JONES & BEACH ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

August 2, 2023

Rochester Planning Board
Attn. Mark Collopy, Chair
31 Wakefield Street
Rochester, NH 03867

RE: Major Subdivision Application (SUBD-22-7) - resubmission
Autumn Street, Rochester, NH
Tax Map 104, Lot 10
JBE Project No. 22022

Dear Board Members,

Jones & Beach Engineers, Inc., on behalf of our client, Tuck Realty Corporation, is providing a resubmission of design documents for the above-mentioned parcel. Below is a summary of where we see the project is at and what has been completed since our last submission:

- Per a meeting with Rochester DPW and the Planning Dept., a HEC-RAS study & report was requested to support the requested waiver for post-development peak volume of runoff exceeding pre-development levels and waiver request for no groundwater infiltration. Our survey department completed a survey of the Salmon Falls River to generate eleven (11) cross-sections which were then used to create a HEC-RAS model and complete a report detailing the results. Our report shows that although there is an increase in runoff volume from the project area, the reductions in peak rates of runoff for all storm-events has no affect on the flooding levels. If anything, there is a slight improvement (refer to zoomed in images in report).
- The bioretention systems between a select number of lots/homes have been removed from the design due to the results of the HEC-RAS report. DPW and the Planning Dept. expressed concern having these systems between individual lots scattered through the subdivision. We agree that there could be long-term problems with maintenance and potential hassle for the City if problems arise between landowners.
- Bioretention System #1 w/ internal storage reservoir has been reduced in size per some further design review, reducing development within the shoreland zone.
- The plans have been modified to remove homes and driveways from the plans to better match the level of development NHDES Alteration of Terrain and Shoreland like to see on lot subdivisions. The roof area, cleared area, and driveway areas have still been accounted for in the drainage analysis, carrying a standard value for all lots.
- Lastly, since our last discussions with the city, we have received our NHDES Sewer Connection Permit and NHDSE Shoreland Permit. These are included with this letter.

If you have any questions or need any additional information, please feel free to contact our office. We look forward to discussing this project with the Planning Board in January. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Ian MacKinnon, P.E.
Project Manager

cc: Mike Garrepy, Tuck Realty Corporation representative (application & plans via email)

The State of New Hampshire

Department of Environmental Services

Robert R. Scott, Commissioner

SHORELAND IMPACT PERMIT 2023-01126

NOTE CONDITIONS

PERMITTEE:	**EWST LLC** **PO BOX 190** **EXETER NH 03833**
PROJECT LOCATION:	**AUTUMN ST, ROCHESTER** **TAX MAP #104, LOT #10**
WATERBODY:	**SALMON FALLS RIVER**
APPROVAL DATE:	**MAY 30, 2023**

EXPIRATION DATE: MAY 30, 2028

Shoreland Permit Application 2023-01126 has been found to meet or exceed the requirements of RSA 483-B as required per RSA 483-B:6, II. The New Hampshire Department of Environmental Services (NHDES) hereby issues this Shoreland Impact Permit with conditions pursuant to RSA 483-B:6, II.

PERMIT DESCRIPTION:
Impact 68,019 square feet of protected shoreland in order to develop a residential subdivision consisting of 23 lots with single-family homes designed as an open space/conservation subdivision.

Impervious Surface Percentage Approved: 2.1%

Natural Woodland Area Required per RSA 483-B:9, V, (b): 34,182 square feet.

THE FOLLOWING PROJECT-SPECIFIC CONDITIONS HAVE BEEN APPLIED TO THE PERMIT PURSUANT TO ENV-WQ 1406.15(c):

1. All work shall be in accordance with revised plans by Jones & Beach Engineers, Inc. dated April 14, 2023 and received by the New Hampshire Department of Environmental Services (NHDES) on May 3, 2023 pursuant to Env-Wq 1406.15(f).
2. Within three days of final grading or temporary suspension of work in an area that is in or adjacent to wetlands or surface waters, all exposed soil areas shall be stabilized by seeding and mulching during the growing season, or if not within the growing season, by mulching with tack or netting and pinning on slopes steeper than 3:1 as required pursuant to RSA 483-B:9, V(d) Erosion and Siltation, (1).
3. This permit shall not be interpreted as acceptance or approval of any impact that will occur within wetlands jurisdiction regulated under RSA 482-A including all wetlands, surface waters and their banks. The owner is responsible for maintaining compliance with RSA 482-A and Administrative Rules Env-Wt 100 - 900 and obtaining any Wetland Impact Permit that may be required prior to construction, excavation or fill that will occur within Wetlands jurisdiction as required pursuant to RSA 483-B:6, I(b).
4. This permit shall not preclude NHDES from taking any enforcement or revocation action as authorized pursuant to 483-B:5, I, if NHDES later determines that any of the structures depicted as "existing" on the plans submitted by the applicant were not previously permitted or grandfathered.

THE FOLLOWING STANDARD PROJECT CONDITIONS SHALL BE MET PURSUANT TO ENV-WQ 1406.20:

1. Erosion and siltation control measures shall be installed prior to the start of work, be maintained throughout the project, and remain in place until all disturbed surfaces are stabilized.

2. Erosion and siltation controls shall be appropriate to the size and nature of the project and to the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to wetlands or surface waters.
3. No person undertaking any activity in the protected shoreland shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards established in Env-Wq 1700, and the requirements in Env-Wq 1404.01(a) and(b).
4. Any fill used shall be clean sand, gravel, rock, or other suitable material.
5. For any project where mechanized equipment will be used, orange construction fence shall be installed prior to the start of work at the limits of the temporary impact area as shown on the approved plans; be maintained throughout the project; and remain in place until all mechanized equipment has been removed from the site.

ANY INDIVIDUAL CONDUCTING WORK UNDER THIS PERMIT IS ADVISED OF THE FOLLOWING:

1. During construction, a copy of this permit should be posted on site in a prominent location visible to inspecting personnel.
2. This permit does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others.
3. Pursuant to Env-Wq 1406.21, transfer of this permit to a new owner requires notification to, and approval of, NHDES.
4. This project has been screened for potential impact to **known** occurrences of protected species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or only cursory surveys have been performed, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species. This permit does not authorize in any way the take of threatened or endangered species, as defined by RSA 212-A:2, or of any protected species or exemplary natural communities, as defined in RSA 217-A:3.

APPROVED:

Craig W. Day
Shoreland/Shoreline Specialist, Shoreland Program
Wetlands Bureau, Land Resources Management
Water Division

THIS PERMIT IS NOT VALID UNTIL SIGNED BY THE PARTIES BELOW (Env-Wq 1406.21(c))

PERMITTEE SIGNATURE (required)

PRINCIPAL CONTRACTOR SIGNATURE (required, if any)

State of New Hampshire
Department of Environmental Services
29 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-4128

SEWER CONNECTION PERMIT

Project Name: Copp's Landing
Location : Autumn Street
Engineer : Jones & Beach - Ian Mackinnon, PE

Municipality/POTW : Rochester
Official Signature : Peter Nourse - Director of Public Works
Date of Request : 5/1/2023

PERMIT/REQUEST NUMBER **D2023-0501**

FLOW : **4,692** **gallons/day** APPROVAL DATE **7/12/2023**

The New Hampshire Department of Environmental Services (NHDES) has reviewed and hereby approves the request as follows:
Approval of the connection to the municipality's wastewater facilities is based on a review of the supporting information submitted and is subject to the conditions indicated below.

CONDITIONS :

Approval applies only to the sewerage plans and sewer connection application received by NHDES.

This approval will become void if the sewerage construction or discharge has not begun within three years of the approval date.

All sewerage construction must comply with the requirements of Chapter Env-Wq 700, the Standards of Design and Construction for Sewerage and Wastewater Treatment Facilities.
No deviations from approved plans or specifications shall be made without prior written approval from DES.

DES approves design plans and specifications for sewer extension (1,215 LF 2" SDR 21 PVC and residential grinder pump stations).

Issued by : John Muras

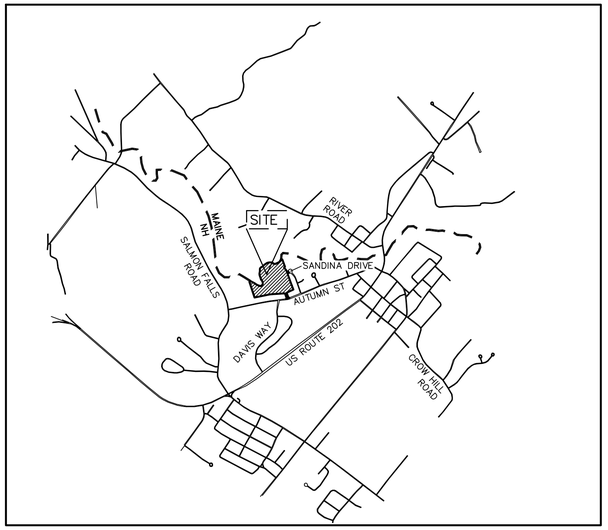
John J. Muras, PE

WATER DIVISION - WASTEWATER ENGINEERING BUREAU - DESIGN REVIEW SECTION

cc: Jones & Beach - Ian Mackinnon, PE

RESIDENTIAL SUBDIVISION
"COPP'S LANDING"
TAX MAP 104, LOT 10
AUTUMN STREET, ROCHESTER, NH

SHEET INDEX



LOCUS MAP
SCALE 1" = 2000'

PERMITS

TYPE OF PERMIT	STATUS
NHDES ALTERATION OF TERRAIN PERMIT:	**SUBMITTED:**
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES - WATER DIVISION	**11/2/2022**
29 HAZEN DRIVE, P.O. BOX 95	**PERMIT NO.**
CONCORD, NEW HAMPSHIRE 03302-0095	**DATED:**
(603) 271-3503	
RESPONSIBLE CONSULTANT:	**EXPIRATION:**
JONES & BEACH ENGINEERS, INC.	
NHDES SHORELAND PERMIT:	**SUBMITTED:**
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES-SHORELANDS BUREAU	**PERMIT NO.**
29 HAZEN DRIVE, P.O. BOX 95	**DATED:**
CONCORD, NEW HAMPSHIRE 03302	
(603) 271-2147	**EXPIRATION:**
RESPONSIBLE CONSULTANT-	
JONES & BEACH ENGINEERS, INC.	

TYPE OF PERMIT	STATUS
ROCHESTER SITE PLAN APPROVAL:	**SUBMITTED:**
CITY OF ROCHESTER PLANNING BOARD	**6/21/2022**
33 WAKEFIELD STREET	**PERMIT NO.**
ROCHESTER, NEW HAMPSHIRE 03867	**SUBD-22-7**
(603) 335-7500	**DATED:**
RESPONSIBLE CONSULTANT:	
JONES & BEACH ENGINEERS, INC.	**EXPIRATION:**
NHDES SEWER CONNECTION PERMIT:	**SUBMITTED:**
NHDES - WASTEWATER ENGINEERING BUREAU	**PERMIT NO.**
29 HAZEN DRIVE, P.O. BOX 95	
CONCORD, NEW HAMPSHIRE 03302-0095	**DATED:**
(603) 271-3503	
RESPONSIBLE CONSULTANT:	**EXPIRATION:**
JONES & BEACH ENGINEERS, INC.	

USEPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT, NOTICE OF INTENT (NOI), AND NOTICE OF TERMINATION (NOT) TO BE FILED IN ACCORDANCE WITH FEDERAL AND LOCAL REGULATIONS PRIOR TO AND FOLLOWING CONSTRUCTION:
EPA STORMWATER NOTICE PROCESSING CENTER
MAIL CODE 4203M,
US EPA
1200 PENNSYLVANIA AVENUE, NW
WASHINGTON, DC 20460
RESPONSIBLE CONSULTANT:
JONES & BEACH ENGINEERS, INC.

WILDLIFE PROTECTION NOTES:

- ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603-271-2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV. EMAIL SUBJECT LINE: NHB22-1802, COPP'S LANDING, AUTUMN STREET, ROCHESTER, NH WILDLIFE SPECIES OBSERVATION.
- PHOTOGRAPHS OF THE OBSERVED SPECIES AND NEARBY ELEMENTS OF HABITAT OR AREAS OF LAND DISTURBANCE SHALL BE PROVIDED TO NHF&G IN DIGITAL FORMAT AT THE ABOVE EMAIL ADDRESS FOR VERIFICATION AS FEASIBLE;
- IN THE EVENT A THREATENED OR ENDANGERED SPECIES IS OBSERVED ON THE PROJECT SITE DURING THE TERM OF THE PERMIT, THE SPECIES SHALL NOT BE DISTURBED, HANDLED, OR HARMED IN ANY WAY PRIOR TO CONSULTATION WITH NHF&G AND IMPLEMENTATION OF CORRECTIVE ACTIONS RECOMMENDED BY NHF&G, IF ANY, TO ASSURE THE PROJECT DOES NOT APPRECIABLY JEOPARDIZE THE CONTINUED EXISTENCE OF THREATENED AND ENDANGERED SPECIES AS DEFINED IN FIS 1002.04
- THE NHF&G, INCLUDING ITS EMPLOYEES AND AUTHORIZED AGENTS, SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.

APPLICANT / DEVELOPER
EWST, LLC
PO BOX 190
EXETER, NH 03833
(603) 944-7530
CONTACT: TURNER PORTER

CIVIL ENGINEER / SURVEYOR
JONES & BEACH ENGINEERS, INC.
85 PORTSMOUTH AVENUE
PO BOX 219
STRATHAM, NH 03885
(603) 772-4746
CONTACT: IAN MACKINNON, P.E.
EMAIL: IMACKINNON@JONESANDBEACH.COM

OWNER OF RECORD
DANA S. COPP 1985 TRUST (& OTHERS)
PO BOX 1767
ROCHESTER, NH 03866

WETLAND CONSULTANT
GOVE ENVIRONMENTAL
8 CONTINENTAL DRIVE, UNIT H
EXETER, NH 03833
(603) 778-0644
CONTACT: JAMES GOVE, CWS, CSS

WATER AND SEWER
ROCHESTER DEPARTMENT OF PUBLIC WORKS
209 CHESTNUT HILL ROAD
ROCHESTER, NH 03867
(603) 335-7500

ELECTRIC
EVERSOURCE
740 N COMMERCIAL ST
PO BOX 330
MANCHESTER, NH 03105-0330
(800) 662-7764

TELEPHONE
CONSOLIDATED COMMUNICATIONS
100 TRI CITY ROAD
SOMERSWORTH, NH 03878
ATTN:DAVE KESTNER
(603) 743-1114

CABLE TV
COMCAST COMMUNICATION CORPORATION
334-B CALEF HIGHWAY
EPPING, NH 03042-2325
(603) 679-5695

BREEZELINE CABLE
QUINCY, MA
603-330-2224

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT/OWNER
EWST, LLC
P.O. BOX 190
EXETER, NH 03833
BK 5054/PG 712

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

APPROVED - ROCHESTER, NH
PLANNING BOARD

DATE:

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE — EWEN I MACKINNON No.16659 — PROFESSIONAL ENGINEER — LICENSED
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	COVER SHEET
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

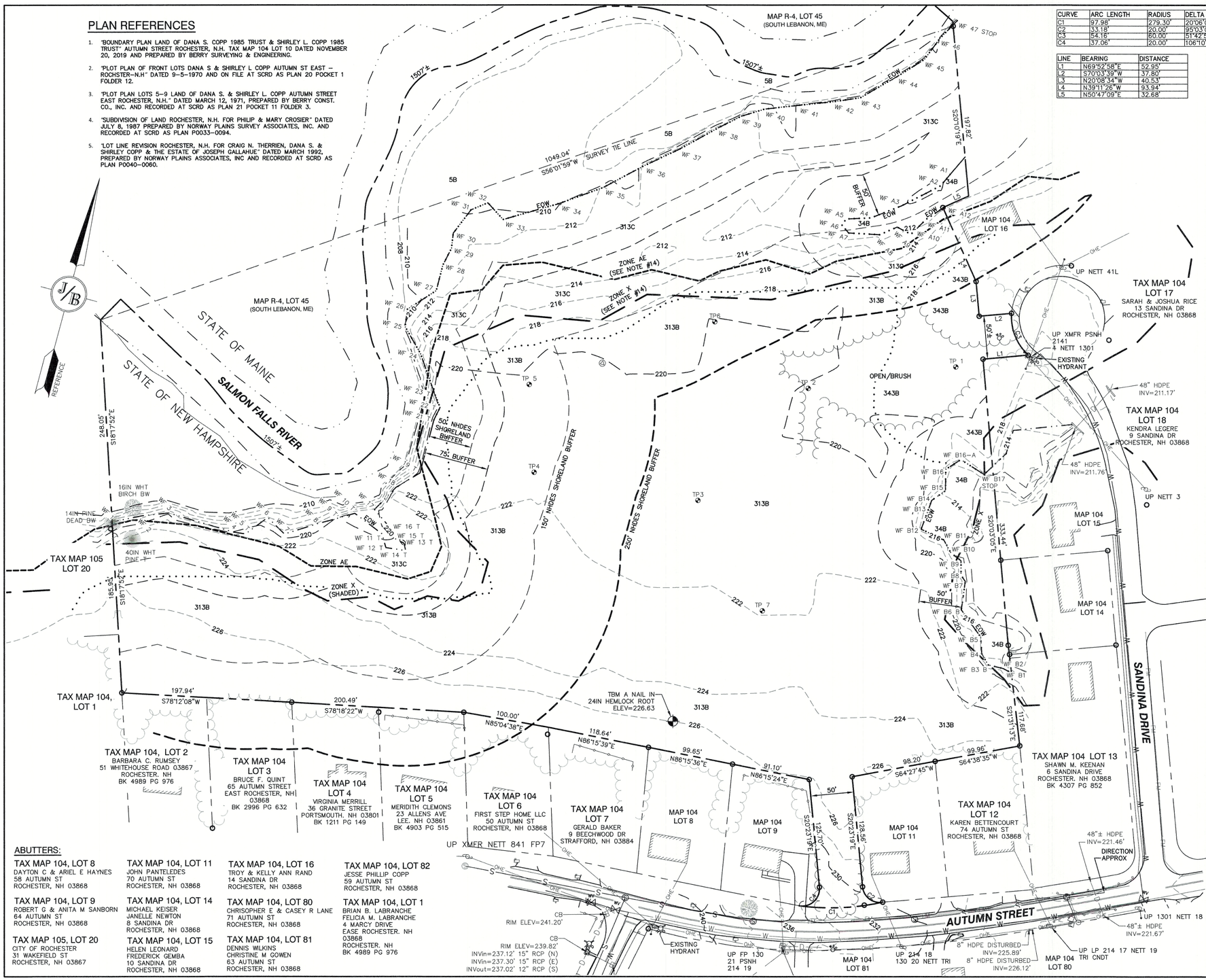
DRAWING No.
CS
SHEET 1 OF 22
JBE PROJECT NO. 22022

RESIDENTIAL SUBDIVISION, "COPP'S LANDING", AUTUMN STREET, ROCHESTER, NH
JBE # 22022 REVISION 5, 2/14/23

W:\22022 ROCHESTER-AUTUMN ST-GARREPY PLANNING\DWG\22022-PLAN.dwg, 8/2/2023 8:56:00 PM

PLAN REFERENCES

1. "BOUNDARY PLAN LAND OF DANA S. COPP 1985 TRUST & SHIRLEY L. COPP 1985 TRUST" AUTUMN STREET ROCHESTER, N.H. TAX MAP 104 LOT 10 DATED NOVEMBER 20, 2019 AND PREPARED BY BERRY SURVEYING & ENGINEERING.
2. "PLOT PLAN OF FRONT LOTS DANA S & SHIRLEY L COPP AUTUMN ST EAST – ROCHSTER–N.H" DATED 9–5–1970 AND ON FILE AT SCRD AS PLAN 20 POCKET 1 FOLDER 12.
3. "PLOT PLAN LOTS 5–9 LAND OF DANA S. & SHIRLEY L. COPP AUTUMN STREET EAST ROCHESTER, N.H." DATED MARCH 12, 1971, PREPARED BY BERRY CONST. CO., INC. AND RECORDED AT SCRD AS PLAN 21 POCKET 11 FOLDER 3.
4. "SUBDIVISION OF LAND ROCHESTER, N.H. FOR PHILIP & MARY CROSIER" DATED JULY 8, 1987 PREPARED BY NORWAY PLAINS SURVEY ASSOCIATES, INC. AND RECORDED AT SCRD AS PLAN P0033–0094.
5. "LOT LINE REVISION ROCHESTER, N.H. FOR CRAIG N. THERRIEN, DANA S. & SHIRLEY COPP & THE ESTATE OF JOSEPH GALLAHUE" DATED MARCH 1992, PREPARED BY NORWAY PLAINS ASSOCIATES, INC AND RECORDED AT SCRD AS PLAN P0040–0060.

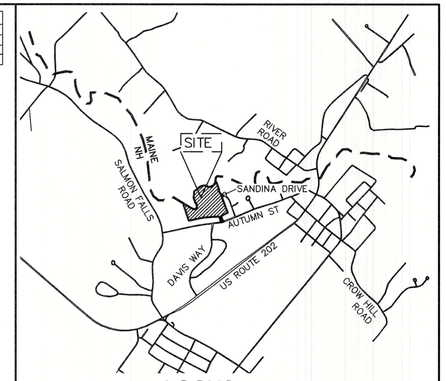


CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	97.98'	279.30'	20°06'00"	N72°32'53"E	97.48'
C2	33.18'	20.00'	95°03'06"	N67°58'09"W	29.50'
C3	54.16'	80.00'	51°42'59"	N36°55'39"W	52.34'
C4	37.06'	20.00'	106°10'07"	S32°42'13"W	31.98'

LINE	BEARING	DISTANCE
L1	N69°52'58"E	52.95'
L2	S70°03'39"W	37.80'
L3	N20°08'34"W	40.53'
L4	N39°11'26"W	93.94'
L5	N50°47'09"E	32.68'

STATE OF NEW HAMPSHIRE
JAMES P. GOVE
2-13-23
No. 604
WETLANDS SOILS SCIENTIST

STATE OF NEW HAMPSHIRE
BRENDEN M. WALDEN
2/13/2023
No. 297
CERTIFIED WETLAND SCIENTIST



LOCUS SCALE: 1"=2000'

NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDTIONS OF TAX MAP 104, LOT 10.
2. THE UTILITY LOCATIONS SHOWN HEREON WERE DETERMINED BY OBSERVED ABOVE GROUND EVIDENCE AND SHOULD BE CONSIDERED APPROXIMATE IN LOCATION ONLY. LOCATION, DEPTH, SIZE, TYPE, EXISTENCE OR NONEXISTENCE OF UNDERGROUND UTILITIES AND/OR UNDERGROUND STORAGE TANKS WAS NOT VERIFIED BY THIS SURVEY. ALL CONTRACTORS SHOULD NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK OR CALL DIG–SAFE AT 1–888–DIG–SAFE.
3. THE SUBJECT PARCEL IS PARTIALLY LOCATED WITHIN AN AREA HAVING A ZONE 'AE' DESIGNATION (FLOODPLAIN AND FLOODWAY), PARTIALLY LOCATED WITHIN AN AREA HAVING A ZONE 'X' (SHADED) AND PARTIALLY LOCATED WITHIN AN AREA HAVING A ZONE 'X' (UNSHADED) DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NO. 33017C0211D, WITH EFFECTIVE DATE OF MAY 17, 2005, FOR COMMUNITY PANEL NO. 211 OF 405, IN STRAFFORD COUNTY, STATE OF NEW HAMPSHIRE, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR COMMUNITY IN WHICH SAID PREMISES IS SITUATED.
4. BASIS OF BEARING: HORIZONTAL: NH STATE PLANE VERTICAL: NAVD 88
5. CERTAIN DATA HEREON MAY VARY FROM RECORDED DATA DUE TO DIFFERENCES IN DECLINATION, ORIENTATION, AND METHODS OF MEASUREMENT.
6. ALL BOOK AND PAGE NUMBERS REFER TO THE STRAFFORD COUNTY REGISTRY OF DEEDS.
7. THE TAX MAP AND LOT NUMBERS ARE BASED ON THE CITY OF ROCHESTER TAX RECORDS AND ARE SUBJECT TO CHANGE.
8. RESEARCH WAS PERFORMED AT THE CITY OF ROCHESTER ASSESSOR'S OFFICE AND THE STRAFFORD COUNTY REGISTRY OF DEEDS.
9. THIS SURVEY IS NOT A CERTIFICATION TO OWNERSHIP OR TITLE OF LANDS SHOWN. OWNERSHIP AND ENCUMBRANCES ARE MATTERS OF TITLE EXAMINATION NOT OF A BOUNDARY SURVEY. THE INTENT OF THIS PLAN IS TO RETRACE THE BOUNDARY LINES OF DEEDS REFERENCED HEREON. OWNERSHIP OF ADJOINING PROPERTIES IS ACCORDING TO ASSESSOR'S RECORDS. THIS PLAN MAY OR MAY NOT INDICATE ALL ENCUMBRANCES EXPRESSED, IMPLIED OR PRESCRIPTIVE.
10. ANY USE OF THIS PLAN AND OR ACCOMPANYING DESCRIPTIONS SHOULD BE DONE WITH LEGAL COUNSEL, TO BE CERTAIN THAT TITLES ARE CLEAR, THAT INFORMATION IS CURRENT, AND THAT ANY NECESSARY CERTIFICATES ARE IN PLACE FOR A PARTICULAR CONVEYANCE, OR OTHER USES.
11. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY GOVE ENVIRONMENTAL DURING SPRING, 2022, USING (EQUIPMENT) AND IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
    A. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
    B. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
    C. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
    D. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.
12. SOILS INFORMATION DEPICTED ON THE PLAN IS DERIVED FROM THE NRCS WEBSOIL SURVEY DATABASE.
13. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY.
14. THE SUBJECT SITE FALLS BETWEEN VERTICAL DATUM NGVD 29 ELEVATION 215.00 AT/NEAR CROSS SECTION AH AND ELEVATION 216.00 AS THEY ARE INDICATED ON FEMA STUDY OF THE SALMON FALLS RIVER. THESE ELEVATIONS ARE EQUIVALENT TO VERTICAL DATUM NAVD 88 ELEVATIONS OF 214.40 AND 215.40 RESPECTIVELY.

CERTIFICATION:

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

STATE OF NEW HAMPSHIRE
No. 892
DAVID M. COLLIER
LICENSED LAND SURVEYOR
SIGNATURE
2/14/2023

DAVID M. COLLIER, LLS 892 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 feet

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT
GARREPY PLANNING
CONSULTANTS, LLC
89 GLEN HILL ROAD
DOVER, NH 03820

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

ABUTTERS:

TAX MAP 104, LOT 8
DAYTON C & ARIEL E HAYNES
58 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104, LOT 9
ROBERT G & ANITA M SANBORN
64 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 105, LOT 20
CITY OF ROCHESTER
31 WAKEFIELD ST
ROCHESTER, NH 03867

TAX MAP 104, LOT 11
JOHN PANTELEDES
70 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104, LOT 14
MICHAEL KEISER
JANELLE NEWTON
8 SANDINA DR
ROCHESTER, NH 03868

TAX MAP 104, LOT 15
HELEN LEONARD
FREDERICK GEMBA
10 SANDINA DR
ROCHESTER, NH 03868

TAX MAP 104, LOT 16
TROY & KELLY ANN RAND
14 SANDINA DR
ROCHESTER, NH 03868

TAX MAP 104, LOT 80
CHRISOPHER E & CASEY R LANE
71 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104, LOT 81
DENNIS WILKINS
CHRISTINE M GOWEN
63 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104, LOT 82
JESSE PHILLIP COPP
59 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104, LOT 1
BRIAN B. LABRANCHE
FELICIA M. LABRANCHE
4 MARCY DRIVE
EASE ROCHESTER. NH
03868
ROCHESTER. NH
BK 4989 PG 976

Design: ISM	Draft: LAJ
Checked: DMC	Scale: 1" = 60'
Date: 6/20/2022	Project No.: 22022
Drawing Name: 22022-EX-COND.dwg	

REV.	DATE	REVISION	BY
1	2/14/23	REVISED PER CITY AND AoT COMMENTS	LAZ
0	8/12/22	ISSUED FOR REVIEW	LAJ

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING CONDITIONS PLAN
Project: RESIDENTIAL SUBDIVISION AUTUMN STREET, ROCHESTER, NH
Owner of Record: DANA S. COPP 1985 TRUST & SHIRLEY L. COOP 1985 TRUST PO BOC 1767, ROCHESTER, NH 03866

DRAWING No.
C1
SHEET 2 OF 20
JBE PROJECT NO. 22022

GENERAL LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROPERTY LINES
		SETBACK LINES
		CENTERLINE
		FRESHWATER WETLANDS LINE
		STREAM CHANNEL
		TREE LINE
		FENCE
		SOIL BOUNDARY
		EASEMENT
100	100	MAJOR CONTOUR
98	98	MINOR CONTOUR
VGC	VGC	EDGE OF PAVEMENT
SGC	SGC	VERTICAL GRANITE CURB
		SLOPE GRANITE CURB
		SILT FENCE
		ORANGE CONSTRUCTION FENCE
D	D	DRAINAGE LINE
S	S	SEWER LINE
FM	FM	SEWER FORCE MAIN
G	G	GAS LINE
W	W	WATER LINE
WS	WS	WATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UGE	UGE	UNDERGROUND ELECTRIC
		GUARDRAIL
UD	UD	UNDERDRAIN
		IRON PIPE/IRON ROD
		DRILL HOLE
		IRON ROD/DRILL HOLE
		STONE/GRANITE BOUND
100x0 100.00	100x0 100.00	SPOT GRADE
		PAVEMENT SPOT GRADE
100.00 99.50	100.00 99.50	CURB SPOT GRADE
		BENCHMARK (TBM)
		DOUBLE POST SIGN
		SINGLE POST SIGN
	TP	WELL
		TEST PIT
M	M PT	MONITORING WELL
		PERC TEST
		TREES AND BUSHES
		UTILITY POLE
		LIGHT POLES
S	S	SEWER MANHOLE
		HYDRANT
		WATER GATE
		WATER SHUT OFF
D	D	REDUCER
		SINGLE GRATE CATCH BASIN
		DOUBLE GRATE CATCH BASIN
		NYOPLAST DRAIN BASIN
D	D	DRAIN MANHOLE
D	D	CULVERT W/WINGWALLS
D	D	CULVERT W/FLARED END SECTION
D	D	CULVERT W/STRAIGHT HEADWALL
		STONE CHECK DAM
		DRAINAGE FLOW DIRECTION
		RIPRAP
		FRESHWATER WETLANDS
		CONCRETE
		GRAVEL
		PAVEMENT
		SNOW STORAGE
		FLOOD ZONE AE
		FLOOD ZONE X

LANDSCAPE NOTES:

1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTINGS SHOWN ON THE DRAWINGS.
3. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL AT THE PLACE OF GROWTH, UPON DELIVERY OR AT THE JOB SITE WHILE WORK IS ON-GOING FOR CONFORMITY TO SPECIFIED QUALITY, SIZE AND VARIETY.
4. NO PLANT SHALL BE PUT IN THE GROUND BEFORE GRADING HAS BEEN FINISHED AND APPROVED BY THE PROJECT ENGINEER OR CONSTRUCTION OVERSIGHT CONSULTANT.
5. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24-HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN IF NECESSARY, DURING THE FIRST GROWING SEASON.
6. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR FOR NOT LESS THAN ONE FULL YEAR FROM THE TIME OF PROVISIONAL ACCEPTANCE. DURING THIS TIME, THE OWNER SHALL MAINTAIN ALL PLANT MATERIALS IN THE ABOVE MANNER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE PLANTS TO ENSURE PROPER CARE. IF THE CONTRACTOR IS DISSATISFIED WITH THE CARE GIVEN, HE SHALL IMMEDIATELY, AND IN SUFFICIENT TIME TO PERMIT THE CONDITION TO BE RECTIFIED, NOTIFY THE PROJECT ENGINEER IN WRITING OR OTHERWISE FORFEIT HIS CLAIM.
7. FINAL ACCEPTANCE BY THE PROJECT ENGINEER OR OWNER WILL BE MADE UPON THE CONTRACTOR'S REQUEST AFTER ALL CORRECTIVE WORK HAS BEEN COMPLETED.
8. BY THE END OF THE GUARANTEE PERIOD, THE CONTRACTOR SHALL HAVE REPLACED ANY PLANT MATERIAL THAT IS MISSING, NOT TRUE TO SIZE AS SPECIFIED, THAT HAS DIED, LOST NATURAL SHAPE DUE TO DEAD BRANCHES, EXCESSIVE PRUNING OR INADEQUATE OR IMPROPER CARE, OR THAT IS, IN THE OPINION OF THE PROJECT ENGINEER, IN UNHEALTHY OR UNSIGHTLY CONDITION.
9. ALL LANDSCAPE AREAS TO BE GRASS COMMON TO REGION, EXCEPT FOR INTERIOR LANDSCAPED ISLANDS OR WHERE OTHER PLANT MATERIAL IS SPECIFIED.
10. ALL LANDSCAPING SHALL MEET THE CITY STANDARDS AND REGULATIONS.
11. EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH TEMPORARY SNOW FENCING AT THE DRIPLINE OF THE TREE. THE CONTRACTOR SHALL NOT STORE VEHICLES OR MATERIALS WITHIN THE LANDSCAPED AREAS. ANY DAMAGE TO EXISTING TREES, SHRUBS OR LAWN SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

GRADING AND DRAINAGE NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES AND/OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 888-DIG-SAFE (888-344-7233).
2. VERTICAL DATUM: NAVD 88. HORIZONTAL DATUM: STATE PLANE.
3. ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (S.W.P.P.P.). THIS DOCUMENT IS TO BE KEPT ONSITE AT ALL TIMES AND UPDATED AS REQUIRED. SWPPP INSPECTIONS SHALL BE PERFORMED BY A QUALIFIED 3RD-PARTY FIRM.
4. ALL BENCHMARKS AND TOPOGRAPHY SHOULD BE FIELD VERIFIED BY THE CONTRACTOR.
5. NO HOUSE OR DRIVEWAY CONSTRUCTION SHALL BEGIN UNITL ALL WORK ON THE ROAD, UTILITY AND DRAINAGE IS COMPLETE AND STABLE.
6. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
7. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT'S LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
8. ALL SWALES AND DETENTION PONDS ARE TO BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
9. ALL SWALES AND ANY SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN SC150BN EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER), UNLESS OTHERWISE SPECIFIED.
10. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 4' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
11. ALL DRAINAGE STRUCTURES AND STORM SEWER PIPES SHALL MEET HEAVY DUTY TRAFFIC H20 LOADING AND SHALL BE INSTALLED ACCORDINGLY.
12. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
13. ALL DRAINAGE PIPE SHALL BE NON-PERFORATED ADS N-12 OR APPROVED EQUAL.
14. STONE INLET PROTECTION SHALL BE PLACED AT ALL PIPE INLETS. SEE DETAIL WITHIN THE DETAIL SHEETS.
15. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY ALL GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE EPA SWPPP DURING CONSTRUCTION OPERATIONS.
16. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING AND ANYTIME CONSTRUCTION STOPS FOR LONGER THAN 3 DAYS.
17. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.5" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
18. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
19. CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
20. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
21. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
22. SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
23. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
24. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
25. SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEET E1.
26. STATE PERMITS REQUIRED:
    NHDES ALTERATION OF TERRAIN PERMIT
    NHDES SHORELAND PROTECTION PERMIT
    NHDES SEWER CONNECTION PERMIT #D2023-0501 DATED 7/12/23.
27. ROADWAY UNDERDRAIN LOCATIONS, IF NECESSARY, TO BE DETERMINED BY THE ENGINEER DURING SUB-BASE INSPECTION.

UTILITY NOTES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, CONNECTION FEES AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM NOTICE OF FOURTEEN (14) DAYS TO ALL CORPORATIONS, COMPANIES AND/OR LOCAL AUTHORITIES OWNING OR HAVING A JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS PROJECT AREAS PRIOR TO DEMOLITION AND/OR CONSTRUCTION ACTIVITIES.
3. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY (ELECTRIC, TELEPHONE, CABLE TELEVISION, FIRE ALARM, GAS, WATER, AND SEWER).
4. A PRECONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, ARCHITECT, CONTRACTOR, LOCAL OFFICIALS, AND ALL PROJECT-RELATED UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. ALL CONSTRUCTION SHALL CONFORM TO THE CITY STANDARDS AND REGULATIONS, AND NHDES STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS OTHERWISE SPECIFIED.
6. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
7. HOMES TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUBS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS. ENGINEER TO BE NOTIFIED.
9. AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
10. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION. THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE THROUGH CHANNEL UNDERLAYMENT OF INVERT, AND SHELF SHALL CONSIST OF BRICK MASONRY.
11. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA, CLEAR OPENING. THE WORD "SEWER" OR DRAIN" SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
12. CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
13. SANITARY SEWER FLOW CALCULATIONS:
    23 - THREE BEDROOM UNITS @ 150 GPD/BEDROOM = 10,350 GPD (PER NHDES TABLE 1008-1)
    23 - THREE-BEDROOM UNITS @ 68 GPD/BEDROOM = 4,692 GPD (PER METCALFE AND EDDY)
    TOTAL FLOW = 4,692 GPD
14. ALL SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS.
15. PROPOSED RIM ELEVATIONS OF DRAINAGE AND SANITARY MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, GAS GATES AND OTHER UTILITIES TO FINISH GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
16. ALL WATER MAINS AND SERVICE PIPES SHALL HAVE A MINIMUM 12" VERTICAL AND 24" HORIZONTAL SEPARATION TO MANHOLES, OR CONTRACTOR SHALL INSTALL BOARD INSULATION FOR FREEZING PROTECTION.
17. WATER MAINS SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR LEAKAGE PRIOR TO ACCEPTANCE. WATERMAINS SHALL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 150 PSI, WHICH EVER IS GREATER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 4 OF AWWA STANDARD C 600. WATERMAINS SHALL BE DISINFECTED AFTER THE ACCEPTANCE OF THE PRESSURE AND LEAKAGE TESTS ACCORDING TO AWWA STANDARD C 651.
18. ALL WATER AND SANITARY LEADS TO BUILDING(S) SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT END.
19. IF THE BUILDINGS ARE REQUIRED TO HAVE A SPRINKLER SYSTEM, A PRECONSTRUCTION MEETING SHALL BE HELD BETWEEN THE CONTRACTOR, OWNER, ARCHITECT AND THE LOCAL FIRE DEPARTMENT PRIOR TO THE INSTALLATION.
20. THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
21. DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
22. CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHOULD BE SENT IN TRIPLICATE TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
23. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
24. ALL GRAVITY SEWER PIPE, MANHOLES, AND FORCE MAINS SHALL BE TESTED ACCORDING TO NHDES STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWAGE AND WASTEWATER TREATMENT FACILITIES, CHAPTER ENV-WQ 700. ADOPTED ON 10-15-14.
25. ALL MAHOLES FOR FLUSHING AND AIR-VACUUM RELEASE SHALL MEET THE REQUIREMENTS OF ENV-WQ 704.12 THROUGH ENV-wQ 704.17.
26. ENV-WQ 704.08 FORCE MAIN AND PRESSURE SEWER CONSTRUCTION MATERIALS.
    (a) FORCE MAINS AND PRESSURE SEWERS SHALL BE CONSTRUCTED OF DUCTILE IRON (DI), HIGH DENSITY POLYETHYLENE (HDPE), OR PVC MATERIAL.
    (b) FORCE MAINS AND PRESSURE SEWERS SHALL BE TREATED AS GRAVITY SEWERS FOR PURPOSES OF FOUNDATION BEDDING AND BACKFILL REQUIREMENTS.
    (c) PVC PIPE USED FOR FORCE MAINS AND PRESSURE SEWERS SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D2241 OR ASTM D1785 STANDARDS IN EFFECT WHEN THE PIPE IS MANUFACTURED.
    (d) HDPE PIPE USED FOR FORCE MAINS AND PRESSURE SEWERS SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D3035 STANDARD IN EFFECT WHEN THE PIPE IS MANUFACTURED.
    (e) IF DI PIPE IS USED IN AN ENVIRONMENT THAT COULD CAUSE CORROSION OR OTHER DETERIORATION OF OR DAMAGE TO AN IRON PIPE, OR OTHERWISE REDUCE THE TYPICAL LIFE EXPECTANCY OF THE PIPE, SUCH AS MAY OCCUR WITH CERTAIN SOIL TYPES, LOW PH LEVELS, OR WATER CONDITIONS, THE PIPE SHALL BE PROTECTED AGAINST CORROSION, SUCH AS WITH CATHODIC PROTECTION.
27. SPECIFICATIONS FOR FORCE MAIN SEWER PIPE TESTING REQUIREMENTS PER ENV WQ 704.09.
    ENV-WQ 704.09 FORCE MAIN AND PRESSURE SEWER TESTING. FORCE MAINS AND PRESSURE SEWERS SHALL BE TESTED IN ACCORDANCE WITH SECTION 5 OF THE AWWA C600, "INSTALLATION OF CAST IRON WATER MAINS AND THEIR APPURTENANCES" STANDARD IN EFFECT WHEN THE TEST IS CONDUCTED, AVAILABLE AS NOTED IN APPENDIX D, AT A PRESSURE EQUAL TO THE GREATER OF 150 PERCENT OF THE DESIGN OPERATING TOTAL DYNAMIC HEAD OR AT LEAST 100 PSI.
28. ENV-WQ 704.17 SEWER MANHOLE TESTING: SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST PRIOR TO BACKFILLING AND PLACEMENT OF SHELVES AND INVERTS.
29. SANITARY SEWER LINES SHALL BE LOCATED AT LEAST TEN (10) FEET HORIZONTALLY FROM AN EXISTING OR PROPOSED WATER LINE. WHEN A SEWER LINE CROSSES UNDER A WATER LINE, THE SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATERMAIN. THE SEWER LINE SHALL ALSO MAINTAIN A VERTICAL SEPARATION OF NOT LESS THAN 18 INCHES.
30. FORCE MAINS AND SEWERS SHALL BE BURIED TO A MINIMUM DEPTH OF 6 FEET BELOW GRADE IN ALL ROADWAY LOCATIONS, AND TO A MINIMUM DEPTH OF 4 FEET BELOW GRADE IN ALL CROSS-COUNTRY LOCATIONS. PROVIDE TWO-INCHES OF R-10 FOAM BOARD INSULATION 2-FOOT WIDE TO BE INSTALLED 6-INCHES OVER SEWER PIPE IN AREAS WHERE DEPTH IS NOT ACHIEVED. A WAIVER FROM THE DEPARTMENT OF ENVIRONMENTAL SERVICES WASTEWATER ENGINEERING BUREAU IS REQUIRED PRIOR TO INSTALLING SEWER AT LESS THAN MINIMUM COVER.
31. ALL WATER AND SANITARY LEADS TO HOMES/LOTS SHALL END AT RIGHT OF WAY AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT END.
32. THE CONTRACTOR SHALL MINIMIZE THE DISRUPTIONS TO THE EXISTING SEWER FLOWS AND THOSE INTERRUPTIONS SHALL BE LIMITED TO FOUR (4) HOURS OR LESS AS DESIGNATED BY THE CITY SEWER DEPARTMENT.
33. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
34. ALL PLASTIC PRESSURE PIPE SHALL BE LAID WITH TRACER WIRE.
35. DISINFECTION OF WATER MAINS SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH CITY STANDARDS AND AWWA STANDARD C651, LATEST EDITION. THE BASIC PROCEDURE TO BE FOLLOWED FOR DISINFECTING WATER MAINS IS AS FOLLOWS:
    a. PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE, CONSTRUCTION, OR REPAIR.
    b. REMOVE, BY FLUSHING OR OTHER MEANS, THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER MAINS.
    c. CHLORINATE ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSH THE CHLORINATED WATER FROM THE MAIN.
    d. PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM BACKFLOW DUE TO HYDROSTATIC PRESSURE TEST AND DISINFECTION PROCEDURES.
    e. DETERMINE THE BACTERIOLOGICAL QUALITY BY LABORATORY TEST AFTER DISINFECTION.
    f. MAKE FINAL CONNECTION OF THE APPROVED NEW WATER MAIN TO THE ACTIVE DISTRIBUTION SYSTEM
    g. TWO NEGATIVE BACTERIA TESTS PERFORMED 24-HOURS APART ARE REQUIRED.
35. LOW PRESSURE SEWER FORCEMAIN SYSTEM SHOWN SHALL BE E-ONE SYSTEM OR APPROVED EQUAL.
36. THE FOLLOWING PERMITS MUST BE OBTAINED PRIOR TO THE PRE-CONSTRUCTION MEETING:
    - STORMWATER MANAGEMENT/DRINAGE PERMIT
    - EXCAVATION PERMIT
    - WATER AND SEWER CONNECTION PERMITS
37. WATER AND SEWER WORK MAY ONLY BE CONSTRUCTED BY A CITY OF ROCHESTER LICENSED WATER/SEWER CONTRACTOR.
38. WATER /SEWER DEVELOPMENT CONNECTION FEES MUST BE PAID PRIOR TO A CERTIFICATE OF OCCUPANCY
39. CURB CUT/DRIVEWAY PERMITS ARE REQUIRED FOR EACH DRIVEAY PRIOR TO BUILDING PERMIT.
40. THIRD PARTY CONSTRUCTION INSPECTION OF INFRASTRUCTURE TO BE ACCEPTED BY THE CITY MAY BE REQUIRED.
41. THE FOLLOWING PERMITS AREA MUST BE OBTAINED FOR INDIVIDUAL BUILDING LOTS:
    - WATER/SEWER CONNECTION PERMIT
    - WATER/SEWER DEVELOPMENT CONNECTION FEE APPLICATION (PAID PRIOR TO C.O.)
    - CURB CUT/DRIVEWAY PERMIT (EACH LOT, PRIOR TO BUILDING PERMIT ISSUANCE)
42. FOR CONNECTION TO THE E-ONE SEWER SYSTEM, INDIVIDUAL BUILDING LOT OWNERS MUST PROVIDE THE FOLLOWING:
    - AN INDIVIDUAL E-ONE GRINDER PUMP STATION;
    - E-ONE LATERAL KIT;
    - ALARM PANEL;
    - AUTOMATIC TRANSFER SWITCH FOR GENERATOR HOOK-UP;
    - ALL ASSOCIATED PIPING AND CONNECTIONS TO CREATE A WORKING, FULLY FUNCTIONING INDIVIDUAL SEWER PUMPING SYTEM PER E-ONE SPECIFICATIONS.

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
EWEN I. MACKINNON No.16659
PROFESSIONAL ENGINEER
LICENSED
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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Plan Name:	GENERAL NOTES
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
G1
SHEET 3 OF 22
JBE PROJECT NO. 22022

EXISTING BOUNDARY CURVE TABLE

CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	97.98'	279.30'	20°06'00"	N72°32'53"E	97.48'
C2	33.18'	20.00'	95°03'06"	N67°58'09"W	29.50'
C3	54.16'	60.00'	51°42'59"	N36°55'39"W	52.34'
C4	37.06'	20.00'	106°10'07"	S32°42'13"W	31.98'

SUBDIVISION CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C5	225.00'	10.32'	10.32'	S68°42'48"W	2°37'42"
C6	225.00'	60.00'	59.82'	S59°45'36"W	15°16'42"
C7	225.00'	60.00'	59.83'	S44°28'51"W	15°16'48"
C8	225.00'	60.00'	59.83'	S29°12'02"W	15°16'48"
C9	225.00'	60.00'	59.82'	S13°55'15"W	15°16'46"
C10	225.00'	20.00'	20.00'	S03°44'04"W	5°05'37"
C11	225.00'	44.70'	44.62'	S04°30'11"E	11°22'54"
C12	65.00'	29.82'	29.56'	N81°23'34"W	26°16'58"
C13	65.00'	48.00'	46.92'	S64°18'31"W	42°18'52"
C14	65.00'	61.26'	59.01'	S16°09'12"W	53°59'45"
C15	65.00'	48.00'	46.92'	S32°00'04"E	42°18'48"
C16	65.00'	60.00'	57.89'	S79°36'02"E	52°53'08"
C17	65.00'	60.01'	57.90'	N47°30'36"E	52°53'36"
C18	65.00'	14.56'	14.53'	N14°39'34"E	12°50'08"
C19	275.00'	34.63'	34.61'	S31°45'02"E	7°12'57"
C20	275.00'	37.36'	37.33'	S24°13'02"E	7°47'03"
C21	325.00'	23.91'	23.91'	N22°27'59"W	4°12'56"
C22	325.00'	61.17'	61.08'	N29°57'59"W	10°47'04"
C23	175.00'	59.69'	59.40'	N25°35'14"W	19°32'33"

EXISTING BOUNDARY LINE TABLE

LINE	BEARING	DISTANCE
L1	N69°57'58"E	52.95'
L2	S70°03'39"W	37.80'
L3	N20°08'34"W	40.53'
L4	N39°11'26"W	93.94'
L5	N50°47'09"E	32.68'

SUBDIVISION LINE TABLE

LINE	BEARING	DISTANCE
L6	N34°11'52"W	40.73'
L7	N01°55'14"W	30.17'
L8	N32°16'16"E	28.62'
L9	N45°29'18"E	54.61'
L10	N50°05'44"E	32.18'
L11	N50°05'44"E	8.00'
L12	S70°29'50"W	29.93'
L13	S70°01'39"W	31.46'
L14	N20°13'50"W	20.08'
L15	S20°12'25"E	20.87'
L16	N72°55'27"W	27.90'

CERTIFICATION:

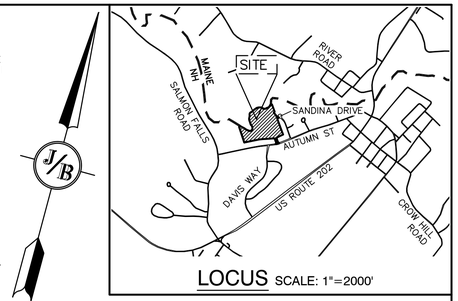
I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — No. 892 — DAVID M. COLLIER — SIGNATURE

DAVID M. COLLIER, LLS 892 DATE:

ON BEHALF OF JONES & BEACH ENGINEERS, INC.



LOCUS SCALE: 1"=2000'

SUBDIVISION NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW A CONSERVATION SUBDIVISION ON TAX MAP 104, LOT 10 IN THE CITY OF ROCHESTER, NH. PROJECT TO BE SERVED BY MUNICIPAL WATER, SEWER, AND ELECTRIC.

2. ZONING DISTRICT: RESIDENTIAL–1 (R1) (CONSERVATION SUBDIVISION)

	REQUIRED	PROPOSED
LOT AREA MINIMUM =	6,000 S.F.	–
**LOT FRONTAGE MINIMUM =	60'	–
BUILDING SETBACKS (MINIMUM):		
FRONT SETBACK =	20'	–
SIDE SETBACK =	10'	–
REAR SETBACK =	20'	–
MIN. OPEN SPACE =	40%	45.7%
MAX. BUILDING HEIGHT =	35'	<35'
MAX. LOT COVERAGE =	35%	10.3%
WETLAND BUFFER =	50'	–
WETLAND BUFFER (SALMON FALLS RIVER) =	75'	–

*= MINIMUM OPEN SPACE MUST BE 40% OF BUILDABLE AREA (AREA EXCLUSIVE OF WETLANDS, STEEP SLOPES OVER 25%, AND ABOVEGROUND UTILITY EASEMENTS.)
** LOT FRONTAGE AROUND CUL–DE–SAC REDUCED TO 48' WITH CONDITIONAL USE PERMIT.

3. OPEN SPACE & LOT COVERAGE CALCULATIONS:
   - TOTAL EXISTING LOT AREA = 691,524 SQ.FT.
   - TOTAL EXISTING BUILDABLE AREA = 529,056 SQ.FT. = 76.5%
   - PROPOSED OPEN SPACE (CONTIGUOUS) = 241,556 SQ.FT. = 45.7%
   - PROPOSED OPEN SPACE (NON–CONTIGUOUS) = 271,163 SQ.FT. = 51.3%

   PROPOSED IMPERVIOUS AREA (PAVEMENT) = 44,254 SQ.FT.
   PROPOSED ROOF AREA = 26,910 SQ.FT.
   TOTAL PROPOSED IMPERVIOUS AREA = 71,164 SQ.FT.
   PROPOSED LOT COVERAGE = 71,164/691,524 = 10.3%

4. LOT DENSITY: A CONSERVATION SUBDIVISION IS ALLOWED IN THE R–1 ZONE AS A CONDITIONAL USE. ONCE YIELD IS DETERMINED, THE DENSITY IS MULTIPLIED BY A FACTOR OF 1.3 TO DETERMINE THE BASE DENSITY.
   - CONVENTIONAL SUBDIVISION YIELD = 19 LOTS
   - CONSERVATION SUBDIVISION BASE DENSITY = 24.7 LOTS = 25 LOTS

   TOTAL LOTS PERMITTED = 25 LOTS
   PROPOSED TOTAL LOTS = 23 LOTS

4. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON–SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON–SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.

5. ALL CONSTRUCTION SHALL CONFORM TO CITY STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.

6. THE SUBJECT PARCEL IS PARTIALLY LOCATED WITHIN AN AREA HAVING A ZONE 'AE' DESIGNATION, PARTIALLY LOCATED WITHIN AN AREA HAVING A ZONE 'X' (SHADED) AND PARTIALLY LOCATED WITHIN AN AREA HAVING A ZONE 'X' (UNSHADED) DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NO. 33017C0211D, WITH EFFECTIVE DATE OF MAY 17, 2005, FOR COMMUNITY PANEL NO. 211 OF 405, IN STRAFFORD COUNTY, STATE OF NEW HAMPSHIRE, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR COMMUNITY IN WHICH SAID PREMISES IS SITUATED.

7. LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.

8. ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (S.W.P.P.P.). THIS DOCUMENT IS TO BE KEPT ONSITE AT ALL TIMES AND UPDATED AS REQUIRED.

9. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, FEES AND BONDS.

10. ALL PROPOSED SIGNAGE SHALL CONFORM WITH THE CITY ZONING REGULATIONS, UNLESS A VARIANCE IS OTHERWISE REQUESTED.

11. ALL SIGNAGE AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AND NHDOT STANDARDS AND SPECIFICATIONS (NON–REFLECTORIZED PAVEMENT MARKINGS), UNLESS OTHERWISE NOTED.

12. ALL PARKING STALLS SHALL BE SEPARATED USING 4" WIDE SOLID STRIPES. STRIPING SHALL BE 100% ACRYLIC TYPE, LOW VOC, FAST DRYING, IN A COLOR OF WHITE.

13. ALL STOP BARS SHALL BE 18" IN WIDTH IN A COLOR OF WHITE; ALL TRAFFIC ARROWS SHALL BE PAINTED IN A COLOR OF WHITE.

14. ALL CURBING TO BE SLOPED GRANITE WITH A MINIMUM RADIUS OF 2', UNLESS OTHERWISE NOTED.

15. SNOW SHALL BE STORED IN AREAS SHOWN WITHIN THE PLAN SET AND TRUCKED OFFSITE WHEN ONSITE AREAS ARE FULL.

16. STREET NAME SIGNS WITH A PRIVATE TOPPER TO BE INSTALLED PRIOR TO FIRST BUILDING PERMIT.

17. NEWLY CONSTRUCTED HOMES SHALL BE LIMITED TO A 1,500 SF FOOTPRINT FOR TWO–STORY HOMES AND AN 1,800 SF FOOTPRINT FOR SINGLE–STORY HOMES. THESE LIMITS ARE EXCLUSIVE OF UNCOVERED PORCHES OR DECKS.

18. HOMEOWNERS ARE RESPONSIBLE FOR ANY ADDITIONAL NHDES SHORELAND PERMITTING REQUIRED TO DEVELOP EACH LOT.

PLAN REFERENCES

1. "BOUNDARY PLAN LAND OF DANA S. COPP 1985 TRUST & SHIRLEY L. COPP 1985 TRUST" AUTUMN STREET ROCHESTER, N.H. TAX MAP 104 LOT 10 DATED NOVEMBER 20, 2019 AND PREPARED BY BERRY SURVEYING & ENGINEERING.
2. "PLOT PLAN OF FRONT LOTS DANA S & SHIRLEY L COPP AUTUMN ST EAST – ROCHSTER–N.H" DATED 9–5–1970 AND ON FILE AT SCRD AS PLAN 20 POCKET 1 FOLDER 12.
3. "PLOT PLAN LOTS 5–9 LAND OF DANA S. & SHIRLEY L. COPP AUTUMN STREET EAST ROCHESTER, N.H." DATED MARCH 12, 1971, PREPARED BY BERRY CONST. CO., INC. AND RECORDED AT SCRD AS PLAN 21 POCKET 11 FOLDER 3.
4. "SUBDIVISION OF LAND ROCHESTER, N.H. FOR PHILIP & MARY CROSIER" DATED JULY 8, 1987 PREPARED BY NORWAY PLAINS SURVEY ASSOCIATES, INC. AND RECORDED AT SCRD AS PLAN P0033–0094.
5. "LOT LINE REVISION ROCHESTER, N.H. FOR CRAIG N. THERRIEN, DANA S. & SHIRLEY COPP & THE ESTATE OF JOSEPH GALLAHUE" DATED MARCH 1992, PREPARED BY NORWAY PLAINS ASSOCIATES, INC AND RECORDED AT SCRD AS PLAN P0040–0060.

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1 inch = 60 feet

APPROVED - ROCHESTER, NH
PLANNING BOARD

DATE:

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT/OWNER
EWST, LLC
P.O. BOX 190
EXETER, NH 03833
BK 5054/PG 712

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: LAZ	Draft: LAZ	Date: 6/21/22	
Checked: ISM	Scale: AS NOTED	Project No.: 22022	
Drawing Name: 22022-PLAN.dwg			

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE — EWEN I. MACKINNON No.16659 — LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
Civil Engineering Services
603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SUBDIVISION PLAN MAP 104, LOT10
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
A1
SHEET 4 OF 22
JBE PROJECT NO. 22022

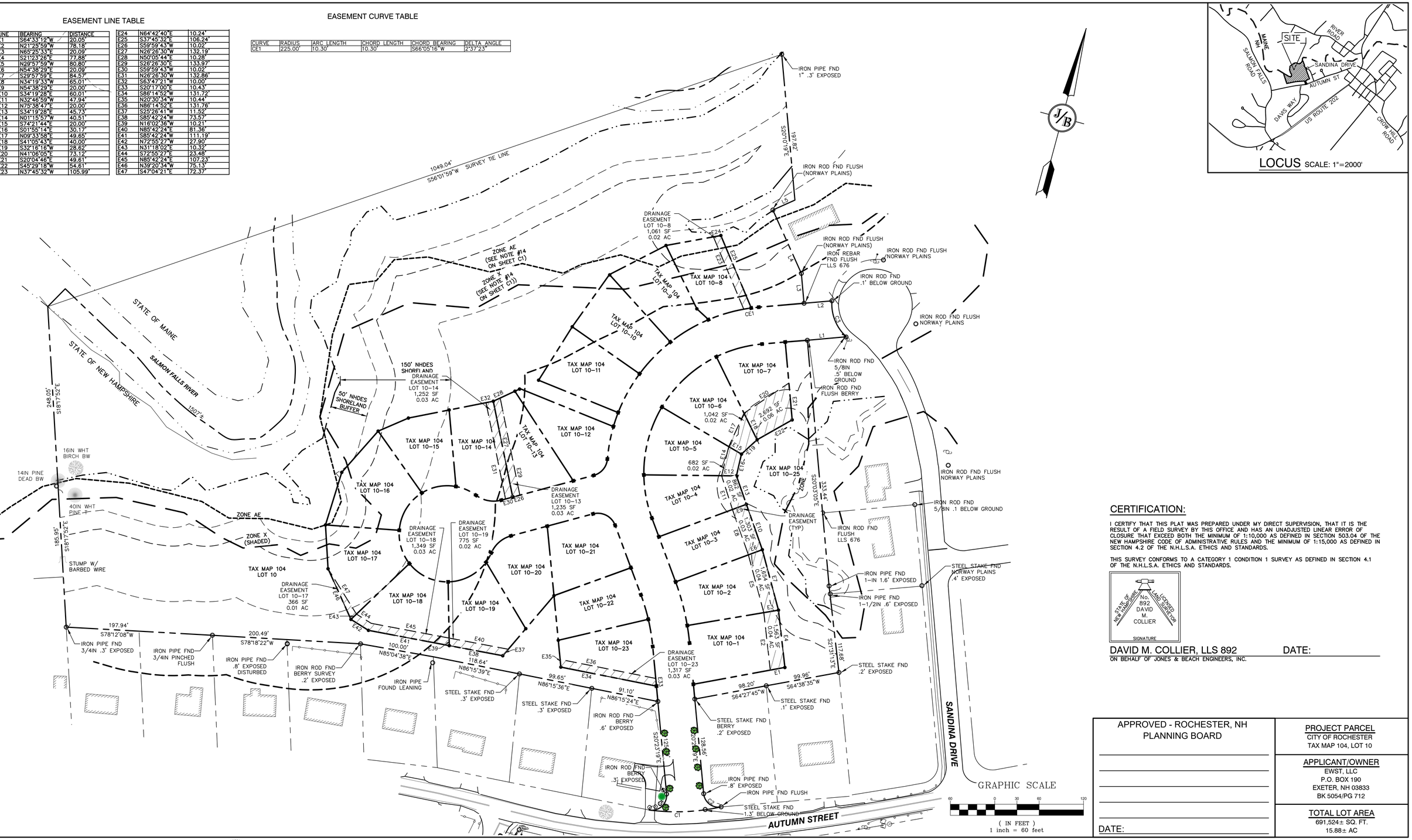
W:\22022 ROCHESTER–AUTUMN ST–GARREPY PLANNING\DWG\22022–PLAN.dwg, 8/2/2023 9:15:18 PM

EASEMENT LINE TABLE

LINE	BEARING	DISTANCE
E1	S64°33'12"W	20.05'
E2	N21°28'59"W	78.18'
E3	N65°25'33"E	20.09'
E4	S21°23'26"E	77.88'
E5	N29°57'59"W	80.80'
E6	N54°38'29"E	20.09'
E7	S29°57'59"E	84.57'
E8	N34°19'33"W	65.01'
E9	N54°38'29"E	20.00'
E10	S34°19'28"E	60.01'
E11	N32°46'59"W	47.94'
E12	N75°38'47"E	20.00'
E13	S34°19'28"E	45.73'
E14	N01°15'57"W	40.51'
E15	S74°21'44"E	20.00'
E16	S01°55'14"E	30.17'
E17	N09°33'58"E	49.65'
E18	S41°05'43"E	40.00'
E19	S32°16'16"W	28.62'
E20	N41°06'05"E	73.12'
E21	S20°04'46"E	49.61'
E22	S45°29'18"W	54.61'
E23	N37°45'32"W	105.99'
E24	N64°42'40"E	10.24'
E25	S37°45'32"E	106.24'
E26	S59°59'43"W	10.02'
E27	N26°26'30"W	132.19'
E28	N50°05'44"E	10.28'
E29	S26°26'30"E	133.97'
E30	S59°59'43"W	10.02'
E31	N26°26'30"W	132.86'
E32	S63°47'21"W	10.00'
E33	S20°17'00"E	10.43'
E34	S86°14'52"W	131.72'
E35	N20°30'34"W	10.44'
E36	N86°14'52"E	131.76'
E37	S25°26'41"W	11.52'
E38	S85°42'24"W	73.57'
E39	N16°02'36"W	10.21'
E40	N85°42'24"E	81.36'
E41	S85°42'24"W	111.19'
E42	N72°55'27"W	27.90'
E43	N31°18'02"E	10.32'
E44	S72°55'27"E	23.48'
E45	N85°42'24"E	107.23'
E46	N39°20'34"W	75.13'
E47	S47°04'21"E	72.37'

EASEMENT CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
CE1	225.00'	10.30'	10.30'	S66°05'16"W	2°37'23"



LOCUS SCALE: 1"=2000'

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1 inch = 60 feet

CERTIFICATION:

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

STATE OF NEW HAMPSHIRE — No. 892 — DAVID M. COLLIER — LICENSED LAND SURVEYOR
SIGNATURE

DAVID M. COLLIER, LLS 892 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

APPROVED - ROCHESTER, NH
PLANNING BOARD

DATE:

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT/OWNER
EWST, LLC
P.O. BOX 190
EXETER, NH 03833
BK 5054/PG 712

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

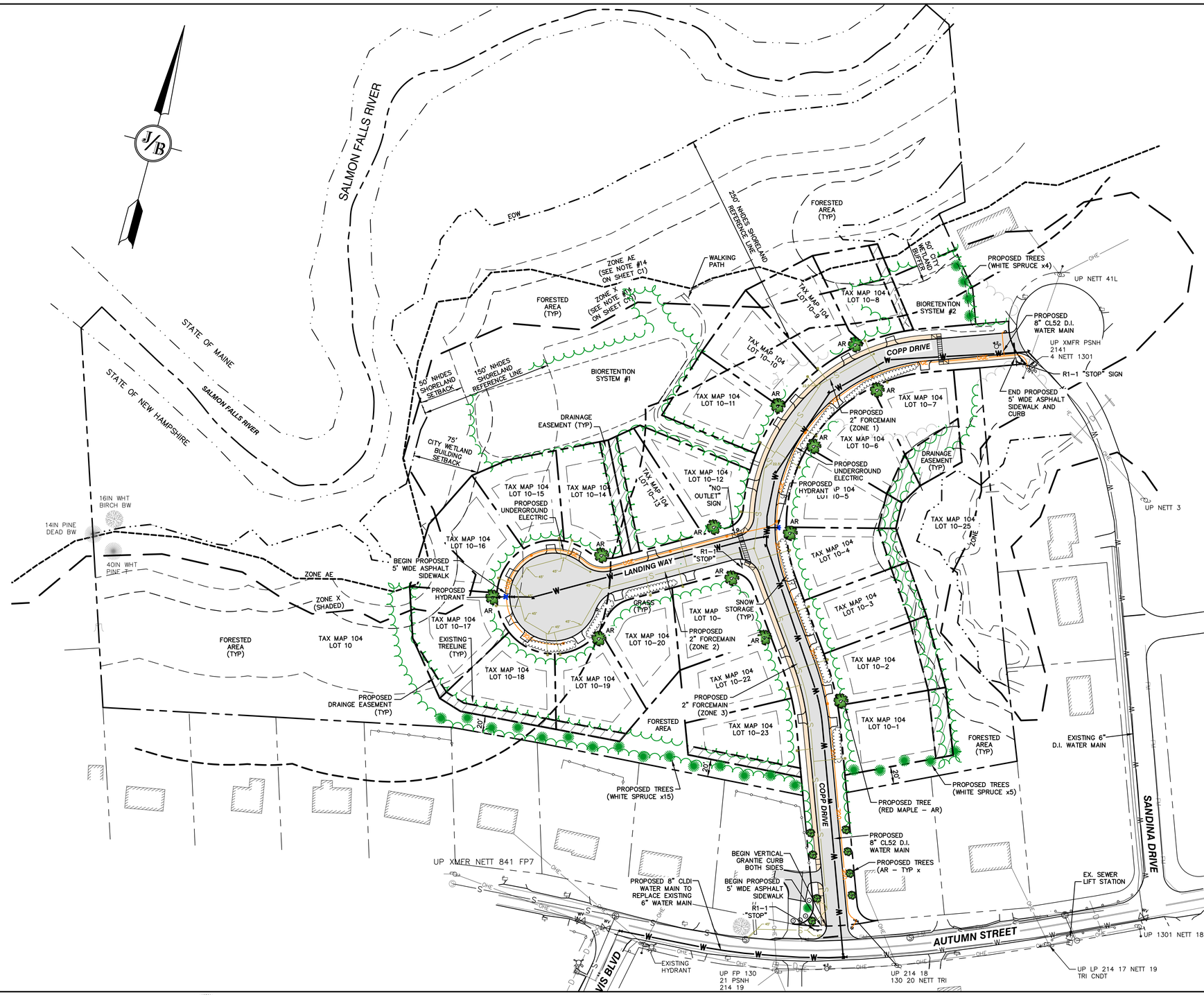
STATE OF NEW HAMPSHIRE — EWEN I MACKINNON No.16659 — LICENSED LAND SURVEYOR
08/02/2023

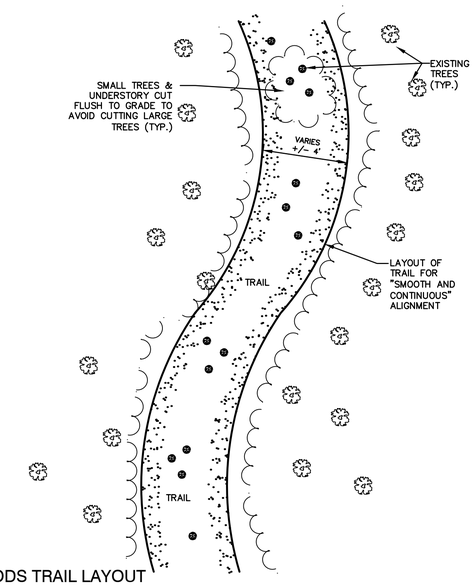
REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
Civil Engineering Services
603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EASEMENT PLAN MAP 104, LOT10
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
A2
SHEET 5 OF 22
JBE PROJECT NO. 22022





WOODS TRAIL LAYOUT

NOT TO SCALE

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 feet

APPROVED - ROCHESTER, NH
PLANNING BOARD

DATE:

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT/OWNER
EWST, LLC
P.O. BOX 190
EXETER, NH 03833
BK 5054/PG 712

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

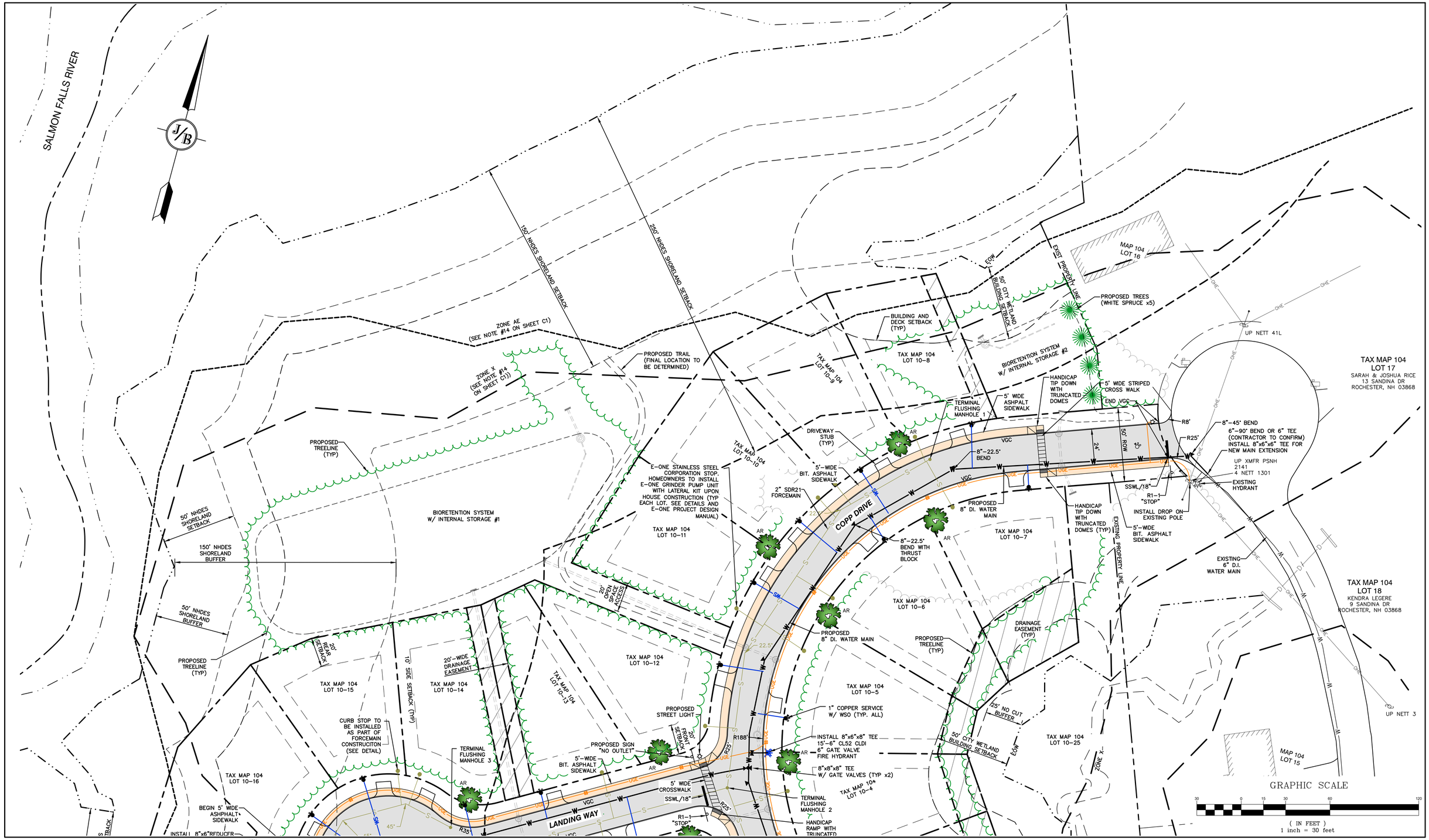
STATE OF NEW HAMPSHIRE
EWEN MACKINNON No.16659 LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	OVERALL SITE & UTILITY PLAN MAP 104 , LOT 10
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
C2
SHEET 6 OF 22
JBE PROJECT NO. 22022



Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
EWEN
MACKINNON
No. 16659
LICENSED
PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SITE & UTILITY PLAN MAP 104 , LOT 10
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
C2-1
SHEET 7 OF 22
JBE PROJECT NO. 22022

W:\22022 ROCHESTER-AUTUMN ST-GARREPY PLANNING\DWG\22022-PLAN.dwg, 8/2/2023 8:59:18 PM

TAX MAP 104
LOT 10-16

TAX MAP 104
LOT 10-17

TAX MAP 104
LOT 10-18

TAX MAP 104
LOT 10-19

TAX MAP 104
LOT 10-20

TAX MAP 104
LOT 10-21

TAX MAP 104
LOT 10-22

TAX MAP 104
LOT 10-23

TAX MAP 104
LOT 10-25

TAX MAP 104
LOT 10-4

TAX MAP 104
LOT 10-3

TAX MAP 104
LOT 10-2

TAX MAP 104
LOT 5
MERIDITH CLEMONS
23 ALLENS AVE
LEE, NH 03861
BK 4903 PG 515

TAX MAP 104
LOT 6
FIRST STEP HOME LLC
50 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104
LOT 7
GERALD BAKER
9 BEECHWOOD DR
STRAFFORD, NH 03884

TAX MAP 104
LOT 12
KAREN BETTENCOURT
74 AUTUMN ST
ROCHESTER, NH 03868

TAX MAP 104
SHAWN M. KEE
6 SANDINA DR
ROCHESTER, NH 0.
BK 4307 PG 85.

MAP 104 LOT 8
MAP 104 LOT 9
MAP 104 LOT 11
MAP 104 LOT 81
MAP 104 LOT 82
MAP 104 LOT 80

LANDING WAY
COPP DRIVE
AUTUMN STREET
DAVIS BLVD

75' CITY WETLAND BUILDING SETBACK
50' NHDES SHORELAND SETBACK
150' NHDES SHORELAND SETBACK
250' NHDES SHORELAND SETBACK
50' CITY WETLAND BUILDING SETBACK
25' NO CUT BUFFER
20' REAR SETBACK
20' FRONT SETBACK
10' SIDE SETBACK (TYP)
PROPOSED TREELINE
PROPOSED DRAINAGE EASEMENT
PROPOSED EASEMENT (TYP)
EXISTING PROPERTY LINE
EOW
ZONE X

BEGIN 5' WIDE ASHPHALT SIDEWALK
INSTALL 8"x6"REDUCER 10'-6" CL52 CLDI 6" GATE VALVE FIRE HYDRANT
PROPOSED 8" DI. WATER MAIN
PROPOSED 2" SDR 21 FORCEMAIN
2" SDR21 FORCEMAIN
E-ONE STAINLESS STEEL CORPORATION STOP. HOMEOWNERS TO INSTALL E-ONE GRINDER PUMP UNIT< WITH LATERAL KIT UPON HOUSE CONSTRUCTION (TYP. EACH LOT. SEE DETAILS AND E-ONE PROJECT DESIGN MANUAL)
TBM A NAIL IN MAIN HEMLOCK ROOT ELEV=226.63
PROPOSED TREES (WHITE SPRUCE x15)
PROPOSED TREES (WHITE SPRUCE x5)
TRAFFIC CONTROL BARRELS OR TRAFFIC CONES WITH FLAGGER. TRAFFIC CONTROL TO FOLLOW MUTCD GUIDELINES FOR SAFETY SIGNAGE AND SPACING AHEAD OF THE WORK ZONE.
TRAFFIC CONES (TYP)
PROPOSED 8" GATE VALVE
EX. HOUSES TO BE CONNECTED TO NEW 8" CLDI WATER LINE
EXISTING SMH .0150 RIM=237.59 INVin=231.47 (4")(SE) INVin=230.6 INVout=230.27 (W)
FORCEMAIN TERMINUS INV 230.65 10' - 8" SDR21 S=0.005 FT/FT (SEE DETAIL)
CONTRACTOR TO COORDINATE TRAFFIC CONTROL FOR LANE CLOSURE WITH CITY.
CONTRACTOR TO CONSTRUCT 2'-WIDE SHOULDER
REPLACE EX. 6" DI WATER MAIN WITH NEW 8" CLDI WATER LINE FROM PROPOSED ROAD TO DAVIS BLVD (260 LF±) (SEE SHEET U1)
EXISTING HYDRANT TO BE CONNECTED TO NEW 8" CLDI WATER LINE
EX. HOUSES TO BE CONNECTED TO NEW 8" CLDI WATER LINE
INSTALL 8"x6"x8" TEE 15'-6" CL52 CLDI 6" GATE VALVE FIRE HYDRANT
8"x8"x8" TEE W/ GATE VALVES (TYP x2)
TERMINAL FLUSHING MANHOLE 2
TERMINAL FLUSHING MANHOLE 3
PROPOSED SIGN "NO OUTLET"
5'-WIDE BIT. ASPHALT SIDEWALK
5' WIDE CROSSWALK
SSWL/18"
HANDICAP RAMP WITH TRUNCATED DOMES (TYP)
R1-1 "STOP"
1" COPPER SERVICE W/ WSO (TYP. ALL)
PROPOSED UNDERGROUND ELECTRIC
PROPOSED UTILITY POLE W/ DROP
PROPOSED LIGHT POLE
BEGIN VGC (4' TIP-UP)
BEGIN 5'-WIDE SIDEWALK
SMH RIM ELEV=241.27' INVin=228.99' 8" PVC (E) INVout=228.74 8" PVC (W)
SMH RIM ELEV=241.48' INVin=229.64' (E) INVin=229.70' (S) INVout=229.70' (W)
SMH 0150 RIM ELEV=229.97' INVout (W) BLOCKED
SMH 1212 RIM ELEV=225.81' INVin=220.04' (E) INVout=219.93' (S) INVin=220.01' (W)
UP XMFR NETT 841 FP7
UP FP 130 21 PSNH 214 19
UP 214 18 130 20 NETT TRI
UP LP 214 17 NETT 19 TRI CNDT
EXIS. 6" DI WATER MAIN TO REMAIN
SEWER LIFT STATION
PROPOSED 6" GATE VALVE
8"x8"x6" TEE 8" GATE VALVE

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 feet

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
EWEN I. MACKINNON No. 16659
LICENSED PROFESSIONAL LAND SURVEYOR
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SITE & UTILITY PLAN MAP 104 , LOT 10
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
C2-2
SHEET 8 OF 22
JBE PROJECT NO. 22022

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SALMON FALLS RIVER

150' NHDES SHORELAND SETBACK

250' NHDES SHORELAND SETBACK

HEADWALL #5
12" INV OUT =215.15
W/RIP RAP APRON
L=16', W=9', d50=3", T=12"

ZONE AE
(SEE NOTE #14 ON SHEET C1)
ELEV 214.4±

ZONE X
(SEE NOTE #14 ON SHEET C1))
ELEV 216.4±

20'-12" HDPE
S=0.005 FT/FT

CBCS #1 (SEE DETAIL SHEET D3)
RIM=219.00
6" PERFORATED INV. IN=214.41
12" INV OUT=215.25

ORANGE CONSTRUCTION FENCE (TYP)

ORGANIC FILTER BERM (TYP)

EXISTING MONITORING WELL

BIORETENTION SYSTEM
W/ INTERNAL STORAGE #1

HEADWALL #3
INV=216.46

HEADWALL #4
INVout=217.00

50' NHDES SHORELAND SETBACK

150' NHDES SHORELAND BUFFER

50' NHDES SHORELAND BUFFER

PROPOSED TREELINE

20'-WIDE DRAINAGE EASEMENT

TP4

TP5

TP3

TAX MAP 104
LOT 10-15

TAX MAP 104
LOT 10-16

TAX MAP 104
LOT 10-14

TAX MAP 104
LOT 10-13

TAX MAP 104
LOT 10-12

TAX MAP 104
LOT 10-11

TAX MAP 104
LOT 10-9

TAX MAP 104
LOT 10-10

TAX MAP 104
LOT 10-8

50' CITY WETLAND BUILDING SETBACK

10'-WIDE DRAINAGE EASEMENT

HEADWALL #12
INV OUT=215.00 W/RIP
RAP APRON L=14',
W=10', d50=3", T=12"

10'-18" HDPE
S=0.025 FT/FT

CBCS #2 (SEE DETAIL SHEET D3)
RIM=218.50
6" PERF. INV IN=214.41
18" HDPE INV OUT=215.25

BIORETENTION SYSTEM
W/ INTERNAL STORAGE #2

HEADWALL #1
INVout=215.93

CB10

CB12

CB8

CB7

CB6

DMH2

COPP DRIVE

LANDING WAY

7+00

6+00

5+00

4+00

HEADWALL #2
20'-12" HDPE
S=0.10 FT/FT
INVin=218.3

CONSTRUCT DIVERSION SWALE
L=480'
(1'-DEEP, 1'-WIDE)
S=0.010 FT/FT

48" HDPE
INV=211.17

48" HDPE
INV=211.76

TAX MAP 104
LOT 10-7

TAX MAP 104
LOT 10-6

TAX MAP 104
LOT 10-5

TAX MAP 104
LOT 10-4

TAX MAP 104
LOT 10-25

25' NO CUT BUFFER

PROPOSED DRAINAGE EASEMENT (TYP)

50' CITY WETLAND BUILDING SETBACK

ZONE X

DOUBLE ROW OF FIBER BERM WITHIN 50' OF

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
EWEN I. MACKINNON No.16659
LICENSED PROFESSIONAL ENGINEER
08/02/2023

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5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

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603-772-4746
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E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	GRADING & DRAINAGE PLAN
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
C3-1
SHEET 9 OF 22
JBE PROJECT NO. 22022

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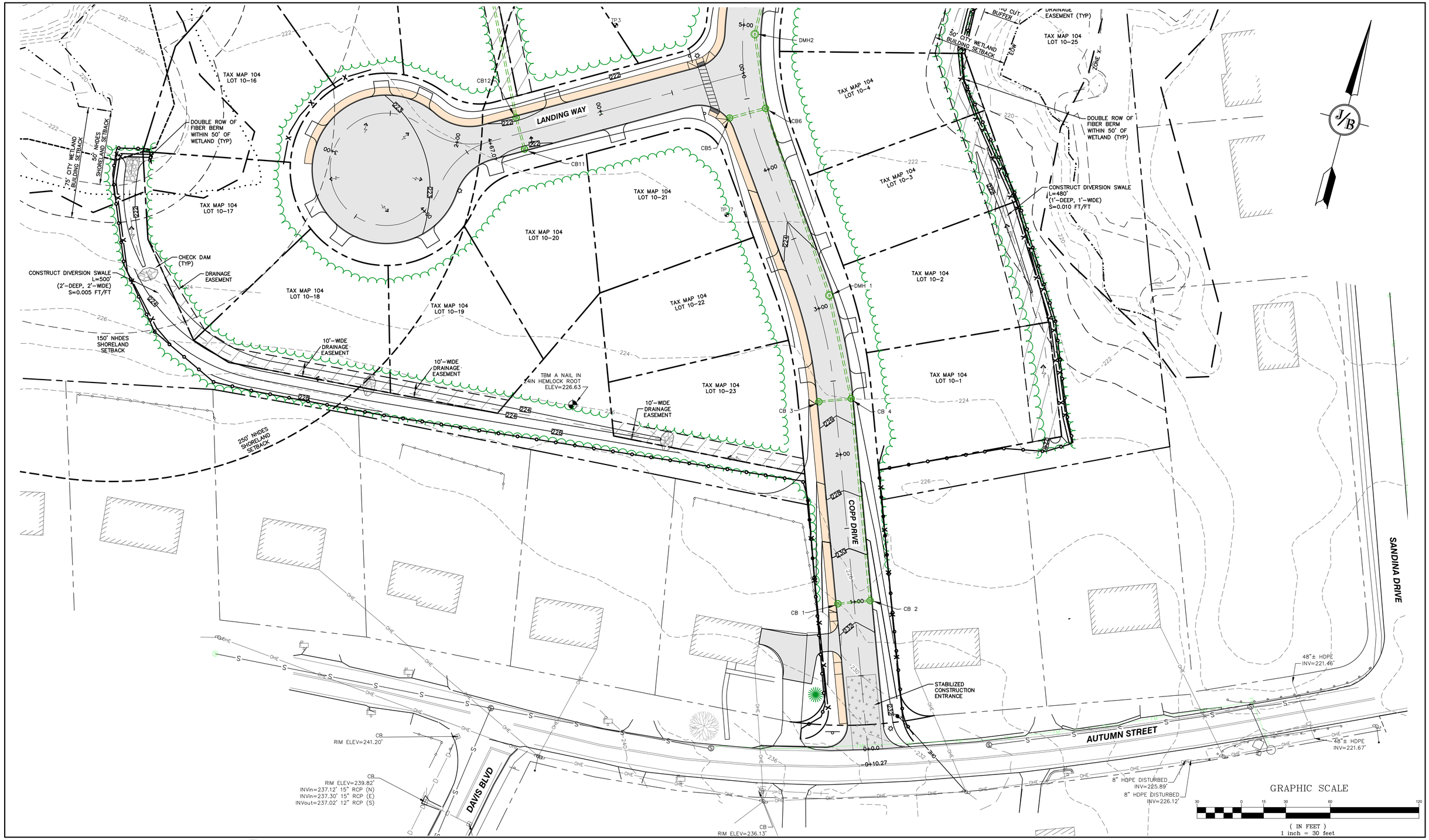

Design: LAZ	Draft: LAZ	Date: 6/21/22
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STATE OF NEW HAMPSHIRE
EWEN MACKINNON No.16659 LICENSED PROFESSIONAL ENGINEER
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DRAWING No.
C3-2
SHEET 10 OF 22
JBE PROJECT NO. 22022

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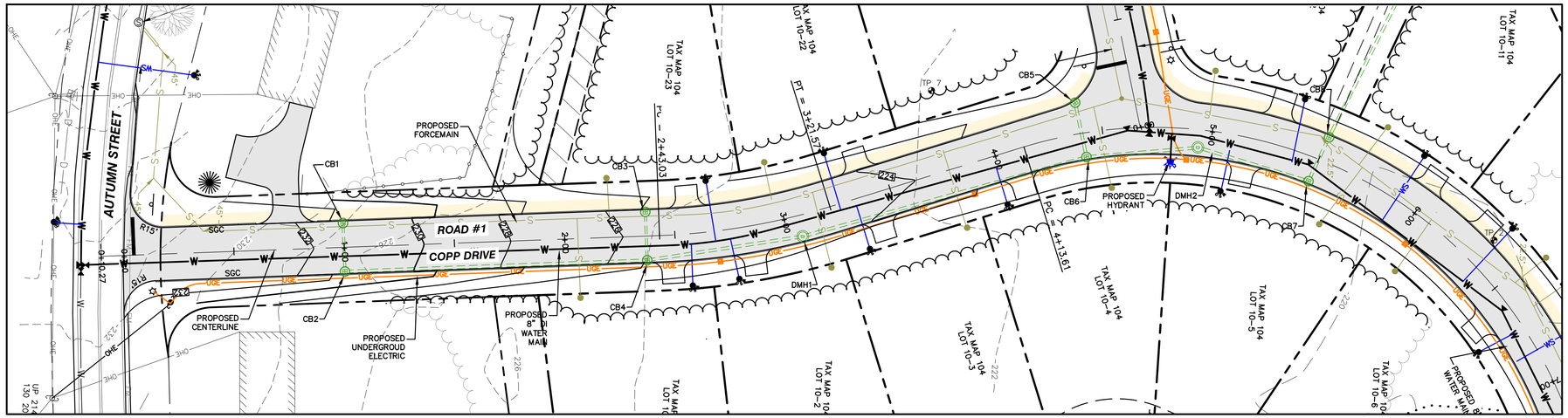
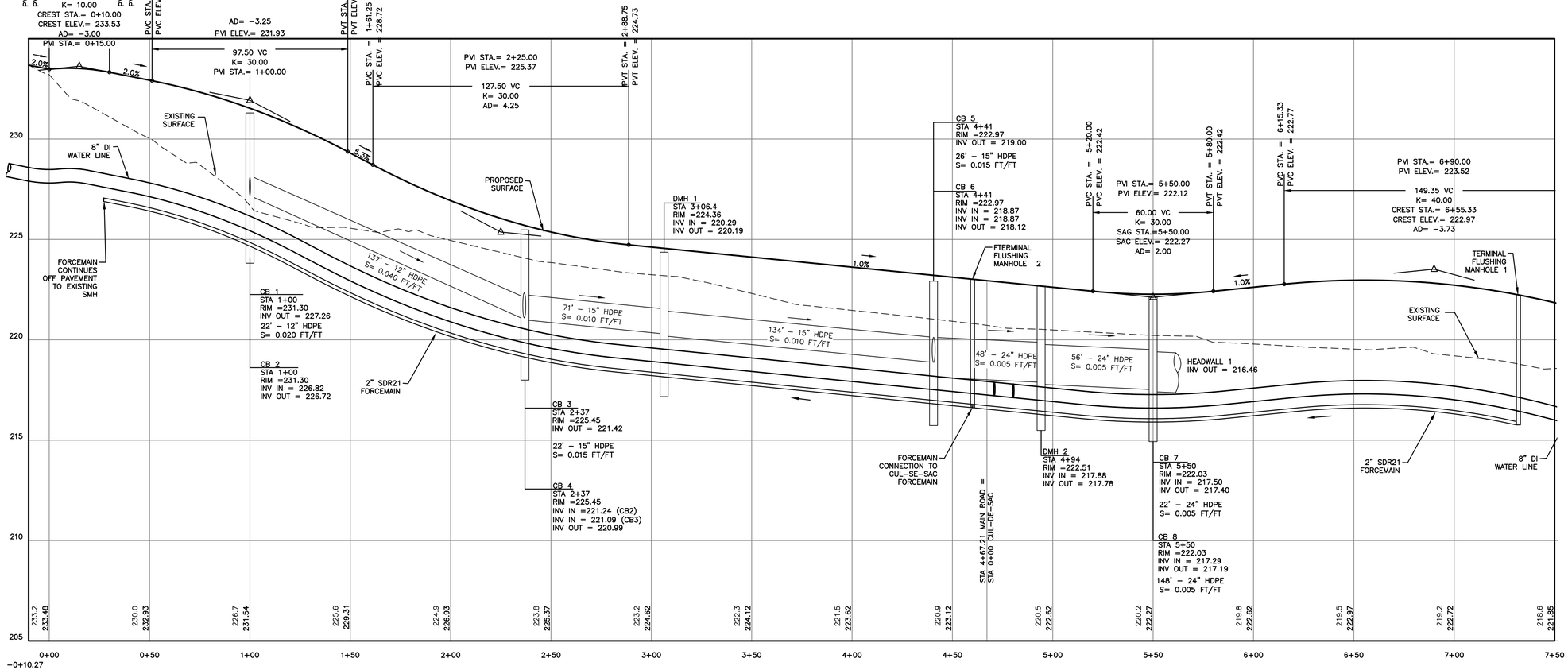


PLAN - ROAD #1 (COPP DRIVE) (STA -0+10.27 - 7+50)



PROFILE - ROAD #1 (COPP DRIVE) (STA -0+10.27 - 7+50)

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE – EWEN I. MACKINNON No. 16659 – LICENSED PROFESSIONAL ENGINEER
08/02/2023

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Plan Name:	PLAN AND PROFILE
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
P1
SHEET 11 OF 22
JBE PROJECT NO. 22022

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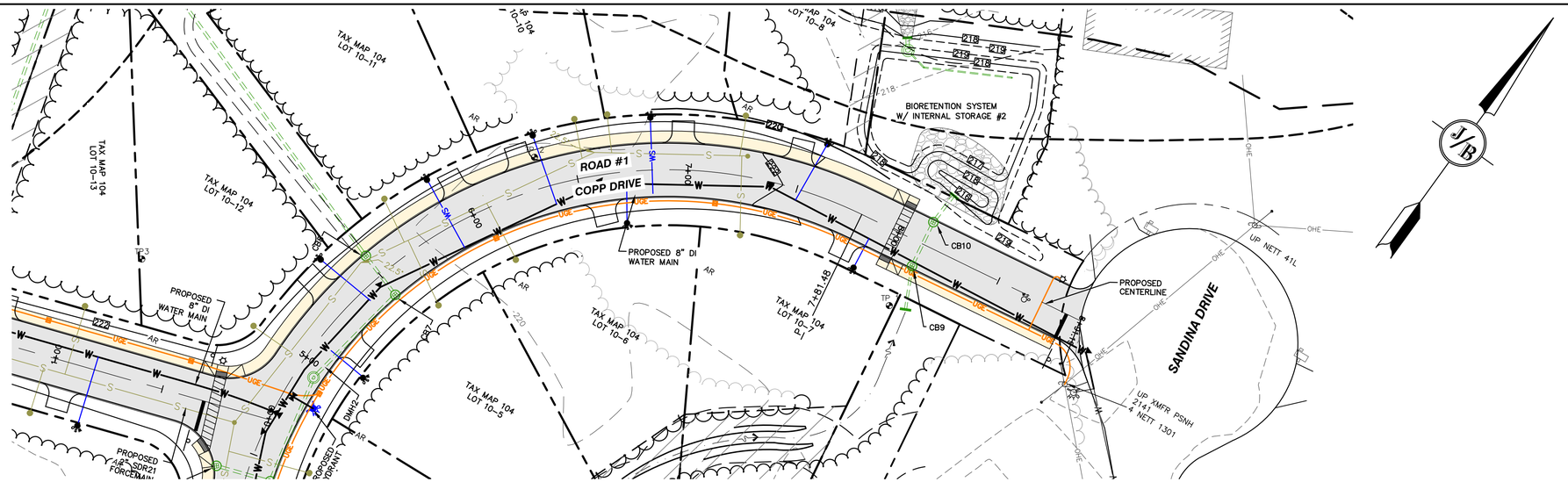
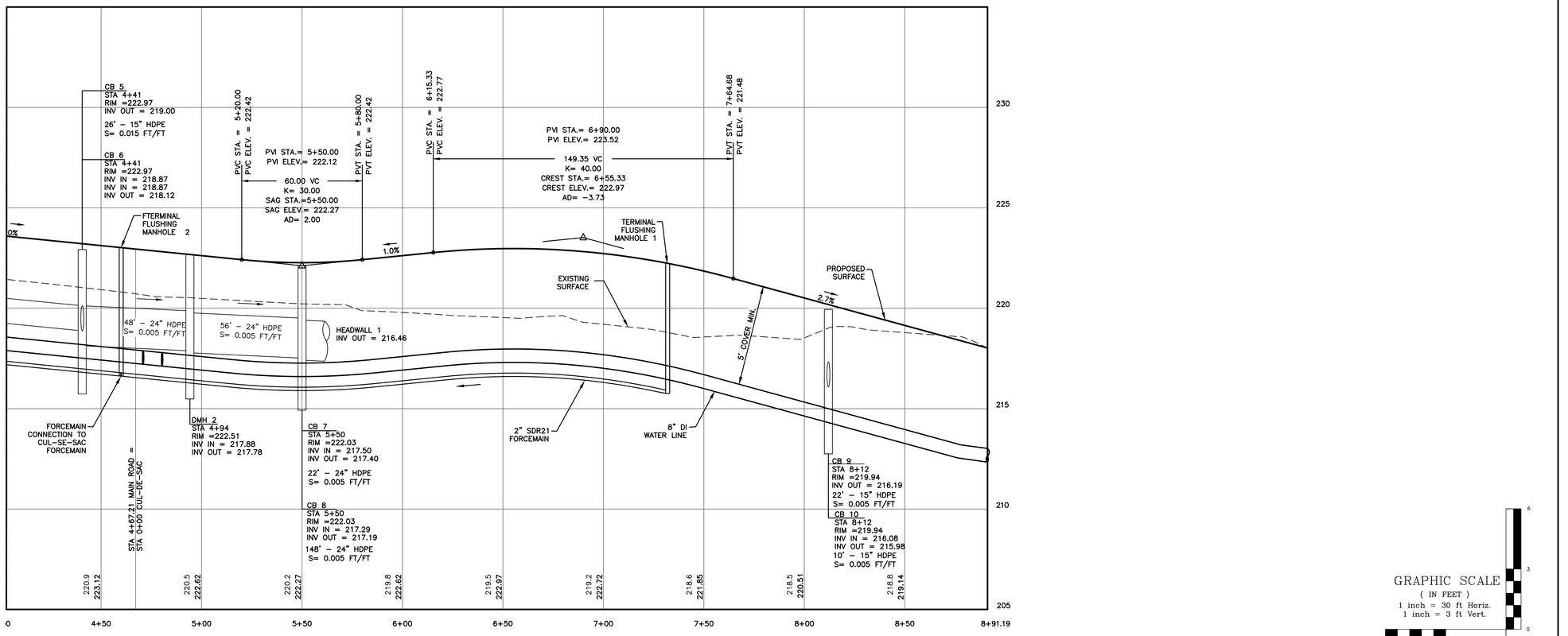


PLAN - ROAD #1 (COPP DRIVE) (STA 7+00 - 8+91.19)



PROFILE - ROAD #1 (COPP DRIVE) (STA 7+00 - 8+91.19)

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.

0 30 60
0 3 6

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
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5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

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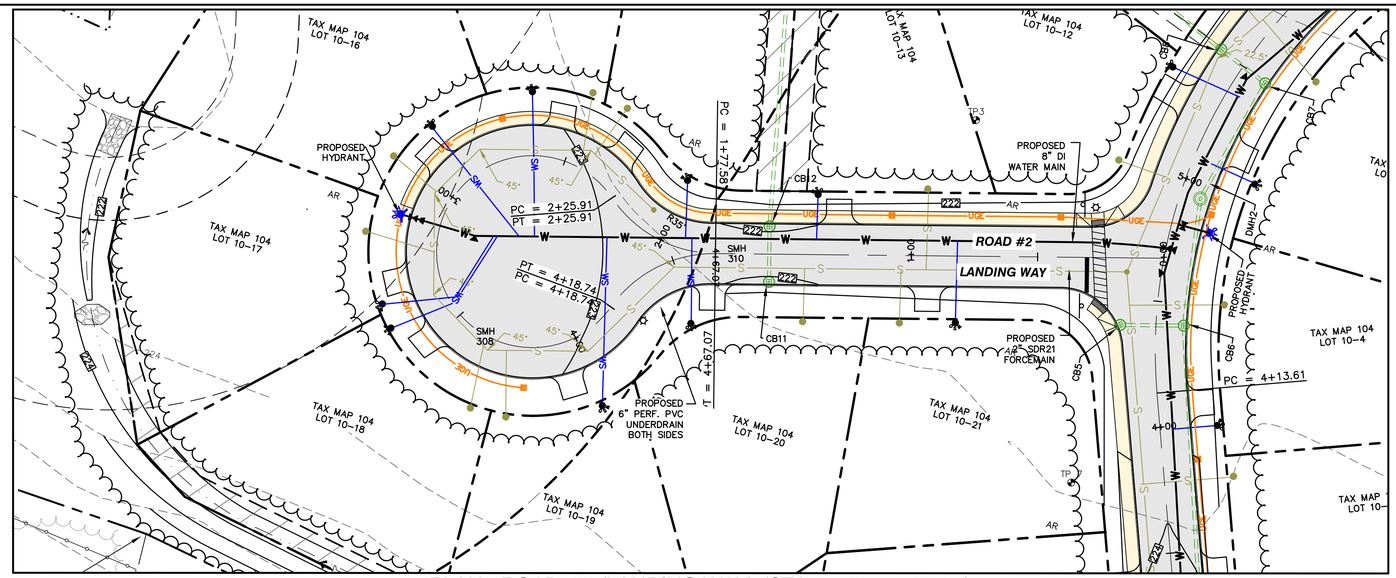
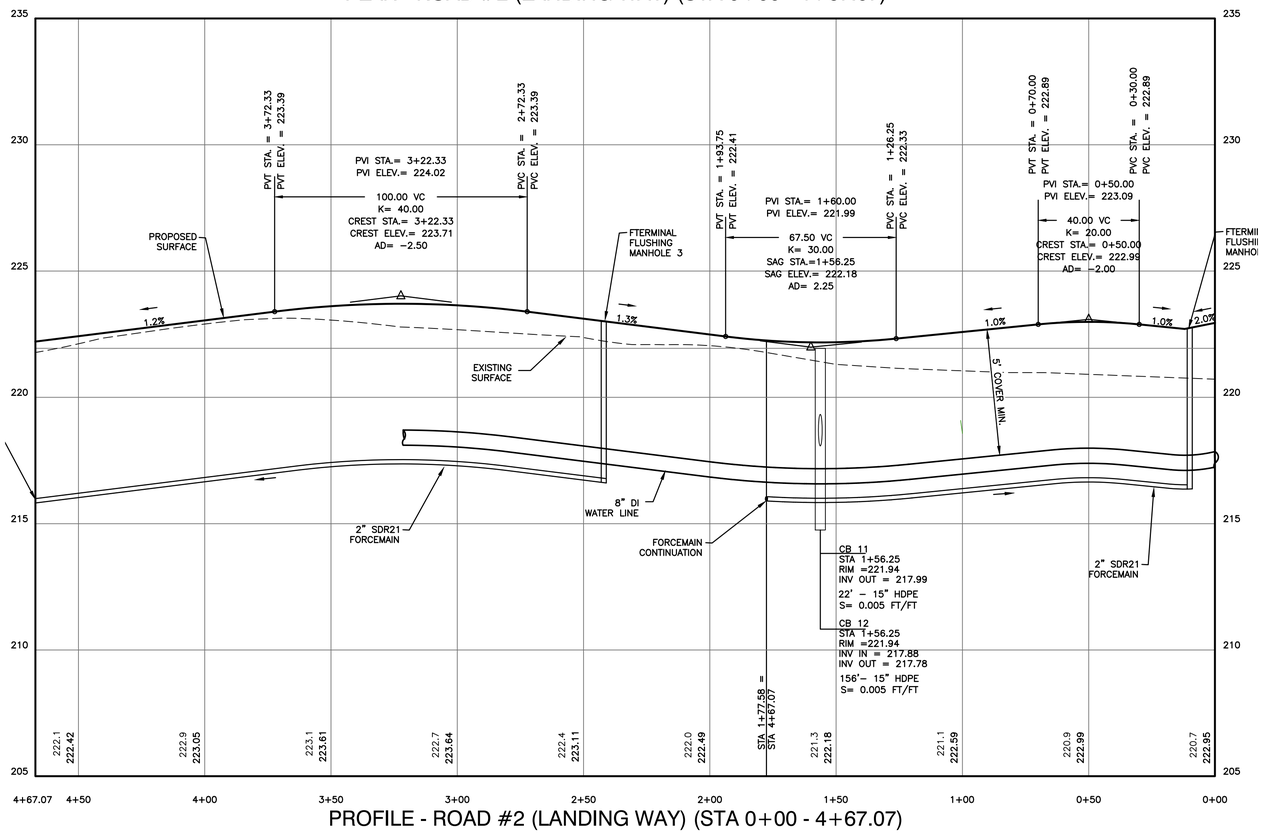
Plan Name:	PLAN AND PROFILE
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
P2
SHEET 12 OF 22
JBE PROJECT NO. 22022



PLAN - ROAD #2 (LANDING WAY) (STA 0+00 - 4+67.07)



PROFILE - ROAD #2 (LANDING WAY) (STA 0+00 - 4+67.07)

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.
0 30 60
0 3 6

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

EWEN I. MACKINNON No.16659 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE
08/02/2023

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9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
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6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

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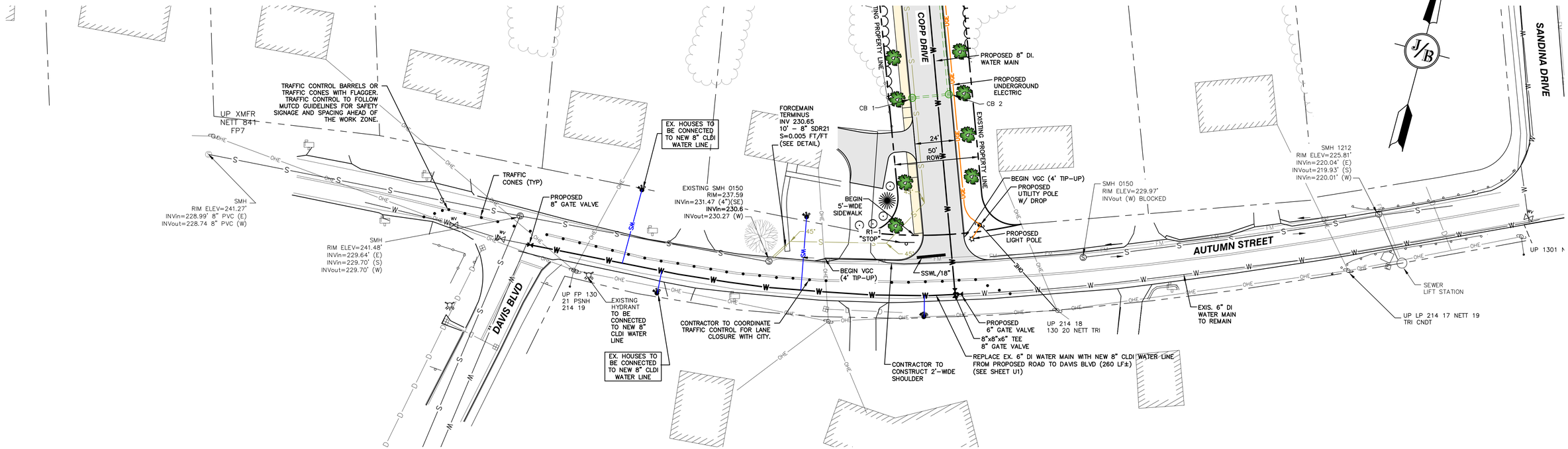
Plan Name:	PLAN AND PROFILE
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
P3
SHEET 13 OF 22
JBE PROJECT NO. 22022

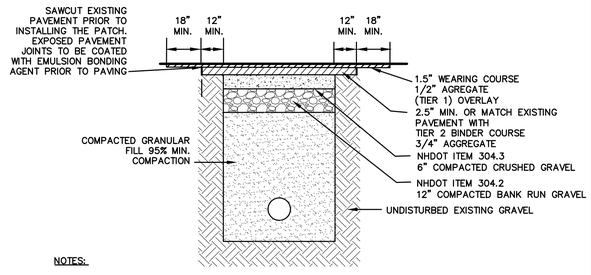


UTILITY NOTES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, OWNER, CITY OF ROCHESTER AND NHDOT IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, CONNECTION FEES AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM NOTICE OF FOURTEEN (14) DAYS TO ALL CORPORATIONS, COMPANIES AND/OR LOCAL AUTHORITIES OWNING OR HAVING A JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS PROJECT AREAS PRIOR TO DEMOLITION AND/OR CONSTRUCTION ACTIVITIES.
3. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE CITY OF ROCHESTER WATER DEPARMENT.
4. A PRECONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, CONTRACTOR, CITY DPW, NHDOT AND ALL PROJECT-RELATED UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. A CONSTRUCTION SEQUENCING PLAN WITH TEMPORARY WATER LOCATIONS AND SHUTDOWN DURATIONS NOTED SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND COMMENT.
6. ALL CONSTRUCTION SHALL CONFORM TO CITY STANDARDS AND REGULATIONS, AND NHDOT STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS OTHERWISE SPECIFIED.
7. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
8. THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUBS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS. ENGINEER TO BE NOTIFIED.
9. AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS AND NHDOT.
10. ALL WATER MAINS AND SERVICE PIPES SHALL HAVE A MINIMUM 18" VERTICAL AND 4' HORIZONTAL SEPARATION TO MANHOLES, OR CONTRACTOR SHALL INSTALL BOARD INSULATION FOR FREEZING PROTECTION.
11. WATER MAINS SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR LEAKAGE PRIOR TO ACCEPTANCE. WATERMAINS SHALL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 150 PSI, WHICH EVER IS GREATER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 4 OF AWWA STANDARD C 600. WATERMAINS SHALL BE DISINFECTED AFTER THE ACCEPTANCE OF THE PRESSURE AND LEAKAGE TESTS ACCORDING TO AWWA STANDARD C 651.
12. THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
13. CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHOULD BE SENT TO THE DESIGN ENGINEER AND CITY OF ROCHESTER DPW FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
14. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
15. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
16. ALL FIRE HYDRANTS SHALL BE PROVIDED WITH AN APPROVED GATE VALVE A MAXIMUM OF 5'-0" FROM HYDRANT.
17. ALL WATER LINE CONSTRUCTION TO CONFORM TO THE CITY OF ROCHESTER WATER DEPARTMENT SPECIFICATIONS.
18. ROCHESTER DPW TO INSPECT ALL WATER MAIN WORK.
19. THE CONTRACTOR MAY NOT OPERATE VALVES OR HYDRANTS ON THE CITY'S WATER MAIN INFRASTUCTURE. CONTRACTOR TO CONTACT DPW TO COORDINATE OPERATIONAL NEEDS DURING WATER MAIN REPLACEMENT.

WATER LINE CONSTRUCTION SEQUENCE

1. CONTRACTOR TO COORDINATE WITH CITY WATER DEPARTMENT PRIOR TO WORK ON ACTIVE WATER LINE AND HOLD A PRE-CONSTRUCTION MEETING.
2. SAWCUT PAVEMENT AND INSTALL NEW 8" CLDI WATER LINE ADJACENT TO EXISTING WATER LINE. EXISTING WATER LINE TO REMAIN ACTIVE UNTIL NEW WATER LINE HAS BEEN ACCEPTED BY THE CITY WATER DEPARTMENT.
3. IF NECESSARY, BYPASS WATER SERVICES SHALL BE SET UP TO LOTS EFFECTED BY WATER LINE REPLACEMENT UNTIL FINAL WATER HOOKUP IS ACTIVE .
4. INSTALL NEW 8" CLDI LINE TO WATER SHUT OFF AT DAVIS BLVD. ACTIVATE WATER LINE AND TEST.
5. CONNECT HOUSES TO NEW WATER LINE.
6. PATCH PAVEMENT PER CITY REQUIREMENTS.



NOTES:

1. PAVEMENT EDGES SHALL BE DEFINED BY A STRAIGHT EDGE FORMED BY A MACNHINED SAW CUT.
2. TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH GRANULAR FILL AND COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY.
3. TOP 18" OF BACKFILL SHALL BE 6" OF COMPACTED CRUSHED GRAVEL (NHDOT 304.3) SUPPORTED BY 12" OF COMPACTED GRAVEL (NHDOT 304.2).
4. ALL VERTICAL AND HORIZONTAL JOINTS BETWEEN PAVEMENTS SHALL BE TACK COATED.
5. PAVEMENT THICKNESS SHALL MATCH EXISTING BUT IN NO CASE SHALL BE LESS THAN 3" TOTAL THICKNESS.
6. PAVEMENT SHALL BE PLACED IN TWO PHASES:
   - 6.1. THE FIRST PHASE SHALL CONSIST OF CUTTING BACK THE FULL DEPTH OF PAVEMENT 12" BEYOND THE EDGES OF THE DISTURBED TRENCH AND PAVING A BINDER COURSE THE FULL DEPTH OF THE PAVEMENT AS TO BRING THE PATCH FLUSH WITH THE EXISTING ROAD SURFACE.
   - 6.2. THE SECOND PHASE SHALL BE CONDUCTED THE FOLLOWING YEAR AND SHALL CONSIST OF MILLING OVER THE EDGES OF THE PREVIOUS PATCH BY A MINIMUM OF 18" IN ALL DIRECTIONS TO A DEPTH OF 1. 5". WEARING COURSE PAVEMENT SHALL BE USED TO CREATE A SMOOTH SURFACE WITH THE ROADWAY OVER THE EXTENTS OF THE MILLED AREA.
7. ANY EXCAVATION WITHIN A CITY RIGHT-OF-WAY REQUIRES PRE-APPROVAL BY DPW AND IS SUBJECT TO INSPECTION TO ENSURE COMPLIANCE WITH CITY STANDARDS.

UTILITY TRENCH PAVEMENT REPAIR

NOT TO SCALE

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

Design: LAZ	Draft: LAZ	Date: 6/21/22	
Checked: ISM	Scale: AS NOTED	Project No.: 22022	
Drawing Name: 22022-PLAN.dwg			

STATE OF NEW HAMPSHIRE
EWEN I MACKINNON No.16659 LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
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Designed and Produced in NH
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Civil Engineering Services
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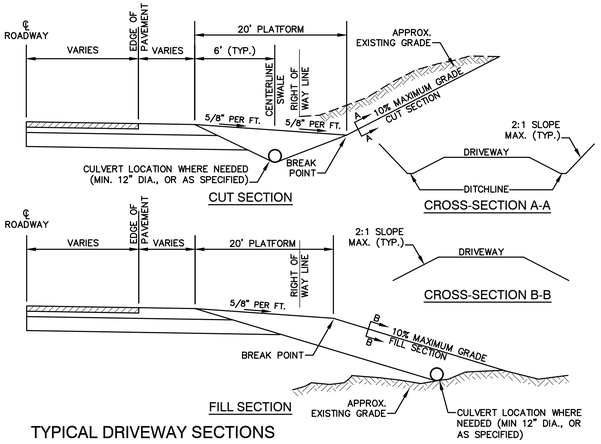
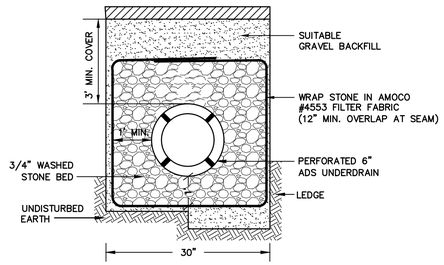
Plan Name:	OFFSITE IMPROVEMENTS PLAN
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
U1
SHEET 14 OF 22
JBE PROJECT NO. 22022



TYPICAL DRIVEWAY SECTIONS

NOT TO SCALE

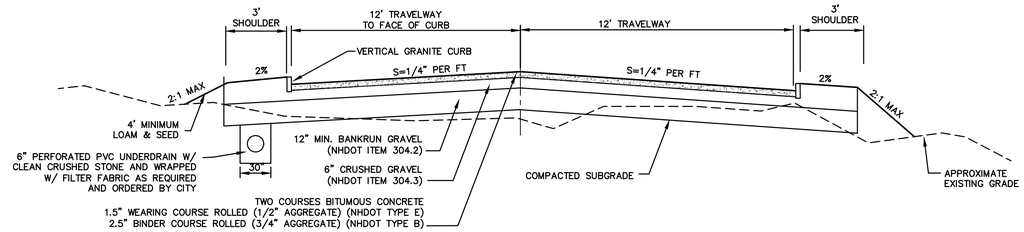


NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO PROJECT AND CITY SPECIFICATIONS.
3. SLOPE UNDERDRAIN PIPE TO DAYLIGHT.

ROADWAY UNDERDRAIN TRENCH (IF REQUIRED)

NOT TO SCALE

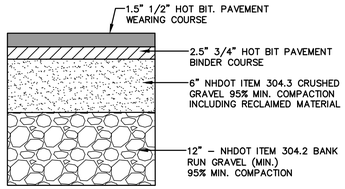


NOTES:

1. REMOVE ALL ORGANICS, TOPSOIL AND MATERIAL YIELDING TO A 10 TON ROLLER. SUBBASE AREAS THAT CONTAIN UNSUITABLE MATERIALS MUST BE EXCAVATED TO A DEPTH NO LESS THAN 36" BELOW FINISH GRADE AND BE REPLACED WITH GRAVEL COMPACTED TO 95%.
2. ALL MATERIALS TO BE AS SPECIFIED PER CITY STANDARDS AND NHDOT, WHICHEVER IS MOST STRINGENT. GRADATION AND COMPACTION TEST RESULTS (95% MIN.) SHALL BE SUBMITTED FOR REVIEW AND APPROVAL.
3. CITY MAY REQUIRE UNDERDRAIN AND/OR ADDITIONAL DRAINAGE IF SOIL CONDITIONS WARRANT.
4. WOVEN GEOTEXTILE FABRIC SHALL BE PLACED ABOVE SUBGRADE AT ALL WETLAND CROSSINGS.

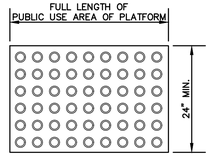
TYPICAL ROADWAY SECTION W/CURBING

NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT

NOT TO SCALE

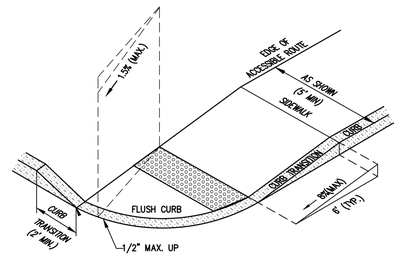


DETECTABLE WARNINGS SHALL CONSIST OF A SURFACE OF TRUNCATED DOMES AND SHALL COMPLY WITH THE FOLLOWING:

A. TRUNCATED DOMES SHALL HAVE A BASE DIAMETER OF 0.9" (MIN.) AND 1.4" (MAX.), A TOP DIAMETER OF 50% OF THE BASE DIAMETER MINIMUM TO 65% OF THE BASE DIAMETER MAXIMUM, AND A HEIGHT OF 0.2".
B. TRUNCATED DOMES SHALL HAVE A CENTER-TO-CENTER SPACING OF 1.6" MINIMUM AND 2.4" MAXIMUM, AND A BASE-TO-BASE SPACING OF .65" MINIMUM AND 1.5" MAXIMUM, MEASURED BETWEEN THE MOST ADJACENT DOMES ON A SQUARE GRID.
C. TRUNCATED DOMES TO BE CAST IRON PER NHDOT SPECIFICATIONS.
D. DETECTABLE WARNING SURFACES SHALL CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT.

TRUNCATED DOMES TO BE PLACED IN SIDEWALK BASE IN PUBLIC TRAFFIC AREAS.

ACCESSIBLE CURB RAMP TRUNCATED DOMES

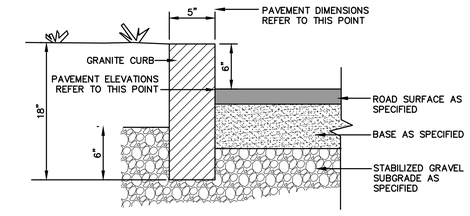


NOTES:

1. THE MAXIMUM ALLOWABLE CROSS SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) AND CURB SHALL BE 1.5%.
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) CURB RAMPS SHALL BE 8%.
4. A MINIMUM OF 4 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (i.e., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SECTION FOR RAMP CONSTRUCTION.

ACCESSIBLE CURB RAMP (TYPE 'B')

NOT TO SCALE

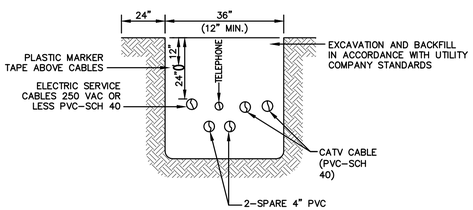


NOTES:

1. JOINTS BETWEEN STONES SHALL BE MORTARED.
2. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.

5" VERTICAL GRANITE CURB

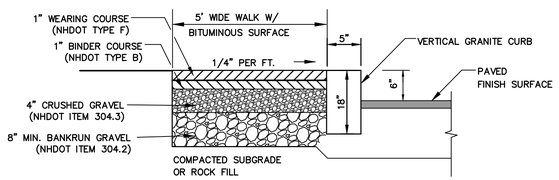
NOT TO SCALE



NOTE: ALL UTILITIES SHALL BE REVIEWED AND APPROVED BY APPROPRIATE UTILITY COMPANY.

UTILITY TRENCH

NOT TO SCALE

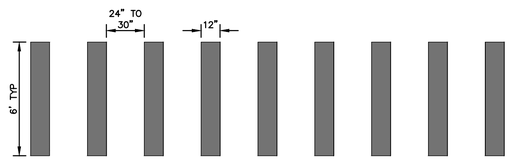


NOTES:

1. JOINTS BETWEEN STONES SHALL BE MORTARED.
2. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.

BIT. SIDEWALK W/ VERTICAL GRANITE CURB

NOT TO SCALE

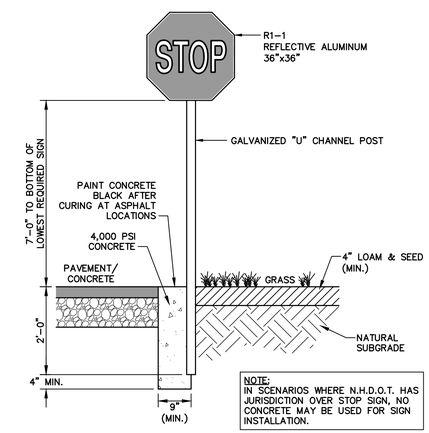


NOTES:

1. TRANSVERSE CROSSWALK LINES SHALL BE THERMOPLASTIC, NOT LESS THAN 6" WIDE AND NOT LESS THAN 6' APART.
2. SPACING FOR THE CONTINENTAL CLOCK MARKINGS SHALL BE UNIFORM FOR EACH INDIVIDUAL CROSSWALK BUT CAN BE MODIFIED FOR ONE CROSSWALK TO THE NEXT TO ELIMINATE A CROSSWALK MARKING DIRECTLY IN THE WHEELPATH.

NHDOT CONTINENTAL BLOCK MARKING DETAIL

NOT TO SCALE



STOP SIGN (R1-1)

NOT TO SCALE

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE – EWEN I. MACKINNON No. 16659 – LICENSED PROFESSIONAL ENGINEER

08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

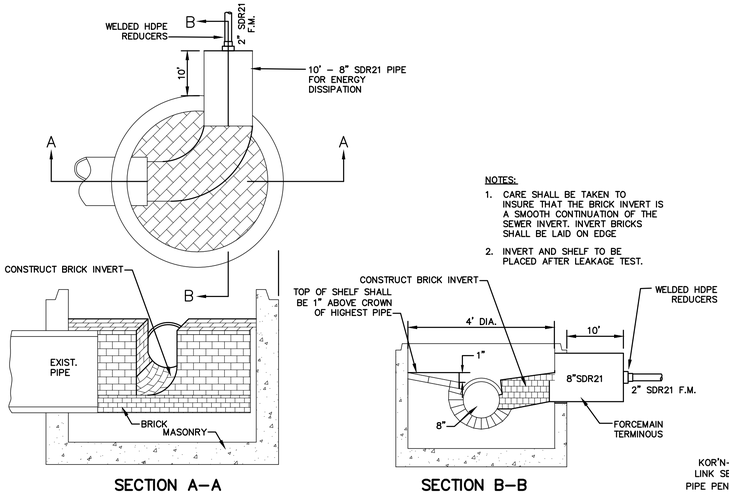
Plan Name:	DETAIL SHEET
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.

D1

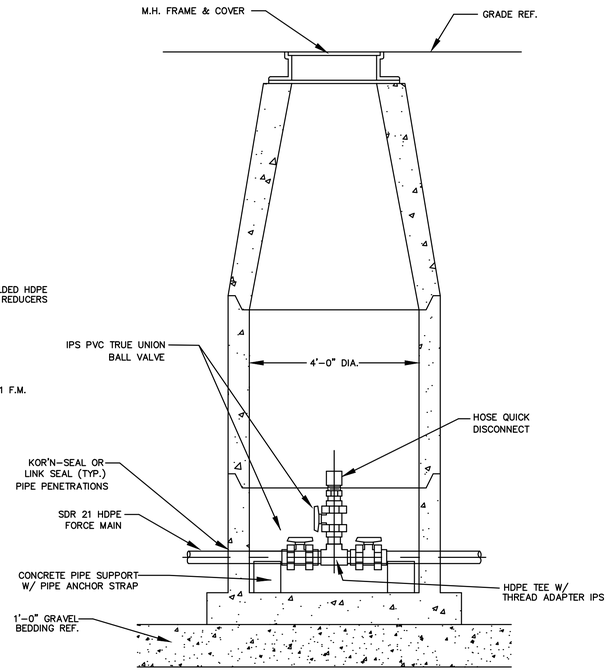
SHEET 15 OF 22
JBE PROJECT NO. 22022

W:\22022 ROCHESTER-AUTUMN ST-GARREPY PLANNING\DWG\22022-PLAN.dwg, 8/2/2023 8:56:37 PM



FORCEMAIN TERMINUS INTO NEW MANHOLE

NOT TO SCALE

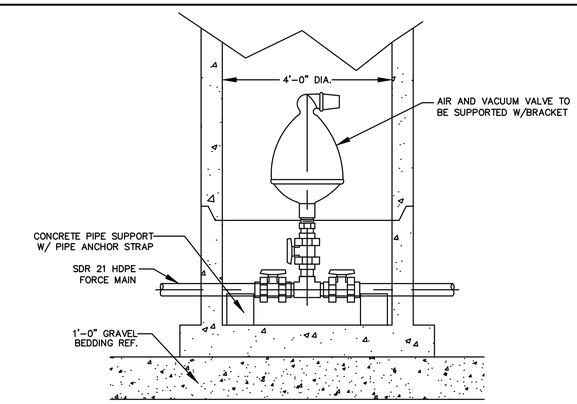


NOTES:

TERMINAL FLUSHING MANHOLE TO MEET THE REQUIREMENTS OF ENV–WQ 704.12 THROUGH ENV–WQ 704.17 AND ENV–WQ 704.17 (G&I). SEE UTILITY NOTES ON SHEET G1.

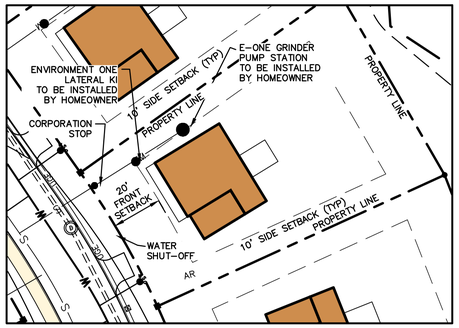
TERMINAL FLUSHING MANHOLE

NOT TO SCALE



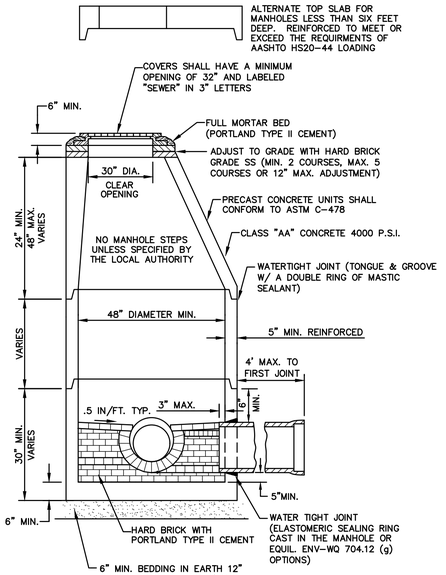
TERMINAL FLUSHING MANHOLE - OPTIONAL ELEV. VIEW

NOT TO SCALE



TYPICAL LOT AND UTILITY LAYOUT

SCALE: 1"=30'



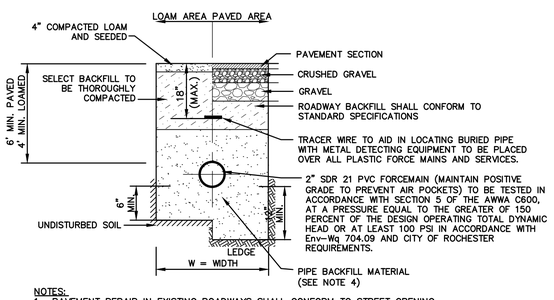
NOTES:

1. PER NHDES ENV–WQ 704.13(C), MORTAR USED IN MANHOLE CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING:
   a. MORTAR SHALL BE COMPOSED OF TYPE II PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION
   b. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE PER TABLE 704–4:
      (1) 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
      (2) 4.5 PARTS SAND, ONE PART CEMENT AND 0.5 PART HYDRATED LIME;
   c. CEMENT SHALL BE TYPE II PORTLAND CEMENT THAT IS CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM C150/C150M STANDARD IN EFFECT AT THE TIME THE CEMENT WAS MANUFACTURED
   d. HYDRATED LIME SHALL BE TYPE S THAT IS CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM C207 STANDARD IN EFFECT AT THE TIME THE HYDRATED LIME WAS PROCESSED
   e. SAND SHALL CONSIST OF INERT NATURAL SAND THAT IS CERTIFIED BY ITS SUPPLIER AS CONFORMING TO THE ASTM C33 STANDARD IN EFFECT AT THE TIME THE SAND IS PROCESSED BY 'STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES
   f. CONCRETE FOR DROP SUPPORTS SHALL CONFORM TO THE REQUIREMENT FOR CLASS AAA CONCRETE OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S 'STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AS AVAILABLE AT:

   HTTP://WWW.NH.GOV/DOT/ORG/PROJECTDEVELOPMENT/HIGHWAYDESIGN/SPECIFICATIONS/INDEX.HTM
2. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL IN ACCORDANCE WITH ENV–WQ 704.12 (K).
3. ALL MANHOLES SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH ENV–WQ 704.17 (a) THROUGH (e).
4. SEWER MANHOLE COVERS SHALL CONFORM TO ASTM A48/48M WITH A CASTING EQUAL TO CLASS 30 IN ACCORDANCE WITH ENV–WQ 704.13 (a) (8).
5. ALL PRECAST SECTIONS SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP–PROOFING COATING IN ACCORDANCE WITH ENV–WQ 704.12 (J).
6. ALL PRECAST SECTIONS AND BASES SHALL HAVE THE DATE OF MANUFACTURE AND THE NAME OR TRADEMARK OF THE MANUFACTURER IMPRESSED OR INDELIBLY MARKED ON THE INSIDE WALL PER ENV–WQ 704.12(i).
7. BRICK MASONRY SHALL CONFORM TO ASTM C32 (ENV–WQ 704.12(a)(9))

SEWER MANHOLE

NOT TO SCALE

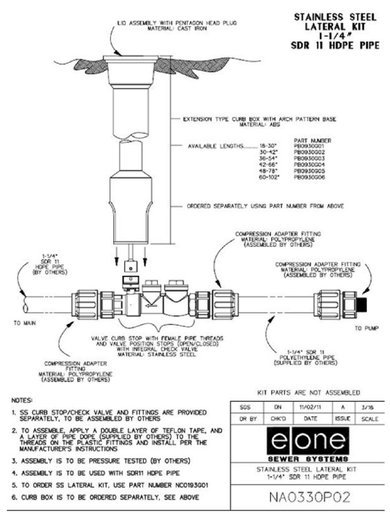


NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPECIFICATIONS.
3. W=MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12" INCHES ABOVE THE PIPE. W SHALL BE NO MORE THAN 36"
4. SAND BEDDING AND BLANKET SHALL BE CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90–100% PASSES A 1/2 INCH SIEVE AND NO MORE THAN 15% WILL PASS A #200 SIEVE.
5. PVC PIPE USED FOR FORCE MAIN SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D2241 OR ASTM D1785 STANDARDS IN EFFECT WHEN THE PIPE IS MANUFACTURED PER Env Wq 704.08(c).
6. THRUST BLOCKS ARE REQUIRED AT ALL BENDS OF 22.5° OR LARGER.

FORCE MAIN SEWER TRENCH

NOT TO SCALE



NOTES:

1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE: APPLY 1 DOUBLE LAYER OF TEFLON TAPE, AND 1 LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC093001
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

KIT PARTS ARE NOT ASSEMBLED

SGS	DN	11/02/11	A	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE

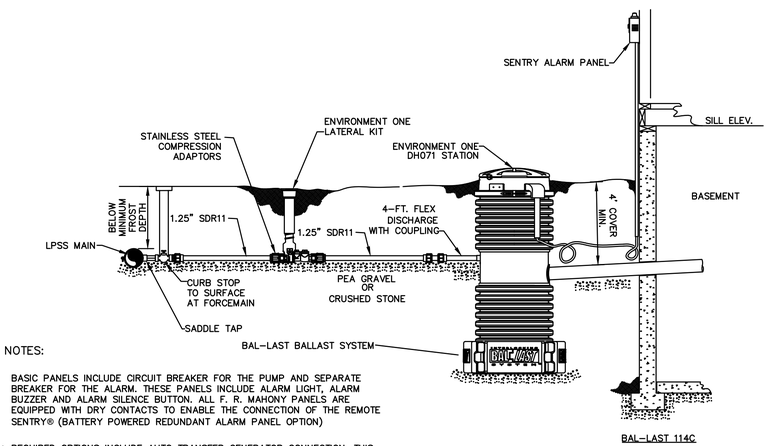
elone SEWER SYSTEMS

STAINLESS STEEL LATERAL KIT 1–1/4" SDR 11 HDPE PIPE

NA0330P02

STAINLESS STEEL LATERAL KIT

NOT TO SCALE



NOTES:

BASIC PANELS INCLUDE CIRCUIT BREAKER FOR THE PUMP AND SEPARATE BREAKER FOR THE ALARM. THESE PANELS INCLUDE ALARM LIGHT, ALARM BUZZER AND ALARM SILENCE BUTTON. ALL F. R. MAHONY PANELS ARE EQUIPPED WITH DRY CONTACTS TO ENABLE THE CONNECTION OF THE REMOTE SENTRY® (BATTERY POWERED REDUNDANT ALARM PANEL OPTION)

- REQUIRED OPTIONS INCLUDE AUTO TRANSFER GENERATOR CONNECTION. THIS PANEL PROVIDES AUTOMATIC POWER TRANSFER WITHOUT HAVING TO OPEN THE ALARM PANEL OR HAVING TO OPERATE ANY MANUAL TRANSFER SWITCHING.

TYPICAL PUMP AND BALLAST INSTALLATION

NOT TO SCALE

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.:22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE — EWEN MACKINNON No.16659 — LICENSED PROFESSIONAL ENGINEER

08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
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6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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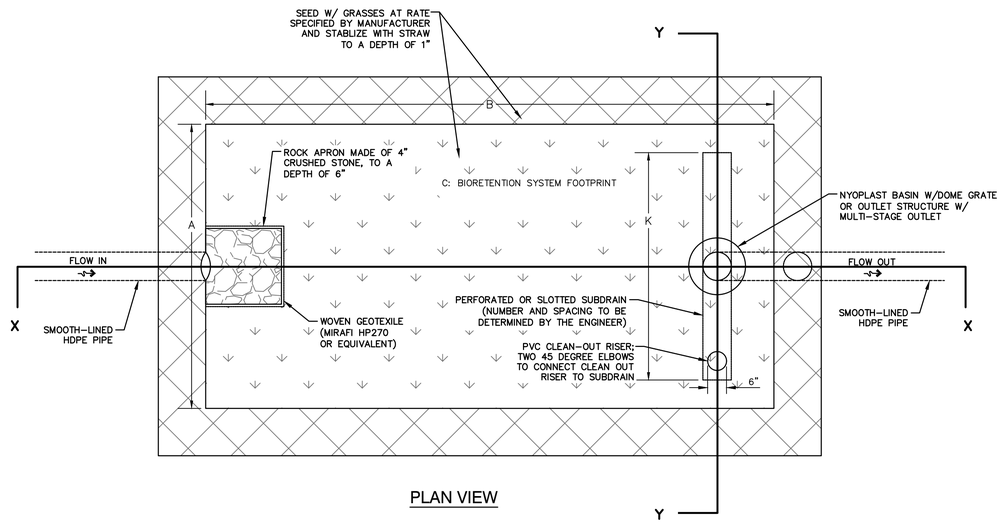
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

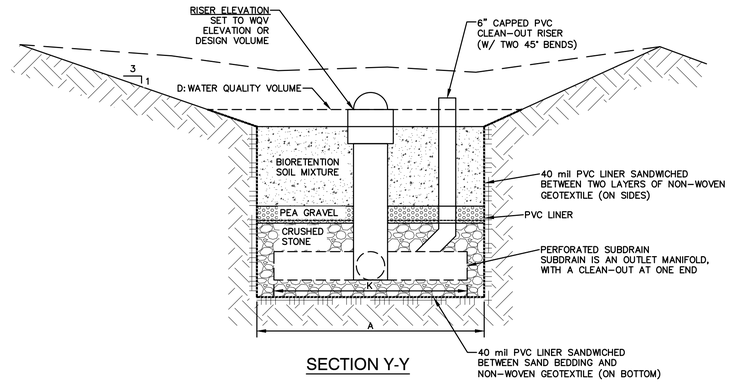
DRAWING No.

D2

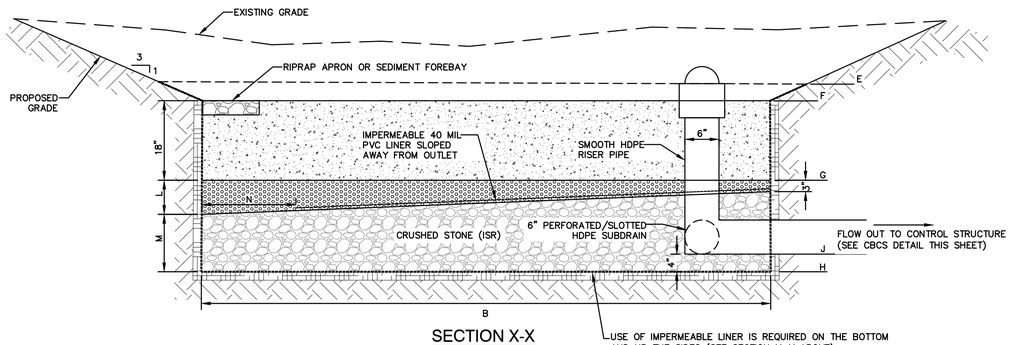
SHEET 16 OF 22
JBE PROJECT NO.22022



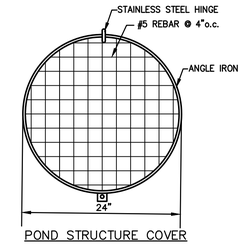
PLAN VIEW



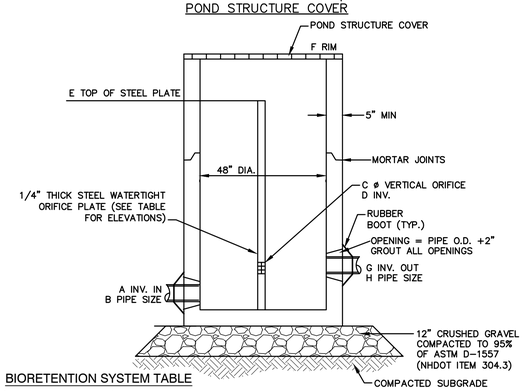
SECTION Y-Y



SECTION X-X



POND STRUCTURE COVER



GENERAL NOTES

1. FOR FULL BIORETENTION STORMWATER SYSTEM SPECIFICATIONS, PLEASE REFER TO THE UNH STORMWATER CENTER'S BIORETENTION SPECIFICATIONS PUBLICATION, DATED SEPTEMBER, 2021, FOUND AT HTTPS://WWW.UNH.EDU/UNHSC/SITES/DEFAULT/FILES/MEDIA/UNHSC_BSM_SPEC_9-2021.PDF
2. SYSTEM FOOTPRINT NEED NOT BE RECTANGULAR.
3. THESE DETAILS ARE NOT TO SCALE: FOR DIMENSIONS AND SPECIFICATIONS, REFERENCE EACH LETTER TO THE TABLE OF METRICS.
4. BIORETENTION SOIL MIX SHALL NOT BE PLACED UNTIL AFTER ENGINEERING APPROVAL AND INSPECTION OF SUBGRADE.
5. BIORETENTION SYSTEM IS RECOMMENDED TO HAVE PRETREATMENT (FOREBAY, SWALE, OR OTHER APPROVED STRUCTURE). PRETREATMENT IS REQUIRED FOR PROJECTS REQUIRING ALTERATION OF TERRAIN (AOT) PERMITTING
6. PLANT THE SYSTEM AS SPECIFIED; AT A MINIMUM, SEED THE SYSTEM FLOOR AND SIDE SLOPES WITH RYE GRASS MIXTURE CONTAINING PERENNIAL AND WINTER RYES, AT A RATE SPECIFIED BY THE MANUFACTURER. STABILIZE THE SLOPES WITH STRAW TO A DEPTH OF 1".
7. GENERAL CONSTRUCTION GUIDELINES
   - 7.1. VERIFY THAT NO FOREIGN OR DELETERIOUS MATERIAL OR LIQUID SUCH AS PAINT. PAINT WASHOUT. CONCRETE SLURRY. ASPHALT/CONCRETE LAYERS OR CHUNKS, CEMENT, PLASTER, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, SOLID WASTE, OR ACID HAS BEEN DEPOSITED IN PLANTING SOIL (BIORETENTION MEDIA OR LOAM ON SIDE SLOPES).
   - 7.2. PROCEED WITH PLACEMENT OF ANY SUBSURFACE MATERIALS ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
   - 7.3. COMPACT EACH BLENDED LIFT OF BIORETENTION SOIL MEDIA TO 75% OF MAXIMUM STANDARD PROCTOR DENSITY ACCORDING TO ASTM 0698.
   - 7.4. GRADE SOIL MEDIA TO A SMOOTH, UNIFORM SURFACE PLANE WITH LOOSE, UNIFORMLY FINE TEXTURE. ROLL AND RAKE, REMOVE RIDGES, AND FILL DEPRESSIONS TO MEET FINISH GRADES.
   - 7.5. LIGHTLY COMPACT FINISHED FLOOR ELEVATION AND FINISHED SLOPES USING THE BUCKET OF AN EXCAVATOR, NON-MOTORIZED ROLLER, HAND TAMP, OR OTHER MEANS. THEN ROUGHEN SURFACE WITH A RAKE TO LOOSEN SOILS BEFORE SEEDING.
   - 7.6. DO NOT COMPACT THE SUBGRADE AT THE BOTTOM OF EXCAVATION.
8. BIORETENTION SOIL MEDIA (BSM) MIXTURE SPECIFICATIONS.
   - 8.1. STICKS AND ROOTS SHOULD BE MINIMIZED IN THE BSM MIXTURE, AND PREFERABLY LIMITED TO NOTHING LARGER THAN 4.76 MM (0.187 IN).
   - 8.2. DEBRIS AND OTHER FOREIGN MATERIALS SHOULD BE MINIMIZED.
   - 8.3. ORGANIC MATTER SHOULD MAKE UP A MINIMUM OF 3% BY VOLUME AND A MAXIMUM 8% BY VOLUME OF THE BSM.
   - 8.4. BSM MIXTURE SHOULD HAVE A SOIL REACTION PH OF 6 TO 7.
   - 8.5. CATION EXCHANGE CAPACITY (CEC) OF BSM SHOULD BE A MINIMUM OF 10 MEQ PER 100 ML AT A PH OF 7.0.
9. IF BSM IS PURCHASED FROM A MANUFACTURER, BSM MIXTURE SHALL NOT CONTAIN THE FOLLOWING:
   - 9.1. UNACCEPTABLE MATERIALS: CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, PLASTER, BUILDING DEBRIS, ASPHALT, BRICKS, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, ACID, SOLID WASTE, OR OTHER EXTRANEOUS MATERIALS THAT ARE HARMFUL TO PLANTS.
   - 9.2. UNSUITABLE MATERIALS: STONES, ROOTS, PLANTS, SOD, CLAY LUMPS, OR POCKETS OF COARSE SAND THAT EXCEED A COMBINED MAXIMUM OF 5% BY DRY WEIGHT OF THE MANUFACTURED SOIL.
   - 9.3. LARGE MATERIALS: STONES, CLODS, ROOTS, CLAY LUMPS EXCEEDING 0.187 IN (4.76 MM) IN ANY DIMENSION.
10. ORGANIC SOIL AMENDMENTS:
    - 10.1. NO COMPOST SHOULD BE USED IN THE PLANTING MIX (USED ON THE SIDE SLOPES AND SURROUNDING AREA) UNLESS SPECIFIED BY THE ENGINEER.
    - 10.2. SPHAGNUM PEAT: PARTIALLY DECOMPOSED SPHAGNUM PEAT MOSS, FINELY DIVIDED OR OF GRANULAR TEXTURE WITH 100% PASSING THROUGH A 1/2 IN (13 MM) SIEVE, WITH A PH OF 3.4 TO 4.8.
    - 10.3. WOOD DERIVATIVES: SHREDDED WOOD, WOOD CHIPS, GROUND 81\RK, OR WOOD WASTE; OF UNIFORM TEXTURE AND FREE OF STONES, STICKS, SOIL, OR TOXIC MATERIAL.
11. THE CRUSHED STONE LAYER SHOULD CONSIST OF AASHTO #5 STONE (¾ –IN).
12. THE VOLUME OF WATER CONTAINED ABOVE THE BSM ELEVATION AND BELOW THE HIGH FLOW SPILLWAY IS STATISTICALLY DESIGNED TO HOLD A SPECIFIC RUNOFF VOLUME.
13. THE DESIGN VOLUME ABOVE THE BSM IS PREFERABLY THE WQV. THIS VOLUME MAY NOT BE ACHIEVABLE FOR RETROFIT INSTALLATIONS

INTERNAL STORAGE RESERVOIR NOTE

1. THE HYBRID BIORETENTION SYSTEM HARBORS AN ANAEROBIC INTERNAL STORAGE RESERVOIR FOR NITROGEN REMOVAL.
2. THE ISR IS SEPARATED BY AN IMPERMEABLE PVC LINER BETWEEN THE PEA GRAVEL AND CRUSHED STONE LAYERS.
3. THE PVC LINER SLOPES FROM THE OUTLET TOWARDS THE INLET TO MAXIMIZE STORAGE RETENTION AND PROVIDE EXTRA TREATMENT/FILTER TIME VIA PLUG FLOW THROUGH CRUSHED STONE.
4. DESIGN GUIDELINES FOR THE SUBSURFACE GRAVEL WETLAND SPECIFICATIONS (UNHSC, 2016) IDENTIFIED THAT THE WATER VOLUME IN THE ISR BE AT LEAST 0.26* WQV, OR 26% OF THE WQV.
5. PVC LINER THICKNESS OF 40 TO 60 MIL, PREFERABLY SEAMLESS. IF SEAMS ARE UNAVOIDABLE, THE SEAMS SHOULD BE SEALED

BIORETENTION SYSTEM (W/ INTERNAL STORAGE RESERVOIR)

NOT TO SCALE

BIORETENTION SYSTEM TABLE

	ELEVATIONS/DIMENSIONS							
	A	B	C	D	E	F	G	H
POND 1	214.41	6"	1.7"	215.25	218.00	219.00	215.25	12"
POND 2	214.41	6"	0.8"	215.25	217.50	218.50	215.25	18"

BIORETENTION SYSTEM DESIGN METRICS

ID	DESIGN PARAMETER	SYSTEM #1	SYSTEM #2
A	SYSTEM FLOOR WIDTH	67'	65'
B	SYSTEM FLOOR LENGTH	236'	55'
C	BIORETENTION FOOTPRINT AREA	13,316 SF	2,766 SF
E	OUTLET RIM ELEVATION	219.00	218.50
F	TOP BSM	217.00	217.00
G	BOTTOM BSM ELEVATION	215.50	215.50
H	BOTTOM STONE ELEVATION	214.08	214.08
J	OUTLET INVERT ELEVATION	214.41	214.41
K	MANIFOLD LENGTH	35'	40'
L	PEASTONE THICKNESS @ LINER GAP	6"	6"
M	STONE THICKNESS @ LINER GAP	11"	11"
N	OPENING IN LINER (LINE GAP)	5'	2'

ACCEPTABLE PARTICLE SIZE DISTRIBUTION OF FINAL BIORETENTION SOIL MIX

MEDIA TYPE	SIEVE #	SIZE (IN)	SIZE (MM)	% PASSING
COURSE SAND	4	0.187	4.76	100
MEDIUM SAND	10	0.079	2.00	95
FINE SAND	40	0.017	0.42	40–15
SILTS	200	0.003	0.075	10–20
CLAYS	<200	PAN	PAN	0–5

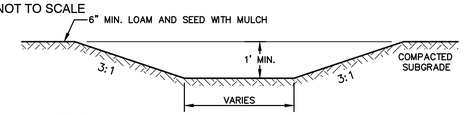
BIORETENTION SOIL MEDIA COMPONENTS

AMOUNTS MIXED BY TOTAL VOLUME
- 60–85% – SAND (0.5 TO 2.0 MM)
- 15–25% – LOAM OR TOPSOIL
- 3–8% – ORGANIC MATTER
- 0.5% – WATER TREATMENT RESIDULS OR NON FILINGS

* ALTERNATELY, USE MEDIA SPECIFIED IN THE ALTERATION OF TERRAIN RULES, Env-Wq 1508.08(k)

CATCH BASIN CONTROL STRUCTURE (CBCS)

NOT TO SCALE

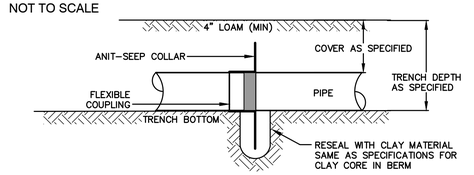


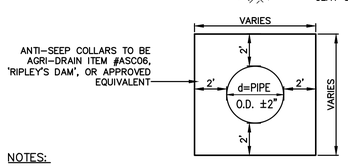
NOTE:

1. STABILIZED PRIOR TO DIRECTING RUN OFF TO SWALE
2. CONSTRUCT SWALE AT 0.005 FT/FT SLOPE (MIN.)

VEGETATED SWALE

NOT TO SCALE





NOTES:

1. CONTRACTOR SHALL INSTALL COLLAR(S) PER MANUFACTURER'S SPECIFICATIONS.
2. CONTRACTOR SHALL ENSURE A WATERTIGHT SEAL BETWEEN THE COLLAR(S) AND PIPE(S).
3. ANTI-SEEP COLLARS SHALL BE PLACED ±15' AND ±25' DOWNSTREAM OF THE CULVERT INLETS, UNLESS OTHERWISE SPECIFIED. WHEN A CLAY CORE IS SPECIFIED, A COLLAR SHALL BE INSTALLED ON BOTH SIDES OF THE CORE.

ANTI-SEEP COLLAR

NOT TO SCALE

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE – EWEN MACKINNON No.16659 – LICENSED PROFESSIONAL ENGINEER

08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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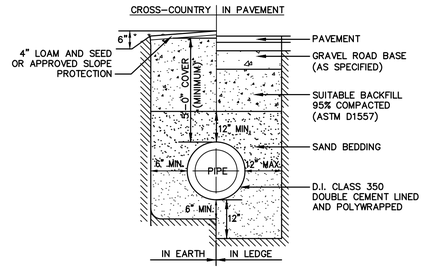
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.

D3

SHEET 17 OF 22
JBE PROJECT NO.22022



WATER SYSTEM TRENCH

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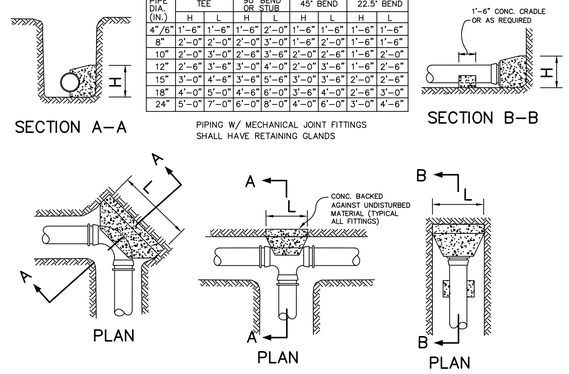
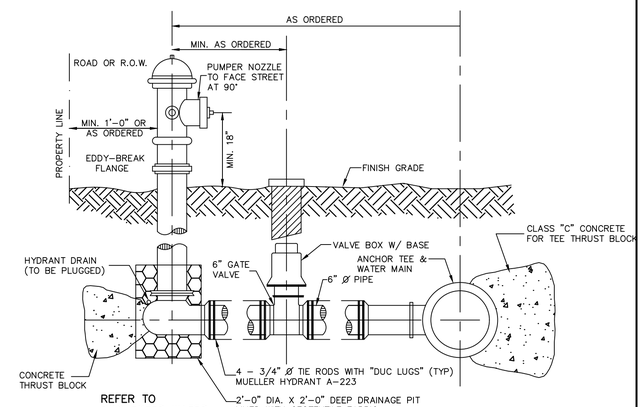


CONCRETE THRUST BLOCK DIMENSIONS								
PIPE DIA. (IN.)	TEE		90° BEND OR STUB		45° BEND		22.5° BEND	
	H	L	H	L	H	L	H	L
4"/6"	1'-6"	1'-6"	1'-6"	2'-0"	1'-6"	1'-6"	1'-6"	1'-6"
8"	2'-0"	2'-0"	2'-0"	3'-0"	1'-6"	2'-0"	1'-6"	1'-6"
10"	2'-0"	3'-0"	2'-6"	3'-6"	2'-0"	2'-6"	1'-6"	2'-0"
12"	2'-6"	3'-6"	3'-0"	4'-0"	2'-0"	3'-6"	1'-6"	2'-6"
15"	3'-0"	4'-6"	3'-6"	5'-6"	3'-0"	3'-6"	2'-0"	2'-6"
18"	4'-0"	5'-0"	4'-6"	6'-0"	3'-6"	4'-0"	2'-6"	3'-0"
24"	5'-0"	7'-0"	6'-0"	8'-0"	4'-0"	6'-0"	3'-0"	4'-6"

PIPING W/ MECHANICAL JOINT FITTINGS
SHALL HAVE RETAINING GLANDS

THRUST BLOCK DETAILS

NOT TO SCALE

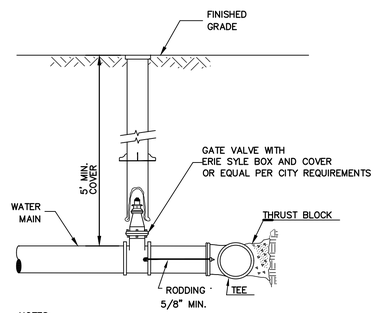


REFER TO ROCHESTER WATER DEPARTMENT SPECS.

NOTES
1. HYDRANTS SHALL BE KENNEDY K81-D.
2. HYDRANT BREAK AWAY FLANGE SHAL BE A MAXIMUM OF 6-INCHES ABOVE GRADE AND MINIMUM 2-INCHES ABOVE GRADE.
3. ALL PIPE FITTINGS TO BE D.I. PRESSURE CLASS 350, THICKNESS CLASS 52.
4. HYDRANT TO BE PAINTED RED WITH WHITE "REFLECTOR" PAINT ON BONNET.
5. MECHANICAL JOINTS SHALL HAVE MEGALUG RETAINING GLANDS AS MADE BY EBBA OR APPROVED EQUAL.
6. STEAMER NOZZLE TO BE "STORCH" TYPE.
7. NATIONAL STANDARD THREAD.

HYDRANT INSTALLATION

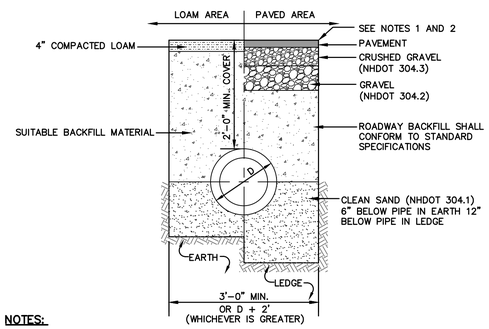
NOT TO SCALE



NOTES:
1. GATE BOXES TO BE PROVIDED WITH GATE BOX ALIGNER (POSI CAP OR APPROVED EQUAL.
2. MUD PLUGS TO BE ADDED TO EACH GATE BOX,

BURIED GATE VALVE DETAIL

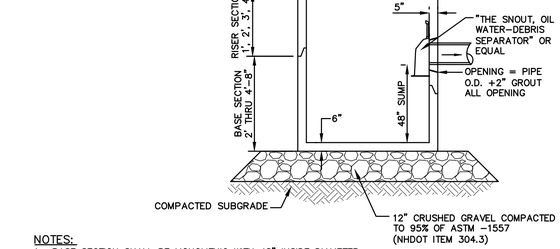
NOT TO SCALE



NOTES:
1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM WITH PROJECT AND CITY SPECIFICATIONS.
3. ALL MATERIALS ARE TO BE COMPACTED TO 95% OF ASTM D-1557.

DRAINAGE TRENCH

NOT TO SCALE



NOTES:
1. BASE SECTION SHALL BE MONOLITHIC WITH 48" INSIDE DIAMETER.
2. ALL SECTIONS SHALL BE DESIGNED FOR H20 LOADING.
3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
4. FRAMES AND GRATES SHALL BE HEAVY DUTY AND DESIGNED FOR H20 LOADING
5. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT.
6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
7. ALL CATCH BASIN FRAMES AND GRATES SHALL BE NHDOT CATCH BASIN TYPE ALTERNATE 1 OR NEENAH R-3570 OR APPROVED EQUAL (24"x24" TYPICAL).
8. STANDARD CATCH BASIN FRAME AND GRATE(S) SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM, BUT NO MORE THAN 12"), OR PRECAST CONCRETE 'DONUTS'.
9. ALL CATCH BASINS ARE TO BE FITTED WITH GREASE HOODS.

CATCH BASIN WITH GREASE HOOD

NOT TO SCALE

Design: LAZ	Draft: LAZ
Checked: ISM	Scale: AS NOTED
Drawing Name: 22022-PLAN.dwg	

Date: 6/21/22
Project No.: 22022

STATE OF NEW HAMPSHIRE
EWEN I. MACKINNON No.16659 LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

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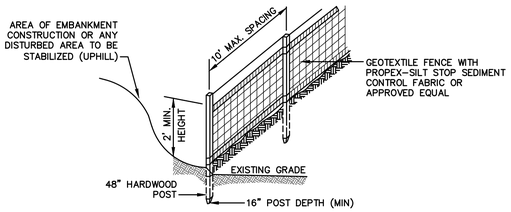
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

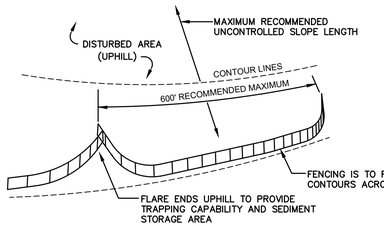
Plan Name:	DETAIL SHEET
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
D4
SHEET 18 OF 22
JBE PROJECT NO.22022



CONSTRUCTION SPECIFICATIONS:

1. WOVEN FABRIC FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. FILTER CLOTH SHALL BE FASTENED TO WOVEN WIRE EVERY 24" AT TOP, MID AND BOTTOM AND EMBEDDED IN THE GROUND A MINIMUM OF 8" AND THEN COVERED WITH SOIL.
2. THE FENCE POSTS SHALL BE A MINIMUM OF 48" LONG, SPACED A MAXIMUM 10' APART, AND DRIVEN A MINIMUM OF 16" INTO THE GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THE ENDS OF THE FABRIC SHALL BE OVERLAPPED 6", FOLDED AND STAPLED TO PREVENT SEDIMENT FROM BY-PASSING.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SEDIMENT REMOVED AND PROPERLY DISPOSED OF WHEN IT IS 6" DEEP OR VISIBLE 'BULGES' DEVELOP IN THE SILT FENCE.
5. PLACE THE ENDS OF THE SILT FENCE UP CONTOUR TO PROVIDE FOR SEDIMENT STORAGE.
6. SILT FENCE SHALL REMAIN IN PLACE FOR 24 MONTHS.



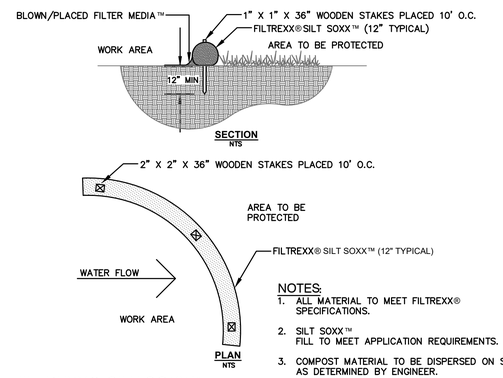
7. SILT FENCES SHALL BE REMOVED WHEN NO LONGER NEEDED AND THE SEDIMENT COLLECTED SHALL BE DISPOSED AS DIRECTED BY THE ENGINEER. THE AREA DISTURBED BY THE REMOVAL SHALL BE SMOOTHED AND REVEGETATED.

MAINTENANCE:

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE DONE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED, OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED, SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

SILT FENCE

NOT TO SCALE



NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

FILTREXX® SILT SOXX™

NOT TO SCALE

TEMPORARY EROSION CONTROL NOTES

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME. AT NO TIME SHALL AN AREA IN EXCESS OF 5 ACRES BE EXPOSED AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS (INCLUDING POND AREAS BELOW THE PROPOSED WATERLINE) SHALL BE RETURNED TO PROPOSED GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 6" OF SCREENED ORGANIC LOAM AND SEEDED WITH SEED MIXTURE 'C' AT A RATE NOT LESS THAN 1.10 POUNDS OF SEED PER 1,000 S.F. OF AREA (48 LBS. / ACRE).
4. SILT FENCES AND OTHER BARRIERS SHALL BE INSPECTED EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.5" OR GREATER. ALL DAMAGED AREAS SHALL BE REPAIRED, AND SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED OR OTHERWISE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 14 DAYS OF THE INITIAL DISTURBANCE OF SOIL. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
7. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING NORTH AMERICAN GREEN S75 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER) ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
8. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
9. AFTER OCTOBER 15th, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
10. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    a. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
    b. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    c. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH STONE OR RIPRAP HAS BEEN INSTALLED; OR
    d. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
11. FUGITIVE DUST CONTROL IS REQUIRED TO BE CONTROLLED IN ACCORDANCE WITH ENV-A 1000, AND THE PROJECT IS TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.
12. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR'S NAME, ADDRESS, AND PHONE NUMBER SHALL BE SUBMITTED TO DES VIA EMAIL (SEE BELOW).
13. PRIOR TO CONSTRUCTION, A PHASING PLAN THAT DELINEATES EACH PHASE OF THE PROJECT SHALL BE SUBMITTED. ALL TEMPORARY SEDIMENT BASINS THAT WILL BE NEEDED FOR DEWATERING WORK AREAS SHALL BE LOCATED AND IDENTIFIED ON THIS PLAN.
14. NO LOT DEVELOPMENT SHALL BEGIN UNTIL ROADWAY IS CONSTRUCTED AND STABILIZED.

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
   A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
   B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDBED PREPARATION
   A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
   B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
   A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPES AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
      AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
      NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
      PHOSPHATE(P205), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
      POTASH(K20), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
      (NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10.)
   B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.
   C. REFER TO THE 'SEEDING GUIDE' AND 'SEEDING RATES' TABLES ON THIS SHEET FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEDING. ALL LEGUMES (CROWNVETCH, BIRDSFOOT, TREFOIL AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
   D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. MULCH
   A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
   B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
   A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
   B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
   C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/

GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE BELOW.
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND athletic FIELDS.

NOTE: TEMPORARY SEED MIX FOR STABILIZATION OF TURF SHALL BE WINTER RYE OR OATS AT A RATE OF 2.5 LBS. PER 1000 S.F. AND SHALL BE PLACED PRIOR TO OCTOBER 15th, IF PERMANENT SEEDING NOT YET COMPLETE.

SEEDING GUIDE

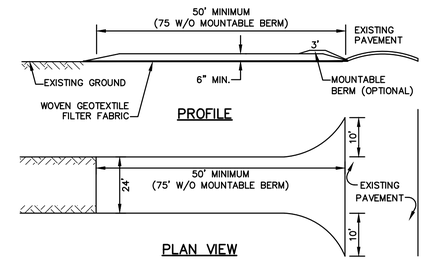
MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
RED TOP	2	0.05
TOTAL	42	0.95
B. TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
CROWN VETCH	15	0.35
OR		
FLAT PEA	30	0.75
TOTAL	40 OR 55	0.95 OR 1.35
* C. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDS FOOT TREFOIL	8	0.20
TOTAL	48	1.10
D. TALL FESCUE	20	0.45
FLAT PEA	30	0.75
TOTAL	50	1.20
E. CREEPING RED FESCUE 1/	50	1.15
KENTUCKY BLUEGRASS 1/	50	1.15
TOTAL	100	2.30
F. TALL FESCUE 1	150	3.60

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

SEEDING RATES

CONSTRUCTION SEQUENCE

1. PRIOR TO THE START OF ANY ACTIVITY, IT IS THE RESPONSIBILITY OF THE SITE'S SITE DEVELOPER (OR OWNER) TO FILE A NOTICE OF INTENT (NOI) FORM WITH THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ORDER TO GAIN COVERAGE UNDER THE NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. A PRE CONSTRUCTION MEETING IS TO BE HELD WITH ALL DEPARTMENT HEADS PRIOR TO THE START OF CONSTRUCTION.
2. WETLAND BOUNDARIES ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION. AT LEAST A TEMPORARY CULVERT OR ROADBED TO BE IN PLACE PRIOR TO THE START OF CONSTRUCTION.
3. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
4. INSTALL SILT FENCING, HAY BALES AND CONSTRUCTION ENTRANCES PRIOR TO THE START OF CONSTRUCTION. THESE ARE TO BE MAINTAINED UNTIL THE FINAL PAVEMENT SURFACING AND LANDSCAPING AREAS ARE ESTABLISHED.
5. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
6. CONSTRUCT AND/OR INSTALL TEMPORARY OR PERMANENT SEDIMENT AND/OR DETENTION BASIN(S) AS REQUIRED. THESE FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUN-OFF TO THEM.
7. STRIP LOAM AND PAVEMENT, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
8. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS, INCLUDING THE CONSTRUCTION OF ANY RETAINING WALLS AND SOUND WALLS.
9. PREPARE BUILDING PAD(S) TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
10. INSTALL THE SEWER AND DRAINAGE SYSTEMS FIRST, THEN ANY OTHER UTILITIES IN ACCORDANCE WITH THE PLAN AND DETAILS. ANY CONFLICTS BETWEEN UTILITIES ARE TO BE RESOLVED WITH THE INVOLVEMENT AND APPROVAL OF THE ENGINEER.
11. INSTALL INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED IN ACCORDANCE WITH DETAILS.
12. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
13. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE DITCHES, CHECK DAMS, SEDIMENT TRAPS, ETC., TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING WATERS AND/OR PROPERTY.
14. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
15. PAVE ALL PARKING LOTS AND ROADWAYS WITH INITIAL 'BASE COURSE'.
16. PERFORM ALL REMAINING SITE CONSTRUCTION (i.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
17. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (i.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
18. FINISH PAVING ALL ROADWAYS AND PARKING AREAS WITH 'FINISH' COURSE.
19. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
20. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
21. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
22. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE BEEN 75%-85% ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
23. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
24. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
25. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL.
26. UPON COMPLETION OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ANY RELEVANT PERMITTING AGENCIES THAT THE CONSTRUCTION HAS BEEN FINISHED IN A SATISFACTORY MANNER.



NOTES:

1. STONE FOR STABILIZED CONSTRUCTION ENTRANCE SHALL BE 3 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, 75' WITHOUT A MOUNTABLE BERM, AND EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS, OR 10 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER FABRIC IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A STONE BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

Design: LAZ	Draft: LAZ
Checked: ISM	Scale: AS NOTED
Drawing Name: 22022-PLAN.dwg	Date: 6/21/22
	Project No.: 22022

STATE OF NEW HAMPSHIRE — EWEN I. MACKINNON No. 16659 — LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EROSION AND SEDIMENT CONTROL DETAILS
Project: RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record: EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
E1
SHEET 19 OF 22
JBE PROJECT NO. 22022

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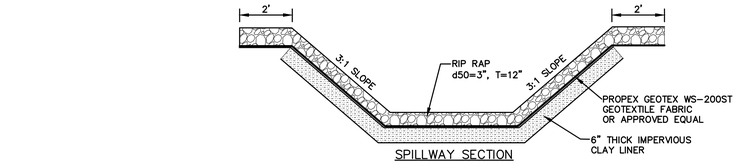
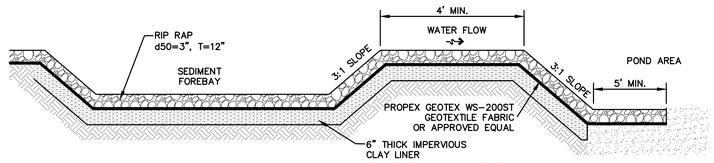


SPILLWAY SECTION



SPILLWAY PROFILE

NOTES:

1. A 6" THICK IMPERVIOUS CLAY LINER IS TO BE PLACED UNDER ENTIRE SEDIMENT FOREBAY AND SPILLWAY AND ONLY AROUND THE SIDES OF THE ENTIRE BIORETENTION AREA.
2. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURE WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
3. EMBANKMENT MATERIAL SHALL BE CLEAN MINERAL SOIL FREE OF ROOTS, ORGANIC MATTER, AND OTHER DELETERIOUS SUBSTANCES. IT SHALL CONTAIN NO ROCKS OR LUMPS OVER FOUR INCHES (4") IN DIAMETER. THIS MATERIAL SHALL BE INSTALLED IN 6" LIFTS COMPACTED TO 92% OF ASTM D-1557, AND SHALL MEET THE FOLLOWING SPECIFICATIONS: 6" PASSING 100%, #4 SIEVE 40-90%, #40 SIEVE 50-80%, #100 SIEVE 25-40%, #200 SIEVE 15-30% (OF THE TOTAL SAMPLE).
4. 6" THICK IMPERVIOUS CLAY LINER MATERIAL SHALL BE CLEAN SILTY-CLAY BORROW FREE OF ROOTS, ORGANIC MATTER, AND OTHER DELETERIOUS SUBSTANCES, AND SHALL CONTAIN NO ROCKS OR LUMPS OVER THREE INCHES (3") IN DIAMETER. THIS MATERIAL SHALL BE INSTALLED IN 6" LIFTS COMPACTED TO 92% OF ASTM D-1557, AND SHALL MEET THE FOLLOWING SPECIFICATIONS: 6" PASSING 100%, #4 SIEVE 95-100%, #40 SIEVE 60-90%, #100 SIEVE 40-60%, #200 SIEVE 25-45% (OF THE FRACTION PASSING THE #4 SIEVE). THE CLAY COMPONENT SHALL HAVE A PLASTICITY INDEX OF AT LEAST 8 AND A HYDRAULIC CONDUCTIVITY OF 10 TO THE -6 CM/SEC.
5. COMPACTION AND MATERIALS TESTING SERVICES SHALL BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.

SEDIMENT FOREBAY SPILLWAY

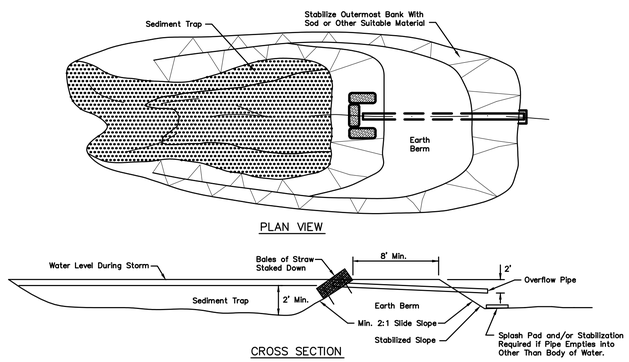
NOT TO SCALE

NOTES:

1. TEMPORARY CULVERT INLET PROTECTION CHECK DAMS SHALL BE CONSTRUCTED OF 2-3" STONE OVER WOVEN GEOTEXTILE FABRIC.
2. INLET PROTECTION MEASURES SHALL BE INSTALLED AT THE OPENINGS OF ALL EXISTING AND PROPOSED CULVERTS LOCATED BELOW (DOWNSTREAM) FROM AND WITHIN 100' OF THE PROJECT SITE.
3. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURE WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
4. STRUCTURES SHALL BE REMOVED WHEN THE SITE IS STABILIZED WITH VEGETATION AND THE CHANNEL SHALL BE SMOOTHED AND REVEGETATED.

TEMPORARY CULVERT INLET PROTECTION CHECK DAM

NOT TO SCALE



PLAN VIEW

CROSS SECTION

TEMPORARY SEDIMENT BASIN

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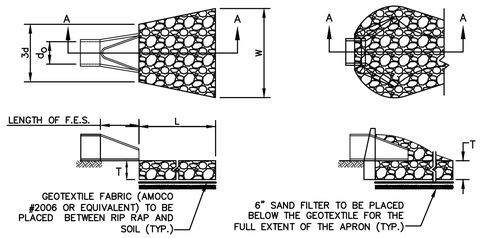

SECTION A-A
PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL

SECTION A-A
PIPE OUTLET TO WELL-DEFINED CHANNEL

TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES		
THICKNESS OF RIP RAP = 1.0 FEET		
d50 SIZE= 0.25	FEET	3 INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	5	6
85%	4	5
50%	3	5
15%	1	2

NOTES:

1. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. OUTLETS TO A DEFINED CHANNEL SHALL HAVE 2:1 OR FLATTER SIDE SLOPES AND SHOULD BEGIN AT THE TOP OF THE CULVERT AND TAPER DOWN TO THE CHANNEL BOTTOM THROUGH THE LENGTH OF THE APRON.
6. MAINTENANCE: THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIP RAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO OUTLET PROTECTION.

RIP RAP OUTLET PROTECTION APRON

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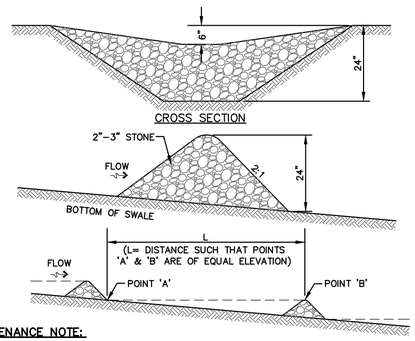

MAINTENANCE NOTE:

1. STONE CHECK DAMS SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY. PARTICULAR ATTENTION SHOULD BE GIVEN TO END RUN AND EROSION AT THE DOWNSTREAM TOE OF THE STRUCTURE. WHEN THE STRUCTURES ARE REMOVED, THE DISTURBED PORTION SHOULD BE BROUGHT TO THE EXISTING CHANNEL GRADE AND THE AREAS PREPARED, SEEDED AND MULCHED. WHILE THIS PRACTICE IS NOT INTENDED TO BE USED PRIMARILY FOR SEDIMENT TRAPPING, SOME SEDIMENT WILL ACCUMULATE BEHIND THE STRUCTURES. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE.

STONE CHECK DAM

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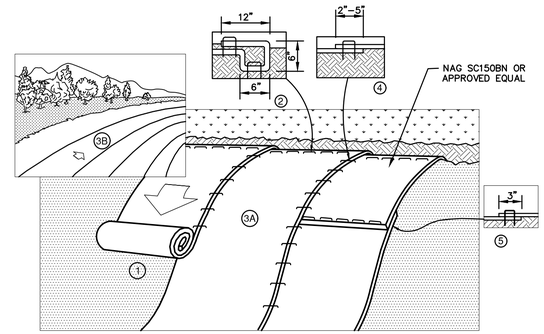

NOTES:

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" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" 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" 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" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH. NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.
6. THERE SHALL BE NO PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN 1/8 INCHES MATERIAL UTILIZED. (NOT APPLICABLE TO TURF REINFORCEMENT MATS).
7. TURF REINFORCEMENT MATS SHALL BE COVERED WITH SOIL TO PREVENT EXPOSURE OF THE MATS TO THE SURFACE.

NORTH AMERICAN GREEN
14649 HIGHWAY 41 NORTH
EVANSVILLE, INDIANA 47725
1-800-772-2040

EROSION CONTROL BLANKET SLOPE INSTALLATION
NORTH AMERICAN GREEN (800) 772-2040

NOT TO SCALE

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE · EWEN MACKINNON No.16659 · LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
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Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
E2
SHEET 20 OF 22
JBE PROJECT NO.22022

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT/OWNER
EWST, LLC
P.O. BOX 190
EXETER, NH 03833
BK 5054/PG 712

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
EWEN I. MACKINNON No. 16659
LICENSED PROFESSIONAL LAND SURVEYOR
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
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Stratham, NH 03885
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E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EROSION & SEDIMENT CONTROL PLAN
Project: RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record: EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
ESC1
SHEET 21 OF 22
JBE PROJECT NO. 22022

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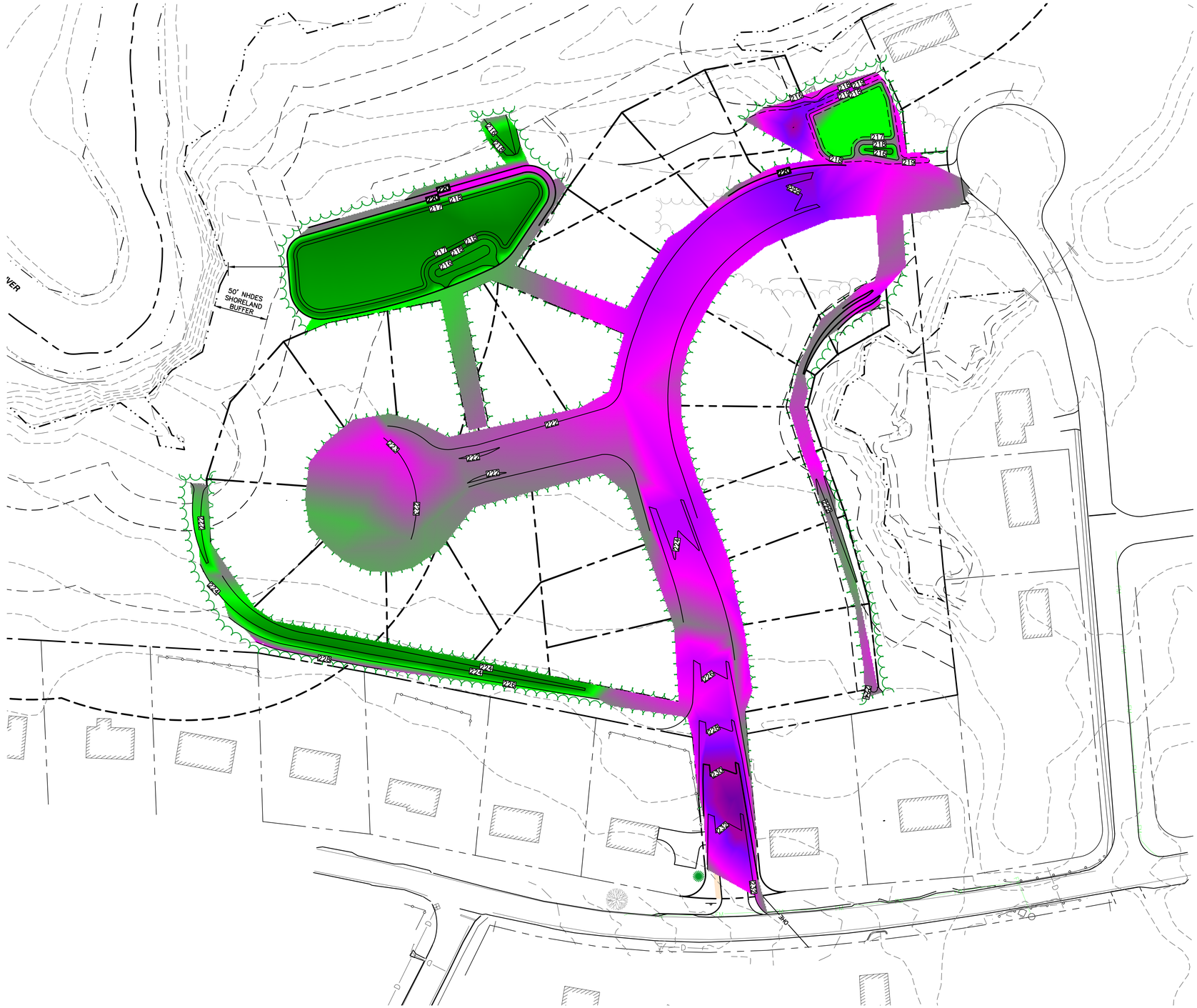


GRAPHICAL KEY

14.0000
8.0000
0.0
−7.0000
−14.0000

VOLUMES:

TOTAL CUT VOLUME = 3,330 CY
TOTAL FILL VOLUME = 4,558 CY

IMPORT 1,227 CY

GRAPHIC SCALE

50 0 25 50 100

(IN FEET)
1 inch = 50 feet

PROJECT PARCEL
CITY OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT/OWNER
EWST, LLC
P.O. BOX 190
EXETER, NH 03833
BK 5054/PG 712

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

STATE OF NEW HAMPSHIRE
EWEN I. MACKINNON No. 16659
LICENSED PROFESSIONAL ENGINEER
08/02/2023

REV.	DATE	REVISION	BY
9	8/2/23	REVISIONS PER HEC-RAS RESULTS, GRADING & DRAINAGE EDITS	LAZ
8	7/11/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
7	6/6/23	REVISIONS PER NHDES SEWER COMMENTS	LAZ
6	4/14/23	REMOVED INDIVIDUAL LOT CONSTRUCTION	LAZ
5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	CUT-FILL PLAN
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.
CF
SHEET 22 OF 22
JBE PROJECT NO. 22022

JONES&BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

DRAINAGE ANALYSIS

SEDIMENT AND EROSION CONTROL PLAN

Prepared for:

Residential Subdivision
Tax Map 104, Lot 10
Autumn Street
Rochester, NH 03868

August 16, 2022
Revised October 18, 2022
Revised April 17, 2023
Revised July 26, 2023
JBE Project No. 22022

1. EXECUTIVE SUMMARY

Tuck Realty Corporation proposes to construct a 23-lot conservation subdivision on a ±14.1-acre parcel of land located on the north side of Autumn Street in Rochester, NH. A drainage analysis of the entire site and its offsite contributing watershed areas was conducted for the purpose of estimating the peak rate of stormwater runoff and to subsequently design adequate drainage structures. Two models were compiled, one for the area in its existing (pre-construction) condition, and a second for its proposed (post-construction) condition. A summary of the existing and proposed conditions peak rates of runoff is as follows:

COMPONENT	PEAK DISCHARGE COMPARISON (CFS)									
	2 Year		10 Year		25 Year		50 Year		100 Year*	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	1.80	1.33	8.38	5.09	15.45	12.53	22.95	18.81	32.68	24.79
Analysis Point #2	0.74	0.73	3.93	3.54	7.25	6.41	10.71	9.37	15.23	13.23

*The 100 Year peak discharge is only for reference purposes with the HEC-RAS model. Calculations are not included within the report.

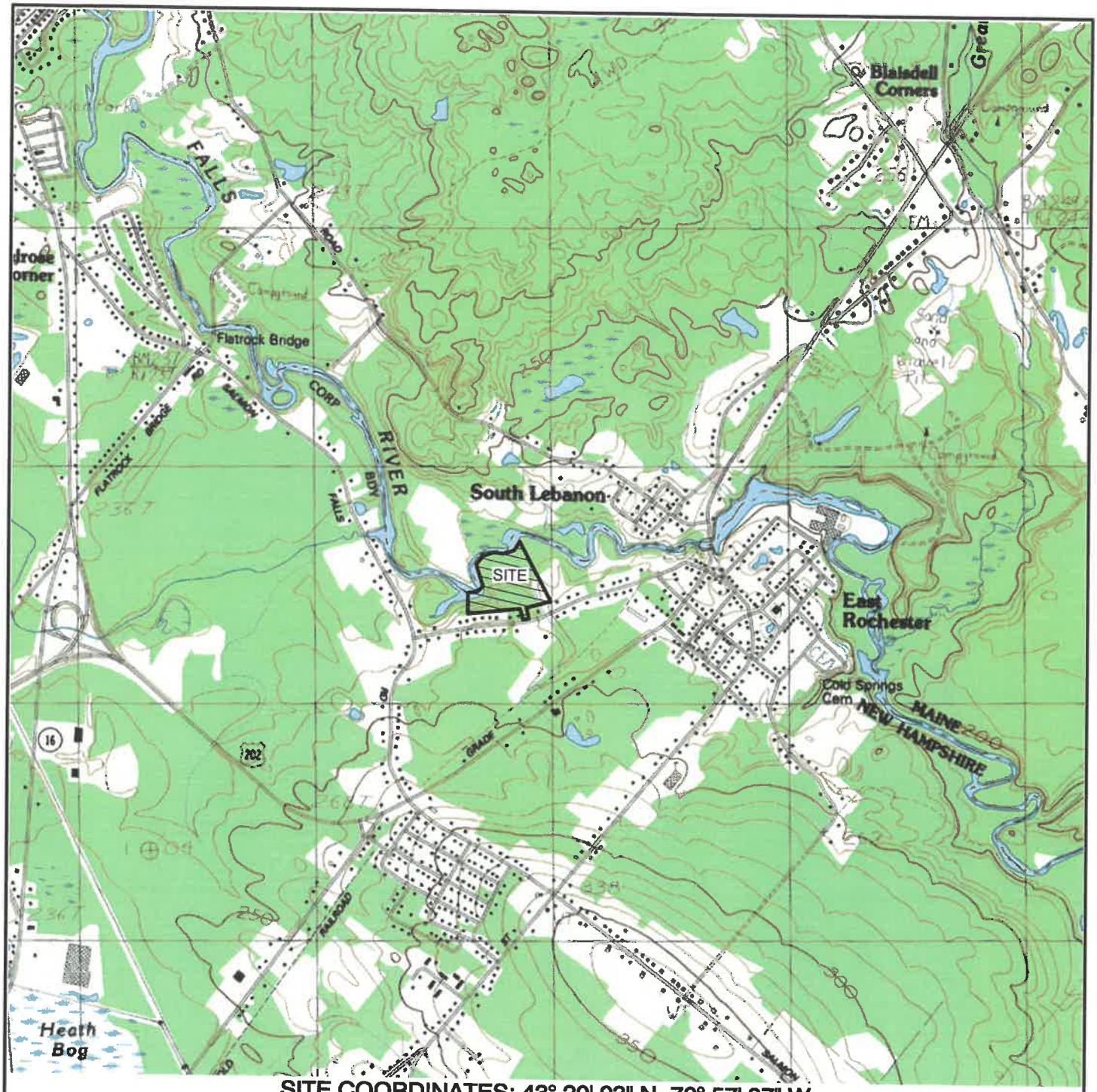
The drainage design intent for this site is to maintain the post-development peak flow to the pre-development peak flow conditions to the extent practicable and to effectively treat stormwater from the development of this site. This has been accomplished through the use of enhanced biofiltration w/ISR to maintain the peak discharge and effectively treat stormwater exiting the site.

The runoff volume for each design storm of for each analysis points is listed below:

AP	Runoff Volume (AF)											
	2 Year			10 Year			25 Year			50 Year		
	Existing	Proposed	Change	Existing	Proposed	Change	Existing	Proposed	Change	Existing	Proposed	Change
AP #1	0.283	0.644	0.361	0.906	1.561	0.655	1.547	2.425	0.878	2.223	3.299	1.076
AP #2	0.105	0.111	0.006	0.336	0.329	-0.007	0.574	0.547	-0.027	0.824	0.774	-0.050
Total	0.388	0.755	0.367 94.6%	1.242	1.890	0.648 52.2%	2.121	2.972	0.851 40.1%	3.047	4.073	1.026 33.7%

The project will be discharging to the Salmon Falls River, which is a fourth order or greater river in this area.

TABLE OF CONTENTS



SITE COORDINATES: 43° 20' 03" N, 70° 57' 07" W

GRAPHIC SCALE

2000 0 1000 2000 4000 8000

(IN FEET)

1 inch = 2000ft.

Designed and Produced in NH
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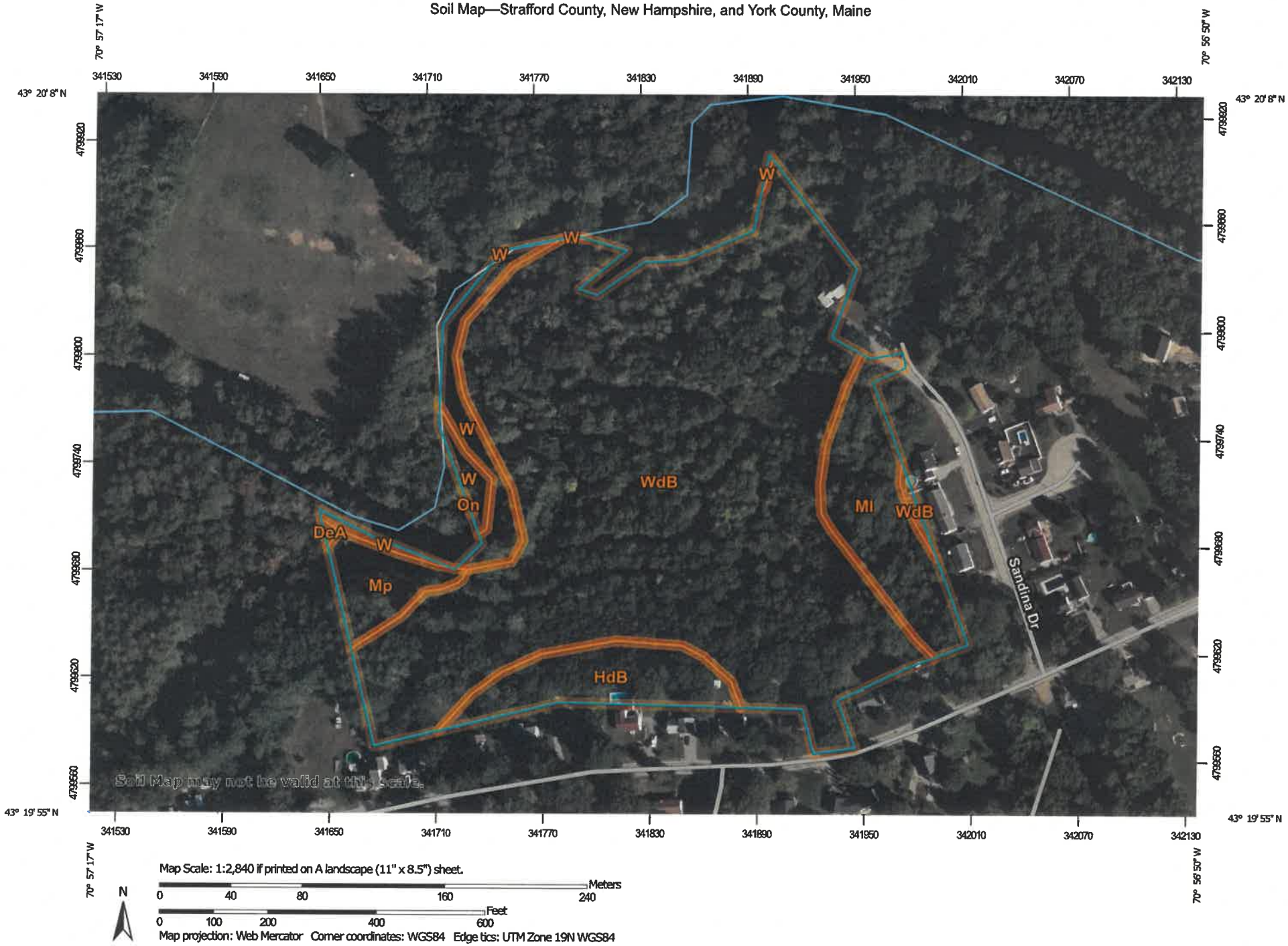
E-Mail: JBE@jonesandbeach.com

Drawing Name:	USGS
Project:	RESIDENTIAL SUBDIVISION
Owner of Record:	DANA S. COPP 1985 TRUST (& OTHERS) PO BOX 1767, ROCHESTER, NH 03866

DRAWING No.
USGS1
SHEET 1 OF 1
JBE PROJECT No. 22022

Soil Map—Strafford County, New Hampshire, and York County, Maine



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 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 22, Aug 31, 2021

Soil Survey Area: York County, Maine
Survey Area Data: Version 20, Aug 31, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Sep 19, 2021—Nov 1, 2021

MAP LEGEND

MAP INFORMATION

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
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	0.0	0.1%
HdB	Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes	1.1	6.2%
MI	Mixed alluvial land, wet	1.5	8.5%
Mp	Freetown and Swansea mucky peats, 0 to 2 percent slopes	0.6	3.4%
W	Water	0.7	4.1%
WdB	Windsor loamy sand, 3 to 8 percent slopes	13.6	76.7%
Subtotals for Soil Survey Area		**17.6**	**99.0%**
Totals for Area of Interest		**17.8**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
On	Ondawa fine sandy loam, 0 to 3 percent slopes, occasionally flooded	0.0	0.0%
W	Water bodies	0.2	1.0%
Subtotals for Soil Survey Area		**0.2**	**1.0%**
Totals for Area of Interest		**17.8**	**100.0%**

4. DRAINAGE ANALYSIS

4.1 METHODOLOGY

This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as a proposed condition, or post-construction analysis, of the same location. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. The curve numbers were developed using the SCS TR-55 Runoff Curve numbers for Urban Areas. A Type III SCS 24-hour rainfall distribution was utilized in analyzing the data for the 2 Year – 24 Hour (3.10”), 10 Year – 24 Hour (4.64”), 25 Year – 24 Hour (5.85"), and 50 Year – 24 Hour (6.97").

4.2 EXISTING CONDITIONS ANALYSIS

The study area consists of the subject property and upstream contributing area. The study area contains 16.137 acres including offsite contributing areas. The existing site is currently undeveloped and is significantly forested. The existing site contains a high point located in the center of Autumn Street to the south of the property. The site drains northerly to the Salmon Falls River on the northern edge of the property resulting in the Analysis Points as defined below.

The majority of the soils for this site are described as Hydrological Soils Group (HSG) "B". A section of soils adjacent to Autumn Road described as HSG "D". A small stream traverses the property to the east which is classified as Mixed Alluvial Land – wet, which does not have an HSG. HSG “D” has been used as this soil is classified as “wet”.

Two (2) Analysis Point (AP) has been defined for this project.

Analysis Point #1 is defined as the bank of the Salmon Falls River on the north end of the property. Stormwater runs from Autumn Road across existing house lots and the flows over the property the Salmon Falls River

Analysis Point #2 is defined as the inlet to a 48” culvert near the end of Sandina Drive which runs under the roadway and eventually deposits to the Salmon Falls River. This watershed generally drains from the Autumn Road north to the Analysis Point.

4.3 PROPOSED CONDITIONS ANALYSIS

The proposed site includes the construction of 23 single family house lots. This project will increase the impervious area from an existing 1.153 Acres to a proposed 2.466 Acres, an increase of 1.313 Acres.

Drainage from the house lots and roadways is directed to closed drainage systems located within the proposed roadways. These systems ultimately drain to two (2) proposed bioretention areas for peak attenuation and treatment. The bioretention areas are placed between the house lots and the Salmon Falls River to the northeast to be able to capture the water flowing from the development.

Erosion and Stabilization

In an effort to reduce sedimentation and erosion, the outlets of all culverts will be protected from erosion by the use of riprap protection aprons. Overall, the structures outlined in this proposal provide for adequate treatment of stormwater runoff for sediment and associated pollutants.
Temporary stabilization measure should be in place within 5 calendar days for exposed soil areas that are within 100-feet of a surface water body or a wetland.

Pollutant Removal

The following calculations relate to the post-construction area treatment. These calculations have been derived from the New Hampshire MS4 General Permit, Appendix F, Attachment 3.

For a phosphorous load reduction of 50%, the BMP capacity for an enhanced biofiltration w/ISR will need to be 0.37" (Table 3-19 and Figure 3-14).

For Biofiltration w/ISR #1-
There are 4.058 Acres of pervious area with a hydrologic soil group (HSG) 'B' and 1.612 Acres of impervious area. The runoff depth for the pervious area = 0.00" for HSG 'B' (Table 3-4).

4.058 Ac x 0.00" x 3,630 ft^3/acre-in = 0.0 ft^3 (Equation 3-5)
0.0 ft^3 + ((0.37" x 1.612 Ac) x 3,630 ft^3/acre-in) = 2,165 ft^3
2,165 ft^3 < 5,465 ft^3 (permanent pool volume) OK

For Biofiltration w/ISR #2-
There are 1.279 Acres of pervious area with a HSG 'B', and 0.242 Acres of impervious area. The runoff depth for the pervious area = 0.00" for HSG 'B' (Table 3-4).

1.279 Ac x 0.00" x 3,630 ft^3/acre-in = 0.0 ft^3 (Equation 3-5)
0.0 ft^3 + ((0.37" x 0.242 Ac) x 3,630 ft^3/acre-in) = 325 ft^3
325 ft^3 < 1,306 ft^3 (permanent pool volume) OK

For a nitrogen load reduction of 50%, the BMP capacity for an enhanced biofiltration w/ISR will need to be 0.29" (Table 3-19 and Figure 3-14).

For Biofiltration w/ISR #1-
There are 4.058 Acres of pervious area with a hydrologic soil group (HSG) 'B' and 1.612 Acres of impervious area. The runoff depth for the pervious area = 0.00" for HSG 'B' (Table 3-4).

4.058 Ac x 0.00" x 3,630 ft^3/acre-in = 0.0 ft^3 (Equation 3-5)
0.0 ft^3 + ((0.29" x 1.612 Ac) x 3,630 ft^3/acre-in) = 1,697 ft^3
1,697 ft^3 < 5,465 ft^3 (permanent pool volume) OK

For Biofiltration w/ISR #2-
There are 1.279 Acres of pervious area with a HSG 'B', and 0.242 Acres of impervious area. The runoff depth for the pervious area = 0.00" for HSG 'B' (Table 3-4).

1.279 Ac x 0.00" x 3,630 ft^3/acre-in = 0.0 ft^3 (Equation 3-5)
0.0 ft^3 + ((0.29" x 0.242 Ac) x 3,630 ft^3/acre-in) = 255 ft^3
255 ft^3 < 1,306 ft^3 (permanent pool volume) OK

Pipe sizing information is described below for the 25-Year design storm:

Structure	CFS	Size	Slope	Velocity
Pond 1	4.25	12”	0.005ft/ft	0.7 fps
Pond 2	1.74	18”	0.025 ft/ft	1.5 fps
CB 1	0.57	12”	0.020 ft/ft	1.7 fps
CB 2	0.74	12”	0.040 ft/ft	1.9 fps
CB 3	0.32	15”	0.015 ft/ft	1.1 fps
CB 4	2.01	15”	0.010 ft/ft	1.5 fps
CB 5	1.59	15”	0.005 ft/ft	1.3 fps
CB 6	5.40	24”	0.005 ft/ft	1.4 fps
CB 7	6.74	24”	0.005 ft/ft	1.5 fps
CB 8	8.23	24”	0.005 ft/ft	1.6 fps
CB 9	1.37	15”	0.005 ft/ft	1.0 fps
CB 10	2.23	15”	0.005 ft/ft	1.1 fps
CB 11	2.73	15”	0.005 ft/ft	1.7 fps
CB 12	5.52	15”	0.005 ft/ft	1.9 fps
DMH 1	3.60	15”	0.010 ft/ft	1.7 fps
DMH 2	5.39	24”	0.005 ft/ft	1.4 fps

Swale information is described below for the 25-Year design storm:

Swale	CFS	Velocity
Swale 1	4.34	0.6 fps
Swale 2	0.49	0.4 fps

Erosion and Stabilization

To reduce sedimentation and erosion, the outlets of all culverts will be protected from erosion by the use of riprap protection aprons. Overall, the structures outlined in this proposal provide for adequate treatment of stormwater runoff for sediment and associated pollutants.

Temporary stabilization measure should be in place within 5 calendar days for exposed soil areas that are within 100-feet of a surface water body or a wetland.

Pollutant Removal

Bioretention Systems are listed in AoT Stormwater Regulations as having pollutant removal efficiencies of 90% TSS, 65% Phosphorous and 65% Nitrogen. Combined with deep sump hooded catch basins and a sediment forebay in the Treatment Train, the combined pollutant removal for the Bioretention with Internal Storage Reservoir System is 93% TSS. The calculations for the removal rates of Phosphorous and Nitrogen can be found above.

Snow removal will be maintained using Green Sno-pro techniques to limit chloride levels on the site.

4.4 CONCLUSION

This proposed site development will have minimal effect on abutting infrastructures or properties by way of stormwater runoff or siltation. Peak runoff rate from the proposed site has been maintained to the existing conditions peak rate to the extent practicable. Treatment is obtained through the use of deep sump hooded catch basins, enhanced biofiltration w/ISR and forebay as described above.

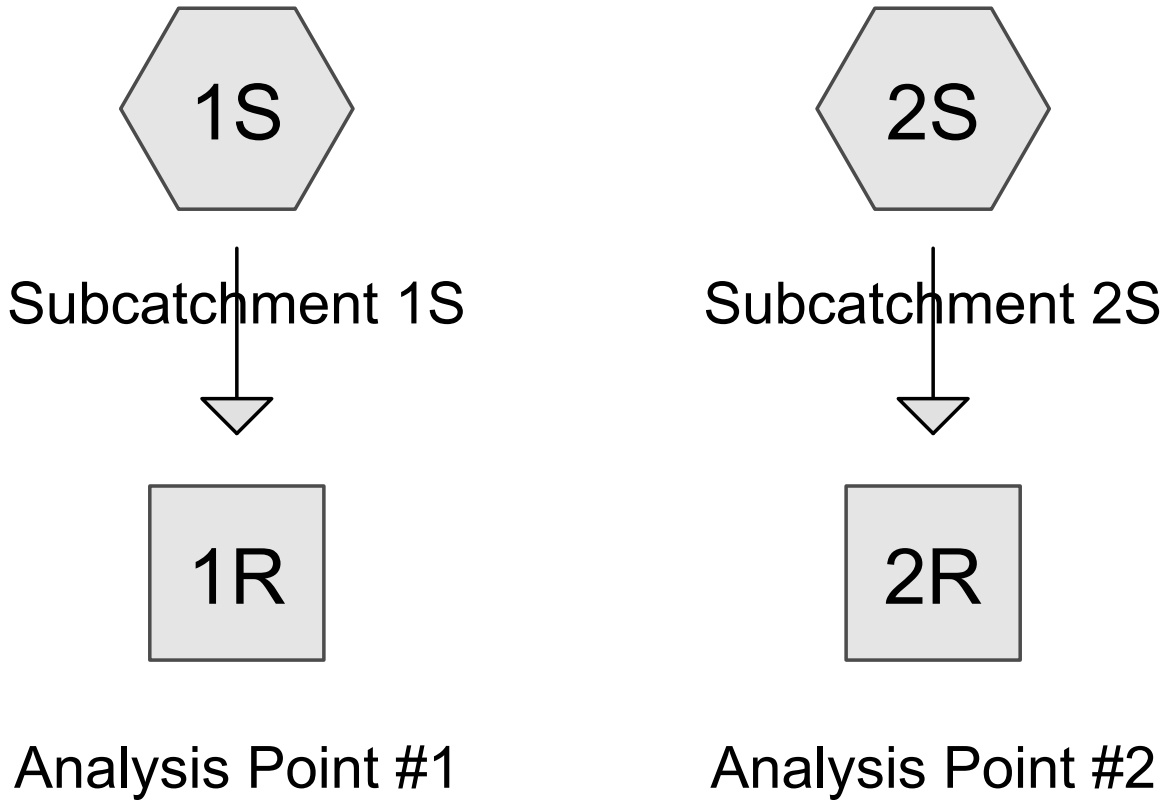
The area of disturbance is greater than 50,000 square feet within the protected shoreland and will require an NHDES Alteration of Terrain Permit.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

Michael J. Kerivan, P.E.
Project Engineer

4.5 EXISTING CONDITIONS ANALYSIS
APPENDIX I

2 Year - 24 Hour Summary
10 Year - 24 Hour Complete
25 Year - 24 Hour Complete
50 Year - 24 Hour Summary



Subcat Reach Pond Link

Routing Diagram for 22022 Existing Condition_4-17-2023
Prepared by Jones & Beach Engineers Inc, Printed 8/2/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.272	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.301	74	>75% Grass cover, Good, HSG C (2S)
0.997	80	>75% Grass cover, Good, HSG D (1S)
0.187	98	Paved parking, HSG A (1S, 2S)
0.096	98	Paved parking, HSG D (1S)
0.260	98	Paved roads w/curbs & sewers, HSG A (1S, 2S)
0.308	98	Paved roads w/curbs & sewers, HSG D (1S, 2S)
0.193	98	Roofs, HSG A (1S, 2S)
0.109	98	Roofs, HSG D (1S, 2S)
0.538	30	Woods, Good, HSG A (2S)
10.909	55	Woods, Good, HSG B (1S, 2S)
0.966	70	Woods, Good, HSG C (1S, 2S)
16.137	**59**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.450	HSG A	1S, 2S
10.909	HSG B	1S, 2S
1.268	HSG C	1S, 2S
1.510	HSG D	1S, 2S
0.000	Other	
16.137		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=513,285 sf 4.28% Impervious Runoff Depth>0.29"
Flow Length=788' Tc=18.3 min CN=59 Runoff=1.80 cfs 0.283 af

Subcatchment2S: Subcatchment2S Runoff Area=189,635 sf 14.91% Impervious Runoff Depth>0.29"
Flow Length=700' Tc=9.4 min CN=59 Runoff=0.74 cfs 0.105 af

Reach 1R: Analysis Point #1 Inflow=1.80 cfs 0.283 af
Outflow=1.80 cfs 0.283 af

Reach 2R: Analysis Point #2 Inflow=0.74 cfs 0.105 af
Outflow=0.74 cfs 0.105 af

Total Runoff Area = 16.137 ac Runoff Volume = 0.388 af Average Runoff Depth = 0.29"
92.85% Pervious = 14.984 ac 7.15% Impervious = 1.153 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=513,285 sf 4.28% Impervious Runoff Depth>0.92"
Flow Length=788' Tc=18.3 min CN=59 Runoff=8.38 cfs 0.906 af

Subcatchment2S: Subcatchment2S Runoff Area=189,635 sf 14.91% Impervious Runoff Depth>0.93"
Flow Length=700' Tc=9.4 min CN=59 Runoff=3.93 cfs 0.336 af

Reach 1R: Analysis Point #1 Inflow=8.38 cfs 0.906 af
Outflow=8.38 cfs 0.906 af

Reach 2R: Analysis Point #2 Inflow=3.93 cfs 0.336 af
Outflow=3.93 cfs 0.336 af

Total Runoff Area = 16.137 ac Runoff Volume = 1.242 af Average Runoff Depth = 0.92"
92.85% Pervious = 14.984 ac 7.15% Impervious = 1.153 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 8.38 cfs @ 12.30 hrs, Volume= 0.906 af, Depth> 0.92"
Routed to Reach 1R : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
2,996	98	Paved roads w/curbs & sewers, HSG A
4,880	98	Paved roads w/curbs & sewers, HSG D
4,203	98	Paved parking, HSG D
3,415	98	Paved parking, HSG A
4,397	98	Roofs, HSG D
2,063	98	Roofs, HSG A
43,432	80	>75% Grass cover, Good, HSG D
26,148	39	>75% Grass cover, Good, HSG A
402,378	55	Woods, Good, HSG B
19,373	70	Woods, Good, HSG C
513,285	59	Weighted Average
491,331		95.72% Pervious Area
21,954		4.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	14	0.0200	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
2.5	36	0.0810	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.9	104	0.0810	1.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	102	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	314	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	218	0.0570	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.3	788	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 3.93 cfs @ 12.16 hrs, Volume= 0.336 af, Depth> 0.93"
Routed to Reach 2R : Analysis Point #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
8,530	98	Paved roads w/curbs & sewers, HSG D
8,332	98	Paved roads w/curbs & sewers, HSG A
345	98	Roofs, HSG D
6,327	98	Roofs, HSG A
4,744	98	Paved parking, HSG A
13,129	74	>75% Grass cover, Good, HSG C
29,266	39	>75% Grass cover, Good, HSG A
22,719	70	Woods, Good, HSG C
23,415	30	Woods, Good, HSG A
72,828	55	Woods, Good, HSG B
189,635	59	Weighted Average
161,357		85.09% Pervious Area
28,278		14.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.93		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
3.7	35	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.3	192	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	94	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	40	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	324	0.0100	5.09	35.64	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=1.00' Z= 1.0 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
9.4	700	Total			

Summary for Reach 1R: Analysis Point #1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.783 ac, 4.28% Impervious, Inflow Depth > 0.92" for 10-Year Storm event
Inflow = 8.38 cfs @ 12.30 hrs, Volume= 0.906 af
Outflow = 8.38 cfs @ 12.30 hrs, Volume= 0.906 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: Analysis Point #2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.353 ac, 14.91% Impervious, Inflow Depth > 0.93" for 10-Year Storm event
Inflow = 3.93 cfs @ 12.16 hrs, Volume= 0.336 af
Outflow = 3.93 cfs @ 12.16 hrs, Volume= 0.336 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=513,285 sf 4.28% Impervious Runoff Depth>1.58"
Flow Length=788' Tc=18.3 min CN=59 Runoff=15.45 cfs 1.547 af

Subcatchment2S: Subcatchment2S Runoff Area=189,635 sf 14.91% Impervious Runoff Depth>1.58"
Flow Length=700' Tc=9.4 min CN=59 Runoff=7.25 cfs 0.574 af

Reach 1R: Analysis Point #1 Inflow=15.45 cfs 1.547 af
Outflow=15.45 cfs 1.547 af

Reach 2R: Analysis Point #2 Inflow=7.25 cfs 0.574 af
Outflow=7.25 cfs 0.574 af

Total Runoff Area = 16.137 ac Runoff Volume = 2.121 af Average Runoff Depth = 1.58"
92.85% Pervious = 14.984 ac 7.15% Impervious = 1.153 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 15.45 cfs @ 12.28 hrs, Volume= 1.547 af, Depth> 1.58"
Routed to Reach 1R : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
2,996	98	Paved roads w/curbs & sewers, HSG A
4,880	98	Paved roads w/curbs & sewers, HSG D
4,203	98	Paved parking, HSG D
3,415	98	Paved parking, HSG A
4,397	98	Roofs, HSG D
2,063	98	Roofs, HSG A
43,432	80	>75% Grass cover, Good, HSG D
26,148	39	>75% Grass cover, Good, HSG A
402,378	55	Woods, Good, HSG B
19,373	70	Woods, Good, HSG C
513,285	59	Weighted Average
491,331		95.72% Pervious Area
21,954		4.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	14	0.0200	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
2.5	36	0.0810	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.9	104	0.0810	1.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	102	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	314	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	218	0.0570	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.3	788	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 7.25 cfs @ 12.15 hrs, Volume= 0.574 af, Depth> 1.58"
Routed to Reach 2R : Analysis Point #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
8,530	98	Paved roads w/curbs & sewers, HSG D
8,332	98	Paved roads w/curbs & sewers, HSG A
345	98	Roofs, HSG D
6,327	98	Roofs, HSG A
4,744	98	Paved parking, HSG A
13,129	74	>75% Grass cover, Good, HSG C
29,266	39	>75% Grass cover, Good, HSG A
22,719	70	Woods, Good, HSG C
23,415	30	Woods, Good, HSG A
72,828	55	Woods, Good, HSG B
189,635	59	Weighted Average
161,357		85.09% Pervious Area
28,278		14.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.93		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
3.7	35	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.3	192	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	94	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	40	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	324	0.0100	5.09	35.64	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=1.00' Z= 1.0 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
9.4	700	Total			

Summary for Reach 1R: Analysis Point #1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.783 ac, 4.28% Impervious, Inflow Depth > 1.58" for 25-Year Storm event
Inflow = 15.45 cfs @ 12.28 hrs, Volume= 1.547 af
Outflow = 15.45 cfs @ 12.28 hrs, Volume= 1.547 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: Analysis Point #2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.353 ac, 14.91% Impervious, Inflow Depth > 1.58" for 25-Year Storm event
Inflow = 7.25 cfs @ 12.15 hrs, Volume= 0.574 af
Outflow = 7.25 cfs @ 12.15 hrs, Volume= 0.574 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=513,285 sf 4.28% Impervious Runoff Depth>2.26"
Flow Length=788' Tc=18.3 min CN=59 Runoff=22.95 cfs 2.223 af

Subcatchment2S: Subcatchment2S Runoff Area=189,635 sf 14.91% Impervious Runoff Depth>2.27"
Flow Length=700' Tc=9.4 min CN=59 Runoff=10.71 cfs 0.824 af

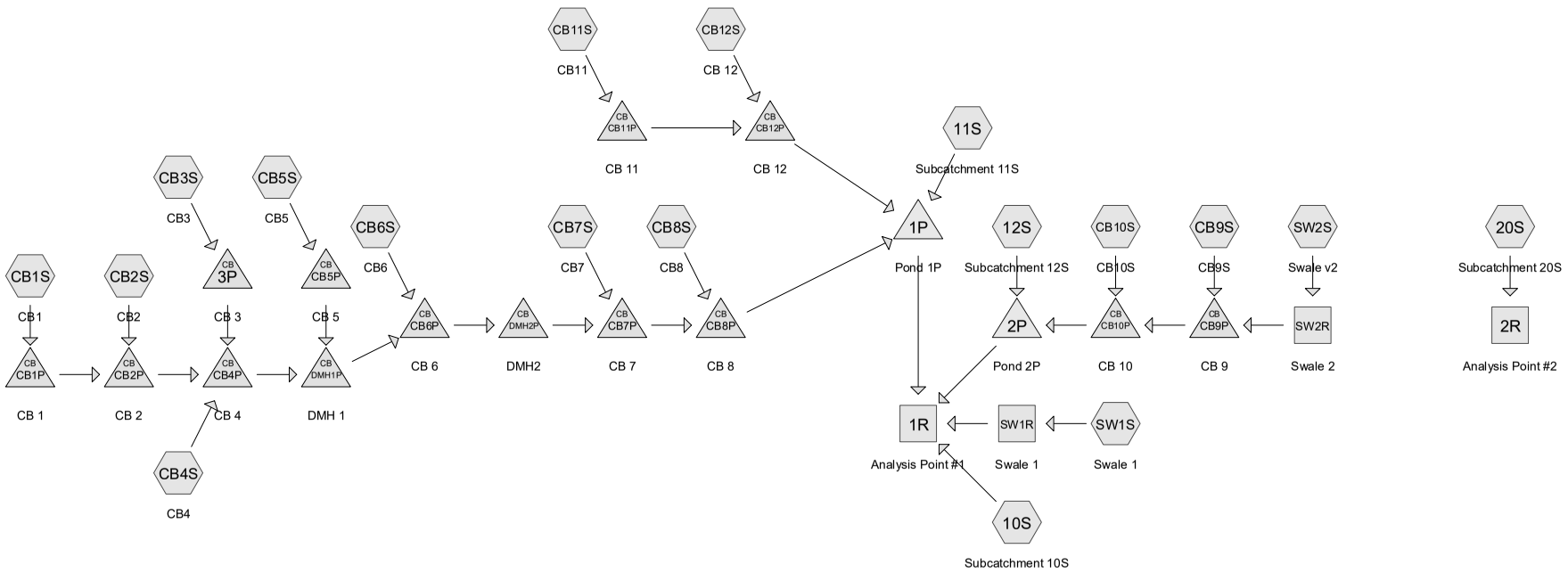
Reach 1R: Analysis Point #1 Inflow=22.95 cfs 2.223 af
Outflow=22.95 cfs 2.223 af

Reach 2R: Analysis Point #2 Inflow=10.71 cfs 0.824 af
Outflow=10.71 cfs 0.824 af

Total Runoff Area = 16.137 ac Runoff Volume = 3.047 af Average Runoff Depth = 2.27"
92.85% Pervious = 14.984 ac 7.15% Impervious = 1.153 ac

4.6 PROPOSED CONDITIONS ANALYSIS
APPENDIX II

2 Year - 24 Hour Summary
10 Year - 24 Hour Complete
25 Year - 24 Hour Complete
50 Year - 24 Hour Summary



Routing Diagram for 22022 Proposed Condition_07-26-2023

Prepared by Jones & Beach Engineers Inc, Printed 8/2/2023

Project Notes

Rainfall events imported from "22022 Existing Condition.hcp"

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.276	39	>75% Grass cover, Good, HSG A (20S, CB1S, CB4S, SW1S)
5.300	61	>75% Grass cover, Good, HSG B (11S, 12S, CB10S, CB11S, CB12S, CB4S, CB5S, CB6S, CB7S, CB8S, CB9S, SW1S, SW2S)
0.452	74	>75% Grass cover, Good, HSG C (12S, CB10S, CB9S, SW2S)
0.963	80	>75% Grass cover, Good, HSG D (20S, SW1S)
0.206	98	Paved parking, HSG A (20S, CB1S, CB4S, SW1S)
0.197	98	Paved parking, HSG B (CB10S, CB3S, CB8S, CB9S)
0.076	98	Paved parking, HSG C (CB10S, CB9S)
0.110	98	Paved parking, HSG D (CB10S, SW1S)
0.238	98	Paved roads w/curbs & sewers, HSG A (20S, CB4S, SW1S)
0.595	98	Paved roads w/curbs & sewers, HSG B (CB11S, CB12S, CB1S, CB2S, CB4S, CB5S, CB6S, CB7S)
0.328	98	Paved roads w/curbs & sewers, HSG D (20S, SW1S)
0.193	98	Roofs, HSG A (20S, SW1S)
0.414	98	Roofs, HSG B (CB12S, CB5S, CB6S, CB7S, CB8S)
0.109	98	Roofs, HSG D (20S, SW1S)
0.538	30	Woods, Good, HSG A (20S)
4.402	55	Woods, Good, HSG B (10S, 20S, SW1S)
0.740	70	Woods, Good, HSG C (10S, 20S)
16.137	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.450	HSG A	20S, CB1S, CB4S, SW1S
10.909	HSG B	10S, 11S, 12S, 20S, CB10S, CB11S, CB12S, CB1S, CB2S, CB3S, CB4S, CB5S, CB6S, CB7S, CB8S, CB9S, SW1S, SW2S
1.268	HSG C	10S, 12S, 20S, CB10S, CB9S, SW2S
1.510	HSG D	20S, CB10S, SW1S
0.000	Other	
16.137		**TOTAL AREA**

Time span=0.00-600.00 hrs, dt=0.01 hrs, 60001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Subcatchment10S Runoff Area=128,278 sf 0.00% Impervious Runoff Depth=0.28"
Flow Length=816' Tc=13.9 min CN=57 Runoff=0.34 cfs 0.068 af

Subcatchment11S: Subcatchment11S Runoff Area=60,563 sf 0.00% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=61 Runoff=0.39 cfs 0.047 af

Subcatchment12S: Subcatchment12S Runoff Area=6,577 sf 0.00% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=72 Runoff=0.14 cfs 0.011 af

Subcatchment20S: Subcatchment20S Runoff Area=156,691 sf 18.61% Impervious Runoff Depth=0.37"
Flow Length=700' Tc=9.4 min CN=60 Runoff=0.73 cfs 0.111 af

SubcatchmentCB10S: CB10S Runoff Area=9,118 sf 36.32% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=79 Runoff=0.30 cfs 0.022 af

SubcatchmentCB11S: CB11 Runoff Area=44,438 sf 13.57% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=66 Runoff=0.56 cfs 0.050 af

SubcatchmentCB12S: CB 12 Runoff Area=34,462 sf 34.12% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=74 Runoff=0.85 cfs 0.064 af

SubcatchmentCB1S: CB1 Runoff Area=8,484 sf 48.33% Impervious Runoff Depth=0.68"
Tc=6.0 min CN=68 Runoff=0.13 cfs 0.011 af

SubcatchmentCB2S: CB2 Runoff Area=1,365 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

SubcatchmentCB3S: CB3 Runoff Area=2,400 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.013 af

SubcatchmentCB4S: CB4 Runoff Area=28,435 sf 11.12% Impervious Runoff Depth=0.22"
Tc=6.0 min CN=55 Runoff=0.06 cfs 0.012 af

SubcatchmentCB5S: CB5 Runoff Area=22,913 sf 21.50% Impervious Runoff Depth=0.72"
Tc=6.0 min CN=69 Runoff=0.39 cfs 0.032 af

SubcatchmentCB6S: CB6 Runoff Area=21,810 sf 34.59% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=74 Runoff=0.54 cfs 0.041 af

SubcatchmentCB7S: CB7 Runoff Area=16,828 sf 31.55% Impervious Runoff Depth=0.92"
Tc=6.0 min CN=73 Runoff=0.39 cfs 0.030 af

SubcatchmentCB8S: CB8 Runoff Area=18,403 sf 35.89% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=74 Runoff=0.45 cfs 0.034 af

SubcatchmentCB9S: CB9S Runoff Area=11,098 sf 24.37% Impervious Runoff Depth=1.20"
Tc=6.0 min CN=78 Runoff=0.35 cfs 0.025 af

SubcatchmentSW1S: Swale 1 Runoff Area=115,986 sf 16.39% Impervious Runoff Depth=0.72"
Flow Length=816' Tc=13.9 min CN=69 Runoff=1.50 cfs 0.161 af

SubcatchmentSW2S: Swale v2 Runoff Area=15,068 sf 0.00% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=65 Runoff=0.17 cfs 0.016 af

Reach 1R: AnalysisPoint #1 Inflow=1.33 cfs 0.644 af
Outflow=1.33 cfs 0.644 af

Reach 2R: AnalysisPoint #2 Inflow=0.73 cfs 0.111 af
Outflow=0.73 cfs 0.111 af

Reach SW1R: Swale 1 Avg. Flow Depth=0.61' Max Vel=0.38 fps Inflow=1.50 cfs 0.161 af
n=0.150 L=555.0' S=0.0050 '/' Capacity=11.94 cfs Outflow=0.88 cfs 0.161 af

Reach SW2R: Swale 2 Avg. Flow Depth=0.18' Max Vel=0.26 fps Inflow=0.17 cfs 0.016 af
n=0.150 L=460.0' S=0.0100 '/' Capacity=14.11 cfs Outflow=0.07 cfs 0.016 af

Pond 1P: Pond 1P Peak Elev=217.66' Storage=15,547 cf Inflow=3.92 cfs 0.341 af
Outflow=0.12 cfs 0.341 af

Pond 2P: Pond 2P Peak Elev=217.52' Storage=3,324 cf Inflow=0.81 cfs 0.074 af
Outflow=0.05 cfs 0.074 af

Pond 3P: CB 3 Peak Elev=221.63' Inflow=0.17 cfs 0.013 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0150 '/' Outflow=0.17 cfs 0.013 af

Pond CB10P: CB 10 Peak Elev=217.52' Inflow=0.67 cfs 0.063 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=0.67 cfs 0.063 af

Pond CB11P: CB 11 Peak Elev=218.53' Inflow=0.56 cfs 0.050 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.56 cfs 0.050 af

Pond CB12P: CB 12 Peak Elev=218.43' Inflow=1.41 cfs 0.115 af
15.0" Round Culvert n=0.012 L=156.0' S=0.0050 '/' Outflow=1.41 cfs 0.115 af

Pond CB1P: CB 1 Peak Elev=227.46' Inflow=0.13 cfs 0.011 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0200 '/' Outflow=0.13 cfs 0.011 af

Pond CB2P: CB 2 Peak Elev=226.98' Inflow=0.22 cfs 0.019 af
12.0" Round Culvert n=0.012 L=137.0' S=0.0400 '/' Outflow=0.22 cfs 0.019 af

Pond CB4P: CB 4 Peak Elev=221.32' Inflow=0.39 cfs 0.044 af
15.0" Round Culvert n=0.012 L=71.0' S=0.0099 '/' Outflow=0.39 cfs 0.044 af

Pond CB5P: CB 5 Peak Elev=220.67' Inflow=0.39 cfs 0.032 af
15.0" Round Culvert n=0.012 L=26.0' S=0.0050 '/' Outflow=0.39 cfs 0.032 af

Pond CB6P: CB 6 Peak Elev=218.71' Inflow=1.32 cfs 0.116 af
24.0" Round Culvert n=0.012 L=48.0' S=0.0050 '/' Outflow=1.32 cfs 0.116 af

Pond CB7P: CB 7 Peak Elev=218.11' Inflow=1.71 cfs 0.146 af
24.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=1.71 cfs 0.146 af

Pond CB8P: CB 8 Peak Elev=217.88' Inflow=2.16 cfs 0.180 af
24.0" Round Culvert n=0.012 L=148.0' S=0.0049 '/' Outflow=2.16 cfs 0.180 af

Pond CB9P: CB 9 Peak Elev=217.52' Inflow=0.37 cfs 0.041 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.37 cfs 0.041 af

Pond DMH1P: DMH 1 Peak Elev=220.66' Inflow=0.78 cfs 0.075 af
15.0" Round Culvert n=0.012 L=134.0' S=0.0099 '/' Outflow=0.78 cfs 0.075 af

Pond DMH2P: DMH2 Peak Elev=218.40' Inflow=1.32 cfs 0.116 af
24.0" Round Culvert n=0.012 L=56.0' S=0.0050 '/' Outflow=1.32 cfs 0.116 af

Total Runoff Area = 16.137 ac Runoff Volume = 0.755 af Average Runoff Depth = 0.56"
84.72% Pervious = 13.672 ac 15.28% Impervious = 2.465 ac

Time span=0.00-600.00 hrs, dt=0.01 hrs, 60001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Subcatchment10S Runoff Area=128,278 sf 0.00% Impervious Runoff Depth=0.92"
Flow Length=816' Tc=13.9 min CN=57 Runoff=1.95 cfs 0.225 af

Subcatchment11S: Subcatchment11S Runoff Area=60,563 sf 0.00% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=61 Runoff=1.67 cfs 0.134 af

Subcatchment12S: Subcatchment12S Runoff Area=6,577 sf 0.00% Impervious Runoff Depth=1.92"
Tc=6.0 min CN=72 Runoff=0.34 cfs 0.024 af

Subcatchment20S: Subcatchment20S Runoff Area=156,691 sf 18.61% Impervious Runoff Depth=1.10"
Flow Length=700' Tc=9.4 min CN=60 Runoff=3.54 cfs 0.329 af

SubcatchmentCB10S: CB10S Runoff Area=9,118 sf 36.32% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=79 Runoff=0.61 cfs 0.044 af

SubcatchmentCB11S: CB11 Runoff Area=44,438 sf 13.57% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=66 Runoff=1.68 cfs 0.126 af

SubcatchmentCB12S: CB 12 Runoff Area=34,462 sf 34.12% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=74 Runoff=1.91 cfs 0.137 af

SubcatchmentCB1S: CB1 Runoff Area=8,484 sf 48.33% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=68 Runoff=0.36 cfs 0.026 af

SubcatchmentCB2S: CB2 Runoff Area=1,365 sf 100.00% Impervious Runoff Depth=4.40"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

SubcatchmentCB3S: CB3 Runoff Area=2,400 sf 100.00% Impervious Runoff Depth=4.40"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.020 af

SubcatchmentCB4S: CB4 Runoff Area=28,435 sf 11.12% Impervious Runoff Depth=0.81"
Tc=6.0 min CN=55 Runoff=0.46 cfs 0.044 af

SubcatchmentCB5S: CB5 Runoff Area=22,913 sf 21.50% Impervious Runoff Depth=1.70"
Tc=6.0 min CN=69 Runoff=1.02 cfs 0.075 af

SubcatchmentCB6S: CB6 Runoff Area=21,810 sf 34.59% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=74 Runoff=1.21 cfs 0.087 af

SubcatchmentCB7S: CB7 Runoff Area=16,828 sf 31.55% Impervious Runoff Depth=2.00"
Tc=6.0 min CN=73 Runoff=0.90 cfs 0.064 af

SubcatchmentCB8S: CB8 Runoff Area=18,403 sf 35.89% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=74 Runoff=1.02 cfs 0.073 af

SubcatchmentCB9S: CB9S Runoff Area=11,098 sf 24.37% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=78 Runoff=0.72 cfs 0.051 af

SubcatchmentSW1S: Swale 1 Runoff Area=115,986 sf 16.39% Impervious Runoff Depth=1.70"
Flow Length=816' Tc=13.9 min CN=69 Runoff=3.97 cfs 0.377 af

SubcatchmentSW2S: Swale v2 Runoff Area=15,068 sf 0.00% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=65 Runoff=0.54 cfs 0.041 af

Reach 1R: AnalysisPoint #1 Inflow=5.09 cfs 1.561 af
Outflow=5.09 cfs 1.561 af

Reach 2R: AnalysisPoint #2 Inflow=3.54 cfs 0.329 af
Outflow=3.54 cfs 0.329 af

Reach SW1R: Swale 1 Avg. Flow Depth=1.02' Max Vel=0.51 fps Inflow=3.97 cfs 0.377 af
n=0.150 L=555.0' S=0.0050 '/' Capacity=11.94 cfs Outflow=2.63 cfs 0.377 af

Reach SW2R: Swale 2 Avg. Flow Depth=0.36' Max Vel=0.37 fps Inflow=0.54 cfs 0.041 af
n=0.150 L=460.0' S=0.0100 '/' Capacity=14.11 cfs Outflow=0.27 cfs 0.041 af

Pond 1P: Pond 1P Peak Elev=218.17' Storage=22,635 cf Inflow=10.60 cfs 0.799 af
Outflow=1.07 cfs 0.799 af

Pond 2P: Pond 2P Peak Elev=217.64' Storage=3,731 cf Inflow=1.83 cfs 0.160 af
Outflow=0.76 cfs 0.160 af

Pond 3P: CB 3 Peak Elev=221.72' Inflow=0.25 cfs 0.020 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0150 '/' Outflow=0.25 cfs 0.020 af

Pond CB10P: CB 10 Peak Elev=217.67' Inflow=1.49 cfs 0.136 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=1.49 cfs 0.136 af

Pond CB11P: CB 11 Peak Elev=219.13' Inflow=1.68 cfs 0.126 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=1.68 cfs 0.126 af

Pond CB12P: CB 12 Peak Elev=218.99' Inflow=3.60 cfs 0.264 af
15.0" Round Culvert n=0.012 L=156.0' S=0.0050 '/' Outflow=3.60 cfs 0.264 af

Pond CB1P: CB 1 Peak Elev=227.59' Inflow=0.36 cfs 0.026 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0200 '/' Outflow=0.36 cfs 0.026 af

Pond CB2P: CB 2 Peak Elev=227.12' Inflow=0.50 cfs 0.038 af
12.0" Round Culvert n=0.012 L=137.0' S=0.0400 '/' Outflow=0.50 cfs 0.038 af

Pond CB4P: CB 4 Peak Elev=221.59' Inflow=1.20 cfs 0.102 af
15.0" Round Culvert n=0.012 L=71.0' S=0.0099 '/' Outflow=1.20 cfs 0.102 af

Pond CB5P: CB 5 Peak Elev=221.09' Inflow=1.02 cfs 0.075 af
15.0" Round Culvert n=0.012 L=26.0' S=0.0050 '/' Outflow=1.02 cfs 0.075 af

Pond CB6P: CB 6 Peak Elev=219.23' Inflow=3.43 cfs 0.263 af
24.0" Round Culvert n=0.012 L=48.0' S=0.0050 '/' Outflow=3.43 cfs 0.263 af

Pond CB7P: CB 7 Peak Elev=218.66' Inflow=4.32 cfs 0.328 af
24.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=4.32 cfs 0.328 af

Pond CB8P: CB 8 Peak Elev=218.36' Inflow=5.34 cfs 0.401 af
24.0" Round Culvert n=0.012 L=148.0' S=0.0049 '/' Outflow=5.34 cfs 0.401 af

Pond CB9P: CB 9 Peak Elev=217.68' Inflow=0.88 cfs 0.092 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.88 cfs 0.092 af

Pond DMH1P: DMH 1 Peak Elev=221.04' Inflow=2.22 cfs 0.177 af
15.0" Round Culvert n=0.012 L=134.0' S=0.0099 '/' Outflow=2.22 cfs 0.177 af

Pond DMH2P: DMH2 Peak Elev=218.93' Inflow=3.43 cfs 0.263 af
24.0" Round Culvert n=0.012 L=56.0' S=0.0050 '/' Outflow=3.43 cfs 0.263 af

Total Runoff Area = 16.137 ac Runoff Volume = 1.890 af Average Runoff Depth = 1.41"
84.72% Pervious = 13.672 ac 15.28% Impervious = 2.465 ac

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 1.95 cfs @ 12.23 hrs, Volume= 0.225 af, Depth= 0.92"
Routed to Reach 1R : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
113,422	55	Woods, Good, HSG B
14,856	70	Woods, Good, HSG C
128,278	57	Weighted Average
128,278		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	12	0.0200	0.89		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
4.6	38	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.1	154	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.9	552	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	60	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.9	816	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 1.67 cfs @ 12.10 hrs, Volume= 0.134 af, Depth= 1.16"
Routed to Pond 1P : Pond 1P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
60,563	61	>75% Grass cover, Good, HSG B
60,563		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 1.92"
Routed to Pond 2P : Pond 2P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
1,179	61	>75% Grass cover, Good, HSG B
5,398	74	>75% Grass cover, Good, HSG C
6,577	72	Weighted Average
6,577		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 20S: Subcatchment 20S

Runoff = 3.54 cfs @ 12.15 hrs, Volume= 0.329 af, Depth= 1.10"
Routed to Reach 2R : Analysis Point #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
9,405	98	Paved roads w/curbs & sewers, HSG D
8,332	98	Paved roads w/curbs & sewers, HSG A
345	98	Roofs, HSG D
6,327	98	Roofs, HSG A
4,744	98	Paved parking, HSG A
11,729	80	>75% Grass cover, Good, HSG D
29,266	39	>75% Grass cover, Good, HSG A
45,733	55	Woods, Good, HSG B
17,395	70	Woods, Good, HSG C
23,415	30	Woods, Good, HSG A
156,691	60	Weighted Average
127,538		81.39% Pervious Area
29,153		18.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.93		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
3.7	35	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.3	192	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	94	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	40	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	324	0.0100	5.09	35.64	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=1.00' Z= 1.0 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
9.4	700	Total			

Summary for Subcatchment CB10S: CB10S

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 2.49"
Routed to Pond CB10P : CB 10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
942	98	Paved parking, HSG B
385	98	Paved parking, HSG B
1,109	98	Paved parking, HSG C
304	98	Paved parking, HSG C
286	98	Paved parking, HSG D
2,795	61	>75% Grass cover, Good, HSG B
3,011	74	>75% Grass cover, Good, HSG C
286	98	Paved parking, HSG D
9,118	79	Weighted Average
5,806		63.68% Pervious Area
3,312		36.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB11S: CB11

Runoff = 1.68 cfs @ 12.10 hrs, Volume= 0.126 af, Depth= 1.49"
Routed to Pond CB11P : CB 11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
6,031	98	Paved roads w/curbs & sewers, HSG B
38,407	61	>75% Grass cover, Good, HSG B
44,438	66	Weighted Average
38,407		86.43% Pervious Area
6,031		13.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB12S: CB 12

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.137 af, Depth= 2.08"
Routed to Pond CB12P : CB 12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
5,156	98	Roofs, HSG B
6,603	98	Paved roads w/curbs & sewers, HSG B
22,703	61	>75% Grass cover, Good, HSG B
34,462	74	Weighted Average
22,703		65.88% Pervious Area
11,759		34.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB1S: CB1

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 1.63"
Routed to Pond CB1P : CB 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
2,785	98	Paved roads w/curbs & sewers, HSG B
1,315	98	Paved parking, HSG A
4,384	39	>75% Grass cover, Good, HSG A
8,484	68	Weighted Average
4,384		51.67% Pervious Area
4,100		48.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB2S: CB2

Runoff = 0.14 cfs @ 12.08 hrs, Volume= 0.011 af, Depth= 4.40"
Routed to Pond CB2P : CB 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
1,365	98	Paved roads w/curbs & sewers, HSG B
1,365		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB3S: CB3

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 0.020 af, Depth= 4.40"
Routed to Pond 3P : CB 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
2,400	98	Paved parking, HSG B
2,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB4S: CB4

Runoff = 0.46 cfs @ 12.11 hrs, Volume= 0.044 af, Depth= 0.81"
Routed to Pond CB4P : CB 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
682	98	Paved roads w/curbs & sewers, HSG A
1,675	98	Paved roads w/curbs & sewers, HSG B
805	98	Paved parking, HSG A
12,630	39	>75% Grass cover, Good, HSG A
12,643	61	>75% Grass cover, Good, HSG B
28,435	55	Weighted Average
25,273		88.88% Pervious Area
3,162		11.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB5S: CB5

Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 1.70"
Routed to Pond CB5P : CB 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
2,578	98	Roofs, HSG B
2,349	98	Paved roads w/curbs & sewers, HSG B
17,986	61	>75% Grass cover, Good, HSG B
22,913	69	Weighted Average
17,986		78.50% Pervious Area
4,927		21.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB6S: CB6

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 2.08"
Routed to Pond CB6P : CB 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
5,156	98	Roofs, HSG B
2,388	98	Paved roads w/curbs & sewers, HSG B
14,266	61	>75% Grass cover, Good, HSG B
21,810	74	Weighted Average
14,266		65.41% Pervious Area
7,544		34.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB7S: CB7

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.064 af, Depth= 2.00"
Routed to Pond CB7P : CB 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
2,578	98	Roofs, HSG B
2,732	98	Paved roads w/curbs & sewers, HSG B
11,518	61	>75% Grass cover, Good, HSG B
16,828	73	Weighted Average
11,518		68.45% Pervious Area
5,310		31.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB8S: CB8

Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 2.08"
Routed to Pond CB8P : CB 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
2,578	98	Roofs, HSG B
4,026	98	Paved parking, HSG B
11,799	61	>75% Grass cover, Good, HSG B
18,403	74	Weighted Average
11,799		64.11% Pervious Area
6,604		35.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB9S: CB9S

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 2.41"
Routed to Pond CB9P : CB 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
828	98	Paved parking, HSG B
1,877	98	Paved parking, HSG C
1,246	61	>75% Grass cover, Good, HSG B
7,147	74	>75% Grass cover, Good, HSG C
11,098	78	Weighted Average
8,393		75.63% Pervious Area
2,705		24.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment SW1S: Swale 1

Runoff = 3.97 cfs @ 12.20 hrs, Volume= 0.377 af, Depth= 1.70"
Routed to Reach SW1R : Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
4,397	98	Roofs, HSG D
2,063	98	Roofs, HSG A
4,880	98	Paved roads w/curbs & sewers, HSG D
1,362	98	Paved roads w/curbs & sewers, HSG A
4,203	98	Paved parking, HSG D
2,100	98	Paved parking, HSG A
30,233	80	>75% Grass cover, Good, HSG D
24,845	61	>75% Grass cover, Good, HSG B
9,293	39	>75% Grass cover, Good, HSG A
32,610	55	Woods, Good, HSG B
115,986	69	Weighted Average
96,981		83.61% Pervious Area
19,005		16.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	12	0.0200	0.89		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
4.6	38	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.1	154	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.9	552	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	60	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.9	816	Total			

Summary for Subcatchment SW2S: Swale v2

Runoff = 0.54 cfs @ 12.10 hrs, Volume= 0.041 af, Depth= 1.42"
Routed to Reach SW2R : Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Storm Rainfall=4.64"

Area (sf)	CN	Description
10,928	61	>75% Grass cover, Good, HSG B
4,140	74	>75% Grass cover, Good, HSG C
15,068	65	Weighted Average
15,068		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Analysis Point #1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.540 ac, 14.32% Impervious, Inflow Depth = 1.49" for 10-Year Storm event
Inflow = 5.09 cfs @ 12.37 hrs, Volume= 1.561 af
Outflow = 5.09 cfs @ 12.37 hrs, Volume= 1.561 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 2R: Analysis Point #2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.597 ac, 18.61% Impervious, Inflow Depth = 1.10" for 10-Year Storm event
Inflow = 3.54 cfs @ 12.15 hrs, Volume= 0.329 af
Outflow = 3.54 cfs @ 12.15 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SW1R: Swale 1

Inflow Area = 2.663 ac, 16.39% Impervious, Inflow Depth = 1.70" for 10-Year Storm event
Inflow = 3.97 cfs @ 12.20 hrs, Volume= 0.377 af
Outflow = 2.63 cfs @ 12.41 hrs, Volume= 0.377 af, Atten= 34%, Lag= 12.4 min
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.51 fps, Min. Travel Time= 18.2 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 70.5 min

Peak Storage= 2,881 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.02' , Surface Width= 8.14'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 11.94 cfs

2.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 555.0' Slope= 0.0050 '/'
Inlet Invert= 224.80', Outlet Invert= 222.00'

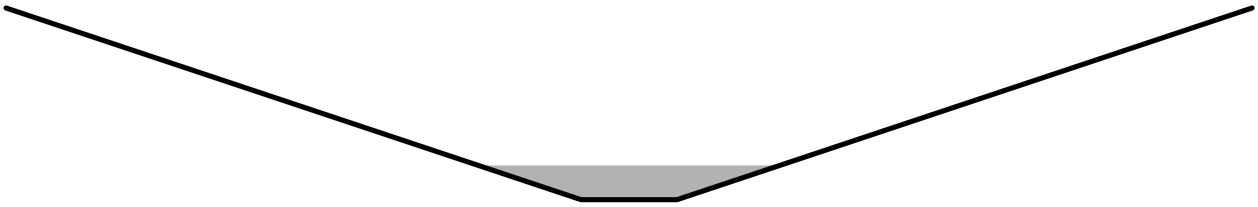
Summary for Reach SW2R: Swale 2

Inflow Area = 0.346 ac, 0.00% Impervious, Inflow Depth = 1.42" for 10-Year Storm event
Inflow = 0.54 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.27 cfs @ 12.31 hrs, Volume= 0.041 af, Atten= 50%, Lag= 12.5 min
Routed to Pond CB9P : CB 9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.37 fps, Min. Travel Time= 20.8 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 57.6 min

Peak Storage= 338 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.36' , Surface Width= 3.13'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 14.11 cfs

1.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 13.00'
Length= 460.0' Slope= 0.0100 '/'
Inlet Invert= 222.90', Outlet Invert= 218.30'



Summary for Pond 1P: Pond 1P

[80] Warning: Exceeded Pond CB12P by 0.24' @ 24.23 hrs (0.12 cfs 0.007 af)
[80] Warning: Exceeded Pond CB8P by 0.83' @ 24.38 hrs (2.87 cfs 0.358 af)

Inflow Area = 5.971 ac, 20.45% Impervious, Inflow Depth = 1.61" for 10-Year Storm event
Inflow = 10.60 cfs @ 12.10 hrs, Volume= 0.799 af
Outflow = 1.07 cfs @ 13.34 hrs, Volume= 0.799 af, Atten= 90%, Lag= 74.6 min
Primary = 1.07 cfs @ 13.34 hrs, Volume= 0.799 af
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Starting Elev= 215.25' Surf.Area= 11,579 sf Storage= 5,465 cf
Peak Elev= 218.17' @ 13.34 hrs Surf.Area= 15,391 sf Storage= 22,635 cf (17,170 cf above start)

Plug-Flow detention time= 1,057.0 min calculated for 0.673 af (84% of inflow)
Center-of-Mass det. time= 822.8 min (1,675.2 - 852.3)

Volume	Invert	Avail.Storage	Storage Description
#1	214.07'	53,644 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.07	11,579	569.7	0.0	0	0	11,579
214.08	11,579	569.7	40.0	46	46	11,585
215.25	11,579	569.7	40.0	5,419	5,465	12,251
215.49	11,579	569.7	40.0	1,112	6,577	12,388
215.50	11,579	569.7	5.0	6	6,583	12,394
216.99	11,579	569.7	5.0	863	7,445	13,243
217.00	11,579	569.7	100.0	116	7,561	13,248
218.00	13,316	588.5	100.0	12,437	19,998	15,075
218.01	15,117	564.0	100.0	142	20,141	17,322
220.00	18,615	601.7	100.0	33,503	53,644	21,007

Device	Routing	Invert	Outlet Devices
#1	Primary	215.25'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.25' / 215.15' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	215.25'	**1.7" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	218.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	219.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.07 cfs @ 13.34 hrs HW=218.17' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.07 cfs of 4.65 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 8.13 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.94 cfs @ 1.36 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: Pond 2P

[80] Warning: Exceeded Pond CB10P by 1.52' @ 24.17 hrs (4.32 cfs 2.689 af)

Inflow Area = 0.961 ac, 14.37% Impervious, Inflow Depth = 1.99" for 10-Year Storm event
Inflow = 1.83 cfs @ 12.09 hrs, Volume= 0.160 af
Outflow = 0.76 cfs @ 12.44 hrs, Volume= 0.160 af, Atten= 58%, Lag= 20.8 min
Primary = 0.76 cfs @ 12.44 hrs, Volume= 0.160 af
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Starting Elev= 215.25' Surf.Area= 2,766 sf Storage= 1,306 cf
Peak Elev= 217.64' @ 12.44 hrs Surf.Area= 3,212 sf Storage= 3,731 cf (2,425 cf above start)

Plug-Flow detention time= 652.2 min calculated for 0.130 af (81% of inflow)
Center-of-Mass det. time= 446.9 min (1,296.6 - 849.8)

Volume	Invert	Avail.Storage	Storage Description
#1	214.07'	9,535 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.07	2,766	220.8	0.0	0	0	2,766
214.08	2,766	220.8	40.0	11	11	2,768
215.25	2,766	220.8	40.0	1,294	1,306	3,027
215.49	2,766	220.8	40.0	266	1,571	3,080
215.50	2,766	220.8	5.0	1	1,572	3,082
216.99	2,766	220.8	5.0	206	1,779	3,411
217.00	2,766	220.8	100.0	28	1,806	3,413
217.99	3,465	242.0	100.0	3,078	4,884	4,227
218.00	4,158	262.0	100.0	38	4,922	5,029
219.00	5,084	323.6	100.0	4,613	9,535	7,914

Device	Routing	Invert	Outlet Devices
#1	Primary	215.25'	**18.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.25' / 215.00' S= 0.0250 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	215.25'	**0.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	217.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	218.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.76 cfs @ 12.44 hrs HW=217.64' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.76 cfs of 8.61 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 7.40 fps)
  ├**3=Sharp-Crested Rectangular Weir**(Weir Controls 0.74 cfs @ 1.29 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: CB 3

Inflow Area = 0.055 ac,100.00% Impervious, Inflow Depth = 4.40" for 10-Year Storm event
Inflow = 0.25 cfs @ 12.08 hrs, Volume= 0.020 af
Outflow = 0.25 cfs @ 12.08 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 12.08 hrs, Volume= 0.020 af
Routed to Pond CB4P : CB 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.72' @ 12.09 hrs
Flood Elev= 225.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	221.42'	**15.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 221.42' / 221.09' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.25 cfs @ 12.08 hrs HW=221.72' TW=221.58' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.25 cfs @ 1.67 fps)

Summary for Pond CB10P: CB 10

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=20)
[80] Warning: Exceeded Pond CB9P by 1.02' @ 33.76 hrs (2.52 cfs 1.028 af)

Inflow Area = 0.810 ac, 17.05% Impervious, Inflow Depth = 2.01" for 10-Year Storm event
Inflow = 1.49 cfs @ 12.10 hrs, Volume= 0.136 af
Outflow = 1.49 cfs @ 12.10 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.10 hrs, Volume= 0.136 af
Routed to Pond 2P : Pond 2P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 217.67' @ 12.40 hrs
Flood Elev= 219.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.98'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.98' / 215.93' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.49 cfs @ 12.10 hrs HW=217.43' TW=217.33' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.49 cfs @ 1.21 fps)

Summary for Pond CB11P: CB 11

Inflow Area = 1.020 ac, 13.57% Impervious, Inflow Depth = 1.49" for 10-Year Storm event
Inflow = 1.68 cfs @ 12.10 hrs, Volume= 0.126 af
Outflow = 1.68 cfs @ 12.10 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.68 cfs @ 12.10 hrs, Volume= 0.126 af
Routed to Pond CB12P : CB 12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 219.13' @ 12.09 hrs
Flood Elev= 221.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.99'	**15.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.99' / 217.88' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.68 cfs @ 12.10 hrs HW=219.13' TW=218.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.68 cfs @ 1.43 fps)

Summary for Pond CB12P: CB 12

Inflow Area = 1.811 ac, 22.55% Impervious, Inflow Depth = 1.75" for 10-Year Storm event
Inflow = 3.60 cfs @ 12.09 hrs, Volume= 0.264 af
Outflow = 3.60 cfs @ 12.09 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min
Primary = 3.60 cfs @ 12.09 hrs, Volume= 0.264 af
Routed to Pond 1P : Pond 1P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 218.99' @ 12.09 hrs
Flood Elev= 221.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.78'	**15.0" Round Culvert** L= 156.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.78' / 217.00' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.59 cfs @ 12.09 hrs HW=218.99' TW=217.42' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.59 cfs @ 2.95 fps)

Summary for Pond CB1P: CB 1

Inflow Area = 0.195 ac, 48.33% Impervious, Inflow Depth = 1.63" for 10-Year Storm event
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
Routed to Pond CB2P : CB 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 227.59' @ 12.09 hrs
Flood Elev= 231.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	227.26'	**12.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.26' / 226.82' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=227.59' TW=227.12' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.36 cfs @ 1.55 fps)

Summary for Pond CB2P: CB 2

Inflow Area = 0.226 ac, 55.49% Impervious, Inflow Depth = 2.01" for 10-Year Storm event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af
Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af
Routed to Pond CB4P : CB 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 227.12' @ 12.09 hrs
Flood Elev= 231.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	226.72'	**12.0" Round Culvert** L= 137.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.72' / 221.24' S= 0.0400 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.09 hrs HW=227.12' TW=221.59' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.50 cfs @ 1.70 fps)

Summary for Pond CB4P: CB 4

Inflow Area = 0.934 ac, 27.10% Impervious, Inflow Depth = 1.31" for 10-Year Storm event
Inflow = 1.20 cfs @ 12.10 hrs, Volume= 0.102 af
Outflow = 1.20 cfs @ 12.10 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.10 hrs, Volume= 0.102 af
Routed to Pond DMH1P : DMH 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.59' @ 12.10 hrs
Flood Elev= 225.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.99'	**15.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.99' / 220.29' S= 0.0099 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.20 cfs @ 12.10 hrs HW=221.59' TW=221.04' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.20 cfs @ 3.02 fps)

Summary for Pond CB5P: CB 5

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=636)

Inflow Area = 0.526 ac, 21.50% Impervious, Inflow Depth = 1.70" for 10-Year Storm event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 1.02 cfs @ 12.10 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.3 min
Primary = 1.02 cfs @ 12.10 hrs, Volume= 0.075 af
Routed to Pond DMH1P : DMH 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.09' @ 12.10 hrs
Flood Elev= 222.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	219.00'	**15.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 219.00' / 218.87' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.02 cfs @ 12.10 hrs HW=221.09' TW=221.04' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.02 cfs @ 0.83 fps)

Summary for Pond CB6P: CB 6

Inflow Area = 1.961 ac, 27.51% Impervious, Inflow Depth = 1.61" for 10-Year Storm event
Inflow = 3.43 cfs @ 12.10 hrs, Volume= 0.263 af
Outflow = 3.43 cfs @ 12.10 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min
Primary = 3.43 cfs @ 12.10 hrs, Volume= 0.263 af
Routed to Pond DMH2P : DMH2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 219.23' @ 12.10 hrs
Flood Elev= 222.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	218.12'	**24.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.12' / 217.88' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.41 cfs @ 12.10 hrs HW=219.23' TW=218.93' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.41 cfs @ 2.77 fps)

Summary for Pond CB7P: CB 7

[80] Warning: Exceeded Pond DMH2P by 0.22' @ 24.36 hrs (0.18 cfs 0.009 af)

Inflow Area = 2.347 ac, 28.18% Impervious, Inflow Depth = 1.68" for 10-Year Storm event
Inflow = 4.32 cfs @ 12.10 hrs, Volume= 0.328 af
Outflow = 4.32 cfs @ 12.10 hrs, Volume= 0.328 af, Atten= 0%, Lag= 0.0 min
Primary = 4.32 cfs @ 12.10 hrs, Volume= 0.328 af
Routed to Pond CB8P : CB 8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 218.66' @ 12.10 hrs
Flood Elev= 222.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.40'	**24.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.40' / 217.29' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.31 cfs @ 12.10 hrs HW=218.65' TW=218.36' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.31 cfs @ 2.08 fps)

Summary for Pond CB8P: CB 8

[80] Warning: Exceeded Pond CB7P by 0.61' @ 24.35 hrs (1.44 cfs 0.157 af)

Inflow Area = 2.769 ac, 29.35% Impervious, Inflow Depth = 1.74" for 10-Year Storm event
Inflow = 5.34 cfs @ 12.10 hrs, Volume= 0.401 af
Outflow = 5.34 cfs @ 12.10 hrs, Volume= 0.401 af, Atten= 0%, Lag= 0.0 min
Primary = 5.34 cfs @ 12.10 hrs, Volume= 0.401 af
Routed to Pond 1P : Pond 1P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 218.36' @ 12.10 hrs
Flood Elev= 222.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.19'	**24.0" Round Culvert** L= 148.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.19' / 216.46' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.33 cfs @ 12.10 hrs HW=218.36' TW=217.42' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.33 cfs @ 4.04 fps)

Summary for Pond CB9P: CB 9

Inflow Area = 0.601 ac, 10.34% Impervious, Inflow Depth = 1.84" for 10-Year Storm event
Inflow = 0.88 cfs @ 12.10 hrs, Volume= 0.092 af
Outflow = 0.88 cfs @ 12.10 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.10 hrs, Volume= 0.092 af
Routed to Pond CB10P : CB 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 217.68' @ 12.39 hrs
Flood Elev= 219.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	216.19'	**15.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 216.19' / 216.08' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.88 cfs @ 12.10 hrs HW=217.48' TW=217.44' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.88 cfs @ 0.72 fps)

Summary for Pond DMH1P: DMH 1

[80] Warning: Exceeded Pond CB5P by 1.28' @ 19.03 hrs (3.60 cfs 44.324 af)

Inflow Area = 1.460 ac, 25.09% Impervious, Inflow Depth = 1.45" for 10-Year Storm event
Inflow = 2.22 cfs @ 12.10 hrs, Volume= 0.177 af
Outflow = 2.22 cfs @ 12.10 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.10 hrs, Volume= 0.177 af
Routed to Pond CB6P : CB 6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.04' @ 12.10 hrs
Flood Elev= 224.36'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.19'	**15.0" Round Culvert** L= 134.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.19' / 218.87' S= 0.0099 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.22 cfs @ 12.10 hrs HW=221.04' TW=219.23' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.22 cfs @ 2.48 fps)

Summary for Pond DMH2P: DMH2

Inflow Area = 1.961 ac, 27.51% Impervious, Inflow Depth = 1.61" for 10-Year Storm event
Inflow = 3.43 cfs @ 12.10 hrs, Volume= 0.263 af
Outflow = 3.43 cfs @ 12.10 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min
Primary = 3.43 cfs @ 12.10 hrs, Volume= 0.263 af
Routed to Pond CB7P : CB 7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 218.93' @ 12.10 hrs
Flood Elev= 221.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.78'	**24.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.78' / 217.50' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.38 cfs @ 12.10 hrs HW=218.93' TW=218.66' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.38 cfs @ 2.61 fps)

Time span=0.00-600.00 hrs, dt=0.01 hrs, 60001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Subcatchment10S Runoff Area=128,278 sf 0.00% Impervious Runoff Depth=1.59"
Flow Length=816' Tc=13.9 min CN=57 Runoff=3.83 cfs 0.389 af

Subcatchment11S: Subcatchment11S Runoff Area=60,563 sf 0.00% Impervious Runoff Depth=1.91"
Tc=6.0 min CN=61 Runoff=2.95 cfs 0.221 af

Subcatchment12S: Subcatchment12S Runoff Area=6,577 sf 0.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=72 Runoff=0.51 cfs 0.036 af

Subcatchment20S: Subcatchment20S Runoff Area=156,691 sf 18.61% Impervious Runoff Depth=1.82"
Flow Length=700' Tc=9.4 min CN=60 Runoff=6.41 cfs 0.547 af

SubcatchmentCB10S: CB10S Runoff Area=9,118 sf 36.32% Impervious Runoff Depth=3.55"
Tc=6.0 min CN=79 Runoff=0.87 cfs 0.062 af

SubcatchmentCB11S: CB11 Runoff Area=44,438 sf 13.57% Impervious Runoff Depth=2.33"
Tc=6.0 min CN=66 Runoff=2.73 cfs 0.198 af

SubcatchmentCB12S: CB 12 Runoff Area=34,462 sf 34.12% Impervious Runoff Depth=3.06"
Tc=6.0 min CN=74 Runoff=2.84 cfs 0.202 af

SubcatchmentCB1S: CB1 Runoff Area=8,484 sf 48.33% Impervious Runoff Depth=2.51"
Tc=6.0 min CN=68 Runoff=0.57 cfs 0.041 af

SubcatchmentCB2S: CB2 Runoff Area=1,365 sf 100.00% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

SubcatchmentCB3S: CB3 Runoff Area=2,400 sf 100.00% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

SubcatchmentCB4S: CB4 Runoff Area=28,435 sf 11.12% Impervious Runoff Depth=1.43"
Tc=6.0 min CN=55 Runoff=0.96 cfs 0.078 af

SubcatchmentCB5S: CB5 Runoff Area=22,913 sf 21.50% Impervious Runoff Depth=2.60"
Tc=6.0 min CN=69 Runoff=1.59 cfs 0.114 af

SubcatchmentCB6S: CB6 Runoff Area=21,810 sf 34.59% Impervious Runoff Depth=3.06"
Tc=6.0 min CN=74 Runoff=1.80 cfs 0.128 af

SubcatchmentCB7S: CB7 Runoff Area=16,828 sf 31.55% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=73 Runoff=1.34 cfs 0.095 af

SubcatchmentCB8S: CB8 Runoff Area=18,403 sf 35.89% Impervious Runoff Depth=3.06"
Tc=6.0 min CN=74 Runoff=1.52 cfs 0.108 af

SubcatchmentCB9S: CB9S Runoff Area=11,098 sf 24.37% Impervious Runoff Depth=3.45"
Tc=6.0 min CN=78 Runoff=1.03 cfs 0.073 af

SubcatchmentSW1S: Swale 1 Runoff Area=115,986 sf 16.39% Impervious Runoff Depth=2.60"
Flow Length=816' Tc=13.9 min CN=69 Runoff=6.23 cfs 0.576 af

SubcatchmentSW2S: Swale v2 Runoff Area=15,068 sf 0.00% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=65 Runoff=0.89 cfs 0.065 af

Reach 1R: Analysis Point #1 Inflow=12.53 cfs 2.425 af
Outflow=12.53 cfs 2.425 af

Reach 2R: Analysis Point #2 Inflow=6.41 cfs 0.547 af
Outflow=6.41 cfs 0.547 af

Reach SW1R: Swale 1 Avg. Flow Depth=1.28' Max Vel=0.58 fps Inflow=6.23 cfs 0.576 af
n=0.150 L=555.0' S=0.0050 '/' Capacity=11.94 cfs Outflow=4.34 cfs 0.576 af

Reach SW2R: Swale 2 Avg. Flow Depth=0.47' Max Vel=0.43 fps Inflow=0.89 cfs 0.065 af
n=0.150 L=460.0' S=0.0100 '/' Capacity=14.11 cfs Outflow=0.49 cfs 0.065 af

Pond 1P: Pond 1P Peak Elev=218.47' Storage=27,273 cf Inflow=16.77 cfs 1.224 af
Outflow=4.25 cfs 1.224 af

Pond 2P: Pond 2P Peak Elev=217.75' Storage=4,074 cf Inflow=2.74 cfs 0.236 af
Outflow=1.74 cfs 0.236 af

Pond 3P: CB 3 Peak Elev=221.92' Inflow=0.32 cfs 0.026 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0150 '/' Outflow=0.32 cfs 0.026 af

Pond CB10P: CB 10 Peak Elev=217.90' Inflow=2.23 cfs 0.200 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=2.23 cfs 0.200 af

Pond CB11P: CB 11 Peak Elev=220.19' Inflow=2.73 cfs 0.198 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=2.73 cfs 0.198 af

Pond CB12P: CB 12 Peak Elev=219.85' Inflow=5.57 cfs 0.400 af
15.0" Round Culvert n=0.012 L=156.0' S=0.0050 '/' Outflow=5.57 cfs 0.400 af

Pond CB1P: CB 1 Peak Elev=227.69' Inflow=0.57 cfs 0.041 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0200 '/' Outflow=0.57 cfs 0.041 af

Pond CB2P: CB 2 Peak Elev=227.22' Inflow=0.74 cfs 0.055 af
12.0" Round Culvert n=0.012 L=137.0' S=0.0400 '/' Outflow=0.74 cfs 0.055 af

Pond CB4P: CB 4 Peak Elev=221.87' Inflow=2.02 cfs 0.159 af
15.0" Round Culvert n=0.012 L=71.0' S=0.0099 '/' Outflow=2.02 cfs 0.159 af

Pond CB5P: CB 5 Peak Elev=221.52' Inflow=1.59 cfs 0.114 af
15.0" Round Culvert n=0.012 L=26.0' S=0.0050 '/' Outflow=1.59 cfs 0.114 af

Pond CB6P: CB 6 Peak Elev=219.69' Inflow=5.40 cfs 0.400 af
24.0" Round Culvert n=0.012 L=48.0' S=0.0050 '/' Outflow=5.40 cfs 0.400 af

Pond CB7P: CB 7 Peak Elev=219.15' Inflow=6.74 cfs 0.496 af
24.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=6.74 cfs 0.496 af

Pond CB8P: CB 8 Peak Elev=218.79' Inflow=8.25 cfs 0.604 af
24.0" Round Culvert n=0.012 L=148.0' S=0.0049 '/' Outflow=8.25 cfs 0.604 af

Pond CB9P: CB 9 Peak Elev=217.98' Inflow=1.37 cfs 0.138 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=1.37 cfs 0.138 af

Pond DMH1P: DMH 1 Peak Elev=221.40' Inflow=3.60 cfs 0.273 af
15.0" Round Culvert n=0.012 L=134.0' S=0.0099 '/' Outflow=3.60 cfs 0.273 af

Pond DMH2P: DMH2 Peak Elev=219.40' Inflow=5.40 cfs 0.400 af
24.0" Round Culvert n=0.012 L=56.0' S=0.0050 '/' Outflow=5.40 cfs 0.400 af

Total Runoff Area = 16.137 ac Runoff Volume = 2.972 af Average Runoff Depth = 2.21"
84.72% Pervious = 13.672 ac 15.28% Impervious = 2.465 ac

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 3.83 cfs @ 12.21 hrs, Volume= 0.389 af, Depth= 1.59"
Routed to Reach 1R : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
113,422	55	Woods, Good, HSG B
14,856	70	Woods, Good, HSG C
128,278	57	Weighted Average
128,278		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	12	0.0200	0.89		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
4.6	38	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.1	154	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.9	552	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	60	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.9	816	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 2.95 cfs @ 12.10 hrs, Volume= 0.221 af, Depth= 1.91"
Routed to Pond 1P : Pond 1P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
60,563	61	>75% Grass cover, Good, HSG B
60,563		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.036 af, Depth= 2.87"
Routed to Pond 2P : Pond 2P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
1,179	61	>75% Grass cover, Good, HSG B
5,398	74	>75% Grass cover, Good, HSG C
6,577	72	Weighted Average
6,577		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 20S: Subcatchment 20S

Runoff = 6.41 cfs @ 12.14 hrs, Volume= 0.547 af, Depth= 1.82"
Routed to Reach 2R : Analysis Point #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
9,405	98	Paved roads w/curbs & sewers, HSG D
8,332	98	Paved roads w/curbs & sewers, HSG A
345	98	Roofs, HSG D
6,327	98	Roofs, HSG A
4,744	98	Paved parking, HSG A
11,729	80	>75% Grass cover, Good, HSG D
29,266	39	>75% Grass cover, Good, HSG A
45,733	55	Woods, Good, HSG B
17,395	70	Woods, Good, HSG C
23,415	30	Woods, Good, HSG A
156,691	60	Weighted Average
127,538		81.39% Pervious Area
29,153		18.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.93		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
3.7	35	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.3	192	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	94	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	40	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	324	0.0100	5.09	35.64	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=1.00' Z= 1.0 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
9.4	700	Total			

Summary for Subcatchment CB10S: CB10S

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.062 af, Depth= 3.55"
Routed to Pond CB10P : CB 10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
942	98	Paved parking, HSG B
385	98	Paved parking, HSG B
1,109	98	Paved parking, HSG C
304	98	Paved parking, HSG C
286	98	Paved parking, HSG D
2,795	61	>75% Grass cover, Good, HSG B
3,011	74	>75% Grass cover, Good, HSG C
286	98	Paved parking, HSG D
9,118	79	Weighted Average
5,806		63.68% Pervious Area
3,312		36.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB11S: CB11

Runoff = 2.73 cfs @ 12.09 hrs, Volume= 0.198 af, Depth= 2.33"
Routed to Pond CB11P : CB 11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
6,031	98	Paved roads w/curbs & sewers, HSG B
38,407	61	>75% Grass cover, Good, HSG B
44,438	66	Weighted Average
38,407		86.43% Pervious Area
6,031		13.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB12S: CB 12

Runoff = 2.84 cfs @ 12.09 hrs, Volume= 0.202 af, Depth= 3.06"
Routed to Pond CB12P : CB 12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
5,156	98	Roofs, HSG B
6,603	98	Paved roads w/curbs & sewers, HSG B
22,703	61	>75% Grass cover, Good, HSG B
34,462	74	Weighted Average
22,703		65.88% Pervious Area
11,759		34.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB1S: CB1

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 2.51"
Routed to Pond CB1P : CB 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
2,785	98	Paved roads w/curbs & sewers, HSG B
1,315	98	Paved parking, HSG A
4,384	39	>75% Grass cover, Good, HSG A
8,484	68	Weighted Average
4,384		51.67% Pervious Area
4,100		48.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB2S: CB2

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.015 af, Depth= 5.61"
Routed to Pond CB2P : CB 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
1,365	98	Paved roads w/curbs & sewers, HSG B
1,365		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB3S: CB3

Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 5.61"
Routed to Pond 3P : CB 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
2,400	98	Paved parking, HSG B
2,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB4S: CB4

Runoff = 0.96 cfs @ 12.10 hrs, Volume= 0.078 af, Depth= 1.43"
Routed to Pond CB4P : CB 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
682	98	Paved roads w/curbs & sewers, HSG A
1,675	98	Paved roads w/curbs & sewers, HSG B
805	98	Paved parking, HSG A
12,630	39	>75% Grass cover, Good, HSG A
12,643	61	>75% Grass cover, Good, HSG B
28,435	55	Weighted Average
25,273		88.88% Pervious Area
3,162		11.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB5S: CB5

Runoff = 1.59 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 2.60"
Routed to Pond CB5P : CB 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
2,578	98	Roofs, HSG B
2,349	98	Paved roads w/curbs & sewers, HSG B
17,986	61	>75% Grass cover, Good, HSG B
22,913	69	Weighted Average
17,986		78.50% Pervious Area
4,927		21.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB6S: CB6

Runoff = 1.80 cfs @ 12.09 hrs, Volume= 0.128 af, Depth= 3.06"
Routed to Pond CB6P : CB 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
5,156	98	Roofs, HSG B
2,388	98	Paved roads w/curbs & sewers, HSG B
14,266	61	>75% Grass cover, Good, HSG B
21,810	74	Weighted Average
14,266		65.41% Pervious Area
7,544		34.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB7S: CB7

Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.095 af, Depth= 2.96"
Routed to Pond CB7P : CB 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
2,578	98	Roofs, HSG B
2,732	98	Paved roads w/curbs & sewers, HSG B
11,518	61	>75% Grass cover, Good, HSG B
16,828	73	Weighted Average
11,518		68.45% Pervious Area
5,310		31.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB8S: CB8

Runoff = 1.52 cfs @ 12.09 hrs, Volume= 0.108 af, Depth= 3.06"
Routed to Pond CB8P : CB 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
2,578	98	Roofs, HSG B
4,026	98	Paved parking, HSG B
11,799	61	>75% Grass cover, Good, HSG B
18,403	74	Weighted Average
11,799		64.11% Pervious Area
6,604		35.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment CB9S: CB9S

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 3.45"
Routed to Pond CB9P : CB 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
828	98	Paved parking, HSG B
1,877	98	Paved parking, HSG C
1,246	61	>75% Grass cover, Good, HSG B
7,147	74	>75% Grass cover, Good, HSG C
11,098	78	Weighted Average
8,393		75.63% Pervious Area
2,705		24.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment SW1S: Swale 1

Runoff = 6.23 cfs @ 12.19 hrs, Volume= 0.576 af, Depth= 2.60"
Routed to Reach SW1R : Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
4,397	98	Roofs, HSG D
2,063	98	Roofs, HSG A
4,880	98	Paved roads w/curbs & sewers, HSG D
1,362	98	Paved roads w/curbs & sewers, HSG A
4,203	98	Paved parking, HSG D
2,100	98	Paved parking, HSG A
30,233	80	>75% Grass cover, Good, HSG D
24,845	61	>75% Grass cover, Good, HSG B
9,293	39	>75% Grass cover, Good, HSG A
32,610	55	Woods, Good, HSG B
115,986	69	Weighted Average
96,981		83.61% Pervious Area
19,005		16.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	12	0.0200	0.89		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
4.6	38	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.1	154	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.9	552	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	60	0.0330	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.9	816	Total			

Summary for Subcatchment SW2S: Swale v2

Runoff = 0.89 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 2.24"
Routed to Reach SW2R : Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.85"

Area (sf)	CN	Description
10,928	61	>75% Grass cover, Good, HSG B
4,140	74	>75% Grass cover, Good, HSG C
15,068	65	Weighted Average
15,068		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 1R: Analysis Point #1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.540 ac, 14.32% Impervious, Inflow Depth = 2.32" for 25-Year Storm event
Inflow = 12.53 cfs @ 12.37 hrs, Volume= 2.425 af
Outflow = 12.53 cfs @ 12.37 hrs, Volume= 2.425 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 2R: Analysis Point #2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.597 ac, 18.61% Impervious, Inflow Depth = 1.82" for 25-Year Storm event
Inflow = 6.41 cfs @ 12.14 hrs, Volume= 0.547 af
Outflow = 6.41 cfs @ 12.14 hrs, Volume= 0.547 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SW1R: Swale 1

Inflow Area = 2.663 ac, 16.39% Impervious, Inflow Depth = 2.60" for 25-Year Storm event
Inflow = 6.23 cfs @ 12.19 hrs, Volume= 0.576 af
Outflow = 4.34 cfs @ 12.37 hrs, Volume= 0.576 af, Atten= 30%, Lag= 10.5 min
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.58 fps, Min. Travel Time= 16.0 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 64.5 min

Peak Storage= 4,175 cf @ 12.37 hrs
Average Depth at Peak Storage= 1.28' , Surface Width= 9.71'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 11.94 cfs

2.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 555.0' Slope= 0.0050 '/'
Inlet Invert= 224.80', Outlet Invert= 222.00'

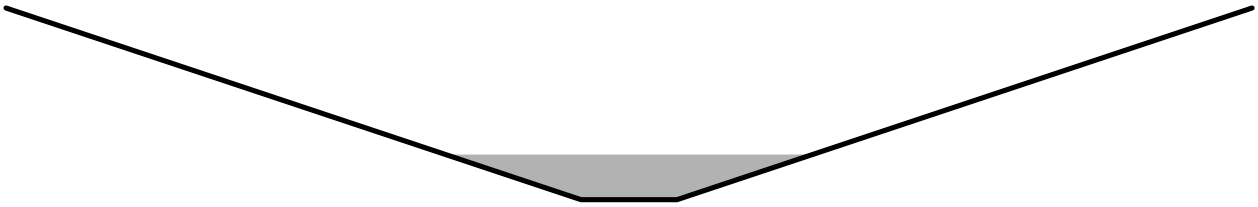
Summary for Reach SW2R: Swale 2

Inflow Area = 0.346 ac, 0.00% Impervious, Inflow Depth = 2.24" for 25-Year Storm event
Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.065 af
Outflow = 0.49 cfs @ 12.24 hrs, Volume= 0.065 af, Atten= 45%, Lag= 9.0 min
Routed to Pond CB9P : CB 9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.43 fps, Min. Travel Time= 17.9 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 52.8 min

Peak Storage= 520 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 3.82'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 14.11 cfs

1.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 13.00'
Length= 460.0' Slope= 0.0100 '/'
Inlet Invert= 222.90', Outlet Invert= 218.30'



Summary for Pond 1P: Pond 1P

[80] Warning: Exceeded Pond CB12P by 0.25' @ 24.34 hrs (0.13 cfs 0.007 af)
[80] Warning: Exceeded Pond CB8P by 0.84' @ 24.34 hrs (3.00 cfs 0.372 af)

Inflow Area = 5.971 ac, 20.45% Impervious, Inflow Depth = 2.46" for 25-Year Storm event
Inflow = 16.77 cfs @ 12.09 hrs, Volume= 1.224 af
Outflow = 4.25 cfs @ 12.50 hrs, Volume= 1.224 af, Atten= 75%, Lag= 24.8 min
Primary = 4.25 cfs @ 12.50 hrs, Volume= 1.224 af
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Starting Elev= 215.25' Surf.Area= 11,579 sf Storage= 5,465 cf
Peak Elev= 218.47' @ 12.50 hrs Surf.Area= 15,893 sf Storage= 27,273 cf (21,808 cf above start)

Plug-Flow detention time= 684.1 min calculated for 1.099 af (90% of inflow)
Center-of-Mass det. time= 558.5 min (1,399.4 - 840.9)

Volume	Invert	Avail.Storage	Storage Description
#1	214.07'	53,644 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.07	11,579	569.7	0.0	0	0	11,579
214.08	11,579	569.7	40.0	46	46	11,585
215.25	11,579	569.7	40.0	5,419	5,465	12,251
215.49	11,579	569.7	40.0	1,112	6,577	12,388
215.50	11,579	569.7	5.0	6	6,583	12,394
216.99	11,579	569.7	5.0	863	7,445	13,243
217.00	11,579	569.7	100.0	116	7,561	13,248
218.00	13,316	588.5	100.0	12,437	19,998	15,075
218.01	15,117	564.0	100.0	142	20,141	17,322
220.00	18,615	601.7	100.0	33,503	53,644	21,007

Device	Routing	Invert	Outlet Devices
#1	Primary	215.25'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.25' / 215.15' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	215.25'	**1.7" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	218.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	219.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.25 cfs @ 12.50 hrs HW=218.47' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 4.25 cfs of 4.92 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 8.54 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 4.12 cfs @ 2.24 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: Pond 2P

[80] Warning: Exceeded Pond CB10P by 1.53' @ 24.26 hrs (4.33 cfs 2.783 af)

Inflow Area = 0.961 ac, 14.37% Impervious, Inflow Depth = 2.94" for 25-Year Storm event
Inflow = 2.74 cfs @ 12.09 hrs, Volume= 0.236 af
Outflow = 1.74 cfs @ 12.23 hrs, Volume= 0.236 af, Atten= 36%, Lag= 8.3 min
Primary = 1.74 cfs @ 12.23 hrs, Volume= 0.236 af
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Starting Elev= 215.25' Surf.Area= 2,766 sf Storage= 1,306 cf
Peak Elev= 217.75' @ 12.23 hrs Surf.Area= 3,288 sf Storage= 4,074 cf (2,768 cf above start)

Plug-Flow detention time= 433.6 min calculated for 0.206 af (87% of inflow)
Center-of-Mass det. time= 312.1 min (1,150.4 - 838.4)

Volume	Invert	Avail.Storage	Storage Description
#1	214.07'	9,535 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.07	2,766	220.8	0.0	0	0	2,766
214.08	2,766	220.8	40.0	11	11	2,768
215.25	2,766	220.8	40.0	1,294	1,306	3,027
215.49	2,766	220.8	40.0	266	1,571	3,080
215.50	2,766	220.8	5.0	1	1,572	3,082
216.99	2,766	220.8	5.0	206	1,779	3,411
217.00	2,766	220.8	100.0	28	1,806	3,413
217.99	3,465	242.0	100.0	3,078	4,884	4,227
218.00	4,158	262.0	100.0	38	4,922	5,029
219.00	5,084	323.6	100.0	4,613	9,535	7,914

Device	Routing	Invert	Outlet Devices
#1	Primary	215.25'	**18.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.25' / 215.00' S= 0.0250 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	215.25'	**0.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	217.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	218.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.74 cfs @ 12.23 hrs HW=217.75' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.74 cfs of 8.89 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 7.56 fps)
  ├**3=Sharp-Crested Rectangular Weir**(Weir Controls 1.71 cfs @ 1.73 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: CB 3

Inflow Area = 0.055 ac,100.00% Impervious, Inflow Depth = 5.61" for 25-Year Storm event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Routed to Pond CB4P : CB 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.92' @ 12.09 hrs
Flood Elev= 225.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	221.42'	**15.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 221.42' / 221.09' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.32 cfs @ 12.08 hrs HW=221.91' TW=221.86' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.32 cfs @ 1.05 fps)

Summary for Pond CB10P: CB 10

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=17)
[80] Warning: Exceeded Pond CB9P by 1.02' @ 34.05 hrs (2.52 cfs 1.011 af)

Inflow Area = 0.810 ac, 17.05% Impervious, Inflow Depth = 2.96" for 25-Year Storm event
Inflow = 2.23 cfs @ 12.10 hrs, Volume= 0.200 af
Outflow = 2.23 cfs @ 12.10 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min
Primary = 2.23 cfs @ 12.10 hrs, Volume= 0.200 af
Routed to Pond 2P : Pond 2P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 217.90' @ 12.13 hrs
Flood Elev= 219.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.98'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.98' / 215.93' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.23 cfs @ 12.10 hrs HW=217.85' TW=217.63' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.23 cfs @ 1.81 fps)

Summary for Pond CB11P: CB 11

Inflow Area = 1.020 ac, 13.57% Impervious, Inflow Depth = 2.33" for 25-Year Storm event
Inflow = 2.73 cfs @ 12.09 hrs, Volume= 0.198 af
Outflow = 2.73 cfs @ 12.09 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min
Primary = 2.73 cfs @ 12.09 hrs, Volume= 0.198 af
Routed to Pond CB12P : CB 12

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 220.19' @ 12.09 hrs
Flood Elev= 221.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.99'	**15.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.99' / 217.88' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.73 cfs @ 12.09 hrs HW=220.18' TW=219.84' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.73 cfs @ 2.22 fps)

Summary for Pond CB12P: CB 12

[80] Warning: Exceeded Pond CB11P by 0.04' @ 24.36 hrs (0.00 cfs 0.000 af)

Inflow Area = 1.811 ac, 22.55% Impervious, Inflow Depth = 2.65" for 25-Year Storm event
Inflow = 5.57 cfs @ 12.09 hrs, Volume= 0.400 af
Outflow = 5.57 cfs @ 12.09 hrs, Volume= 0.400 af, Atten= 0%, Lag= 0.0 min
Primary = 5.57 cfs @ 12.09 hrs, Volume= 0.400 af
Routed to Pond 1P : Pond 1P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 219.85' @ 12.09 hrs
Flood Elev= 221.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.78'	**15.0" Round Culvert** L= 156.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.78' / 217.00' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.56 cfs @ 12.09 hrs HW=219.85' TW=217.85' (Dynamic Tailwater)
1=Culvert (Barrel Controls 5.56 cfs @ 4.53 fps)

Summary for Pond CB1P: CB 1

Inflow Area = 0.195 ac, 48.33% Impervious, Inflow Depth = 2.51" for 25-Year Storm event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af
Routed to Pond CB2P : CB 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 227.69' @ 12.09 hrs
Flood Elev= 231.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	227.26'	**12.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.26' / 226.82' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.09 hrs HW=227.69' TW=227.22' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.56 cfs @ 1.76 fps)

Summary for Pond CB2P: CB 2

Inflow Area = 0.226 ac, 55.49% Impervious, Inflow Depth = 2.94" for 25-Year Storm event
Inflow = 0.74 cfs @ 12.09 hrs, Volume= 0.055 af
Outflow = 0.74 cfs @ 12.09 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min
Primary = 0.74 cfs @ 12.09 hrs, Volume= 0.055 af
Routed to Pond CB4P : CB 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 227.22' @ 12.09 hrs
Flood Elev= 231.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	226.72'	**12.0" Round Culvert** L= 137.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.72' / 221.24' S= 0.0400 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.74 cfs @ 12.09 hrs HW=227.22' TW=221.87' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.74 cfs @ 1.90 fps)

Summary for Pond CB4P: CB 4

Inflow Area = 0.934 ac, 27.10% Impervious, Inflow Depth = 2.04" for 25-Year Storm event
Inflow = 2.02 cfs @ 12.09 hrs, Volume= 0.159 af
Outflow = 2.02 cfs @ 12.09 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min
Primary = 2.02 cfs @ 12.09 hrs, Volume= 0.159 af
Routed to Pond DMH1P : DMH 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.87' @ 12.09 hrs
Flood Elev= 225.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.99'	**15.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.99' / 220.29' S= 0.0099 '/' Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.01 cfs @ 12.09 hrs HW=221.87' TW=221.40' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.01 cfs @ 3.06 fps)

Summary for Pond CB5P: CB 5

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=45)

Inflow Area = 0.526 ac, 21.50% Impervious, Inflow Depth = 2.60" for 25-Year Storm event
Inflow = 1.59 cfs @ 12.09 hrs, Volume= 0.114 af
Outflow = 1.59 cfs @ 12.09 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.09 hrs, Volume= 0.114 af
Routed to Pond DMH1P : DMH 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.52' @ 12.09 hrs
Flood Elev= 222.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	219.00'	**15.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 219.00' / 218.87' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.59 cfs @ 12.09 hrs HW=221.52' TW=221.40' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.59 cfs @ 1.29 fps)

Summary for Pond CB6P: CB 6

Inflow Area = 1.961 ac, 27.51% Impervious, Inflow Depth = 2.45" for 25-Year Storm event
Inflow = 5.40 cfs @ 12.09 hrs, Volume= 0.400 af
Outflow = 5.40 cfs @ 12.09 hrs, Volume= 0.400 af, Atten= 0%, Lag= 0.0 min
Primary = 5.40 cfs @ 12.09 hrs, Volume= 0.400 af
Routed to Pond DMH2P : DMH2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 219.69' @ 12.10 hrs
Flood Elev= 222.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	218.12'	**24.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 218.12' / 217.88' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.37 cfs @ 12.09 hrs HW=219.69' TW=219.40' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.37 cfs @ 2.03 fps)

Summary for Pond CB7P: CB 7

[80] Warning: Exceeded Pond DMH2P by 0.10' @ 24.42 hrs (0.08 cfs 0.011 af)

Inflow Area = 2.347 ac, 28.18% Impervious, Inflow Depth = 2.54" for 25-Year Storm event
Inflow = 6.74 cfs @ 12.09 hrs, Volume= 0.496 af
Outflow = 6.74 cfs @ 12.09 hrs, Volume= 0.496 af, Atten= 0%, Lag= 0.0 min
Primary = 6.74 cfs @ 12.09 hrs, Volume= 0.496 af
Routed to Pond CB8P : CB 8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 219.15' @ 12.10 hrs
Flood Elev= 222.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.40'	**24.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.40' / 217.29' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.73 cfs @ 12.09 hrs HW=219.14' TW=218.77' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.73 cfs @ 2.32 fps)

Summary for Pond CB8P: CB 8

[80] Warning: Exceeded Pond CB7P by 0.61' @ 24.35 hrs (1.44 cfs 0.165 af)

Inflow Area = 2.769 ac, 29.35% Impervious, Inflow Depth = 2.62" for 25-Year Storm event
Inflow = 8.25 cfs @ 12.09 hrs, Volume= 0.604 af
Outflow = 8.25 cfs @ 12.09 hrs, Volume= 0.604 af, Atten= 0%, Lag= 0.0 min
Primary = 8.25 cfs @ 12.09 hrs, Volume= 0.604 af
Routed to Pond 1P : Pond 1P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 218.79' @ 12.11 hrs
Flood Elev= 222.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.19'	**24.0" Round Culvert** L= 148.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.19' / 216.46' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.25 cfs @ 12.09 hrs HW=218.77' TW=217.85' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.25 cfs @ 4.25 fps)

Summary for Pond CB9P: CB 9

Inflow Area = 0.601 ac, 10.34% Impervious, Inflow Depth = 2.75" for 25-Year Storm event
Inflow = 1.37 cfs @ 12.10 hrs, Volume= 0.138 af
Outflow = 1.37 cfs @ 12.10 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.10 hrs, Volume= 0.138 af
Routed to Pond CB10P : CB 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 217.98' @ 12.13 hrs
Flood Elev= 219.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	216.19'	**15.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 216.19' / 216.08' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.37 cfs @ 12.10 hrs HW=217.95' TW=217.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.37 cfs @ 1.11 fps)

Summary for Pond DMH1P: DMH 1

[80] Warning: Exceeded Pond CB5P by 1.23' @ 24.12 hrs (3.40 cfs 43.500 af)

Inflow Area = 1.460 ac, 25.09% Impervious, Inflow Depth = 2.24" for 25-Year Storm event
Inflow = 3.60 cfs @ 12.09 hrs, Volume= 0.273 af
Outflow = 3.60 cfs @ 12.09 hrs, Volume= 0.273 af, Atten= 0%, Lag= 0.0 min
Primary = 3.60 cfs @ 12.09 hrs, Volume= 0.273 af
Routed to Pond CB6P : CB 6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 221.40' @ 12.09 hrs
Flood Elev= 224.36'

Device	Routing	Invert	Outlet Devices
#1	Primary	220.19'	**15.0" Round Culvert** L= 134.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.19' / 218.87' S= 0.0099 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.60 cfs @ 12.09 hrs HW=221.40' TW=219.69' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.60 cfs @ 2.96 fps)

Summary for Pond DMH2P: DMH2

Inflow Area = 1.961 ac, 27.51% Impervious, Inflow Depth = 2.45" for 25-Year Storm event
Inflow = 5.40 cfs @ 12.09 hrs, Volume= 0.400 af
Outflow = 5.40 cfs @ 12.09 hrs, Volume= 0.400 af, Atten= 0%, Lag= 0.0 min
Primary = 5.40 cfs @ 12.09 hrs, Volume= 0.400 af
Routed to Pond CB7P : CB 7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 219.40' @ 12.10 hrs
Flood Elev= 221.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	217.78'	**24.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 217.78' / 217.50' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.26 cfs @ 12.09 hrs HW=219.40' TW=219.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.26 cfs @ 2.63 fps)

Time span=0.00-600.00 hrs, dt=0.01 hrs, 60001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Subcatchment10S Runoff Area=128,278 sf 0.00% Impervious Runoff Depth=2.29"
Flow Length=816' Tc=13.9 min CN=57 Runoff=5.81 cfs 0.563 af

Subcatchment11S: Subcatchment11S Runoff Area=60,563 sf 0.00% Impervious Runoff Depth=2.68"
Tc=6.0 min CN=61 Runoff=4.26 cfs 0.311 af

Subcatchment12S: Subcatchment12S Runoff Area=6,577 sf 0.00% Impervious Runoff Depth=3.80"
Tc=6.0 min CN=72 Runoff=0.67 cfs 0.048 af

Subcatchment20S: Subcatchment20S Runoff Area=156,691 sf 18.61% Impervious Runoff Depth=2.58"
Flow Length=700' Tc=9.4 min CN=60 Runoff=9.37 cfs 0.774 af

SubcatchmentCB10S: CB10S Runoff Area=9,118 sf 36.32% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=79 Runoff=1.11 cfs 0.079 af

SubcatchmentCB11S: CB11 Runoff Area=44,438 sf 13.57% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=66 Runoff=3.78 cfs 0.270 af

SubcatchmentCB12S: CB 12 Runoff Area=34,462 sf 34.12% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=74 Runoff=3.73 cfs 0.265 af

SubcatchmentCB1S: CB1 Runoff Area=8,484 sf 48.33% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=68 Runoff=0.77 cfs 0.055 af

SubcatchmentCB2S: CB2 Runoff Area=1,365 sf 100.00% Impervious Runoff Depth=6.73"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

SubcatchmentCB3S: CB3 Runoff Area=2,400 sf 100.00% Impervious Runoff Depth=6.73"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.031 af

SubcatchmentCB4S: CB4 Runoff Area=28,435 sf 11.12% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=55 Runoff=1.50 cfs 0.114 af

SubcatchmentCB5S: CB5 Runoff Area=22,913 sf 21.50% Impervious Runoff Depth=3.49"
Tc=6.0 min CN=69 Runoff=2.15 cfs 0.153 af

SubcatchmentCB6S: CB6 Runoff Area=21,810 sf 34.59% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=74 Runoff=2.36 cfs 0.168 af

SubcatchmentCB7S: CB7 Runoff Area=16,828 sf 31.55% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=73 Runoff=1.77 cfs 0.126 af

SubcatchmentCB8S: CB8 Runoff Area=18,403 sf 35.89% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=74 Runoff=1.99 cfs 0.141 af

SubcatchmentCB9S: CB9S Runoff Area=11,098 sf 24.37% Impervious Runoff Depth=4.45"
Tc=6.0 min CN=78 Runoff=1.32 cfs 0.094 af

SubcatchmentSW1S: Swale 1 Runoff Area=115,986 sf 16.39% Impervious Runoff Depth=3.49"
Flow Length=816' Tc=13.9 min CN=69 Runoff=8.46 cfs 0.774 af

SubcatchmentSW2S: Swale v2 Runoff Area=15,068 sf 0.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=65 Runoff=1.24 cfs 0.089 af

Reach 1R: Analysis Point #1 Inflow=18.81 cfs 3.299 af
Outflow=18.81 cfs 3.299 af

Reach 2R: Analysis Point #2 Inflow=9.37 cfs 0.774 af
Outflow=9.37 cfs 0.774 af

Reach SW1R: Swale 1 Avg. Flow Depth=1.49' Max Vel=0.63 fps Inflow=8.46 cfs 0.774 af
n=0.150 L=555.0' S=0.0050 '/' Capacity=11.94 cfs Outflow=6.08 cfs 0.774 af

Reach SW2R: Swale 2 Avg. Flow Depth=0.56' Max Vel=0.47 fps Inflow=1.24 cfs 0.089 af
n=0.150 L=460.0' S=0.0100 '/' Capacity=14.11 cfs Outflow=0.71 cfs 0.089 af

Pond 1P: Pond 1P Peak Elev=218.90' Storage=34,222 cf Inflow=22.92 cfs 1.651 af
Outflow=5.30 cfs 1.651 af

Pond 2P: Pond 2P Peak Elev=217.85' Storage=4,395 cf Inflow=3.62 cfs 0.311 af
Outflow=2.87 cfs 0.311 af

Pond 3P: CB 3 Peak Elev=222.37' Inflow=0.38 cfs 0.031 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0150 '/' Outflow=0.38 cfs 0.031 af

Pond CB10P: CB 10 Peak Elev=218.21' Inflow=2.95 cfs 0.263 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=2.95 cfs 0.263 af

Pond CB11P: CB 11 Peak Elev=221.82' Inflow=3.78 cfs 0.270 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=3.78 cfs 0.270 af

Pond CB12P: CB 12 Peak Elev=221.17' Inflow=7.50 cfs 0.535 af
15.0" Round Culvert n=0.012 L=156.0' S=0.0050 '/' Outflow=7.50 cfs 0.535 af

Pond CB1P: CB 1 Peak Elev=227.77' Inflow=0.77 cfs 0.055 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0200 '/' Outflow=0.77 cfs 0.055 af

Pond CB2P: CB 2 Peak Elev=227.31' Inflow=0.98 cfs 0.073 af
12.0" Round Culvert n=0.012 L=137.0' S=0.0400 '/' Outflow=0.98 cfs 0.073 af

Pond CB4P: CB 4 Peak Elev=222.36' Inflow=2.86 cfs 0.218 af
15.0" Round Culvert n=0.012 L=71.0' S=0.0099 '/' Outflow=2.86 cfs 0.218 af

Pond CB5P: CB 5 Peak Elev=222.20' Inflow=2.15 cfs 0.153 af
15.0" Round Culvert n=0.012 L=26.0' S=0.0050 '/' Outflow=2.18 cfs 0.153 af

Pond CB6P: CB 6 Peak Elev=220.53' Inflow=7.40 cfs 0.538 af
24.0" Round Culvert n=0.012 L=48.0' S=0.0050 '/' Outflow=7.40 cfs 0.538 af

Pond CB7P: CB 7 Peak Elev=219.79' Inflow=9.17 cfs 0.664 af
24.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=9.17 cfs 0.664 af

Pond CB8P: CB 8 Peak Elev=219.22' Inflow=11.16 cfs 0.806 af
24.0" Round Culvert n=0.012 L=148.0' S=0.0049 '/' Outflow=11.16 cfs 0.806 af

Pond CB9P: CB 9 Peak Elev=218.36' Inflow=1.85 cfs 0.183 af
15.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=1.85 cfs 0.183 af

Pond DMH1P: DMH 1 Peak Elev=221.98' Inflow=5.04 cfs 0.371 af
15.0" Round Culvert n=0.012 L=134.0' S=0.0099 '/' Outflow=5.04 cfs 0.371 af

Pond DMH2P: DMH2 Peak Elev=220.15' Inflow=7.40 cfs 0.538 af
24.0" Round Culvert n=0.012 L=56.0' S=0.0050 '/' Outflow=7.40 cfs 0.538 af

Total Runoff Area = 16.137 ac Runoff Volume = 4.073 af Average Runoff Depth = 3.03"
84.72% Pervious = 13.672 ac 15.28% Impervious = 2.465 ac

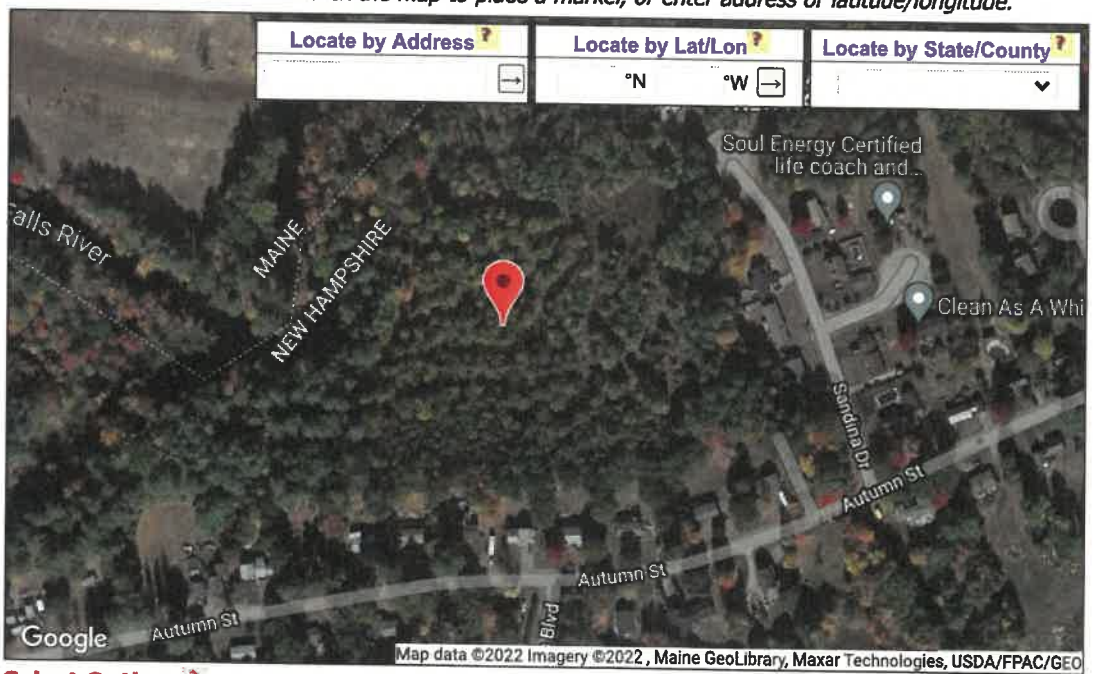
About this Project | Data & Products | Daily Monitoring | Documentation

Select Product

- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps

Select Location *Double-click the map to place a marker, or enter address or latitude/longitude.*

Locate by Address | Locate by Lat/Lon (°N °W) | Locate by State/County



Select Options

Smoothing: Yes

Delivery: Popup

Submit

This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) — Cornell University

Natural Resources Conservation Service (NRCS)

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.951 degrees West
Latitude	43.334 degrees North
Elevation	0 feet
Date/Time	Fri, 10 Jun 2022 11:33:39 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.81	1.02	**1yr**	0.70	0.97	1.19	1.53	1.97	2.55	2.85	**1yr**	2.26	2.74	3.16	3.89	4.44	**1yr**
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.16	1.49	1.90	2.42	3.10	3.47	**2yr**	2.74	3.34	3.84	4.57	5.21	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.37	3.04	3.90	4.43	**5yr**	3.45	4.26	4.89	5.73	6.48	**5yr**
10yr	0.41	0.64	0.81	1.10	1.44	1.86	**10yr**	1.24	1.69	2.19	2.82	3.62	4.64	5.33	**10yr**	4.11	5.13	5.89	6.81	7.65	**10yr**
25yr	0.47	0.75	0.96	1.32	1.76	2.31	**25yr**	1.52	2.09	2.73	3.53	4.55	5.85	6.82	**25yr**	5.18	6.55	7.52	8.56	9.54	**25yr**
50yr	0.53	0.85	1.09	1.53	2.06	2.72	**50yr**	1.77	2.46	3.23	4.20	5.43	6.97	8.21	**50yr**	6.17	7.90	9.06	10.17	11.27	**50yr**
100yr	0.59	0.96	1.24	1.76	2.40	3.22	**100yr**	2.08	2.89	3.84	5.00	6.47	8.32	9.90	**100yr**	7.36	9.52	10.91	12.10	13.33	**100yr**
200yr	0.67	1.10	1.42	2.04	2.81	3.79	**200yr**	2.43	3.41	4.54	5.94	7.70	9.92	11.94	**200yr**	8.78	11.48	13.16	14.40	15.76	**200yr**
500yr	0.80	1.31	1.71	2.48	3.47	4.72	**500yr**	3.00	4.24	5.67	7.46	9.70	12.53	15.29	**500yr**	11.09	14.70	16.85	18.13	19.69	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.60	0.73	0.89	1yr	0.63	0.87	0.93	1.25	1.43	2.09	2.40	1yr	1.85	2.31	2.89	3.39	3.99	1yr
2yr	0.31	0.48	0.59	0.80	0.99	1.17	2yr	0.85	1.15	1.34	1.80	2.31	3.00	3.35	2yr	2.66	3.22	3.71	4.43	5.05	2yr
5yr	0.35	0.54	0.67	0.91	1.16	1.39	5yr	1.00	1.36	1.59	2.11	2.74	3.60	4.04	5yr	3.18	3.88	4.53	5.31	6.01	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.59	10yr	1.14	1.56	1.80	2.38	3.07	4.10	4.65	10yr	3.63	4.47	5.21	6.09	6.83	10yr
25yr	0.44	0.67	0.84	1.19	1.57	1.90	25yr	1.36	1.86	2.11	2.78	3.54	4.87	5.58	25yr	4.31	5.36	6.31	7.25	8.01	25yr
50yr	0.49	0.74	0.93	1.33	1.79	2.18	50yr	1.55	2.13	2.37	3.12	3.92	5.54	6.39	50yr	4.90	6.15	7.28	8.28	9.20	50yr
100yr	0.55	0.83	1.04	1.50	2.05	2.50	100yr	1.77	2.45	2.68	3.50	4.33	6.29	7.32	100yr	5.57	7.04	8.40	9.46	10.44	100yr
200yr	0.61	0.92	1.16	1.69	2.35	2.88	200yr	2.03	2.81	3.02	3.93	4.78	7.14	8.38	200yr	6.32	8.06	9.68	10.80	11.86	200yr
500yr	0.71	1.06	1.37	1.99	2.83	3.49	500yr	2.44	3.41	3.55	4.58	5.45	8.40	10.01	500yr	7.43	9.63	11.66	12.89	13.98	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.07	1yr	0.75	1.04	1.22	1.69	2.12	2.81	3.09	1yr	2.49	2.97	3.42	4.20	4.78	1yr
2yr	0.33	0.51	0.62	0.84	1.04	1.24	2yr	0.90	1.21	1.44	1.93	2.51	3.23	3.61	2yr	2.86	3.47	3.99	4.73	5.38	2yr
5yr	0.39	0.60	0.75	1.03	1.31	1.57	5yr	1.13	1.54	1.83	2.46	3.16	4.21	4.82	5yr	3.72	4.63	5.26	6.16	6.93	5yr
10yr	0.46	0.70	0.87	1.22	1.58	1.90	10yr	1.36	1.85	2.21	2.99	3.82	5.18	6.00	10yr	4.58	5.77	6.65	7.52	8.40	10yr
25yr	0.56	0.86	1.07	1.52	2.00	2.43	25yr	1.73	2.38	2.84	3.89	4.93	6.83	8.05	25yr	6.05	7.74	8.90	9.98	10.88	25yr
50yr	0.66	1.00	1.24	1.79	2.40	2.93	50yr	2.08	2.87	3.45	4.73	6.01	8.42	10.08	50yr	7.45	9.69	11.13	12.26	13.39	50yr
100yr	0.77	1.17	1.46	2.11	2.89	3.53	100yr	2.50	3.45	4.18	5.78	7.32	10.40	12.61	100yr	9.20	12.13	13.92	15.09	16.34	100yr
200yr	0.90	1.36	1.72	2.49	3.47	4.26	200yr	3.00	4.17	5.08	7.05	8.93	12.87	15.81	200yr	11.39	15.20	17.42	18.57	19.97	200yr
500yr	1.11	1.66	2.13	3.10	4.41	5.45	500yr	3.80	5.33	6.55	9.19	11.62	17.07	21.31	500yr	15.11	20.49	23.46	24.46	26.06	500yr

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Northeast Regional Climate Center

Table 3-4 provides values of runoff depth from pervious areas for various rainfall depths and HSGs. Soils are assigned to an HSG on the basis of their permeability. HSG A is the most permeable, and HSG D is the least permeable. HSG categories for pervious areas in the drainage area shall be estimated by consulting local soil surveys prepared by the National Resource Conservation Service (NRCS) or by a storm water professional evaluating soil testing results from the drainage area. If the HSG condition is not known, a HSG C soil condition should be assumed.

Table 3- 4: Developed Land Pervious Area Runoff Depths based on Precipitation depth and Hydrological Soil Groups (HSGs)

Developed Land Pervious Area Runoff Depths based on Precipitation depth and Hydrological Soil Groups					
Rainfall Depth, Inches	Runoff Depth, inches				
	Pervious HSG A	Pervious HSG B	Pervious HSG C	Pervious HSG C/D	Pervious HSG D
0.10	0.00	0.00	0.00	0.00	0.00
0.20	0.00	0.00	0.01	0.02	0.02
0.40	0.00	0.00	0.03	0.05	0.06
0.50	0.00	0.01	0.05	0.07	0.09
0.60	0.01	0.02	0.06	0.09	0.11
0.80	0.02	0.03	0.09	0.13	0.16
1.00	0.03	0.04	0.12	0.17	0.21
1.20	0.04	0.05	0.14	0.27	0.39
1.50	0.08	0.11	0.39	0.55	0.72
2.00	0.14	0.22	0.69	0.89	1.08

Notes: Runoff depths derived from combination of volumetric runoff coefficients from Table 5 of *Small Storm Hydrology and Why it is Important for the Design of Stormwater Control Practices*, (Pitt, 1999), and using the Stormwater Management Model (SWMM) in continuous model mode for hourly precipitation data for Boston, MA, 1998-2002.

Example 3-3: Determine the design storage volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area has impervious and pervious surfaces*:

*The approach used in this example for phosphorus is equally applicable for nitrogen.

A permittee is considering a gravel wetland system to treat runoff from a high-density residential (HDR) site. The site is 7.5 acres of which 4.0 acres are impervious surfaces and 3.50 acres are pervious surfaces. The pervious area is made up of 2.5 acres of lawns in good condition surrounding cluster housing units and 1.0 acre of stable unmanaged woodland. Soils information indicates that all of the woodland and 0.5 acres of the lawn is hydrologic soil group (HSG) B and the other 2.0 acres of lawn are HSG C. The permittee wants to size the gravel wetland system to achieve a cumulative phosphorus load reduction (P_{Target}) of 55% from the entire 7.5 acres.

Table 3- 19: Gravel Wetland BMP Performance Table

Gravel Wetland BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	19%	26%	41%	51%	57%	61%	65%	66%
Cumulative Nitrogen Load Reduction	22%	33%	48%	57%	64%	68%	74%	79%

Figure 3- 14: BMP Performance Curve: Gravel Wetland

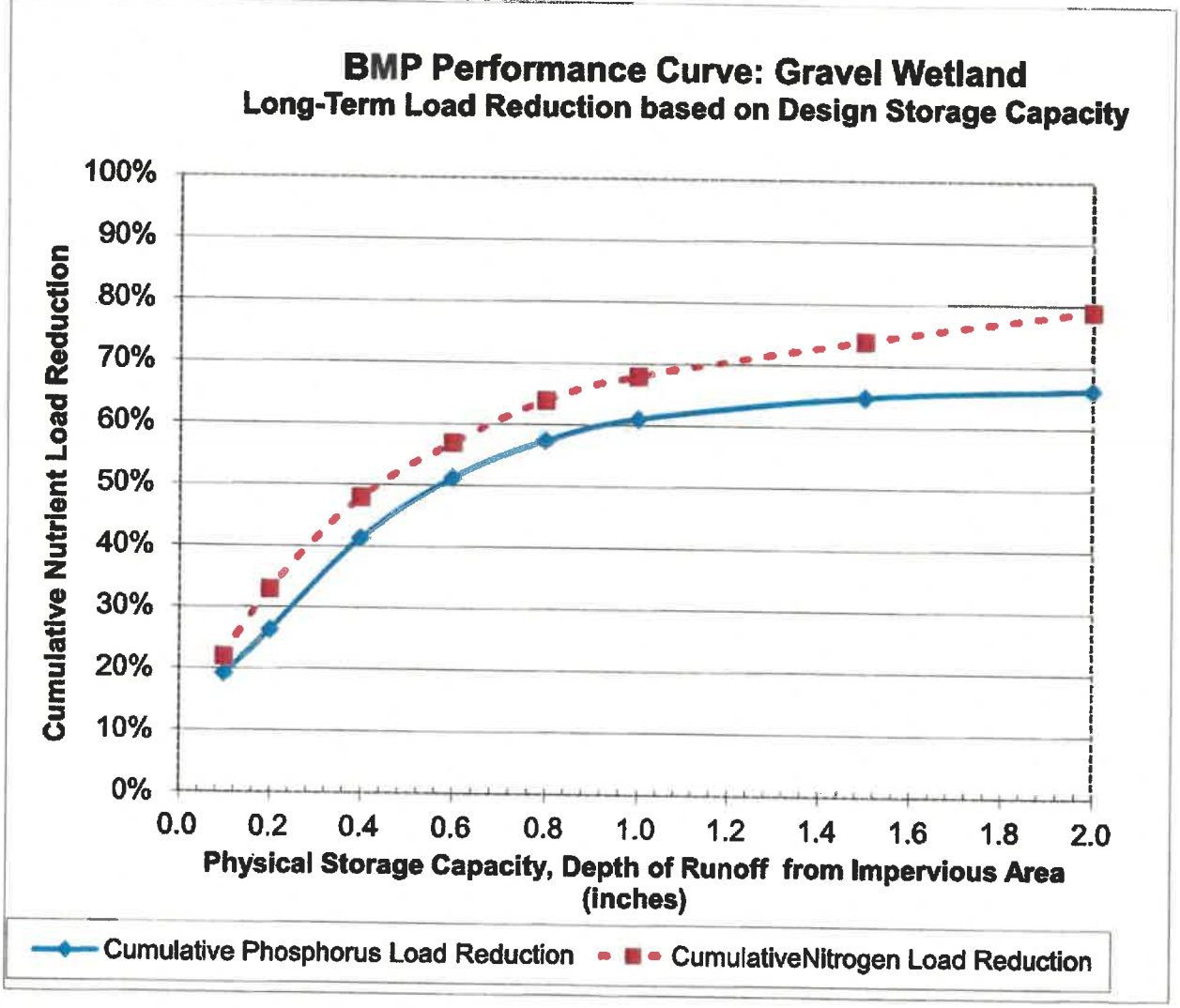


Table 3- 20: Enhanced Bio-filtration* with Internal Storage Reservoir (ISR) BMP Performance Table

Enhanced Bio-filtration* w/ ISR BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction

BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	19%	34%	53%	64%	71%	76%	84%	89%
Cumulative Nitrogen Load Reduction	32%	44%	58%	66%	71%	75%	82%	86%

***Filter media augmented with phosphorus sorbing materials to enhance phosphorus removal.**

Figure 3-15: BMP Performance Curve: Enhanced Bio-filtration with Internal Storage Reservoir (ISR) BMP Performance Table

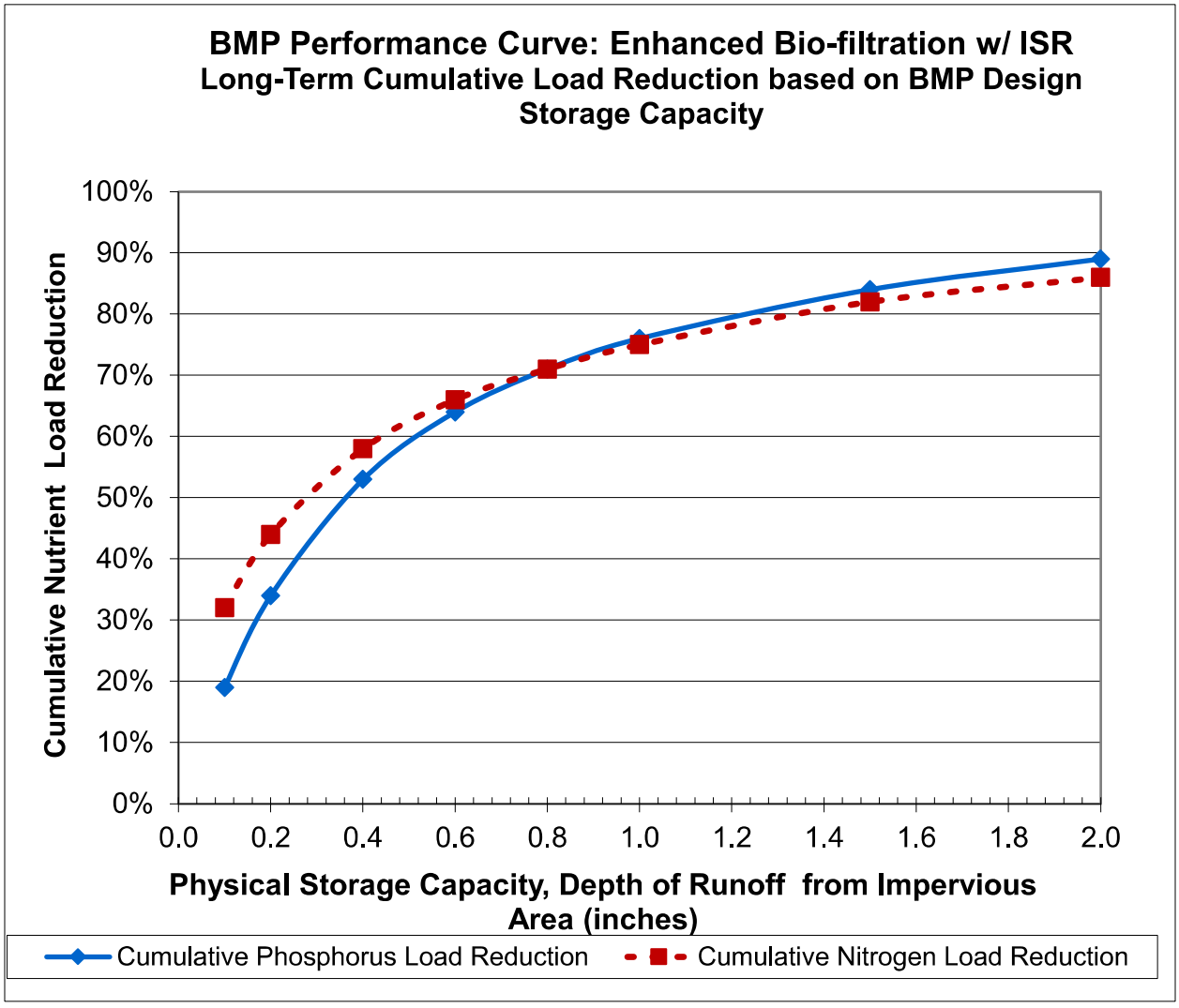


Table 3-21: Sand Filter BMP Performance Table

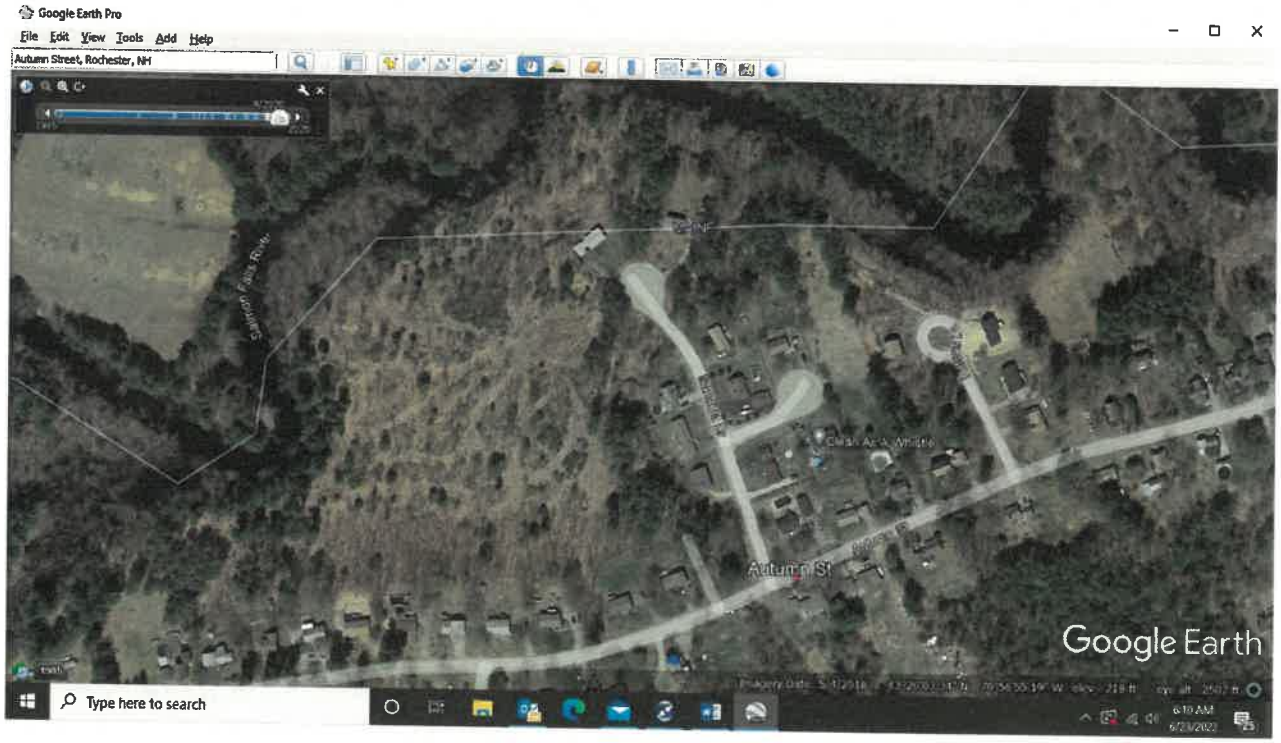
Sand Filter BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction

SITE-SPECIFIC SOIL SURVEY REPORT
For
Autumn Street, Rochester, NH
By
GES, Inc.
Project # 2022032
Date: June 23, 2022

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 7.0, July, 2021. This map product is within the technical standards of the National Cooperative Soil Survey. It is a special product, intended for the submission to NH DES Alteration of Terrain. It was produced by a professional soil scientist and is not a product of the USDA Natural Resource Conservation Service.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5, Ksat Values for New Hampshire Soils, September 2009.



OVERVIEW:

The site is a flat, sandy outwash plan that lies adjacent to the Salmon Falls River and its floodplain. The soils are predominately moderately well drained sands but appear to be underlain at depth below the control section (40 inches) with marine silts. The site is flat, wooded but cutover recently, and is consistent with regard to the soil profiles recorded.

Scale of soil map:

Approximately 1" equals 60'

Contours:

Intervals of 2 feet

2. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: 3-11-2022

Date(s) of test pits: 3-11-2022

Test pits recorded by: JP Gove, CSS # 004

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Rochester, NH

Location: At the end of a cul-de sac on Sandina Drive off of Autumn Street

Size of area: approximately 14.5 acres

Was the map for the entire lot? Yes

If no, where was the mapping conducted on the parcel: N/A

4. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? yes

If no, what was the purpose of the map? n/a

Who was the map prepared for? Jones & Beach Engineers, Inc.

5. SOIL IDENTIFICATION LEGEND

SSSS SYM.	SSSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
313	Deerfield, loamy sand	311	B
343	Eldridge, loamy sand	343	C
34	Wareham, loamy sand	511	C
5	Rippowam, frequently flooded	571	C

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%+	E				

6. SOIL MAP UNIT DESCRIPTIONS – SOIL DESCRIPTIONS

SSSS SYM.	SSSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
313	Deerfield, loamy sand	311	B

This soil map unit is found on relatively flat sand plains, The soil is moderately well drained and sandy throughout the particle control section of 40 inches. The estimated seasonal high water table ranges from 17 to 29 inches. Inclusions would be somewhat poorly drained sands and Eldridge in transition zones.

343	Eldridge, loamy sand	343	C

This soil map unit is found on plains that are sands over marine silts. The soil is moderately well drained and is sandy in the upper part and silty in the lower part. This is relatively small area of the site but does explain the higher estimated seasonal high water tables on the site as a whole. Inclusions would be Deerfield and somewhat poorly drained soils in the transition zones.

34	Wareham, loamy sand	511	C

This soil map unit is found in the wetlands on sandy outwash plains. It is poorly drained and will have inclusions of very poorly drained soils.

5	Rippowam, frequently flooded	571	C

This soil map unit is found on active floodplains and is typically sandy. These are wetland soils. Inclusions are moderately and somewhat poorly drained soils on rises in the flood plain such as Pootatuck.

TEST PIT DATA

Project – Autumn Street Residential Development – Tax Map 104, Lot 10
Client - Jones & Beach Engineers, Inc.
GES Project No. 2022032
MM/DD/YY Staff 03-11-2022 JPG & AKD

Test Pit No. 1
ESHWT: 18" Eldridge
Termination @ 48"
Refusal: None
Obs. Water: 30"

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–8"	10YR 3/2	LS	GR	FR	NONE , Ap
8–18"	10YR 4/6	LS	GR	FR	NONE, Bw
18–29"	2.5Y5/2	VFS	PL	FI	30%, Cd
29-48"	2.5Y5/2	SiL	PL	FI	30%, 2Cd

Test Pit No. 2
ESHWT: 21" Deerfield
Termination @ 40"
Refusal: None
Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–5"	10YR 3/2	LS	GR	FR	NONE , Ap
5–13"	2.5Y3/2	LS	GR	FR	NONE, A/B
13–21"	10YR4/6	LS	GR	FR	NONE. Bw
21-28"	5YR5/4	LS	OM	FI	30%, Cd
28-40"	2.5Y5/3	LS	OM	FR	30%, C

Test Pit No. 3
ESHWT: 17" Deerfield
Termination @ 40"
Refusal: None
Obs. Water: 30"

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–4"	10YR 3/2	LS	GR	FR	NONE , Ap
4–14"	2.5Y5/4	LS	GR	FR	NONE, A/B
14–17"	10YR4/6	LS	GR	FR	NONE. Bw
17-23"	5YR5/4	LS	OM	FI	20%, Cd
23-40"	2.5Y5/3	LS	OM	FR	10%, C

Test Pit No. 4
ESHWT: 24"
Termination @ 40"
Refusal: None –
Phyllite Rippable
Obs. Water: None

Deerfield

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–5"	10YR 3/2	LS	GR	FR	NONE , Ap
5–11"	2.5Y3/2	LS	GR	FR	NONE, A/B
11–24"	10YR5/6	LS	GR	FR	NONE. Bw
24-46"	2.5Y5/2	LS	OM	FR	30%, C

Test Pit No. 5
ESHWT: 29"
Termination @ 46"
Refusal: None
Obs. Water: None

Deerfield

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–10"	10YR 3/2	LS	GR	FR	NONE , Ap
10–29"	10YR5/6	LS	GR	FR	NONE, Bw
29–46"	2.5Y5/3	S	OM	FR	20%, C

Test Pit No. 6
ESHWT: 20"
Termination @ 46"
Refusal: None
Obs. Water: None

Deerfield

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–10"	10YR 3/2	LS	GR	FR	NONE , Ap
10–20"	10YR5/6	LS	GR	FR	NONE, Bw
20–46"	2.5Y5/3	S	OM	FR	20%, C

Test Pit No. 7
ESHWT: 20"
Termination @ 51"
Refusal: None
Obs. Water: 27"

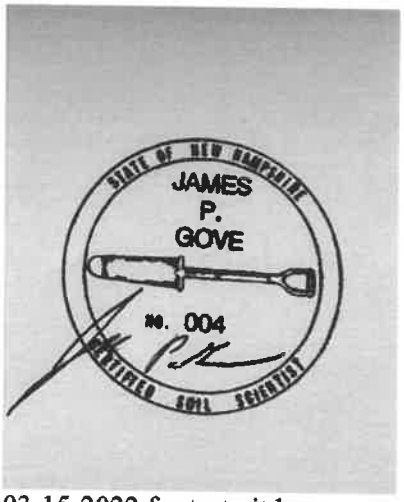
Deerfield

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–10"	10YR 3/2	LS	GR	FR	NONE , Ap
10–20"	10YR4/6	LS	GR	FR	NONE, Bw
20–51"	2.5Y5/3	S	OM	FR	30%, C

LS = Loamy Sand
S = Sand
VFS = Very Fine Sand
SiL = Silt Loam

GR = Granular
OM = Massive (no structure)
PL = Platy

FR = Friable
FI = Firm (mineral restrictive layer)



03-15-2022 for test pit logs.

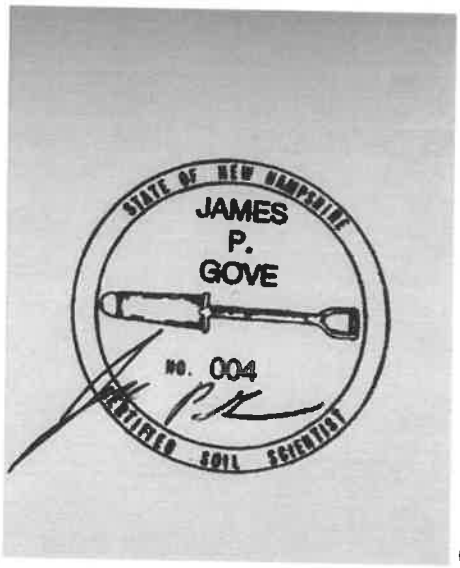
7. RESPONSIBLE SOIL SCIENTIST

Name: James Gove

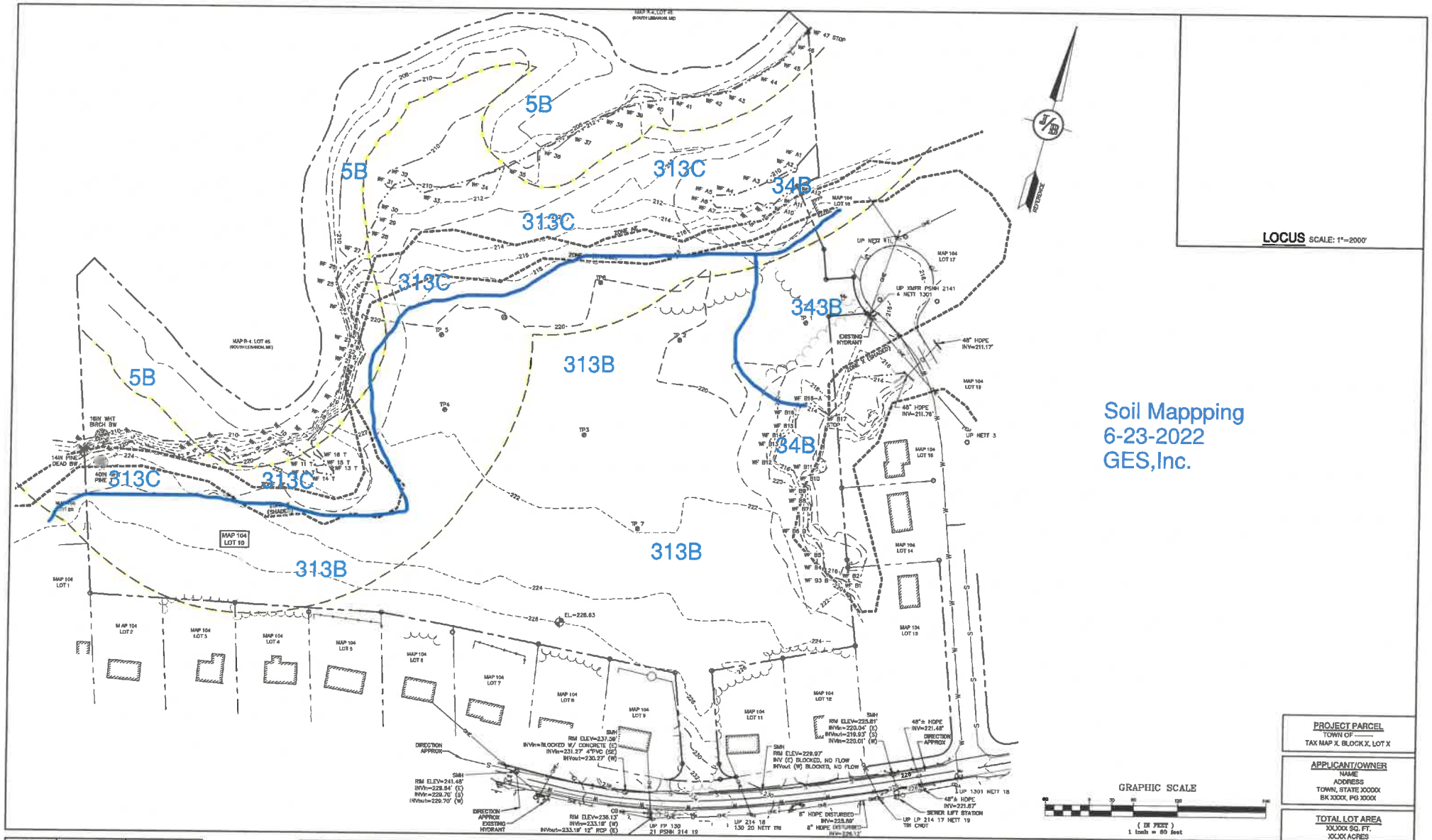
Certified Soil Scientist Number: 004

8. OTHER DISTINGUISHING FEATURES OF SITE - None

Stamp of CSS for soil map and soil report.



6-23-2022



PROJECT PARCEL
TOWN OF ——
TAX MAP X, BLOCK X, LOT X

APPLICANT/OWNER
NAME
ADDRESS
TOWN, STATE XXXXX
BK XXXX, PG XXXX

TOTAL LOT AREA
XX,XXX SQ. FT.
XX.XX ACRES

Design: XXX	Draft: XXX
Checked: XXX	Scale: XXXXXX
Drawing Name: XXXXX-DWGNAME.dwg	

Date: XX/XX/XX
Project No.: XXXXX

REV.	DATE	REVISION	BY
0	—	ISSUED FOR REVIEW	—

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
Civil Engineering Services
603-772-4746 FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING CONDITIONS PLAN
Project:	NAME OF PROJECT STREET, TOWN, STATE
Owner of Record:	CLIENT NAME CLIENT ADDRESS

DRAWING No.
C1
SHEET X OF X
JBE PROJECT NO. XXXXX

RIP RAP CALCULATIONS
Autumn Street Subdivision
Autumn Street
Rochester, NH

Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, NH 03885
16-Aug-22

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.*
Aprons are sized for the 25-Year storm event.

TAILWATER < HALF THE D_o

$L_a = (1.8 \times Q) / D_0^{3/2} + (7 \times D_o)$
$W = L_a + (3 \times D_o)$ or defined channel width
$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
18" ADS (Pond #2P)	0.31	1.74	1.5	13.3	10	0.09

TAILWATER > HALF THE D_o

$L_a = (3.0 \times Q) / D_0^{3/2} + (7 \times D_o)$
$W = (0.4 \times L_a) + (3 \times D_o)$ or defined channel width
$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
12" ADS (Pond #1)	1	2.94	1	15.8	9	0.08

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d_{50} Size =	0.25	Feet	3	Inches
% of Weight Smaller Than the Given d_{50} Size	Size of Stone (Inches)			
	From		To	
100%	5		6	
85%	4		5	
50%	3		5	
15%	1		2	

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d_{50} Size =	0.5	Feet	6	Inches
% of Weight Smaller Than the Given d_{50} Size	Size of Stone (Inches)			
	From		To	
100%	9		12	
85%	8		11	
50%	6		9	
15%	2		3	

TSS Removal Calculations

Residential Subdivision
Autumn Street, Rochester NH

Best Management Practice	TSS Removal Rate	Starting Load	Amount Removed
Section A (Pond #1)			
Sediment Forebay	25%	1.00	0.25
Bioretention Pond	90%	0.75	0.68
Total Removed			0.93
Section B (Pond #1)			
Sediment Forebay	25%	1.00	0.25
Bioretention Pond	90%	0.75	0.68
Total Removed			0.93

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	68%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	65%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Treatment Swales	Flow Through Treatment Swale	TBA				
Vegetated Buffers	Vegetated Buffers		A, B, I	73%	40%	45%
Pre-Treatment Practices	Sediment Forebay	TBA				
	Vegetated Filter Strip		A, B, I	73%	40%	45%
	Vegetated Swale		A, B, C, F, H, I	65%	20%	25%
	Flow-Through Device - Hydrodynamic Separator		A, B, G, H	35%	10%	5%
	Flow-Through Device - ADS Underground Multichamber Water Quality Unit (WQU)		G, H	72%	10%	9%
	Other Flow-Through Devices	TBA				
	Off-line Deep Sump Catch Basin		J, K, L, M	15%	5%	5%

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Pond 1P**

Enter the node name in the drainage analysis if applicable.

5.97 ac	A = Area draining to the practice	
1.22 ac	A_I = Impervious area draining to the practice	
0.20 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.23 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.40 ac-in	WQV= 1" x Rv x A	
5,073 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
507 cf	10% x WQV (check calc for sediment forebay)	
1,268 cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay	Method of Pretreatment	
1,891 cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
12,319 cf	Volume below lowest orifice[1]	**≥ 100%WQV**
5,465 cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.12 cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)^2	
217.02 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.11 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
25.62 hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00 in	Depth of Filter Media	**≥ 18"**
3.00 :1	Pond side slopes	**≥ 3:1**
	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
218.90 ft	Peak elevation of the 50-year storm event (E_{50})	
220.00 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

Stage-Area-Storage for Pond 1P: Pond 1P

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
214.07	11,579	0
214.17	11,579	463
214.27	11,579	926
214.37	11,579	1,389
214.47	11,579	1,853
214.57	11,579	2,316
214.67	11,579	2,779
214.77	11,579	3,242
214.87	11,579	3,705
214.97	11,579	4,168
215.07	11,579	4,632
215.17	11,579	5,095
215.27	11,579	5,558
215.37	11,579	6,021
215.47	11,579	6,484
215.57	11,579	6,623
215.67	11,579	6,681
215.77	11,579	6,739
215.87	11,579	6,797
215.97	11,579	6,855
216.07	11,579	6,913
216.17	11,579	6,971
216.27	11,579	7,028
216.37	11,579	7,086
216.47	11,579	7,144
216.57	11,579	7,202
216.67	11,579	7,260
216.77	11,579	7,318
216.87	11,579	7,376
216.97	11,579	7,434
217.07	11,697	8,376
217.17	11,866	9,554
217.27	12,036	10,749
217.37	12,208	11,961
217.47	12,380	13,190
217.57	12,554	14,437
217.67	12,729	15,701
217.77	12,906	16,983
217.87	13,083	18,283
217.97	13,262	19,600
218.07	15,217	21,051
218.17	15,385	22,581
218.27	15,553	24,128
218.37	15,723	25,691
218.47	15,893	27,272
218.57	16,065	28,870
218.67	16,237	30,485
218.77	16,410	32,117
218.87	16,584	33,767
218.97	16,759	35,434
219.07	16,935	37,119
219.17	17,112	38,821
219.27	17,290	40,541
219.37	17,468	42,279
219.47	17,648	44,035
219.57	17,828	45,809
219.67	18,010	47,601
219.77	18,192	49,411
219.87	18,375	51,239
219.97	**18,560**	**53,086**

215.25 5465

217.0 7716

217.25 10538

218.0 20035

5465
+ 5073 WQV
10538

20035
- 7716
12319

Stage-Discharge for Pond 1P: Pond 1P

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
214.07	0.00	216.67	0.09	219.27	5.60
214.12	0.00	216.72	0.09	219.32	5.64
214.17	0.00	216.77	0.09	219.37	5.68
214.22	0.00	216.82	0.09	219.42	5.72
214.27	0.00	216.87	0.09	219.47	5.76
214.32	0.00	216.92	0.10	219.52	5.80
214.37	0.00	216.97	0.10	219.57	5.84
214.42	0.00	217.02	0.10	219.62	5.87
214.47	0.00	217.07	0.10	219.67	5.91
214.52	0.00	217.12	0.10	219.72	5.95
214.57	0.00	217.17	0.10	219.77	5.99
214.62	0.00	217.22	0.10	219.82	6.02
214.67	0.00	217.27	0.11	219.87	6.06
214.72	0.00	217.32	0.11	219.92	6.10
214.77	0.00	217.37	0.11	219.97	**6.13**
214.82	0.00	217.42	0.11		
214.87	0.00	217.47	0.11		
214.92	0.00	217.52	0.11		
214.97	0.00	217.57	0.11		
215.02	0.00	217.62	0.12		
215.07	0.00	217.67	0.12		
215.12	0.00	217.72	0.12		
215.17	0.00	217.77	0.12		
215.22	0.00	217.82	0.12		
215.27	0.00	217.87	0.12		
215.32	0.01	217.92	0.12		
215.37	0.02	217.97	0.12		
215.42	0.02	218.02	0.16		
215.47	0.03	218.07	0.37		
215.52	0.03	218.12	0.67		
215.57	0.04	218.17	1.04		
215.62	0.04	218.22	1.46		
215.67	0.04	218.27	1.94		
215.72	0.05	218.32	2.46		
215.77	0.05	218.37	3.02		
215.82	0.05	218.42	3.62		
215.87	0.06	218.47	4.25		
215.92	0.06	218.52	4.91		
215.97	0.06	218.57	5.01		
216.02	0.06	218.62	5.06		
216.07	0.07	218.67	5.10		
216.12	0.07	218.72	5.15		
216.17	0.07	218.77	5.19		
216.22	0.07	218.82	5.23		
216.27	0.07	218.87	5.27		
216.32	0.08	218.92	5.32		
216.37	0.08	218.97	5.36		
216.42	0.08	219.02	5.40		
216.47	0.08	219.07	5.44		
216.52	0.08	219.12	5.48		
216.57	0.08	219.17	5.52		
216.62	0.09	219.22	5.56		

Summary for Pond 1P: Pond 1P

[80] Warning: Exceeded Pond CB12P by 0.27' @ 24.29 hrs (0.15 cfs 0.008 af)
[80] Warning: Exceeded Pond CB8P by 0.85' @ 24.35 hrs (3.08 cfs 0.374 af)

Inflow Area = 5.971 ac, 20.45% Impervious, Inflow Depth = 3.32" for 50-Year Storm event
Inflow = 22.92 cfs @ 12.09 hrs, Volume= 1.651 af
Outflow = 5.30 cfs @ 12.52 hrs, Volume= 1.651 af, Atten= 77%, Lag= 25.6 min
Primary = 5.30 cfs @ 12.52 hrs, Volume= 1.651 af
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Starting Elev= 215.25' Surf.Area= 11,579 sf Storage= 5,465 cf
Peak Elev= 218.90' @ 12.52 hrs Surf.Area= 16,632 sf Storage= 34,222 cf (28,757 cf above start)

Plug-Flow detention time= 513.4 min calculated for 1.526 af (92% of inflow)
Center-of-Mass det. time= 429.8 min (1,262.8 - 833.0)

Volume	Invert	Avail.Storage	Storage Description
#1	214.07'	53,644 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.07	11,579	569.7	0.0	0	0	11,579
214.08	11,579	569.7	40.0	46	46	11,585
215.25	11,579	569.7	40.0	5,419	5,465	12,251
215.49	11,579	569.7	40.0	1,112	6,577	12,388
215.50	11,579	569.7	5.0	6	6,583	12,394
216.99	11,579	569.7	5.0	863	7,445	13,243
217.00	11,579	569.7	100.0	116	7,561	13,248
218.00	13,316	588.5	100.0	12,437	19,998	15,075
218.01	15,117	564.0	100.0	142	20,141	17,322
220.00	18,615	601.7	100.0	33,503	53,644	21,007

Device	Routing	Invert	Outlet Devices
#1	Primary	215.25'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.25' / 215.10' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	215.25'	**1.7" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	218.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	219.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.30 cfs @ 12.52 hrs HW=218.90' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.30 cfs @ 6.74 fps)
├**2=Orifice/Grate** (Passes < 0.14 cfs potential flow)
├**3=Sharp-Crested Rectangular Weir** (Passes < 10.62 cfs potential flow)
└**4=Orifice/Grate** (Controls 0.00 cfs)

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Pond 2P**

Enter the node name in the drainage analysis if applicable.

0.96 ac	A = Area draining to the practice	
0.14 ac	A_I = Impervious area draining to the practice	
0.14 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.18 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.17 ac-in	WQV= 1" x Rv x A	
625 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
63 cf	10% x WQV (check calc for sediment forebay)	
156 cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay	Method of Pretreatment	
489 cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
5,285 cf	Volume below lowest orifice[1]	**≥ 100%WQV**
1,306 cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.01 cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)^2	
217.04 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.02 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
23.16 hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00 in	Depth of Filter Media	**≥ 18"**
3.00 :1	Pond side slopes	**≥ 3:1**
	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
217.85 ft	Peak elevation of the 50-year storm event (E_{50})	
219.00 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

Stage-Area-Storage for Pond 2P: Pond 2P

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
214.07	2,766	0
214.12	2,766	55
214.17	2,766	111
214.22	2,766	166
214.27	2,766	221
214.32	2,766	277
214.37	2,766	332
214.42	2,766	387
214.47	2,766	443
214.52	2,766	498
214.57	2,766	553
214.62	2,766	609
214.67	2,766	664
214.72	2,766	719
214.77	2,766	774
214.82	2,766	830
214.87	2,766	885
214.92	2,766	940
214.97	2,766	996
215.02	2,766	1,051
215.07	2,766	1,106
215.12	2,766	1,162
215.17	2,766	1,217
215.22	2,766	1,272
215.27 215.25	2,766 1306	1,328
215.32	2,766	1,383
215.37	2,766	1,438
215.42	2,766	1,494
215.47	2,766	1,549
215.52	2,766	1,575
215.57	2,766	1,582
215.62	2,766	1,589
215.67	2,766	1,596
215.72	2,766	1,603
215.77	2,766	1,610
215.82	2,766	1,617
215.87	2,766	1,624
215.92	2,766	1,631
215.97	2,766	1,637
216.02	2,766	1,644
216.07	2,766	1,651
216.12	2,766	1,658
216.17	2,766	1,665
216.22	2,766	1,672
216.27	2,766	1,679
216.32	2,766	1,686
216.37	2,766	1,693
216.42	2,766	1,700
216.47	2,766	1,707
216.52	2,766	1,714
216.57	2,766	1,720
216.62	2,766	1,727

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
216.67	2,766	1,734
216.72	2,766	1,741
216.77	2,766	1,748
216.82	2,766	1,755
216.87	2,766	1,762
216.92	2,766	1,769
216.97 217.0	2,766 1828	1,776
217.02	2,779	1,862
217.07 217.04	2,813 1931	2,001
217.12	2,847	2,143
217.17	2,880	2,286
217.22	2,915	2,431
217.27	2,949	2,578
217.32	2,983	2,726
217.37	3,018	2,876
217.42	3,053	3,028
217.47	3,088	3,181
217.52	3,123	3,336
217.57	3,159	3,494
217.62	3,195	3,652
217.67	3,230	3,813
217.72	3,267	3,975
217.77	3,303	4,140
217.82	3,339	4,306
217.87	3,376	4,474
217.92	3,413	4,643
217.97	3,450	4,815
218.02	4,176	5,005
218.07	4,220	5,215
218.12	4,264	5,427
218.17	4,309	5,642
218.22	4,354	5,858
218.27	4,399	6,077
218.32	4,444	6,298
218.37	4,490	6,522
218.42	4,536	6,747
218.47 218.50	4,582 7113	6,975
218.52	4,628	7,205
218.57	4,674	7,438
218.62	4,721	7,673
218.67	4,768	7,910
218.72	4,815	8,150
218.77	4,863	8,392
218.82	4,910	8,636
218.87	4,958	8,883
218.92	5,006	9,132
218.97	**5,055**	**9,383**

1306
+625 WQV
1931

7113
-1828
5285

Stage-Discharge for Pond 2P: Pond 2P

Elevation (feet)	Primary (cfs)
214.07	0.00
214.12	0.00
214.17	0.00
214.22	0.00
214.27	0.00
214.32	0.00
214.37	0.00
214.42	0.00
214.47	0.00
214.52	0.00
214.57	0.00
214.62	0.00
214.67	0.00
214.72	0.00
214.77	0.00
214.82	0.00
214.87	0.00
214.92	0.00
214.97	0.00
215.02	0.00
215.07	0.00
215.12	0.00
215.17	0.00
215.22	0.00
215.27	0.00
215.32	0.00
215.37	0.00
215.42	0.01
215.47	0.01
215.52	0.01
215.57	0.01
215.62	0.01
215.67	0.01
215.72	0.01
215.77	0.01
215.82	0.01
215.87	0.01
215.92	0.01
215.97	0.01
216.02	0.01
216.07	0.01
216.12	0.02
216.17	0.02
216.22	0.02
216.27	0.02
216.32	0.02
216.37	0.02
216.42	0.02
216.47	0.02
216.52	0.02
216.57	0.02
216.62	0.02
216.67	0.02
216.72	0.02
216.77	0.02
216.82	0.02
216.87	0.02
216.92	0.02
216.97	0.02
217.02	0.02
217.07	0.02
217.12	0.02
217.17	0.02
217.22	0.02
217.27	0.02
217.32	0.02
217.37	0.02
217.42	0.02
217.47	0.02
217.52	0.06
217.57	0.27
217.62	0.58
217.67	0.97
217.72	1.43
217.77	1.96
217.82	2.54
217.87	3.18
217.92	3.87
217.97	4.62
218.02	5.41
218.07	6.26
218.12	7.15
218.17	8.10
218.22	9.09
218.27	10.12
218.32	10.23
218.37	10.34
218.42	10.45
218.47	10.56
218.52	10.66
218.57	10.77
218.62	10.87
218.67	10.98
218.72	11.08
218.77	11.18
218.82	11.28
218.87	11.38
218.92	11.48
218.97	**11.58**

Summary for Pond 2P: Pond 2P

[80] Warning: Exceeded Pond CB10P by 1.51' @ 25.22 hrs (4.27 cfs 2.777 af)

Inflow Area = 0.961 ac, 14.37% Impervious, Inflow Depth = 3.88" for 50-Year Storm event
Inflow = 3.62 cfs @ 12.09 hrs, Volume= 0.311 af
Outflow = 2.87 cfs @ 12.17 hrs, Volume= 0.311 af, Atten= 21%, Lag= 4.4 min
Primary = 2.87 cfs @ 12.17 hrs, Volume= 0.311 af
Routed to Reach 1R : Analysis Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-600.00 hrs, dt= 0.01 hrs / 3
Starting Elev= 215.25' Surf.Area= 2,766 sf Storage= 1,306 cf
Peak Elev= 217.85' @ 12.17 hrs Surf.Area= 3,359 sf Storage= 4,395 cf (3,089 cf above start)

Plug-Flow detention time= 329.5 min calculated for 0.281 af (90% of inflow)
Center-of-Mass det. time= 243.2 min (1,073.6 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	214.07'	9,535 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.07	2,766	220.8	0.0	0	0	2,766
214.08	2,766	220.8	40.0	11	11	2,768
215.25	2,766	220.8	40.0	1,294	1,306	3,027
215.49	2,766	220.8	40.0	266	1,571	3,080
215.50	2,766	220.8	5.0	1	1,572	3,082
216.99	2,766	220.8	5.0	206	1,779	3,411
217.00	2,766	220.8	100.0	28	1,806	3,413
217.99	3,465	242.0	100.0	3,078	4,884	4,227
218.00	4,158	262.0	100.0	38	4,922	5,029
219.00	5,084	323.6	100.0	4,613	9,535	7,914

Device	Routing	Invert	Outlet Devices
#1	Primary	215.25'	**18.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.25' / 215.00' S= 0.0250 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	215.25'	**0.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	217.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	218.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.87 cfs @ 12.17 hrs HW=217.85' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.87 cfs of 9.13 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 7.71 fps)
  ├─**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.84 cfs @ 2.09 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

LOCUS SCALE: 1"=2000'

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH [X]
- POND (X)
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 feet

PROJECT PARCEL
TOWN OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT
TUCK REALTY CORPORATION
P.O. BOX 190
EXETER, NH 03833

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: MJK	Draft: LAZ	Date: 6/1/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-WATERSHED.dwg		

STATE OF NEW HAMPSHIRE — MICHAEL J. KERIVAN No. 9646 — LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
4	7/26/23	REVISED PER COMMENTS	MJK
3	4/17/23	REVISIONS PER NH DES AoT COMMENTS	MJK
2	2/16/23	REVISIONS PER CITY COMMENTS	MJK
1	8/16/22	REVISIONS PER CITY COMMENTS	MJK
0	6/21/22	ISSUED FOR REVIEW	MJK

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING WATERSHED PLAN

Project: RESIDENTIAL SUBDIVISON
AUTUMN STREET, ROCHESTER, NH

Owner of Record: DANA S. COPP 1985 TRUST (& OTHERS)
PO BOX 1767, ROCHESTER, NH 03866

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 22022

PROJECT PARCEL
TOWN OF ROCHESTER
TAX MAP 104, LOT 10

APPLICANT
TUCK REALTY CORPORATION
P.O. BOX 190
EXETER, NH 03833

TOTAL LOT AREA
691,524± SQ. FT.
15.88± AC

Design: MJK	Draft: LAZ	Date: 6/1/22
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Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
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603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	PROPOSED WATERSHED PLAN
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	DANA S. COPP 1985 TRUST (& OTHERS) PO BOX 1767, ROCHESTER, NH 03866

DRAWING No.
W2
SHEET 2 OF 2
JBE PROJECT NO. 22022

Hydrology & Hydraulics Study

For:

Residential Subdivision
Tax Map 104, Lot 10
Autumn Street
Rochester, NH 03868

Applicant/Owner:

EWST, LLC
PO Box 190
Exeter, NH 03833

Prepared by:

Jones & Beach Engineers, Inc.
PO Box 219
85 Portsmouth Ave
Stratham, NH 03885

July 26, 2023

Project No. 22022

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1.0 EXECUTIVE SUMMARY

Jones & Beach Engineers, Inc. has conducted a hydrology and hydraulics study to evaluate the impact of changes in runoff volumes and peak flows resulting from the construction of a 26-lot subdivision with 23 single-family home lots on a 15.88± acre parcel located on the north side of Autumn Street and west side of Sandina Drive in Rochester, NH. The purpose of this study was to evaluate the City of Rochester Chapter 218 Stormwater Management and Erosion Control requirement, § *218-10. Post-Construction Stormwater Management Design Standards*

> *(3) Peak Stormwater Runoff and Volume Control Requirements*
> *(c) If an increase in post-development peak rate or volume is anticipated due to site constraints that limit the ability to implement LID measures, the applicant shall demonstrate that the project will not cause adverse impacts to downstream properties, infrastructure, aquatic habitat or water quality degradation in downstream water bodies.*

To accomplish this, a hydrology and hydraulics analysis was conducted to examine the change in flows and demonstrate the project will not cause adverse impacts to downstream properties, infrastructure, and aquatic habitat.

A drainage report conducted by this office (revised 7/26/2023) calculated the peak flows and total stormwater runoff volume for the two (2) watershed areas and analysis points for the 2-, 10-, 25-, and 50-YR Storms. For the proposed project there was found to be no increase in peak flows. There is a projected increase in runoff volume for Analysis Point #1 for the 2-, 10-, 25-, and 50-YR storms and for Analysis Point #2 for the 2-YR storm. Although increases in runoff volume are predicted, the peak rates of runoff are projected to decrease for both watershed areas and analysis points for all storm-events. There is no proposed development activities within the 100-Yr floodplain. As per § *218-10(3)(c)* an increase in post development peak or volume must demonstrate no adverse impact.

The hydrology and hydraulics analysis demonstrates that there is a reduced impact, i.e. lowering of flood flows and water surface elevations at locations downstream of the project site. Specifically, there shall be no adverse impacts to downstream property or infrastructure along Salmon Falls River as a result in the changes in peak rates of runoff for the proposed site. A summary of the existing and proposed conditions peak rates of runoff volumes is listed in Table 1. The increases in runoff volume are highlighted in yellow for Analysis Points #1 and #2.

Table 1: HydroCAD Summary of Peak Flow and Runoff Volumes for Pre- and Post-Development for the 2 - 100-Yr Storm-events

Component	Peak Discharge Comparison (cubic feet per second)									
	2-Year		10-Year		25-Year		50-Year		100-Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	1.80	1.33	8.38	5.09	15.45	12.57	22.95	18.81	32.68	24.79
Analysis Point #2	0.74	0.73	3.93	3.54	7.25	6.41	10.71	9.37	15.23	13.23
Δ Peak – AP #1		-0.47		-3.29		-2.88		-4.14		-8.58
Δ Peak – AP #2		-0.01		-0.39		-0.84		-1.34		-2.00
% Δ Peak – AP #1		-26.1%		-39.3%		-18.6%		-18.0%		-24.1%
% Δ Peak – AP #2		-1.4%		-9.9%		-11.6%		-12.5%		-13.1%

Component	Peak Runoff Volume Comparison (acre-feet)							
	2-Year		10-Year		25-Year		50-Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.283	0.649	0.906	1.564	1.547	2.426	2.223	3.299
Analysis Point #2	0.105	0.111	0.336	0.329	0.574	0.547	0.824	0.774
Δ Peak – AP #1		0.366		0.658		0.879		1.076
Δ Peak – AP #2		0.006		-0.007		-0.027		-.050
% Δ Peak – AP #1		129%		72.6%		56.8%		48.4%
% Δ Peak – AP #2		5.7%		-2.1%		-4.7%		-6.1%

2.0 PROJECT DESCRIPTION

The subject property is located at 64-70 Autumn Street, Rochester, NH, Tax Map 104, Lot 10. The project parcel is 15.88± acres. The property is located within the Residential-1 Zoning District. Existing and proposed conditions plans are shown in Figure 2 and Figure 3, respectively. The proposed project includes the construction of a 26-lot subdivision with 23 single-family home lots with associated roadways, utilities, and stormwater infrastructure. Within the analysis area, the project will increase the impervious area (pavement and roof area) from an existing 1.153 acres to a proposed 2.466 acres (increase of 1.313 acres or 113.8%). Runoff from the roadways and house lots is collected in a combination of open and closed drainage systems, including deep sump hooded catch basins, and distributed to two (2) bioretention systems with internal storage reservoirs (ISR) (Ponds 1P and 2P). These ponds are equipped with forebays for pretreatment of the runoff.

The site is bounded by Autumn Street to the South, Sandina Drive to the East, City of Rochester vacant land to the West, and the Salmon Falls River to the North. The site is located along the Salmon Falls River, approximately 3,000 feet upstream of the Route 11/202 bridge over the river. Based on the Stream Stats Report the contributing watershed drainage area is 126.26 square miles (80,806 acres). Peak flow statistics for the Salmon Falls River are listed in Table 2.

Table 2: Watershed peak Flow Data for Salmon Falls River (USGS, Stream Stats, 2023)

Storm-event	% Recurrence	Peak Flow (cfs)
2-Year	50%	2,330
10-Year	10%	4,560
25-Year	4%	5,790
50-Year	2%	6,780
100-Year	1%	7,960
500-Year	0.2%	10,600

The study area consists of the subject property, upstream watershed, and downstream river area for the Salmon Falls River. The site area contains 16.137 acres including offsite contributing areas. The existing site is currently vacant and primarily consists of woods with some meadow areas. The existing site drains south to north, towards the Salmon Falls River, resulting in the Analysis Points as defined below.

Most of the soils for this site are described as Hydrological Soils Group (HSG) "B". A section of soils adjacent to Autumn Street are described as HSG “D”. A small stream traverses the property to the east which is classified as Mixed Alluvial Land – wet, which does not have an HSG. HSG “D” has been used as this soil is classified as “wet”.

Two (2) Analysis Points (AP's) were defined for this project:

- Analysis Point #1 is defined as the bank of the Salmon Falls River on the north end of the property. Stormwater runs from Autumn Street across existing house lots and the flows over the property the Salmon Falls River
- Analysis Point #2 is defined as the inlet to a 48” culvert near the end of Sandina Drive which runs under the roadway and eventually deposits to the Salmon Falls River. This watershed generally drains from the Autumn Street north to the Analysis Point.

Figure 1

Site Location Map

Figure 1: Site Location Map

Figure 2

Existing Watershed Plan

Figure 2: Existing Watershed Plan

Figure 3

Proposed Watershed Plan

Figure 3: Proposed Watershed Plan

Figure 4

River Cross-Sections #1-11

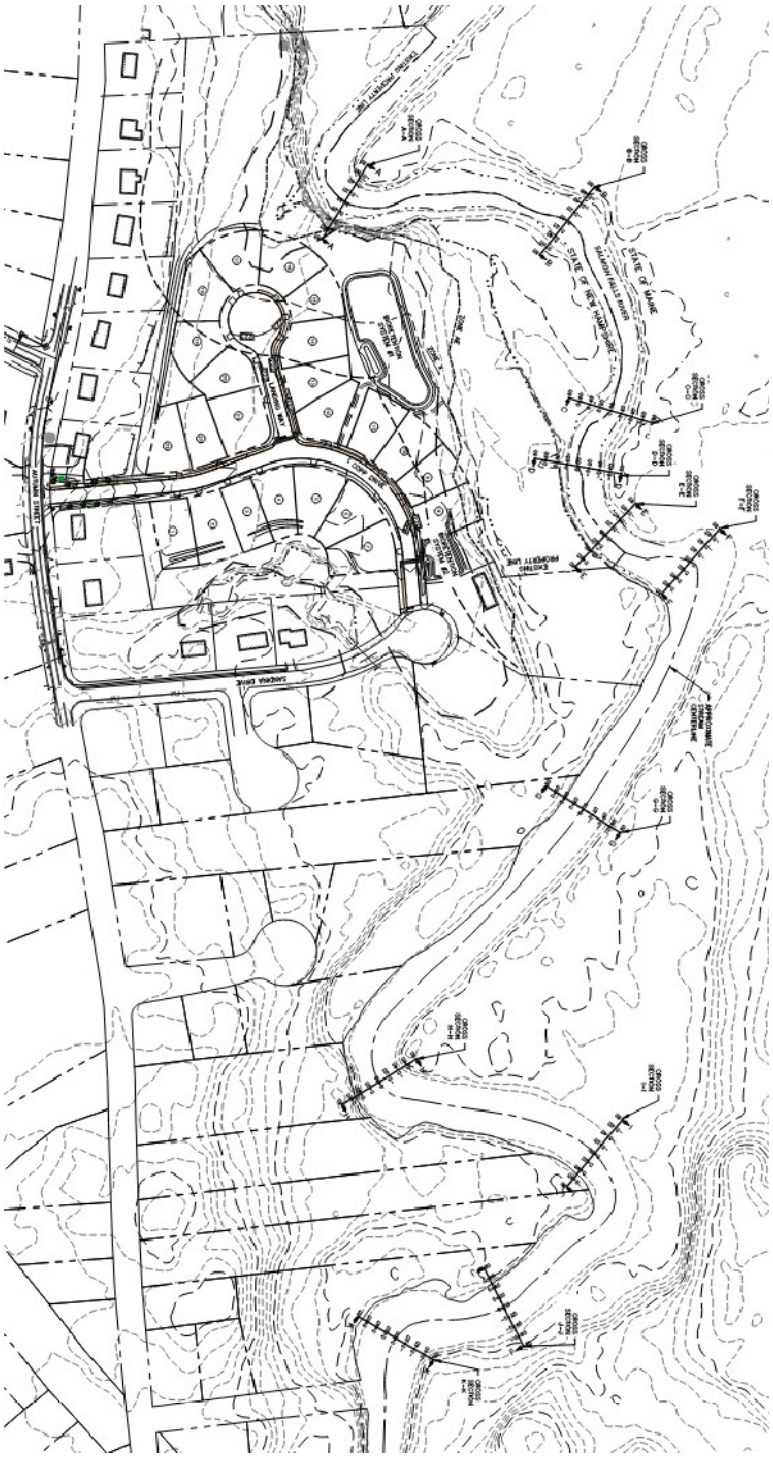


Figure 4: River Cross-Sections #1-11 for Salmon Falls River

3.0 HYDROLOGIC AND HYDRAULICS MODEL

Floodplain Hydraulics:
A one-dimension hydraulic surface water model was developed using GeoHECRAS version 4.0.0.1852, a proprietary software by CivilGeo. GeoHECRAS is built upon the Army Corps HEC-RAS model version 6.2. HEC-RAS is a river analysis model that enables the evaluation of channel hydraulics. HEC-RAS will compute water surface profiles for steady and unsteady flow models, bridge and culvert roadway crossings, FEMA floodplain encroachments, stream restorations, inline reservoir structures, and off-channel storage areas. The Hydrologic Engineering Center's (HEC) River Analysis System (HEC-RAS) software allows you to perform one-dimensional steady and 1D and 2D unsteady flow river hydraulics calculations. HEC-RAS is an integrated system of software designed for interactive use in a multi-tasking, multi-user network environment.

The HEC-RAS system contains four hydraulic analysis components for:

1. Steady flow water surface profile computations;
2. One and two-dimensional unsteady flow simulations;
3. Movable boundary sediment transport computations; and
4. Water temperature and constituent transport modeling.

A key element is that all four components use a common geometric data representation and common geometric and hydraulic computations routines. In addition to the four hydraulic analysis components, the system contains several hydraulic design features that can be invoked once the basic water surface profiles are computed.

The surface water model enables the assessment of:

- Water surface elevations at surveyed cross-sections,
- Evaluate the impact from changes in site hydrology upon the downstream section of Salmon Falls River,
- Predict the effects of the proposed development hydrology for the various design events 2, 10, 25, 50, and 100-YR Storm-events,
- Assess the potential effects upon neighboring parcels.

Watershed Hydrology:
Watershed hydrology was developed using the USGS Stream Stats web application. StreamStats provides access to spatial analytical tools that are useful for water-resources planning and management, and for engineering and design purposes. The map-based user interface is used to delineate drainage areas, get basin characteristics, and estimates of flow statistics, and more. StreamStats provides access to an assortment of Geographic Information Systems (GIS) analytical tools that are useful for water-resources planning and management, and for engineering and design purposes. Peak flow estimation is based on a USGS method for flood discharges of streams in NH. The StreamStats Report for the Salmon Falls River Watershed can be found in Appendix A.

Site Hydrology:
Site hydrology was developed using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. The curve numbers were developed using the SCS TR-55 Runoff Curve numbers for Urban Areas. A Type III SCS 24-hour rainfall distribution was utilized in analyzing the data for the 2 Year — 24 Hour (3.10"), 10 Year — 24 Hour (4.64"), 25 Year (5.85“), 50 Year — 24 Hour (6.97"), and 100 Year – 24 Hour (8.32“) storm events. This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as a proposed condition, or post-construction analysis, of the same location. The HydroCAD report for the proposed project site can be found in drainage report conducted by this office (revised 7/26/2023).

3.1 Model Construction

Two (2) surface water model scenarios were built representing

1. Pre-existing conditions, and
2. Post-development runoff conditions

Eleven (11) model cross-sections were surveyed along the river reach and are shown in Figure 4 with cross-section details provided in Appendix D. Topography beyond the extent of the cross-sections was sourced from the USGS 1-Meter DEM (digital elevation model) and publicly available LiDAR for the remaining model space. Additional cross-sections are included for floodplain modeling and illustration purposes only using the 1-meter DEM. This is because the DEM topography lacks the resolution below the bank full channel dimensions however is sufficient for floodplain. For this reason, the surveyed cross-sections are only used for comparisons with pre- and post-development conditions. Surface water runoff (peak flows) for Analysis Point #1 enters at the location between cross-sections B-B and C-C (999 and 998 in model) at (river station) RS2800± which corresponds to the Bioretention System #1 outlet.

4.0 STUDY RESULTS

The HEC-RAS modeled surface water hydrology and hydraulics demonstrates that the reduced peak flows result in lowered water surface elevations and floodwater along the Salmon Falls River.

Similarly the extent of the floodplain can be observed for all storms ranging from 2-YR to the 100-YR storm (Figure 5), and the induvial storms the 100-YR storm (Figure 6), the 50-YR storm (Figure 7), 25-YR storm (Figure 8), 10-YR storm (Figure 9) and the 2-YR storm (Figure 10). The difference in floodplain is almost imperceptible because of the very insignificant lowering of the water surface elevation (WSEL). Changes in the floodplain extent for the 100-YR storm are highlighted by red circles in Figure 11. The larger scale enables the reader to distinguish the reduction more clearly in the 100-yr flood plain from the pre-development to the post-development condition.

The longitudinal stream profile of the water surface elevations for the 100-YR to the 2-YR storm are illustrated in Figure 12. It can be observed from this figure the minor change in WSEL reduction along the Salmon Falls River below the project site.

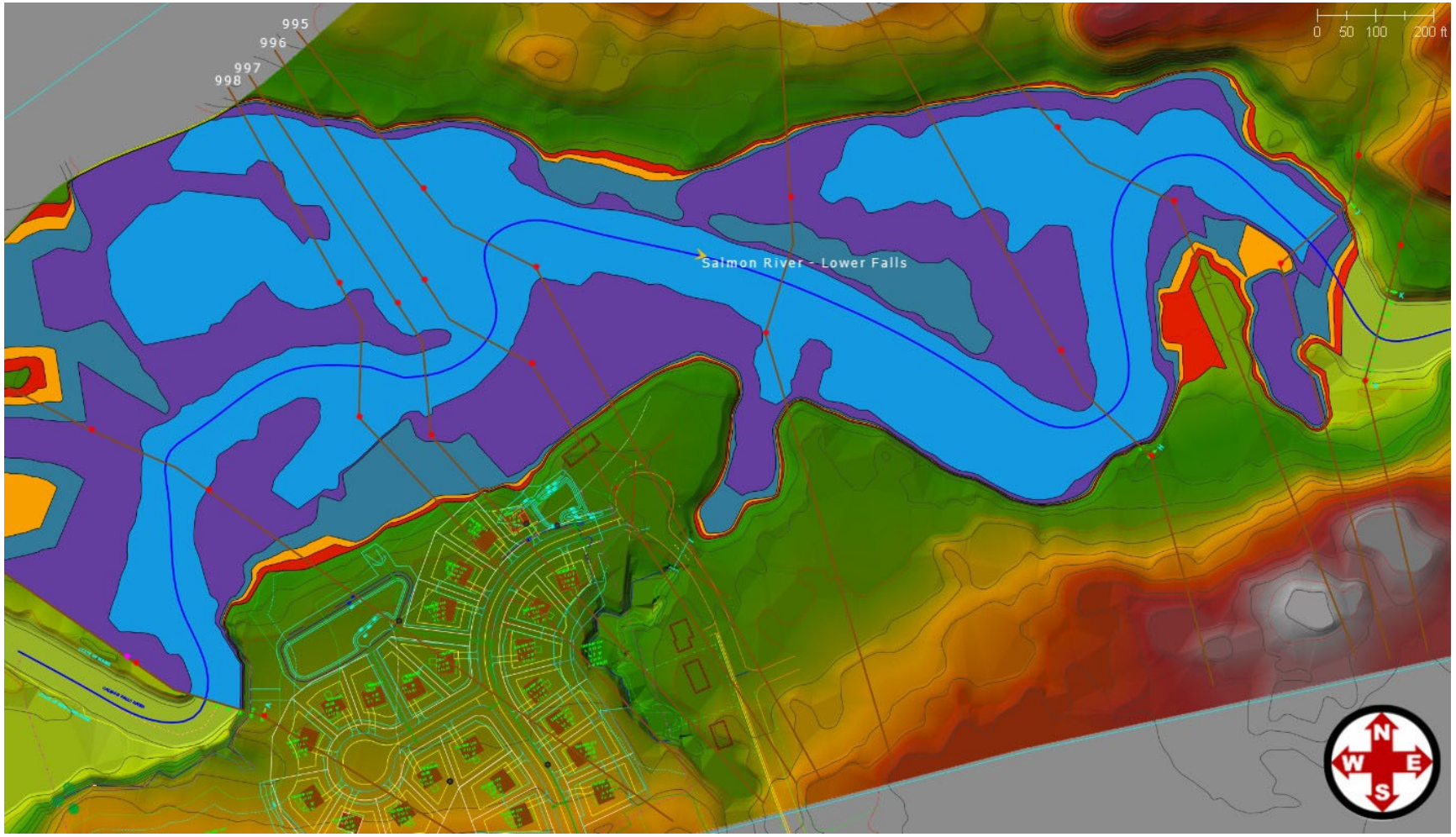


Figure 5: Existing Development for the 2-year (blue), 10-year (purple), 25-year (navy blue), 50-year (orange) and 100-year (red) Storm Flood Simulation

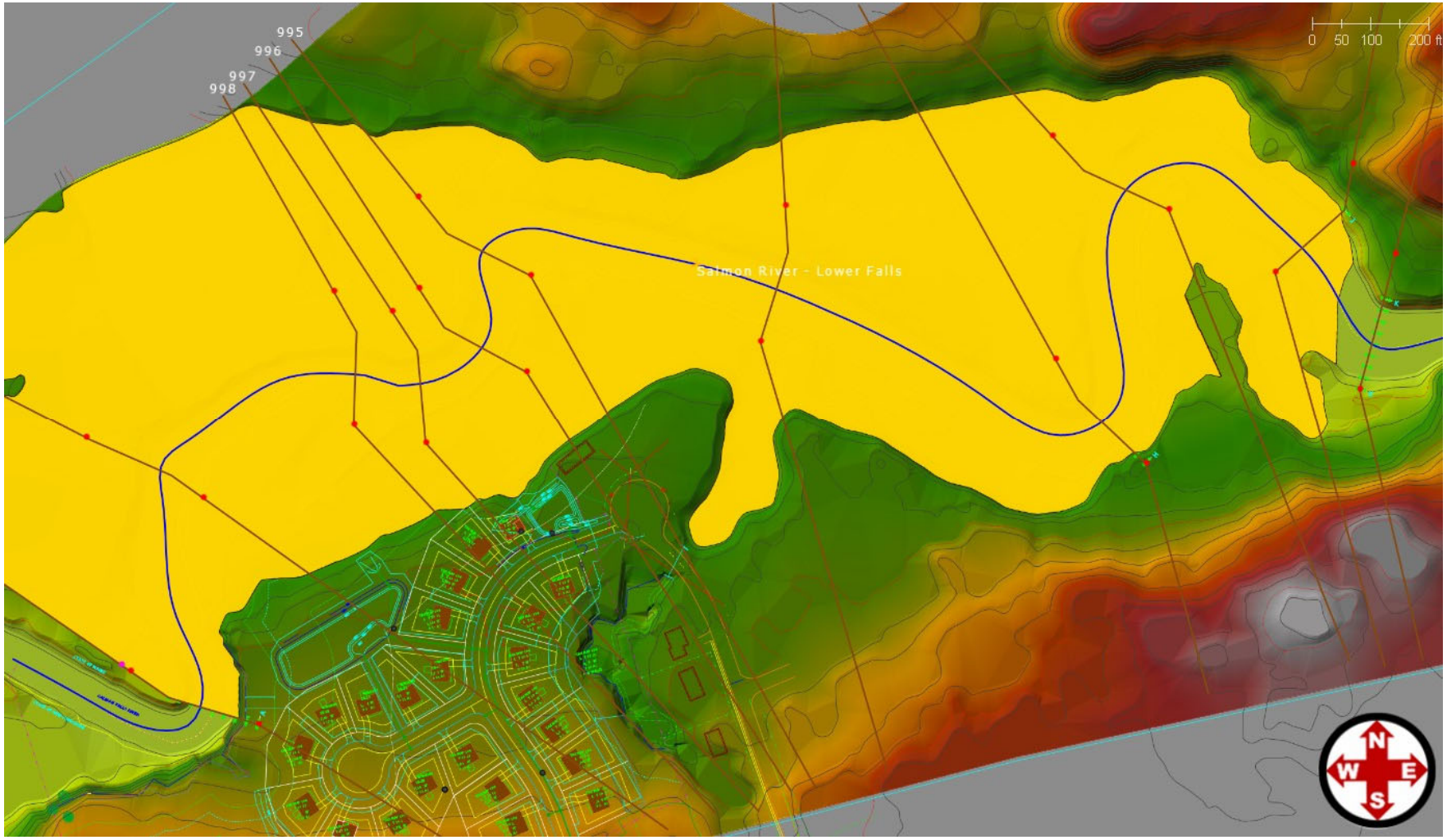


Figure 6: Existing (blue) and Proposed (yellow) Development 100-year Storm Flood Simulation

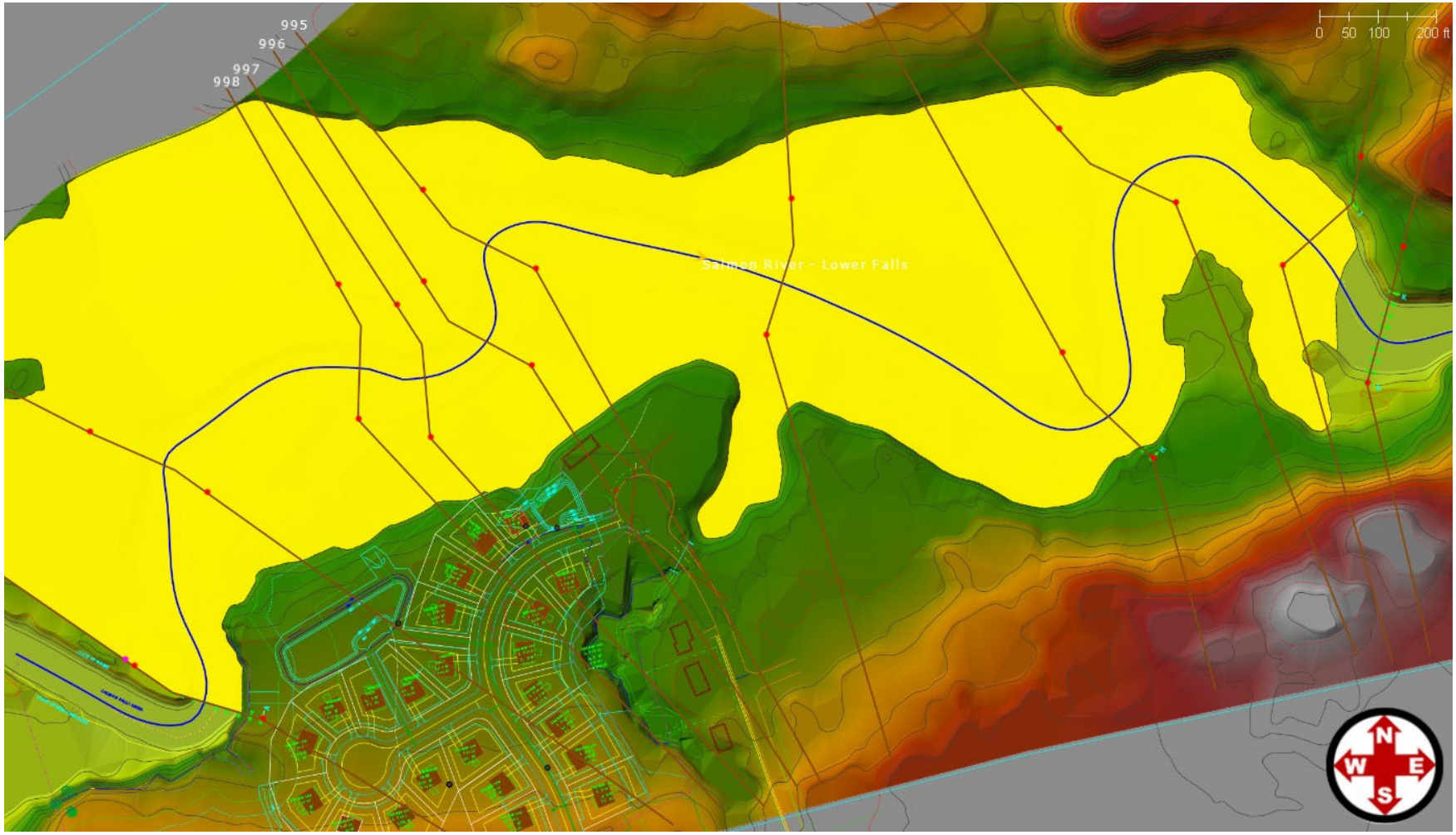


Figure 7: Existing (blue) and Proposed (yellow) Development 50-year Storm Flood Simulation

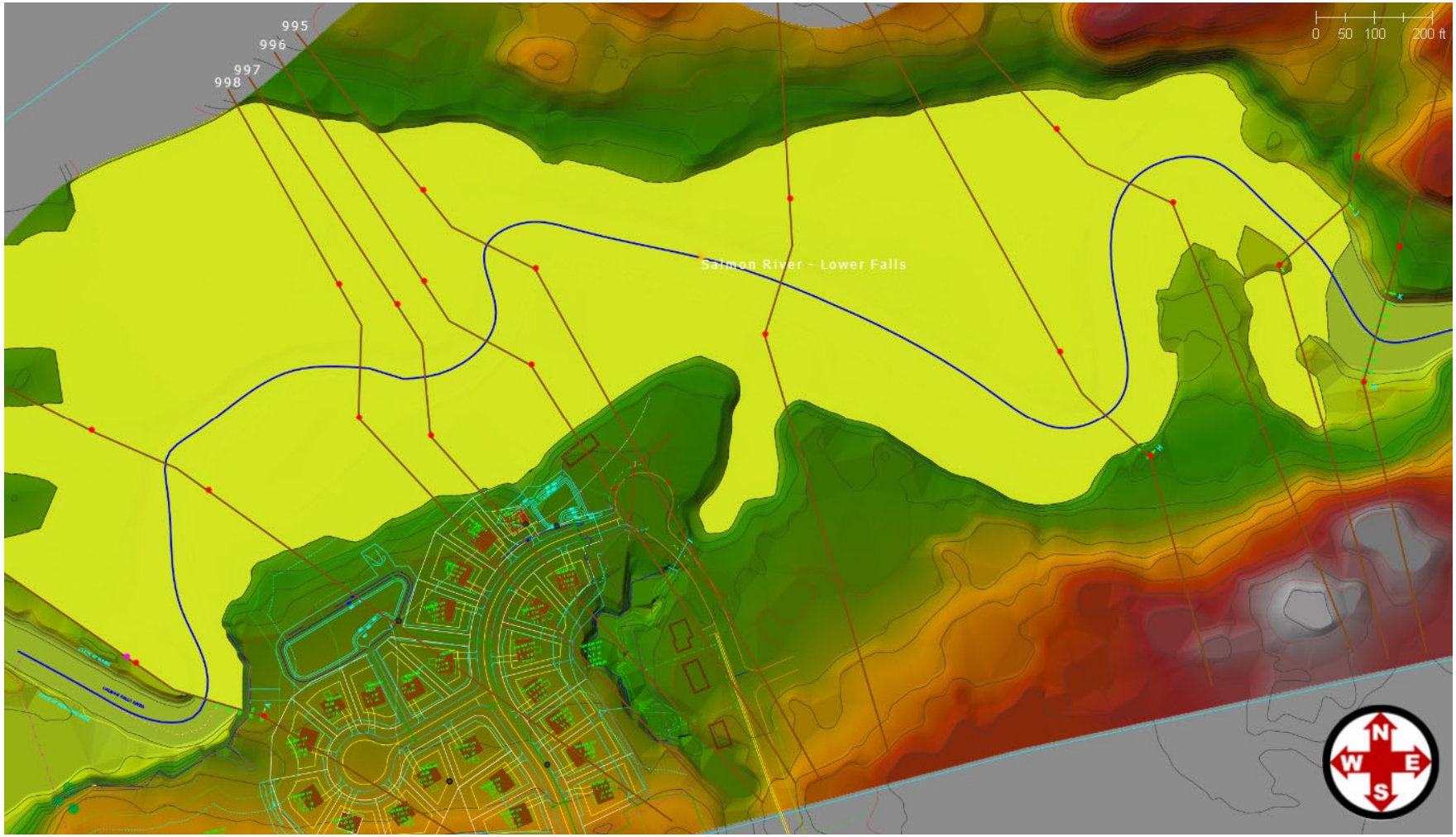


Figure 8: Existing (blue) and Proposed (yellow) Development 25-year Storm Flood Simulation

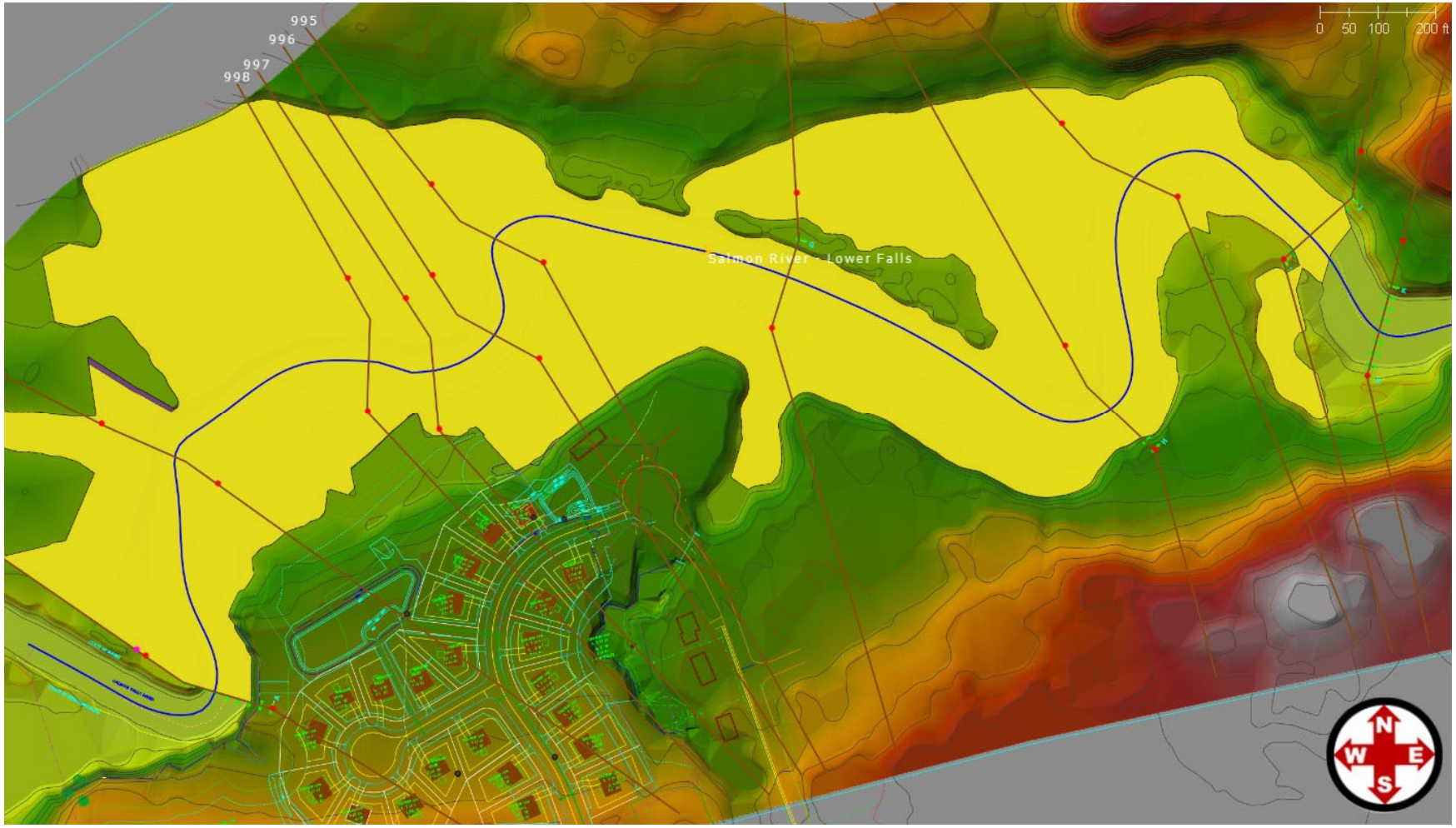


Figure 9: Existing (blue) and Proposed (yellow) Development 10-year Storm Flood Simulation

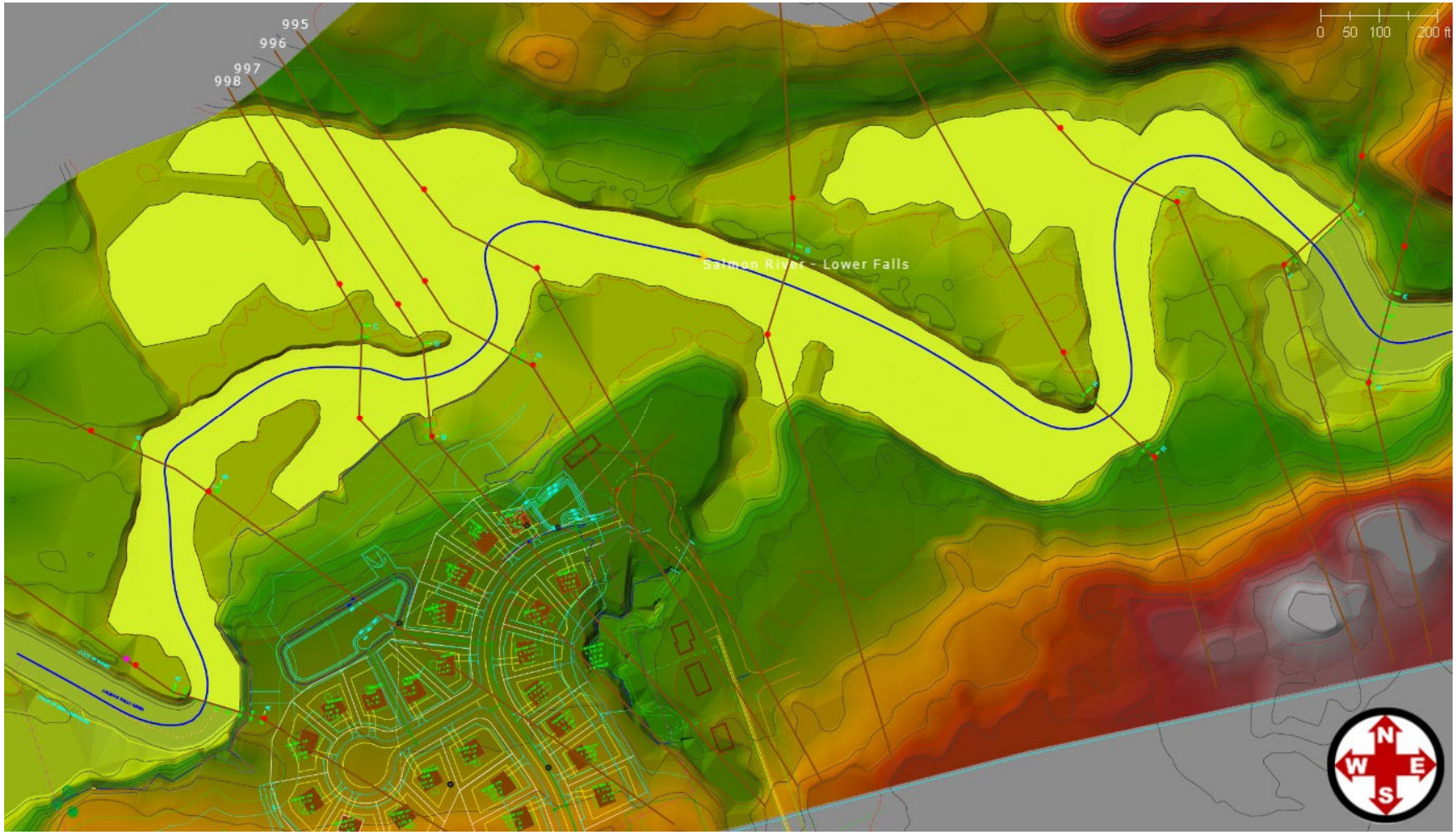


Figure 10: Existing (blue) and Proposed (yellow) Development 2-year Storm Flood Simulation

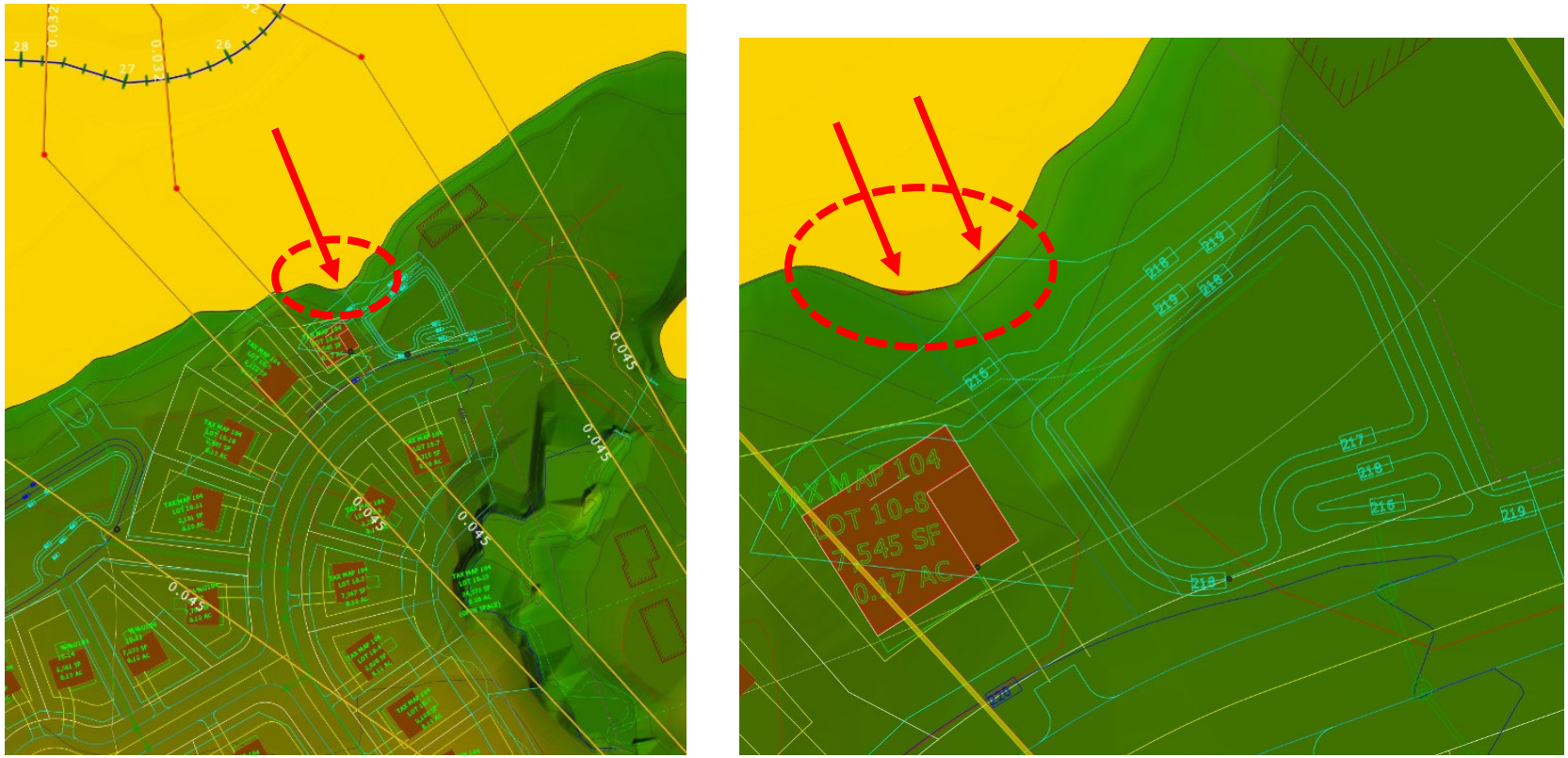


Figure 11: Detail of Existing (red) and Proposed (yellow) Development 100-year Storm Flood Simulation

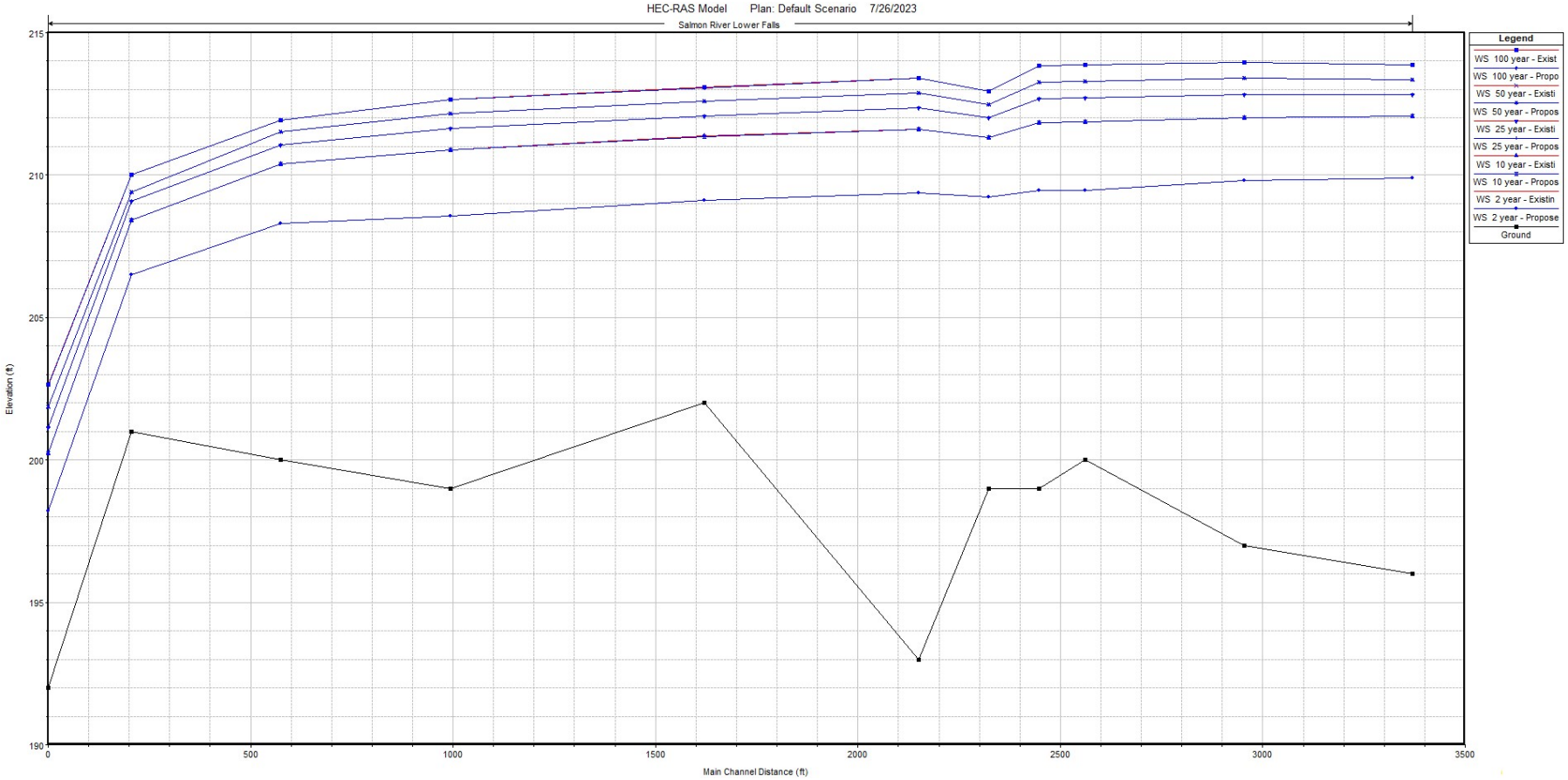


Figure 12: Water Surface Elevation Profile for Existing and Proposed Development

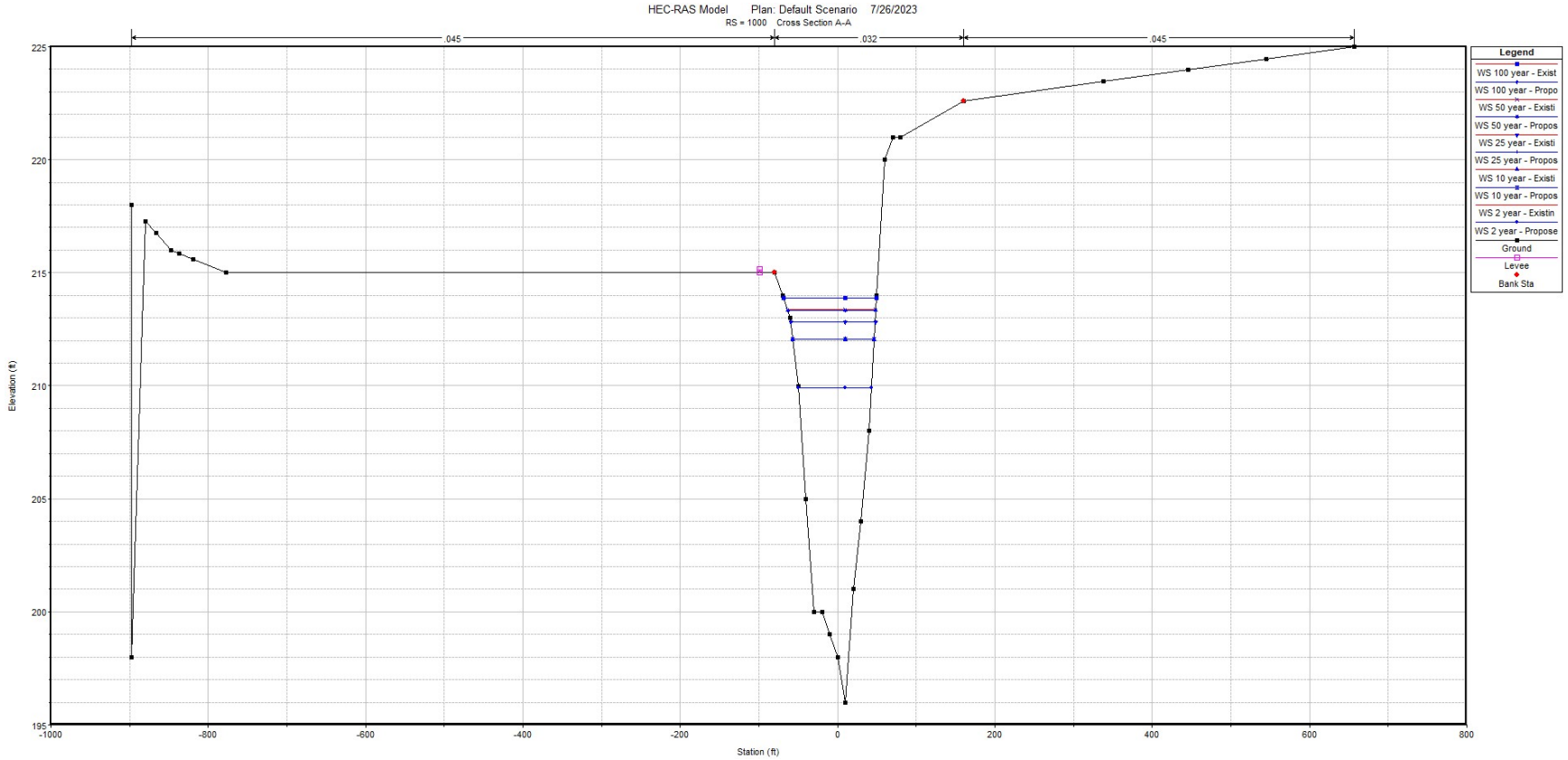


Figure 13: Cross-section A-A for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

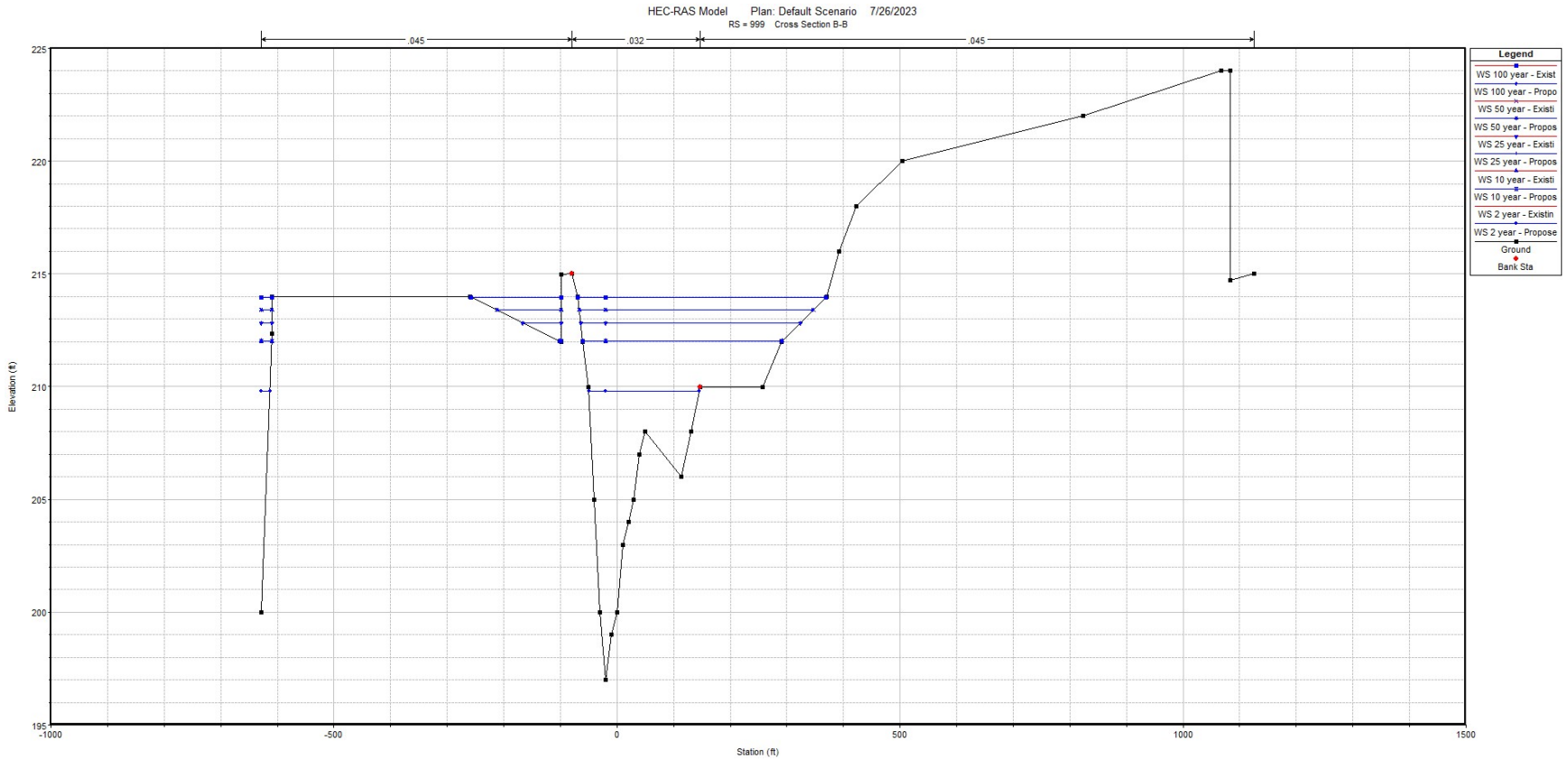


Figure 14: Cross-section B-B for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

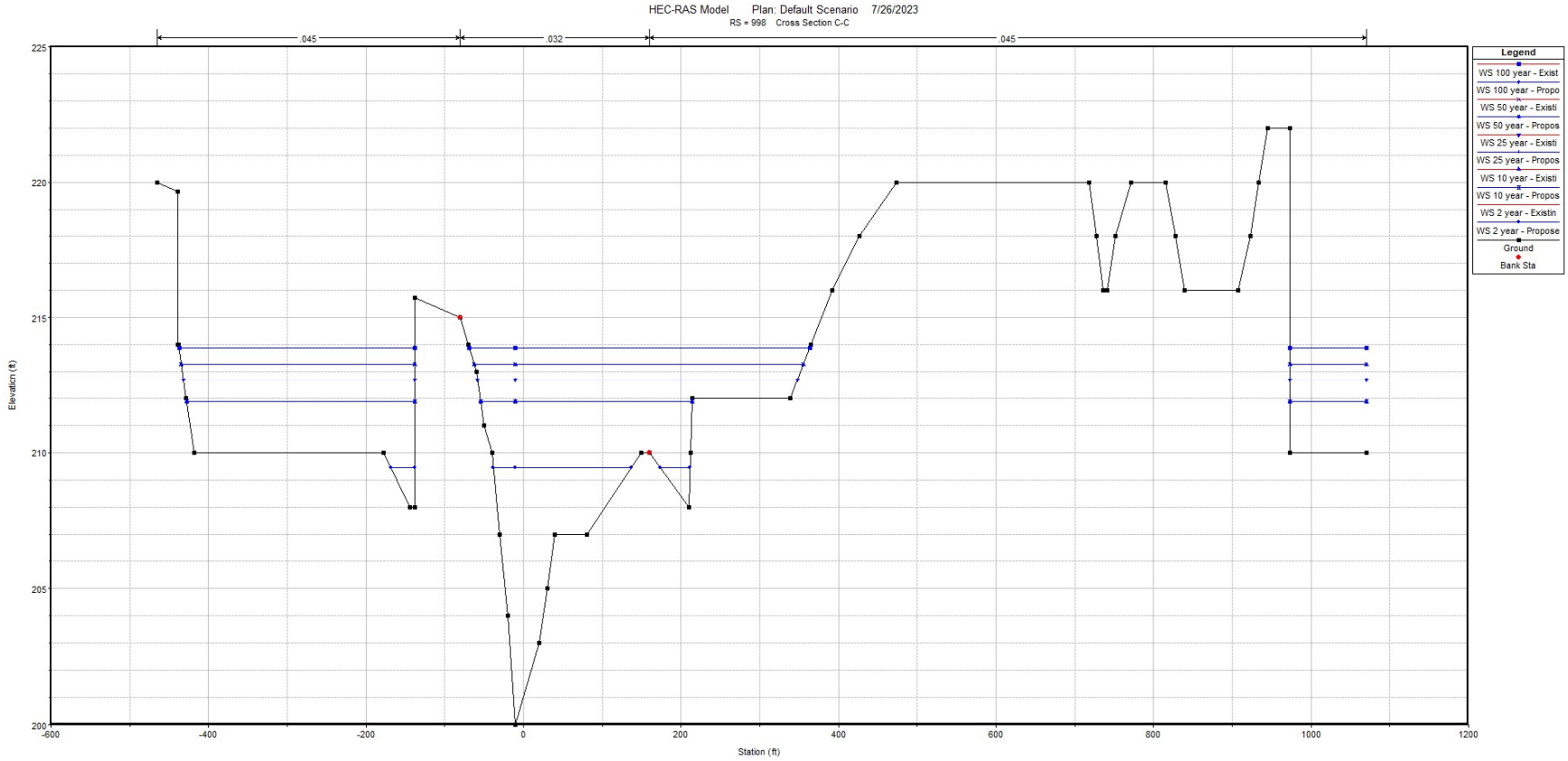


Figure 15: Cross-section C-C for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

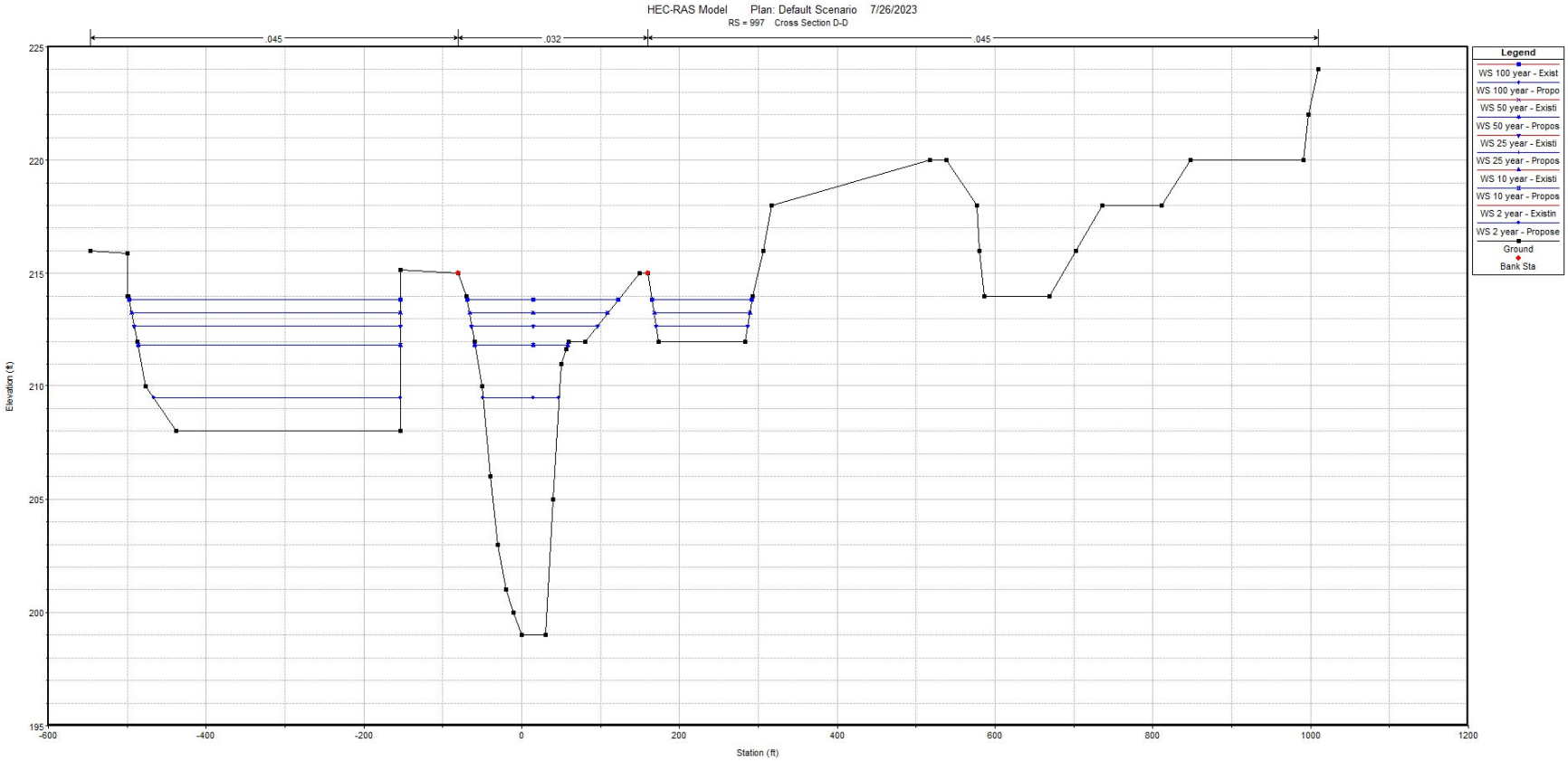


Figure 16: Cross-section D-D for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

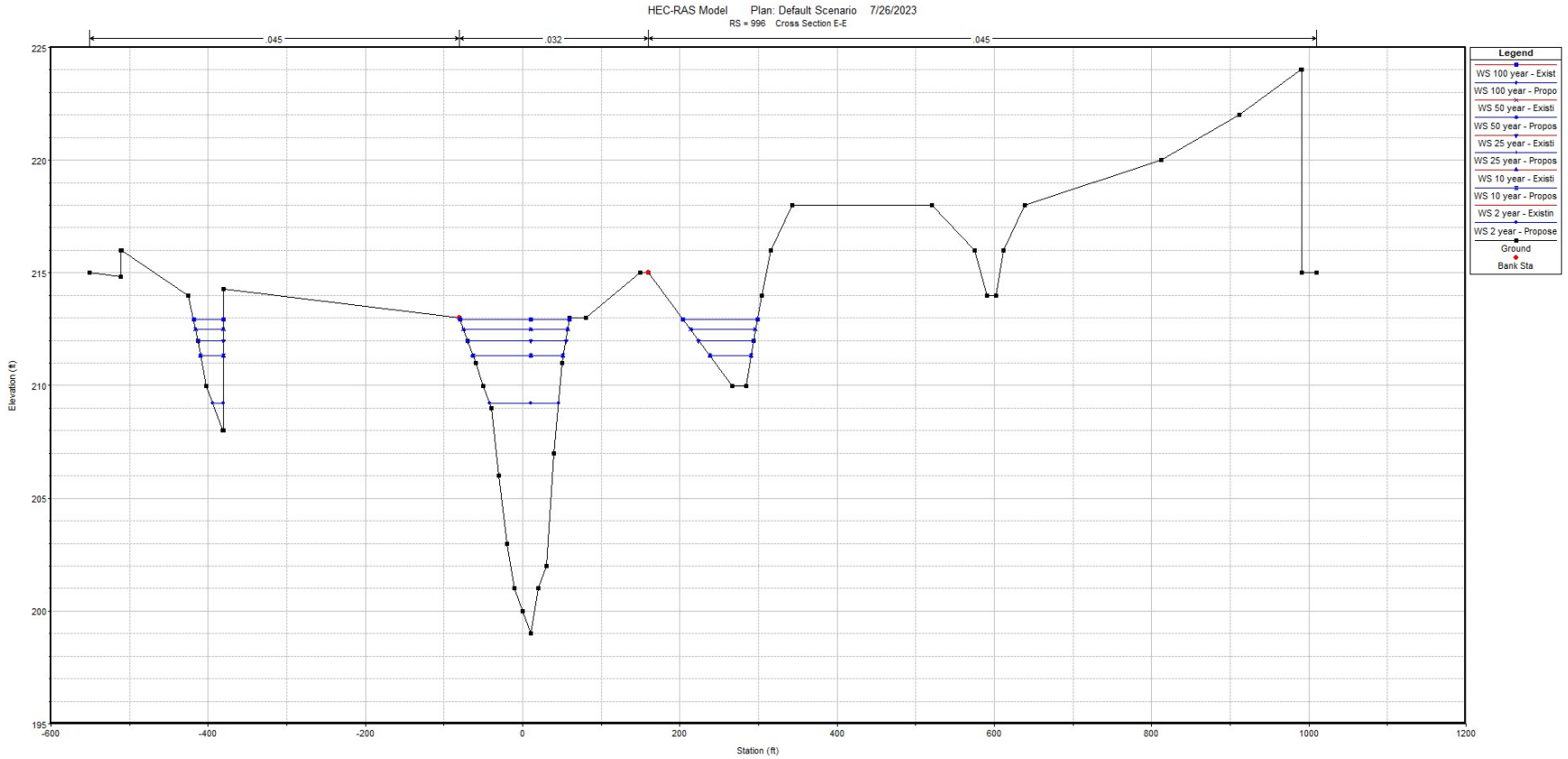


Figure 17: Cross-section E-E for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

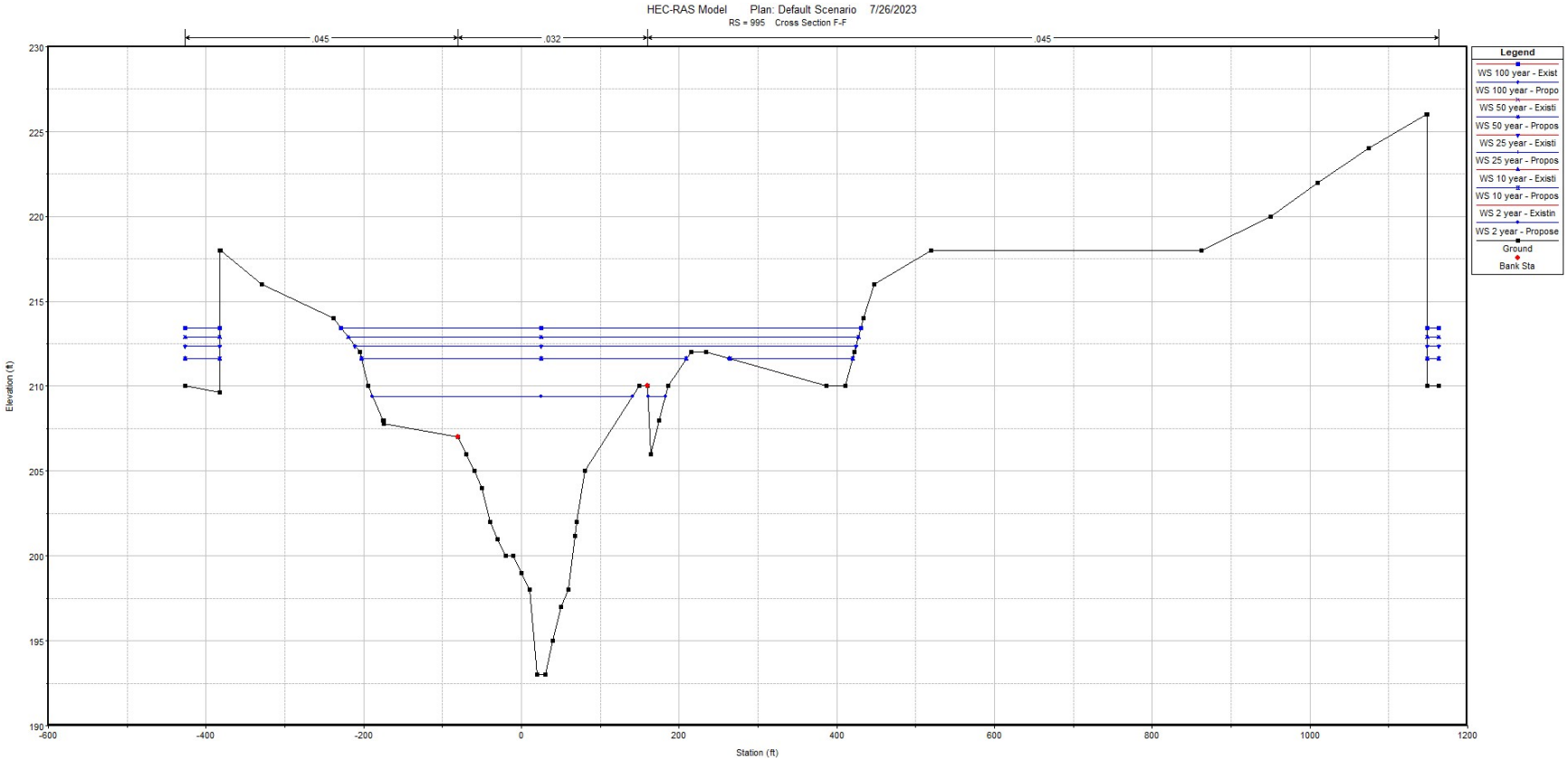


Figure 18: Cross-section F-F for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

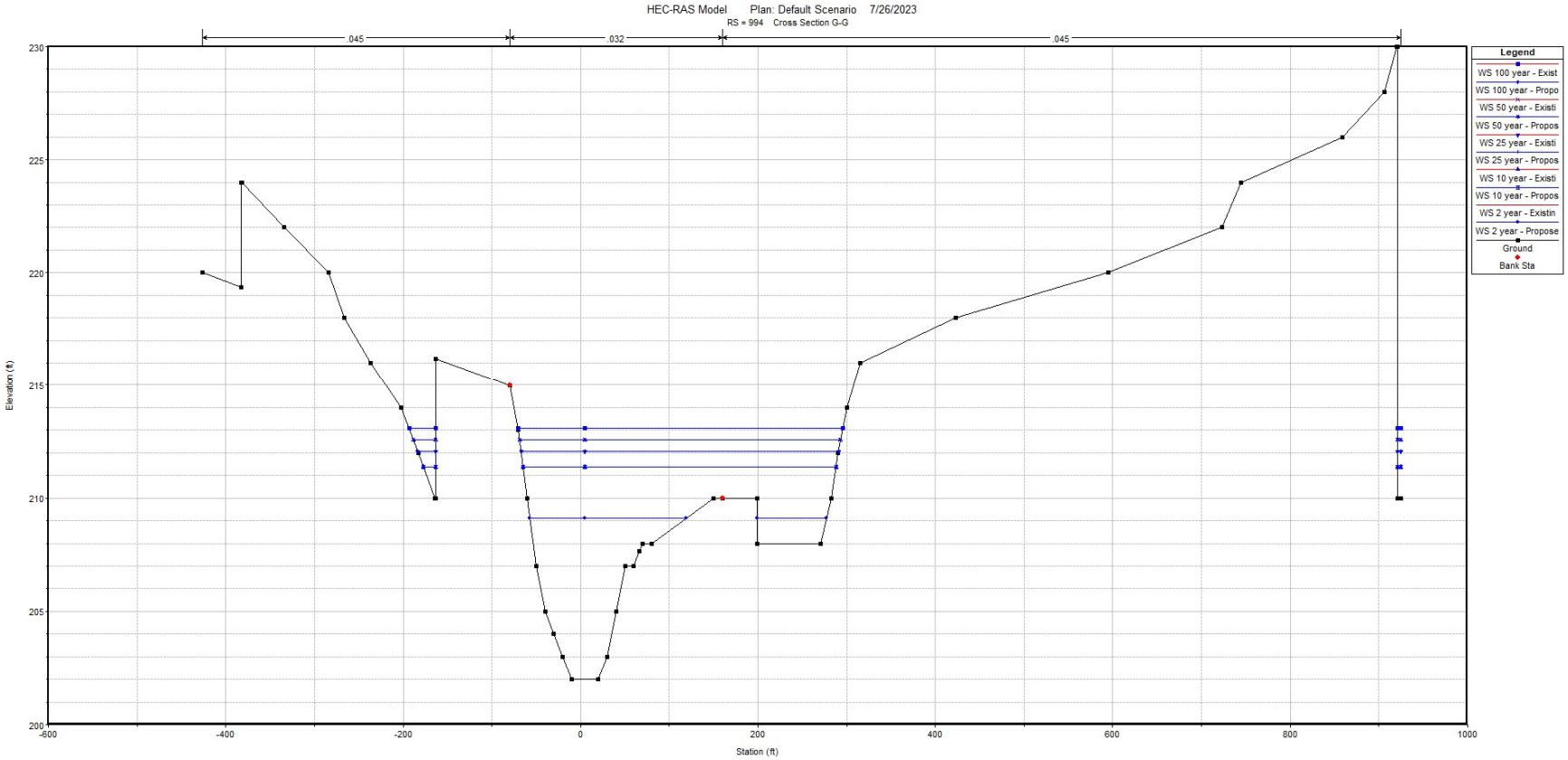


Figure 19: Cross-section G-G for Existing (red) and Proposed Development for All Storm Flood Simulations (2-YR thru 100-YR)

5.0 CONCLUSION

A one-dimension hydraulics surface water model was developed using GeoHECRAS to compute water surface profiles for 2 steady flow models. This enabled the evaluation of the impact of changes in runoff volumes and peak flows resulting from the construction of a 26-lot subdivision with 23 single-family home lots on a 15.88± acre parcel located on the north side of Autumn Street and west side of Sandina Drive in Rochester, NH. There is no proposed development activities within the 100-Yr floodplain. The purpose of this study was to evaluate the City of Rochester Chapter 218 Stormwater Management and Erosion Control requirement, § 218-10, Post-Construction Stormwater Management Design Standards (3) Peak Stormwater Runoff and Volume Control Requirements. This for the purpose of demonstrating the project will not cause adverse impacts to downstream properties, infrastructure, and aquatic habitat.

The surface water model enables the assessment of:

- Water surface elevations at surveyed cross-sections,
- Evaluate the impact from changes in site hydrology upon the downstream section of the Salmon Falls River,
- Predict the effects of the proposed development hydrology for the various design events,
- Assess the potential effects upon neighboring parcels.

The drainage analysis by this office (revised 7/26/2023) determined that there would be no increase in peak flows, and only an increase in runoff volume for Analysis Point #1 for the 2-, 10-, 25-, 50-YR storms and for Analysis Point #2 for the 2-YR storm. In fact, there was a decrease in peak flows for Analysis Point #1 of 26.1%, 39.3%, 18.6%, 18% and 24.1%
respectively.

The two (2) hydraulic surface water models representing pre-existing and post-development conditions demonstrated a decrease in water surface elevations for all cross-sections, thus reducing flooding concerns. The difference in the storm flood extent is almost imperceptible as the project's study area represents only 0.02% of the watershed area of the Salmon Falls River at this point.

Please let our office know if there are any questions.

Sincerely,

Ian MacKinnon, P.E.
Associate | Project Manger

APPENDIX A: USGS STREAM STATS REPORT

USGS StreamStats Streamflow Statistics Report

General Information

Site Location: 288 Salmon Falls Rd, Rochester, NH 03868, USA

Lat, Long: 43.33371306, -70.95332019

Site Drainage Area: 126.26 mi² (80806.4 acres)

Peak Flow Basin Characteristics

Parameter	Value
Drainage Area (mi²)	126.26
Drainage Area (acres)	80806.4
24 Hour 2 Year Precipitation (in)	
Percent Storage (%)	
24 Hour 5 Year Precipitation (in)	
24 Hour 10 Year Precipitation (in)	
24 Hour 25 Year Precipitation (in)	
24 Hour 50 Year Precipitation (in)	
24 Hour 100 Year Precipitation (in)	
24 Hour 200 YearPrecipitation (in)	
24 Hour 500 Year Precipitation (in)	
Mean April Precipitation (in)	4.319
Percent Wetlands (%)	10.6459
Stream Slope 10 and 85 Method (ft/mi)	16

Peak Flow Basin Characteristics (Statewide Drng Area Only Peakflows Sir Report 2020-5092)

Parameter	Value	Regression Equation Valid Range	
		Minimum	Maximum
Drainage Area (mi²)	126.26	0.26	5680

Peak Flow Streamflows (Statewide Drng Area Only Peakflows Sir Report 2020-5092)

Streamflow Statistic	Return Frequency (year)	Flows (cfs)	Prediction Error (%)	Equivalent Years of Record	90% Prediction (cfs)	
					Minimum	Maximum
PK2	2 year	2830	54.4	0		
PK5	5 year	4070	56.1	0		
PK10	10 year	4930	57.2	0		
PK25	25 year	6060	58.3	0		
PK50	50 year	6910	58.9	0		
PK100	100 year	7810	60.3	0		
PK200	200 year	8700	60.9	0		
PK500	500 year	9950	62.1	0		

Peak Flow Basin Characteristics (Statewide Multiparameter Peakflows Sir Report 2020-5092)

Parameter	Value	Regression Equation Valid Range	
		Minimum	Maximum
Drainage Area (mi²)	126.26	0.26	5680
24 Hour 2 Year Precipitation (in)		1.92	4.17
Percent Storage (%)		0	29.4
24 Hour 5 Year Precipitation (in)		2.48	5.38
24 Hour 10 Year Precipitation (in)		2.84	6.38
24 Hour 25 Year Precipitation (in)		3.3	7.75
24 Hour 50 Year Precipitation (in)		3.65	8.79
24 Hour 100 Year Precipitation (in)		3.99	9.88
24 Hour 200 YearPrecipitation (in)		5.26	11.1
24 Hour 500 Year Precipitation (in)		5.95	13.1

Peak Flow Streamflows (Statewide Multiparameter Peakflows Sir Report 2020-5092)

Streamflow Statistic	Return Frequency (year)	Flows (cfs)	Prediction Error (%)	Equivalent Years of Record	90% Prediction (cfs)	
					Minimum	Maximum
PK2	2 year	undefined				
PK5	5 year	undefined				
PK10	10 year	undefined				
PK25	25 year	undefined				
PK50	50 year	undefined				
PK100	100 year	undefined				
PK200	200 year	undefined				
PK500	500 year	undefined				

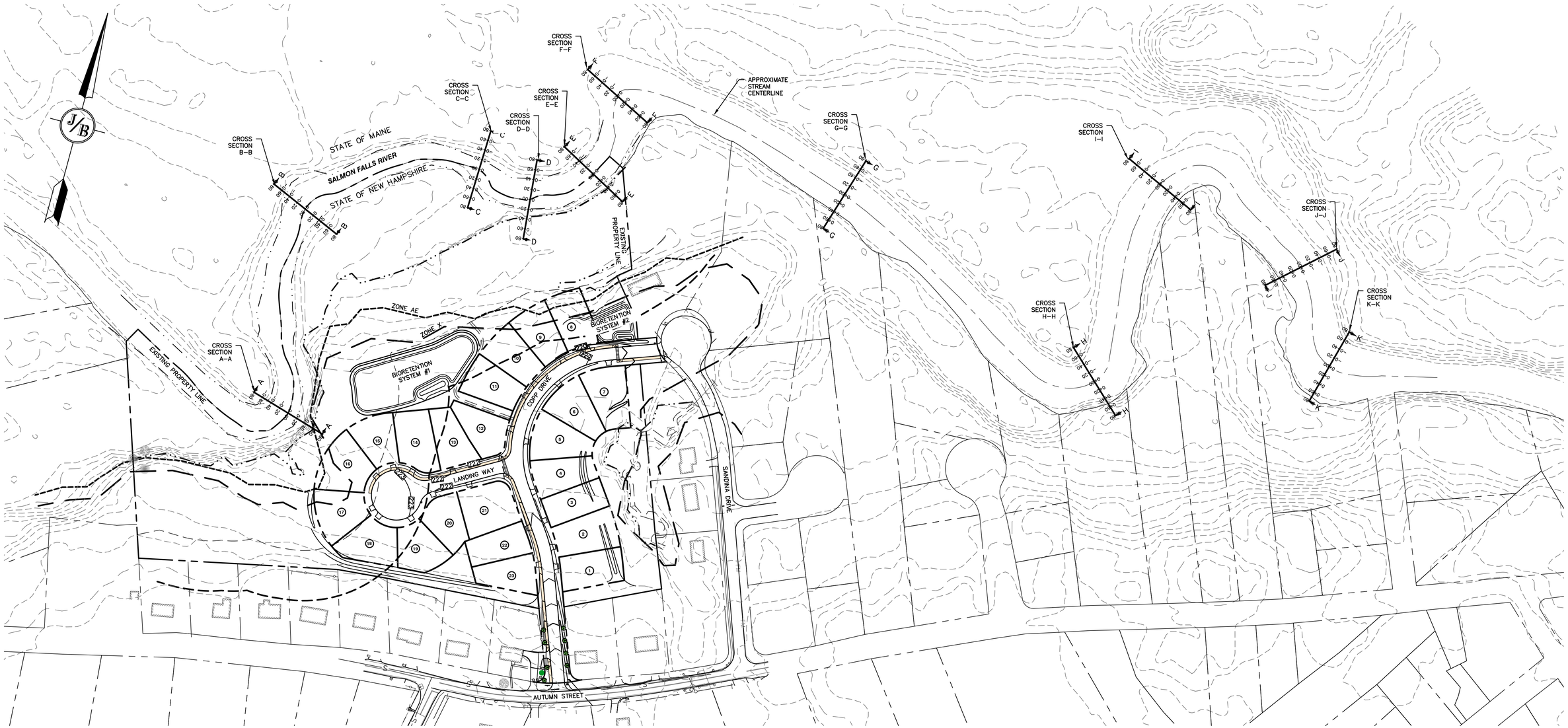
Peak Flow Basin Characteristics (Peak Flow Statewide Sir2008 5206)

Parameter	Value	Regression Equation Valid Range	
		Minimum	Maximum
Drainage Area (mi²)	126.26	0.7	1290
Mean April Precipitation (in)	4.319	2.79	6.23
Percent Wetlands (%)	10.6459	0	21.8
Stream Slope 10 and 85 Method (ft/mi)	16	5.43	543

Peak Flow Streamflows (Peak Flow Statewide Sir2008 5206)

Streamflow Statistic	Return Frequency (year)	Flows (cfs)	Prediction Error (%)	Equivalent Years of Record	90% Prediction (cfs)	
					Minimum	Maximum
PK2	2 year	2330	30.1	3.2	1440	3780
PK5	5 year	3580	31.1	4.7	2180	5870
PK10	10 year	4560	32.3	6.2	2730	7610
PK25	25 year	5790	34.3	8	3360	9980
PK50	50 year	6780	36.4	9	3820	12000
PK100	100 year	7960	38.6	9.8	4340	14600
PK500	500 year	10600	44.1	11	5340	21000

APPENDIX B: PROJECT PLANS AND CROSS-SECTIONS



NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW THE LOCATION AND EXTENT OF CROSS SECTIONS ALONG THE SALMON FALLS RIVER AT THE LOCATION OF THE PROPOSED COPP'S LANDING SUBDIVISION.
2. STREAM ELVATIONS BASED ON FIELD SURVEY BY JONES & BEACH ENGINEERS, INC. COMPLETED IN APRIL 2023.

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Design: LAZ	Draft: LAZ	Date: 6/21/22
Checked: ISM	Scale: AS NOTED	Project No.: 22022
Drawing Name: 22022-PLAN.dwg		

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5	2/14/23	REVISIONS PER CITY AND AoT COMMENTS	LAZ
4	12/11/22	REVISIONS PER CITY COMMENTS	LAZ
3	11/7/22	REVISIONS PER CITY COMMENTS	LAZ
2	10/18/22	REVISIONS PER CITY COMMENTS	LAZ

Designed and Produced in NH
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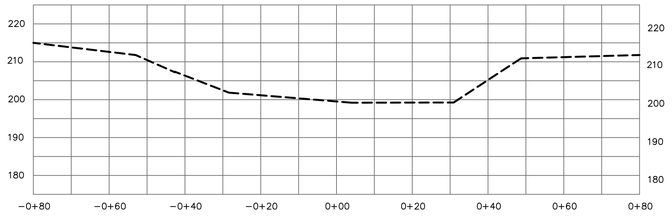
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SALMON FALLS RIVER CROSS SECTION OVERVIEW
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.

X1

SHEET 5 OF 2
JBE PROJECT NO. 22022



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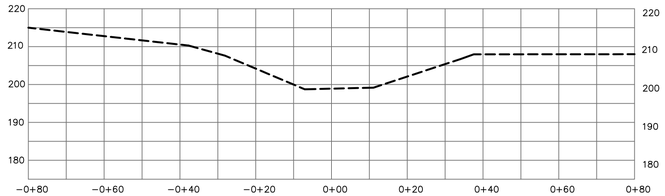

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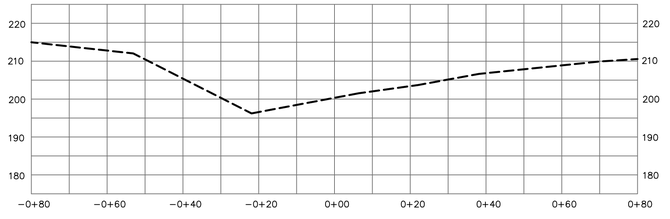

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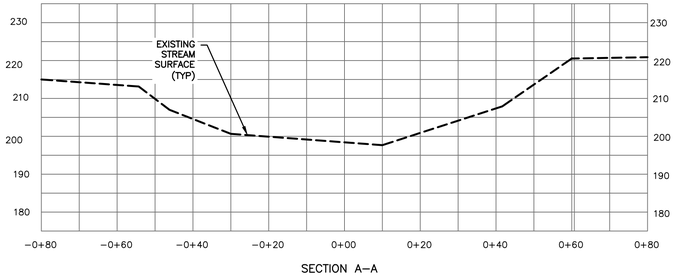

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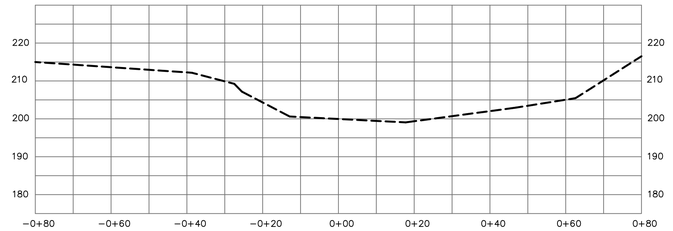

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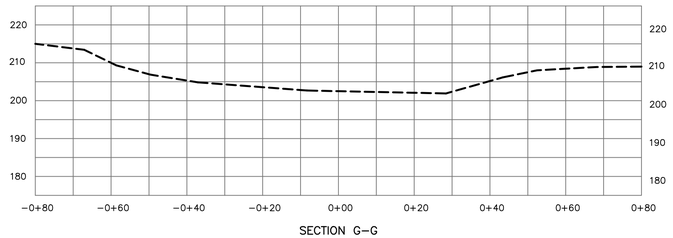

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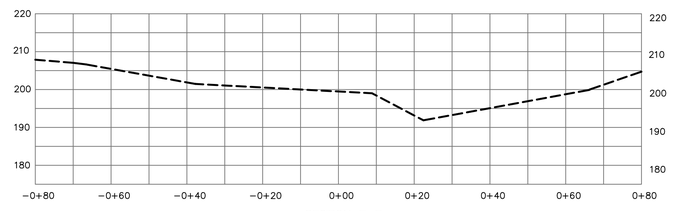

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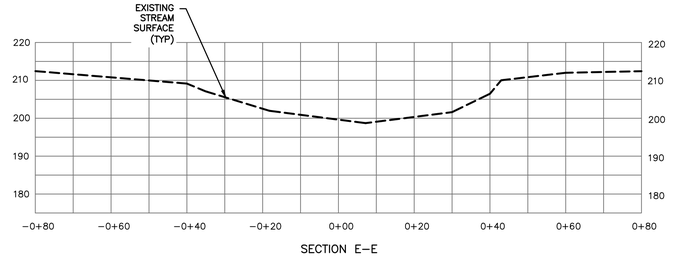

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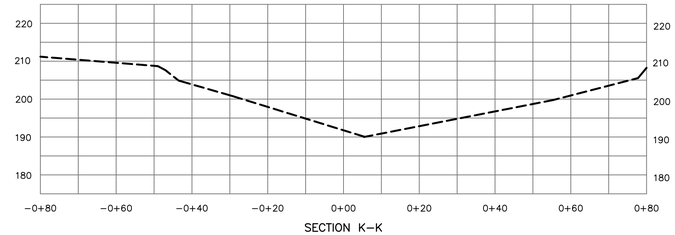

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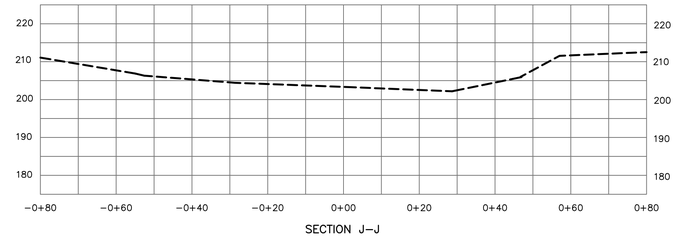

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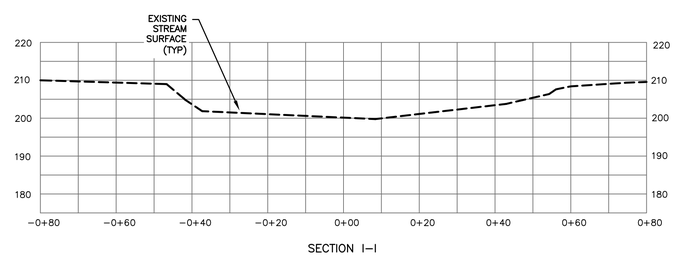

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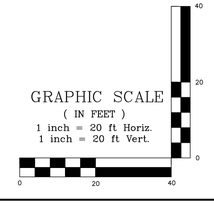

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Drawing Name: 22022-PLAN.dwg		

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2	10/18/22	REVISIONS PER CITY COMMENTS	LAZ

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Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SALMON FALLS RIVER CROSS SECTIONS
Project:	RESIDENTIAL SUBDIVISON AUTUMN STREET, ROCHESTER, NH
Owner of Record:	EWST, LLC PO BOX 190, EXETER, NH 03833

DRAWING No.

X2

SHEET 2 OF 2
JBE PROJECT NO. 22022