ALTUS ENGINEERING, INC.

Civil
Site Planning
Environmental
Engineering

133 Court Street
Portsmouth, NH
03801-4413

April 19, 2022

Beverly Zendt, Planning Director
Planning Department, City of Portsmouth
1 Junkins Avenue
Portsmouth, NH 03801

Re: Application for Subdivision Approval
445 Marcy Street, LLC
Tax Map 101, Lot 03
445 Marcy Street
P5217

Dear Ms. Zendt;

On behalf of Gail and James Sanders and 445 Marcy Street, LLC, Altus Engineering, Inc. (Altus) is pleased to submit a subdivision application to the Portsmouth Technical Advisory Committee.

The parcel is 14,947 SF in area and has frontage on three streets. There are no wetlands on the property. A portion of the property lies within the 100-year flood zone and is within 250-feet of the highest observable tide line which will require a Shoreland Permit from NHDES.

Both parcels will be serviced with municipal sewer and water and underground electrical and telecommunication services.

The Sanders' intend to construct their new home on Lot 2. As such, we know the development scenario for the lot and have included it with the Subdivision Application.

We look forward to presenting this application at the April May3, 2022 TAC meeting. Please feel free to contact me directly if you have any questions or require any additional supporting documentation.

Sincerely,

Eric D. Weinrieb, PE
President

Enclosure

Ecopy: Gail and Jim Sanders
Tracy Kozak, Arcove
Jim Verra, James Verra and Associates, Inc.

5217 tac cvr ltr.docx

THIS DRAWING SET HAS NOT BEEN RELEASED FOR CONSTRUCTION

445 MARCY STREET RESIDENCE

445 Marcy Street
Portsmouth, NH 03801

Assessor's Parcel 101, Lot 03

Owner/Applicant:
445 Marcy Street, LLC
(Gail & James Sanders)
30 Walden Street
Portsmouth, NH 03801
(603) 498-2636

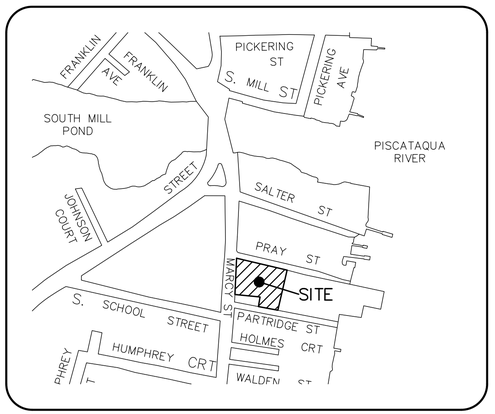
Architect:
ARCOVE ARCHITECTS
3 Congress Street, Suite 1
Portsmouth, NH 03801
(603) 731-5187

Civil Engineer:
ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

Surveyor:
James Verra
& Associates Inc.
LAND SURVEYORS
101 SHATTUCK WAY, SUITE 8
Newington, New Hampshire
03801-7876
Tel 603-436-3557

Plan Issue Date:

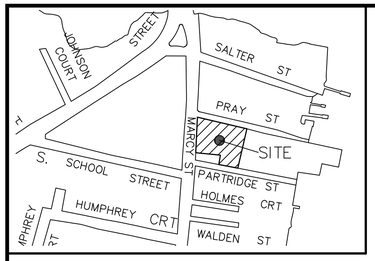
APRIL 15, 2022 TAC Review



LOCUS NOT TO SCALE

Sheet Index Title	*Sheet No.:*	*Rev.*	*Date*
Existing Conditions Plan	EX-1	2	10/06/21
Subdivision Plan	S-1	1	04/01/22
Site Plan	C-1	0	04/15/22
Grading, Drainage and Utility Plan	C-2	1	04/15/22
Details Sheet	C-3	0	04/15/22
Details Sheet	C-4	0	04/15/22
Details Sheet	C-5	0	04/15/22

P5217



LOCUS
(N.T.S.)

OWNERS

APN 101–3
445 MARCY STREET LLC
30 WALDEN ST
PORTSMOUTH, NH 03801
5829/1409

APN 101–2 (40 PRAY ST)
SANDERS LOBSTER CO INC
54 PRAY ST
PORTSMOUTH, NH 03801
2042/0383

APN 101–4
MICHELE E. MCLAUGHLIN
469 MARCY ST
PORTSMOUTH, NH 03801
2803/1555

APN 101–5
MARCY STREET INVESTMENTS
54 PRAY ST
PORTSMOUTH, NH 03801
2862/1897

NOTES:

1. OWNER OF RECORD.....445 MARCY STREET, LLC.
   ADDRESS.....30 WALDEN STREET, PORTSMOUTH, NH 03801
   DEED REFERENCE.....5829/1409
   TAX SHEET / LOT.....101–03
   PARCEL AREA.....14,947 S.F, 0.34 ACRES
2. ZONED:.....*GENERAL RESIDENCE B*
   MINIMUM LOT AREA..*5,000 S.F.*
   FRONTAGE.....*80'*
   FRONT YARD SETBACK ....*5'*
   SIDE YARD SETBACK .....*10'*
   REAR YARD SETBACK .....*25'*
3. THE RELATIVE ERROR OF CLOSURE WAS LESS THAN 1 FOOT IN 15,000 FEET.
4. *THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG–SAFE @ 1–888–DIG–SAFE.*
5. *HORIZONTAL DATUM: NAD 1983 ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND NGS "OPUS" SOLUTION. REFERENCE FRAME: NAD83 (2011)(EPOCH: 2010.0000), US SURVEY FOOT.*
   VERTICAL DATUM: NAVD 1988. PRIMARY BENCHMARK: CITY OF PORTSMOUTH "ROBE"
6. *CONTRACTOR TO VERIFY SITE BENCHMARKS BY LEVELING BETWEEN 2 BENCHMARKS PRIOR TO THE ESTABLISHMENT OF ANY GRADES OR ELEVATIONS. DISCREPANCIES ARE TO BE REPORTED TO JAMES VERRA AND ASSOCIATES, INC..*
7. *THE PARCEL SHOWN HEREON LIES WITHIN ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0259E, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.*
8. *APPROXIMATE 250' SETBACK TO THE HIGHEST OBSERVABLE TIDE LINE PER THE CITY OF PORTSMOUTH TAX MAPS.*

REFERENCE PLANS:

1. *PLAT OF LAND, #445 MARCY STREET, PORTSMOUTH, NEW HAMPSHIRE FOR JAMES H. SANDERS, DATED 9/1/94. RECORDED AS RCRD PLAN #D–23172.*

NH STATE PLANE COORDINATE SYSTEM
NAD 1983

RIM AND INVERT DATA

CB #1535
RIM EL= 9.08
(1) INV IN 12"RCP=5.58
(2) INV IN 12"RCP=5.48
(3) INV OUT 12"RCP=5.32

CB #1531
RIM EL= 9.18
(1) INV OUT 12"PVC=6.93

INV "A"
INV IN (6" RCP)= 6.74

SMH #1006
RIM EL= 14.09
(1) INV IN (8"?)=–0.79
(2) INV OUT (8"?)=–0.79

SMH #1533
RIM EL=9.19
(1) INV IN (8"?)=–2.41
(2) INV IN (8"?)=–2.41
(3) INV (OUT 8"?)=–2.45

SMH #1382
RIM EL=7.07
INACCESSIBLE

SMH #1180
RIM EL= 10.60
(1) INV OUT (6"?)=3.70

SMH #1183
RIM EL=7.87
INACCESSIBLE

BOUNDARY LINE TABLE

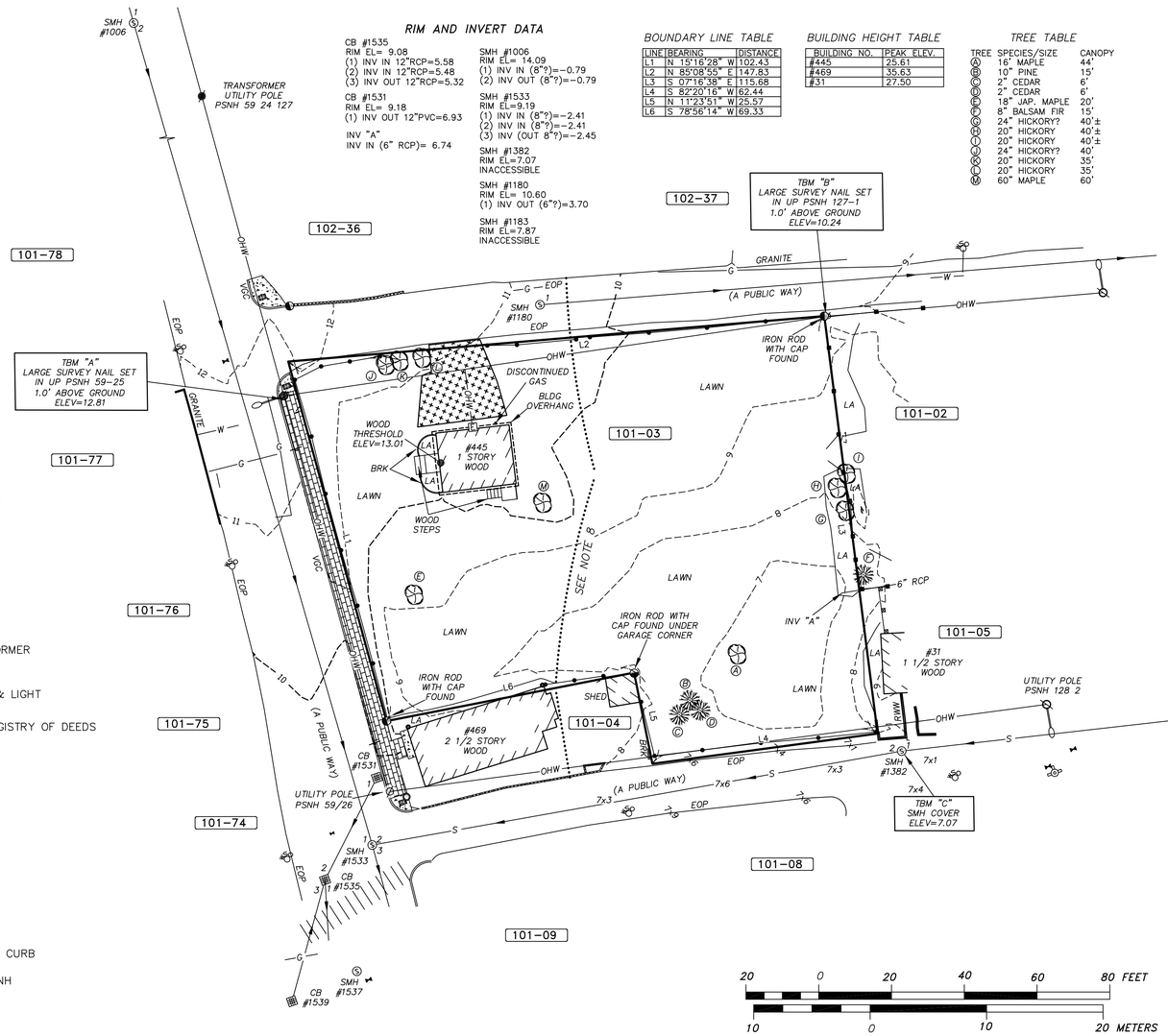
LINE	BEARING	DISTANCE
L1	N 15°16'28" W	102.43
L2	N 85°08'55" E	147.83
L3	S 07°16'38" E	115.68
L4	S 82°20'16" W	62.44
L5	N 11°23'51" W	25.57
L6	S 78°56'14" W	69.33

BUILDING HEIGHT TABLE

BUILDING NO.	PEAK ELEV.
#445	25.61
#469	35.63
#31	27.50

TREE TABLE

TREE	SPECIES/SIZE	CANOPY
A	16" MAPLE	44'
B	10" PINE	15'
C	2" CEDAR	6'
D	2" CEDAR	6'
E	18" JAP. MAPLE	20'
F	8" BALSAM FIR	15'
G	24" HICKORY?	40'±
H	20" HICKORY	40'±
I	20" HICKORY	40'±
J	24" HICKORY?	40'
K	20" HICKORY	35'
L	20" HICKORY	35'
M	60" MAPLE	60'



LEGEND:

- IRON ROD (AS NOTED)
- SURVEY NAIL (AS NOTED)
- POST & RAIL FENCE
- *WOOD FENCE*
- BRICK SIDEWALK
- CONCRETE
- STONE RETAINING WALL
- CRUSHED STONE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- GUY
- —OHW— OVERHEAD WIRES
- UTILITY POLE WITH ARM & LIGHT
- ELECTRIC METER
- *RCRD* ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 101–03 TAX SHEET / LOT NO.
- *EOP* EDGE OF PAVEMENT
- *LA* LANDSCAPED AREA
- CATCH BASIN
- SEWER MANHOLE
- SEWER CLEAN OUT
- — W — WATER LINE
- — S — SEWER LINE
- —D— DRAIN LINE
- — G — GAS LINE
- WATER GATE VALVE
- WATER SHUT OFF VALVE
- HYDRANT
- VGC VERTICAL FACED GRANITE CURB
- RWW WOOD RETAINING WALL
- PSNH PUBLIC SERVICE CO. OF NH
- PP/PL PLASTIC GAS LINE
- GJ GAS METER
- DECIDUOUS TREE
- CONIFEROUS TREE
- DOWN SPOUT

PURSUANT TO RSA 676:18,III AND RSA 672:14

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

JAMES VERRA DATE

PRELIMINARY
SUBJECT TO CHANGE

P5217

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

JAMES VERRA & ASSOCIATES, INC.
LAND SURVEYORS
101 SHATTUCK WAY – SUITE 8
NEWINGTON, N.H. 03801– 7876
603–436–3557

JOB NO: 20460–A

ISSUED FOR:
ENGINEERING DESIGN

ISSUE DATE:
PRELIMINARY

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	CLIENT REVIEW	JVA	PRELIMINARY
1	ADD INVERT, TREE DATA & BLDG. HEIGHT TABLE	JVA	10–1–2021
2	ADD 250' SETBACK TO HIGHEST OBSERVABLE TIDE LINE & NOTE 8	JVA	10–6–2021

DRAWN BY: GTD
APPROVED BY:
DRAWING FILE: 20460–A.DWG

SCALE:
22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

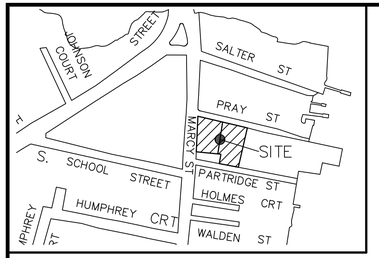
APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

OWNER:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
EXISTING CONDITIONS PLAN 445 MARCY STREET PORTSMOUTH, NH

SHEET NUMBER:
EX-1



LOCUS
(N.T.S.)

OWNERS

APN 101–2 (40 PRAY ST)
SANDERS LOBSTER CO. INC.
54 PRAY STREET
PORTSMOUTH, NH 03801
2042/0383

APN 101–3
445 MARCY STREET LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801
5829/1409

APN 101–4
MICHELE E. MCLAUGHLIN
469 MARCY STREET
PORTSMOUTH, NH 03801
2803/1555

APN 101–5
MARCY STREET INVESTMENTS
54 PRAY STREET
PORTSMOUTH, NH 03801
2862/1897

APN 101–8
ROBERT W. MORIN, III REV. TRUST
20 PARTRIDGE STREET
PORTSMOUTH, NH 03801
3460/747

APN 101–9
MARCY STREET REV. TRUST
JOHN TYLER MARKLEY, TRUSTEE
KRISTINE CUDAHY, TRUSTEE
PO BOX 268
CENTER HARBOR, NH 03226
6299/1657

APN 101–74
KRISTEN L. BENSON
478 MARCY STREET
PORTSMOUTH, NH 03801
5799/040

APN 101–75
RALPH J. MONTGOMERY REV. TRUST
RALPH J. MONTGOMERY, TRUSTEE
466 MARCY STREET
PORTSMOUTH, NH 03801
6122/014

APN 101–76
SARAH J. MINOR REV. TRUST
SARAH J. MINOR, TRUSTEE
65 LAUREL COURT
PORTSMOUTH, NH 03801
5222/1652

APN 101–77
JOHN & CAROL EBERLEIN
454 MARCY STREET
PORTSMOUTH, NH 03801
6199/1736

APN 101–78
JANINE CONTILLO
MICHAEL J. VITALE
442 MARCY STREET
PORTSMOUTH, NH 03801
3491/568

APN 102–36
MARK & NANCY MININBERG
7 PORTWALK PLACE, #1523
PORTSMOUTH, NH 03801
6204/2930

APN 101–37
BRUCE L. ADDISON REV. TRUST
SALLY E. ELSHOUT REV. TRUST
17 PRAY STREET
PORTSMOUTH, NH 03801
6254/2072

NH STATE PLANE COORDINATE SYSTEM
NAD 1983

PROPOSED LOT AREAS

LOT	CURRENT	PROPOSED
101–03	14,947	ORIG. LOT
1	--	6,127 S.F.
2	--	8,820 S.F.

BUILDING COVERAGE

101–03	2.51%	--
1	--	6.10%

IMPERVIOUS COVERAGE

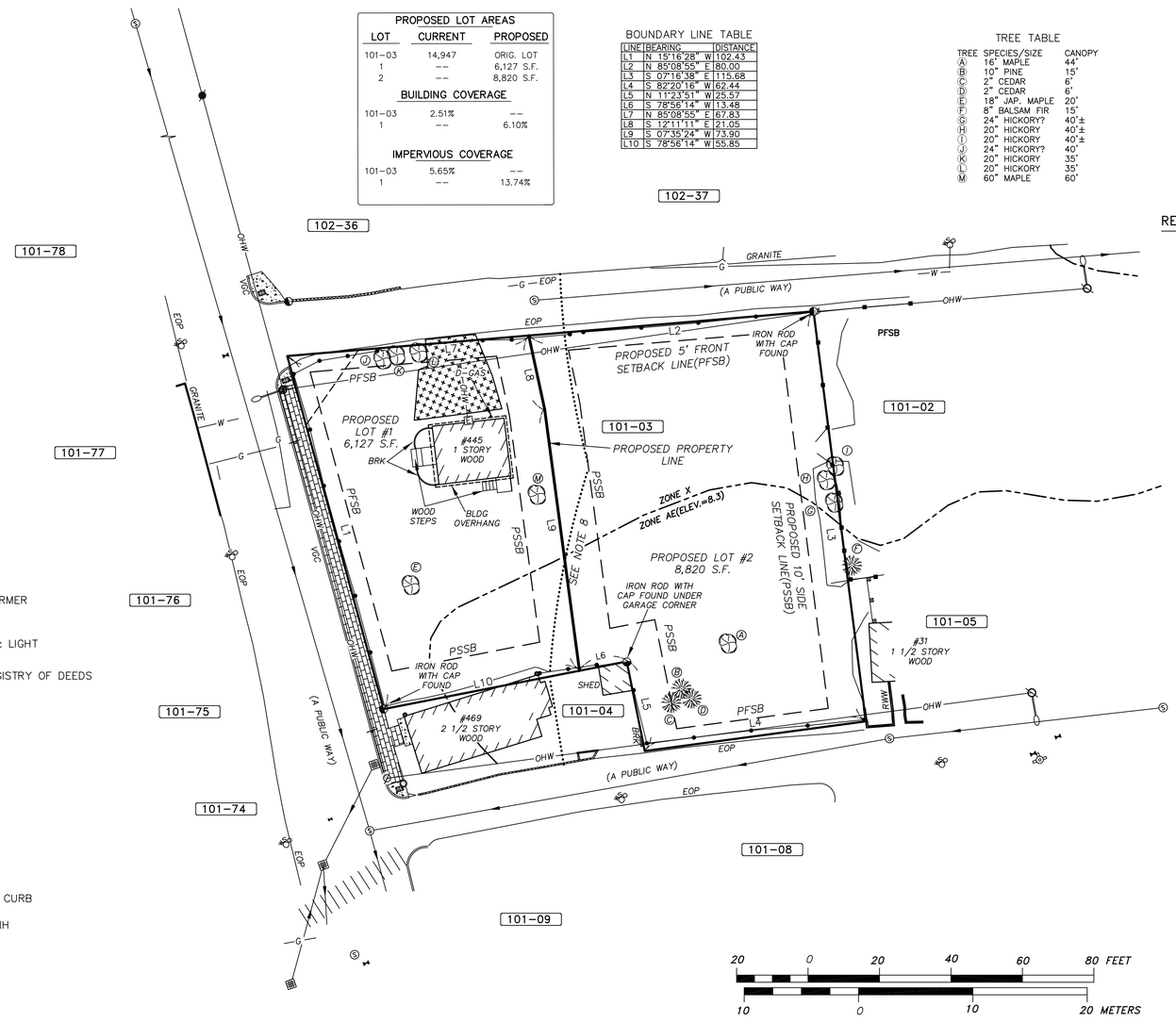
101–03	5.65%	--
1	--	13.74%

BOUNDARY LINE TABLE

LINE	BEARING	DISTANCE
L1	N 15°16'28" W	102.43
L2	N 85°08'55" E	80.00
L3	S 07°16'38" E	115.68
L4	S 82°20'16" W	62.44
L5	N 11°23'51" W	25.57
L6	S 78°56'14" W	13.48
L7	N 85°08'55" E	67.83
L8	S 12°11'11" E	21.05
L9	S 07°35'24" W	73.90
L10	S 78°56'14" W	55.85

TREE TABLE

TREE	SPECIES/SIZE	CANOPY
(A)	16" MAPLE	44'
(B)	10" PINE	15'
(C)	2" CEDAR	6'
(D)	2" CEDAR	6'
(E)	18" JAP. MAPLE	20'
(F)	8" BALSAM FIR	15'
(G)	24" HICKORY?	40'±
(H)	20" HICKORY	40'±
(I)	20" HICKORY	40'±
(J)	24" HICKORY?	40'
(K)	20" HICKORY	35'
(L)	20" HICKORY	35'
(M)	60" MAPLE	60'



LEGEND:

- IRON ROD (AS NOTED)
- SURVEY NAIL (AS NOTED)
- POST & RAIL FENCE
- *WOOD FENCE*
- BRICK SIDEWALK
- CONCRETE
- STONE RETAINING WALL
- CRUSHED STONE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- GUY
- —OHW— OVERHEAD WIRES
- UTILITY POLE WITH ARM & LIGHT
- [E] ELECTRIC METER
- *RCRD* ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 101–03 TAX SHEET / LOT NO.
- *EOP* EDGE OF PAVEMENT
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- CATCH BASIN
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- WATER GATE VALVE
- WATER SHUT OFF VALVE
- HYDRANT
- VGC VERTICAL FACED GRANITE CURB
- RWW WOOD RETAINING WALL
- PSNH PUBLIC SERVICE CO. OF NH
- PP/PL PLASTIC GAS LINE
- [G] GAS METER
- DECIDUOUS TREE
- CONIFEROUS TREE
- DOWN SPOUT
- D–GAS DISCONTINUED GAS SERVICE

NOTES:

1. OWNER OF RECORD.....445 MARCY STREET, LLC.
   ADDRESS.....30 WALDEN STREET, PORTSMOUTH, NH 03801
   DEED REFERENCE.....5829/1409
   TAX SHEET / LOT.....101–03
   PARCEL AREA.....14,947 S.F. 0.34 ACRES
2. ZONED:.....*GENERAL RESIDENCE B* FRONT YARD SETBACK .....5'
   MINIMUM LOT AREA..5,000 S.F. SIDE YARD SETBACK .....10'
   FRONTAGE.....80' REAR YARD SETBACK .....25'
3. THE RELATIVE ERROR OF CLOSURE WAS LESS THAN 1 FOOT IN 15,000 FEET.
4. *THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG–SAFE @ 1–888–DIG–SAFE.*
5. *HORIZONTAL DATUM: NAD 1983 ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND NGS "OPUS" SOLUTION. REFERENCE FRAME: NAD83 (2011)(EPOCH: 2010.0000), US SURVEY FOOT.*
   VERTICAL DATUM: NAVD 1988. PRIMARY BENCHMARK: CITY OF PORTSMOUTH "ROBE"
6. *PORTIONS OF PROPOSED LOTS 1 & 2 LIE WITHIN THE FLOODPLAIN DISTRICT (FP) AS DEFINED BY SECTION 10.613.10 OF THE PORTSMOUTH ZONING ORDINANCE. A PORTION OF THE PROPOSED LOT 1 AND ALL OF PROPOSED LOT 2 LIE WITHIN THE EXTENDED FLOOD HAZARD AREA AS DEFINED BY SECTION 10.622.20 OF THE PORTSMOUTH ZONING ORDINANCE.*
7. *A PORTION OF THE PARCEL SHOWN HEREON LIES WITHIN ZONE AE (ELEVATION 8.3) & ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0278F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.*
8. *APPROXIMATE 250' SETBACK TO THE HIGHEST OBSERVABLE TIDE LINE PER THE CITY OF PORTSMOUTH TAX MAPS.*

REFERENCE PLANS:

1. *EXISTING CONDITIONS PLAN 445 MARCY STREET RESIDENCE, TAX MAP 101, LOT 03, DATED 10–11–2021 BY ALTUS ENGINEERING, INC. NOT RECORDED.*
2. *PLAT OF LAND, #445 MARCY STREET, PORTSMOUTH, NEW HAMPSHIRE FOR JAMES H. SANDERS, DATED 9/1/94. RECORDED AS RCRD PLAN #D–23172.*

APPROVED FOR THE RECORD:

CHAIRMAN PORTSMOUTH PLANNING BOARD *DATE*

STATE OF NEW HAMPSHIRE — No. 625 JAMES VERRA — LICENSED LAND SURVEYOR — SIGNATURE

P5217

JAMES VERRA & ASSOCIATES, INC.
LAND SURVEYORS
101 SHATTUCK WAY – SUITE 8
NEWINGTON, N.H. 03801– 7876
603–436–3557

JOB NO: 20460–A

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

ISSUED FOR:
APPROVAL

ISSUE DATE:
PRELIMINARY

REVISIONS

NO.	DESCRIPTION	BY	DATE
1	REVISE PROP. LOTS & SETBACKS	GTD	4–1–22

DRAWN BY: GTD
APPROVED BY: JV
DRAWING FILE: 20460–A2.DWG

SCALE:
22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

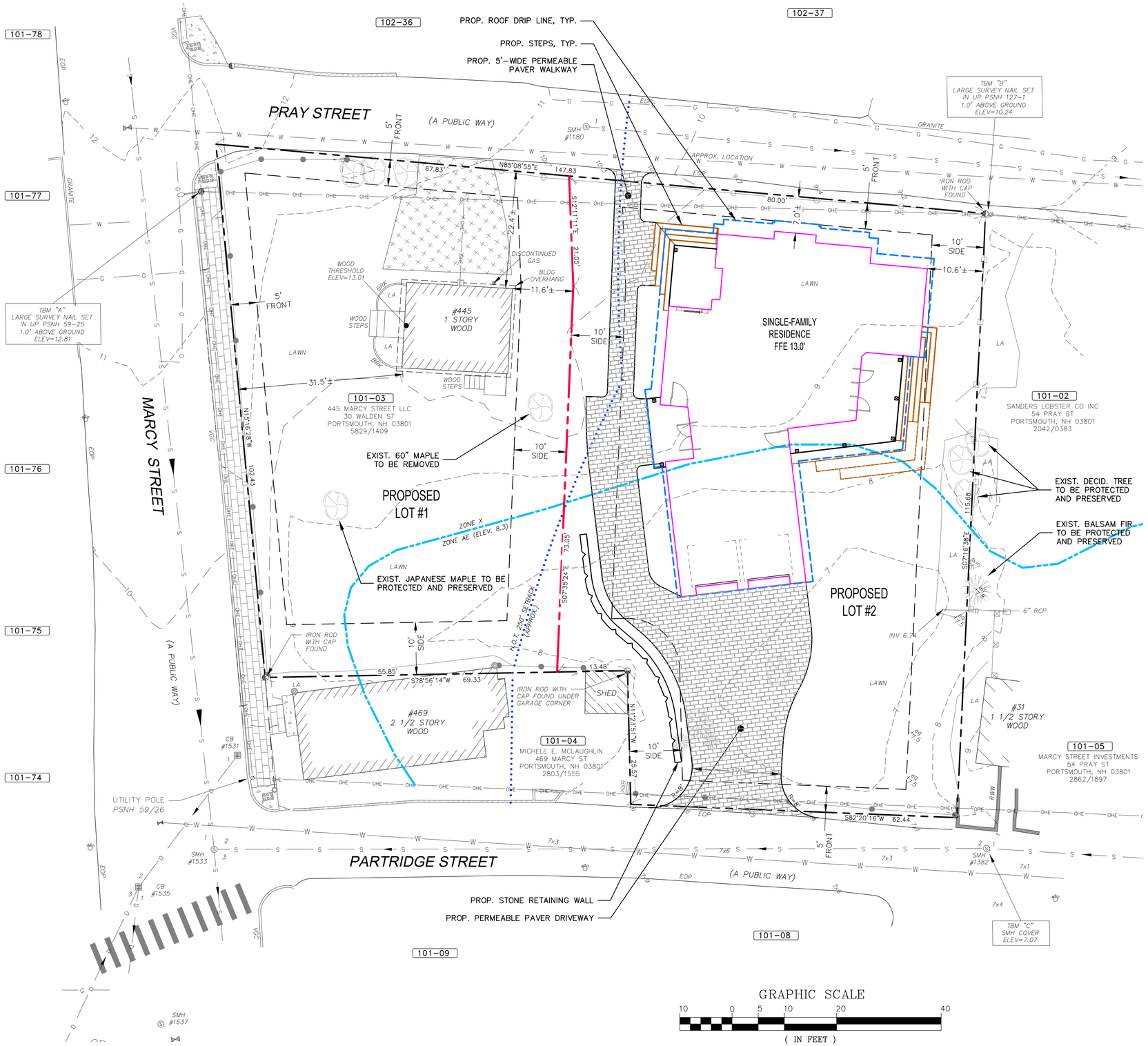
APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

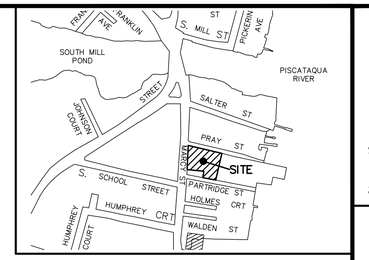
OWNER:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
SUBDIVISION PLAN
445 MARCY STREET PORTSMOUTH, NH

SHEET NUMBER:
S-1





LOCUS
(N.T.S.)

SITE NOTES

1. DESIGN INTENT – THIS PLAN IS INTENDED TO DEPICT A SUBDIVISION AND SITE PLAN FOR PROPOSED NEW SINGLE-FAMILY RESIDENCE.
2. APPROXIMATE LOT AREA: 14,947 S.F.± (0.34 AC.±)
3. ZONE: GENERAL RESIDENCE B (GRB)
4. DIMENSIONAL REQUIREMENTS:

	REQUIRED	EXISTING	PROPOSED LOT #1	PROPOSED LOT #2
MIN. LOT AREA:	5,000 SF	14,947 SF	6,127 SF	8,820 SF
MIN. STREET FRONTAGE:	80'	102.43'	102.43'	80.00'
MIN. LOT DEPTH:	60'	133.7'±	94.9'±	115.6'±
FRONT SETBACK:	5'	22.4'±	22.4'±	7.0'±
SIDE SETBACK:	10'	89.7'±	11.6'±	10.6'±
REAR SETBACK:	25'	N/A	N/A	N/A
MAX. BLDG. HEIGHT	35' (SLOPE)	<20'	<20'	32.5'±
MAX. BLDG. COVERAGE:	30%	2.5%	6.1%	28.7%
MIN. OPEN SPACE:	25%	94.3%	86.2%	47.0%

5. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE @ 1-888-DIG-SAFE.
6. THE EXISTING SITE CONDITION DETAILS SHOWN ARE THE RESULTS OF AN ON THE GROUND INSTRUMENT FIELD SURVEY PERFORMED BY JAMES VERRA & ASSOCIATES, INC. OCTOBER 2021. THE CLOSED TRAVERSE ROUGH CLOSURE PRECISION WAS 1/15,000.
7. HORIZONTAL DATUM: NAD 1983 ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND NGS "OPUS" SOLUTION. REFERENCE FRAME: NAD83 2010.0000), US SURVEY FOOT.
   VERTICAL DATUM: NAVD 1988. PRIMARY BENCHMARK: CITY OF PORTSMOUTH "ROBE"
8. A PORTION OF THE PROPOSED LOTS SHOWN HEREON LIES WITHIN ZONE AE (ELEVATION 8) & ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0259F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
9. APPROXIMATE 250' SETBACK TO THE HIGHEST OBSERVABLE TIDE LINE PER THE CITY OF PORTSMOUTH TAX MAPS.

PLAN REFERENCE

1. "EXISTING CONDITIONS PLAN, 445 MARCY STREET, PORTSMOUTH, NEW HAMPSHIRE", REVISED DATED APRIL 1, 2022, PREPARED BY JAMES VERRA & ASSOCIATES, INC.

ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE
4/18/22

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: APRIL 15, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/15/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

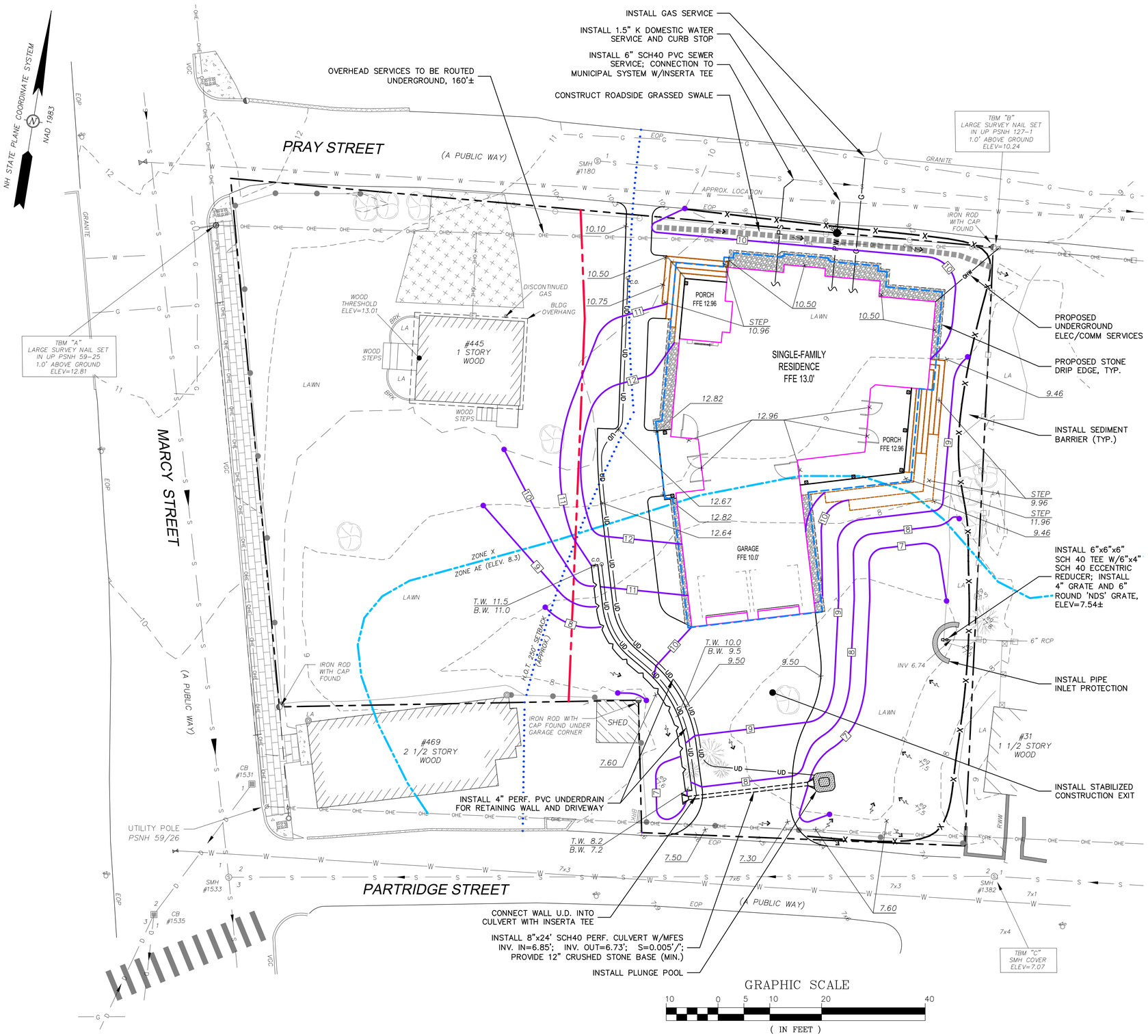
OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
SITE PLAN

SHEET NUMBER:
C - 1

P5217



GRADING AND DRAINAGE NOTES

1. DO NOT BEGIN CONSTRUCTION UNTIL ALL STATE AND LOCAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED.
2. CONTRACTOR SHALL OBTAIN A "DIGSAFE" NUMBER AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION.
3. ALL CONSTRUCTION SHALL MEET THE MINIMUM CONSTRUCTION STANDARDS OF THE CITY OF PORTSMOUTH AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL GOVERN.
4. ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO INITIATING CONSTRUCTION.
5. UNLESS OTHERWISE AGREED IN WRITING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING TEMPORARY BENCHMARKS (TBM) AND PERFORMING ALL CONSTRUCTION SURVEY LAYOUT.
6. PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES FOR FOUNDATIONS, PAVEMENT AREAS, UTILITY TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL. IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER, EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATIONS. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.
7. IF SUITABLE, EXCAVATED MATERIALS SHALL BE PLACED AS FILL WITHIN UPLAND AREAS ONLY AND SHALL NOT BE PLACED WITHIN WETLANDS. PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION.
8. IN ORDER TO PROVIDE VISUAL CLARITY ON THE PLANS, DRAINAGE AND OTHER UTILITY STRUCTURES MAY NOT BE DRAWN TO SCALE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SIZING AND LOCATION OF ALL STRUCTURES AND IS DIRECTED TO RESOLVE ANY POTENTIAL DISCREPANCY WITH THE ENGINEER PRIOR TO CONSTRUCTION.

UTILITY NOTES

1. ALL EXISTING UTILITIES SHOWN ARE PER PLAN REFERENCE #1. LOCATIONS AND COMPLETENESS ARE NOT GUARANTEED BY ENGINEER OR OWNER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES.
2. SITE WILL BE SERVED BY MUNICIPAL WATER & SEWER.
3. COORDINATE ALL WATER LINE CONSTRUCTION ACTIVITIES WITH PORTSMOUTH DPW, JIM TOW, (603) 427-1530.
4. COORDINATE ALL SEWER LINE CONSTRUCTION ACTIVITIES WITH PORTSMOUTH DPW, JIM TOW, (603) 427-1530.

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445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
GRADING, DRAINAGE AND UTILITY PLAN

SHEET NUMBER:
C - 2

P5217

SEDIMENT AND EROSION CONTROL NOTES

PROJECT NAME AND LOCATION

SINGLE FAMILY RESIDENCE
GAIL AND JAMES SANDERS
445 MARCY STREET
PORTSMOUTH, NEW HAMPSHIRE
TAX MAP 101 LOT 3

LONGITUDE: 70°44'58" W
LATITUDE: 43°04'19" N

OWNER / APPLICANT:

445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 038001

DESCRIPTION

The project consists of the development of the lot for the construction of a single–family residential home along with associated site improvements.

DISTURBED AREA

The total area to be disturbed for the redevelopment improvements is approximately 7,300 S.F. (±0.17 acres).

PROJECT PHASING

The proposed project will be completed in one phase.

NAME OF RECEIVING WATER

The site drains overland to the Piscataqua River.

SEQUENCE OF MAJOR ACTIVITIES

1. Install temporary erosion control measures including silt fences, stabilized construction entrance and inlet sediment filters as noted on the plan. All temporary erosion control measures shall be maintained in good working condition for the duration of the project.
2. Strip loam and stockpile.
3. Site features as shown on plan.
4. Rough grade site including placement of borrow materials.
5. Construct drainage structures, culverts, utilities, swales & pavement base course materials.
6. Loam (6" min) and seed all disturbed areas not paved or otherwise stabilized.
7. Install pavers.
8. When all construction activity is complete and site is stabilized, remove all temporary erosion control measures and any sediment that has been trapped by these devices.

TEMPORARY EROSION & SEDIMENT CONTROL AND STABILIZATION PRACTICES

All work shall be in accordance with state and local permits. Work shall conform to the practices described in the "New Hampshire Stormwater Manual, Volumes 1 – 3", issued December 2008, as amended. As indicated in the sequence of Major Activities, the silt fences shall be installed prior to commencing any clearing or grading of the site. Structural controls shall be installed concurrently with the applicable activity. Once construction activity ceases permanently in an area, silt fences and any earth/dikes will be removed once permanent measures are established.

During construction, runoff will be diverted around the site with stabilized channels where possible. Sheet runoff from the site shall be filtered through hay bale barriers, stone check dams, and silt fences. All storm drain inlets shall be provided with hay bale filters or stone check dams. Stone rip rap shall be provided at the outlets of drain pipes and culverts where shown on the drawings.

Stabilize all ditches, swales, & level spreaders prior to directing flow to them.

Temporary and permanent vegetation and mulching is an integral component of the erosion and sedimentation control plan. All areas shall be inspected and maintained until vegetative cover is established. These control measures are essential to erosion prevention and also reduce costly rework of graded and shaped areas.

Temporary vegetation shall be maintained in these areas until permanent seeding is applied. Additionally, erosion and sediment control measures shall be maintained until permanent vegetation is established.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

A. GENERAL

These are general inspection and maintenance practices that shall be used to implement the plan:

1. The smallest practical portion of the site shall be denuded at one time.
2. All control measures shall be inspected at least once each week and following any storm event of 0.5 inches or greater.
3. All measures shall be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours.
4. Built–up sediment shall be removed from silt fence or other barriers when it has reached one–third the height of the fence or bale, or when "bulges" occur.
5. All diversion dikes shall be inspected and any breaches promptly repaired.
6. Temporary seeding and planting shall be inspected for bare spots, washouts, and unhealthy growth.
7. The owner's authorized engineer shall inspect the site on a periodic basis to review compliance with the Plans.
8. An area shall be considered stable if one of the following has occurred:
   a. Base coarse gravels have been installed in areas to be paved;
   b. A minimum of 85% vegetated growth as been established;
   c. A minimum of 3 inches of non–erosive material such as stone of riprap has been installed; – or –
   d. Erosion control blankets have been properly installed.
9. The length of time of exposure of area disturbed during construction shall not exceed 45 days.

B. MULCHING

Mulch shall be used on highly erodible soils, on critically eroding areas, on areas where conservation of moisture will facilitate plant establishment, and where shown on the plans.

1. Timing – In order for mulch to be effective, it must be in place prior to major storm events. There are two (2) types of standards which shall be used to assure this:
   a. Apply mulch prior to any storm event. This is applicable when working within 100 feet of wetlands. It will be necessary to closely monitor weather predictions, usually by contacting the National Weather Service in Concord, to have adequate warning of significant storms.
   b. Required Mulching within a specified time period. The time period can range from 21 to 28 days of inactivity on a area, the length of time varying with site conditions. Professional judgment shall be used to evaluate the interaction of site conditions (soil erodibility, season of year, extent of disturbance, proximity to sensitive resources, etc.) and the potential impact of erosion on adjacent areas to choose an appropriate time restriction.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (CON'T)

2. Guidelines for Winter Mulch Application –

Type	Rate per 1,000 s.f.	Use and Comments
Hay or Straw	70 to 90 lbs.	Must be dry and free from mold. May be used with plantings.
Wood Chips or Bark Mulch	460 to 920 lbs.	Used mostly with trees and shrub plantings.
Jute and Fibrous Matting (Erosion Blanket	As per manufacturer Specifications	Used in slope areas, water courses and other Control areas.
Crushed Stone 1/4" to 1–1/2" dia.	Spread more than 1/2" thick	Effective in controlling wind and water erosion.
Erosion Control Mix	2" thick (min)	* The organic matter content is between 80 and 100%, dry weight basis. * Particle size by weight is 100% passing a 6" screen and a minimum of 70 % maximum of 85% passing a 0.75" screen. * The organic portion needs to be fibrous and elongated. * Large portions of silts, clays or fine sands are not acceptable in the mix. * Soluble salts content is less than 4.0 mmhos/cm. * The pH should fall between 5.0 and 8.0.

3. Maintenance – All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. If less than 90% of the soil surface is covered by mulch, additional mulch shall be immediately applied.

C. TEMPORARY GRASS COVER

1. Seedbed Preparation –
   Apply fertilizer at the rate of 600 pounds per acre of 10–10–10. Apply limestone (equivalent to 50 percent calcium plus magnesium oxide) at a rate of three (3) tons per acre.

2. Seeding –
   a. Utilize annual rye grass at a rate of 40 lbs/acre.
   b. Where the soil has been compacted by construction operations, loosen soil to a depth of two (2) inches before applying fertilizer, lime and seed.
   c. Apply seed uniformly by hand, cyclone seeder, or hydroseeder (slurry including seed and fertilizer). Hydroseedings, which include mulch, may be left on soil surface. Seeding rates must be increased 10% when hydroseeding.

3. Maintenance –
   Temporary seedings shall be periodically inspected. At a minimum, 95% of the soil surface should be covered by vegetation. If any evidence of erosion or sedimentation is apparent, repairs shall be made and other temporary measures used in the interim (mulch, filter barriers, check dams, etc.).

D. FILTERS

1. Sequence of Installation –
   Sediment barriers shall be installed prior to any soil disturbance of the contributing upslope drainage area.

2. Maintenance –
   a. Silt fence barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. They shall be repaired if there are any signs of erosion or sedimentation below them. Any required repairs shall be made immediately. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water, the sediment barriers shall be replaced with a temporary stone check dam.
   b. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still is necessary, the fabric shall be replaced promptly.
   a. Sediment deposits must be removed when deposits reach approximately one–third (1/3) the height of the barrier.
   b. Any sediment deposits remaining in place after the silt fence or other barrier is no longer required shall be removed. The area shall be prepared and seeded.
   c. Additional stone may have to be added to the construction entrance, rock barrier and riprap lined swales, etc., periodically to maintain proper function of the erosion control structure.

E. PERMANENT SEEDING –

1. Bedding – stones larger than 1½", trash, roots, and other debris that will interfere with seeding and future maintenance of the area should be removed. Where feasible, the soil should be tilled to a depth of 5" to prepare a seedbed and mix fertilizer into the soil.

2. Fertilizer – lime and fertilizer should be applied evenly over the area prior to or at the time of seeding and incorporated into the soil. Kinds 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 @ 100 lbs. per 1,000 s.f.
   10–20–20 fertilizer @ 12 lbs. per 1,000 s.f.

3. Seed Mixture (recommended):

Type	Lbs. / Acre	Lbs. / 1,000 sf
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	48	1.10

Seed Mixture (For slope embankments):
Grass Seed: Provide fresh, clean, new–crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed mixture composed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified:

Type	Min. Purity (%)	Min. Germination (%)	Kg./Hectare (Lbs/Acre)
Creeping Red Fescue (c)	96	85	45 (40)
Perennial Rye Grass (a)	98	90	35 (30)
Redtop	95	80	5 (5)
Alsike Clover	97	90(e)	5 (5)
		Total	90 (80)

a. Ryegrass shall be a certified fine–textured variety such as Pennfine, Fiesta, Yorktown, Diplomat, or equal.
b. Fescue varieties shall include – Creeping Red and/or Hard Reliant, Scaldis, Koket, or Jamestown.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (CON'T)

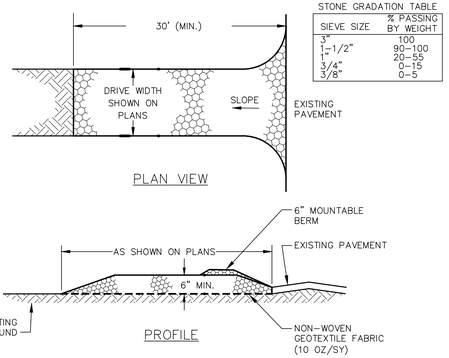
4. Sodding – sodding is done where it is desirable to rapidly establish cover on a disturbed area. Sodding an area may be substituted for permanent seeding procedures anywhere on site. Bed preparation, fertilizing, and placement of sod shall be performed according to the S.C.S. Handbook. Sodding is recommended for steep sloped areas, areas immediately adjacent to sensitive water courses, easily erodible soils (fine sand/silt), etc.

WINTER CONSTRUCTION NOTES

1. All proposed vegetated areas which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and elsewhere seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting. 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;

2. All ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions; and

3. After November 15th, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT Item 304.3.



STONE GRADATION TABLE

SIEVE SIZE	% PASSING BY WEIGHT
3"	100
1–1/2"	90–100
1"	20–55
3/4"	0–15
3/8"	0–5

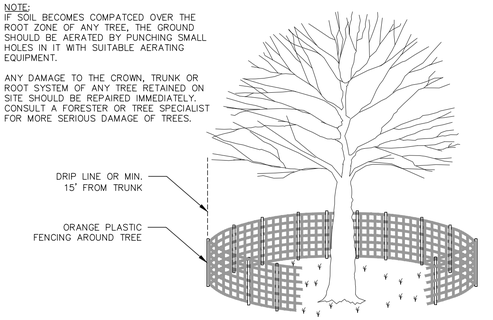
CONSTRUCTION SPECIFICATIONS

1. STONE SIZE – NHDOT STANDARD STONE SIZE #4 – SECTION 703 OF NHDOT STANDARD.
2. LENGTH – DETAILED ON PLANS (50 FOOT MINIMUM).
3. THICKNESS – SIX (6) INCHES (MINIMUM).
4. WIDTH – FULL DRIVE WIDTH UNLESS OTHERWISE SPECIFIED.
5. FILTER FABRIC – MIRAFI 600X OR EQUAL APPROVED BY ENGINEER.
6. SURFACE WATER CONTROL – ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WHEELS SHALL BE CLEANED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AT ALL ENTRANCES TO PUBLIC RIGHTS–OF–WAY, AT LOCATIONS SHOWN ON THE PLANS, AND/OR WHERE AS DIRECTED BY THE ENGINEER.

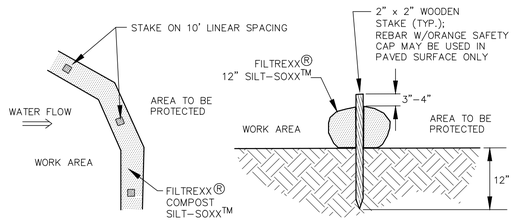
STABILIZED CONSTRUCTION EXIT NOT TO SCALE

NOTE:
IF SOIL BECOMES COMPATCED OVER THE ROOT ZONE OF ANY TREE, THE GROUND SHOULD BE AERATED BY PUNCHING SMALL HOLES IN IT WITH SUITABLE AERATING EQUIPMENT.

ANY DAMAGE TO THE CROWN, TRUNK OR ROOT SYSTEM OF ANY TREE RETAINED ON SITE SHOULD BE REPAIRED IMMEDIATELY. CONSULT A FORESTER OR TREE SPECIALIST FOR MORE SERIOUS DAMAGE OF TREES.

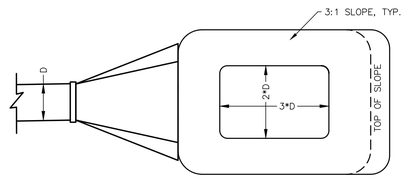


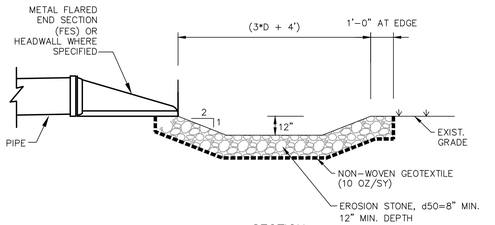
TREE PROTECTION DETAIL NOT TO SCALE



NOTES:
1. SILTSOXX MAY BY USED IN PLACE OF SILT FENCE OR OTHER SEDIMENT BARRIERS.
2. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
3. SILTSOXX COMPOST/SOIL/ROCK/SEED FILL MATERIAL SHALL BE ADJUSTED AS NECESSARY TO MEET THE REQUIREMENTS OF THE SPECIFIC APPLICATION.
4. ALL SEDIMENT TRAPPED BY SILTSOXX SHALL BE DISPOSED OF PROPERLY.

TUBULAR SEDIMENT BARRIER NOT TO SCALE





1. CONSTRUCT PLUNGE POOL TO THE WIDTHS AND LENGTHS SHOWN ON THE PLAN.
2. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIPRAP SHALL BE PREPARED TO LINES AND GRADES SHOWN ON THE PLANS.
3. EROSION STONE USED FOR THE PLUNGE POOL SHALL MEET THE FOLLOWING GRADATION.
4. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE EROSION STONE. 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 18 INCHES.
5. THE EROSION STONE 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.

PLUNGE POOL NOT TO SCALE

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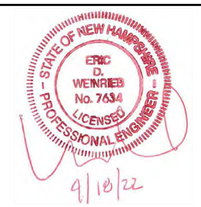

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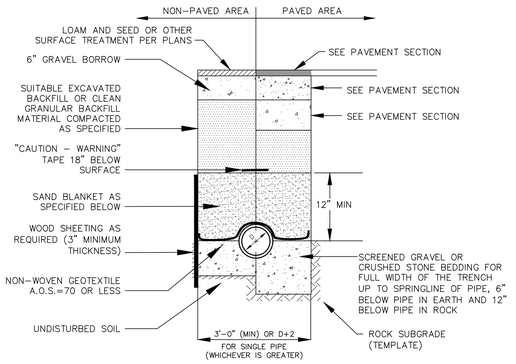


NOTES

1. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
2. INSULATE GRAVITY SEWER AND FORCEMAINS WHERE THERE IS LESS THAN 5'-0" OF COVER WITH 2" THICK CLOSED CELL RIGID BOARD INSULATION, 18" ON EACH SIDE OF PIPE.
3. MAINTAIN 12" MINIMUM HORIZONTAL SEPARATION AND WIDEN TRENCH ACCORDINGLY IF MULTIPLE PIPES ARE IN TRENCH.

SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

SCREENED GRAVEL OR CRUSHED STONE BEDDING*

SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90 – 100
3/8"	20 – 55
# 4	0 – 10
# 8	0 – 5

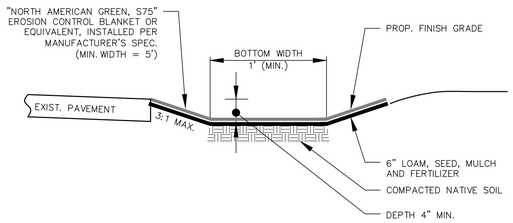
* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

DRAINAGE, SEWER & FORCEMAIN TRENCH

NOT TO SCALE

STANDARD TRENCH NOTES

1. ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE: BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWING.
2. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING THE GRADATION SHOWN IN THE TRENCH DETAIL. WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1-1/2 INCH TO 1/2 INCH SHALL BE USED.
3. SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER MEETING THE GRADATION SHOWN IN THE TRENCH DETAIL. BLANKET MAY BE REPLACED WITH BEDDING MATERIAL FOR CAST-IRON, DUCTILE IRON, AND REINFORCED CONCRETE PIPE PROVIDED THAT NO STONE LARGER THAN 2" IS IN CONTACT WITH THE PIPE AND THE GEOTEXTILE IS RELOCATED ACCORDINGLY.
4. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT, OR CLAY, ALL EXCAVATED LEDGE MATERIAL, ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION, AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN CROSS COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK, OR PEAT, IF SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLE RECONSTRUCTION WILL BE PRESERVED.
5. BASE COURSE AND PAVEMENT SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES – DIVISIONS 300 AND 400 RESPECTIVELY.
6. SHEETING, IF REQUIRED: WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAT 1 FOOT ABOVE THE TOP OF THE PIPE.
7. W = MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 15 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.) ALSO, W SHALL BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE.
8. FOR CROSS COUNTRY CONSTRUCTION, BACKFILL, FILL AND/OR LOAM SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
9. CONCRETE FOR ENCASEMENT SHALL CONFORM TO THE NEW HAMPSHIRE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS STANDARD SPECIFICATION REQUIREMENTS FOR CLASS A (3000#)
   CONCRETE AS FOLLOWS:
   CEMENT: 6.0 BAGS PER CUBIC YARD
   WATER: 5.75 GALLONS PER BAG
   CEMENT MAXIMUM SIZE OF AGGREGATE: 1 INCH
   CONCRETE ENCASEMENT IS NOT ALLOWED FOR PVC PIPE.
10. CONCRETE FULL ENCASEMENT: IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I.D. (4" MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.
11. NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES DESIGN STANDARDS REQUIRE TEN FEET (10') SEPARATION BETWEEN WATER AND SEWER. REFER TO TOWN'S STANDARD SPECIFICATIONS FOR METHODS OF PROTECTION IN AREAS THAT CANNOT MEET THESE REQUIREMENTS.

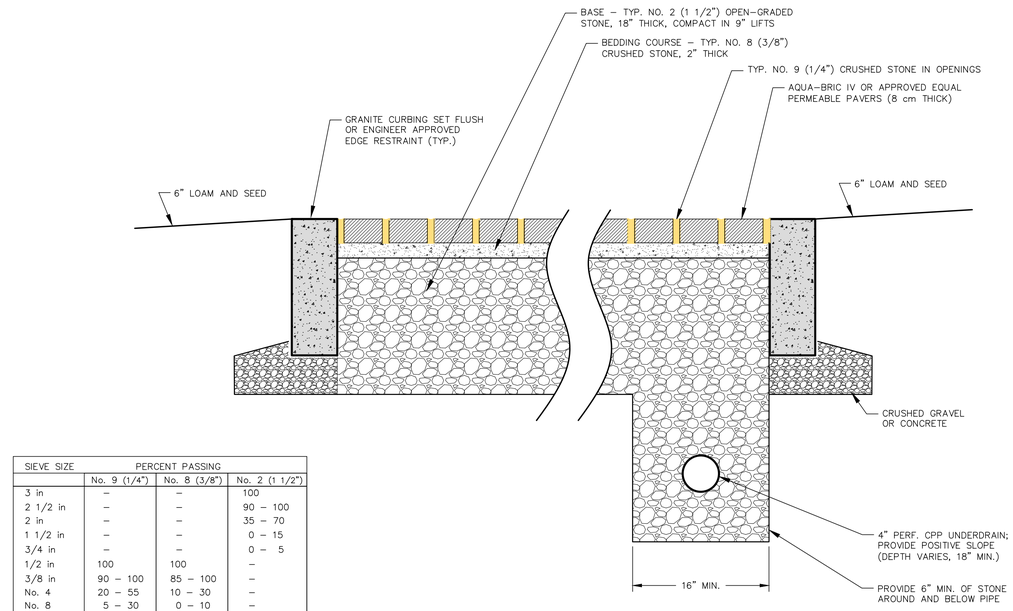


NOTES:

1. THE FOUNDATION AREA OF THE WATERWAY SHALL BE CLEARED AND GRUBBED OF ALL TREES, BRUSH, STUMPS, AND OTHER OBJECTIONABLE MATERIAL. MATERIALS REMOVED SHALL BE DISPOSED OF SO THEY WILL NOT INTERFERE WITH THE CONSTRUCTION OR PROPER FUNCTIONING OF THE WATERWAY.
2. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE AND CROSS SECTION AS REQUIRED TO MEET THE DESIGN CRITERIA. THE WATERWAY SHALL BE FREE OF IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. EARTH FILLS REQUIRED TO MEET SUBGRADE REQUIREMENTS BECAUSE OF OVER EXCAVATION OR TOPOGRAPHY SHALL BE COMPACTED TO THE SAME DENSITY AS THE SURROUNDING SOIL TO PREVENT UNEQUAL SETTLEMENT THAT COULD CAUSE DAMAGE TO THE COMPLETED WATERWAY. EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER AS TO MINIMIZE EROSION AND AIR AND WATER POLLUTION. ALL APPROPRIATE STATE AND LOCAL LAWS AND REGULATIONS SHALL BE COMPLIED WITH FOR INSTALLATION.
5. VEGETATION SHALL BE ESTABLISHED IN THE SWALE OR AN EROSION CONTROL MATTING INSTALLED PRIOR TO ALLOWING STORMWATER RUNOFF TO FLOW THROUGH THE SWALE.
6. MAINTENANCE OF THE VEGETATION IN THE GRASSED WATERWAY IS EXTREMELY IMPORTANT IN ORDER TO PREVENT RILLING, EROSION, AND FAILURE OF THE WATERWAY. MOWING SHALL BE DONE FREQUENTLY ENOUGH TO CONTROL ENCROACHMENT OF WEEDS AND WOODY VEGETATION AND TO KEEP THE GRASSES IN A VIGOROUS CONDITION. THE VEGETATION SHALL NOT BE MOWED TOO CLOSELY SO AS TO REDUCE THE EROSION RESISTANCE IN THE WATERWAY.
7. THE WATERWAY SHOULD BE INSPECTED PERIODICALLY AND AFTER ANY STORM GREATER THAN 0.5" OF RAINFALL IN 24 HOURS TO DETERMINE THE CONDITION OF THE WATERWAY. RILLS AND DAMAGED AREAS SHOULD BE PROMPTLY REPAIRED AND REVEGETATED AS NECESSARY TO PREVENT FURTHER DETERIORATION.
8. APPLY LIME AND FERTILIZER AS NEEDED TO MAINTAIN VIGOROUS GROWTH.

ROADSIDE SWALE

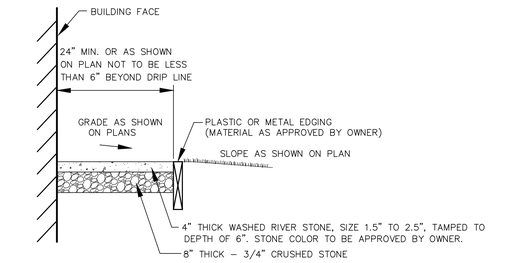
NOT TO SCALE



SIEVE SIZE	PERCENT PASSING		
	No. 9 (1/4")	No. 8 (3/8")	No. 2 (1 1/2")
3 in	–	–	100
2 1/2 in	–	–	90 – 100
2 in	–	–	35 – 70
1 1/2 in	–	–	0 – 15
3/4 in	–	–	0 – 5
1/2 in	100	100	–
3/8 in	90 – 100	85 – 100	–
No. 4	20 – 55	10 – 30	–
No. 8	5 – 30	0 – 10	–
No. 16	0 – 10	0 – 5	–
No. 50	0 – 5	–	–

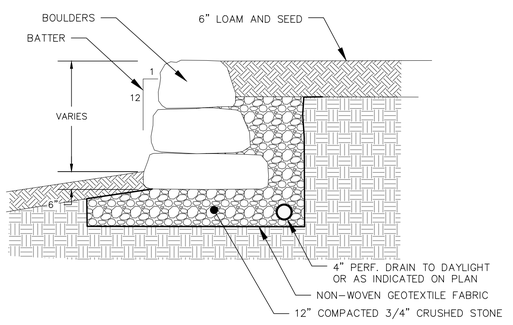
PERMEABLE PAVERS DETAIL

NOT TO SCALE



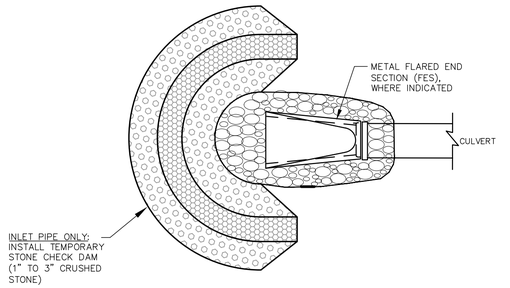
DRIP EDGE DETAIL

NOT TO SCALE

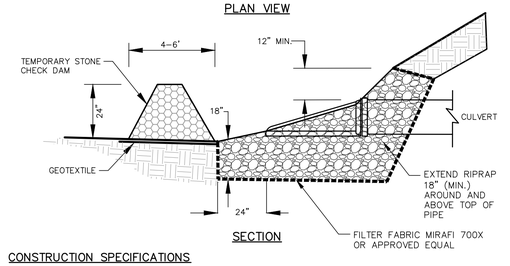


TYPICAL BOULDER WALL DETAIL

NOT TO SCALE



PLAN VIEW



SECTION

CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIPRAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIPRAP. 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 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.

PIPE INLET PROTECTION

NOT TO SCALE

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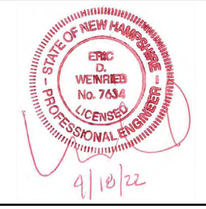
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com



NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: APRIL 15, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/15/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

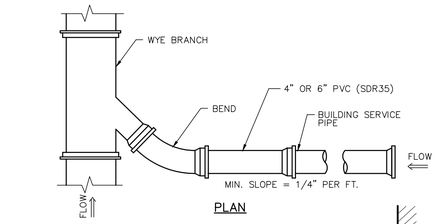
APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

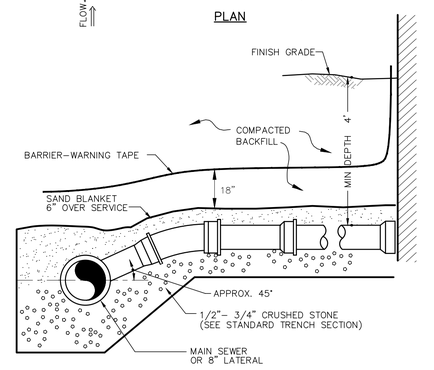
PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
DETAILS SHEET

SHEET NUMBER:
C - 4



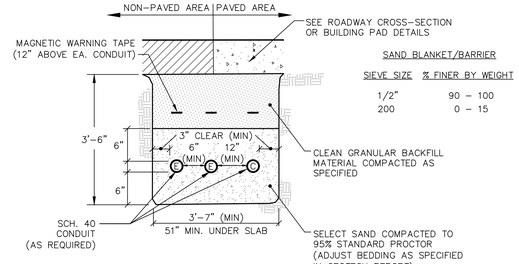
PLAN



NOTE: SERVICE CONNECTION SHALL BE INSTALLED BELOW WATER MAIN WHERE POSSIBLE.

ELEVATION

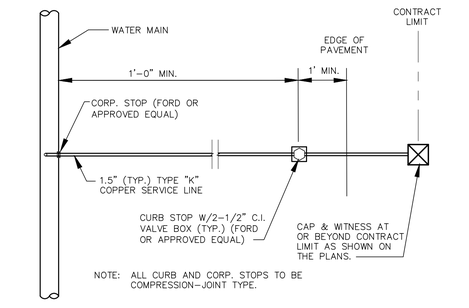
SEWER SERVICE CONNECTION NOT TO SCALE



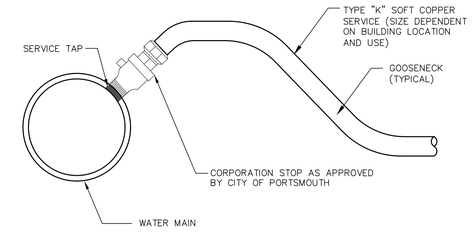
NOTES

1. ALL CONDUIT IS TO BE SCHEDULE 40 PVC, ELECTRICAL GRADE, GRAY IN COLOR AND INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS. A 10-FOOT HORIZONTAL SECTION OF RIGID GALVANIZED STEEL CONDUIT WILL BE REQUIRED AT EACH SWEEP, UNLESS IN THE OPINION OF THE SERVICE PROVIDER DESIGNER, THE SWEEP-PVC JOINT IS NOT SUBJECT TO FAILURE DURING PULLING OF THE CABLE. ALL JOINTS ARE TO BE WATERTIGHT.
2. ALL 90 DEGREE SWEEPS WILL BE MADE WITH RIGID GALVANIZED STEEL WITH A MINIMUM RADIUS OF 36 INCHES FOR PRIMARY CABLES AND 24 INCHES FOR SECONDARY CABLES.
3. BACKFILL MAY BE MADE WITH EXCAVATED MATERIAL OR COMPARABLE, UNLESS MATERIAL IS DEEMED UNSUITABLE BY SERVICE PROVIDER. BACKFILL SHALL BE FREE OF FROZEN LUMPS, ROCKS, DEBRIS, AND RUBBISH. ORGANIC MATERIAL SHALL NOT BE USED AS BACKFILL. BACKFILL SHALL BE IN 6-INCH LAYERS AND THOROUGHLY COMPACTED.
4. A SUITABLE PULLING STRING, CAPABLE OF 300 POUNDS OF PULL, MUST BE INSTALLED IN THE CONDUIT BEFORE SERVICE PROVIDER IS NOTIFIED TO INSTALL CABLE. THE STRING SHOULD BE BLOWN INTO THE CONDUIT AFTER THE RUN IS ASSEMBLED TO AVOID BONDING THE STRING TO THE CONDUIT. A MINIMUM OF TWENTY-FOUR (24") INCHES OF ROPE SLACK SHALL REMAIN AT THE END OF EACH DUCT. PULL ROPE SHALL BE INSTALLED IN ALL CONDUIT FOR FUTURE PULLS. PULL ROPE SHALL BE NYLON ROPE HAVING A MINIMUM TENSILE STRENGTH OF THREE HUNDRED (300#) LBS.
5. SERVICE PROVIDER SHALL BE GIVEN THE OPPORTUNITY TO INSPECT ALL CONDUIT PRIOR TO BACKFILL. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS SHOULD SERVICE PROVIDER BE UNABLE TO INSTALL ITS CABLE IN A SUITABLE MANNER.
6. TYPICAL CONDUIT SIZES ARE 3-INCH FOR SINGLE PHASE PRIMARY AND SECONDARY VOLTAGE CABLES, 4-INCH FOR THREE PHASE SECONDARY, AND 5-INCH FOR THREE PHASE PRIMARY. HOWEVER, SERVICE PROVIDERS MAY REQUIRE DIFFERENT NUMBERS, TYPES AND SIZES OF CONDUIT THAN THOSE SHOWN HERE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL CONDUIT SIZES, TYPES AND NUMBERS WITH EACH SERVICE PROVIDER PRIOR TO ORDERING THEM.
7. ROUTING OF CONDUIT, LOCATION OF MANHOLES, TRANSFORMERS, CABINETS, HANDHOLES, ETC., SHALL BE DETERMINED BY SERVICE PROVIDER DESIGN PERSONNEL. THE CONTRACTOR SHALL COORDINATE WITH ALL SERVICE PROVIDERS PRIOR TO THE INSTALLATION OF ANY CONDUIT.
8. ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND WHERE APPLICABLE, THE NATIONAL ELECTRIC CODE. WHERE REQUIRED BY UTILITY PROVIDER, CONDUIT SHALL BE SUPPORTED IN PLACE USING PIPE STANCHIONS PLACED EVERY FIVE (5') FEET ALONG THE CONDUIT RUN.
9. UNDER A BUILDING SLAB THE CONDUIT SHALL BE ENCASED IN 8" OF CONCRETE ON ALL SIDES.
10. ALL CONDUIT TERMINATIONS SHALL BE CAPPED TO PREVENT DEBRIS FROM ENTERING CONDUIT.

ELECTRIC / COMMUNICATION TRENCH NOT TO SCALE



NOTE: ALL MATERIALS AND SPECIFICATIONS SHALL CONFORM TO CITY OF PORTSMOUTH WATER DEPARTMENT STANDARDS AND REQUIREMENTS. VERIFY PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES.



WATER SERVICE CONNECTION NOT TO SCALE

P5217

ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

STATE OF NEW HAMPSHIRE - ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER
4/18/22

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: APRIL 15, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/15/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

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(GAIL AND JAMES SANDERS)
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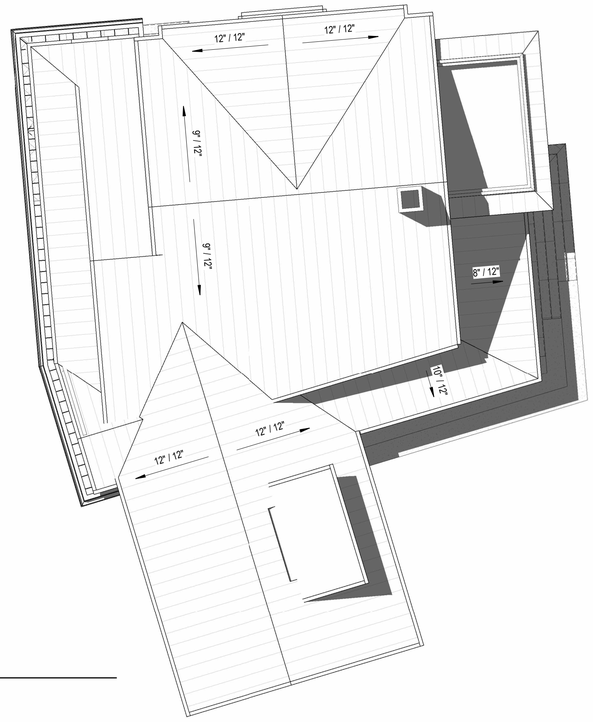
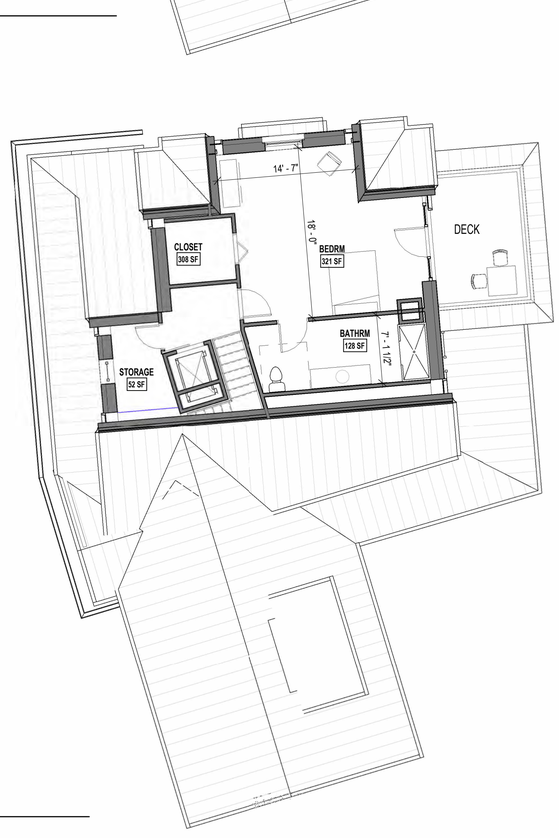
PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
DETAILS SHEET

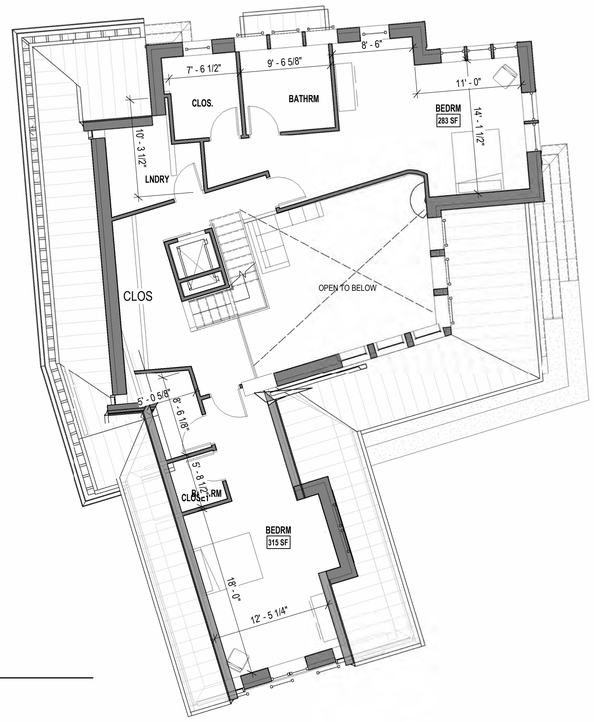
SHEET NUMBER:
C - 5



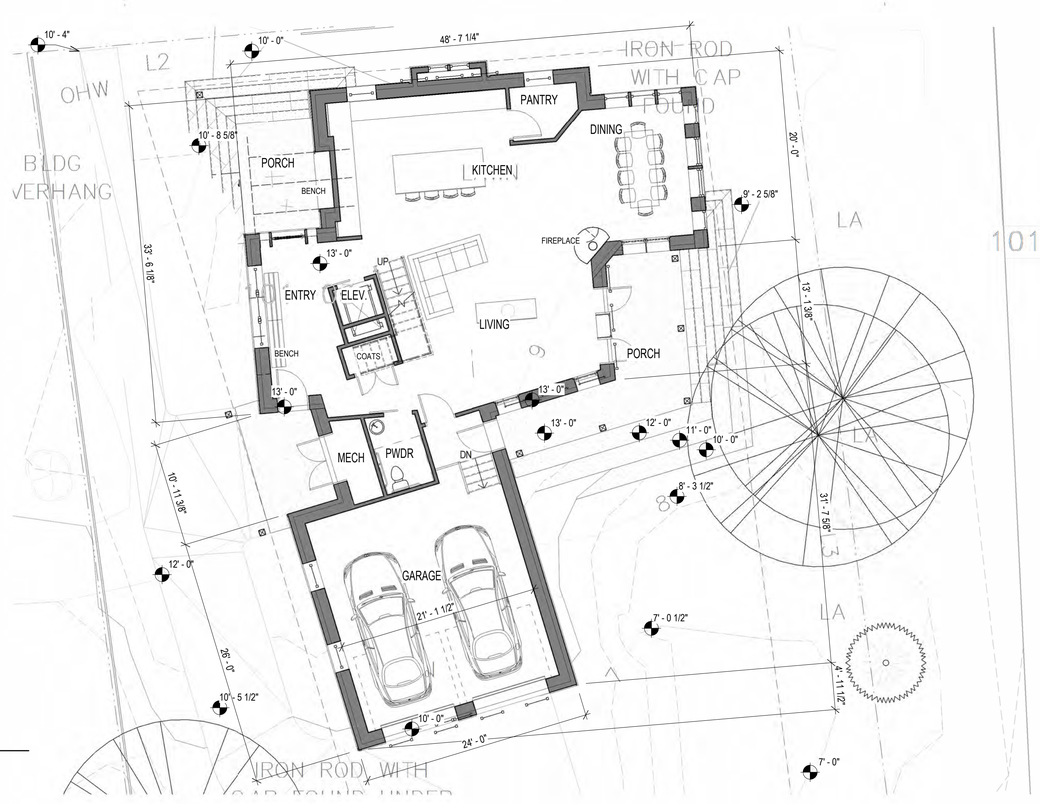
4 **ROOF TAC**
1/8" = 1'-0"



3 **ATTIC tac**
1/8" = 1'-0"



2 **LEVEL 2 TAC**
1/8" = 1'-0"



1 **LEVEL 1 TAC**
1/8" = 1'-0"

ARCOVE ARCHITECTS
3 Congress St, Ste 1
PORTSMOUTH, NH 03801
T 603.731.5187
arcove.com

Ambit Engineering Inc
Civil Engineering
200 Griffin Rd Unit 3
Portsmouth NH 03801
(603) 430-9282
ambitengineering.com

Terra Firma Landscape
Landscape Architecture
163a Court St
Portsmouth NH 03801
(603) 531-9109
terrafirmalandarch.com

445 MARCY ST

273 CORPORATE DRIVE
PORTSMOUTH, NH, 03801

Scale: 1/8" 1'-0"
Date: 4/19/2022
Project Number: 2021-001

REVISIONS		
NO.	DESCRIPTION	DATE

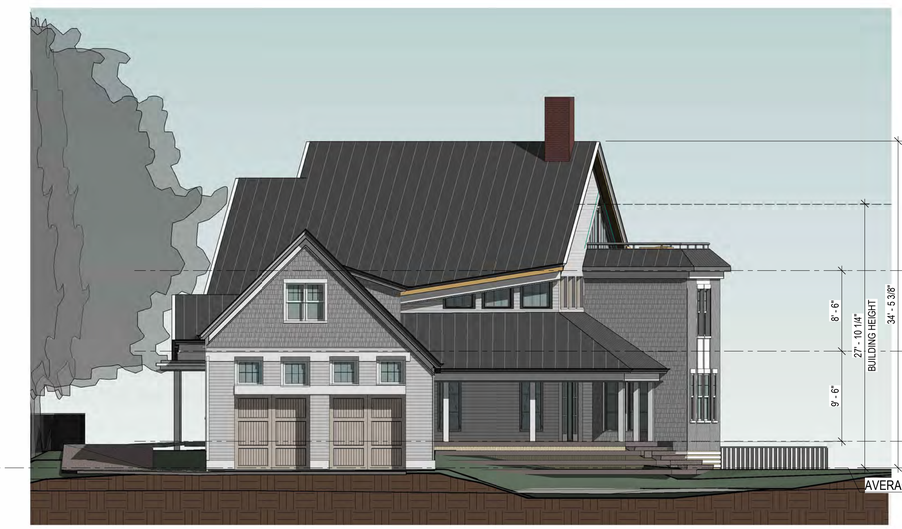
SITE PLAN REVIEW

FLOOR PLANS

T1.01

1 **NORTH ELEVATION - PRIMARY FRONT, PRAY STREET**
1/8" = 1'-0"

2 **WEST ELEVATION - SIDE, MARCY STREET**
1/8" = 1'-0"



3 **SOUTH ELEVATION - SECONDARY FRONT, PARTRIDGE STREET**
1/8" = 1'-0"

4 **EAST ELEVATION - SIDE, WATERSIDE**
1/8" = 1'-0"

ARCOVE ARCHITECTS
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163a Court St
Portsmouth NH 03801
(603) 531-9109
terrafirmalandarch.com

445 MARCY ST

273 CORPORATE DRIVE
PORTSMOUTH, NH, 03801

Scale:	1/8" 1'-0"
Date:	4/19/2022
Project Number:	2021-001

REVISIONS		
NO.	DESCRIPTION	DATE

SITE PLAN REVIEW

ELEVATIONS

T2.01

Drainage Analysis

445 Marcy Street Residence

Tax Map 101, Lot 03

445 Marcy Street
Portsmouth, NH

April 2022

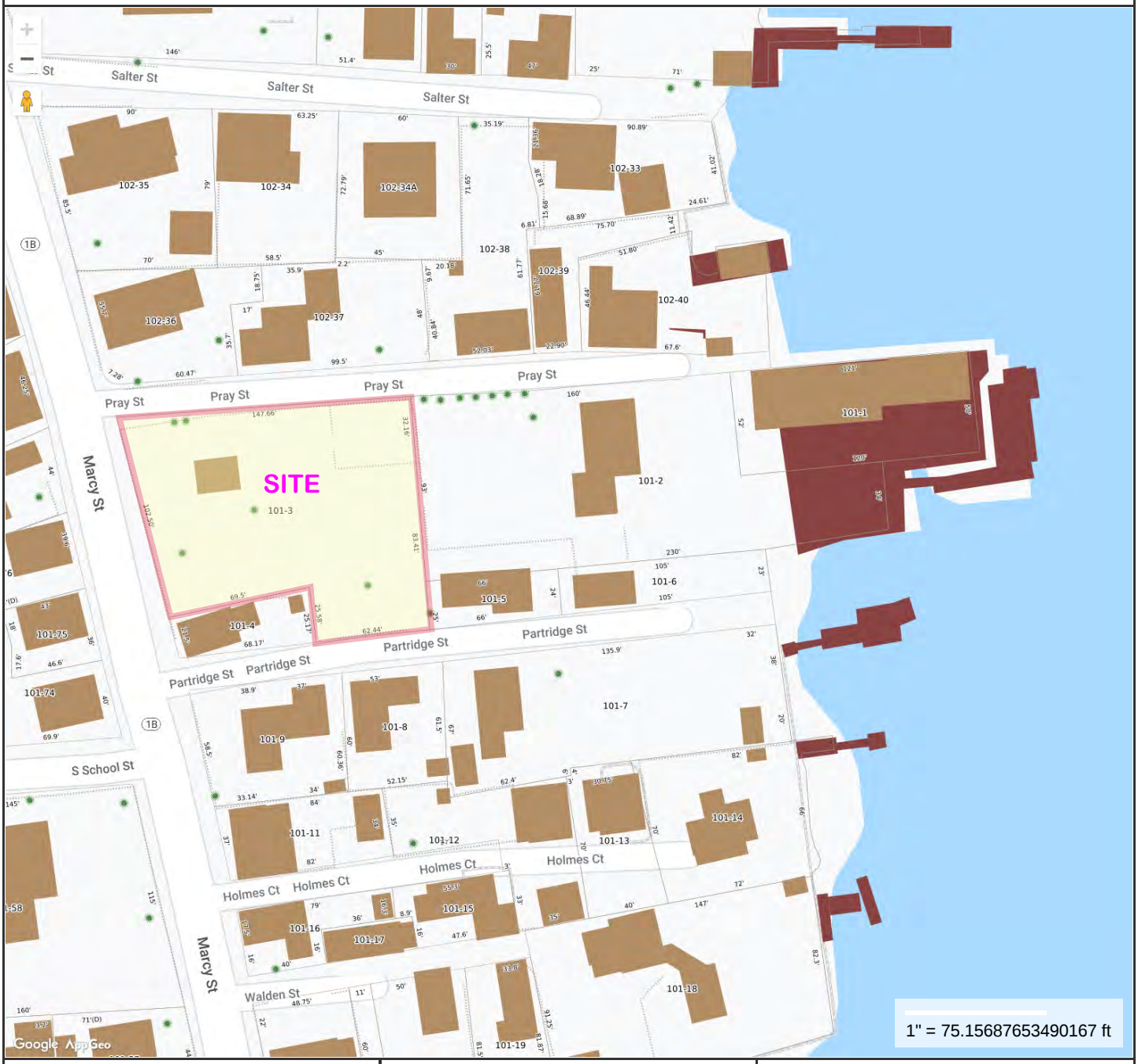
Prepared For:

445 Marcy Street, LLC
(Gail & James Sanders)
30 Walden Street
Portsmouth, NH 03801

Prepared By:

Altus Engineering, Inc.
133 Court Street
Portsmouth, NH 03801
Phone: (603) 433-2335
Fax: (603) 433-4194

TABLE OF CONTENTS



MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Portsmouth, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 3/9/2022
Data updated 3/9/2022

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

PROJECT DESCRIPTION

The project consists of a two (2) lot subdivision of Marcy Road in Portsmouth, New Hampshire. The applicant proposes to construct a single-family residence with site improvements one of the lots. While this 8,820-sf. lot will have frontage on both Pray Street and Partridge Street, the proposed curb cut will be located off Partridge Street. The proposed lot is a vacant grassed lot surrounding by single-family residences, some which are owned by the applicant.

The site is partially located with the Flood Hazard Zone AE (elev. 8.3). The owner/applicant proposes to construct a single-family residence for their personal residence. The proposed finished floor elevation will be set at elevation 13.0 feet well above the known Flood Hazard Zone. The driveway and walkway will consist of permeable pavers with underdrain system. The project has been designed to fit harmoniously into the landscape and the neighborhood.

The lot will be serviced by municipal sewer and water.

Stormwater from impervious and other developed areas on the property will be treated by the use of stormwater best management practices (BMPs) designed to remove fine particulates and suspended sediments. Permeable pavers, grassed roadside swale, roof dripline filters, plunge pool, and other practices will be utilized to achieve the required stormwater management. Vegetative control measures are utilized to the greatest extent possible to address the stormwater quality requirements.

The project team believes that this development concept has been developed with significant sensitivity to the environment.

CALCULATION METHODS

The drainage analysis was completed using HydroCAD v.10. The program generates runoff hydrographs for specified storm distributions and performs reservoir routing using the storage indication method. The criteria used for this drainage analysis are the 2-year, 10-year, 25-year, and 50-year 24-hour Type III frequency storm events based on 1.15% of the Northeast Regional Climate Center "extreme precipitation tables" for the Portsmouth, New Hampshire.

Recommended erosion control measures are based upon the "*New Hampshire Stormwater Manual"*, developed in 2008.

The following modeling conservative data and assumptions were incorporated into the analysis:

- Model based on 1.15% of the extreme precipitation values published by Cornell/UNH for coastal communities.
- Project area soils and hydrological group are based on NRCS Web Soil Survey mapping.
- Minimum Tc of 6 minutes SCS TR-55 Urban Hydrology for Small Watersheds indicates that the minimum Tc is 0.1 hour or 6 minutes. The Federal Highway Administration Hydraulic Engineering and NHDOT Drainage Design for Highways states that minimum time of concentration (Tc) for urbanized areas should not be less than 5-minutes. Extremely short Tc times can lead to improbable runoff values and is not appropriate for design.
- Analysis is based on the development of Proposed Lot #2 only.

Altus Engineering notes that stormwater modeling is limited in its capacity to precisely predict peak flow rates and flood elevations. Results should not be considered absolute due to the number of variables and assumptions involved in the modeling effort. Surface roughness coefficients (n), entrance loss coefficients (ke), velocity factors (kv), time of concentration (Tc), and tail water conditions are based on subjective field observations and engineering judgment. For design purposes, curve numbers (CN) describe the average conditions. However, curve numbers will vary from storm to storm depending on the antecedent runoff conditions (ARC). Modeling to simulate an actual storm event requires measurement of the pre-storm ARC to adjust the CN for the event. Also, higher flood elevations than predicted by modeling could occur if drainage channels and culverts are not maintained and become blocked by debris before or during the storm event. Siltation, blockage or damage to culverts or storm drains will impact flow capacity of the structures. Structures should be re-evaluated if future changes occur within drainage basins.

SUMMARY

Drainage Analysis

The NRCS web soils survey indicates the site consists of Urban land-Canton complex soils, a well-drained soil. It is known that this area of the city was built up over time during the colonial period. There is evidence that the soil has restrictive layers and is poorly draining, therefore the soil is best described as Hydrological Group C.

The pre-development watershed is delineated on the accompanying Sheet W-1, Pre-Development Watershed Plan. The runoff flows to the depression in the southeast corner of the parcel. The point of analysis (POA) is a 6" pipe, daylights onto paved surface before flowing to the Piscataqua River. In larger storm events, the depression overflows onto Partridge Street. The flow runs easterly along the north side of the street and other parcels owned by the applicant to the river.

The post-development conditions were analyzed at the same discharge points as the pre-development conditions. The post-development watersheds are delineated on the accompanying Sheet WS-2, Post-Development Watershed Plan. Modifications to the delineated areas and associated ground cover were made to sub-catchments to account for the improvements to the property. In the 10-year storm event and greater, the magnitude of flooding is decreased in Partridge Street (e.g., a 10-year storm event 0.49 cfs goes down to 0.42 cfs).

A complete summary of the flow conditions and modeling is included in Appendix A. The following compares pre- and post-development peak flow rates at the point of analysis:

		2-Year Storm (3.69 in.)	**10-Year Storm (5.60 in.)**	**25-Year Storm (7.10 in.)**	**50-Year Storm (8.50 in.)**
		Qout (cfs)	**Qout (cfs)**	**Qout (cfs)**	**Qout (cfs)**
Discharge 6" pipe	Pre	0.25	0.41	0.46	0.48
	Post	0.24	0.63	0.79	0.91
Overflow from Pond 1P	Pre	0.00	0.49	1.09	1.58
	Post	0.00	0.42	0.87	1.18
Combined Flow	Pre	0.25	0.90	1.55	2.06
	Post	0.24	1.05	1.66	2.03
	Net Change	**-0.01**	**0.15**	**0.11**	**0.03**

Conclusions

As shown in the summary table, the analysis indicates a minor increase in runoff leaving the site which flows directly to the Piscataqua River. Additionally, the development shows a reduce volume of water or flooding potential along Partridge Street. Altus believes that no down gradient abutters will be negatively impacted by the proposed development.

This analysis is based on the development of Proposed Lot #2 only. Any development of Proposed Lot #1 is expected to address drainage on-site without increasing flow onto Proposed Lot #2.

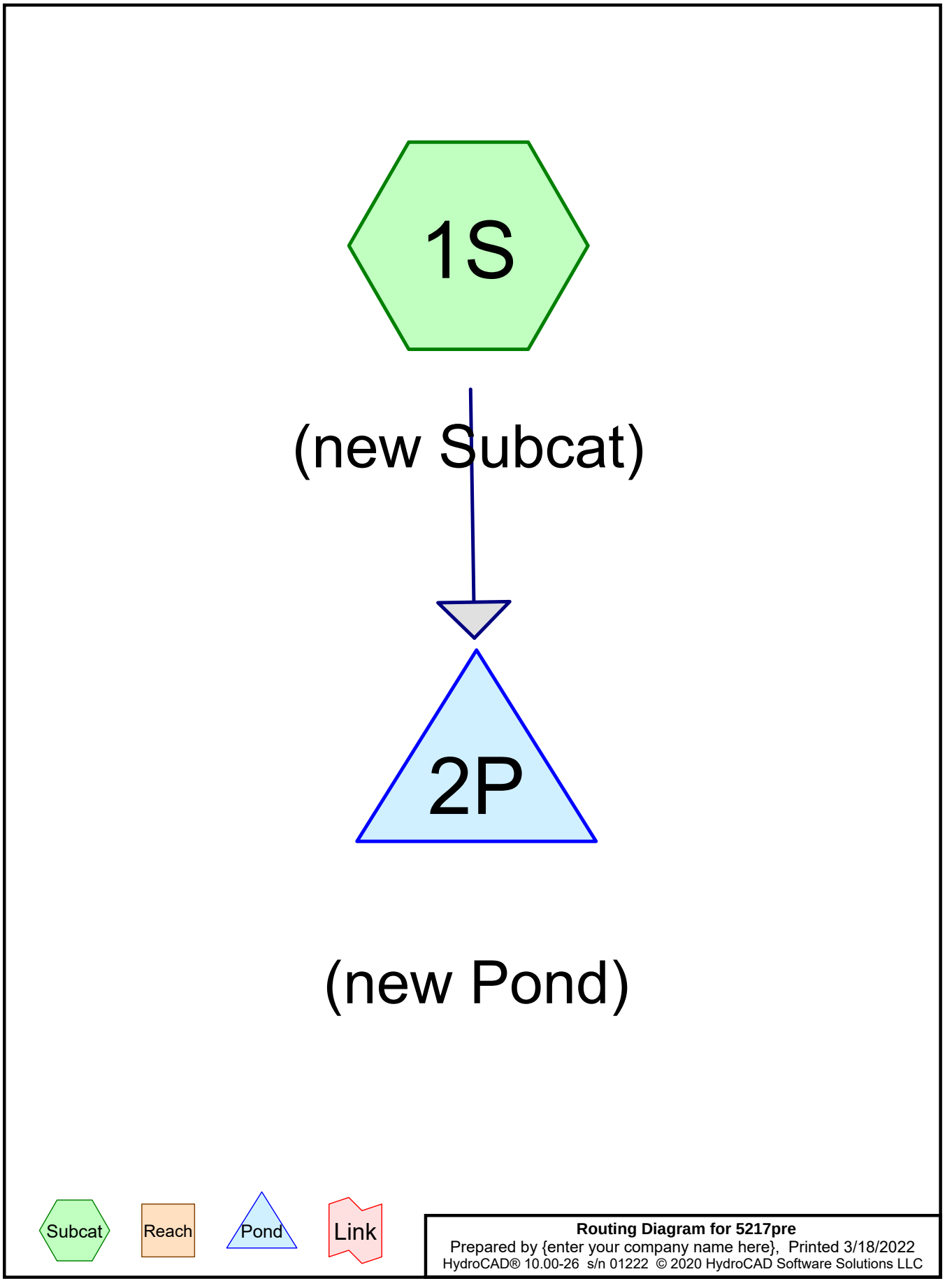
Stormwater Treatment

Stormwater from impervious and other developed areas on the property will be treated by the use of stormwater best management practices (BMPs) designed to remove fine particulates and suspended sediments. Permeable pavers, grassed roadside swale, roof dripline filters, plunge pool, and other practices will be utilized to achieve the required stormwater management. Vegetative control measures are utilized to the greatest extent possible to address the stormwater quality requirements.

APPENDIX A:

SUPPORTING CALCULATIONS

PRE-DEVELOPMENT CALCULATIONS



Routing Diagram for 5217pre
Prepared by {enter your company name here}, Printed 3/18/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.324	74	>75% Grass cover, Good, HSG C (1S)
0.010	89	Gravel roads, HSG C (1S)
0.009	98	Paved parking, HSG C (1S)
0.343	**75**	**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 Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: (new Subcat) Runoff Area=14,947 sf 2.73% Impervious Runoff Depth>1.32"
Flow Length=185' Tc=6.0 min CN=75 Runoff=0.56 cfs 0.038 af

Pond 2P: (new Pond) Peak Elev=7.12' Storage=405 cf Inflow=0.56 cfs 0.038 af
Outflow=0.25 cfs 0.036 af

Total Runoff Area = 0.343 ac Runoff Volume = 0.038 af Average Runoff Depth = 1.32"
97.27% Pervious = 0.334 ac 2.73% Impervious = 0.009 ac

Summary for Subcatchment 1S: (new Subcat)

Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.038 af, Depth> 1.32"

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 2-yr Rainfall=3.69"

Area (sf)	CN	Description
428	89	Gravel roads, HSG C
408	98	Paved parking, HSG C
14,111	74	>75% Grass cover, Good, HSG C
14,947	75	Weighted Average
14,539		97.27% Pervious Area
408		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
1.0	135	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.8	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Pond 2P: (new Pond)

Inflow Area = 0.343 ac, 2.73% Impervious, Inflow Depth > 1.32" for 2-yr event
Inflow = 0.56 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.25 cfs @ 12.34 hrs, Volume= 0.036 af, Atten= 55%, Lag= 14.3 min
Primary = 0.25 cfs @ 12.34 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.12' @ 12.34 hrs Surf.Area= 1,618 sf Storage= 405 cf

Plug-Flow detention time= 37.3 min calculated for 0.036 af (96% of inflow)
Center-of-Mass det. time= 24.0 min (833.6 - 809.7)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	713 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	300	0	0
7.00	1,230	199	199
7.30	2,200	514	713

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#2	Primary	7.20'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.25 cfs @ 12.34 hrs HW=7.12' (Free Discharge)
1=Culvert (Barrel Controls 0.25 cfs @ 2.15 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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 Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: (new Subcat) Runoff Area=14,947 sf 2.73% Impervious Runoff Depth>2.74"
Flow Length=185' Tc=6.0 min CN=75 Runoff=1.16 cfs 0.078 af

Pond 2P: (new Pond) Peak Elev=7.28' Storage=672 cf Inflow=1.16 cfs 0.078 af
Outflow=0.92 cfs 0.077 af

Total Runoff Area = 0.343 ac Runoff Volume = 0.078 af Average Runoff Depth = 2.74"
97.27% Pervious = 0.334 ac 2.73% Impervious = 0.009 ac

Summary for Subcatchment 1S: (new Subcat)

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.078 af, Depth> 2.74"

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-yr Rainfall=5.60"

Area (sf)	CN	Description
428	89	Gravel roads, HSG C
408	98	Paved parking, HSG C
14,111	74	>75% Grass cover, Good, HSG C
14,947	75	Weighted Average
14,539		97.27% Pervious Area
408		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
1.0	135	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.8	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Pond 2P: (new Pond)

Inflow Area = 0.343 ac, 2.73% Impervious, Inflow Depth > 2.74" for 10-yr event
Inflow = 1.16 cfs @ 12.09 hrs, Volume= 0.078 af
Outflow = 0.92 cfs @ 12.17 hrs, Volume= 0.077 af, Atten= 21%, Lag= 4.6 min
Primary = 0.92 cfs @ 12.17 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.28' @ 12.17 hrs Surf.Area= 2,122 sf Storage= 672 cf

Plug-Flow detention time= 29.0 min calculated for 0.077 af (98% of inflow)
Center-of-Mass det. time= 20.1 min (813.4 - 793.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	713 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	300	0	0
7.00	1,230	199	199
7.30	2,200	514	713

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#2	Primary	7.20'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.87 cfs @ 12.17 hrs HW=7.27' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.41 cfs @ 2.43 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.46 cfs @ 0.65 fps)

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 Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: (new Subcat) Runoff Area=14,947 sf 2.73% Impervious Runoff Depth>3.96"
Flow Length=185' Tc=6.0 min CN=75 Runoff=1.67 cfs 0.113 af

Pond 2P: (new Pond) Peak Elev=7.34' Storage=713 cf Inflow=1.67 cfs 0.113 af
Outflow=1.79 cfs 0.111 af

Total Runoff Area = 0.343 ac Runoff Volume = 0.113 af Average Runoff Depth = 3.96"
97.27% Pervious = 0.334 ac 2.73% Impervious = 0.009 ac

Summary for Subcatchment 1S: (new Subcat)

Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.113 af, Depth> 3.96"

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-yr Rainfall=7.10"

Area (sf)	CN	Description
428	89	Gravel roads, HSG C
408	98	Paved parking, HSG C
14,111	74	>75% Grass cover, Good, HSG C
14,947	75	Weighted Average
14,539		97.27% Pervious Area
408		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
1.0	135	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.8	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Pond 2P: (new Pond)

Inflow Area = 0.343 ac, 2.73% Impervious, Inflow Depth > 3.96" for 25-yr event
Inflow = 1.67 cfs @ 12.09 hrs, Volume= 0.113 af
Outflow = 1.79 cfs @ 12.11 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.8 min
Primary = 1.79 cfs @ 12.11 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.34' @ 12.11 hrs Surf.Area= 2,200 sf Storage= 713 cf

Plug-Flow detention time= 24.7 min calculated for 0.111 af (98% of inflow)
Center-of-Mass det. time= 17.5 min (802.3 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	713 cf	**Custom Stage Data (Prismatic)** Listed below

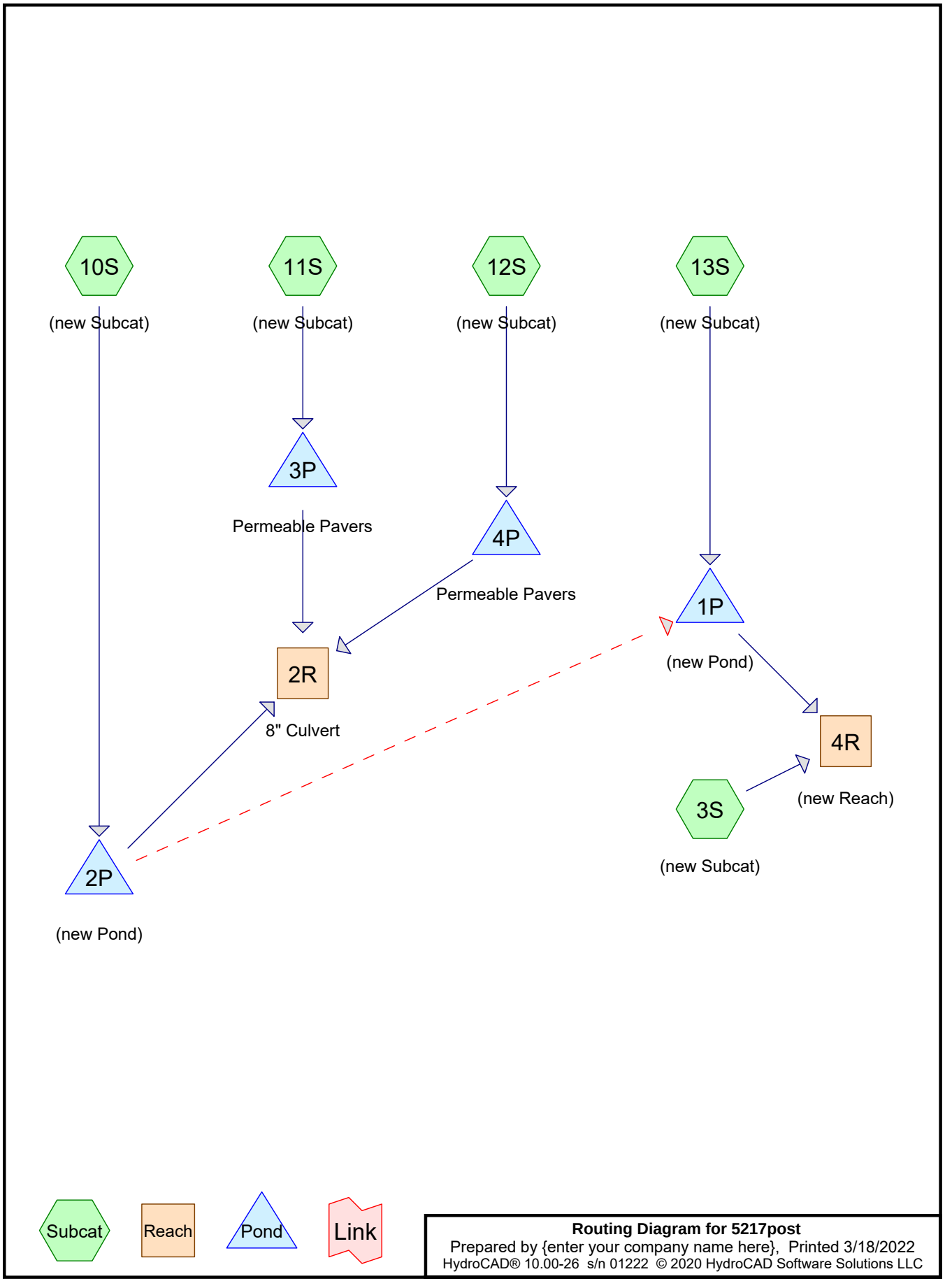
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	300	0	0
7.00	1,230	199	199
7.30	2,200	514	713

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#2	Primary	7.20'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=1.71 cfs @ 12.11 hrs HW=7.34' (Free Discharge)
1=Culvert (Barrel Controls 0.46 cfs @ 2.50 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 1.25 cfs @ 0.90 fps)

POST-DEVELOPMENT CALCULATIONS



Routing Diagram for 5217post

Prepared by {enter your company name here}, Printed 3/18/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.221	74	>75% Grass cover, Good, HSG C (3S, 10S, 11S, 12S, 13S)
0.010	89	Gravel roads, HSG C (3S, 10S)
0.076	98	Roofs, HSG C (3S, 10S, 11S, 12S, 13S)
0.036	98	Unconnected pavers, HSG C (3S, 11S, 12S, 13S)
0.343	**82**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2R	6.85	6.75	20.0	0.0050	0.013	8.0	0.0	0.0
2	1P	6.74	6.64	20.0	0.0050	0.012	6.0	0.0	0.0
3	3P	7.50	7.00	50.0	0.0100	0.012	4.0	0.0	0.0
4	4P	7.25	7.00	25.0	0.0100	0.012	4.0	0.0	0.0

Summary for Subcatchment 3S: (new Subcat)

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 2.12"

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 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
	171	89	Gravel roads, HSG C
	1,435	98	Roofs, HSG C
	1,622	74	>75% Grass cover, Good, HSG C
*	172	98	Unconnected pavers, HSG C
	3,400	86	Weighted Average
	1,793		52.74% Pervious Area
	1,607		47.26% Impervious Area
	172		10.70% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S: (new Subcat)

Runoff = 0.24 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 1.39"

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 2-yr Rainfall=3.69"

Area (sf)	CN	Description
257	89	Gravel roads, HSG C
294	98	Roofs, HSG C
5,689	74	>75% Grass cover, Good, HSG C
6,240	76	Weighted Average
5,946		95.29% Pervious Area
294		4.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S: (new Subcat)

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 2.95"

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 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
*	610	98	Unconnected pavers, HSG C
	220	98	Roofs, HSG C
	113	74	>75% Grass cover, Good, HSG C
	943	95	Weighted Average
	113		11.98% Pervious Area
	830		88.02% Impervious Area
	610		73.49% Unconnected

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

Summary for Subcatchment 12S: (new Subcat)

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth> 2.95"

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 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
*	708	98	Unconnected pavers, HSG C
	195	98	Roofs, HSG C
	126	74	>75% Grass cover, Good, HSG C
	1,029	95	Weighted Average
	126		12.24% Pervious Area
	903		87.76% Impervious Area
	708		78.41% Unconnected

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

Summary for Subcatchment 13S: (new Subcat)

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 1.88"

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 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
*	93	98	Unconnected pavers, HSG C
	1,092	98	Roofs, HSG C
	2,074	74	>75% Grass cover, Good, HSG C
	77	98	Roofs, HSG C
	3,336	83	Weighted Average
	2,074		62.17% Pervious Area
	1,262		37.83% Impervious Area
	93		7.37% Unconnected

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

Summary for Reach 2R: 8" Culvert

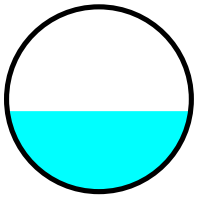
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[80] Warning: Exceeded Pond 2P by 0.04' @ 9.75 hrs (0.01 cfs 0.001 af)

Inflow Area = 0.189 ac, 24.68% Impervious, Inflow Depth > 1.75" for 2-yr event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.027 af
Outflow = 0.33 cfs @ 12.12 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.29 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.85 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0050 '/'
Inlet Invert= 6.85', Outlet Invert= 6.75'



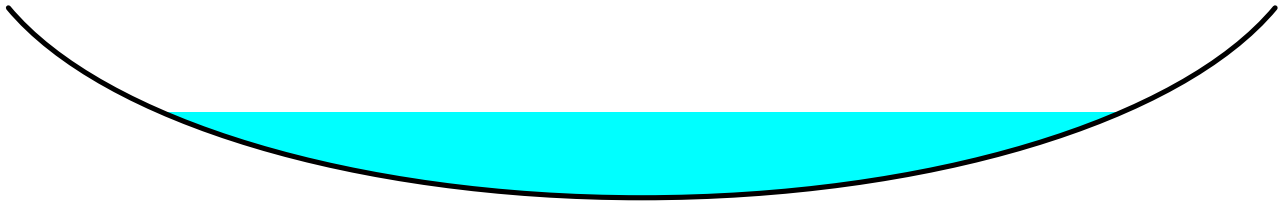
Summary for Reach 4R: (new Reach)

Inflow Area = 0.155 ac, 42.59% Impervious, Inflow Depth > 1.99" for 2-yr event
Inflow = 0.29 cfs @ 12.11 hrs, Volume= 0.026 af
Outflow = 0.29 cfs @ 12.11 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.43 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.33' Flow Area= 0.7 sf, Capacity= 1.59 cfs

3.00' x 0.33' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 1.0' Slope= 0.0100 '/'
Inlet Invert= 6.66', Outlet Invert= 6.65'



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Summary for Pond 1P: (new Pond)

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.077 ac, 37.83% Impervious, Inflow Depth > 1.88" for 2-yr event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.11 cfs @ 12.22 hrs, Volume= 0.012 af, Atten= 41%, Lag= 7.5 min
Primary = 0.11 cfs @ 12.22 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 6.98' @ 12.22 hrs Surf.Area= 660 sf Storage= 103 cf

Plug-Flow detention time= 26.0 min calculated for 0.012 af (98% of inflow)
Center-of-Mass det. time= 18.2 min (809.0 - 790.7)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	567 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	200	0	0
7.00	700	117	117
7.50	1,100	450	567

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Device 1	6.74'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	7.54'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=6.98' TW=6.79' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.10 cfs @ 1.65 fps)
  └**2=Orifice/Grate** (Passes 0.10 cfs of 0.11 cfs potential flow)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: (new Pond)

Inflow Area = 0.143 ac, 4.71% Impervious, Inflow Depth > 1.39" for 2-yr event
Inflow = 0.24 cfs @ 12.10 hrs, Volume= 0.017 af
Outflow = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af, Atten= 14%, Lag= 1.7 min
Primary = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.19' @ 12.16 hrs Surf.Area= 134 sf Storage= 40 cf

Plug-Flow detention time= 4.9 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 3.3 min (810.7 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1	6.85'	108 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.85	35	0	0
7.00	80	9	9
7.60	250	99	108

Device	Routing	Invert	Outlet Devices
#1	Primary	6.85'	**8.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	7.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.18 cfs @ 12.12 hrs HW=7.18' TW=7.13' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=6.85' TW=6.74' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.022 ac, 88.02% Impervious, Inflow Depth > 2.95" for 2-yr event
Inflow = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af
Outflow = 0.05 cfs @ 12.17 hrs, Volume= 0.005 af, Atten= 26%, Lag= 4.7 min
Primary = 0.05 cfs @ 12.17 hrs, Volume= 0.005 af

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

Peak Elev= 7.66' @ 12.17 hrs Surf.Area= 610 sf Storage= 39 cf

Plug-Flow detention time= 33.5 min calculated for 0.005 af (97% of inflow)
Center-of-Mass det. time= 23.2 min (773.6 - 750.4)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	366 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	610	0.0	0	0
9.00	610	40.0	366	366

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	**4.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.50' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.05 cfs @ 12.17 hrs HW=7.66' TW=7.13' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.05 cfs @ 1.90 fps)

Summary for Pond 4P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span
[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.024 ac, 87.76% Impervious, Inflow Depth > 2.95" for 2-yr event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.50' @ 12.10 hrs Surf.Area= 708 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	425 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	708	0.0	0	0
9.00	708	40.0	425	425

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**4.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.25' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.11 cfs @ 12.09 hrs HW=7.50' TW=7.13' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.11 cfs @ 2.21 fps)

Summary for Subcatchment 3S: (new Subcat)

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 3.80"

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-yr Rainfall=5.60"

	Area (sf)	CN	Description
	171	89	Gravel roads, HSG C
	1,435	98	Roofs, HSG C
	1,622	74	>75% Grass cover, Good, HSG C
*	172	98	Unconnected pavers, HSG C
	3,400	86	Weighted Average
	1,793		52.74% Pervious Area
	1,607		47.26% Impervious Area
	172		10.70% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S: (new Subcat)

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 2.83"

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-yr Rainfall=5.60"

Area (sf)	CN	Description
257	89	Gravel roads, HSG C
294	98	Roofs, HSG C
5,689	74	>75% Grass cover, Good, HSG C
6,240	76	Weighted Average
5,946		95.29% Pervious Area
294		4.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S: (new Subcat)

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 4.71"

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-yr Rainfall=5.60"

	Area (sf)	CN	Description
*	610	98	Unconnected pavers, HSG C
	220	98	Roofs, HSG C
	113	74	>75% Grass cover, Good, HSG C
	943	95	Weighted Average
	113		11.98% Pervious Area
	830		88.02% Impervious Area
	610		73.49% Unconnected

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

Summary for Subcatchment 12S: (new Subcat)

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 4.71"

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-yr Rainfall=5.60"

	Area (sf)	CN	Description
*	708	98	Unconnected pavers, HSG C
	195	98	Roofs, HSG C
	126	74	>75% Grass cover, Good, HSG C
	1,029	95	Weighted Average
	126		12.24% Pervious Area
	903		87.76% Impervious Area
	708		78.41% Unconnected

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

Summary for Subcatchment 13S: (new Subcat)

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 3.50"

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-yr Rainfall=5.60"

	Area (sf)	CN	Description
*	93	98	Unconnected pavers, HSG C
	1,092	98	Roofs, HSG C
	2,074	74	>75% Grass cover, Good, HSG C
	77	98	Roofs, HSG C
	3,336	83	Weighted Average
	2,074		62.17% Pervious Area
	1,262		37.83% Impervious Area
	93		7.37% Unconnected

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

Summary for Reach 2R: 8" Culvert

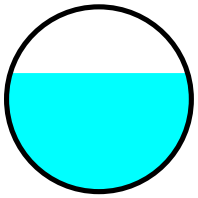
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[80] Warning: Exceeded Pond 2P by 0.03' @ 8.10 hrs (0.00 cfs 0.001 af)

Inflow Area = 0.189 ac, 24.68% Impervious, Inflow Depth > 3.27" for 10-yr event
Inflow = 0.63 cfs @ 12.11 hrs, Volume= 0.051 af
Outflow = 0.63 cfs @ 12.12 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.68 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.85 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0050 '/'
Inlet Invert= 6.85', Outlet Invert= 6.75'



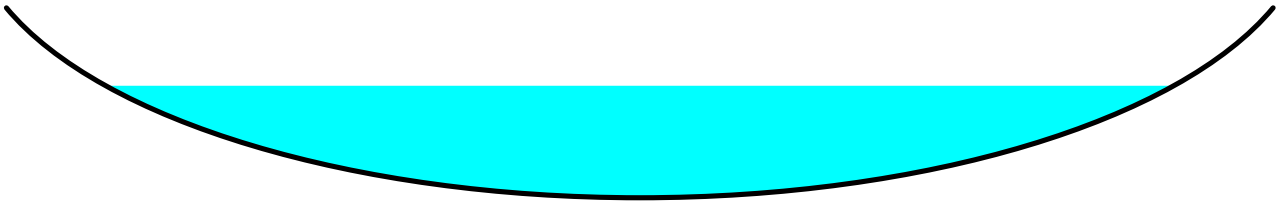
Summary for Reach 4R: (new Reach)

Inflow Area = 0.155 ac, 42.59% Impervious, Inflow Depth > 3.62" for 10-yr event
Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.047 af
Outflow = 0.51 cfs @ 12.10 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.33' Flow Area= 0.7 sf, Capacity= 1.59 cfs

3.00' x 0.33' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 1.0' Slope= 0.0100 '/'
Inlet Invert= 6.66', Outlet Invert= 6.65'



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Summary for Pond 1P: (new Pond)

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.077 ac, 37.83% Impervious, Inflow Depth > 3.50" for 10-yr event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.18 cfs @ 12.22 hrs, Volume= 0.022 af, Atten= 45%, Lag= 8.0 min
Primary = 0.18 cfs @ 12.22 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.09' @ 12.22 hrs Surf.Area= 772 sf Storage= 183 cf

Plug-Flow detention time= 22.5 min calculated for 0.022 af (99% of inflow)
Center-of-Mass det. time= 16.8 min (793.1 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	567 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	200	0	0
7.00	700	117	117
7.50	1,100	450	567

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Device 1	6.74'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	7.54'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 12.22 hrs HW=7.09' TW=6.83' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.18 cfs of 0.20 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 2.05 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: (new Pond)

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)

Inflow Area = 0.143 ac, 4.71% Impervious, Inflow Depth > 2.83" for 10-yr event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.034 af
Outflow = 0.45 cfs @ 12.11 hrs, Volume= 0.034 af, Atten= 11%, Lag= 1.2 min
Primary = 0.45 cfs @ 12.11 hrs, Volume= 0.034 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.36' @ 12.15 hrs Surf.Area= 183 sf Storage= 69 cf

Plug-Flow detention time= 3.9 min calculated for 0.034 af (99% of inflow)
Center-of-Mass det. time= 2.9 min (794.2 - 791.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6.85'	108 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.85	35	0	0
7.00	80	9	9
7.60	250	99	108

Device	Routing	Invert	Outlet Devices
#1	Primary	6.85'	**8.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	7.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.37 cfs @ 12.11 hrs HW=7.35' TW=7.27' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.32 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=6.85' TW=6.74' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.022 ac, 88.02% Impervious, Inflow Depth > 4.71" for 10-yr event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.08 cfs @ 12.16 hrs, Volume= 0.008 af, Atten= 26%, Lag= 4.6 min
Primary = 0.08 cfs @ 12.16 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.72' @ 12.16 hrs Surf.Area= 610 sf Storage= 53 cf

Plug-Flow detention time= 27.3 min calculated for 0.008 af (98% of inflow)
Center-of-Mass det. time= 19.1 min (762.3 - 743.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	366 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	610	0.0	0	0
9.00	610	40.0	366	366

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	**4.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.50' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.08 cfs @ 12.16 hrs HW=7.72' TW=7.25' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.08 cfs @ 2.00 fps)

Summary for Pond 4P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span
[44] Hint: Outlet device #1 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=75)

Inflow Area =	0.024 ac, 87.76% Impervious, Inflow Depth > 4.71"	for 10-yr event		
Inflow =	0.12 cfs @	12.09 hrs, Volume=	0.009 af	
Outflow =	0.11 cfs @	12.07 hrs, Volume=	0.009 af, Atten= 8%, Lag= 0.0 min	
Primary =	0.11 cfs @	12.07 hrs, Volume=	0.009 af	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.51' @ 12.14 hrs Surf.Area= 708 sf Storage= 3 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (743.8 - 743.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	425 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	708	0.0	0	0
9.00	708	40.0	425	425

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**4.0" Round Culvert**

L= 25.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 7.25' / 7.00' S= 0.0100 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.10 cfs @ 12.07 hrs HW=7.50' TW=7.25' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.10 cfs @ 2.00 fps)

Summary for Subcatchment 3S: (new Subcat)

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 5.16"

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-yr Rainfall=7.10"

	Area (sf)	CN	Description
	171	89	Gravel roads, HSG C
	1,435	98	Roofs, HSG C
	1,622	74	>75% Grass cover, Good, HSG C
*	172	98	Unconnected pavers, HSG C
	3,400	86	Weighted Average
	1,793		52.74% Pervious Area
	1,607		47.26% Impervious Area
	172		10.70% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S: (new Subcat)

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.049 af, Depth> 4.07"

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-yr Rainfall=7.10"

Area (sf)	CN	Description
257	89	Gravel roads, HSG C
294	98	Roofs, HSG C
5,689	74	>75% Grass cover, Good, HSG C
6,240	76	Weighted Average
5,946		95.29% Pervious Area
294		4.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S: (new Subcat)

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 6.09"

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-yr Rainfall=7.10"

	Area (sf)	CN	Description
*	610	98	Unconnected pavers, HSG C
	220	98	Roofs, HSG C
	113	74	>75% Grass cover, Good, HSG C
	943	95	Weighted Average
	113		11.98% Pervious Area
	830		88.02% Impervious Area
	610		73.49% Unconnected

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

Summary for Subcatchment 12S: (new Subcat)

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 6.09"

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-yr Rainfall=7.10"

	Area (sf)	CN	Description
*	708	98	Unconnected pavers, HSG C
	195	98	Roofs, HSG C
	126	74	>75% Grass cover, Good, HSG C
	1,029	95	Weighted Average
	126		12.24% Pervious Area
	903		87.76% Impervious Area
	708		78.41% Unconnected

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

Summary for Subcatchment 13S: (new Subcat)

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 4.83"

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-yr Rainfall=7.10"

	Area (sf)	CN	Description
*	93	98	Unconnected pavers, HSG C
	1,092	98	Roofs, HSG C
	2,074	74	>75% Grass cover, Good, HSG C
	77	98	Roofs, HSG C
	3,336	83	Weighted Average
	2,074		62.17% Pervious Area
	1,262		37.83% Impervious Area
	93		7.37% Unconnected

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

Summary for Reach 2R: 8" Culvert

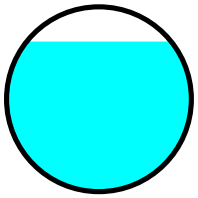
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[80] Warning: Exceeded Pond 2P by 0.03' @ 7.05 hrs (0.00 cfs 0.001 af)

Inflow Area = 0.189 ac, 24.68% Impervious, Inflow Depth > 4.54" for 25-yr event
Inflow = 0.85 cfs @ 12.11 hrs, Volume= 0.071 af
Outflow = 0.85 cfs @ 12.11 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.79 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.3 min

Peak Storage= 6 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.85 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0050 '/'
Inlet Invert= 6.85', Outlet Invert= 6.75'



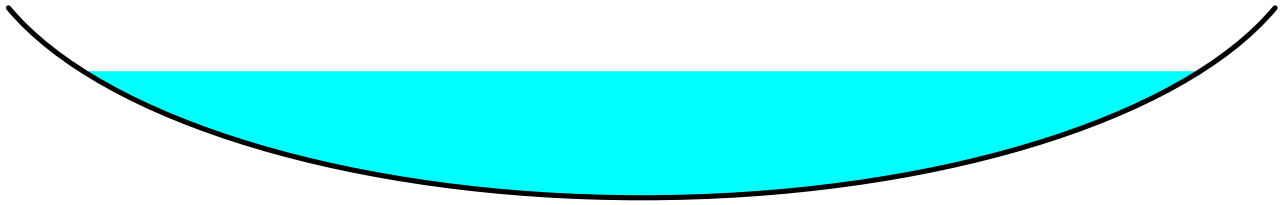
Summary for Reach 4R: (new Reach)

Inflow Area = 0.155 ac, 42.59% Impervious, Inflow Depth > 4.97" for 25-yr event
Inflow = 0.66 cfs @ 12.10 hrs, Volume= 0.064 af
Outflow = 0.66 cfs @ 12.10 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.33' Flow Area= 0.7 sf, Capacity= 1.59 cfs

3.00' x 0.33' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 1.0' Slope= 0.0100 '/'
Inlet Invert= 6.66', Outlet Invert= 6.65'



‡

Summary for Pond 1P: (new Pond)

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.077 ac, 37.83% Impervious, Inflow Depth > 4.84" for 25-yr event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.22 cfs @ 12.25 hrs, Volume= 0.030 af, Atten= 50%, Lag= 9.4 min
Primary = 0.22 cfs @ 12.25 hrs, Volume= 0.030 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.19' @ 12.25 hrs Surf.Area= 849 sf Storage= 261 cf

Plug-Flow detention time= 21.7 min calculated for 0.030 af (98% of inflow)
Center-of-Mass det. time= 16.9 min (785.4 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	567 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	200	0	0
7.00	700	117	117
7.50	1,100	450	567

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Device 1	6.74'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	7.54'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 12.25 hrs HW=7.19' TW=6.84' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.22 cfs of 0.30 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.54 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: (new Pond)

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=5)

Inflow Area = 0.143 ac, 4.71% Impervious, Inflow Depth > 4.07" for 25-yr event
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 0.049 af
Outflow = 0.64 cfs @ 12.11 hrs, Volume= 0.048 af, Atten= 10%, Lag= 1.0 min
Primary = 0.64 cfs @ 12.11 hrs, Volume= 0.048 af
Secondary = 0.01 cfs @ 12.15 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.51' @ 12.15 hrs Surf.Area= 223 sf Storage= 92 cf

Plug-Flow detention time= 3.5 min calculated for 0.048 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (785.6 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1	6.85'	108 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.85	35	0	0
7.00	80	9	9
7.60	250	99	108

Device	Routing	Invert	Outlet Devices
#1	Primary	6.85'	**8.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	7.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.49 cfs @ 12.11 hrs HW=7.47' TW=7.39' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.49 cfs @ 1.44 fps)

Secondary OutFlow Max=0.01 cfs @ 12.15 hrs HW=7.51' TW=7.16' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.19 fps)

Summary for Pond 3P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.022 ac, 88.02% Impervious, Inflow Depth > 6.09" for 25-yr event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.11 cfs @ 12.18 hrs, Volume= 0.011 af, Atten= 27%, Lag= 5.7 min
Primary = 0.11 cfs @ 12.18 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.76' @ 12.17 hrs Surf.Area= 610 sf Storage= 65 cf

Plug-Flow detention time= 24.4 min calculated for 0.011 af (98% of inflow)
Center-of-Mass det. time= 17.2 min (757.4 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	366 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	610	0.0	0	0
9.00	610	40.0	366	366

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	**4.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.50' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.11 cfs @ 12.18 hrs HW=7.76' TW=7.34' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.11 cfs @ 2.04 fps)

Summary for Pond 4P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span
[44] Hint: Outlet device #1 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=75)

Inflow Area = 0.024 ac, 87.76% Impervious, Inflow Depth > 6.09" for 25-yr event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.12 cfs @ 12.20 hrs, Volume= 0.012 af, Atten= 27%, Lag= 7.1 min
Primary = 0.12 cfs @ 12.20 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.56' @ 12.17 hrs Surf.Area= 708 sf Storage= 16 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (740.9 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	425 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	708	0.0	0	0
9.00	708	40.0	425	425

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**4.0" Round Culvert**

L= 25.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 7.25' / 7.00' S= 0.0100 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.12 cfs @ 12.20 hrs HW=7.55' TW=7.32' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.12 cfs @ 1.98 fps)

APPENDIX B:

HYDROLOGICAL DATA

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	
Location	
Longitude	70.714 degrees West
Latitude	43.061 degrees North
Elevation	0 feet
Date/Time	Fri, 30 Jul 2021 14:38:04 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr	add 15%	1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.66	2.93	3.06	2.35	2.82	3.23	3.95	4.56	**1yr**
2yr	0.32	0.50	0.62	0.82	1.03	1.30	**2yr**	0.89	1.19	1.52	1.94	2.49	3.21	3.58	3.69	2.84	3.44	3.94	4.69	5.33	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.14	4.07	4.58	4.68	3.60	4.41	5.05	5.94	6.71	**5yr**
10yr	0.42	0.65	0.83	1.12	1.46	1.90	**10yr**	1.26	1.74	2.24	2.90	3.76	4.87	5.53	5.60	4.31	5.32	6.10	7.12	7.98	**10yr**
25yr	0.48	0.77	0.98	1.35	1.79	2.36	**25yr**	1.55	2.16	2.80	3.65	4.75	6.17	7.10	7.10	5.46	6.83	7.82	9.04	10.05	**25yr**
50yr	0.54	0.87	1.11	1.56	2.10	2.79	**50yr**	1.81	2.55	3.32	4.35	5.68	7.39	8.59	8.50	6.54	8.26	9.45	10.83	11.97	**50yr**
100yr	0.60	0.98	1.26	1.79	2.45	3.30	**100yr**	2.12	3.01	3.95	5.20	6.80	8.85	10.38	9.88	7.83	9.98	11.41	12.98	14.27	**100yr**
200yr	0.69	1.12	1.45	2.08	2.87	3.89	**200yr**	2.48	3.56	4.67	6.18	8.11	10.60	12.55		9.38	12.07	13.79	15.57	17.01	**200yr**
500yr	0.82	1.34	1.75	2.53	3.54	4.84	**500yr**	3.05	4.44	5.84	7.78	10.27	13.48	16.14		11.93	15.52	17.73	19.81	21.47	**500yr**

Lower Confidence Limits

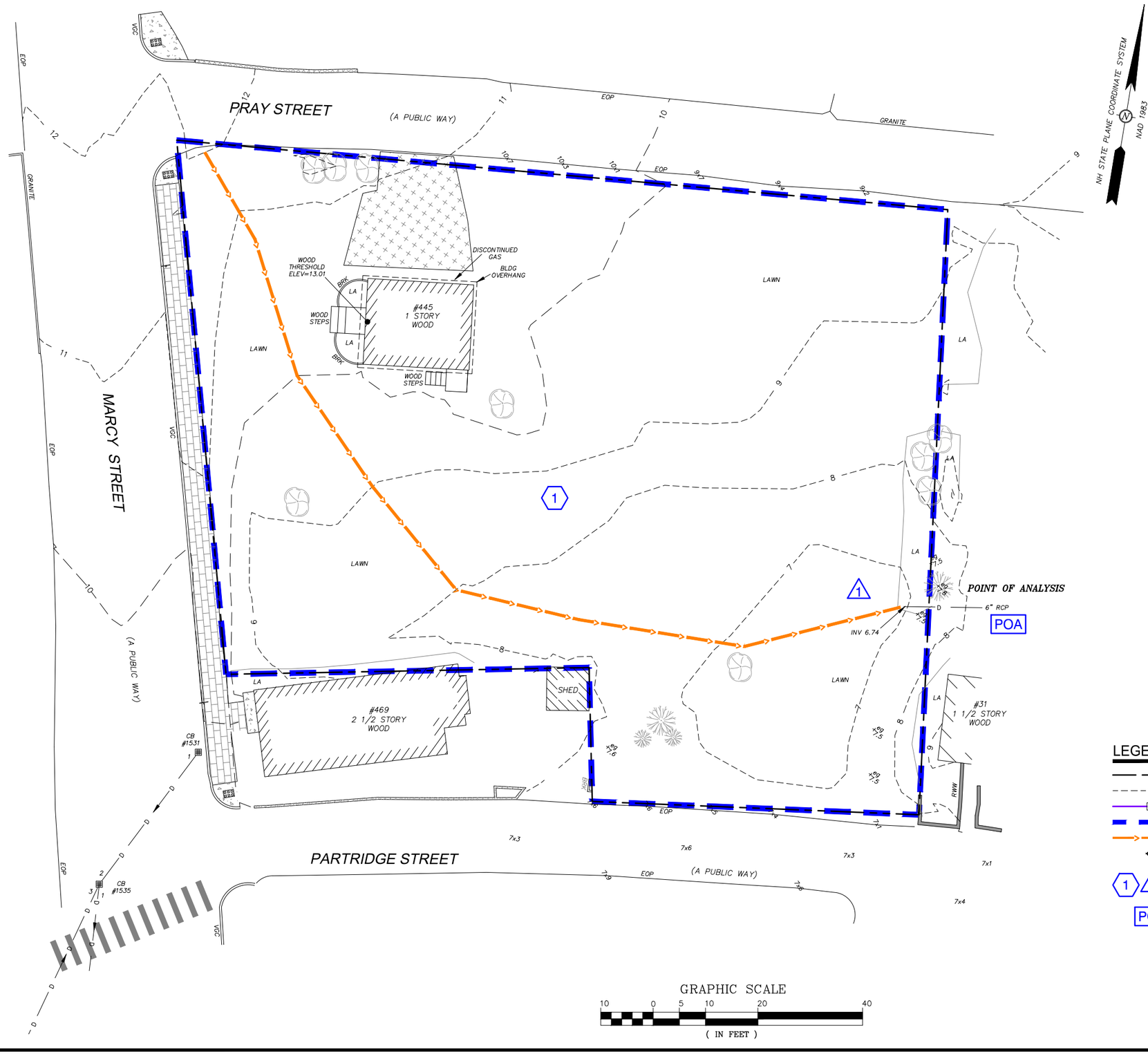
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	**1yr**	0.62	0.86	0.93	1.34	1.71	2.27	2.46	**1yr**	2.01	2.36	2.88	3.24	3.95	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.81	2.33	3.07	3.45	**2yr**	2.72	3.31	3.83	4.55	5.11	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.11	2.72	3.78	4.17	**5yr**	3.34	4.01	4.72	5.52	6.22	**5yr**
10yr	0.39	0.59	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.80	2.37	3.04	4.36	4.83	**10yr**	3.86	4.64	5.42	6.39	7.17	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.90	**25yr**	1.35	1.86	2.10	2.73	3.50	4.80	5.83	**25yr**	4.25	5.61	6.60	7.75	8.64	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.16	**50yr**	1.52	2.11	2.35	3.04	3.88	5.44	6.72	**50yr**	4.82	6.46	7.65	8.98	9.97	**50yr**
100yr	0.53	0.81	1.01	1.46	2.00	2.46	**100yr**	1.73	2.41	2.63	3.36	4.28	6.14	7.73	**100yr**	5.44	7.44	8.85	10.43	11.51	**100yr**
200yr	0.59	0.88	1.12	1.62	2.26	2.80	**200yr**	1.95	2.74	2.94	3.72	4.69	6.92	8.90	**200yr**	6.12	8.56	10.23	12.13	13.31	**200yr**
500yr	0.68	1.01	1.30	1.89	2.68	3.35	**500yr**	2.32	3.27	3.42	4.22	5.31	8.09	10.71	**500yr**	7.16	10.30	12.39	14.84	16.14	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.73	0.89	1.09	**1yr**	0.77	1.06	1.27	1.74	2.20	2.96	3.19	**1yr**	2.62	3.06	3.57	4.36	5.02	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.27	**2yr**	0.93	1.25	1.48	1.96	2.52	3.41	3.72	**2yr**	3.02	3.58	4.11	4.85	5.61	**2yr**
5yr	0.40	0.62	0.77	1.06	1.34	1.63	**5yr**	1.16	1.60	1.89	2.55	3.27	4.35	5.00	**5yr**	3.85	4.81	5.39	6.41	7.19	**5yr**
10yr	0.47	0.72	0.90	1.25	1.62	1.99	**10yr**	1.40	1.95	2.30	3.13	3.99	5.34	6.25	**10yr**	4.73	6.01	6.89	7.89	8.81	**10yr**
25yr	0.58	0.89	1.10	1.57	2.07	2.60	**25yr**	1.79	2.54	2.98	4.10	5.22	7.67	8.43	**25yr**	6.79	8.10	9.28	10.41	11.48	**25yr**
50yr	0.68	1.04	1.29	1.85	2.50	3.17	**50yr**	2.15	3.10	3.63	5.05	6.43	9.59	10.58	**50yr**	8.48	10.17	11.64	12.82	14.06	**50yr**
100yr	0.80	1.21	1.52	2.20	3.01	3.87	**100yr**	2.60	3.78	4.42	6.23	7.92	11.97	13.28	**100yr**	10.59	12.77	14.60	15.83	17.21	**100yr**
200yr	0.94	1.42	1.80	2.60	3.63	4.73	**200yr**	3.13	4.63	5.41	7.69	9.77	14.99	16.68	**200yr**	13.26	16.04	18.35	19.54	21.06	**200yr**
500yr	1.18	1.75	2.25	3.27	4.65	6.16	**500yr**	4.01	6.02	7.03	10.19	12.92	20.19	22.57	**500yr**	17.87	21.71	24.83	25.78	27.52	**500yr**

APPENDIX C:

WATERSHED PLANS



LEGEND

- PROPERTY LINE
- 60 EXISTING CONTOUR
- 60 PROPOSED CONTOUR
- WATERSHED BOUNDARY
- Tc PATH
- PROPOSED GROUND SLOPE DIRECTION
- 1 1 1 SUBCATCHMENT/POND/REACH
- POA POINT OF ANALYSIS

ALTUS ENGINEERING, INC.

133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

STATE OF NEW HAMPSHIRE – ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: APRIL 12, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/12/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

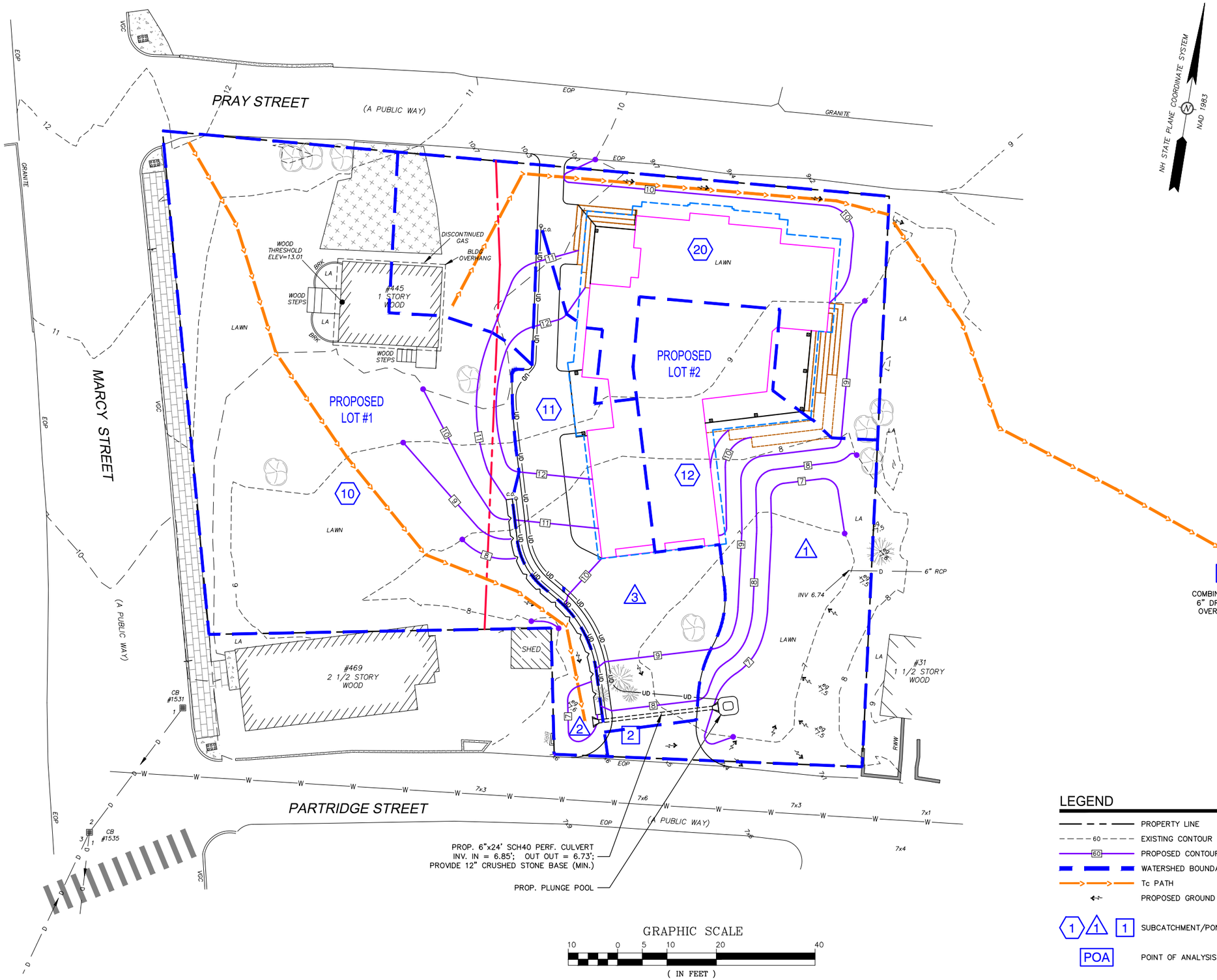
OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
PRE-DEVELLOPMENT WATERSHED PLAN

SHEET NUMBER:
WS - 1

P5217



LEGEND

- PROPERTY LINE
- 60 EXISTING CONTOUR
- 60 PROPOSED CONTOUR
- WATERSHED BOUNDARY
- Tc PATH
- PROPOSED GROUND SLOPE DIRECTION
- 1 1 1 SUBCATCHMENT/POND/REACH
- POA POINT OF ANALYSIS

P5217

ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

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REVISIONS

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(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
POST-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER:
WS - 2

APPENDIX D:

Stormwater Management Facility Operation and Maintenance (O&M) Manual

445 Marcy Street, LLC
(Gail and James Sanders)
445 Marcy Street
Portsmouth, NH

Stormwater Management Program

Stormwater Management / BMP Facilities Maintenance Plan

Proper construction, inspection, maintenance, and repair are key elements in maintaining a successful stormwater management program on a developed property. Routine inspections ensure permit compliance and reduces the potential for deterioration of infrastructure or reduced water quality. Maintenance personnel must be qualified to properly maintain stormwater management facilities. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

For the purpose of this Stormwater Management Program, a significant rainfall event is considered an event of three (3) inches in a 24-hour period or 0.5 inches in a one-hour period. It is anticipated that a short, intense event is likely to have a higher potential of erosion for this site than a longer, high volume event.

The following provides a list of recommendations and guidelines for managing the stormwater facilities.

MANICURED LANDSCAPED AREAS - LITTER CONTROL

Function – Landscaped areas tend to filter debris and contaminates that may block drainage systems and pollute the surface and ground waters.

Maintenance

- Litter Control and lawn maintenance involves removing litter such as trash, leaves, lawn clippings, pet wastes, oil and chemicals from streets, parking lots, and lawns before materials are transported into surface waters.
- Litter control shall be implemented as part of the ground's maintenance program.

MANICURED LANDSCAPED AREAS - FERTILIZER MANAGEMENT

Function – Fertilizer management involves controlling the rate, timing, and method of fertilizer application so that the nutrients are taken up by the plants thereby reducing the chance of polluting the surface and ground waters. Fertilizer management can be effective in reducing the amounts of phosphorus and nitrogen in runoff from landscaped areas, particularly lawns. Soil tests shall be conducted to determine fertilizer application rates.

Maintenance

- Have the soil tested by your landscaper or local Soil Conservation Service for nutrient requirements and follow the recommendations.
- Do not apply fertilizer to frozen ground.
- Clean up any fertilizer spills.
- Do not allow fertilizer to be broadcast into water bodies.
- When fertilizing a lawn, water thoroughly, but do not create a situation where water runs off the surface of the lawn.

PERMEABLE PAVERS

Function – Pavers are designed to capture rainwater runoff containing suspended solids, nutrients and pollutants. These systems require periodic maintenance to insure infiltration and storage capacity.

Maintenance

- Permeable pavers should be observed periodically during rain events for proper water infiltration into the system and inspected at least once per year to verify water flow and exfiltration. Sediment and debris should be removed from the joint/void opening to increase infiltration through light vacuuming on a semi-annual basic.

DE-ICING CHEMICAL USE AND STORAGE

Function – Salt and sand is used for de-icing of walkways, parking lots and drives. Care shall be taken to prevent the over-application of salt for melting ice.

Maintenance

- Proper storage of salt is critical. Salt is highly water-soluble. Contamination of wetlands and other sensitive areas can occur when salt is stored in open areas. Salt shall always be stored in a building
- When parking lots and walkways are free of snow and ice, they shall be swept clean. Disposal of sweepings shall be at a solid waste disposal facility.

CULVERTS AND DRAINAGE PIPES

Function – Culverts and drainage pipes convey stormwater away from buildings, walkways, and parking areas.

Maintenance
Culverts and drainage pipes shall be inspected semi-annually, or more often as needed, for accumulation of debris and structural integrity. Leaves and other debris shall be removed from the inlet and outlet to insure the functionality of drainage structures. Debris shall be disposed of on site where it will not concentrate back at the drainage structures or at a solid waste disposal facility.

GENERAL CLEAN UP

Upon completion of the project, the contractor shall remove all temporary stormwater structures (i.e., temporary stone check dams, silt fence, temporary diversion swales, catch basin inlet basket, etc.). Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared, and seeded. Remove any sediment in catch basins and clean drain pipes that may have accumulated during construction.

Once in operation, all paved areas of the site should be swept at least once annually, preferably at the end of winter prior to significant spring rains.