AMBIT ENGINEERING, INC. CIVIL ENGINEERS AND LAND SURVEYORS

200 Griffin Road, Unit 3, Portsmouth, NH 03801
Phone (603) 430-9282 Fax 436-2315

6 April 2020

Juliet Walker, Planning Director
City of Portsmouth
1 Junkins Avenue
Portsmouth, NH 03801

RE: Request for Review for Subdivision Approval at 183 Coolidge Drive, Tax Map 268 / Lot 29

Dear Ms. Walker:

On behalf of Matthew Wajda we hereby submit the attached and enclosed Subdivision Plans for the Wajda Residential Subdivision at 183 Coolidge Drive. The project consists of the subdivision of one lot into 2 lots with the associated site and infrastructure improvements. The existing residence will remain and be on Proposed Lot 1 and a new home will be constructed on Proposed Lot 2. In accordance with the feedback from our TAC Workshop we include a conceptual design for the proposed home on Lot 2.

We look forward to the City's review of this submission. If there are any questions or comments please feel free to reach out to me.

Sincerely,

John Chagnon

John R. Chagnon, PE

CC: Matthew Wajda, Bernie Pelech

PROPOSED SUBDIVISION RESIDENTIAL DEVELOPMENT
183 COOLIDGE DRIVE
PORTSMOUTH, NEW HAMPSHIRE
PERMIT PLANS

OWNER:

MATTHEW WAJDA
183 COOLIDGE DRIVE
PORTSMOUTH, N.H. 03801

CIVIL ENGINEER & LAND SURVEYOR:

AMBIT ENGINEERING, INC.
200 GRIFFIN ROAD, UNIT 3
PORTSMOUTH, N.H. 03801
TEL. (603) 430-9282
FAX (603) 436-2315

PORTSMOUTH ZONING MAP

Residential Districts
- R Rural
- SRA Single Residence A
- SRB Single Residence B
- GRA General Residence A
- GRB General Residence B
- GRC General Residence C
- GA/MH Garden Apartment/Mobile Home Park

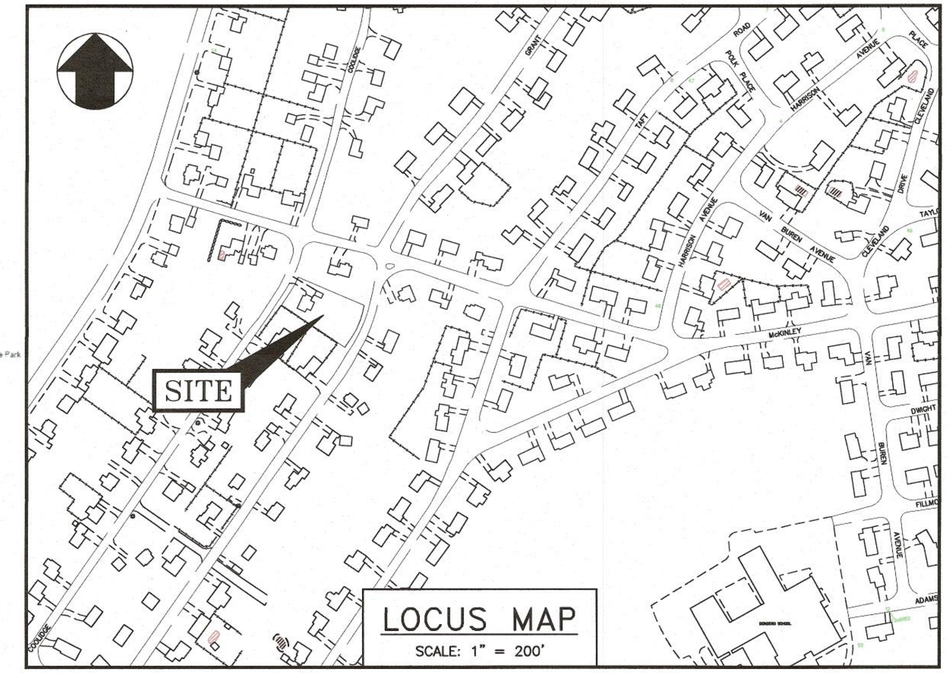
Mixed Residential Districts
- MRO Mixed Residential Office
- MRB Mixed Residential Business
- G1 Gateway Corridor
- G2 Gateway Center

Business Districts
- GB General Business
- B Business
- WB Waterfront Business

Industrial Districts
- OR Office Research
- I Industrial
- WI Waterfront Industrial

Airport Districts
- AIR Airport
- AI Airport Industrial
- PI Pease Industrial
- ABC Airport Business Commercial

Conservation Districts
- M Municipal
- NRP Natural Resource Protection



LEGEND:

EXISTING	*PROPOSED*	
		PROPERTY LINE
		SETBACK
S	S	SEWER PIPE
SL	SL	SEWER LATERAL
G	G	GAS LINE
D	D	STORM DRAIN
W	W	WATER LINE
WS	WS	WATER SERVICE
UGE	UGE	UNDERGROUND ELECTRIC
OHW	OHW	OVERHEAD ELECTRIC/WIRES
	UD	FOUNDATION DRAIN
		EDGE OF PAVEMENT (EP)
100	100	CONTOUR
97x3	98x0	SPOT ELEVATION
		UTILITY POLE
		WALL MOUNTED EXTERIOR LIGHTS
		TRANSFORMER ON CONCRETE PAD
		ELECTRIC HANDHOLD
		SHUT OFFS (WATER/GAS)
	GV	GATE VALVE
	HYD	HYDRANT
CB	CB	CATCH BASIN
S	SMH	SEWER MANHOLE
D	DMH	DRAIN MANHOLE
T	TMH	TELEPHONE MANHOLE
14	14	PARKING SPACE COUNT
PM		PARKING METER
LSA		LANDSCAPED AREA
TBD	TBD	TO BE DETERMINED
CI	CI	CAST IRON PIPE
COP	COP	COPPER PIPE
DI	DI	DUCTILE IRON PIPE
PVC	PVC	POLYVINYL CHLORIDE PIPE
RCP	RCP	REINFORCED CONCRETE PIPE
AC	–	ASBESTOS CEMENT PIPE
VC	VC	VITRIFIED CLAY PIPE
EP	EP	EDGE OF PAVEMENT
EL.	EL.	ELEVATION
FF	FF	FINISHED FLOOR
INV	INV	INVERT
S =	S =	SLOPE FT/FT
TBM	TBM	TEMPORARY BENCH MARK
TYP	TYP	TYPICAL

DIG SAFE
MA – ME – NH – RI – VT
1-888-344-7233
CALL TOLL FREE

INDEX OF SHEETS

UTILITY CONTACTS

ELECTRIC:
EVERSOURCE
1700 LAFAYETTE ROAD
PORTSMOUTH, N.H. 03801
Tel. (603) 436-7708, Ext. 555.5678
ATTN: MICHAEL BUSBY, P.E. (MANAGER)

NATURAL GAS:
UNITIL
325 WEST ROAD
PORTSMOUTH, N.H. 03801
Tel. (603) 294-5144
ATTN: DAVE BEAULIEU

CABLE:
COMCAST
155 COMMERCE WAY
PORTSMOUTH, N.H. 03801
Tel. (603) 679-5695 (X1037)
ATTN: MIKE COLLINS

SEWER & WATER:
PORTSMOUTH DEPARTMENT OF PUBLIC WORKS
680 PEVERLY HILL ROAD
PORTSMOUTH, N.H. 03801
Tel. (603) 427-1530
ATTN: JIM TOW

COMMUNICATIONS:
CONSOLIDATED
COMMUNICATIONS
JOE CONSIDINE
1575 GREENLAND ROAD
GREENLAND, N.H. 03840
Tel. (603) 427-5525

PORTSMOUTH APPROVAL CONDITIONS NOTE:
ALL CONDITIONS ON THIS PLAN SET SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE CITY OF PORTSMOUTH SITE PLAN REVIEW REGULATIONS.

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN _____ DATE _____

PROPOSED RESIDENTIAL DEVELOPMENT
183 COOLIDGE DRIVE
PORTSMOUTH, N.H.

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road – Unit 3
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Tel (603) 430-9282
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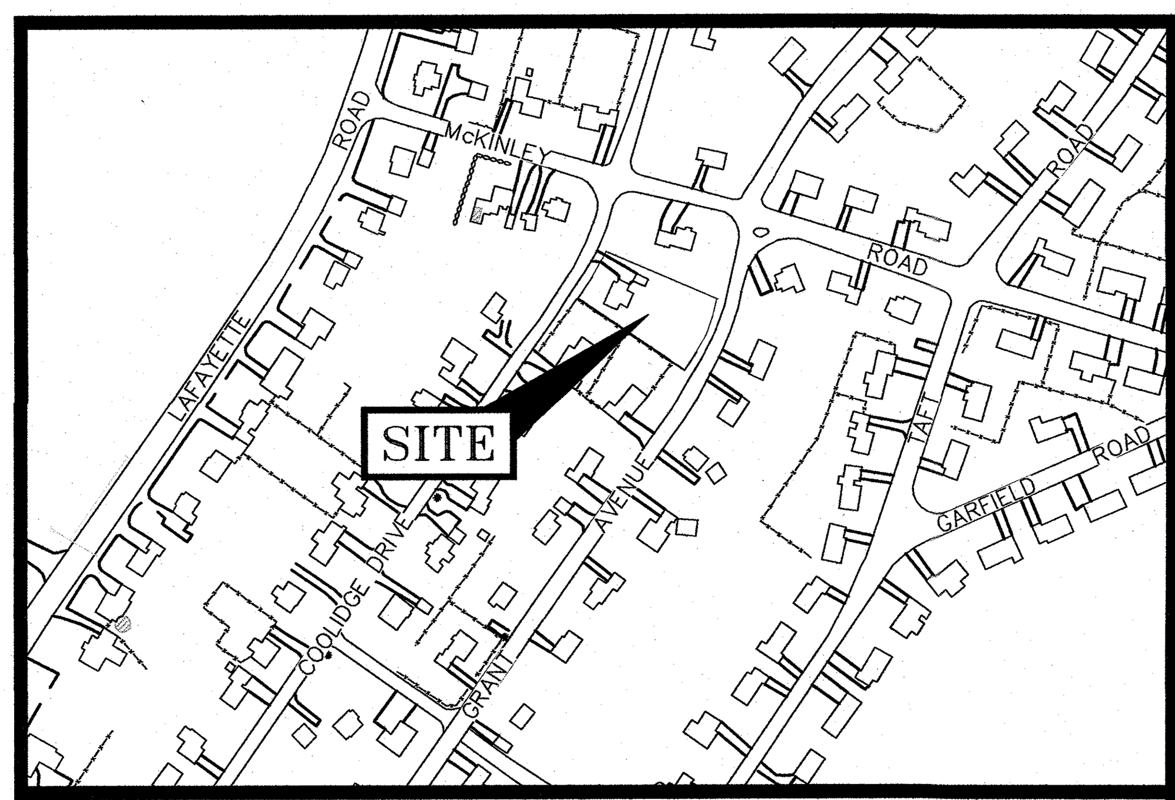
PLAN SET SUBMITTAL DATE: 27 MARCH 2020



LOCATION MAP SCALE 1"=300'

PLAN REFERENCES:

1) PLAN OF LOTS, PART OF ELWYN PARK, PORTSMOUTH, N.H. PREPARED BY JOHN W. DURGIN, CIVIL ENGINEER. DATED MAY 1947. R.C.R.D. PLAN #01321.

2) VARIANCE APPLICATION SKETCH, 183 COOLIDGE DRIVE, PORTSMOUTH, NH FOR W. FRANK REARDON. PREPARED BY JAMES VERRA AND ASSOCIATES, INC. DATED 19 NOVEMBER 1998. NOT RECORDED.

VARIANCES GRANTED (7/23/19):

1) VARIANCES AND/OR SPECIAL EXCEPTIONS FROM SECTION 10.521 TO ALLOW:

a) A LOT AREA AND LOT AREA PER DWELLING UNIT OF 10,100 S.F. FOR THE LOT WITH AN EXISTING STRUCTURE WHERE 15,000 S.F. IS REQUIRED FOR EACH;

b) A LOT AREA AND LOT AREA PER DWELLING UNIT OF 10,270 S.F. FOR THE PROPOSED LOT WHERE 15,000 S.F. IS REQUIRED FOR EACH;

c) 85' OF CONTINUOUS STREET FRONTAGE WHERE 100 FEET IS REQUIRED; AND

d) 86 FEET OF LOT DEPTH WHERE 100 FEET IS REQUIRED.

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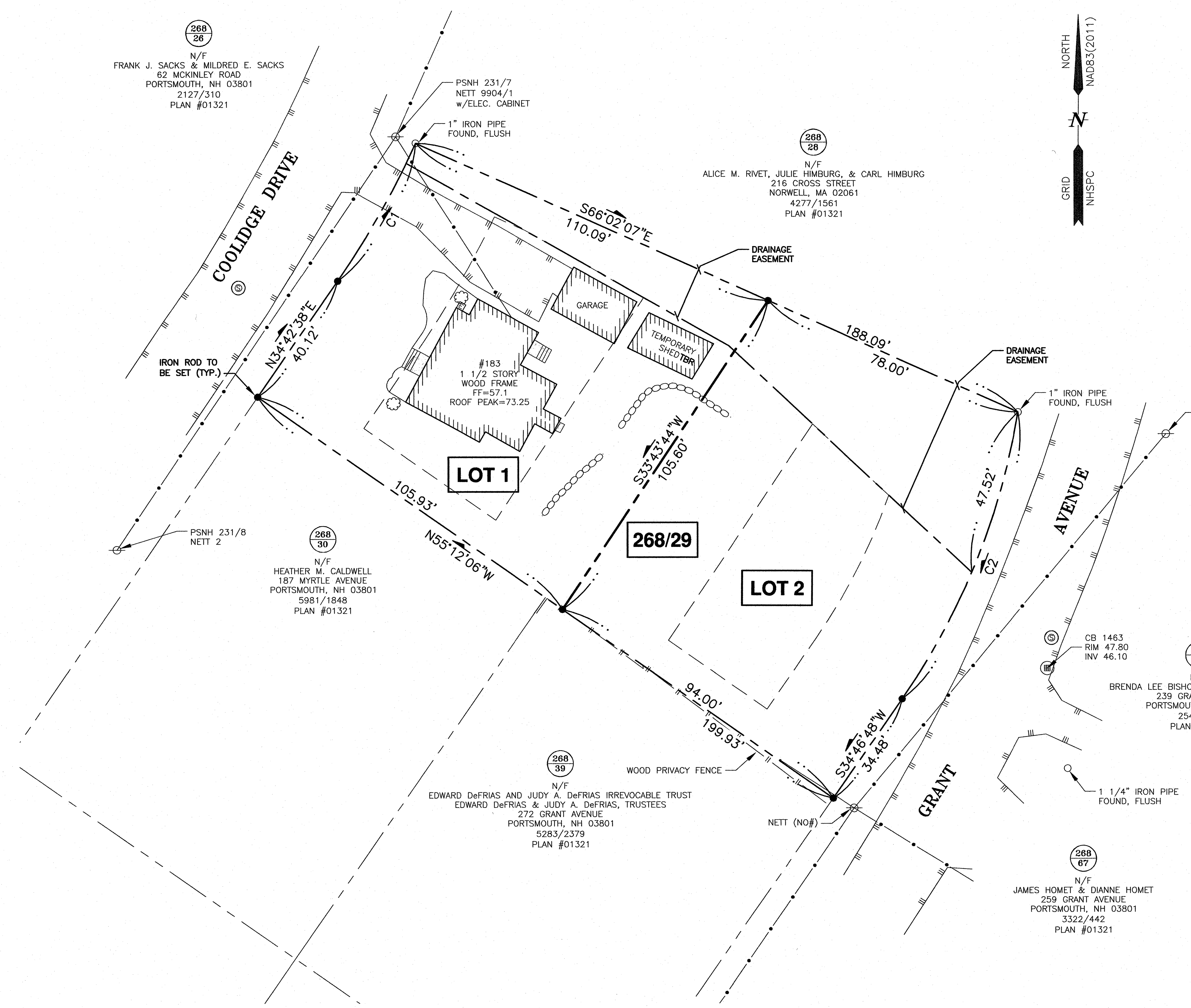
LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
11/21	MAP 11 / LOT 21
— — —	BOUNDARY
- - - - -	SETBACK
	RAILROAD SPIKE FOUND
	IRON ROD/PIPE FOUND
	DRILL HOLE FOUND
	STONE/CONCRETE BOUND FOUND
	RAILROAD SPIKE SET
	IRON ROD SET
	DRILL HOLE SET
	GRANITE BOUND SET
TBR	TO BE REMOVED



NOTES:

1) PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 268 AS LOT 29.

2) OWNER OF RECORD:
MATTHEW WAJDA
183 COOLIDGE DRIVE
PORTSMOUTH, NH 03801
4936/1611
R.C.R.D. PLAN #01321 (LOT 22)

3) PARCEL IS NOT IN A SPECIAL FLOOD HAZARD AREA AS SHOWN ON FIRM PANEL 33015C0270E. EFFECTIVE DATE MAY 17, 2005.

4) EXISTING LOT AREA:
20,444 S.F.
0.4693 ACRES

PROPOSED LOT AREAS:

LOT 1	LOT 2
10,113 S.F.	10,330 S.F.
0.2322 ACRES	0.2372 ACRES

5) PARCEL IS LOCATED IN SINGLE RESIDENCE B (SRB) ZONING DISTRICT.

6) DIMENSIONAL REQUIREMENTS:

MIN. LOT AREA:		15,000 S.F.
FRONTAGE:		100 FEET
DEPTH:		100 FEET
SETBACKS:	FRONT	30 FEET
	SIDE	10 FEET
	REAR	30 FEET
MAXIMUM STRUCTURE HEIGHT:		35 FEET
MAXIMUM BUILDING COVERAGE:		20%
MINIMUM OPEN SPACE:		40%

7) THE PURPOSE OF THIS PLAN IS TO SHOW THE SUBDIVISION OF ASSESSOR'S MAP 268 LOT 29 IN THE CITY OF PORTSMOUTH INTO TWO LOTS.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	10/7/19

REVISIONS

"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

PAUL A DOBBERSTEIN, LLS — 3/27/2020 DATE

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 1000 PAUL A. DOBBERSTEIN

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN — DATE

GRAPHIC SCALE
10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	250.00'	45.01'	44.95'	N29°33'09"E	10°18'58"
C2	200.00'	88.64'	87.91'	S22°05'01"W	25°23'35"

SUBDIVISION PLAN
TAX MAP 268 – LOT 29

OWNER:

MATTHEW WAJDA
183 COOLIDGE DRIVE
CITY OF PORTSMOUTH
COUNTY OF ROCKINGHAM
STATE OF NEW HAMPSHIRE

SCALE 1"=20' OCTOBER 2019

FB 240 PG 48 3106

LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
11/21	MAP 11 / LOT 21
	BOUNDARY
	SETBACK
	RAILROAD SPIKE FOUND
	IRON ROD/PIPE FOUND
	DRILL HOLE FOUND
	STONE/CONCRETE BOUND FOUND
	RAILROAD SPIKE SET
	IRON ROD SET
	DRILL HOLE SET
	GRANITE BOUND SET
S	SEWER LINE
G	GAS LINE
D	STORM DRAIN
W	WATER LINE
	UNDERGROUND ELECTRIC
	OVERHEAD ELECTRIC/WIRES
100	CONTOUR
97x3	SPOT ELEVATION
	EDGE OF PAVEMENT (EP)
	WOODS / TREE LINE
	UTILITY POLE (w/ GUY)
	GAS SHUT OFF
	WATER SHUT OFF/CURB STOP
GV	GATE VALVE
HYD	HYDRANT
G W E	METER (GAS, WATER, ELECTRIC)
	CATCH BASIN
T	TELEPHONE MANHOLE
S	SEWER MANHOLE
D	DRAIN MANHOLE
AC	AIR CONDITIONER UNIT
	SIGNS
AC	ASBESTOS CEMENT PIPE
CI	CAST IRON PIPE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
COP	COPPER PIPE
DI	DUCTILE IRON PIPE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
VC	VITRIFIED CLAY PIPE
EL.	ELEVATION
EP	EDGE OF PAVEMENT
F.F.	FINISHED FLOOR
INV.	INVERT
TBM	TEMPORARY BENCHMARK
TYP.	TYPICAL
VGC/SGC	VERTICAL/SLOPED GRANITE CURB
CCB	CAPE COD BERM
LSA	LANDSCAPED AREA

PLAN REFERENCES:

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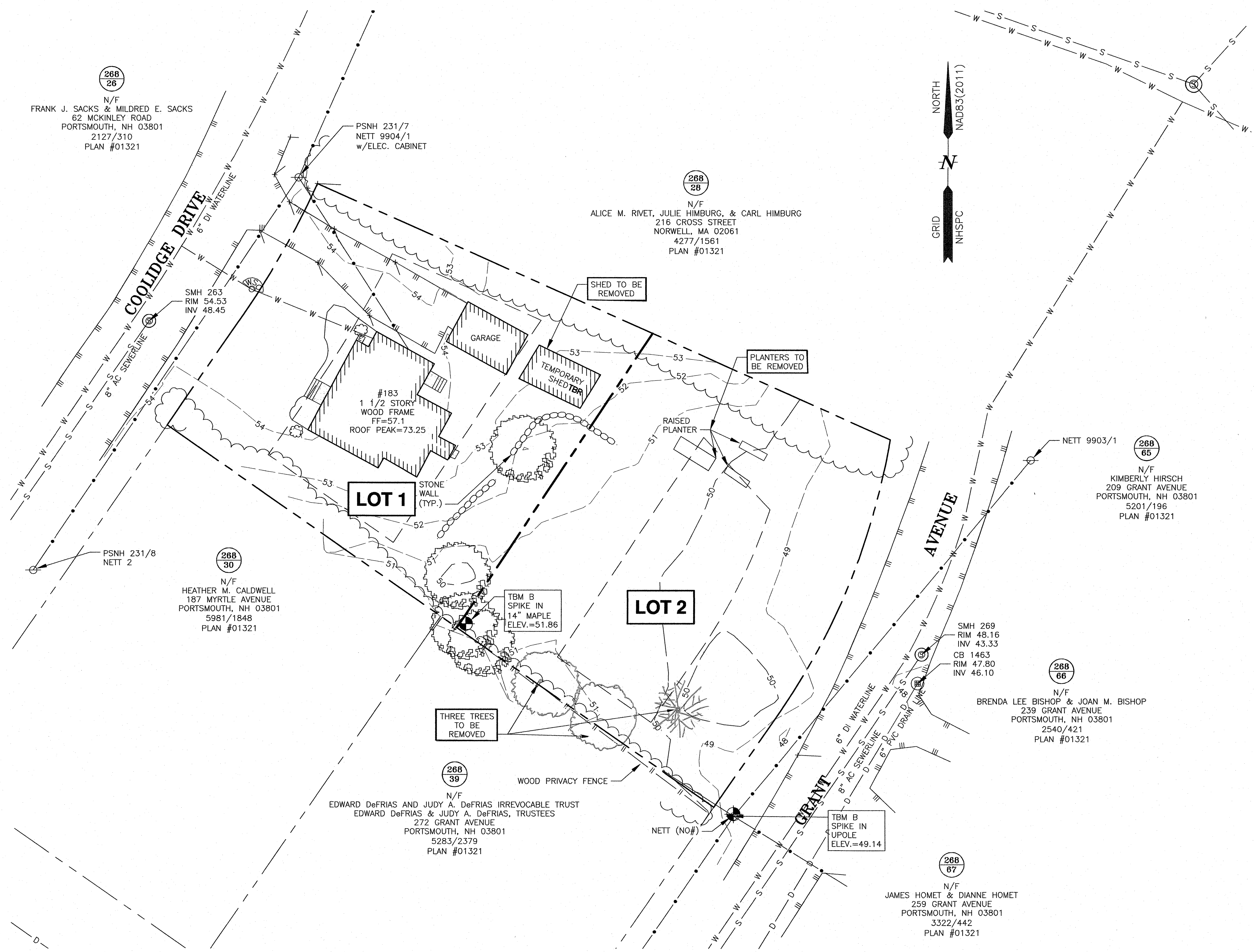

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PAUL A DOBBERSTEIN, LLS — 3/27/2020 DATE

STATE OF NEW HAMPSHIRE — PAUL A. DOBBERSTEIN — No. 1000 — LICENSED LAND SURVEYOR

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NOTES:

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DEPTH:	100 FEET	
SETBACKS:	FRONT	30 FEET
	SIDE	10 FEET
	REAR	30 FEET
MAXIMUM STRUCTURE HEIGHT:		35 FEET
MAXIMUM BUILDING COVERAGE:		20%
MINIMUM OPEN SPACE:		40%

7) THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS ON ASSESSOR'S MAP 268 LOT 29 IN THE CITY OF PORTSMOUTH.

8) VERTICAL DATUM IS MEAN SEA LEVEL NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GPS OBSERVATIONS (±0.2').

WAJDA SUBDIVISION 183 COOLIDGE DRIVE PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	10/7/19

REVISIONS

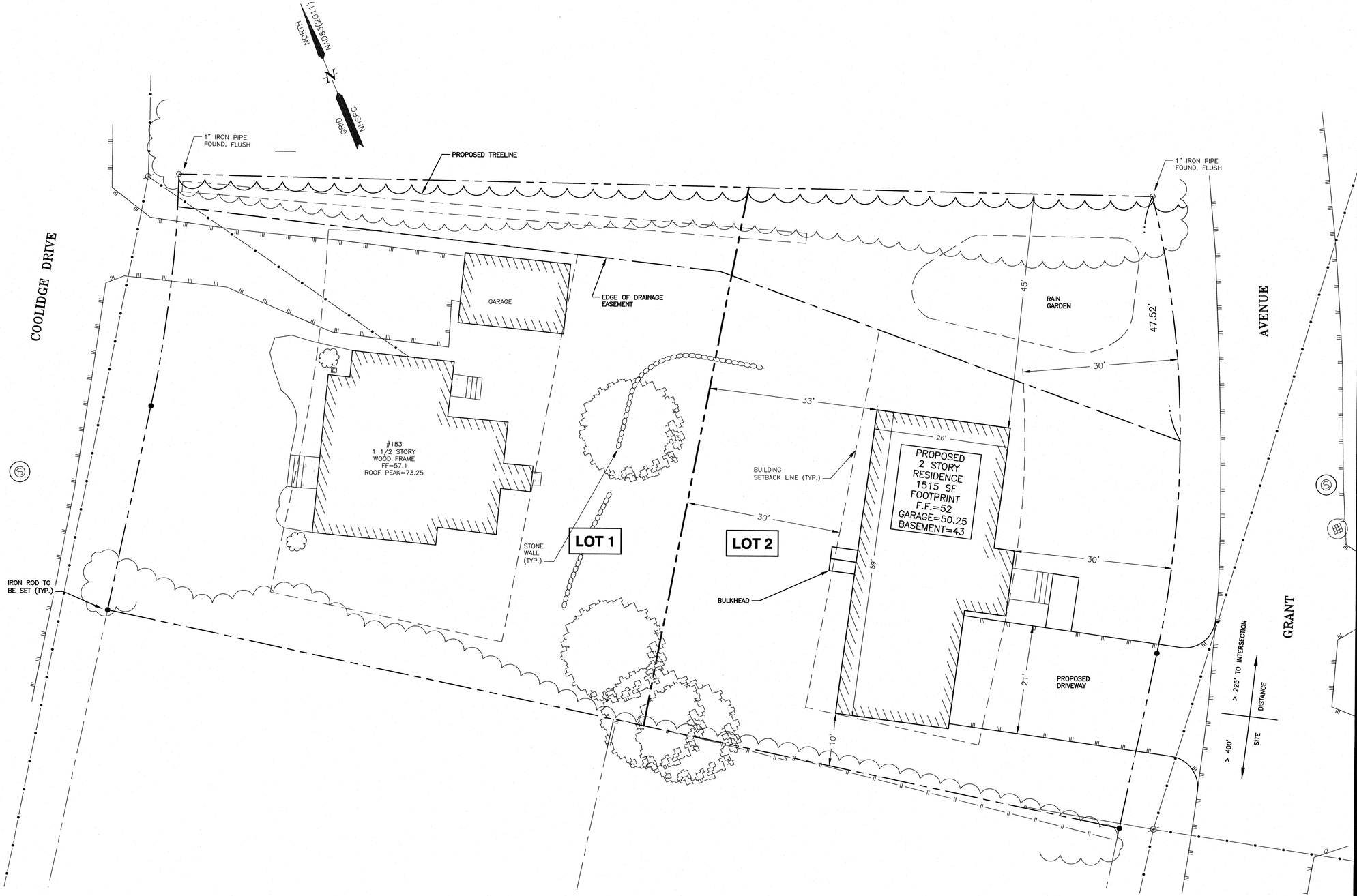
SCALE 1"=20' — OCTOBER 2019

EXISTING CONDITIONS PLAN

C1

FB 240 PG 48

3106



GRAPHIC SCALE

10 5 0 10 20 30 40 FEET
3 0 5 10 METERS

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN

DATE

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road – Unit 3
Portsmouth, N.H. 03801-7114
Tel (603) 430-9282
Fax (603) 436-2315

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY WITHIN 100 FEET OF UNDERGROUND UTILITIES. THE EXCAVATOR IS RESPONSIBLE TO MAINTAIN MARKS. DIG SAFE TICKETS EXPIRE IN THIRTY DAYS.

2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION. (NHDES DECEMBER 2008).

4) THERE ARE NO WETLANDS ON SUBJECT PROPERTY.

5) PROPOSED RESIDENCE WILL BE GUTTERED TO DIRECT ROOF RUNOFF TO THE RAIN GARDEN.

6) THE PURPOSE OF THIS PLAN IS TO SHOW THE PROPOSED DEVELOPMENT ON LOT 2 OF THE SUBDIVISION. BUILDING DESIGN IS CONCEPTUAL.

WAJDA SUBDIVISION
183 COOLIDGE DRIVE
PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	3/6/20

REVISIONS

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 738 JOHN R. CHAGNON SIGNATURE

JOHN R. CHAGNON No. 7651 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

SCALE: 1" = 10' JANUARY 2020

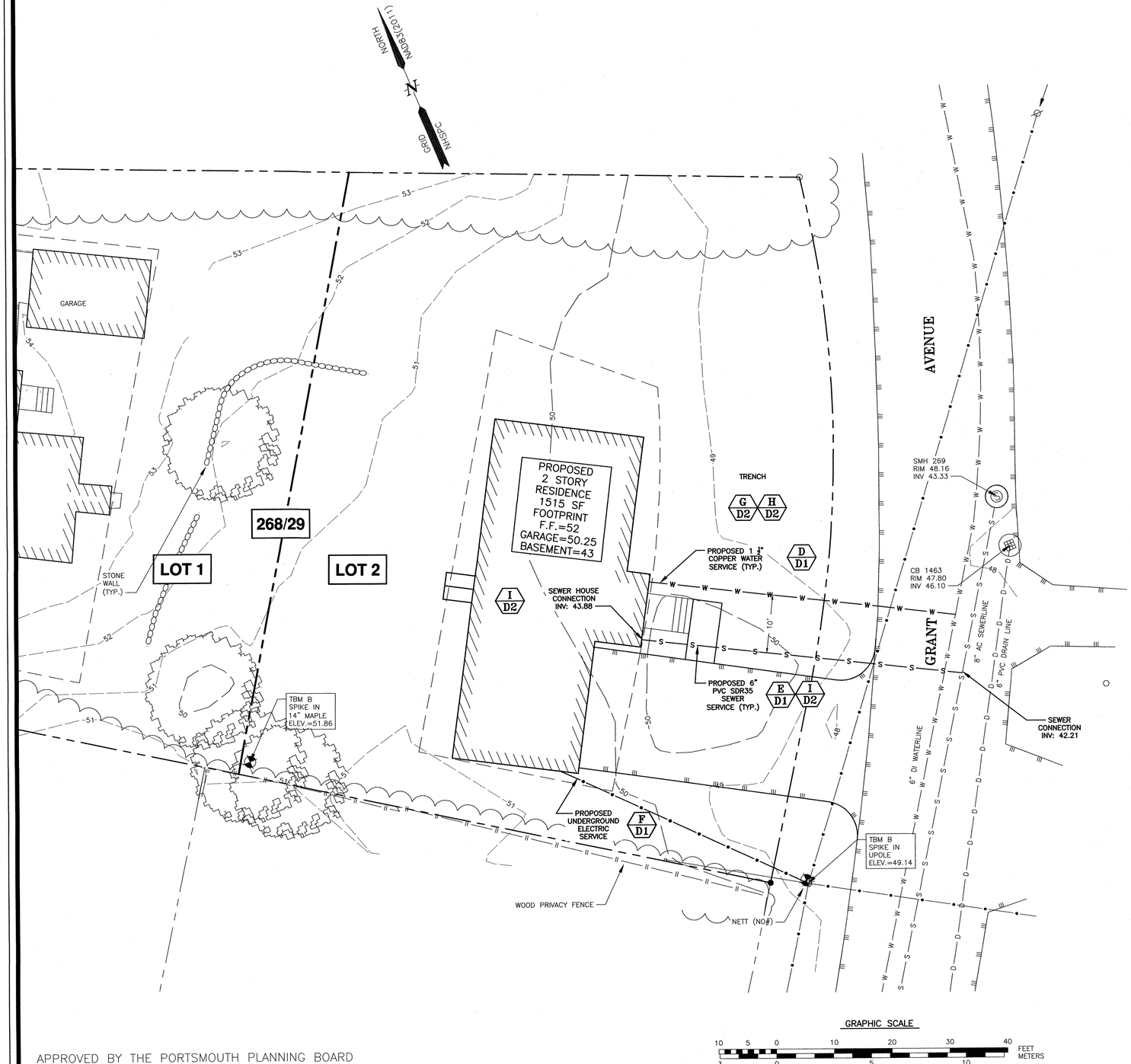
SITE LAYOUT PLAN

C2

FB. 240, PG 48

3106

J:\JOBS\JN 3100's\3106\2012 Subdivision\Plans & Specs\Site\3106 Subdivision 2020.dwg



GRAPHIC SCALE

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3 0 5 10 METERS

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN _____ DATE _____

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4) THERE ARE NO WETLANDS ON SUBJECT PROPERTY.

5) PROPOSED UTILITY CONNECTIONS TO BE REVIEWED AND APPROVED BY PORTSMOUTH DPW PRIOR TO ISSUANCE OF BUILDING PERMIT.

WAJDA SUBDIVISION
183 COOLIDGE DRIVE
PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	1/27/20

REVISIONS

STATE OF NEW HAMPSHIRE
JOHN R. CHAGNON No. 7651 LICENSED
PROFESSIONAL ENGINEER

SCALE: 1" = 10' JANUARY 2020

UTILITY PLAN

C3

FB. 240, PG 48

3106

J:\JOBS\3106\2020\JAN 3106-2020 S-Subdivision\Plans & Specs\Site\3106 SiteMotion 2019.dwg

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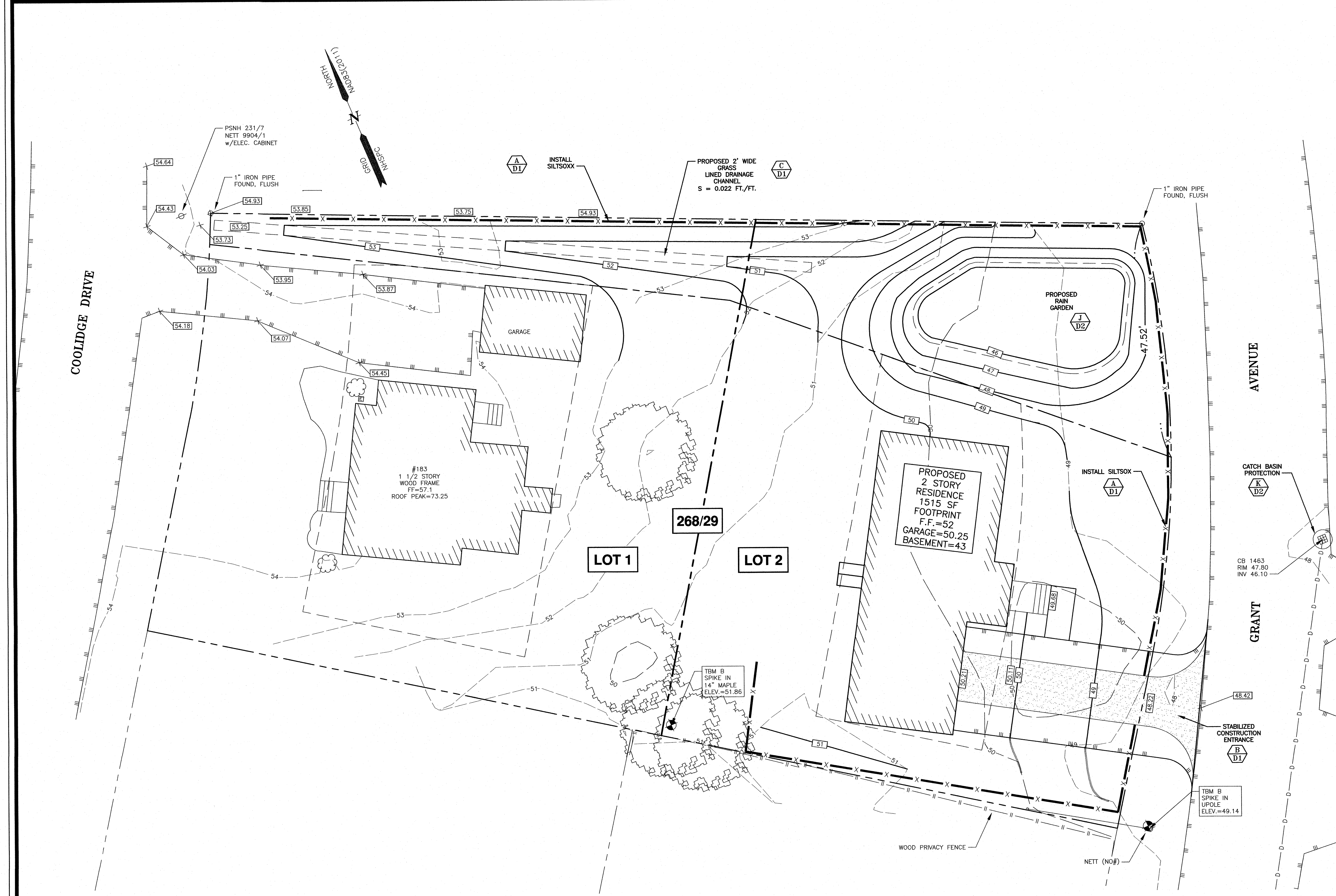

GRAPHIC SCALE

10 5 0 10 20 30 40 FEET

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APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN

DATE

NOTES:

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5) BUILDINGS WILL BE GUTTERED TO DIRECT ROOF RUNOFF TO THE RAIN GARDEN.

WAJDA SUBDIVISION
183 COOLIDGE DRIVE
PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	3/6/20

REVISIONS

STATE OF NEW HAMPSHIRE
JOHN R. CHAGNON
No. 7851
LICENSED
PROFESSIONAL ENGINEER

SCALE: 1" = 10'

JANUARY 2020

GRADING & EROSION CONTROL PLAN

C4

FB. 240, PG 48

3106

EROSION CONTROL NOTES

CONSTRUCTION SEQUENCE

DO NOT BEGIN CONSTRUCTION UNTIL ALL LOCAL, STATE AND FEDERAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED.

INSTALL INLET PROTECTION AND PERIMETER CONTROLS, i.e., SILTSOXX AROUND THE LIMITS OF DISTURBANCE BEFORE ANY EARTH MOVING OPERATIONS.

INSTALL CATCH BASIN PROTECTION.

INSTALL CONSTRUCTION ENTRANCE.

CUT AND GRUB ALL TREES, SHRUBS, SAPLINGS, BRUSH, VINES AND REMOVE OTHER DEBRIS AND RUBBISH AS REQUIRED.

REMOVE EXISTING GARDEN PLANTERS AND SHED

INSTALL SWALE AND RAIN GARDEN.

INSTALL FOUNDATION AND CONSTRUCT SITE UTILITIES.

COMPLETE BUILDING CONSTRUCTION.

INSTALL DRIVEWAY.

REMOVE TRAPPED SEDIMENTS FROM COLLECTION DEVICES AS APPROPRIATE, AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES UPON COMPLETION OF FINAL STABILIZATION OF THE SITE.

GENERAL CONSTRUCTION NOTES

THE EROSION CONTROL PROCEDURES SHALL CONFORM TO SECTION 645 OF THE "STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION" OF THE NHDOT, AND "STORM WATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE". THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

DURING CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED. THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING DEVELOPMENT. NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED FOR MORE THAN 45 DAYS.

ANY DISTURBED AREAS WHICH ARE TO BE LEFT TEMPORARILY, AND WHICH WILL BE REGRADED LATER DURING CONSTRUCTION SHALL BE MACHINE HAY MULCHED AND SEEDED WITH RYE GRASS TO PREVENT EROSION.

DUST CONTROL: IF TEMPORARY STABILIZATION PRACTICES, SUCH AS TEMPORARY VEGETATION AND MULCHING, DO NOT ADEQUATELY REDUCE DUST GENERATION, APPLICATION OF WATER OR CALCIUM CHLORIDE SHALL BE APPLIED IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES.

SILT FENCES AND SILTSOXX SHALL BE PERIODICALLY INSPECTED DURING THE LIFE OF THE PROJECT AND AFTER EACH STORM. ALL DAMAGED SILT FENCES AND SILTSOXX SHALL BE REPAIRED. SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED IN A SECURED LOCATION.

AVOID THE USE OF FUTURE OPEN SPACES (LOAM AND SEED AREAS) WHEREVER POSSIBLE DURING CONSTRUCTION. CONSTRUCTION TRAFFIC SHALL USE THE ROADBEDS OF FUTURE ACCESS DRIVES AND PARKING AREAS.

ADDITIONAL TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNTS NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS--CONSTRUCT SILT FENCE OR SILTSOXX AROUND TOPSOIL STOCKPILE.

AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL. STUMPS SHALL BE DISPOSED OF IN AN APPROVED FACILITY.

ALL FILLS SHALL BE PLACED AND COMPACTED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS.

ALL NON-STRUCTURAL, SITE-FILL SHALL BE PLACED AND COMPACTED TO 90% MODIFIED PROCTOR DENSITY IN LAYERS NOT EXCEEDING 18 INCHES IN THICKNESS UNLESS OTHERWISE NOTED.

FROZEN MATERIAL OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIAL, TRASH, WOODY DEBRIS, LEAVES, BRUSH OR ANY DELETERIOUS MATTER SHALL NOT BE INCORPORATED INTO FILLS.

FILL MATERIAL SHALL NOT BE PLACED ON FROZEN FOUNDATION SUBGRADE.

DURING CONSTRUCTION AND UNTIL ALL DEVELOPED AREAS ARE FULLY STABILIZED, ALL EROSION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH ONE HALF INCH OF RAINFALL.

THE CONTRACTOR SHALL MODIFY OR ADD EROSION CONTROL MEASURES AS NECESSARY TO ACCOMMODATE PROJECT CONSTRUCTION.

ALL ROADWAYS AND PARKING AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:

- BASE COURSE GRAVELS HAVE BEEN INSTALLED ON AREAS TO BE PAVED
- A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
- A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED
- EROSION CONTROL BLANKETS HAVE BEEN INSTALLED

VEGETATIVE PRACTICE

FOR PERMANENT MEASURES AND PLANTINGS:

LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF 2 TONS PER ACRE.

FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 500 POUNDS PER ACRE OF 10-20-20 FERTILIZER.

SEED SHALL BE SOWN AT THE RATES SHOWN IN THE TABLE BELOW. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AT A RATE OF 1.5 TO 2 TONS PER ACRE, AND SHALL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE EROSION AND SEDIMENT CONTROL HANDBOOK.

THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED.

A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE:

GENERAL COVER	PROPORTION	SEEDING RATE
CREEPING RED FESCUE	50%	100 LBS/ACRE
KENTUCKY BLUEGRASS	50%	

SLOPE SEED (USED ON ALL SLOPES GREATER THAN OR EQUAL TO 3:1)

CREEPING RED FESCUE	42%	
TALL FESCUE	42%	48 LBS/ACRE
BIRDSFOOT TREFOIL	16%	

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH APPLICABLE STATE AND FEDERAL SEED LAWS.

FOR TEMPORARY PROTECTION OF DISTURBED AREAS:
MULCHING AND SEEDING SHALL BE APPLIED AT THE FOLLOWING RATES:
PERENNIAL RYE: 0.7 LBS/1,000 S.F.
MULCH: 1.5 TONS/ACRE

MAINTENANCE AND PROTECTION

THE CONTRACTOR SHALL MAINTAIN ALL LOAM & SEED AREAS UNTIL FINAL ACCEPTANCE AT THE COMPLETION OF THE CONTRACT. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, REMOVAL OF STONES AND OTHER FOREIGN OBJECTS OVER 1/2 INCHES IN DIAMETER WHICH MAY APPEAR AND THE FIRST TWO (2) CUTTINGS OF GRASS NO CLOSER THEN TEN (10) DAYS APART. THE FIRST CUTTING SHALL BE ACCOMPLISHED WHEN THE GRASS IS FROM 2 1/2 TO 3 INCHES HIGH. ALL BARE AND DEAD SPOTS WHICH BECOME APPARENT SHALL BE PROPERLY PREPARED, LIMED AND FERTILIZED, AND RESEEDED BY THE CONTRACTOR AT HIS EXPENSE AS MANY TIMES AS NECESSARY TO SECURE GOOD GROWTH. THE ENTIRE AREA SHALL BE MAINTAINED, WATERED AND CUT UNTIL ACCEPTANCE OF THE LAWN BY THE OWNER'S REPRESENTATIVE.

THE CONTRACTOR SHALL TAKE WHATEVER MEASURES ARE NECESSARY TO PROTECT THE GRASS WHILE IT IS DEVELOPING.

TO BE ACCEPTABLE, SEEDED AREAS SHALL CONSIST OF A UNIFORM STAND OF AT LEAST 90 PERCENT ESTABLISHED PERMANENT GRASS SPECIES, WITH UNIFORM COUNT OF AT LEAST 100 PLANTS PER SQUARE FOOT.

SEEDED AREAS WILL BE FERTILIZED AND RESEEDED AS NECESSARY TO INSURE VEGETATIVE ESTABLISHMENT.

THE SWALES WILL BE CHECKED WEEKLY AND REPAIRED WHEN NECESSARY UNTIL ADEQUATE VEGETATION IS ESTABLISHED.

THE SILT FENCE OR SILTSOXX BARRIER SHALL BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.

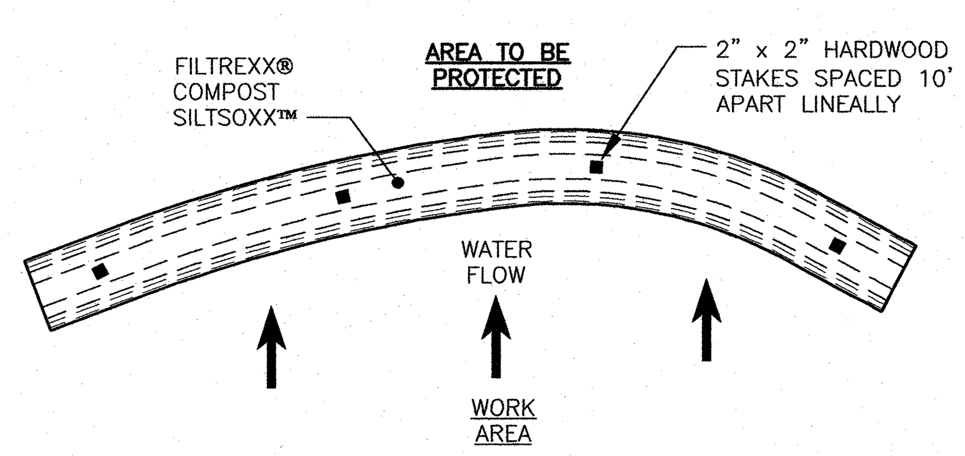
SILT FENCING AND SILTSOXX SHALL BE REMOVED ONCE VEGETATION IS ESTABLISHED, AND DISTURBED AREAS RESULTING FROM SILT FENCE AND SILTSOXX REMOVAL SHALL BE PERMANENTLY SEEDED.

WINTER NOTES

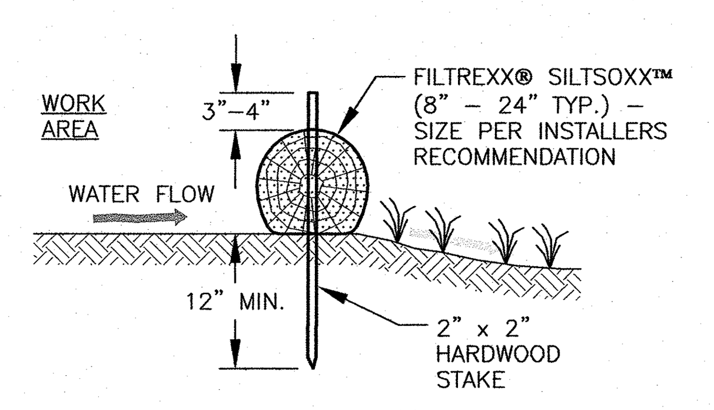
ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.

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.

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.



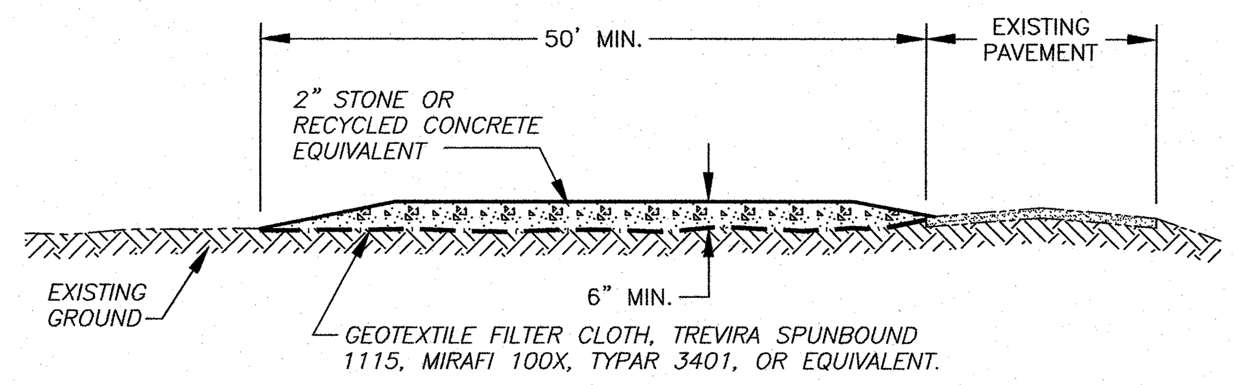
PLAN



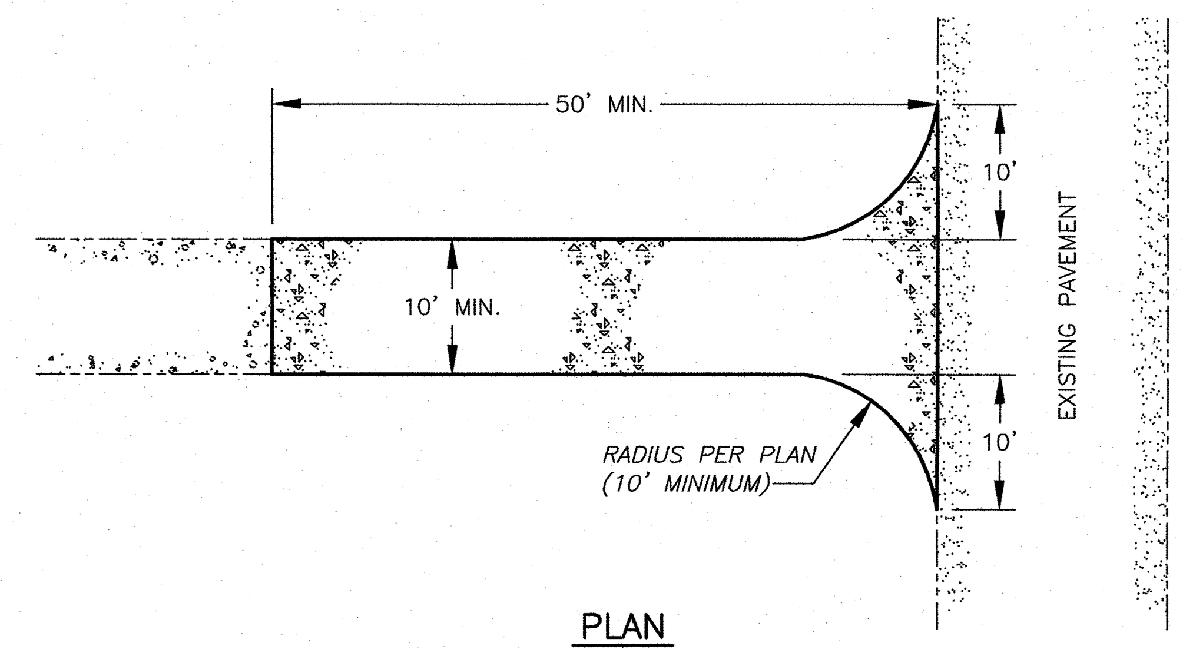
ELEVATION

NOTES:
1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. FILLTREXX SYSTEM SHALL BE INSTALLED BY A CERTIFIED FILTREXX INSTALLER.
3. THE CONTRACTOR SHALL MAINTAIN THE COMPOST FILTRATION SYSTEM IN A FUNCTIONAL CONDITION AT ALL TIMES. IT WILL BE ROUTINELY INSPECTED AND REPAIRED WHEN REQUIRED.
4. SILTSOXX DEPICTED IS FOR MINIMUM SLOPES, GREATER SLOPES MAY REQUIRE ADDITIONAL PLACEMENTS.
5. THE COMPOST FILTER MATERIAL WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED, AS DETERMINED BY THE ENGINEER.

A / C4 FILTREXX® SILTSOXX™ FILTRATION SYSTEM NTS

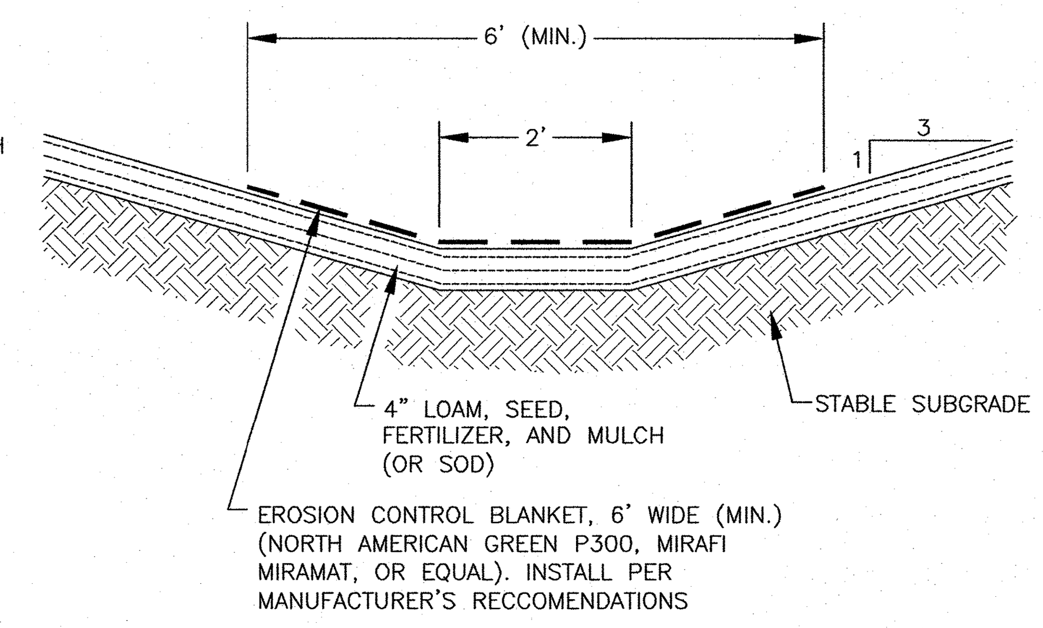


PROFILE



PLAN

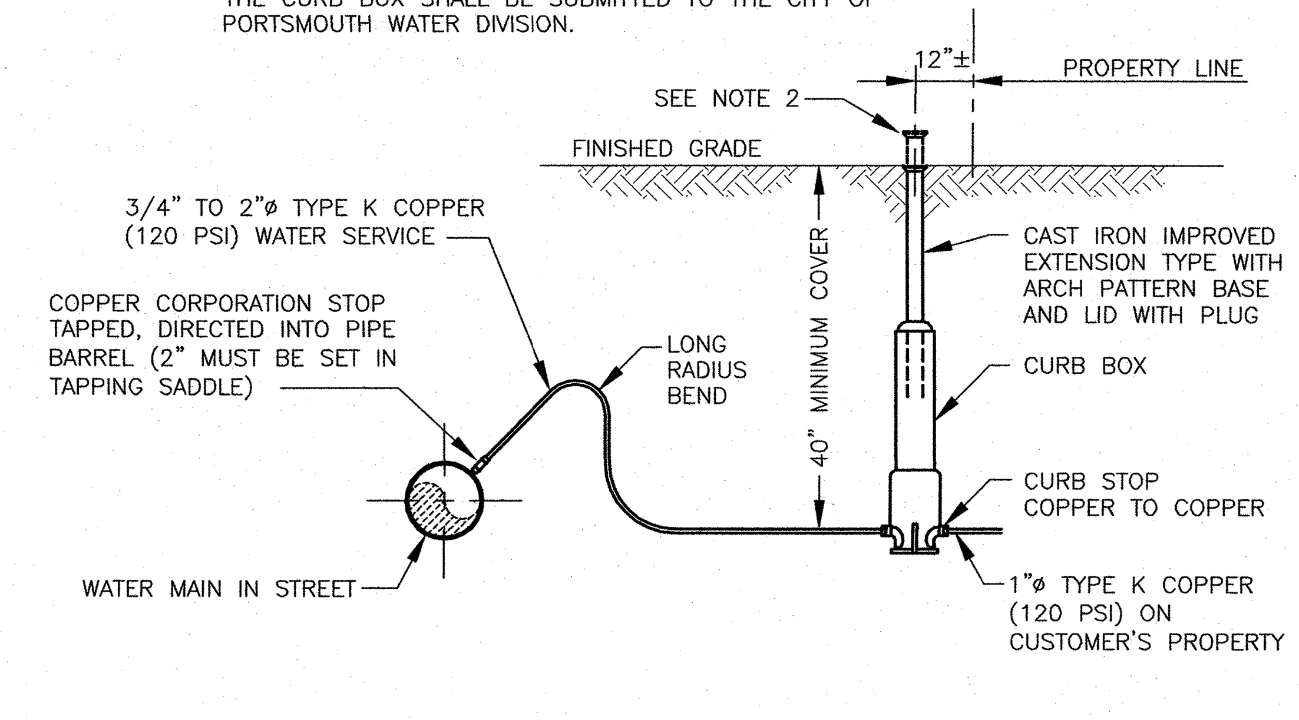
B / C4 STABILIZED CONSTRUCTION ENTRANCE
MAY SUBSTITUTE FODS NTS



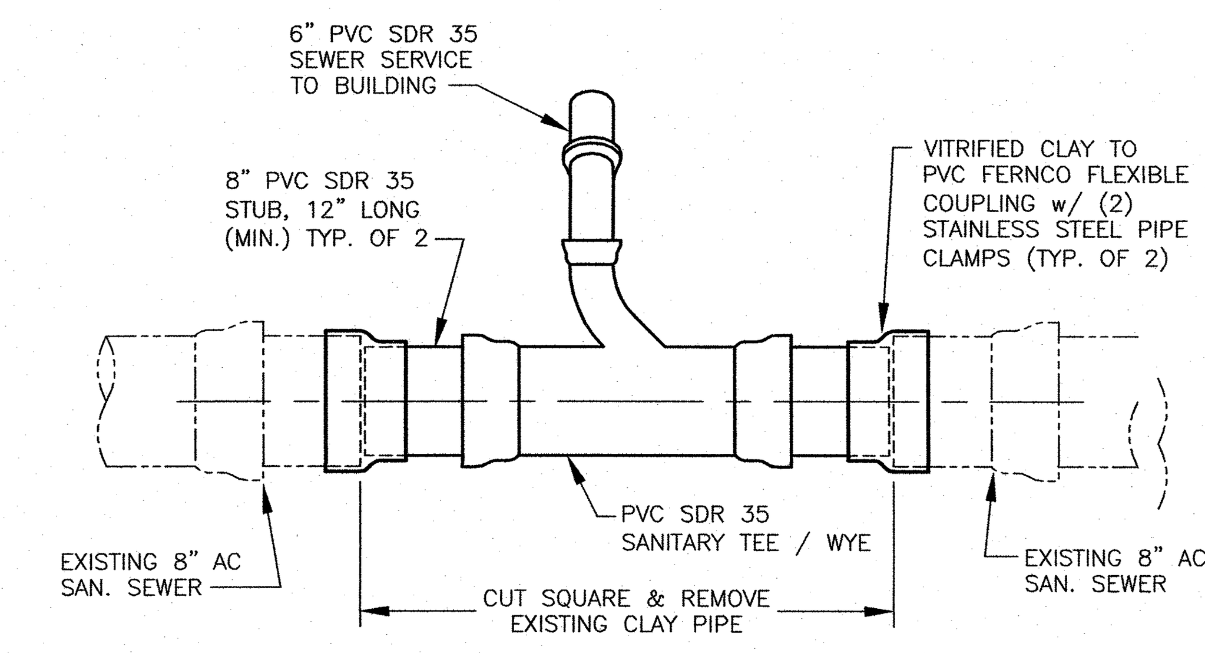
CROSS SECTION

C / C4 GRASS LINED DRAINAGE CHANNEL NTS

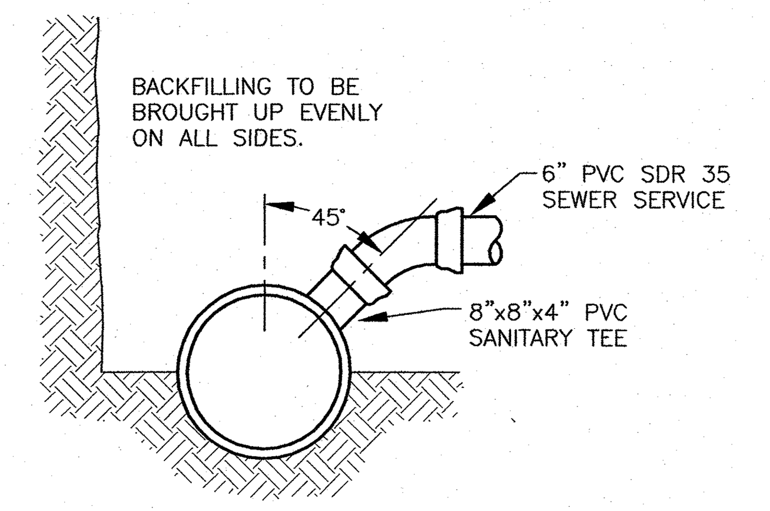
NOTE:
1) INSTALLATION OF WATER MAIN TAP & CURB STOP & BOX SHALL ONLY BE PERFORMED BY THOSE AUTHORIZED BY THE PUBLIC WORKS DEPARTMENT.
2) IN AREAS OF HEAVY GROWTH THE CURB BOX COVER SHALL BE SET 6" ABOVE FINISH GRADE AND A WITNESS STAKE SET.
3) CURB BOX SHALL BE SET APPROXIMATELY 12" OUTSIDE PROPERTY LINE AS SHOWN.
4) PRIOR TO ACCEPTANCE, A PLAN INDICATING THE LOCATION OF THE CURB BOX SHALL BE SUBMITTED TO THE CITY OF PORTSMOUTH WATER DIVISION.



D / C3 WATER SERVICE CONNECTION
(PORTSMOUTH) NTS

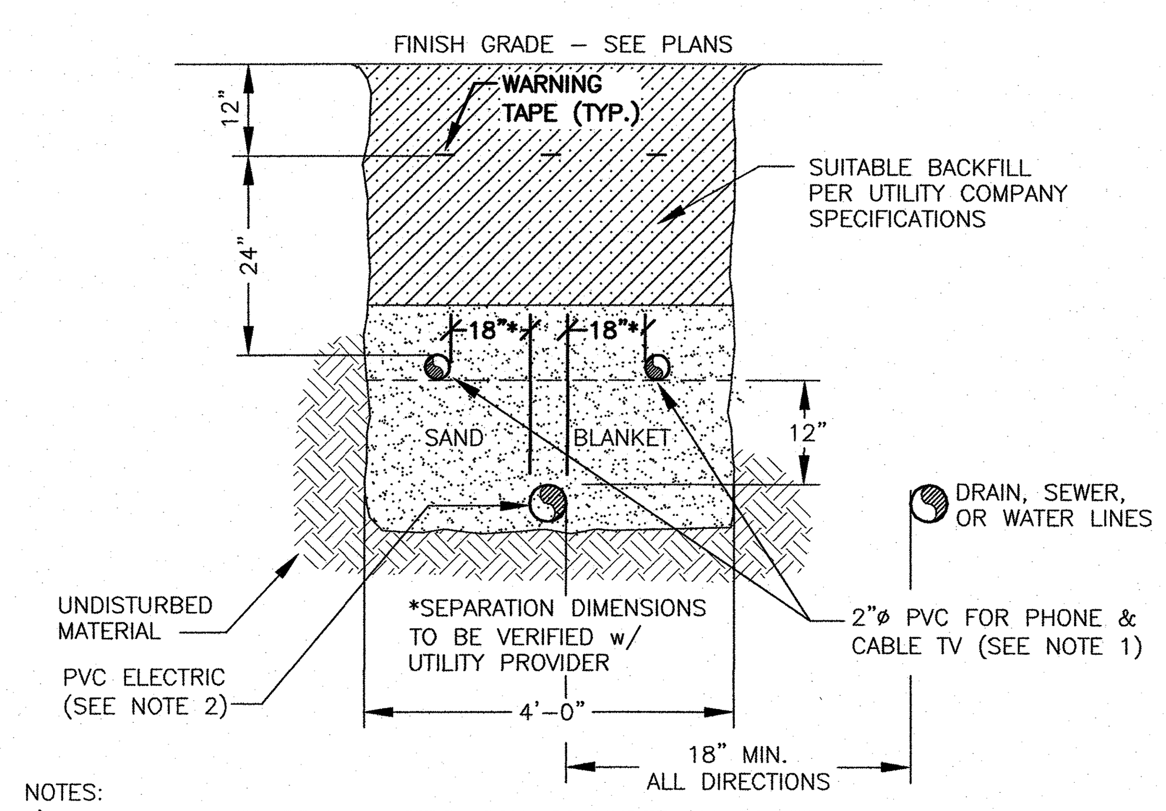


PLAN



SECTION

E / C3 SEWER SERVICE TAP DETAIL NTS



NOTES:
1) ALL CONDUIT TO BE U.L. LISTED, SCH. 80 UNDER ALL TRAVEL WAYS, & SCH. 40 FOR THE REMAINDER.
2) NORMAL CONDUIT SIZES FOR PSNH ARE 3 INCH FOR SINGLE PHASE PRIMARY AND SECONDARY VOLTAGE CABLES, 4 INCH FOR THREE PHASE SECONDARY, AND 5 INCH FOR THREE PHASE PRIMARY.
3) ALL WORK TO CONFORM TO THE NATIONAL ELECTRICAL CODE (LATEST REVISION)
4) INSTALL A 200# PULL ROPE FOR EACH CONDUIT
5) VERIFY ALL CONDUIT SPECIFICATIONS WITH UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION.

F / C3 UTILITY TRENCH
ELECTRIC/PHONE/CABLE NTS

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road - Unit 3
Portsmouth, N.H. 03801-7114
Tel (603) 430-9282
Fax (603) 436-2315

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY WITHIN 100 FEET OF UNDERGROUND UTILITIES. THE EXCAVATOR IS RESPONSIBLE TO MAINTAIN MARKS. DIG SAFE TICKETS EXPIRE IN THIRTY DAYS.

2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

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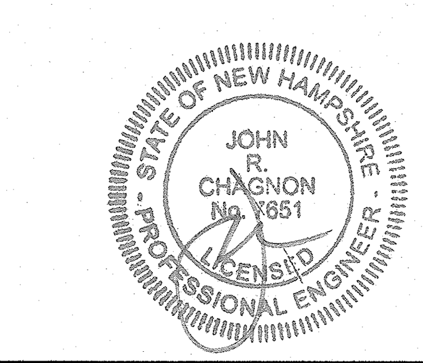
WAJDA SUBDIVISION 183 COOLIDGE DRIVE PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	3/6/20

REVISIONS



SCALE AS SHOWN JANUARY 2020

EROSION CONTROL NOTES & DETAILS

D1

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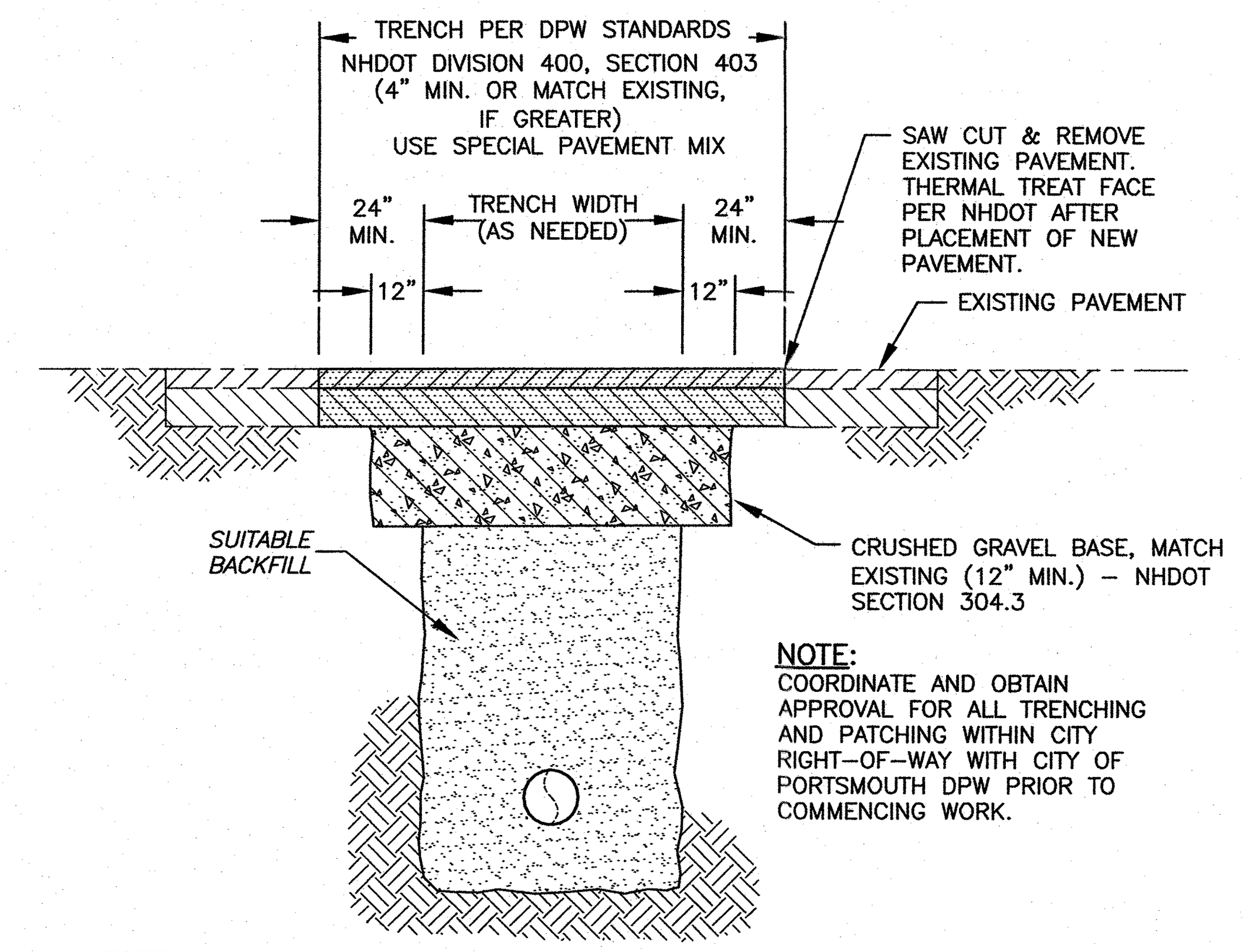
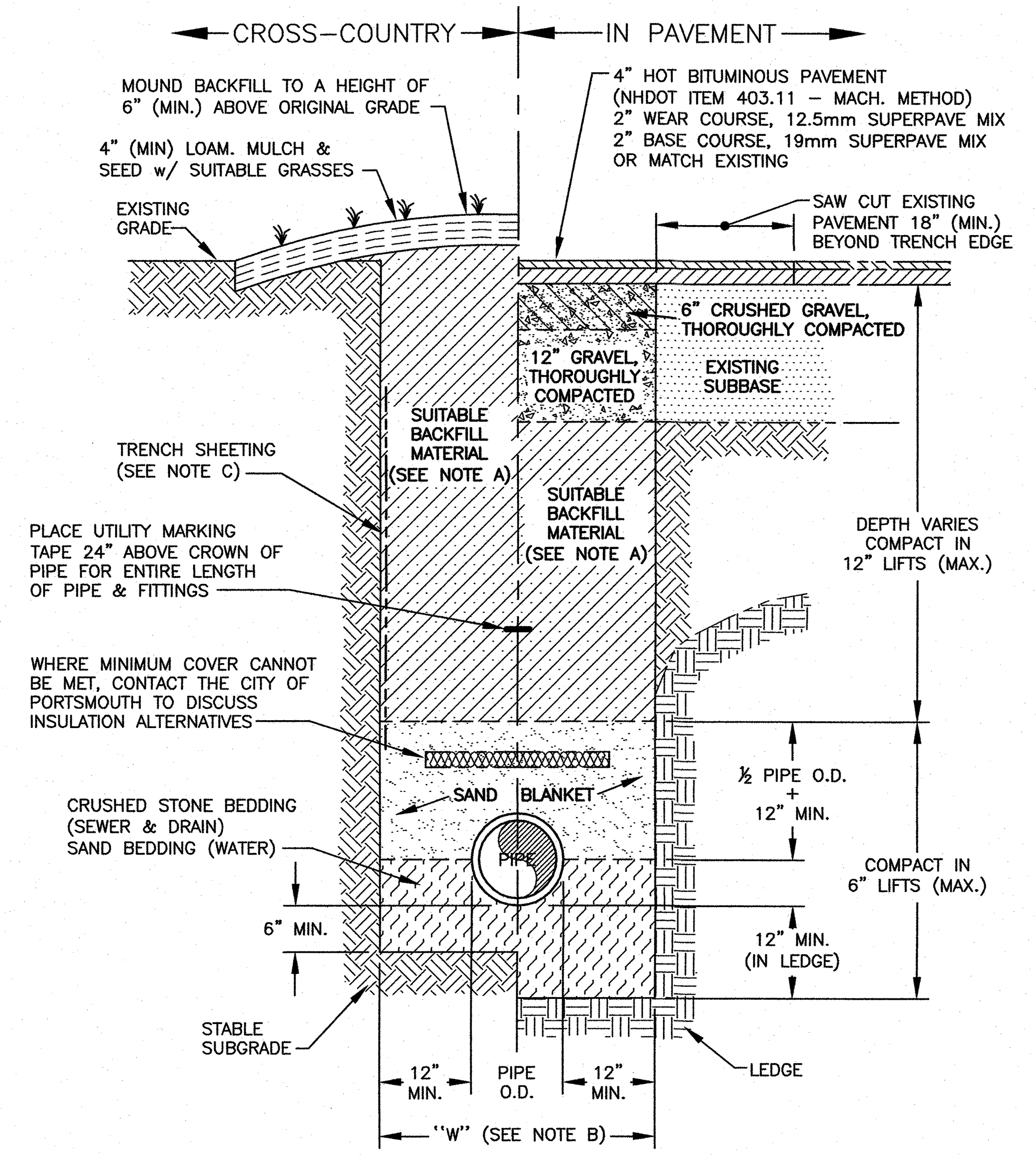


G / C3 TRENCH – PAVEMENT REPLACEMENT

NTS



H / C3 TYPICAL PIPE TRENCH

NTS

TRENCH NOTES:

A) TRENCH BACKFILL:

– IN PAVED AREAS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIALS DEEMED TO BE UNACCEPTABLE BY THE ENGINEER.

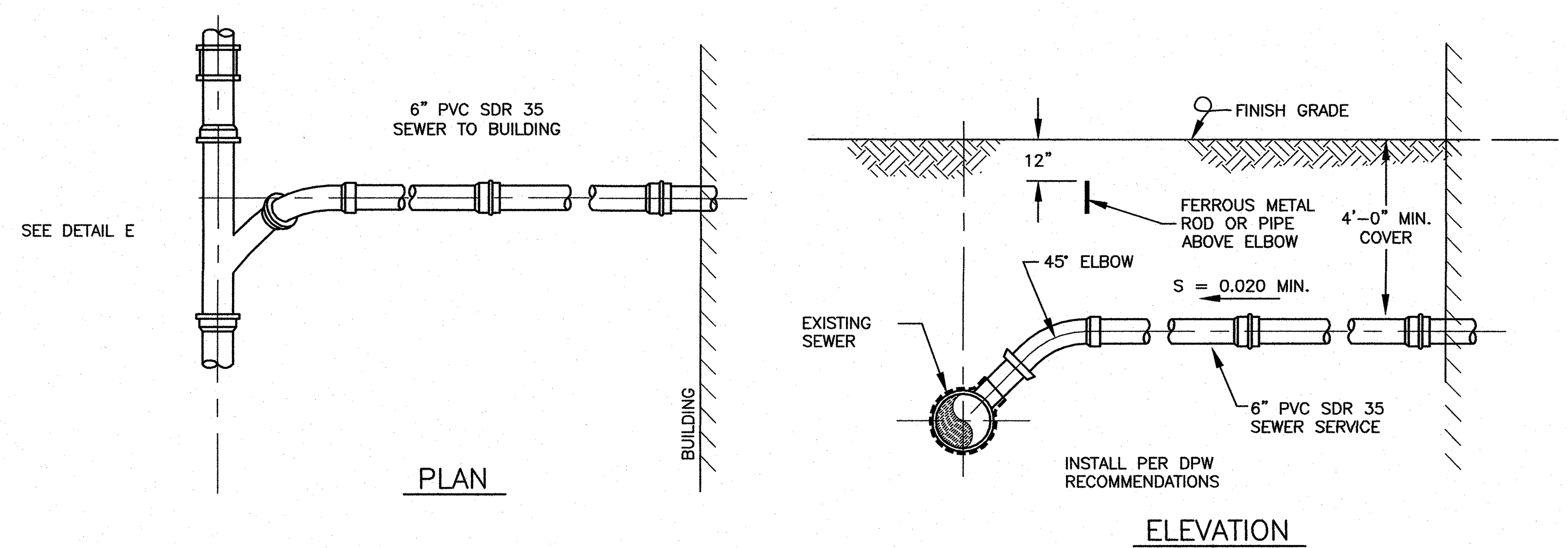
– IN CROSS-COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE.

B) "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 NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE O.D..

C) TRENCH 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 NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE 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 THAN 1 FOOT ABOVE THE TOP OF THE PIPE.

D) MINIMUM PIPE COVER FOR UTILITY MAINS (UNLESS GOVERNED BY OTHER CODES):
- 6' MINIMUM FOR SEWER (IN PAVEMENT)
- 4' MINIMUM FOR SEWER (CROSS COUNTRY)
- 3' MINIMUM FOR STORMWATER DRAINS
- 5' MINIMUM FOR WATER MAINS

E) ALL PAVEMENT CUTS SHALL BE REPAIRED BY THE INFRARED HEAT METHOD.



I / C3 TYPE "A" SEWER SERVICE CONNECTION

NTS

BIORETENTION MAINTENANCE

SOILS: VISUALLY INSPECT AND REPAIR EROSION MONTHLY. USE SMALL STONES TO STABILIZE EROSION ALONG DRAINAGE PATHS. CHECK THE pH ONCE OR TWICE A YEAR. APPLY AN ALKALINE PRODUCT, SUCH AS LIMESTONE, IF NEEDED.

MULCH: REMULCH ANY VOID AREAS BY HAND AS NEEDED. EVERY 6 MONTHS, IN THE SPRING AND FALL, ADD A FRESH MULCH LAYER. ONCE EVERY 2 TO 3 YEARS, IN THE SPRING, REMOVE OLD MULCH LATER BEFORE APPLYING NEW ONE.

PLANTS: IMMEDIATELY AFTER THE COMPLETION OF CELL CONSTRUCTION, WATER PLANT MATERIAL FOR 14 CONSECUTIVE DAYS UNLESS THERE IS SUFFICIENT NATURAL RAINFALL. WHEN TREES HAVE TAKEN ROOT, OR AT LEAST BY 6 MONTHS, REMOVE STAKES AND WIRES. ONCE A MONTH (MORE FREQUENTLY IN SUMMER), VISUALLY INSPECT VEGETATION FOR DISEASE OR PEST PROBLEMS. IF TREATMENT IS WARRANTED, USE THE LEAST TOXIC APPROACH. TWICE A YEAR, FROM MARCH 15TH TO APRIL 30TH AND OCTOBER 1ST TO NOVEMBER 30TH, REMOVE AND REPLACE ALL DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT. DURING TIMES OF EXTENDED DROUGHT, LOOK FOR PHYSICAL FEATURES OF STRESS (UNREVIVED WILTING, YELLOW, SPOTTED OR BROWN LEAVES, LOSS OF LEAVES, ETC.). WATER IN THE EARLY MORNING AS NEEDED. WEED REGULARLY, IF NEEDED.

RAIN GARDEN MEDIA

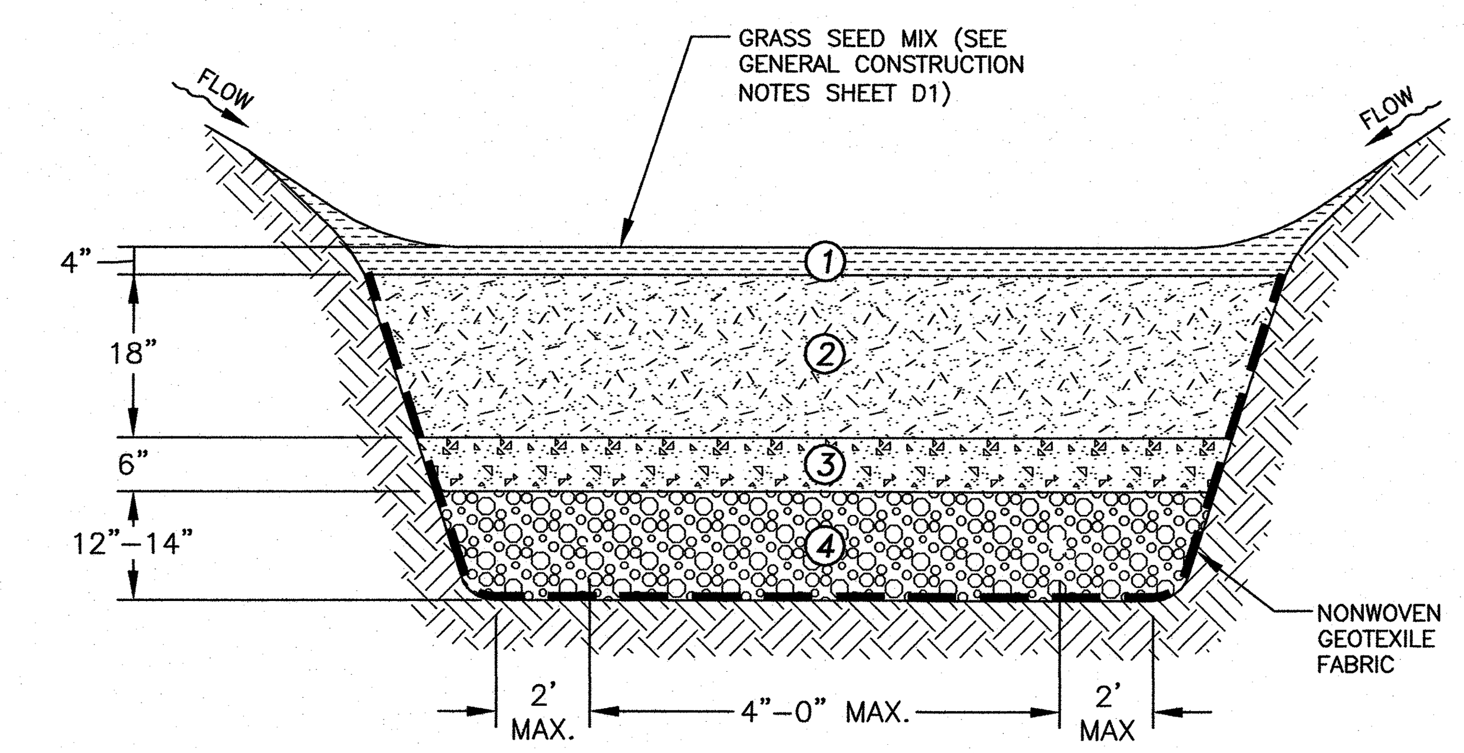
① MULCH/GROWING MEDIUM:
FINELY SHREDDED WOOD FIBER MULCH OR YARD WASTE COMPOST (FINES <5%).

② SOIL FILTER LAYER:
20% – 30% MULCH ? BY VOLUME, MIXED THOROUGHLY WITH LOAMY, COARSE SAND (70% – 80% BY VOLUME) MEETING THE FOLLOWING GRADATION;

SIEVE NO.	% BY WEIGHT, PASSING
10	85 – 100
20	70 –100
60	15 – 40
200	8 – 15

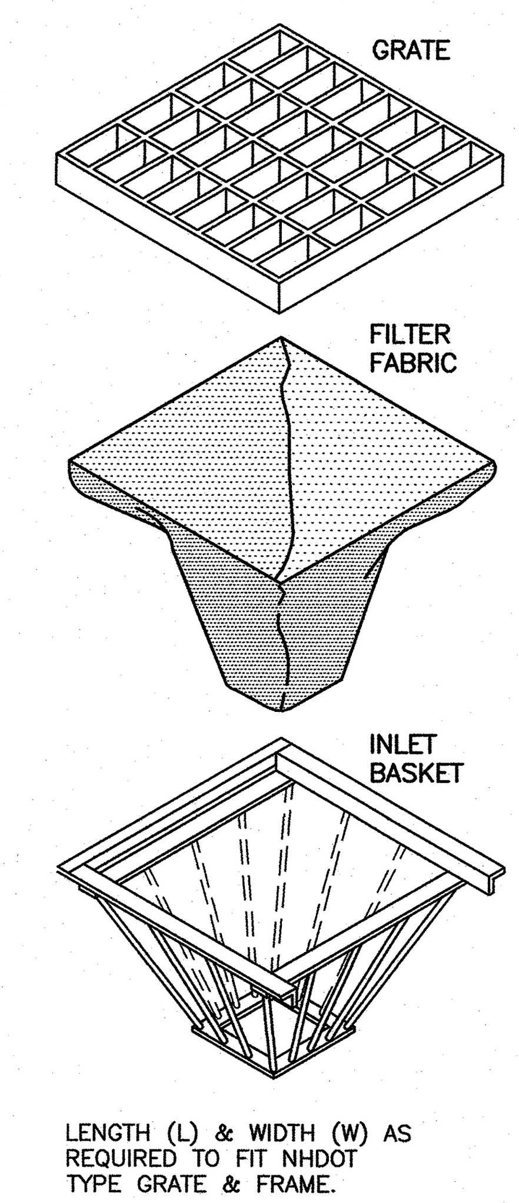
③ ASTM 33 CONCRETE SAND

④ 0.75"ø – 1.5"ø CRUSHED STONE, WASHED.



J / C4 RAIN GARDEN DETAIL

NTS



1) INLET BASKETS SHALL BE INSTALLED IMMEDIATELY AFTER CATCH BASIN CONSTRUCTION IS COMPLETE AND SHALL REMAIN IN PLACE AND BE MAINTAINED UNTIL PAVEMENT BINDER COURSE IS COMPLETE.

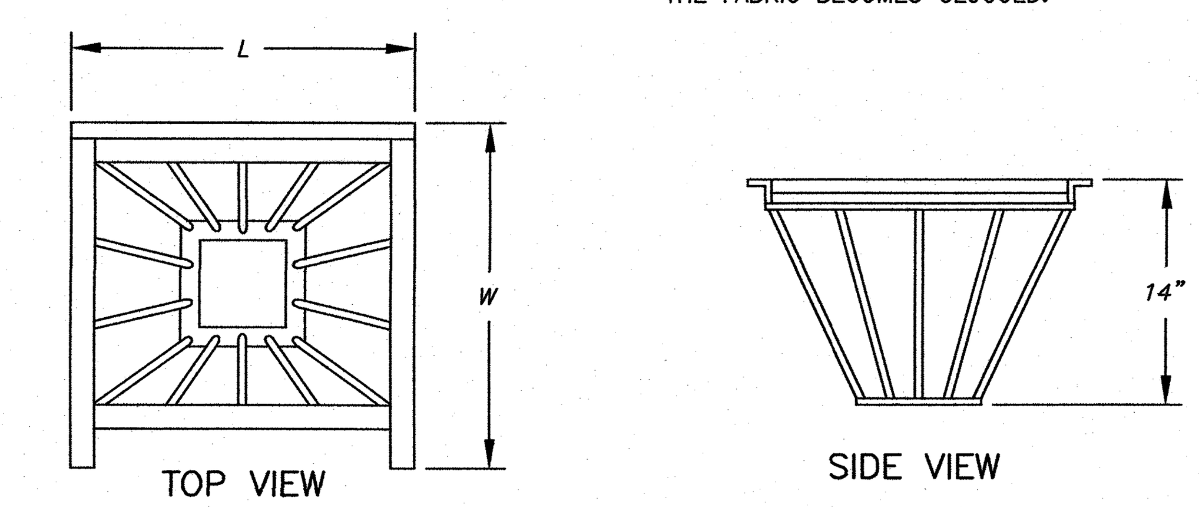
2) FILTER FABRIC SHALL BE PUSHED DOWN AND FORMED TO THE SHAPE OF THE BASKET. THE SHEET OF FABRIC SHALL BE LARGE ENOUGH TO BE SUPPORTED BY THE BASKET FRAME WHEN HOLDING SEDIMENT AND, SHALL EXTEND AT LEAST 6" PAST THE FRAME. THE INLET GRATE SHALL BE PLACED OVER THE BASKET/FRAME AND WILL SERVE AS THE FABRIC ANCHOR.

3) THE FILTER FABRIC SHALL BE A GEOTEXTILE FABRIC; POLYESTER, POLYPROPYLENE, STABILIZED NYLON, POLYETHYLENE, OR POLYVINYLIDENE CHLORIDE MEETING THE FOLLOWING SPECIFICATIONS:
- –RAB STRENGTH: 45 LB. MIN. IN ANY PRINCIPAL DIRECTION (ASTM D1682)
- –MULLEN BURST STRENGTH: MIN. 60 psi (ASTM D774)

4) THE FABRIC SHALL HAVE AN OPENING NO GREATER THAN A NUMBER 20 U.S. STANDARD SIEVE AND A MINIMUM PERMEABILITY OF 120 gpm/s.f. (MULTIPLY THE PERMITTIVITY IN SEC.–1 FROM ASTM 54491–85 CONSTANT HEAD TEST USING THE CONVERSION FACTOR OF 74.)

5) THE INLET BASKET SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM REACHING THE DRAINAGE SYSTEM AND/OR CAUSING SURFACE FLOODING.

6) SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT, OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED.



K / C4 CATCH BASIN INLET BASKET

NTS

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WAJDA SUBDIVISION
183 COOLIDGE DRIVE
PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR APPROVAL	3/27/20
0	ISSUED FOR COMMENT	3/6/20

REVISIONS

STATE OF NEW HAMPSHIRE
JOHN R. CHAGNON
No. 7851
LICENSED PROFESSIONAL ENGINEER

SCALE AS SHOWN | JANUARY 2020

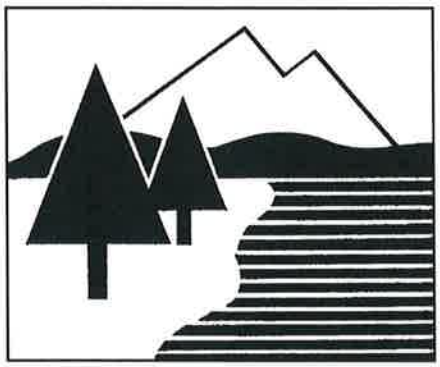
DETAILS

D2

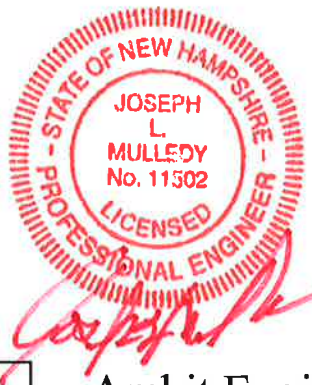
DRAINAGE ANALYSIS

PROPOSED RESIDENTIAL DEVELOPMENT

183 Coolidge Drive
PORTSMOUTH, NH



March 27, 2020



3/27/20

Ambit Engineering, Inc.

Civil Engineers and Land Surveyors
200 Griffin Road, Unit 3
Portsmouth, NH 03801
Phone: 603.430.9282; Fax: 603.436.2315
E-mail: jlm@ambitengineering.com
(Ambit Job Number 3082.01)

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This drainage analysis examines the pre-development (existing) and post-development (proposed) stormwater drainage patterns for the proposed subdivision of land and construction of a single family home on a residential lot at 183 Coolidge Drive in Portsmouth, NH. The site is shown on the City of Portsmouth Assessor's Tax Map 268 as Lot 29. The total lot size is 20,444 square-feet (0.4693 acres).

The project consists of the subdivision of one lot into two lots with the associated site and infrastructure improvements. The existing residence will remain and be on Proposed Lot 1 and a new home will be constructed on Proposed Lot 2. We include a conceptual design for the proposed home on Lot 2 in the plan set. The proposed home will be serviced by public water and sewer. The development has the potential to increase stormwater runoff to adjacent properties, and therefore must be designed in a manner to prevent that occurrence. This will be done by capturing stormwater runoff and routing it through a rain garden, which will slow the flow and allow infiltration. This site is somewhat unique in that surface water runoff from portions of McKinley Road and Coolidge Drive enter the subject property in the northwest corner and travel across the lot towards Grant Avenue. Currently there exists a low depression, which is at the north east corner of the property adjacent to Grant Avenue, where water sits and infiltrates. The infiltrative capacity of the soil is good as this area does not hold water long enough to allow wetland species to predominate the surface. The proposed design mimics this existing condition and utilizes a rain garden in that location to expand the area of capture and thereby enhance the storage and infiltration of the site; to capture the added runoff from development. The result is that the site has been designed to ensure that there will be no increase in peak runoff from the site as a result of this project.

The hydrologic modeling for this project considers the "Extreme Precipitation" values from The Northeast Regional Climate Center (Cornell University). For modeling purposes, these values have been used and are included in this report.

PROPOSED RESIDENTIAL

DEVELOPMENT

183 Coolidge Drive

PORTSMOUTH, NH

INTRODUCTION / PROJECT DESCRIPTION

This drainage report is designed to assist the owner, planning board, contractor, regulatory reviewer, and others in understanding the impact of the proposed development project on local surface water runoff and quality. The project site is shown on the City of Portsmouth, NH Assessor's Tax Map 268 as Lot 29.

Bounding the site to the north and south are single family residential properties. Bounding the site to the east and west are City Streets. The property is situated in the Single Residence B (SRB) Zoning District. A Vicinity Map is included in the Appendix to this report.

The proposed development will construct a new single family home, new driveway and other associated improvements such as a utilities and landscaping. The project is anticipated to begin construction in the fall of 2020 and be substantially completed by the spring of 2021.

This report includes information about the existing site and the proposed development necessary to analyze stormwater runoff and to design any required mitigation. The report includes maps of pre-development and post-development watersheds, sub-catchment areas and calculations of runoff. The report will provide a narrative of the stormwater runoff and describe numerically and graphically the surface water runoff patterns for this site. Proposed stormwater management and treatment structures and methods will also be described, as well as erosion and sediment control practices. To fully understand the proposed site development the reader should also review a complete site plan set in addition to this report.

METHODOLOGY

This report uses the US Soil Conservation Service (SCS) Method for estimating stormwater runoff. The SCS method is published in The National Engineering Handbook (NEH), Section 4 "Hydrology" and includes the Technical Release No. 20, (TR-20) "Computer Program for Project Formulation Hydrology", and Technical Release No. 55 (TR-55) "Urban Hydrology for Small Watersheds" methods. This report uses the HydroCAD version 10.0 program, written by HydroCAD Software Solutions LLC, Chocorua, N.H., to apply these methods for the calculation

of runoff and for pond modeling. The hydrologic modeling considers the "Extreme Precipitation" values from The Northeast Regional Climate Center (Cornell University).These values have been used and are included in this report.

Time of Concentration (Tc) is calculated by entering measured flow path data such as flow path type, length, slope and surface characteristics into the HydroCAD program. For the purposes of this report, a minimum time of concentration of 5 minutes is used.

The storm events used for the calculations in this report are the 10-year and 50-year (24-hour) storms. Watershed basin boundaries have been delineated using topographic maps prepared by Ambit Engineering and field observations to confirm.

SITE SPECIFIC INFORMATION

Based on the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Soil Survey of Rockingham County, New Hampshire, and confirmed by field exploration conducted by Ambit Engineering, Inc., the site is made up of one soil type:

799 – Urban land – Canton Series - This soil does has a Hydrologic Soils Group (HSG) of A. The physical characteristics of the site consist of (1-5%) grades that generally slope downward from the west (front along Coolidge Drive) to the east (back of lot – front on Grant Avenue). Elevations on the site range from 48 to 54 feet above sea level. The existing site is partially developed and includes an existing building with an asphalt driveway, which will remain on Proposed Lot 1 after subdividing. Vegetation around the developed portion of the lot consists of established grasses, shrubs and trees. The lot is in the middle of a residential subdivision; and Lot 2 has obtained a Variance for minor dimensional relief.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 33015C0270E (effective date May 17, 2005), the project site is located in Zone X and is determined to be outside of the 0.2% annual chance floodplain. A copy of the FIRM map is included in the Appendix.

PRE-DEVELOPMENT DRAINAGE

The existing site drains via overland flow from the front of the lot at Coolidge Drive towards the rear of the site to Grant Avenue. There is no existing stormwater detention or treatment on the site.

In the pre-development condition, the site has been analyzed as two watershed basins (ES1 and ES2) based on localized topography and discharge location. Subcatchment ES1 is primarily overland flow from off site directly to the northwest of the lot from Lafayette Road and down McKinley Road. Subcatchment ES2 represents the majority of the lot which was previously developed consisting of a single family home, paved driveway and grassed / landscaped yard.

The runoff curve number (CN) for Subcatchment ES1 is calculated to be 66 with impervious coverage of 45.29%. The CN value for Subcatchment ES2 is calculated to be 47 with 16.24% impervious coverage.

Table 1: Pre-Development Watershed Basin Summary

Watershed Basin ID	Basin Area (SF)	Tc (MIN)	CN	10-Year Runoff (CFS)	50-Year Runoff (CFS)	Design Point
ES1	49,887	5.0	66	2.90	6.10	DP1
ES2	40,838	5.0	47	0.53	2.25	DP1

POST-DEVELOPMENT DRAINAGE

The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. In the post-development condition, the site has been analyzed as two separate watersheds (PS1 and PS2) based on localized topography and discharge locations.

Subcatchment PS1 is primarily overland flow from offsite runoff from as far away as Lafayette Road. PS1 is the same area as ES1. The runoff curve number (CN) for PS1 is calculated to be 66 with impervious coverage of 45.29%. Subcatchment PS2 represents the majority of the lot which will be developed with the addition of a second single family home, paved driveway and rain garden. The runoff curve number (CN) for basin PS2 is calculated to be 49 with impervious coverage of 22.33%.

Table 2: Post-Development Watershed Basin Summary

Watershed Basin ID	Basin Area (SF)	Tc (MIN)	CN	10-Year Runoff (CFS)	50-Year Runoff (CFS)	Design Point
PS1	49,887	5.0	66	2.90	6.10	DP1
PS2	40,838	5.0	49	0.70	2.55	DP1

The overall impervious coverage of the area analyzed in this report for all basins **increases** from 29,223 square feet (32.21%) in the pre-development condition to 31,717 square feet (34.96%) in

the post-development condition. Since the site development represents an increase in impervious area, the project proposes the construction of a Rain Garden to infiltrate and control the rate of runoff from the site. The roof runoff from the proposed new home will be directed to the rain garden. See Note 5 on Sheet C2. Since no permanent structural treatment systems currently exist for the site, providing proposed treatment in the proposed rain garden is a vast improvement on the permanent water quality of the site runoff. In addition a Drainage Easement will be created to memorialize the city street runoff crossing the property.

Table 3 shows a summary of the comparison between pre-developed flows and post-developed flows for the design point.

Table 3: Pre-Development to Post-Development Peak Flow Comparison

	Q2 (CFS)		Q10 (CFS)		Q25 (CFS)		Q50 (CFS)	
Design Point	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
DP 1	1.10	0.00	3.39	1.04	5.83	3.71	8.33	7.26

Typically, in a site development such as the subject subdivision, namely the Elwyn Park subdivision, city drainage would exist on both sides of the city streets to collect and transfer run-off. In the case of Grant Avenue, no catch basins exist on the west side of the street. Additionally, the catch basin on the east side of the street has a discharge pipe which is barely below the surface of the road, making a hard pipe connection impossible. Therefore water will pond on the lot, as it does now, until it infiltrates into the ground. This drainage analysis included an analysis of the ponding water on the east side of the lot at Grant Avenue. Table 4 shows a summary of the comparison between pre-development peak elevations of the ponded water and post-development peak elevations for ponded water.

Table 4: Pre-Development to Post-Development Peak Elevation Comparison

	Q2 (Ft.)		Q10 (Ft.)		Q25 (Ft.)		Q50 (Ft.)	
Design Point	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
DP 1	48.78	48.10	48.81	48.62	48.83	48.79	48.85	48.93

This shows a minimal increase in the height of the water *only* during a 50 year design frequency storm.

EROSION AND SEDIMENT CONTROL PRACTICES

The erosion potential for this site as it exists is low due to the existing vegetation and the built-up nature of the surrounding sites. During construction, the major potential for erosion is wind and stormwater runoff. The contractor will be required to inspect and maintain all necessary erosion control measures, as well as installing any additional measures as required. All erosion control practices shall conform to "The Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire." Some examples of erosion and sediment control measures to be utilized for this project during construction may include:

- Silt Soxx located at the toe of disturbed slopes
- Stabilized construction entrance at access point to the site
- Temporary mulching and seeding for disturbed areas
- Spraying water over disturbed areas to minimize wind erosion

After construction, permanent stabilization will be accomplished by permanent seeding, landscaping and surfacing the access drives and parking areas with either compacted gravel or asphalt paving.

CONCLUSION

The proposed development has been designed to have no impact in terms of stormwater quality and quantity. With the design of a Rain Garden on site, stormwater runoff is managed to mitigate impacts to neighboring properties. There is no increase in Pre vs. Post peak runoff and the extent of existing ponding experienced near Grant Avenue is reduced for all but the 50 year, 24 hour storm event. Erosion and sediment control practices will be implemented for both the temporary condition during construction and for final stabilization after construction. Therefore, there are no negative impacts to downstream receptors or adjacent properties anticipated as a result of this project. There is also no negative impact to the City of Portsmouth storm drainage system.

REFERENCES

1. City of Portsmouth, NH. Site Plan Review Regulations amended December 18, 2014.

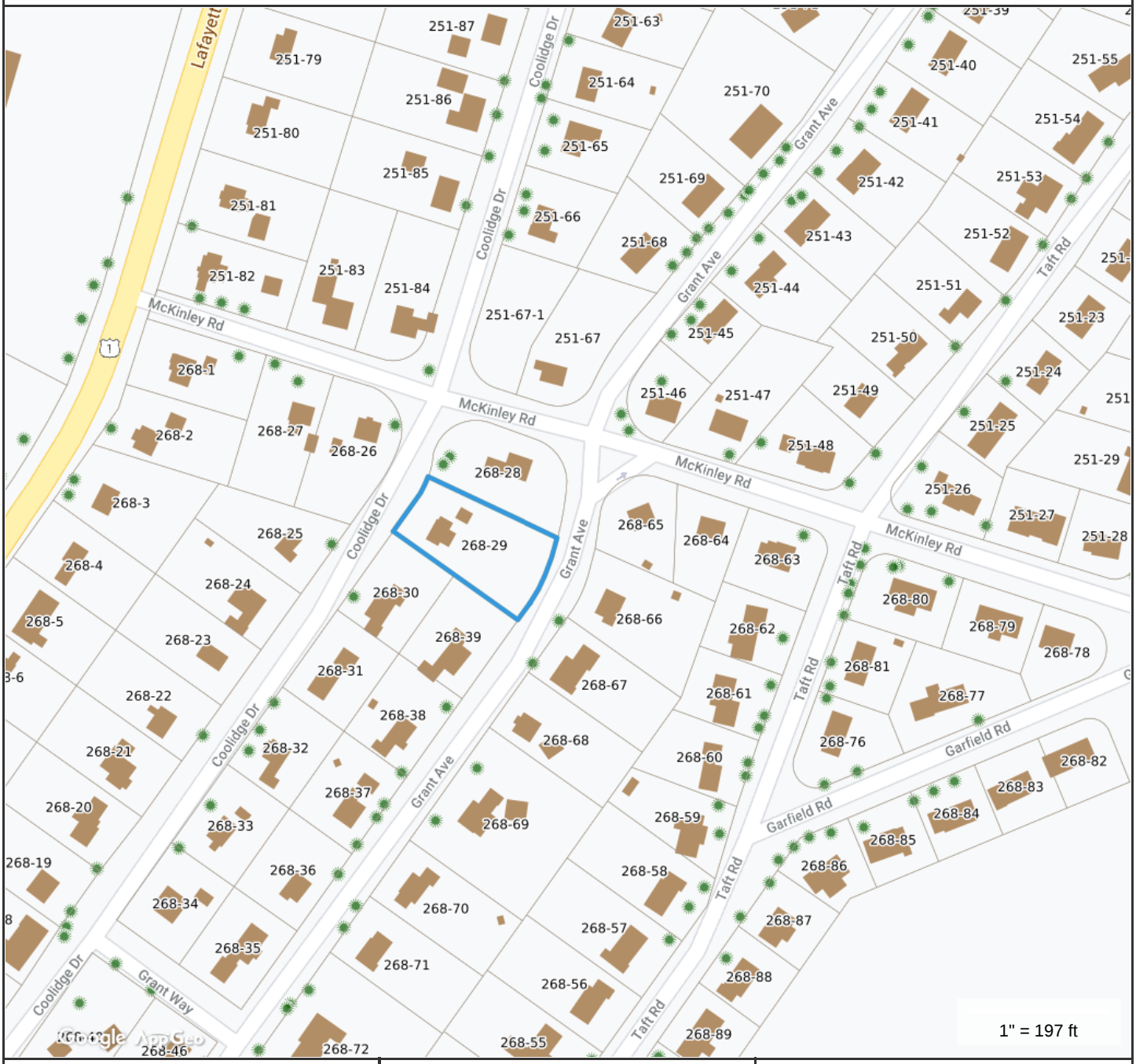
2. Comprehensive Environmental Inc. and New Hampshire Department of Environmental Services. *New Hampshire Stormwater Manual (Volumes 1, 2 and 3)*, December 2008 (Revision 1.0).

3. Minnick, E.L. and H.T. Marshall. *Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire*, prepared by Rockingham County Conservation District, prepared for New Hampshire Department of Environmental Services, in cooperation with USDA Soil Conservation Service, August 1992.

4. HydroCAD Software Solution, LLC. *HydroCAD Stormwater Modeling System Version 10.0* copyright 2013.

APPENDIX A

VICINITY (TAX) MAP



Property Information

Property ID	0268-0029-0000
Location	183 COOLIDGE DR
Owner	WAJDA MATTHEW

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 4/1/2019
Data updated 7/17/2019

VICINITY MAP

APPENDIX B

TABLES, CHARTS, ETC.

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	No
State	New Hampshire
Location	
Longitude	70.770 degrees West
Latitude	43.069 degrees North
Elevation	0 feet
Date/Time	Tue, 17 Apr 2018 15:07:43 -0400

Inches of Rain - 24 HR Event

2 YR = 3.21 x 15% = 3.69

10 YR = 4.87 x 15% = 5.60

25 YR = 6.17 x 15% = 7.10

50 Yr = 7.39 x 15% = 8.50

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.66	0.81	1.00	**1yr**	0.70	0.98	1.14	1.57	2.01	2.66	2.92	**1yr**	2.35	2.81	3.22	3.94	4.55	**1yr**
2yr	0.32	0.50	0.61	0.83	1.02	1.21	**2yr**	0.88	1.18	1.40	1.87	2.40	3.21	3.57	**2yr**	2.84	3.43	3.94	4.68	5.33	**2yr**
5yr	0.37	0.58	0.71	0.98	1.25	1.50	**5yr**	1.08	1.47	1.73	2.32	2.96	4.07	4.58	**5yr**	3.60	4.40	5.04	5.94	6.70	**5yr**
10yr	0.42	0.65	0.80	1.12	1.45	1.76	**10yr**	1.25	1.72	2.04	2.72	3.47	4.87	5.53	**10yr**	4.31	5.32	6.08	7.11	7.98	**10yr**
25yr	0.50	0.76	0.94	1.35	1.77	2.19	**25yr**	1.53	2.14	2.53	3.38	4.28	6.17	7.10	**25yr**	5.46	6.83	7.80	9.02	10.05	**25yr**
50yr	0.56	0.86	1.07	1.54	2.07	2.58	**50yr**	1.78	2.52	2.98	3.99	5.02	7.39	8.58	**50yr**	6.54	8.25	9.42	10.81	11.98	**50yr**
100yr	0.64	0.97	1.22	1.76	2.41	3.04	**100yr**	2.08	2.97	3.51	4.70	5.89	8.85	10.38	**100yr**	7.84	9.98	11.38	12.96	14.28	**100yr**
200yr	0.73	1.10	1.40	2.02	2.82	3.59	**200yr**	2.43	3.51	4.14	5.55	6.91	10.61	12.55	**200yr**	9.39	12.07	13.75	15.55	17.03	**200yr**
500yr	0.88	1.30	1.68	2.44	3.47	4.47	**500yr**	2.99	4.37	5.14	6.90	8.55	13.49	16.15	**500yr**	11.93	15.53	17.67	19.78	21.50	**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	0.73	0.88	**1yr**	0.63	0.86	0.92	1.33	1.68	2.23	2.50	**1yr**	1.98	2.40	2.86	3.17	3.89	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.34	3.06	3.45	**2yr**	2.71	3.32	3.82	4.55	5.08	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.12	2.73	3.79	4.19	**5yr**	3.35	4.03	4.72	5.54	6.24	**5yr**
10yr	0.39	0.59	0.73	1.03	1.32	1.60	**10yr**	1.14	1.56	1.81	2.39	3.06	4.37	4.87	**10yr**	3.87	4.68	5.45	6.42	7.20	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.90	**25yr**	1.35	1.86	2.10	2.76	3.54	4.71	5.90	**25yr**	4.17	5.68	6.66	7.80	8.69	**25yr**
50yr	0.48	0.73	0.91	1.31	1.77	2.17	**50yr**	1.52	2.12	2.35	3.08	3.94	5.32	6.82	**50yr**	4.71	6.56	7.74	9.06	10.03	**50yr**
100yr	0.54	0.81	1.01	1.47	2.01	2.47	**100yr**	1.74	2.41	2.63	3.42	4.36	5.98	7.87	**100yr**	5.29	7.57	9.00	10.53	11.58	**100yr**
200yr	0.59	0.89	1.13	1.63	2.28	2.82	**200yr**	1.97	2.75	2.93	3.79	4.80	6.70	9.09	**200yr**	5.93	8.74	10.46	12.25	13.39	**200yr**
500yr	0.69	1.02	1.31	1.91	2.71	3.37	**500yr**	2.34	3.29	3.41	4.33	5.47	7.79	10.98	**500yr**	6.89	10.56	12.75	14.99	16.21	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.08	**1yr**	0.77	1.06	1.26	1.74	2.21	2.99	3.16	**1yr**	2.64	3.04	3.58	4.38	5.05	**1yr**
2yr	0.34	0.52	0.64	0.86	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.51	3.43	3.70	**2yr**	3.03	3.56	4.09	4.84	5.63	**2yr**
5yr	0.40	0.62	0.76	1.05	1.34	1.62	**5yr**	1.15	1.58	1.88	2.53	3.25	4.34	4.96	**5yr**	3.84	4.77	5.38	6.37	7.15	**5yr**
10yr	0.47	0.72	0.89	1.24	1.61	1.97	**10yr**	1.39	1.93	2.28	3.10	3.95	5.34	6.19	**10yr**	4.72	5.96	6.81	7.83	8.74	**10yr**
25yr	0.57	0.87	1.09	1.55	2.04	2.56	**25yr**	1.76	2.51	2.95	4.07	5.14	7.79	8.33	**25yr**	6.90	8.01	9.13	10.33	11.40	**25yr**
50yr	0.67	1.02	1.27	1.82	2.45	3.12	**50yr**	2.12	3.05	3.59	4.99	6.30	9.76	10.44	**50yr**	8.64	10.03	11.41	12.71	13.95	**50yr**
100yr	0.79	1.19	1.49	2.15	2.95	3.80	**100yr**	2.55	3.72	4.37	6.15	7.74	12.22	13.07	**100yr**	10.81	12.57	14.25	15.67	17.07	**100yr**
200yr	0.92	1.39	1.76	2.54	3.55	4.64	**200yr**	3.06	4.54	5.33	7.57	9.50	15.33	16.40	**200yr**	13.57	15.77	17.84	19.31	20.90	**200yr**
500yr	1.14	1.70	2.19	3.18	4.52	6.02	**500yr**	3.90	5.88	6.91	10.00	12.50	20.72	22.13	**500yr**	18.34	21.28	24.00	25.46	27.31	**500yr**

SCS METHODS

Technical Release - 55 Urban Hydrology for Small Watersheds

TR-55 presents simplified procedures to calculate storm runoff volume, peak rate of discharge, partial hydrographs and storage volumes for water control structures. The procedures are applicable to small watersheds, especially urbanizing watersheds with time of concentration between 0.1 hours and 10.0 hours. TR-55 is an approximation of the more detailed TR-20 method and does not have TR-20's capability to flood route. The user should examine the sensitivity of the analysis being conducted to ensure that the degree of error is tolerable. TR-55 contains two methods, the Tabular Hydrograph method and the Graphical Peak Discharge method. The accuracy of both methods is comparable; they differ only in their output. Both methods are based on open and unconfined flow over land and in channels.

The TR-55 Tabular Method can develop partial composite flood hydrographs at any point in a watershed by dividing the watershed into homogeneous subareas. By doing this, the method can estimate runoff from a larger nonhomogeneous watershed. The method is especially applicable for estimating the effects of land use change in a portion of a watershed. It can also be used to estimate the effects of proposed structures. The TR-55 Graphical Peak Discharge method calculates peak discharge using an assumed unit hydrograph and a thorough, but rapid, evaluation of the soils, slope, and surface cover characteristics of the watershed. This method is recommended for use in the design of all erosion and sediment control measures and simple stormwater management practices. When more detail and accuracy are required or when an accurate simulation of natural conditions is required, one of the other appropriate methods should be used. The TR-55 Graphical Peak Discharge method is the method that is discussed in this manual.

SCS TR-55 Graphical Peak Discharge Method

The peak discharge equation used in this method is:

$$q_p = q_u A_m Q F_p$$

where:

q_p is the peak discharge in cubic feet per second (cfs).

q_u is the unit peak discharge in cubic feet per second per square mile per inch of runoff (csm/in).

A_m is the drainage area in square miles.

Q is the runoff from the watershed in inches.

F_p is a pond and swamp adjustment factor that can be applied for ponds or swamps that are spread throughout the watershed and not in the time of concentration flow path.

Technical Release-20 Computer Program for Project Formulation Hydrology

The TR-20 computer program assists the engineer in hydrologic evaluation of flood events for use in analysis of water resource projects. The program is a single event model which computes direct runoff resulting from any natural or synthetic rainstorm. It develops flood hydrographs from runoff and routes the flow through stream channels and reservoirs. It combines the routed hydrograph with those from tributaries and computes the peak discharges, their times of occurrence and the water surface elevations at any desired cross section or structure. The program provides for the analysis of up to nine different rainstorm distributions over a watershed under various combinations of land treatment. The analysis can be performed on as many as 200 reaches and 99 structures in any one continuous run. The procedure should probably not be used for subarea drainage areas less than 5 acres nor more than 20 square miles.

Input Data Required

The following information is required to use TR-20:

Drainage Area - The drainage area of each subwatershed in square miles.

Runoff Curve Number - A factor that relates mass rainfall to mass runoff. It is based on soil characteristics, cover type, and land treatment. Tables 6-4.1 - 6-4.3 provides runoff curve numbers for urban areas and agricultural areas.

Time of Concentration - The time which would be required for the surface runoff from the hydraulically most remote part of the drainage area to reach the point being evaluated. A more detailed discussion of time of concentration is found later in this chapter.

Reach Length - The length of the stream or valley in feet selected for generally constant hydraulic characteristics for use in the study. A watershed may have several reaches in the flow path.

Cross Section Information - This information consists of either surveyed valley and channel sections with appropriate Manning's "n" values or "x" and "m" discharge coefficient values obtained from nomographs in the TR-20 documentation for the valley and channel reach.

Rainfall Data - The average depth, in inches, of rainfall occurring over a watershed or subwatershed for a given design frequency and duration storm event.

Structural Data - Information on any culverts, bridges, or reservoirs in the watershed that includes elevations, discharges, and storage behind the structures.

Output Data

The type and amount of output can be controlled by options within the program. In general the output data will provide estimates of peak flow, hydrographs, peak times, runoff volumes, and water surface elevations at any location within the watershed.

Runoff Curve Number (RCN)

The runoff curve number is a factor that relates mass rainfall to mass runoff. It is based on soil characteristics, cover type, hydrologic condition, and land treatment. Tables 6-4.1 through 6-4.3 provide runoff curve numbers for urban areas, cultivated agricultural areas, and other agricultural areas for various hydrologic conditions

Cover type relates to the kind of cover found on the soil such as vegetation, bare soil, and impervious surfaces such as parking areas, roofs, streets, and roads.

Hydrologic condition indicates the effects of cover type and treatment on infiltration and runoff rates. It is generally estimated from the density of plant and crop residue on the area. Good hydrologic condition indicates that the soil usually has low runoff potential for that specific hydrologic soil group, cover type and treatment. Some factors to consider in estimating the effect of cover on infiltration and runoff are: canopy or density of leaves, amount of year-round cover, amount of grass or close-seeded legumes in a rotation, percent of residue cover, and the degree of surface roughness.

Treatment is a cover type modifier used to describe the management of cultivated agricultural lands. It includes mechanical practices such as contouring and terracing, and management practices, such as crop rotations and reduced or no tillage.

TABLE 6-4.1 -- RUNOFF CURVE NUMBERS (Average Watershed Condition)

COVER DESCRIPTION Cover type and hydrologic condition	Average percent impervious area[2]	CURVE NUMBERS FOR HYDROLOGIC SOIL GROUP A	B	C	D
FULLY DEVELOPED URBAN AREAS[1] (Vegetation Established)					
Lawns, open spaces, parks, golf courses, cemeteries, etc.					
good condition; grass cover on 75% or more of the area		39	61	74	80
fair condition; grass cover on 50% to 75% of the area		49	69	79	84
poor condition; grass cover on 50% or less of the area		68	79	86	89
Paved parking lots, roofs, driveways, etc.		98	98	98	98
Streets and roads;					
paved with curbs and storm sewers		98	98	98	98
gravel		76	85	89	91
dirt		72	82	87	89
paved with open ditches		83	89	92	93
Commercial and business areas	85	89	92	94	95
Industrial districts	72	81	88	91	93
Row houses, town houses, and residential with lot sizes 1/8 acre or less	65	77	85	90	92
Residential					
Average lot size					
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acre	12	46	65	77	82
DEVELOPING URBAN AREAS[3] (No vegetation Established)					
Newly graded area		77	86	91	94

1. For land uses with impervious areas, curve numbers are computed assuming that 100% of runoff from impervious areas is directly connected to the drainage system. Pervious areas (lawn) are considered to be equivalent to lawns in good condition and the impervious areas have an RCN of 98.

2. Includes paved streets.

3. Use for the design of temporary measures during grading and construction. Impervious area percent for urban areas under development vary considerably. The user will determine the percent impervious. Then using the newly graded area RCN and Table 6-4, the composite RCN can be computed for any degree of development.

Source: USDA Soil Conservation Service

TABLE 6-4.2 -- RUNOFF CURVE NUMBERS (Average Watershed Condition)

COVER DESCRIPTION		Hydrologic condition[4]	CURVE NUMBERS FOR HYDROLOGIC SOIL GROUP			
Cover type and hydrologic condition			A	B	C	D
CULTIVATED AGRICULTURAL LAND						
Fallow	Bare soil		77	86	91	94
	Crop residue cover (CR)	poor	76	85	90	93
	CR	good	74	83	88	90
Row crops	Straight row (SR)	poor	72	81	88	91
	SR	good	67	78	85	89
	SR & CR	poor	71	80	87	90
	SR & CR	good	64	75	82	85
	Contoured (C)	poor	70	79	84	88
	C	good	65	75	82	86
	C & CR	poor	69	78	83	87
	C & CR	good	64	74	81	85
	Contoured & Terraces (C&T)	poor	66	74	80	82
	C&T	good	62	71	78	81
	C&T & CR	poor	65	73	79	81
	C&T & CR	good	61	70	77	80
Small grain	SR	poor	65	76	84	88
	SR	good	63	75	83	87
	SR & CR	poor	64	75	83	86
	SR & CR	good	60	72	80	84
	C	poor	63	74	82	85
	C	good	61	73	81	84
	C & CR	poor	62	73	81	84
	C & CR	good	60	72	80	83
	C&T	poor	61	72	79	82
	C&T	good	59	70	78	81
	C&T & CR	poor	60	71	78	81
	C&T & CR	good	58	69	77	80
Close-seeded Legumes or Rotation Meadow[5]	SR	poor	66	77	85	89
	SR	good	58	72	81	85
	C	poor	64	75	83	85
	C	good	55	69	78	83
	C&T	poor	63	73	80	83
	C&T	good	51	67	76	80

4. For conservation tillage poor hydrologic condition, 5 to 20 percent of the surface is covered with residue (less than 750 #/acre row crops or 300#/acre small grain).
   For conservation tillage good hydrologic condition, more than 20 percent of the surface is covered with residue (greater than 750 #/acre row crops or 300 #/acre small grain).
5. Close-drilled or broadcast.

Source: USDA Soil Conservation Service

TABLE 6-4.3 -- RUNOFF CURVE NUMBERS (Average Watershed Condition)

COVER DESCRIPTION Cover type and hydrologic condition	Hydrologic condition[6]	CURVE NUMBERS FOR HYDROLOGIC SOIL GROUP A	B	C	D
NON-CULTIVATED AGRICULTURAL LAND					
Pasture, grassland, or range - continuous forage for grazing	poor	68	79	86	89
	fair	49	69	79	84
	good	39	61	74	80
Meadow - continuous grass, protected from grazing and generally mowed for hay	---	30	58	71	78
Woods-grass combination (orchard or tree farm)	poor	57	73	82	86
	fair	43	65	76	82
	good	32	58	72	79
Brush - brush-weed-grass mixture with brush the major element	poor	48	67	77	83
	fair	35	56	70	77
	good	30	48	65	73
Woods	poor	45	66	77	83
	fair	36	60	73	79
	good	30	55	70	77
Farmsteads - buildings, lanes, driveways, and surrounding lots	---	59	74	82	86

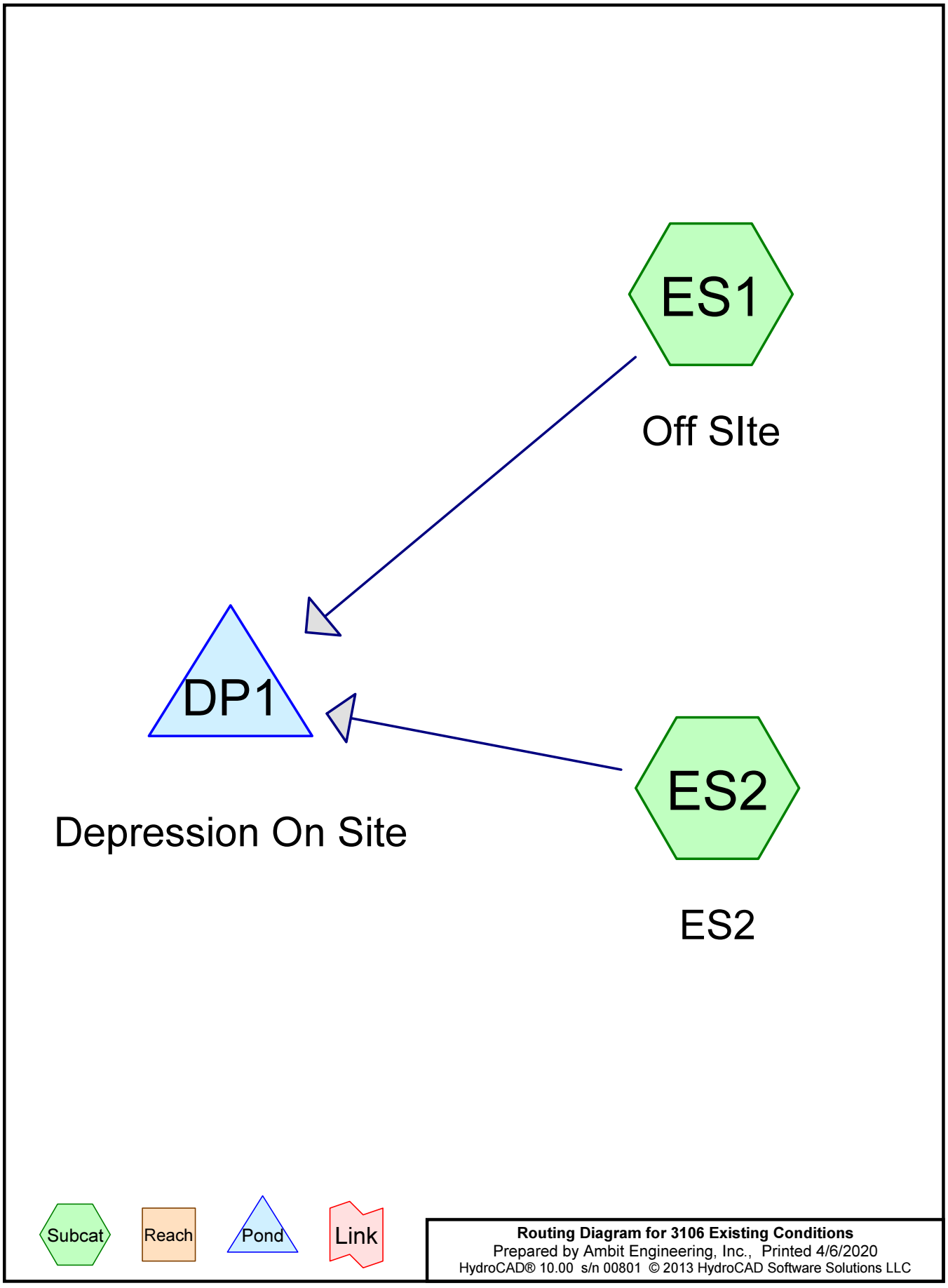
6. Poor hydrologic condition has less than 50 percent ground cover density.
Fair hydrologic condition has between 50 and 75 percent ground cover density.
Good hydrologic condition has more than 75 percent ground cover density.

Source: USDA Soil Conservation Service

APPENDIX C

HYDROCAD DRAINAGE

ANALYSIS CALCULATIONS



Routing Diagram for 3106 Existing Conditions
Prepared by Ambit Engineering, Inc., Printed 4/6/2020

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
61,500	39	>75% Grass cover, Good, HSG A (ES1, ES2)
18,965	98	Paved parking, HSG A (ES1, ES2)
10,260	98	Unconnected roofs, HSG A (ES1, ES2)
90,725	**58**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
90,725	HSG A	ES1, ES2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
90,725		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
61,500	0	0	0	0	61,500	>75% Grass cover, Good	
18,965	0	0	0	0	18,965	Paved parking	
10,260	0	0	0	0	10,260	Unconnected roofs	
90,725	**0**	**0**	**0**	**0**	**90,725**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES1: Off SIte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=0.90"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=1.10 cfs 3,741 cf

Subcatchment ES2: ES2 Runoff Area=40,838 sf 16.24% Impervious Runoff Depth=0.16"
Tc=5.0 min UI Adjusted CN=47 Runoff=0.03 cfs 544 cf

Pond DP1: Depression On Site Peak Elev=48.78' Storage=93 cf Inflow=1.10 cfs 4,285 cf
Discarded=0.00 cfs 0 cf Primary=1.10 cfs 4,217 cf Outflow=1.10 cfs 4,217 cf

Total Runoff Area = 90,725 sf Runoff Volume = 4,285 cf Average Runoff Depth = 0.57"
67.79% Pervious = 61,500 sf 32.21% Impervious = 29,225 sf

Summary for Subcatchment ES1: Off SIte

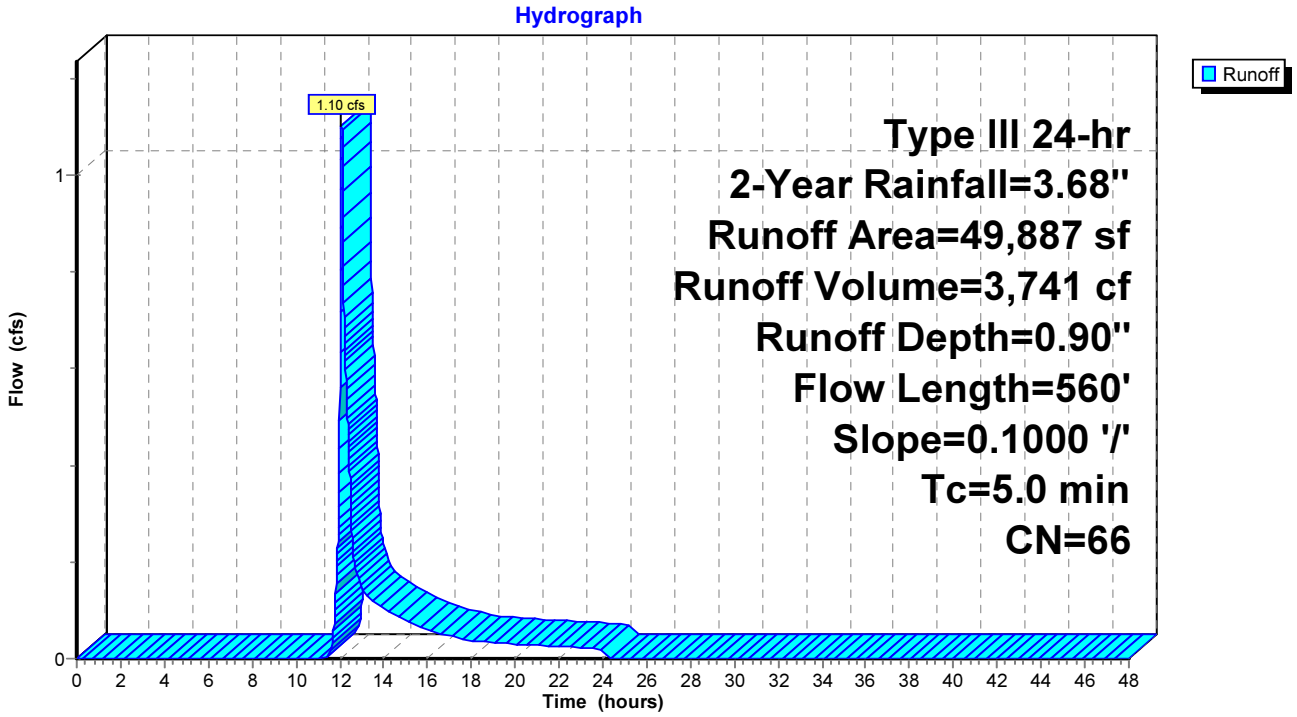
Runoff = 1.10 cfs @ 12.09 hrs, Volume= 3,741 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.68"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment ES1: Off SIte



Summary for Subcatchment ES2: ES2

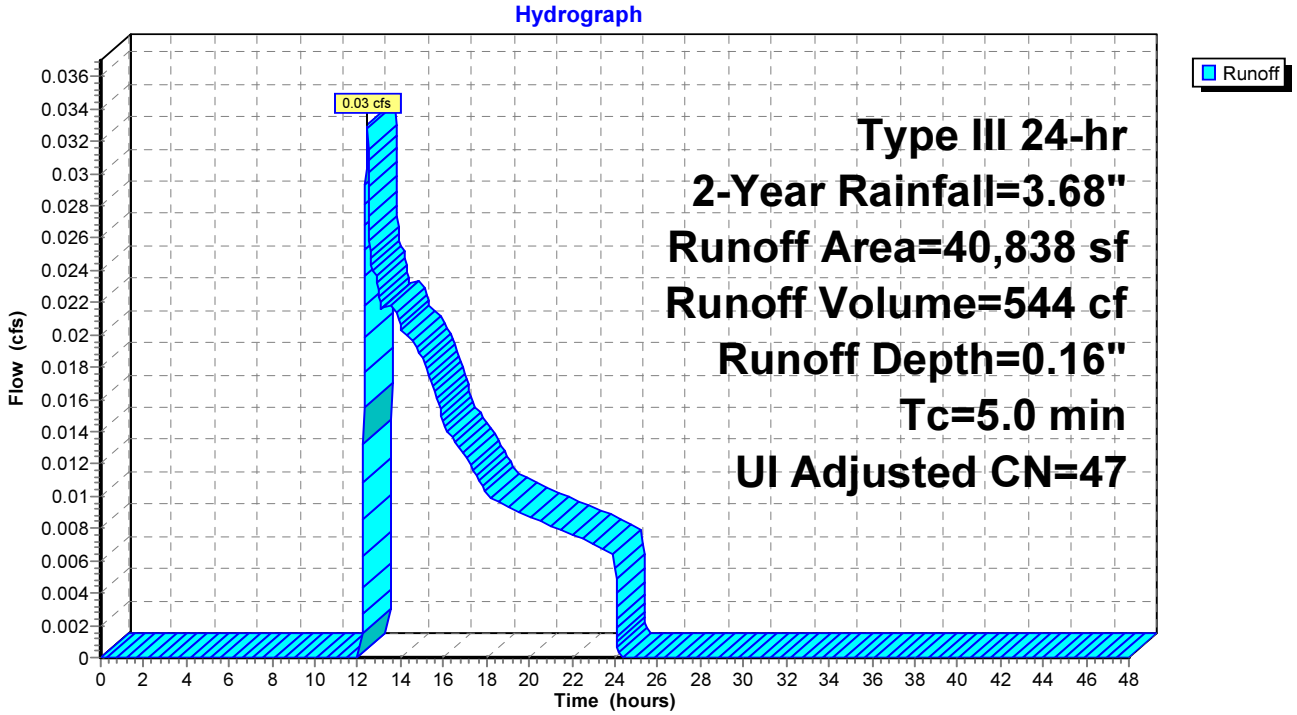
Runoff = 0.03 cfs @ 12.44 hrs, Volume= 544 cf, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.68"

Area (sf)	CN	Adj	Description
4,163	98		Paved parking, HSG A
2,468	98		Unconnected roofs, HSG A
34,207	39		>75% Grass cover, Good, HSG A
40,838	49	47	Weighted Average, UI Adjusted
34,207			83.76% Pervious Area
6,631			16.24% Impervious Area
2,468			37.22% Unconnected

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

Subcatchment ES2: ES2



Summary for Pond DP1: Depression On Site

Inflow Area = 90,725 sf, 32.21% Impervious, Inflow Depth = 0.57" for 2-Year event
Inflow = 1.10 cfs @ 12.09 hrs, Volume= 4,285 cf
Outflow = 1.10 cfs @ 12.09 hrs, Volume= 4,217 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 1.10 cfs @ 12.09 hrs, Volume= 4,217 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.78' @ 12.09 hrs Surf.Area= 1,005 sf Storage= 93 cf

Plug-Flow detention time= 12.3 min calculated for 4,216 cf (98% of inflow)
Center-of-Mass det. time= 3.7 min (897.7 - 894.0)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	545 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

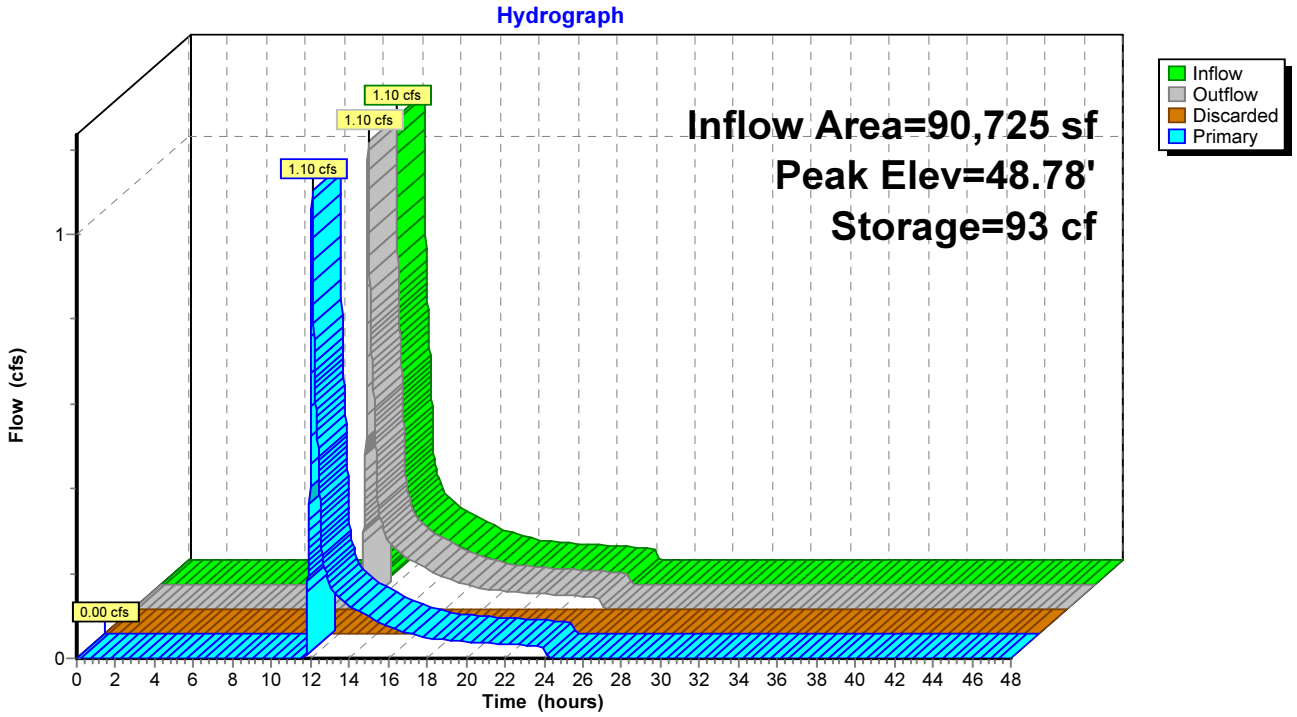
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.50	0	0.0	0	0	0
49.00	3,270	235.0	545	545	4,395

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**75.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	48.50'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=1.09 cfs @ 12.09 hrs HW=48.78' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.09 cfs @ 0.54 fps)

Pond DP1: Depression On Site



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES1: Off SIte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=2.13"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=2.90 cfs 8,870 cf

Subcatchment ES2: ES2 Runoff Area=40,838 sf 16.24% Impervious Runoff Depth=0.76"
Tc=5.0 min UI Adjusted CN=47 Runoff=0.53 cfs 2,576 cf

Pond DP1: Depression On Site Peak Elev=48.81' Storage=127 cf Inflow=3.39 cfs 11,447 cf
Discarded=0.00 cfs 0 cf Primary=3.39 cfs 11,379 cf Outflow=3.39 cfs 11,379 cf

Total Runoff Area = 90,725 sf Runoff Volume = 11,447 cf Average Runoff Depth = 1.51"
67.79% Pervious = 61,500 sf 32.21% Impervious = 29,225 sf

Summary for Subcatchment ES1: Off SIte

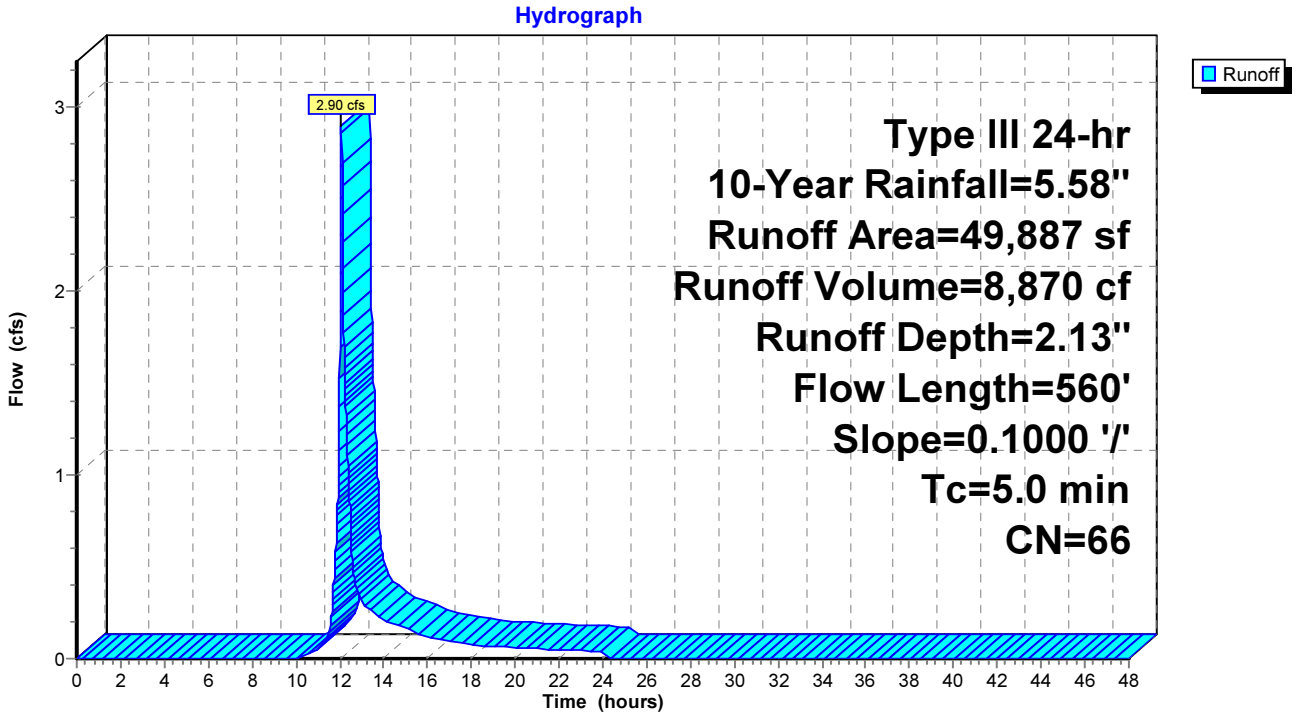
Runoff = 2.90 cfs @ 12.08 hrs, Volume= 8,870 cf, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.58"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment ES1: Off SIte



Summary for Subcatchment ES2: ES2

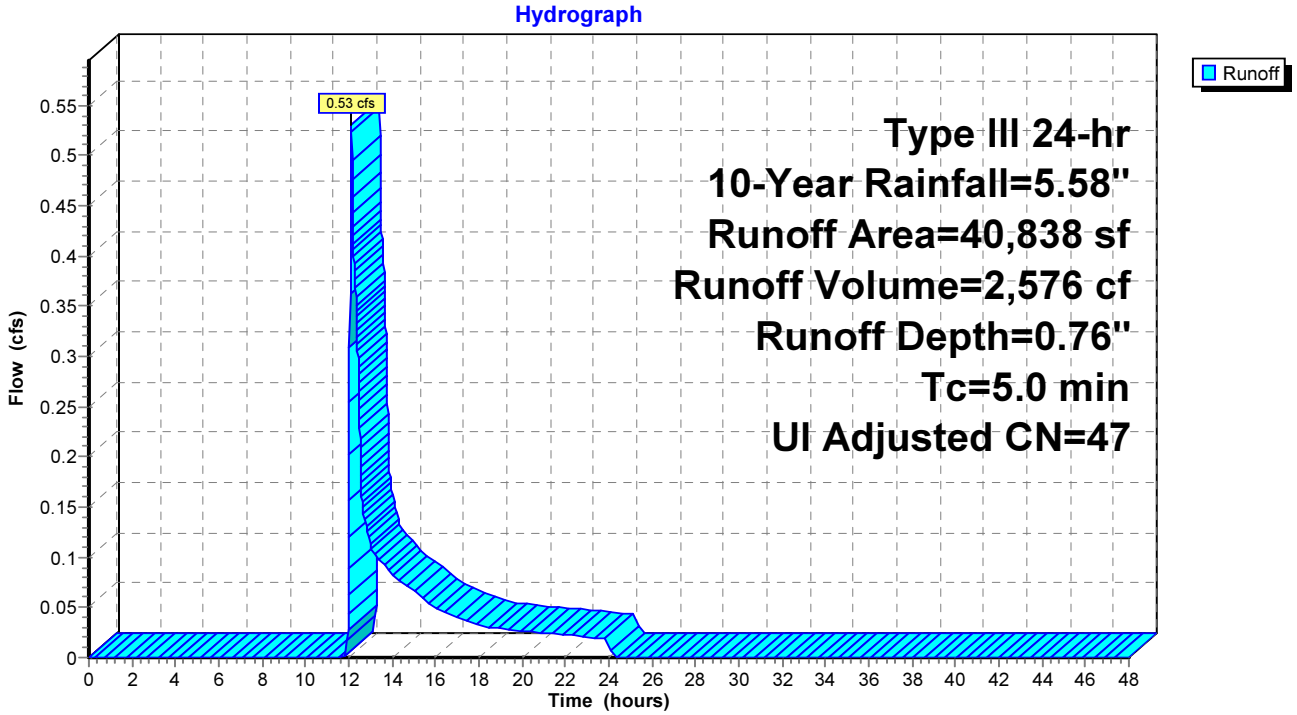
Runoff = 0.53 cfs @ 12.11 hrs, Volume= 2,576 cf, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.58"

Area (sf)	CN	Adj	Description
4,163	98		Paved parking, HSG A
2,468	98		Unconnected roofs, HSG A
34,207	39		>75% Grass cover, Good, HSG A
40,838	49	47	Weighted Average, UI Adjusted
34,207			83.76% Pervious Area
6,631			16.24% Impervious Area
2,468			37.22% Unconnected

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

Subcatchment ES2: ES2



Summary for Pond DP1: Depression On Site

Inflow Area = 90,725 sf, 32.21% Impervious, Inflow Depth = 1.51" for 10-Year event
Inflow = 3.39 cfs @ 12.08 hrs, Volume= 11,447 cf
Outflow = 3.39 cfs @ 12.09 hrs, Volume= 11,379 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 3.39 cfs @ 12.09 hrs, Volume= 11,379 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.81' @ 12.09 hrs Surf.Area= 1,237 sf Storage= 127 cf

Plug-Flow detention time= 5.3 min calculated for 11,376 cf (99% of inflow)
Center-of-Mass det. time= 1.9 min (867.2 - 865.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	545 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

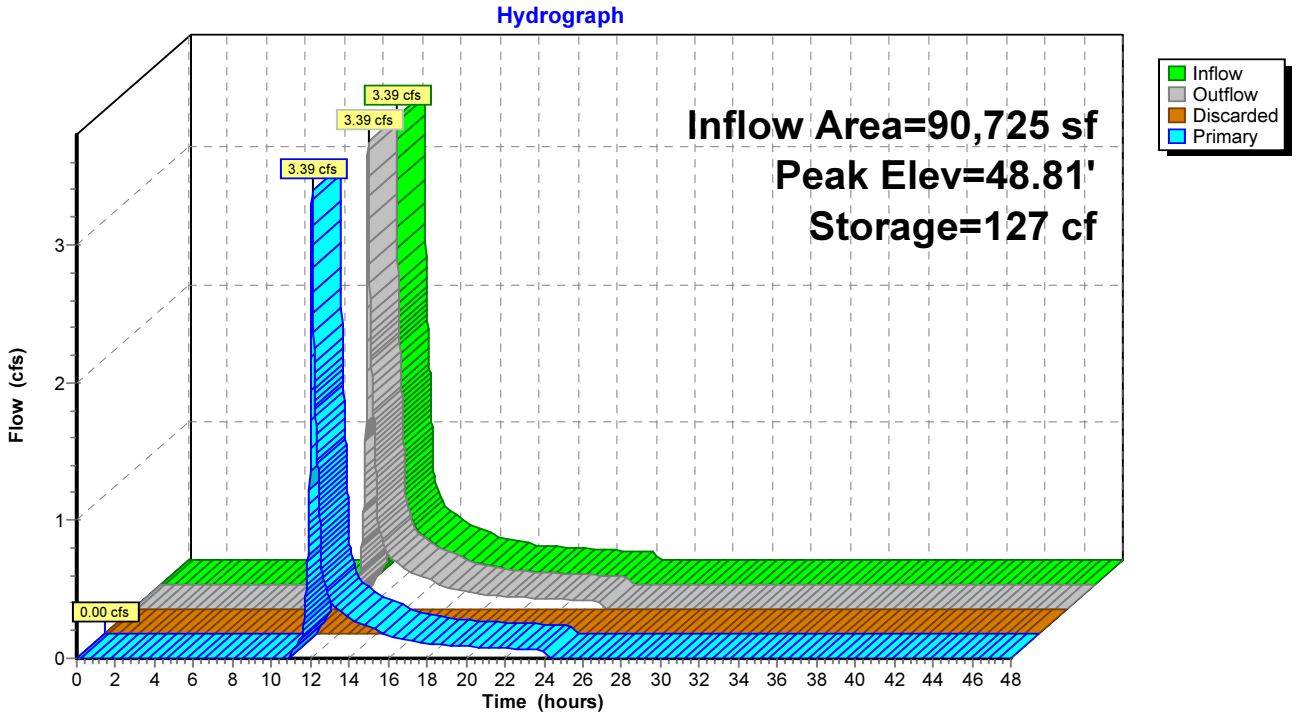
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.50	0	0.0	0	0	0
49.00	3,270	235.0	545	545	4,395

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**75.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	48.50'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=3.38 cfs @ 12.09 hrs HW=48.81' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 3.38 cfs @ 0.78 fps)

Pond DP1: Depression On Site



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES1: Off SIte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=4.39"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=6.10 cfs 18,240 cf

Subcatchment ES2: ES2 Runoff Area=40,838 sf 16.24% Impervious Runoff Depth=2.20"
Tc=5.0 min UI Adjusted CN=47 Runoff=2.25 cfs 7,495 cf

Pond DP1: Depression On Site Peak Elev=48.85' Storage=195 cf Inflow=8.34 cfs 25,735 cf
Discarded=0.00 cfs 0 cf Primary=8.33 cfs 25,667 cf Outflow=8.33 cfs 25,667 cf

Total Runoff Area = 90,725 sf Runoff Volume = 25,735 cf Average Runoff Depth = 3.40"
67.79% Pervious = 61,500 sf 32.21% Impervious = 29,225 sf

Summary for Subcatchment ES1: Off SIte

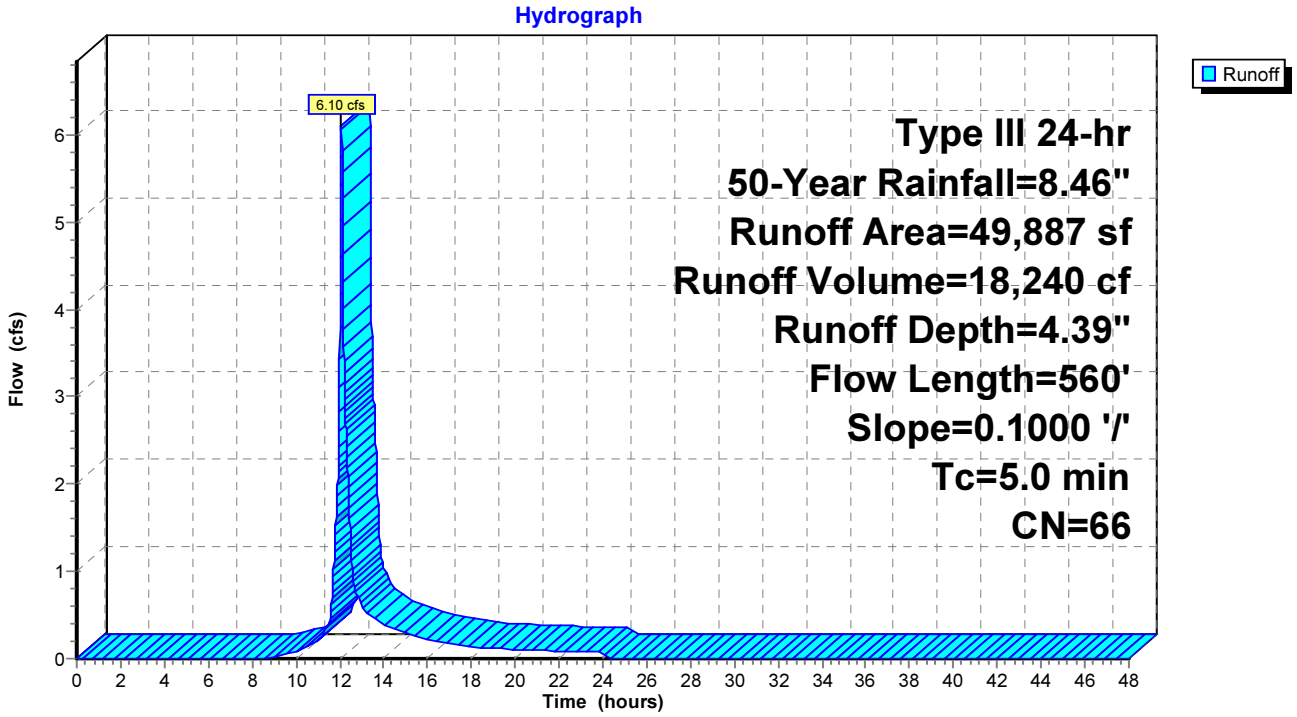
Runoff = 6.10 cfs @ 12.08 hrs, Volume= 18,240 cf, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=8.46"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment ES1: Off SIte



Summary for Subcatchment ES2: ES2

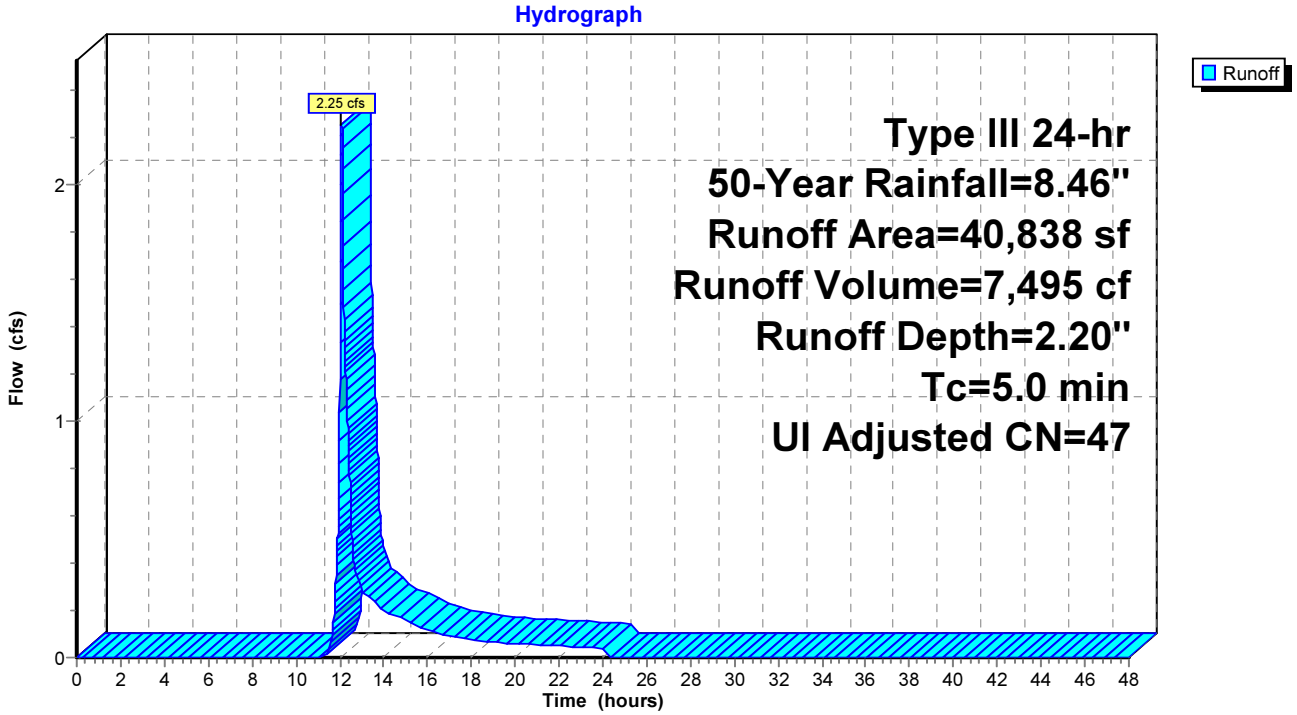
Runoff = 2.25 cfs @ 12.09 hrs, Volume= 7,495 cf, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=8.46"

Area (sf)	CN	Adj	Description
4,163	98		Paved parking, HSG A
2,468	98		Unconnected roofs, HSG A
34,207	39		>75% Grass cover, Good, HSG A
40,838	49	47	Weighted Average, UI Adjusted
34,207			83.76% Pervious Area
6,631			16.24% Impervious Area
2,468			37.22% Unconnected

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

Subcatchment ES2: ES2



Summary for Pond DP1: Depression On Site

Inflow Area = 90,725 sf, 32.21% Impervious, Inflow Depth = 3.40" for 50-Year event
Inflow = 8.34 cfs @ 12.08 hrs, Volume= 25,735 cf
Outflow = 8.33 cfs @ 12.08 hrs, Volume= 25,667 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 8.33 cfs @ 12.08 hrs, Volume= 25,667 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.85' @ 12.08 hrs Surf.Area= 1,648 sf Storage= 195 cf

Plug-Flow detention time= 2.8 min calculated for 25,661 cf (100% of inflow)
Center-of-Mass det. time= 1.2 min (843.9 - 842.7)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	545 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

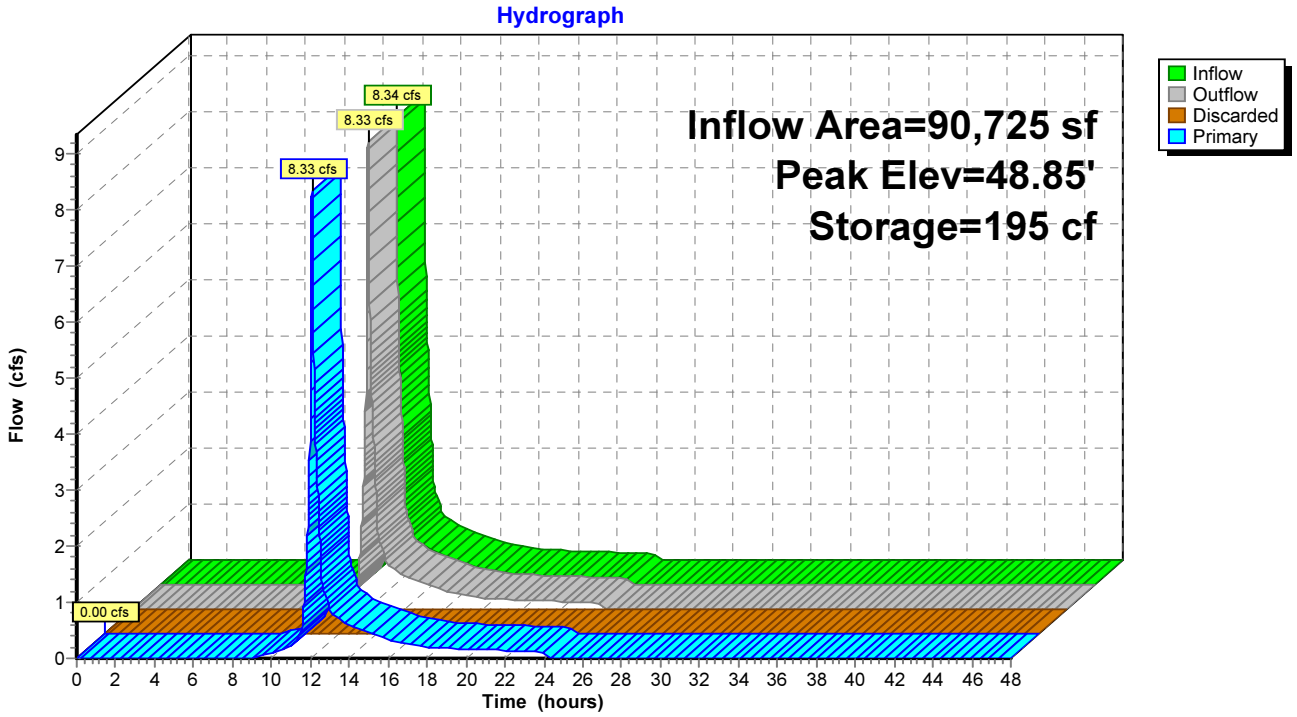
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.50	0	0.0	0	0	0
49.00	3,270	235.0	545	545	4,395

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**75.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	48.50'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=8.32 cfs @ 12.08 hrs HW=48.85' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 8.32 cfs @ 1.06 fps)

Pond DP1: Depression On Site



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES1: Off SIte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=5.82"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=8.10 cfs 24,191 cf

Subcatchment ES2: ES2 Runoff Area=40,838 sf 16.24% Impervious Runoff Depth=3.24"
Tc=5.0 min UI Adjusted CN=47 Runoff=3.50 cfs 11,041 cf

Pond DP1: Depression On Site Peak Elev=48.88' Storage=240 cf Inflow=11.58 cfs 35,233 cf
Discarded=0.00 cfs 0 cf Primary=11.57 cfs 35,165 cf Outflow=11.57 cfs 35,165 cf

Total Runoff Area = 90,725 sf Runoff Volume = 35,233 cf Average Runoff Depth = 4.66"
67.79% Pervious = 61,500 sf 32.21% Impervious = 29,225 sf

Summary for Subcatchment ES1: Off Site

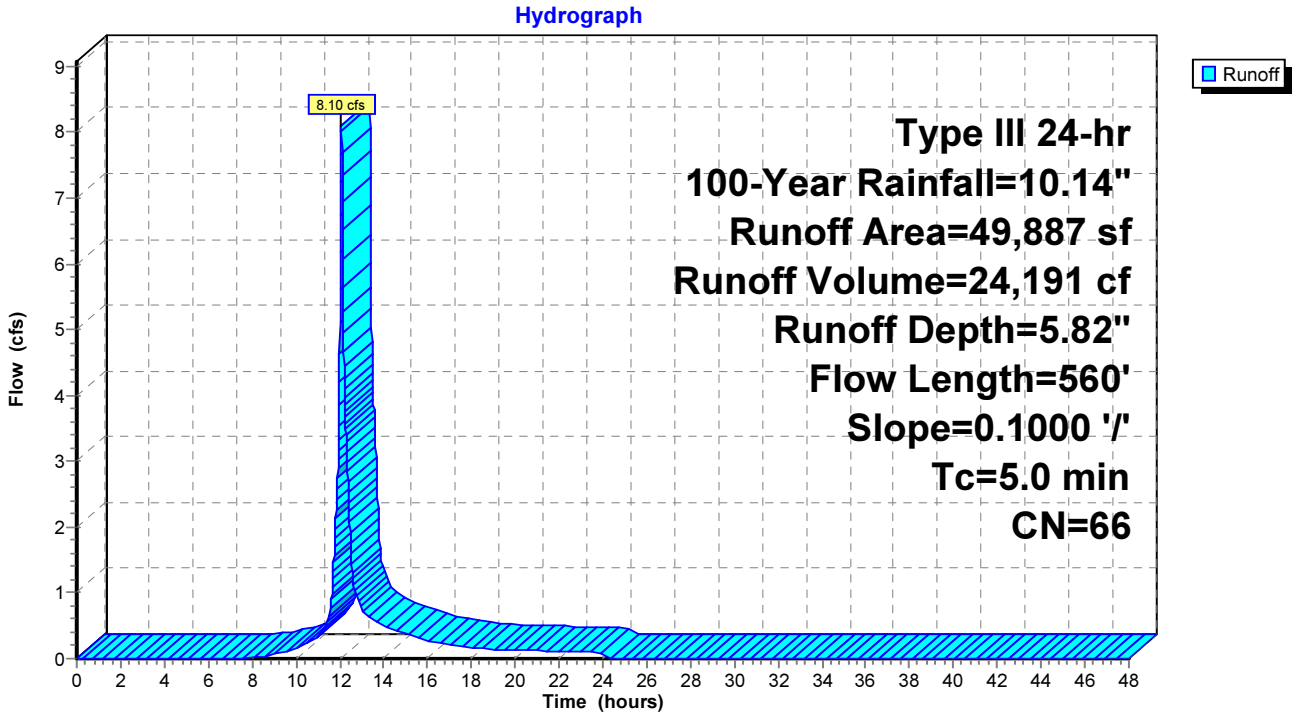
Runoff = 8.10 cfs @ 12.07 hrs, Volume= 24,191 cf, Depth= 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.14"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment ES1: Off Site



Summary for Subcatchment ES2: ES2

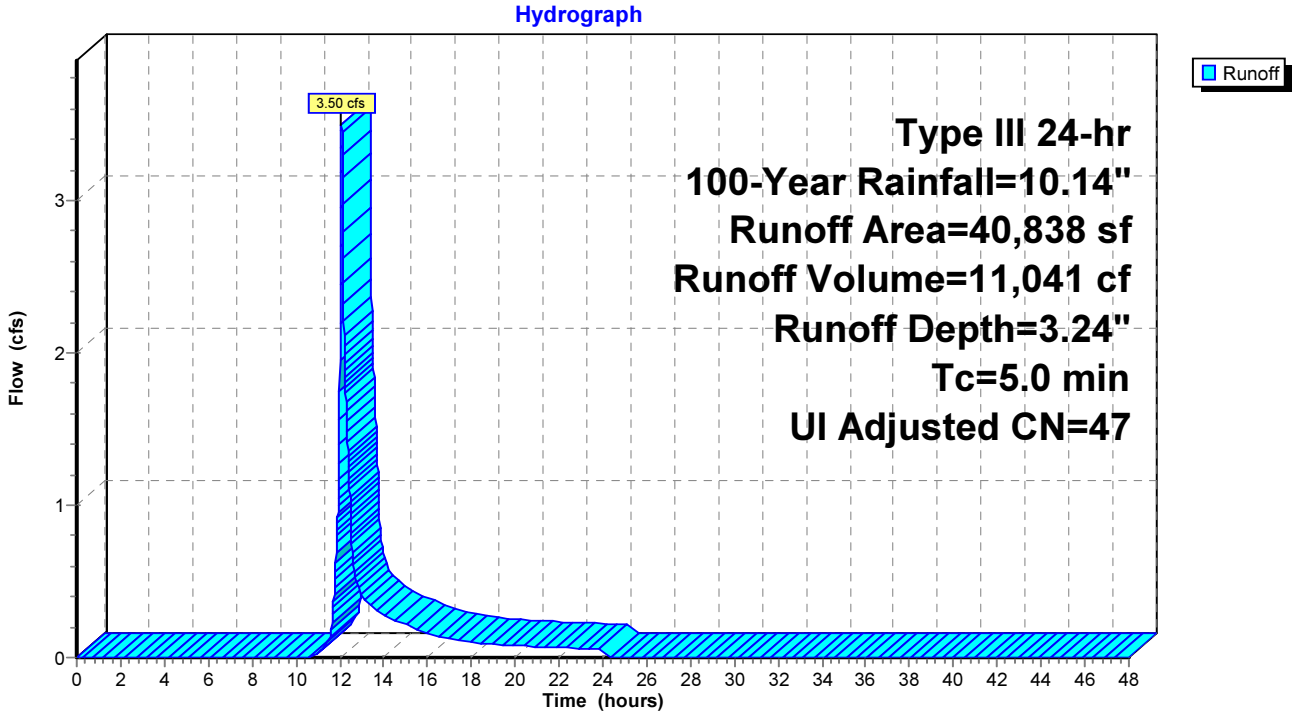
Runoff = 3.50 cfs @ 12.08 hrs, Volume= 11,041 cf, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.14"

Area (sf)	CN	Adj	Description
4,163	98		Paved parking, HSG A
2,468	98		Unconnected roofs, HSG A
34,207	39		>75% Grass cover, Good, HSG A
40,838	49	47	Weighted Average, UI Adjusted
34,207			83.76% Pervious Area
6,631			16.24% Impervious Area
2,468			37.22% Unconnected

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

Subcatchment ES2: ES2



Summary for Pond DP1: Depression On Site

Inflow Area = 90,725 sf, 32.21% Impervious, Inflow Depth = 4.66" for 100-Year event
Inflow = 11.58 cfs @ 12.08 hrs, Volume= 35,233 cf
Outflow = 11.57 cfs @ 12.08 hrs, Volume= 35,165 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 11.57 cfs @ 12.08 hrs, Volume= 35,165 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.88' @ 12.08 hrs Surf.Area= 1,895 sf Storage= 240 cf

Plug-Flow detention time= 2.2 min calculated for 35,157 cf (100% of inflow)
Center-of-Mass det. time= 1.0 min (835.3 - 834.2)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	545 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

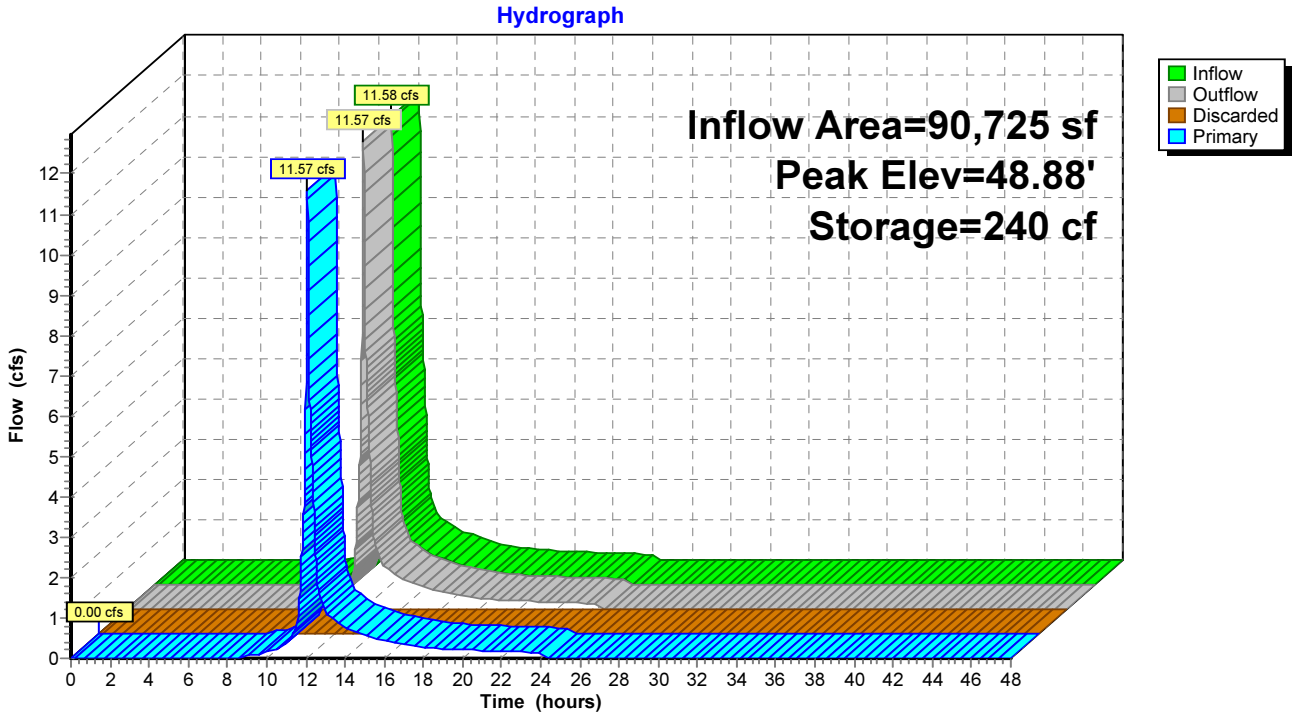
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
48.50	0	0.0	0	0	0
49.00	3,270	235.0	545	545	4,395

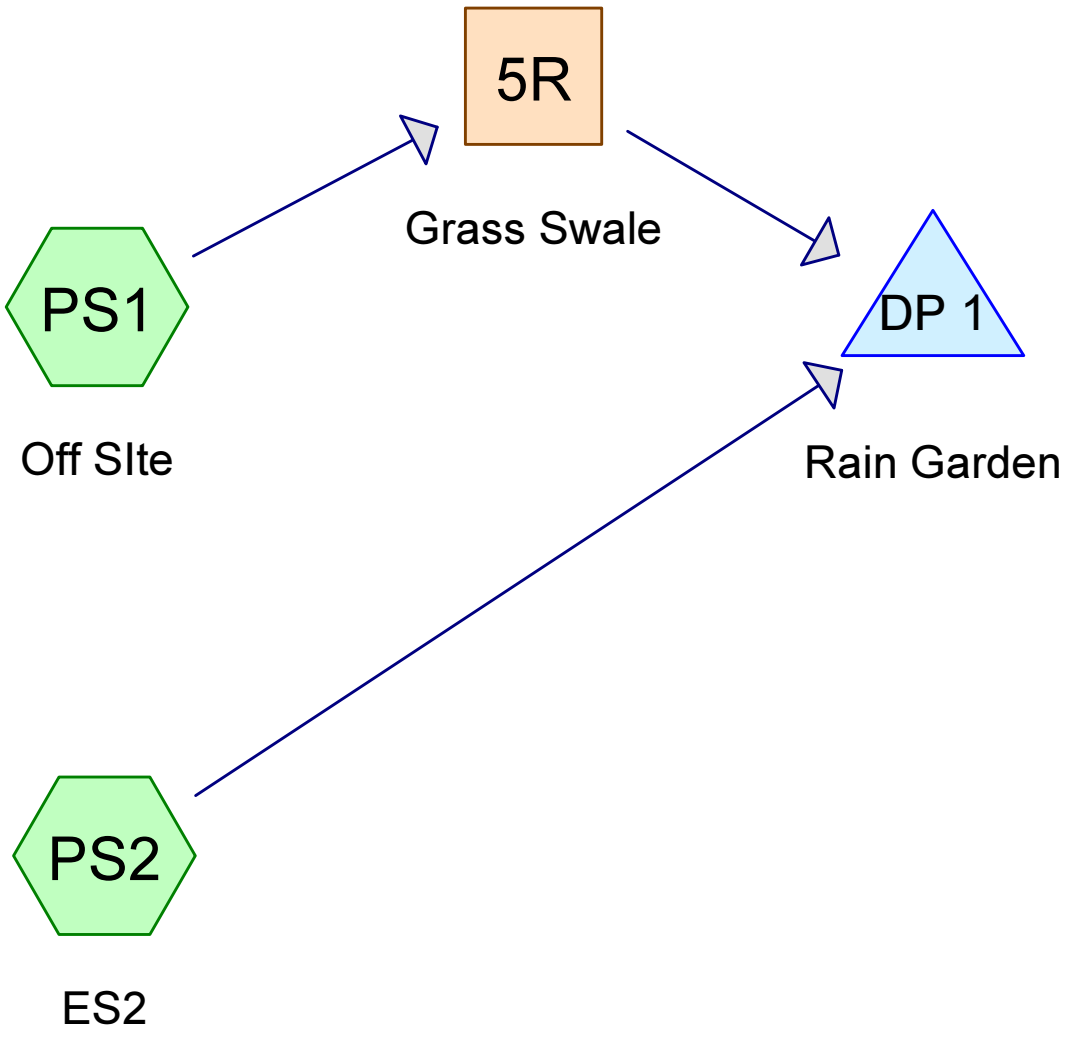
Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**75.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	48.50'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=11.56 cfs @ 12.08 hrs HW=48.88' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 11.56 cfs @ 1.18 fps)

Pond DP1: Depression On Site





Subcat Reach Pond Link

Routing Diagram for 3106 Developed Conditions
Prepared by Ambit Engineering, Inc., Printed 4/6/2020

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
59,012	39	>75% Grass cover, Good, HSG A (PS1, PS2)
19,939	98	Paved parking, HSG A (PS1, PS2)
11,774	98	Unconnected roofs, HSG A (PS1, PS2)
90,725	**60**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
90,725	HSG A	PS1, PS2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
90,725		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
59,012	0	0	0	0	59,012	>75% Grass cover, Good	
19,939	0	0	0	0	19,939	Paved parking	
11,774	0	0	0	0	11,774	Unconnected roofs	
90,725	**0**	**0**	**0**	**0**	**90,725**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS1: Off Slte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=0.90"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=1.10 cfs 3,741 cf

Subcatchment PS2: ES2 Runoff Area=40,838 sf 22.33% Impervious Runoff Depth=0.21"
Tc=5.0 min UI Adjusted CN=49 Runoff=0.06 cfs 724 cf

Reach 5R: Grass Swale Avg. Flow Depth=0.15' Max Vel=3.20 fps Inflow=1.10 cfs 3,741 cf
n=0.022 L=145.0' S=0.0345 '/' Capacity=160.04 cfs Outflow=1.09 cfs 3,741 cf

Pond DP 1: Rain Garden Peak Elev=48.10' Storage=3,092 cf Inflow=1.09 cfs 4,466 cf
Discarded=0.04 cfs 3,050 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 3,050 cf

Total Runoff Area = 90,725 sf Runoff Volume = 4,466 cf Average Runoff Depth = 0.59"
65.04% Pervious = 59,012 sf 34.96% Impervious = 31,713 sf

Summary for Subcatchment PS1: Off Site

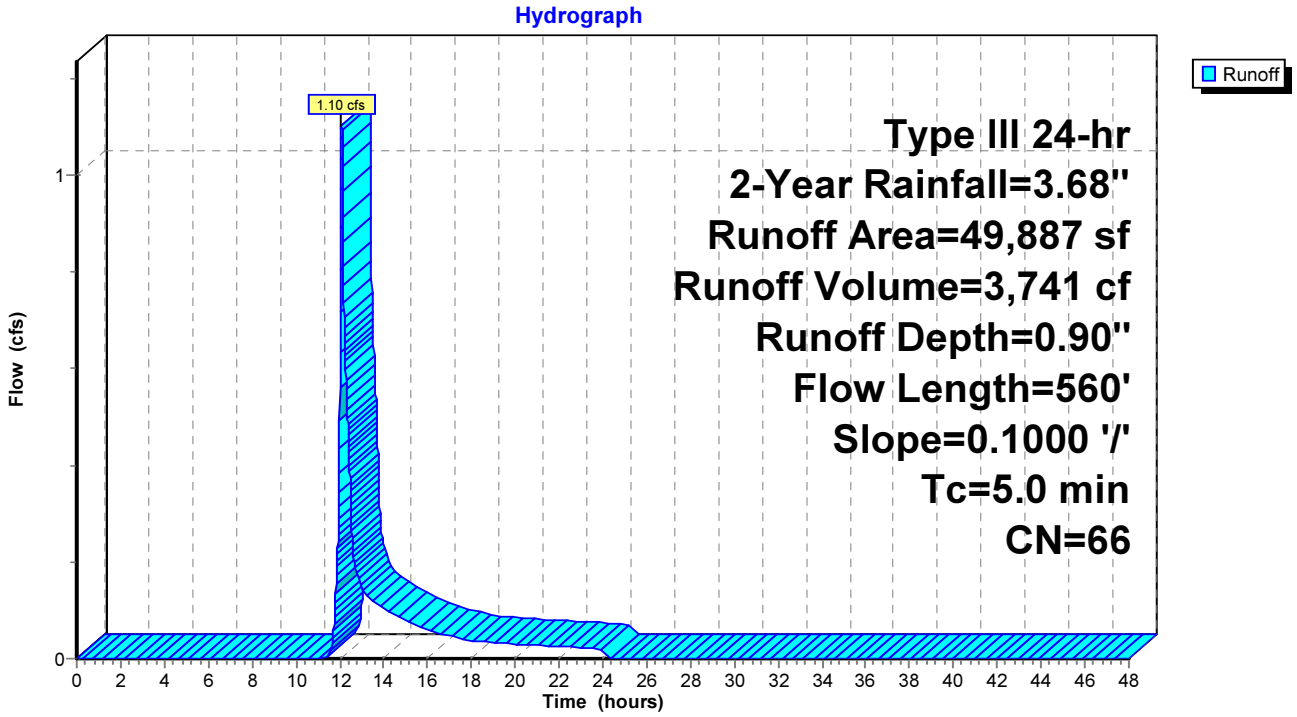
Runoff = 1.10 cfs @ 12.09 hrs, Volume= 3,741 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.68"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PS1: Off Site



Summary for Subcatchment PS2: ES2

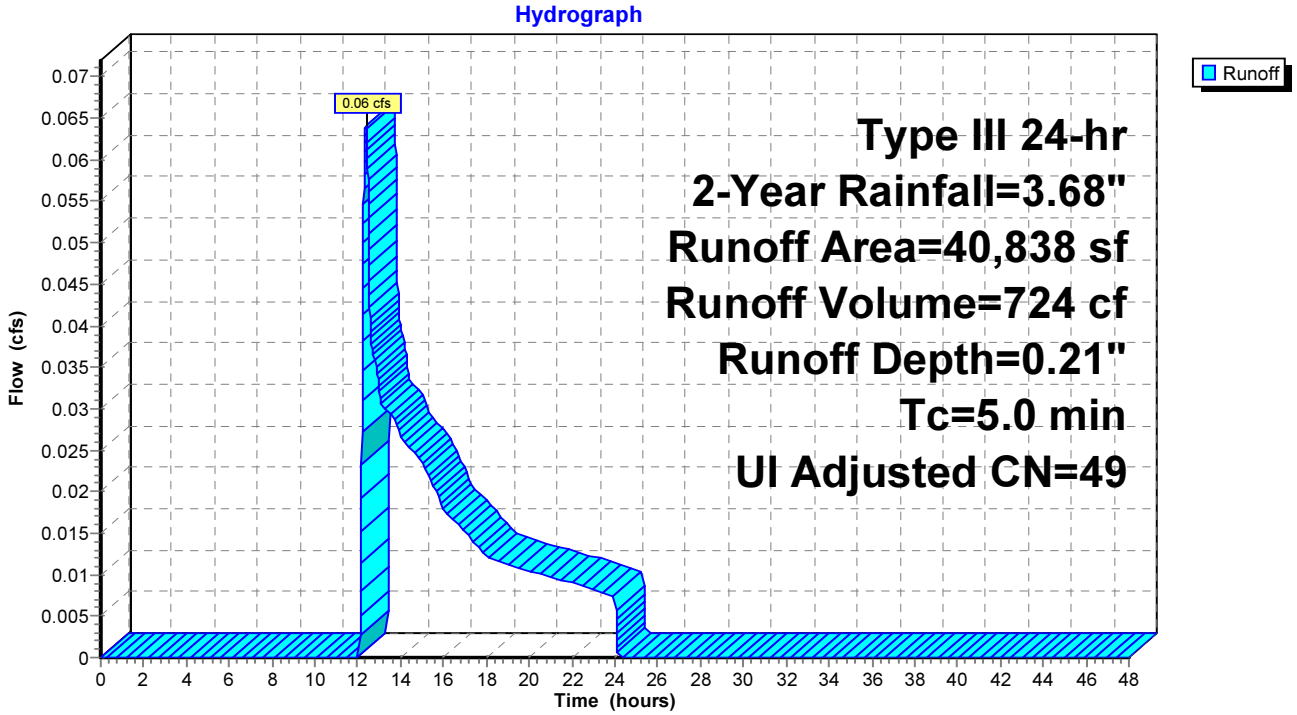
Runoff = 0.06 cfs @ 12.38 hrs, Volume= 724 cf, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.68"

Area (sf)	CN	Adj	Description
5,137	98		Paved parking, HSG A
3,982	98		Unconnected roofs, HSG A
31,719	39		>75% Grass cover, Good, HSG A
40,838	52	49	Weighted Average, UI Adjusted
31,719			77.67% Pervious Area
9,119			22.33% Impervious Area
3,982			43.67% Unconnected

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

Subcatchment PS2: ES2



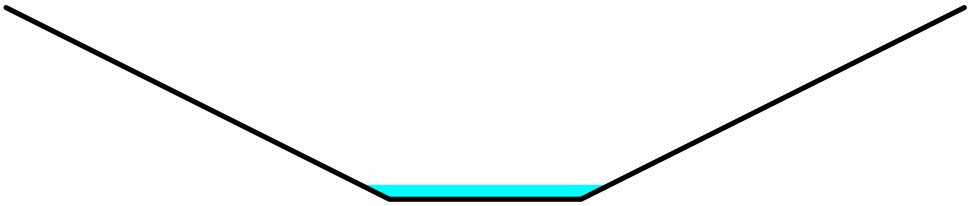
Summary for Reach 5R: Grass Swale

Inflow Area = 49,887 sf, 45.29% Impervious, Inflow Depth = 0.90" for 2-Year event
Inflow = 1.10 cfs @ 12.09 hrs, Volume= 3,741 cf
Outflow = 1.09 cfs @ 12.11 hrs, Volume= 3,741 cf, Atten= 1%, Lag= 1.3 min

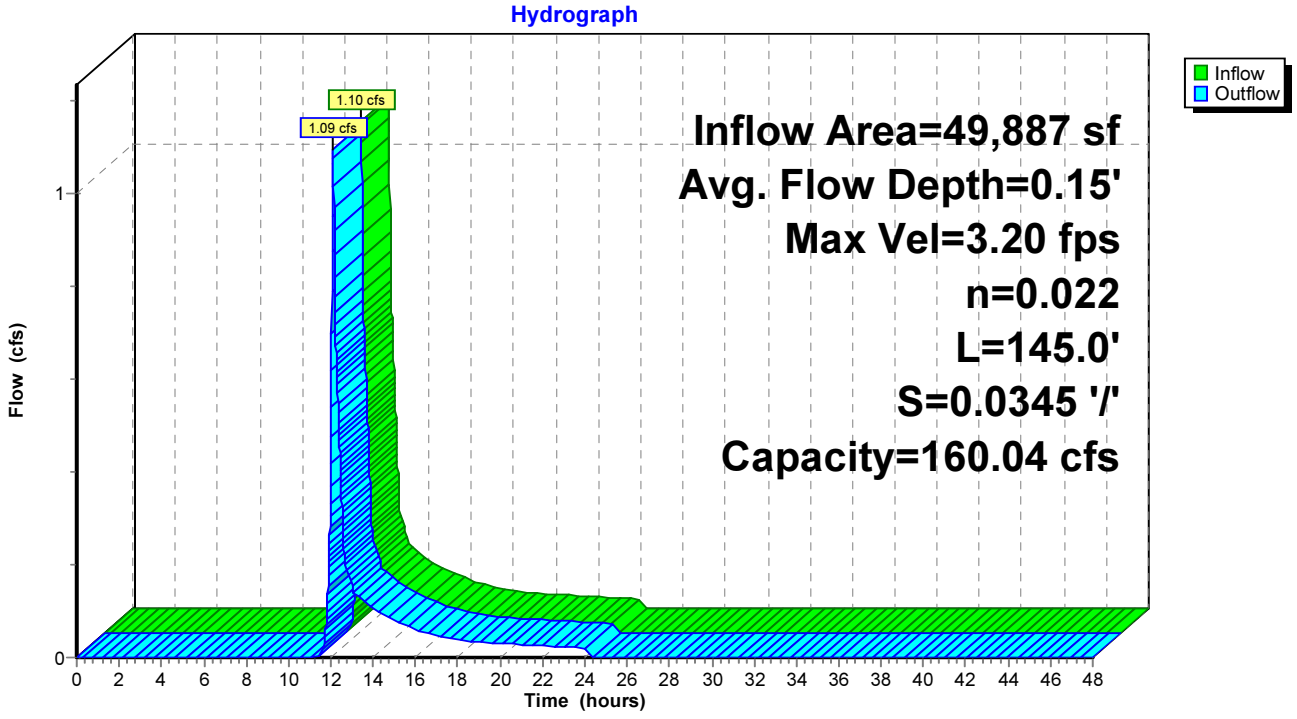
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.20 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 2.1 min

Peak Storage= 50 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 160.04 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 145.0' Slope= 0.0345 '/'
Inlet Invert= 53.00', Outlet Invert= 48.00'



Reach 5R: Grass Swale



Summary for Pond DP 1: Rain Garden

Inflow Area = 90,725 sf, 34.96% Impervious, Inflow Depth = 0.59" for 2-Year event
Inflow = 1.09 cfs @ 12.11 hrs, Volume= 4,466 cf
Outflow = 0.04 cfs @ 19.49 hrs, Volume= 3,050 cf, Atten= 96%, Lag= 443.0 min
Discarded = 0.04 cfs @ 19.49 hrs, Volume= 3,050 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.10' @ 19.49 hrs Surf.Area= 1,604 sf Storage= 3,092 cf

Plug-Flow detention time= 812.1 min calculated for 3,050 cf (68% of inflow)
Center-of-Mass det. time= 696.6 min (1,593.1 - 896.5)

Volume	Invert	Avail.Storage	Storage Description
#1	42.99'	5,854 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

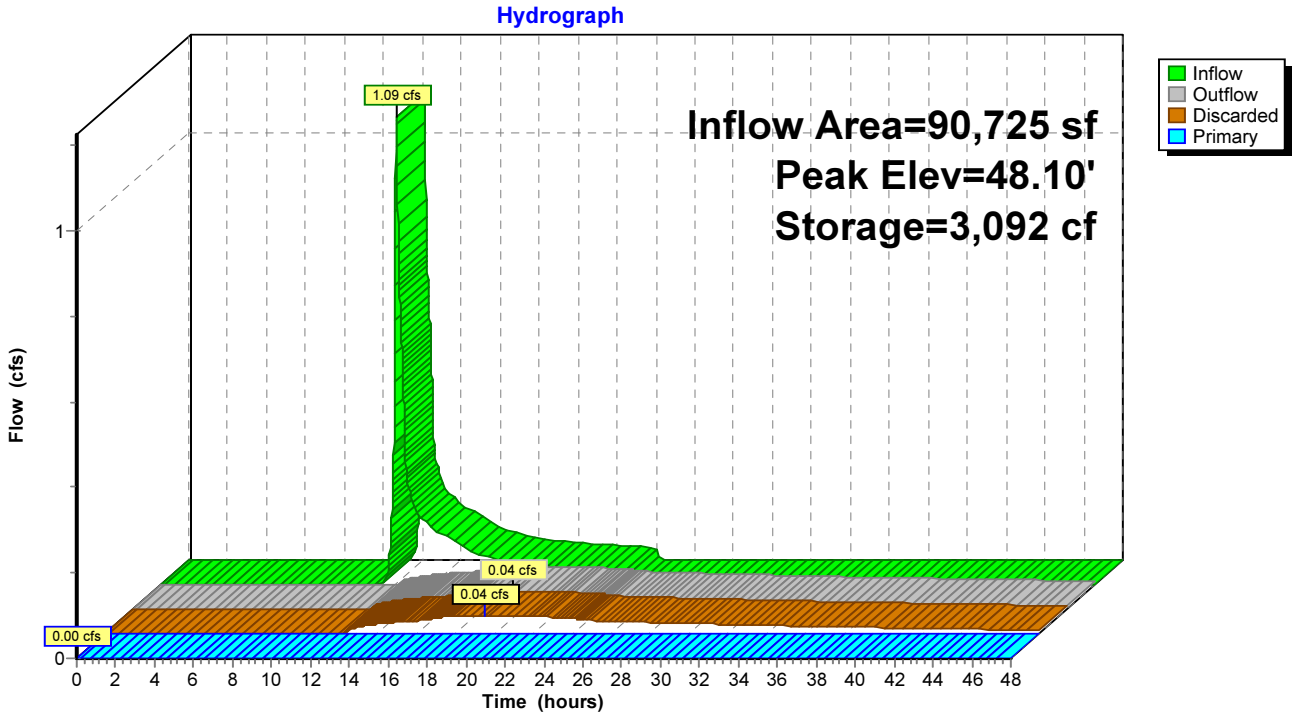
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.99	784	112.0	0.0	0	0	784
43.00	784	112.0	40.0	3	3	785
44.00	784	112.0	40.0	314	317	897
45.00	784	112.0	40.0	314	630	1,009
45.99	784	112.0	40.0	310	941	1,120
46.00	675	106.0	100.0	7	948	1,224
47.00	992	123.0	100.0	828	1,777	1,554
48.00	1,355	140.0	100.0	1,169	2,945	1,934
49.00	4,817	391.0	100.0	2,909	5,854	12,543

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**10.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	46.00'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 675 sf

Discarded OutFlow Max=0.04 cfs @ 19.49 hrs HW=48.10' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=42.99' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP 1: Rain Garden



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS1: Off Slte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=2.13"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=2.90 cfs 8,870 cf

Subcatchment PS2: ES2 Runoff Area=40,838 sf 22.33% Impervious Runoff Depth=0.88"
Tc=5.0 min UI Adjusted CN=49 Runoff=0.70 cfs 2,995 cf

Reach 5R: Grass Swale Avg. Flow Depth=0.26' Max Vel=4.39 fps Inflow=2.90 cfs 8,870 cf
n=0.022 L=145.0' S=0.0345 '/' Capacity=160.04 cfs Outflow=2.88 cfs 8,870 cf

Pond DP 1: Rain Garden Peak Elev=48.62' Storage=4,344 cf Inflow=3.58 cfs 11,865 cf
Discarded=0.10 cfs 6,307 cf Primary=1.04 cfs 4,030 cf Outflow=1.14 cfs 10,337 cf

Total Runoff Area = 90,725 sf Runoff Volume = 11,865 cf Average Runoff Depth = 1.57"
65.04% Pervious = 59,012 sf 34.96% Impervious = 31,713 sf

Summary for Subcatchment PS1: Off SIte

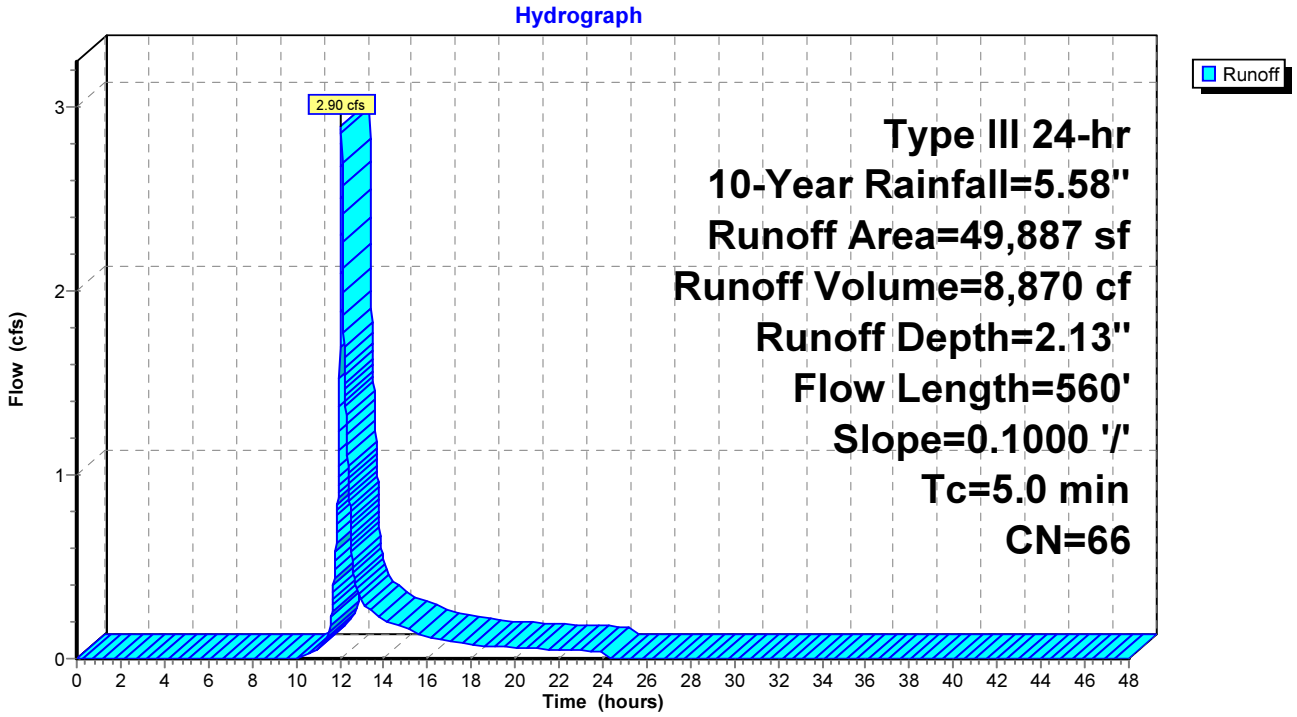
Runoff = 2.90 cfs @ 12.08 hrs, Volume= 8,870 cf, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.58"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PS1: Off SIte



Summary for Subcatchment PS2: ES2

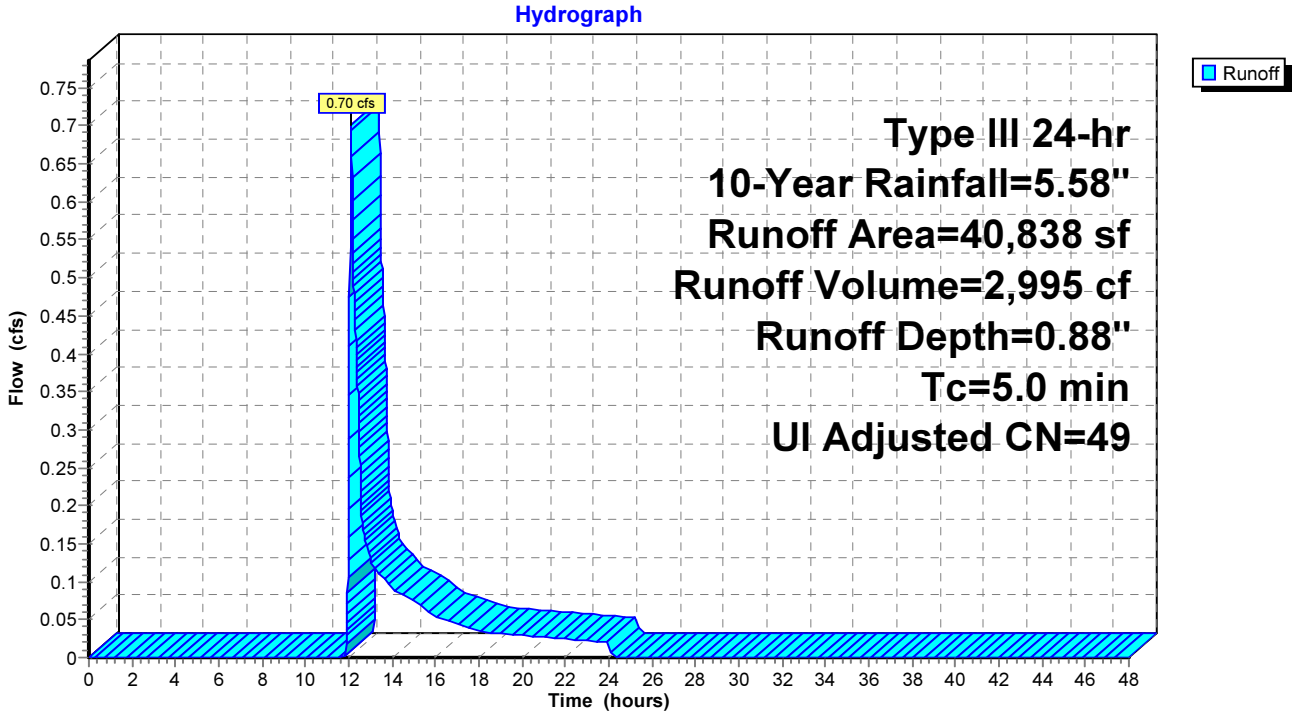
Runoff = 0.70 cfs @ 12.10 hrs, Volume= 2,995 cf, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.58"

Area (sf)	CN	Adj	Description
5,137	98		Paved parking, HSG A
3,982	98		Unconnected roofs, HSG A
31,719	39		>75% Grass cover, Good, HSG A
40,838	52	49	Weighted Average, UI Adjusted
31,719			77.67% Pervious Area
9,119			22.33% Impervious Area
3,982			43.67% Unconnected

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

Subcatchment PS2: ES2



Summary for Reach 5R: Grass Swale

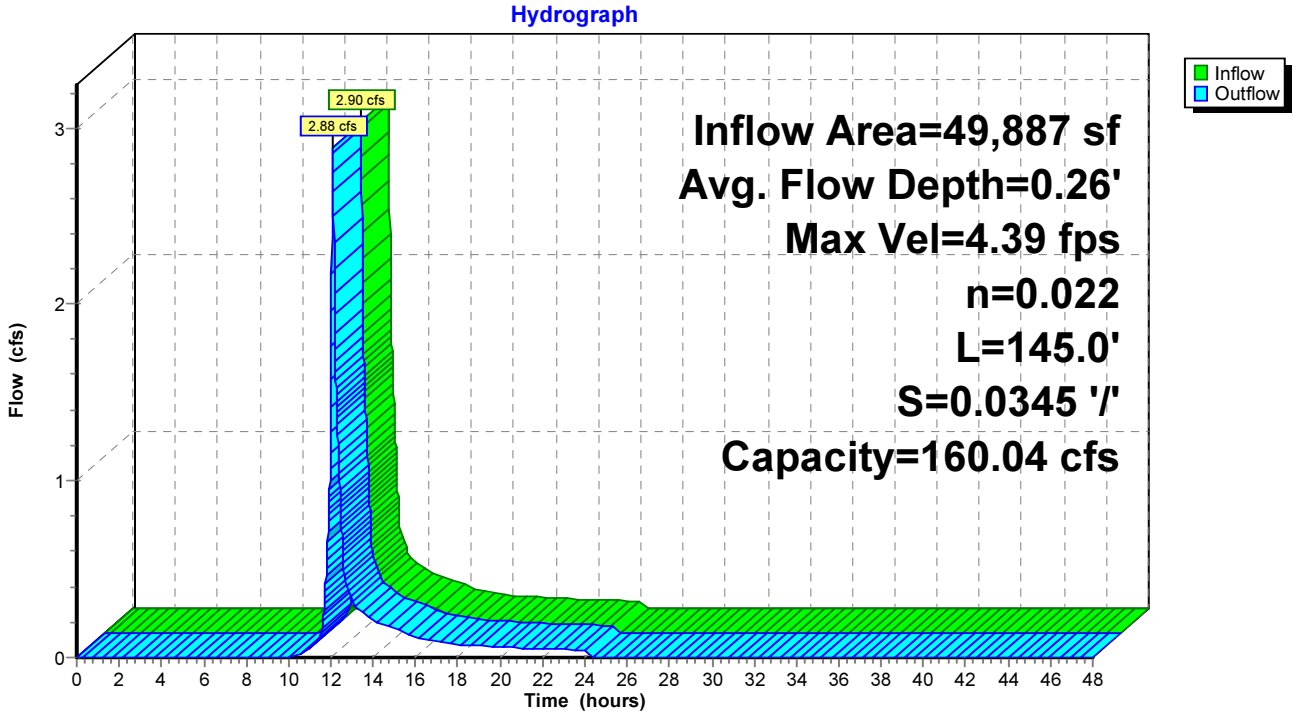
Inflow Area = 49,887 sf, 45.29% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 2.90 cfs @ 12.08 hrs, Volume= 8,870 cf
Outflow = 2.88 cfs @ 12.10 hrs, Volume= 8,870 cf, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.39 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 1.7 min

Peak Storage= 95 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 160.04 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 145.0' Slope= 0.0345 '/'
Inlet Invert= 53.00', Outlet Invert= 48.00'

Reach 5R: Grass Swale



Summary for Pond DP 1: Rain Garden

Inflow Area = 90,725 sf, 34.96% Impervious, Inflow Depth = 1.57" for 10-Year event
Inflow = 3.58 cfs @ 12.10 hrs, Volume= 11,865 cf
Outflow = 1.14 cfs @ 12.47 hrs, Volume= 10,337 cf, Atten= 68%, Lag= 22.6 min
Discarded = 0.10 cfs @ 12.32 hrs, Volume= 6,307 cf
Primary = 1.04 cfs @ 12.47 hrs, Volume= 4,030 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.62' @ 12.47 hrs Surf.Area= 3,266 sf Storage= 4,344 cf

Plug-Flow detention time= 358.9 min calculated for 10,337 cf (87% of inflow)
Center-of-Mass det. time= 299.0 min (1,164.9 - 865.9)

Volume	Invert	Avail.Storage	Storage Description
#1	42.99'	5,854 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

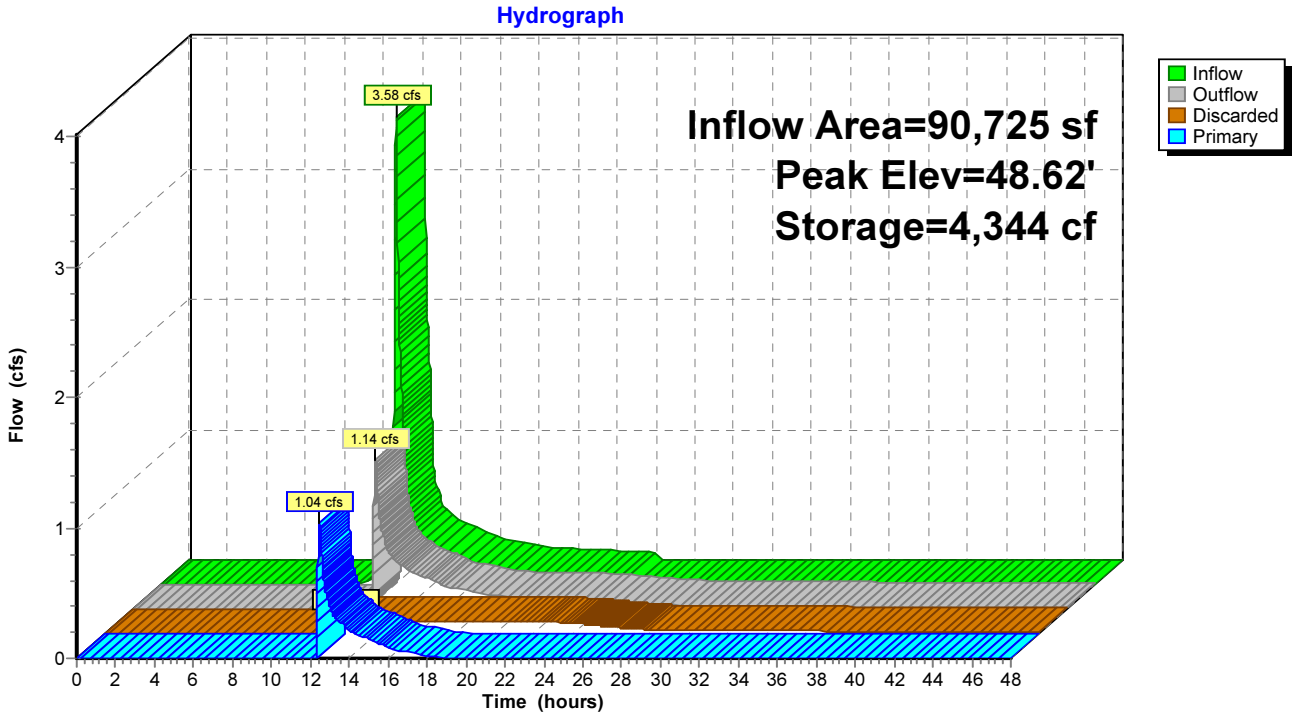
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.99	784	112.0	0.0	0	0	784
43.00	784	112.0	40.0	3	3	785
44.00	784	112.0	40.0	314	317	897
45.00	784	112.0	40.0	314	630	1,009
45.99	784	112.0	40.0	310	941	1,120
46.00	675	106.0	100.0	7	948	1,224
47.00	992	123.0	100.0	828	1,777	1,554
48.00	1,355	140.0	100.0	1,169	2,945	1,934
49.00	4,817	391.0	100.0	2,909	5,854	12,543

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**10.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	46.00'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 675 sf

Discarded OutFlow Max=0.10 cfs @ 12.32 hrs HW=48.51' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=1.02 cfs @ 12.47 hrs HW=48.62' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.02 cfs @ 0.82 fps)

Pond DP 1: Rain Garden



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS1: Off Slte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=4.39"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=6.10 cfs 18,240 cf

Subcatchment PS2: ES2 Runoff Area=40,838 sf 22.33% Impervious Runoff Depth=2.42"
Tc=5.0 min UI Adjusted CN=49 Runoff=2.55 cfs 8,248 cf

Reach 5R: Grass Swale Avg. Flow Depth=0.39' Max Vel=5.53 fps Inflow=6.10 cfs 18,240 cf
n=0.022 L=145.0' S=0.0345 '/' Capacity=160.04 cfs Outflow=6.08 cfs 18,240 cf

Pond DP 1: Rain Garden Peak Elev=48.93' Storage=5,547 cf Inflow=8.62 cfs 26,488 cf
Discarded=0.10 cfs 6,796 cf Primary=7.26 cfs 18,129 cf Outflow=7.36 cfs 24,925 cf

Total Runoff Area = 90,725 sf Runoff Volume = 26,488 cf Average Runoff Depth = 3.50"
65.04% Pervious = 59,012 sf 34.96% Impervious = 31,713 sf

Summary for Subcatchment PS1: Off SIte

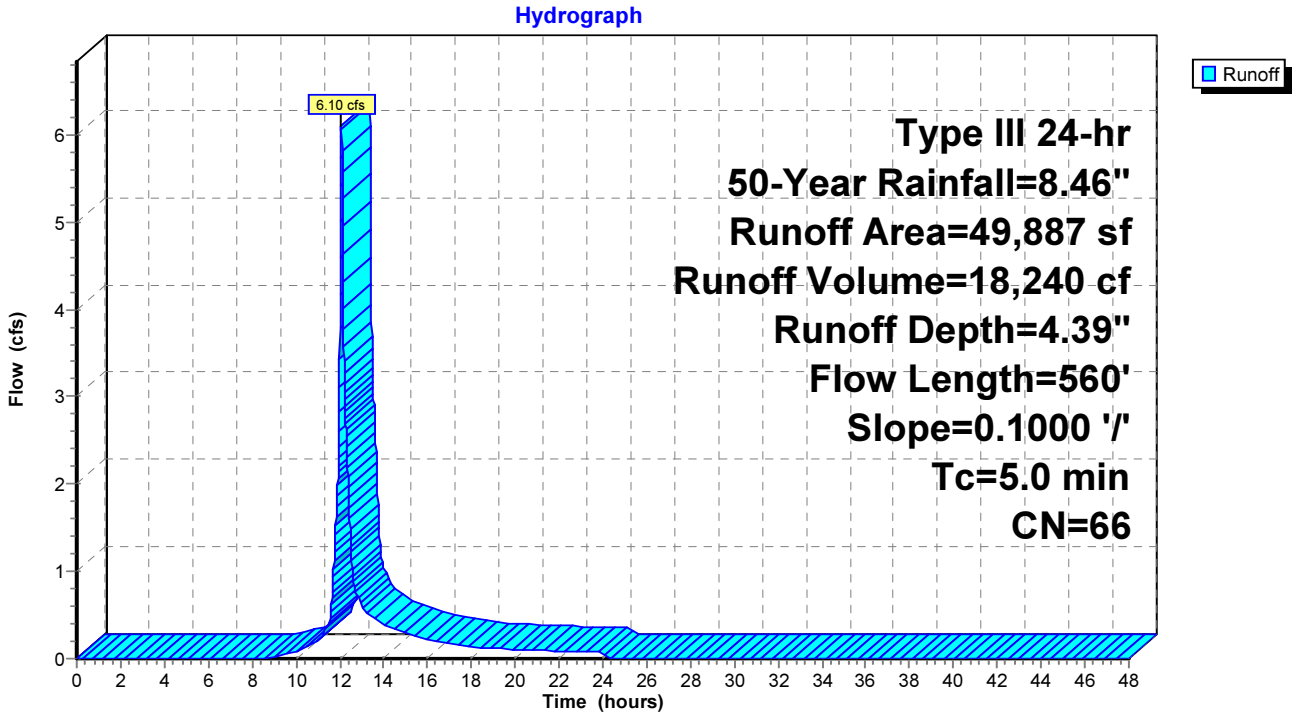
Runoff = 6.10 cfs @ 12.08 hrs, Volume= 18,240 cf, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=8.46"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PS1: Off SIte



Summary for Subcatchment PS2: ES2

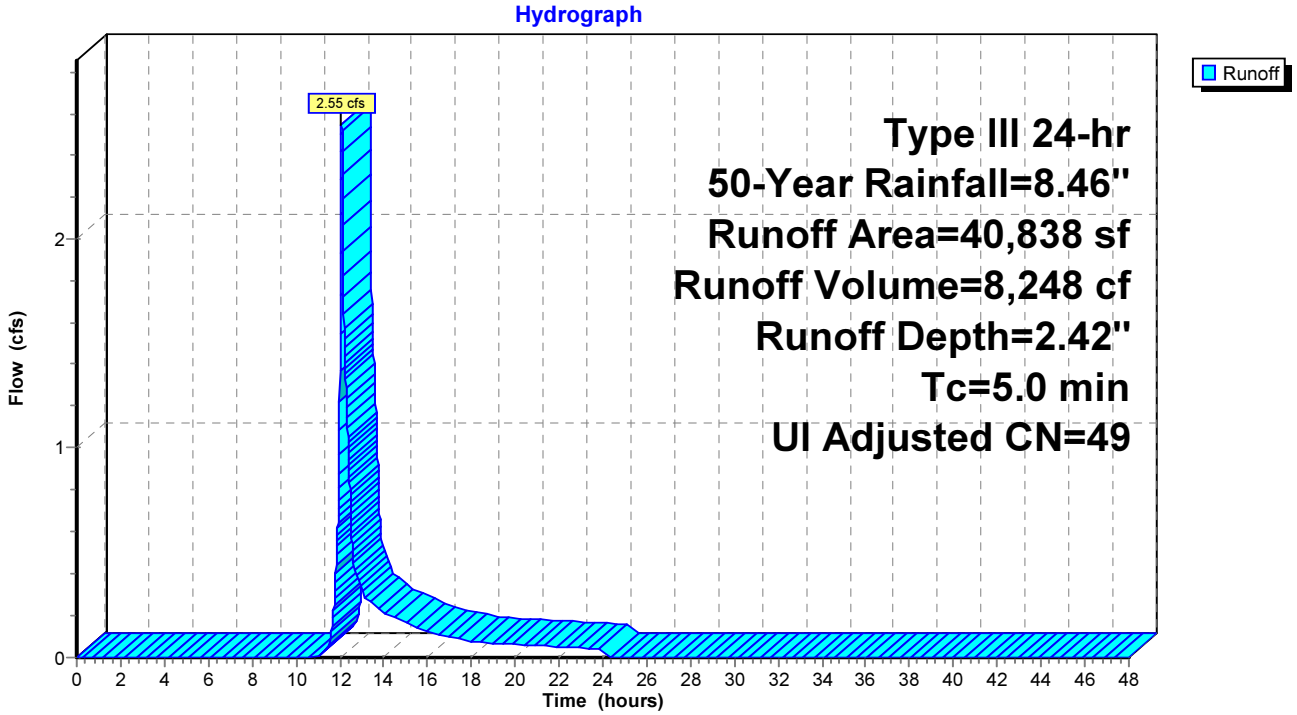
Runoff = 2.55 cfs @ 12.08 hrs, Volume= 8,248 cf, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=8.46"

Area (sf)	CN	Adj	Description
5,137	98		Paved parking, HSG A
3,982	98		Unconnected roofs, HSG A
31,719	39		>75% Grass cover, Good, HSG A
40,838	52	49	Weighted Average, UI Adjusted
31,719			77.67% Pervious Area
9,119			22.33% Impervious Area
3,982			43.67% Unconnected

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

Subcatchment PS2: ES2



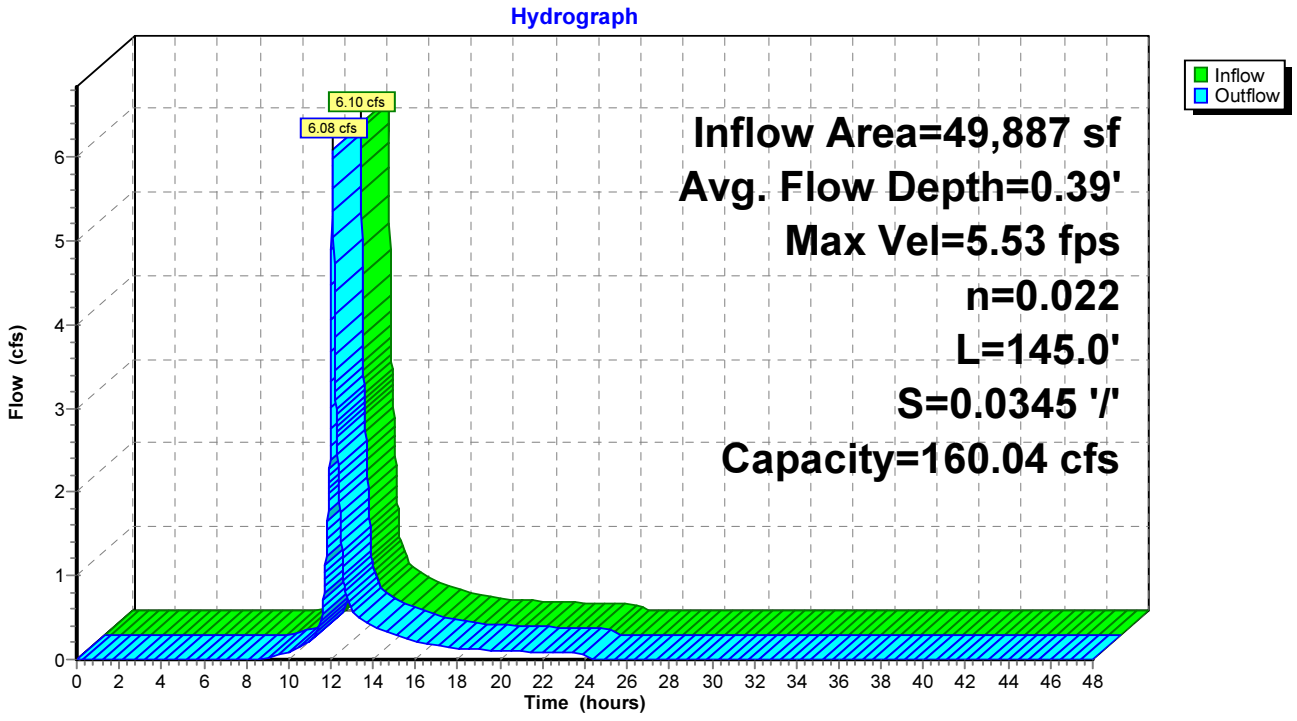
Summary for Reach 5R: Grass Swale

Inflow Area = 49,887 sf, 45.29% Impervious, Inflow Depth = 4.39" for 50-Year event
Inflow = 6.10 cfs @ 12.08 hrs, Volume= 18,240 cf
Outflow = 6.08 cfs @ 12.09 hrs, Volume= 18,240 cf, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.53 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.72 fps, Avg. Travel Time= 1.4 min

Peak Storage= 160 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 160.04 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 145.0' Slope= 0.0345 '/'
Inlet Invert= 53.00', Outlet Invert= 48.00'



Summary for Pond DP 1: Rain Garden

Inflow Area = 90,725 sf, 34.96% Impervious, Inflow Depth = 3.50" for 50-Year event
Inflow = 8.62 cfs @ 12.09 hrs, Volume= 26,488 cf
Outflow = 7.36 cfs @ 12.13 hrs, Volume= 24,925 cf, Atten= 15%, Lag= 2.9 min
Discarded = 0.10 cfs @ 11.99 hrs, Volume= 6,796 cf
Primary = 7.26 cfs @ 12.13 hrs, Volume= 18,129 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.93' @ 12.13 hrs Surf.Area= 4,524 sf Storage= 5,547 cf

Plug-Flow detention time= 165.3 min calculated for 24,920 cf (94% of inflow)
Center-of-Mass det. time= 134.2 min (977.0 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	42.99'	5,854 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

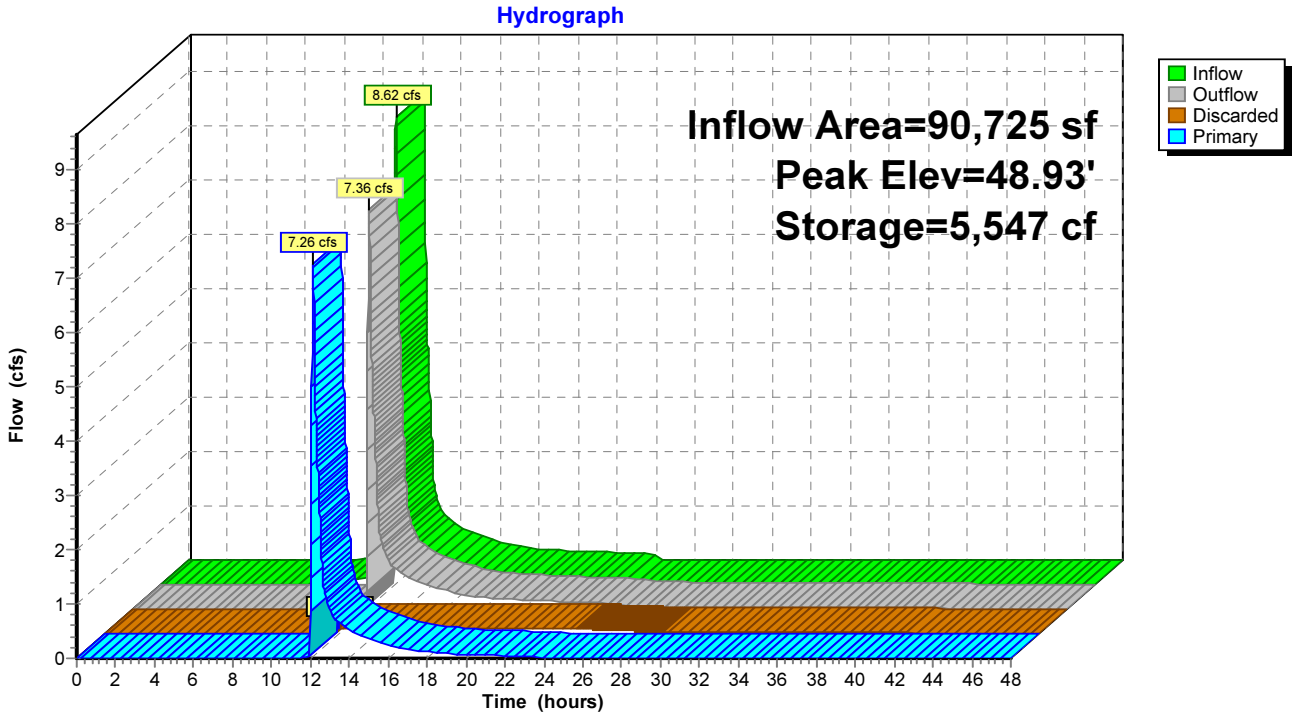
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.99	784	112.0	0.0	0	0	784
43.00	784	112.0	40.0	3	3	785
44.00	784	112.0	40.0	314	317	897
45.00	784	112.0	40.0	314	630	1,009
45.99	784	112.0	40.0	310	941	1,120
46.00	675	106.0	100.0	7	948	1,224
47.00	992	123.0	100.0	828	1,777	1,554
48.00	1,355	140.0	100.0	1,169	2,945	1,934
49.00	4,817	391.0	100.0	2,909	5,854	12,543

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**10.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	46.00'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 675 sf

Discarded OutFlow Max=0.10 cfs @ 11.99 hrs HW=48.51' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=7.24 cfs @ 12.13 hrs HW=48.93' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.24 cfs @ 1.67 fps)

Pond DP 1: Rain Garden



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS1: Off Slte Runoff Area=49,887 sf 45.29% Impervious Runoff Depth=5.82"
Flow Length=560' Slope=0.1000 '/' Tc=5.0 min CN=66 Runoff=8.10 cfs 24,191 cf

Subcatchment PS2: ES2 Runoff Area=40,838 sf 22.33% Impervious Runoff Depth=3.52"
Tc=5.0 min UI Adjusted CN=49 Runoff=3.85 cfs 11,967 cf

Reach 5R: Grass Swale Avg. Flow Depth=0.46' Max Vel=6.01 fps Inflow=8.10 cfs 24,191 cf
n=0.022 L=145.0' S=0.0345 '/' Capacity=160.04 cfs Outflow=8.07 cfs 24,191 cf

Pond DP 1: Rain Garden Peak Elev=49.10' Storage=5,854 cf Inflow=11.91 cfs 36,158 cf
Discarded=0.10 cfs 6,907 cf Primary=12.46 cfs 27,686 cf Outflow=12.56 cfs 34,593 cf

Total Runoff Area = 90,725 sf Runoff Volume = 36,158 cf Average Runoff Depth = 4.78"
65.04% Pervious = 59,012 sf 34.96% Impervious = 31,713 sf

Summary for Subcatchment PS1: Off SIte

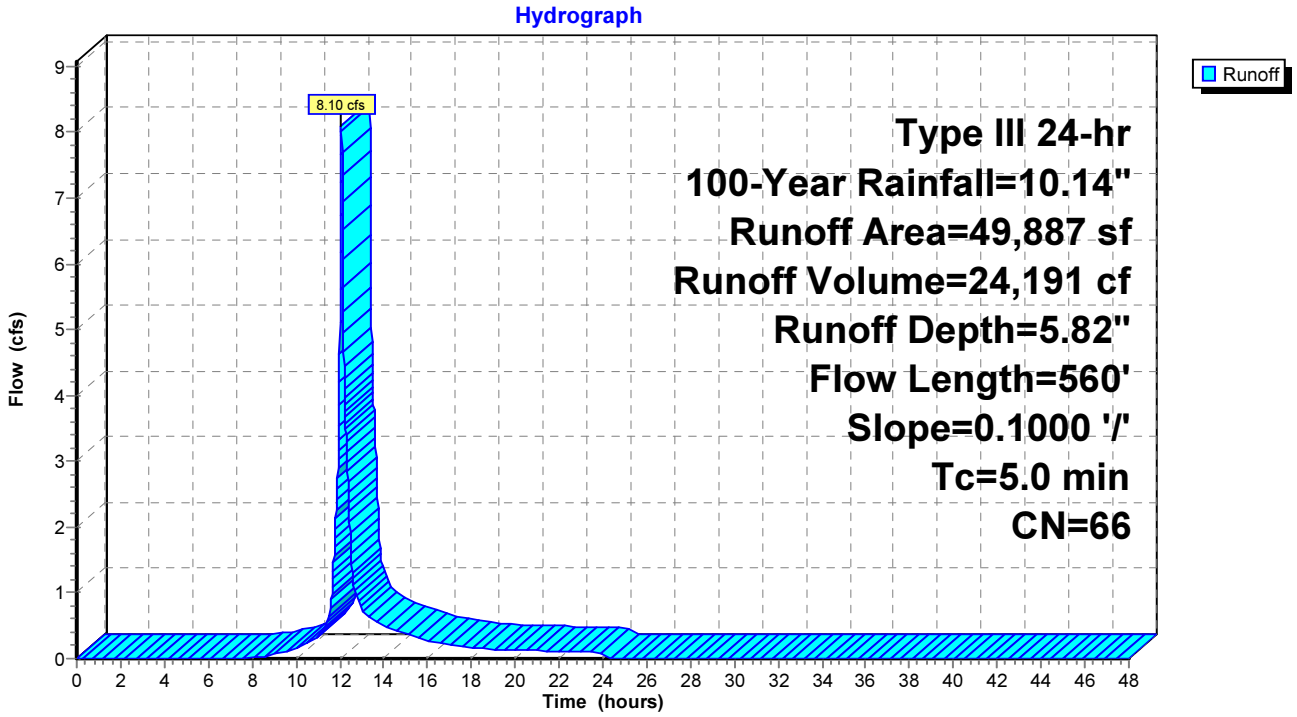
Runoff = 8.10 cfs @ 12.07 hrs, Volume= 24,191 cf, Depth= 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.14"

Area (sf)	CN	Description
14,802	98	Paved parking, HSG A
7,792	98	Unconnected roofs, HSG A
27,293	39	>75% Grass cover, Good, HSG A
49,887	66	Weighted Average
27,293		54.71% Pervious Area
22,594		45.29% Impervious Area
7,792		34.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	560	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	560	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PS1: Off SIte



Summary for Subcatchment PS2: ES2

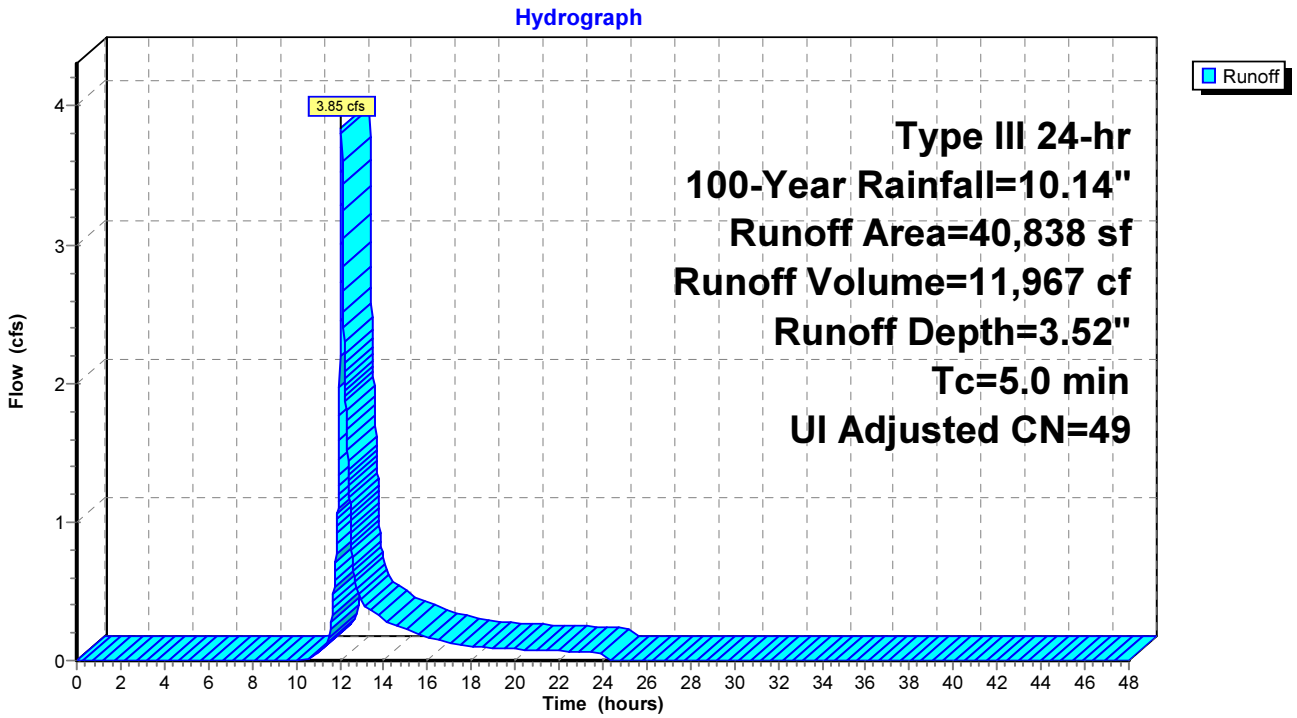
Runoff = 3.85 cfs @ 12.08 hrs, Volume= 11,967 cf, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.14"

Area (sf)	CN	Adj	Description
5,137	98		Paved parking, HSG A
3,982	98		Unconnected roofs, HSG A
31,719	39		>75% Grass cover, Good, HSG A
40,838	52	49	Weighted Average, UI Adjusted
31,719			77.67% Pervious Area
9,119			22.33% Impervious Area
3,982			43.67% Unconnected

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

Subcatchment PS2: ES2



Summary for Reach 5R: Grass Swale

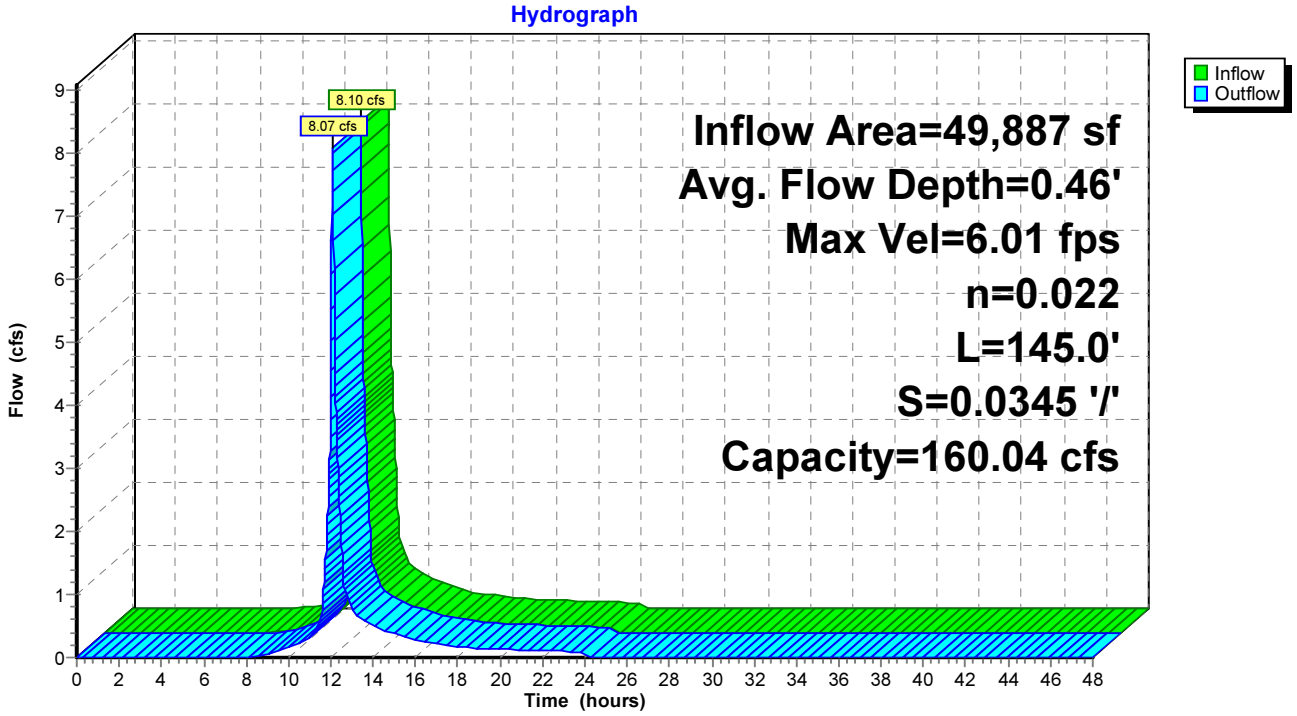
Inflow Area = 49,887 sf, 45.29% Impervious, Inflow Depth = 5.82" for 100-Year event
Inflow = 8.10 cfs @ 12.07 hrs, Volume= 24,191 cf
Outflow = 8.07 cfs @ 12.09 hrs, Volume= 24,191 cf, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.01 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 1.3 min

Peak Storage= 195 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 160.04 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 145.0' Slope= 0.0345 '/'
Inlet Invert= 53.00', Outlet Invert= 48.00'

Reach 5R: Grass Swale



Summary for Pond DP 1: Rain Garden

Inflow Area = 90,725 sf, 34.96% Impervious, Inflow Depth = 4.78" for 100-Year event
Inflow = 11.91 cfs @ 12.08 hrs, Volume= 36,158 cf
Outflow = 12.56 cfs @ 12.09 hrs, Volume= 34,593 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.10 cfs @ 11.83 hrs, Volume= 6,907 cf
Primary = 12.46 cfs @ 12.09 hrs, Volume= 27,686 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.10' @ 12.09 hrs Surf.Area= 4,817 sf Storage= 5,854 cf

Plug-Flow detention time= 124.1 min calculated for 34,586 cf (96% of inflow)
Center-of-Mass det. time= 100.4 min (934.6 - 834.1)

Volume	Invert	Avail.Storage	Storage Description
#1	42.99'	5,854 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

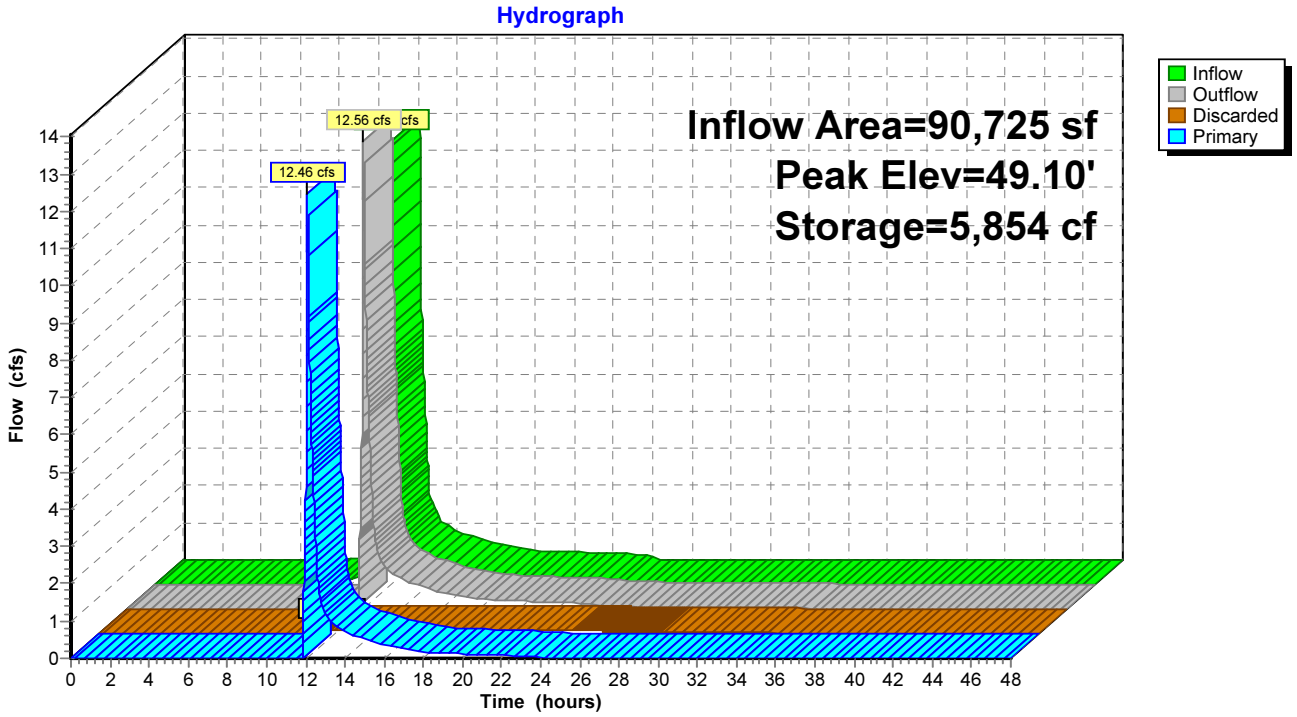
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.99	784	112.0	0.0	0	0	784
43.00	784	112.0	40.0	3	3	785
44.00	784	112.0	40.0	314	317	897
45.00	784	112.0	40.0	314	630	1,009
45.99	784	112.0	40.0	310	941	1,120
46.00	675	106.0	100.0	7	948	1,224
47.00	992	123.0	100.0	828	1,777	1,554
48.00	1,355	140.0	100.0	1,169	2,945	1,934
49.00	4,817	391.0	100.0	2,909	5,854	12,543

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**10.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	46.00'	**2.000 in/hr Exfiltration over Surface area from 46.00' - 48.50'** Excluded Surface area = 675 sf

Discarded OutFlow Max=0.10 cfs @ 11.83 hrs HW=48.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=12.45 cfs @ 12.09 hrs HW=49.10' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 12.45 cfs @ 2.08 fps)

Pond DP 1: Rain Garden



APPENDIX D

SOIL SURVEY INFORMATION

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Rockingham County, New Hampshire

March 27, 2020

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 21, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 31, 2009—Jun 14, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
799	Urban land-Canton complex, 3 to 15 percent slopes	0.5	100.0%
Totals for Area of Interest		**0.5**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

Rockingham County, New Hampshire

799—Urban land-Canton complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9cq0
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Canton and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Parent material: Till

Typical profile

H1 - 0 to 5 inches: gravelly fine sandy loam
H2 - 5 to 21 inches: gravelly fine sandy loam
H3 - 21 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

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

Minor Components

Udorthents

Percent of map unit: 5 percent
Hydric soil rating: No

Squamscott and scitico

Percent of map unit: 4 percent
Landform: Marine terraces
Hydric soil rating: Yes

Boxford and eldridge

Percent of map unit: 4 percent
Hydric soil rating: No

Chatfield

Percent of map unit: 4 percent
Hydric soil rating: No

Scituate and newfields

Percent of map unit: 4 percent
Hydric soil rating: No

Walpole

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

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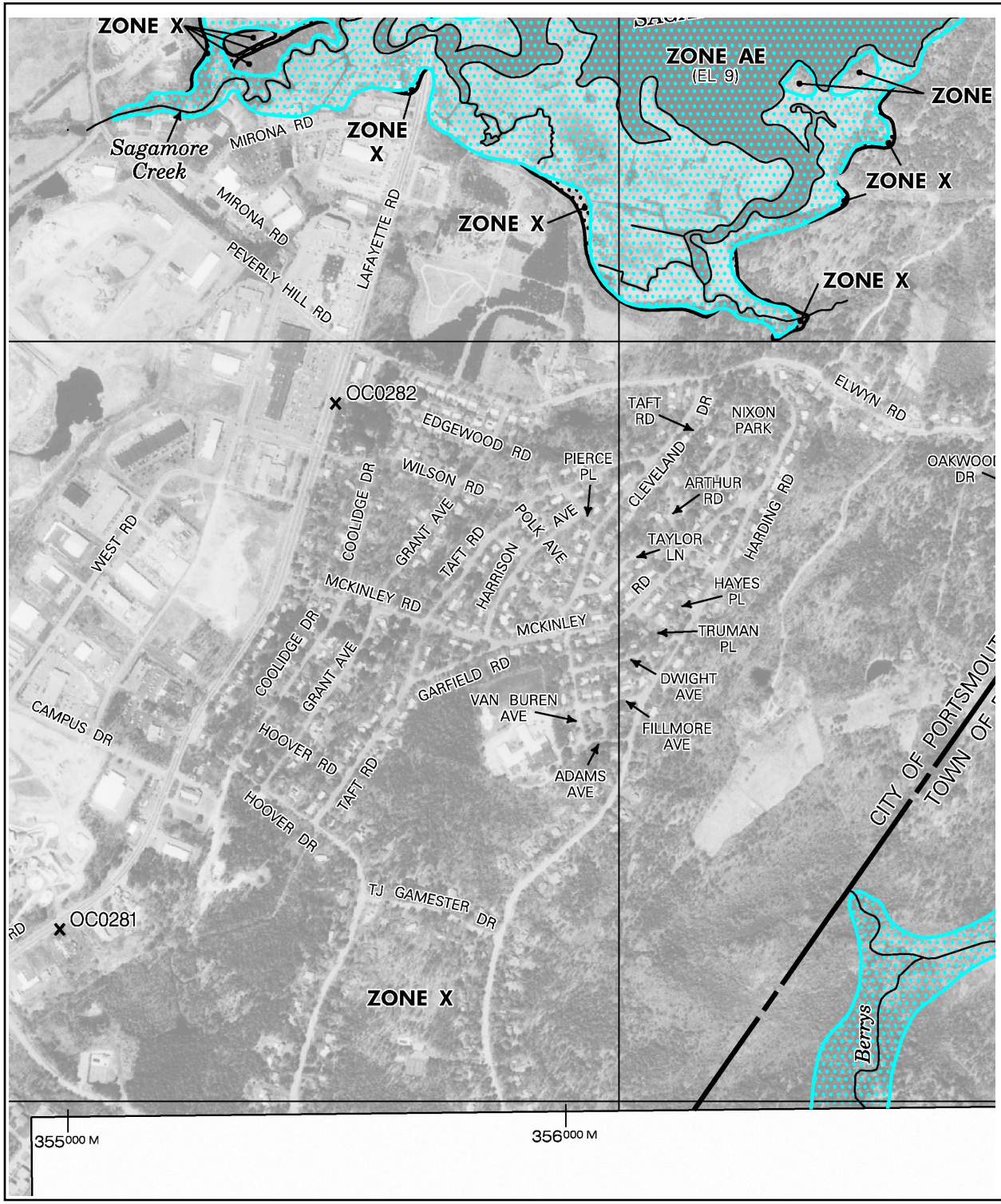
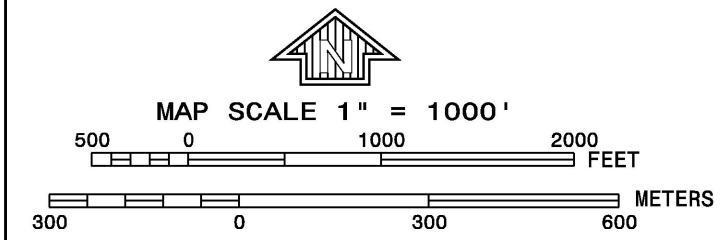
APPENDIX E

FEMA FIRM MAP





NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0270E

FIRM

FLOOD INSURANCE RATE MAP

ROCKINGHAM COUNTY,
NEW HAMPSHIRE
(ALL JURISDICTIONS)

PANEL 270 OF 681

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENLAND, TOWN OF	330210	0270	E
NORTH HAMPTON, TOWN OF	330232	0270	E
PORTSMOUTH, CITY OF	330139	0270	E
RYE, TOWN OF	330141	0270	E

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

MAP NUMBER
33015C0270E

EFFECTIVE DATE
MAY 17, 2005

Federal Emergency Management Agency

APPENDIX F

INSPECTION & MAINTENANCE PLAN

STORMWATER INSPECTION & MAINTENANCE PLAN

FOR

TBD Grant Avenue

Proposed Residential Development

183 Coolidge Drive Subdivision

Portsmouth, NH

Introduction

The intent of this plan is to provide Mathew Wajda – current owner (herein referred to as "owner") with a list of procedures that document the inspection and maintenance requirements of the stormwater management system for this development. Specifically, the swale and rain garden on the project site (collectively referred to as the "Stormwater Management System"). The intent is that building gutters will direct the roof drainage to the proposed rain garden. The site is anticipated to be transferred to a new owner, and the responsibility to carry out this Inspection and Maintenance Plan will be transferred to the new owner with the ownership transfer.

The following inspection and maintenance program is necessary to keep the stormwater management system functioning properly. These measures will also help minimize potential environmental impacts. By following the enclosed procedures, the owner will be able to maintain the functional design of the stormwater management system and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Annual Report

The owner shall prepare an annual Inspection & Maintenance Report. The report shall include a summary of the system's maintenance and repair by transmission of the Inspection & Maintenance Log and other information as required. A copy of the report shall be delivered annually to the City of Portsmouth Department of Public Works.

Inspection & Maintenance Checklist/Log

The following pages contain a Stormwater Management System Inspection & Maintenance Checklist and a blank copy of the Stormwater Management System Inspection & Maintenance Log. These forms are provided to the owner as a guideline for performing the inspection and maintenance of the Stormwater Management System. This is a guideline and should be periodically reviewed for conformance with current practice and standards.

STORMWATER MANAGEMENT SYSTEM COMPONENTS

The Stormwater Management System is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, the design includes the following elements:

Non-Structural BMP's

Non-Structural best management practices (BMP's) include temporary and permanent measures that typically require less labor and capital inputs and are intended to provide protection against erosion of soils. Examples of non-structural BMP's on this project include but are not limited to: temporary and permanent mulching, temporary and permanent grass cover, trees, shrubs and ground covers, miscellaneous landscape plantings, dust control, tree protection, topsoiling, sediment barriers, and a stabilized construction entrance.

Structural BMP's

Structural BMP's are more labor and capital-intensive structures or installations that require more specialized personnel to install. Examples on this project include but are not limited to: drainage channel and rain garden.

Inspection and Maintenance Requirements

The following summarizes the inspection and maintenance requirements for the various BMP's that may be found on this project.

1. **Grassed areas:** After each rain event of 0.5" or more during a 24-hour period, inspect grassed areas for signs of disturbance, such as erosion. If damaged areas are discovered, immediately repair the damage. Repairs may include adding new topsoil, lime, seed, fertilizer and mulch.
2. **Plantings**: Planting and landscaping (trees, shrubs) shall be monitored bi-monthly during the first year to insure viability and vigorous growth. Replace dead or dying vegetation with new stock and make adjustments to the conditions that caused the dead or dying vegetation. During dryer times of the year, provide weekly watering or irrigation during the establishment period of the first year. Make the necessary adjustments to ensure long-term health of the vegetated covers, i.e. provide more permanent mulch or compost or other means of protection.
3. **Rain Garden:** In order to keep the rain garden functioning properly, it is important to keep the filter surface porous and unplugged by debris. After the grass is well established, monitor the growth and health monthly. Replace any dead or dying grass by over-seeding. Keep weeds in check and pull by hand on a regular basis. Remove any other debris that may clog the filter surface. After heavy rains, inspect the rain garden for wash outs or erosion, and if found, repair to pre-damage condition. After leaf fall (i.e. in November), remove large accumulations of leaves. It is not necessary to remove every leaf but at the same time it is not desirable to have the bottom of the rain garden completely covered with leaves to the point of plugging the filter surface. In the spring inspect the rain garden to see if any grass has died over the winter or is otherwise showing signs of weakness or distress. If it is, then repair by over-seeding.

4. **Roof Gutters:** Twice yearly check for sediment clogging and inspect system integrity. Review to insure flow is getting to the rain garden. When needed clean system by removing all sediments. Repair gutters as needed to maintain gutter / piping integrity.

Invasive Species

The site should be monitored during construction for the presence of any invasive species. Such growth should be removed and disposed properly.

Stormwater Management System

Inspection & Maintenance Checklist for Post Construction Condition—for Matthew Wajda,183 Coolidge Drive, Portsmouth, NH

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Roof Gutters	2 X Annually	*Check for sediment and clogging, inspect system integrity.*	Clean system and remove all sediments; maintain gutter / piping and stone surface integrity
Rain Garden	2 X Annually	*Keep infiltration surface clean. Review infiltration after storms. Rain Garden should be dry within 72 hours.*	Remove any weeds, trash, debris and accumulated sediment. If filter does not drain within 72 hours following a rain event, a qualified professional should assess the condition of the facility to determine restoration measures.
Annual Report	Yearly	*Prepare Annual Report, including all Inspection & Maintenance Logs. Provide to Town (if required).*	N/A

Stormwater Management System Maintenance Summary

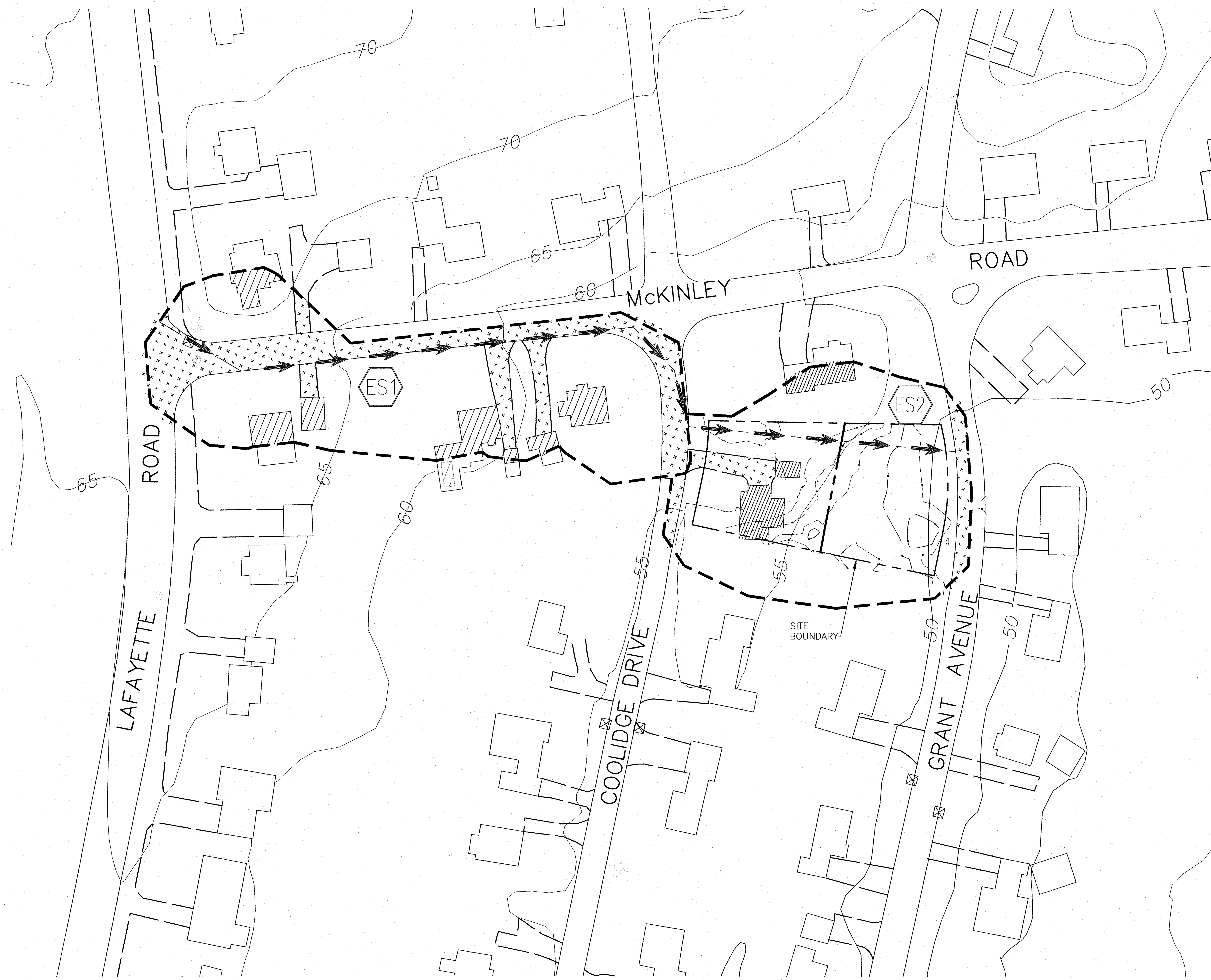
Inspection & Maintenance Log—for Matthew Wajda, 183 Coolidge Drive, Portsmouth, NH

BMP/System Component	Date Inspected	Inspector	Problems Noted, Required Maintenance *(List Items/Comments)*	Date of Maintenance	Performed By

Data Sheet

LEGEND

EXISTING	PROPOSED	
D	D	STORM DRAIN
X X	X X	SILT FENCE
100	100	CONTOUR
97x3	98x0	SPOT ELEVATION
		EDGE OF PAVEMENT (EP)
		SUBCATCHMENT LINE
6	600	SUBCATCHMENT NUMBER
1234 WOODS	1234 WOODS	AREA IN SQUARE FEET DESCRIPTION OF COVER
6	600	POND (DESIGN MODEL)
6	600	REACH (DESIGN MODEL)
		DRAINAGE VECTOR
		EDGE OF WOODS / TREES
CB	CB	CATCH BASIN
DMH	DMH	DRAIN MANHOLE
W	W	WELL
EL.	EL.	ELEVATION
EP	EP	EDGE OF PAVEMENT
FF	FF	FINISHED FLOOR
INV	INV	INVERT
TBM	TBM	TEMPORARY BENCH MARK
TYP	TYP	TYPICAL
		Tc PATH
HSG	HSG	HYDROLGIC SOIL GROUP
SF	SF	SHEET FLOW
SCF	SCF	SHALLOW CONCENTRATED FLOW
CHANNEL	CHANNEL	CHANNEL FLOW



GRAPHIC SCALE
50 40 30 20 10 0 50 100 150 200 FEET
15 10 5 0 10 20 30 40 50 60 METERS

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road - Unit 3
Portsmouth, N.H. 03801-7114
Tel (603) 430-9282
Fax (603) 436-2315

NOTES:

1) PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 268 AS LOT 29.

2) OWNER OF RECORD:
MATTHEW WAJDA
183 COOLIDGE DRIVE
PORTSMOUTH, NH 03801
4936/1611
R.C.R.D. PLAN #01321 (LOT 22

3) PARCEL IS LOCATED IN SINGLE RESIDENCE B (SRB) ZONING DISTRICT.

NOTES:

1) THIS PLAN IS INTENDED FOR RUNOFF ANALYSIS ONLY AND SHALL NOT BE USED FOR CONSTRUCTION.

2) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

3) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

4) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION. (NHDES DECEMBER 2008).

5) TOPO AND SITE FEATURES ARE FROM CITY OF PORTSMOUTH AERIAL MAPS AND ON-SITE TOPO.

WAJDA SUBDIVISION 183 COOLIDGE DRIVE PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
0	ISSUED FOR REVIEW	3/27/20

REVISIONS

STATE OF NEW HAMPSHIRE · JOSEPH L. MULLEDY No. 11502 · LICENSED PROFESSIONAL ENGINEER
3/27/20

SCALE: 1" = 50'

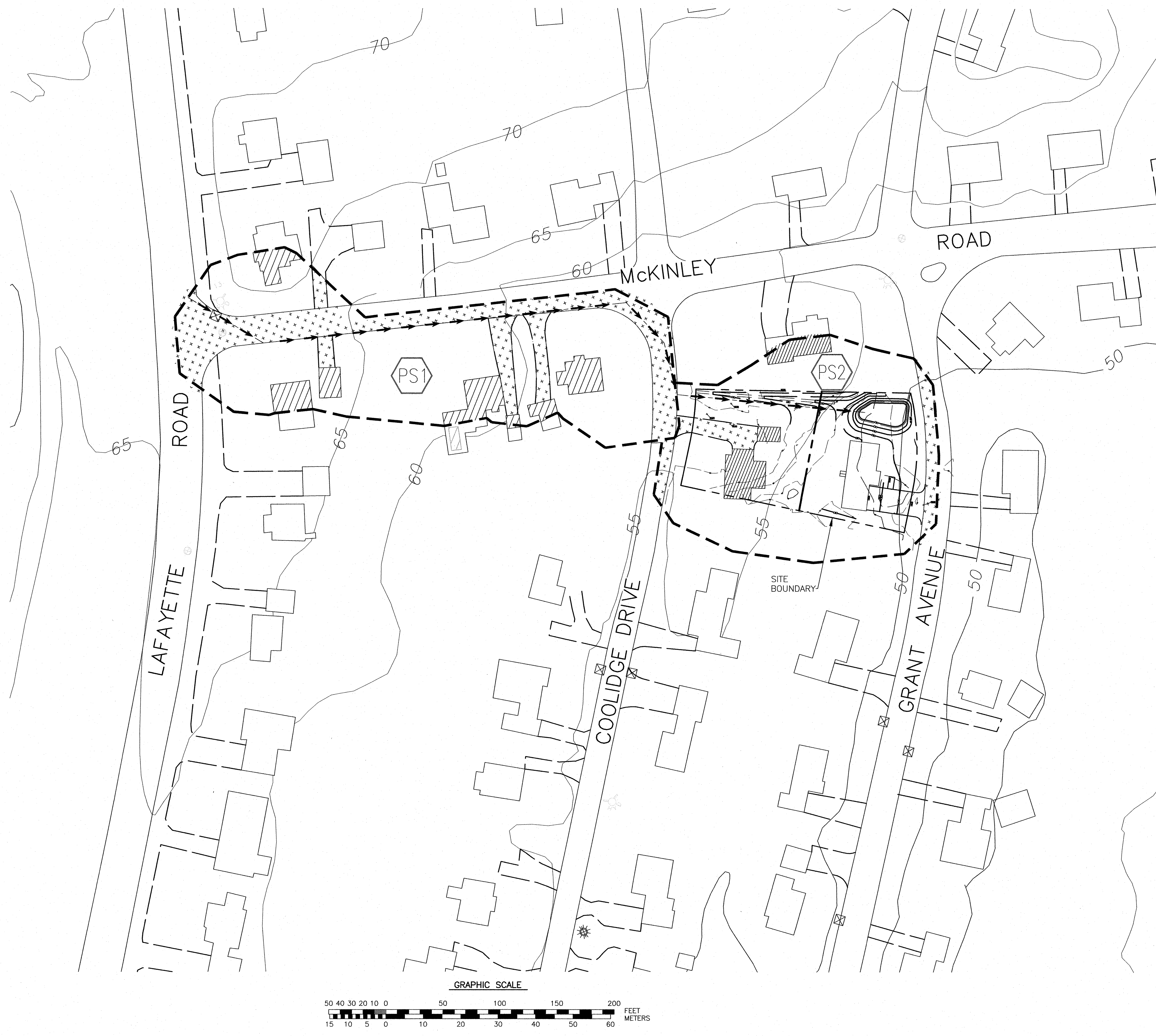
PLAN OF EXISTING SUBCATCHMENTS

W1

3106

LEGEND

EXISTING	PROPOSED	
D	D	STORM DRAIN
X X	X X	SILT FENCE
100	100	CONTOUR
97x3	98x0	SPOT ELEVATION
		EDGE OF PAVEMENT (EP)
		SUBCATCHMENT LINE
6	600	SUBCATCHMENT NUMBER
1234 WOODS	1234 WOODS	AREA IN SQUARE FEET DESCRIPTION OF COVER
6	600	POND (DESIGN MODEL)
6	600	REACH (DESIGN MODEL)
		DRAINAGE VECTOR
		EDGE OF WOODS / TREES
CB	CB	CATCH BASIN
DMH	DMH	DRAIN MANHOLE
W	W	WELL
EL.	EL.	ELEVATION
EP	EP	EDGE OF PAVEMENT
FF	FF	FINISHED FLOOR
INV	INV	INVERT
TBM	TBM	TEMPORARY BENCH MARK
TYP	TYP	TYPICAL
		Tc PATH
HSG	HSG	HYDROLGIC SOIL GROUP
SF	SF	SHEET FLOW
SCF	SCF	SHALLOW CONCENTRATED FLOW
CHANNEL	CHANNEL	CHANNEL FLOW



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5) TOPO AND SITE FEATURES ARE FROM CITY OF PORTSMOUTH AERIAL MAPS AND ON-SITE TOPO.

WAJDA SUBDIVISION 183 COOLIDGE DRIVE PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
0	ISSUED FOR REVIEW	3/27/20

REVISIONS

STATE OF NEW HAMPSHIRE JOSEPH L. MULHERN No. 11302 LICENSED PROFESSIONAL ENGINEER

3/27/20

SCALE: 1" = 50'

PLAN OF PROPOSED SUBCATCHMENTS

W2

3106

City of Portsmouth, New Hampshire

Subdivision Application Checklist

This subdivision application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all subdivision review requirements. Please refer to the Subdivision review regulations for full details.

Applicant Responsibilities (Section III.C): Applicable fees are due upon application submittal along with required number of copies of the Preliminary or final plat and supporting documents and studies. Please consult with Planning staff for submittal requirements.

Owner: Matthew Wajda Date Submitted: 4-6-2020

Applicant: Matthew Wajda

Phone Number: (603) 556-0937 E-mail: mattwajda70@gmail.com

Site Address 1: 183 Coolidge Drive Map: 268 Lot: 29

Site Address 2: _____ Map: _____ Lot: _____

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☐	Completed Application form. **(III.C.2-3)**	On-line	N/A
☐	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF). **(III.C.4)**	On-Line	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
☐	Name and address of record owner, any option holders, descriptive name of subdivision, engineer and/or surveyor or name of person who prepared the plat. **(Section IV.1/V.1)**	Cover Sheet	☑ Preliminary Plat ☑ Final Plat	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
☐	**Preliminary Plat** Names and addresses of all adjoining property owners. **(Section IV.2)** **Final Plat** Names and addresses of all abutting property owners, locations of buildings within one hundred (100) feet of the parcel, and any new house numbers within the subdivision. **(Section V.2)**	Subdivision Plan	☑ Preliminary Plat ☑ Final Plat	N/A
☐	North point, date, and bar scale. **(Section IV.3/V3)**	Required on all Plan Sheets	☑ Preliminary Plat ☑ Final Plat	N/A
☐	Zoning classification and minimum yard dimensions required. **(Section IV.4/V.4)**	Subdivision Plan	☑ Preliminary Plat ☑ Final Plat	N/A
☐	**Preliminary Plat** Scale (not to be smaller than one hundred (100) feet = 1 inch) and location map (at a scale of 1" = 1000'). **(Section IV.5)** **Final Plat** Scale (not to be smaller than 1"=100'), Location map (at a scale of 1"=1,000') showing the property being subdivided and its relation to the surrounding area within a radius of 2,000 feet. Said location map shall delineate all streets and other major physical features that my either affect or be affected by the proposed development. **(Section V.5)**	Subdivision Plan	☑ Preliminary Plat ☑ Final Plat	N/A
☐	Location and approximate dimensions of all existing and proposed property lines including the entire area proposed to be subdivided, the areas of proposed lots, and any adjacent parcels in the same ownership. **(Section IV.6)**	Subdivision Plan	☑ Preliminary Plat ☑ Final Plat	
☐	Dimensions and areas of all lots and any and all property to be dedicated or reserved for schools, parks, playgrounds, or other public purpose. Dimensions shall include radii and length of all arcs and calculated bearing for all straight lines. **(Section V.6/ IV.7)**	Subdivision Plan	☑ Preliminary Plat ☑ Final Plat	N/A
☐	Location, names, and present widths of all adjacent streets, with a designation as to whether public or private and approximate location of existing utilities to be used. Curbs and sidewalks shall be shown. **(Section IV.8/V.7)**	Subdivision Plan	☑ Preliminary Plat ☑ Final Plat	

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
☐	Location of significant physical features, including bodies of water, watercourses, wetlands, railroads, important vegetation, stone walls and soils types that my influence the design of the subdivision. **(Section IV.9/V.8)**	Sheet C1	☑ Preliminary Plat ☑ Final Plat	
☐	**Preliminary Plat** Proposed locations, widths and other dimensions of all new streets and utilities, including water mains, storm and sanitary sewer mains, catch basins and culverts, street lights, fire hydrants, sewerage pump stations, etc. **(Section IV.10)** **Final Plat** Proposed locations and profiles of all proposed streets and utilities, including water mains, storm and sanitary sewer mains, catchbasins and culverts, together with typical cross sections. Profiles shall be drawn to a horizontal scale of 1"=50' and a vertical scale of 1"=5', showing existing centerline grade, existing left and right sideline grades, and proposed centerline grade. **(Section V.9)**	N/A	☑ Preliminary Plat ☑ Final Plat	
☐	When required by the Board, the plat shall be accompanied by profiles of proposed street grades, including extensions for a reasonable distance beyond the subject land; also grades and sizes of proposed utilities. **(Section IV.10)**	N/A	☑ Preliminary Plat ☑ Final Plat	
☐	Base flood elevation (BFE) for subdivisions involving greater than five (5) acres or fifty (50) lots. **(Section IV.11)**	N/A	☑ Preliminary Plat ☑ Final Plat	
☐	For subdivisions of five (5) lots or more, or at the discretion of the Board otherwise, the preliminary plat shall show contours at intervals no greater than two (2) feet. Contours shall be shown in dotted lines for existing natural surface and in solid lines for proposed final grade, together with the final grade elevations shown in figures at all lot corners. If existing grades are not to be changed, then the contours in these areas shall be solid lines. **(Section IV.12/ V.12)**	Sheet C1	☑ Preliminary Plat ☑ Final Plat	

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
☐	Dates and permit numbers of all necessary permits from governmental agencies from which approval is required by Federal or State law. **(Section V.10)**	N/A	☐ Preliminary Plat ☑ Final Plat	
☐	For subdivisions involving greater than five (5) acres or fifty (50) lots, the final plat shall show hazard zones and shall include elevation data for flood hazard zones. **(Section V.11)**	N/A	☐ Preliminary Plat ☑ Final Plat	
☐	Location of all permanent monuments. **(Section V.12)**	Subdivision Plan	☐ Preliminary Plat ☑ Final Plat	

General Requirements[1]			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	**1. Basic Requirements: (VI.1)** a. Conformity to Official Plan or Map b. Hazards c. Relation to Topography d. Planned Unit Development	Sheet C1	
☐	**2. Lots: (VI.2)** a. Lot Arrangement b. Lot sizes c. Commercial and Industrial Lots	Subdivision Plan	
☐	**3. Streets: (VI.3)** a. Relation to adjoining Street System b. Street Rights-of-Way c. Access d. Parallel Service Roads e. Street Intersection Angles f. Merging Streets g. Street Deflections and Vertical Alignment h. Marginal Access Streets i. Cul-de-Sacs j. Rounding Street Corners k. Street Name Signs l. Street Names m. Block Lengths n. Block Widths o. Grade of Streets p. Grass Strips	N/A	
☐	**4. Curbing: (VI.4)**	N/A	
☐	**5. Driveways: (VI.5)**	Sheet C2	
☐	**6. Drainage Improvements: (VI.6)**	Sheet C4	
☐	**7. Municipal Water Service: (VI.7)**	Sheet C3	
☐	**8. Municipal Sewer Service: (VI.8)**	Sheet C3	
☐	**9. Installation of Utilities: (VI.9)** a. All Districts b. Indicator Tape	Sheet C3	
☐	**10. On-Site Water Supply: (VI.10)**	N/A	
☐	**11. On-Site Sewage Disposal Systems: (VI.11)**	N/A	
☐	**12. Open Space: (VI.12)** a. Natural Features b. Buffer Strips c. Parks d. Tree Planting	N/A	
☐	**13. Flood Hazard Areas: (VI.13)** a. Permits b. Minimization of Flood Damage c. Elevation and Flood-Proofing Records d. Alteration of Watercourses	N/A	
☐	**14. Erosion and Sedimentation Control (VI.14)**	Sheet C4	

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☐ ☐ ☐	**15. Easements (VI.15)** a. Utilities b. Drainage	Subdivision Plan	
☐	**16. Monuments: (VI.16)**	Subdivision Plan	
☐	**17. Benchmarks: (VI.17)**	Sheet C1	
☐	**18. House Numbers (VI.18)**	TBD	

Design Standards			
	Required Items for Submittal	**Indicate compliance and/or provide explanation as to alternative design**	**Waiver Requested**
☐	**1. Streets have been designed according to the design standards required under Section (VII.1).** a. Clearing b. Excavation c. Rough Grade and Preparation of Sub-Grade d. Base Course e. Street Paving f. Side Slopes g. Approval Specifications h. Curbing i. Sidewalks j. Inspection and Methods	N/A	
☐	**2. Storm water Sewers and Other Drainage Appurtenances have been designed according to the design standards required under Section (VII.2).** a. Design b. Standards of Construction	Yes	
☐	**3. Sanitary Sewers have been designed according to the design standards required under Section (VII.3).** a. Design b. Lift Stations c. Materials d. Construction Standards	N/A	
☐	**4. Water Mains and Fire Hydrants have been designed according to the design standards required under Section (VII.4).** a. Connections to Lots b. Design and Construction c. Materials d. Notification Prior to Construction	N/A	

Applicant's/Representative's Signature:_____ **Date:**_____

[1] See City of Portsmouth, NH Subdivision Rules and Regulations for details.