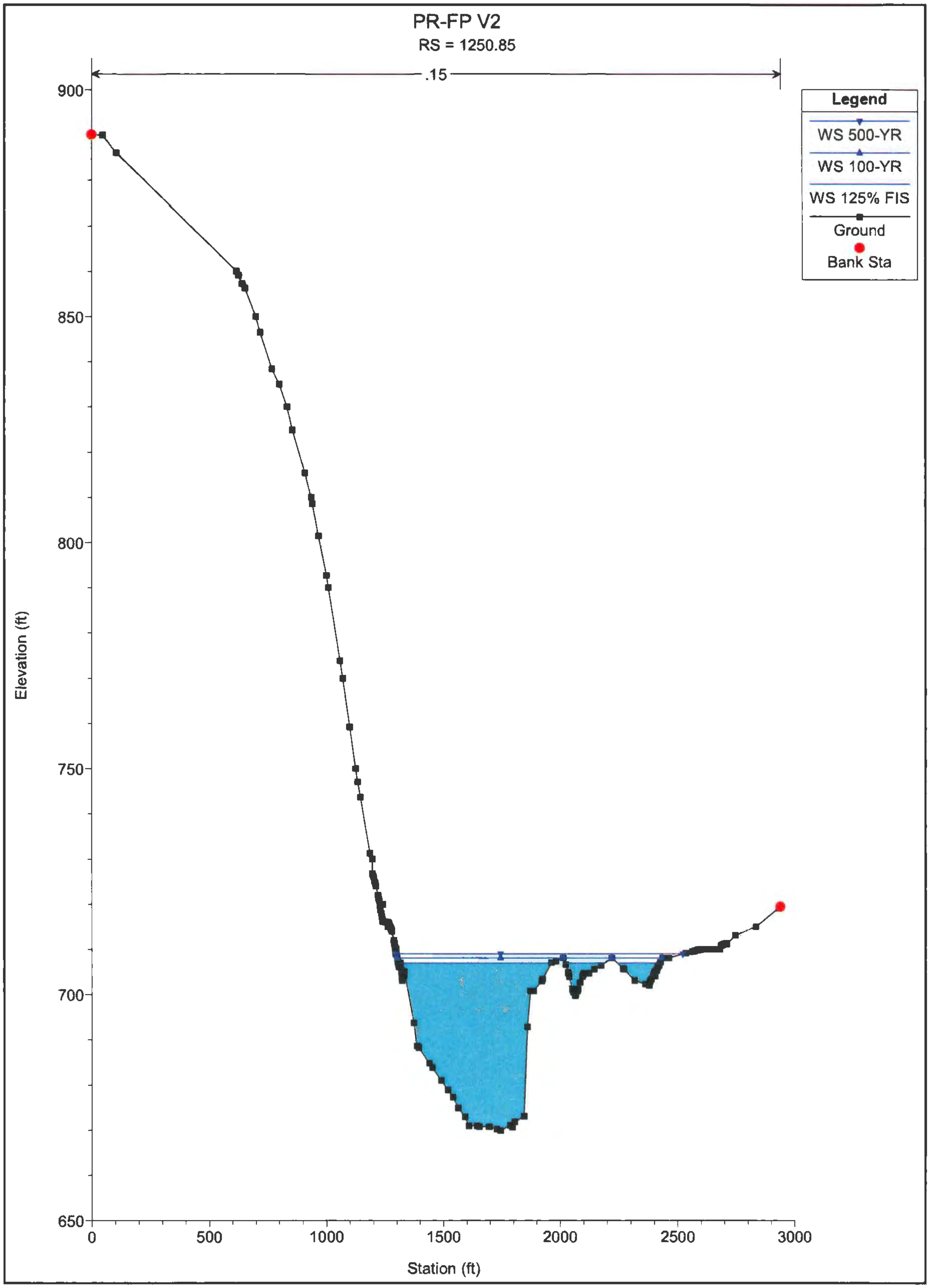
PR-FP V2
RS = 1696.64
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
3500
Station (ft)



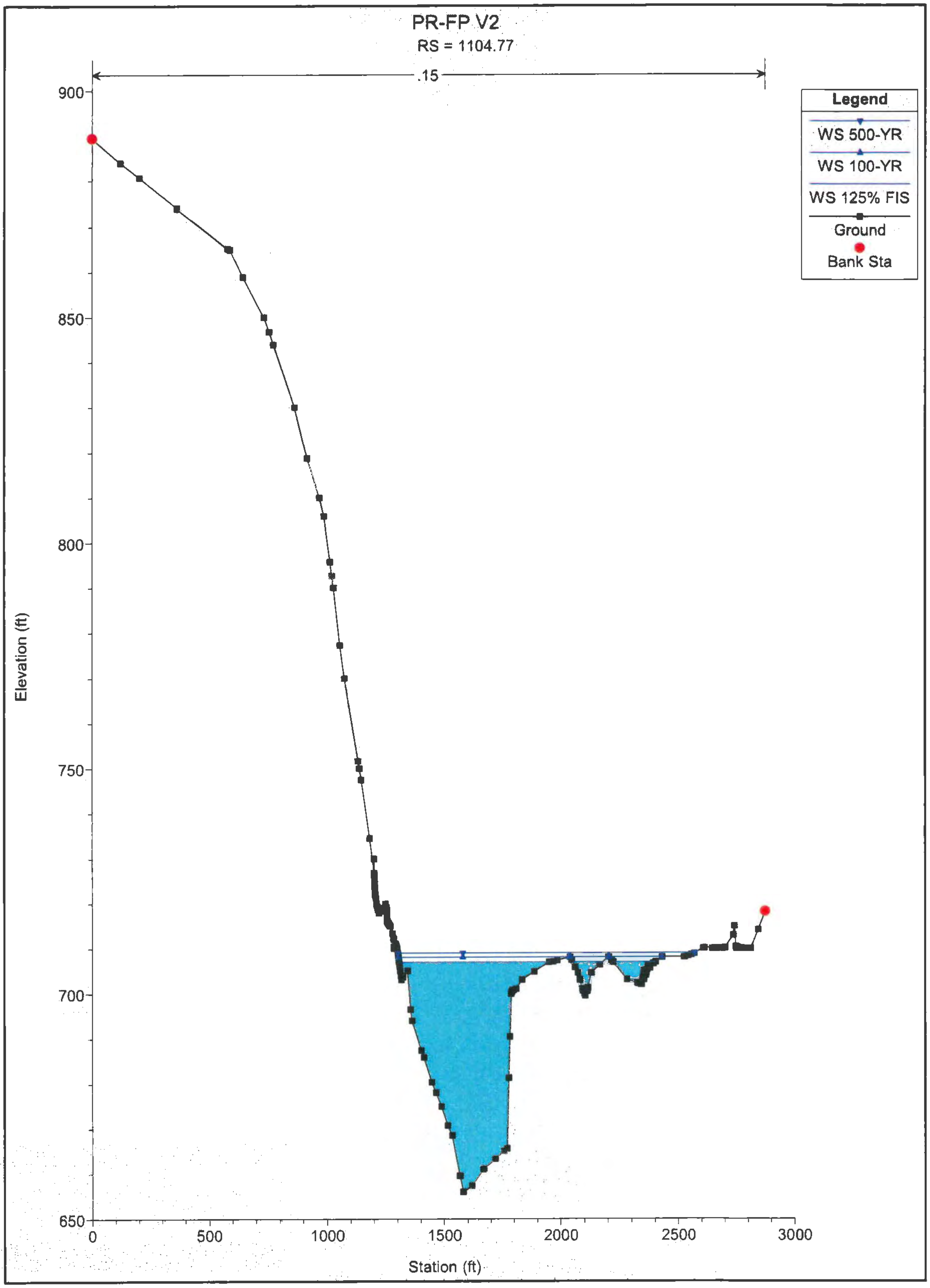
PR-FP V2
RS = 1560.42
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
Station (ft)
0
500
1000
1500
2000
2500
3000
3500



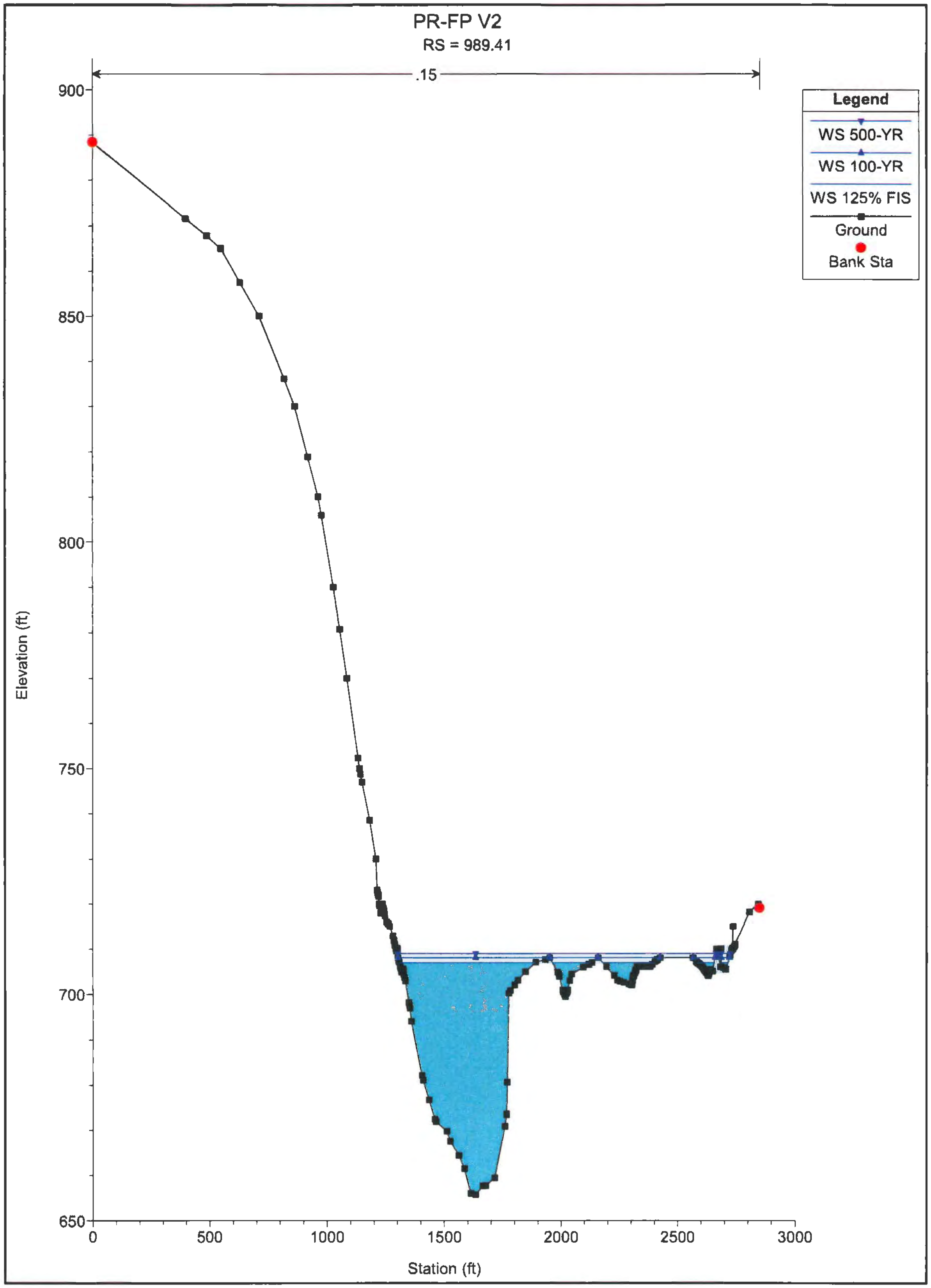
PR-FP V2
RS = 1411.28
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
3500



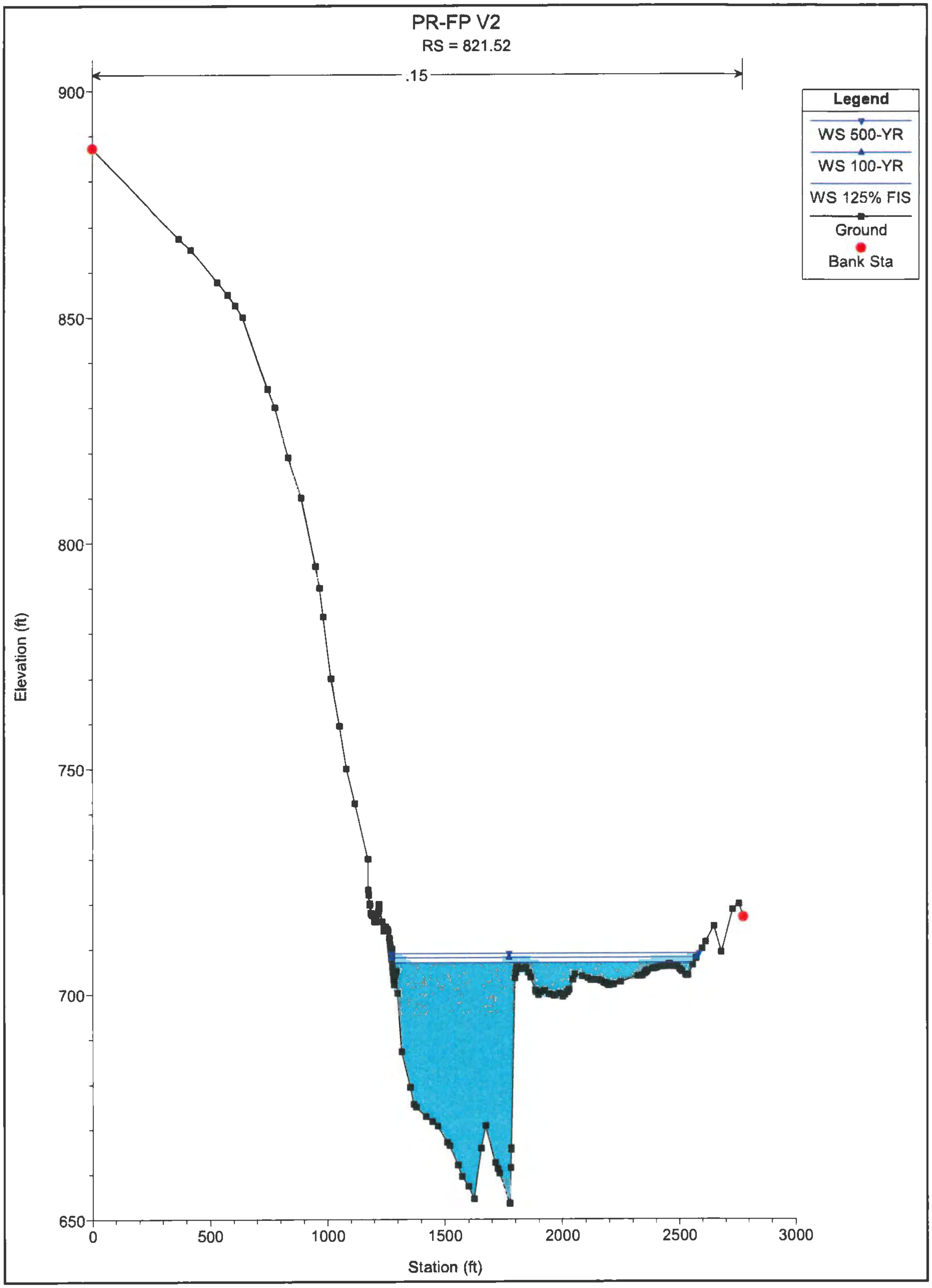
PR-FP V2
RS = 1250.85
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000

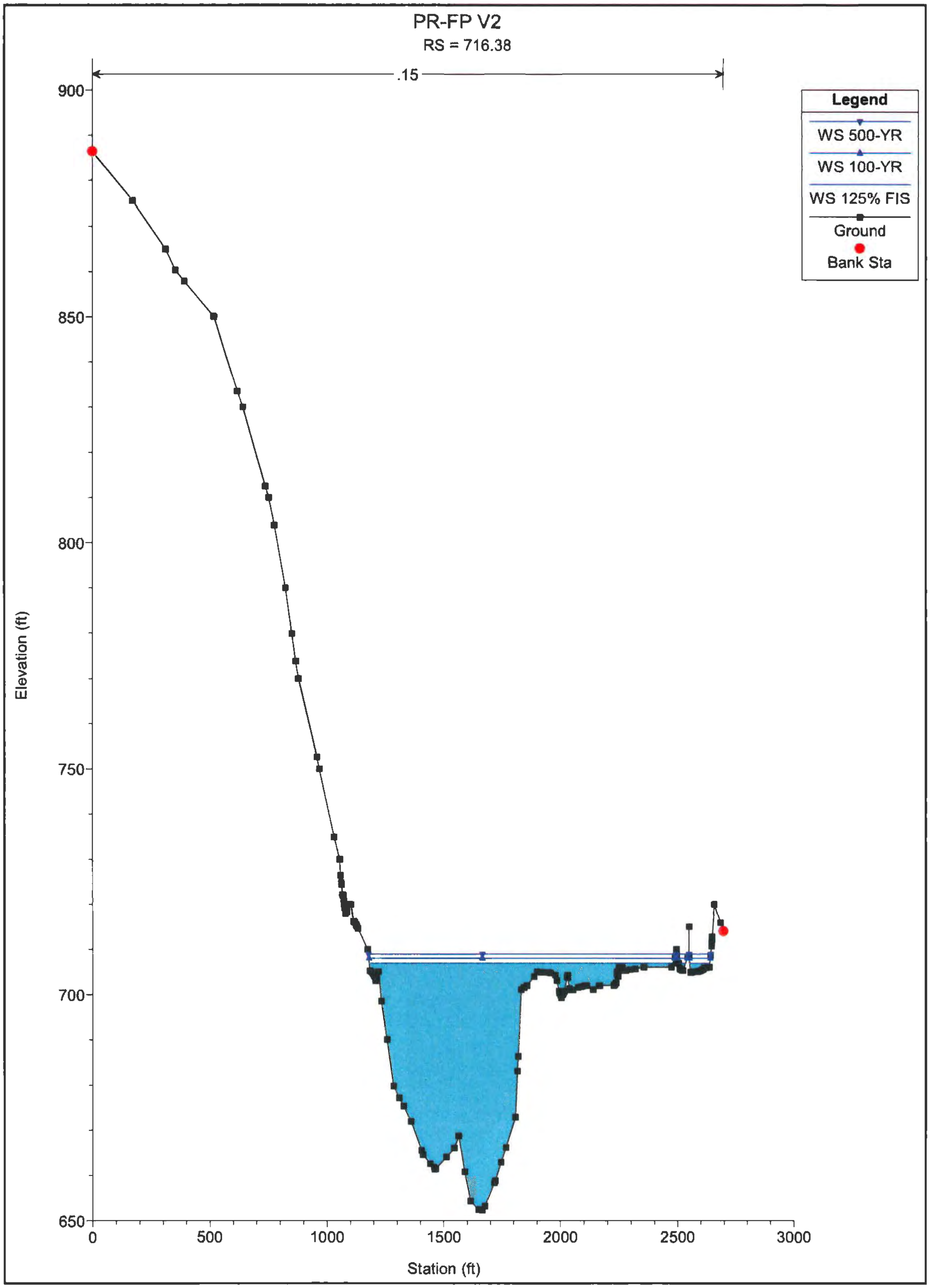


PR-FP V2
RS = 1104.77
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
Station (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000

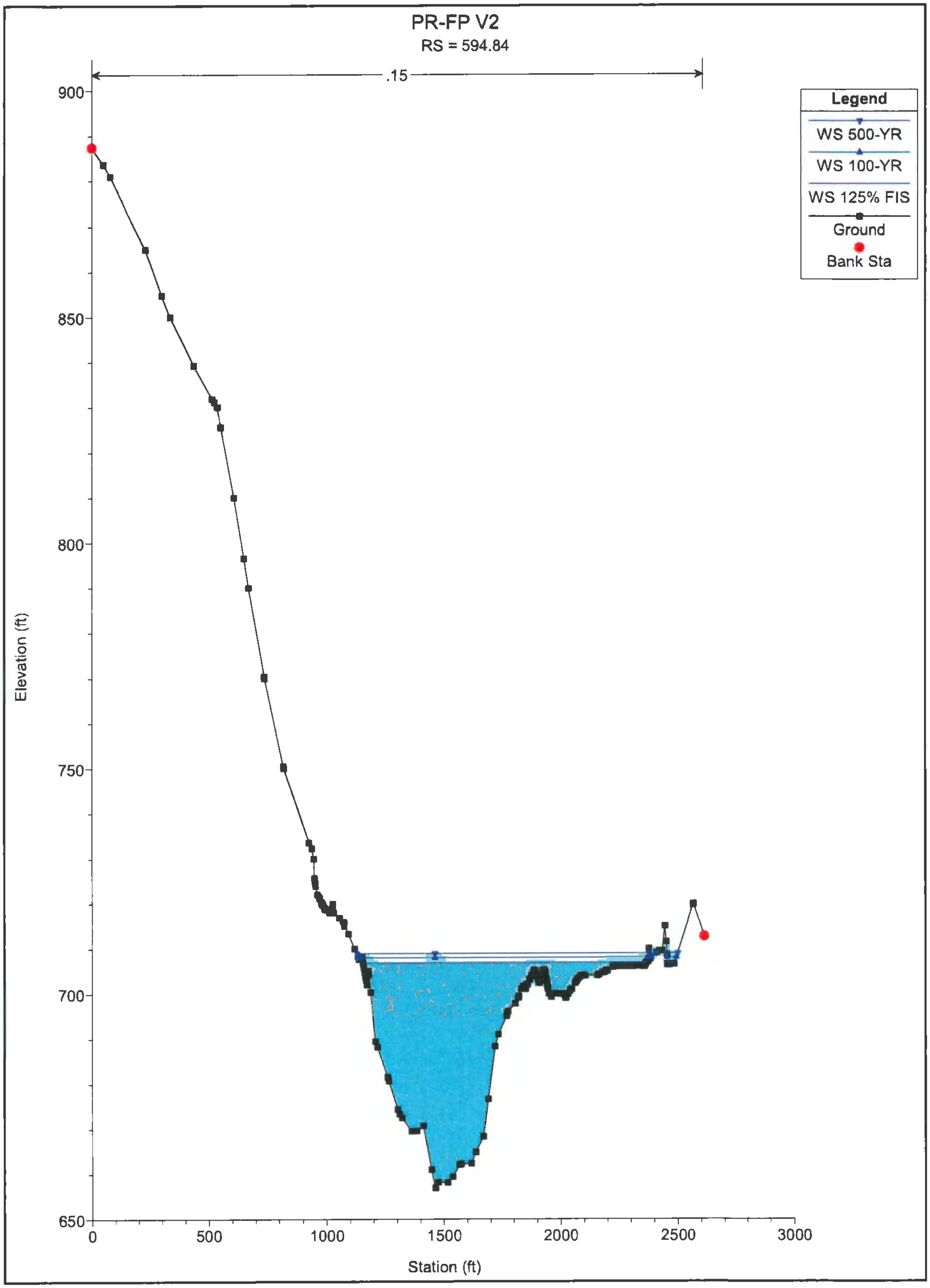


PR-FP V2
RS = 989.41
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

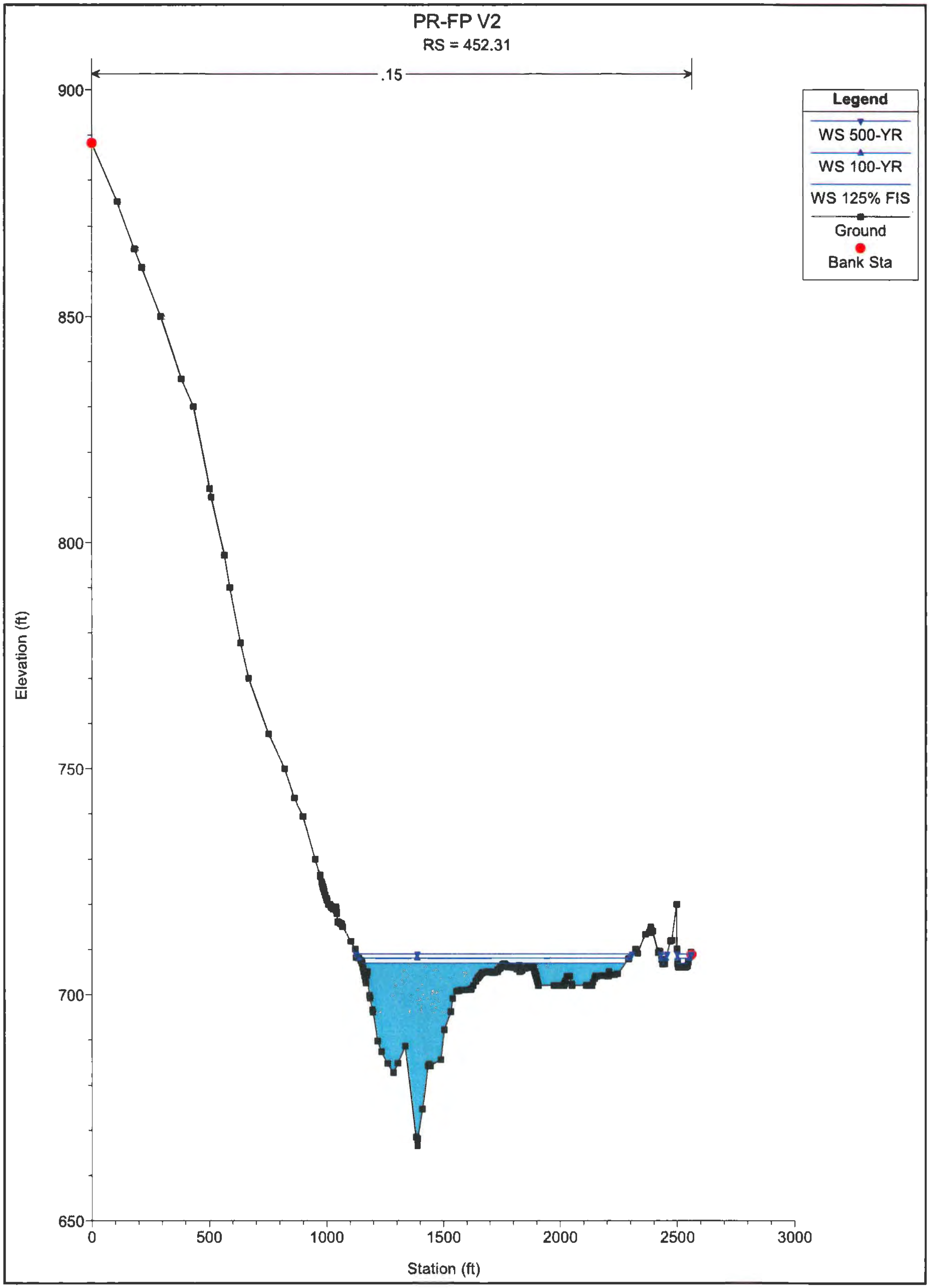

PR-FP V2
RS = 821.52
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

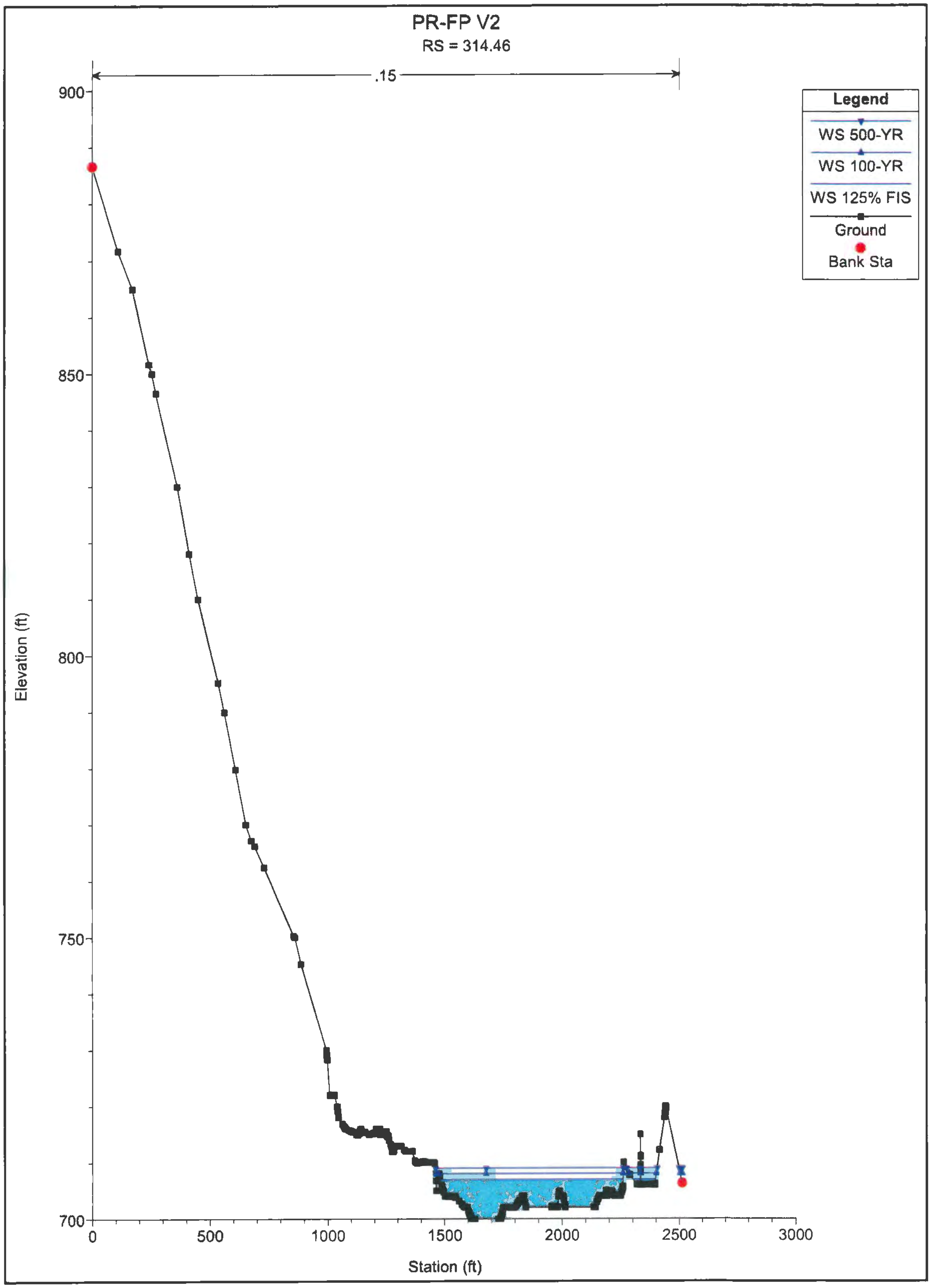


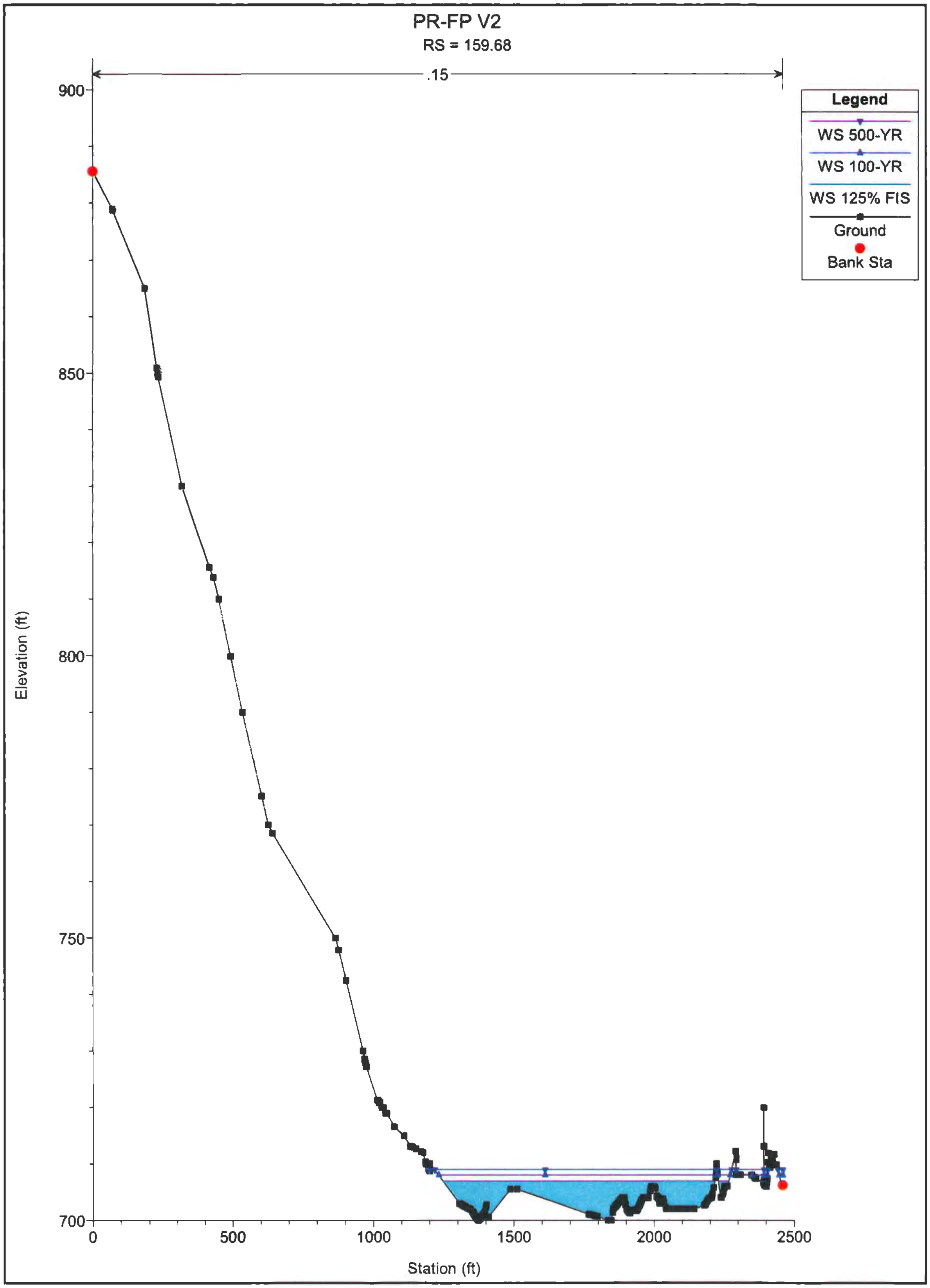
PR-FP V2
RS = 716.38
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)

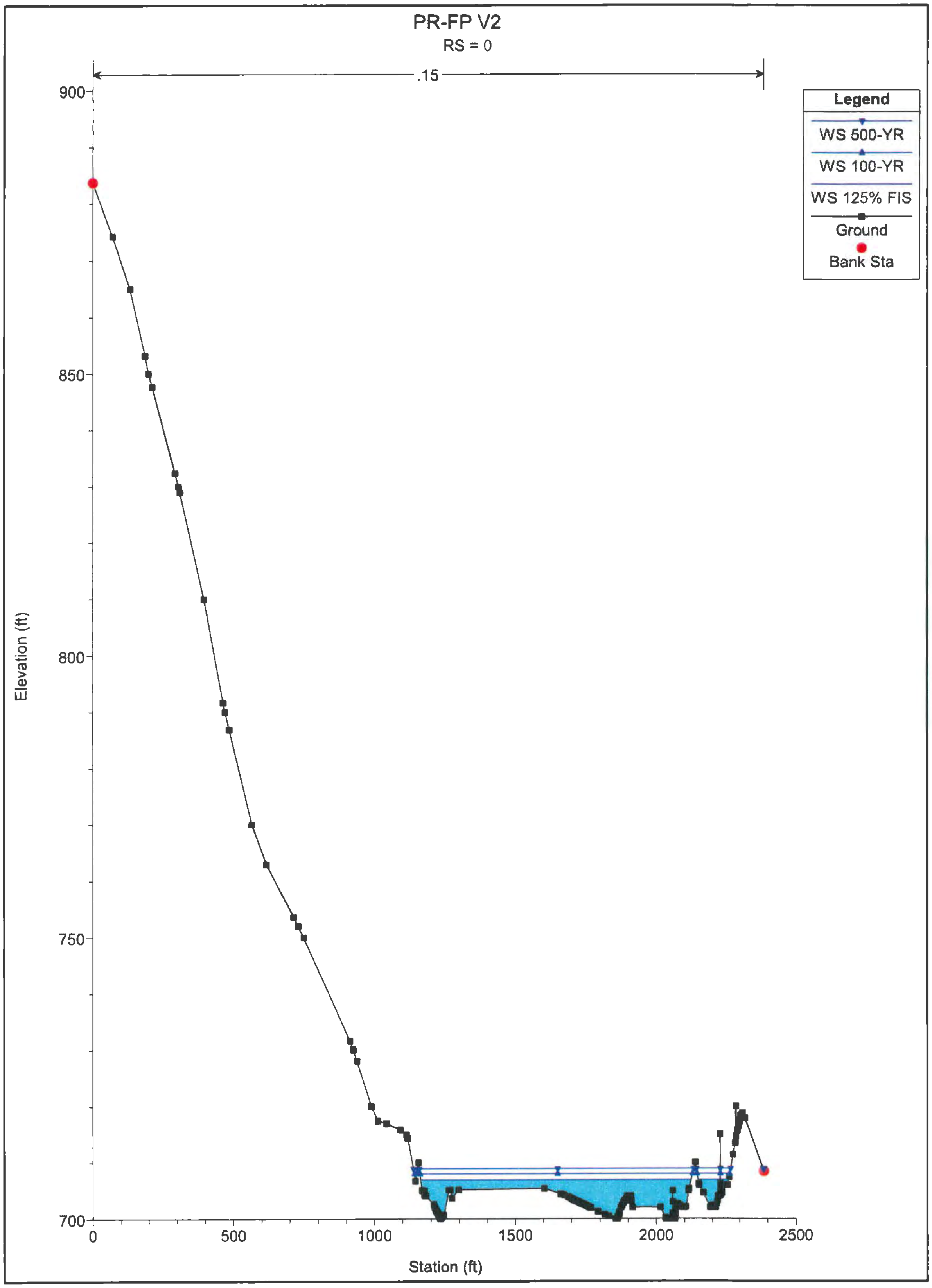


PR-FP V2
RS = 594.84
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)


PR-FP V2
RS = 452.31
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
650
0
500
1000
1500
2000
2500
3000
Station (ft)


PR-FP V2
RS = 314.46
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
Station (ft)
0
500
1000
1500
2000
2500
3000


PR-FP V2
RS = 159.68
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
Elevation (ft)
900
850
800
750
700
0
500
1000
1500
2000
2500
Station (ft)



PR-FP V2
RS = 0
.15
Legend
WS 500-YR
WS 100-YR
WS 125% FIS
Ground
Bank Sta
900
850
800
750
700
Elevation (ft)
0
500
1000
1500
2000
2500
Station (ft)

HEC-RAS Plan: new River: PR FP Reach: FG FP

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FG FP	2381.3	125% FIS	0.10	701.78	706.85	701.81	706.85	0.000000	0.00	3135.92	1260.54	0.00
FG FP	2381.3	100-YR	0.10	701.78	707.93	701.81	707.93	0.000000	0.00	4526.98	1301.41	0.00
FG FP	2381.3	500-YR	0.10	701.78	708.88	701.81	708.88	0.000000	0.00	5782.79	1333.16	0.00
FG FP	2279.4	125% FIS	0.10	697.70	706.85		706.85	0.000000	0.00	5436.05	1435.17	0.00
FG FP	2279.4	100-YR	0.10	697.70	707.93		707.93	0.000000	0.00	7017.31	1485.68	0.00
FG FP	2279.4	500-YR	0.10	697.70	708.88		708.88	0.000000	0.00	8452.75	1527.33	0.00
FG FP	2087.11	125% FIS	0.10	691.02	706.85		706.85	0.000000	0.00	10635.17	1558.40	0.00
FG FP	2087.11	100-YR	0.10	691.02	707.93		707.93	0.000000	0.00	12393.05	1696.29	0.00
FG FP	2087.11	500-YR	0.10	691.02	708.88		708.88	0.000000	0.00	14074.21	1798.37	0.00
FG FP	1843.87	125% FIS	787.50	682.18	706.85		706.85	0.000001	0.05	16969.42	1747.38	0.00
FG FP	1843.87	100-YR	1240.00	682.18	707.93		707.93	0.000002	0.07	18889.24	1800.76	0.00
FG FP	1843.87	500-YR	1700.00	682.18	708.88		708.88	0.000003	0.08	20630.87	1843.48	0.00
FG FP	1696.64	125% FIS	787.50	677.08	706.85		706.85	0.000001	0.04	20275.96	1541.15	0.00
FG FP	1696.64	100-YR	1240.00	677.08	707.93		707.93	0.000001	0.06	21963.51	1574.28	0.00
FG FP	1696.64	500-YR	1700.00	677.08	708.88		708.88	0.000002	0.07	23480.72	1615.44	0.00
FG FP	1560.42	125% FIS	787.50	675.23	706.85		706.85	0.000000	0.04	20230.48	1285.56	0.00
FG FP	1560.42	100-YR	1240.00	675.23	707.93		707.93	0.000001	0.06	21632.01	1303.80	0.00
FG FP	1560.42	500-YR	1700.00	675.23	708.88		708.88	0.000001	0.07	22892.13	1344.94	0.00
FG FP	1411.28	125% FIS	787.50	672.44	706.85		706.85	0.000000	0.04	20531.42	1151.59	0.00
FG FP	1411.28	100-YR	1240.00	672.44	707.93		707.93	0.000001	0.06	21797.78	1186.85	0.00
FG FP	1411.28	500-YR	1700.00	672.44	708.88		708.88	0.000001	0.07	23030.82	1346.99	0.00
FG FP	1250.85	125% FIS	787.50	669.87	706.85		706.85	0.000001	0.05	16680.94	1000.64	0.00
FG FP	1250.85	100-YR	1240.00	669.87	707.93		707.93	0.000001	0.07	17828.70	1123.17	0.00
FG FP	1250.85	500-YR	1700.00	669.87	708.88		708.88	0.000002	0.09	18955.76	1221.43	0.00
FG FP	1104.77	125% FIS	787.50	656.02	706.85		706.85	0.000000	0.05	17192.70	947.25	0.00
FG FP	1104.77	100-YR	1240.00	656.02	707.93		707.93	0.000001	0.07	18311.81	1114.10	0.00
FG FP	1104.77	500-YR	1700.00	656.02	708.88		708.88	0.000002	0.09	19487.33	1266.92	0.00
FG FP	989.41	125% FIS	787.50	655.65	706.85		706.85	0.000001	0.04	17590.08	1064.93	0.00
FG FP	989.41	100-YR	1240.00	655.65	707.93		707.93	0.000001	0.07	18840.91	1247.84	0.00
FG FP	989.41	500-YR	1700.00	655.65	708.88		708.88	0.000002	0.08	20168.16	1413.43	0.00
FG FP	821.52	125% FIS	787.50	653.45	706.85		706.85	0.000000	0.04	21876.52	1284.43	0.00
FG FP	821.52	100-YR	1240.00	653.45	707.93		707.93	0.000001	0.05	23272.49	1296.29	0.00
FG FP	821.52	500-YR	1700.00	653.45	708.88		708.88	0.000001	0.07	24512.61	1310.34	0.00
FG FP	716.38	125% FIS	787.50	652.29	706.85		706.85	0.000000	0.03	25969.47	1408.94	0.00
FG FP	716.38	100-YR	1240.00	652.29	707.93		707.93	0.000000	0.05	27513.31	1438.15	0.00
FG FP	716.38	500-YR	1700.00	652.29	708.88		708.88	0.000001	0.06	28893.64	1459.82	0.00
FG FP	594.84	125% FIS	787.50	656.98	706.85		706.85	0.000000	0.03	22538.19	1239.04	0.00
FG FP	594.84	100-YR	1240.00	656.98	707.93		707.93	0.000001	0.05	23895.81	1273.94	0.00
FG FP	594.84	500-YR	1700.00	656.98	708.88		708.88	0.000001	0.07	25134.15	1320.74	0.00
FG FP	452.31	125% FIS	787.50	666.64	706.85		706.85	0.000003	0.08	10276.68	1178.31	0.00
FG FP	452.31	100-YR	1240.00	666.64	707.93		707.93	0.000006	0.11	11573.76	1222.69	0.01
FG FP	452.31	500-YR	1700.00	666.64	708.88		708.88	0.000009	0.13	12761.00	1264.93	0.01
FG FP	314.46	125% FIS	787.50	700.00	706.84		706.85	0.000078	0.22	3561.12	874.98	0.02
FG FP	314.46	100-YR	1240.00	700.00	707.93		707.93	0.000092	0.27	4526.44	910.25	0.02
FG FP	314.46	500-YR	1700.00	700.00	708.88		708.88	0.000100	0.31	5410.84	943.07	0.02
FG FP	159.68	125% FIS	787.50	700.00	706.83		706.83	0.000070	0.20	3920.74	1033.54	0.02
FG FP	159.68	100-YR	1240.00	700.00	707.91		707.91	0.000080	0.24	5073.98	1100.35	0.02
FG FP	159.68	500-YR	1700.00	700.00	708.86		708.86	0.000087	0.28	6181.13	1187.42	0.02
FG FP	0	125% FIS	787.50	700.00	706.82	701.43	706.82	0.000100	0.22	3585.76	1069.18	0.02
FG FP	0	100-YR	1240.00	700.00	707.90	701.78	707.90	0.000100	0.26	4750.42	1091.79	0.02
FG FP	0	500-YR	1700.00	700.00	708.85	702.20	708.85	0.000100	0.29	5796.63	1116.03	0.02

Errors Warnings and Notes for Plan : new

Location:	River: PR FP Reach: FG FP RS: 2381.3 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: PR FP Reach: FG FP RS: 2279.4 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: PR FP Reach: FG FP RS: 2087.11 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: PR FP Reach: FG FP RS: 1843.87 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: PR FP Reach: FG FP RS: 1696.64 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: PR FP Reach: FG FP RS: 1560.42 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: PR FP Reach: FG FP RS: 1250.85 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: PR FP Reach: FG FP RS: 1104.77 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: PR FP Reach: FG FP RS: 989.41 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: PR FP Reach: FG FP RS: 716.38 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Location:	River: PR FP Reach: FG FP RS: 594.84 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: PR FP Reach: FG FP RS: 452.31 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: PR FP Reach: FG FP RS: 314.46 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The cross-section end points had to be extended vertically for the computed water surface.
Location:	River: PR FP Reach: FG FP RS: 159.68 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.
Warning:	The cross-section end points had to be extended vertically for the computed water surface.
Location:	River: PR FP Reach: FG FP RS: 0 Profile: 125% FIS
Warning:	Divided flow computed for this cross-section.

APPENDIX F

Environmental and Historical Review

Frequently Asked Questions About The Natural Heritage Priority Sites GIS File

What are Natural Heritage Priority Sites?
Through its Natural Heritage Database, the Office of Natural Lands Management (ONLM) identifies critically important areas to conserve New Jersey's biological diversity, with particular emphasis on rare plant species and ecological communities. The database provides detailed information on rare species and ecological communities to planners, developers, and conservation agencies for use in resource management, environmental impact assessment, and both public and private land protection efforts.

Using the database, ONLM has identified 343 Natural Heritage Priority Sites, representing some of the best remaining habitat for rare species and rare ecological communities in the state. Although the primary focus of these sites is rare plant species and ecological communities, the DEP Endangered and Nongame Species Program also provided key information and assisted with the delineation of a number of the sites that encompass significant habitats for rare animals. These areas should be considered to be top priorities for the preservation of biological diversity in New Jersey. If these sites become degraded or destroyed, we may lose some of the unique components of our natural heritage.

How are Natural Heritage Priority Sites used in conservation of biological diversity?
Natural Heritage Priority Site maps are used by individuals and agencies concerned with the protection and management of land. The maps have been used by municipalities preparing natural resource inventories; public and private conservation organizations preparing open space acquisition goals; land developers and consultants identifying environmentally sensitive lands; and public and private landowners developing land management plans. However, the coverage was not developed for regulatory purposes, and should not be used as a substitute for the on-site surveys and Natural Heritage Database searches required by regulatory agencies.

Natural Heritage Priority Sites contain some of the best and most viable occurrences of rare plant species and ecological communities, but they do not cover all known habitat for these elements or most rare animal species in New Jersey. Most of the state has not been surveyed for rare species and ecological communities. If information is needed on whether or not endangered or threatened species have been documented from a particular area, a Natural Heritage Database search can be requested by contacting the Office of Natural Lands Management.

What do the boundaries of the sites contain?
The boundaries of each Natural Heritage Priority Site are drawn to encompass critical habitat for the rare species or ecological communities. Often the boundaries extend to include additional buffer lands that should be managed to protect this critical habitat. A justification for the boundary is provided for each site.

Boundaries of site polygons may overlap. Site polygons may also be nested so that one site may be found entirely within a larger site. When viewing the shape file, a larger site may sometimes obscure a smaller site within it. Such confusion can be eliminated by highlighting the area of interest and checking the attribute table to reveal all sites within the selected area.

How was the GIS coverage developed?
The coverage was originally developed as lines on USGS topographic paper maps and subsequently edited to fit on either 1995/97 color infrared aerial imagery, 1991 black and white aerial imagery or scanned USGS 1:24,000 topographic maps as an ArcView shape file (NJ State Plane Coordinate System, NAD83). Within the Highlands Region the coverage was developed using the NJDEP 2002 Land use/Land cover: Highlands Study Area (DRAFT) coverage, and then subsequently edited using 2002 High Resolution Orthophotography, as well as scanned USGS 1:24,000 topographic maps, as references.

What attributes are included with the shape file?
(Note: Text fields in the attribute table are truncated at 254 characters. Therefore, some text may be deleted from the attribute table of some of the sites. The complete text for all the site records is contained in the **Prisites.rtf** file that is included in the Prisites Winzip distribution file.)
Identifying attributes – The Sitecode and Sitename fields are assigned by the Office of Natural Lands Management to track each site by a unique alphanumeric code and name. The Version field indicates the year and month of the current version of the Natural Heritage Priority Sites coverage.
Locational attributes – Information about where each

site is located can by found in the County, Quadname (US Geological Survey 7.5 minute topographic quadrangle map) and Municipali(ty) fields. More detailed information can be gathered by overlaying county and municipal coverages that are available from NJ DEP.

Descriptive attributes – A description of the site can be found in the Descriptio(n) field, while the Boundjust field contains a written justification for the site boundaries.

Significance attributes – The relative significance of each site is determined by assigning a biodiversity significance rank (Biodivrank). Justification for the rank can be found in the BiodivComm(ents) field. The Siteclass field indicates whether the site is categorized as a macrosite or a standard site. Standard sites are smaller in size (usually less than 3200 acres in size), while macrosites tend to be larger (usually greater than 3200 acres in size). It is not unusual to find several standard sites entirely contained within the boundaries of a macrosite.

What is the biodiversity significance rank and how is it used?

Each site is ranked according to its significance for biological diversity using a scale developed by The Nature Conservancy, the network of Natural Heritage Programs and the New Jersey Natural Heritage Program. The ranks can be used to distinguish between sites that are of global significance for conservation of biological diversity vs. those that are of state significance. The global biodiversity significance ranks range from B1 to B5. Within the Highlands Region the global biodiversity significance rank has been combined with a state biodiversity significance rank which provides information about the significance of the site on a state level. The state biodiversity significance ranks for sites in the Highlands Region range from V1 to V5. Therefore, all sites have been assigned a global biodiversity rank (B rank), but not all sites have been assigned a state biodiversity rank (V rank). The specific definitions for each rank are as follows:

B1 - Outstanding significance on a global level, generally the "last of the least" in the world, such as the only known occurrence of any element (species or ecological community), the best or an excellent occurrence of an element ranked critically imperiled globally, or a concentration (4+) of good or excellent occurrences of elements that are imperiled or critically imperiled globally. The site should be viable and defensible for the elements or ecological processes contained.

B2 - Very high significance on a global level, such as the most outstanding occurrence of any ecological community. Also includes areas containing other occurrences of elements that are critically imperiled globally, a good or excellent occurrence of an element that is imperiled globally, an excellent occurrence of an element that is rare globally, or a concentration (4+) of good occurrences of globally rare elements or viable occurrences of globally imperiled elements.

B3 - High significance on a global level, such as any other viable occurrence of an element that is globally imperiled, a good occurrence of a globally rare element, an excellent occurrence of any ecological community, or a concentration (4+) of good or excellent occurrences of elements that are critically imperiled in the State.

B4 - Moderate significance on a global level, such as a viable occurrence of a globally rare element, a good occurrence of any ecological community, a good or excellent occurrence or only viable state occurrence of an element that is critically imperiled in the State, an excellent occurrence of an element that is imperiled in the State, or a concentration (4+) of good occurrences of elements that are imperiled in the State or excellent occurrences of elements that are rare in the State.

B5 - Of general biodiversity interest.

V1 - Outstanding significance on a state level. Only known occurrence in the state for an element **or** Site with an excellent occurrence or the best occurrence in the state for an element ranked critically imperiled in the state **or** a concentration (4+) of good or excellent occurrences of elements that are imperiled or critically imperiled in the state.

V2 - Very high significance on a state level. Includes sites containing other occurrences of elements that are critically imperiled in the state **or** a concentration (4+) of other occurrences of state imperiled elements and/or good or excellent occurrences of state rare elements.

V3 - High significance on a state level. Includes sites containing the best occurrence in the state or an excellent occurrence of a state imperiled element **or** multiple (2+) other occurrences for state imperiled elements and/or excellent, good or moderate quality occurrences of state rare elements.

V4 - Moderate significance on a state level. Includes sites containing the best occurrence in the state or an excellent occurrence of a state rare element **or** any site with other occurrences of a state imperiled element **or** multiple (2+) other occurrences of state rare elements.

V5 - Any site with any other occurrence of a state rare element.

How can I obtain Natural Heritage Priority Site maps for an area of interest to me?

Natural Heritage Priority Site hard copy maps can be obtained by submitting a written request accompanied by a check or money order made payable to the Office of Natural Lands Management at the following address:

Office of Natural Lands Management
P.O. Box 404
Trenton, NJ 08625-0404
Phone: 609-984-1339; Fax: 609-984-1427

Individual 8.5" X 11" maps are available at the following rate:

1 - 10 site maps & reports:	$1.50/site
11 - 20 site maps & reports:	$1.00/site
> 20 sites:	$0.50/site

Digital GIS Coverage of Natural Heritage Priority Sites

A digital version of the ArcView GIS file of Natural Heritage Priority Sites is also available. The 2007 version of Natural Heritage Priority Sites will be sent as an email attachment upon request. There is no charge for emailing the GIS data.

How often are the maps updated?

The Natural Heritage Priority Site information is constantly being updated in the Natural Heritage Database. A new edition of the maps will be made available after significant revisions or additions to the Database.

May 17, 2007

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

t [DEP <Vince dep.nj.gov> Mon /2022 AM

Baratta, Meghan [DEP]

Subject: HPO Project No. 22-0248, Black Creek Stream Restoration, Township of Roxbury-NJHPO data request

**This e-mail serves as the official correspondence of the New Jersey Historic Preservation **

HPO Project No. 22-0248-1
HPO-A2022-173

Re:
Morris County, Roxbury Township
Black Creek Stream Restoration
Block 20001, Lot 13
Block 2401, Lot 9
Block 2501, Lot 1
Technical Assistance Review

Dear Mr. Behbahani:

Thank you for providing the Historic Preservation Office (HPO) with the opportunity for review and comment on the potential for the above-referenced project to affect historic and archaeological resources. The project proposes stream habitat rehabilitation of Black Creek (Lamington River) through Rutgers Pond and the southwestern outlet including reestablishing the natural stream channel, new stream banks, landscaping, and shade trees. Upon review, there are no districts, buildings, or structures listed in, or identified on HPO maps as eligible for listing in, the New Jersey or National Registers of Historic Places within the project site. While the project site is located within an area of high archaeological sensitivity for pre-Contact period archaeological resources, the work is confined to existing, modified stream channels through previous mining operations. Therefore, the work, as currently understood, has a low potential to effect any archaeological deposits.

The HPO reviews projects for their effects on historic resources when federal funding, licensing, or permitting is involved. The HPO also reviews projects requiring Freshwater Wetlands, Waterfront Development, Upland Development, CAFRA and Highland Preservation Area Approval permits issued by the State of New Jersey's Division of Land Resource Protection, as well as environmental assessments under Executive Order 215. *Upon review, if subject to any of the above-referenced regulations, the HPO would not recommend any further consideration of project effects on historic and archaeological resources prior to permit issuance.*

Additional Comments

This information is provided as informal notes to you and does not constitute identification level cultural resources survey under Section 106 of the National Historic Preservation Act or other law or regulation. These notes do not constitute project review under any state or federal law. The absence of previously identified cultural resources does not imply that there are no eligible historic properties in the requested area. Further identification of cultural resources may be required under one or more historic preservation review processes depending on project funding, licensing, or permitting.

From:	Maresca, Vincent [DEP] <Vincent.Maresca@dep.nj.gov>	Sent:	Mon 1/31/2022 11:29 AM
To:	ali@bogiaeng.com		
Cc:	Baratta, Meghan [DEP]		
Subject:	HPO Project No. 22-0248, Black Creek Stream Restoration, Township of Roxbury-NJHPO data request		

Thank you again for providing this opportunity for review and comment on the potential for this project to affect historic and archaeological resources. Please reference the HPO project number 22-0121in any future calls, emails, or written correspondence to help expedite your review and response. If you have any questions, please feel free to contact me at Vincent.maresca@dep.nj.gov with questions.

Regards,

Vincent Maresca, M.A.
Historic Preservation Specialist 2
Historic Preservation Office
Department of Environmental Protection
501 East State Street, Trenton, NJ 08625-0420
vincent.maresca@dep.nj.gov Ph: (609) 633-2395 , F: (609) 984-0578

APPENDIX G

Adjoiner Property Owner Written Permission

APPENDIX H

USDA Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Morris County, New Jersey

April 26, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morris County, New Jersey
Survey Area Data: Version 16, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 13, 2021—Sep 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdrAt	Timakwa muck, 0 to 2 percent slopes, frequently flooded	16.3	9.3%
NerB	Netcong gravelly sandy loam, 3 to 8 percent slopes	25.9	14.8%
NerC	Netcong gravelly sandy loam, 8 to 15 percent slopes	9.6	5.5%
PauCc	Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony	0.4	0.2%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	27.1	15.5%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	0.5	0.3%
PohB	Pompton sandy loam, 3 to 8 percent slopes	0.6	0.4%
RksB	Riverhead gravelly sandy loam, 3 to 8 percent slopes	4.0	2.3%
UR	Urban land	17.2	9.9%
USRHVB	Urban land-Riverhead complex, 3 to 8 percent slopes	35.5	20.3%
WATER	Water	37.5	21.5%
Totals for Area of Interest		**174.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morris County, New Jersey

AdrAt—Timakwa muck, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w671
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Timakwa, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 37 inches: muck
2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand
2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 14.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Minor Components

Catden, frequently flooded

Percent of map unit: 7 percent
Landform: Swamps, bogs, marshes, kettles, flood plains, fens, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Parsippany, frequently flooded

Percent of map unit: 4 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Preakness, frequently flooded, poorly drained

Percent of map unit: 4 percent
Landform: Outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

NerB—Netcong gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0mj
Elevation: 280 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Netcong and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Netcong

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 7 inches: gravelly sandy loam
BA - 7 to 13 inches: gravelly sandy loam
Bw1 - 13 to 21 inches: gravelly sandy loam
Bw2 - 21 to 30 inches: gravelly sandy loam
BC - 30 to 41 inches: sandy loam
C - 41 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hibernia, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Rockaway, moderately well drained, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

NerC—Netcong gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: b0mk
Elevation: 280 to 1,210 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Netcong and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Netcong

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 7 inches: gravelly sandy loam
BA - 7 to 13 inches: gravelly sandy loam
Bw1 - 13 to 21 inches: gravelly sandy loam
Bw2 - 21 to 30 inches: gravelly sandy loam
BC - 30 to 41 inches: sandy loam
C - 41 to 60 inches: sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Parker

Percent of map unit: 5 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rockaway, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

PauCc—Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc4
Elevation: 250 to 1,250 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent
Gladstone, extremely stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam
B - 10 to 22 inches: gravelly sandy clay loam
BC - 22 to 37 inches: sandy loam
C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 5 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PauDc—Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc5
Elevation: 250 to 1,250 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent
Gladstone, extremely stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam
Bt - 10 to 22 inches: gravelly sandy clay loam
BC - 22 to 37 inches: gravelly sandy loam
C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Califon, friable subsoil

Percent of map unit: 5 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PawE—Parker-Rock outcrop complex, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: b0mt
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 75 percent
Rock outcrop: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly sandy loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 25 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

R - 0 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Gladstone, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PohB—Pompton sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0n5
Elevation: 160 to 1,500 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Pompton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pompton

Setting

Landform: Outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy outwash derived from gneiss, sandsatone and basalt

Typical profile

A - 0 to 7 inches: sandy loam
BA - 7 to 10 inches: sandy loam
Bw - 10 to 28 inches: sandy loam
BC - 28 to 36 inches: gravelly sandy loam
2C - 36 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Hydric soil rating: No

Minor Components

Otisville

Percent of map unit: 5 percent
Landform: Kames
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Hibernia, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Riverhead

Percent of map unit: 5 percent
Landform: Outwash fans
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

RksB—Riverhead gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0nf
Elevation: 70 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Riverhead and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting

Landform: Moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from granite and gneiss

Typical profile

A - 0 to 2 inches: gravelly sandy loam
BA - 2 to 4 inches: gravelly sandy loam

Bw1 - 4 to 8 inches: gravelly sandy loam
Bw2 - 8 to 28 inches: gravelly sandy loam
2C1 - 28 to 33 inches: gravelly loamy sand
2C2 - 33 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Parker

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Gladstone

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Annandale

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

UR—Urban land

Map Unit Setting

National map unit symbol: b0nx
Elevation: 0 to 170 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

USRHVB—Urban land-Riverhead complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 13q0d
Elevation: 0 to 950 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Riverhead and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Outwash fans
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

C - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Riverhead

Setting

Landform: Outwash fans
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from granite and gneiss

Typical profile

A - 0 to 10 inches: sandy loam
Bw - 10 to 26 inches: gravelly sandy loam
BC - 26 to 36 inches: gravelly sandy loam
C - 36 to 60 inches: gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

WATER—Water

Map Unit Setting

National map unit symbol: b0p9
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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APPENDIX I

Maintenance Plan

The proposed restored channel is designed for an indefinite lifespan, however, field inspection is needed to confirm the stability and functionality to safely pass the flow. Field inspection will be used to gather data and develop understanding of active process and conditions. Personnel with sufficient experience shall look for potential geomorphological landform , destabilizing phenomena, erosion signs, sediment storage, deposition patterns etc.
The safety of the inspection is critical and therefore the inspections shall be conducted during low flow conditions and dormant season. There should be at least a team of two persons with proper equipment for the task.
Basic information to be collected during inspection:

- Measurement of low flow and bankfull channel dimensions and channel slope in critical reaches.
- Identification of terraces and active floodplains.
- Characterization of channel bed and banks. Check gradation by collecting samples from the bed.
- Description of bank profiles, and check for structural or erosional signs of failure
- Description of point bars, pools, riffles, bed instability, and evidence of sedimentation process.
- Observation of impacts due to channel alterations and evidence of stream recovery
- Description of channel debris and bed and bank vegetation.
- Photographic record of critical stream and floodplain characteristics.

For consistency of the investigation, it is recommended that same team do the entire study as feasible. The team shall walk the entire reach, including upstream and downstream of the channel, and document the observations in form of notes.

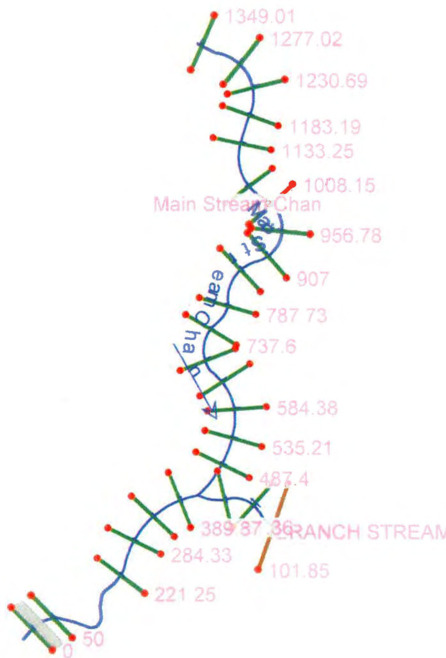
The channel is designed as a stable channel. Which implies there is balance between slopes and sediment sizes. As long as the stability of bed and banks is maintained, the channel would have adequate hydraulic capacity to pass the design discharge, and would also avert contaminating the downstream with extra sediment loads. The following table summarizes evidences of degradation, aggradation, and stability for reference.

Possible Field Indicators of River Stability/Instability

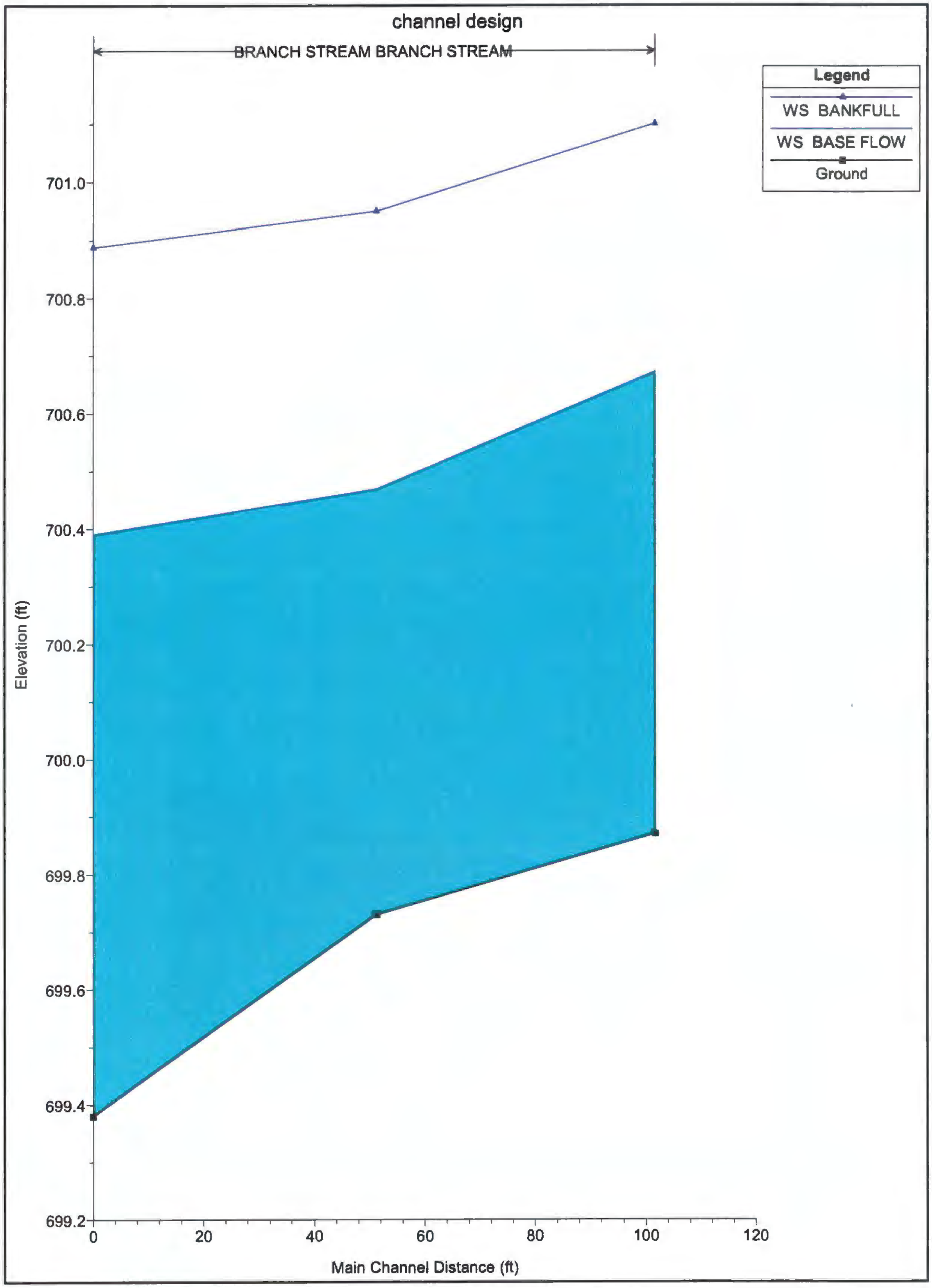
Evidence of Degradation	Terraces (abandoned floodplains) Perched channels or tributaries Headcuts and knickpoints Exposed pipe crossings Suspended culvert outfalls and ditches Undercut bridge piers Exposed or "air" tree roots Leaning trees Narrow/deep channel Banks undercut, both sides Armored bed Hydrophytic vegetation located high on bank
Evidence of Aggradation	Buried structures such as culverts and outfalls Reduced bridge clearance Presence of midchannel bars Outlet of tributaries buried in sediment Sediment deposition in floodplain Buried vegetation Perched main channel Significant backwater in tributaries Uniform sediment deposition across the channel Hydrophobic vegetation located low on bank or dead in floodplain
Evidence of Stability	Vegetated bars and banks Limited bank erosion Older bridges, culverts and outfalls with bottom elevations at or near grade Mouth of tributaries at or near existing main stem stream grade No exposed pipeline crossings

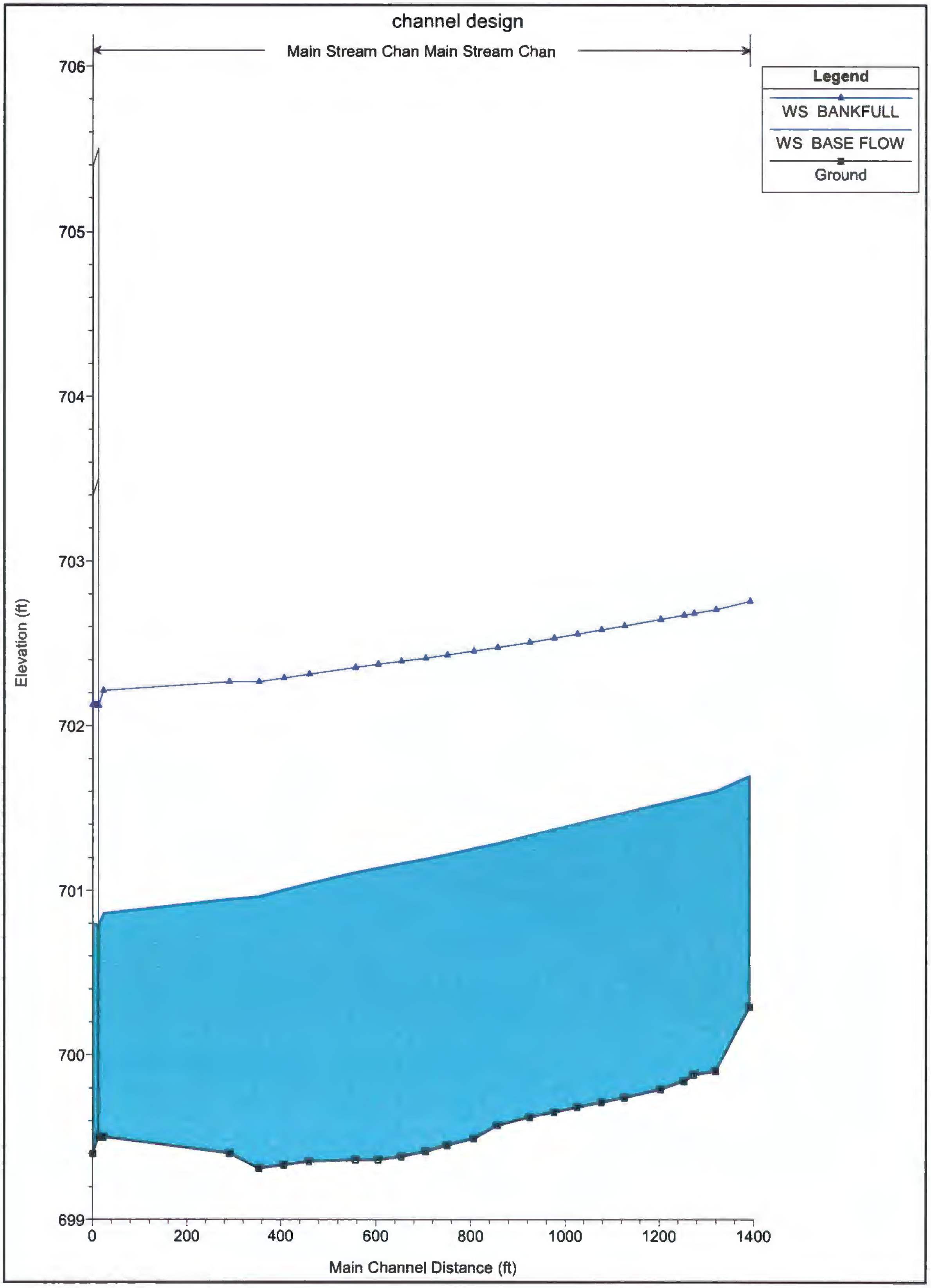
APPENDIX J

Restored Channel Design



1349.01
1277.02
1230.69
1183.19
1133.25
1008.15
Main Stream Chan
956.78
907
787.73
737.6
584.38
535.21
487.4
BRANCH STREAM
284.33
101.85
221.25
50
0


channel design
BRANCH STREAM BRANCH STREAM
Legend
WS BANKFULL
WS BASE FLOW
Ground
Elevation (ft)
701.0
700.8
700.6
700.4
700.2
700.0
699.8
699.6
699.4
699.2
0
20
40
60
80
100
120
Main Channel Distance (ft)


channel design
Main Stream Chan Main Stream Chan
Legend
WS BANKFULL
WS BASE FLOW
Ground
Elevation (ft)
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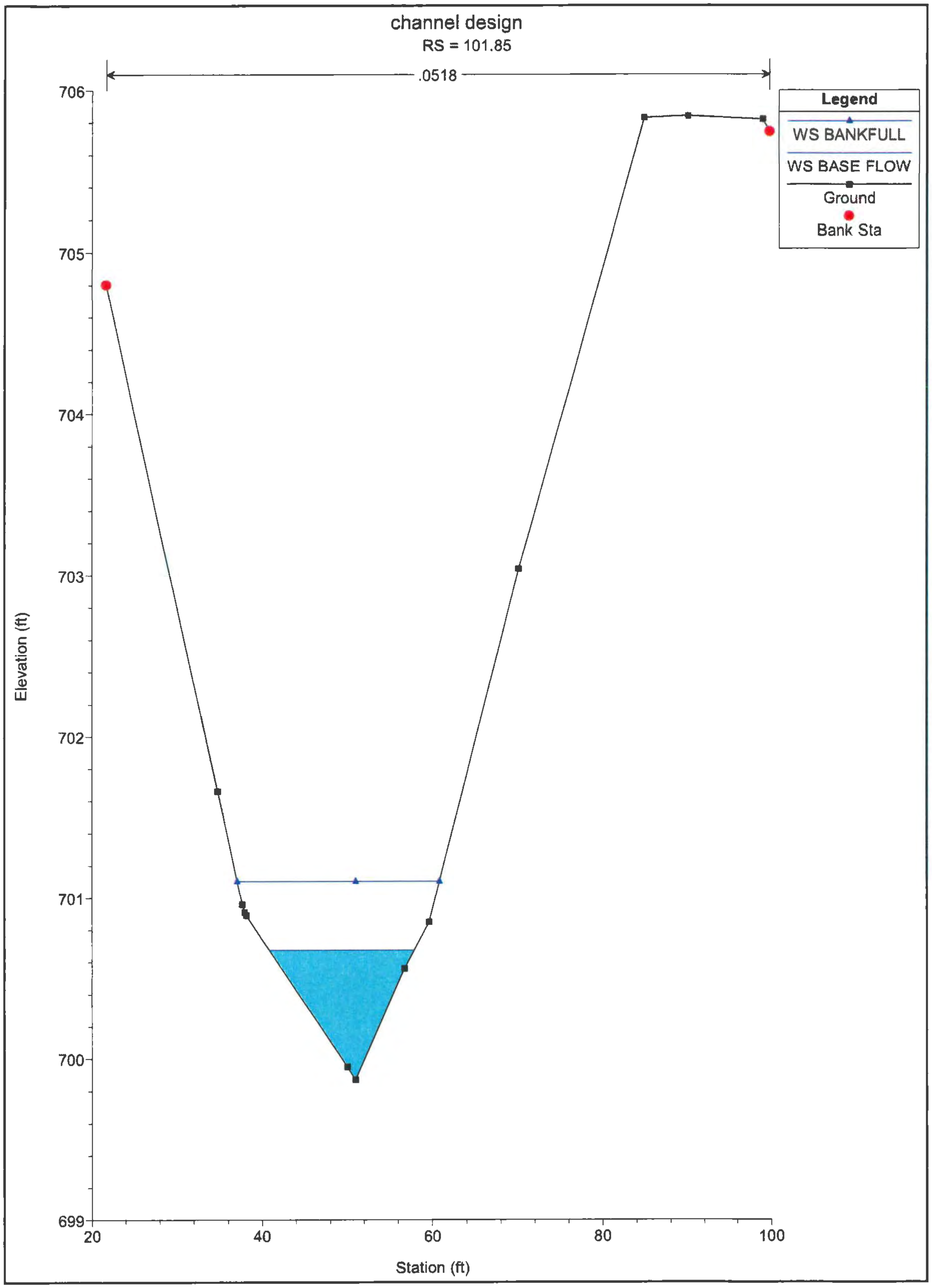
705
704
703
702
701
700
699
0
200
400
600
800
1000
1200
1400
Main Channel Distance (ft)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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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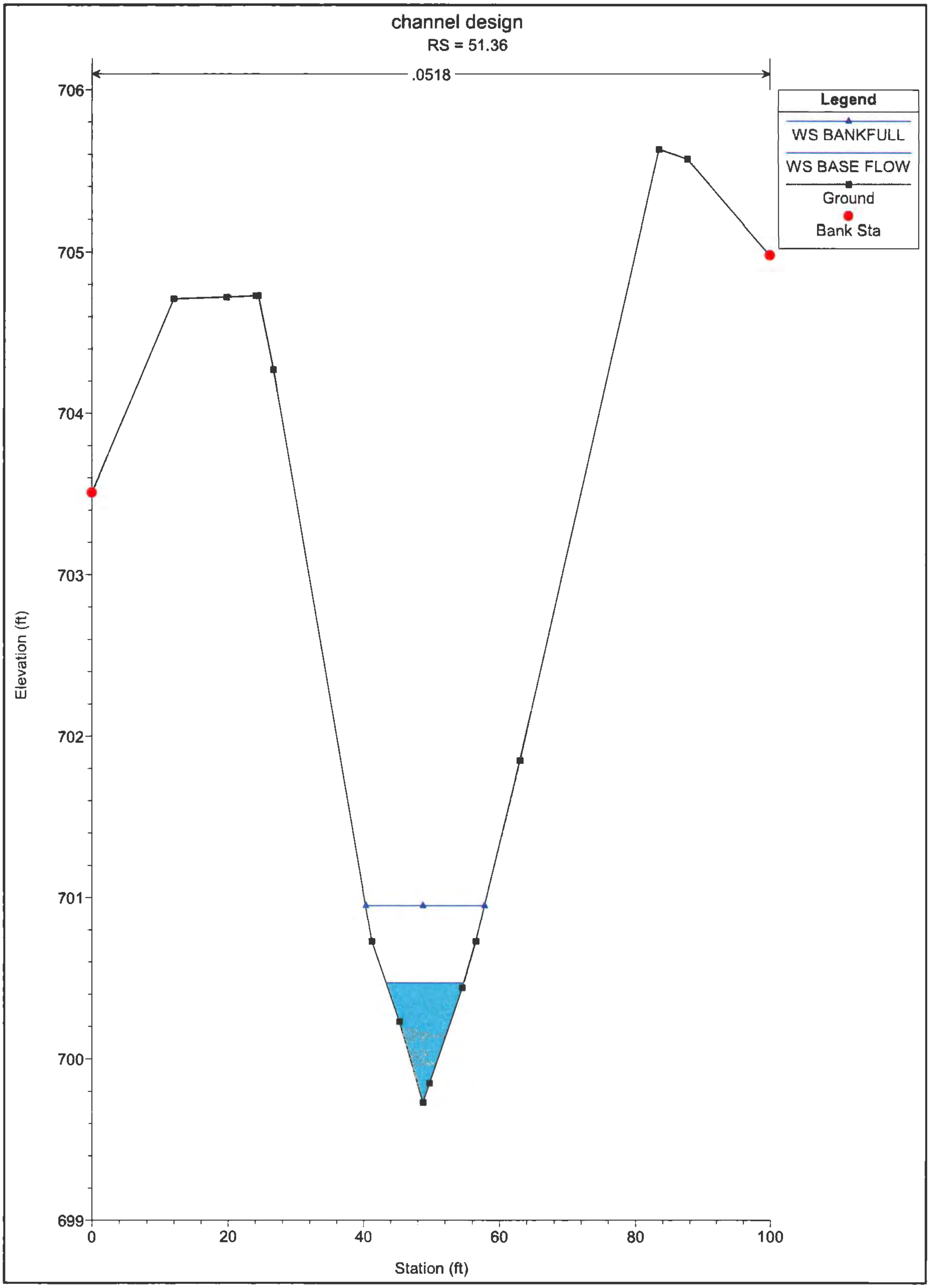
705
704
703
702
701
700
699
Station (ft)
20
40
60
80
100



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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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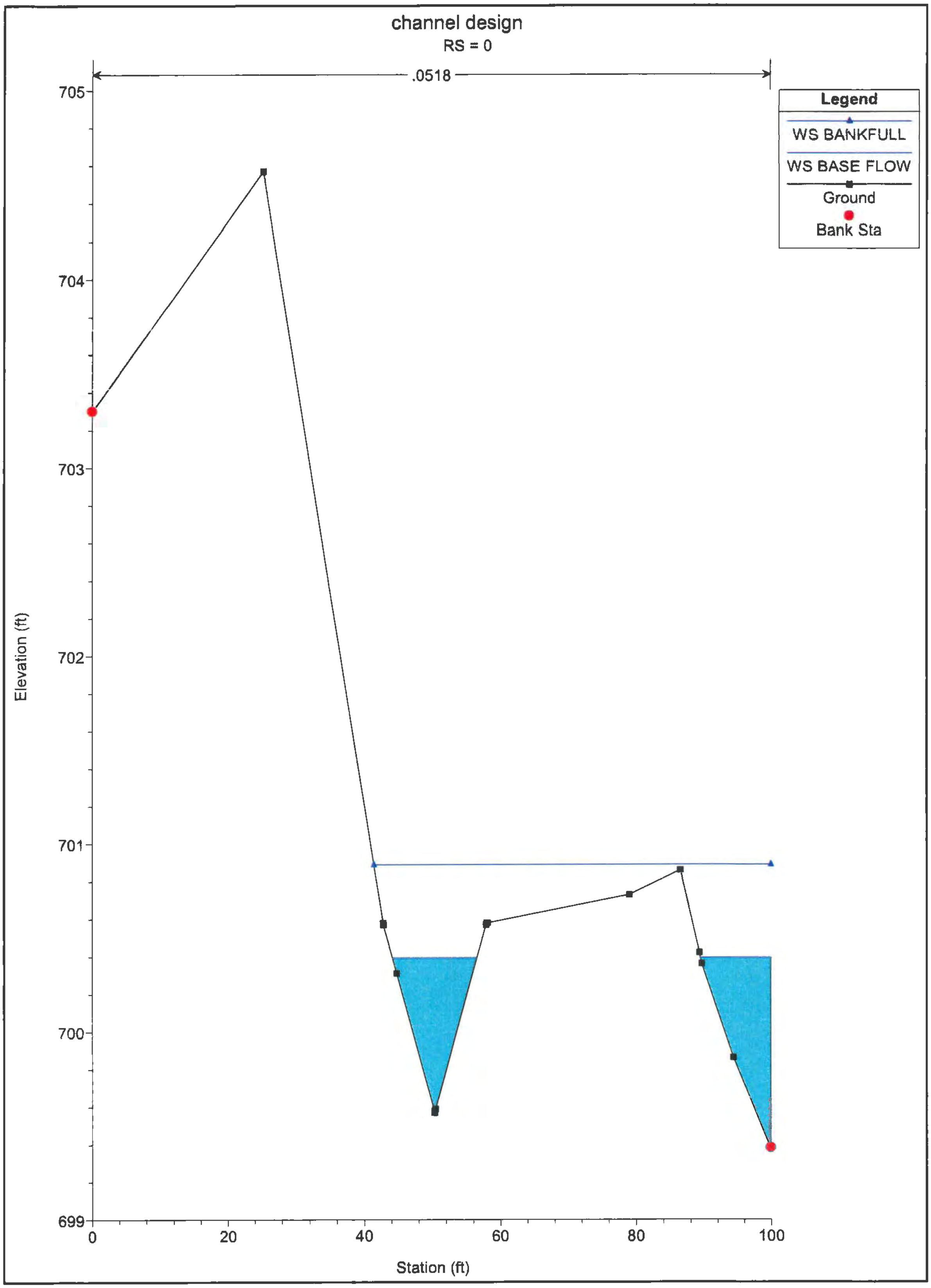
705
704
703
702
701
700
699
0
20
40
60
80
100
Station (ft)



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RS = 0
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Legend
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WS BASE FLOW
Ground
Bank Sta
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704
703
702
701
700
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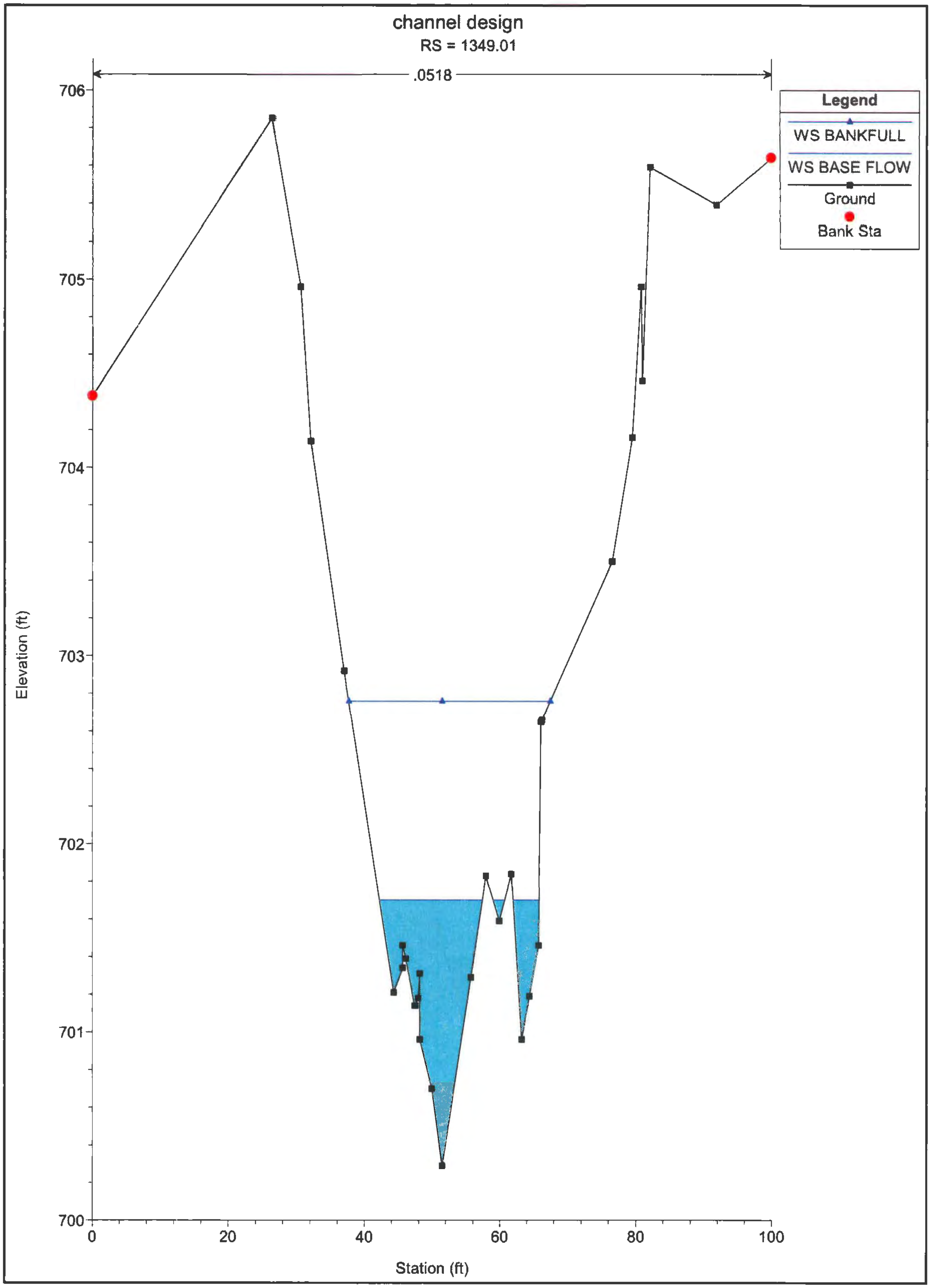
0
20
40
60
80
100
Elevation (ft)
Station (ft)



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WS BASE FLOW
Ground
Bank Sta
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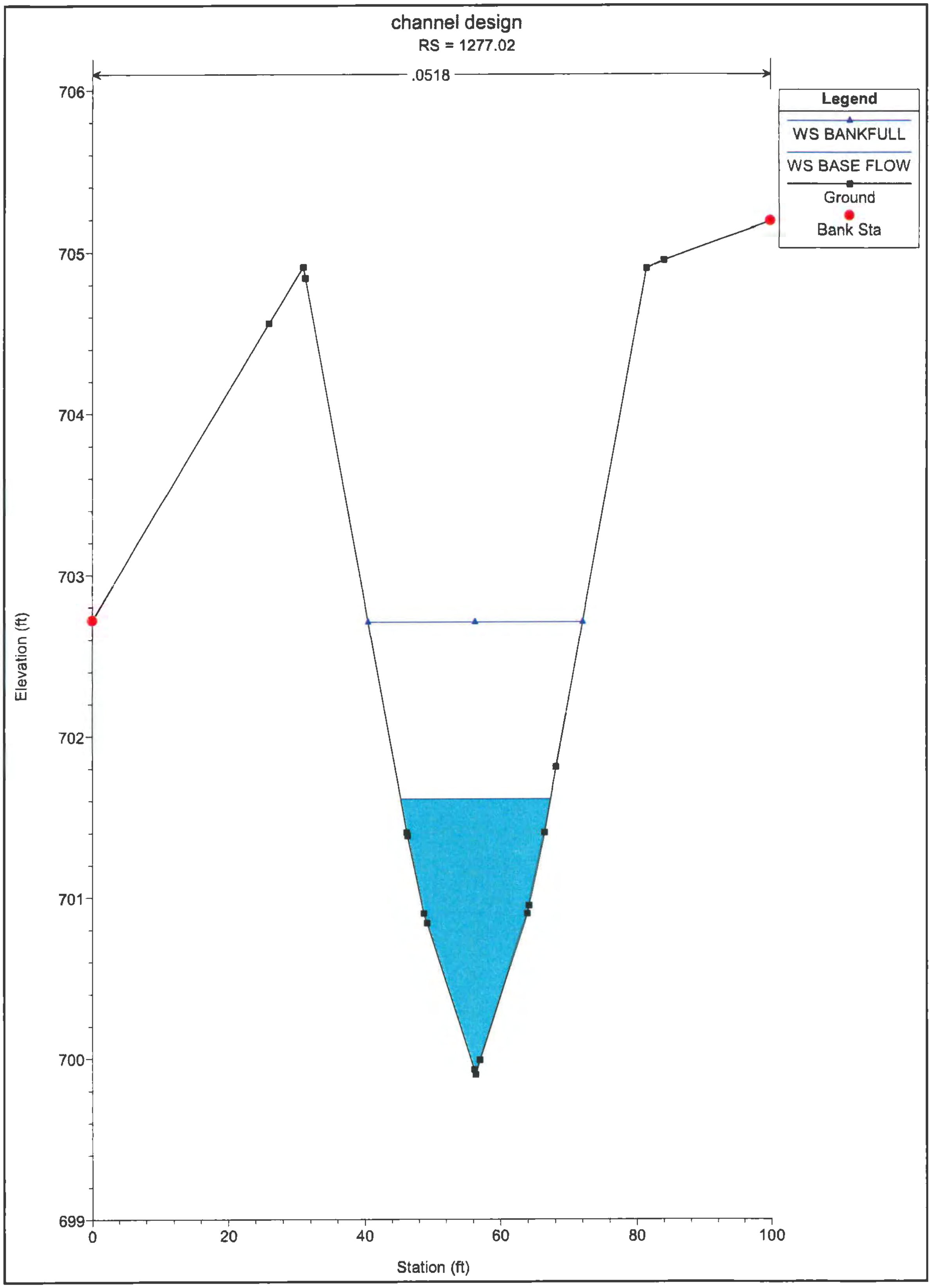
703
702
701
700
0
20
40
60
80
100
Station (ft)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Legend
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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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705
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702
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700
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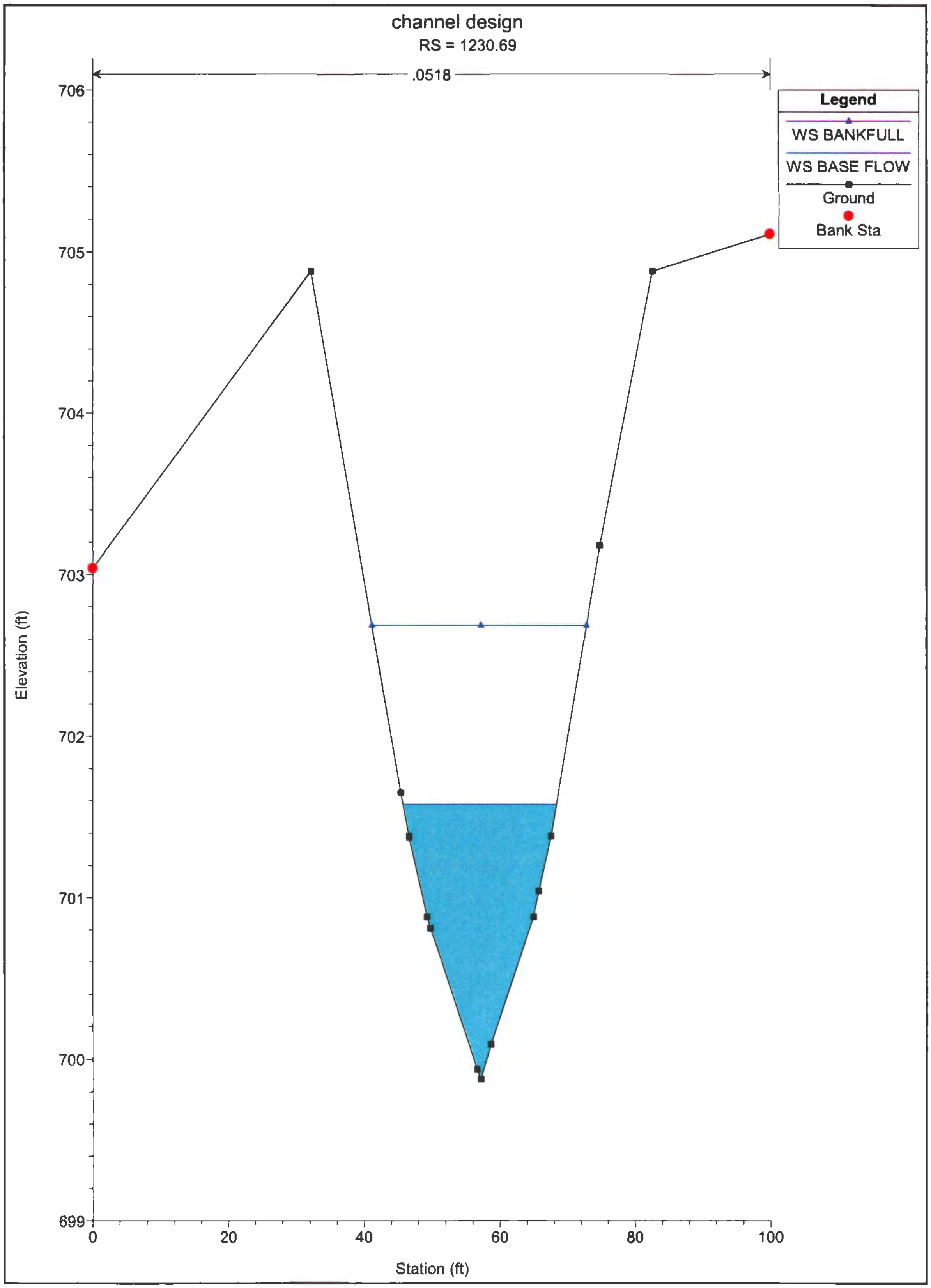
0
20
40
60
80
100
Station (ft)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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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700
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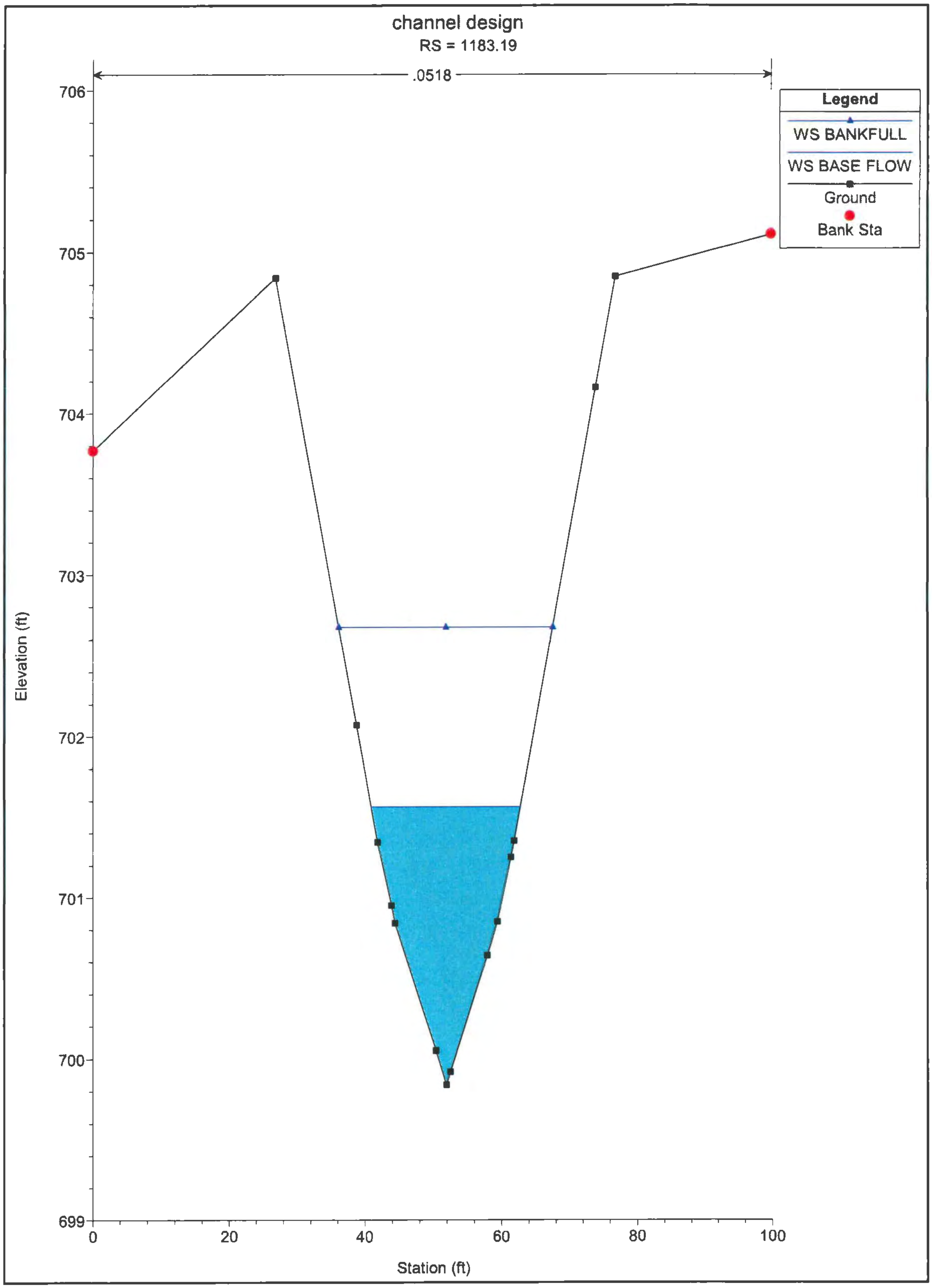
0
20
40
60
80
100
Station (ft)



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RS = 1183.19
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WS BASE FLOW
Ground
Bank Sta
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700
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Elevation (ft)
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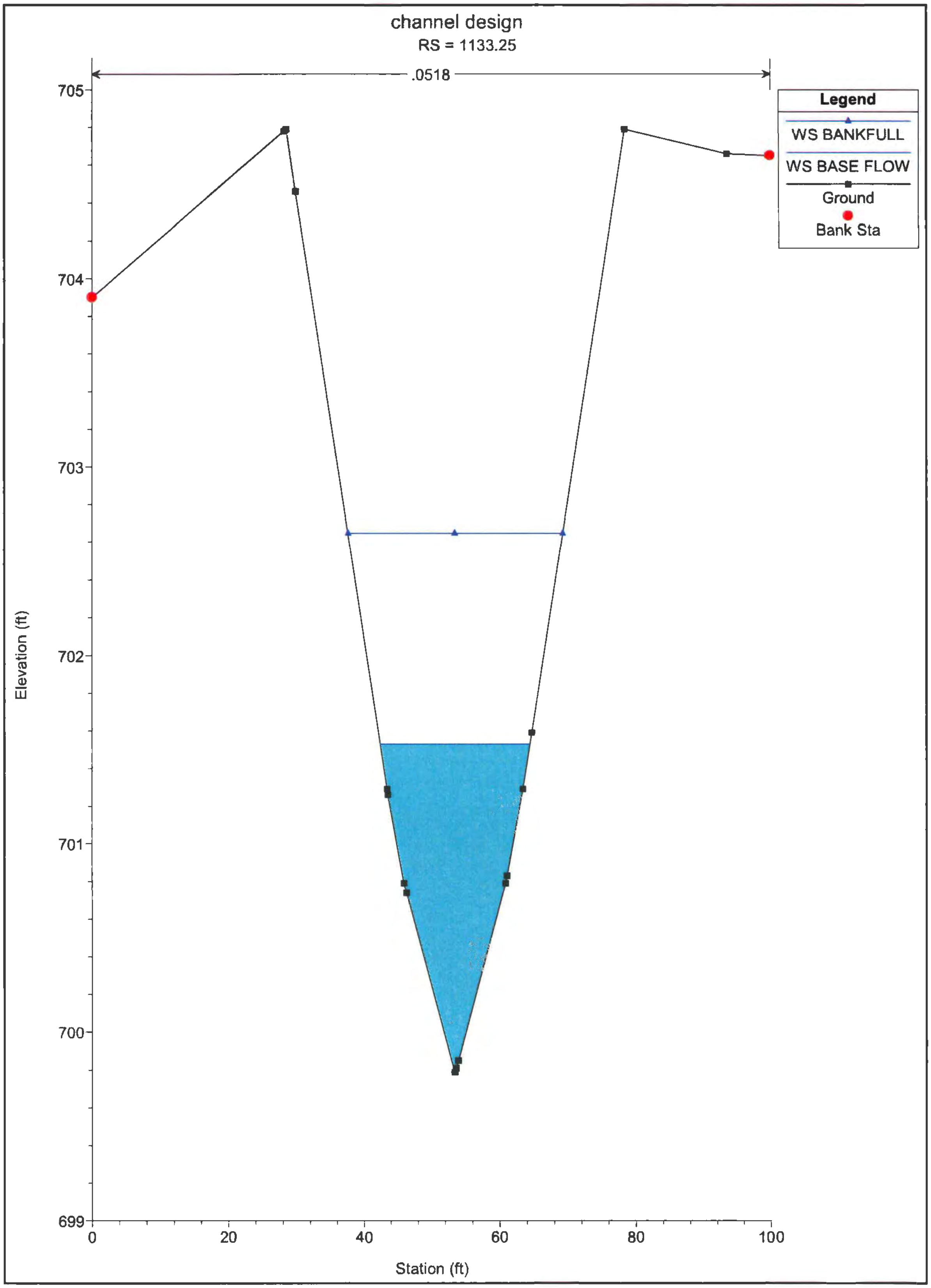
60
80
100
Station (ft)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WS BANKFULL
WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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700
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0
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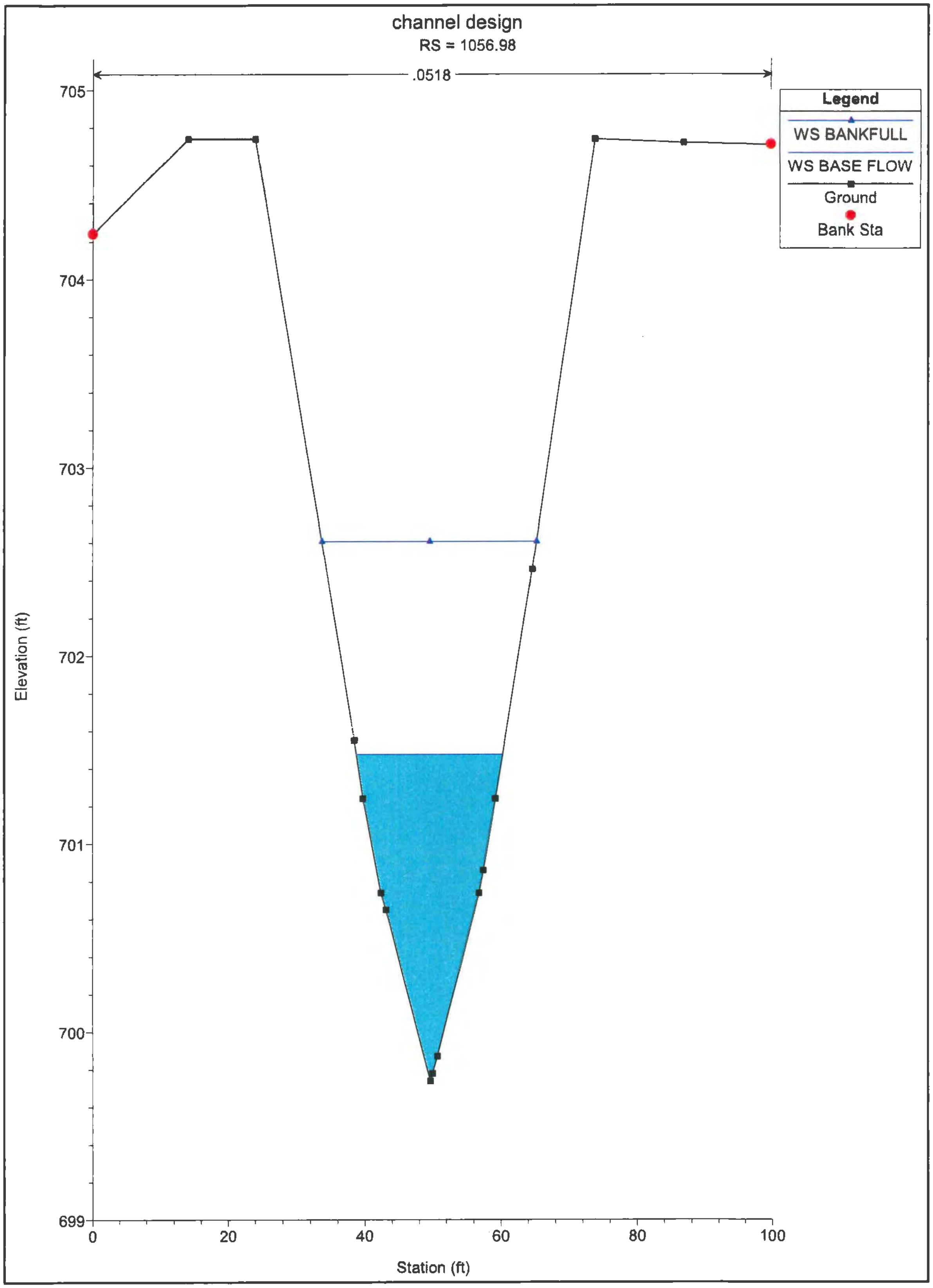
40
60
80
100
Station (ft)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Legend
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WS BASE FLOW
Ground
Bank Sta
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702
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Elevation (ft)
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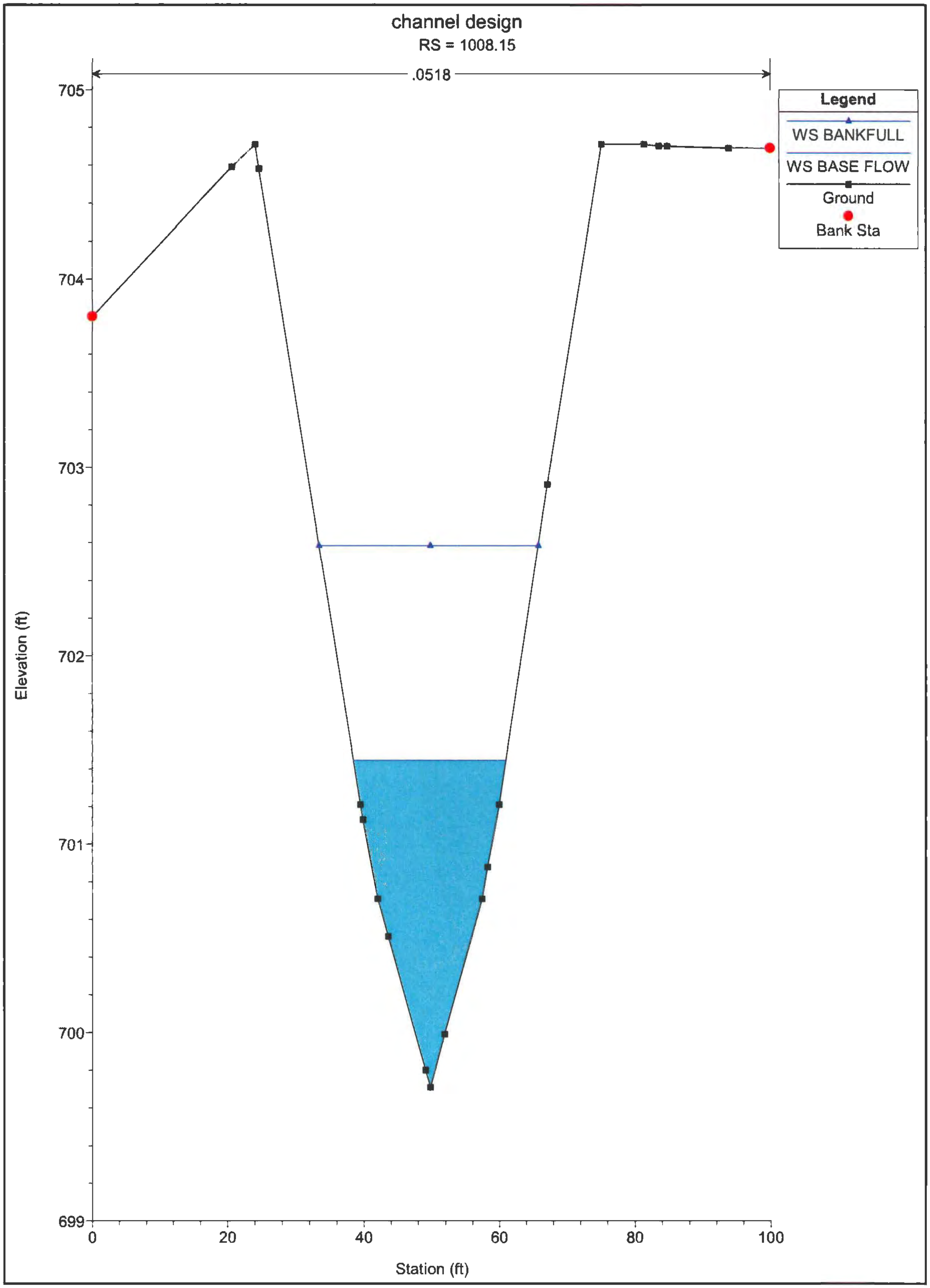
40
60
80
100
Station (ft)



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Legend
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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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703
702
701
700
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Station (ft)
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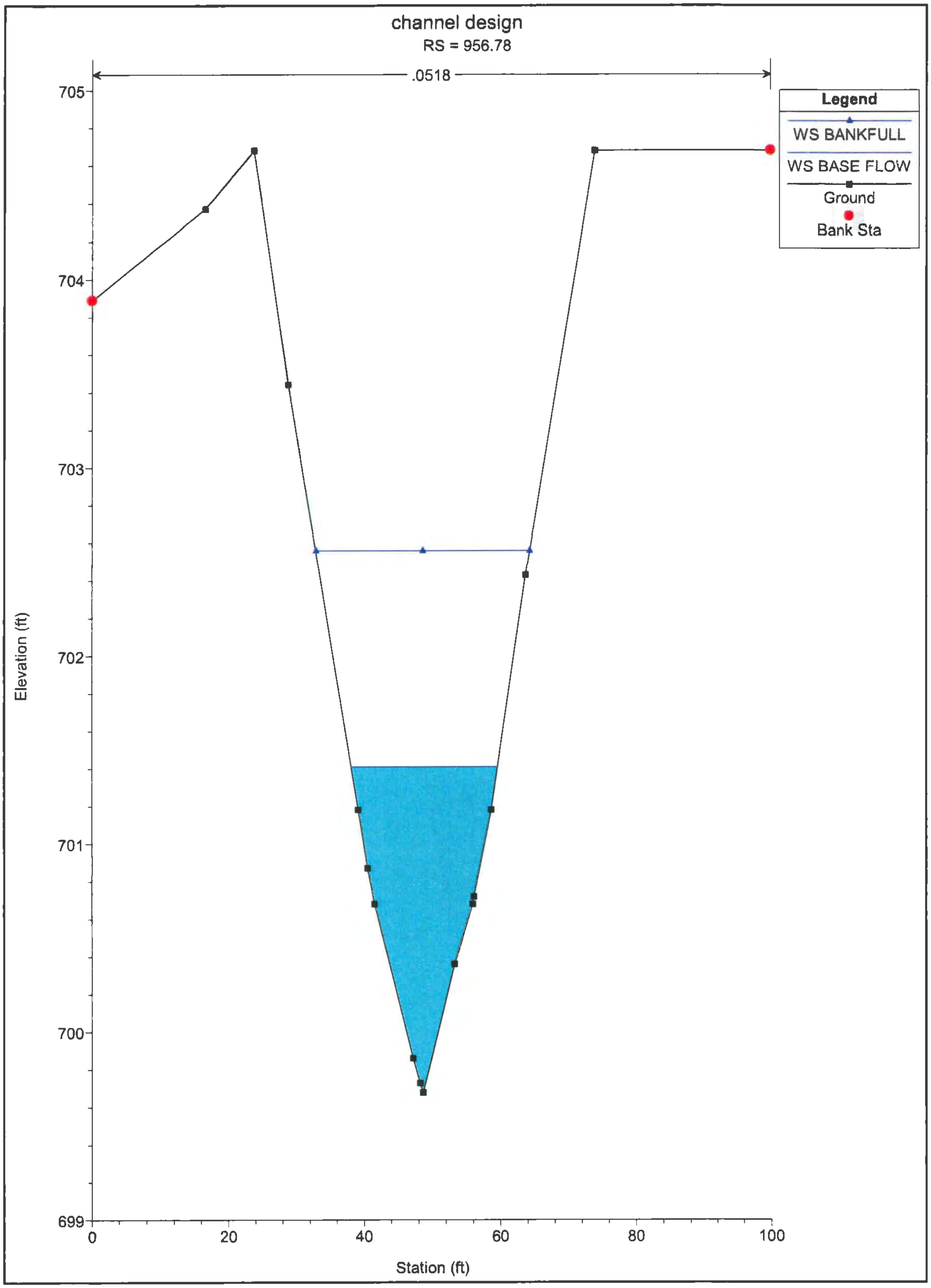
40
60
80
100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Legend
WS BANKFULL
WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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701
700
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Station (ft)
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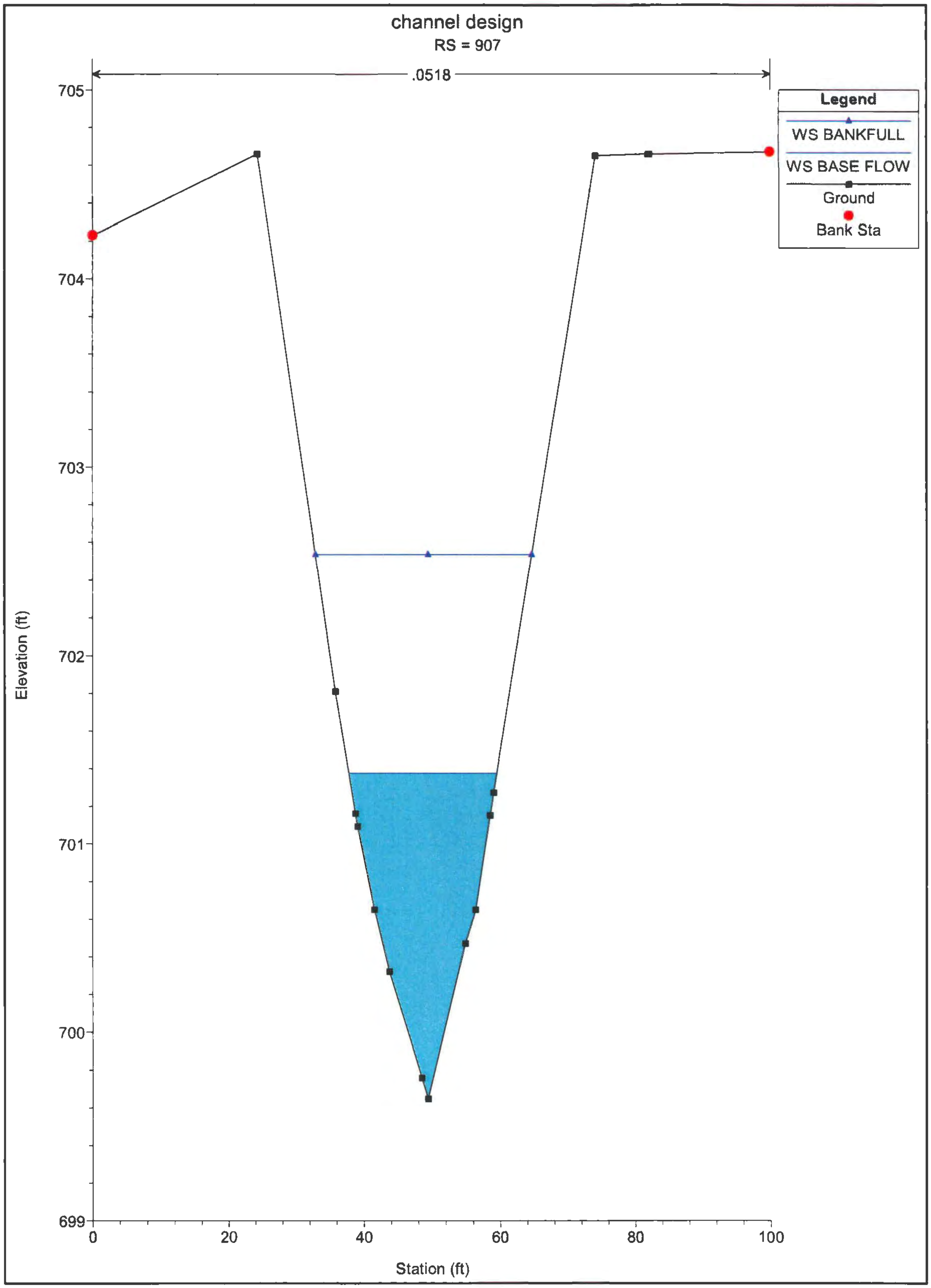
40
60
80
100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WS BASE FLOW
Ground
Bank Sta
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700
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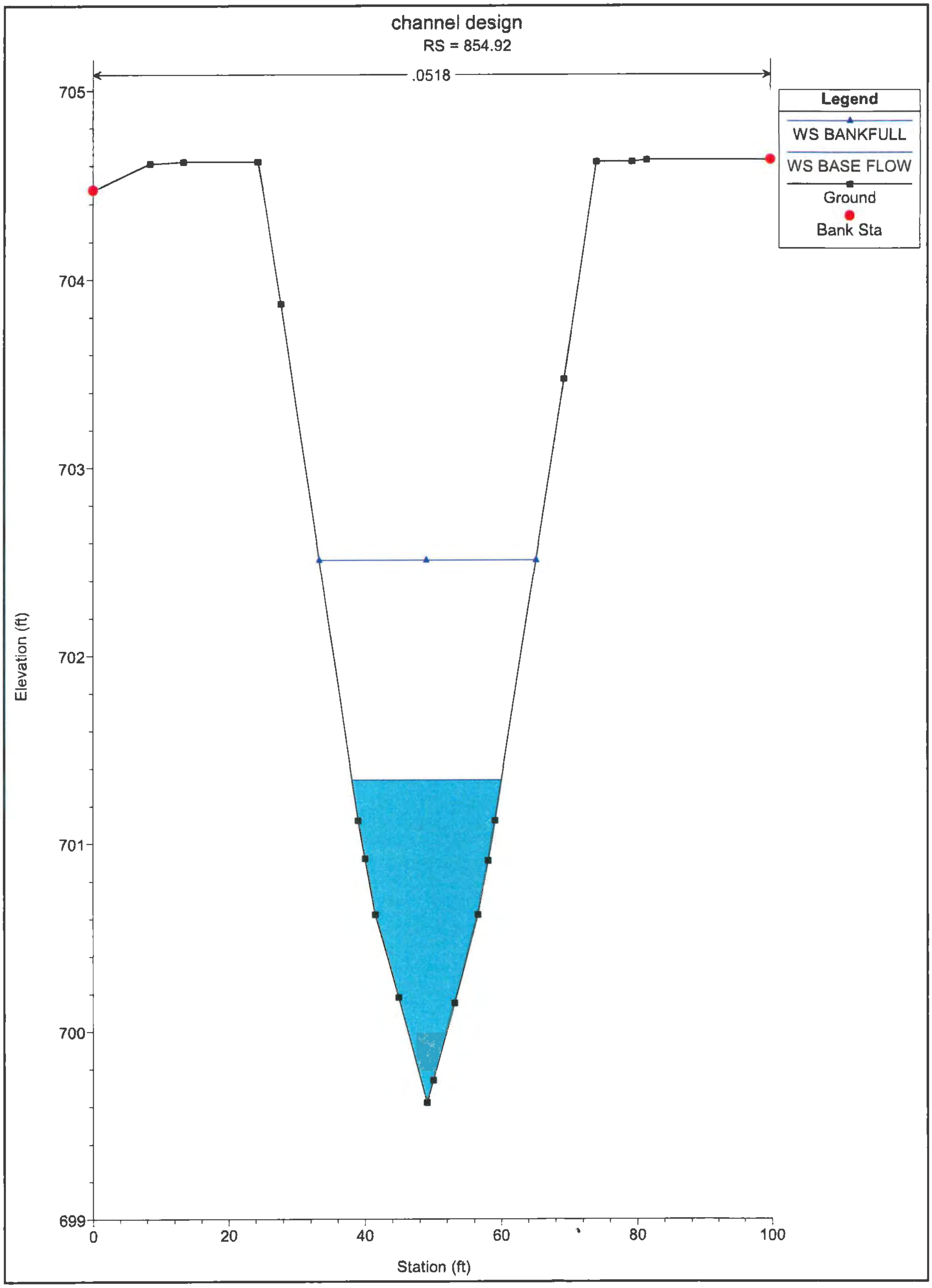
40
60
80
100
Station (ft)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Legend
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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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Station (ft)
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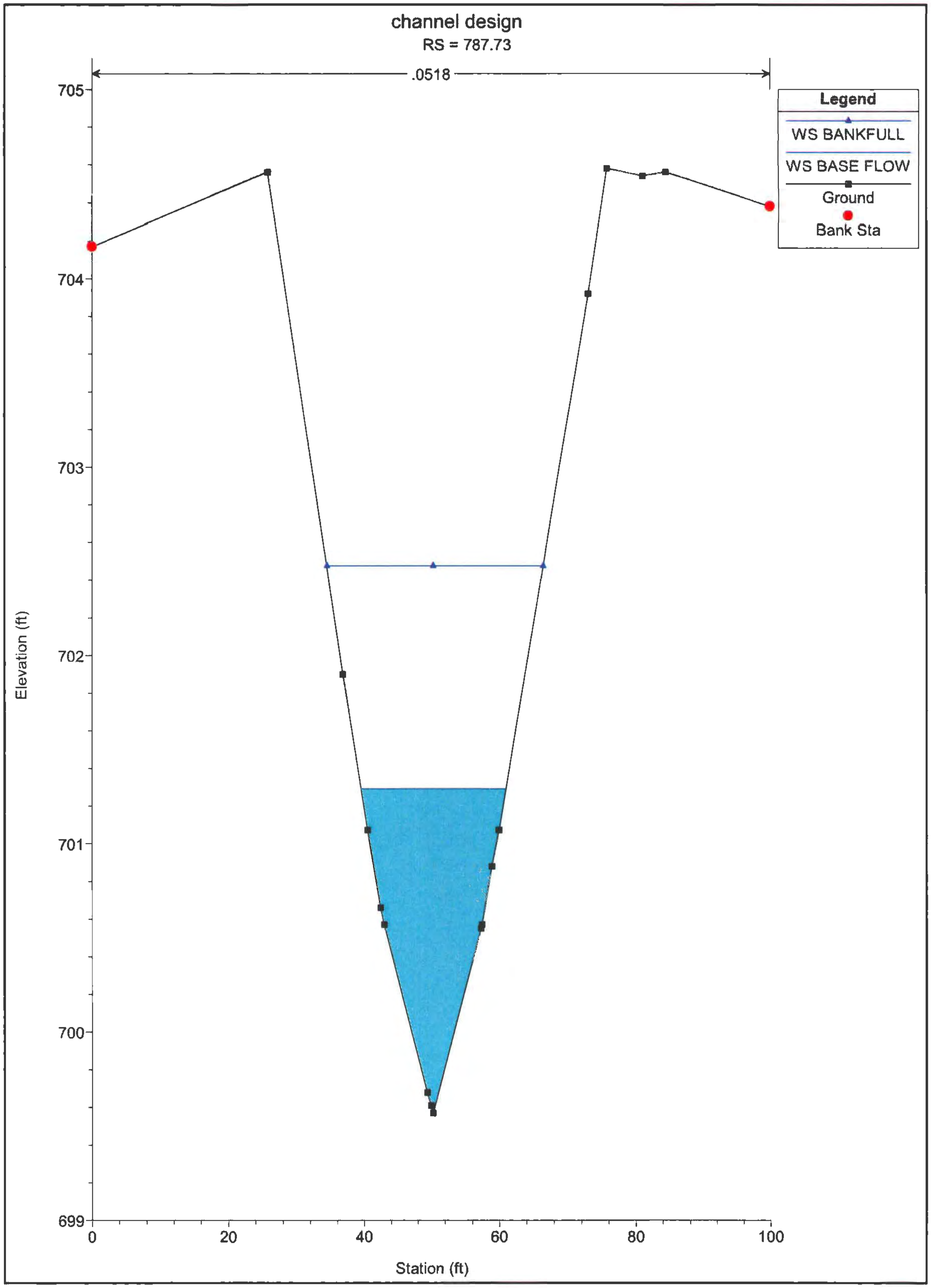
60
80
100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Legend
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WS BASE FLOW
Ground
Bank Sta
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700
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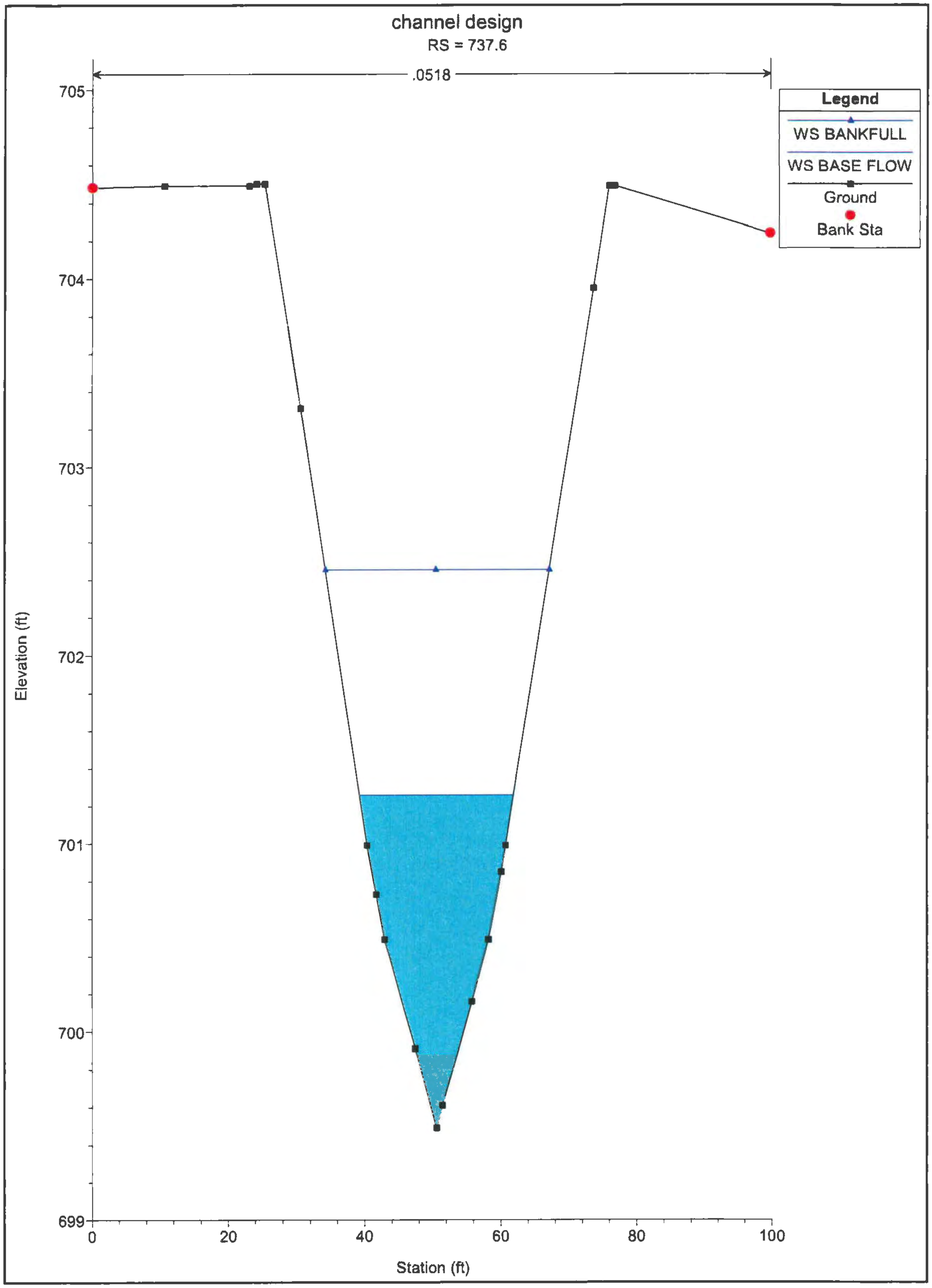
40
60
80
100
Station (ft)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WS BASE FLOW
Ground
Bank Sta
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700
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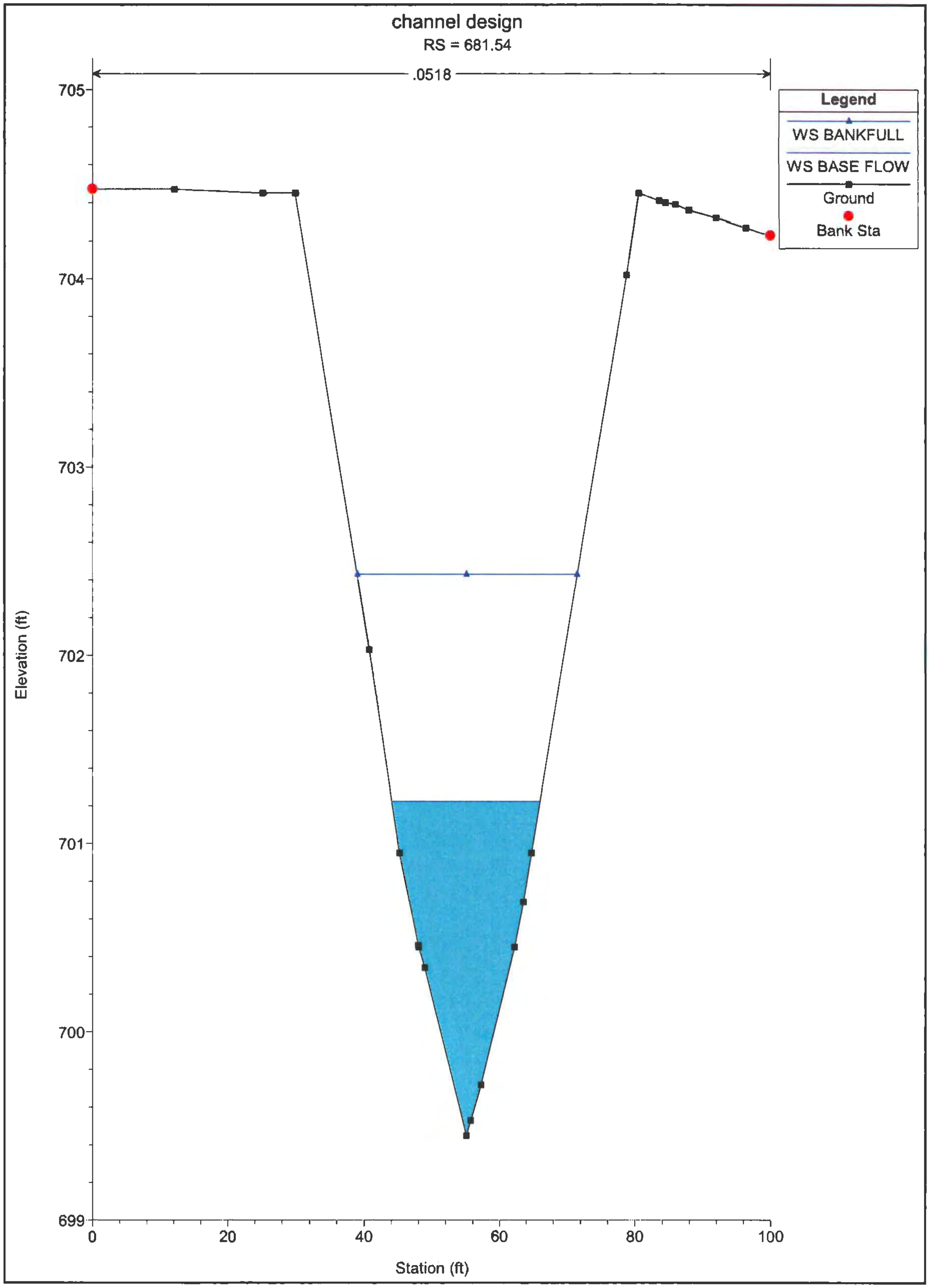
60
80
100
Station (ft)



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RS = 681.54
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WS BASE FLOW
Ground
Bank Sta
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704
703
702
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700
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Elevation (ft)
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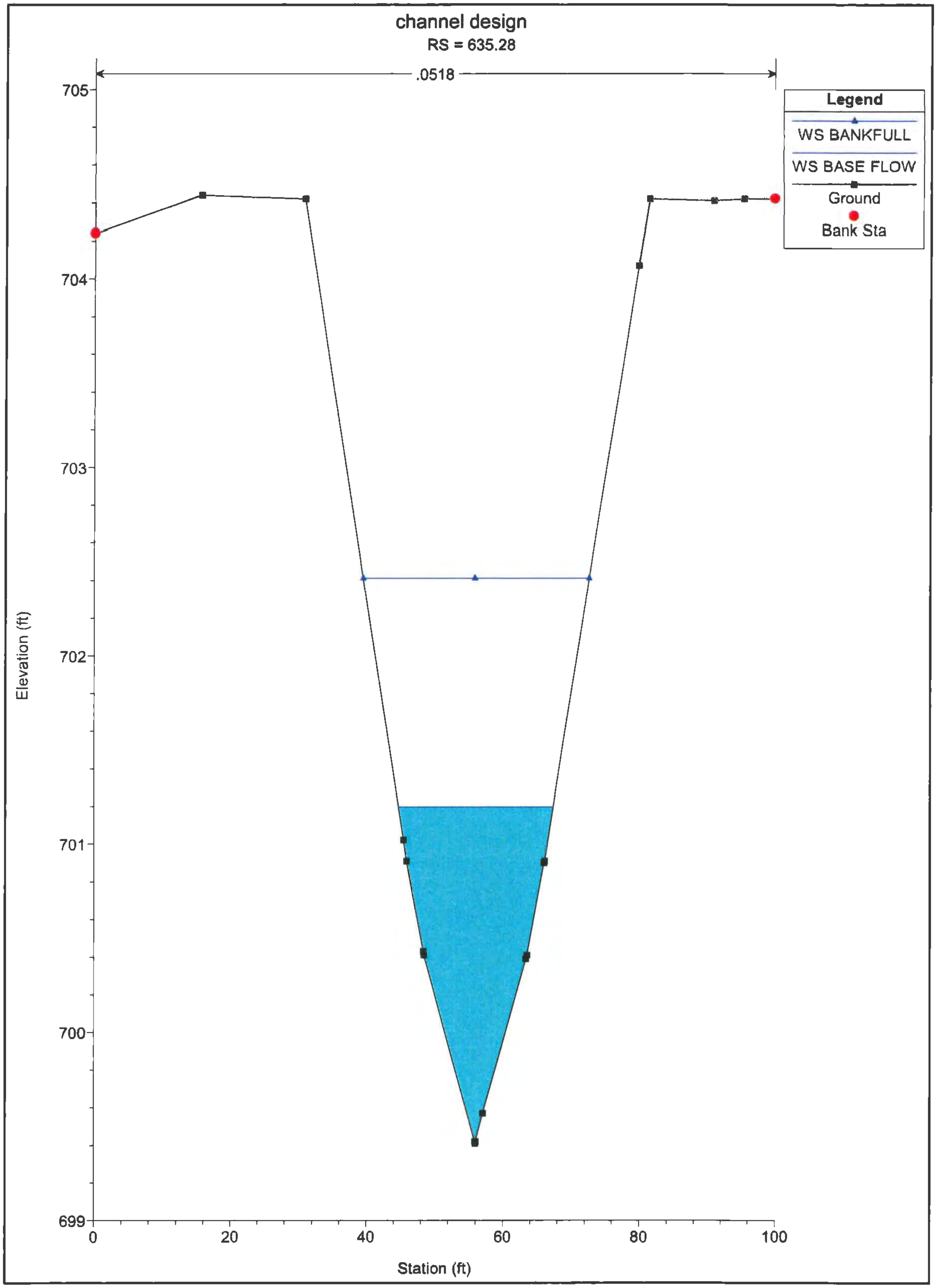
40
60
80
100
Station (ft)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Legend
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WS BASE FLOW
Ground
Bank Sta
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703
702
701
700
699
Station (ft)
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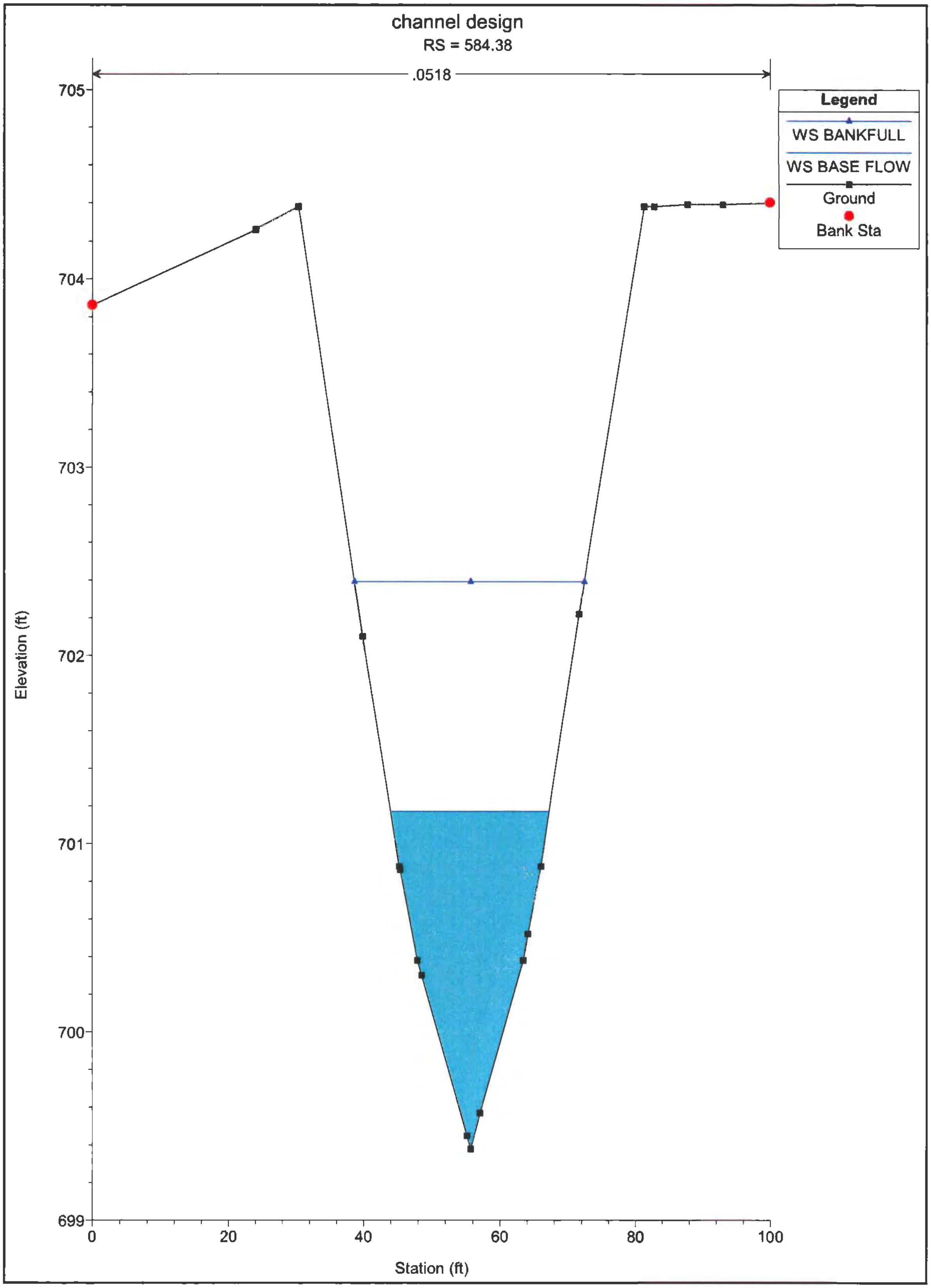
20
40
60
80
100



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RS = 584.38
.0518
Legend
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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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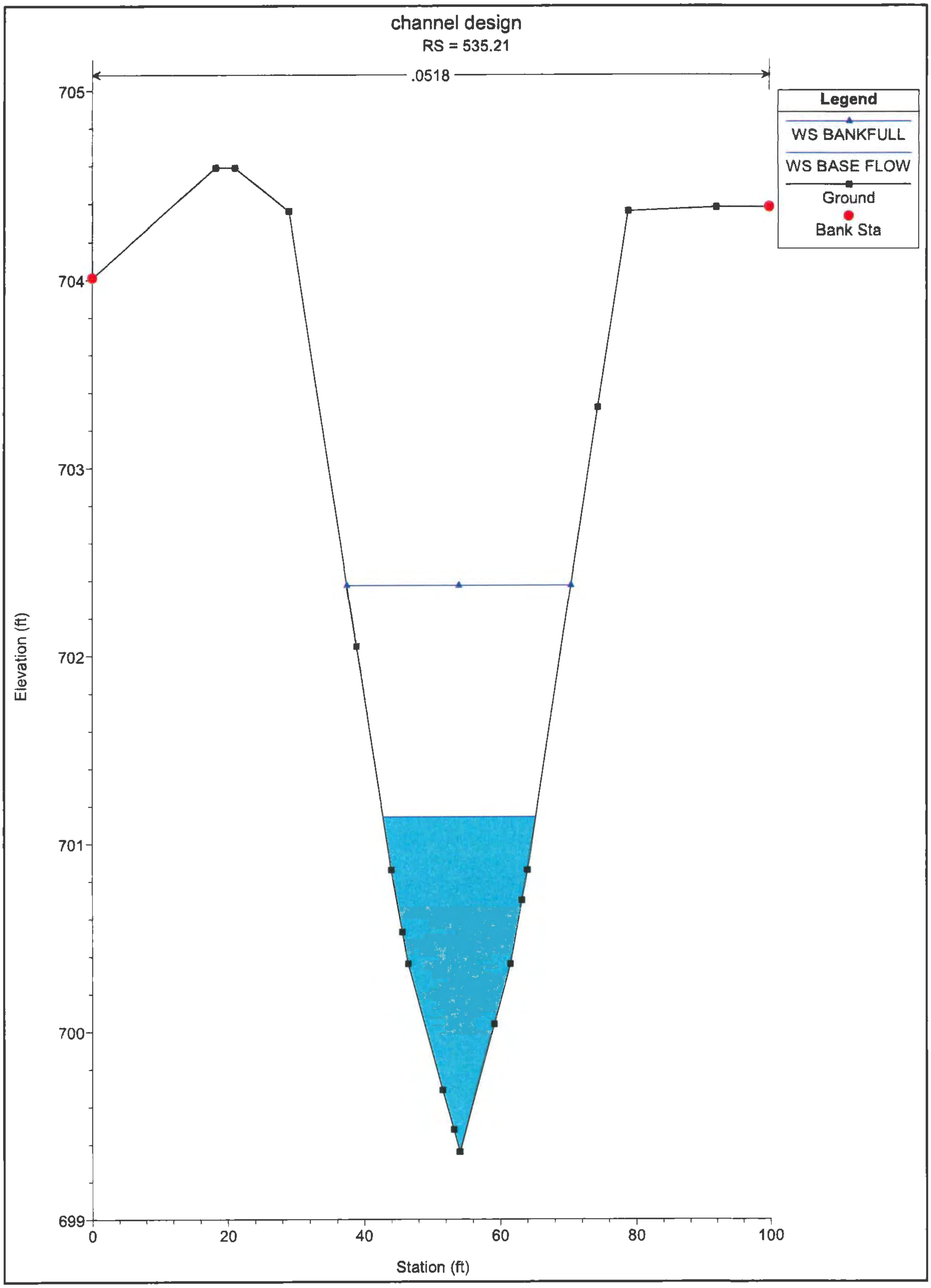
703
702
701
700
699
0
20
40
60
80
100
Station (ft)



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Legend
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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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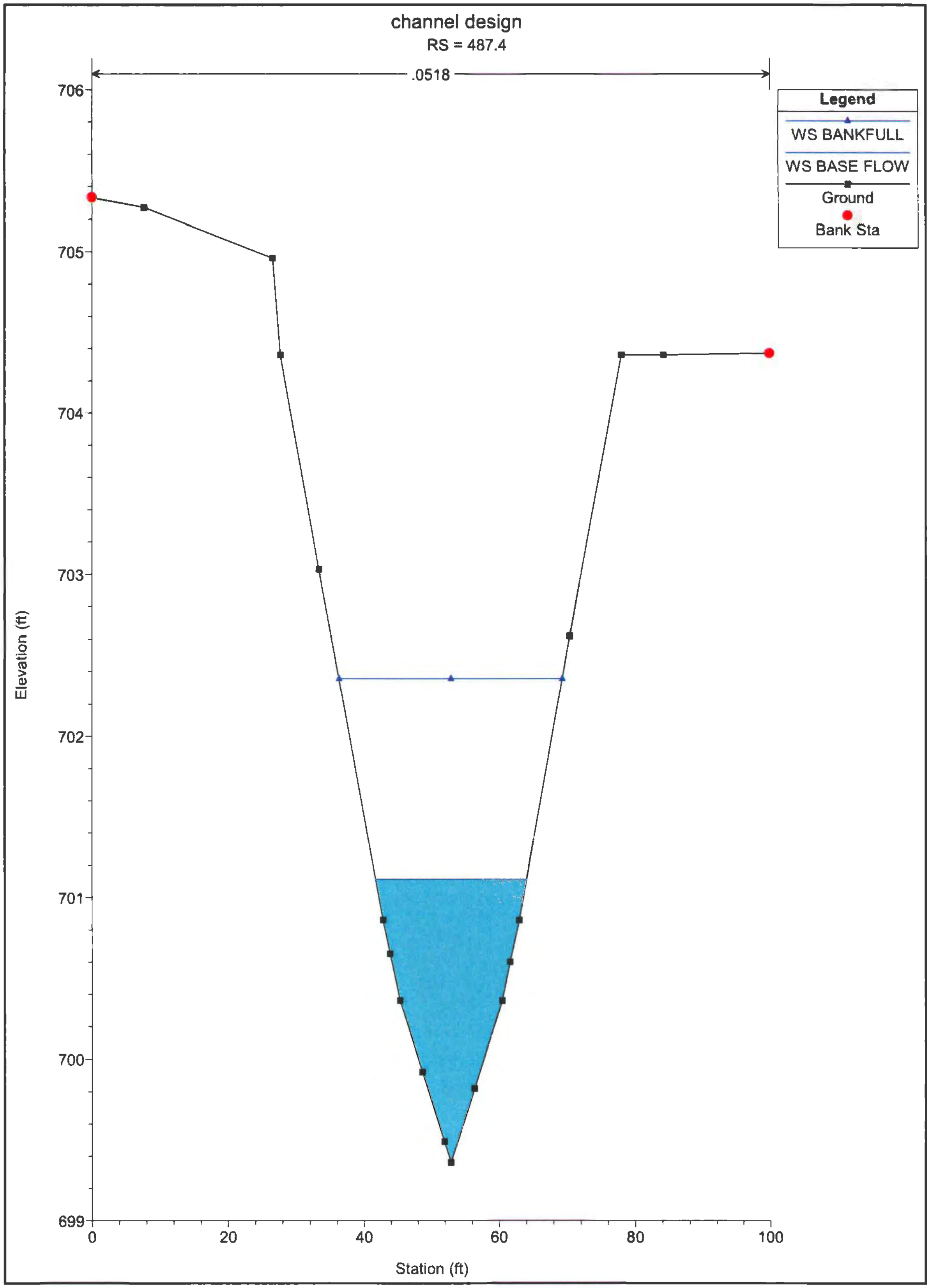
704
703
702
701
700
699
Station (ft)
0
20
40
60
80
100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Legend
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WS BASE FLOW
Ground
Bank Sta
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700
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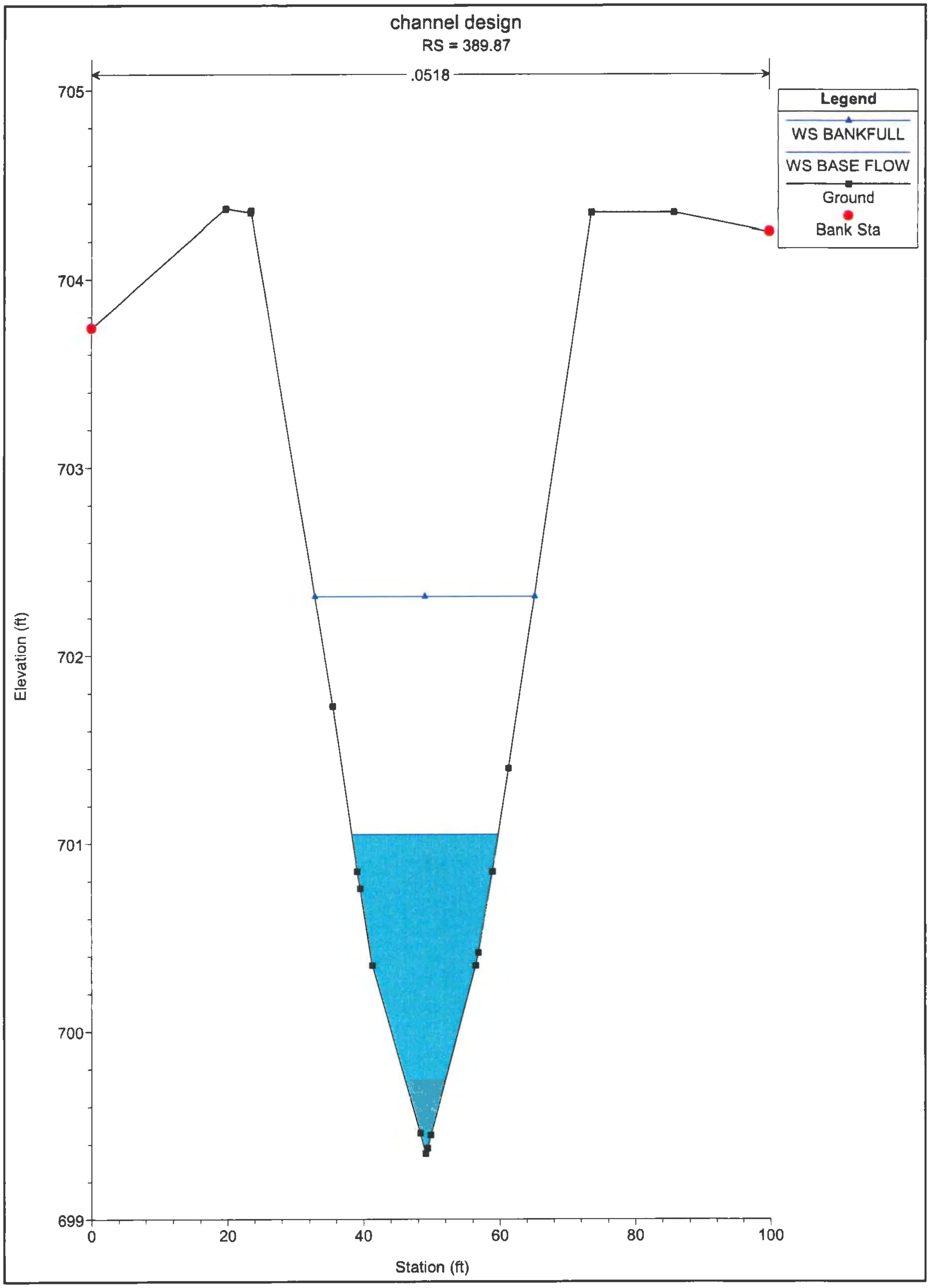
0
20
40
60
80
100
Station (ft)



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Legend
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WS BASE FLOW
Ground
Bank Sta
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703
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700
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Station (ft)
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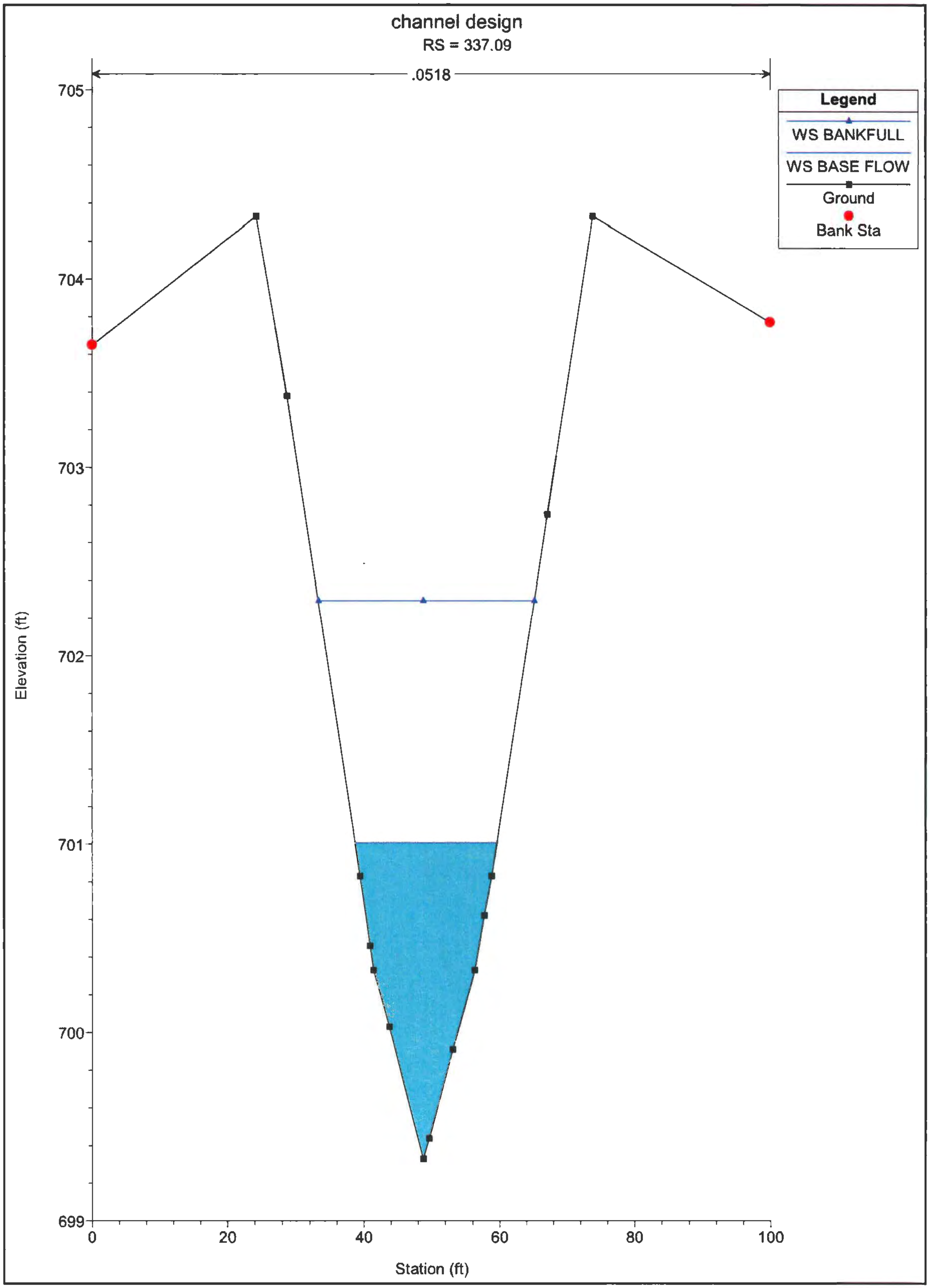
20
40
60
80
100



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Legend
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WS BASE FLOW
Ground
Bank Sta
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703
702
701
700
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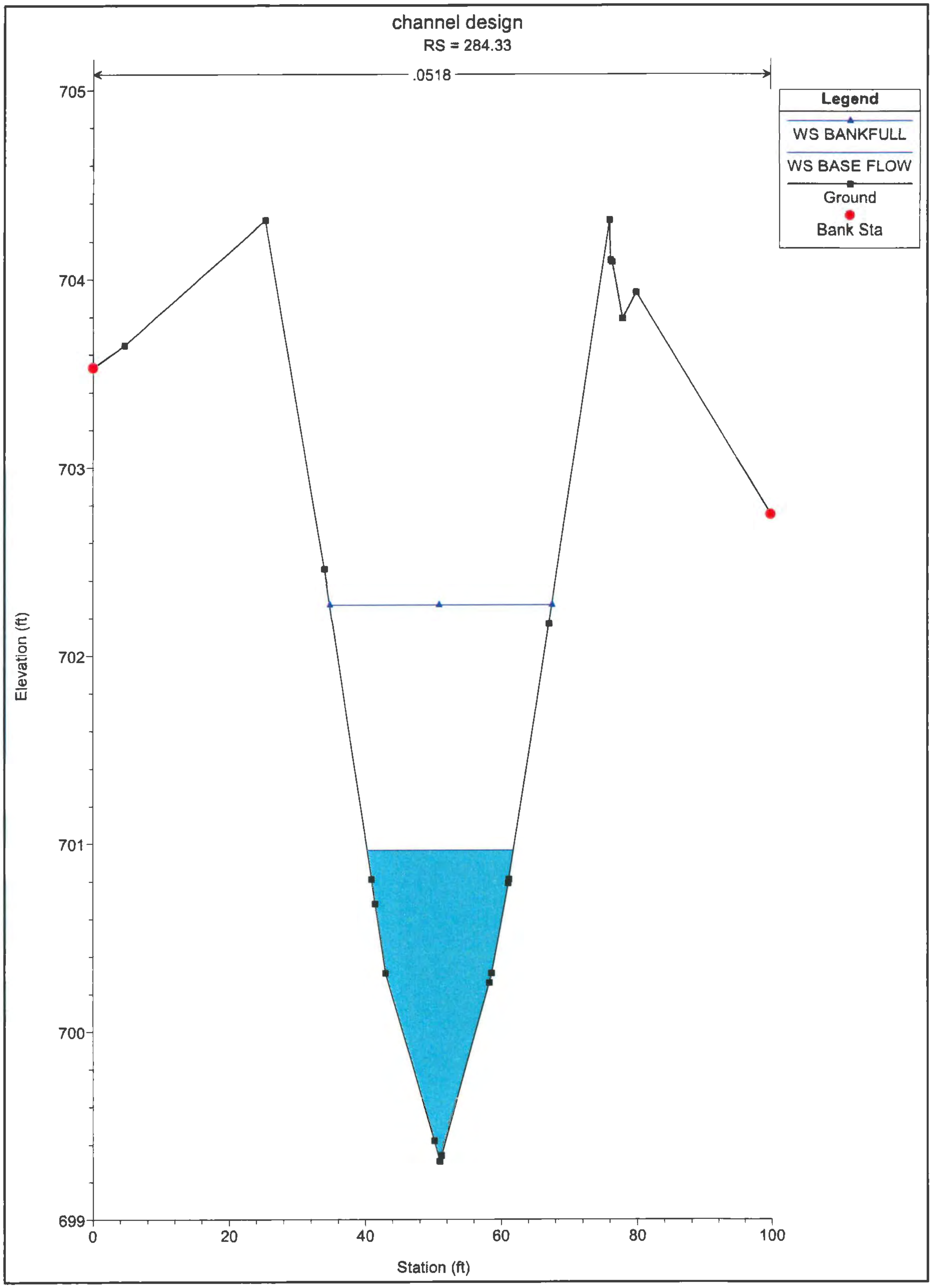
0
20
40
60
80
100
Station (ft)



channel design
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Legend
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WS BASE FLOW
Ground
Bank Sta
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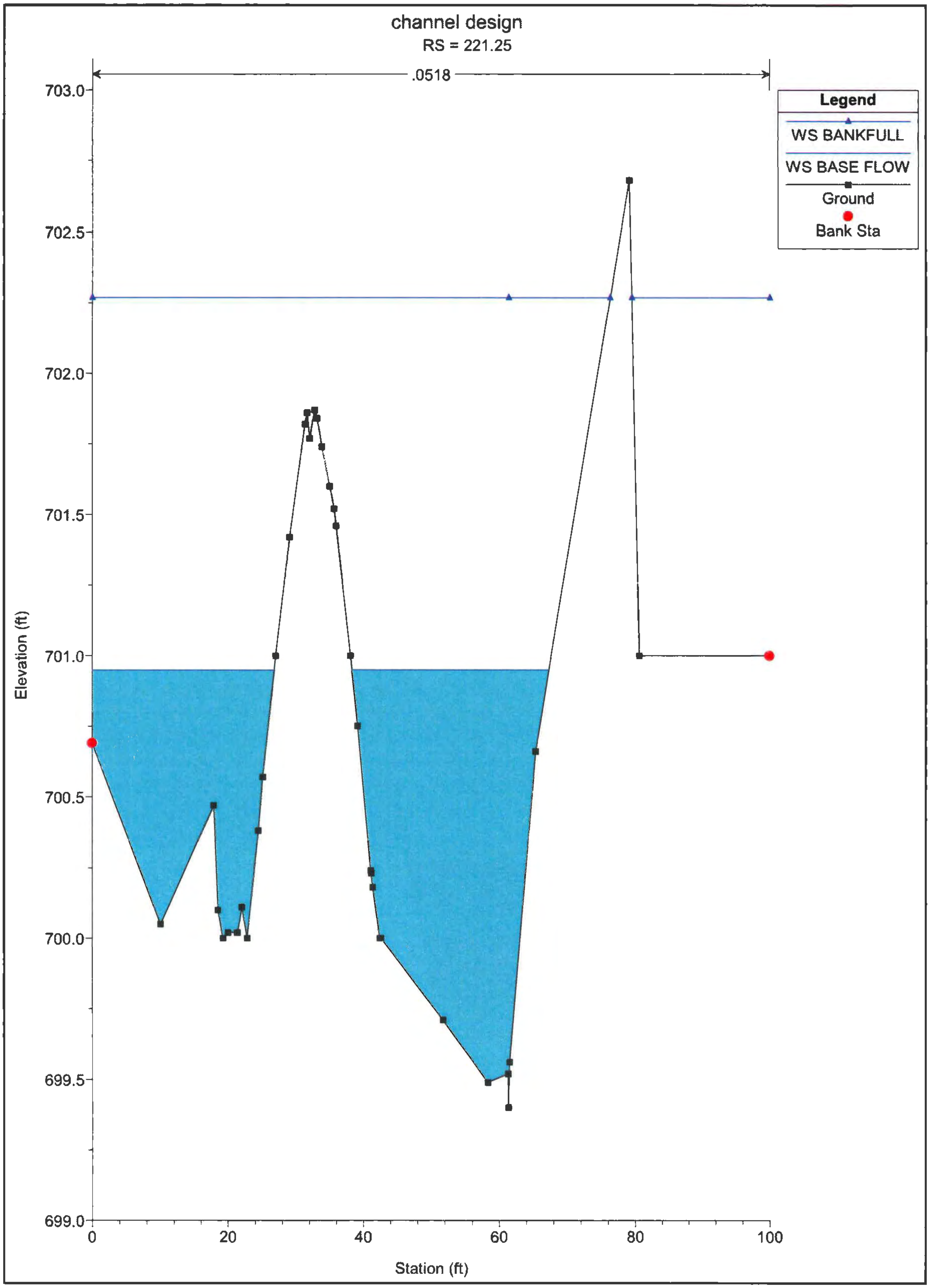
703
702
701
700
699
0
20
40
60
80
100
Station (ft)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Legend
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Ground
Bank Sta
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702.5
702.0
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700.0
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699.0
Elevation (ft)
0
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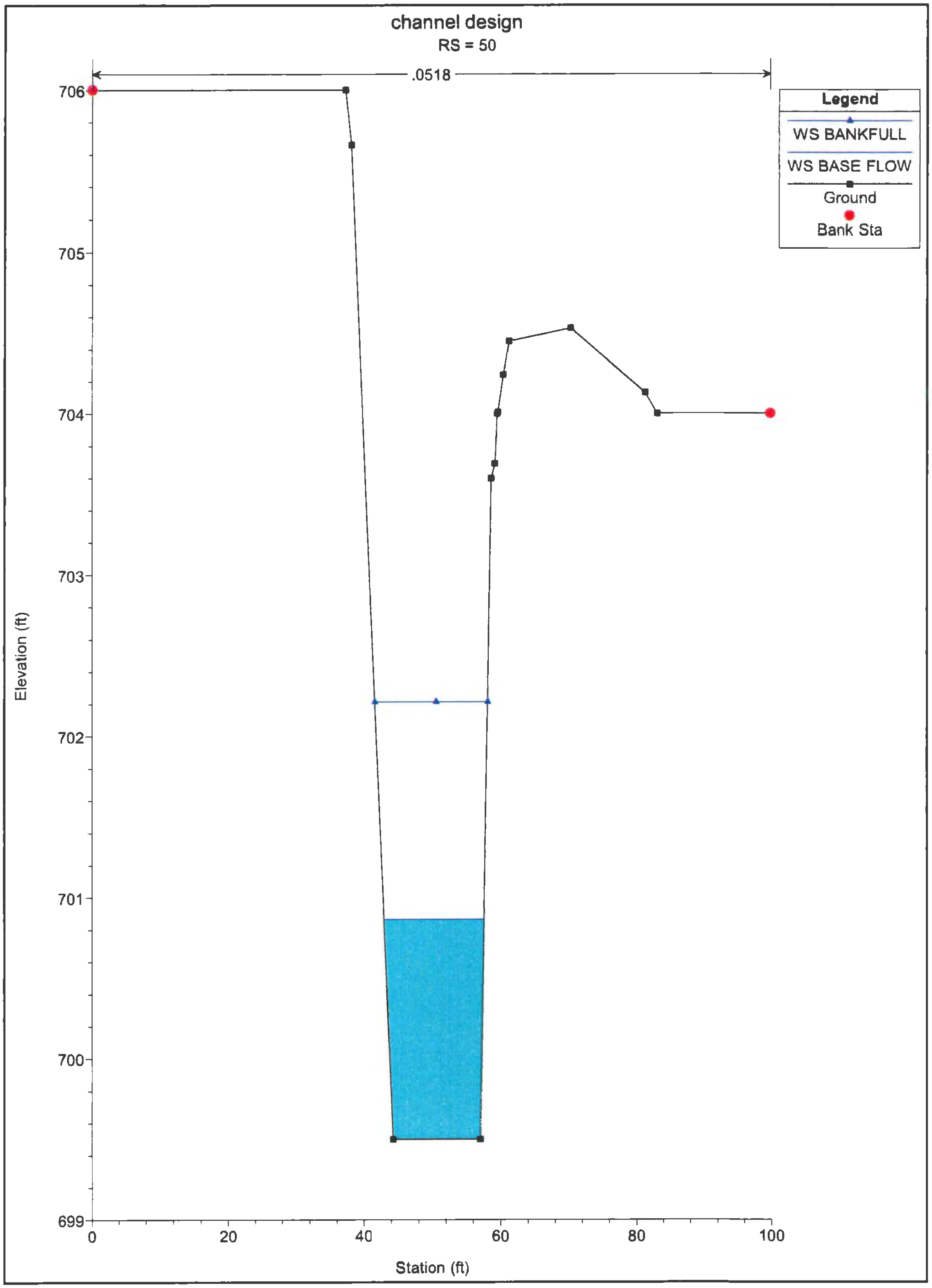
40
60
80
100
Station (ft)



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Legend
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WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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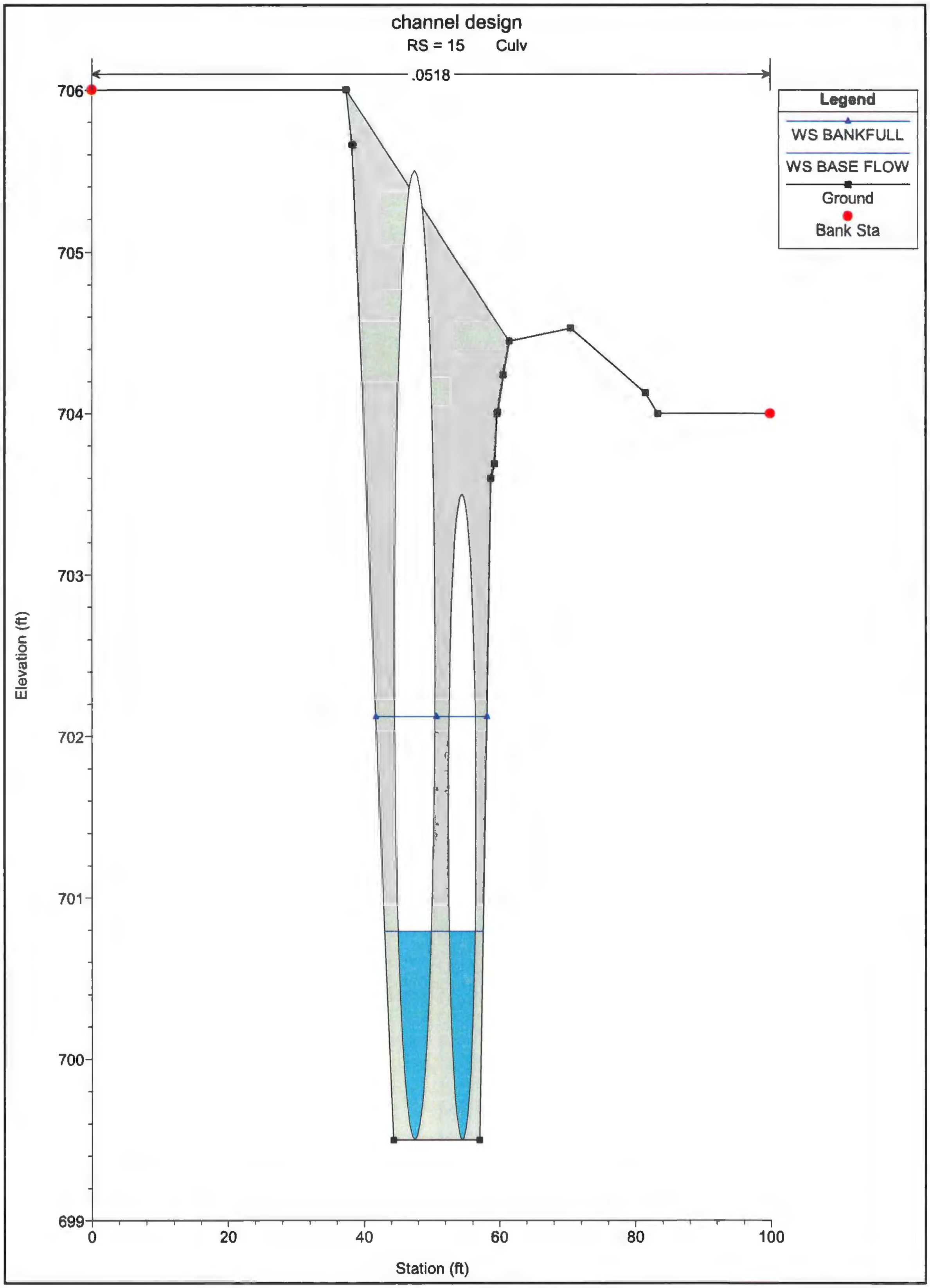
705
704
703
702
701
700
699
0
20
40
60
80
100
Station (ft)



channel design
RS = 15 Culv
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Legend
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WS BASE FLOW
Ground
Bank Sta
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704
703
702
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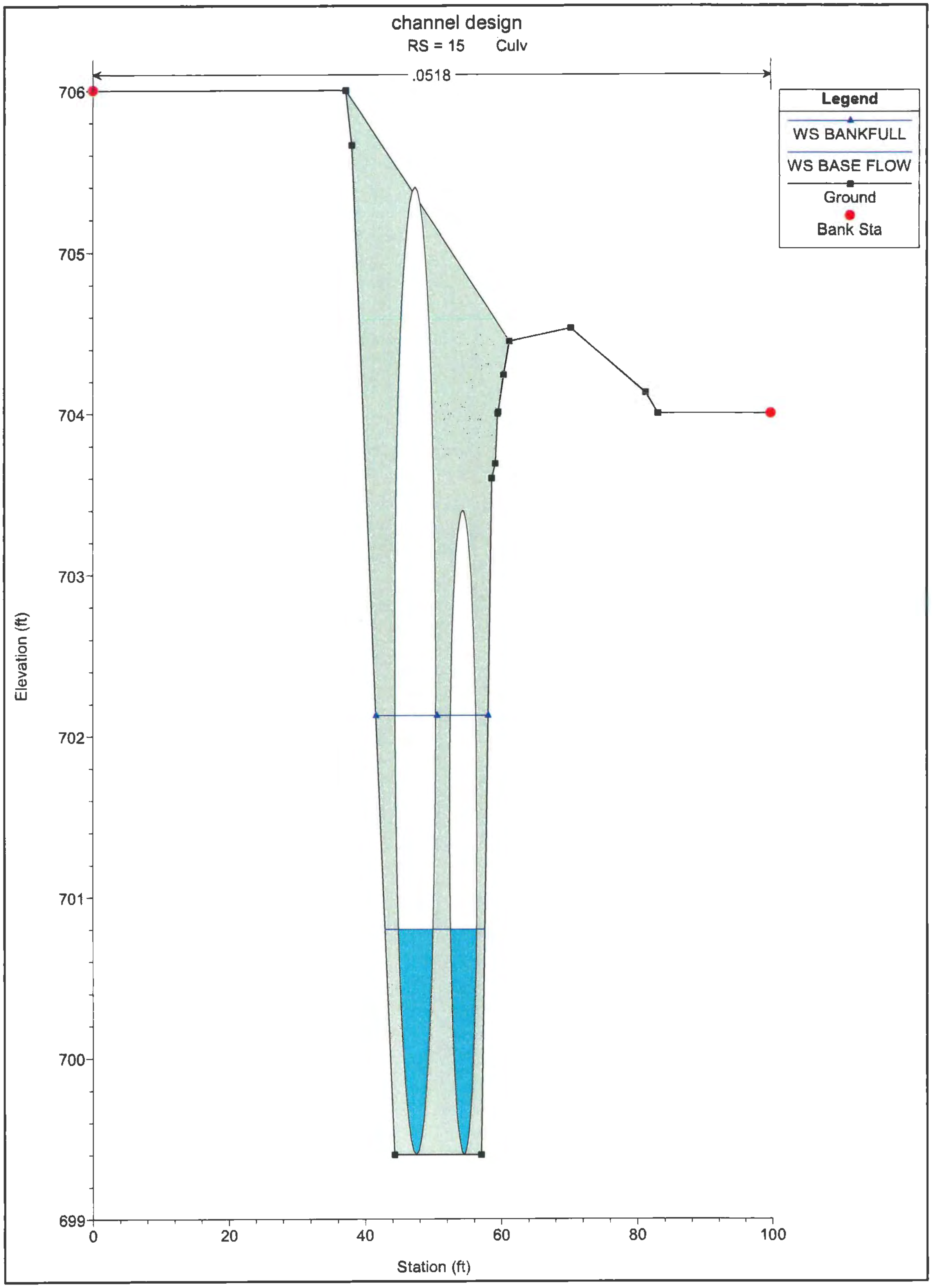
700
699
0
20
40
60
80
100
Elevation (ft)
Station (ft)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RS = 15 Culv
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Legend
WS BANKFULL
WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
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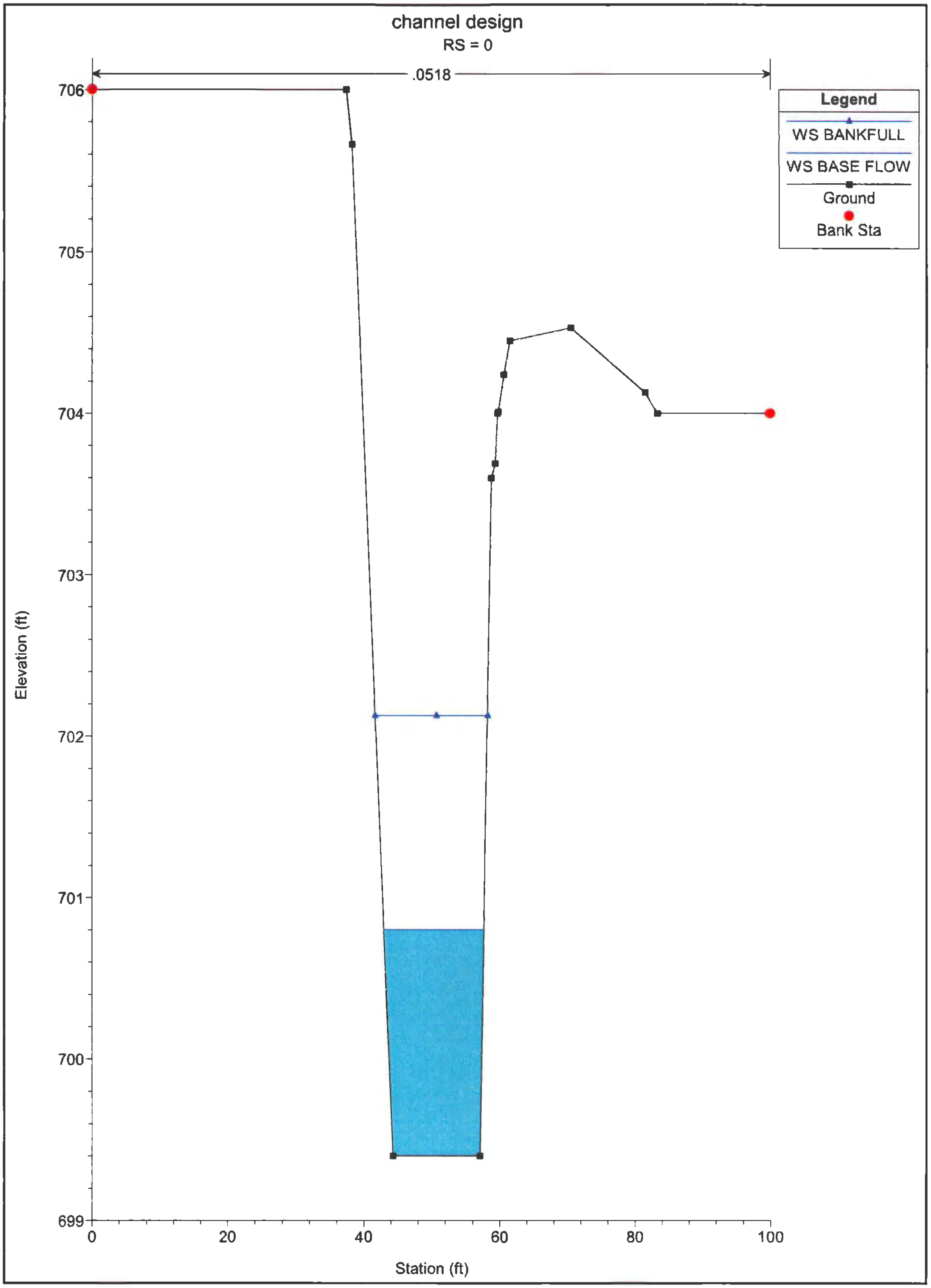
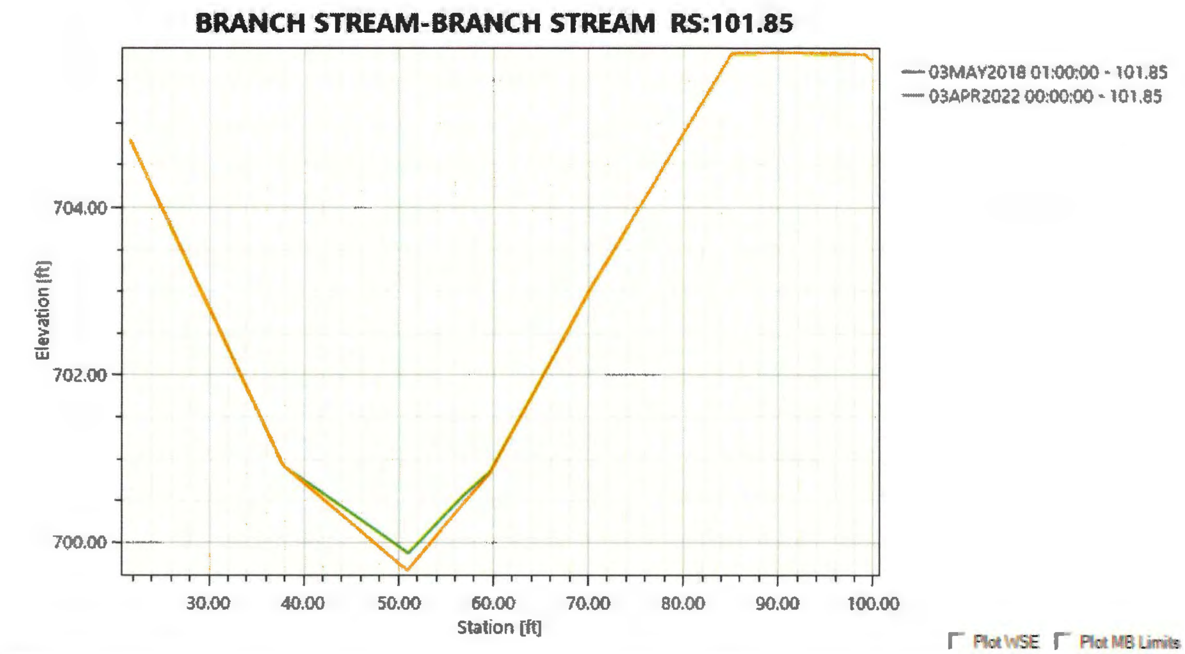
705
704
703
702
701
700
699
0
20
40
60
80
100
Station (ft)


channel design
RS = 0
.0518
Legend
WS BANKFULL
WS BASE FLOW
Ground
Bank Sta
Elevation (ft)
706
705
704
703
702
701
700
699
0
20
40
60
80
100
Station (ft)

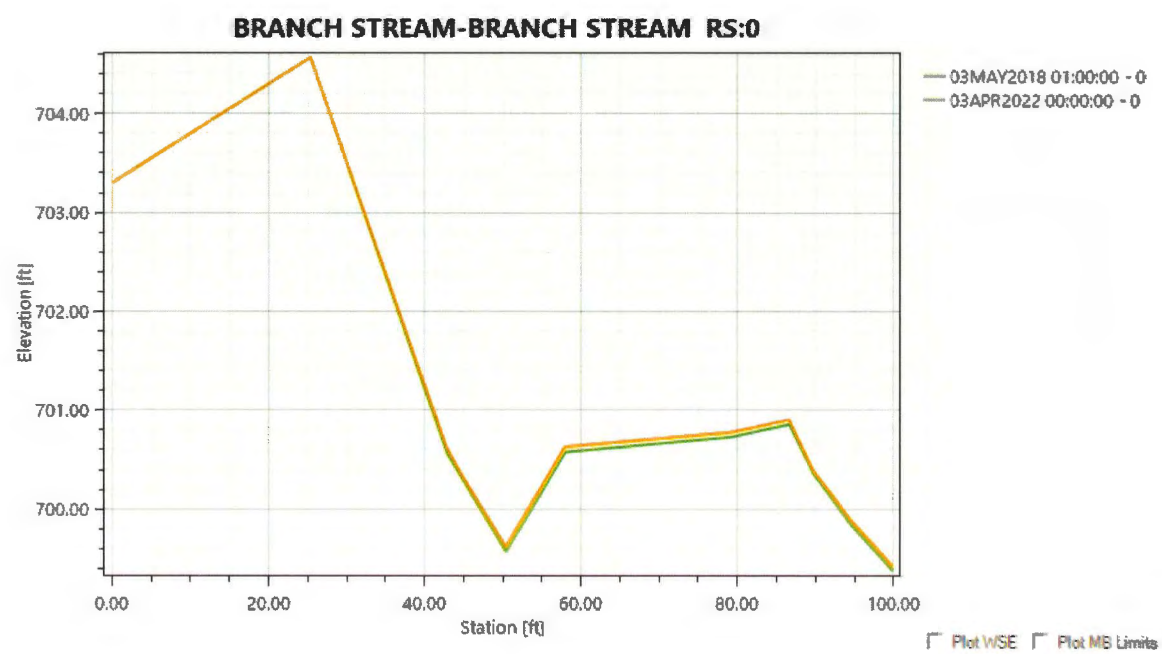
HEC-RAS Plan: Plan 03

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)	
Main Stream Chan	Main Stream Chan	1349.01	BASE FLOW	15.00	700.29	701.70	701.25	701.73	0.004843	1.30	11.52	20.70	0.31
Main Stream Chan	Main Stream Chan	1349.01	BANKFULL	45.00	700.29	702.76	701.66	702.78	0.001242	1.16	38.89	29.70	0.18
Main Stream Chan	Main Stream Chan	1277.02	BASE FLOW	15.00	699.90	701.61		701.61	0.000699	0.72	20.72	21.99	0.13
Main Stream Chan	Main Stream Chan	1277.02	BANKFULL	45.00	699.90	702.71		702.72	0.000538	0.90	50.14	31.50	0.13
Main Stream Chan	Main Stream Chan	1230.69	BASE FLOW	15.00	699.88	701.58		701.58	0.000674	0.71	21.16	22.53	0.13
Main Stream Chan	Main Stream Chan	1230.69	BANKFULL	45.00	699.88	702.68		702.70	0.000505	0.88	51.15	31.58	0.12
Main Stream Chan	Main Stream Chan	1183.19	BASE FLOW	15.00	699.84	701.56		701.57	0.000686	0.72	20.80	21.87	0.13
Main Stream Chan	Main Stream Chan	1183.19	BANKFULL	45.00	699.84	702.67		702.68	0.000527	0.89	50.39	31.39	0.12
Main Stream Chan	Main Stream Chan	1133.25	BASE FLOW	15.00	699.79	701.53		701.54	0.000648	0.71	21.20	21.97	0.13
Main Stream Chan	Main Stream Chan	1133.25	BANKFULL	45.00	699.79	702.65		702.66	0.000504	0.88	51.13	31.52	0.12
Main Stream Chan	Main Stream Chan	1056.98	BASE FLOW	15.00	699.74	701.48		701.48	0.000706	0.73	20.47	21.44	0.13
Main Stream Chan	Main Stream Chan	1056.98	BANKFULL	45.00	699.74	702.61		702.62	0.000528	0.89	50.49	31.59	0.12
Main Stream Chan	Main Stream Chan	1008.15	BASE FLOW	15.00	699.71	701.44		701.45	0.000626	0.69	21.61	22.46	0.12
Main Stream Chan	Main Stream Chan	1008.15	BANKFULL	45.00	699.71	702.58		702.59	0.000467	0.85	52.84	32.32	0.12
Main Stream Chan	Main Stream Chan	956.78	BASE FLOW	15.00	699.68	701.41		701.42	0.000729	0.74	20.29	21.51	0.13
Main Stream Chan	Main Stream Chan	956.78	BANKFULL	45.00	699.68	702.56		702.57	0.000518	0.89	50.70	31.45	0.12
Main Stream Chan	Main Stream Chan	907	BASE FLOW	15.00	699.65	701.37		701.38	0.000695	0.73	20.64	21.65	0.13
Main Stream Chan	Main Stream Chan	907	BANKFULL	45.00	699.65	702.53		702.54	0.000491	0.87	51.70	31.73	0.12
Main Stream Chan	Main Stream Chan	854.92	BASE FLOW	15.00	699.62	701.34		701.34	0.000688	0.72	20.77	21.84	0.13
Main Stream Chan	Main Stream Chan	854.92	BANKFULL	45.00	699.62	702.51		702.52	0.000477	0.86	52.18	31.80	0.12
Main Stream Chan	Main Stream Chan	787.73	BASE FLOW	15.00	699.57	701.29		701.30	0.000738	0.74	20.17	21.38	0.13
Main Stream Chan	Main Stream Chan	787.73	BANKFULL	45.00	699.57	702.48		702.49	0.000489	0.87	51.87	31.94	0.12
Main Stream Chan	Main Stream Chan	737.6	BASE FLOW	15.00	699.49	701.26		701.26	0.000575	0.67	22.24	22.63	0.12
Main Stream Chan	Main Stream Chan	737.6	BANKFULL	45.00	699.49	702.45		702.46	0.000407	0.81	55.51	32.96	0.11
Main Stream Chan	Main Stream Chan	681.54	BASE FLOW	15.00	699.45	701.22		701.23	0.000642	0.71	21.22	21.84	0.13
Main Stream Chan	Main Stream Chan	681.54	BANKFULL	45.00	699.45	702.43		702.44	0.000439	0.83	53.95	32.49	0.11
Main Stream Chan	Main Stream Chan	635.28	BASE FLOW	15.00	699.41	701.20		701.20	0.000561	0.67	22.41	22.64	0.12
Main Stream Chan	Main Stream Chan	635.28	BANKFULL	45.00	699.41	702.41		702.42	0.000391	0.80	56.34	33.18	0.11
Main Stream Chan	Main Stream Chan	584.38	BASE FLOW	15.00	699.38	701.17		701.17	0.000528	0.65	23.03	23.19	0.12
Main Stream Chan	Main Stream Chan	584.38	BANKFULL	45.00	699.38	702.39		702.40	0.000365	0.78	57.89	33.73	0.10
Main Stream Chan	Main Stream Chan	535.21	BASE FLOW	15.00	699.36	701.14		701.15	0.000572	0.68	22.18	22.39	0.12
Main Stream Chan	Main Stream Chan	535.21	BANKFULL	45.00	699.36	702.37		702.38	0.000389	0.80	56.26	32.91	0.11
Main Stream Chan	Main Stream Chan	487.4	BASE FLOW	15.00	699.36	701.11		701.12	0.000619	0.69	21.60	22.25	0.12
Main Stream Chan	Main Stream Chan	487.4	BANKFULL	45.00	699.36	702.35		702.36	0.000398	0.81	55.88	32.93	0.11
Main Stream Chan	Main Stream Chan	389.87	BASE FLOW	15.00	699.35	701.05		701.05	0.000726	0.74	20.30	21.46	0.13
Main Stream Chan	Main Stream Chan	389.87	BANKFULL	45.00	699.35	702.31		702.32	0.000427	0.83	54.30	32.29	0.11
Main Stream Chan	Main Stream Chan	337.09	BASE FLOW	15.00	699.33	701.00		701.01	0.000809	0.77	19.41	20.80	0.14
Main Stream Chan	Main Stream Chan	337.09	BANKFULL	45.00	699.33	702.29		702.30	0.000448	0.85	53.17	31.75	0.12
Main Stream Chan	Main Stream Chan	284.33	BASE FLOW	15.00	699.31	700.96		700.97	0.000771	0.75	19.97	21.55	0.14
Main Stream Chan	Main Stream Chan	284.33	BANKFULL	45.00	699.31	702.27		702.28	0.000406	0.81	55.38	32.71	0.11
Main Stream Chan	Main Stream Chan	221.25	BASE FLOW	15.00	699.40	700.95		700.95	0.000164	0.32	46.58	55.77	0.06
Main Stream Chan	Main Stream Chan	221.25	BANKFULL	45.00	699.40	702.27		702.27	0.000052	0.28	160.17	96.71	0.04
Main Stream Chan	Main Stream Chan	50	BASE FLOW	15.00	699.50	700.86	699.85	700.87	0.000653	0.81	18.57	14.60	0.13
Main Stream Chan	Main Stream Chan	50	BANKFULL	45.00	699.50	702.21	700.22	702.23	0.000607	1.14	39.59	16.52	0.13
Main Stream Chan	Main Stream Chan	15		Culvert									
Main Stream Chan	Main Stream Chan	0	BASE FLOW	15.00	699.40	700.80	699.75	700.81	0.000600	0.79	19.07	14.62	0.12
Main Stream Chan	Main Stream Chan	0	BANKFULL	45.00	699.40	702.13	700.12	702.15	0.000600	1.13	39.71	16.47	0.13
BRANCH STREAM	BRANCH STREAM	101.85	BASE FLOW	5.00	699.87	700.67	700.30	700.68	0.002302	0.74	6.74	17.01	0.21
BRANCH STREAM	BRANCH STREAM	101.85	BANKFULL	15.00	699.87	701.10	700.53	701.11	0.001909	0.95	15.79	23.81	0.21
BRANCH STREAM	BRANCH STREAM	51.36	BASE FLOW	5.00	699.73	700.47		700.49	0.007068	1.22	4.10	11.31	0.36
BRANCH STREAM	BRANCH STREAM	51.36	BANKFULL	15.00	699.73	700.95		700.98	0.004032	1.34	11.16	17.46	0.30
BRANCH STREAM	BRANCH STREAM	0	BASE FLOW	5.00	699.38	700.39	699.87	700.39	0.000801	0.47	10.59	22.72	0.12
BRANCH STREAM	BRANCH STREAM	0	BANKFULL	15.00	699.38	700.89	700.08	700.89	0.000801	0.51	29.62	58.44	0.13

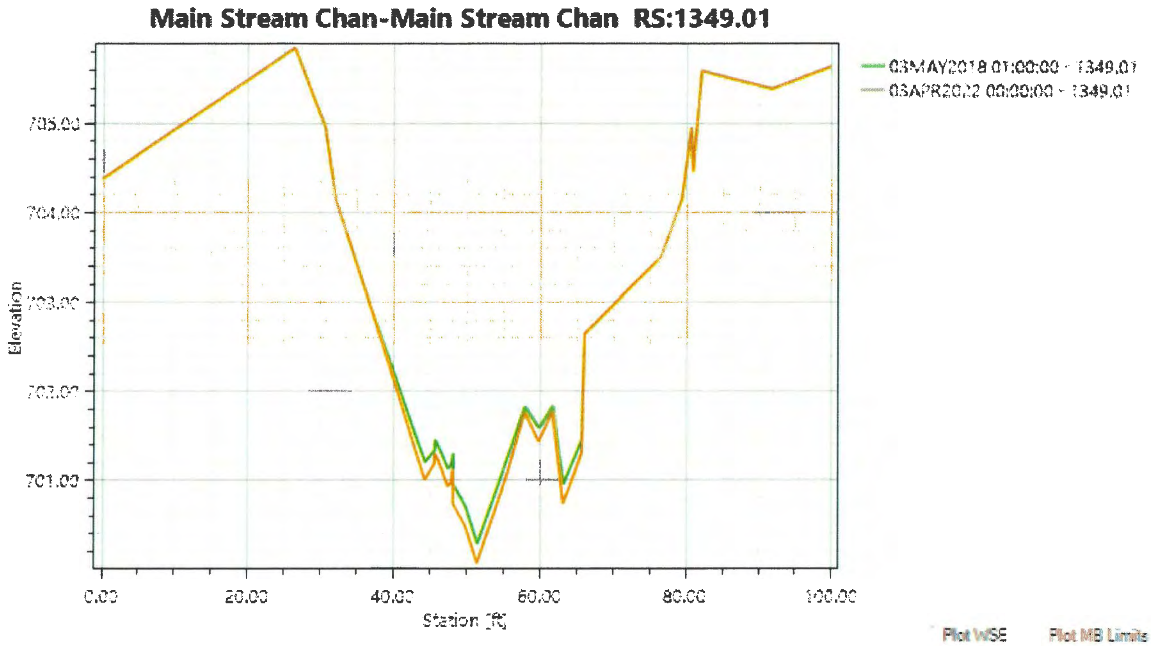
Changes in the cross section morphology after 4-year simulation:



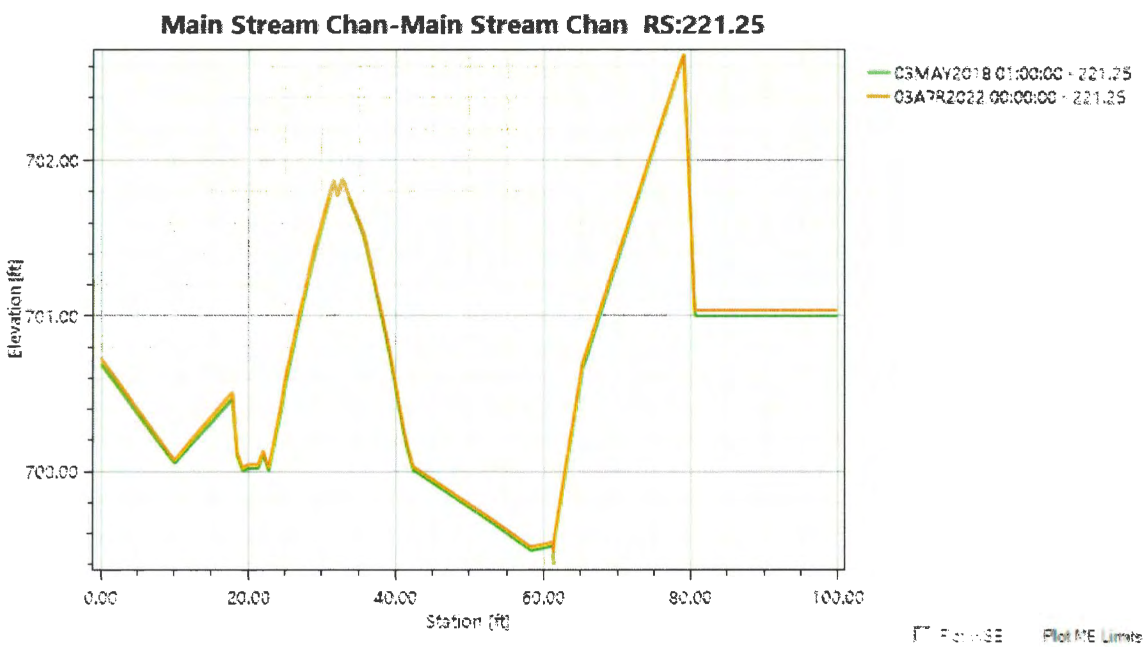
upstream of branch channel



downstream of branch channel



upstream of main channel

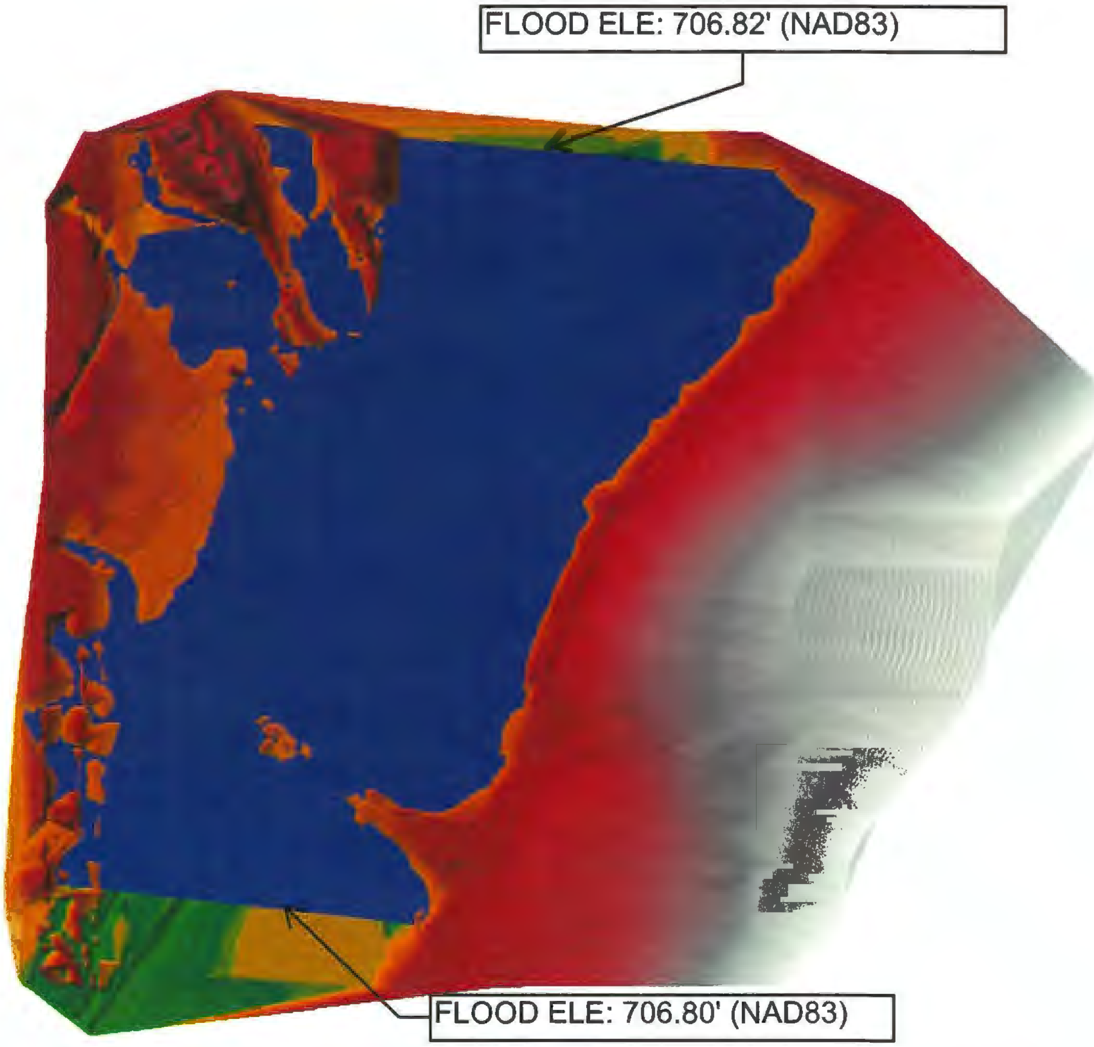


downstream of main channel

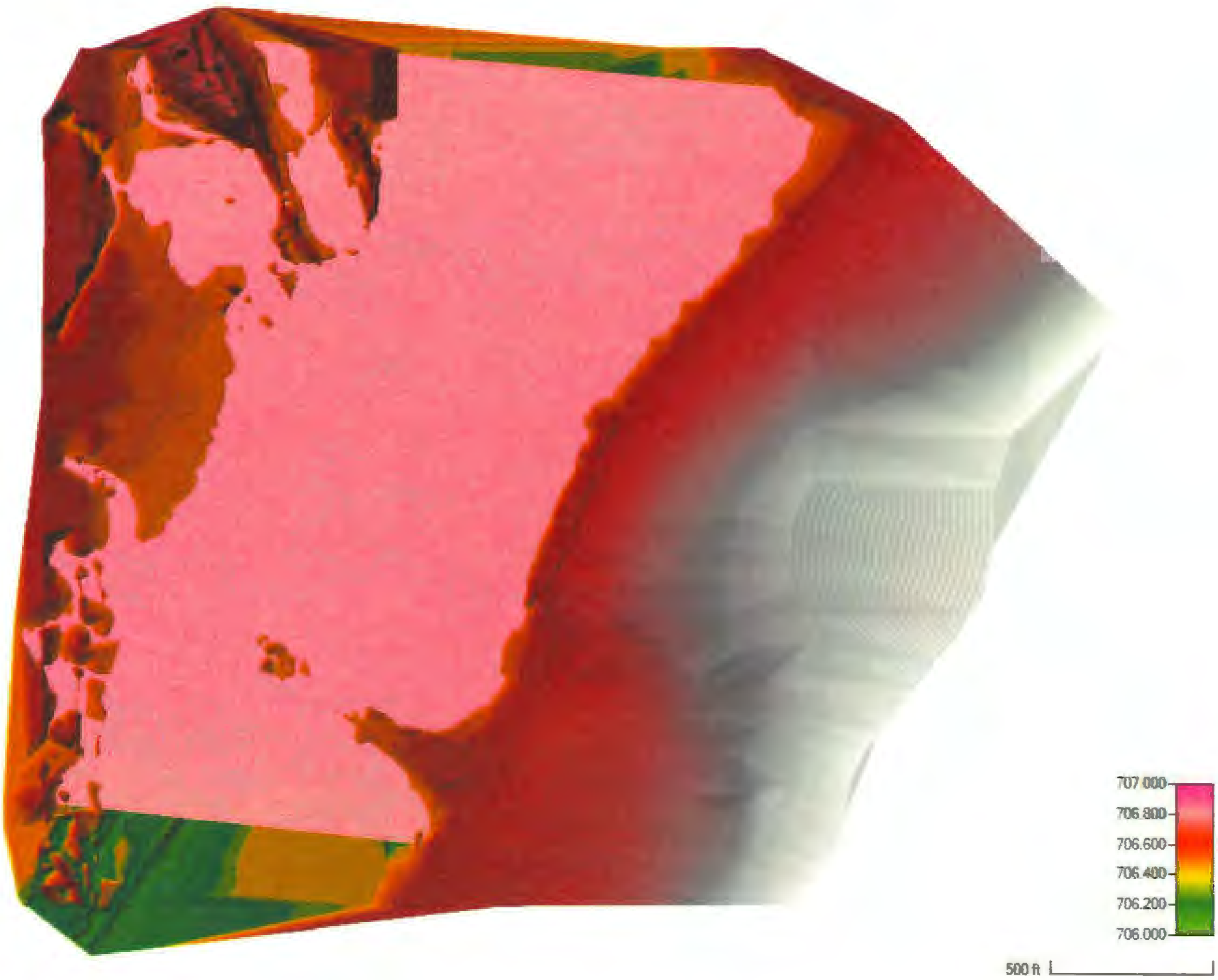
Errors Warnings and Notes for Plan : Plan 03

Location:	River: BRANCH STREAM Reach: BRANCH STREAM RS: 101.85 Profile: BASE FLOW
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: BRANCH STREAM Reach: BRANCH STREAM RS: 51.36 Profile: BASE FLOW
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: BRANCH STREAM Reach: BRANCH STREAM RS: 0 Profile: BASE FLOW
Warning:	Divided flow computed for this cross-section.

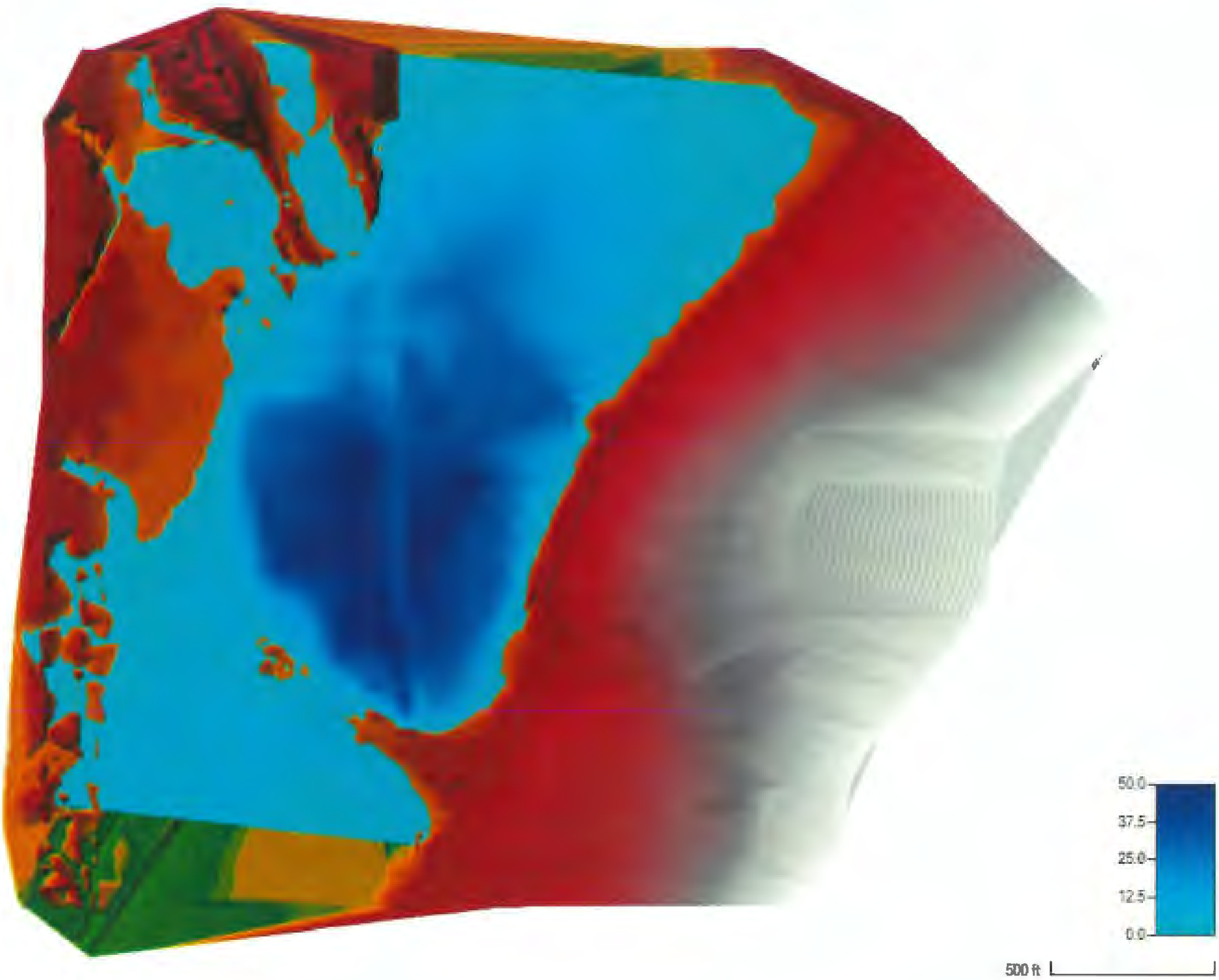
Pre-construction flood modeling results



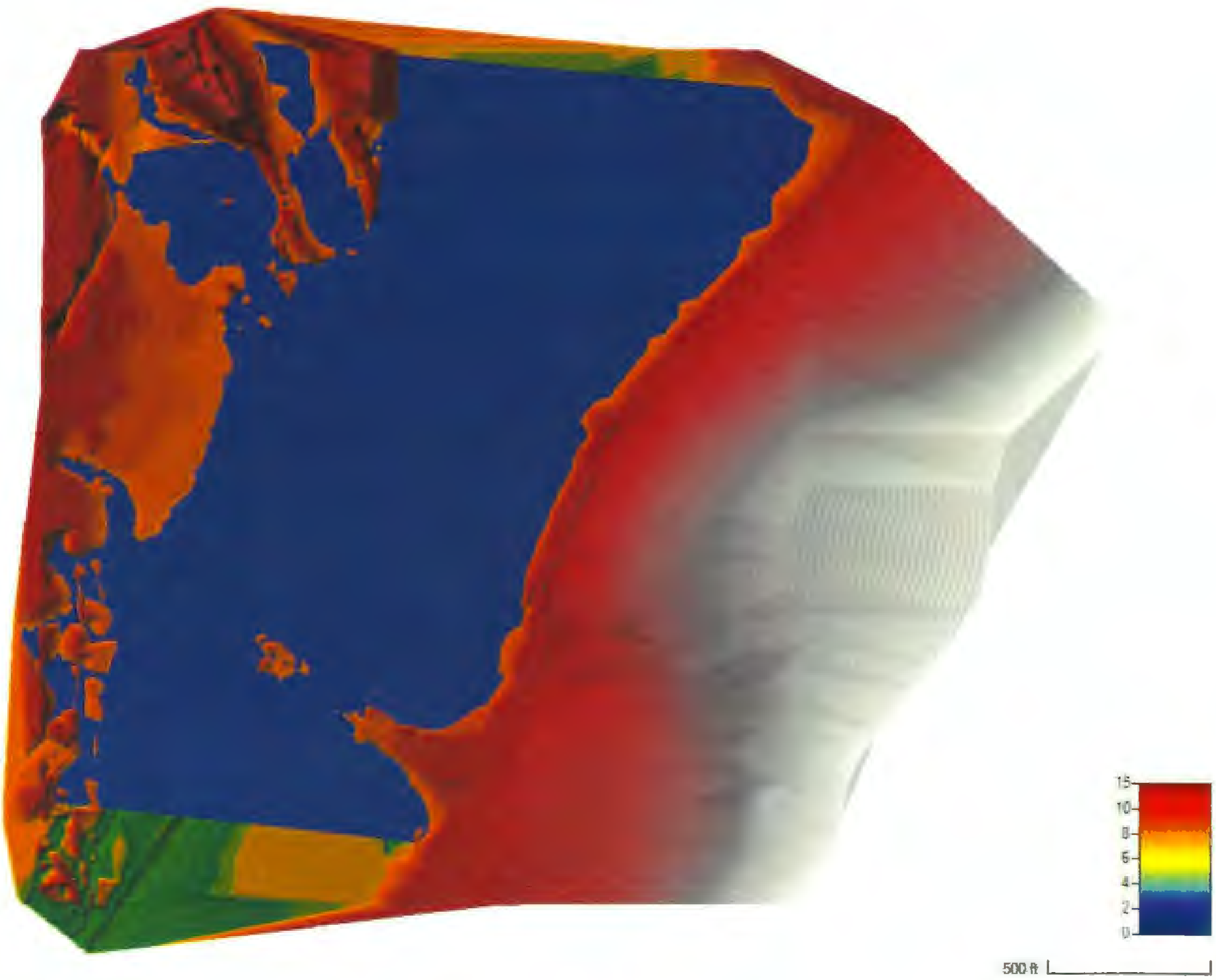
Inundation boundary (i.e., floodplain boundary) associated with 125 % of FEMA FIS report



Water surface elevation associated with 125 % of FEMA FIS report

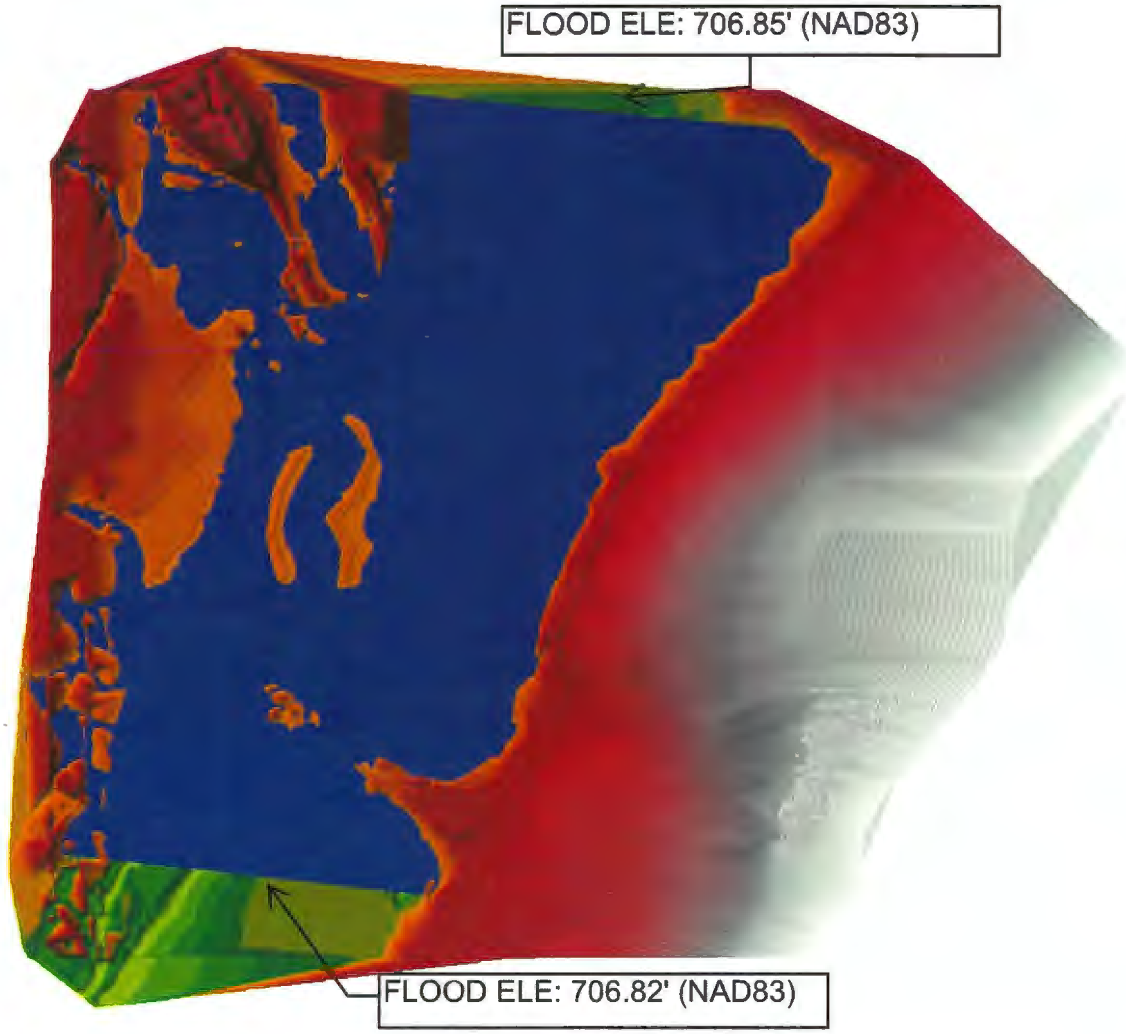


Depth associated with 125 % of FEMA FIS report

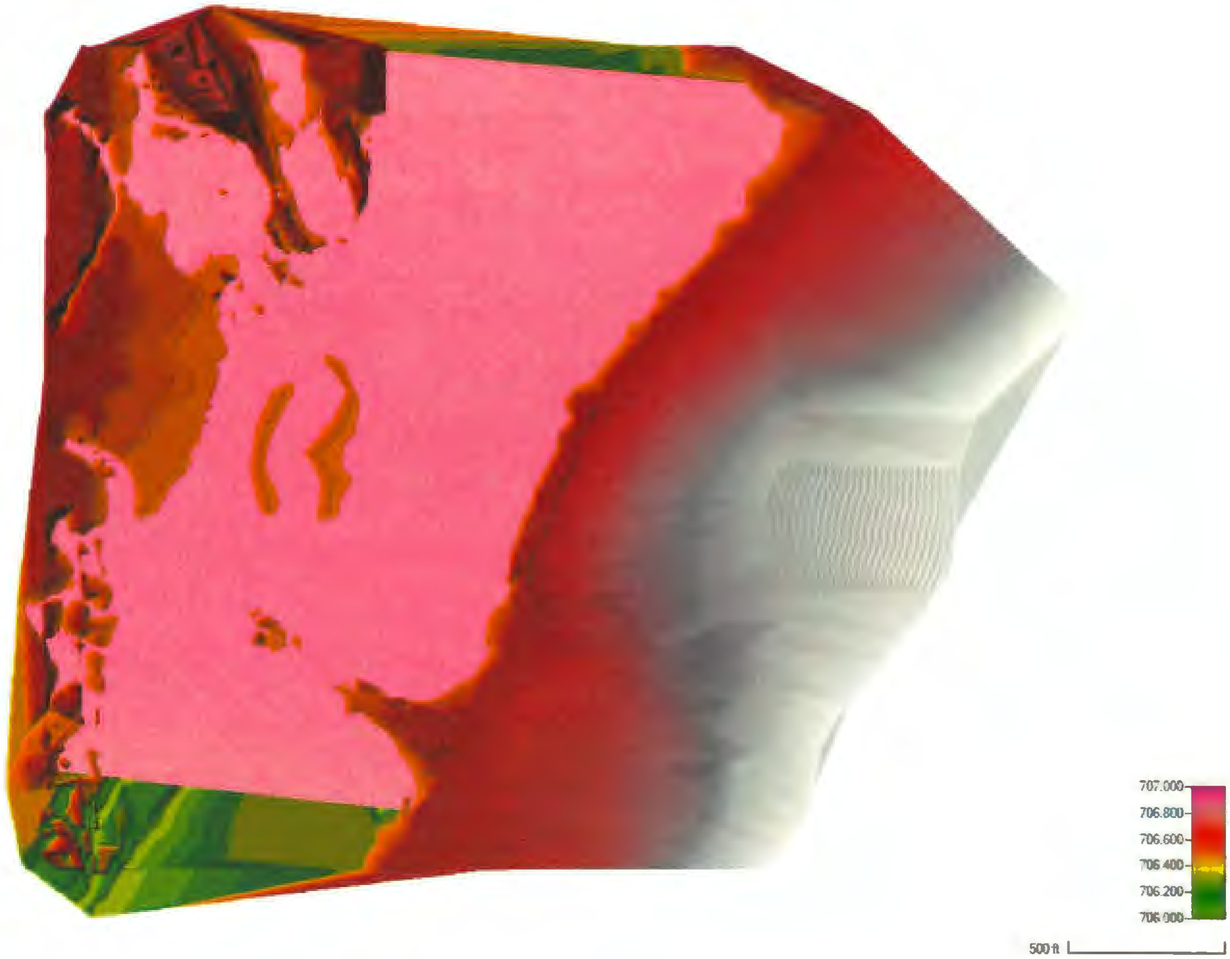


Velocity associated with 125 % of FEMA FIS report

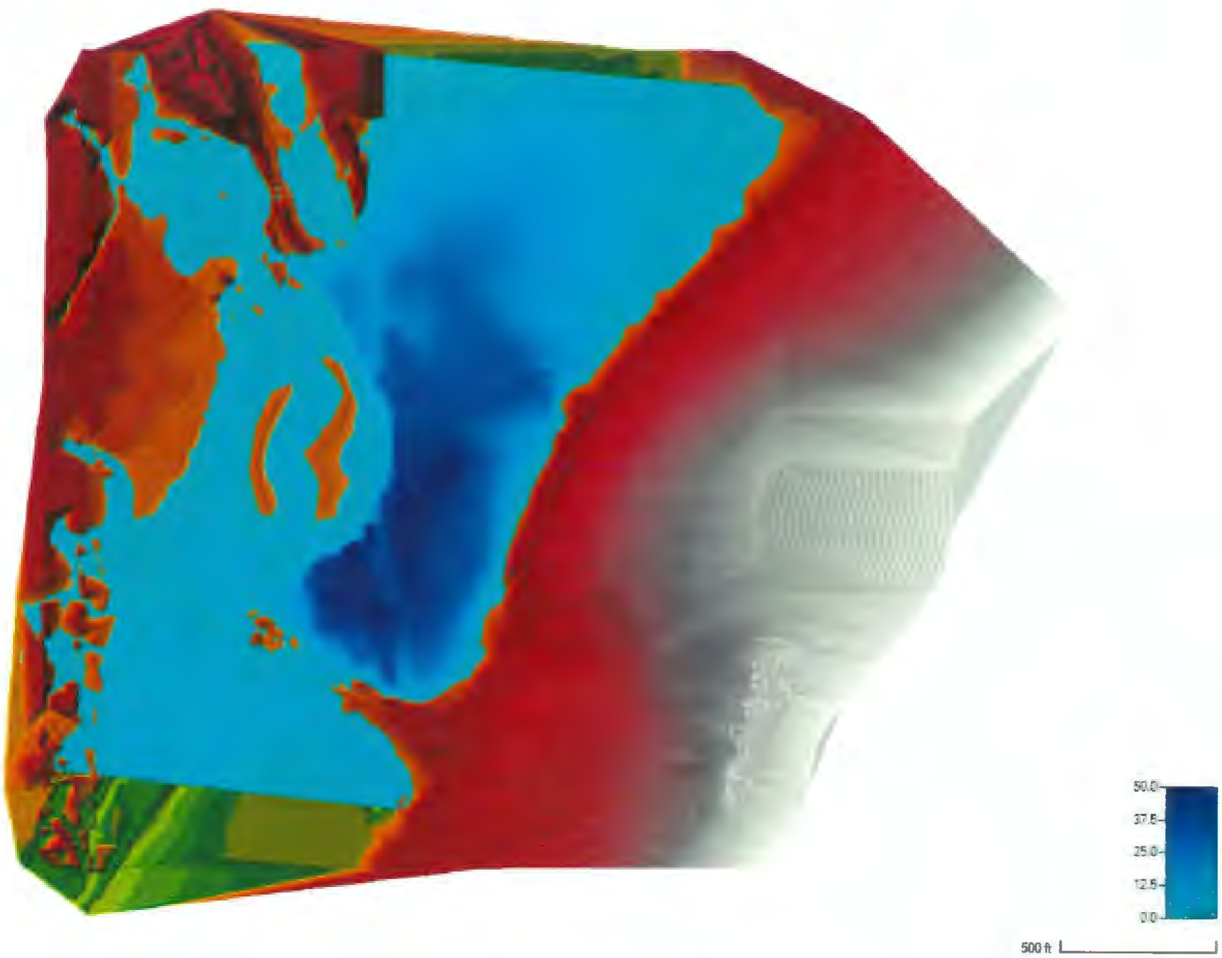
Post-construction flood modeling results



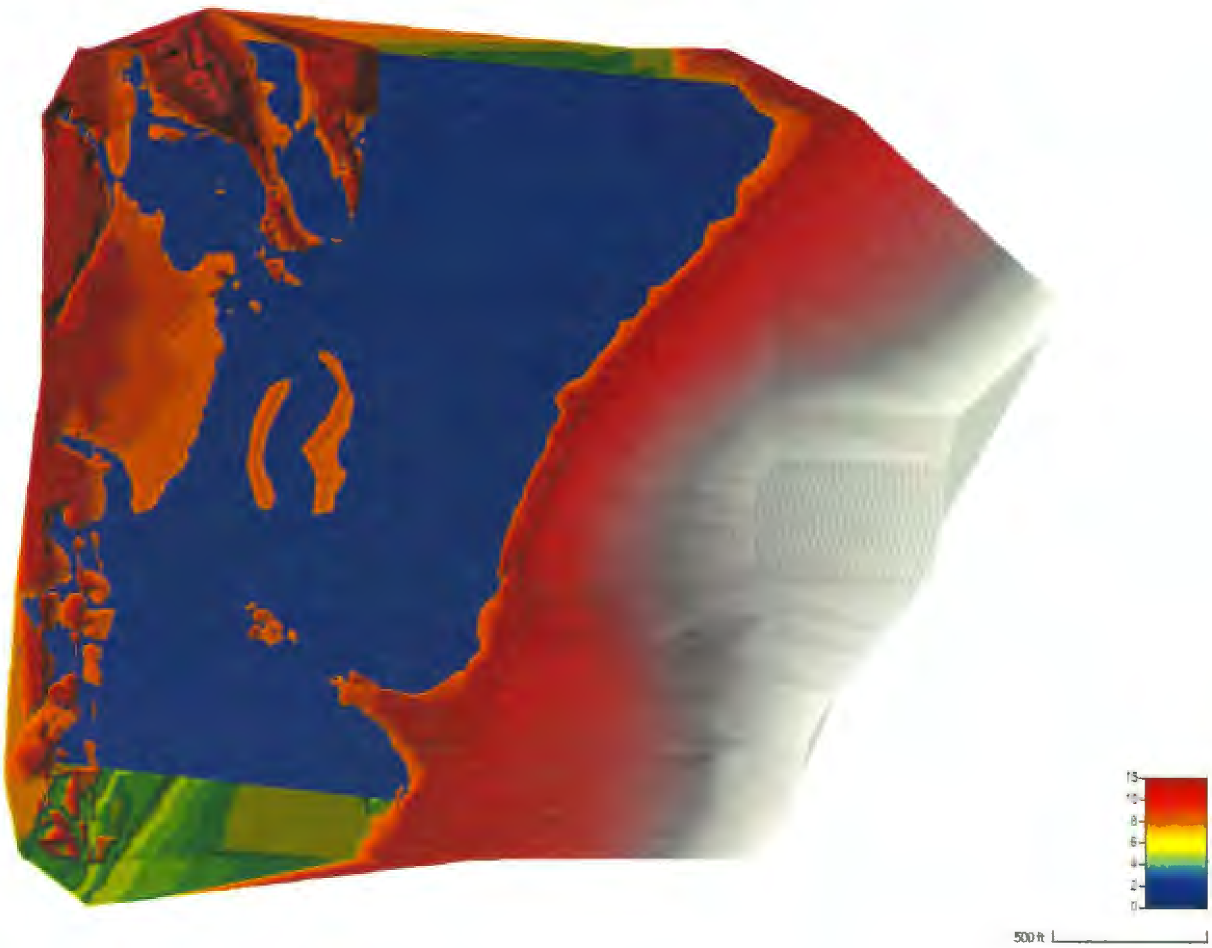
Inundation boundary (i.e., floodplain boundary) associated with 125 % of FEMA FIS report



Water surface elevation associated with 125 % of FEMA FIS report

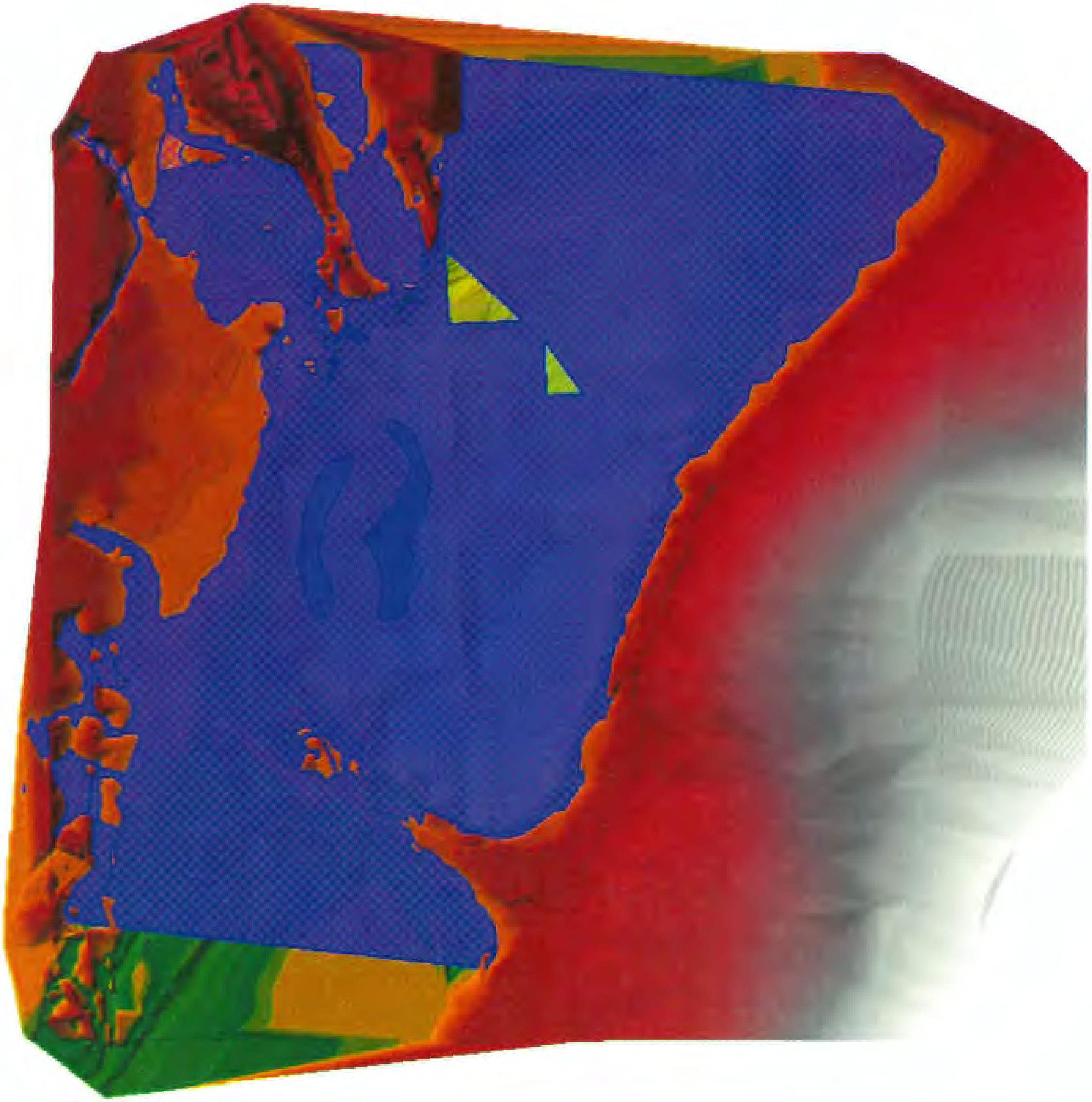


Depth associated with 125 % of FEMA FIS report



Velocity associated with 125 % of FEMA FIS report

Comparison of post versus pre-floodplain boundaries



Solid blue is pre-construction floodplain boundary

squared-hatched purple id post-construction floodplain boundary.

[Type here] **Local Design Flood Elevation (LDFE) Worksheet** Version 2.0 - 03/17/2021

PART I

Site Name:	County Concrete	**Date:**	02/11/2022
Address:	28 Green Lane, Roxbury Township, Morris County, NJ		
Latitude (y):	741047.278	**Longitude (x):**	458214.497

	State Flood Study[1]	FEMA Effective FIRM[2]	FEMA Best Available[3] Preliminary, Draft, or Advisory Flood Hazard Data **(Circle Source)**
Data Available (Yes/No)	Yes	Yes	Yes (FIS report)
Panel Number & Date	PLATE LA-18 & LA-17 September 1982	340362 0007 B December 15, 1982	340556 May 3, 1993
Flood Zone Designation	Yes	Yes	Yes
Floodway (Yes/No)	Yes	No	Yes
LiMWA Area (Yes/No)	No	No	No
Design[1] or Base Flood Elevation[2, 3]	706.8	707	706.7
Vertical Datum^	NGVD29	NGVD29	NGVD29
^[4]Resulting Elevations below must be in same datum, if conversion factor needed, note here: NAVD88 = NGVD29 - 0.72 ft.			
Tidal or Riverine FEMA Mapping[5]			
If Riverine, add 1 foot		+1	+1
Resulting Elevation	Box A 706.8	Box B 708	Box C 707.7

If none of the above data is available and/or the project is in a watershed 50 acres or greater in size, licensed NJ Professional Engineers may use NJFHACA Method 5 or 6 to approximate the DFE for design purposes, however, an unexpired Flood Hazard Verification Letter which includes a Flood Hazard Design Elevation is necessary to ensure compliance with State standards. Enter elevation in Box D.

Date of Letter Verifying the NJ Flood Hazard Design Flood Elevation (FHDFE):	Box D N/A

Select highest elevation from Box A, B, C, and D to determine the New Jersey Flood Hazard Design Flood Elevation (FHDFE) and input into Box E

[1]Use Appendix 2 of the FHACA Rules (N.J.A.C. 7:13) to identify state-studied waters; or visit https://www.nj.gov/dep/floodcontrol/studied_streams.htm

[2]https://msc.fema.gov/portal/home

[3] The most recent available preliminary flood risk guidance FEMA has provided. The Best Available Flood Hazard Data may be depicted on but not limited to Advisory Flood Hazard Area Maps, Work Maps or Preliminary FIS and FIRM.

[4]Vertical datum conversion factor sources: FIS report or https://vdatum.noaa.gov/runapp_agreement.php

[5] Tidal flooding refers to modeled and mapped floodplains where the primary flood hazard is controlled by coastal or tidal forces. Note that many mouths and lower reaches of rivers are considered tidal. The riverine/fluvial adjustment that adds one foot to FEMA Base Flood Elevations is discussed in N.J.A.C. 7:13-3.4.

PART II

Site Name:	County Concrete				
Freeboard Requirements			Highest Elevation		Highest Elevation with Freeboard Comparison
State Freeboard Requirements - The NJ Flood Hazard Area Control Act (NJFHACA) requires that a minimum of 1 foot of freeboard be added to the Flood Hazard Design Flood Elevation FHDFE and no lower than that required by the UCC pursuant to the calculation below for Class I through IV facilities.	1 Foot	+	Box E _708__ _ Ft	=	State Box 1 __709__ Ft
Local Community Freeboard Requirements – More restrictive freeboard must be added if a higher freeboard is adopted in the Community's Flood Damage Prevention Ordinance.	N/A Ft	+	Box E ____ Ft*	=	Local Box 2 _____ Ft
ASCE 24 Type of Facility (circle one):** Class I Class II Class III Class IV *If Class I or II no further entry is required* *If Class III or IV, enter elevations below*	If Class III (in V Zone only) or Class IV, chose Highest Elevation from below and enter here →				**ASCE 24 Critical Facility** Box 3 __709___ Ft
Class III (in *V Zone only*) choose either: Box 1 Elevation + 1' Box 2 Elevation + 1'***					
Class IV choose either: Box 1 Elevation + 2' Box 2 Elevation + 2'***					
Class IV: 500-year Elevation					
Select highest DFE from State (Box 1), Local (Box 2), and ASCE (Box 3): ***(This is your Local DFE****)*** →					_709_____ Ft
Note Vertical Datum →					NGVD29
Note Flood Zone and if LiMWA Area →					***Zone A2 with no LiMWA***

*Review community ordinance to determine if the freeboard should be added to the BFE or NJ State Flood Hazard Area DFE.

**ASCE Classes and Elevation Requirements are Defined in ASCE 24-14: https://www.fema.gov/sites/default/files/2020-07/asce24-14_highlights_jan2015.pdf

*** The local Flood Damage Prevention ordinance may require that additional freeboard for a critical facility be added to the Local Minimum Freeboard calculated in Box 2 which may be higher than the State minimum freeboard calculated in Box 1. The local ordinance should be consulted to confirm the calculations in this worksheet. In no circumstance should a critical facility be constructed lower than required by both the Flood Hazard Area Control Act and the Uniform Construction Code.

Local Design Flood Elevation (LDFE) Worksheet

****Local Design Flood Elevation Definition - the Local DFE is the elevation reflective of the most recent available preliminary flood elevation guidance FEMA has provided as depicted on but not limited to Advisory Flood Hazard Area Maps, Work Maps, or Preliminary FIS and FIRM which is also inclusive of freeboard specified by the New Jersey Flood Hazard Area Control Act and Uniform Construction Codes and any additional freeboard specified in a community's ordinance. In no circumstances shall a project's LDFE be lower than a permit-specified Flood Hazard Area Design Flood Elevation or a valid NJDEP Flood Hazard Area Verification Letter plus the freeboard as required in ASCE 24 and the effective FEMA Base Flood Elevation.

Notes: Use the space below to document comments, assumptions, and sources. For example, source of the datum conversion factor or source of the ordinance BFE in Box E.
Community's Flood Damage Prevention Ordinance: https://ecode360.com/28595030
Vertical datum conversion: https://vdatum.noaa.gov/vdatumweb/vdatumweb?a=055702020220217 https://www.broward.org/Environment/FloodZoneMaps/Documents/ConversionInstructions.pdf

BEI
BOGIA ENGINEERING INC.

1340 Penn Avenue

Wyomissing, PA 19160

Phone: 610.678.3071

Fax: 610.678.3517

www.bogiaeng.com

STORMWATER MANAGEMENT AND E&S REPORT

BLACK RIVER RESTORATION

FOR COUNTY CONCRETE CORPORATION

MINE HILL AND ROXBURY TOWNSHIPS
MORRIS COUNTY
NEW JERSEY

Prepared by: A. Behbahani

Checked by: C. MULDOON

Date: April 2022

Project: NJ1954-01

BLACK RIVER RESTORATION

Contents

General Description

The Black River in Morris County, New Jersey currently routes through man-made Rutgers Pond in Roxbury and Mine Hill Townships. The NAD 1983 NJ State Plane coordinates for the project area are 458117.001174, 741284.80268 feet. The proposed project will reestablish the natural channel of the river, disconnecting it from Rutgers Pond. This will be accomplished by mainly using fine-grained materials that were separated from aggregates removed from the pond to build up land surface along the southwest edge of the pond. A naturalized stream channel will be constructed to directly connect the Black River to itself downstream of the existing pond. The new stream banks will be stabilized with gravel and vegetation. Landscaping and shade trees will be implemented along both sides of the new stream channel. The intended use of the new area around the restored stream channel is a vegetated, naturalized area.

A local aggregate quarry, County Concrete Corporation, will be undertaking this restoration project. They are willing to complete this restoration and beneficial re-use project. The fill material for the project will be quarry tailings from County Concrete operations. This material is comprised of native fine-grained materials removed from the pond and not used for making concrete. These have been mechanically separated on site using the pond water for washing and without the use of additives.

The total project area is 16.4 acres. Rutgers Pond is approximately 56 acres. The proposed fill area in open water is 16.3 acres, and the area where fill elevations will be higher than the existing normal pool elevation is 8.6 acres. The project site is located largely within the floodway and minimally impacts the flood fringe and riparian zone. There are freshwater wetlands along the banks of the Black River and Rutgers pond. Impacts to these areas are minimal and temporary. The entire project site is within one drainage area. Stormwater from the site drains to the existing Black River channel along the south edge of Rutgers Pond.

This project is expected to be completed over the course of 7 to 10 years. The southwestern portion of Rutgers Pond will be incrementally filled in, starting along the bank to the north of the project site. The existing stream into the project site will continue to discharge into Rutgers Pond for the duration of the filling. As the area of fill is placed, the area will be graded to specified slopes and the designed channel will be stabilized with gravel and vegetation. A second stream channel will be created in the fill area to manage flows from the Lamington River, which enters at the north end of Rutgers Pond. During fill activities, a flow path will be maintained along the existing shoreline of Rutgers Pond until the designed channel has been stabilized with gravel and vegetation. Once the new channels have been determined to be stable, the former flow paths along the shoreline will be filled in to a specified grade, stabilized, and revegetated. Once the constructed channels have been stabilized, stream flows will be directed into the new stream channels. The new stream channels will be monitored and any necessary remediation and stabilization will be conducted.

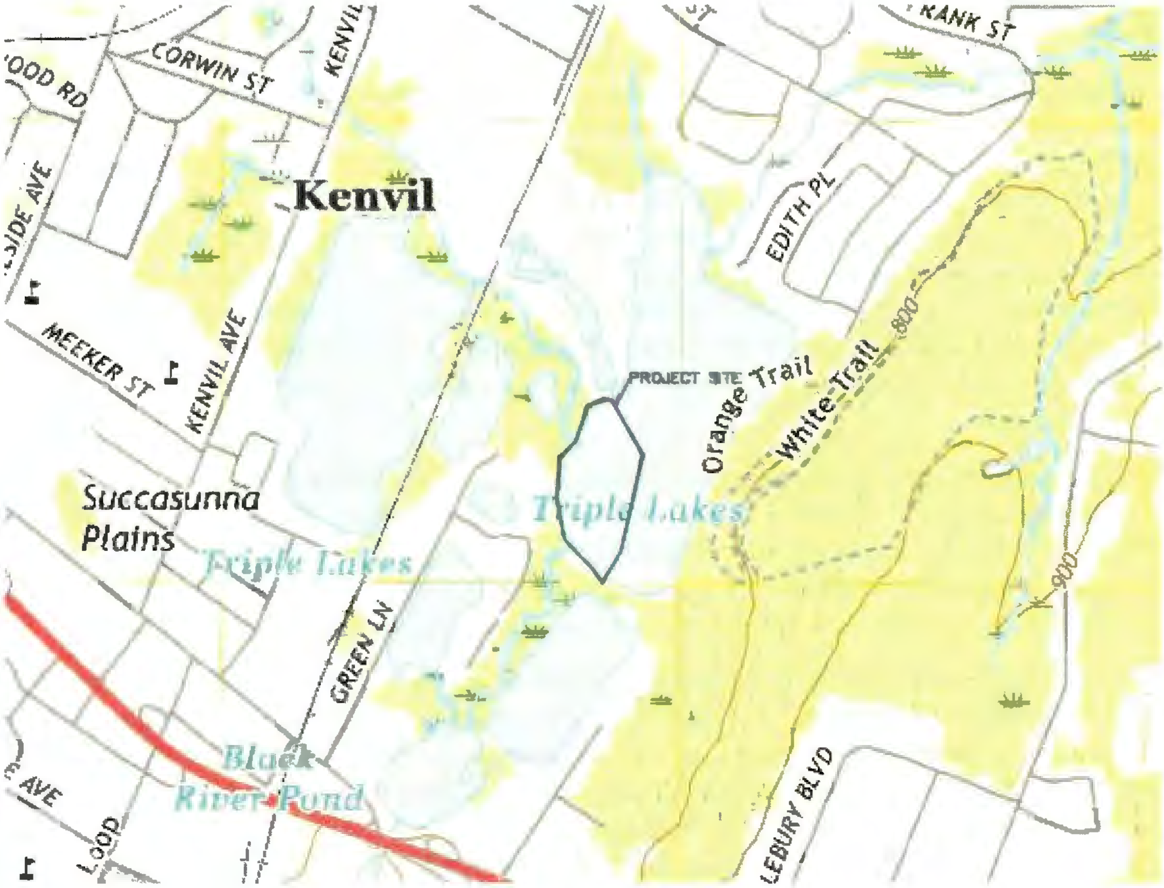


Figure 1. USGS 7.5 Minute Quad Map with project site.

Stormwater Analysis

The existing conditions of the site are largely open water (CN= 100). The proposed condition restores 8.6 acres of vegetative cover. With a conservative soil hydrologic group classification of "D", the CN of the interim condition lowers with additional soil placed. The CN of dirt is 89, lower than the CN of open water. As the site matures and vegetation is established, the CN will further reduce. The curve number for the proposed land area is 77. The existing conditions have a weighted CN of 99.92. The proposed conditions have a weighted CN of 87.88. As the proposed condition of the site has a lower CN than the existing conditions, stormwater runoff will be reduced in the post construction conditions from the existing conditions. Dense vegetative buffers will be established along both sides of the proposed channels. This vegetative buffer will filter and cool stormwater runoff before it enters the Black River.

A discussion of floodplain modeling and compliance with Flood Hazard Area requirements can be found in the Engineering Report prepared by Bogia Engineering, Inc.

E&SC Measures

The construction methods, phasing, and temporary BMPs have been designed to mitigate erosion and sediment control concerns from the project site.

Transport of placed sediments within Rutgers Pond will be controlled by the following methods. The placement of fill will begin at the north edge of the project site, upstream. Starting on the upstream side will allow settling time for fine particles through the water column of the pond as the soils are placed into the project site. A turbidity curtain will be placed across the full width of the outlet channel. This will help to filter suspended particles as the placement edge gets closer to the southern edge of the project site.

As soils are placed and graded above the normal water surface elevation, on land E&SC BMPs will be implemented to limit the sediments entering the Rutgers Pond from stormwater runoff during construction. Coffer dams will be constructed at the inlet of both constructed channels to prevent stream flows from entering the constructed channel before the downslope area is fully stabilized. Any new shoreline that will not be added to or manipulated for a time period of greater than 3 days, compost filter sock shall be installed along the shoreline. Erosion control matting will be installed along the channel banks and steep slopes above the normal water surface elevation.

Conclusion

The post-construction conditions reduce the volume of stormwater runoff from the site from existing conditions by reducing the impervious area by 8.6 acres. Quality of stormwater runoff will be improved by vegetated riparian zones, which will filter, cool, and slow stormwater runoff flows from the site. Erosion and sediment control measures will be implemented throughout the construction process to protect the project site and the Black River from erosion and sediment pollution.

APPENDIX A

Storm Drainage Calculations

Stormwater Drainage Calculation

The pre-development and post-development conditions at the site were evaluated for a single point of investigation (POI) that was determined based on the current and proposed topography of the existing site. The POI was the existing outlet of Rutgers Pond, located along the south edge of the project area.

The stormwater calculations were conducted using the NRCS method. The existing site condition was considered as wooded in good condition for soil group D and open water, therefore, the curve number 99.92 was used. In the post-development condition the proposed stream restoration replaces open water with pervious land cover, increasing the area of wooded cover type to 8.65 acres. The post-construction conditions have a weighted CN of 87.88.

Existing Conditions:

Cover Type	***Curve Number***	***Area (acres)***
Open Water	100	16.36
Woods in Good Condition	77	0.06

Proposed Conditions:

Cover Type	***Curve Number***	***Area (acres)***
Open Water	100	7.77
Woods in Good Condition	77	8.65

The CN is lower in the post construction condition than the existing condition. Therefore, all storms analyzed using the NCRS method will indicate a reduction in stormwater runoff from existing conditions to proposed conditions.

Water Quality Assessment

Generally, vegetated areas provide water quality tools such as filtration, settlement, uptake and adsorption that can enhance water quality before it reaches downstream surface water bodies and groundwater. The vegetated banks of the proposed channel will act as a vegetated buffer to filter, cool, and slow stormwater runoff from the site. Nutrient removal via plant uptake may also improve the water quality.

BMP Operation and Maintenance Plan

EROSION CONTROL DEVICE MAINTENANCE AND INSPECTION PROCEEDURES

1. THE MAINTENANCE PROCEDURES BELOW ARE COMPREHENSIVE AND INCLUDE DEVICES PROPOSED FOR THIS SPECIFIC PROJECT OR MAY BE NEEDED TO SUPPLEMENT UNFORESEEN EROSIVE CONDITIONS. SHOULD EROSION CONTROL DEVICES BE IMPLEMENTED OUTSIDE OF THOSE DEPICTED WITHIN THESE EROSION CONTROL PLANS, THE DEVICES AND MAINTENANCE PROCEDURES SHALL BE APPROVED BY THE CONSERVATION DISTRICT PRIOR TO IMPLEMENTATION.

2. IT SHALL BE THE RESPONSIBILITY OF THE O/RP TO ENSURE THAT ALL DEVICES ARE INSTALLED AND MAINTAINED ACCORDING TO THE PROVIDED DETAILS OR MANUFACTURES SPECIFICATION.

3. ALL EROSION CONTROL DEVICES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT UNLESS OTHERWISE SPECIFIED BELOW. NECESSARY REPAIRS SHALL BE PERFORMED IMMEDIATELY.

4. SEDIMENT REMOVED FROM EROSION CONTROL DEVICES SHALL BE REDISTRIBUTED/REPLACED ON SITE AND IMMEDIATELY STABILIZED.

ROCK ENTRANCE

- ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.

- DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK.

- ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK FILTER OUTLET

- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

FILTER FENCE

- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

- ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET.

SILT SOCK

- SILT SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE.
- ENDS OF SOCK SHALL BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
- ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND MUST BE DISPOSED IN THE MANNER ACCEPTABLE TO THE CONSERVATION DISTRICT AND NJDEP.

ROCK FILTERS

- CLOGGED FILTER STONE (AASHTO # 57) SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.
- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/ 2 THE HEIGHT OF THE FILTERS.
- IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

PUMP WATER FILTER BAGS

- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED
- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED.
- FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

INLET FILTER BAGS

- FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS ½ FULL.
- DAMAGED FILTER BAGS SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

WETLAND MATS

- INSTALL MATS ON TOP OF NON-WOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
- USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
- INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS.
- IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS.
- UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.

APPENDIX B

NRCS Custom Soil Resource Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Morris County, New Jersey

County Concrete

July 9, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:4,190 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morris County, New Jersey
Survey Area Data: Version 15, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 31, 2014—Apr 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdrAt	Timakwa muck, 0 to 2 percent slopes, frequently flooded	15.4	23.5%
NerB	Netcong gravelly sandy loam, 3 to 8 percent slopes	0.5	0.8%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	6.9	10.5%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	4.8	7.3%
PHG	Pits, sand and gravel	1.0	1.5%
UR	Urban land	3.6	5.5%
WATER	Water	33.5	51.0%
Totals for Area of Interest		**65.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morris County, New Jersey

AdrAt—Timakwa muck, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w671
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Timakwa, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 37 inches: muck
2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand
2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very high (about 14.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Minor Components

Catden, frequently flooded

Percent of map unit: 7 percent
Landform: Fens, depressions, swamps, bogs, marshes, kettles, flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Preakness, frequently flooded, poorly drained

Percent of map unit: 4 percent
Landform: Outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Parsippany, frequently flooded

Percent of map unit: 4 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

NerB—Netcong gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0mj
Elevation: 280 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Netcong and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Netcong

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 7 inches: gravelly sandy loam
BA - 7 to 13 inches: gravelly sandy loam
Bw1 - 13 to 21 inches: gravelly sandy loam
Bw2 - 21 to 30 inches: gravelly sandy loam
BC - 30 to 41 inches: sandy loam
C - 41 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rockaway, moderately well drained, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hibernia, very stony

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PauDc—Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc5
Elevation: 250 to 1,250 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent
Gladstone, extremely stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam
Bt - 10 to 22 inches: gravelly sandy clay loam
BC - 22 to 37 inches: gravelly sandy loam
C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 5 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PawE—Parker-Rock outcrop complex, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: b0mt
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 75 percent
Rock outcrop: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly sandy loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 25 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

R - 0 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Gladstone, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

PHG—Pits, sand and gravel

Map Unit Setting

National map unit symbol: b0n3
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, sand and gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Sand And Gravel

Setting

Parent material: Sandy material disturbed by human activity

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

UR—Urban land

Map Unit Setting

National map unit symbol: b0nx
Elevation: 0 to 170 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

WATER—Water

Map Unit Setting

National map unit symbol: b0p9
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

APPENDIX C

Erosion and Sediment Control Report

Site:

The project site is a section of Rutgers Pond, located at 50 Railroad Ave, Kenvil, NJ. The site is mostly open water with some woods as the existing condition. The proposed conditions will restore the Black River channel and 8.6 acres of riparian zone. There are wetlands along the shoreline of Rutgers Pond and the stream banks.

Soils:

The majority of project site consists of open water area. The edges of the project site are Timakwa muck (AdrAt) with 0 to 2 percent slopes and hydrologic soil group B/D, and pits, sand and gravel (PHG), which is sandy material disturbed by human activity. The Appendix D of this report contains the Geotechnical investigation of the fill material and slope stability analysis.

Construction Sequence:

1. INSTALL CONSTRUCTION ACCESS AREA (ROCK ENTRANCE/WETLAND MATTING)
2. CLEARLY DELINEATE THE LIMIT OF DISTURBANCE IN THE FIELD WITH STAKES. INSTALL WETLAND PROTECTION FENCING AND TREE PROTECTION FOR WETLANDS AND TREES WITHIN THE LIMIT OF DISTURBANCE.
3. INSTALL PERMIETER E&S CONTROLS FOR THE FILL AREA.
    A. AS FILL AREA EXPANDS, E&S CONTROLS MUST BE MODIFIED TO PROTECT ENTIRE FILL AREA FROM EROSION AND SEDIMENT POLLUTION.
4. PLACE FILL MATERIAL IN LAKE WHILE LEAVING A FLOW PATH ALONG EXISTING SHORELINE. SEDIMENTS SHALL NOT BE PLACED WITHIN 30 FEET OF THE EXISTING SHORELINE WHERE THE TEMPORARY CHANNEL IS PROPOSED.
5. ONCE FILL IS AT PROPOSED GRADE, PERMANENTLY STABILIZE THE AREA. NO MORE THAN 15,000 SQ. FT OF DISTURBED AREA ABOVE THE NORMAL WSE (700.7') SHALL BE AT FINAL GRADE WITH OUT INITIATING SEEDING AND MULCHING. PLANTING OF SHADE TREES AND FINAL VEGETATIVE COVER SHALL BE INITIATED AT ALL AREAS WHICH ARE AT FINAL GRADE AND FARTHER THAN 10' FROM THE EDGE OF ANY CURRENT OR FUTURE CONSTRUCTION TRAFFIC.
6. CONSTRUCT NEW STREAM CHANNELS WITHIN FILL PLACEMENT AREA. INSTALL COFFER DAMS #1 AND #2 TO ISOLATE FLOW FROM THE NEWLY CONSTRUCTED CHANNELS UNTIL CHANNEL AREA HAS BEEN FULLY STABILIZED. STABILIZE CONSTRUCTED CHANNELS WITH GRAVEL AND VEGETATION.

7. REMOVE COFFER DAMS# 1 AND #2. INSTALL COFFER DAM #3 AND #4. REDIRECT EXISTING STREAM FLOWS INTO NEW STREAM CHANNELS.
8. MONITOR FOR STABILITY. WHEN DEEMED STABLE, CONSTRUCT TEMPORARY STREAM CROSSINGS #1 AND #2. FILL IN FORMER FLOW PATHS ALONG SHORELINE, STABILIZE AND VEGETATE.
9. PLANT REMINGING SHADE TREES AND OTHER STREAMBANK RESTORATION VEGETATION AND STABILIZE.
10. REMOVE ALL REMAINING TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.
11. MONITOR NEW STREAM CHANNEL REGULARLY AND PROVIDE ANY NECESSARY REMEDIATION.

Temporary Seeding:

Apply limestone at a rate of 40 pounds per acre for sandy loam soils.
Apply fertilizer (10-20-10) at a rate of 500 pounds per acre.
Apply mulch at a rate of 2.0 tons per acre and use crimper to prevent loss due to wind.
Apply seed (Perennial Rye Grass) at a rate of 40 pounds per acre

Permanent Seeding:

Provide limestone and fertilizer as noted in temporary seeding. Final seeding is to consist of grain rye (30lbs/acre) and "Floodplain Mix" (20 lbs/acre), or approved alternative. Floodplain mix is a mixture of grasses and wildflowers that are native to the mid-atlantic region, including the following species: Viginia Wildrye, Deertounge, Aster, Indiangrass, and Swamp Milkweed.

"Floodplain Mix" is available through Ernst Seeds, 8884 Mercer Pike, Meadville, PA 16335.

Seed Bed Preparation:

Optimum seeding dates are between 2/15-5/01 and 8/15-10/15. Seed beds are to be uniformly tilled or mixed to incorporate the limestone and fertilizer. Spread seed uniformly across the seedbed area and incorporate into the soil by raking to a depth of ¼" to ½" and firm with a roller or light drag. Seeding operations are to be done on the contour. Mulch the seeded areas immediately with mulch consisting of unrotted hay or small grain straw spread uniformly by hand or mechanically at a rate of two tons per acre and anchored immediately after placement.

Permanent Vegetation:

The project location is along the border of zone 6a and 6b per Figure 4-1 of NJ E&S control standards in the Highlands physiographic province. The native underlying soil is classified as poor and moderately drained. For the pond edge, upland areas, and channel banks, species from Table 7-3, 7-5 and 7-7 of the NJ E&S control standards, respectively, were adopted. The following tables describe the corresponding detail for each planting area along with the proposed maintenance activities.

Table 7-3: Common Emergent Wetland Plant Species Used for Stormwater Wetlands and on Aquatic Benches of Stormwater Ponds

Common Name	Scientific Name	Inundation Tolerance
Arrow arum	Peltandra virginica	up to 12"
Arrowhead/Duck potato	Saggitaria latifolia	up to 12"
Pickerelweed	Pontederia cordata	up to 12"
Blunt spike rush	Eleocharis obtusa	up to 3"
Bushy beardgrass	Andropogon glomeratus	up to 3"
Common three-square	Scirpus pungens	up to 6"
Iris (blue flag)	Iris versicolor	up to 6"
Marsh hibiscus	Hibiscus moscheutos	up to 3"
Spatterdock	Nuphar luteum	up to 36"
Sedges	Carex spp.	up to 6"
Soft rush	Juncus effusus	up to 6"
Switchgrass	Panicum virgatum	up to 3"
Note 1: Inundation tolerance is maximum inches below the normal pool; most plants prefer shallower depths than the maximum indicated. Note 2: For additional plant options, consult the stormwater planting list in Section 5. Other good sources include the NJDA Standards for Soil Erosion and Sediment Control in New Jersey, Design of Stormwater Wetland Systems (Schueler 1992), and Wetland Planting Guide for the Northeastern United States (Thunhorst 1993).		

Table 7-5: Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
Acer rubrum Red maple	*Clethra alnifolia* Sweet pepperbush	*Andropogon glomeratus* Lowland broomsedge
Betula nigra River birch	*Ilex verticillata* Winterberry	*Eupatorium purpureum* Sweet-scented Joe Pye weed
Juniperus virginiata Eastern red cedar	*Cephalathus occidentalis* Buttonbush	*Scripus pungens* Three square bulrush
Chionanthus virginicus Fringe-tree	*Hamemelis virginiana* Witch hazel	*Iris versicolor* Blue flag
Nyssa sylvatica Black gum	*Vaccinium corymbosum* Highbush blueberry	*Lobelia cardinalis* Cardinal flower
Diospyros virginiana Persimmon	*Ilex glabra* Inkberry	*Panicum virgatum* Switchgrass
Platanus occidentalis Sycamore	*Ilex verticillata* Winterberry	*Dichanthelium clandestinium* Deertongue
Quercus palustris Pin oak	*Viburnum dentatum* Arrowwood	*Rudbeckia laciniata* Cutleaf coneflower
Quercus phellos Willow oak	*Lindera benzoin* Spicebush	*Scirpus cyperinus* Woolgrass
Salix nigra Black willow	*Morella pennsylvanica* Bayberry	*Vernonia noveboracensis* New York ironweed
Note: For more plant section options for bioretention, consult Design Manual for Use of Bioretention in Stormwater Management (ETA&B 1993) or Design of Stormwater Filtering Systems (Claytor and Schueler 1997).		

Table 7-7: Common Grass Species for Open Channels

Common Name	Scientific Name	Notes
Alkali saltgrass	Puccinellia distans	Cool, good for wet, saline swales
Fowl bluegrass	Poa palustris	Cool, good for wet swales
Canada bluejoint	Calamagrostis canadensis	Cool, good for wet swales
Creeping bentgrass	Agrostis palustris	Cool, good for wet swales, salt tolerant
Red fescue	Festuca rubra	Cool, not for wet swales
Redtop	Agrostis gigantea	Cool, good for wet swales
Rough bluegrass	Poa trivialis	Cool, good for wet, shady swales
Switchgrass	Panicum virgatum	Warm, good for wet swales, some salt tolerance
Wildrye	Elymus virginicus/riparius	Cool, good for shady, wet swales

Notes: These grasses are sod forming and can withstand frequent inundation, and are ideal for the swale or grass channel environment. A few are also salt-tolerant. Cool refers to cool season grasses that grow during the cooler temperatures of spring and fall. Warm refers to warm season grasses that grow most vigorously during the hot, mid-summer months.

Where possible, one or more of these grasses should be in the seed mixes. For a more thorough listing of seed mixes see Table 7-8 in Part 5 or consult the Standards for Soil Erosion and Sediment Control in New Jersey.

Maintenance shall be conducted according to the table presented below.

RIPARIAN CORRIDOR MAINTENANCE SCHEDULE

NEWLY SEEDED GRASSES AND POND EDGE:	YEAR 1	YEAR 2	YEAR 3	YEAR 4+
INSPECT FOR INVASIVE/WEED SPECIES. IF WEED SPECIES APPEAR IN THE SEEDED AREA, SPOT TREAT BY PULLING.	X			
PRUNING, RESEEDING, THATCH REMOVAL OF VEGETATED AREAS, AS NEEDED	X	X	X	
PEST CONTROL, AS NEEDED	X	X	X	
NEWLY PLANTED TREES AND SHRUBS:				
SUPPLEMENTAL WATER, IF NEEDED. NATURALISTIC PRUNING OF DEAD/DAMAGED BRANCHES IN LATE FALL OR EARLY SPRING.	X			
REMOVE STAKES, IF UTILIZED. CHECK TREE BARK PROTECTION AND REPAIR/REPLACE AS NEEDED. REPLACE DEAD PLANT MATERIAL. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.		X		
CHECK TREE BARK PROTECTION AND REPAIR/REPLACE AS NEEDED. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.			X	X
EXISTING VEGETATION AREAS:				
REMOVE OR SPOT TREAT INVASIVE SPECIES. PRUNE POTENTIALLY HAZARDOUS MATERIAL FROM EXISTING PLANT MATERIAL.	X	X	X	X

Erosion Control Measures:

The erosion control measures included on the site are a stabilized construction entrance, compost filter sock at the downslope perimeter of the project, turbidity curtain, temporary stream crossings, and erosion control matting. Temporary and permanent seeding and stabilization are also part of the controls used to prevent downstream erosive conditions. Should water infiltration into trenches or into other excavations require water pumping, it shall be done per the Standard for Dewatering, Chapter 14 of the Standards for Soil Erosion and Sediment Control in New Jersey manual.

Should any erosive conditions occur not anticipated at the time of this report, the county conservation district and the design engineer are to be contacted immediately.

APPENDIX D

Fill Material Geotechnical Report

Dynamic Earth, LLC
245 Main Street, Suite 110
Chester, NJ 07930
T. 908-879-7095

Date: April 4, 2022
Via email:

County Concrete Corp.
50 Railroad Avenue,
Kenvil, NJ 07847

Attn: John Crimi

RE: Slope Stability Analysis
Black River Restoration
Mine Hill and Roxbury Township, Morris County, New Jersey
Dynamic Earth Project No.: 1949-99-001EC

Dear Mr. Crimi;

Dynamic Earth, LLC (Dynamic Earth) has completed the laboratory testing of the fill material and the slope stability analysis. The results of our slope stability analysis are detailed herein.

Project Details:

The subject site located in the Morris County identified as the Rutgers Pond, a man-made pond located within both Roxbury and Mine Hill Townships. The proposed restoration area is bound to the north by the existing County Concrete Corporation; east by undeveloped wooded area and Canfield Avenue beyond; to the south by Randolph Park beach and Rt. 10 beyond and on the west by Cutting Edge Sawmill and residential developments beyond. Based on Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc., the approximate area of the reclamation is 40,655 square feet. The proposed restoration includes reclamation of partial land area from the existing Rutgers pond by filling the pond with quarry tailings from the nearby County Concrete Corporation. The proposed restoration to reestablish the natural channel of the Black River within the reclaimed land mass.

Site Geology:

Based on the Bedrock Geologic Map of Northern New Jersey prepared by the United States Department of the Interior, U.S. Geologic Survey, the site is located within the Valley and Ridge Province of Northern New Jersey. Specifically, the site is underlain by the Middle and Lower Cambrian-aged Leithville Formation. This formation reportedly consists of light- to dark-gray and light-olive-gray fine- to medium-grained thin- to medium-bedded dolomite grading downward through medium-gray, grayish-yellow, or pinkish-gray dolomite and dolomitic sandstone, siltstone and shale to medium-gray, medium-grained, medium bedded dolomite containing quartz sand grains as stringers and lenses near the base. Overburden materials include glacial deposits associated with the Wisconsinan Glacial Cycle which reached its most southerly advance thousands of years ago and alluvial deposits.

Historical Document Review:

As part of the slope stability analysis, historical and available data was obtained using sources such as *New Jersey Geoweb*, and *New Jersey Department of Transportation Geotechnical Data Management System*. The data obtained using above sources were used in the development of the finite element models utilized to evaluate the slope stability of the proposed land reclamation.

Laboratory Analysis:

A representative sample of the material proposed to be utilized during the land reclamation was subjected to a laboratory testing program which included, natural moisture content determinations (ASTM D-2216), Atterberg limits (ASTM D-4318), and washed gradation analyses (ASTM D-6913) in order to perform engineering soil classifications in general accordance with ASTM D-2487.

Finite Element Analysis:

Dynamic Earth performed slope stability analysis using Midas SoilWorks (2020) version 1.1, a finite element modeling software. The proposed landmass cross sections were provided on a drawing labeled Black River Restoration Concept Plans dated August 11, 2021 prepared by Bogia Engineering Inc. The aforementioned drawing presented four proposed cross sections of the land mass. Each cross section was modeled in SoilWorks in one to one scale in order to mimic expected conditions once completed. The model considered the long-term stability of the slopes during the analysis.

The historical data and the results from the laboratory investigation were used to generate the soil parameters used in the analysis. See the accompanying finite element analysis output summary for the results.

Slope Stability Review:

The stability of the conceptual slopes was performed and the factor of safety obtained through the finite element analysis of the crucial slopes are summarized in the table below.

SUMMARY OF SLOPE STABILITY ANALYSIS	
Cross Section	**Factor of Safety**
A - A	5.55
B - B	3.08
C - C	1.40
D - D	1.31

The long-term slope stability obtained using the finite element analysis for the critical conceptual slopes are larger than the industrial minimum factor of safety of 1.3.

Please feel free to contract us with any questions regarding these matters.

Sincerely,

DYNAMIC EARTH, LLC

Peter H. Howell, P.E.
Principal
NJ PE License No. 24GE04728700

Janitha Batagoda, Ph.D.
Geotechnical Engineer

Enclosures: Slope Stability Analysis Summary

CC: Kurt Peters

SLOPE STABILITY ANALYSIS

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment regions	User Defined	FS >= 1.3

II. Applied Properties

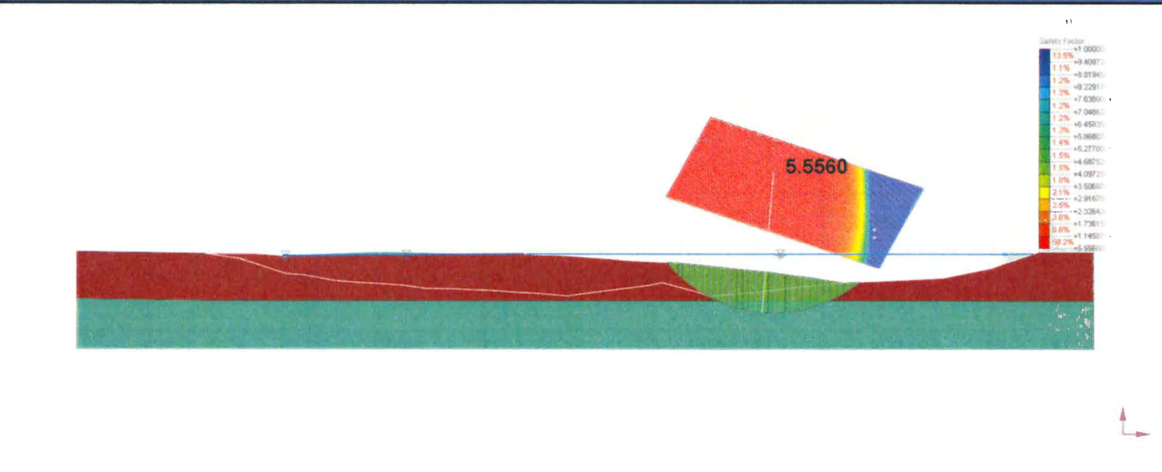
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	115.000	130.000	-	17.00	-	-
Natural MD sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	5.556	**OK**

Critical Embankment region slope stability check: In case of Slope Stability analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

II. Applied Properties

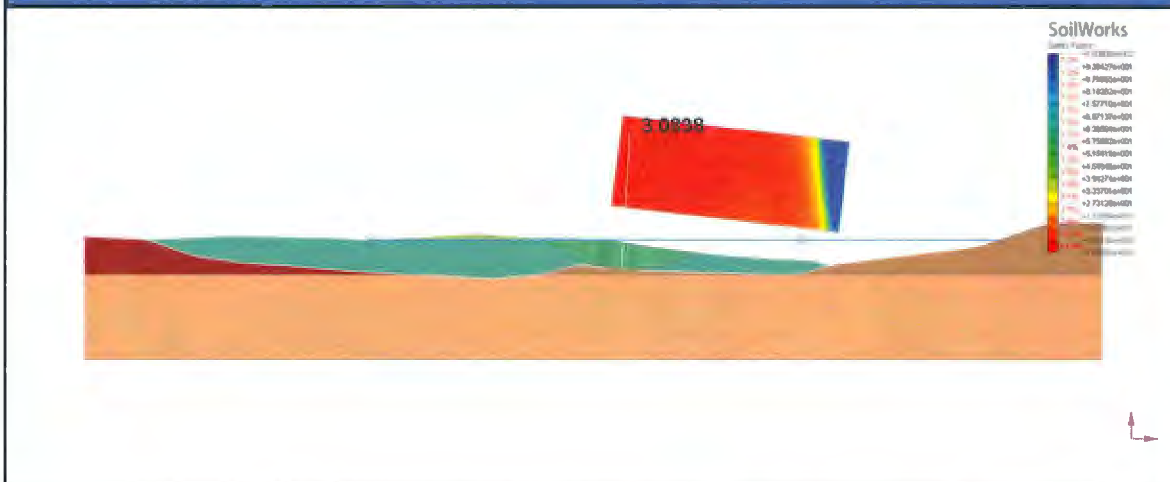
1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	125.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	30.00	-	-
Weathered Rock	135.000	138.000	-	32.00	-	-
Bedrock	140.000	145.000	-	36.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis



Standard safety factor	1.300	Evaluation
Analysis safety factor	3.084	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

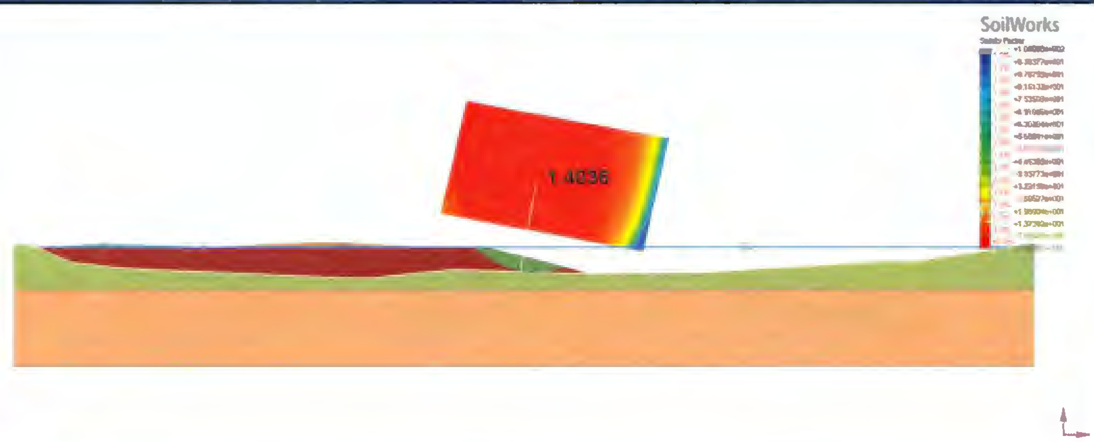
II. Applied Properties

1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.030	-	16.00	-	-
Natural MD Sand	120.000	128.000	-	28.00	-	-
Natural Dense Sand	125.000	128.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

Slope Stability Analysis		
		
Standard safety factor	1.300	Evaluation
Analysis safety factor	1.404	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Analysis allowable safety factor 1.3 has been satisfied.

Determined to be safe.

List

I. Slope Stability Analysis

1. Review Objective

For slope stability check, the site conditions, constructability and economy need to be considered.

2. Applied Safety Factor

Section	Minimum safety factor	
Embankment region	User Defined	FS >= 1.3

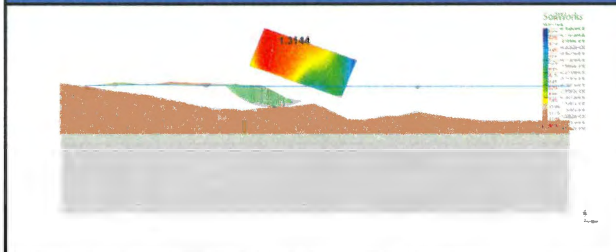
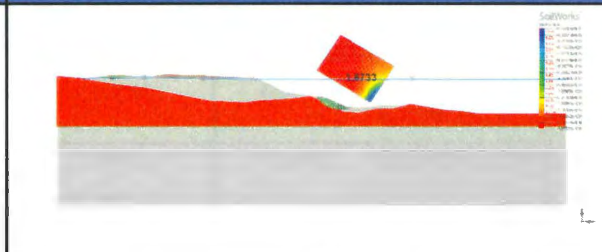
II. Applied Properties

1. Soil Properties

Section	Wet unit weight (lbf/ft³)	Saturated unit weight (lbf/ft³)	Cohesion (lbf/ft²)	Internal friction angle ([deg])	Modulus of elasticity (lbf/ft²)	Poisson's ratio
Pond Fill Material	114.400	130.300	-	16.00	-	-
Natural MD Sand	120.000	130.000	-	28.00	-	-
Dense Sand	125.000	130.000	-	32.00	-	-

III. Analysis Results

1. Critical Slope

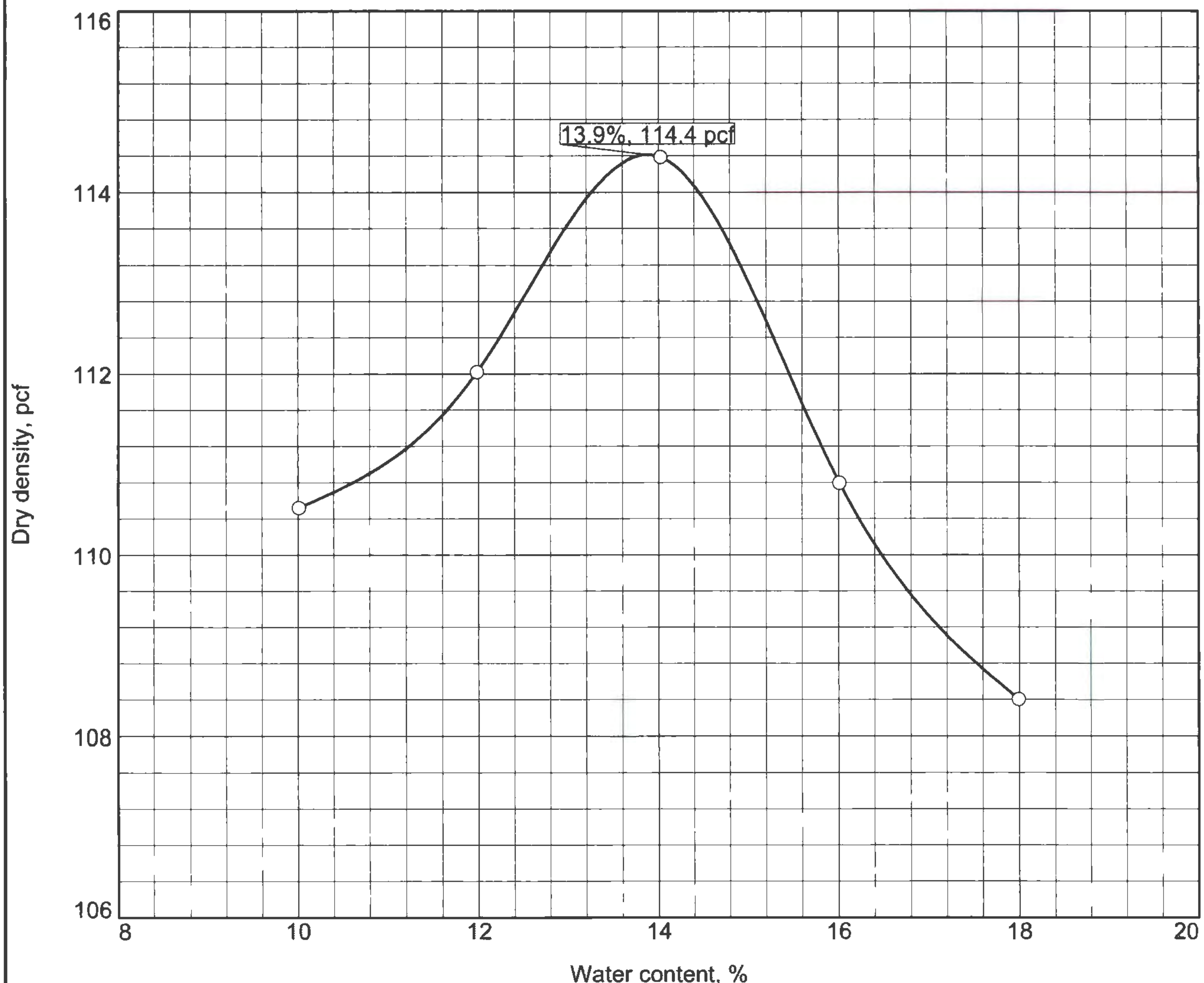
Slope Stability Slope 1			Slope Stability Slope 2		
					
Standard safety factor	1.300	Evaluation	Standard safety factor	1.300	Evaluation
Analysis safety factor	1.314	**OK**	Analysis safety factor	1.673	**OK**

Critical Embankment region slope stability check: In case of Slope Stability Slope 1,Slope Stability Slope 2 allowable safety factor 1.3 has been satisfied.

Determined to be safe.

LABORATORY TESTING

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
N/A	ML	N/A	11.7	N/A	17	NP	0.3	54.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 114.4 pcf Optimum moisture = 13.9 %	Brown Silt, and c-f sand, trace f gravel

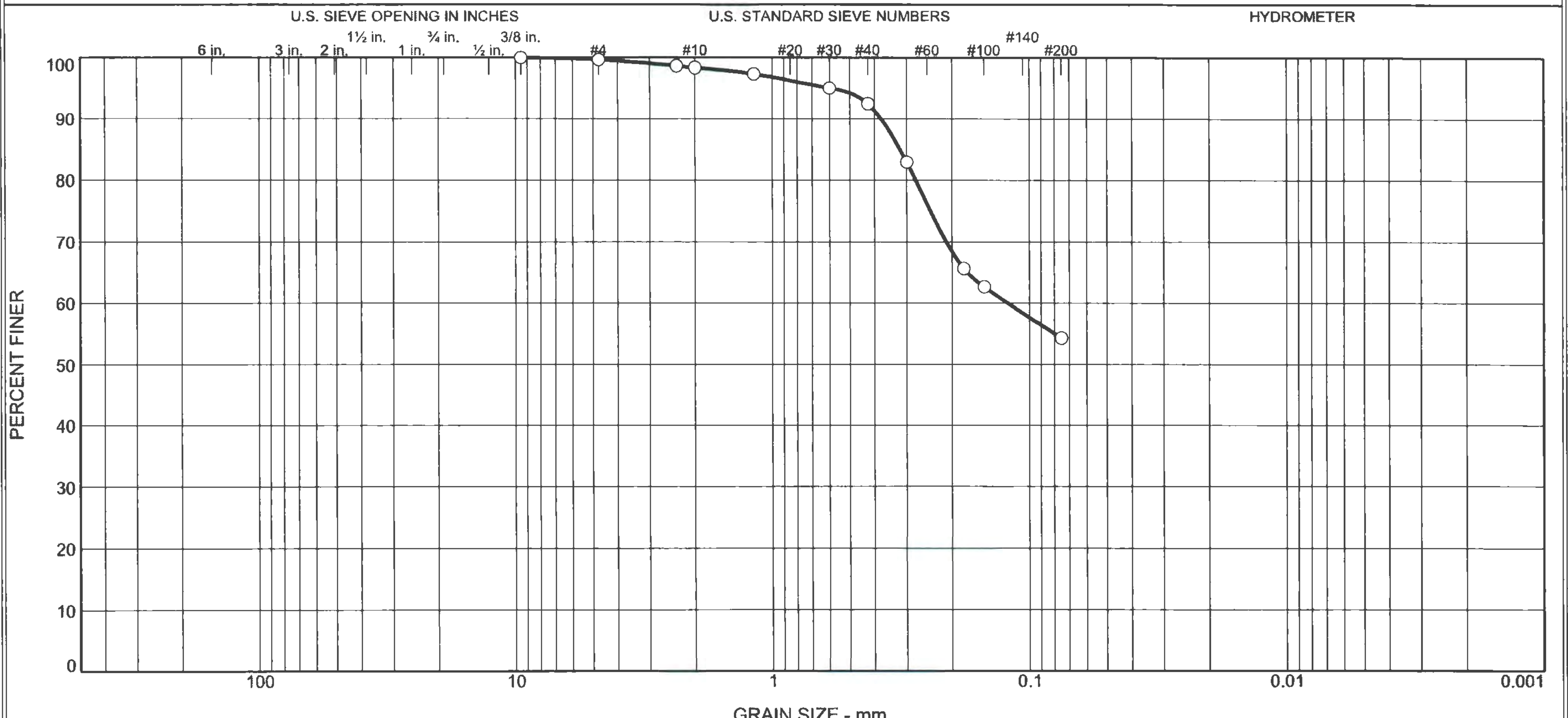
Project No. 1949-99- **Client:** County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
○ **Source of Sample:** Pond Fill **Sample Number:** BS-1

DYNAMIC EARTH

Remarks:

Figure 1

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.3	5.9	38.2	54.3	

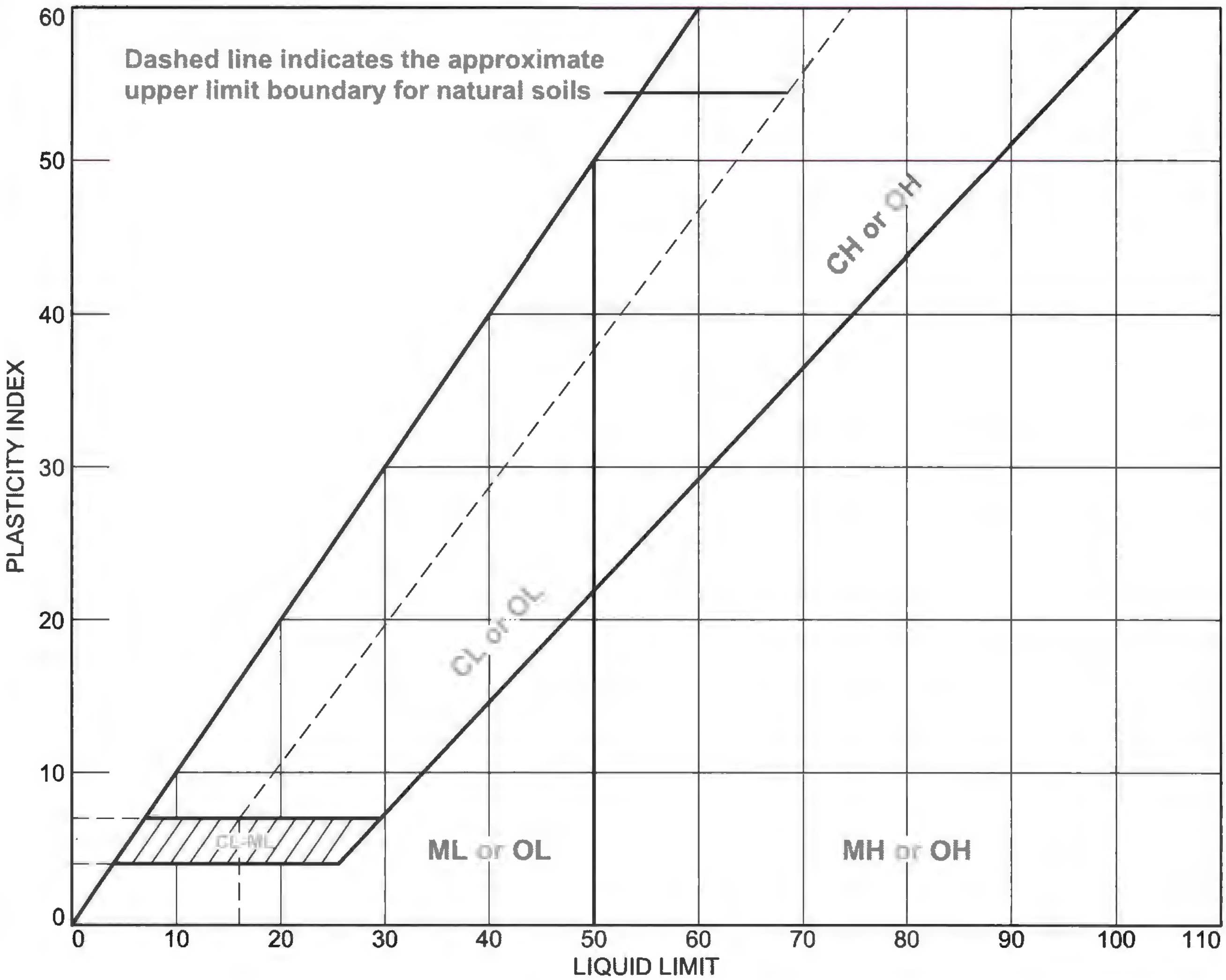
	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	B-1	--	--	2/22/22	ML	Brown silt, and c-f sand, trace f gravel	11.7	17	19

Client County Concrete
Project Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No. 1949-99-001EC Figure 2

DYNAMIC EARTH

Stockpiled Processed - Pond Fill

LIQUID AND PLASTIC LIMITS TEST REPORT

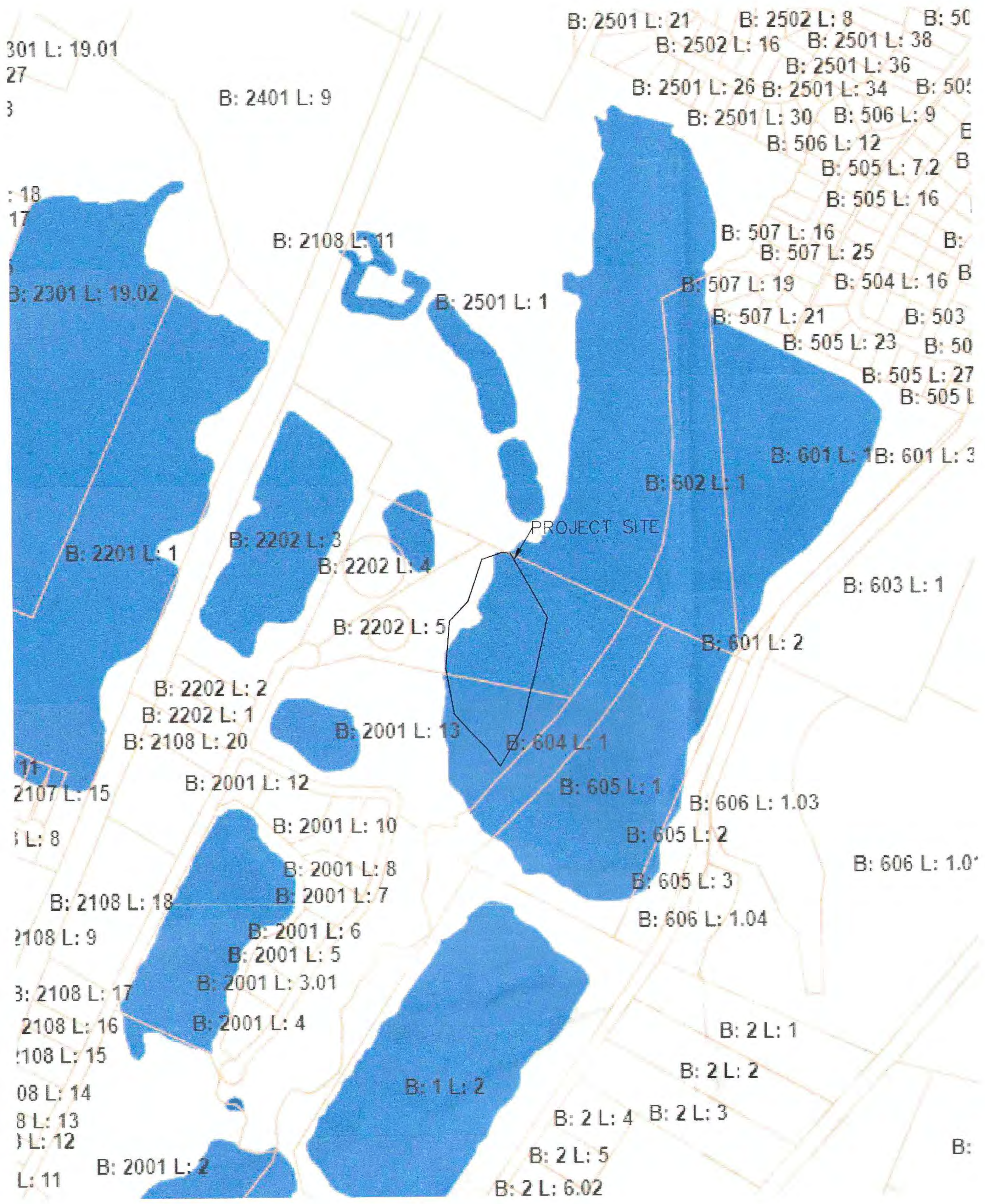


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1	--	--	11.7	19	17	NP	ML

DYNAMIC EARTH

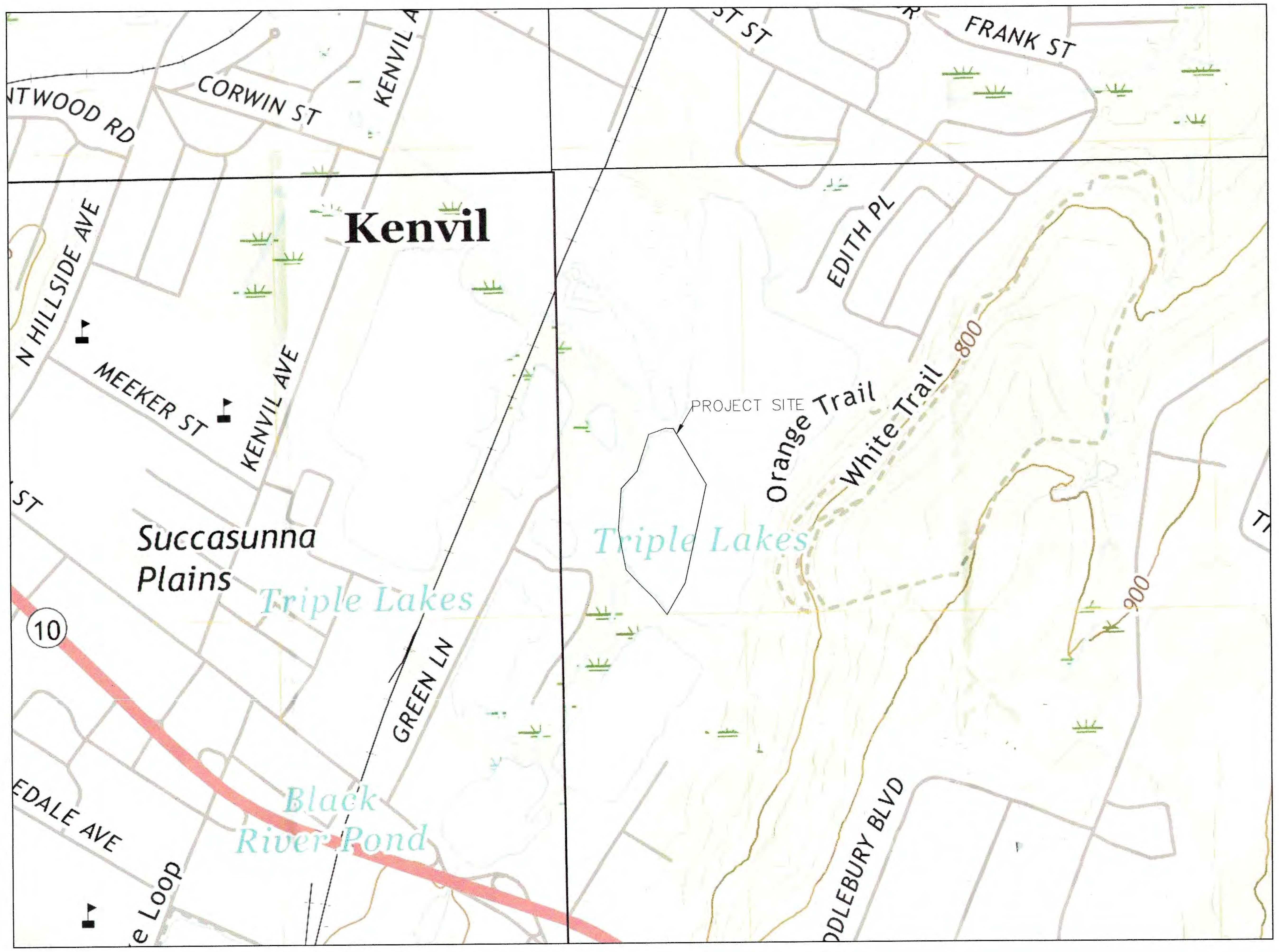
Client: County Concrete
Project: Existing Concrete Plant
50 Railroad Avenue, Kenvil, New Jersey
Project No.: 1949-99- **Figure** 3

PROJECT TITLE: BLACK RIVER RESTORATION



ADJOINING PROPERTIES MAP

NJ-GEOWEB
NTS



LOCATION MAP

USGS TOPO MAP 2019 QUADRANGLE
CHESTER, DOVER, MENDHAM, STANHOPE NJ
1":1000'

TABLE OF CONTENTS

SITE DATA:

BLOCK-LOT: 2501-1
RECORD OWNER: COUNTY CONCRETE CORP
LOCATION: 50 RAILROAD AVE, KENVIL NJ

BLOCK-LOT: 602-1
RECORD OWNER: COUNTY CONCRETE CORP
LOCATION: GREEN LN, KENVIL NJ

BLOCK-LOT: 605-1
RECORD OWNER: COUNTY CONCRETE CORP
LOCATION: GREEN LN, KENVIL NJ

BLOCK-LOT: 2001-13
RECORD OWNER: STEPHEN D PENZENIK
LOCATION: 28 GREEN LN, SUCCASUNNA NJ

BLOCK-LOT: 2202-5
RECORD OWNER: STEPHEN D PENZENIK & PATRICIA A PENZENIK
LOCATION: 30 GREEN LN, SUCCASUNNA NJ

BLOCK-LOT: 604-1
RECORD OWNER: MINE HILL TOWNSHIP
LOCATION: GREEN RD, KENVIL NJ

STREAM CLASSIFICATION:

THE PROJECT'S RECEIVING WATERCOURSE IS THE BLACK RIVER/LAMINGTON RIVER. THE SITE IS LOCATED IN THE NORTH AND SOUTH BRANCH RARITAN WATERSHED MANAGEMENT AREA, LAMINGTON RIVER (ABOVE RT 10) SUBWATERSHED (08BA01). THE NJ CHAPTER 9B: SURFACE WATER QUALITY CLASSIFICATION IS FRESHWATER 2-NON-TROUT (FW2-NT(C1)).

EXISTING CONDITIONS DATA:

EXISTING SITE CONDITIONS ARE FROM A SURVEY CONDUCTED BY PROPERTY LINE SURVEYING LLC ON 06/02/2021.

LIMIT OF AREA OF DISTURBANCE:

THIS LIMIT OF DISTURBANCE OF THIS PROJECT IS 16.4 ACRES (715,102 SQFT).

THE AREA SHOWN AS THE LIMIT OF DISTURBANCE ON THIS PLAN SHALL BE DELINEATED IN THE FIELD BY ORANGE CONSTRUCTION FENCING OR STAKES AND ROPE TO PREVENT ANY DISTURBANCE OUTSIDE THIS AREA. ANY DELINEATING DEVICES USED THAT ARE KNOCKED DOWN BY CONSTRUCTION EQUIPMENT SHALL BE IMMEDIATELY RESTORED AND REPLACED AS NECESSARY. DISTURBANCE OUTSIDE THIS AREA IS PROHIBITED.

GEOLOGIC FORMATIONS/SOIL CONDITIONS:

THE SITE IS UNDERLAIN BY MIDDLE AND LOWER CAMBRIAN-AGED LEITHVILLE FORMATION, WHICH CONSISTS OF LIGHT TO DARK GRAY AND LIGHT-OLIVE-GRAY FINE- TO MEDIUM GRAINED THIN TO MEDIUM BEDDED DOLOMITE GRADING DOWNWARD THROUGH MEDIUM GRAY, GRAYISH YELLOW, OR PINKISH GRAY DOLOMITE AND DOLOMITE SANDSTONE, SILTSTONE AND SHALE TO MEDIUM GRAY, MEDIUM GRAINED, MEDIUM BEDDED DOLOMITE CONTAINING QUARTZ SAND GRAINS AS STRINGERS AND LENSES NEAR BASE. OVERBURDEN MATERIALS INCLUDE GLACIAL DEPOSITS ASSOCIATED WITH WISCONSINAN GLACIAL CYCLE, WHICH REACHED ITS MOST SOUTHERLY ADVANCE THOUSANDS OF YEARS AGO AND ALLUVIAL DEPOSITS.

POTENTIAL THERMAL IMPACTS TO SURFACE WATER:

THE THERMAL IMPACTS ASSOCIATED WITH THIS PROJECT ARE AVOIDED, MINIMIZED, AND MITIGATED BY FILTERING STORMWATER RUNOFF THROUGH A VEGETATED BUFFER AND ISOLATING THE BLACK RIVER STREAM FLOWS FROM RUTGERS POND.

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdrAt	Timakwa muck, 0 to 2 percent slopes, frequently flooded	15.4	23.5%
NerB	Netcong gravelly sandy loam, 3 to 8 percent slopes	0.5	0.8%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	6.9	10.5%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	4.8	7.3%
PHG	Pits, sand and gravel	1.0	1.5%
UR	Urban land	3.6	5.5%
WATER	Water	33.5	51.0%
Totals for Area of Interest		65.8	100.0%

SOIL TABLE

USDA NRCS REPORT

REVISION
DATE

BEI

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BOGIA ENGINEERING INC.
1340 PENN AVE WYOMISSING, PA 19610
PHONE: 610-678-3071 - FAX: 610-678-3517
WWW.BOGIAENG.COM

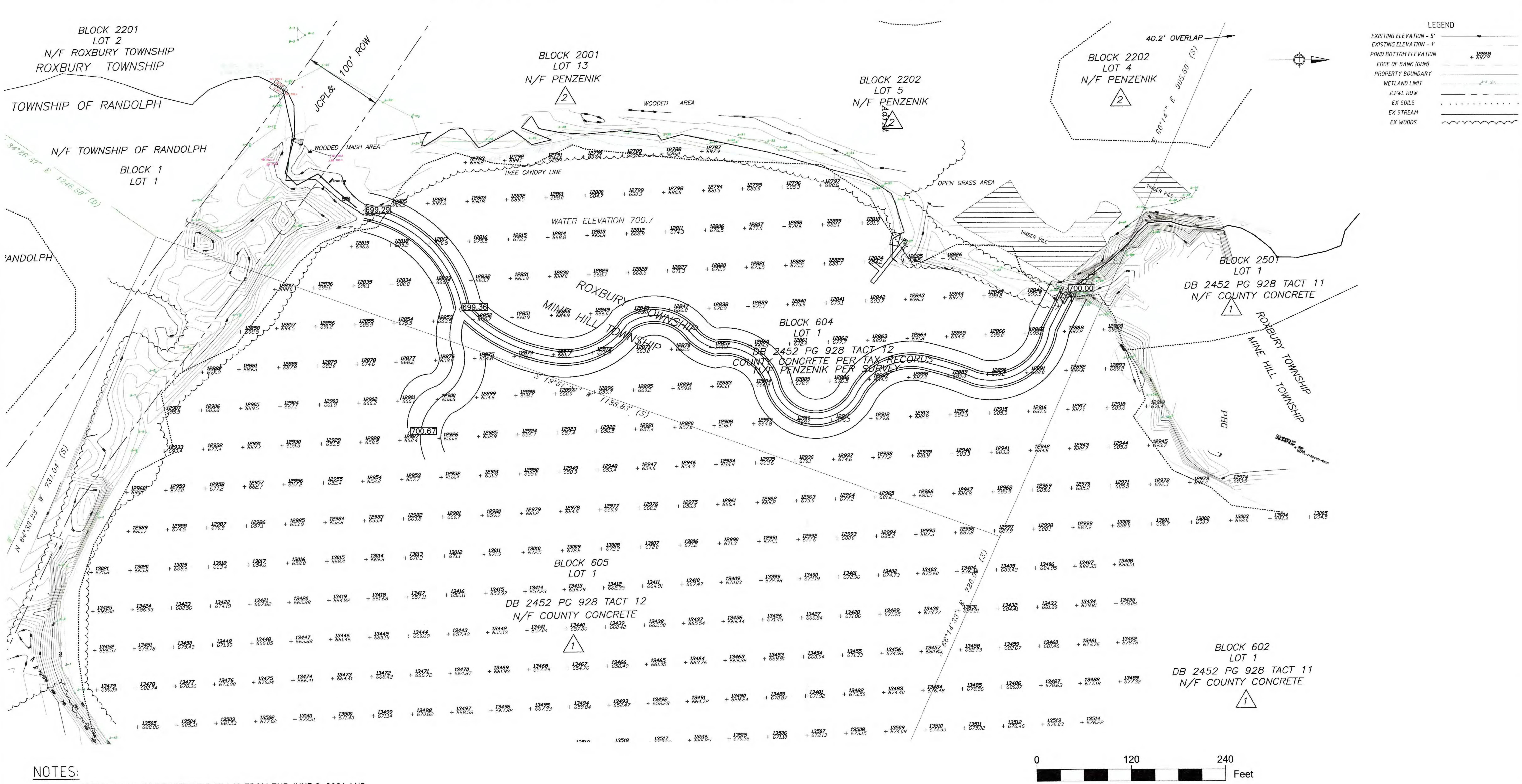
FINAL PLANS
BLACK RIVER RESTORATION
COVER SHEET

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847

JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

PIN: SEE COVER SHEET
CHECKED BY: ----
DRAWN BY: AB
DATE: 4/27/2022
SCALE: NTS
DRAWING: C100
PROJECT: NJ1954-01
SHEET: 1 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



NOTES:

1: SURVEY AND BATHYMETRIC DATA IS FROM THE JUNE 2, 2021 AND AUGUST 5, 2021 SURVEYS BY PROPERTY LINE SURVEYING LLC. THE HORIZONTAL DATUM IS NAD83 AND VERTICAL DATUM IS NAVD88.

2: WETLAND DELINEATION WAS PERFORMED BY DUBOIS & ASSOCIATES ON DECEMBER 15, 2021. MARKED WETLAND FLAGS WERE SURVEYED BY PROPERTY LINE SURVEYING LLC.

REVISION | DATE

BEI

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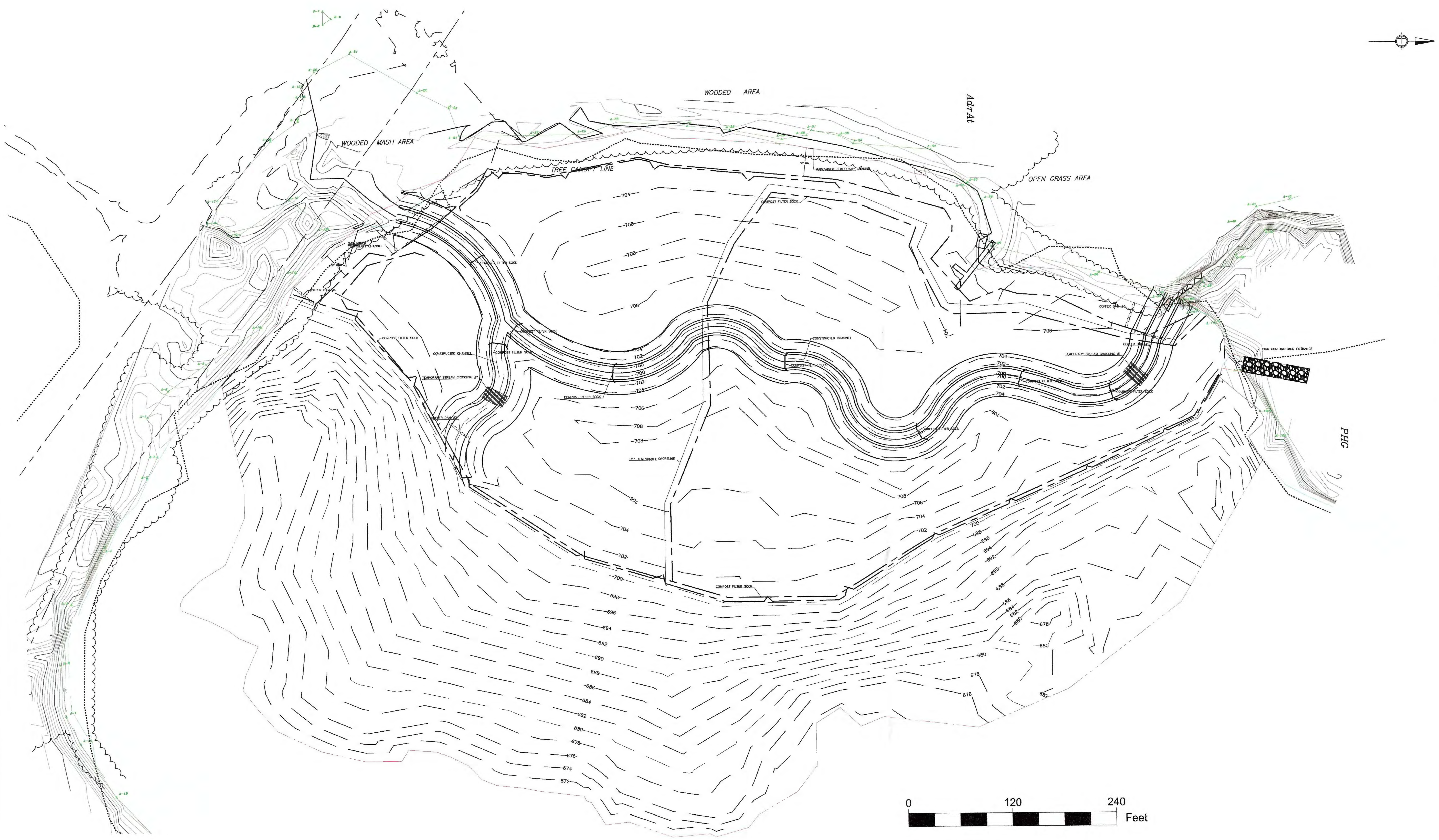
BOGIA ENGINEERING INC.
1340 PENN AVE WYOMISSING, PA 19610
PHONE 610-678-3071 - FAX 610-678-3517
WWW.BOGIAENG.COM

FINAL PLANS
BLACK RIVER RESTORATION
EXISTING CONDITIONS

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE	
KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
MORRIS	
NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	1"=60'
DRAWING:	C101
PROJECT:	NJ1954-01
SHEET:	2 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



LEGEND

- EX. 1' CONTOURS
- EX. EDGE OF BANK (OHM)
- PROPERTY BOUNDARY
- WETLAND LIMIT
- JCP&L ROW
- EX. SOILS
- EX. STREAM
- EX. WOODS
- LIMIT OF DISTURBANCE
- PROPOSED 2' CONTOURS
- PROPOSED SHORELINE
- TYP. TEMPORARY SHORELINE
- TEMPORARY CHANNEL
- ROCK CONSTRUCTION ENTRANCE
- COFFER DAM
- COMPOST FILTER SOCK
- TURBIDITY CURTAIN
- TEMPORARY STREAM CROSSING

LIMIT OF AREA OF DISTURBANCE:

THE AREA SHOWN AS THE LIMIT OF CONSTRUCTION ON THIS PLAN SHALL BE DELINEATED IN THE FIELD BY ORANGE CONSTRUCTION FENCING OR STAKES AND ROPE TO PREVENT ANY DISTURBANCE OUTSIDE THIS AREA. ANY DELINEATING DEVICES USED THAT ARE KNOCKED DOWN BY CONSTRUCTION EQUIPMENT SHALL BE IMMEDIATELY RESTORED AND REPLACED AS NECESSARY. DISTURBANCE OUTSIDE THIS AREA IS PROHIBITED.

SITE FEATURE NOTES:

1. IT IS MANDATORY FOR THE CONTRACTOR TO FOLLOW AND COMPLY WITH THE APPROVED EROSION AND SEDIMENTATION PLAN EXCEPT FOR WHERE THE CONTRACTOR IS FOLLOWING AMENDMENTS THAT HAVE BEEN APPROVED BY THE CONSERVATION DISTRICT.
2. OFFSITE DISPOSAL OF MATERIALS TO BE IN DEP APPROVED MANNER OR AT FACILITIES PERMITTED TO HANDLE MATERIALS.
3. ALL ENVIRONMENTAL CLEAN UP, ASBESTOS REMOVAL OR HAZARDOUS WASTE TO BE HANDLED BY EPA AND DEP GUIDELINES AND DISPOSED OF OFF-SITE AT AN APPROVED FACILITY.
4. FEATURES AND UTILITIES SHOWN ON THIS PLAN ARE THE RESULT OF FIELD SURVEY. DIFFERENCES BETWEEN THIS PLAN AND THE PREVIOUSLY RECORDED PLAN FOR UTILITY LOCATION IS A NON-RECORDED CONSTRUCTION CHANGES. THIS PLAN REPRESENTS THE KNOWN FACILITIES AT THE TIME THE SURVEY WAS PERFORMED.

NOTES:

1: SOILS DATA AND BOUNDARIES ARE FROM A CUSTOM NRCS SOIL RESOURCE REPORT. SOILS WITHIN THE PROJECT AREA ARE TIMAKWA MUCK (AdrAt) AND PITS, SAND, AND GRAVEL (PHG).
2: VOLUME OF FILL IS 590,180 CUYD.
3: PLACED FILL SHALL HAVE A MAXIMUM SLOPE OF 22.5%.

REVISION | DATE

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FINAL PLANS
BLACK RIVER RESTORATION
E&SC PLAN

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847
JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
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PIN:	SEE COVER SHEET
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DATE:	4/27/2022
SCALE:	1"=60'
DRAWING:	C102
PROJECT:	NJ1954-01
SHEET:	3 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION

GENERAL NOTES

1. THIS EROSION AND SEDIMENT MANAGEMENT PLAN WAS PREPARED BY THE STAFF OF BOGIA ENGINEERING, INC. UNDER THE DIRECTION OFCHRISTOPHER MULDOON, P.E. THE MEASURES SHOWN HAVE BEEN DESIGNED IN ACCORDANCE WITH THE NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THE COUNTY SOIL CONSERVATION DISTRICT. BOGIA ENGINEERING, INC. DOES NOT TAKE RESPONSIBILITY IN OBSERVING AND/OR CERTIFYING THE CONSTRUCTION OF THESE FACILITIES UNLESS REQUESTED SPECIFICALLY BY THE OWNER AND/OR CONTRACTOR. THEREFORE, BOGIA ENGINEERING, INC. DOES NOT ACCEPT ANY RESPONSIBILITY FOR DAMAGES AS A RESULT OF IMPROPER CONSTRUCTION AND/OR MAINTENANCE OF FACILITIES DURING CONSTRUCTION.

2. THE CONTRACTOR/RESPONSIBLE PARTY (C/RP) SHALL BE DEFINED AS THE CONTRACTOR FOR THE TIME PERIOD OF INITIAL SITE DISTURBANCE UP TO THE POINT THE SITE ACHIEVES FINAL STABILIZATION AS DEFINED HEREIN. THE PERMITTEE/CO-PERMITTEE (PERMITTEE) SHALL BE THOSE INDIVIDUALS OR ORGANIZATIONS AS DEFINED ON THE APPROVED EROSION & SEDIMENT CONTROL PERMIT APPLICATION, THE APPROVED NJPDES PERMIT APPLICATION AND/OR THE PROPERTY OWNER.

3. THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION, NEW JERSEY ADMINISTRATIVE CODE 7:8, STORMWATER MANAGEMENT.

4. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.

5. CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE STATE UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE-USE).

- CLEAN FILL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE: FILL MATERIALS AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE STILL QUALIFIES AS CLEAN FILL PROVIDED THE TESTING REVEALS THAT THE FILL MATERIAL CONTAINS CONCENTRATIONS OF REGULATED SUBSTANCES THAT ARE BELOW THE RESIDENTIAL LIMITS IN TABLE 1B, NON-RESIDENTIAL DIRECT CONTACT HEALTH BASED CRITERIA AND SOIL REMEDIATION STANDARDS.
- ANY PERSON PLACING CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP-001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL.
- ENVIRONMENTAL DUE DILIGENCE: THE APPLICANT MUST PERFORM ENVIRONMENTAL DUE DILIGENCE TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH THE DEPARTMENT'S RULES AND REGULATIONS
- FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S WASTE REGULATIONS.

6. THE C/RP SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, THE EROSION AND SEDIMENT CONTROL PLAN PREPARER, AND ALL PERMITTING AGENCIES TO AN ON-SITE MEETING TO TAKE PLACE AT LEAST 7 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES. ALSO, AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE NEW JERSEY ONE CALL SYSTEM AT 811 OR 1-800-272-1000 FOR BURIED UTILITIES LOCATIONS.

7. THE C/RP SHALL REMOVE FROM THIS SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS FROM NEW JERSEY ADMINISTRATIVE CODE 7:26, AND/OR ANY ADDITIONAL LOCAL, STATE OR FEDERAL REGULATIONS. THE CONTRACTOR SHALL NOT ILLEGALLY BURY, DUMP, OR DISCHARGE ANY BUILDING MATERIALS (USED OR UNUSED) OR WASTES AT THIS SITE.

8. THE PROJECT'S RECEIVING WATERCOURSE IS THE BLACK RIVER/LAMINGTON RIVER. THE SITE IS LOCATED IN THE NORTH AND SOUTH BRANCH RARITAN WATERSHED MANAGEMENT AREA, LAMINGTON RIVER (ABOVE RT 10) SUBWATERSHED (08BA01). THE NJ CHAPTER 9B: SURFACE WATER QUALITY CLASSIFICATION IS A FRESHWATER 2-NON-TROUT (FW2-NT(C1))

9. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES.

10. WHERE E&S BMPS ARE FOUND TO BE INOPERATIVE OR INEFFECTIVE DURING AN INSPECTION, OR ANY OTHER TIME, THE C/RP SHALL IMMEDIATELY CONTACT THE SOIL CONSERVATION DISTRICT, BY PHONE OR PERSONAL CONTACT, FOLLOWED BY THE SUBMISSION OF A WRITTEN REPORT WITHIN 5 DAYS OF THE INITIAL CONTACT.

11. UPON REDUCTION, LOSS OR FAILURES OF BMPS, THE PERMITTEE SHALL TAKE IMMEDIATE ACTION TO RESTORE THE BMPS OR PROVIDE AN ALTERNATIVE METHOD OF TREATMENT.

12. THE CONTRACTOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED THROUGHOUT THE PROJECT.

13. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO ELIMINATE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION.

14. BEFORE INITIATING ANY REVISIONS TO THE APPROVED EROSION AND SEDIMENT CONTROL PLAN OR REVISIONS TO OTHER PLANS WHICH MAY AFFECT THE EFFECTIVENESS OF THE APPROVED E&S CONTROL PLAN, THE O/RP MUST RECEIVE APPROVAL OF THE REVISIONS FROM THE COUNTY SOIL CONSERVATION DISTRICT.

15. THE CONTRACTOR SHALL ASSURE THAT AN EROSION AND SEDIMENT CONTROL PLAN HAS BEEN PREPARED, APPROVED BY THE APPROPRIATE SOIL CONSERVATION DISTRICT, AND IS BEING IMPLEMENTED AND MAINTAINED FOR ALL SOIL AND/OR ROCK SPOIL AND BORROW AREAS, REGARDLESS OF THEIR LOCATIONS.

16. THE C/RP MUST DEVELOP, AND HAVE APPROVED BY THE COUNTY SOIL CONSERVATION DISTRICT, A SEPARATE EROSION AND SEDIMENTATION POLLUTION CONTROL PLAN FOR EACH SPOIL, BORROW, OR OTHER WORK AREA NOT DETAILED IN THE PERMITTED PLAN, WHETHER LOCATED WITHIN OR OUTSIDE OF THE CONSTRUCTION LIMITS.

17. UNTIL THE SITE ACHIEVES FINAL STABILIZATION, THE CONTRACTOR SHALL ASSURE THAT THE BEST MANAGEMENT PRACTICES ARE IMPLEMENTED, OPERATED, AND MAINTAINED PROPERLY AND COMPLETELY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL BEST MANAGEMENT PRACTICE FACILITIES AND MAINTAIN AND MAKE AVAILABLE TO THE COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF ALL THOSE INSPECTIONS. ALL MAINTENANCE WORK, INCLUDING CLEANING, REPAIR, REPLACEMENT, REGARDING, RESEEDING, AND RE-STABILIZATION SHALL BE PERFORMED IMMEDIATELY.

18. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMP CONTROLS MUST BE REMOVED. AREAS DISTURBED DURING REMOVAL OF THE BMPS MUST BE STABILIZED IMMEDIATELY.

19. EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS. ONLY LIMITED DISTURBANCE WILL BE PERMITTED TO PROVIDE ACCESS TO THE SITE FOR GRADING AND ACQUIRING BORROW TO CONSTRUCT THOSE BMPS.

20. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE ANY AREAS DISTURBED BY THE ACTIVITIES. DURING NON-GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE SPECIFIED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN ONE YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY VEGETATIVE STABILIZATION SPECIFICATIONS. DISTURBED AREAS WHICH ARE AT FINISHED GRADE OR WHICH WILL NOT BE REDISTURBED WITHIN ONE YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE PERMANENT VEGETATIVE STABILIZATION SPECIFICATIONS.

21. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.

22. STOCKPILE HEIGHTS MUST NOT EXCEED 35 FEET. STOCKPILE SLOPES MUST BE 2: 1 OR FLATTER. STOCKPILE TOPSOIL WHERE INDICATED ON PLAN FOR USE WITH FINAL GRADING. INSTALL PERIMETER FILTER FABRIC FENCE AND IMMEDIATELY APPLY TEMPORARY SEEDING AND MULCHING.

23. ALL PUMPING OF SEDIMENT LADEN WATER (UNRELATED TO DREDGE MATERIAL DEWATERING) SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.

24. TEMPORARY STABILIZATION AND PERMANENT STABILIZATION

a. HAY OR STRAW MULCH MUST BE APPLIED AT 3.0 TONS PER ACRE.

b. MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED ON ALL SLOPES 3:1 OR STEEPER.

c. STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN.

d. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGARDING, RESEEDING, REMULCHING, AND RENETTING, MUST BE DONE IMMEDIATELY. IF EROSION AND SEDIMENT CONTROL BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS TO THOSE INSTALLED WILL BE REQUIRED.

e. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPE AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

25. SEEDING, TEMPORARY AND PERMANENT

A. TEMPORARY SEEDING AS APPROVED BY THE MUNICIPALITY AND THE COUNTY SOIL CONSERVATION DISTRICT SHALL BE PERFORMED ON ALL DISTURBED SOIL AREAS IMMEDIATELY AT THE END OF EACH WORK ACTIVITY, AND ON ALL DISTURBED SOIL AREAS IN WHICH ACTIVITIES HAVE CEASED OR WHICH WILL REMAIN EXPOSED IN ACCORDANCE WITH THE MINIMUM SEEDING SPECIFICATIONS IN THE GENERAL E&S NOTES

B. PERMANENT SEEDING AS APPROVED BY THE MUNICIPALITY AND THE COUNTY SOIL CONSERVATION DISTRICT SHALL BE PERFORMED ON ALL DISTURBED SOIL AREAS THAT ARE AT FINISHED GRADE, AND ALL DISTURBED SOIL AREAS THAT WILL NOT BE DISTURBED WITHIN ONE YEAR, IN ACCORDANCE WITH THE MINIMUM SEEDING SPECIFICATIONS IN THE GENERAL E&S NOTES

-PRIOR TO PERMANENT SEEDING SOILS TESTING SHALL BE PERFORMED TO DETERMINE THE APPROPRIATE FERTILIZER AND LIMESTONE APPLICATIONS. FERTILIZER AND LIMESTONE SHALL BE APPLIED PER THE RECOMMENDATIONS OF A LICENSED LANDSCAPE PROFESSIONAL. PERMANENT VEGETATION SHOULD BE ESTABLISHED AT THE EARLIEST POSSIBLE DATE. WATERING, MOWING AND FERTILIZING PROGRAMS SHALL BE CONTINUED UNTIL VEGETATIVE COVER IS ADEQUATELY ESTABLISHED.

GENERAL E&S NOTES

1. PRIOR TO ANY UPLAND EARTH DISTURBANCE, THE MORRIS COUNTY SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED AT LEAST 72 HOURS IN ADVANCE.

2. ALL APPLICABLE EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IN PLACE PRIOR TO ANY GRADING OPERATION AND/OR INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES.

3. SOIL EROSION AND SEDIMENT CONTROL PRACTICES ON THIS PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY.

4. APPLICABLE EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE LEFT IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND/OR THE AREA IS STABILIZED.

5. THE CONTRACTOR SHALL PERFORM ALL WORK, FURNISH ALL MATERIALS AND INSTALL ALL MEASURES REQUIRED TO REASONABLY CONTROL SOIL EROSION RESULTING FROM CONSTRUCTION OPERATIONS AND PREVENT EXCESSIVE FLOW OF SEDIMENT FROM THE CONSTRUCTION SITE.

6. ANY DISTURBED AREA THAT IS TO BE LEFT EXPOSED FOR MORE THAN THIRTY (30) DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC SHALL IMMEDIATELY RECEIVE A TEMPORARY SEEDING AND FERTILIZATION IN ACCORDANCE WITH THE NEW JERSEY STANDARDS AND THEIR RATES SHOULD BE INCLUDED IN THE NARRATIVE. IF THE SEASON PROHIBITS TEMPORARY SEEDING, THE DISTURBED AREAS WILL BE MULCHED WITH SALT HAY OR EQUIVALENT AND ANCHORED IN ACCORDANCE WITH THE NEW JERSEY STANDARDS (I.E. PEG AND TWINE, MULCH NETTING OR LIQUID MULCH BINDER).

7. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO PROVIDE CONFIRMATION OF LIME, FERTILIZER AND SEED APPLICATION AND RATES OF APPLICATION AT THE REQUEST OF THE MORRIS COUNTY SOIL CONSERVATION DISTRICT.

8. ALL CRITICAL AREAS SUBJECT TO EROSION WILL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH AT A RATE OF 2 TONS PER ACRE, ACCORDING TO THE NEW JERSEY STANDARDS IMMEDIATELY FOLLOWING ROUGH GRADING.

9. THE SITE SHALL AT ALL TIMES BE GRADED AND MAINTAINED SUCH THAT ALL STORMWATER RUNOFF IS DIVERTED TO SOIL EROSION AND SEDIMENT CONTROL FACILITIES.

10. ALL SEDIMENTATION STRUCTURES WILL BE INSPECTED AND MAINTAINED ON A REGULAR BASIS AND AFTER EVERY STORM EVENT.

11. A CRUSHED STONE, TIRE CLEANING PAD WILL BE INSTALLED WHEREVER A CONSTRUCTION ACCESS POINT EXISTS. THE STABILIZED PAD WILL BE INSTALLED ACCORDING TO THE STANDARD FOR STABILIZED CONSTRUCTION ACCESS.

12. ALL DRIVEWAYS MUST BE STABILIZED WITH 2 ½" CRUSHED STONE OR SUBBASE PRIOR TO INDIVIDUAL LOT CONSTRUCTION.

13. PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES.

14. ALL CATCH BASIN INLETS WILL BE PROTECTED ACCORDING TO THE CERTIFIED PLAN.

15. ALL STORM DRAINAGE OUTLETS WILL BE STABILIZED, AS REQUIRED, BEFORE THE DISCHARGE POINTS BECOME OPERATIONAL.

16. ALL GENERAL SITE DEWATERING OPERATIONS MUST DISCHARGE DIRECTLY INTO A SEDIMENT FILTER AREA. THE SEDIMENT FILTER SHOULD BE COMPOSED OF A SUITABLE SEDIMENT FILTER FABRIC. (SEE DETAIL) ALL SEDIMENT TRAPS AND SUMPS MUST BE DEWATERED THROUGH FILTER BAGS.

17. NJSA 4:24-39, ET SEQ. REQUIRES THAT NO CERTIFICATE OF OCCUPANCY BE ISSUED BEFORE ALL PROVISIONS OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN HAVE BEEN COMPLIED WITH FOR PERMANENT MEASURES. ALL SITE WORK FOR THE PROJECT MUST BE COMPLETED PRIOR TO THE DISTRICT ISSUING A REPORT OF COMPLIANCE AS A PREREQUISITE TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY BY THE MUNICIPALITY.

18. MULCHING IS REQUIRED ON ALL SEEDED AREAS TO INSURE AGAINST EROSION BEFORE GRASS IS ESTABLISHED TO PROMOTE EARLIER VEGETATION COVER.

19. OFFSITE SEDIMENT DISTURBANCE MAY REQUIRE ADDITIONAL CONTROL MEASURES TO BE DETERMINED BY THE EROSION CONTROL INSPECTOR.

20. A COPY OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN MUST BE MAINTAINED ON THE PROJECT SITE DURING CONSTRUCTION.

21. ANY CONVEYANCE OF THIS PROJECT PRIOR TO ITS COMPLETION WILL TRANSFER FULL RESPONSIBILITY FOR COMPLIANCE WITH THE CERTIFIED PLAN TO ANY SUBSEQUENT OWNERS.

22. IMMEDIATELY AFTER THE COMPLETION OF STRIPPING AND STOCKPILING OF TOPSOIL, THE STOCKPILE MUST BE STABILIZED ACCORDING TO THE STANDARD FOR TEMPORARY VEGETATIVE COVER. STABILIZE TOPSOIL PILE WITH STRAW MULCH FOR PROTECTION IF THE SEASON DOES NOT PERMIT THE APPLICATION AND ESTABLISHMENT OF TEMPORARY SEEDING. ALL SOIL STOCKPILES ARE NOT TO BE LOCATED WITHIN FIFTY (50) FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY AND THE BASE MUST BE PROTECTED WITH A SEDIMENT BARRIER.

23. ANY CHANGES TO THE SITE PLAN WILL REQUIRE THE SUBMISSION OF A REVISED SOIL EROSION AND SEDIMENT CONTROL PLAN TO THE MORRIS COUNTY SOIL CONSERVATION DISTRICT. THE REVISED PLAN MUST BE IN ACCORDANCE WITH THE CURRENT NEW JERSEY STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL.

24. METHODS FOR THE MANAGEMENT OF HIGH ACID PRODUCING SOILS SHALL BE IN ACCORDANCE WITH THE STANDARDS. HIGH ACID PRODUCING SOILS ARE THOSE FOUND TO CONTAIN IRON SULFIDES OR HAVE A pH OF 4 OR LESS.

25. TEMPORARY AND PERMANENT SEEDING MEASURES MUST BE APPLIED ACCORDING TO THE NEW JERSEY STANDARDS, AND MULCHED WITH SALT HAY OR EQUIVALENT AND ANCHORED IN ACCORDANCE WITH THE NEW JERSEY STANDARDS (I.E. PEG AND TWINE, MULCH NETTING OR LIQUID MULCH BINDER).

26. MAXIMUM SIDE SLOPES OF ALL EXPOSED SURFACES SHALL NOT BE CONSTRUCTED STEEPER THAN 3:1 UNLESS OTHERWISE APPROVED BY THE DISTRICT.

27. DUST IS TO BE CONTROLLED BY AN APPROVED METHOD ACCORDING TO THE NEW JERSEY STANDARDS AND MAY INCLUDE WATERING WITH A SOLUTION OF CALCIUM CHLORIDE AND WATER. DUST IS TO BE CONTROLLED BY DAILY WATERING AS NECESSARY.

28. ADJOINING PROPERTIES SHALL BE PROTECTED FROM EXCAVATION AND FILLING OPERATIONS ON THE PROPOSED SITE.

29. USE STAGED CONSTRUCTION METHODS TO MINIMIZE EXPOSED SURFACES, WHERE APPLICABLE.

30. ALL VEGETATIVE MATERIAL SHALL BE SELECTED IN ACCORDANCE WITH AMERICAN STANDARDS FOR NURSERY STOCK OF THE AMERICAN ASSOCIATION OF THE NURSERYMEN AND IN ACCORDANCE WITH THE NEW JERSEY STANDARDS.

31. NATURAL VEGETATION AND SPECIES SHALL BE RETAINED WHERE SPECIFIED ON THE LANDSCAPE PLAN.

32. THE SOIL EROSION INSPECTOR MAY REQUIRE ADDITIONAL SOIL EROSION MEASURES TO BE INSTALLED, AS DIRECTED BY THE DISTRICT INSPECTOR.

33. WITHIN TEN (10) DAYS AFTER FINAL GRADING, THE SITE WILL RECEIVE PERMANENT VEGETATIVE STABILIZATION FOLLOWING A UNIFORM APPLICATION OF TOPSOIL TO A MINIMUM DEPTH OF AT LEAST FIVE (5) INCHES AND ACCORDING TO THE ITEMS BELOW:

(a) SEEDBED PREPARATION - ANY SOIL HAVING A PH OF 4 OR LESS OR CONTAINING IRON SULFIDE SHALL BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A PH OF 5 OR MORE PRIOR TO SEEDBED PREPARATION. ALL STONES TWO INCHES OR LARGER AND ALL OTHER DEBRIS SUCH AS TREE ROOTS, LOGS, PIECES OF CONCRETE, ETC., WILL BE REMOVED. FERTILIZER (10-20-10) WILL BE APPLIED AT A RATE OF 500 POUNDS PER ACRE. PULVERIZED DOLOMITIC LIMESTONE WILL BE APPLIED AT A RATE OF (2) TONS PER ACRE. FERTILIZER AND LIMESTONE WILL BE WORKED INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES. IF TRAFFIC HAS COMPACTED THE SOIL, THE AREA WILL BE RETILLED AND FIRMED.

(b) SEEDING - THE FOLLOWING MIXTURES WILL BE APPLIED:

FINAL SEEDING IS TO CONSIST OF GRAIN RYE (30LBS/ACRE) AND "FLOODPLAIN MIX" (20 LBS/ACRE), OR APPROVED ALTERNATIVE. FLOODPLAIN MIX IS A MIXTURE OF GRASSES AND WILDFLOWERS THAT ARE NATIVE TO THE MID-ATLANTIC REGION, INCLUDING THE FOLLOWING SPECIES: VIGINIA WILDRYE, DEERTOUNGE, ASTER, INDIANGRASS, AND SWAMP MILKWEED.

"FLOODPLAIN MIX" IS AVAILABLE THROUGH ERNST SEEDS, 8884 MERCER PIKE, MEADVILLE, PA 16335.

OPTIMUM SEEDING DATES: OCTOBER - MAY

APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL OR CULTIPACK SEEDER TO A DEPTH OF 1/4" TO 1/2". FIRM SEEDBED FOLLOWING SEEDING WITH A ROLLER OR LIGHT DRAG. SEEDING OPERATIONS ARE TO BE DONE ON THE CONTOUR.

(c) MULCHING - IMMEDIATELY FOLLOWING SEEDING, MULCH WILL BE PLACED. MULCH WILL CONSIST OF EITHER UNROTTED HAY OR SMALL GRAIN STRAW SPREAD UNIFORMLY BY HAND OR MECHANICALLY AT A RATE OF TWO TONS PER ACRE AND ANCHORED IMMEDIATELY AFTER PLACEMENT. MULCH ANCHORING WILL CONSIST OF LIQUID MULCH BINDER OR NETTING TIEDOWN.

STANDARD E&SC NOTES

1. ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE INSTALLED IN ACCORDANCE WITH THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY, AND WILL BE IN PLACE PRIOR TO ANY MAJOR SOIL DISTURBANCE OR IN THEIR PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.

2. PERMANENT VEGETATION IS TO BE ESTABLISHED ON EXPOSED AREAS WITHIN TEN (10) DAYS AFTER FINAL GRADING. MULCH IS TO BE USED FOR PROTECTION UNTIL VEGETATION IS ESTABLISHED. SEE NOTE 23 BELOW.

3. IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING. ALL CRITICAL AREAS (STEEP SLOPES, SANDY SOILS, WET CONDITIONS) SUBJECT TO EROSION WILL RECEIVE A TEMPORARY SEEDING IN ACCORDANCE WITH NOTE BELOW.

4. PERMANENT SEEDING AND STABILIZATION TO BE IN ACCORDANCE WITH THE "STANDARD FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION". SPECIFIED RATES AND LOCATIONS SHALL BE ON THE APPROVED SOIL EROSION AND SEDIMENT CONTROL PLAN.

5. THE SITE SHALL AT ALL TIMES BE GRADED AND MAINTAINED SO THAT ALL STORMWATER RUNOFF IS DIVERTED TO SOIL EROSION AND SEDIMENT CONTROL FACILITIES.

6. ALL SEDIMENTATION STRUCTURES (SILT FENCE, INLET FILTERS, AND SEDIMENT BASINS) WILL BE INSPECTED AND MAINTAINED DAILY.

7. PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES.

8. ALL DEWATERING OPERATIONS MUST BE DISCHARGED DIRECTLY INTO A SEDIMENT FILTER AREA. THE FILTER SHOULD BE COMPOSED OF A FABRIC OR APPROVED MATERIAL. SEE THE DEWATERING DETAIL.

9. ALL SEDIMENT BASINS WILL BE CLEANED WHEN THE CAPACITY HAS BEEN REDUCED BY 50%. A CLEAN OUT ELEVATION WILL BE IDENTIFIED ON THE PLAN AND A MARKER INSTALLED ON THE SITE.

10. DURING AND AFTER CONSTRUCTION, THE APPLICANT WILL BE RESPONSIBLE FOR THE MAINTENANCE AND UPKEEP OF THE DRAINAGE STRUCTURES, VEGETATION COVER, AND ANY OTHER MEASURES DEEMED APPROPRIATE BY THE DISTRICT. SAID RESPONSIBILITY WILL END WHEN COMPLETED WORK IS APPROVED BY THE MORRIS COUNTY SOIL CONSERVATION DISTRICT.

11. ALL TREES OUTSIDE THE DISTURBANCE LIMIT INDICATED ON THE SUBJECT PLAN OR THOSE TREES WITHIN THE DISTURBANCE AREA WHICH ARE DESIGNATED TO REMAIN AFTER CONSTRUCTION ARE TO BE PROTECTED WITH TREE PROTECTION DEVICES. SEE THE TREE PROTECTION DETAIL.

12. THE MORRIS COUNTY SOIL CONSERVATION DISTRICT MAY REQUEST ADDITIONAL MEASURES TO MINIMIZE ON SITE OR OFF SITE EROSION PROBLEMS DURING CONSTRUCTION.

13. THE MORRIS COUNTY SOIL CONSERVATION DISTRICT MUST BE NOTIFIED, IN WRITING, AT LEAST 48 HOURS PRIOR TO ANY LAND DISTURBANCE, AND A PRE-CONSTRUCTION MEETING HELD.

14. CONTRACTOR TO SET UP A MEETING WITH THE INSPECTOR FOR PERIODIC INSPECTIONS OF THE TEMPORARY SEDIMENT BASIN PRIOR TO AND DURING ITS CONSTRUCTION.

15. TOPSOIL STOCKPILE PROTECTION

A)APPLY GROUND LIMESTONE AT A RATE OF 90 LBS PER 1000 SQ. FT.

B) APPLY FERTILIZER (10-20-10) AT A RATE OF 11 LBS. PER 1000 SQ. FT.

C)APPLY PERENNIAL RYEGRASS SEED AT 1 LB. PER 1000 SQ. FT.

D)MULCH STOCKPILE WITH STRAW OR HAY AT A RATE OF 90 LBS. PER 1000 SQ. FT.

E) APPLY A LIQUID MULCH BINDER OR TACK TO STRAW OR HAY MULCH.

F) PROPERTY ENTRENCH A SILT FENCE AT THE BOTTOM OF THE STOCKPILE.

22. TEMPORARY STABILIZATION SPECIFICATIONS

A)APPLY GROUND LIMESTONE AT A RATE OF 90 LBS PER 1000 SQ. FT.

B) APPLY FERTILIZER (10-20-10) AT A RATE OF 11 LBS. PER 1000 SQ. FT.

C)APPLY PERENNIAL RYEGRASS SEED AT 1 LB. PER 1000 SQ. FT.

D)MULCH DISTURBED SOIL WITH STRAW OR HAY AT A RATE OF 90 LBS. PER 1000 SQ. FT.

E) APPLY A LIQUID MULCH BINDER OR TACK TO STRAW OR HAY MULCH.

23. PERMANENT STABILIZATION SPECIFICATIONS

A)APPLY TOPSOIL TO A DEPTH OF 5 INCHES (UNSETTLED).

B) APPLY GROUND LIMESTONE AT A RATE OF 90 LBS PER 1000 SQ. FT. AND WORK FOUR INCHES INTO SOIL.

C)APPLY FERTILIZER (10-20-10) AT A OF RATE 11 LBS. PER 1000 SQ. FT.

D)APPLY HARD FESCUE SEED AT 2.7 LBS. PER 1000 SQ. FT. AND CREEPING RED FESCUE SEED AT 0.7 LBS PER 1000 SQ. FT. AND PERENNIAL RYEGRASS SEED AT 0.25 LBS PER 1000 SQ. FT.

E) MULCH STOCKPILE WITH STRAW OR HAY AT A RATE OF 90 LBS. PER 1000 SQ. FT.

F) APPLY A LIQUID MULCH BINDER OR TACK TO STRAW OR HAY MULCH.

*NOTE: 48 HOURS PRIOR TO ANY SOIL DISTURBANCE, NOTICE IN WRITING, SHALL BE GIVEN TO THE MORRIS COUNTY SOIL CONSERVATION DISTRICT AND A PRE-CONSTRUCTION MEETING HELD.

GENERAL ROAD WORK NOTES

1. THE CONTRACTOR SHALL PREPARE A PLAN FOR THE PROPER DEWATERING OF EACH STREAM CROSSING PRIOR TO EXCAVATING THE STREAM BED. PLAN SHALL BE FORWARDED TO THE ENGINEER AND MORRIS COUNTY SOIL CONSERVATION DISTRICT FOR APPROVAL. THE DISTRICT SHALL BE NOTIFIED FOR INSPECTION PRIOR TO EACH STREAM CROSSING CONSTRUCTION.

2. ANY AREAS USED FOR THE CONTRACTOR'S STAGING, INCLUDING BUT NOT LIMITED TO, TEMPORARY STORAGE OF STOCKPILED MATERIALS (E.G. CRUSHED STONE, QUARRY PROCESS STONE, SELECT FILL, EXCAVATED MATERIALS, ETC.), SHALL BE ENTIRELY PROTECTED BY A SILT FENCE ALONG THE LOW ELEVATION SIDE TO CONTROL SEDIMENT RUNOFF.

3. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE MORRIS COUNTY SOIL CONSERVATION DISTRICT OF ANY STAGING AND/OR STOCKPILE LOCATION AREAS AND FOR OBTAINING A SOIL EROSION AND SEDIMENT CONTROL CERTIFICATION FOR THESE AREAS.

4. A CRUSHED STONE, VEHICLE WHEEL-CLEANING BLANKET SHALL BE INSTALLED AT THE CONTRACTOR'S STAGING YARD AND/OR STOCKPILE AREAS TO PREVENT OFF-SITE TRACING OF SEDIMENT BY CONSTRUCTION VEHICLES ONTO PUBLIC ROADS. BLANKET SHALL BE 15 FT. X 50 FT. X 6 IN. (MINIMUM), CRUSHED STONE 2-112 INCHES IN DIAMETER. SAID BLANKET SHALL BE UNDERLAIN WITH A SUITABLE SYNTHETIC SEDIMENT FILTER FABRIC AND MAINTAINED IN GOOD ORDER.

GENERAL DUST CONTROL NOTES

PAGE REFERENCES ARE TO THE NEW JERSEY DEPARTMENT OF AGRICULTURE STATE SOIL CONSERVATION COMMITTEE DOCUMENT "THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY", REVISED 2017.

THE FOLLOWING METHODS SHOULD BE CONSIDERED FOR CONTROLLING DUST:

MULCHES - SEE STANDARD FOR STABILIZATION WITH MULCHES ONLY (PG. 5-1)

VEGETATIVE COVER - SEE STANDARD FOR TEMPORARY VEGETATIVE COVER (PG. 7-I), PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION (PG. 4-I), AND PERMANENT STABILIZATION WITH SOD (PG. 6-1)

SPRAY-ON ADHESIVES - ON MINERAL SOILS (NOT EFFECTIVE ON MUCK SOILS). KEEP TRAFFIC OFF THESE AREAS.

MATERIAL	WATER DILUTION	TYPE OF NOZZLE	APPLY GALLONS/ACRE
ANIONIC ASPHALT EMULSION	7:01	COARSE SPRAY	1200
LATEX EMULSION	12.5:1	FINE SPRAY	235
RESIN IN WATER	4:01	FINE SPRAY	300
POLYACRYLAMINE (PAM) -SPRAY ON POLYACRYLAMINE (PAM) -DRY SPREAD	APPLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS. MAY ALSO BE USED AS AN ADDITIVE TO SEDIMENT BASINS TO FLOCCULATE AND PRECIPITATE SUSPENDED COLLOIDS. SEE SEDIMENT BASIN STANDARD, P. 26-1 OF NJ STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL, 2014.		
ACIDULATED SOY BEAN SOAP STICK	NONE	COARSE SPRAY	1200

TILLAGE - TO ROUGHEN SURFACE AND BRING CLODS TO THE SURFACE. THIS IS A TEMPORARY EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE SOIL BLOWING STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL-TYPE PLOWS SPACED ABOUT 12 INCHES APART AND SPRING-TOOTHED HARROWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.

SPRINKLING - SITE IS SPRINKLED UNTIL THE SURFACE IS WET.

BARRIERS - SOLID BOARD FENCES, SNOW FENCES, BURLAP FENCES, CRATE WALLS, BALES OF HAY AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND SOIL BLOWING.

CALCIUM CHLORIDE - SHALL BE IN THE FORM OF LOOSE, DRY GRANULES OR FLAKES FINE ENOUGH TO FEED THROUGH COMMONLY USED SPREADERS AT A RATE THAT WILL KEEP SURFACE MOIST BUT NOT CAUSE POLLUTION OR PLANT DAMAGE. IF USED ON STEEPER SLOPES, THEN USE OTHER PRACTICES TO PREVENT WASHING INTO STREAMS OR ACCUMULATION AROUND PLANTS.

STONE - COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.

SEQUENCE OF CONSTRUCTION

SEQUENCE NOTES

1. THE CONTRACTOR SHALL REFER TO THIS SPECIFIC SEQUENCE OF CONSTRUCTION FOR PROJECT OPERATIONS. PROJECT OPERATIONS AND PLACEMENT OF FILL SHALL ADHERE TO THE PLANS AND THE PERMIT REQUIREMENTS AT ALL TIMES.

SEQUENCE OF CONSTRUCTION

1. INSTALL CONSTRUCTION ACCESS AREA (ROCK ENTRANCE/WETLAND MATTING)

2. CLEARLY DELINEATE THE LIMIT OF DISTURBANCE IN THE FIELD WITH STAKES. INSTALL WETLAND PROTECTION FENCING AND TREE PROTECTION FOR WETLANDS AND TREES WITHIN THE LIMIT OF DISTURBANCE.

3. INSTALL PERMIETER E&S CONTROLS FOR THE FILL AREA.

   a. AS FILL AREA EXPANDS, E&S CONTROLS MUST BE MODIFIED TO PROTECT ENTIRE FILL AREA FROM EROSION AND SEDIMENT POLLUTION.

4. PLACE FILL MATERIAL IN LAKE WHILE LEAVING A FLOW PATH ALONG EXISTING SHORELINE. SEDIMENTS SHALL NOT BE PLACED WITHIN 30 FEET OF THE EXISTING SHORELINE WHERE THE TEMPORARY CHANNEL IS PROPOSED.

5. ONCE FILL IS AT PROPOSED GRADE, PERMANENTLY STABILIZE THE AREA. NO MORE THAN 15,000 SQ. FT OF DISTURBED AREA ABOVE THE NORMAL WSE (700.7') SHALL BE AT FINAL GRADE WITH OUT INITIATING SEEDING AND MULCHING. PLANTING OF SHADE TREES AND FINAL VEGETATIVE COVER SHALL BE INITIATED AT ALL AREAS WHICH ARE AT FINAL GRADE AND FARTHER THAN 10' FROM THE EDGE OF ANY CURRENT OR FUTURE CONSTRUCTION TRAFFIC.

6. CONSTRUCT NEW STREAM CHANNELS WITHIN FILL PLACEMENT AREA. INSTALL COFFER DAMS #1 AND #2 TO ISOLATE FLOW FROM THE NEWLY CONSTRUCTED CHANNELS UNTIL CHANNEL AREA HAS BEEN FULLY STABILIZED. STABILIZE CONSTRUCTED CHANNELS WITH GRAVEL AND VEGETATION.

7. REMOVE COFFER DAMS# 1 AND #2. INSTALL COFFER DAM #3 AND #4. REDIRECT EXISTING STREAM FLOWS INTO NEW STREAM CHANNELS.

8. MONITOR FOR STABILITY. WHEN DEEMED STABLE, CONSTRUCT TEMPORARY STREAM CROSSINGS #1 AND #2. FILL IN FORMER FLOW PATHS ALONG SHORELINE, STABILIZE AND VEGETATE.

9. PLANT REMINGING SHADE TREES AND OTHER STREAMBANK RESTORATION VEGETATION AND STABILIZE.

10. REMOVE ALL REMAINING TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.

11. MONITOR NEW STREAM CHANNEL REGULARLY AND PROVIDE ANY NECESSARY REMEDIATION.

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PHONE 610-678-3071 FAX 610-678-3517
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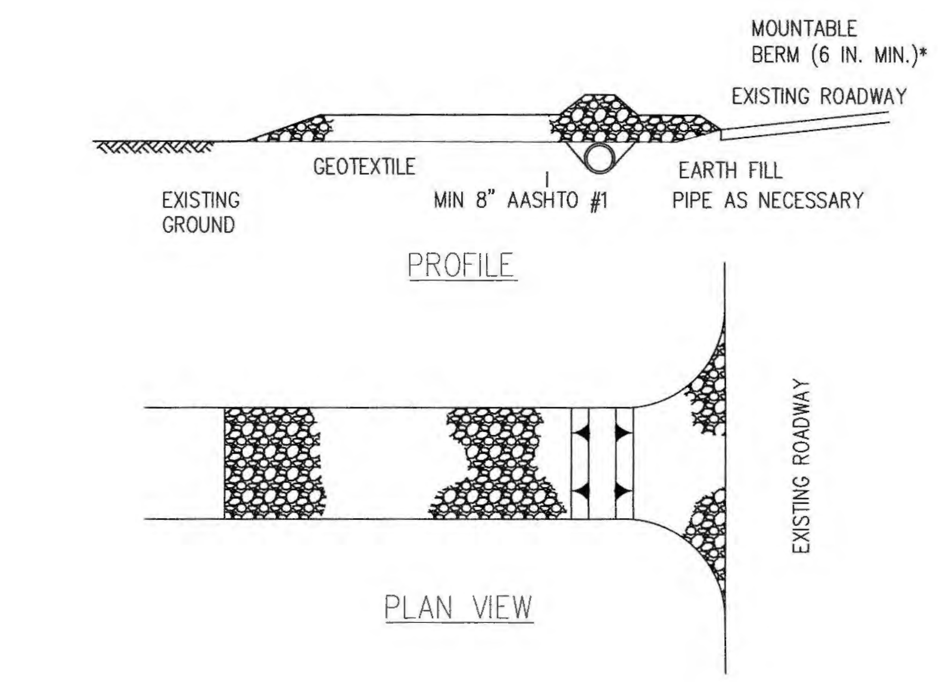
FINAL PLANS
BLACK RIVER RESTORATION
NOTES

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847
JOB:BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AEB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C103
PROJECT:	NJ1954-01
SHEET:	4 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:
REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.

RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.

MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.

MAINTENANCE:
ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.

ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK.

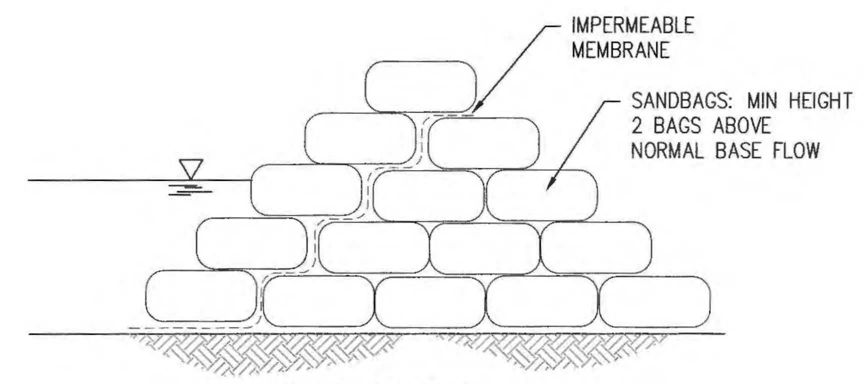
WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK CONSTRUCTION ENTRANCE

N.T.S.

COFFER DAM SCHEDULE

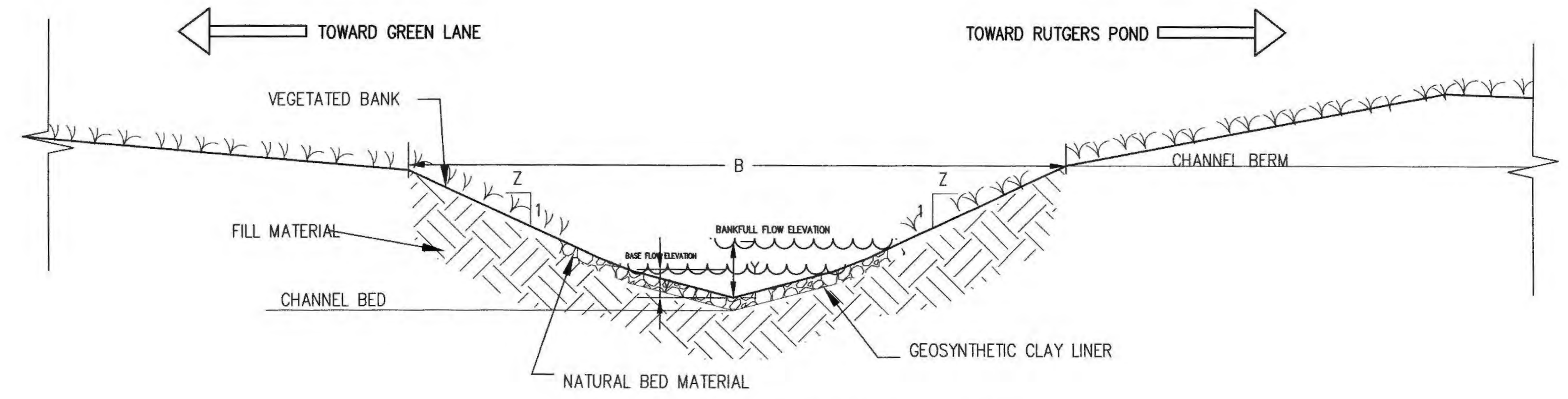
I.D.	LENGTH (FT)	MIN. TOP BARRIER	RECOMMENDED TYPE
1	15	2.98	SANDBAGS
2	15	2.98	SANDBAGS
3	30	2.98	SANDBAGS
4	30	2.98	SANDBAGS



NOTES:
1. COFFERDAMS SHALL BE INSTALLED BY DIVERS OR QUALIFIED PERSONNEL TO ASSURE PROPER FUNCTIONALITY.
2. COFFERDAMS SHALL BE INSTALLED VIA WATERWAY ACCESS ONLY AND TIED INTO THE IMMEDIATE EMBANKMENT.
3. OTHER APPROVED EQUAL COFFERDAM SYSTEMS MAY BE USED ONCE APPROVED BY THE OWNER, ENGINEER AND NJDEP, OR OTHER JURISDICTIONAL AGENCIES, AS REQUIRED.

COFFER DAM DETAILS

N.T.S.



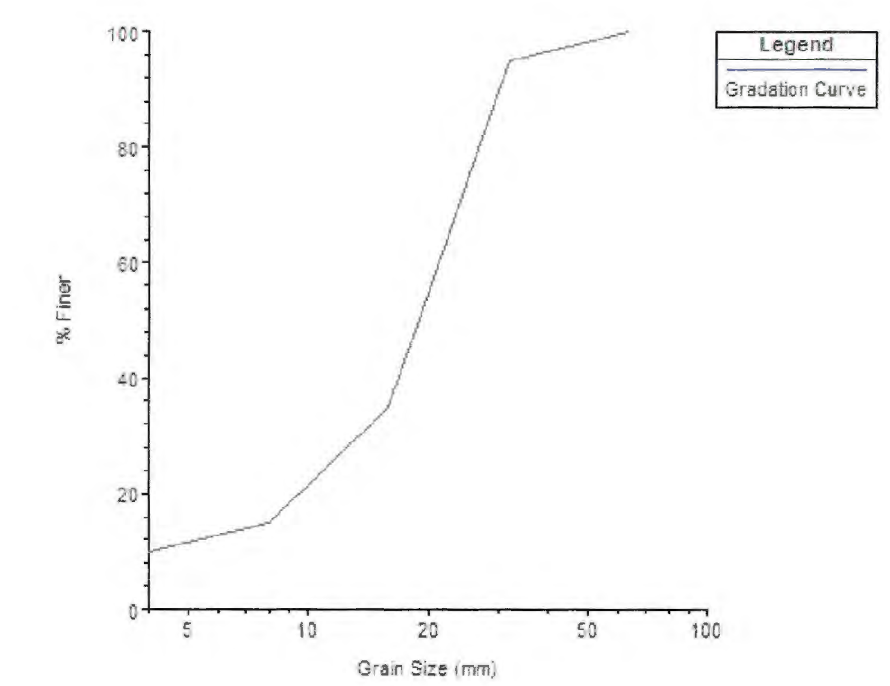
RESTORED CHANNEL CROSS SECTION

NTS

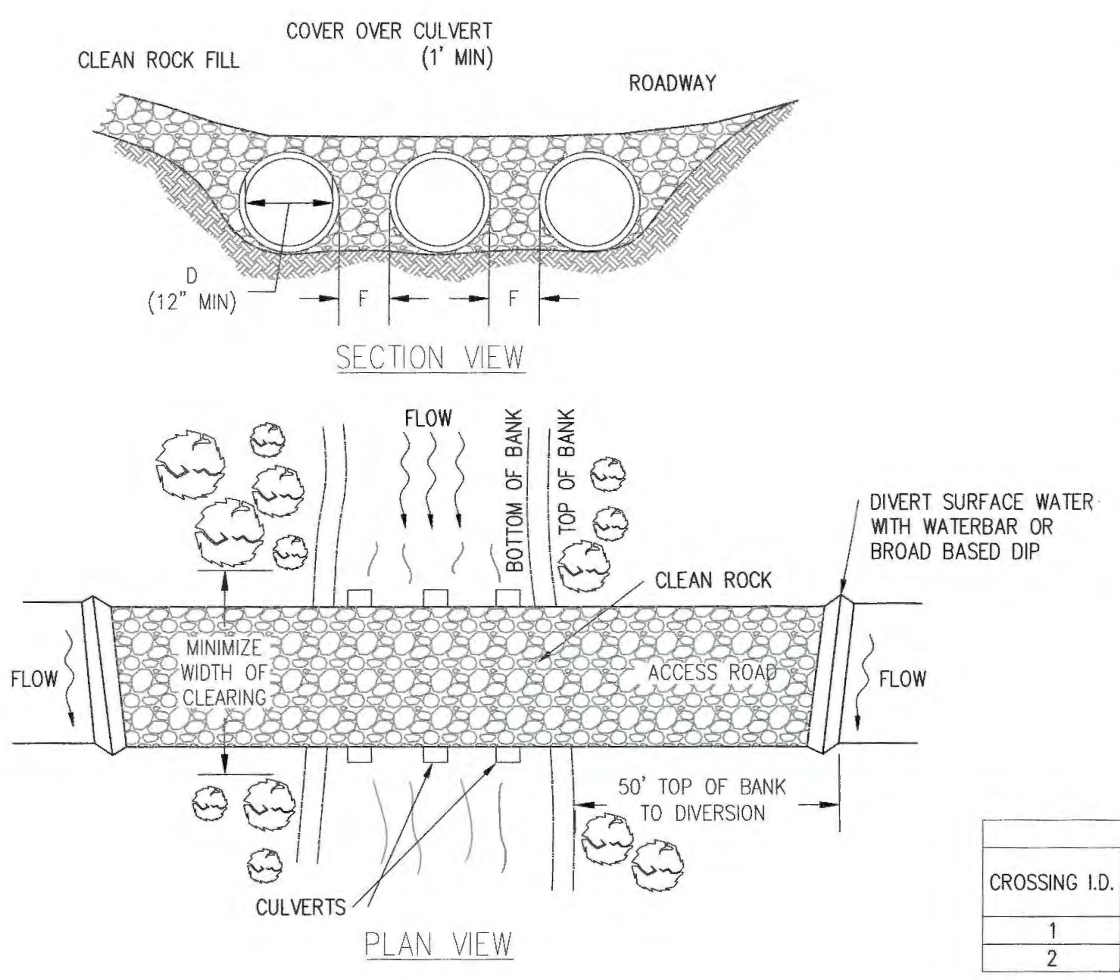
RESTORED CHANNEL

CHANNEL	TOP WIDTH (B)	BASE FLOW DEPTH (y)	BANKFULL FLOW DEPTH (Y)	SIDE SLOPE (Z)	LONGITUDINAL SLOPE (%)
BLACK RIVER	50'	1.7	2.3	5	0.06
BRANCH	50'	1.7	2.3	5	0.08

GENERAL NOTES:
1. THE RESTORED CHANNEL IS EXCAVATED THROUGH THE FILL MATERIAL.
2. MANNING'S AND CHANG'S EQUATIONS ALONG WITH HEC-RAS SIMULATION WERE EMPLOYED TO DESIGN THE CHANNEL.
3. A 2.5' OF FREE BOARD IS PROVIDED ABOVE BASE FLOW WATER POOL.
4. THE REPRESENTATIVE SIZE (d50) OF THE BED LAYER IS 0.8".
5. INSPECTION OF BED AND SIDEWALLS, PARTICULARLY AFTER INTENSE STORMS, SHALL BE CONDUCTED TO ASSESS POTENTIAL EROSION/DEPOSITION PATTERNS.
6. STABILIZATION METHODS SHALL BE CONDUCTED IN ACCORDANCE TO NJ SOIL AND EROSION SEDIMENT CONTROL MANUAL AND PER DESIGN DETAILS.
7. BANKFULL DISCHARGE IS 45 CFS FOR BLACK RIVER.
8. BASE FLOW IS 14 CFS FOR BLACK RIVER.
9. GEOSYNTHETIC CLAY LINER SHALL BE INSTALLED ACROSS THE THE STREAM BED AND BANKS UP TO BASE FLOW ELEVATION.
10. NATURAL BED MATERIAL COVERS THE BED AND BANKS UP TO BANKFULL ELEVATION.



NATURAL CHANNEL LINING SIZE DISTRIBUTION (mm)



NOTES:
1. WATERBARS AND BROAD-BASED DIPS SHALL DISCHARGE TO SEDIMENT REMOVAL FACILITY.
2. CLEAN ROCK SHALL CONFORM TO PERMITTING REQUIREMENTS.
3. FOLLOW PERMIT CONDITIONS REGARDING REMOVAL OF CROSSING.
4. PROVIDE 50' STABILIZED ACCESS TO CROSSING ON BOTH SIDES OF STREAM CHANNEL.
5. PIPES SHALL EXTEND BEYOND THE TOE OF THE ROADWAY.
6. RUNOFF FROM THE ROADWAY SHALL BE DIVERTED OFF THE ROADWAY AND INTO A SEDIMENT REMOVAL BMP (COMPOST FILTER SOCK) BEFORE IT REACHES THE ROCK APPROACH TO THE CROSSING.

MAINTENANCE
1. TEMPORARY STREAM CROSSINGS SHALL BE INSPECTED ON A DAILY BASIS.
2. DAMAGED CROSSINGS SHALL BE REPAIRED WITHIN 24 HOURS OF THE INSPECTION AND BEFORE ANY SUBSEQUENT USE.
3. SEDIMENT DEPOSITS ON THE CROSSING OR ITS APPROACHES SHALL BE REMOVED WITHIN 24 HOURS OF THE INSPECTION.

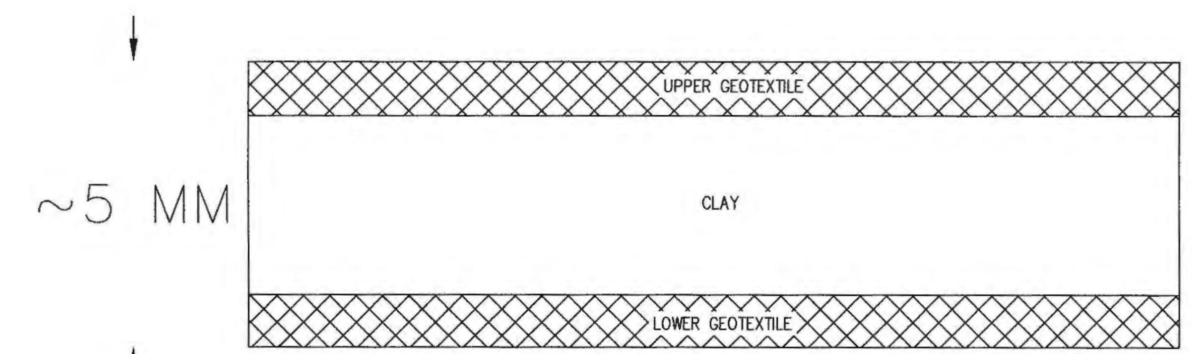
AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED, IT SHALL BE REMOVED. ALL MATERIALS SHALL BE DISPOSED OF PROPERLY AND DISTURBED AREAS STABILIZED.

CULVERT SCHEDULE

CROSSING I.D.	QTY	SIZE 'D' (IN)	MAT'L TYPE	SEPARATION 'F' (FT)	COVER (FT)
1	4	18	HDPE	1.5	1.5
2	4	18	HDPE	1.5	1.5

TEMPORARY STREAM CROSSING / ACCESS ROAD CROSSING

N.T.S.



GCL CROSS SECTION

NOTES:
1. GCL MAY BE CLAY BOUND WITH ADHESIVE TO UPPER AND LOWER GEOTEXTILES, CLAY STITCHBONDED BETWEEN UPPER AND LOWER GEOTEXTILES, OR CLAY NEEDLEPUNCHED THROUGH UPPER AND LOWER GEOTEXTILES.
2. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
3. UPSTREAM EDGE MUST BE ADEQUATELY TOED IN.

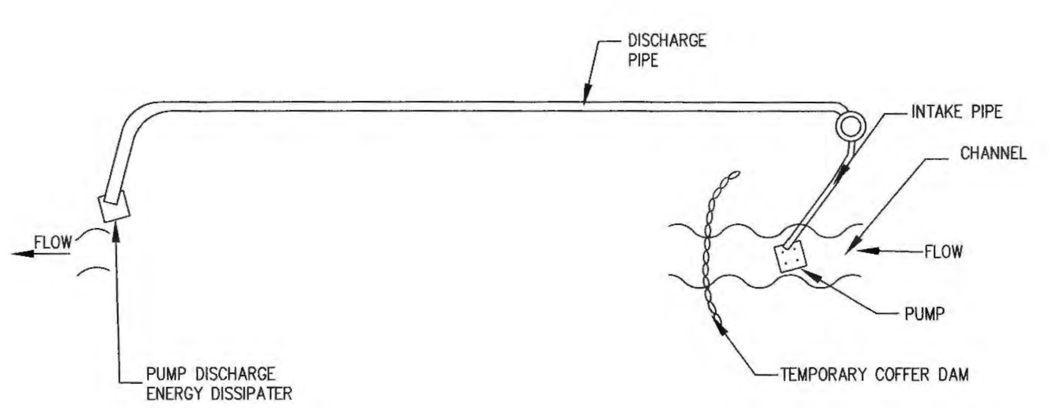
GEOSYNTHETIC CLAY LINER (GCL)

N.T.S.

NOTES:

A FILTER BAG IS REQUIRED TO BE INSTALLED PRIOR TO THE PUMPING OF ANY SEDIMENT-LADEN WATER.

PUMPING EQUIPMENT AND FILTER BAGS ARE TO BE SIZED APPROPRIATELY TO HANDLE ANTICIPATED FLOWS.



TEMPORARY BYPASS (PUMP-AROUND)

N.T.S.

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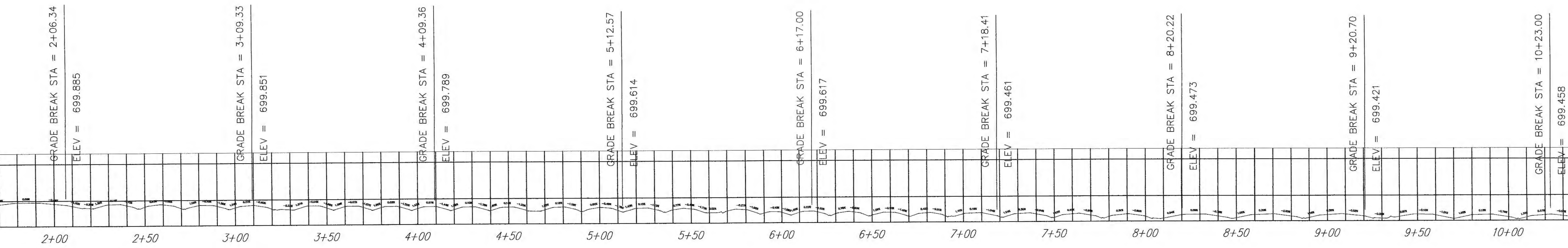
FINAL PLANS
BLACK RIVER RESTORATION
CONSTRUCTION DETAILS

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847
JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

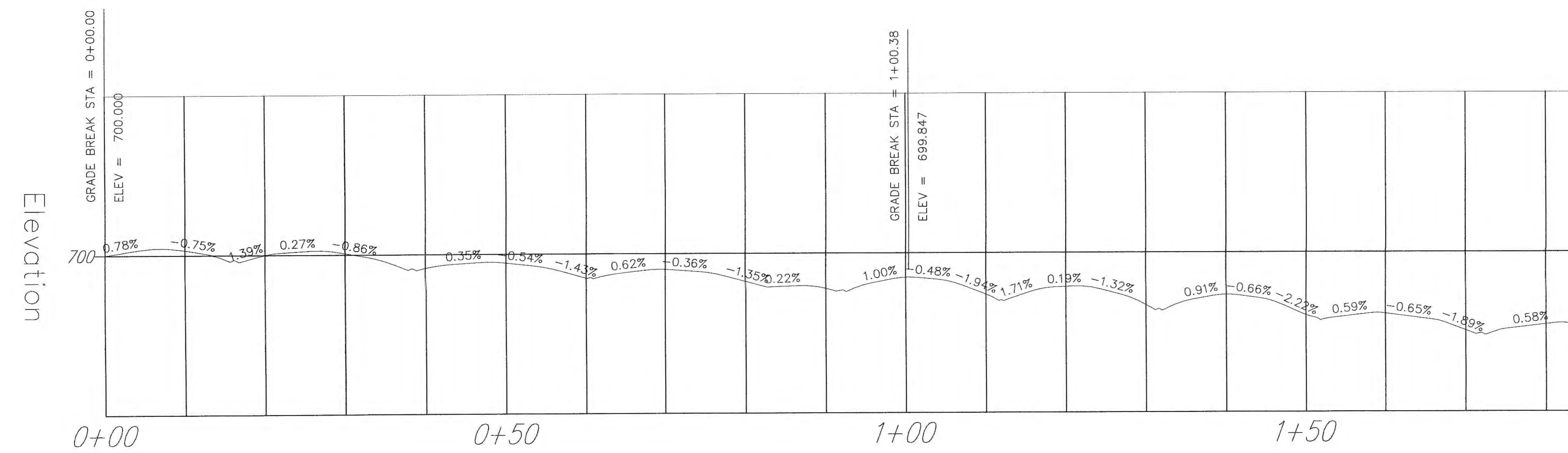
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C104
PROJECT:	NJ1954-01
SHEET:	5 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



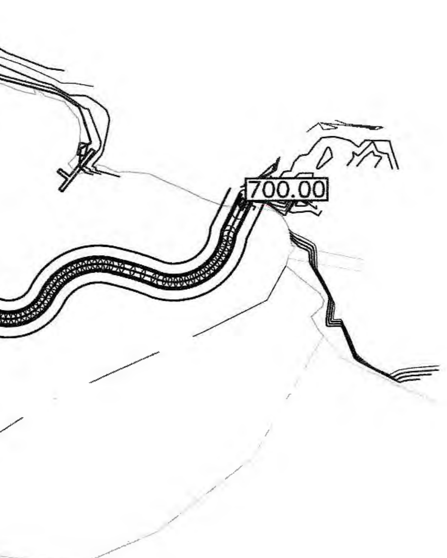
PROFILE VIEW OF MAIN STREAM

SC: 1"=35' VERTICAL EXAGGERATION: 20



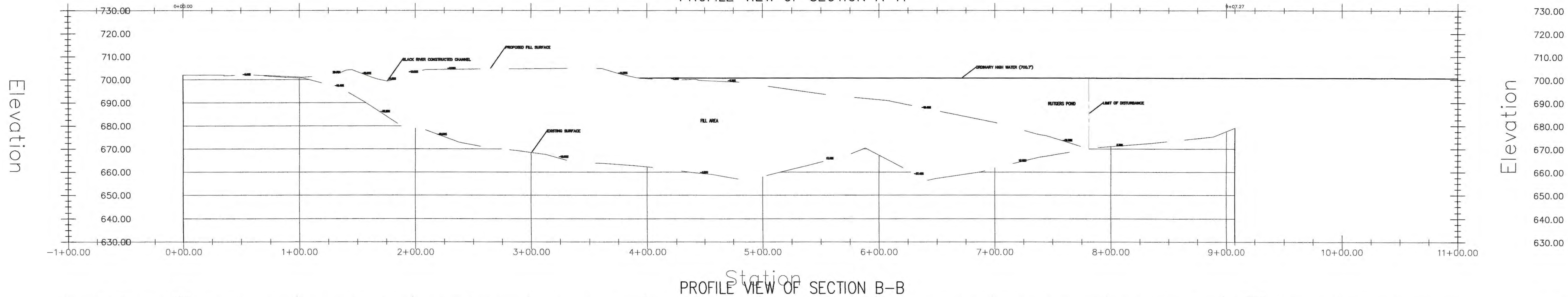
PROFILE VIEW OF BRANCH STREAM

SC: 1"=10' VERTICAL EXAGGERATION: 20

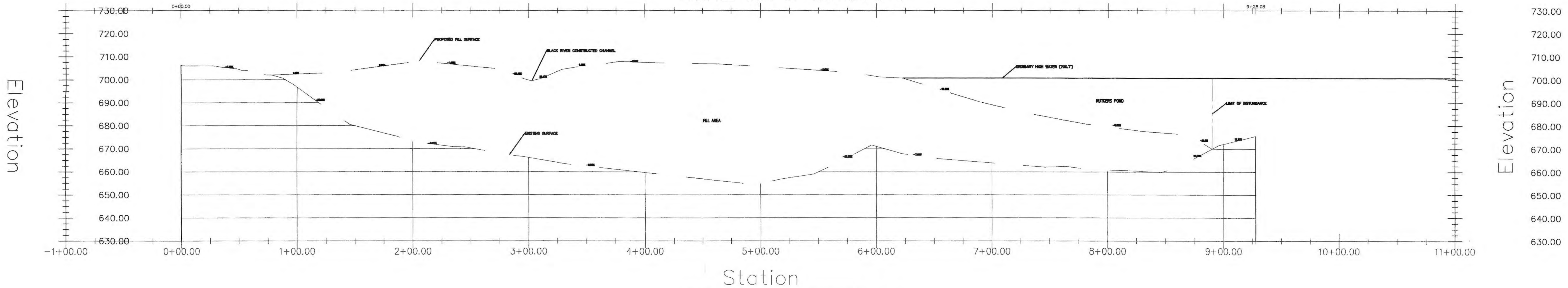


PROJECT TITLE: BLACK RIVER RESTORATION

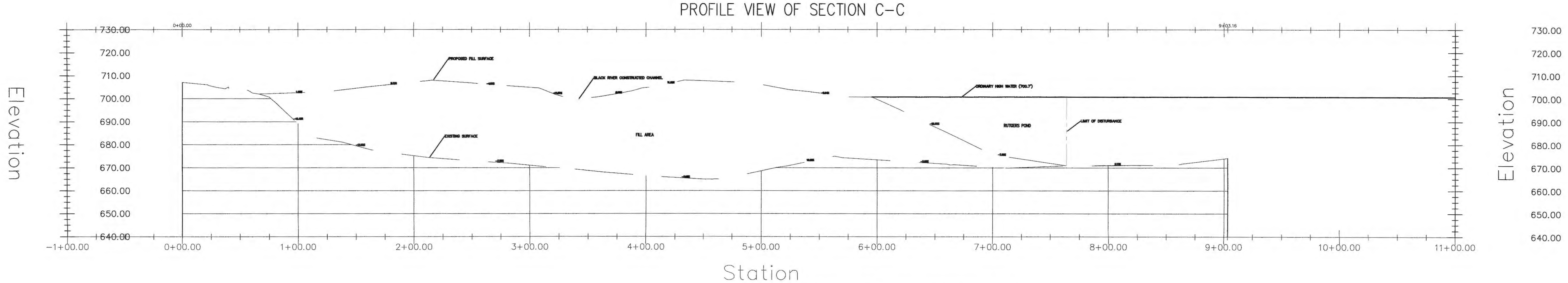
PROFILE VIEW OF SECTION A-A



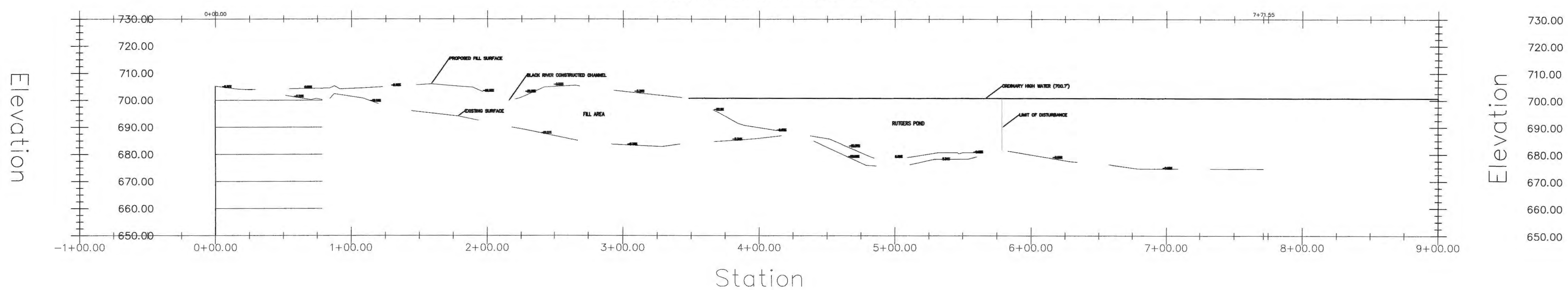
PROFILE VIEW OF SECTION B-B

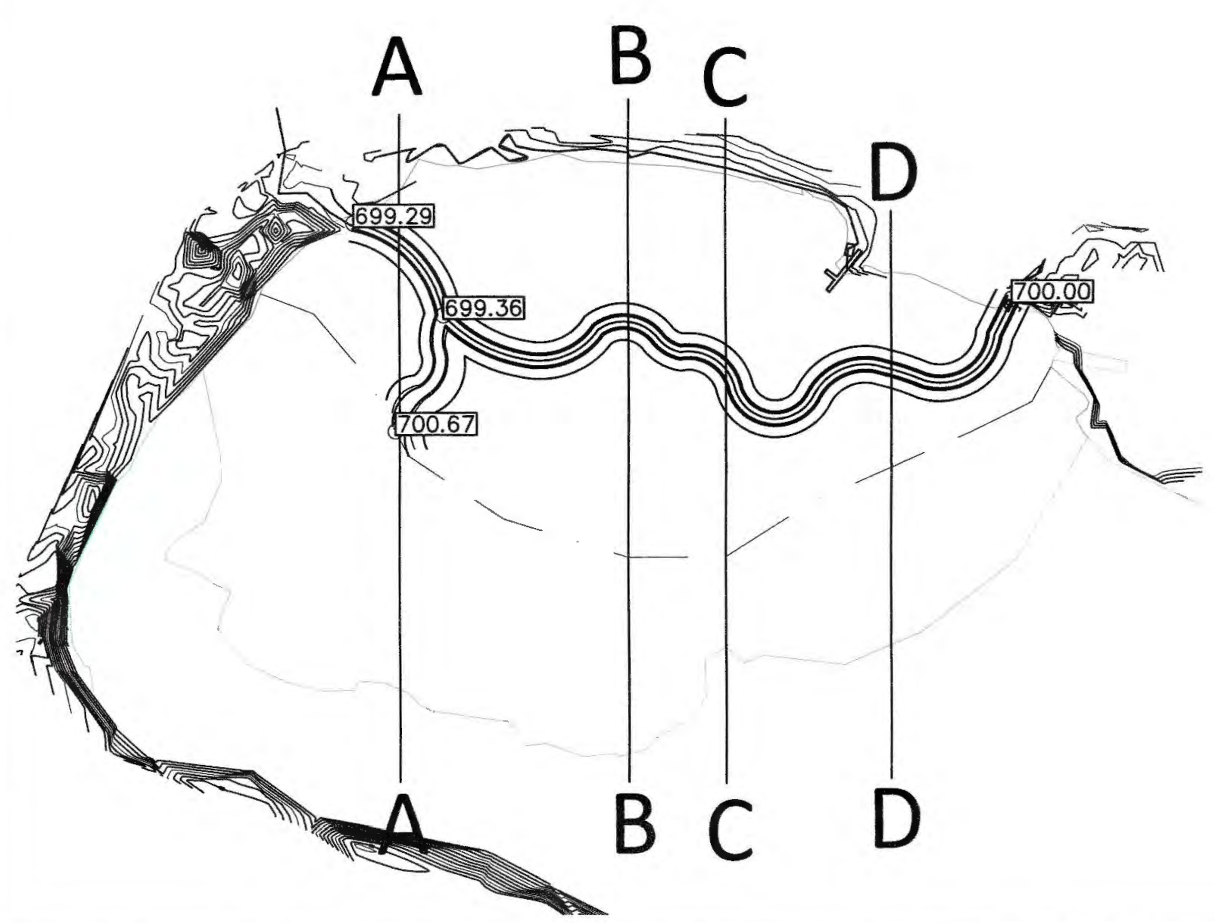


PROFILE VIEW OF SECTION C-C



PROFILE VIEW OF SECTION D-D





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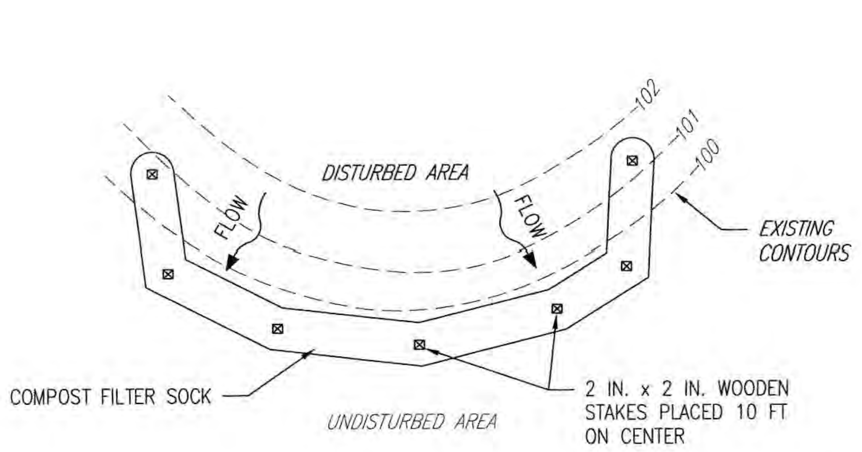
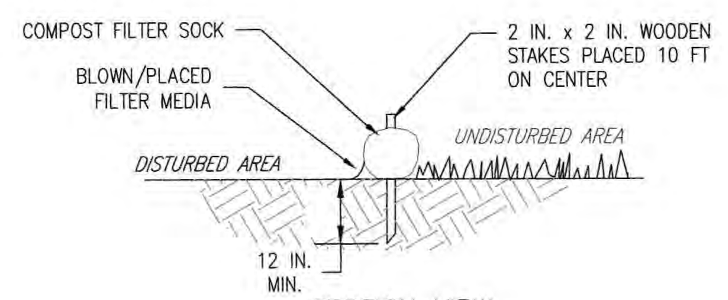
FINAL PLANS
BLACK RIVER RESTORATION
PROFILES - 2

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE	
KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
MORRIS	
NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C106
PROJECT:	NJ1954-01
SHEET:	7 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



PLAN VIEW



SECTION VIEW

INSTALLATION NOTES:

1) SILT SOCKS SHALL BE 18"
2) A SILT SOCK SHALL BE INSTALLED ALONG THE SLOPE CONTOUR WITHIN 2 FEET OF THE WATER EDGE FOR ANY AREA ALONG A NEWLY CREATED SHORELINE THAT WILL NOT BE DIRECTLY ADDED TO WITHIN THREE (3) DAYS OF PLACEMENT.
3) SILT SOCKS SHALL BE PLACED IN THE EXCAVATED CONSTRUCTED CHANNEL BEFORE FINAL STABILIZATION IS ACHIEVED TO MINIMIZE TRANSPORT OF SEDIMENTS ALONG THE CHANNEL LENGTH, AS DEPICTED ON THE E&SC PLAN SHEET. THESE MAY BE REMOVED AS THE NATURAL CHANNEL LINING IS INSTALLED.

COMPOST SOCK MATERIAL SPECIFICATIONS (4.1)

FABRIC TYPE	MATERIAL	MATERIAL CHARACTERISTICS	SOCK DIAMETERS	MESH OPENING	TENSILE STRENGTH	ULTRAVIOLET STABILITY	MINIMUM LONGEVITY
TYPE I	3 mil HDPE	PHOTO-DEGRADEABLE	12", 18"	3/8"	-	23% at 1000 HR	6 MONTHS
TYPE II	5 mil HDPE	PHOTO-DEGRADEABLE	12", 18", 24", 32"	3/8"	26 PSI	23% at 1000 HR	9 MONTHS
TYPE III	5 mil HDPE	BIO-DEGRADABLE	12", 18", 24", 32"	3/8"	26 PSI	-	6 MONTHS
TYPE IV	MULTI-FILAMENT POLYPROPYLENE (MFPP)	PHOTO-DEGRADEABLE	12", 18", 24", 32"	3/8"	44 PSI	100% at 1000 HR	1 YEAR
TYPE V	HEAVY DUTY MFPP	PHOTO-DEGRADEABLE	12", 18", 24", 32"	1/8"	202 PSI	100% at 1000 HR	2 YEARS

NOTES:

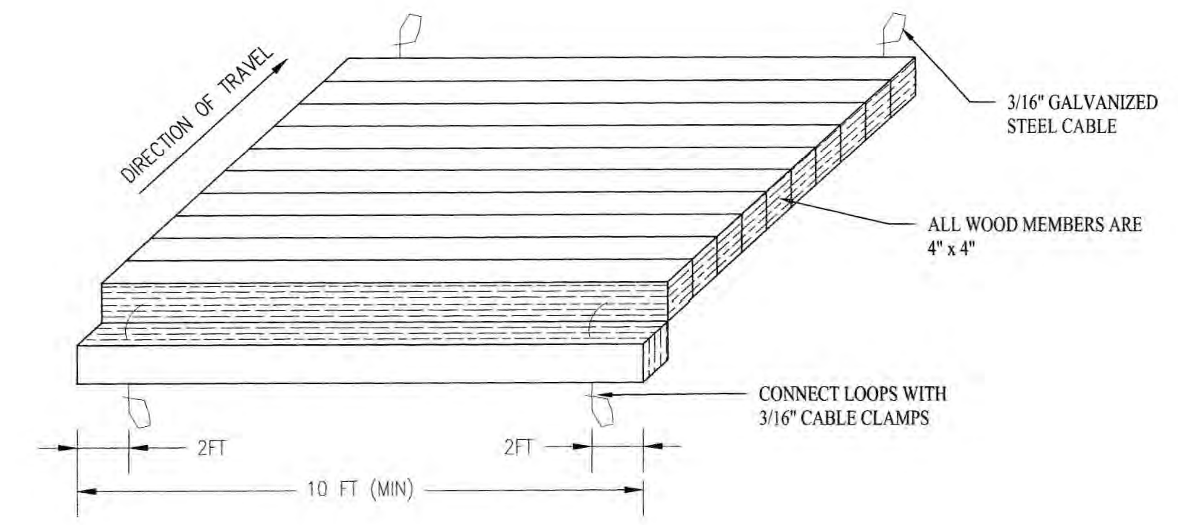
1. SOCK FABRIC AND COMPOST SHALL MEET STANDARDS OF THE CONSERVATION DISTRICT AND NJDEP.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST STANDARDS (4.2)

ORGANIC MATTER CONTENT	25%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 - 8.5
MOISTURE CONTENT	30% - 60%
PARTICLE SIZE	30%-50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS/m (mmhos/cm) MAXIMUM

COMPOST FILTER SOCK

N.T.S.



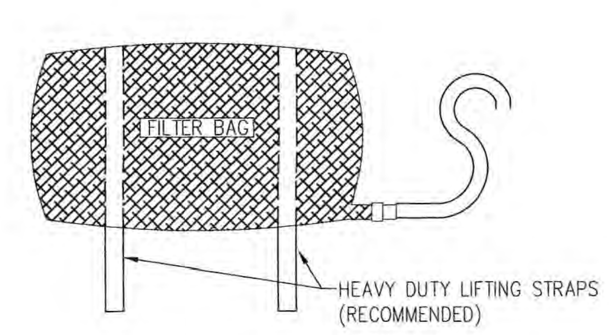
NOTES:

1. USE WOOD MATS ON WETLAND SOILS OR EXISTING ROAD BEDS. THE SURFACE SHOULD BE FLAT AND FREE OF HIGH SPOTS (E.G. STUMPS AND LARGE ROCKS).
2. INSTALL MATS ON TOP OF NONEWOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
3. USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
4. IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS.
5. UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.

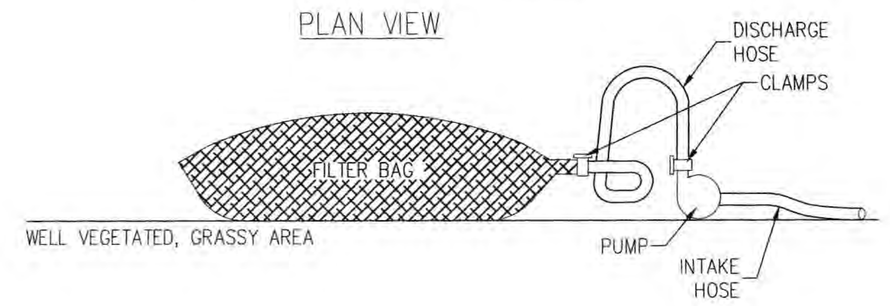
MAINTENANCE: INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS.

WETLAND MATS

N.T.S.



PLAN VIEW



ELEVATION VIEW

NOTES:

- LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
- NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

PUMPED WATER FILTER BAG (FOR E&S CONTROL)

N.T.S.

DEPTH 2FT MAX 1522-12\1522-12_CAD\Plan Ref Docs\TurbCurtain_3.15.jpg

NOTES:

1. INSTALL CURTAIN IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
2. BOTH ENDS OF THE CURTAIN SHOULD BE SECURELY ANCHORED TO THE SHORELINE.
3. BARRIER MATERIAL WILL BE A POLYETHYLENE PLASTIC SHEET, 10 MIL., OR SUITABLE ALTERNATIVE.
4. ROPE WILL BE ¼" NYLON OR MANILA.
5. BARRIER WILL EXTEND PARALLEL TO THE DISTURBED SHORELINE FOR THE FULL LENGTH OF THE WORK AREA.
6. BARRIER WILL EXTEND ACROSS THE ENTIRE CHANNEL WHEN WORK IS PERFORMED WITHIN THE CHANNEL.

DESIGN CONSIDERATIONS:

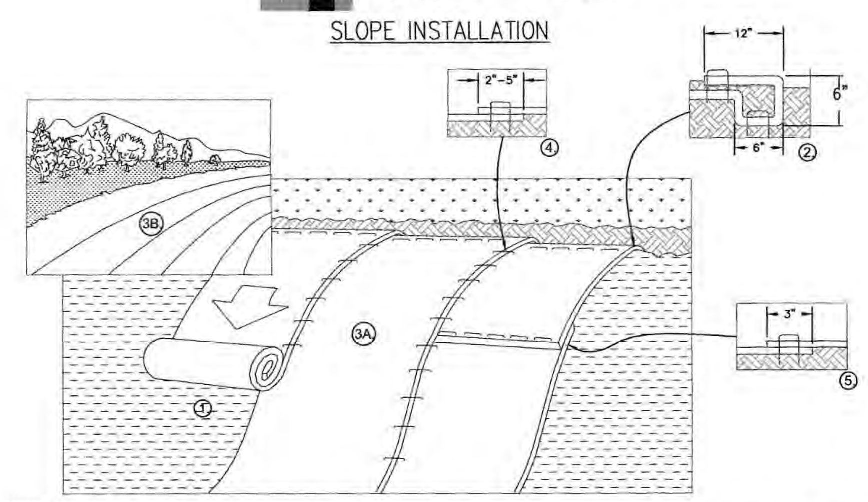
1. FOR PONDS AND OTHER RELATIVELY STILL WATER BODIES, THE FABRIC SHOULD BE RELATIVELY IMPERMEABLE SO AS TO PROVIDE A BARRIER BETWEEN THE CLEAN WATER AND THE SEDIMENT-LADEN WATER. RUNOFF INTO THIS TYPE OF CURTAIN SHOULD BE MINIMIZED, DUE TO LIMITED AVAILABLE CAPACITY.
2. FOR MOVING WATER, SUCH AS IN LAKES AND STREAM CHANNELS, PROVISION SHOULD BE MADE TO ALLOW PASSAGE OF WATER THROUGH THE CURTAIN. THIS IS NORMALLY DONE BY CONSTRUCTING AT LEAST PART OF THE CURTAIN FROM A HEAVY FILTER FABRIC. WHILE SUCH CURTAINS ALLOW FOR SOME WATER MOVEMENT THROUGH THE CURTAIN, THE FLOW RATE IS LOW. THEREFORE, THESE CURTAINS SHOULD NOT BE INSTALLED ACROSS FLOWING WATERCOURSES. TURBIDITY BARRIERS PLACED IN STREAM CHANNELS SHOULD BE PLACED PARALLEL TO THE FLOW DIRECTION.
3. WHENEVER THE WATER BODY IS NOT SUBJECT TO TIDAL AND/OR WIND AND WAVE ACTION, THE CURTAIN SHOULD EXTEND THE ENTIRE DEPTH OF THE WATER AND REST ON (OR BE ANCHORED TO) THE BOTTOM. FAILURE TO MAINTAIN CONTACT WITH THE BOTTOM WILL ALLOW SEDIMENT TO MOVE UNDER THE CURTAIN. IT IS RECOMMENDED THAT THE HEIGHT OF THE CURTAIN BE 20% GREATER THAN THE DEPTH OF THE WATER TO ALLOW FOR FLUCTUATIONS.
4. WHEREVER THE WATER BODY IS SUBJECT TO SIGNIFICANT TIDE, WIND, OR WAVE ACTION, THE WEIGHTED BOTTOM OF THE CURTAIN SHOULD NOT EXTEND TO THE BOTTOM OF THE WATER BODY. WIND AND WAVE ACTION CAN CAUSE THE BOTTOM OF THE CURTAIN TO MOVE ALONG THE BOTTOM, STIRRING UP SEDIMENT. THEREFORE, A MINIMUM 1-FOOT GAP SHOULD BE PROVIDED BETWEEN THE BOTTOM OF THE CURTAIN AND THE BOTTOM OF THE WATER BODY AT MEAN LOW WATER
5. CURTAIN HEIGHTS BEYOND 12 FEET ARE GENERALLY NOT PRACTICAL. CURTAINS INSTALLED DEEPER THAN THIS ARE SUBJECT TO VERY LARGE LOADS WITH CONSEQUENT STRAIN ON CURTAIN MATERIALS AND THE ANCHORING SYSTEM.
6. THE OVERALL LENGTH OF THE CURTAIN SHOULD BE 10-20% GREATER THAN THE STRAIGHT-LINE MEASUREMENT OF THE PERIMETER TO FACILITATE INSTALLATION AND REDUCE STRESS CAUSED BY WIND AND/OR WAVES.
7. BOTH ENDS OF THE CURTAIN SHOULD BE SECURELY ANCHORED TO THE SHORELINE.
8. AN EXCESSIVE NUMBER OF JOINTS SHOULD BE AVOIDED. A MINIMUM CONTINUOUS SPAN OF 50 FEET BETWEEN JOINTS IS RECOMMENDED. FOR STABILITY PURPOSES, THE MAXIMUM SPAN BETWEEN JOINTS SHOULD BE 100 FEET.
9. FOR APPLICATIONS WHERE IT IS DESIRABLE FOR WATER TO PASS THROUGH THE CURTAIN (E.G. WHEN USED INSTEAD OF A BAFFLE IN A SEDIMENT BASIN), A CURTAIN WITH ONE OR MORE PANELS OF SCREEN FABRIC SHOULD BE USED. IN THIS APPLICATION, THE CURTAIN MAY REMAIN IN PLACE OVER WINTER MONTHS.

TURBIDITY CURTAIN

N.T.S.

NORTH AMERICAN GREEN

SLOPE INSTALLATION



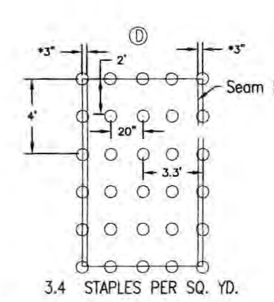
NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5cm-12.5cm) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5cm) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30cm) APART ACROSS ENTIRE BLANKET WIDTH.

NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL MATTING

N.T.S. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SEQUENCE OF CONSTRUCTION.



*LOCATION OF SEAM STITCH WILL VARY DEPENDING ON NORTH AMERICAN GREEN PRODUCT TYPE.

NORTH AMERICAN GREEN
14649 HIGHWAY 41 NORTH
EVANSVILLE, IN 47725
USA 1-800-772-2040
CANADA 1-800-448-2040
www.nagreen.com

NOTES:

1. BLANKETS WITH THE OPTIONAL NORTH AMERICAN GREEN DOT SYSTEM PLACE STAPLES/STAKES THROUGH EACH OF THE WHITE COLORED DOTS.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
3. APPROX. 5" SEAM OVERLAP FOR BIONET EROSION CONTROL BLANKETS

EROSION CONTROL MATTING STAPLE PATTERN

N.T.S.

REVISION | DATE

BEI

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BOGIA ENGINEERING INC.
1340 PENN AVE WYOMISSING, PA 19610
PHONE: 610-678-3071 - FAX: 610-678-3517
WWW.BOGIAENG.COM

FINAL PLANS
BLACK RIVER RESTORATION
E&SC DETAILS - 1

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847
JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C107
PROJECT:	NJ1954-01
SHEET:	8 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION

EROSION CONTROL DEVICE MAINTENANCE AND INSPECTION PROCEEDURES

1. THE MAINTENANCE PROCEDURES BELOW ARE COMPREHENSIVE AND INCLUDE DEVICES PROPOSED FOR THIS SPECIFIC PROJECT OR MAY BE NEEDED TO SUPPLEMENT UNFORESEEN EROSIVE CONDITIONS. SHOULD EROSION CONTROL DEVICES BE IMPLEMENTED OUTSIDE OF THOSE DEPICTED WITHIN THESE EROSION CONTROL PLANS, THE DEVICES AND MAINTENANCE PROCEDURES SHALL BE APPROVED BY THE CONSERVATION DISTRICT PRIOR TO IMPLEMENTATION.
2. IT SHALL BE THE RESPONSIBILITY OF THE O/RP TO ENSURE THAT ALL DEVICES ARE INSTALLED AND MAINTAINED ACCORDING TO THE PROVIDED DETAILS OR MANUFACTURES SPECIFICATION.
3. ALL EROSION CONTROL DEVICES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT UNLESS OTHERWISE SPECIFIED BELOW. NECESSARY REPAIRS SHALL BE PERFORMED IMMEDIATELY.
4. SEDIMENT REMOVED FROM EROSION CONTROL DEVICES SHALL BE REDISTRIBUTED/REPLACED ON SITE AND IMMEDIATELY STABILIZED.

ROCK ENTRANCE

- ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.
- DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK.
- ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

ROCK FILTER OUTLET

- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

FILTER FENCE

- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.
- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.
- ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET.

SILT SOCK

- SILT SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE.
- ENDS OF SOCK SHALL BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
- ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND MUST BE DISPOSED IN THE MANNER ACCEPTABLE TO THE CONSERVATION DISTRICT AND NJDEP.

ROCK FILTERS

- CLOGGED FILTER STONE (AASHTO # 57) SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.
- SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/ 2 THE HEIGHT OF THE FILTERS.
- IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

PUMP WATER FILTER BAGS

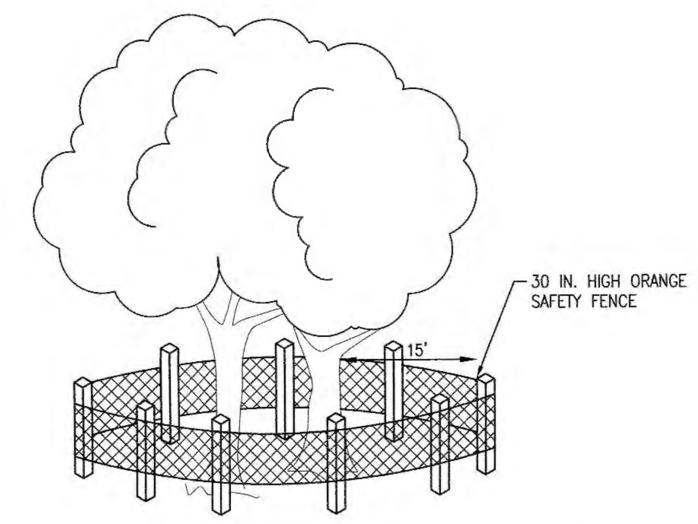
- FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED
- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED.
- FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.

INLET FILTER BAGS

- FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS ½ FULL.
- DAMAGED FILTER BAGS SHOULD BE REPLACED.
- NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

WETLAND MATS

- INSTALL MATS ON TOP OF NON-WOVEN GEOTEXTILE THAT COVERS THE CROSSING AREA. ON HAUL ROAD, SMOOTH OUT HIGH SPOTS AND FILL RUTS TO PROTECT THE GEOTEXTILE FABRIC AND THE MATS. DO NOT DISTURB THE ROOT MAT OF ANY VEGETATION BECAUSE IT PROVIDES ADDITIONAL SUPPORT.
- USE THE SIZE OF WOOD MAT NEEDED TO MEET THE ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LARGER MATS ON VERY WEAK SOILS WITH LOW BEARING STRENGTH (E.G. MUCK OR PEAT) TO SPREAD THE WEIGHT OVER LARGER AREA.
- INSPECT WOOD MATS DURING AND BETWEEN USES TO MAKE SURE NO SECTIONS ARE BROKEN. REPAIR BROKEN PIECES BY DISCONNECTING THE CABLE CLAMPS AND SLIDING OFF AND REPAIRING BROKEN SECTIONS.
- IF VEHICLES NEED MORE TRACTION, USE EXPANDED METAL GRATING ON TOP OF THE MATS.
- UPON REMOVAL OF MATTING, LIGHTLY SCARIFY THE SOIL.



NOTES:
1. TREE PROTECTION FENCE TO BE LOCATED AT THE EDGE OF DRIPLINE (TO BE VERIFIED BY PROJECT MANAGER).
2. BOARDS SHALL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
3. ANY TREES NOT SCHEDULED TO BE REMOVED THAT ARE IRREPARABLY DAMAGED DURING CONSTRUCTION OR DIE WITHIN 18 MONTHS OF COMPLETION OF CONSTRUCTION SHALL BE REPLACED IN ACCORDANCE WITH THE PROVISIONS OF TOWNSHIP ORDINANCE

TREE PROTECTION FENCE

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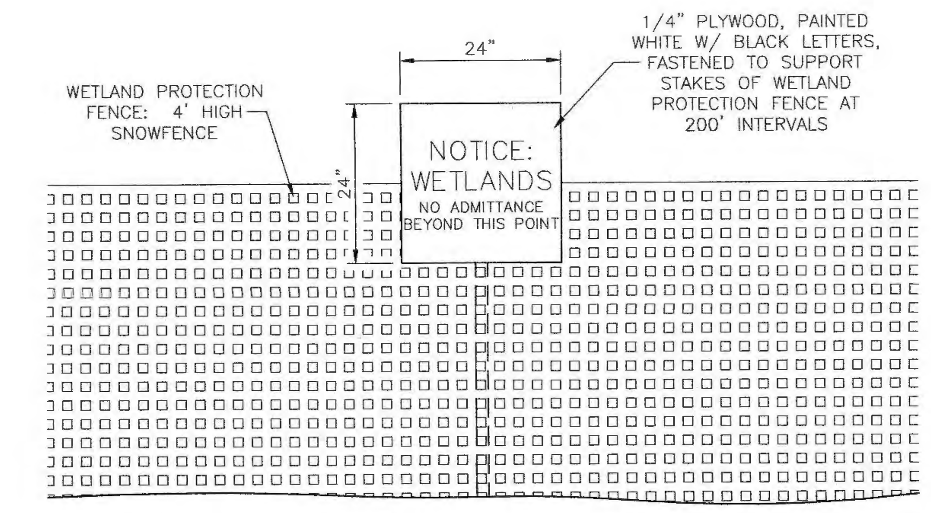

WETLAND PROTECTION SIGNAGE DETAIL

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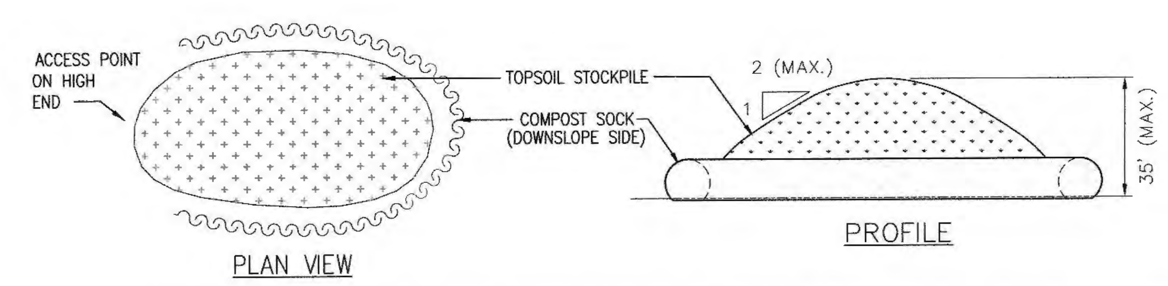
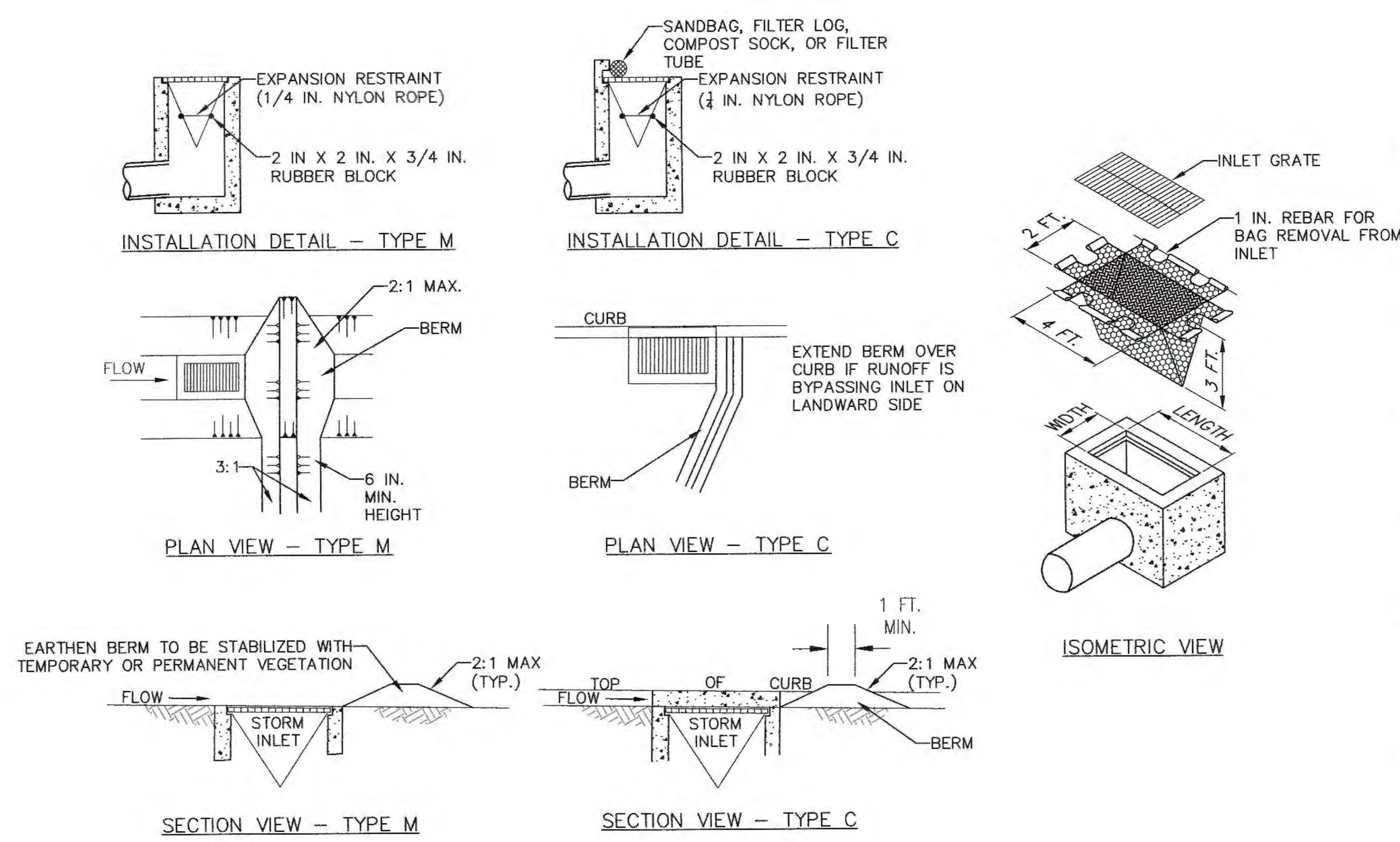


COMPOST SOCK MUST BE PLACED AROUND THE PERIMETER OF ALL STOCKPILES. IMMEDIATELY APPLY TEMPORARY SEEDING TO ALL STOCKPILES WHICH WILL BE IN PLACE FOR 20 DAYS OR MORE.

TEMPORARY TOPSOIL STOCKPILE

N.T.S.



MAINTENANCE:
1. MAXIMUM DRAINAGE AREA = 1/2 ACRE
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLETS TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS NOT LOCATED AT A LOW POINT.
3. EARTHEN BERM SHALL BE INSTALLED & MAINTAINED IN LIEU OF ASPHALT BERMS UNTIL ROADWAY IS STONED. 6" MINIMUM HEIGHT ASPHALT BERM TO BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LB, BURST STRENGTH OF 200 PSI, AND TRAPEZOIDAL TEAR STRENGTH OF 50 LB. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A #40 SIEVE.
5. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET.
6. DAMAGED OR CLOGGED BAGS SHALL BE REPAIRED OR REPLACED IMMEDIATELY UPON INSPECTION. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.
7. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

FILTER BAG INLET PROTECTION DETAIL (TYPE C & TYPE M)

NTS

REVISION	DATE

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PHONE: 610-678-3071 - FAX: 610-678-3517
WWW.BOGIAENG.COM

FINAL PLANS
BLACK RIVER RESTORATION
E&SC DETAILS 2

COUNTY CONCRETE CORPORATION	
50 RAILROAD AVE	
KENVIL, NJ 07847	
JOB:BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP	
MORRIS	
NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C108
PROJECT:	NJ1954-01
SHEET:	9 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION

LEGEND

SYMBOL	PLANTING ZONE	SPECIES	AREA (ACRES)
▽ ▽ ▽	WOODED	TABLE 7–5	7.0
+ + +	CHANNEL BANKS	TABLE 7–7	1.1
(hatched)	POND SHORE	TABLE 7–3	0.4

0 120 240 Feet

Table 7-3: Common Emergent Wetland Plant Species Used for Stormwater Wetlands and on Aquatic Benches of Stormwater Ponds

Common Name	Scientific Name	Inundation Tolerance
Arrow arum	Peltandra virginica	up to 12"
Arrowhead/Duck potato	Saggitaria latifolia	up to 12"
Pickerelweed	Pontederia cordata	up to 12"
Blunt spike rush	Eleocharis obtusa	up to 3"
Bushy beardgrass	Andropogon glomeratus	up to 3"
Common three-square	Scirpus pungens	up to 6"
Iris (blue flag)	Iris versicolor	up to 6"
Marsh hibiscus	Hibiscus moscheutos	up to 3"
Spatterdock	Nuphar luteum	up to 36"
Sedges	Carex spp.	up to 6"
Soft rush	Juncus effusus	up to 6"
Switchgrass	Panicum virgatum	up to 3"

Note 1: Inundation tolerance is maximum inches below the normal pool: most plants prefer shallower depths than the maximum indicated.

Note 2: For additional plant options, consult the stormwater planting list in Section 5. Other good sources include the NJDA Standards for Soil Erosion and Sediment Control in New Jersey, Design of Stormwater Wetland Systems (Schueler 1992), and Wetland Planting Guide for the Northeastern United States (Thunhorst 1993).

Table 7-5: Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
Acer rubrum Red maple	*Clethra alnifolia* Sweet pepperbush	*Andropogon glomeratus* Lowland broomsedge
Betula nigra River birch	*Ilex verticillata* Winterberry	*Eupatorium purpureum* Sweet-scented Joe Pye weed
Juniperus virginiata Eastern red cedar	*Cephalathus occidentalis* Buttonbush	*Scripus pungens* Three square bulrush
Chionanthus virginicus Fringe-tree	*Hamemelis virginiana* Witch hazel	*Iris versicolor* Blue flag
Nyssa sylvatica Black gum	*Vaccinium corymbosum* Highbush blueberry	*Lobelia cardinalis* Cardinal flower
Diospyros virginiana Persimmon	*Ilex glabra* Inkberry	*Panicum virgatum* Switchgrass
Platanus occidentalis Sycamore	*Ilex verticillata* Winterberry	*Dichanthelium clandestinum* Deertongue
Quercus palustris Pin oak	*Viburnum dentatum* Arrowwood	*Rudbeckia laciniata* Cutleaf coneflower
Quercus phellos Willow oak	*Lindera benzoin* Spicebush	*Scirpus cyperinus* Woolgrass
Salix nigra Black willow	*Morella pennsylvanica* Bayberry	*Vernonia noveboracensis* New York ironweed

Note: For more plant section options for bioretention, consult Design Manual for Use of Bioretention in Stormwater Management (ETA&B 1993) or Design of Stormwater Filtering Systems (Claytor and Schueler 1997).

Table 7-7: Common Grass Species for Open Channels

Common Name	Scientific Name	Notes
Alkali saltgrass	Puccinellia distans	Cool, good for wet, saline swales
Fowl bluegrass	Poa palustris	Cool, good for wet swales
Canada bluejoint	Calamagrostis canadensis	Cool, good for wet swales
Creeping bentgrass	Agrostis palustris	Cool, good for wet swales, salt tolerant
Red fescue	Festuca rubra	Cool, not for wet swales
Redtop	Agrostis gigantea	Cool, good for wet swales
Rough bluegrass	Poa trivialis	Cool, good for wet, shady swales
Switchgrass	Panicum virgatum	Warm, good for wet swales, some salt tolerance
Wildrye	Elymus virginicus/riparius	Cool, good for shady, wet swales

Notes: These grasses are sod forming and can withstand frequent inundation, and are ideal for the swale or grass channel environment. A few are also salt-tolerant. Cool refers to cool season grasses that grow during the cooler temperatures of spring and fall. Warm refers to warm season grasses that grow most vigorously during the hot, mid-summer months.

Where possible, one or more of these grasses should be in the seed mixes. For a more thorough listing of seed mixes see Table 7-8 in Part 5 or consult the Standards for Soil Erosion and Sediment Control in New Jersey.

REVISION	DATE
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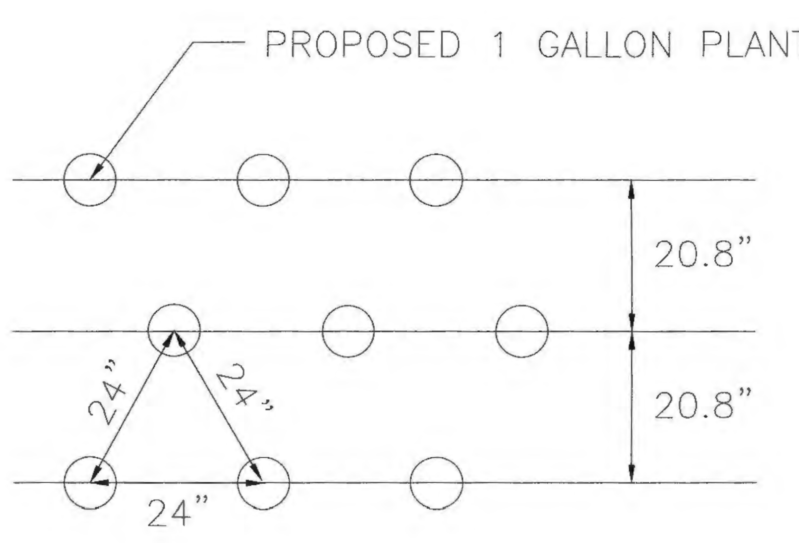
FINAL PLANS
BLACK RIVER RESTORATION
LANDSCAPING PLAN

COUNTY CONCRETE CORPORATION
50 RAILROAD AVE
KENVIL, NJ 07847

JOB: BLACK RIVER RESTORATION
MINE HILL & ROXBURY TWP
MORRIS
NJ

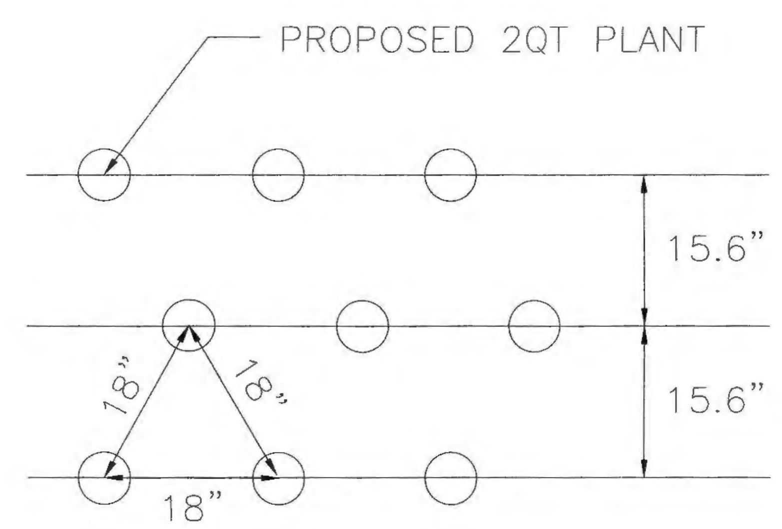
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	1"=60'
DRAWING:	C109
PROJECT:	NJ1954-01
SHEET:	10 OF 11

PROJECT TITLE: BLACK RIVER RESTORATION



PERENNIAL PLANT SPACING DETAIL

NOT TO SCALE



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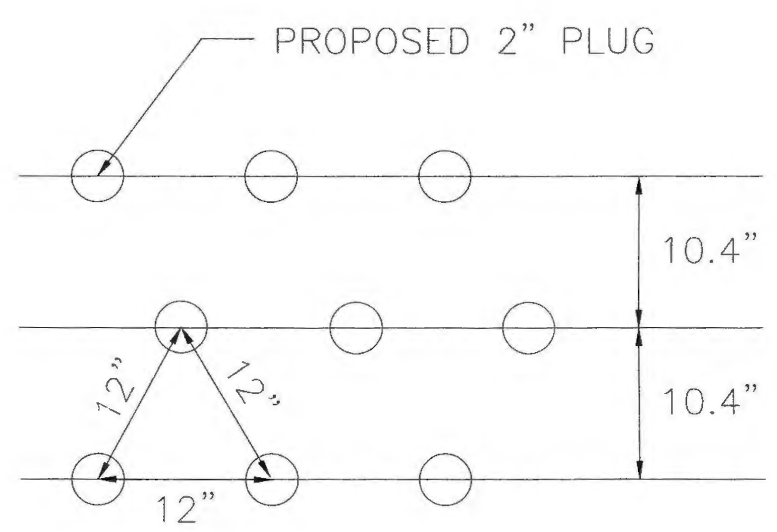

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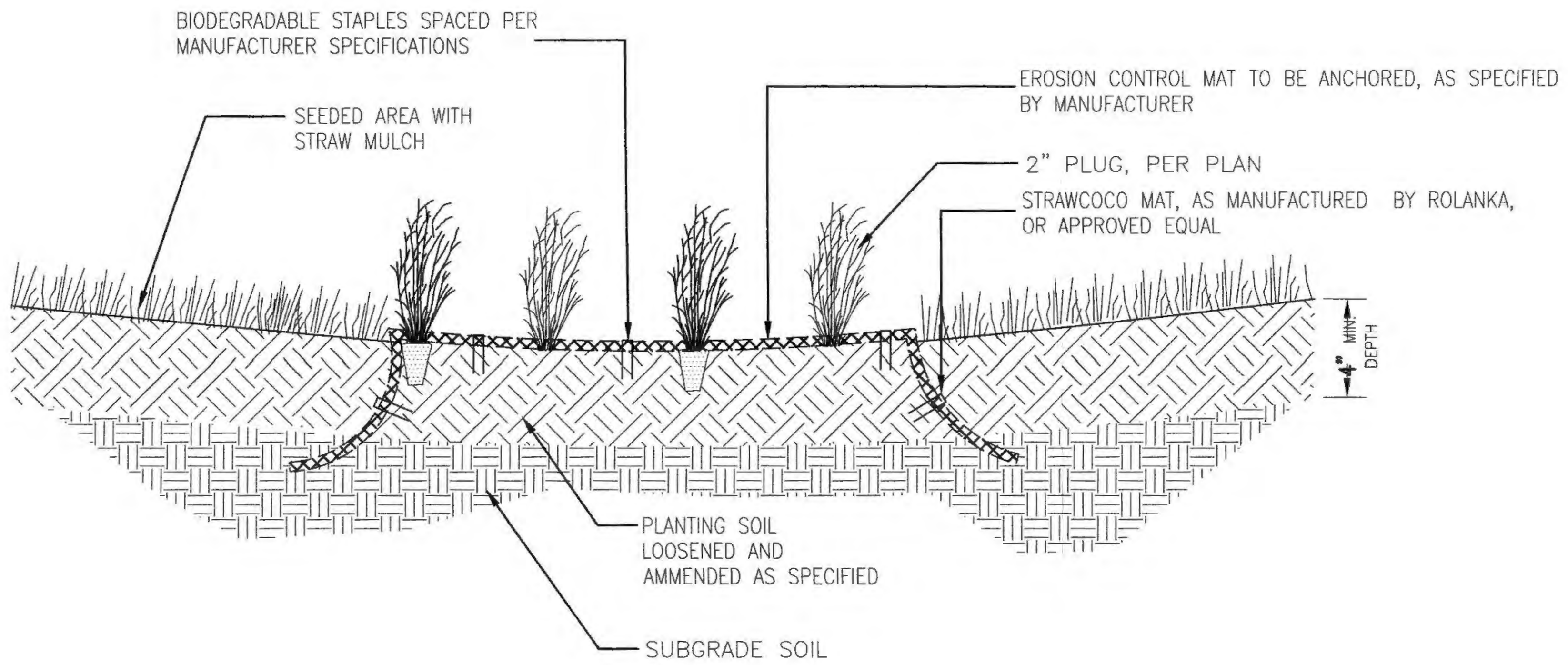
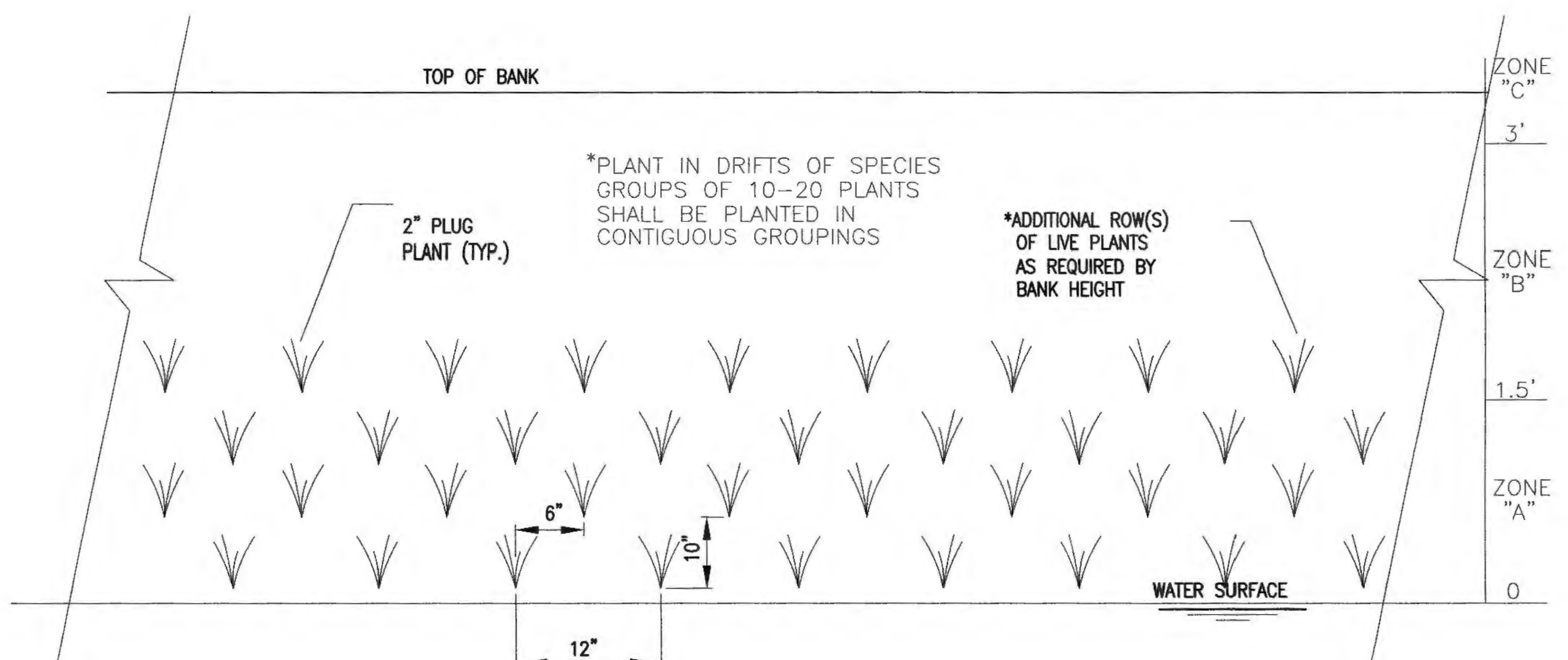


PLUG PLANTING DETAIL

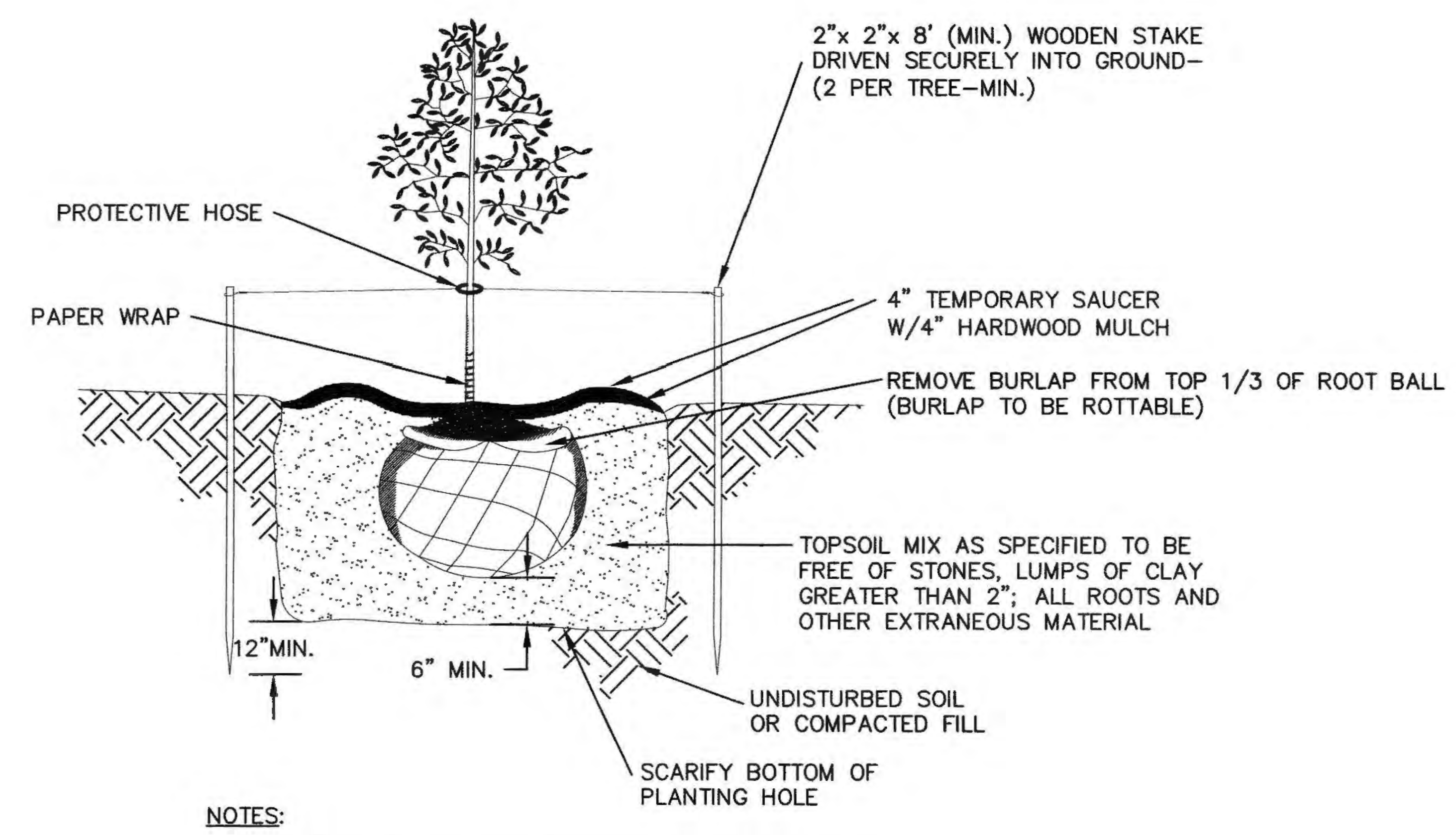
NOT TO SCALE



TYPICAL BANK PLANTINGS

NOT TO SCALE

PLANTNG ZONES:
ZONE A: 0'-1.5' ABOVE WATER SURFACE
ZONE B: 1.5'-3' ABOVE WATER SURFACE
ZONE C: 3+' ABOVE WATER SURFACE



NOTES:

1. REMOVE DEAD AND DAMAGED BRANCHES BY PRUNING ACCORDING TO RECOGNIZED HORTICULTURAL PRACTICES. DO NOT CUT LEADER.
2. ENCASE NON-CORRODIBLE CABLE IN REINFORCED RUBBER GARDEN HOSE AT POINTS OF CONTACT WITH TRUNK OF TREE. FLAG EACH GUY CABLE WITH FLUOURESCENT MATERIAL FOR SAFETY.

TREE PLANTING DETAIL

NOT TO SCALE

RIPARIAN SEEDING NOTES:

AREAS ALONG SHORELINE AND PROPOSED CHANNELS (15' FROM EDGES OF TOP OF BANK AND SHORELINE) SHALL BE SEEDED WITH THE FOLLOWING NATIVE SEED MIX: (OR APPROVED EQUAL)

"FLOODPLAIN MIX" IS A MIXTURE OF GRASSES AND WILDFLOWERS WHICH ARE NATIVE TO THE MID-ATLANTIC REGION, INCLUDING THE FOLLOWING SPECIES: VIRGINIA WILDRYE, DEERTOUNGE, ASTER, INDIANGRASS, AND SWAMP MILKWEED

"FLOODPLAIN MIX" SHOULD BE SEEDED AT A RATE OF 20LBS./ACRE WITH COVER CROP OF GRAIN RYE AT 30LBS./ACRE.

"FLOODPLAIN MIX" IS AVAILABLE THROUGH:

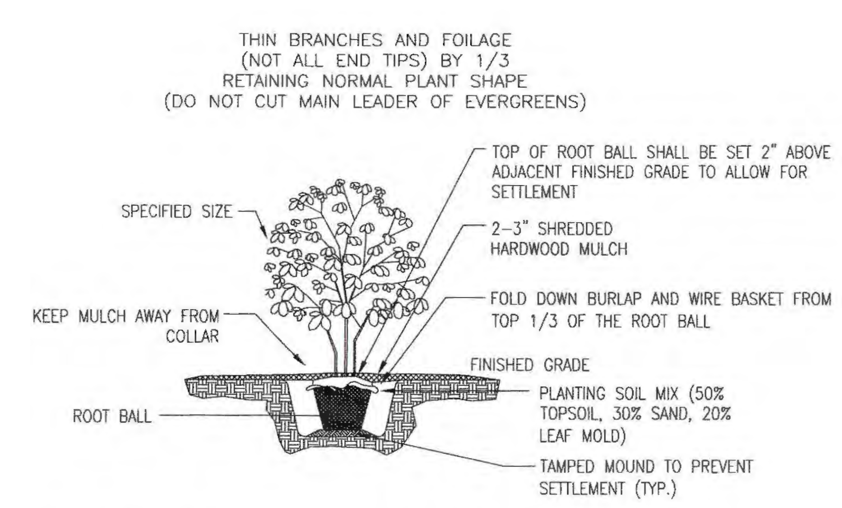
ERNST SEEDS
8884 MERCER PIKE
MEADVILLE, PA 16335
(800) 873-3321

RIPARIAN CORRIDOR MAINTENANCE SCHEDULE

NEWLY SEEDED GRASSES AND POND EDGE:	YEAR 1	YEAR 2	YEAR 3	YEARS 4 PLUS
INSPECT FOR INVASIVE/WEED SPECIES. IF WEED SPECIES APPEAR IN THE SEEDED AREA, SPOT TREAT BY PULLING.	X			
PRUNING, RESEEDING, THATCH REMOVAL OF VEGETATED AREAS, AS NEEDED	X	X	X	
PEST CONTROL, AS NEEDED	X	X	X	
NEWLY PLANTED TREES & SHRUBS:				
MONITOR WEATHER CONDITIONS AND PROVIDE SUPPLEMENTAL WATERING, IF NEEDED. NATURALISTIC PRUNING OF DEAD/DAMAGED BRANCHES IN LATE FALL OR EARLY SPRING.	X			
REMOVE STAKES, IF UTILIZED. CHECK TREE BARK PROTECTION AND REPAIR/ REPLACE AS NEEDED. REPLACE DEAD PLANT MATERIAL. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.		X		
CHECK TREE BARK PROTECTION AND REPAIR/ REPLACE AS NEEDED. PRUNE DAMAGED/DEAD BRANCHES IN NATURALISTIC MANNER IN EARLY SPRING OR LATE FALL.			X	X
VEGETATED AREAS:				
INSPECT FOR INVASIVE/WEED SPECIES. PHYSICALLY REMOVE OR SPOT TREAT INVASIVE SPECIES. PRUNE POTENTIALLY HAZARDOUS BRANCHES FROM EXISTING PLANT MATERIAL.	X	X	X	X

PLANTING SPECIFICATIONS

1. NAME OF PLANTS - SHALL AGREE WITH THE NOMENCLATURE OF "STANDARD PLANT NAMES" AS ADOPTED BY AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMENCLATURE; SIZE AND GRADING STANDARDS SHALL CONFORM TO THOSE SPECIFIED BY THE AMERICAN ASSOCIATION OF NURSERYMEN IN THE LATEST EDITION OF THE "U.S.D.A. STANDARDS FOR NURSERY STOCK".
2. QUALITY - ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY; THEY SHALL HAVE NORMAL, WELL-DEVELOPED BRANCHES AND VIGOROUS FIBROUS ROOT SYSTEMS. ALL PLANTS SHALL BE NURSERY-GROWN UNLESS OTHERWISE STATES; THEY SHALL HAVE BEEN GROWN UNDER THE SAME CLIMATE CONDITIONS AS THE SUBJECT SITE FOR AT LEAST TWO (2) YEARS PRIOR TO DATE OF PLANTING. ALL PLANTS WHICH ARE FOUND UNSUITABLE IN GROWTH OR CONDITION OR WHICH ARE NOT TRUE TO NAME SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE PLANTS.
3. MEASUREMENTS - PLANTS SHALL BE MEASURED AS THEY STAND IN THEIR NATURAL POSITION. STOCK FURNISHED SHALL BE A FAIR AVERAGE OF THE MINIMUM SIZES SPECIFIED OR OF THE RANGE GIVEN IN THE "U.S.D.A. STANDARDS FOR NURSERY STOCK".
4. PREPARATION OF PLANTS - ALL PRECAUTIONS CUSTOMARY IN GOOD TRADE PRACTICE SHALL BE TAKEN IN PREPARING PLANTS FOR MOVING. ALL BALLED AND BURLAPPED PLANTS SHALL BE DUG TO MEET OR EXCEED THE "U.S.D.A. STANDARDS FOR NURSERY STOCK".
5. SOIL EXCAVATIONS - THE EXCAVATION MUST BE NOT LESS THAN 12 INCHES WIDER OR ANY DEEPER THAN NECESSARY TO ACCOMMODATE THE BALL OF THE TREE.
6. PLANTING - TREES SHALL BE PLANTED AT THE SAME DEPTH AS THEY WERE IN THE NURSERY. PLANTING SOIL SHALL BE COMPOSED OF ONE PART PEAT MOSS AND THREE PARTS TOPSOIL THOROUGHLY MIXED. EACH TREE SHALL BE WATERED THOROUGHLY AT TIME OF PLANTING.
7. PRUNING - TREES SHALL BE PRUNED AFTER PLANTING, OR BY THE NURSERYMAN AT THE TIME OF DIGGING, TO BALANCE TOP GROWTH WITH ROOTS AND TO PRESERVE THEIR NATURAL CHARACTER AND SHAPE. PRUNING SHALL BE RESTRICTED IN GENERAL TO THE SECONDARY BRANCHES AND SOFT AND SUCKER GROWTH.
8. WRAPPING - ALL TREES SHALL BE WRAPPED WITH SIX TO TEN INCH WIDE 8-OUNCE BURLAP OR KRAFT TREE PAPER AT THE TIME OF PLANTING FROM THE GROUND TO THE FIRST BRANCHES
9. MULCHING - ALL TREES SHALL BE MULCHED WITHIN THREE DAYS OF PLANTING WITH WOOD CHIPS, LICORICE ROOT, GROUND CORNCOBS OR OTHER SUITABLE MULCH MATERIAL.
10. STAKING AND GUYING -
    a. TREES SHALL BE STAKED WITH AT LEAST ONE RED OR WHITE CEDAR STAKE THE SAME DAY OF PLANTING. STAKES SHALL BE A MINIMUM OF 9 FEET IN HEIGHT AND NOT LESS THAN TWO INCHES IN SMALLEST DIAMETER. STAKES ARE TO BE DRIVEN INTO THE GROUND AT A DEPTH OF 12 INCHES BELOW THE BOTTOM OF THE EXCAVATION. THIS SHOULD BE DONE BEFORE SETTING THE TREE OR, IF AFTER SETTING, IN SUCH A MANNER AS NOT TO INJURE THE ROOTS.
    b. TREES SHALL BE GUYED TO THE STAKES AT A HEIGHT OF ABOUT FIVE FEET USING NO. 10 GAGE GALVANIZED STEEL WIRE IN A PIECE OF RUBBER HOSE. THE WIRE SHALL BE FASTENED TO THE STAKE IN SUCH A MANNER THAT THE WIRE WILL NOT SLIP NOR COME IN CONTACT WITH THE TREE TRUNK. GUYS BROKEN (BUT NOT DELIBERATELY BROKEN THROUGH VANDALISM) WITHIN A YEAR OF PLANTING SHALL BE REPLACED.
11. REMOVAL OF ALL PLANTING DEBRIS - REMOVAL OF DEBRIS IS REQUIRED. THE PROPERTY MUST BE LEFT IN A NEAT AND ORDERLY CONDITION IN ACCORDANCE WITH GOOD AND ACCEPTED PLANTING PRACTICES.
12. HERBIVORY PROTECTION - WIRE CAGES MUST BE INSTALLED AROUND ALL TREES AND SHRUBS IN ORDER TO PROTECT THEM FROM WILDFIRE BROWSING WHILE THEY BECOME ESTABLISHED
13. GUARANTEE -
    a. TREES SHALL BE GUARANTEED FOR ONE YEAR FOR FALL PLANTED AND 13 MONTHS FOR SPRING PLANTED TREES FROM DATE OF ACCEPTANCE BY THE OWNER OR HIS REPRESENTATIVE. THE TREES ARE TO BE ALIVE AND IN A SATISFACTORY GROWING CONDITION AS DETERMINED BY OWNER OR HIS REPRESENTATIVE AT THE END OF THE GUARANTEE PERIOD.
    b. REPLACEMENT WILL BE MADE ACCORDING TO THESE SAME SPECIFICATIONS AND DURING THE NORMAL PLANTING PERIOD. REPLACEMENTS SHALL BE SUBJECT TO THE SAME GUARANTEE AND REPLACEMENT AS THE ORIGINAL MATERIAL. THE REPLACEMENTS SHALL BE MADE WITHIN 60 DAYS FOLLOWING WRITTEN DEMAND FROM THE OWNER OR HIS REPRESENTATIVE.



SHRUB PLANTING AND SHRUB BED PREPARATION

NOT TO SCALE

REVISION | DATE

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FINAL PLANS
BLACK RIVER RESTORATION
LANDSCAPING DETAILS

COUNTY CONCRETE CORPORATION 50 RAILROAD AVE KENVIL, NJ 07847	
JOB: BLACK RIVER RESTORATION	
MINE HILL & ROXBURY TWP MORRIS NJ	
PIN:	SEE COVER SHEET
CHECKED BY:	----
DRAWN BY:	AB
DATE:	4/27/2022
SCALE:	NTS
DRAWING:	C110
PROJECT:	NJ1954-01
SHEET:	11 OF 11

Department of Environmental Protection
Office of Natural Lands Management
Mail Code 501-04, P.O. Box 420
Trenton, New Jersey 08625-0420
Tel. (609) 984-1339; Fax. (609) 984-1427

Invoice

Date	Invoice #
12/9/2021	23583

Bill to:
Bogia Engineering, Inc.
667 Exton Commons
Exton, PA 19341

Make check payable to:
DEP - Office of Natural Lands Management

Include this invoice with payment & send to:
NJDEP Office of Natural Lands Management
Mail Code 501-04, P.O. Box 420
Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 21-4007475-23583	$ 70.00	$ 70.00
Ali Behbahani Project Name: County Concrete 28 Green Lane		**Total**	$ 70.00

NHP File No. 21-4007475-23583

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

December 9, 2021

Ali Behbahani
Bogia Engineering, Inc.
667 Exton Commons
Exton, PA 19341

Re: County Concrete 28 Green Lane
Block(s) - 2001, Lot(s) - 13
Roxbury Township, Morris County

Dear Mr. Behbahani:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the map(s) submitted with the Natural Heritage Data Request Form into our GIS. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted in order to make a riparian zone width determination as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species is also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 21-4007475-23583

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
Insecta								
	Arogos Skipper	Atrytone arogos arogos	Breeding/Courtship	4	NA	State Endangered	G3T1T2	S1
Mammalia								
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
	Northern Myotis	Myotis septentrionalis	Active Season Sighting	5	Federally Listed Threatened	NA	G1G2	S1
Reptilia								
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	Yes	1 page(s) included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Immediate Vicinity of the Project Site
Based on Search of Natural Heritage Database
Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Regional Status	Grank	Srank	Identified	Last Observed	Location
Vascular Plants									
Verbena simplex	Narrow-leaf Vervain		E	LP, HL	G5	S1	Y	2012-06-20	Succasunna, Roxbury Township, Morris County. Approximately 1.5 mi. south-southeast of the intersection of Highways 10 and 46. East side of the Conrail railroad tracks, approximately 0.25 mi. north-northeast of Highway 10.

Total number of records: 1

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
Insecta								
	Arogos Skipper	Atrytone arogos arogos	Breeding/Courtship	4	NA	State Endangered	G3T1T2	S1
Mammalia								
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
	Northern Myotis	Myotis septentrionalis	Active Season Sighting	5	Federally Listed Threatened	NA	G1G2	S1
Reptilia								
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Table 3: Within 1 Mile for Riparian Zone Width Determination (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences for Riparian Zone Width Determination (Flood Hazard Area Control Act Rule Appplication) - Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites for Riparian Zone Width Determination - Within One Mile of the Project Site	Yes	See emailed attachments
3. Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Red-shouldered Hawk	Buteo lineatus	Breeding Sighting	4	NA	State Endangered	G5	S1B,S3N
	Veery	Catharus fuscescens	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Insecta								
	Arogos Skipper	Atrytone arogos arogos	Breeding/Courtship	4	NA	State Endangered	G3T1T2	S1
	Arogos Skipper	Atrytone arogos arogos	Casual Flyby	4	NA	State Endangered	G3T1T2	S1
	Arogos Skipper	Atrytone arogos arogos	Nectaring	4	NA	State Endangered	G3T1T2	S1
Mammalia								

Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Bobcat	Lynx rufus	Live Individual Sighting	4	NA	State Endangered	G5	S2
	Bobcat	Lynx rufus	On Road	4	NA	State Endangered	G5	S2
	Bobcat	Lynx rufus	Physical evidence	4	NA	State Endangered	G5	S2
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
	Northern Myotis	Myotis septentrionalis	Active Season Sighting	5	Federally Listed Threatened	NA	G1G2	S1
	Northern Myotis	Myotis septentrionalis	Hibernaculum	5	Federally Listed Threatened	NA	G1G2	S1
Reptilia								
	Eastern Box Turtle	Terrapene carolina carolina	Occupied Habitat	2	NA	Special Concern	G5T5	S3
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Vernal Pool Habitat for Riparian Zone Width Determination
Within One Mile of the Project Site
Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Vernal habitat area	2960
Vernal habitat area	2964
Vernal habitat area	2968
Vernal habitat area	2971

Total number of records: 4

Other Animal Species for Riparian Zone Width Determination Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Vertebrate Animals					
Eptesicus fuscus	Big Brown Bat			G5	S3

Total number of records: 1

From: Maresca, Vincent [DEP] <Vincent.Maresca@dep.nj.gov> Sent: Mon 1/31/2022 11:29 AM
To: ali@bogiaeng.com
Cc: Baratta, Meghan [DEP]
Subject: HPO Project No. 22-0248, Black Creek Stream Restoration, Township of Roxbury-NJHPO data request

**This e-mail serves as the official correspondence of the New Jersey Historic Preservation **

HPO Project No. 22-0248-1
HPO-A2022-173

Re:
Morris County, Roxbury Township
Black Creek Stream Restoration
Block 20001, Lot 13
Block 2401, Lot 9
Block 2501, Lot 1
Technical Assistance Review

Dear Mr. Behbahani:

Thank you for providing the Historic Preservation Office (HPO) with the opportunity for review and comment on the potential for the above-referenced project to affect historic and archaeological resources. The project proposes stream habitat rehabilitation of Black Creek (Lamington River) through Rutgers Pond and the southwestern outlet including reestablishing the natural stream channel, new stream banks, landscaping, and shade trees. Upon review, there are no districts, buildings, or structures listed in, or identified on HPO maps as eligible for listing in, the New Jersey or National Registers of Historic Places within the project site. While the project site is located within an area of high archaeological sensitivity for pre-Contact period archaeological resources, the work is confined to existing, modified stream channels through previous mining operations. Therefore, the work, as currently understood, has a low potential to effect any archaeological deposits.

The HPO reviews projects for their effects on historic resources when federal funding, licensing, or permitting is involved. The HPO also reviews projects requiring Freshwater Wetlands, Waterfront Development, Upland Development, CAFRA and Highland Preservation Area Approval permits issued by the State of New Jersey's Division of Land Resource Protection, as well as environmental assessments under Executive Order 215. *Upon review, if subject to any of the above-referenced regulations, the HPO would not recommend any further consideration of project effects on historic and archaeological resources prior to permit issuance.*

Additional Comments

This information is provided as informal notes to you and does not constitute identification level cultural resources survey under Section 106 of the National Historic Preservation Act or other law or regulation. These notes do not constitute project review under any state or federal law. The absence of previously identified cultural resources does not imply that there are no eligible historic properties in the requested area. Further identification of cultural resources may be required under one or more historic preservation review processes depending on project funding, licensing, or permitting.

From: Maresca, Vincent [DEP] <Vincent.Maresca@dep.nj.gov>
Sent: Mon 1/31/2022 11:29 AM
To: ali@bogiaeng.com
Cc: Baratta, Meghan [DEP]
Subject: HPO Project No. 22-0248, Black Creek Stream Restoration, Township of Roxbury-NJHPO data request

Thank you again for providing this opportunity for review and comment on the potential for this project to affect historic and archaeological resources. Please reference the HPO project number 22-0121in any future calls, emails, or written correspondence to help expedite your review and response. If you have any questions, please feel free to contact me at Vincent.maresca@dep.nj.gov with questions.

Regards,

Vincent Maresca, M.A.
Historic Preservation Specialist 2
Historic Preservation Office
Department of Environmental Protection
501 East State Street, Trenton, NJ 08625-0420
vincent.maresca@dep.nj.gov Ph: (609) 633-2395 , F: (609) 984-0578

New Jersey Department of Environmental Protection
Land Use Management Program
Division of Land Use Regulation

PROPERTY OWNER CERTIFICATION

INSTRUCTIONS: All applicants are required to complete Sections A and B of this form. Applicants who are individual owners of record of the property upon which the activities will occur must also complete Section C.

All other persons who are required to certify to this application in accordance with N.J.A.C. 7:7-23.2(d), N.J.A.C. 7:7A-16.2(d), and N.J.A.C. 7:13-18.2(d) must complete Sections A and C.

Separate forms may be submitted for each signatory, or a single form may be submitted with all required signatures.

SECTION A. SITE INFORMATION (required)

Project Name: Black River Restoration

Applicant's Name: County Concrete Corporation

Street Address: Green Rd

Municipality: Mine Hill Township County: Morris Zip Code: 07803

Blocks and Lots: Block 602 Lot 1, Block 605 Lot 1

SECTION B. SIGNATURE OF APPLICANT

The undersigned applicant hereby certifies that he/she is one of the following: 1) an owner of the site on which the activity is proposed or conducted; 2) an agent designated by the site owner(s) to obtain the permit, verification, or letter of interpretation on the owner's behalf; 3) a representative of a public entity proposing an activity within a right-of-way or easement that is held or controlled by that entity or that will be appropriated by the entity under the power of eminent domain; OR 4) a person with the legal authority to perform the proposed activities.

The undersigned applicant also certifies to the following:

1. Does the application include any activities within an easement or right-of-way? ☐ Yes ☑ No

   If "**Yes**," has written consent from all easement or right-of-way holders in accordance with N.J.A.C. 7:7-23.2(g), 7:7A-16.2(g), and 7:13-18.2(g) been attached to this form? ☐ Yes ☑ No
2. Will any part of the project be located within property belonging to the State of New Jersey? ☐ Yes ☑ No
3. Does the application include activities on any property owned by any public agency that would be encumbered by Green Acres? ☐ Yes ☑ No
4. Does this project require a Section 106 (National Register of Historic Places) Determination as part of a federal approval? ☐ Yes ☑ No

Applicant's Name: John Gilkinson Date: 6/24/2022

Applicant's Signature: [signature]

Applicant's Name: Date:

Applicant's Signature:

Applicant's Name: Date:

Applicant's Signature:

Applicant's Name: Date:

Applicant's Signature:

SECTION C. PROPERTY OWNER'S CERTIFICATION

All individual owners of record of the property upon which the activities will occur must certify to this application unless the applicant is a corporation, partnership, sole proprietorship, municipality, or State, Federal, or other public entity. If the applicant is a corporation, a principal executive officer of at least the level of vice president must certify below. In the case of partnerships and sole proprietorships, a general partner or the proprietor, respectively, is required to certify. For a municipality or for a State, Federal, or other public entity, the certification must be provided by either a principal executive officer or ranking elected official.

A duly authorized representative may sign this application on behalf of any individual who is required to certify provided that the authorization is made in writing and is submitted as part of this application. Please note that in lieu of a property owner's signature, a legal agreement with the current property owner may be attached to this form. Acceptable legal agreements include, but are not limited to, certificates of eminent domain and certificates of inverse condemnation. **Please note that contracts of sale are not considered an acceptable substitute for a property owner's signature.**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment. I hereby grant permission for the conduct of the proposed activities and consent to allow access to the site by representatives or agents of the Department for the purpose of conducting a site inspection(s) of the property in question.

Name of Owner/Easement Holder: John Crimi; President, County Concrete Corporation Date: 6/24/2022
Signature:
Specific Block(s) and Lot(s) Owned: Block 602 Lot 1, Block 605 Lot 1

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

New Jersey Department of Environmental Protection
Land Use Management Program
Division of Land Use Regulation

PROPERTY OWNER CERTIFICATION

INSTRUCTIONS: All applicants are required to complete Sections A and B of this form. Applicants who are individual owners of record of the property upon which the activities will occur must also complete Section C.

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Separate forms may be submitted for each signatory, or a single form may be submitted with all required signatures.

SECTION A. SITE INFORMATION (required)

Project Name: Black River Restoration

Applicant's Name: County Concrete Corporation

Street Address: 50 Railroad Avenue

Municipality: Roxbury Township County: Morris Zip Code: 07847

Blocks and Lots: Block 2501 Lot 1

SECTION B. SIGNATURE OF APPLICANT

The undersigned applicant hereby certifies that he/she is one of the following: 1) an owner of the site on which the activity is proposed or conducted; 2) an agent designated by the site owner(s) to obtain the permit, verification, or letter of interpretation on the owner's behalf; 3) a representative of a public entity proposing an activity within a right-of-way or easement that is held or controlled by that entity or that will be appropriated by the entity under the power of eminent domain; OR 4) a person with the legal authority to perform the proposed activities.

The undersigned applicant also certifies to the following:

1. Does the application include any activities within an easement or right-of-way? ☐ Yes ☒ No

   If "Yes," has written consent from all easement or right-of-way holders in accordance with N.J.A.C. 7:7-23.2(g), 7:7A-16.2(g), and 7:13-18.2(g) been attached to this form? ☐ Yes ☐ No

2. Will any part of the project be located within property belonging to the State of New Jersey? ☐ Yes ☒ No
3. Does the application include activities on any property owned by any public agency that would be encumbered by Green Acres? ☐ Yes ☐ No
4. Does this project require a Section 106 (National Register of Historic Places) Determination as part of a federal approval? ☐ Yes ☐ No

Applicant's Name: [illegible] C. [illegible] Date: 6/24/2022
Applicant's Signature: [signature]

Applicant's Name: Date:
Applicant's Signature:

Applicant's Name: Date:
Applicant's Signature:

Applicant's Name: Date:
Applicant's Signature:

SECTION C. PROPERTY OWNER'S CERTIFICATION

All individual owners of record of the property upon which the activities will occur must certify to this application unless the applicant is a corporation, partnership, sole proprietorship, municipality, or State, Federal, or other public entity. If the applicant is a corporation, a principal executive officer of at least the level of vice president must certify below. In the case of partnerships and sole proprietorships, a general partner or the proprietor, respectively, is required to certify. For a municipality or for a State, Federal, or other public entity, the certification must be provided by either a principal executive officer or ranking elected official.

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I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment. I hereby grant permission for the conduct of the proposed activities and consent to allow access to the site by representatives or agents of the Department for the purpose of conducting a site inspection(s) of the property in question.

Name of Owner/Easement Holder: STEPHEN PEVERLY (Mine Hill Township) Date: 4/24/2022

Signature:

Specific Block(s) and Lot(s) Owned: Block 604 Lot 1

Name of Owner/Easement Holder: Date:

Signature:

Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:

Signature:

Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:

Signature:

Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:

Signature:

Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:

Signature:

Specific Block(s) and Lot(s) Owned:

SECTION C. PROPERTY OWNER'S CERTIFICATION

All individual owners of record of the property upon which the activities will occur must certify to this application unless the applicant is a corporation, partnership, sole proprietorship, municipality, or State, Federal, or other public entity. If the applicant is a corporation, a principal executive officer of at least the level of vice president must certify below. In the case of partnerships and sole proprietorships, a general partner or the proprietor, respectively, is required to certify. For a municipality or for a State, Federal, or other public entity, the certification must be provided by either a principal executive officer or ranking elected official.

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Name of Owner/Easement Holder: John Crimi, President, County Concrete Corporation Date: 6/26/2022
Signature:
Specific Block(s) and Lot(s) Owned: Block 2501 Lot 1

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

SECTION C. PROPERTY OWNER'S CERTIFICATION

All individual owners of record of the property upon which the activities will occur must certify to this application unless the applicant is a corporation, partnership, sole proprietorship, municipality, or State, Federal, or other public entity. If the applicant is a corporation, a principal executive officer of at least the level of vice president must certify below. In the case of partnerships and sole proprietorships, a general partner or the proprietor, respectively, is required to certify. For a municipality or for a State, Federal, or other public entity, the certification must be provided by either a principal executive officer or ranking elected official.

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Name of Owner/Easement Holder: Stephen Penzenik Date: 6/24/2022
Signature:
Specific Block(s) and Lot(s) Owned: Block 2001 Lot 13

Name of Owner/Easement Holder: Stephen D Penzenik Date: 6/24/2022
Signature:
Specific Block(s) and Lot(s) Owned: Block 2202 Lot 5

Name of Owner/Easement Holder: Patricia A Penzenik Date: 6/24/2022
Signature: Patricia Penzenik
Specific Block(s) and Lot(s) Owned: Block 2202 Lot 5

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

Name of Owner/Easement Holder: Date:
Signature:
Specific Block(s) and Lot(s) Owned:

New Jersey Department of Environmental Protection
Land Use Management Program
Division of Land Use Regulation

PUBLIC NOTICE

SECTION A. SITE INFORMATION

Applicant's Name: County Concrete Corporation

Street Address: 50 Railroad Ave.

Municipality: Roxbury Township County: Morris Zip Code: 07847

Blocks and Lots: Blocks: 2001, 2202, 2501, 602, 604, 605 Lots:13, 5, 1, 1, 1 , 1

SECTION B. STANDARD NOTICE REQUIREMENTS

Except as provided at item 6 below, public notice of the application shall be provided no more than 30 calendar days prior to submitting the application and no later than the date the application is submitted to the Department.

1. Public notice is required for all of the following (*check all that apply*):

- ☐ A flood hazard area general permit authorization (except general permit 1)
- ☒ A flood hazard area individual permit
- ☒ A flood hazard area verification
- ☐ A coastal general permit authorization
- ☐ A CAFRA individual permit
- ☐ An in-water waterfront development individual permit
- ☐ An upland waterfront development individual permit
- ☐ A coastal wetlands individual permit
- ☒ A freshwater wetlands individual permit
- ☐ A freshwater wetlands transition area waiver
- ☐ A freshwater wetlands general permit authorization (except general permit 15)
- ☐ A freshwater wetlands general permit 15 **(please skip to Section C)**

2. Has a copy of the entire application been sent to the municipal clerk of each municipality in which the proposed activity or project is located?.. ☒ Yes ☐ No

   Note: For electronic submissions, the application consists of a description of the project, which must include the lot and block, municipality, and county, the specific permit(s)/authorization(s) being sought, and all items that will be uploaded to the submission service, including all required items on the applicable application checklist(s).

   If "**Yes**," did you attach a copy of the certified United States Postal Service white mailing receipt, or other written receipt, and a copy of any letter sent with the application to this form?.......... ☒ Yes ☐ No

3. Have both a notice letter, including a brief description of the proposed activity or project, and a legible copy of the site plans been sent to the all following applicable agencies? .... ☒ Yes ☐ No

   - The construction official of each municipality in which the site is located
   - The environmental commission, or other government agency with similar responsibilities, of each municipality in which the site is located
   - The planning board of each municipality in which the site is located
   - The planning board of each county in which the site is located

   If "**Yes**," did you attach **both** of the following to this form?.. ☒ Yes ☐ No

   - A copy of the certified United States Postal Service white mailing receipt or other written receipt
   - A copy of the notice letter

4. Is the application for a coastal permit for an activity within the 12-mile circle with Delaware, as described at N.J.A.C. 7:7-1.2(c), or within 200 feet of the 12-mile circle? ☐ Yes ☒ No

If "**Yes**," have both a notice letter, including a brief description of the proposed activity or project, and a legible copy of the site plans been sent to the State of Delaware, Department of Natural Resources & Environmental Control, Delaware Coastal Management Program, 89 Kings Highway, Dover, DE 19901? ☐ Yes ☐ No

If "**Yes**," did you attach **both** of the following to this form? ☐ Yes ☐ No

- A copy of the certified United States Postal Service white mailing receipt or other written receipt
- A copy of the notice letter

5. Is the application for a waterfront development individual permit to install a submarine cable in the ocean or to perform sand mining in the ocean? ☐ Yes ☒ No

If "**Yes**," have you submitted a description of the project, the specific permit(s)/authorization(s) being sought, and a copy of the NOAA nautical chart showing the proposed cable route or the limits of the proposed sand mining area to **all** of the following entities? ☐ Yes ☐ No

- Garden State Seafood Association
- National Fisheries Institute
- North Atlantic Clam Association
- Rutgers Cooperative Extension
- New Jersey Shellfisheries Council
- New Jersey Marine Fisheries Council

6. Does the application include a CAFRA individual permit? ☐ Yes ☒ No

If "**No**," skip to Question 7.

If "**Yes**," has newspaper notice, consisting of a legal notice or display advertisement, been published in the official newspaper of the municipality in which the site is located or a newspaper of general circulation in the municipality? ☐ Yes ☐ No

If "**Yes**," did you attach a copy of the published newspaper notice, the date of publication, and the name of the newspaper to this form? ☐ Yes ☐ No

If "**No**," did you verify that a newspaper notice, consisting of a legal notice or display advertisement, will be published in the official newspaper of the municipality in which the site is located or a newspaper of general circulation in the municipality no more than **10 calendar days** after the application is submitted to the Department? ☒ Yes ☐ No

Note: A copy of the published newspaper notice, the date of publication, and the name of the newspaper must be submitted to the Department within this timeframe.

7. Does the application include one or more of the activities listed below (**other than those proposed in a freshwater wetlands individual permit application**)? ☐ Yes ☒ No

- A delineation of one-half mile or longer of a regulated water
- A mosquito control activity subject to flood hazard general permit 2
- A linear project of one-half mile or longer
- A shore protection development, including beach nourishment, beach and dune maintenance, or dune creation of one-half mile or longer
- A public development on a site of 50 acres or more
- An industrial or commercial development on a site of 100 acres or more
- A project to remove sediment or debris from a channel of one-half mile or longer
- Maintenance dredging of a State navigation channel of one-half mile or longer
- A trail or boardwalk of one-half mile or longer subject to a freshwater wetlands general permit or transition area waiver

If you answered "**No**," to question 7:

Have both a notice letter, including a brief description of the proposed activity or project, and a legible copy of the site plans been sent to all owners of real property, including easements, located **within 200 feet of the property boundary of the site?**......... ☒ Yes ☐ No

If "**Yes**," did you attach **all** of the following to this form? .... ☒ Yes ☐ No

- A copy of the certified United States Postal Service white mailing receipt or other written receipt
- A copy of the notice letter
- A certified list of all owners of real property, including easements, within 200 feet of the property boundary, prepared by the municipality with a date of certification no earlier than one year prior to the date of the application

If you answered "**Yes**," to question 7, answer questions I. and II. below:

I. Have both a notice letter, including a brief description of the proposed activity or project, and a legible copy of the site plans been sent to all owners of property, including easements, **within 200 feet of any proposed above-ground structure?** .... ☐ Yes ☐ No

If "**Yes**," did you attach **all** of the following to this form? .... ☐ Yes ☐ No

- A copy of the certified United States Postal Service white mailing receipt or other written receipt
- A copy of the notice letter
- A certified list of all owners of real property, including easements, within 200 feet of the property boundary, prepared by the municipality with a date of certification no earlier than one year prior to the date of the application

II. For all applications, **except CAFRA individual permits**, has newspaper notice, consisting of a legal notice or display advertisement been published in the official newspaper of the municipality in which the site is located or a newspaper of general circulation in the municipality? .... ☐ Yes ☐ No

If "**Yes**," did you attach a copy of the published newspaper notice, the date of publication, and the name of the newspaper to this form? .... ☐ Yes ☐ No

8. Will the proposed activity or project disturb 5,000 square feet of land or more? .... ☒ Yes ☐ No

If "**Yes**," have both a notice letter, including a brief description of the proposed activity or project, and a legible copy of the site plans been sent to the local Soil Conservation District? .... ☒ Yes ☐ No

If "**Yes**," did you attach a copy of the certified United States Postal Service white mailing receipt or other written receipt **and** a copy of the notice letter to this form? .... ☒ Yes ☐ No

9. Is the proposed activity or project located within the Pinelands Area as designated under the Pinelands Protection Act at N.J.S.A. 13:18A-11(a)? .... ☐ Yes ☒ No

If "Yes," you are also required to complete Section D of this form.

10. Does the application include a freshwater wetlands individual permit application? .... ☒ Yes ☐ No

If "**No**," skip to Question 11.

If "**Yes**," does the proposed project involve more than 10 acres of fill? .... ☒ Yes ☐ No

If "**Yes**," has newspaper notice been published in a newspaper with regional circulation in the region in which the site is located? .... ☒ Yes ☐ No

If "**Yes**," did you attach a copy of the published newspaper notice, the date of publication, and the name of the newspaper to this form? .... ☒ Yes ☐ No

If "**No**," has newspaper notice consisting of a legal notice or display advertisement been published in the official newspaper of the municipality in which the site is located or a newspaper of general circulation in the municipality? .... ☐ Yes ☐ No

If "**Yes**," did you attach a copy of the published newspaper notice, the date of publication, and the name of the newspaper to this form? .... ☐ Yes ☐ No

11. Does the application include a flood hazard individual permit based on a hardship exception? ☐ Yes ☒ No

If "**Yes**," do all notice letters and published newspaper notices attached to this form (under questions 3, 4, 7, and 8 above, as applicable) include a description of the nature of the hardship as well as the citation and subject matter of each requirement for which the hardship exception is being requested? ☐ Yes ☐ No

SECTION C. FRESHWATER WETLANDS GENERAL PERMIT 15

This section only applies to applications that include a freshwater wetlands general permit 15.

1. Is the applicant a Federal agency conducting activities on Federal land? ☐ Yes ☐ No

If "Yes," public notice is not required for this activity.

2. Has a display advertisement describing the proposed activities, at least four column inches in size, been published in a newspaper with local circulation (including the municipality) and in a newspaper with regional circulation (including the county)? ☐ Yes ☐ No

If "**Yes**," did you attach a copy of the published newspaper notices, the dates of publication, and the names of the newspapers to this form? ☐ Yes ☐ No

SECTION D. PINELANDS

This section only applies to applications where the proposed activity or project is located within the Pinelands Area as designated under the Pinelands Protection Act at N.J.S.A. 13:18A-11.a.

1. Does the application include a flood hazard general permit or individual permit? ☐ Yes ☐ No

If "**Yes**," has a description of the project, including the lot and block, municipality, county, and specific permit(s)/authorization(s) being sought, been sent to the New Jersey Pinelands Commission? ☐ Yes ☐ No

If "**Yes**," did you attach a copy of the certified United States Postal Service white mailing receipt or other written receipt and a copy of any letter provided with the project description to this form? ☐ Yes ☐ No

2. Does the application include a coastal general permit or individual permit? ☐ Yes ☐ No

If "**Yes**," has a copy of the entire application been sent to the New Jersey Pinelands Commission? ☐ Yes ☐ No

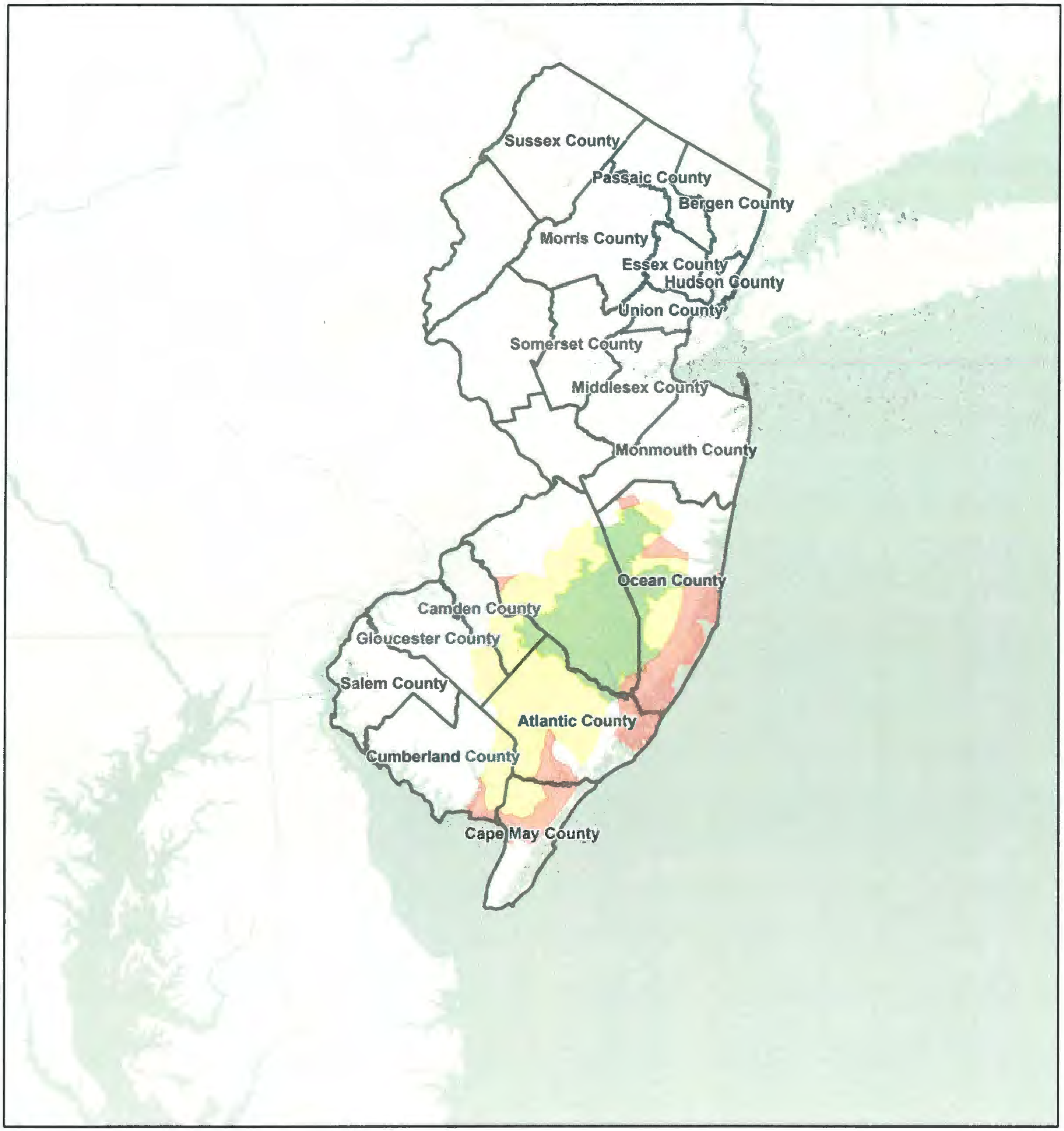
Note: For electronic submissions, the application consists of a description of the project, which must include the lot and block, municipality, and county, the specific permit(s)/authorization(s) being sought, and all items that will be uploaded to the submission service, including all required items on the applicable application checklist(s).

If "**Yes**," did you attach a copy of the certified United States Postal Service white mailing receipt or other written receipt and a copy of any letter provided with the application to this form? ☐ Yes ☐ No

3. Is the application solely for a freshwater wetlands general permit(s)? ☐ Yes ☐ No

If "Yes," do not submit the application to the Department. Submit the application to the New Jersey Pinelands Commission.

NJ-GeoWeb



7/19/2022, 11:41:05 AM

Pinelands Boundary

Preservation Area

Protection Area

National Reserve

County Boundaries

1:2,311,162

0 15 30 60 mi

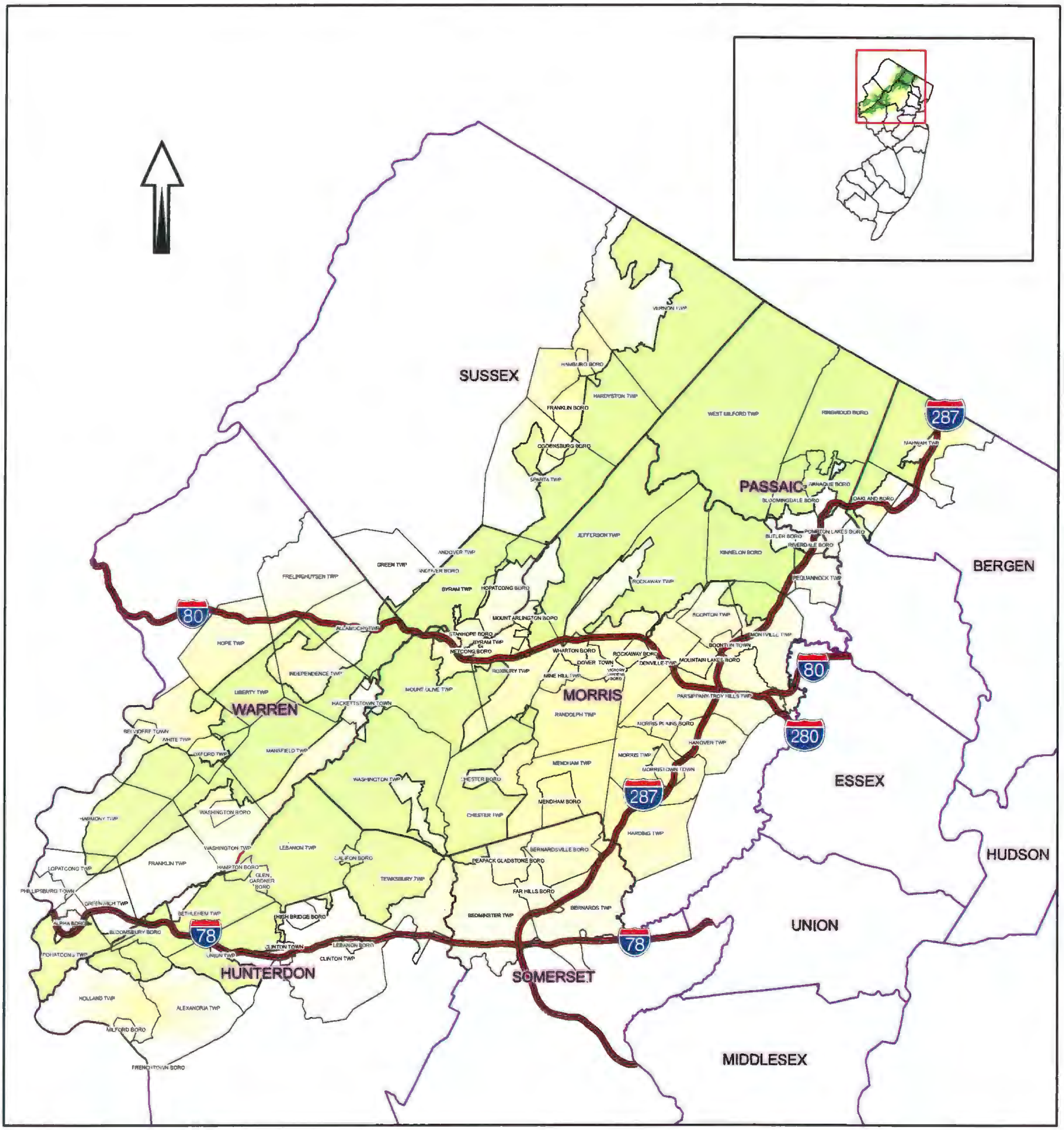
0 20 40 80 km

data.pa.gov, New Jersey Office of GIS, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

New Jersey Department of Environmental Protection

data.pa.gov, New Jersey Office of GIS, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | NJDEP | NJDEP. Bureau of Energy and Sustainability Edition 20190327 | NJDEP, Division of Fish and

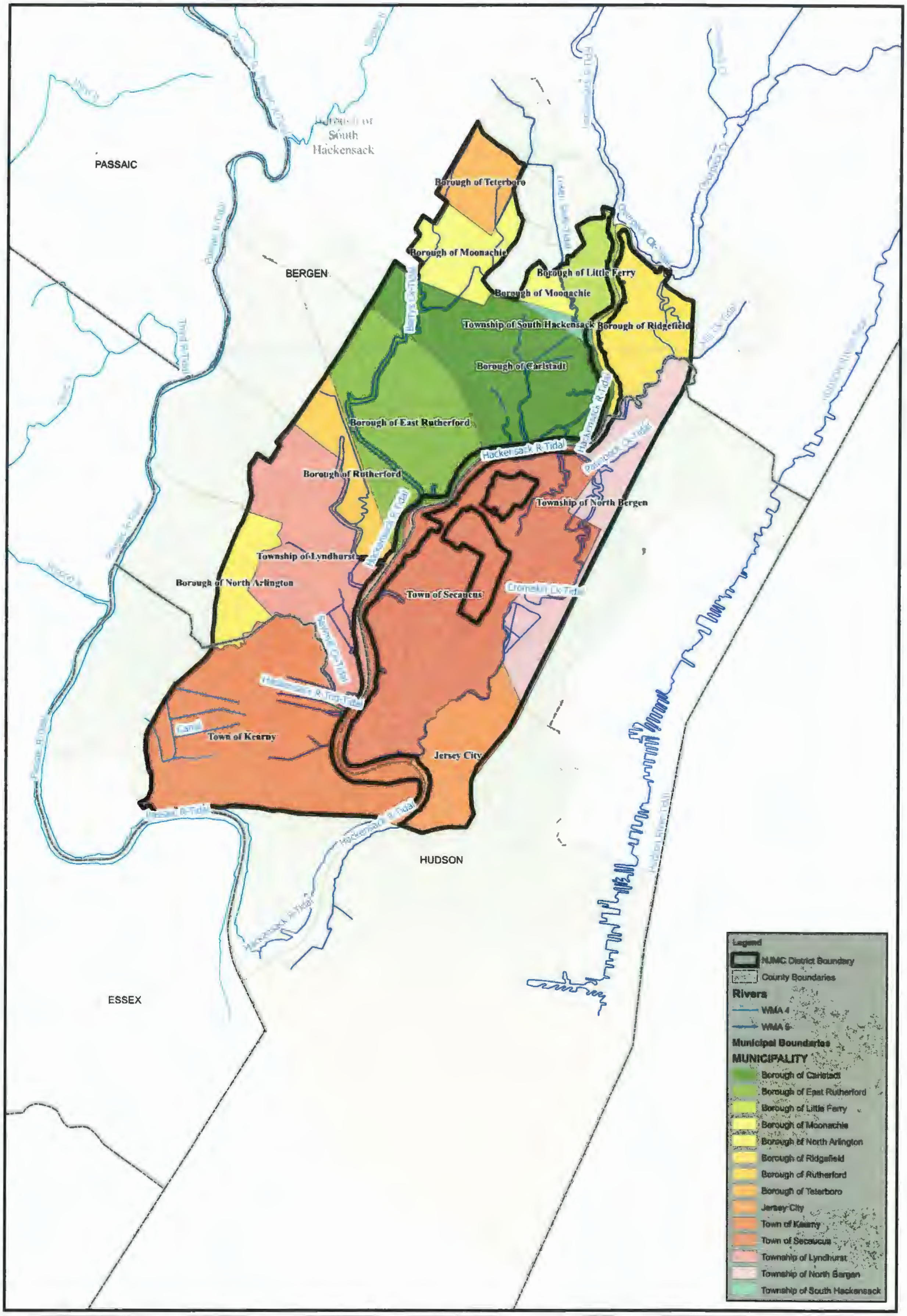
New Jersey Highlands
Preservation and Planning Areas



0 2.5 5 10 15 20 Miles

Highlands Preservation Area
Highlands Planning Area
Counties
Municipalities
Interstate Highways

December 2005



RCE Water Resources Program
Department of Environmental Sciences
14 College Farm Road
New Brunswick, New Jersey 08901
T: 732-932-9011/ F: 732-932-8644
www.water.rutgers.edu
August 2006

New Jersey Meadowlands District
MUNICIPALITIES MAP

N W E S

1 inch equals 5,782 feet

0 6,250 12,500 Feet