

GENERAL LEGEND		DESCRIPTION
EXISTING	PROPOSED	
		PROPERTY LINES
		SETBACK LINES
		CENTERLINE
		FRESHWATER WETLANDS LINE
		TREE LINE
		STONEWALL
		BARBED WIRE
		FENCE
		STOCKADE FENCE
		SOIL BOUNDARY
		AQUIFER PROTECTION LINE
		ZONELINE
		EASEMENT
		MAJOR CONTOUR
		MINOR CONTOUR
		EDGE OF PAVEMENT
		VERTICAL GRANITE CURB
		SLOPE GRANITE CURB
		CAPE COD BERM
		POURED CONCRETE CURB
		SILT FENCE
		DRAINAGE LINE
		SEWER LINE
		SEWER FORCE MAIN
		WATER LINE
		WATER SERVICE
		OVERHEAD ELECTRIC
		UNDERGROUND ELECTRIC
		GUARDRAIL
		UNDERDRAIN
		FIRE PROTECTION LINE
		THRUST BLOCK
		IRON PIPE/IRON ROD
		DRILL HOLE
		IRON ROD/DRILL HOLE
		STONE/GRANITE BOUND
		SPOT GRADE
		PAVEMENT SPOT GRADE
		CURB SPOT GRADE
		BENCHMARK (TBM)
		DOUBLE POST SIGN
		SINGLE POST SIGN
		WELL
		TEST PIT
		FAILED TEST PIT
		MONITORING WELL
		TREES AND BUSHES
		UTILITY POLE
		LIGHT POLES
		DRAIN MANHOLE
		SEWER MANHOLE
		HYDRANT
		SINGLE GRATE CATCH BASIN
		DOUBLE GRATE CATCH BASIN
		TRANSFORMER
		CULVERT W/WINGWALLS
		CULVERT W/FLARED END SECTION
		CULVERT W/STRAIGHT HEADWALL
		STONE CHECK DAM
		DRAINAGE FLOW DIRECTION
		VEGETATED FILTER STRIP
		RIPRAP
		FRESHWATER WETLANDS
		STABILIZED CONSTRUCTION ENTRANCE
		CONCRETE
		GRAVEL
		SNOW STORAGE
		RETAINING WALL

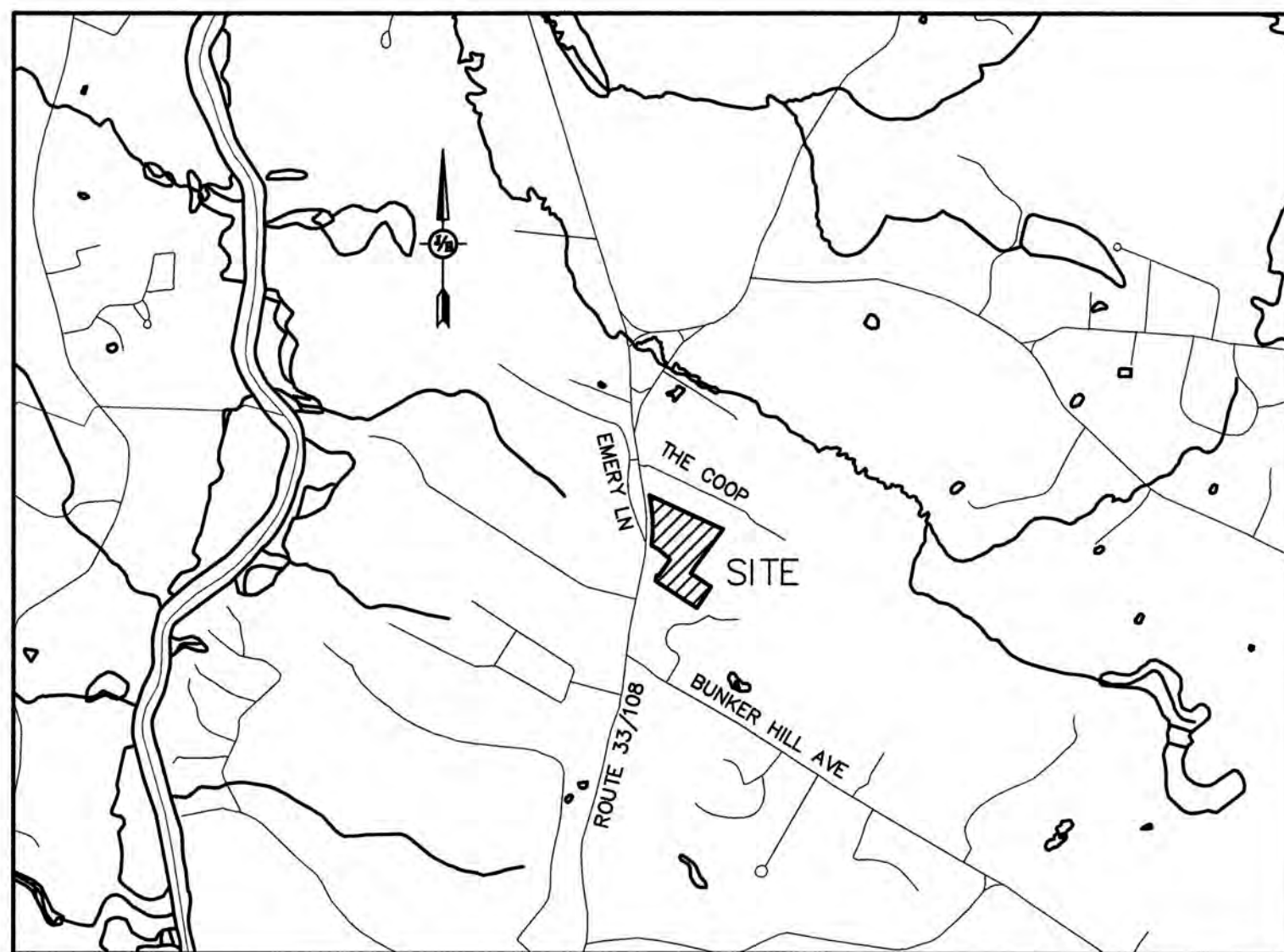
SITE PLAN

"STRATHAM NH SPCA"

TAX MAP 13 AND LOTS 83, 84 & 85

102, 104 & 108 PORTSMOUTH AVENUE

ROUTE 108/33, STRATHAM NH 03885



LOCUS MAP
SCALE 1" = 2000'

APPLICANT
NH SPCA
104 PORTSMOUTH AVENUE
PO BOX 196, STRATHAM, NH 03885
(603) 772-2921
CONTACT: LISA DENNISON

ARCHITECT
ARQ ARCHITECTS
ATTN: LUCINDA SCHLAFFER, AIA
1 GOVERNMENT ST #2
KITTEERY, ME 03904
(207) 439-5286

CIVIL ENGINEER / SURVEYOR
JONES & BEACH ENGINEERS, INC.
85 PORTSMOUTH AVENUE
PO BOX 219
STRATHAM, NH 03885
(603) 772-4746
CONTACT: JONATHAN RING, PE
EMAIL: JRING@JONESANDBEACH.COM

WETLAND & SOIL CONSULTANT
GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE, UNIT H
EXETER, NH 03833-7507
(603) 778-0644 X2
CONTACT: JAMES GOVE

ELECTRIC
UNITIL
6 LIBERTY LANE WEST
HAMPTON, NH 03842
(603) 852-7276

TELEPHONE
CONSOLIDATED COMMUNICATIONS
1575 GREENLAND ROAD
GREENLAND, NH 03840
(603) 427-5525
CONTACT: JOE CONSINDINE

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

LIGHTING CONSULTANT
CHARRON, INC.
PO BOX 4550
MANCHESTER, NH 03108
(603) 622-8418
CONTACT: KEN SWEENEY

LANDSCAPE ARCHITECT
SOREN DENOIRD DESIGN STUDIO
43 WELLWOOD ROAD
PORTLAND, ME 04103
SOREN@SORENDENOIRD.COM
CONTACT: SOREN DENOIRD

ABUTTERS

13/86
ONE HUNDRED PORTSMOUTH AVENUE PROPERTY, LLC
100 PORTSMOUTH AVE., UNIT 3
STRATHAM, NH 03885
3754/0765 (04/11/02)

13/87
STONE BROOK PROPERTIES, LLC
98 PORTSMOUTH AVE.
STRATHAM, NH 03885
4960/0518 (10/31/08)

13/88
JOSEPHINE E. SCAMMAN REVOCABLE TRUST
JOSEPHINE E. SCAMMAN, TRUSTEE
96 PORTSMOUTH AVE.
PO BOX 292
STRATHAM, NH 03885
5507/2467 (01/15/14)

13/96
WARK REVOCABLE TRUST 2015
GRAHAM J. WARK, TRUSTEE
13 TRISHA'S WAY
STRATHAM, NH 03885
5666/0720 (10/29/15)

13/97
DAVID D. CURRY
ELIZABETH ANN CURRY
15 TRISHA'S WAY
STRATHAM, NH 03885
3460/414 (03/03/00)

13/39
BRIAN D. NELSON
JENNIFER L. NELSON
14 EMERY LANE
STRATHAM, NH 03885
3420/2052 (08/31/99)

13/43
KIM LEVINE STILES
THEODORE ROLLIN STILES
5 EMERY LANE
STRATHAM, NH 03885
5915/2664 (05/24/18)

13/44
RICHARD VITALE
7 EMERY LANE
STRATHAM, NH 03885
5273/0767 (12/21/11)

13/76 (14 MILLBROOK DR.)
13/77 (12 MILLBROOK DR.)
13/78 (10 MILLBROOK DR.)
13/79 (8 MILLBROOK DR.)
13/80 (6 MILLBROOK DR.)
13/81 (4 MILLBROOK DR.)
13/82 (2 MILLBROOK DR.)
13/98 (17 TRISHA'S WAY)
EMANUEL CO., INC.
6 PATRIOTS RD.
STRATHAM, NH 03885



Know what's below
811 before you dig

PERMITS

TYPE OF PERMIT	STATUS
STRATHAM SITE PLAN APPROVAL: TOWN OF STRATHAM PLANNING BOARD 10 BUNKER HILL STRATHAM, NEW HAMPSHIRE 03885 (603) 772-7391 RESPONSIBLE CONSULTANT: JONES & BEACH ENGINEERS, INC.	SUBMITTED: 5/15/2019; 3/10/20 PERMIT NO. DATED: EXPIRATION:
NHDES ALTERATION OF TERRAIN PERMIT: NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES - WATER DIVISION 29 HAZEN DRIVE, P.O. BOX 95 CONCORD, NEW HAMPSHIRE 03302-0095 (603) 271-3503 RESPONSIBLE CONSULTANT: JONES & BEACH ENGINEERS, INC.	SUBMITTED: 8/12/2019; 3/31/20 PERMIT NO. DATED: EXPIRATION:
USEPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT, NOTICE OF INTENT (NOI), AND NOTICE OF TERMINATION (NOT) TO BE FILED IN ACCORDANCE WITH FEDERAL AND LOCAL REGULATIONS PRIOR TO AND FOLLOWING CONSTRUCTION: EPA STORMWATER NOTICE PROCESSING CENTER MAIL CODE 4203M, US EPA 1200 PENNSYLVANIA AVENUE, NW WASHINGTON, DC 20460 RESPONSIBLE CONSULTANT: JONES & BEACH ENGINEERS, INC.	

PROJECT PARCEL
TOWN OF STRATHAM
TAX MAP 13, LOT 83, 84 & 85
BK: 5988 PG: 0105
BK: 2244 PG: 1786
BK: 5579 PG: 1936

APPLICANT
NH SPCA
104 PORTSMOUTH AVE
STRATHAM, NH 03885

TOTAL LOT AREA
652,668 SQ. FT.
14.98 ACRES

APPROVED — STRATHAM, NH
PLANNING BOARD

DATE:

Design: JSR	Draft: PLB	Date: 10/8/18
Checked: JSR	Scale: AS NOTED	Project No.: 17088
Drawing Name: 17088-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		



REV.	DATE	REVISION	BY
3	3/31/20	REVISED PER HW; SUBMITTED TO TOWN AND NHDES	DJM
2	3/3/20	REVISED PER OWNER; SUBMIT TO PLANNING BOARD	DJM
1	8/1/19	SUBMITTED TO NHDES	PLB
0	5/15/19	ISSUED FOR REVIEW	PLB

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

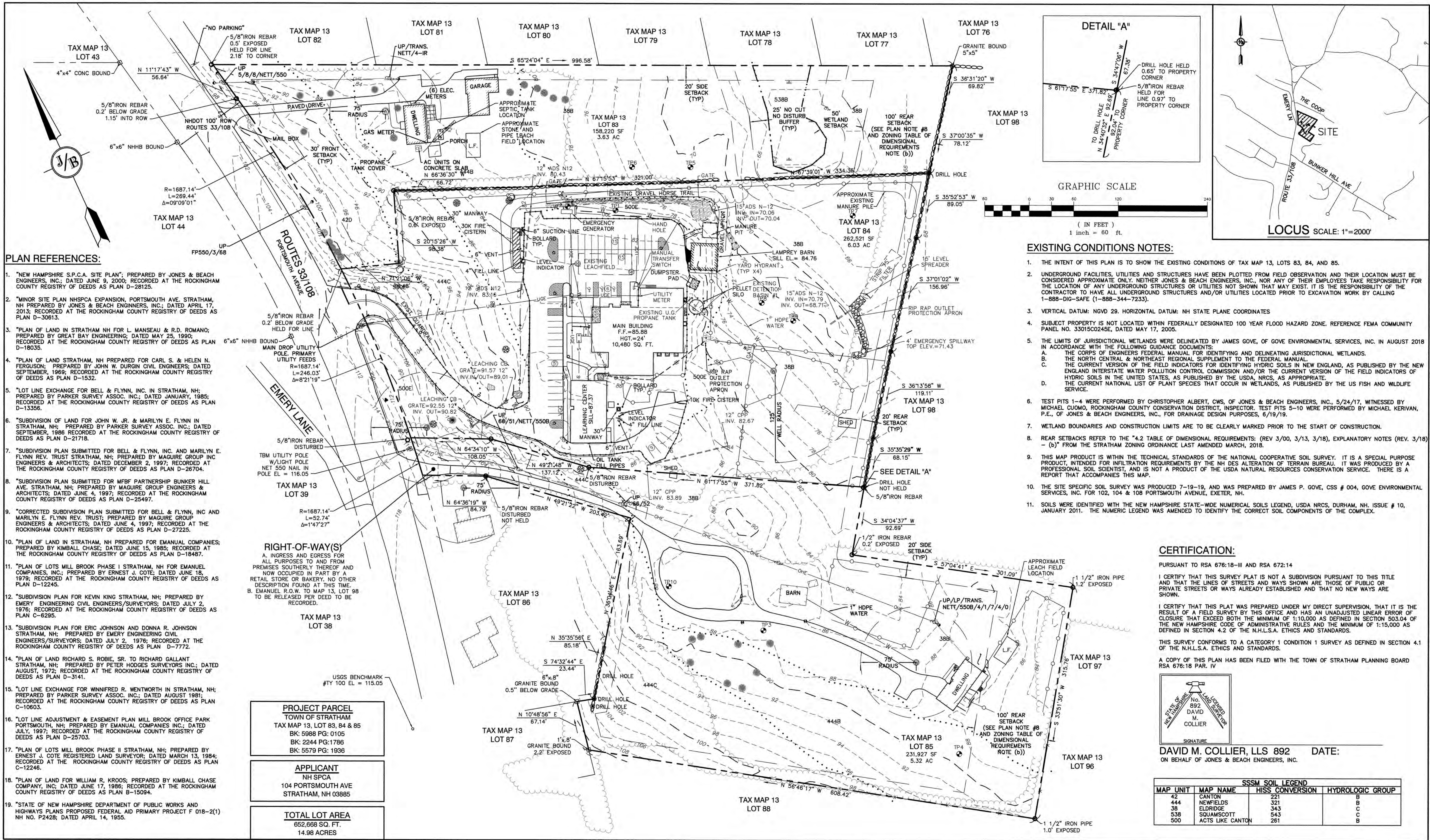
Civil Engineering Services

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	COVER SHEET
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.	CS
SHEET 1 OF 16	JBE PROJECT NO. 17088

SITE PLAN FOR NH SPCA, STRATHAM NH
JBE PROJECT NO. 17088



Design: JSR Draft: PLB Date: 10/8/18
Checked: JSR Scale: 1" = 60' Project No.: 17088
Drawing Name: 17088-PLAN.dwg
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Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

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

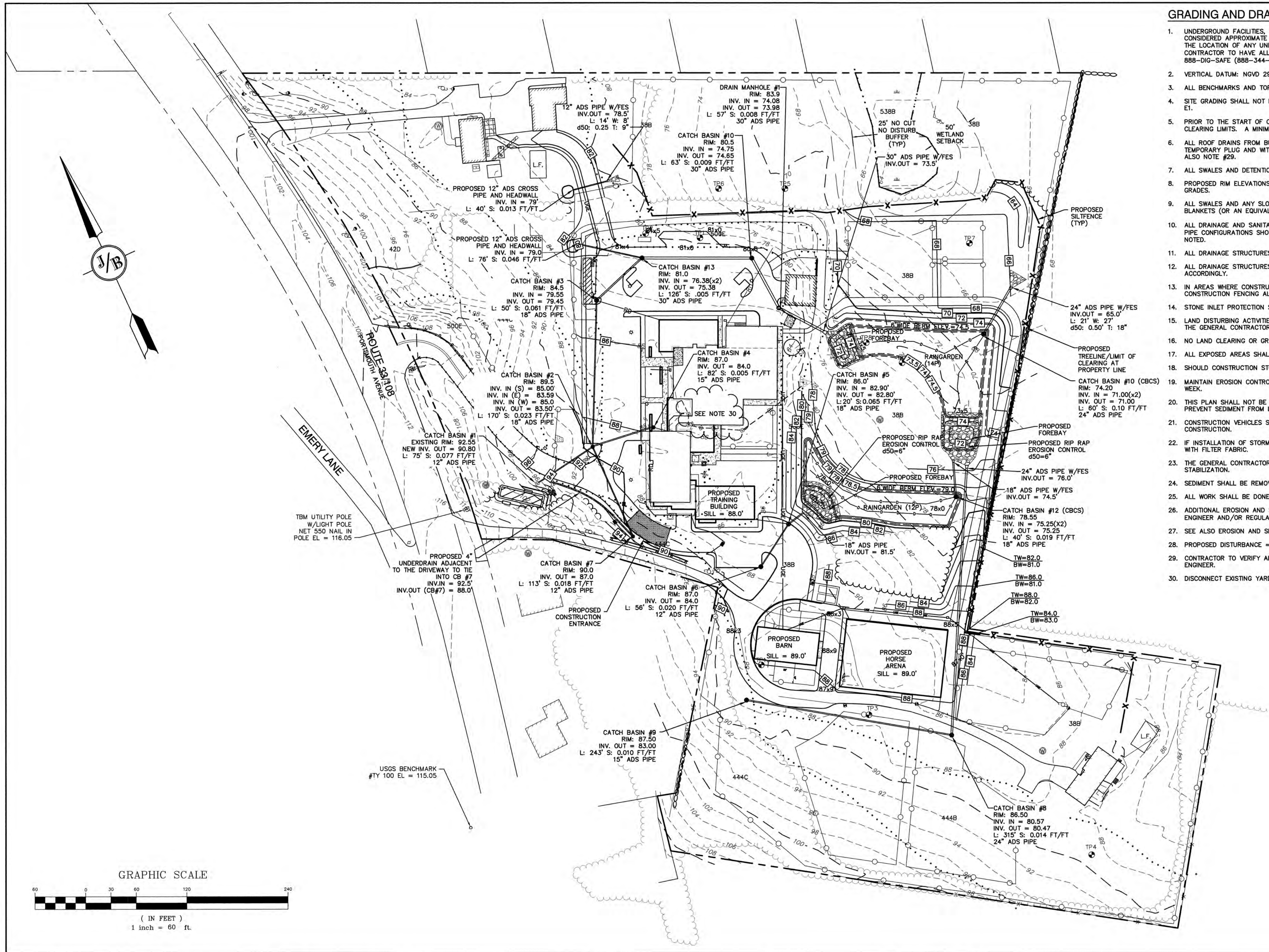
Plan Name: **EXISTING CONDITIONS PLAN**

Project: **NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE**

Owner of Record: **NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885**

DRAWING No. **C1**

SHEET 2 OF 16
JBE PROJECT NO. 17088



GRADING AND DRAINAGE NOTES:

- UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES AND/OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 888-DIG-SAFE (888-344-7233).
- VERTICAL DATUM: NGVD 29. HORIZONTAL DATUM: NH STATE PLANE COORDINATES.
- ALL BENCHMARKS AND TOPOGRAPHY SHOULD BE FIELD VERIFIED BY THE CONTRACTOR.
- SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT'S LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
- ALL ROOF DRAINS FROM BUILDING SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLAN AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT THE END. ALL EXTERIOR ROOF DOWNSPOUTS ARE TO BE INSTALLED WITH OVERFLOW DEVICES. SEE ALSO NOTE #29.
- ALL SWALES AND DETENTION PONDS ARE TO BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
- PROPOSED RIM ELEVATIONS OF DRAINAGE STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES.
- ALL SWALES AND ANY SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN S75 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER), UNLESS OTHERWISE SPECIFIED.
- ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 3' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
- ALL DRAINAGE STRUCTURES SHALL BE PRECAST, UNLESS OTHERWISE SPECIFIED.
- ALL DRAINAGE STRUCTURES AND STORM SEWER PIPES SHALL MEET HEAVY DUTY TRAFFIC H2O LOADING AND SHALL BE INSTALLED ACCORDINGLY.
- IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
- STONE INLET PROTECTION SHALL BE PLACED AT ALL CATCH BASINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
- LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY ALL GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE EPA SWPPP DURING CONSTRUCTION OPERATIONS.
- NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
- ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING.
- SHOULD CONSTRUCTION STOP FOR LONGER THAN 3 DAYS, THE SITE SHALL BE SEEDED AS SPECIFIED.
- MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.25" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
- THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
- CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
- IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
- SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
- ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
- SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEET E1.
- PROPOSED DISTURBANCE = 235,000 S.F.
- CONTRACTOR TO VERIFY ALL EXISTING AND PROPOSED ROOF DRAINS AND FOUNDATION DRAINS WITH ARCHITECT AND INFORM CIVIL ENGINEER.
- DISCONNECT EXISTING YARD AND ROOF DRAINS, AND CONNECT EXISTING SUMP PUMP DRAINS TO STORM DRAIN SYSTEM.

Design: JSR	Draft: PLB	Date: 10/8/18
Checked: JSR	Scale: 1" = 60'	Project No.: 17088
Drawing Name: 17088-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		



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3	3/31/20	REVISED PER HW; SUBMITTED TO TOWN AND NHDES	DJM
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J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

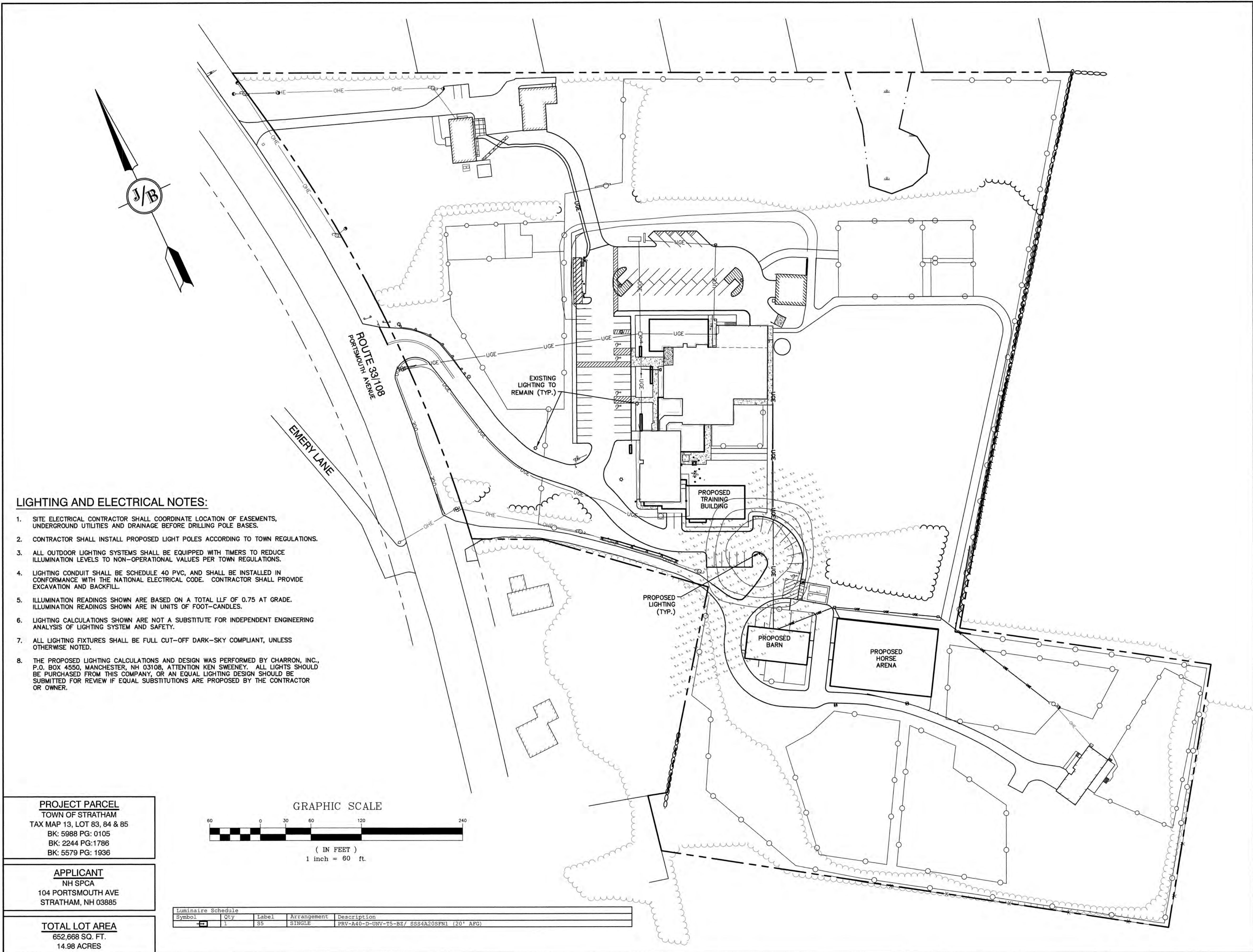
Designed and Produced in NH
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	GRADING AND DRAINAGE PLAN
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.

C3

SHEET 5 OF 16
JBE PROJECT NO. 17088



Lumark

DESCRIPTION
The Prevail LED area, site luminaire combines optical performance, energy efficiency and long term reliability in an advanced, patented modern design. Utilizing the latest LED technology, the Prevail luminaire delivers unparalleled uniformity resulting in greater pole spacing. A versatile mount standard arm facilitates ease of installation for both retrofit and new installations. With energy savings greater than 62%, the Prevail fixture replaces 150-450W metal halide fixtures in general area lighting applications such as parking lots, walkways, roadways and building areas.

SPECIFICATION FEATURES
Construction
Construction is comprised of a heavy-duty, single-piece die-cast aluminum housing. The LED drivers are mounted in direct contact with the ceiling to provide low operating temperature and long life. The die-cast aluminum door is hinged to provide easy access to the driver if replacement is required. A one-piece silicone gasket seals the door to the fixture housing. The optics is mounted on a variable, aluminum plate that dissipates heat from the LEDs resulting in longer life of the fixture. The fixture is IP66 and 3G vibration rated (ANSI C136.31) to insure strength of construction and longevity in the selected application.
Optics
Precision molded, high efficiency optics are precisely designed to shape the distribution, maximizing efficiency and application spacing. Available in Type II, III, IV and V distributions with lumen packages ranging from 6,100 to 18,900 nominal lumens. Light engine configurations consist of 1 or 2 high-efficiency LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L20,000 hours at 25°C) per IESNA TM-21. For the ultimate level of spill light control, an optional house side shield accessory can be field or factory installed.

Electrical
LED drivers are mounted to the fixture for optimal heat sinking and ease of maintenance. Thermal management incorporates both conduction and convection to transfer heat rapidly away from the LED source for optimal efficiency and light output. Class 1 electronic drivers have a power factor >80%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Available in 120-277V 50/60Hz, 847V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. 10A/110 VA surge protection standard. 0-10V dimming driver is standard with leads external to the fixture. Suitable for ambient temperatures from -40°C to 40°C. Optional 50°C HA (high ambient) available. Standard NEMA 3-PIN twistlock photocontrol receptacle and NEMA 7-PIN twistlock photocontrol receptacles are available as options.

Mounting
Standard pole mount arm is bolted directly to the pole and the fixture slides onto the arm and locks in place with a bolt facilitating quick and easy installation. The versatile, patented, standard mount arm accommodates multiple drill patterns ranging from 1-1/2" to 4-7/8". Removal of the door on the standard mounting arm enables wiring of the fixture without having to access the driver compartment. A knock-out on the standard mounting arm enables round pole mounting. Wall mount and mast arm mounting options are available. Mast arm adapter fits 2-3/8" O.D. tenon.

Finish
Housing and cast parts finished in five-stage super TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Standard color is bronze. Additional colors available in white, gray, black, dark platinum and graphite metallic.

Warranty
Five-year warranty.

CERTIFICATION DATA
UL and cUL Wet Location Listed
RoHS/REACH
3G Vibration Tested
ISO 9001
DesignLights Consortium® Qualified*
Dark Sky Approved (3000K CCT and warmer only)

ENERGY DATA
Electronic LED Driver
0.3 Power Factor
<20% Total Harmonic Distortion
120-277V/50 and 60Hz
847V/60Hz, 480V/60Hz
40°C Minimum Temperature Rating
40°C Ambient Temperature Rating

EPA
Effective Projected Area (Sq. Ft.): 0.75

SHIPPING DATA
Approximate Net Weight:
23 lbs. (9.8 kg.)

DESIGN CONSIDERATIONS
Wind induced vibrations resulting from steady, unidirectional winds and other aerodynamic forces, as well as vibration and coefficient of height factors for non-grounded mounted installations (e.g., installations on bridges or buildings) are not included in this document. The information contained herein is for general guidance only and is not a replacement for professional judgement. Consult with professional, local and federal standards, further detailing to ensure product is appropriate for the intended purpose and installation location. Also, please review Eaton's Light Pole White Paper for risk factors and design considerations. L1001-2015

Specifications and dimensions subject to change without notice. Consult your lighting representative at Eaton or visit www.eaton.com/lighting for available options, accessories and ordering information.

ORDERING INFORMATION
SAMPLE NUMBER: SSSA208FW1XG

Product Family	Shaft Size	Mounting Height (ft.)	Wind Thrust (lbs.)	Base Type	Finish	Mounting Type	Number and Location of Arms	Arm Lengths (ft.)	Options (Add as Suffix)
SSS-Square Straight Steel	4-1/2" 5-1/2" 6-1/2"	10-10" 15-10" 20-20" 25-20" 30-20" 35-20" 38-20"	10-10" Max. 160" Max. 250"	S-Square Steel Base	F-Dark Bronze G-Galvanized Steel A-Burnt White K-Carbon Bronze L-Black Phosphor M-Burnt Green N-Silver O-Graphite Metallic V-White X-Custom Color Y-Black	2-3-3/8" O.D. Tenon (4" Long) 2-1/2-1/2" O.D. Tenon (5" Long) 4-1/2-1/2" O.D. Tenon (8" Long) 6-1/2-1/2" O.D. Tenon (8" Long) 7-1/2-1/2" O.D. Tenon (10" Long) 8-1/2-1/2" O.D. Tenon (10" Long) 9-1/2-1/2" O.D. Tenon (10" Long) 10-1/2-1/2" O.D. Tenon (10" Long) 11-1/2-1/2" O.D. Tenon (10" Long) 12-1/2-1/2" O.D. Tenon (10" Long) 13-1/2-1/2" O.D. Tenon (10" Long) 14-1/2-1/2" O.D. Tenon (10" Long) 15-1/2-1/2" O.D. Tenon (10" Long) 16-1/2-1/2" O.D. Tenon (10" Long) 17-1/2-1/2" O.D. Tenon (10" Long) 18-1/2-1/2" O.D. Tenon (10" Long) 19-1/2-1/2" O.D. Tenon (10" Long) 20-1/2-1/2" O.D. Tenon (10" Long) 21-1/2-1/2" O.D. Tenon (10" Long) 22-1/2-1/2" O.D. Tenon (10" Long) 23-1/2-1/2" O.D. 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PLANT SCHEDULE			
ID	BOTANICAL NAME	COMMON NAME	QTY SIZE
CONIFEROUS TREES			
EWC	CEDRUS	EASTERN WHITE CEDAR	X 4'-6" 4' OC
DECIDUOUS TREES			
CK	CORNUS KOUSA	KOUSA DOGWOOD	X 10' - 12'
STORM-WATER GARDEN		Perennials/Grasses 24" OC Shrubs 4' OC	
CS	CORNUS SERICEA	RED TWIGGED DOGWOOD	
CA	CLETHRA ALN.	SUMMER SWEET	
IV	ILEX VERTICILATTA	WINTERBERRY HOLLY	
IR	IRIS VERSICOLOR	BLUE FLAG IRIS	
PA	PANICUM	SWITCHGRASS	
POLLINATOR GARDEN		Perennials/Grasses 24" OC Shrubs 4' OC	
NE	NEPETA	CATMINT	
EP	EUTROCHIUM PURPUREAUM	JOE PYE WEED	
EC	ECHINAEA	CONE FLOWER	
SA	SALVIA SP.	MEADOW SAGE 'May Night'	
PA	PANICUM	SWITCHGRASS	
SH	SPOROBOLUS HETEROLEPIS	PRAIRIE DROP-SEED	
RA	RHUS AROMAICA	LOW GROW SUMAC	
VEGETATED GARDEN ROOF		SYSTEM I	
SE	SEDUM	VARYING 12" OC	6-8 TYPES

SYMBOLS LEGEND	
HARDSCAPE	
	PIP CONCRETE PAVING
	ASPHALT PAVING
	DECOMPOSED GRANITE
	CRUSHED STONE
	FLUSH GRANITE CURB
	STEEL EDGING
	PIP CONC SEAT WALL
	RECLAIMED GRANITE
PLANTS	
	PROPOSED DECIDUOUS TREE (SHADED)
	EXISTING DECIDUOUS TREE
	PROPOSED EVERGREEN TREE
	PROPOSED SHRUB
	TREE CANOPY
	TURF SOD
	SEEDED LAWN

- PLANTING NOTES
1. THE CONTRACTOR SHALL PREPARE PLANTING ZONES TO THE GRADES AND DEPTHS AS INDICATED ON THE DRAWINGS.
 2. IF THE CONTRACTOR DETERMINES THE SUB-GRADE SOIL CONDITIONS ARE DELETERIOUS TO PLANT GROWTH OR WILL INHIBIT DRAINAGE, THE LANDSCAPE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY AND PRIOR TO INSTALLATION OF PLANT MATERIAL.
 3. TOPSOIL SHALL BE FREE FROM SUBSOIL, STONES LARGER THAN 1", OR ANY UNDESIRABLE MATERIAL; CONTAIN 5% ORGANIC MATTER AND HAVE A pH SUITABLE TO THE LOCAL GROWING CONDITIONS.
 4. ALL PLANTS TO BE SELECTED AND SEALED IN THE FIELD BY THE LANDSCAPE DESIGNER OR SELECTED BY THE LANDSCAPE CONTRACTOR, AND APPROVED BY LANDSCAPE DESIGNER.
 5. THE PLANT LIST IS PROVIDED AS A CONVENIENCE TO THE CONTRACTOR. IN THE EVENT OF A DISCREPANCY BETWEEN THE PLANT COUNT SHOWN IN THE SCHEDULE AND THE DRAWING, THE DRAWING SHALL TAKE PRECEDENCE.
 6. ALL TRANSPLANTED SHRUBS SHALL BE "HEELD IN" OR HEAVILY MULCHED IN A SHADED AREA AND WATERED AS NECESSARY UNTIL THEY CAN BE PLANTED.
 7. FINAL LOCATION OF ALL PLANTS TO BE DETERMINED IN THE FIELD BY THE LANDSCAPE ARCHITECTS PRIOR TO INSTALLATION OF PLANT MATERIAL.
 8. PLANTS SHALL BEAR SAME RELATIONSHIP TO FINISHED GRADE AS THE BORE TO THE EXISTING GRADE IN THE NURSERY.
 9. CUT AND REMOVE BURLAP FROM TOP 1/3 OF BALL. CUT AND REMOVE AT LEAST 1/3-1/2 OF WIRE BASKET. NYLON ROPE AND / OR NYLON BALLING MATERIAL IS NOT ACCEPTABLE.
 10. LOCATE GUY WIRES AROUND MAIN TRUNK OF TREE.
 11. PLANT PERENNIALS AND GROUNDCOVER IN 12" DEEP TOPSOIL BED CONSISTING OF 2/3 TOPSOIL AND 1/3 HUMUS.
 12. TOPSOIL AND SEED ALL AREAS DISTURBED AS A RESULT OF ANY AND ALL DISTURBANCES, CONSTRUCTION, OR STORAGE OF EQUIPMENT WHETHER SUCH AREAS ARE SHOWN ON THE PLANS OR NOT. (SEE GRADING PLAN)
 13. ALL PLANTS AND ENTIRE SHRUB BEDS TO RECEIVE 12" OF CASSELLA'S ORGANICS OR EQUAL (40% COMPOST / 60% LOAM) AND A 3" LAYER OF DOUBLE SHREDDED HARDWOOD BARK MULCH.
 14. UPON COMPLETION OF THE ONE (1) YEAR PLANT GUARANTEE PERIOD, THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR ADJUSTING OR REMOVING ALL STAKES. THIS SHALL BE DONE IN CONSULTATION WITH THE LANDSCAPE ARCHITECT.
 15. ALL TREE PLANTING AND REMOVAL TO COMPLY WITH LOCAL AND STATE TREE ORDINANCES.



PROJECT:
**NHSPCA
Expansion &
Renovation**
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413-436-5500

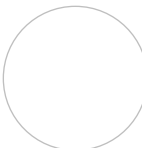
Soren DeNoird
Landscape Architect
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Portland, ME 04103
207-400-2450

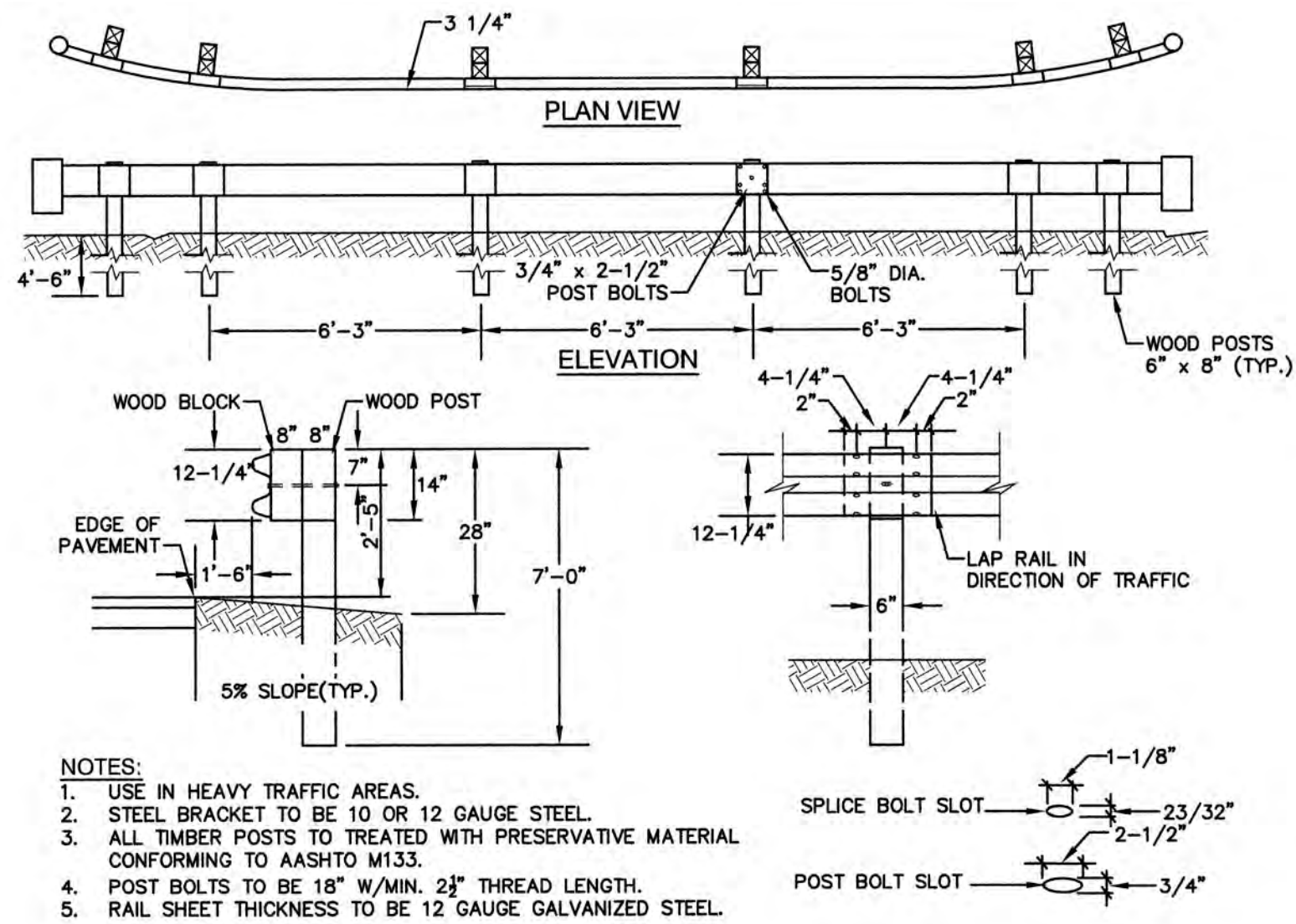
Jones & Beach Engineers,
Inc., Civil Engineering
85 Portsmouth Ave,
PO Box 219
Stratham, NH 03885
603-772-4746

REVISIONS:		
NO	DATE	REVISION

LANDSCAPE PLAN

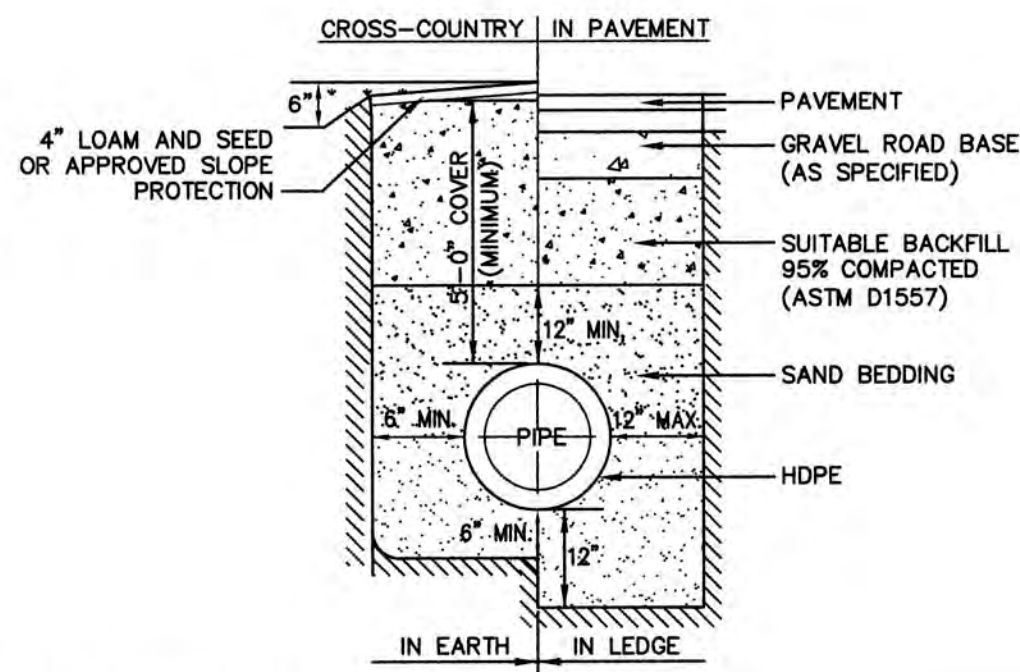
**Construction
Documents
Progress**
April 9, 2020
SCALE: **1" = 60'**
@ FULL SIZE - 24" x 36"

SEAL & SIGNATURE:  DATE:
PROJ. NO: 1814
DWG BY:
CK BY:
DWG NO:
L101
FILE No:



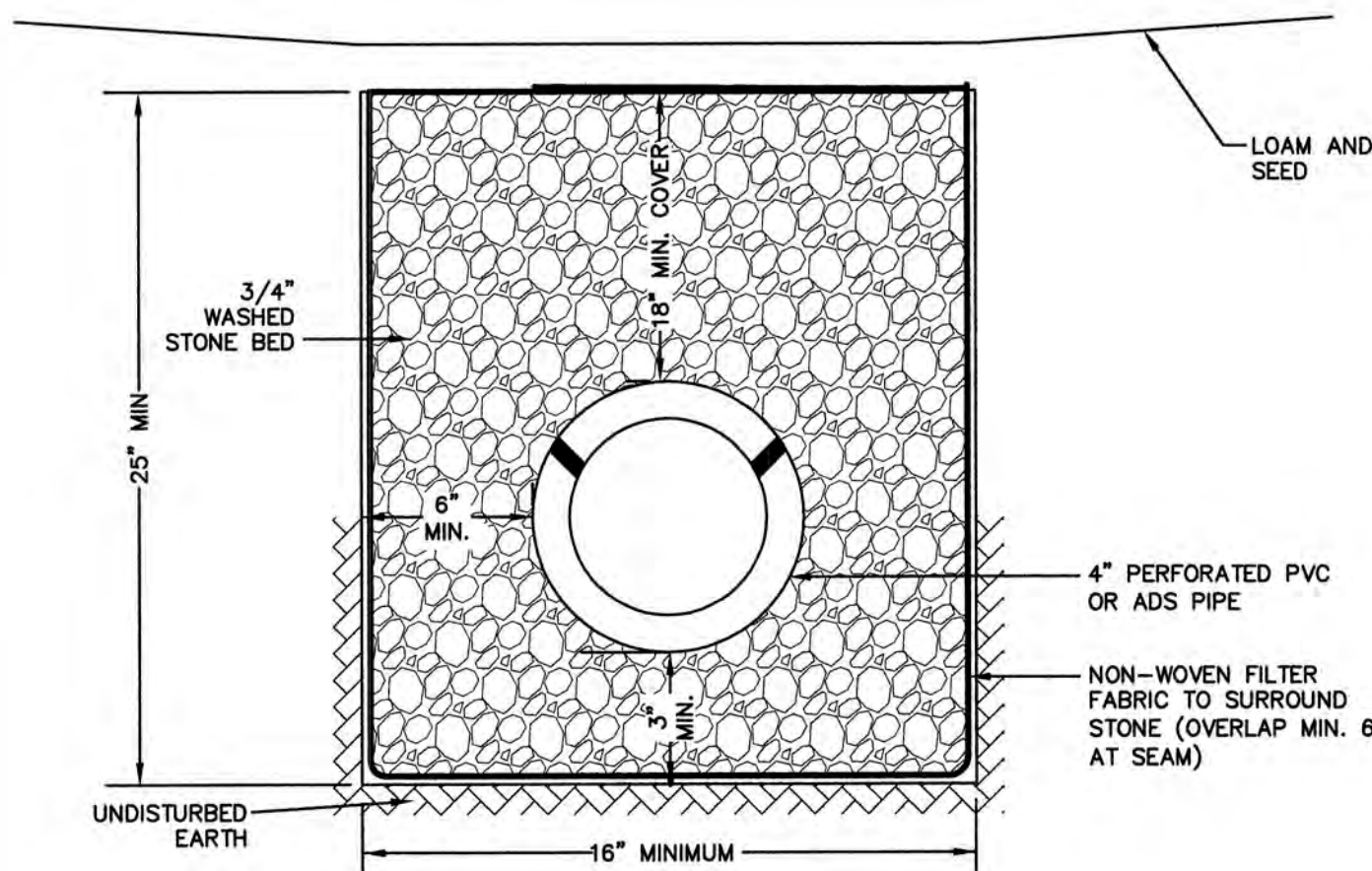
GUARD RAIL (STEEL)

NOT TO SCALE



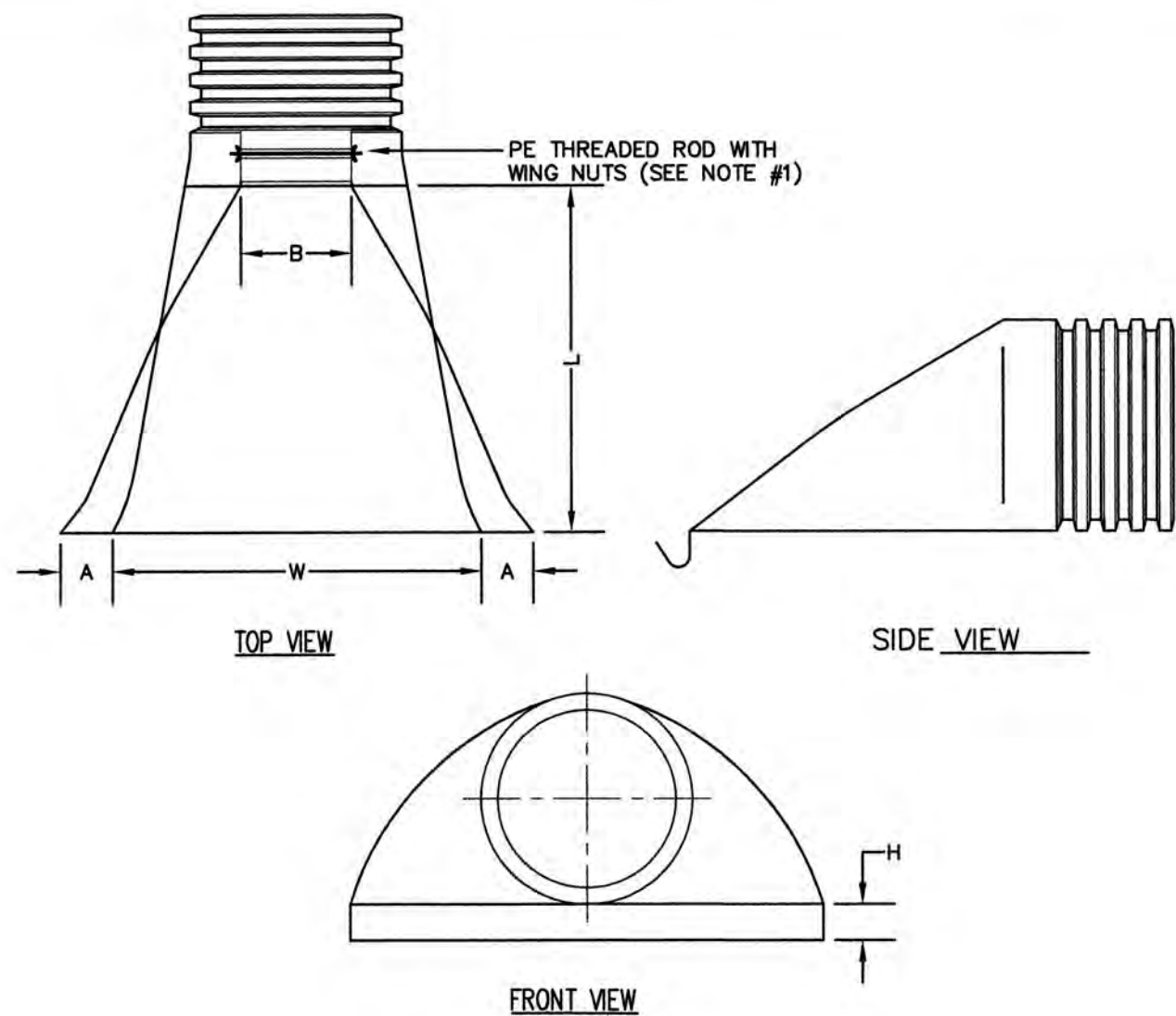
WATER SYSTEM TRENCH

NOT TO SCALE



PERFORATED PIPE INFILTRATION TRENCH

NOT TO SCALE



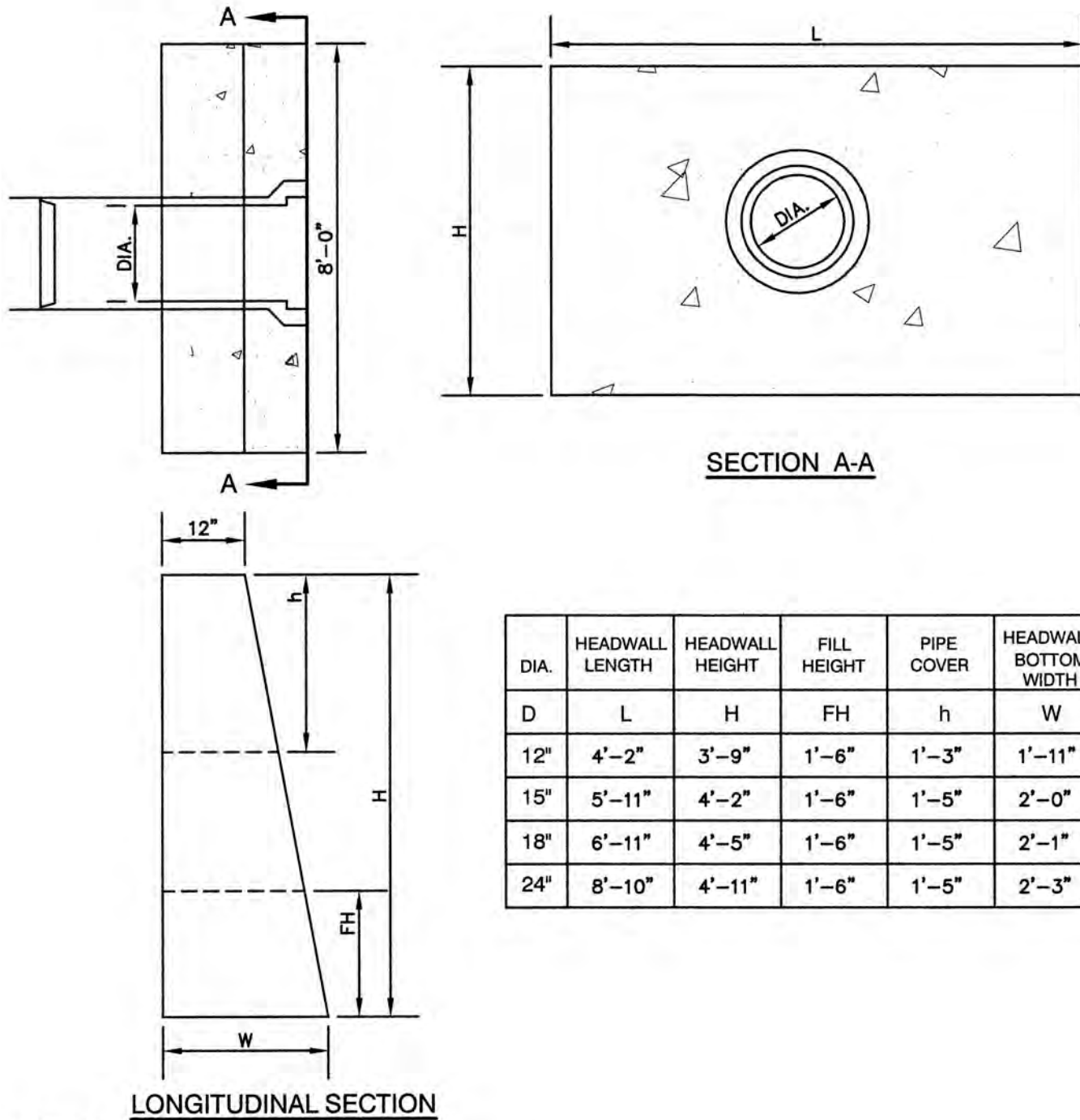
PART NO.	PIPE SIZE	A	B (MAX)	H	L	W
1210-NP	12"	6.5"	10"	6.5"	25"	29"
1810-NP	18"	7.5"	15"	6.5"	32"	35"

NOTES:

1. PE THREADED ROD WITH WING NUTS PROVIDED FOR END SECTIONS 12"-24".
2. ALL DIMENSIONS ARE NOMINAL.

ADS N-12 FLARED END SECTION

NOT TO SCALE

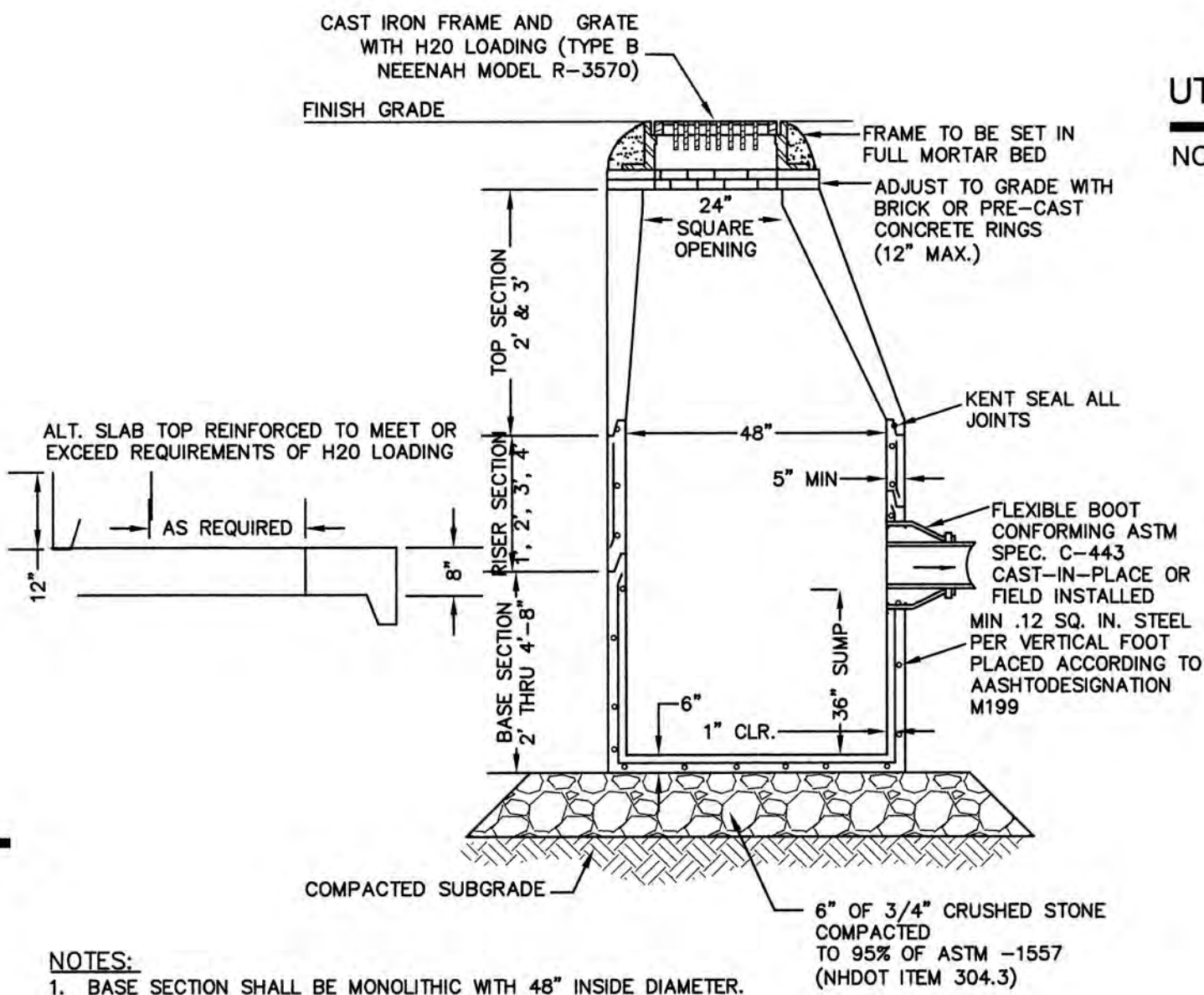


NOTES:

1. ALL DIMENSIONS GIVEN IN FEET & INCHES.
2. PROVIDE BELL END AT INLET HEADWALL, AND SPIGOT END AT OUTLET END HEADWALL.
3. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS. CEMENT TO BE TYPE III PER ASTM C-150. REINFORCING TO MEET OR EXCEED ASTM A-615 GRADE 60 DEFORMED BARS.
4. 1" THREADED INSERTS PROVIDED FOR FINAL ATTACHMENT IN FIELD BY OTHERS.

PRECAST CONCRETE HEADWALL

NOT TO SCALE

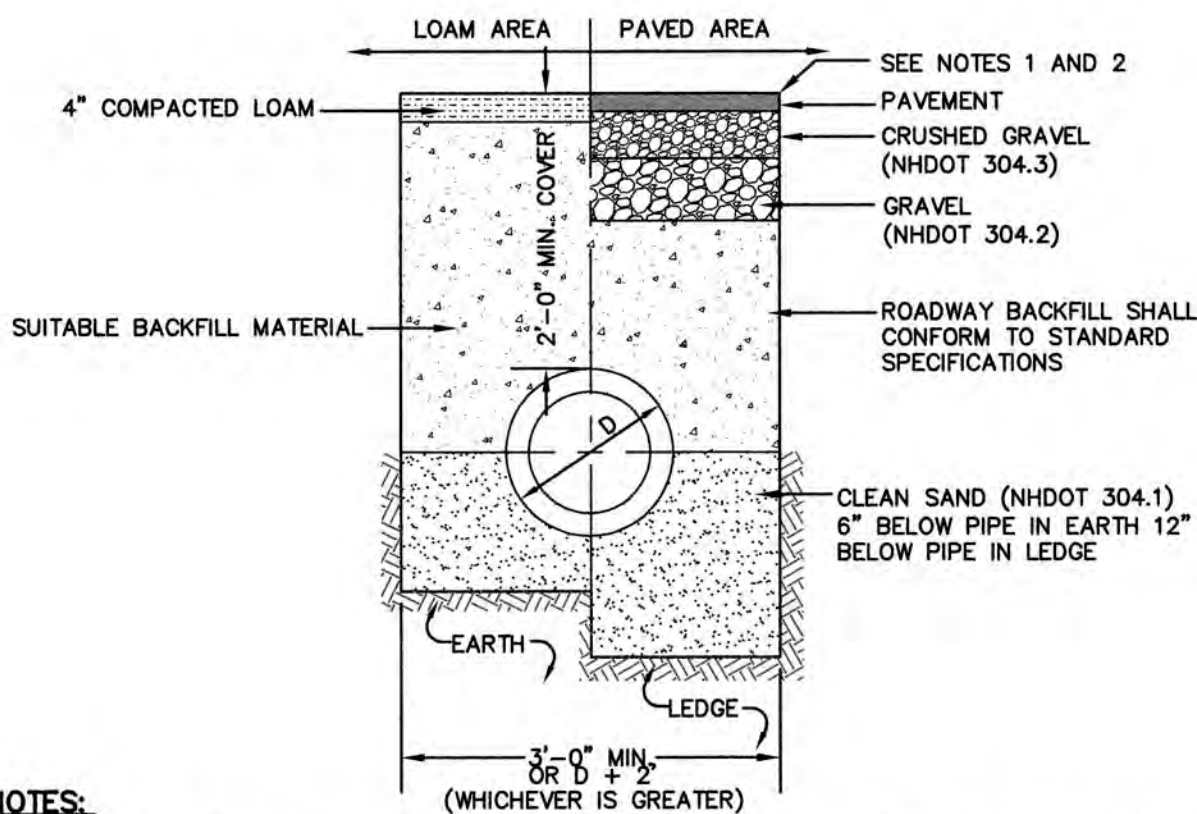


NOTES:

1. BASE SECTION SHALL BE MONOLITHIC WITH 48" INSIDE DIAMETER.
2. ALL SECTIONS SHALL BE DESIGNED FOR H2O LOADING.
3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
4. FRAMES AND GRATES SHALL BE HEAVY DUTY AND DESIGNED FOR H2O LOADING
5. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT.
6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
7. ALL CATCH BASIN FRAMES AND GRATES SHALL BE NHDOT CATCH BASIN TYPE ALTERNATE 1 OR NEENAH R-3570 OR APPROVED EQUAL (24"x24" TYPICAL).
8. STANDARD CATCH BASIN FRAME AND GRATE(S) SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM, BUT NO MORE THAN 12"), OR PRECAST CONCRETE "DONUTS".

CATCH BASIN

NOT TO SCALE

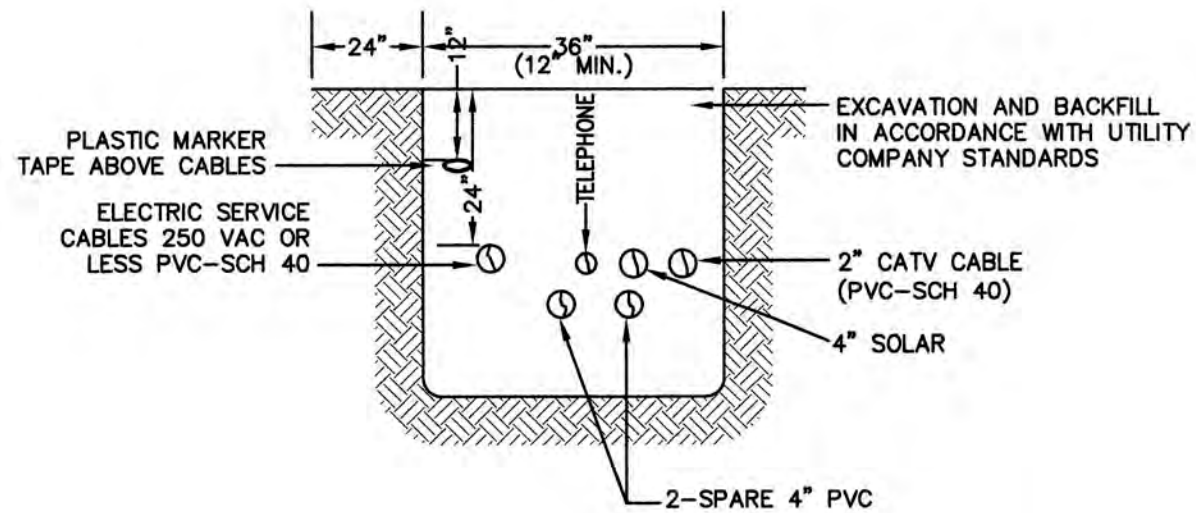


NOTES:

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

DRAINAGE TRENCH

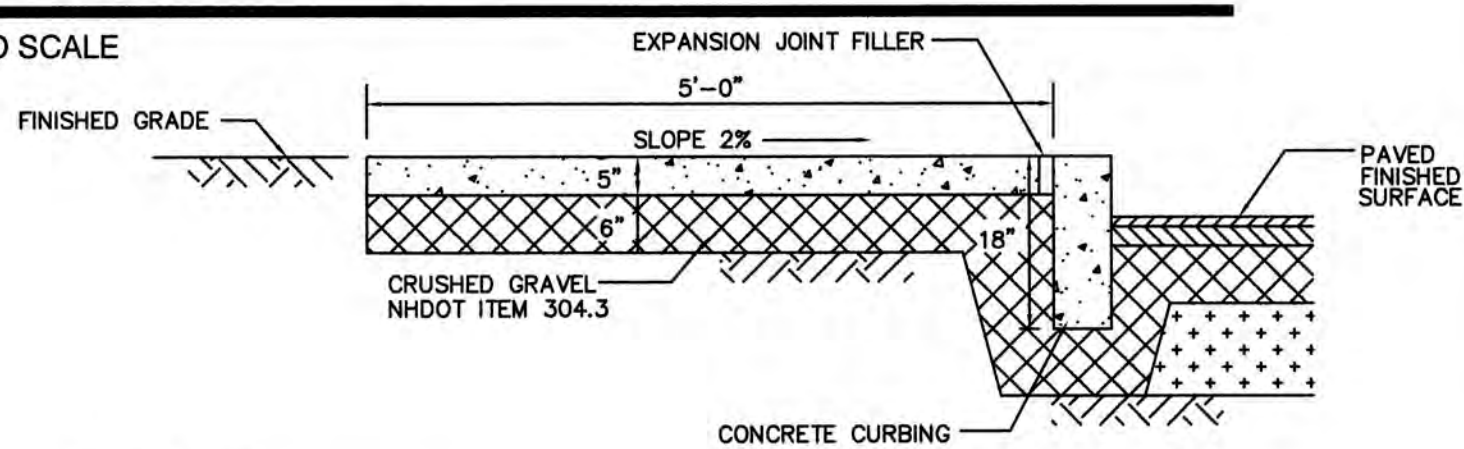
NOT TO SCALE



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

UTILITY TRENCH

NOT TO SCALE



SIDEWALK NOTES:

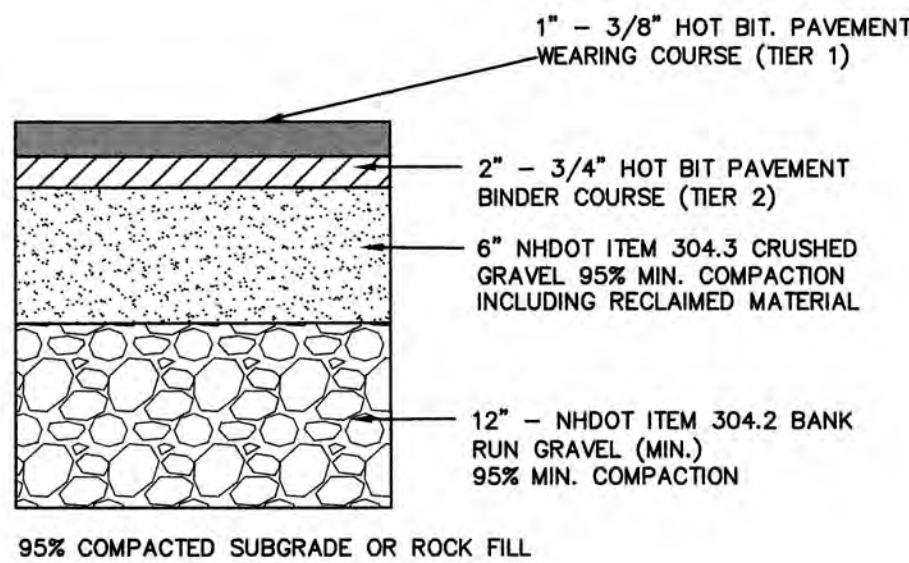
1. PLACE A TOOLED JOINT 1/8" WIDE AND AT LEAST 1/3 OF THE DEPTH @ 5'-0" O.C.
2. PLACE AN EXPANSION JOINT WITH FILLER EVERY 20'-0"
3. PROVIDE FINE-GRAINED, NON-SKID TEXTURE
4. APPLY PROTECTIVE COATING AFTER 14 DAYS
5. SIDEWALK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NHDOT STANDARDS, SECTION 608.

CONCRETE CURB NOTES:

1. CONSTRUCT IN 10'-0" SECTIONS WITH 1/8" JOINT BETWEEN SECTIONS
2. PLACE AN EXPANSION JOINT EVERY 20'-0"

CONCRETE SIDEWALK WITH CONCRETE CURB

NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT

NOT TO SCALE

Design: JSR	Draft: PLB	Date: 10/8/18
Checked: JSR	Scale: AS NOTED	Project No.: 17088
Drawing Name: 17088-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		

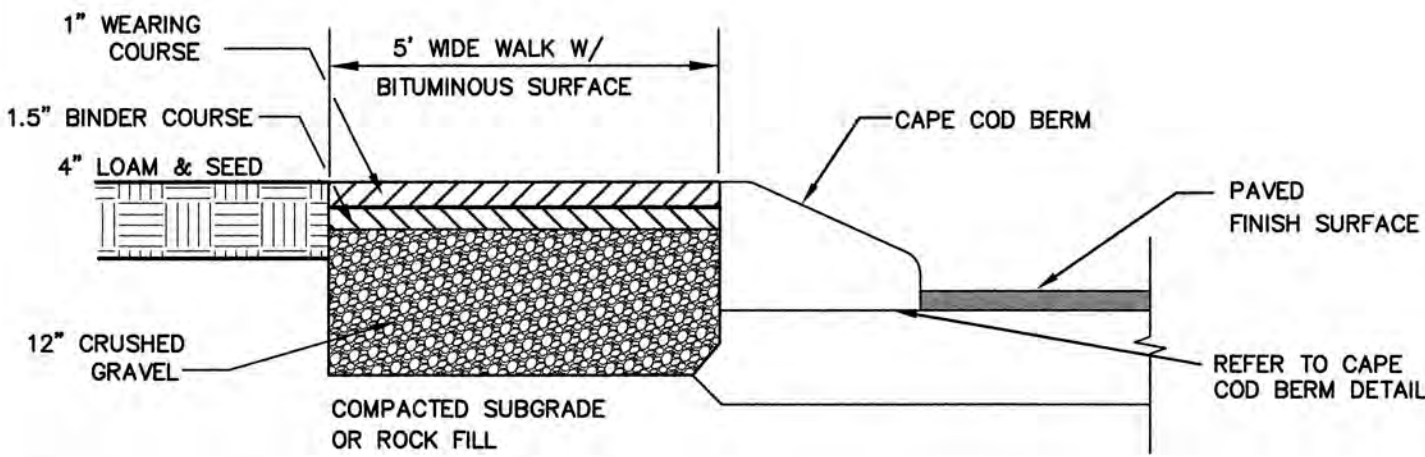


REV.	DATE	REVISION	BY
3	3/31/20	REVISED PER HW; SUBMITTED TO TOWN AND NHDES	DJM
2	3/3/20	REVISED PER OWNER; SUBMIT TO PLANNING BOARD	DJM
1	8/1/19	SUBMITTED TO NHDES	PLB
0	5/15/19	ISSUED FOR REVIEW	PLB

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

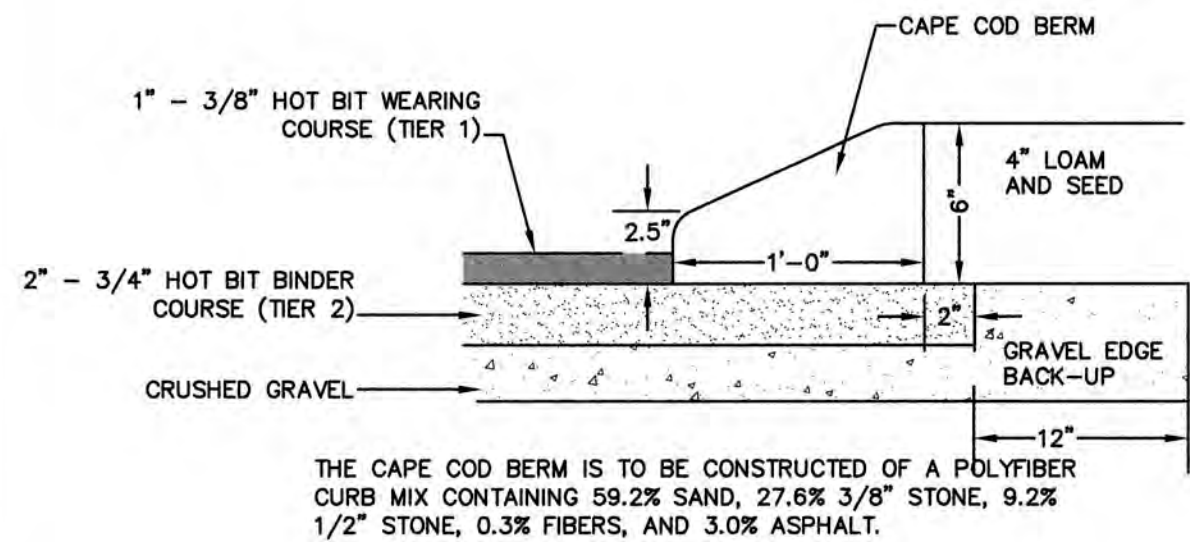
Plan Name:	DETAIL SHEET
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.
D1
SHEET 9 OF 16 JBE PROJECT NO. 17088



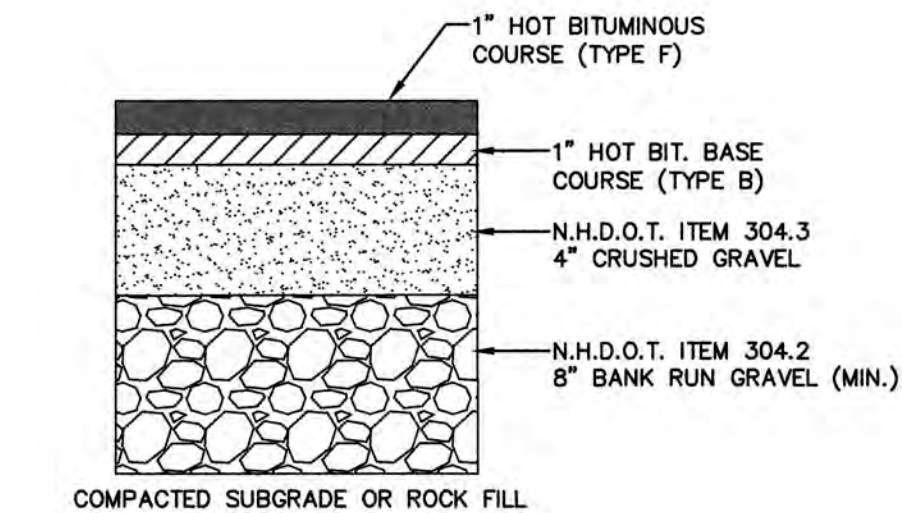
BITUMINOUS SIDEWALK W/CAPE COD BERM

NOT TO SCALE



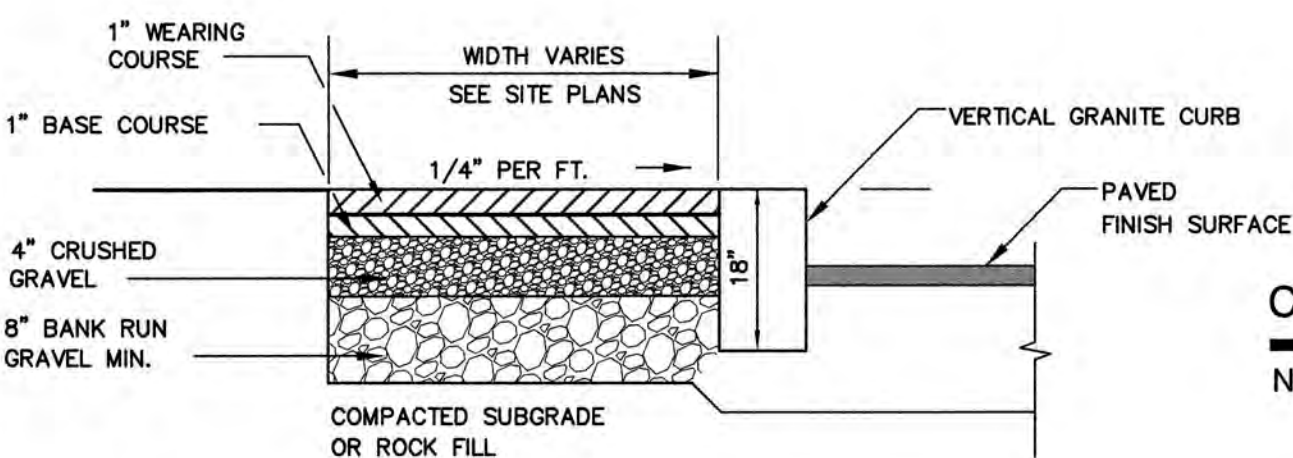
CAPE COD BERM

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BITUMINOUS SIDEWALK DETAIL

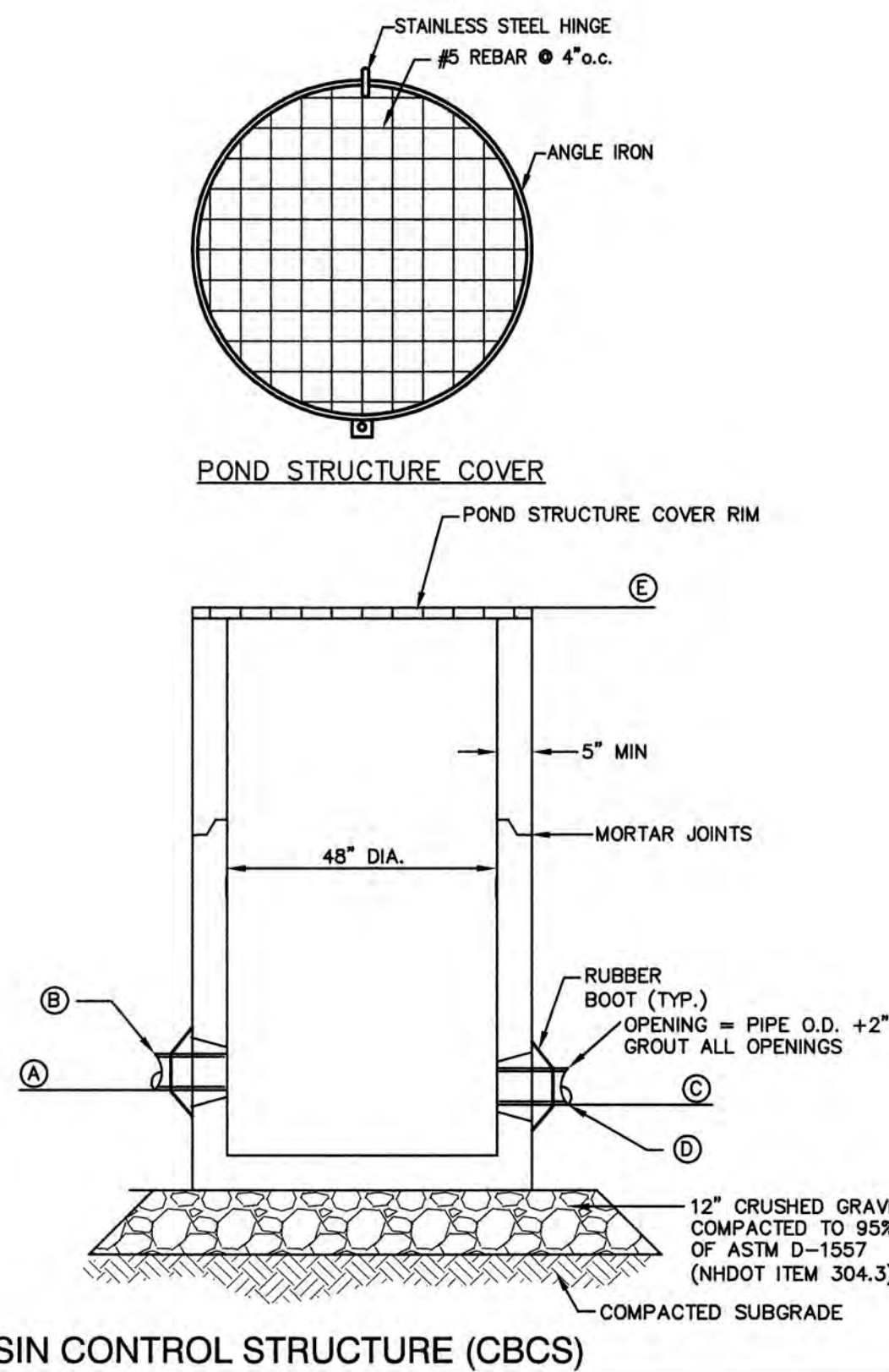
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BIT. SIDEWALK W/ VERTICAL GRANITE CURB

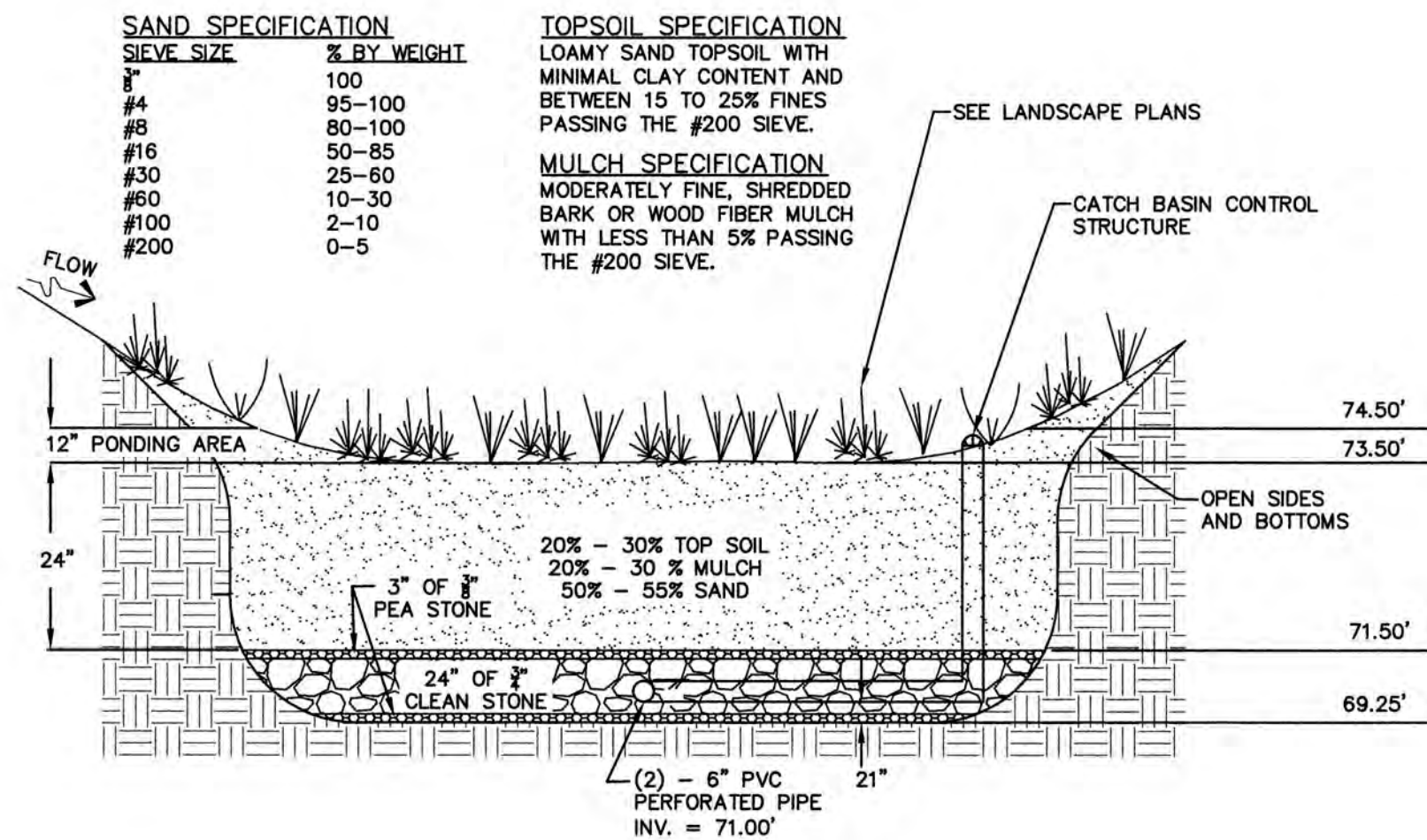
NOT TO SCALE

	A	B	C	D	E
POND 12P (CB#12)	78.25	(2)6"	78.25	15"	82.00
POND 14P (CB# 10)	70.00	6"	68.50	24"	72.90



CATCH BASIN CONTROL STRUCTURE (CBCS)

NOT TO SCALE



DESIGN CONSIDERATIONS

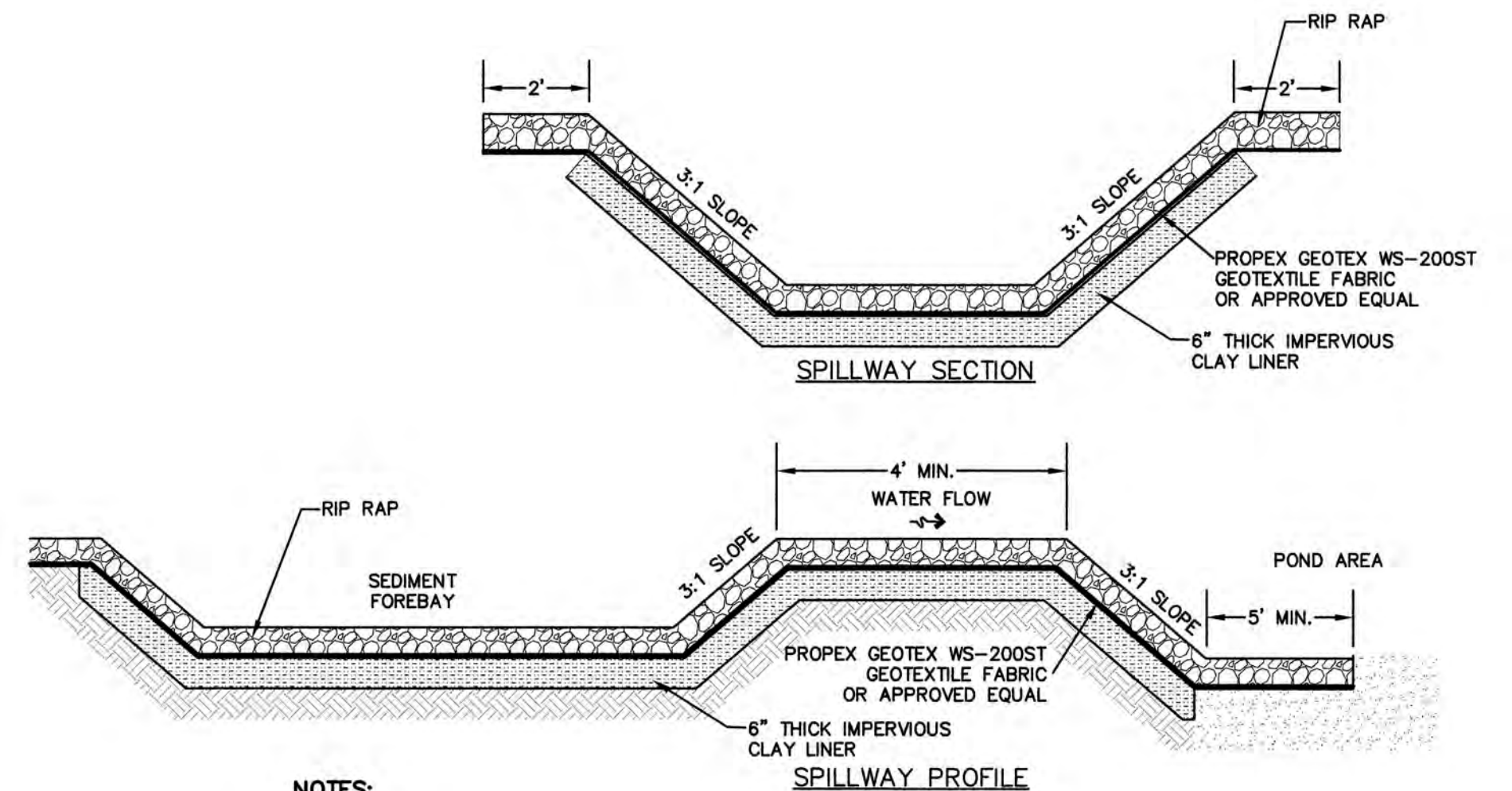
- DO NOT PLACE BIORETENTION SYSTEMS INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
- DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUN-OFF, WATER FROM EXCAVATIONS) TO THE BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
- DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

MAINTENANCE REQUIREMENTS:

- SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
- PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.
- TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.
- AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72 HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
- VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING PRUNING, REMOVAL AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

BIORETENTION SYSTEM - (RAINGARDEN 14P)

NOT TO SCALE

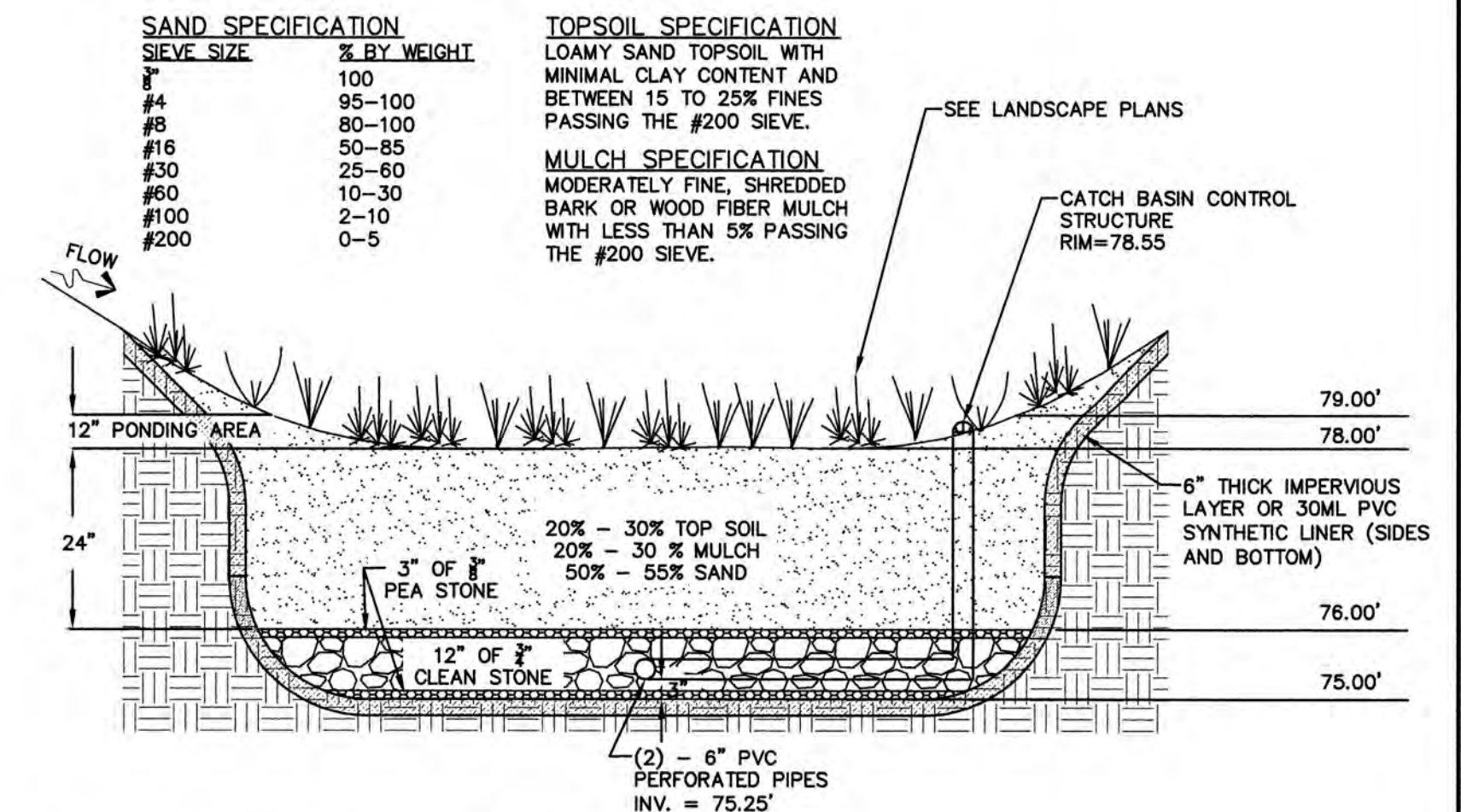


NOTES:

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

SEDIMENT FOREBAY SPILLWAY

NOT TO SCALE



BIORETENTION SYSTEM - (RAINGARDEN 12P)

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Design: JSR	Draft: PLB	Date: 10/8/18
Checked: JSR	Scale: AS NOTED	Project No.: 17088
Drawing Name: 17088-PLAN.dwg		
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0	5/15/19	ISSUED FOR REVIEW	PLB

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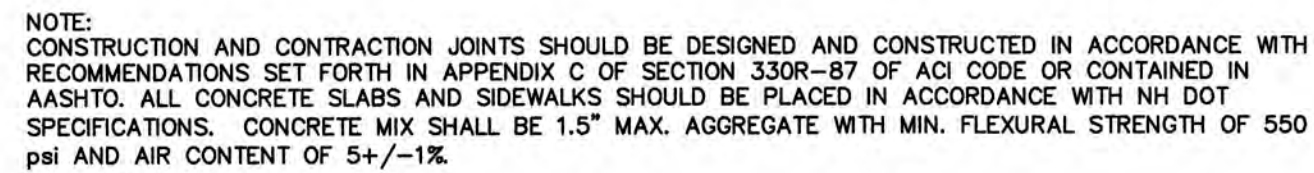
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Civil Engineering Services

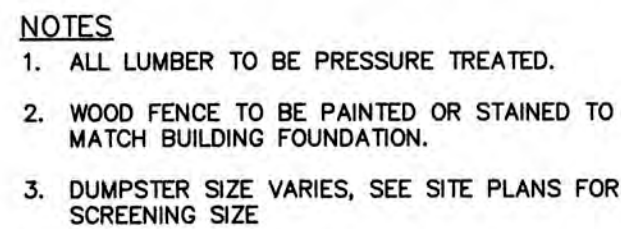
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Plan Name:	DETAIL SHEET
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

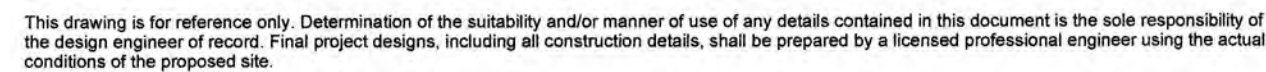
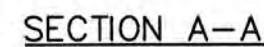
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SHEET 10 OF 16	JBE PROJECT NO. 17088



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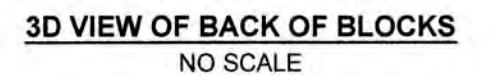
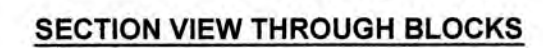


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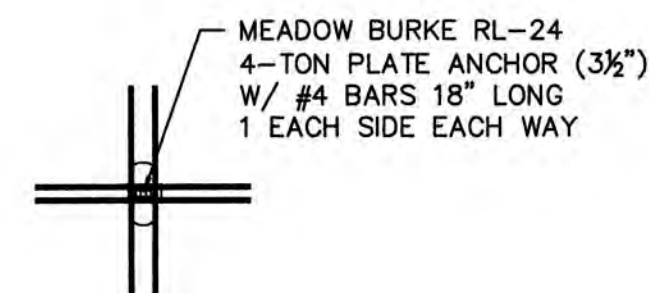
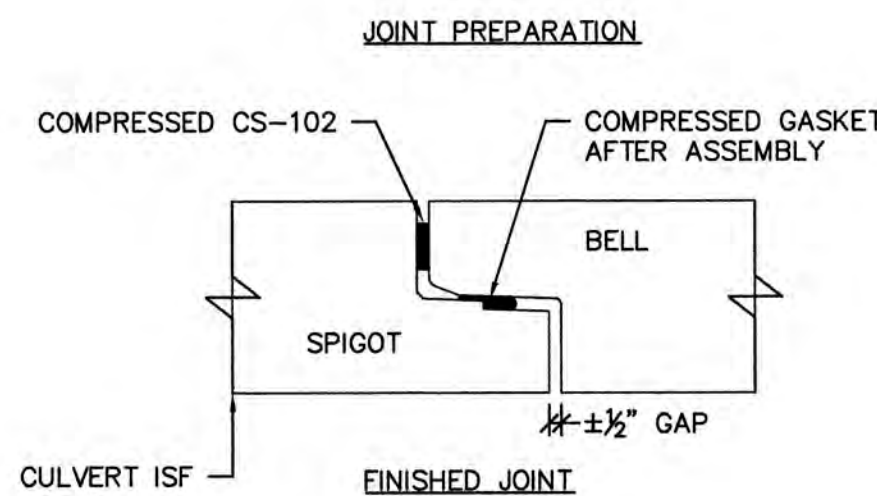
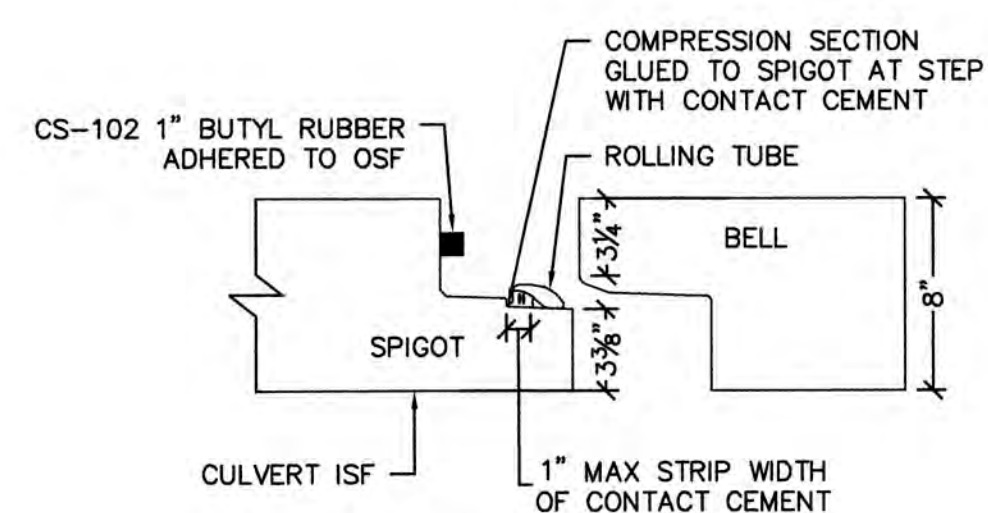
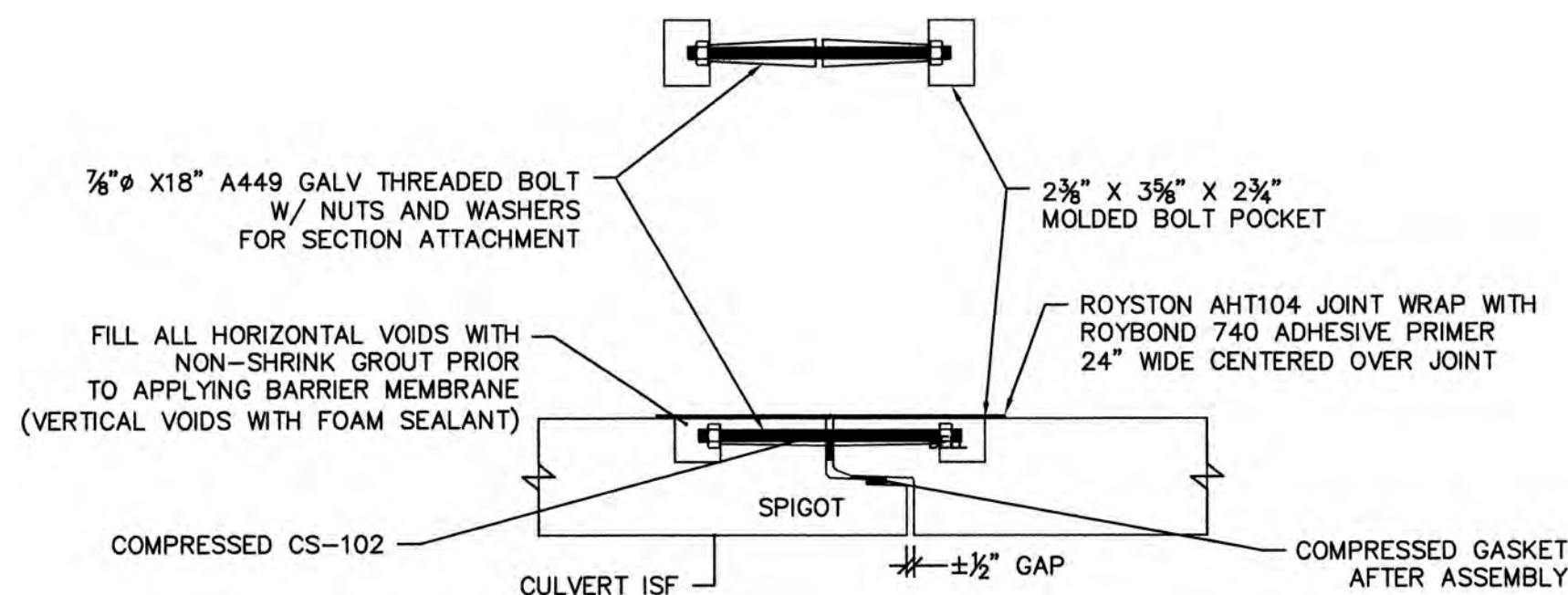
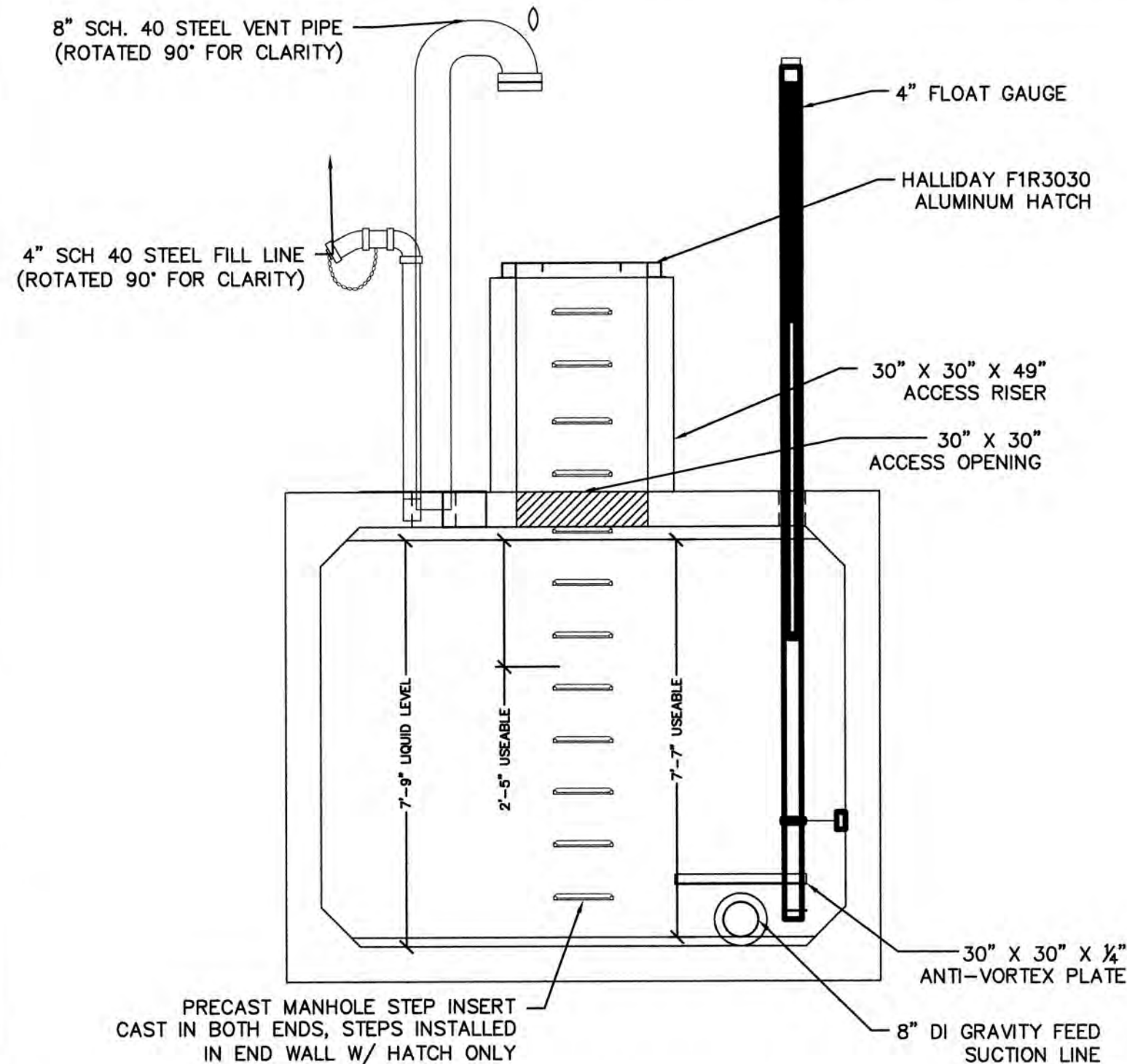
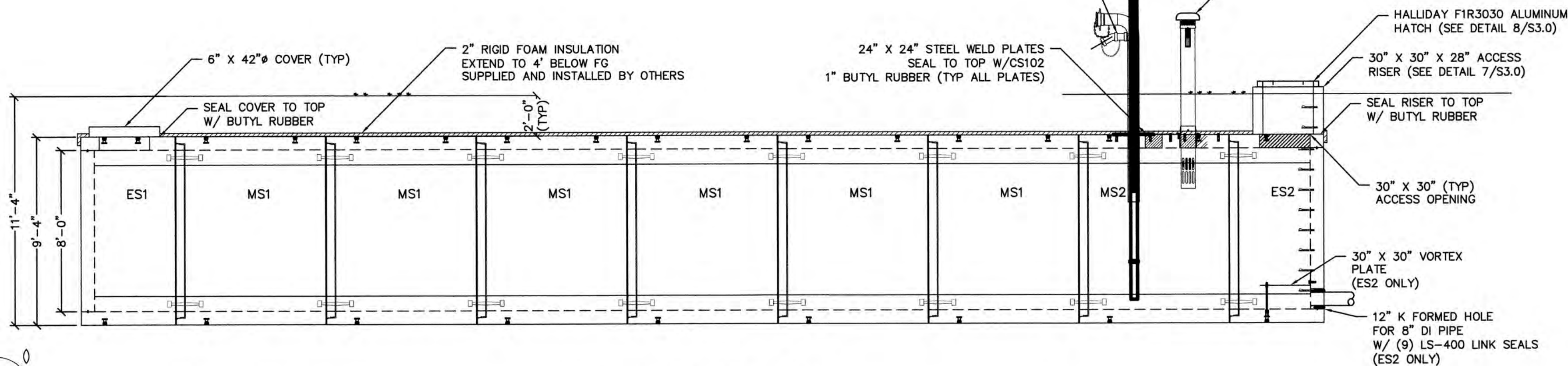
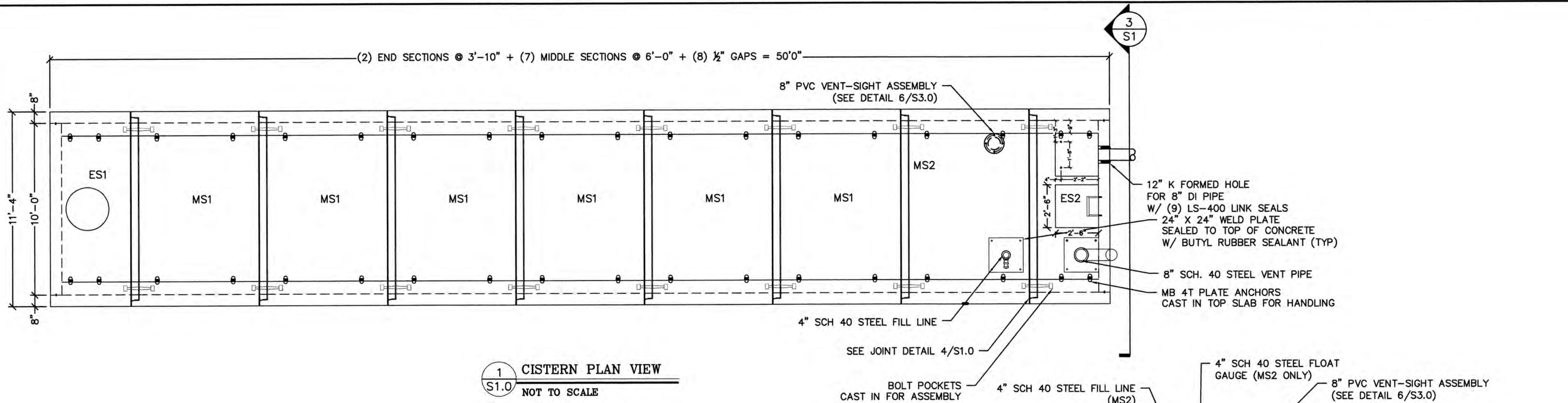
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 PO Box 219 FAX: 603-772-0222
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DRAWING No.

D3

SHEET 11 OF 16
JBE PROJECT NO. 17088



GENERAL NOTES:

- THE PLANS ARE INTENDED TO BE DRAWN TO SCALE UNLESS OTHERWISE NOTED. HOWEVER, IF A CRITICAL DIMENSION IS NOT PROVIDED, MICHE CORPORATION SHOULD BE CONTACTED FOR VERIFICATION.
- IF ANY OF THE WORK TO BE DONE AS SHOWN ON THE DRAWINGS DOES NOT CORRESPOND WITH THE EXISTING FIELD CONDITIONS, CONTACT THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK IN QUESTION.
- CONTRACTOR TO FIELD-VERIFY ALL ELEVATIONS PRIOR TO THE START OF CONSTRUCTION. IF THERE ARE ANY DISCREPANCIES, CONSULT THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK IN QUESTION. THE CONTRACTOR IS RESPONSIBLE FOR ALL SITE LAYOUT AND ORIENTATION OF THE PRECAST COMPONENTS. MICHE FIELD ERECTION ASSISTANCE (IF APPLICABLE) IS FOR ASSEMBLY OF THE PRECAST COMPONENTS ONLY AND IS NOT RESPONSIBLE FOR OVERALL PROJECT GUIDANCE OR MANAGEMENT.
- MAINTAIN MINIMUM 60 DEGREE SLING ANGLE WHEN HANDLING PRECAST COMPONENTS.
- PRECAST COMPONENTS SHALL REACH A MINIMUM COMPRESSIVE STRENGTH OF 2,500 PSI PRIOR TO STRIPPING, AND THE MINIMUM DESIGN COMPRESSIVE STRENGTH PRIOR TO SHIPPING, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ALL JOINTS AND VOIDS SHALL BE FILLED WITH NON-SHRINK GROUT. SURFACE VOIDS MAY BE FILLED WITH FOAM SEALANT, BY OTHERS. (IF INCLUDED ON PLANS, JOB SPECIFIC NOTES REGARDING JOINTS TAKE PRECEDENCE).
- ALL EXPOSED EDGES TO BE CHAMFERED 1/4" UNLESS OTHERWISE NOTED. NHDOT INSTALLATIONS REQUIRE ALL EXPOSED SURFACES TO BE WATERPROOFED IN THE FIELD. VTRANS INSTALLATIONS REQUIRE ALL EXPOSED SURFACES TO BE WATERPROOFED IN THE FIELD.
- IF THERE IS ADDITIONAL INFORMATION PERTINENT TO THE FABRICATION AND INSTALLATION OF THESE UNITS THAT IS NOT CONTAINED WITHIN THE RESOURCES LISTED ABOVE, IT SHALL BE BROUGHT TO THE ATTENTION OF MICHE CORPORATION. FAILURE TO MAKE SUCH ADDITIONAL INFORMATION AVAILABLE SHALL RELIEVE MICHE CORPORATION OF ALL LIABILITIES ARISING FROM ERRORS OR OMISSIONS RELATED TO THE OMITTED INFORMATION.
- CISTERN TO BE PROVIDED BY MICHE CORPORATION OR APPROVED EQUAL.

TUNNEL TANK NOTES:

- CONCRETE SHALL BE SELF-CONSOLIDATING CONFORMING TO ASTM C260 WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 5,000 PSI. AGGREGATE SHALL CONFORM TO ASTM C-33 WITH A MAXIMUM DIAMETER OF 3/4". CEMENT SHALL CONFORM TO ASTM C150.
- REINFORCING SHALL BE GRADE 60 DEFORMED BLACK BARS CONFORMING TO ASTM A-615. ALL BARS SHALL BE BENT COLD. IF REQ'D, EPOXY COATED REINFORCING SHALL CONFORM TO ASTM A-775.
- TANK DESIGNED USING THE FOLLOWING PROPERTIES:
 - LIVE LOAD: AASHTO HS-20
 - EARTH COVER: 2-5 FEET
 - WATER TABLE DEPTH: 5 FEET BELOW FG
 - LATERAL EARTH PRESSURE: 60PSF (MIN) - 120PSF (MAX)
 - THE ADEQUACY OF THE ABOVE INFORMATION SHALL BE REVIEWED FOR SITE SPECIFIC CONDITIONS BY A QUALIFIED LICENSED P.E.
- ALL EXCAVATED HOLES SHALL BE PREPARED PER OSHA STANDARDS; NOTHING IN THESE PLANS SHALL BE CONSTRUED TO PROVIDE EXCAVATION GUIDANCE. TANK EXCAVATION SHALL BE KEPT DEWATERED THROUGHOUT INSTALLATION AND BACKFILL OPERATIONS.
- STRUCTURE SHALL BE PLACED AT ELEVATIONS SHOWN ON THE DRAWINGS ON THE FOLLOWING SUBGRADE:
 - A MINIMUM OF 12" OF COMPACTED CRUSHED STONE SUBBASE WITH AN AGGREGATE SIZE OF 1/2" TO 1 1/2".
 - 1" TO 3" OF COMPACTED CRUSHED PEA STONE TOP LAYER WITH AN AGGREGATE SIZE OF APPROXIMATELY 3/8".
- THE TOP LAYER OF PEA STONE SHALL BE GRADED TO WITHIN 1/4" USING A LEVELING SCREED PIPE SYSTEM OR AN EQUIVALENT METHOD. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A PROPERLY GRADED BASE TO ENSURE A SATISFACTORY CONNECTION AT GASKETED JOINTS. ALL TOPSOIL, LOOSE FILL, AND DELETERIOUS MATERIALS SHALL BE REMOVED BEFORE PLACING MATERIAL.
- BACKFILL MATERIAL SHALL BE SCREENED GRAVEL OR SAND, FREE OF DELETERIOUS MATERIAL WITH A MAXIMUM AGGREGATE SIZE OF 1 1/2". BACKFILL SHALL EXTEND FOR A MINIMUM DISTANCE OF 3'-0" BEYOND THE HORIZONTAL LIMITS OF THE STRUCTURE. MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING 12" AND COMPACTED TO NOT LESS THAN 95% OF THE MAXIMUM DENSITY DETERMINED BY ASTM D1557 (MODIFIED PROCTOR TEST). ALL COMPACTION SHALL BE DONE WITH HAND-OPERATED COMPACTION EQUIPMENT.
 - THE CONTRACTOR SHALL BACKFILL AROUND THE ENDS OF THE TANK FIRST WITH A MINIMUM OF (2) 12" LIFTS OF COMPACTED FILL TO PREVENT SEPARATION WHEN BACKFILLING THE SIDES.
 - THE SIDES SHALL BE BACKFILLED NEXT ALTERNATING BETWEEN THE OUTSIDE OF THE TANKS AND THE CENTER (FOR MULTIPLE TANK RUNS) UP TO THE (2) 12" LIFTS.
 - THE CONTRACTOR SHALL CONTINUE BACKFILLING THE TANK IN 12" COMPACTED LIFTS ALTERNATING FROM SIDE TO SIDE, AND END TO END TO ENSURE SYMMETRICAL LOADING DURING THE BACKFILL OPERATIONS.
 - EQUIPMENT (NOT EXCEEDING 40,000 LBS) MAY BE USED ABOVE TANKS WITH A MINIMUM OF 2 FEET OF COMPACTED EARTH COVER.
- PRIOR TO BACKFILL, THE EXTERIOR JOINTS SHALL BE FILLED WITH EXPANDABLE FOAM SEALANT AND COVERED WITH VYKOR 12" JOINT WRAP (SUPPLIED BY MICHE CORP, APPLIED BY OTHERS).
- ONCE TANK IS INSTALLED AND BACKFILLED, SIKKA FLEX 1A SHALL BE APPLIED INTO THE INTERIOR JOINTS AND THE JOINTS SHALL BE COATED WITH DYNESIC TECHNOLOGIES PAN-SEAL EPOXY MEMBRANE.
- IF THE TANK IS INSTALLED DURING WINTER MONTHS OR AMBIENT TEMPERATURES BELOW 50°F, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE HEAT SOURCE FOR THE INTERIOR FINISHING WORK.
- MANUFACTURER SHALL PROVIDE ANTI-BUOYANCY CALCULATION, OR DRAIN TO DAYLIGHT.

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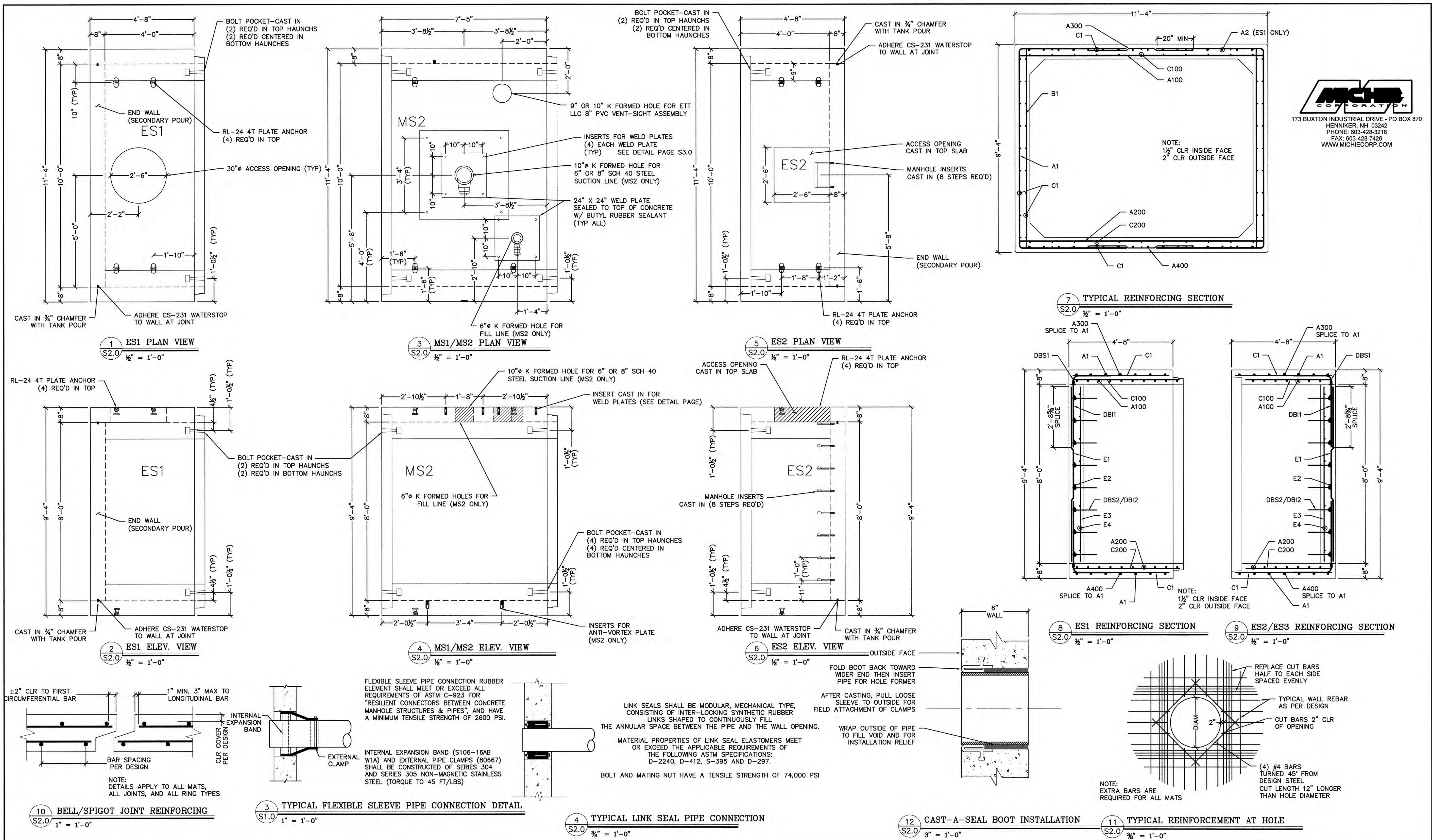
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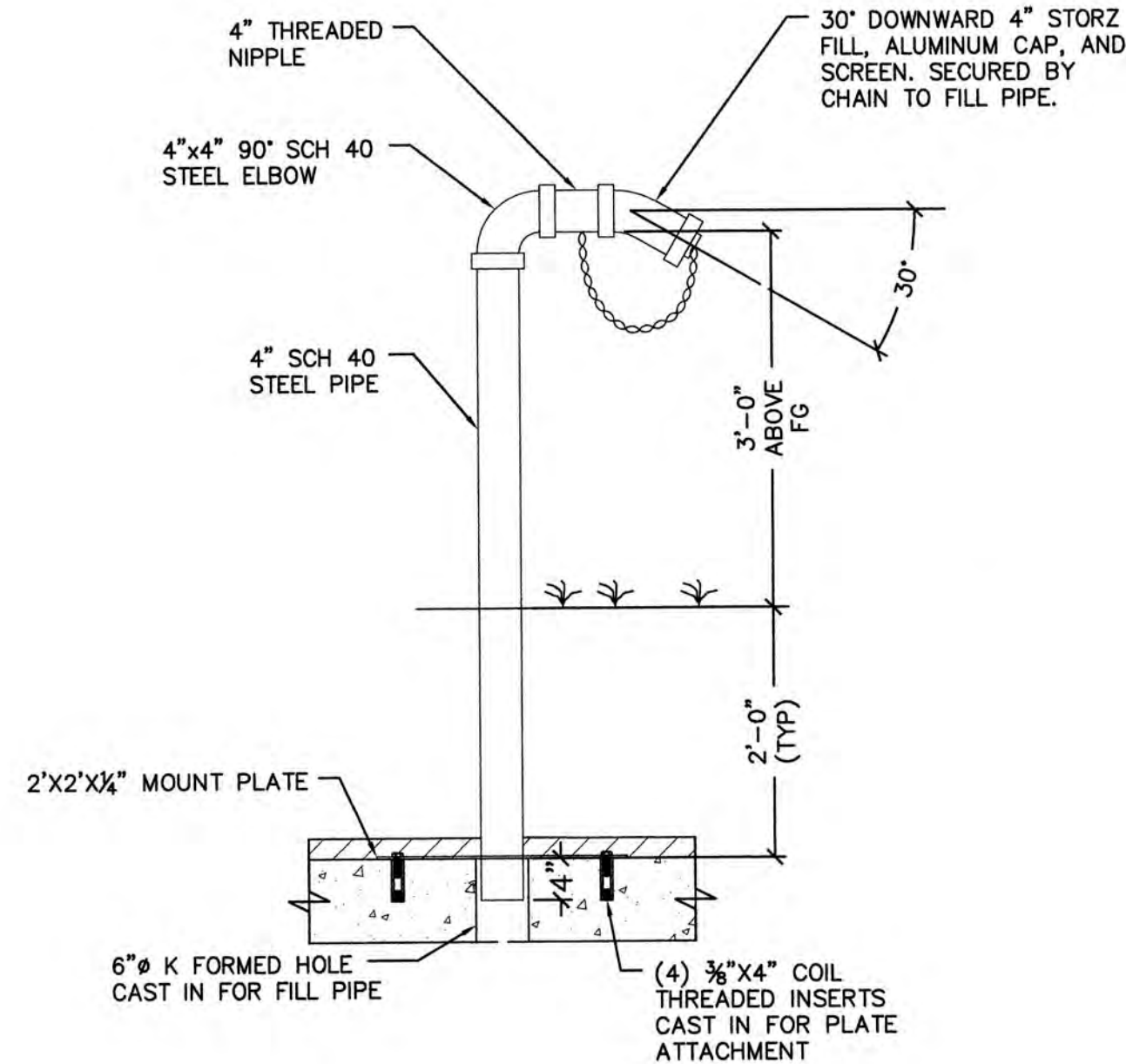
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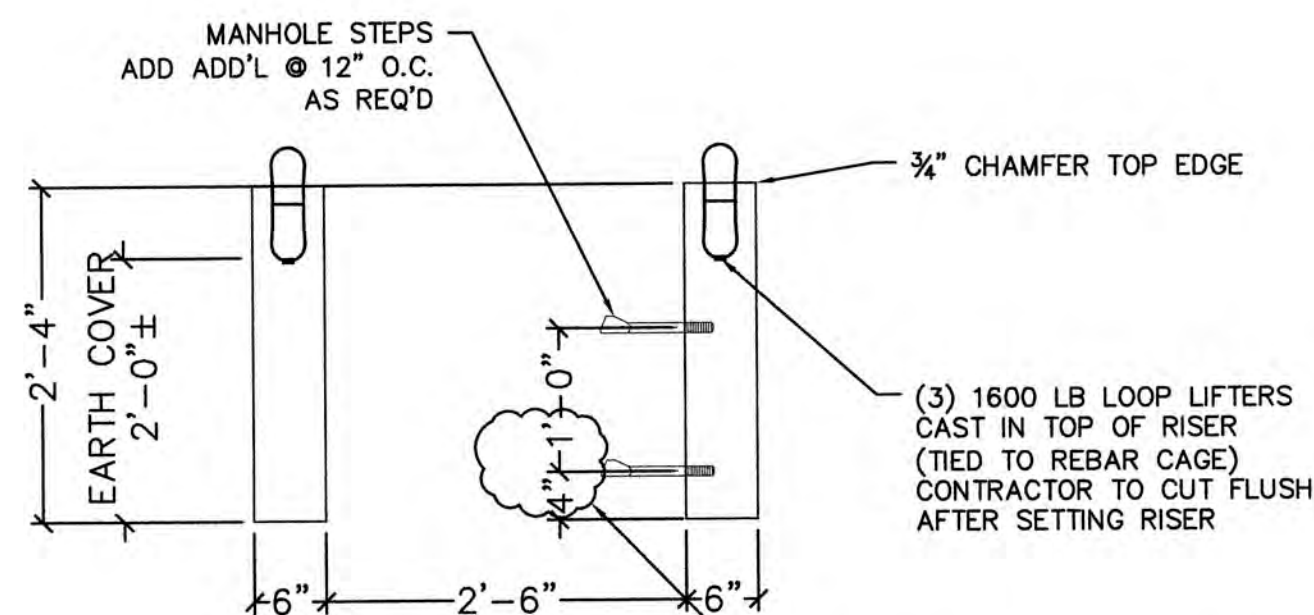
Plan Name:	24,000 GALLON FIRE CISTERN DETAILS
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.	D4
SHEET 12 OF 16	JBE PROJECT NO. 17088

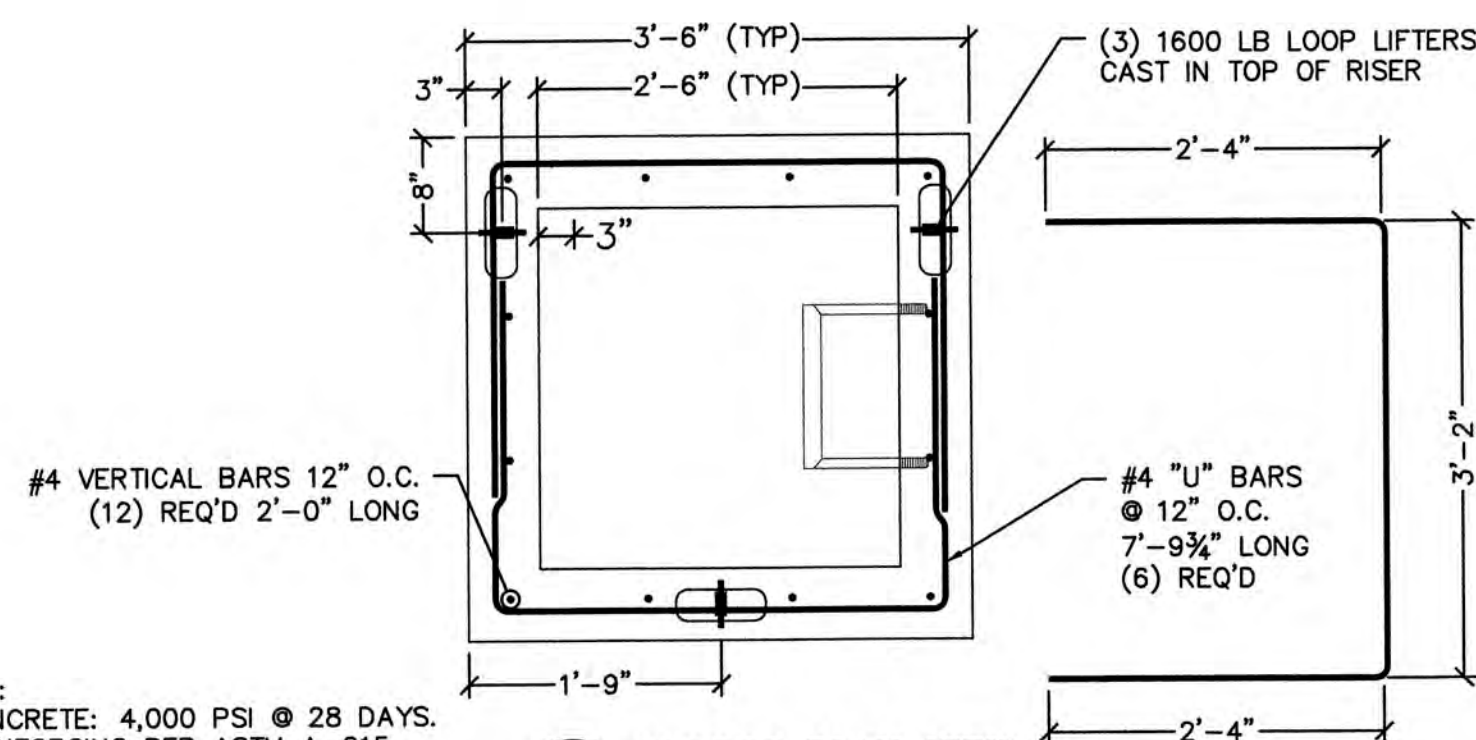




3
S3.0
FILL LINE ASSEMBLY DETAIL
3/4" = 1'-0"

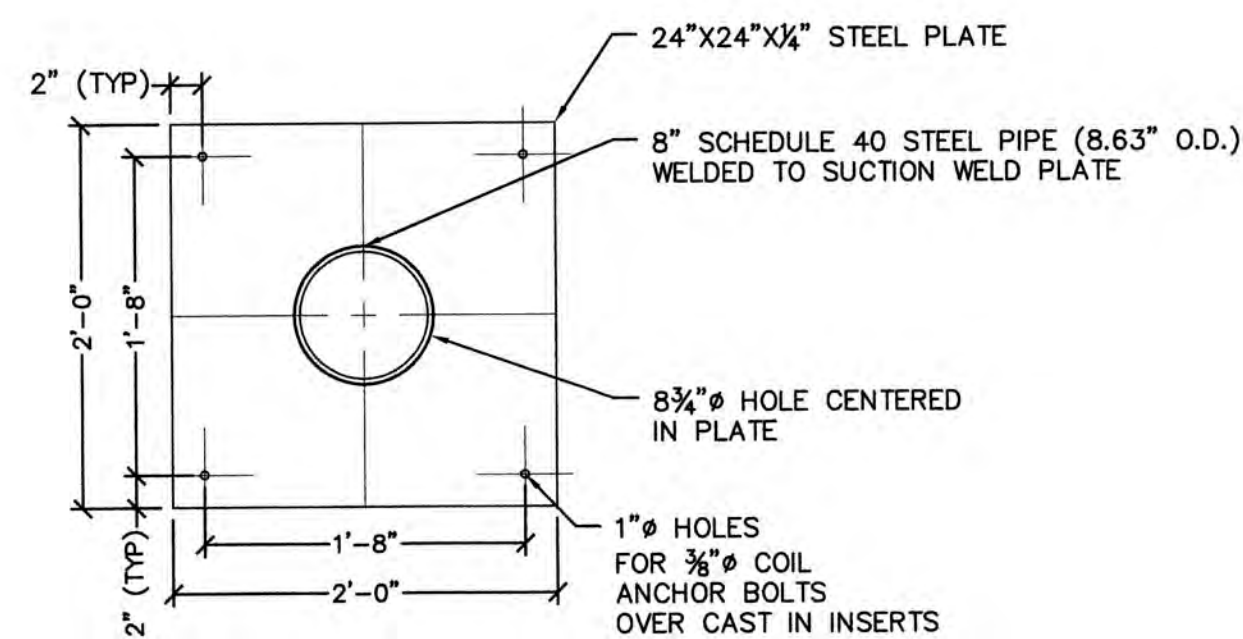


7A
S3.0
TURRET ELEV. VIEW
3/4" = 1'-0"



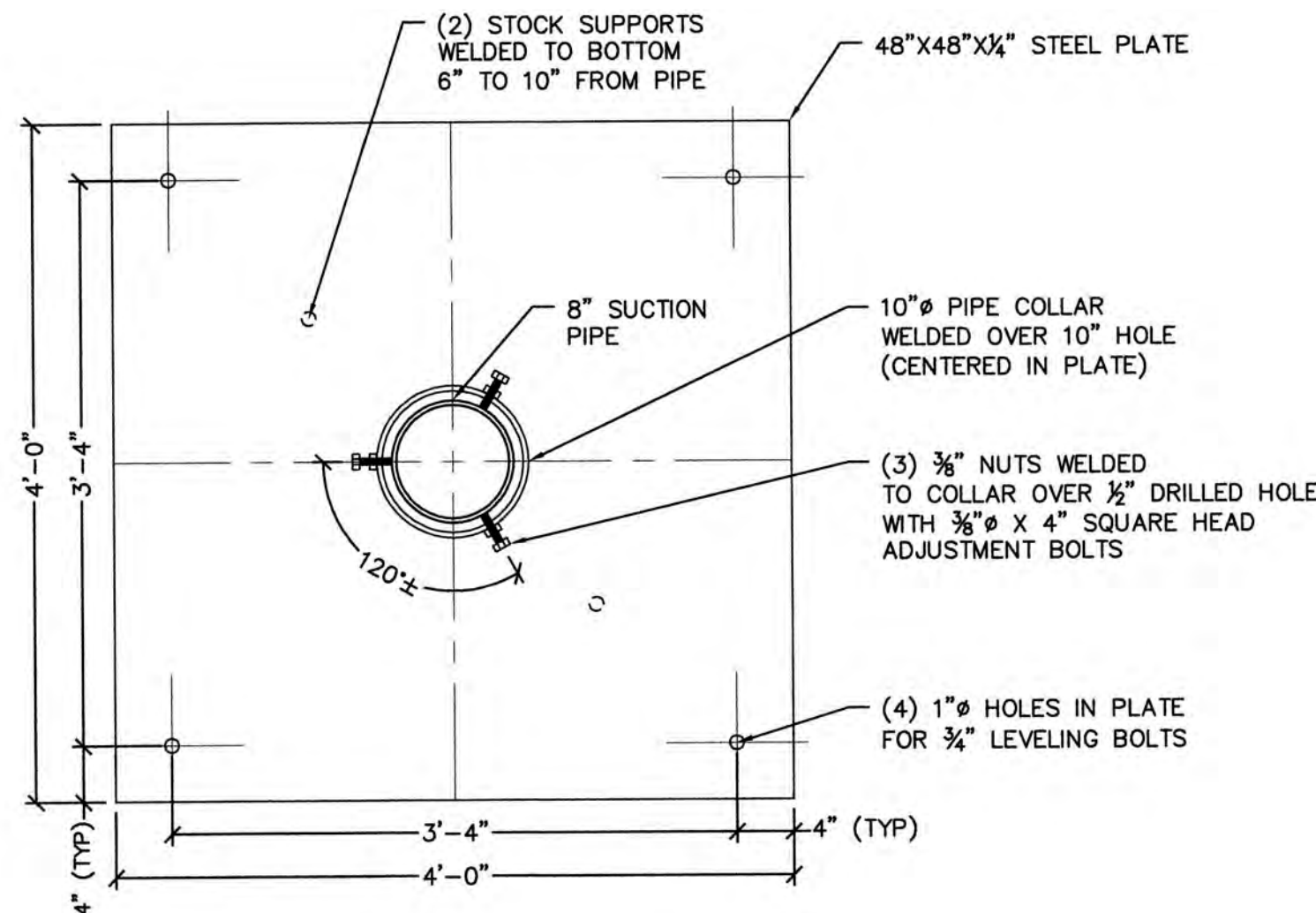
7B
S3.0
TURRET PLAN VIEW
3/4" = 1'-0"

NOTES:
1. CONCRETE: 4,000 PSI @ 28 DAYS.
2. REINFORCING PER ASTM A-615, GRADE 60 DEFORMED BLACK BARS.
3. ALL CONDUIT AND ALARM/ELECTRICAL WORK BY OTHERS

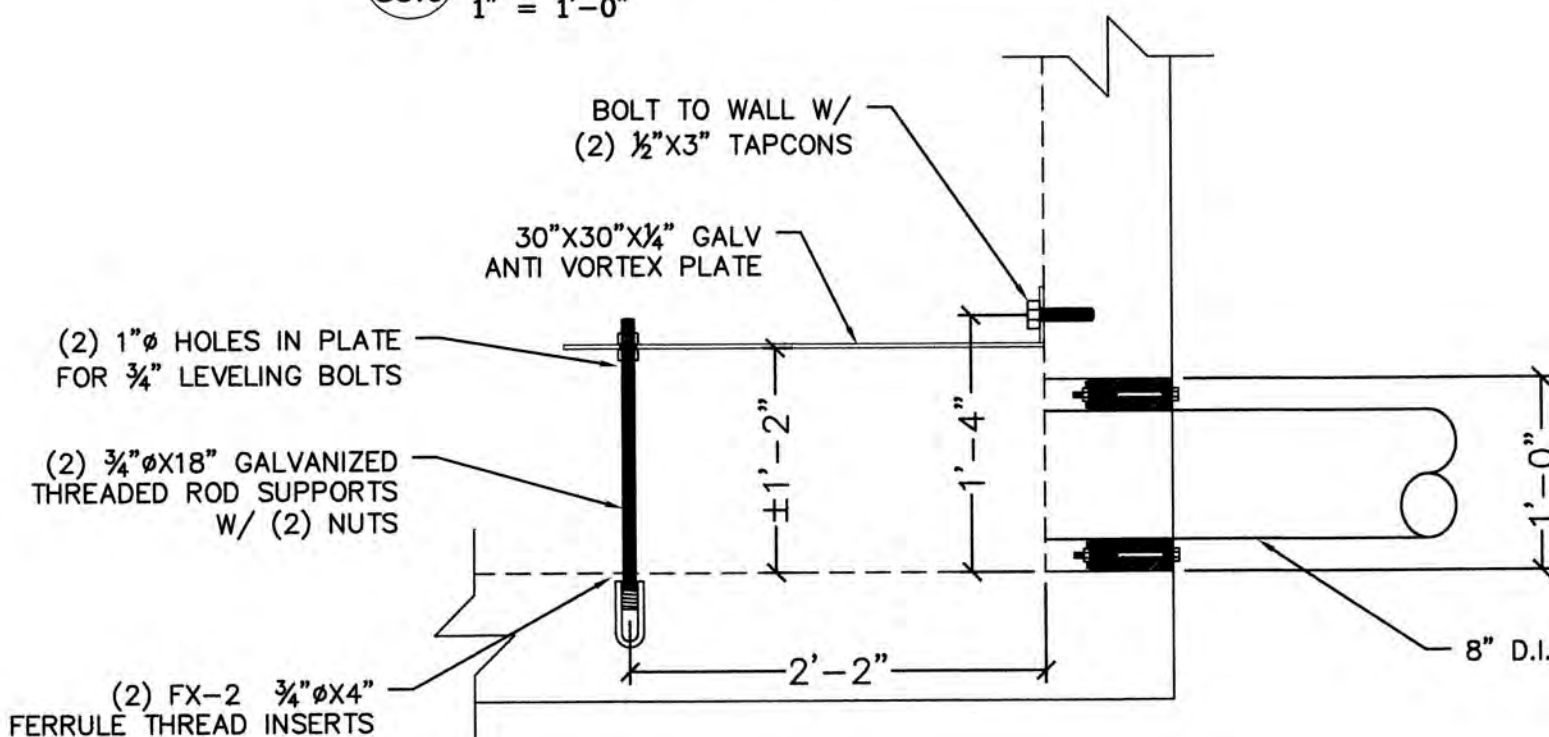


NOTE:
ALL WELD PLATES HAVE SIMILAR DIMENSIONS
ONLY CENTER HOLE SIZE VARIES

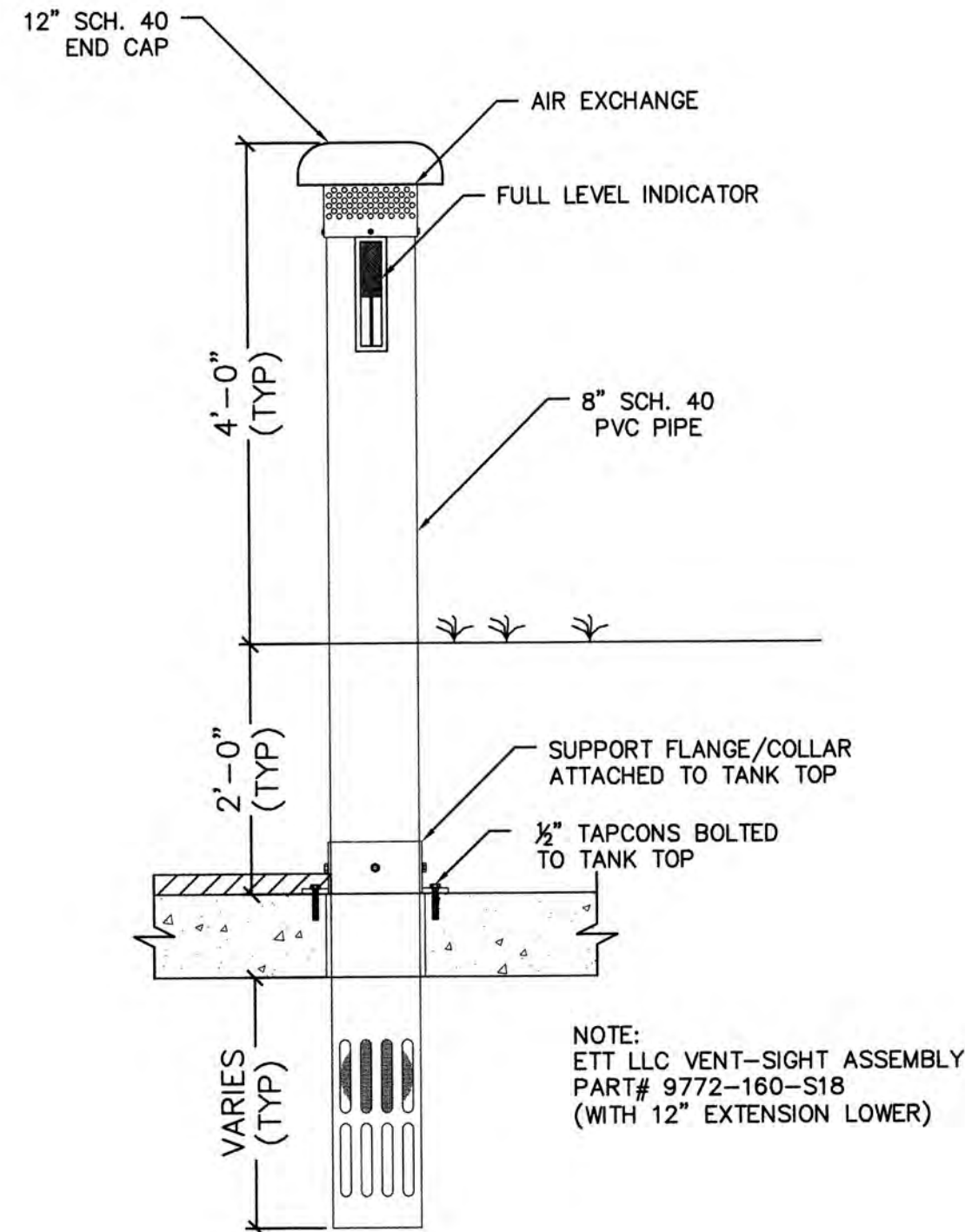
5
S3.0
SUCTION WELD PLATE DETAIL
PLAN VIEW
1" = 1'-0"



6A
S3.0
ANTI VORTEX PLATE DETAIL
PLAN VIEW
1" = 1'-0"



7B
S3.0
ANTI VORTEX PLATE DETAIL
ELEVATION VIEW



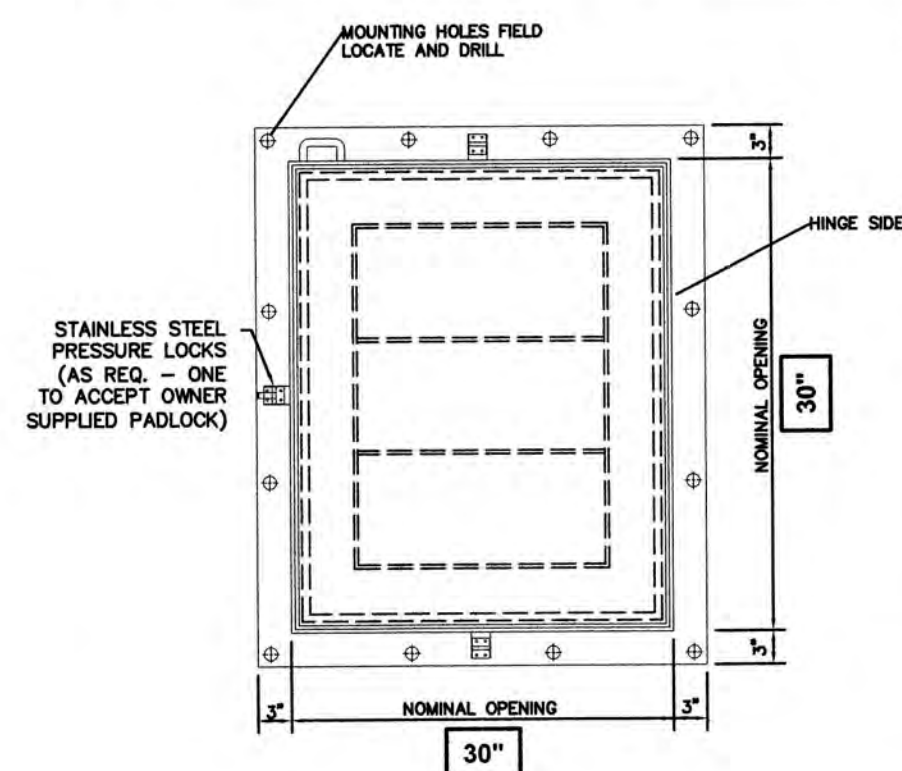
NOTE:
ETT LLC VENT-SIGHT ASSEMBLY
PART# 9772-160-S18
(WITH 12" EXTENSION LOWER)

6
S3.0
VENT PIPE ASSEMBLY DETAIL
3/4" = 1'-0"

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MODEL NO. F1R3030M
QUANTITY: (3) REQ'D
ORDER NO.
DATE:
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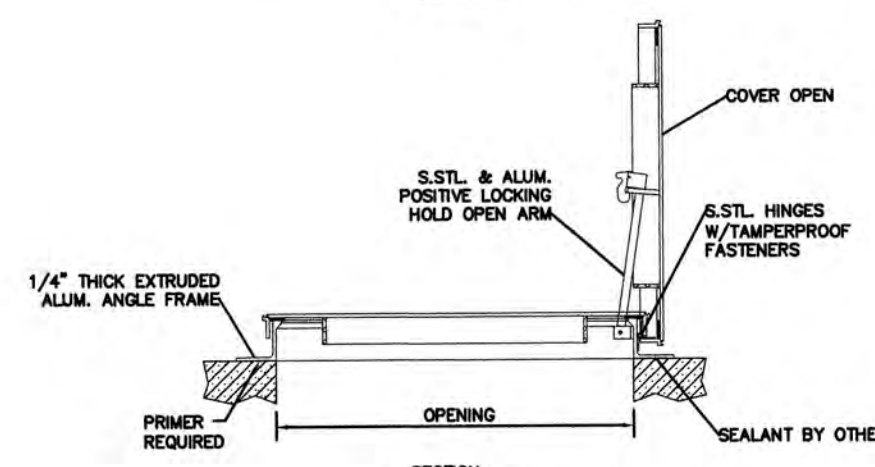
STANDARD FEATURES:
1/4 ALUMINUM TREAD PLATE COVER
1/4 THICK ALUMINUM FRAME EXTRUSION
1-316 STAINLESS STEEL HARDWARE
NEOPRENE GASKET (ON COVER)
S.STL. & ALUM. HOLD OPEN ARM
S.STL. PRESSURE LOCKS
LOCKING LUG
LIFETIME GUARANTEE

☒ 625 LB. PER SQ. FT. LOAD RATING
☐ 300 LB. PER SQ. FT. LOAD RATING

OPTIONS/FEATURES:

☐ BITUMINOUS COATING
☐ CLEAR ANODIZED FINISH
☐ LACQUER FINISH
☐ SPRING ASSIST
☐ 2" INSULATION W/ CAPTIVE PAN
☐ SLAB SKIRTING
☐ PVC PROTECTIVE FILM
☐ SHOP DRILL MOUNTING HOLES
☐ MISCELLANEOUS

NOTE:
ACTUAL CLEAR OPENING =
NOMINAL OPENING - 1.25"



8
S3.0
HATCH DETAILS
NOT TO SCALE



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HENNIKER, NH 03242
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FAX: 603-428-7426
WWW.MICHIECORP.COM

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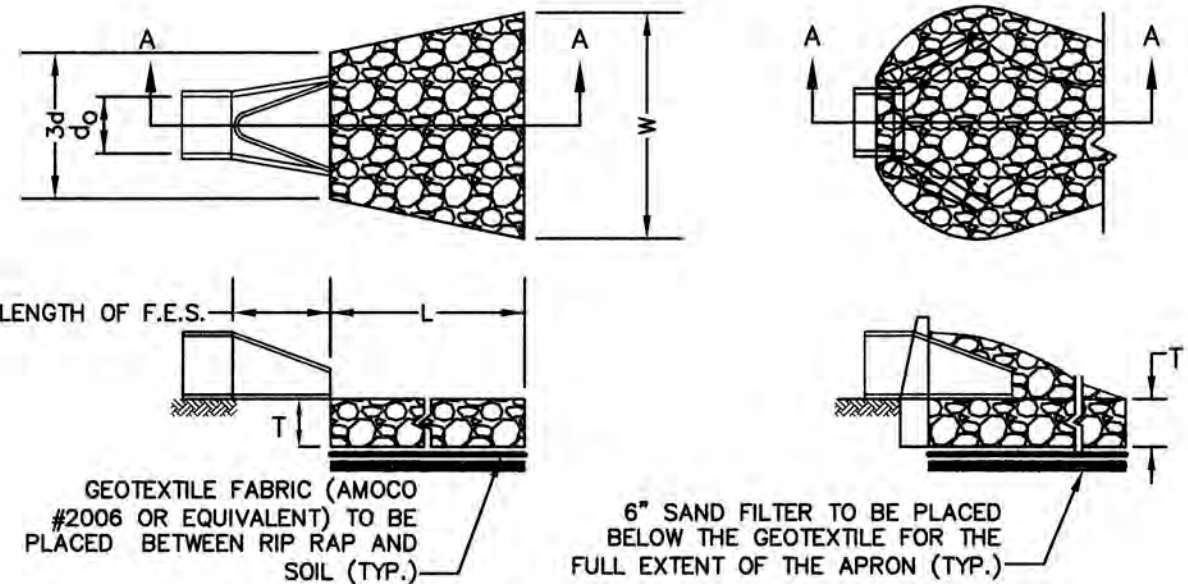
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FAX: 603-772-0227
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Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.	D6
SHEET 14 OF 16	JBE PROJECT NO. 17088



SECTION A-A

PIPE OUTLET TO FLAT AREA
WITH NO DEFINED CHANNEL

SECTION A-A

PIPE OUTLET TO
WELL-DEFINED
CHANNEL

TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES

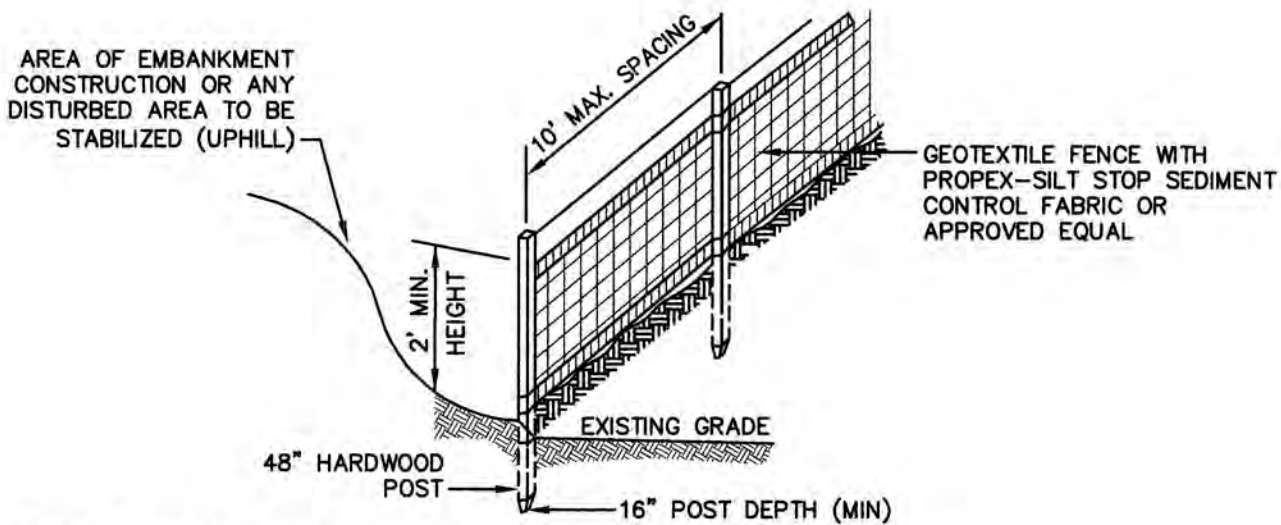
THICKNESS OF RIP RAP = 1.5 FEET		
d50 SIZE=	0.50	6 INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	
100%	9	12
85%	8	11
50%	6	9
15%	2	3

NOTES:

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

RIP RAP OUTLET PROTECTION APRON

NOT TO SCALE

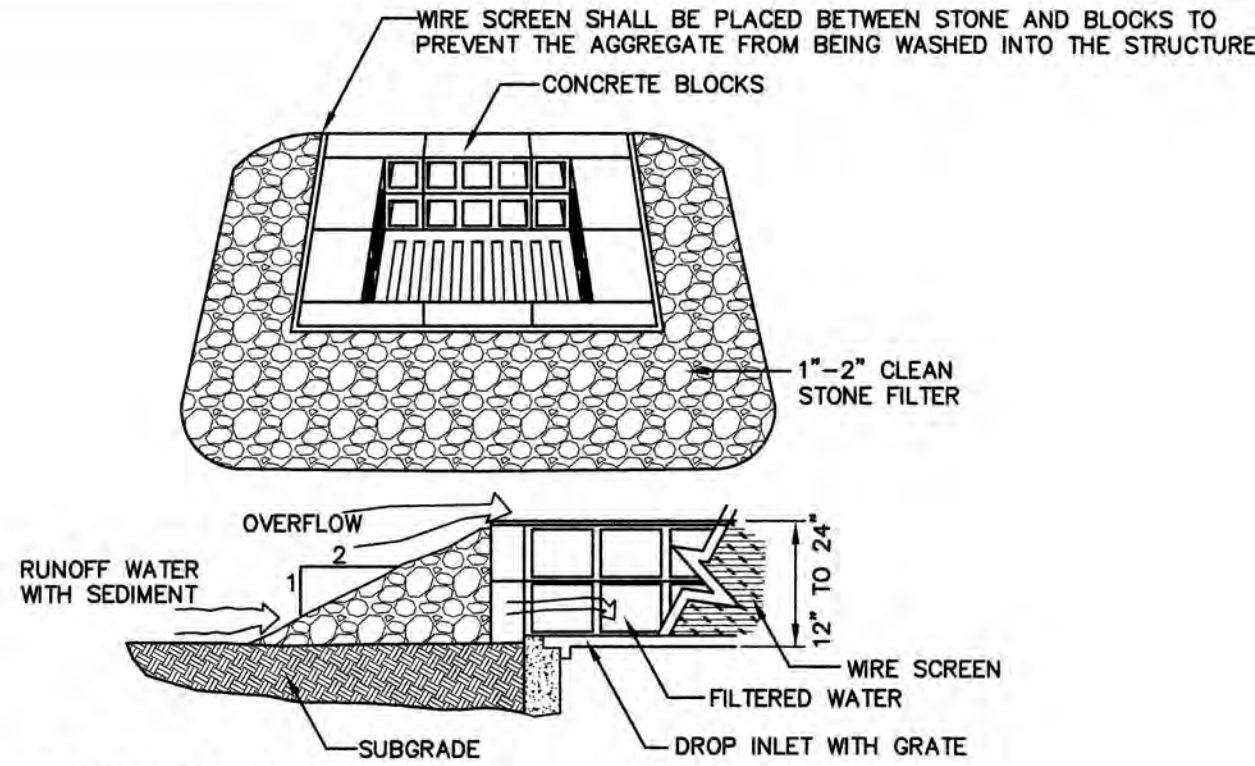


CONSTRUCTION SPECIFICATIONS:

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

SILT FENCE

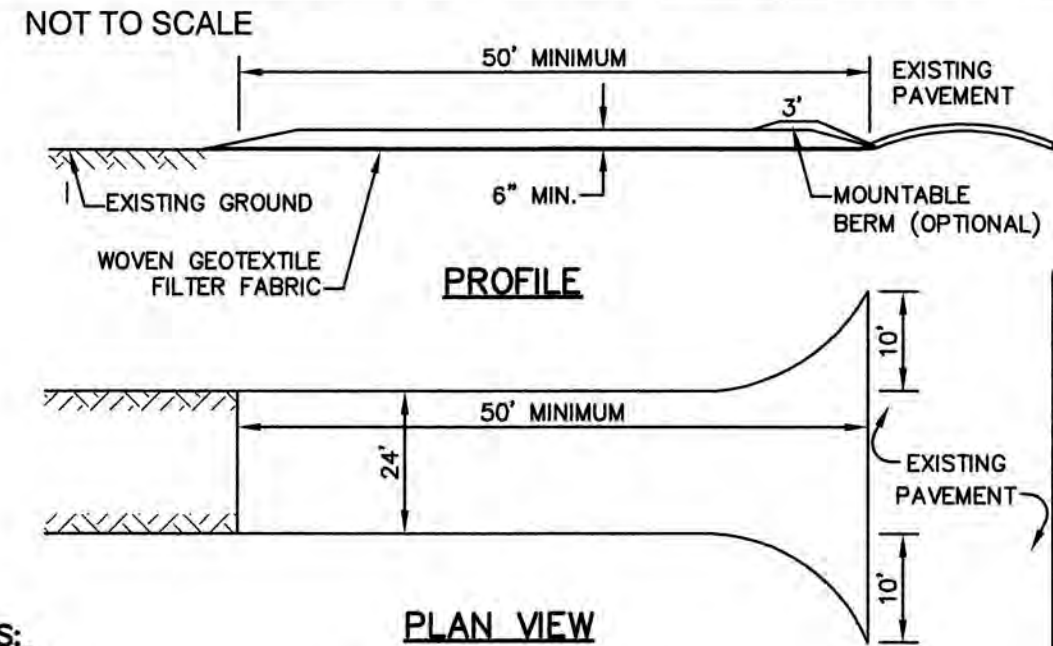
NOT TO SCALE



MAINTENANCE NOTE:

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAINFALL AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED IN A SUITABLE UPLAND AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURE OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

TEMPORARY CATCH BASIN INLET PROTECTION
(Block and Gravel Drop Inlet Sediment Filter)

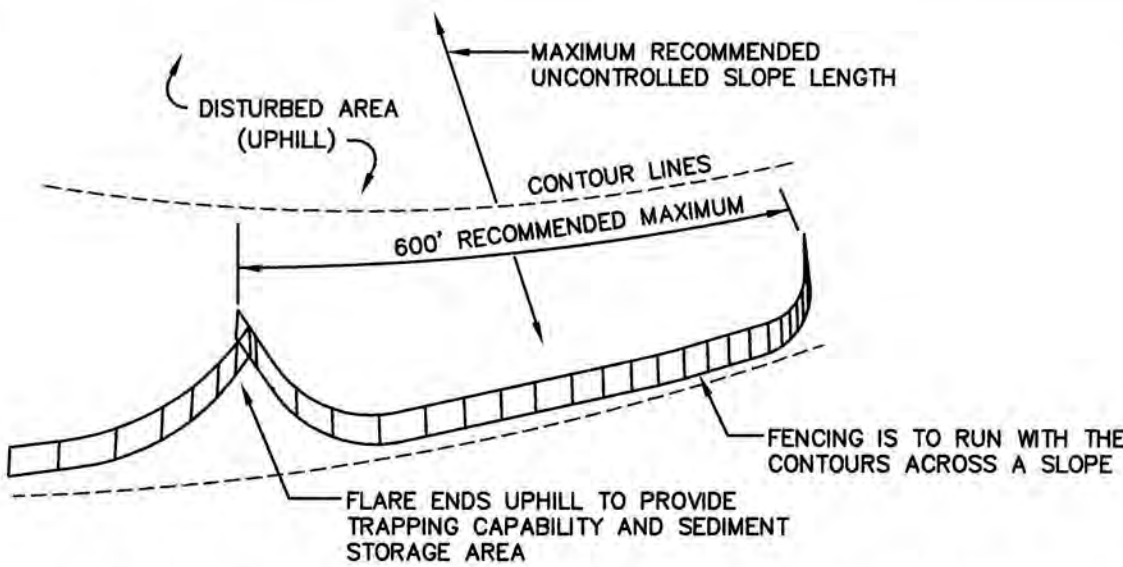


NOTES:

1. STONE FOR STABILIZED CONSTRUCTION ENTRANCE SHALL BE 1 TO 2 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS, OR 10 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER FABRIC IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A STONE BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



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

MAINTENANCE:

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

TEMPORARY EROSION CONTROL NOTES

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME. AT NO TIME SHALL AN AREA IN EXCESS OF 5 ACRES BE EXPOSED AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS (INCLUDING POND AREAS BELOW THE PROPOSED WATERLINE) SHALL BE RETURNED TO PROPOSED GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 6" OF SCREENED ORGANIC LOAM AND SEEDED WITH SEED MIXTURE 'C' AT A RATE NOT LESS THAN 1.10 POUNDS OF SEED PER 1,000 S.F. OF AREA (48 LBS. / ACRE).
4. SILT FENCES AND OTHER BARRIERS SHALL BE INSPECTED EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.25" OR GREATER. ALL DAMAGED AREAS SHALL BE REPAIRED, AND SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED OR OTHERWISE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 14 DAYS OF THE INITIAL DISTURBANCE OF SOIL. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
7. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEING AND INSTALLING NORTH AMERICAN GREEN S75 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER) ON SLOPES GREATER THAN 3:1, AND SEEING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
8. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
9. AFTER NOVEMBER 15th, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
10. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
 - a. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
 - b. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
 - c. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH STONE OR RIPRAP HAS BEEN INSTALLED; OR
 - d. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
11. FUGITIVE DUST CONTROL IS REQUIRED TO BE CONTROLLED IN ACCORDANCE WITH ENV-A 1000, AND THE PROJECT IS TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.
12. IN ORDER TO ENSURE THE STABILITY OF THE SITE AND EFFECTIVE IMPLEMENTATION OF THE SEDIMENT AND EROSION CONTROL MEASURES SPECIFIED IN THE PLANS FOR THE DURATION OF CONSTRUCTION, THE CONTRACTOR SHALL BE IN STRICT COMPLIANCE WITH THE FOLLOWING INSPECTION AND MAINTENANCE REQUIREMENTS IN ADDITION TO THOSE CALLED FOR IN THE SWPPP:
 - a. A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL OR A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE ("MONITOR") SHALL BE EMPLOYED TO INSPECT THE SITE FROM THE START OF ALTERATION OF TERRAIN ACTIVITIES UNTIL THE SITE IS IN FULL COMPLIANCE WITH THE SITE SPECIFIC PERMIT ("PERMIT").
 - b. DURING THIS PERIOD, THE MONITOR SHALL INSPECT THE SUBJECT SITE AT LEAST ONCE A WEEK, AND IF POSSIBLE, DURING ANY ½ INCH OR GREATER RAIN EVENT (I.E. ½ INCH OF PRECIPITATION OR MORE WITHIN A 24 HOUR PERIOD). IF UNABLE TO BE PRESENT DURING SUCH A STORM, THE MONITOR SHALL INSPECT THE SITE WITHIN 24 HOURS OF THIS EVENT.

CONSTRUCTION SEQUENCE

1. PRIOR TO THE START OF ANY ACTIVITY, IT IS THE RESPONSIBILITY OF THE SITE'S SITE DEVELOPER (OR OWNER) TO FILE A NOTICE OF INTENT (NOI) FORM WITH THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ORDER TO GAIN COVERAGE UNDER THE NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. A PRE-CONSTRUCTION MEETING IS TO BE HELD WITH ALL DEPARTMENT HEADS PRIOR TO THE START OF CONSTRUCTION.
2. WETLAND BOUNDARIES ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION.
3. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
4. INSTALL SILT FENCING, HAY BALES AND CONSTRUCTION ENTRANCES PRIOR TO THE START OF CONSTRUCTION. THESE ARE TO BE MAINTAINED UNTIL THE FINAL PAVEMENT SURFACING AND LANDSCAPING AREAS ARE ESTABLISHED.
5. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
6. CONSTRUCT AND/OR INSTALL TEMPORARY OR PERMANENT SEDIMENT AND/OR DETENTION BASIN(S) AS REQUIRED. THESE FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUN-OFF TO THEM.
7. STRIP LOAM AND PAVEMENT, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
8. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS.
9. PREPARE BUILDING PAD(S) TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
10. INSTALL THE SEWER AND DRAINAGE SYSTEMS FIRST, THEN ANY OTHER UTILITIES IN ACCORDANCE WITH THE PLAN AND DETAILS. ANY CONFLICTS BETWEEN UTILITIES ARE TO BE RESOLVED WITH THE INVOLVEMENT AND APPROVAL OF THE ENGINEER.
11. INSTALL INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED IN ACCORDANCE WITH DETAILS.
12. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
13. STORMWATER FLOWS ARE NOT TO BE DIRECTED TO TREATMENT PRACTICES UNTIL ALL CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
14. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE DITCHES, CHECK DAMS, SEDIMENT TRAPS, ETC., TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING WATERS AND/OR PROPERTY.
15. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
16. PAVE ALL PARKING LOTS AND ROADWAYS WITH INITIAL 'BASE COURSE'.
17. PERFORM ALL REMAINING SITE CONSTRUCTION (I.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
18. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (I.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
19. FINISH PAVING ALL ROADWAYS AND PARKING AREAS WITH 'FINISH' COURSE.
20. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
21. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
22. COMPLETE PERMANENT SEEING AND LANDSCAPING.
23. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEING AREAS HAVE BEEN 75%-85% ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
24. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
25. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
26. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY QUARTER-INCH OF RAINFALL.
27. UPON COMPLETION OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ANY RELEVANT PERMITTING AGENCIES THAT THE CONSTRUCTION HAS BEEN FINISHED IN A SATISFACTORY MANNER.

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
 - A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
 - B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDED PREPARATION
 - A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
 - B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
 - A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEING AND INCORPORATED INTO THE SOIL. TYPES AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
PHOSPHATE(P2O5), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
POTASH(K2O), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
(NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10).
 - B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTPACKING OR RAKING.
 - C. REFER TO THE 'SEEING GUIDE' AND 'SEEING RATES' TABLES ON THIS SHEET FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEING. ALL LEGUMES (CROWNVETCH, BIRDSFOOT, TREFOIL AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
 - D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. MULCH
 - A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEING.
 - B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
 - A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
 - B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
 - C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/
GRAVEL PIT. SEE NH-PW-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.					
1/ REFER TO SEEING MIXTURES AND RATES IN TABLE BELOW.					
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.					

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

SEEDING GUIDE

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE CREEPING RED FESCUE RED TOP TOTAL	20	0.45
	20	0.45
	2	0.05
	42	0.95
B. TALL FESCUE CREEPING RED FESCUE CROWN VETCH OR FLAT PEA TOTAL	15	0.35
	10	0.25
	15	0.35
	30	0.75
	40 OR 55	0.95 OR 1.35
C. TALL FESCUE CREEPING RED FESCUE BIRDS FOOT TREFOIL TOTAL	20	0.45
	20	0.45
	5	0.20
	45	1.10
D. TALL FESCUE FLAT PEA TOTAL	20	0.45
	30	0.75
	50	1.20
E. CREEPING RED FESCUE 1/ KENTUCKY BLUEGRASS 1/ TOTAL	50	1.15
	50	1.15
	100	2.30
F. TALL FESCUE 1	150	3.60
1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEING RATES.		

SEEDING RATES

Design: JSR	Draft: PLB	Date: 10/8/18
Checked: JSR	Scale: AS NOTED	Project No.: 17088
Drawing Name: 17088-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USERS SOLE RISK AND WITHOUT LIABILITY TO JBE.		

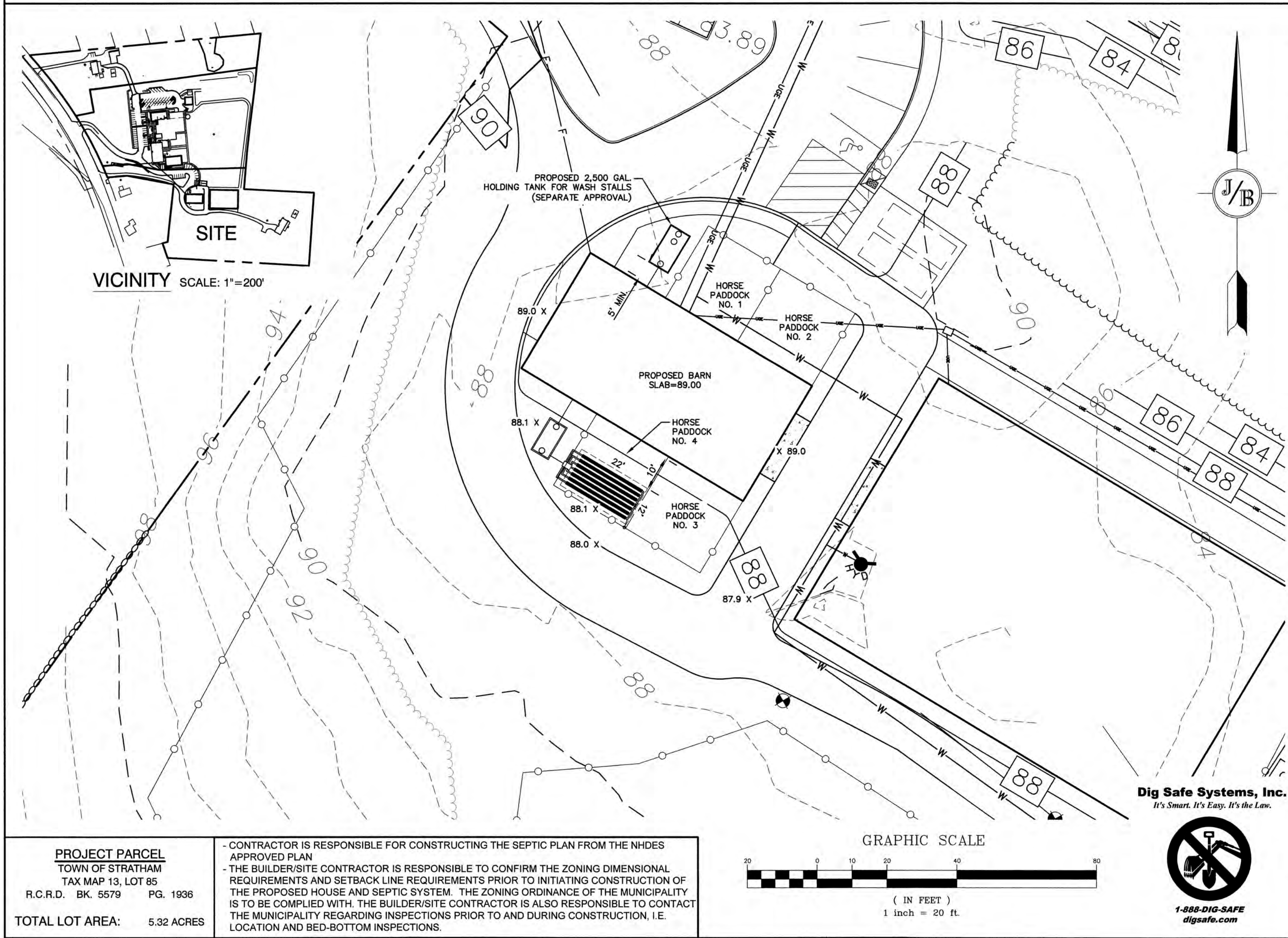
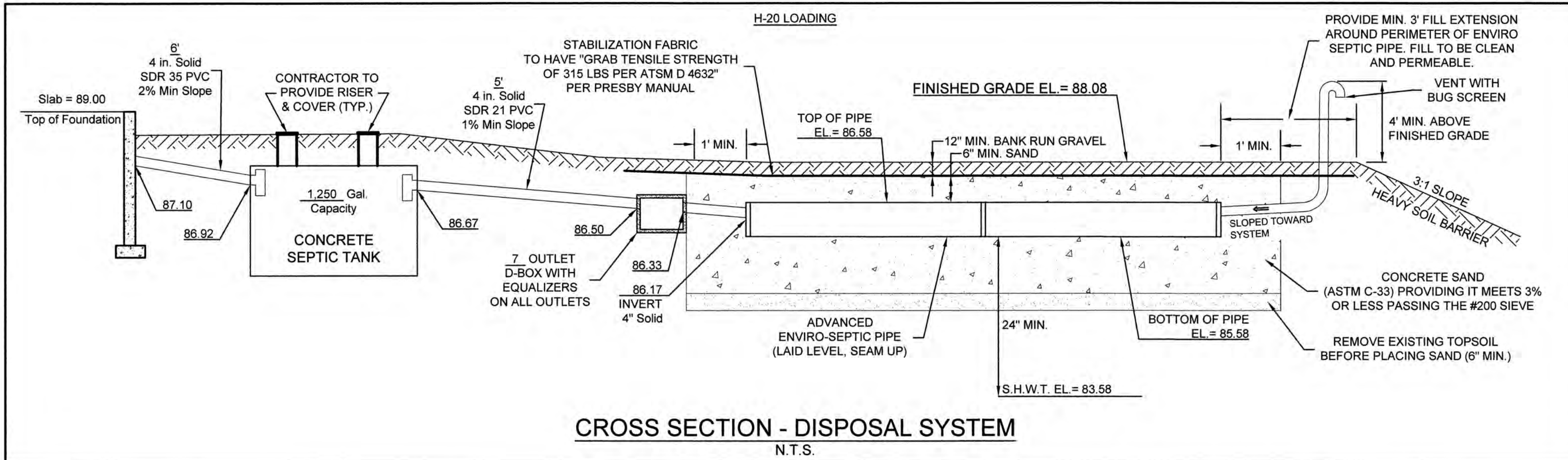


REV.	DATE	REVISION	BY
3	3/31/20	REVISED PER HW; SUBMITTED TO TOWN AND NHDES	DJM
2	3/3/20	REVISED PER OWNER; SUBMIT TO PLANNING BOARD	DJM
1	8/1/19	SUBMITTED TO NHDES	PLB
0	5/15/19	ISSUED FOR REVIEW	PLB

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

Plan Name:	EROSION AND SEDIMENT CONTROL DETAILS
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.
E1
SHEET 15 OF 16
JBE PROJECT NO. 17088



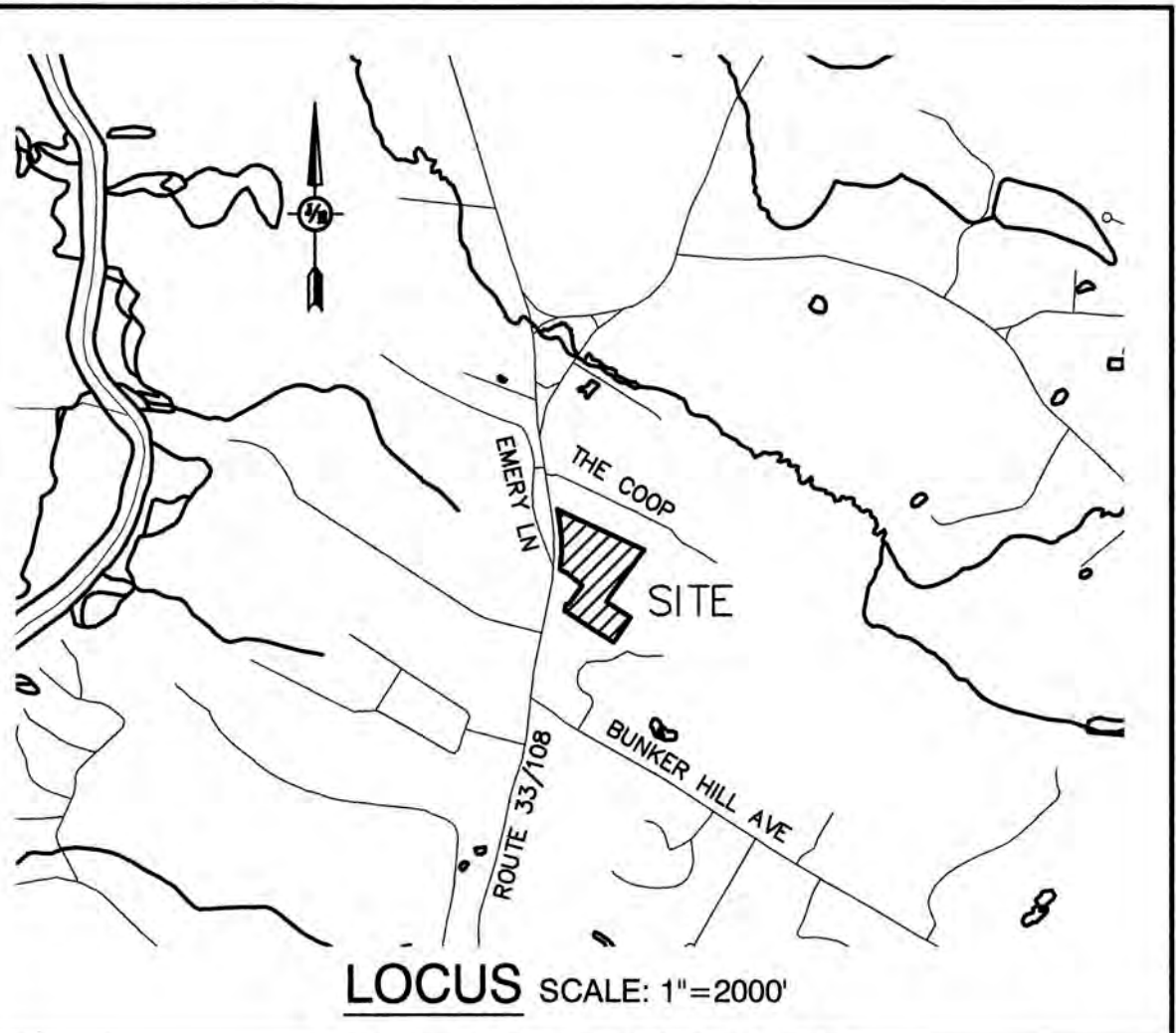
TEST PIT LOGS

PERFORMED BY: MICHAEL KERIVAN, JONES & BEACH ENGINEERS, INC. SSD# 1200

TEST PIT	#10
0'-6"	10YR 3/2 LOAM GRANULAR, FRIABLE
6'-16"	10YR 4/3 LOAMY SAND GRANULAR, LOOSE
16'-41"	10YR 5/8 SANDY LOAM GRANULAR, FRIABLE
41'-74"	10YR 4/4 SANDY LOAM GRANULAR, FRIABLE

SHWT = 41
ROOTS TO 9"
NO H₂O
NO REFUSAL

TEST PIT, DATE: JUNE 19, 2019
PERC. TEST, DATE: JUNE 19, 2019
4 MIN./INCH



ADVANCED ENVIRO-SEPTIC DESIGN CALCULATIONS

COMMERCIAL BARN = 300 GALLONS PER DAY (150 GPD/BEDROOM)
300 GPD @ 4 MIN./INCH = 140 L.F. OF ADVANCED ENVIRO-SEPTIC PIPE REQUIRED.
140 L.F. OF ADVANCED ENVIRO-SEPTIC PIPE PROVIDED.
7 ROWS OF ADVANCED ENVIRO-SEPTIC PIPE x 20' LONG. TO BE CONNECTED IN PARALLEL

BED DIMENSIONS 22' x 12'

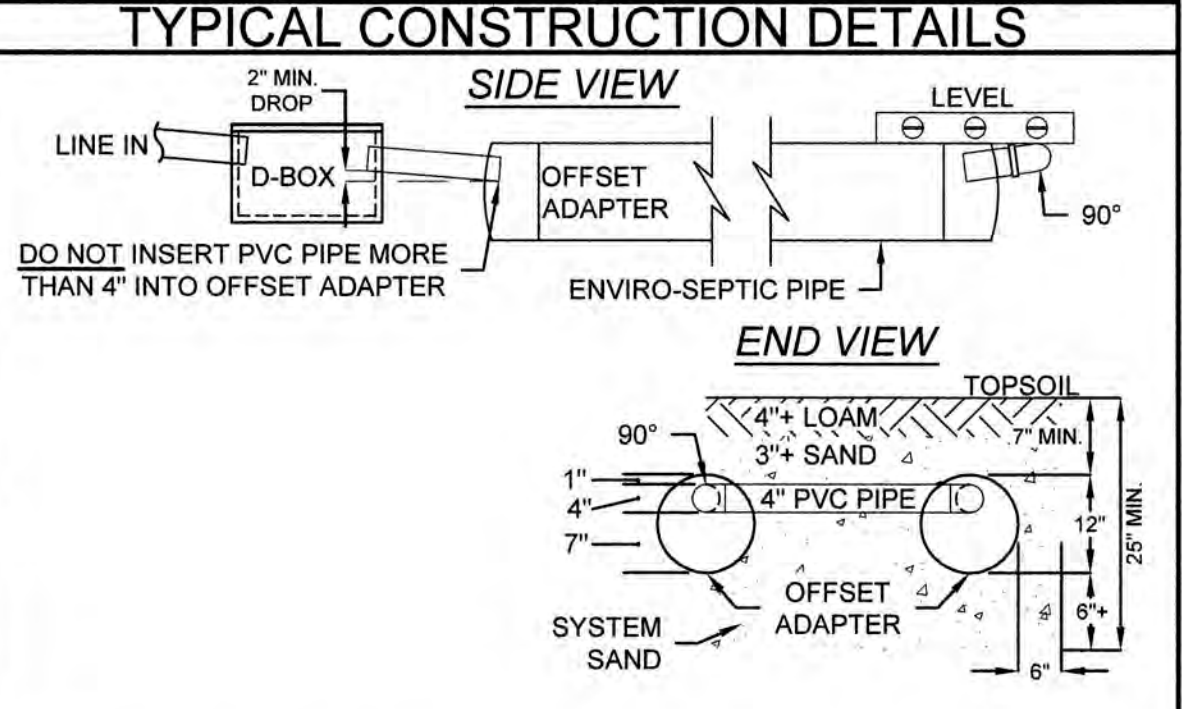
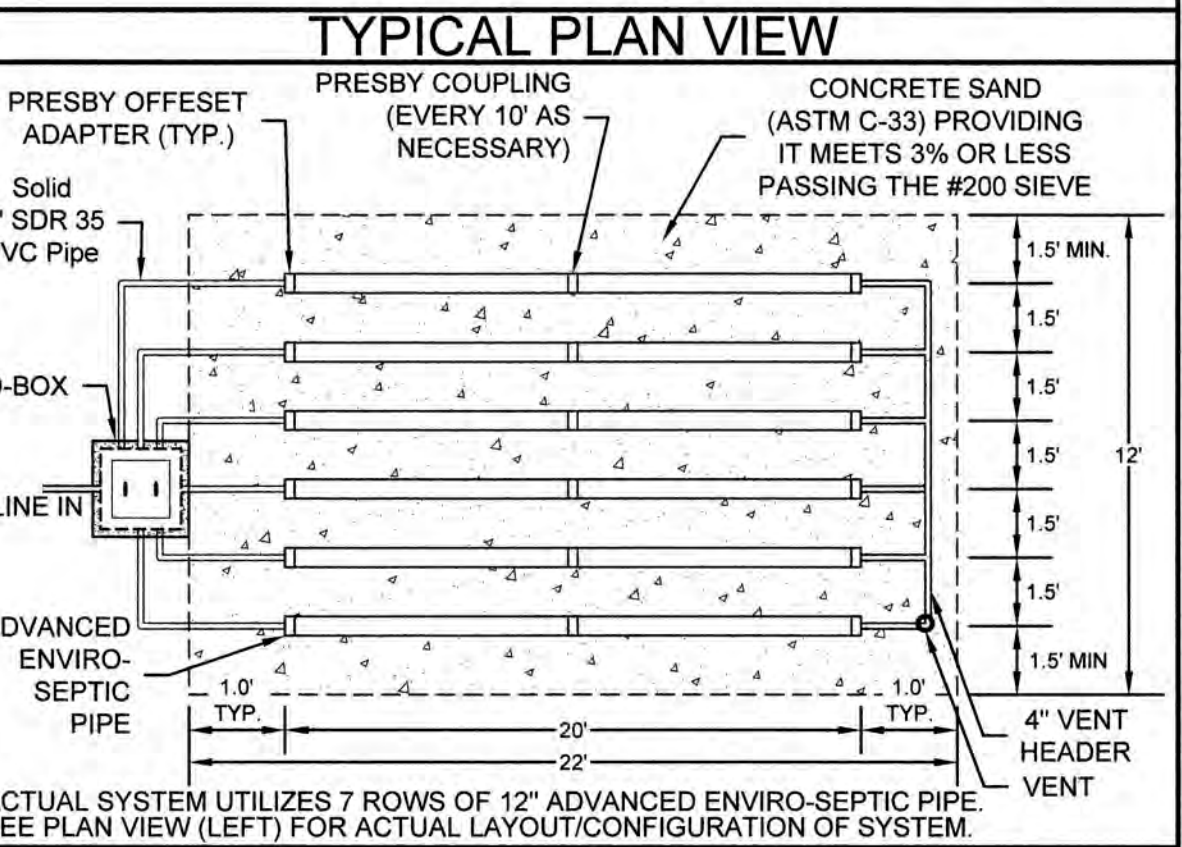
DESIGN INTENT

THE BOTTOM OF THE EFFLUENT DISPOSAL SYSTEM (E.D.S.) SHALL BE CONSTRUCTED AT ELEVATION ###. THIS IS APPROXIMATELY ## FEET ABOVE ORIGINAL GROUND ON THE HIGH CONTOUR (###) OF THE DESIGNED E.D.S. (ENV-WQ-1003.13(aaa))

GENERAL NOTES

- CONTRACTOR TO VERIFY ALL ELEVATIONS IN FIELD PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY DESIGNER OF ANY ABNORMAL CONDITIONS (HARDPAN OR SATURATED SOILS, LEDGE, ETC.) FOUND WHEN EXCAVATING PRIOR TO INSTALLING THE SYSTEM.
- LEACH BED COMPRISED OF ADVANCED ENVIRO-SEPTIC LEACHING PIPE. FOR DETAILED INSTALLATION INFORMATION REFER TO "ENVIRO-SEPTIC & SIMPLE-SEPTIC LEACHING SYSTEMS DESIGN AND INSTALLATION MANUAL", 2019 EDITION (OR MOST CURRENT EDITION). CONTACT PRESBY ENVIRONMENTAL AT PHONE (800) 473-5298 OR WWW.PRESBYENVIRONMENTAL.COM
- PER ENV-WQ 1016.03, CONTRACTOR IS TO PROTECT THE NATURAL ABSORPTION QUALITIES OF THE SOIL. DO NOT COMPACT OR DRIVE OVER THE AREA WITH EQUIPMENT AND PROTECT OPEN EXCAVATION TO PREVENT THE ENTRANCE OF SILT AND DEBRIS.
- FILL AROUND ENVIRO PIPES TO BE ASTM C-33 (CONCRETE SAND) OR EQUAL
- REMOVE TOPSOIL BEFORE PLACING FILL
- 4 INCH THICK LOAM & SEED AROUND PERIMETER OF FILL
- VENTING IS REQUIRED FOR ADVANCED ENVIRO-SEPTIC SYSTEMS
- 3 FT. FILL EXTENSION. SIDE SLOPES OF FILL = 3(HORIZONTAL): 1(VERTICAL).
- CROWN SYSTEM TO SHED RAINWATER. SLOPE SYSTEM AWAY FROM HOUSE.
- SYSTEM WILL BE REPLACED IN SAME LOCATION IN CASE OF FAILURE.
- DISTRIBUTION BOX SHALL HAVE FLOW EQUALIZERS INSTALLED IN THE OUTLET PORTS.
- JOINTS ARE TO BE BELLED PVC OR STANDARD SLIP COLLARS.
- PER ENV-WQ 1010.11, THE FIRST COMPARTMENT IN MULTI-COMPARTMENT SEPTIC TANKS MUST EQUAL AT LEAST 2/3 OF THE REQUIRED VOLUME.
- PER ENV-WQ 1010.10, EXCEPTING LEDGE TANKS, THE LIQUID DEPTH OF THE SEPTIC TANK IS TO BE AT LEAST 40".
- THE OUTLET BAFFLE SHALL BE A VENTED TEE WHICH SHALL EXTEND TO A DISTANCE BELOW THE SURFACE EQUAL TO 40% OF THE LIQUID DEPTH AND SHALL EXTEND ABOVE THE LIQUID LINE TO NOT LESS THAN ONE INCH FROM THE TOP OF THE TANK.
- ALL CONNECTIONS BETWEEN A SEPTIC TANK AND THE PIPES LEADING TO AND EXITING FROM THE SEPTIC TANK SHALL BE SEALED WITH A WATERTIGHT, FLEXIBLE JOINT CONNECTOR THAT: (1) WILL ACCOMMODATE NORMAL MOVEMENT OF THE SEPTIC TANK WITHOUT LEAKING OR BREAKING; AND (2) HAS BEEN CERTIFIED BY ITS MANUFACTURER OR DISTRIBUTOR AS MEETING OR EXCEEDING THE APPLICABLE STANDARD IN ASTM C 1644-06, SECTION 7.
- CONTRACTOR TO PROVIDE RISERS FOR TANKS WITH MORE THAN 12' OF COVER.
- IF GARBAGE GRINDERS ARE DESIRED, SEPTIC TANK SHALL BE 50% LARGER.
- TOWN OF STRATHAM REQUIRES BED BOTTOM INSPECTION.
- ENVIRO-SEPTIC TO BE SUPPLIED BY: ELIMINATOR SYSTEMS INC. (603) 868-2242) OR EQUAL.
- 1,250 GALLON SEPTIC TANK & D-BOX TO BE SUPPLIED BY: SHEA CONCRETE, (800-696-7432) OR EQUAL.
- SITE SPECIFIC SOILS SOIL TYPE: ELDRIDGE, PREPARED BY GOVE ENVIRONMENTAL SERVICES.
- ANY CHANGES TO SEPTIC TANK, BUILDING OR WELL LOCATION/ORIENTATION WILL REQUIRE AN AS-BUILT PLAN TO BE PROVIDED BY THE DESIGNER PRIOR TO NHDES FINAL INSPECTION.
- PER ENV-WQ 1004.10, SYSTEMS OVER 2,500 GPD ARE TO BE INSPECTED BY DESIGNER.
- PER ENV-WQ 1003.13(a)(3) THERE ARE NO KNOWN BURIAL SITES OR CEMETERIES ON THE LOT WITHIN 100' OF ANY COMPONENT OF THE ISDS.
- 50' SETBACK FROM POORLY DRAINED SOILS.
- DISTANCE FROM SEWER PIPE TO SURFACE WATER, OPEN DRAINAGE, VERY POORLY DRAINED SOIL, AN OPEN LOOP GEOTHERMAL WELL, OR A PRIVATE ON-SITE WELL SHALL BE 75 FT. THIS MAY BE REDUCED TO 50 FT IF SDR26 OR EQUIVALENT IS USED IN ACCORDANCE WITH ENV-WQ 1008.04(c)(1).
- DISTANCE FROM SEPTIC TANK TO SURFACE WATER, OPEN DRAINAGE, VERY POORLY DRAINED SOIL, AN OPEN LOOP GEOTHERMAL WELL, OR A PRIVATE ON-SITE WELL SHALL BE 75 FT. THIS MAY BE REDUCED TO 50 FT IF THE SEPTIC TANK IS EITHER MADE FROM PLASTIC OR COATED WITH A SEALANT TO PREVENT INFILTRATION AND EXFILTRATION IN ACCORDANCE WITH ENV-WQ 1008.04(c)(2).
- APPROVAL FOR CONSTRUCTION IS VALID FOR 4 YEARS FROM DATE OF ISSUE.

SUBDIVISION APPROVAL #	N/A	>5 AC.
CONSTRUCTION APPROVAL #	eCA2017080827	ISSUED: 08/08/2017
CONSTRUCTION APPROVAL #	eCA2000023601	ISSUED: 02/18/2000



LOT LOADING CALCULATIONS:

231,927 S.F. LOT. - 17,671 S.F. WELL RADIUS = 214,256 S.F.
214,256 S.F. / 1.76 SOIL FACTOR = 121,736 / 43,560 x 2,000 = 5,589 GPD ALLOWABLE

WETLAND DELINEATION

WETLANDS ON-SITE WERE DELINEATED BY:	GOVE ENVIRONMENTAL SERVICES 8 CONTINENTAL DRIVE, UNIT #H EXETER, NH 03833
--------------------------------------	---

- OWNER NOTES**
- KNOW THE LOCATION OF YOUR SEPTIC TANK AND LEACHING AREA.
 - INSPECT YOUR SEPTIC TANK YEARLY. HAVE THE SEPTIC TANK PUMPED AS NEEDED BUT AT LEAST ONCE EVERY THREE YEARS.
 - DO NOT FLUSH BULKY ITEMS SUCH AS DIAPERS, SANITARY PADS OR BABY WIPES.
 - DO NOT FLUSH TOXIC CHEMICALS SUCH AS PAINT THINNERS, DRANO, PESTICIDES, OR CHLORINE, AS THEY MAY KILL THE NECESSARY BACTERIA IN THE SEPTIC TANK.
 - REPAIR LEAKING FIXTURES IN THE BUILDING PROMPTLY.
 - BE CONSERVATIVE WITH WATER USE, SPREAD OUT USE OVER TIME, AND USE WATER-REDUCING FIXTURES WHENEVER AND WHEREVER POSSIBLE. TOO MUCH USE IN A SHORT TIME CAN OVERLOAD THE SYSTEM, WHICH MAY LEAD TO FAILURE.
 - MOW YOUR LEACHING AREA REGULARLY. PREVENT DEEP-ROOTED TREES AND SHRUBS FROM GROWING ON AND ADJACENT TO YOUR LEACHING AREA.
 - NO VEHICULAR TRAVEL, LIVESTOCK TRAVEL, OR SNOW REMOVAL IN AREA OF SYSTEM, UNLESS SPECIFICALLY DESIGNED FOR H2O LOADING.

Design: JSR	Draft: PLB	Date: 10/8/18
Checked: JSR	Scale: 1" = 60'	Project No.: 17088
Drawing Name: 17088-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		



REV.	DATE	REVISION	BY
3	3/31/20	REVISED PER HW: SUBMITTED TO TOWN AND NHDES	DJM
2	3/3/20	REVISED PER OWNER: SUBMIT TO PLANNING BOARD	DJM
1	8/1/19	SUBMITTED TO NHDES	PLB
0	5/15/19	ISSUED FOR REVIEW	PLB

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

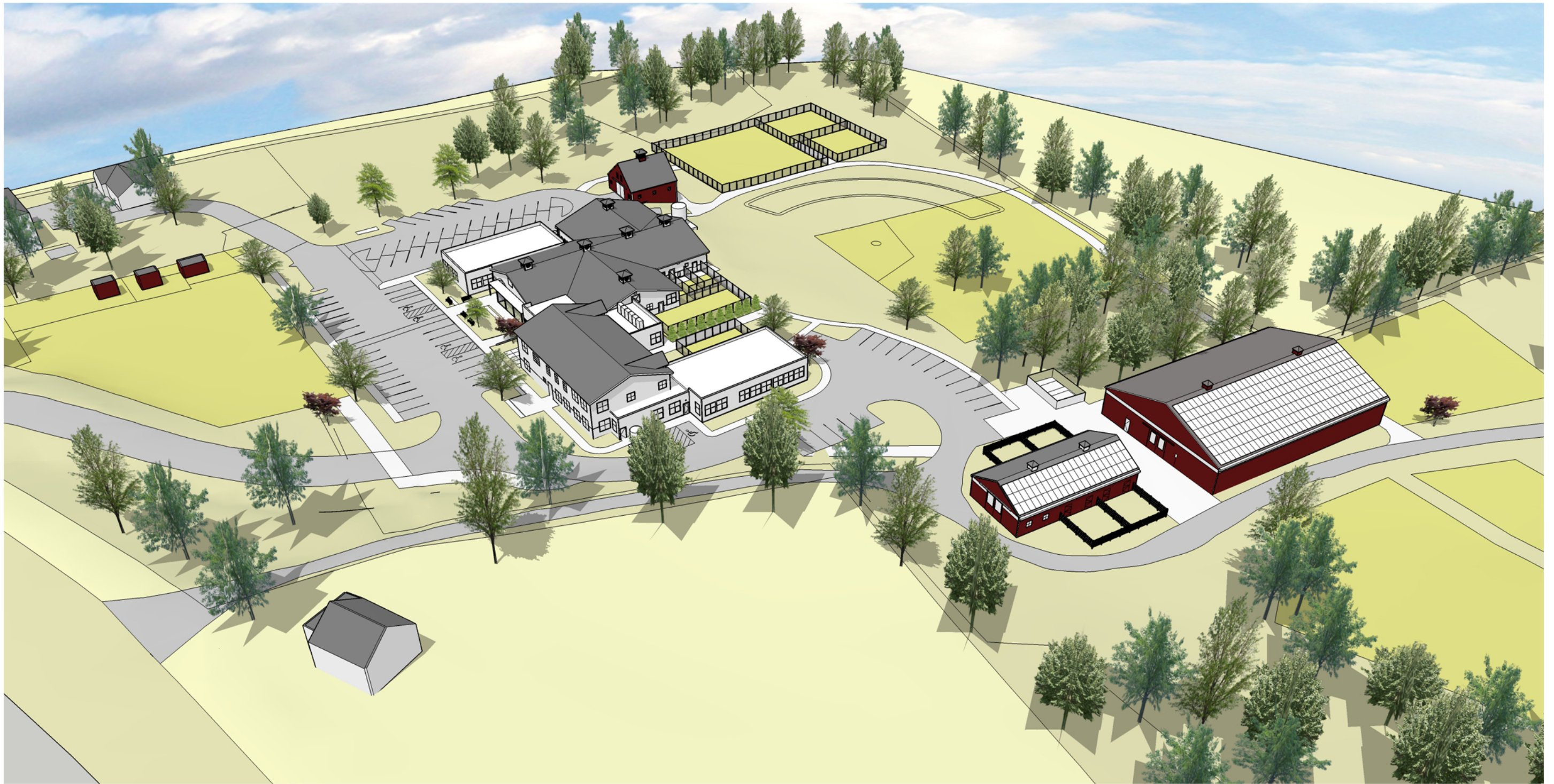
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

Civil Engineering Services

603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EFFLUENT DISPOSAL DESIGN
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.	S1
SHEET 16 OF 16 JBE PROJECT NO. 17088	



JONES & BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

March 10, 2020

Stratham Planning Board
Attn. Tom House, Chairman
10 Bunker Hill Avenue
Stratham, NH 03885

**RE: Site Plan Application for NH SPCA Expansion
104 Portsmouth Avenue, Stratham, NH
Map 13, Lots 83, 84 & 85
JBE Project No. 17088**

Dear Mr. House:

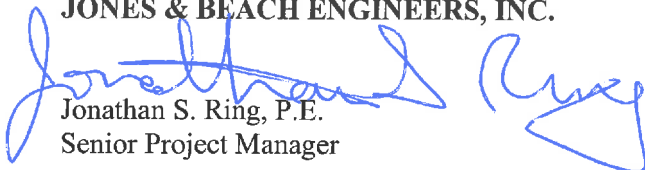
Jones & Beach Engineers, Inc. respectfully submits an Application for Site Plan Review for the above-referenced parcel on behalf of our client, NH SPCA. The intent of this application is for Building Additions, a Horse Rehabilitation Arena, Dog Play Areas with additional parking. As you are aware, a similar application was reviewed and approved last summer. The project has been slightly down-sized.

The following items are provided in support of this Site Plan Application:

1. Site Plan Review Application.
2. Site Plan Review Checklist.
3. Waiver Request.
4. Letter of Authorization.
5. Copy Deeds (3).
6. Test Pit Logs.
7. Application Fee Check (\$254.00).
8. Abutters List & Mailing Labels (3 sets) & Tax Map.
9. Six (6) Full Size Plan Sets.
10. Nine (9) Reduced Size (11" x 17") Plan Sets with Architectural Plans (Pending).

If you have any questions or need any additional information, please feel free to contact our office. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.



Jonathan S. Ring, P.E.
Senior Project Manager

CC: Lisa Dennison, NH SPCA (application and plans via email)
Lucy Schlaffer, ARQ Architects (application and plans via email)



**Town of Stratham, NH
Site Plan Review Application**

Map# 13 Lot# 83, 84, & 85

Project Name: NH SPCA "Site Plan" Expansion

Location: 104 Portsmouth Avenue, Stratham, NH

Project Description: Building Additions, a Horse Rehabilitation Arena, Dog Play Areas
with access drives and parking.

Zone: Professional - Residential New Industrial / Commercial Square Footage: 8,000 S.F. +/- Additions, 9,600 S.F. +/-
Horse Arena, &
3,000 S.F. +/-
Barn
or Number of Residential Units: N/A

Applicant:

Name: Lisa Dennison, Director Phone: 603-772-2921

Company: NH SPCA Fax: _____

Address: 104 Portsmouth Avenue, PO Box 196, Stratham, NH 03885

Owner:

Name: Same as Applicant Phone: _____

Company: _____ Fax: _____

Address: _____

Agent:

Contact Name: Jonathan S. Ring, P.E. Phone: 603-772-4746

Company: Jones & Beach Engineers, Inc. Fax: _____

Address: PO Box 219, Stratham, NH 03885

Email Address: jring@jonesandbeach.com

By signing this application, you are agreeing to all rules and regulations of the Town of Stratham, and are agreeing to allow agents of the Town of Stratham to conduct inspections, during normal business hours, of your property, to ensure compliance with all Stratham Zoning and Site Review regulations while your application is under consideration and during any construction and operational phases after approval is granted.

The Signor shall be the owner or the signor shall provide a letter signed by all the property owners giving the signor permission to represent the owner in presentation of this application.

Signed: Jonathan S. Ring Date: March 10, 2020

Fees: Jonathan S. Ring, P.E.

Notification Fee: \$150.00 plus Abutters Fee: 13 Abutters X \$8.00 = \$ 104 .00

Site Review Fee*: \$ Waiver .00 One-Hundred (\$100) dollars for each 1,000 square feet of building construction – with a minimum of one-hundred (\$100) dollars.

Preliminary Consultation as provided for under Section 4.1, a filling fee of \$75.00.

Total Fees: \$ 254 .00

See Section 4.2.7 of the Site Review Regulations for fee schedule.
*Additional fees may be charged to cover inspection and review cost.

For Office Use Only

Date Application Received: _____ Total Fees Collected with Application: \$ _____ .00

Abutters List Received: _____ Check List Received: _____

PB Hearing Date: _____ Notice Date: _____ PB Jurisdiction Acceptance Date: _____

**S
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**Town of Stratham
Site Plan Review Checklist**



Project Name: NH SPCA "Site Plan" Expansion

Map # 13 Lot # 83, 84, & 85

Date: March 10, 2020

Site Plan Review - Information Checklist

A site plan review application shall contain the following information, where applicable, to be considered complete. However, this checklist is intended only as a guide; the Planning Board may require additional information as deemed necessary. All plans shall conform to the applicable requirements of the Zoning Ordinance, Building Ordinance, Subdivision and Site Plan Review Regulations, and other state, local, and federal requirements. (All data/information sources should be referenced.)

X – Information Provided

O – Information Not Provided

W – Waiver Requested

I. Preliminary Consultation (Held November 7, 2018)

 A. Base map drawn to scale

- 1. General description of existing conditions on the site.
- 2. Any facilities and utilities.
- 3. Dimensions and sizes of the proposed structure(s).
- 4. Topographic map showing the proposed layout of the site: parking, driveways(s), sidewalks.

II. Formal Application

 X **A. Completed "Application for Site Plan Review".**

 X **B. Names and addresses of all abutters.**

 X **C. Administrative fees (payable to the Town of Stratham).**

 X **D. High intensity soils information with sewage disposal and lot size calculations.**

 X **E. Data on test pits and percolation tests:**

 X Location of test pits.

 X Percolation test date and rate.

 X Certification of test witness.

 X Outline of the area reserved for leach fields.

 X **F. Six complete sets of prints drawn to scale with the following:**

 X Sheet size of 22" x 34".

 X Appropriate scale.

 X Space for Planning Board signature and date.

 X **G. Additional submission requirements:**

 X Nine 11 X 17 copies of proposed plan.

 Pending One copy of the plan in a digital format referenced to NH State Plane feet, NAD 83, in a format compatible with the town's ESRI ArcView GIS system.

 Three copies of any engineering or impact reports.

**Town of Stratham
Site Plan Review Checklist**

- x Three sets of printed labels for abutter mailing.
- x 1. Existing data required.
- x a. Site location, current names and addresses of developer, owners of record, abutting landowners.
- x b. Names and addresses of person/firm preparing the map with other information:
- x Stamp by registered architect and/or professional engineer.
- x Map scale.
- x North arrow.
- x Date.
- x Tax map and parcel number.
- x Size of parcel.
- x c. Topographic contours.
- x d. Boundary lines.
- x e. Natural features.
- x f. Drainage systems and roads.
- x g. Structures within 200 feet
- x h. Easements and rights-of-way.
- x i. Location of utilities.
- x j. Vicinity sketch showing surrounding streets, zoning districts, site boundaries, and 100 year flood plain.
- x k. Soils map.
- x 2. Proposed Plans.
- x a. Grades, topographic contours.
- x b. Plan view of proposed structures and/or alterations; rendering of exterior design.
- x c. Data for streets, driveways, etc.: location, size, direction of travel, curbing, paving and curve radii.
- x d. Parking and loading facilities.
- x e. Location of utilities.
- x f. Storm drainage plan with supporting calculations.
- x g. Landscaping and screening.
- x h. Sign location, size, and design.
- x i. Outdoor lighting.
- x j. Surveyed property lines with monument locations.
- x k. Construction details (e.g. walks, curbing, drainage structures, etc.).
- x l. Snow storage area.
- x m. Solid waste disposal receptacles and screening.
- x n. Fire protection (e.g. fire lanes, alarms, etc.).
- x o. Erosion and sedimentation control methods.

**Town of Stratham
Site Plan Review Checklist**

Pending p.

Site Review Agreement.

Pending q.

Other exhibits, if applicable:

_____ Performance Bond.

_____ Maintenance Bond.

_____ Information on pollutants discharge and/or noise generation.

_____ Traffic impact analysis.

_____ Natural/Environmental Recourses Inventory

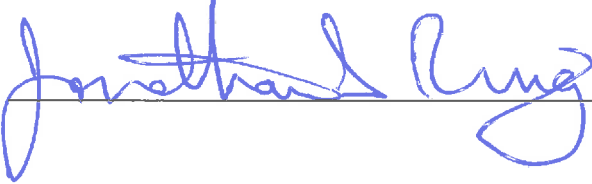
_____ Environmental/Forestry Impact Report

_____ State and local permits (e.g. state septic system [RSA 149-E:3], site specific [RSA 149:8-a], driveway access [RSA 236:13], dredge and fill [RSA 483-A], etc.).

Note: For more complete information, it is strongly recommended that the applicant read Stratham's "Subdivision and Site Plan Review Regulations" (2004), as well as the Town's Zoning Ordinance (2004) and Building Ordinance. (2002).

I certify that the information provided is complete and correct to the best of my knowledge.

Signed: _____



Date: March 10, 2020

JONES & BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

March 10, 2020

Stratham Planning Board
Attn. Tom House, Chairman
10 Bunker Hill Avenue
Stratham, NH 03885

**RE: Waiver Request
104 Portsmouth Avenue, Stratham, NH
Map 13, Lots 83, 84 & 85
JBE Project No. 17088**

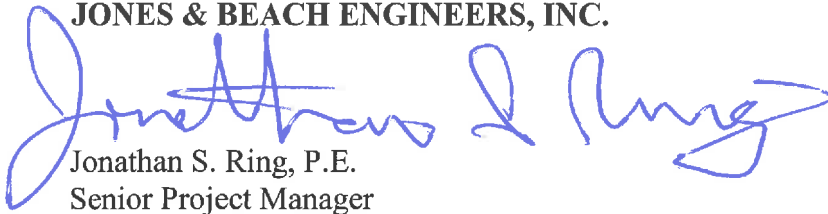
Dear Mr. House:

Jones & Beach Engineers, Inc. respectfully submits a Waiver Request for the above-referenced parcel on behalf of our client & owner, NH SPCA. Jones & Beach respectfully requests a waiver for the following:

Site Plan Regulations – Section IV – Application Procedures & Requirements– Sub-Section 4.2.7.a – Fees & Charges, Filing Fee - Jones & Beach Engineers respectfully request a waiver from this section as the Site Review Fee was already paid with the original Site Plan Application submission back in 2019.

If you have any questions or need any additional information, please feel free to contact our office. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.



Jonathan S. Ring, P.E.
Senior Project Manager

CC: Lisa Dennison, Director, NH SPCA (via email)

Letter of Authorization

I, NH SPCA, Lisa Dennison, Executive Director, PO Box 196, Stratham, NH 03885, for property located in Stratham, NH, known as Tax Map 13, Lots 84 and 85, do hereby authorize Jones & Beach Engineers, Inc., PO Box 219, Stratham, NH, to act on our behalf concerning the previously-mentioned property. The parcels are located on 102 and 104 Portsmouth Avenue in Stratham, NH.

I hereby appoint Jones & Beach Engineers, Inc., as our agent to act on our behalf in the review process, to include any required signatures.

Mary Baker
Witness

Lisa Dennison 7/26/18
Lisa Dennison, Executive Director Date
NH SPCA

JONES & BEACH
ENGINEERS INC.

**ABUTTERS LIST (DIRECT)
FOR
NH SPCA
102R, 104, & 108 PORTSMOUTH AVENUE
STRATHAM, NH
JBE PROJECT No. 17088
FEBRUARY 18, 2019
REVISED MAY 2, 2019
REVISED FEBRUARY 25, 2020**

OWNER OF RECORD/ APPLICANT:

TAX MAP 13/ LOT 83 (108 PORTSMOUTH AVE.)
TAX MAP 13/ LOT 84 (104 PORTSMOUTH AVE.)
TAX MAP 13/ LOT 85 (102R PORTSMOUTH AVE.)
NH SPCA
ATTN. MS. LISA DENNISON, EXECUTIVE DIRECTOR
104 PORTSMOUTH AVE.
P.O. BOX 196
STRATHAM, NH 03885
BK 5988/PG 0105 (03/25/19) – LOT 83
BK 5579/PG 1936 (12/03/14) – LOT 85

ABUTTERS:

13/38
JOHN H. REISS
SUSAN A. REISS
16 EMERY LANE
STRATHAM, NH 03885

13/39
BRIAN D. NELSON
JENNIFER L. NELSON
14 EMERY LANE
STRATHAM, NH 03885
3420/2052 (08/31/99)

13/43
KIM LEVINE STILES
THEODORE ROLLIN STILES
5 EMERY LANE
STRATHAM, NH 03885
5915/2664 (05/24/18)

13/44
RICHARD VITALE
7 EMERY LANE
STRATHAM, NH 03885
5273/0767 (12/21/11)

13/76 (14 MILLBROOK DR.)
13/77 (12 MILLBROOK DR.)
13/78 (10 MILLBROOK DR.)
13/79 (8 MILLBROOK DR.)
13/80 (6 MILLBROOK DR.)
13/81 (4 MILLBROOK DR.)
13/82 (2 MILLBROOK DR.)
13/98 (17 TRISHA'S WAY)
EMANUEL CO., INC.
6 PATRIOTS RD.
STRATHAM, NH 03885

13/86
ONE HUNDRED PORTSMOUTH AVENUE PROPERTY, LLC
100 PORTSMOUTH AVE., UNIT 3
STRATHAM, NH 03885
3754/0765 (04/11/02)

13/87
STONE BROOK PROPERTIES, LLC
98 PORTSMOUTH AVE.
STRATHAM, NH 03885
4960/0518 (10/31/08)

13/88
JOSEPHINE E. SCAMMAN REVOCABLE TRUST
JOSEPHINE E. SCAMMAN, TRUSTEE
96 PORTSMOUTH AVE.
PO BOX 292
STRATHAM, NH 03885
5507/2467 (01/15/14)

13/96
WARK REVOCABLE TRUST 2015
GRAHAM J. WARK, TRUSTEE
13 TRISHA'S WAY
STRATHAM, NH 03885
5666/0720 (10/29/15)

13/97
DAVID D. CURRY
ELIZABETH ANN CURRY
15 TRISHA'S WAY
STRATHAM, NH 03885
3460/414 (03/03/00)

ENGINEERS/SURVEYORS:

JONES & BEACH ENGINEERS, INC.
ATTN: JONATHAN S. RING, P.E.
PO BOX 219
STRATHAM, NH 03885

WETLAND SCIENTIST:

GOVE ENVIORNMENTAL SERVICES, INC.
ATTN. BRENDAN WALDEN
8 CONTINENTAL DR.
BUILDING 2, UNIT H
EXETER, NH 03833-7526

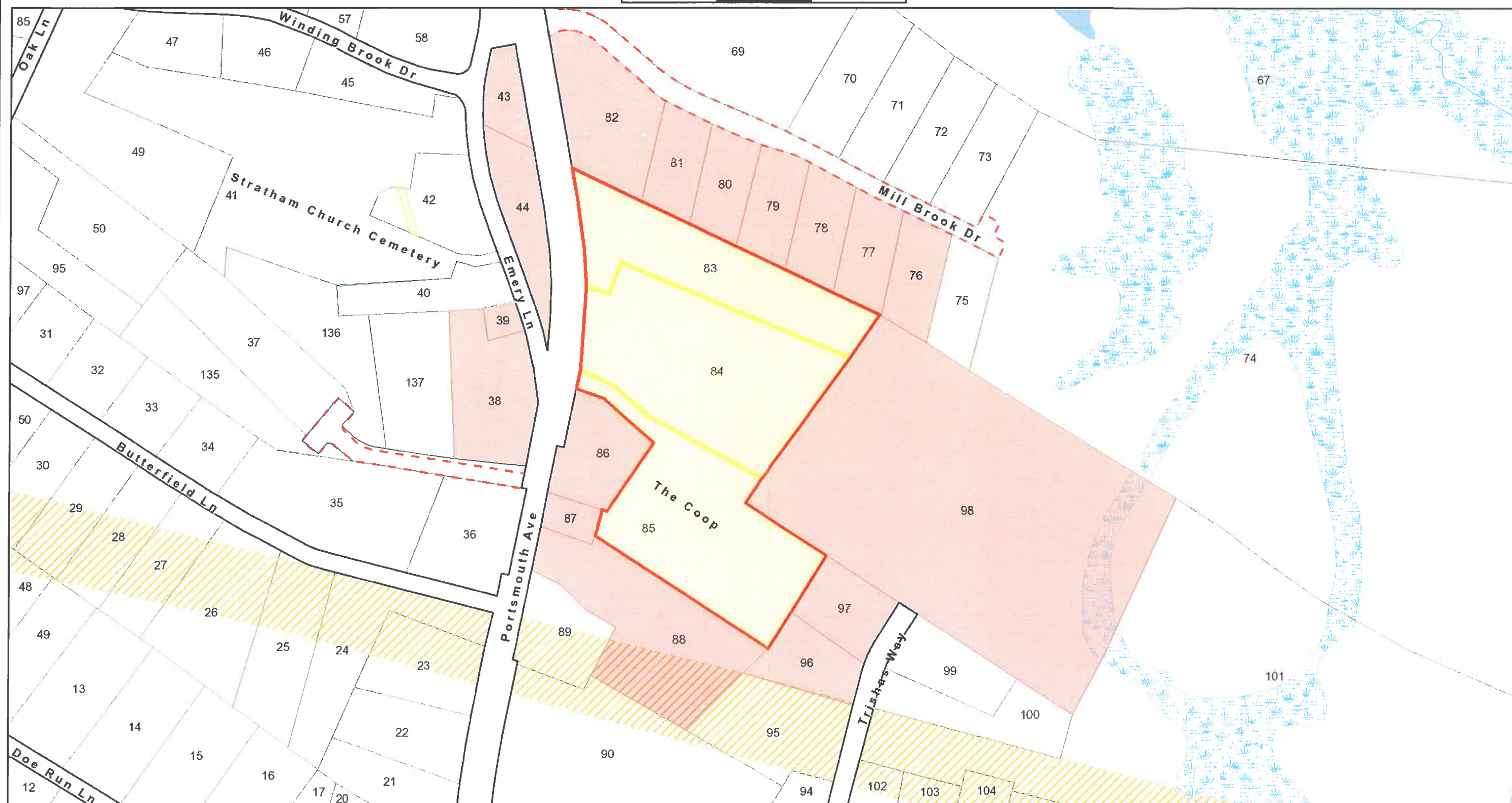


Stratham, NH

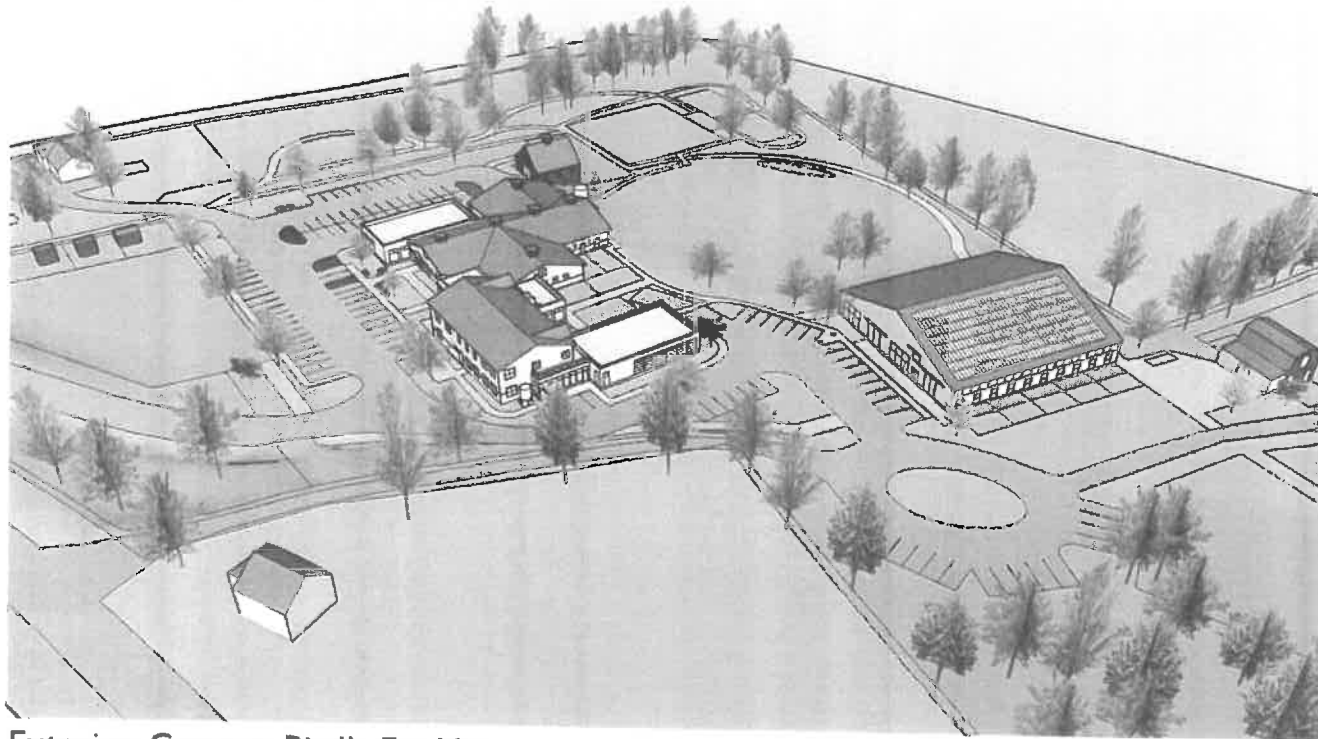
1 inch = 275 Feet

0 275 550 826

March 3, 2020



Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.



Exterior Campus Bird's Eye View

Site Plan Review



1 Government Street, Suite 2
Kittery, Maine 03904

New Hampshire SPCA
104 Portsmouth Avenue, Stratham, NH

May 15, 2019

date



Groundwater Recharge Volume (GRV) Calculation

-	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.48	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.42	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.18 inches		Rd = weighted groundwater recharge depth	
0.162 ac-in		GRV = AI * Rd	
588 cf		GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

The lower raingarden (Pond 14 P) offers infiltration for a total volume of 6,180 c.f. of total system infiltration below the underdrain invert. This more than meets the requirement for GRV for the site.

Stage-Area-Storage for Pond 14P: LOWER RAINGARDEN

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
68.49	10,230	0
68.59	10,232	409
68.69	10,232	819
68.79	10,232	1,228
68.89	10,232	1,637
68.99	10,232	2,046
69.09	10,232	2,456
69.19	10,232	2,865
69.29	10,232	3,274
69.39	10,232	3,684
69.49	10,232	4,093
69.59	10,232	4,502
69.69	10,232	4,911
69.79	10,232	5,321
69.89	10,232	5,730
69.99	10,232	6,139
70.09	10,232	6,548
70.19	10,232	6,958
70.29	10,232	7,367
70.39	10,232	7,776
70.49	10,232	8,186
70.59	10,232	8,339
70.69	10,232	8,493
70.79	10,232	8,646
70.89	10,232	8,800
70.99	10,232	8,953
71.09	10,232	9,106
71.19	10,232	9,260
71.29	10,232	9,413
71.39	10,232	9,567
71.49	10,232	9,720
71.59	10,232	9,874
71.69	10,232	10,027
71.79	10,232	10,181
71.89	10,232	10,334
71.99	10,232	10,488
72.09	10,232	10,641
72.19	10,232	10,795
72.29	10,232	10,948
72.39	10,232	11,102
72.49	10,232	11,255
72.59	10,343	12,283
72.69	10,468	13,324
72.79	10,593	14,377
72.89	10,719	15,443
72.99	10,845	16,521
73.09	10,973	17,612
73.19	11,101	18,715
73.29	11,230	19,832
73.39	11,360	20,961
73.49	11,490	22,104

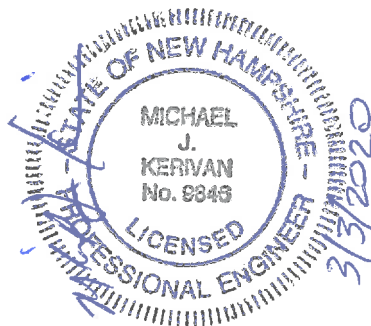
JONES & BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

Prepared for:

**NH SPCA
MAP 13, LOTS 83, 84, 85
102, 104, & 108 Portsmouth Avenue
Stratham, NH 03885**



**August 1, 2019
Revised March 3, 2020
JBE Project No. 17088**

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The Association, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. The annual report and certification shall be submitted with three copies to the Town Planner by December 31st of each year.
2. Regular management of dog waste and horse manure shall be ongoing by staff and volunteers. See more detail below.

B. General Inspection and Maintenance Requirements

- a. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:
 - a. Parking lots and roadways
 - b. Culverts
 - c. Erosion
 - d. Vegetation and landscaping
 - e. Catch basins
 - f. Riprap inlet and outlet protection aprons
 - g. Rain Gardens (Bio-retention systems)
 - h. Management of Dog Waste and Horse Manure
- b. Maintenance of permanent measures shall follow the following schedule:
 - a. Normal winter roadway and parking lot maintenance including plowing and snow removal. Road and parking lot sweeping at the end of every winter, preferably at the start of the spring rain season.
 - b. **Inspection** of culvert inlets and outlets at least **once per month** during the rainy season (March to November). Any debris is to be removed and disposed of properly by residents or contractor.
 - c. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately.
 - d. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.

- e. **Annual inspection** of catch basins to determine if they need to be cleaned. Catch basins are to be cleaned if the depth of deposits is greater than one-half the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a catch basin significantly exceeds the one-half depth standard during the inspection, then it should be cleaned more frequently. If woody debris or trash accumulates in a catch basin, then it should be cleaned on a weekly basis. Catch basins can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials should be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet should also be removed.
- f. Rock riprap should be **inspected annually** in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water should be kept clear of obstructions, debris, and sediment deposits.
- g. Raingarden – Bio-retention Systems:
- Visually inspect monthly and repair erosion. Use small stones to stabilize erosion along drainage paths.
 - Check the pH once a year if plantings are not surviving. Apply an alkaline product, such as limestone, if needed.
 - Re-mulch 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 layer before applying new one.
 - 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 the summer), residents are encouraged to visually inspect vegetation for disease or pest problems and treat as required.
 - 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.
 - Prune excess growth annually or more often, if desired. Trimmed materials may be recycled back in with replenished mulch or land filled if there is a concern of heavy metals accumulation.

- After rainstorms, inspect the cell and make sure that drainage paths are clear and that ponding water dissipates over 4-6 hours. (Water may pond for longer times during the winter and early spring.)
- KEEP IN MIND, THE BIORETENTION CELL IS NOT A POND. IT SHOULD NOT PROVIDE A BREEDING GROUND FOR MOSQUITOES. MOSQUITOES NEED AT LEAST FOUR (4) DAYS OF STANDING WATER TO DEVELOP AS LARVA.

Cleaning Criteria for all Sedimentation Forebays: Sediment should be removed from the sedimentation chamber (forebay) when it accumulates to a depth of more than 12 inches (30 cm) or 10 percent of the pretreatment volume. The sedimentation forebay should be cleaned of vegetation if persistent standing water and wetland vegetation becomes dominant. The cleaning interval is once every year. A dry sedimentation forebay is the optimal condition while in practice this condition is rarely achieved. The sedimentation chamber, forebay, and treatment cell outlet devices should be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however this equipment should not track on the wetland surface. Revegetation of disturbed areas as necessary. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

- h. **Regular Management of Dog Waste and Horse Manure:** Doggy bags are provided for collection of dog waste that may be needed during dog walks. Metal garbage cans with secure lids are provided for disposal along dog walking paths and within each outdoor play area. Staff and volunteers are trained to use these procedures. The outdoor play areas are typically utilized for one dog at a time to play ball or for other enrichment with a staff or volunteer. At times several dogs will play in a play group for a limited time. Dogs are always monitored and waste is picked up during each play time as needed and disposed in the canisters provided. At the end of each week the waste from the canisters is collected and transported to the trash dumpster. The dumpster is emptied bi-weekly.

The number of horses is limited on the NH SPCA campus. Horse stalls are cleaned daily within the barns, and then manure/bedding is transported via wheelbarrow to a manure dumpster adjacent. The manure dumpster will be placed as shown on the site plan between the two horse barns for ease of cleaning. Other waste that may be deposited by a horse in the larger paddocks is picked up daily as needed, and transported to the manure dumpster. The dumpster is replaced when full. Staff and volunteers monitor the paddocks and turn out areas daily, and remove waste from staying on the ground. This is transported to the manure dumpster. The waste management plan is written down as protocol. Staff and volunteers are trained on management of animal waste on the NH SPCA campus. The downstream drainage has been changed to a raingarden BMP with 24" of filter media. This is one of the best treatments for phosphorous and nitrogen per the NH Stormwater Manual, Appendix B.

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746

F#: (603) 772-0227

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

Signature

Print Name

Title

Date

Annual Operations and Maintenance Report

The Association, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. The annual report and certification shall be submitted with three copies to the Town Planner by December 31st of each year.

Construction Activity	Date of Inspection	Who Inspected	Findings of Inspector
Parking lots and roadways			
Culverts			
Erosion			
Vegetation and landscaping			
Catch basins			

Riprap inlet and outlet protection aprons			
Rain Gardens (Bio-retention systems)			
Management of Dog Waster and Horse Manure:			
Other:			
Other:			

Regular Inspection and Maintenance Guidance for Bioretention Systems / Tree Filters

Maintenance of bioretention systems and tree filters can typically be performed as part of standard landscaping. Regular inspection and maintenance is critical to the effective operation of bioretention systems and tree filters to insure they remain clear of leaves and debris and free draining. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and the upstream land use.

ACTIVITIES

The most common maintenance activity is the removal of leaves from the system and bypass structure. Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Mulch and/or vegetation coverage is integral to the performance of the system, including infiltration rate and nutrient uptake. Vegetation care is important to system productivity and health.

ACTIVITY	FREQUENCY
A record should be kept of the time to drain for the system completely after a storm event. The system should drain completely within 72 hours.	After every major storm in the first few months, then biannually.
Check to insure the filter surface remains well draining after storm event. Remedy: If filter bed is clogged, draining poorly, or standing water covers more than 15% of the surface 48 hours after a precipitation event, then remove top few inches of discolored material. Till or rake remaining material as needed.	
Check inlets and outlets for leaves and debris. Remedy: Rake in and around the system to clear it of debris. Also, clear the inlet and overflow if obstructed.	
Check for animal burrows and short circuiting in the system Remedy: Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
Check to insure the filter bed does not contain more than 2 inches accumulated material Remedy: Remove sediment as necessary. If 2 inches or more of filter bed has been removed, replace media with either mulch or a (50% sand, 20% woodchips, 20% compost, 10% soil) mixture.	
During extended periods without rainfall, inspect plants for signs of distress. Remedy: Plants should be watered until established (typical only for first few months) or as needed thereafter.	
Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. Remedy: Repair or replace any damaged structural parts, inlets, outlets, sidewalls.	Annually
Check for robust vegetation coverage throughout the system. Remedy: If at least 50% vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
Check for dead or dying plants, and general long term plant health. Remedy: This vegetation should be cut and removed from the system. If woody vegetation is present, care should be taken to remove dead or decaying plant Material. Separation of Herbaceous vegetation rootstock should occur when overcrowding is observed.	As needed

CHECKLIST FOR INSPECTION OF BIORETENTION SYSTEM / TREE FILTERS

Location:

Inspector:

Date:

Time:

Site Conditions:

Date Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Initial Inspection After Planting and Mulching		
Plants are stable, roots not exposed	S U	
Surface is at design level, typically 4" below overpass	S U	
Overflow bypass / inlet (if available) is functional	S U	
2. Debris Cleanup (2 times a year minimum, Spring & Fall)		
Litter, leaves, and dead vegetation removed from the system	S U	
Prune perennial vegetation	S U	
3. Standing Water (1 time a year, After large storm events)		
No evidence of standing water after 72 hours	S U	
4. Short Circuiting & Erosion (1 time a year, After large storm events)		
No evidence of animal burrows or other holes	S U	
No evidence of erosion	S U	
5. Drought Conditions (As needed)		
Water plants as needed	S U	
Dead or dying plants		
6. Overflow Bypass / Inlet Inspection (1 time a year, After large storm events)		
No evidence of blockage or accumulated leaves	S U	
Good condition, no need for repair	S U	
7. Vegetation Coverage (once a year)		
50% coverage established throughout system by first year	S U	
Robust coverage by year 2 or later	S U	
8. Mulch Depth (if applicable)(once every 2 years)		
Mulch at original design depth after tilling or replacement	S U	
9. Vegetation Health (once every 3 years)		
Dead or decaying plants removed from the system	S U	
10. Tree Pruning (once every 3 years)		
Prune dead, diseased, or crossing branches	S U	
Corrective Action Needed		Due Date
1.		
2.		
3.		

JONES & BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

March 4, 2020

Town of Stratham Planning Board
Attn: Tavis Austin, Town Planner
10 Bunker Hill Avenue
Stratham, NH 03885

**RE: Response Letter 2 – Horsley Witten Group
Third Party Peer Review – NH SPCA Site Plan
102, 104 & 108 Portsmouth Avenue, Stratham, NH
Tax Map 13, Lots 83, 84 & 85
JBE Project No. 17088**

Dear Mr. Austin,

The SPCA Site Plan has been revised as shown on the attached plans. Rather than begin anew, we hope to address prior comment items. I expect there to be new comments. Jones & Beach Engineers, Inc. had received Review Letter 2 with comments from Horsley Witten Group, dated August 28, 2019. Review comments that remain outstanding are listed below with our responses in bold.

Site Plan Regulations:

- 1. The Applicant has not provided a Landscaping Plan to demonstrate proposed landscaping and to demonstrate if the buffers adjacent to residential properties are being maintained or proposed. The Applicant states in the Drainage Analysis that a raingarden is proposed (Pond 18P); however, the location is not marked on the drawings and details and a landscaping plan is not provided for this feature. HW recommends that the Applicant provide a leader on the site plans for the raingarden. Further, HW recommends that the Applicant provide a Landscaping Plan to meet the requirements stated above.*

The Applicant states that all proposed raingarden are included on the Grading and Drainage Plan (Sheet C3) and that the Landscaping Plan has been provided. The Landscaping Plan provided only includes planting details for proposed raingarden 14P and does not include details for raingardens 18P, 12P, and 13P. HW recommends that the Applicant provide landscaping details for the additional rain gardens, as the details show on sheet D2, refer to the landscaping plan for plantings.

NEW RESPONSE: The updated Landscape Plan will be delivered as soon as possible.

Addendum C – Town of Stratham Stormwater Regulations:

2. *Based on review of the design, it does not appear that the Applicant has selected BMPs optimized for Total Nitrogen (TN), that can remove 90% Total Suspended Solids (TSS) and 60% of the average annual load of Total Phosphorus (TP) consistent with Section C.viii. HW recommends that the Applicant review and/or update the design and provide BMPs and supporting calculations to demonstrate that the BMPs meet the requirements of this Section.*

The Applicant has provided design calculations for the four raingardens included in the proposed site (Ponds 12P, 13P, 14P, and 18P).

The NH Stormwater Manual requires a minimum underdrain of 6 inches for bioretention systems; however, the Applicant is proposing 4-inch underdrains for raingardens 14P and 18P. It appears from the detail that sufficient stone depth is available to accommodate a 6" underdrain. HW recommends that the Applicant review the design and increase the size of the underdrain if feasible.

For bioretention systems, the filter media should be separated from the clean stone by a 3-inch layer of 3/8-inch pea gravel.

Further, the Applicant specified a drainage area for Pond 14P greater than the maximum 5 acres noted in the NH Stormwater Manual. HW recommends that the Applicant consider an appropriate BMP for the drainage area, that can accommodate a larger drainage area and associated flows.

NEW RESPONSE: The underdrain has been revised to 6", and the filter media separation pea gravel layer has been added, as suggested.

Pond 14P Rain Garden includes a "series" composite collection of Pond 12P into a culvert which flow into Pond 14P. Each have surface flow feeding them. If necessary, a Waiver will be requested from NHDES AoT.

3. *The Applicant has not provided calculations to demonstrate that the groundwater recharge volume (GR_v) has been infiltrated to meet the requirements under Section C.ix. HW recommends that the Applicant revisit the design and provide calculations to demonstrate that the proposed design meets the GR_v requirements in the current Alteration of Terrain (AoT) guidelines.*

The Applicant provided calculations for the groundwater recharge volume and indicates that groundwater recharge volume will be managed by infiltration in raingardens 13P and 14P. Based on review of the calculations it should be noted that for raingarden 13P that Applicant assumes that infiltration will occur below an invert elevation of 72.5 feet; however, the invert of the 6" underdrain is 71.5 feet. Using the correct elevation of 71.5 feet, the storage under the underdrain is sufficient to meet the groundwater recharge volume. HW recommends that the Applicant revise the calculations to represent the correct elevation.

NEW RESPONSE: The calculations have been revised. See attached selected sheets, which are also in the bound Drainage Analysis.

4. *All proposed parking appears to be traditional bituminous asphalt. Section C.xiv recommends that porous pavement for general and overflow parking for commercial applications be considered. HW recommends that the Applicant demonstrate to the Board why porous pavement cannot be used in the proposed parking areas.*

The Applicant states that paved parking areas are small, and that the use of porous pavement would not be cost-effective. HW believes that the Planning Board has the information to review the Applicant's consideration and determine whether their response is acceptable.

NEW RESPONSE: The Planning Board voted that porous pavement was not needed for this project at the meeting September 4.

5. *Based on review of the proposed HydroCAD model, it appears that Ponds 12P, 13P, and 14P are designed to exfiltrate. The detail provided for the pond section isn't consistent with the modeled designs. If the Applicant intends for these to be infiltration basins, the Applicant should provide at least one test pit data to a depth of at least 5 feet below the proposed system (in accordance with the NH Stormwater Manual) at each proposed infiltration basin location. The Applicant should also provide information on how the design infiltration rate was selected, how the basins were designed and typical construction details.*

The Applicant has provided an Infiltration Feasibility Report for the proposed raingardens that have been designed to infiltrate (see comment #3 and 4 above). The Report indicates that the underlying soils have an approximately design infiltration rate of 3 inches per hour; however, test pits in the proposed location of these BMPs has not been provided. HW recommends that prior to construction of the infiltrating rain gardens, the Applicant conduct test pits and infiltration testing and provide it to the Planning Board for approval.

NEW RESPONSE: Test pits 5 – 10 were performed by Michael Kerivan, P.E., on June 19, 2019 (see logs attached). The infiltration values were obtained from "Ksat values for New Hampshire soils", sponsored by the Society of Soil Scientists of Northern New England SSSNNE Special Publication No. 5. This publication is at Terrain Bureau.

6. *The proposed dog play area appears to drain towards the wetland and is located within the 50-foot buffer. It is unclear from the information provided how pet waste will be managed on-site to prevent it from conveying polluted runoff to the wetland resource area. Further it is unclear from the information provided if these areas will be covered or are open areas with fences. HW recommends that the Applicant provide details on the dog play areas and the number of dogs expected to be in these areas, pet waste management protocol for the area and include this information in the Operation and Maintenance (O&M) Plan. HW recommends that the Applicant provide a treatment BMP to manage runoff from this area to provide water quality treatment prior to discharging to the wetland.*

The Applicant has provided a plan for collection of dog waste, collection procedures for staff, and a plan outlining the transfer of dog waste from collection canisters to a dumpster on a weekly basis, followed by dumpster waste collection bi-weekly. HW recommends that the Applicant update the O&M Plan to incorporate these procedures.

NEW RESPONSE: The attached O&M Manual has been revised, as suggested.

7. *The horse paddock area discharges to a culvert and ultimately to one of the detention ponds. It is unclear how waste from the horses will be managed, what the ground surface material is, and how the groundcover will be maintained. HW recommends that the Applicant provide details on how the horse paddock area and waste from the horses will be managed. HW recommends that the Applicant provide a treatment BMP for runoff from the paddock area prior to discharging to the culvert, as stormwater comingled with horse waste would have high concentrations of nutrients when compared to typical stormwater from a vegetated area. Further, if the Applicant provides waste management on-site for the animals, this location should be marked on the drawings and the operation and maintenance of this area summarized in the O&M Plan.*

The Applicant has provided a plan for cleaning horse stalls and collecting manure/bedding to the manure dumpster on site. Additional plans have been described for the collection and disposal of manure generated in the horse paddocks. The Applicant states that the dumpster is removed when full, and that this Waste Management Plan is written down as staff protocol. The Applicant has updated the Site Plan to include the manure dumpster. HW recommends that the Applicant update the O&M plan to incorporate the Waste Management Plan.

NEW RESPONSE: The attached O&M Manual has been revised.

Thank you very much for your time. If you have any questions, or need further assistance, please contact our office.

Very truly yours,
JONES & BEACH ENGINEERS, INC.



Jonathan S. Ring, P.E.
Senior Project Manager

cc: Renee L. Bourdeau, P.E., Horsley Witten Group (letter, plans and calculations via email)
Lisa Dennison, NH SPCA (letter and plans via email)
Lucy Schlaffer, AIA, ARQ Architects (letter and plans via email)

**TEST PITS
FOR
102, 104 & 108 PORTSMOUTH AVENUE
STRATHAM, NEW HAMPSHIRE
JUNE 19, 2019
JBE Project No. 17088**

Performed by: Michael Kerivan, Jones & Beach Engineers, Inc., SSD #1200

Test Pit #5

0" - 14"	2.5Y 3/1	very dark gray loam granular, friable
14" - 20"	10YR 4/4	dark yellowish brown sandy loam blocky friable
20" - 77"	5Y 4/2	olive gray sandy loam blocky very firm

SHWT = 22"
Roots @ 22"
H₂O @ 36"
No Refusal observed

Test Pit #6

0" - 20"	2.5Y 3/2	very dark grayish brown loam granular, friable
20" - 33"	7.5YR 4/3	brown sandy loam granular, friable
33" - 77"	5Y 4/3	olive sandy loam blocky very firm

SHWT = 34"
Roots to 34"
No H₂O observed
No Refusal observed

Test Pit #7

0" - 9"	10YR 3/1	very dark gray loam granular, friable
9" - 18"	10YR 4/3	brown sandy loam blocky firm
18" - 80"	5Y 4/3	olive sandy loam blocky very firm

SHWT = 12"
Roots to 12"
No H₂O observed
No Refusal observed

Test Pit #8

0" - 5"	2.5Y 3/2	very dark grayish brown loam granular, friable
5" - 10"	2.5Y 5/4	light olive brown sandy loam blocky friable
10" - 84"	5Y 4/3	olive sandy loam blocky very firm

SHWT = 22"
Roots to 10"
No H₂O observed
No Refusal observed

Test Pit #9

0" - 6"	10YR 3/3	very brown loam granular, friable
6" - 24"	7.5 YR 4/6	strong brown sandy loam granular, friable
24" - 82"	5Y 4/3	olive sandy loam blocky very firm

SHWT = 21"
Roots to 9"
No H₂O observed
No Refusal observed

Test Pit #10

0" - 6"	10YR 3/2	very dark grayish brown loam granular, friable
6" - 16"	10YR 4/3	brown loamy sand granular, loose
16" - 41"	10YR 5/8	yellowish brown sandy loam granular, friable
41" - 74"	10YR 4/4	dark yellowish brown sandy loam granular, friable

SHWT = 41"
Roots to 9"
No H₂O observed
No Refusal observed

Stephanie Gardner

From: Seth Hickey
Sent: Wednesday, March 25, 2020 11:11 AM
To: Stephanie Gardner
Subject: Re: DH and Committee/Commission Chair Review Comments
Attachments: 2020.04.15 DH Comments SP 104 Portsmouth Ave - NHSPCA.pdf

Nothing here... other than wow! What a facility...

From: Stephanie Gardner <sgardner@StrathamNH.gov>
Sent: Wednesday, March 25, 2020 11:05 AM
To: Andrea Lewy <Alewy@StrathamNH.gov>; Anthony King <AKing@strathamfire.org>; Dawna Duhamel <dduhamel@StrathamNH.gov>; Joyce Charbonneau <JCharbonneau@StrathamNH.gov>; Lesley Kimball <WigginML@comcast.net>; Matt Larrabee <MLarrabee@strathamfire.org>; Nathaniel Mears <nmeares@StrathamNH.gov>; Seth Hickey <SHickey@StrathamNH.gov>; Shanti Wolph <swolph@StrathamNH.gov>; Tavis Austin <TAustin@StrathamNH.gov>
Cc: Tavis Austin <TAustin@StrathamNH.gov>
Subject: DH and Committee/Commission Chair Review Comments

Dear Department Heads and Committee/Commission Chairs,

Attached is a Department Head and Committee/Commission Chair Review Comment form and planning materials for a Planning Board hearing on April 15, 2020. The Board would like to hear from you if you have any comments regarding the project. Please use the fillable form and send your responses to me via email **by 12 PM, Wednesday April 8th**. If you have no comments, please return your form and note "no comment". If we do not receive a response, a no comment response will be shared by the Town Planner with the Board on behalf of your Department, Committee, or Commission.

Best,
Stephanie

Stephanie Gardner
Land Use Project Coordinator
Town of Stratham
(p) 603-772-7391 ext. 180
(fax) 603-775-0517

Privacy should not be assumed with emails associated with Town Business.

Certain emails are public documents and subject to disclosure unless the subject matter is protected by State or Federal Laws. This electronic message and any attachments may contain information that is confidential and/or legally privileged in accordance with NH RSA 91-A and other applicable laws or regulations. It is intended only for the use of the person and/or entity identified as recipient(s) in the message. If you are not an intended recipient of this message, please notify the sender immediately and delete the material. Do not print, deliver, distribute or copy this message, and do not disclose its contents or take any action in reliance on the information it contains unless authorized to do so. Thank you.

JONES & BEACH ENGINEERS INC.

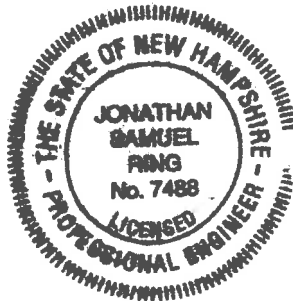
DRAINAGE ANALYSIS

EROSION AND SEDIMENT CONTROL PLAN

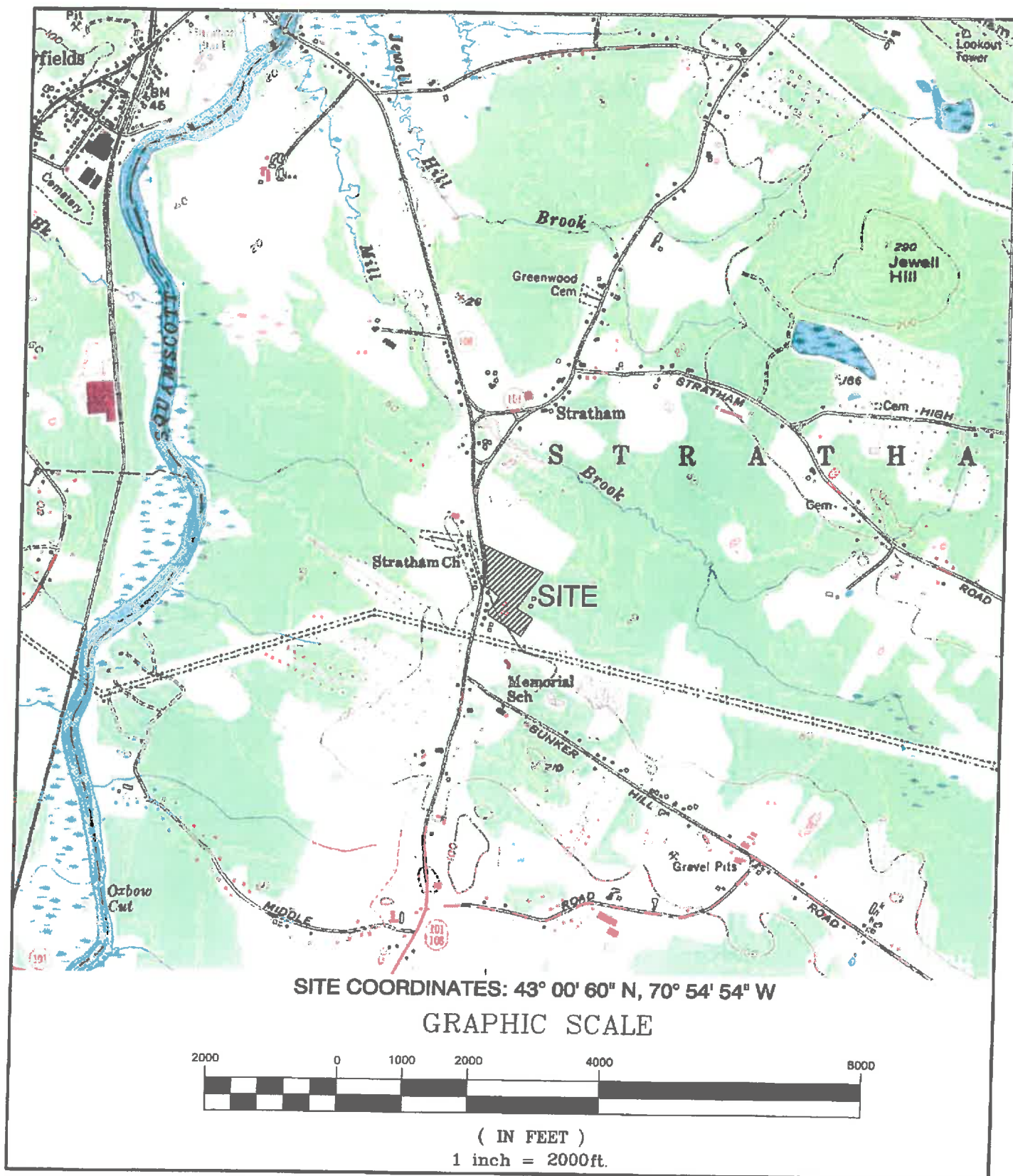
NH SPCA
MAP 13, LOTS 83, 84, 85
102, 104, & 108 Portsmouth Avenue
Stratham, NH 03885

Prepared for:

NH SPCA
104 Portsmouth Avenue
Stratham, NH 03885



Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
May 14, 2019
Revised August 5, 2019
Revised September 24, 2019
Revised March 30, 2020
JBE Project No. 17088



J/B Designed and Produced in NH
Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
 PO Box 219
 Stratham, NH 03885

603-772-4746

FAX: 603-772-0227

E-Mail: JBE@jonesandbeach.com

Drawing Name:

USGS MAP

Project:

**NH SPCA EXPANSION
 STRATHAM, NH**

Owner of Record: NHSPCA, ATTN: LISA DENNISON
 104 PORTSMOUTH AVE, STRATHAM, NH

DRAWING No.

USGS

SHEET 1 OF 1

JBE PROJECT
 No. 17088

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This project proposes to expand the existing NH SPCA facility in Stratham, NH to more appropriately handle the existing animal intake that the facility currently has. This project proposes to expand the horse areas by adding a horse arena and barn to the south of the property and add several smaller infill buildings to the existing building. A larger clinic area is to be added and a training facility will be constructed. The proposed development to be serviced by proposed onsite utilities and drainage. Two models were compiled, one for the area in its existing (pre-development) condition, and a second for its proposed (post-development) condition. The analysis was conducted using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. A summary of the existing and proposed conditions peak rates of runoff is as follows:

EXECUTIVE SUMMARY TABLE								
Analysis Point	2-Year		10-Year		25-Year		50-Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	5.76	5.65	21.09	15.01	42.75	23.25	55.97	32.32

The drainage design intent for this site is to maintain the post-development peak flow to the pre-development peak flow conditions to the extent practicable and to effectively treat stormwater from the development of this project. This has been accomplished through the use of multiple lined and infiltration bioretention areas to maintain the peak discharge and infiltrate stormwater.

In addition, the potential for increased erosion and sedimentation is handled by way of erosion control blankets, vegetated treatment swales, and riprap inlet and outlet protection aprons. The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage system and will be observed during all stages of construction. Existing wetlands and abutting property owners will suffer minimal impact resultant from this development.

1. DRAINAGE ANALYSIS

1.1 INTRODUCTION

This project proposes to expand the existing NH SPCA facility to more appropriately handle the existing animal intake that the facility currently has. This project proposes to expand the horse areas by adding a horse arena and barn to the south of the property and add several smaller infill buildings to the existing building. A larger clinic area is to be added and a training facility will be constructed. The proposed development to be serviced by proposed onsite utilities and drainage.

1.2 METHODOLOGY

The existing and proposed watersheds were modeled utilizing HydroCad stormwater software, version 9.10. The watersheds were analyzed utilizing the SCS TR-20 methodology for hydrograph development and the TR-55 methodology for Time of Concentration (T_c) determination. The Dynamic-Storage-Indicating method for reach and pond routing was utilized. Type III, 24-hour hydrographs were developed for the 2-year, 10-year, 25-year, and 50-year storm events, corresponding to rainfall events of 3.70", 5.64", 7.16", and 8.59" respectively. This rainfall data has been taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center, and the values have been increased by 15% due to the project being within the Coastal/Great Bay Region.

Existing topography and site features were obtained through aerial topography and on-ground topography completed by Jones & Beach Engineers. Existing soil conditions were derived from a combination a Site Specific Soil Survey conducted by Gove Environmental Services, Inc. and soils information obtained from the NRCS Web Soil Survey.

1.3 EXISTING CONDITIONS ANALYSIS

The study area consists of the subject property and upstream contributing area. The study area contains 18.221 acres including offsite contributing areas. The site consists of the existing NH SPCA facility including parking and drainage facilities. The majority of the site drains from Portsmouth Avenue to the west through a system of catch basins, pipes and drainage swales to an existing stormwater facility located on the east side of the site. This facility outlets to a low point in the northeast corner of the property which is designated as Analysis Point #1.

The soils for this site are described as Hydrological Soils "B" and "C" with the majority falling within the "B" category.

1.4 PROPOSED CONDITIONS ANALYSIS

The proposed site includes the construction of $18,080 \pm$ sq.ft. of building additions with associated access drives, parking, drainage, and utilities.

The addition of the proposed impervious paved areas and buildings causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), the net result being a potential increase in

peak rates of runoff from the site. To mitigate the potential increase in the peak rate of runoff and to effectively treat the subsequent stormwater runoff the following Best Management Practices (BMP's) have been employed at the Analysis Points as follows:

The proposed drainage will function similarly as the existing condition with the drainage being directed to the northeast corner of the site (Analysis Point #1). Two (2) bioretention areas are proposed to mitigate to effects of the additional impervious areas.

1.5 CONCLUSION

This proposed site development will have minimal adverse effect on abutting infrastructures or properties by way of stormwater runoff or siltation if properly constructed in accordance with this Drainage Analysis and approved project plan set. The post-construction peak rates of runoff for the site will be lower than the existing conditions for all analyzed storm events. Appropriate steps will be taken to control erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, curbing, catch basins with sedimentation sumps, jute matting, bioretention areas, and riprap outlet protection aprons. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced with regular inspections throughout the construction process.

An NHDES Alteration of Terrain Permit (RSA 485:A-17) is required for this site plan due to the area of disturbance being greater than 100,000 square-feet.

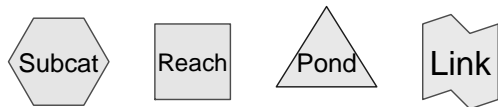
Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

Michael Kerivan, P.E.
Project Engineer

1.6 DRAINAGE CALCULATIONS

PRE-DEVELOPMENT CONDITIONS ANALYSIS

- 1.6.1 2-Year 24-Hour Summary Analysis
- 1.6.2 10-Year 24-Hour Complete Analysis
- 1.6.3 25-Year 24-Hour Summary Analysis
- 1.6.4 50-Year 24-Hour Summary Analysis



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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.751	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S)
3.725	74	>75% Grass cover, Good, HSG C (1S, 8S, 9S)
1.442	98	Paved parking, HSG B (1S, 2S, 5S, 6S, 7S, 8S, 9S)
0.230	98	Paved parking, HSG C (1S, 9S)
0.527	98	Roofs, HSG B (1S, 5S, 6S, 7S, 8S, 9S)
0.050	98	Roofs, HSG C (1S, 9S)
1.865	55	Woods, Good, HSG B (1S, 2S, 5S, 8S, 9S)
3.631	70	Woods, Good, HSG C (1S, 8S, 9S)
18.221	69	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.585	HSG B	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S
7.636	HSG C	1S, 8S, 9S
0.000	HSG D	
0.000	Other	
18.221		TOTAL AREA

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2R	83.16	80.43	110.0	0.0248	0.020	12.0	0.0	0.0
2	4R	70.06	70.04	40.0	0.0005	0.013	15.0	0.0	0.0
3	5R	83.89	82.67	112.0	0.0109	0.020	12.0	0.0	0.0
4	1P	90.82	89.11	54.0	0.0317	0.013	12.0	0.0	0.0
5	2P	89.01	88.44	13.0	0.0438	0.013	12.0	0.0	0.0
6	3P	70.79	68.71	32.0	0.0650	0.013	15.0	0.0	0.0
7	4P	82.95	82.45	100.0	0.0050	0.013	12.0	0.0	0.0
8	5P	82.35	78.61	85.0	0.0440	0.013	12.0	0.0	0.0

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Type III 24-hr 2YR Rainfall=3.70"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1S	Runoff Area=317,891 sf 4.80% Impervious Runoff Depth>1.07" Flow Length=1,439' Tc=25.6 min CN=69 Runoff=5.13 cfs 0.650 af
Subcatchment 2S: SUB 2S	Runoff Area=22,432 sf 31.06% Impervious Runoff Depth>1.25" Tc=6.0 min CN=72 Runoff=0.71 cfs 0.054 af
Subcatchment 3S: SUB 3S	Runoff Area=18,289 sf 0.00% Impervious Runoff Depth>0.66" Tc=6.0 min CN=61 Runoff=0.25 cfs 0.023 af
Subcatchment 4S: SUB 4S	Runoff Area=830 sf 0.00% Impervious Runoff Depth>0.66" Tc=6.0 min CN=61 Runoff=0.01 cfs 0.001 af
Subcatchment 5S: SUB 5S	Runoff Area=75,281 sf 56.90% Impervious Runoff Depth>1.95" Tc=6.0 min CN=82 Runoff=3.87 cfs 0.280 af
Subcatchment 6S: SUB 6S	Runoff Area=10,981 sf 61.37% Impervious Runoff Depth>2.11" Tc=6.0 min CN=84 Runoff=0.61 cfs 0.044 af
Subcatchment 7S: SUB 7S	Runoff Area=11,505 sf 40.14% Impervious Runoff Depth>1.51" Tc=6.0 min CN=76 Runoff=0.45 cfs 0.033 af
Subcatchment 8S: SUB 8S	Runoff Area=38,249 sf 19.12% Impervious Runoff Depth>0.96" Flow Length=334' Tc=9.5 min CN=67 Runoff=0.78 cfs 0.070 af
Subcatchment 9S: SUB 9S	Runoff Area=298,243 sf 4.77% Impervious Runoff Depth>0.91" Flow Length=885' Tc=22.8 min CN=66 Runoff=4.08 cfs 0.517 af
Reach 1R: SWALE 1R	Avg. Flow Depth=0.25' Max Vel=0.58 fps Inflow=0.97 cfs 0.078 af n=0.150 L=135.0' S=0.0373 '/' Capacity=76.36 cfs Outflow=0.86 cfs 0.078 af
Reach 2R: REACH 2R	Avg. Flow Depth=0.33' Max Vel=3.80 fps Inflow=0.86 cfs 0.078 af 12.0" Round Pipe n=0.020 L=110.0' S=0.0248 '/' Capacity=3.65 cfs Outflow=0.86 cfs 0.078 af
Reach 3R: SWALE 3R	Avg. Flow Depth=0.72' Max Vel=1.22 fps Inflow=4.59 cfs 0.358 af n=0.150 L=246.0' S=0.0422 '/' Capacity=37.69 cfs Outflow=4.21 cfs 0.357 af
Reach 4R: PIPE 4R	Avg. Flow Depth=1.25' Max Vel=1.34 fps Inflow=4.21 cfs 0.357 af 15.0" Round Pipe n=0.013 L=40.0' S=0.0005 '/' Capacity=1.44 cfs Outflow=1.44 cfs 0.357 af
Reach 5R: REACH 5R	Avg. Flow Depth=0.39' Max Vel=2.74 fps Inflow=0.78 cfs 0.070 af 12.0" Round Pipe n=0.020 L=112.0' S=0.0109 '/' Capacity=2.42 cfs Outflow=0.78 cfs 0.070 af
Reach AP1: AP1	Inflow=5.76 cfs 0.824 af Outflow=5.76 cfs 0.824 af
Pond 1P: EX CB 1P	Peak Elev=91.31' Inflow=0.71 cfs 0.054 af 12.0" Round Culvert n=0.013 L=54.0' S=0.0317 '/' Outflow=0.71 cfs 0.054 af

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Pond 2P: EX CB 2P

Peak Elev=89.50' Inflow=0.72 cfs 0.055 af
12.0" Round Culvert n=0.013 L=13.0' S=0.0438 '/ Outflow=0.72 cfs 0.055 af

Pond 3P: DETENTION POND 3P

Peak Elev=71.47' Storage=10,494 cf Inflow=6.45 cfs 1.021 af
Discarded=1.89 cfs 0.847 af Primary=1.57 cfs 0.174 af Outflow=3.46 cfs 1.021 af

Pond 4P: EX CB 4P

Peak Elev=83.44' Inflow=0.61 cfs 0.044 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/ Outflow=0.61 cfs 0.044 af

Pond 5P: EX CB 4P

Peak Elev=82.96' Inflow=1.06 cfs 0.078 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0440 '/ Outflow=1.06 cfs 0.078 af

Total Runoff Area = 18.221 ac Runoff Volume = 1.673 af Average Runoff Depth = 1.10"
87.66% Pervious = 15.972 ac 12.34% Impervious = 2.249 ac

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Type III 24-hr 10YR Rainfall=5.64"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1S	Runoff Area=317,891 sf 4.80% Impervious Runoff Depth>2.42" Flow Length=1,439' Tc=25.6 min CN=69 Runoff=12.42 cfs 1.472 af
Subcatchment 2S: SUB 2S	Runoff Area=22,432 sf 31.06% Impervious Runoff Depth>2.70" Tc=6.0 min CN=72 Runoff=1.59 cfs 0.116 af
Subcatchment 3S: SUB 3S	Runoff Area=18,289 sf 0.00% Impervious Runoff Depth>1.77" Tc=6.0 min CN=61 Runoff=0.81 cfs 0.062 af
Subcatchment 4S: SUB 4S	Runoff Area=830 sf 0.00% Impervious Runoff Depth>1.77" Tc=6.0 min CN=61 Runoff=0.04 cfs 0.003 af
Subcatchment 5S: SUB 5S	Runoff Area=75,281 sf 56.90% Impervious Runoff Depth>3.65" Tc=6.0 min CN=82 Runoff=7.21 cfs 0.526 af
Subcatchment 6S: SUB 6S	Runoff Area=10,981 sf 61.37% Impervious Runoff Depth>3.86" Tc=6.0 min CN=84 Runoff=1.10 cfs 0.081 af
Subcatchment 7S: SUB 7S	Runoff Area=11,505 sf 40.14% Impervious Runoff Depth>3.07" Tc=6.0 min CN=76 Runoff=0.93 cfs 0.068 af
Subcatchment 8S: SUB 8S	Runoff Area=38,249 sf 19.12% Impervious Runoff Depth>2.26" Flow Length=334' Tc=9.5 min CN=67 Runoff=1.99 cfs 0.165 af
Subcatchment 9S: SUB 9S	Runoff Area=298,243 sf 4.77% Impervious Runoff Depth>2.17" Flow Length=885' Tc=22.8 min CN=66 Runoff=10.79 cfs 1.235 af
Reach 1R: SWALE 1R	Avg. Flow Depth=0.39' Max Vel=0.78 fps Inflow=2.44 cfs 0.180 af n=0.150 L=135.0' S=0.0373 '/ Capacity=76.36 cfs Outflow=2.25 cfs 0.180 af
Reach 2R: REACH 2R	Avg. Flow Depth=0.57' Max Vel=4.88 fps Inflow=2.25 cfs 0.180 af 12.0" Round Pipe n=0.020 L=110.0' S=0.0248 '/ Capacity=3.65 cfs Outflow=2.25 cfs 0.180 af
Reach 3R: SWALE 3R	Avg. Flow Depth=1.01' Max Vel=1.52 fps Inflow=9.28 cfs 0.706 af n=0.150 L=246.0' S=0.0422 '/ Capacity=37.69 cfs Outflow=8.69 cfs 0.705 af
Reach 4R: PIPE 4R	Avg. Flow Depth=1.25' Max Vel=1.34 fps Inflow=8.69 cfs 0.705 af 15.0" Round Pipe n=0.013 L=40.0' S=0.0005 '/ Capacity=1.44 cfs Outflow=1.46 cfs 0.704 af
Reach 5R: REACH 5R	Avg. Flow Depth=0.69' Max Vel=3.44 fps Inflow=1.99 cfs 0.165 af 12.0" Round Pipe n=0.020 L=112.0' S=0.0109 '/ Capacity=2.42 cfs Outflow=2.00 cfs 0.165 af
Reach AP1: AP1	Inflow=21.09 cfs 2.361 af Outflow=21.09 cfs 2.361 af
Pond 1P: EX CB 1P	Peak Elev=91.61' Inflow=1.59 cfs 0.116 af 12.0" Round Culvert n=0.013 L=54.0' S=0.0317 '/ Outflow=1.59 cfs 0.116 af

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Pond 2P: EX CB 2P

Peak Elev=89.81' Inflow=1.63 cfs 0.119 af
12.0" Round Culvert n=0.013 L=13.0' S=0.0438 '/ Outflow=1.63 cfs 0.119 af

Pond 3P: DETENTION POND 3P

Peak Elev=72.11' Storage=16,672 cf Inflow=14.30 cfs 2.254 af
Discarded=2.70 cfs 1.339 af Primary=9.96 cfs 0.889 af Outflow=12.65 cfs 2.228 af

Pond 4P: EX CB 4P

Peak Elev=83.69' Inflow=1.10 cfs 0.081 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/ Outflow=1.10 cfs 0.081 af

Pond 5P: EX CB 4P

Peak Elev=83.31' Inflow=2.04 cfs 0.149 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0440 '/ Outflow=2.04 cfs 0.149 af

Total Runoff Area = 18.221 ac Runoff Volume = 3.728 af Average Runoff Depth = 2.46"
87.66% Pervious = 15.972 ac 12.34% Impervious = 2.249 ac

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Type III 24-hr 10YR Rainfall=5.64"

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Summary for Subcatchment 1S: SUB 1S

Runoff = 12.42 cfs @ 12.37 hrs, Volume= 1.472 af, Depth> 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
102,162	61	>75% Grass cover, Good, HSG B
69,358	74	>75% Grass cover, Good, HSG C
2,242	55	Woods, Good, HSG B
128,876	70	Woods, Good, HSG C
8,143	98	Paved parking, HSG B
2,377	98	Paved parking, HSG C
3,216	98	Roofs, HSG B
1,517	98	Roofs, HSG C
317,891	69	Weighted Average
302,638		95.20% Pervious Area
15,253		4.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
3.0	390	0.0930	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	35	0.0250	1.11		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	42	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
4.3	312	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.6	410	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,439	Total			

Summary for Subcatchment 2S: SUB 2S

Runoff = 1.59 cfs @ 12.09 hrs, Volume= 0.116 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

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Type III 24-hr 10YR Rainfall=5.64"

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Area (sf)	CN	Description
13,761	61	>75% Grass cover, Good, HSG B
1,704	55	Woods, Good, HSG B
6,967	98	Paved parking, HSG B
22,432	72	Weighted Average
15,465		68.94% Pervious Area
6,967		31.06% Impervious Area

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

Summary for Subcatchment 3S: SUB 3S

Runoff = 0.81 cfs @ 12.10 hrs, Volume= 0.062 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
18,289	61	>75% Grass cover, Good, HSG B
18,289		100.00% Pervious Area

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

Summary for Subcatchment 4S: SUB 4S

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
830	61	>75% Grass cover, Good, HSG B
830		100.00% Pervious Area

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

Summary for Subcatchment 5S: SUB 5S

Runoff = 7.21 cfs @ 12.09 hrs, Volume= 0.526 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

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Type III 24-hr 10YR Rainfall=5.64"

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Area (sf)	CN	Description
29,901	61	>75% Grass cover, Good, HSG B
2,546	55	Woods, Good, HSG B
37,142	98	Paved parking, HSG B
5,692	98	Roofs, HSG B
75,281	82	Weighted Average
32,447		43.10% Pervious Area
42,834		56.90% Impervious Area

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

Summary for Subcatchment 6S: SUB 6S

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.081 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
4,242	61	>75% Grass cover, Good, HSG B
1,436	98	Paved parking, HSG B
5,303	98	Roofs, HSG B
10,981	84	Weighted Average
4,242		38.63% Pervious Area
6,739		61.37% Impervious Area

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

Summary for Subcatchment 7S: SUB 7S

Runoff = 0.93 cfs @ 12.09 hrs, Volume= 0.068 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
6,887	61	>75% Grass cover, Good, HSG B
1,577	98	Paved parking, HSG B
3,041	98	Roofs, HSG B
11,505	76	Weighted Average
6,887		59.86% Pervious Area
4,618		40.14% Impervious Area

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Type III 24-hr 10YR Rainfall=5.64"

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

Summary for Subcatchment 8S: SUB 8S

Runoff = 1.99 cfs @ 12.14 hrs, Volume= 0.165 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
14,125	61	>75% Grass cover, Good, HSG B
12,717	55	Woods, Good, HSG B
4,525	98	Paved parking, HSG B
2,790	98	Roofs, HSG B
1,567	74	>75% Grass cover, Good, HSG C
2,525	70	Woods, Good, HSG C
38,249	67	Weighted Average
30,934		80.88% Pervious Area
7,315		19.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
1.6	152	0.1050	1.62		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	82	0.0730	1.89		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.5	334	Total			

Summary for Subcatchment 9S: SUB 9S

Runoff = 10.79 cfs @ 12.34 hrs, Volume= 1.235 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
103,884	61	>75% Grass cover, Good, HSG B
62,012	55	Woods, Good, HSG B
3,007	98	Paved parking, HSG B
2,933	98	Roofs, HSG B
91,336	74	>75% Grass cover, Good, HSG C
26,773	70	Woods, Good, HSG C
7,639	98	Paved parking, HSG C
659	98	Roofs, HSG C
298,243	66	Weighted Average
284,005		95.23% Pervious Area
14,238		4.77% Impervious Area

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Type III 24-hr 10YR Rainfall=5.64"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0200	0.12		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
0.9	131	0.1220	2.44		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	90	0.1220	1.75		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.8	564	0.0393	1.39		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.8	885	Total			

Summary for Reach 1R: SWALE 1R

Inflow Area = 0.954 ac, 16.77% Impervious, Inflow Depth > 2.27" for 10YR event
 Inflow = 2.44 cfs @ 12.10 hrs, Volume= 0.180 af
 Outflow = 2.25 cfs @ 12.13 hrs, Volume= 0.180 af, Atten= 8%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.78 fps, Min. Travel Time= 2.9 min
 Avg. Velocity = 0.29 fps, Avg. Travel Time= 7.9 min

Peak Storage= 389 cf @ 12.13 hrs
 Average Depth at Peak Storage= 0.39'
 Bank-Full Depth= 2.00' Flow Area= 33.3 sf, Capacity= 76.36 cfs

25.00' x 2.00' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass
 Length= 135.0' Slope= 0.0373 '/'
 Inlet Invert= 88.19', Outlet Invert= 83.16'

**Summary for Reach 2R: REACH 2R**

[52] Hint: Inlet/Outlet conditions not evaluated
 [90] Warning: Qout>Qin may require smaller dt or Finer Routing
 [62] Hint: Exceeded Reach 1R OUTLET depth by 0.18' @ 12.15 hrs

Inflow Area = 0.954 ac, 16.77% Impervious, Inflow Depth > 2.26" for 10YR event
 Inflow = 2.25 cfs @ 12.13 hrs, Volume= 0.180 af
 Outflow = 2.25 cfs @ 12.14 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 4.88 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 1.92 fps, Avg. Travel Time= 1.0 min

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Type III 24-hr 10YR Rainfall=5.64"

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Peak Storage= 51 cf @ 12.14 hrs

Average Depth at Peak Storage= 0.57'

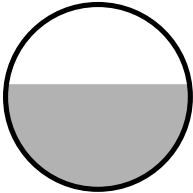
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.65 cfs

12.0" Round Pipe

n= 0.020 Corrugated PE, corrugated interior

Length= 110.0' Slope= 0.0248 '/'

Inlet Invert= 83.16', Outlet Invert= 80.43'



Summary for Reach 3R: SWALE 3R

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.44' @ 12.10 hrs

Inflow Area = 2.682 ac, 42.63% Impervious, Inflow Depth > 3.16" for 10YR event

Inflow = 9.28 cfs @ 12.10 hrs, Volume= 0.706 af

Outflow = 8.69 cfs @ 12.13 hrs, Volume= 0.705 af, Atten= 6%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.52 fps, Min. Travel Time= 2.7 min

Avg. Velocity = 0.52 fps, Avg. Travel Time= 7.8 min

Peak Storage= 1,405 cf @ 12.13 hrs

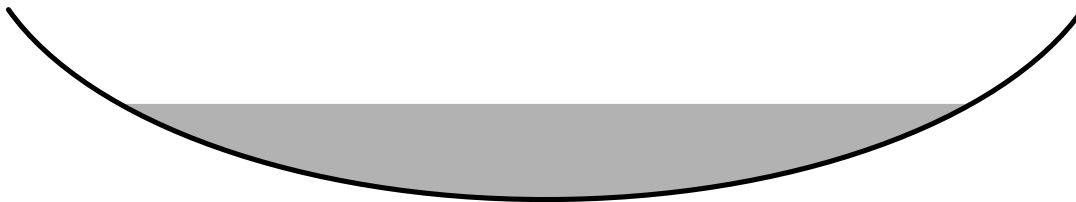
Average Depth at Peak Storage= 1.01'

Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 37.69 cfs

12.00' x 2.00' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass

Length= 246.0' Slope= 0.0422 '/'

Inlet Invert= 80.43', Outlet Invert= 70.06'



Summary for Reach 4R: PIPE 4R

[52] Hint: Inlet/Outlet conditions not evaluated

[55] Hint: Peak inflow is 602% of Manning's capacity

[76] Warning: Detained 0.209 af (Pond w/culvert advised)

[62] Hint: Exceeded Reach 3R OUTLET depth by 1.02' @ 15.85 hrs

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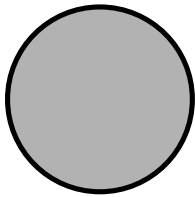
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Inflow Area = 2.682 ac, 42.63% Impervious, Inflow Depth > 3.15" for 10YR event
Inflow = 8.69 cfs @ 12.13 hrs, Volume= 0.705 af
Outflow = 1.46 cfs @ 11.75 hrs, Volume= 0.704 af, Atten= 83%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.34 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 0.8 min

Peak Storage= 49 cf @ 11.80 hrs
Average Depth at Peak Storage= 1.25'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 1.44 cfs

15.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0005 '/
Inlet Invert= 70.06', Outlet Invert= 70.04'



Summary for Reach 5R: REACH 5R

[52] Hint: Inlet/Outlet conditions not evaluated

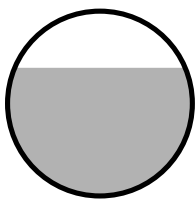
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.878 ac, 19.12% Impervious, Inflow Depth > 2.26" for 10YR event
Inflow = 1.99 cfs @ 12.14 hrs, Volume= 0.165 af
Outflow = 2.00 cfs @ 12.15 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.44 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 1.3 min

Peak Storage= 65 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.69'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.42 cfs

12.0" Round Pipe
n= 0.020 Corrugated PE, corrugated interior
Length= 112.0' Slope= 0.0109 '/
Inlet Invert= 83.89', Outlet Invert= 82.67'



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Summary for Reach AP1: AP1

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

Inflow Area = 18.221 ac, 12.34% Impervious, Inflow Depth > 1.55" for 10YR event
 Inflow = 21.09 cfs @ 12.49 hrs, Volume= 2.361 af
 Outflow = 21.09 cfs @ 12.49 hrs, Volume= 2.361 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: EX CB 1P

Inflow Area = 0.515 ac, 31.06% Impervious, Inflow Depth > 2.70" for 10YR event
 Inflow = 1.59 cfs @ 12.09 hrs, Volume= 0.116 af
 Outflow = 1.59 cfs @ 12.09 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.59 cfs @ 12.09 hrs, Volume= 0.116 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 91.61' @ 12.09 hrs

Flood Elev= 92.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	90.82'	12.0" Round Culvert L= 54.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 90.82' / 89.11' S= 0.0317 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 12.09 hrs HW=91.60' TW=89.81' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.57 cfs @ 2.38 fps)**Summary for Pond 2P: EX CB 2P**

Inflow Area = 0.534 ac, 29.95% Impervious, Inflow Depth > 2.67" for 10YR event
 Inflow = 1.63 cfs @ 12.09 hrs, Volume= 0.119 af
 Outflow = 1.63 cfs @ 12.09 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.63 cfs @ 12.09 hrs, Volume= 0.119 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 89.81' @ 12.09 hrs

Flood Elev= 91.57'

Device	Routing	Invert	Outlet Devices
#1	Primary	89.01'	12.0" Round Culvert L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 89.01' / 88.44' S= 0.0438 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.61 cfs @ 12.09 hrs HW=89.81' TW=88.57' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.61 cfs @ 2.40 fps)

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Summary for Pond 3P: DETENTION POND 3P

[93] Warning: Storage range exceeded by 0.11'

[63] Warning: Exceeded Reach 4R INLET depth by 0.86' @ 16.00 hrs

Inflow Area = 10.923 ac, 17.38% Impervious, Inflow Depth > 2.48" for 10YR event
 Inflow = 14.30 cfs @ 12.31 hrs, Volume= 2.254 af
 Outflow = 12.65 cfs @ 12.50 hrs, Volume= 2.228 af, Atten= 12%, Lag= 11.4 min
 Discarded = 2.70 cfs @ 12.50 hrs, Volume= 1.339 af
 Primary = 9.96 cfs @ 12.50 hrs, Volume= 0.889 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 72.11' @ 12.50 hrs Surf.Area= 12,788 sf Storage= 16,672 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 39.3 min (900.1 - 860.8)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	16,672 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.00	3,884	0	0
72.00	12,788	16,672	16,672

Device	Routing	Invert	Outlet Devices
#1	Primary	70.79'	15.0" Round Culvert L= 32.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.79' / 68.71' S= 0.0650 ' S= 0.0650 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Primary	71.43'	4.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#3	Discarded	70.00'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 69.50'

Discarded OutFlow Max=2.70 cfs @ 12.50 hrs HW=72.11' (Free Discharge)↑ **3=Exfiltration** (Controls 2.70 cfs)**Primary OutFlow** Max=9.95 cfs @ 12.50 hrs HW=72.11' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 3.89 cfs @ 3.17 fps)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 6.05 cfs @ 2.22 fps)**Summary for Pond 4P: EX CB 4P**

Inflow Area = 0.252 ac, 61.37% Impervious, Inflow Depth > 3.86" for 10YR event
 Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.081 af
 Outflow = 1.10 cfs @ 12.09 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.10 cfs @ 12.09 hrs, Volume= 0.081 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 83.69' @ 12.11 hrs

Flood Elev= 85.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	82.95'	12.0" Round Culvert L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 82.95' / 82.45' S= 0.0050 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.09 hrs HW=83.67' TW=83.29' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.96 cfs @ 2.24 fps)**Summary for Pond 5P: EX CB 4P**

Inflow Area = 0.516 ac, 50.51% Impervious, Inflow Depth > 3.45" for 10YR event
Inflow = 2.04 cfs @ 12.09 hrs, Volume= 0.149 af
Outflow = 2.04 cfs @ 12.09 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.09 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 83.31' @ 12.09 hrs

Flood Elev= 84.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	82.35'	12.0" Round Culvert L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 82.35' / 78.61' S= 0.0440 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.00 cfs @ 12.09 hrs HW=83.29' TW=71.22' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 2.00 cfs @ 2.61 fps)

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1S	Runoff Area=317,891 sf 4.80% Impervious Runoff Depth>3.63" Flow Length=1,439' Tc=25.6 min CN=69 Runoff=18.84 cfs 2.205 af
Subcatchment 2S: SUB 2S	Runoff Area=22,432 sf 31.06% Impervious Runoff Depth>3.96" Tc=6.0 min CN=72 Runoff=2.35 cfs 0.170 af
Subcatchment 3S: SUB 3S	Runoff Area=18,289 sf 0.00% Impervious Runoff Depth>2.81" Tc=6.0 min CN=61 Runoff=1.33 cfs 0.098 af
Subcatchment 4S: SUB 4S	Runoff Area=830 sf 0.00% Impervious Runoff Depth>2.81" Tc=6.0 min CN=61 Runoff=0.06 cfs 0.004 af
Subcatchment 5S: SUB 5S	Runoff Area=75,281 sf 56.90% Impervious Runoff Depth>5.06" Tc=6.0 min CN=82 Runoff=9.87 cfs 0.729 af
Subcatchment 6S: SUB 6S	Runoff Area=10,981 sf 61.37% Impervious Runoff Depth>5.29" Tc=6.0 min CN=84 Runoff=1.49 cfs 0.111 af
Subcatchment 7S: SUB 7S	Runoff Area=11,505 sf 40.14% Impervious Runoff Depth>4.40" Tc=6.0 min CN=76 Runoff=1.33 cfs 0.097 af
Subcatchment 8S: SUB 8S	Runoff Area=38,249 sf 19.12% Impervious Runoff Depth>3.43" Flow Length=334' Tc=9.5 min CN=67 Runoff=3.08 cfs 0.251 af
Subcatchment 9S: SUB 9S	Runoff Area=298,243 sf 4.77% Impervious Runoff Depth>3.31" Flow Length=885' Tc=22.8 min CN=66 Runoff=16.88 cfs 1.891 af
Reach 1R: SWALE 1R	Avg. Flow Depth=0.48' Max Vel=0.89 fps Inflow=3.74 cfs 0.273 af n=0.150 L=135.0' S=0.0373 '/ Capacity=76.36 cfs Outflow=3.52 cfs 0.272 af
Reach 2R: REACH 2R	Avg. Flow Depth=0.78' Max Vel=5.28 fps Inflow=3.52 cfs 0.272 af 12.0" Round Pipe n=0.020 L=110.0' S=0.0248 '/ Capacity=3.65 cfs Outflow=3.50 cfs 0.272 af
Reach 3R: SWALE 3R	Avg. Flow Depth=1.19' Max Vel=1.69 fps Inflow=13.17 cfs 1.001 af n=0.150 L=246.0' S=0.0422 '/ Capacity=37.69 cfs Outflow=12.43 cfs 0.999 af
Reach 4R: PIPE 4R	Avg. Flow Depth=1.25' Max Vel=1.34 fps Inflow=12.43 cfs 0.999 af 15.0" Round Pipe n=0.013 L=40.0' S=0.0005 '/ Capacity=1.44 cfs Outflow=1.45 cfs 0.999 af
Reach 5R: REACH 5R	Avg. Flow Depth=1.00' Max Vel=3.51 fps Inflow=3.08 cfs 0.251 af 12.0" Round Pipe n=0.020 L=112.0' S=0.0109 '/ Capacity=2.42 cfs Outflow=2.42 cfs 0.251 af
Reach AP1: AP1	Inflow=42.75 cfs 3.824 af Outflow=42.75 cfs 3.824 af
Pond 1P: EX CB 1P	Peak Elev=91.94' Inflow=2.35 cfs 0.170 af 12.0" Round Culvert n=0.013 L=54.0' S=0.0317 '/ Outflow=2.35 cfs 0.170 af

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Pond 2P: EX CB 2P

Peak Elev=90.16' Inflow=2.41 cfs 0.175 af
12.0" Round Culvert n=0.013 L=13.0' S=0.0438 '/ Outflow=2.41 cfs 0.175 af

Pond 3P: DETENTION POND 3P

Peak Elev=72.87' Storage=16,672 cf Inflow=21.89 cfs 3.349 af
Discarded=3.48 cfs 1.679 af Primary=23.95 cfs 1.619 af Outflow=27.42 cfs 3.298 af

Pond 4P: EX CB 4P

Peak Elev=83.99' Inflow=1.49 cfs 0.111 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/ Outflow=1.49 cfs 0.111 af

Pond 5P: EX CB 4P

Peak Elev=83.74' Inflow=2.82 cfs 0.208 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0440 '/ Outflow=2.82 cfs 0.208 af

Total Runoff Area = 18.221 ac Runoff Volume = 5.557 af Average Runoff Depth = 3.66"
87.66% Pervious = 15.972 ac 12.34% Impervious = 2.249 ac

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB 1S	Runoff Area=317,891 sf 4.80% Impervious Runoff Depth>4.83" Flow Length=1,439' Tc=25.6 min CN=69 Runoff=25.16 cfs 2.938 af
Subcatchment 2S: SUB 2S	Runoff Area=22,432 sf 31.06% Impervious Runoff Depth>5.21" Tc=6.0 min CN=72 Runoff=3.08 cfs 0.224 af
Subcatchment 3S: SUB 3S	Runoff Area=18,289 sf 0.00% Impervious Runoff Depth>3.90" Tc=6.0 min CN=61 Runoff=1.87 cfs 0.136 af
Subcatchment 4S: SUB 4S	Runoff Area=830 sf 0.00% Impervious Runoff Depth>3.90" Tc=6.0 min CN=61 Runoff=0.08 cfs 0.006 af
Subcatchment 5S: SUB 5S	Runoff Area=75,281 sf 56.90% Impervious Runoff Depth>6.42" Tc=6.0 min CN=82 Runoff=12.38 cfs 0.924 af
Subcatchment 6S: SUB 6S	Runoff Area=10,981 sf 61.37% Impervious Runoff Depth>6.66" Tc=6.0 min CN=84 Runoff=1.86 cfs 0.140 af
Subcatchment 7S: SUB 7S	Runoff Area=11,505 sf 40.14% Impervious Runoff Depth>5.69" Tc=6.0 min CN=76 Runoff=1.71 cfs 0.125 af
Subcatchment 8S: SUB 8S	Runoff Area=38,249 sf 19.12% Impervious Runoff Depth>4.61" Flow Length=334' Tc=9.5 min CN=67 Runoff=4.15 cfs 0.337 af
Subcatchment 9S: SUB 9S	Runoff Area=298,243 sf 4.77% Impervious Runoff Depth>4.48" Flow Length=885' Tc=22.8 min CN=66 Runoff=22.95 cfs 2.554 af
Reach 1R: SWALE 1R	Avg. Flow Depth=0.56' Max Vel=0.98 fps Inflow=5.03 cfs 0.366 af n=0.150 L=135.0' S=0.0373 '/ Capacity=76.36 cfs Outflow=4.79 cfs 0.365 af
Reach 2R: REACH 2R	Avg. Flow Depth=1.00' Max Vel=5.29 fps Inflow=4.79 cfs 0.365 af 12.0" Round Pipe n=0.020 L=110.0' S=0.0248 '/ Capacity=3.65 cfs Outflow=3.65 cfs 0.365 af
Reach 3R: SWALE 3R	Avg. Flow Depth=1.32' Max Vel=1.80 fps Inflow=16.01 cfs 1.289 af n=0.150 L=246.0' S=0.0422 '/ Capacity=37.69 cfs Outflow=15.45 cfs 1.287 af
Reach 4R: PIPE 4R	Avg. Flow Depth=1.25' Max Vel=1.34 fps Inflow=15.45 cfs 1.287 af 15.0" Round Pipe n=0.013 L=40.0' S=0.0005 '/ Capacity=1.44 cfs Outflow=1.53 cfs 1.287 af
Reach 5R: REACH 5R	Avg. Flow Depth=1.00' Max Vel=3.42 fps Inflow=4.15 cfs 0.337 af 12.0" Round Pipe n=0.020 L=112.0' S=0.0109 '/ Capacity=2.42 cfs Outflow=2.42 cfs 0.337 af
Reach AP1: AP1	Inflow=55.97 cfs 5.331 af Outflow=55.97 cfs 5.331 af
Pond 1P: EX CB 1P	Peak Elev=92.38' Inflow=3.08 cfs 0.224 af 12.0" Round Culvert n=0.013 L=54.0' S=0.0317 '/ Outflow=3.08 cfs 0.224 af

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Pond 2P: EX CB 2P

Peak Elev=90.63' Inflow=3.16 cfs 0.230 af
12.0" Round Culvert n=0.013 L=13.0' S=0.0438 '/ Outflow=3.16 cfs 0.230 af

Pond 3P: DETENTION POND 3P

Peak Elev=73.18' Storage=16,672 cf Inflow=28.26 cfs 4.443 af
Discarded=3.80 cfs 1.972 af Primary=30.83 cfs 2.392 af Outflow=34.63 cfs 4.365 af

Pond 4P: EX CB 4P

Peak Elev=84.59' Inflow=1.86 cfs 0.140 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/ Outflow=1.86 cfs 0.140 af

Pond 5P: EX CB 4P

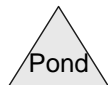
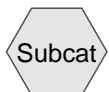
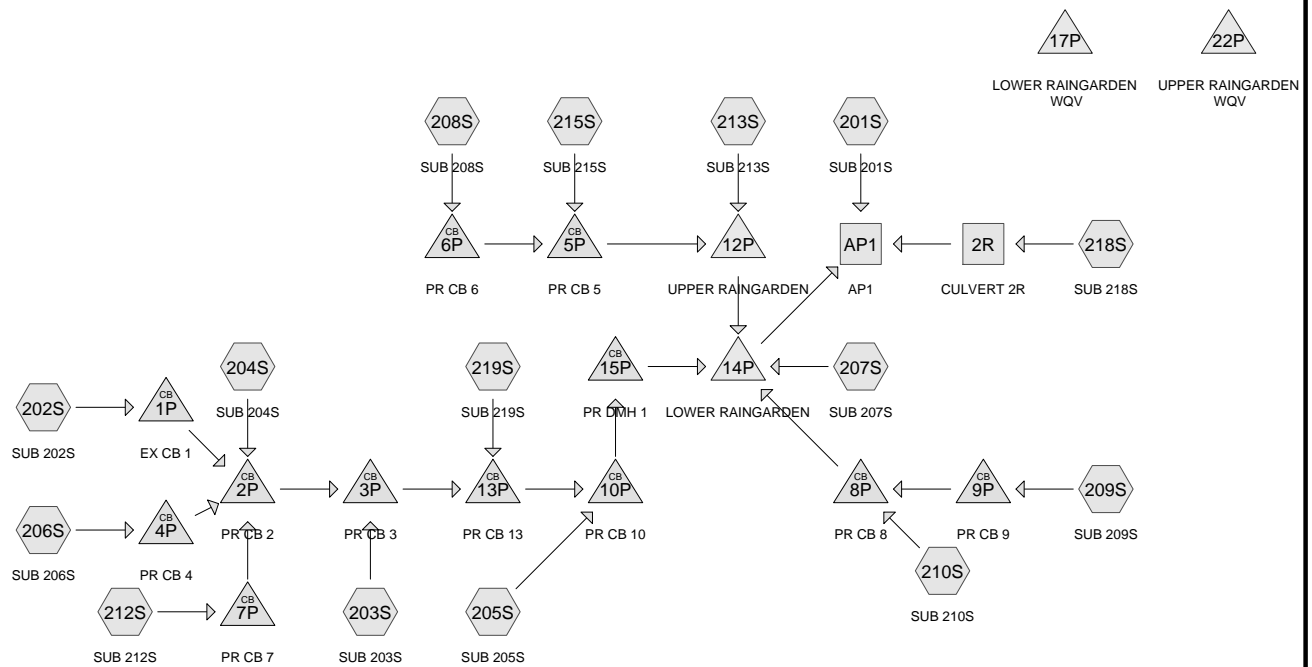
Peak Elev=84.28' Inflow=3.57 cfs 0.265 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0440 '/ Outflow=3.57 cfs 0.265 af

Total Runoff Area = 18.221 ac Runoff Volume = 7.384 af Average Runoff Depth = 4.86"
87.66% Pervious = 15.972 ac 12.34% Impervious = 2.249 ac

1.7 APPENDIX II

POST-DEVELOPMENT CONDITIONS ANALYSIS

- 1.7.1 2-Year 24-Hour Summary Analysis
- 1.7.2 10-Year 24-Hour Complete Analysis
- 1.7.3 25-Year 24-Hour Summary Analysis
- 1.7.4 50-Year 24-Hour Summary Analysis



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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.851	61	>75% Grass cover, Good, HSG B (201S, 202S, 203S, 204S, 205S, 206S, 207S, 208S, 209S, 210S, 212S, 213S, 215S, 218S, 219S)
3.904	74	>75% Grass cover, Good, HSG C (201S, 207S, 208S, 209S, 210S, 213S, 215S)
1.391	98	Paved parking, HSG B (201S, 202S, 203S, 204S, 205S, 206S, 207S, 208S, 209S, 212S, 213S, 219S)
0.700	98	Paved parking, HSG C (201S, 207S, 208S, 209S, 210S, 213S, 215S)
0.625	98	Roofs, HSG B (201S, 205S, 206S, 207S, 208S, 209S, 213S)
0.282	98	Roofs, HSG C (201S, 210S, 213S, 215S)
1.718	55	Woods, Good, HSG B (201S, 202S, 208S, 209S, 210S, 212S, 215S, 218S)
2.751	70	Woods, Good, HSG C (201S, 213S)
18.221	71	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
10.585	HSG B	201S, 202S, 203S, 204S, 205S, 206S, 207S, 208S, 209S, 210S, 212S, 213S, 215S, 218S, 219S
7.636	HSG C	201S, 207S, 208S, 209S, 210S, 213S, 215S
0.000	HSG D	
0.000	Other	
18.221		TOTAL AREA

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Type III 24-hr 2 YR Rainfall=3.70"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 6
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment201S: SUB 201S	Runoff Area=310,035 sf 7.38% Impervious Runoff Depth>1.13" Flow Length=1,439' Tc=25.6 min CN=70 Runoff=5.35 cfs 0.668 af
Subcatchment202S: SUB 202S	Runoff Area=21,489 sf 25.96% Impervious Runoff Depth>1.13" Tc=6.0 min CN=70 Runoff=0.61 cfs 0.047 af
Subcatchment203S: SUB 203S	Runoff Area=19,745 sf 7.18% Impervious Runoff Depth>0.81" Tc=6.0 min CN=64 Runoff=0.36 cfs 0.030 af
Subcatchment204S: SUB 204S	Runoff Area=3,958 sf 52.75% Impervious Runoff Depth>1.87" Tc=6.0 min CN=81 Runoff=0.20 cfs 0.014 af
Subcatchment205S: SUB 205S	Runoff Area=23,121 sf 93.64% Impervious Runoff Depth>3.24" Tc=6.0 min CN=96 Runoff=1.86 cfs 0.143 af
Subcatchment206S: SUB 206S	Runoff Area=10,544 sf 74.54% Impervious Runoff Depth>2.54" Tc=6.0 min CN=89 Runoff=0.71 cfs 0.051 af
Subcatchment207S: SUB 207S	Runoff Area=50,863 sf 13.35% Impervious Runoff Depth>1.51" Flow Length=235' Tc=8.8 min CN=76 Runoff=1.84 cfs 0.147 af
Subcatchment208S: SUB 208S	Runoff Area=40,889 sf 17.38% Impervious Runoff Depth>0.86" Flow Length=405' Tc=9.8 min CN=65 Runoff=0.71 cfs 0.067 af
Subcatchment209S: SUB 209S	Runoff Area=71,289 sf 8.01% Impervious Runoff Depth>0.66" Flow Length=275' Tc=9.0 min CN=61 Runoff=0.87 cfs 0.090 af
Subcatchment210S: SUB 210S	Runoff Area=83,762 sf 10.67% Impervious Runoff Depth>0.90" Flow Length=613' Tc=22.6 min CN=66 Runoff=1.15 cfs 0.145 af
Subcatchment212S: SUB 212S	Runoff Area=15,649 sf 14.04% Impervious Runoff Depth>0.86" Tc=6.0 min CN=65 Runoff=0.31 cfs 0.026 af
Subcatchment213S: SUB 213S	Runoff Area=46,843 sf 20.11% Impervious Runoff Depth>1.44" Tc=6.0 min CN=75 Runoff=1.78 cfs 0.129 af
Subcatchment215S: SUB 215S	Runoff Area=31,297 sf 47.10% Impervious Runoff Depth>2.11" Tc=6.0 min CN=84 Runoff=1.78 cfs 0.126 af
Subcatchment218S: SUB 218S	Runoff Area=37,553 sf 0.00% Impervious Runoff Depth>0.62" Flow Length=284' Tc=11.4 min CN=60 Runoff=0.38 cfs 0.044 af
Subcatchment219S: SUB 219S	Runoff Area=26,673 sf 53.18% Impervious Runoff Depth>1.87" Tc=6.0 min CN=81 Runoff=1.34 cfs 0.095 af
Reach 2R: CULVERT 2R	Avg. Flow Depth=0.20' Max Vel=3.33 fps Inflow=0.38 cfs 0.044 af 12.0" Round Pipe n=0.013 L=106.0' S=0.0142 '/ Capacity=4.24 cfs Outflow=0.38 cfs 0.044 af

Reach AP1: AP1

Inflow=5.65 cfs 0.712 af

Outflow=5.65 cfs 0.712 af

Pond 1P: EX CB 1

Peak Elev=91.25' Inflow=0.61 cfs 0.047 af

12.0" Round Culvert n=0.013 L=75.0' S=0.0773 '/' Outflow=0.61 cfs 0.047 af

Pond 2P: PR CB 2

Peak Elev=84.20' Inflow=1.83 cfs 0.138 af

18.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=1.83 cfs 0.138 af

Pond 3P: PR CB 3

Peak Elev=80.23' Inflow=2.19 cfs 0.168 af

18.0" Round Culvert n=0.013 L=50.0' S=0.0614 '/' Outflow=2.19 cfs 0.168 af

Pond 4P: PR CB 4

Peak Elev=84.53' Inflow=0.71 cfs 0.051 af

15.0" Round Culvert n=0.013 L=82.0' S=0.0050 '/' Outflow=0.71 cfs 0.051 af

Pond 5P: PR CB 5

Peak Elev=83.61' Inflow=2.36 cfs 0.193 af

18.0" Round Culvert n=0.013 L=20.0' S=0.0650 '/' Outflow=2.36 cfs 0.193 af

Pond 6P: PR CB 6

Peak Elev=84.45' Inflow=0.71 cfs 0.067 af

15.0" Round Culvert n=0.013 L=56.0' S=0.0196 '/' Outflow=0.71 cfs 0.067 af

Pond 7P: PR CB 7

Peak Elev=87.31' Inflow=0.31 cfs 0.026 af

12.0" Round Culvert n=0.013 L=113.0' S=0.0177 '/' Outflow=0.31 cfs 0.026 af

Pond 8P: PR CB 8

Peak Elev=81.09' Inflow=1.77 cfs 0.235 af

24.0" Round Culvert n=0.013 L=315.0' S=0.0142 '/' Outflow=1.77 cfs 0.235 af

Pond 9P: PR CB 9

Peak Elev=83.50' Inflow=0.87 cfs 0.090 af

15.0" Round Culvert n=0.013 L=243.0' S=0.0100 '/' Outflow=0.87 cfs 0.090 af

Pond 10P: PR CB 10

Peak Elev=75.72' Inflow=5.39 cfs 0.407 af

30.0" Round Culvert n=0.013 L=63.0' S=0.0090 '/' Outflow=5.39 cfs 0.407 af

Pond 12P: UPPER RAINGARDEN

Peak Elev=76.88' Storage=3,336 cf Inflow=4.14 cfs 0.322 af

Outflow=2.22 cfs 0.315 af

Pond 13P: PR CB 13

Peak Elev=76.32' Inflow=3.53 cfs 0.263 af

30.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=3.53 cfs 0.263 af

Pond 14P: LOWER RAINGARDEN

Peak Elev=70.55' Storage=5,028 cf Inflow=9.93 cfs 1.104 af

Discarded=6.90 cfs 1.104 af Primary=0.00 cfs 0.000 af Outflow=6.90 cfs 1.104 af

Pond 15P: PR DMH 1

Peak Elev=75.03' Inflow=5.39 cfs 0.407 af

30.0" Round Culvert n=0.013 L=57.0' S=0.0084 '/' Outflow=5.39 cfs 0.407 af

Pond 17P: LOWER RAINGARDENWQV

Peak Elev=0.00' Storage=0 cf

Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Pond 22P: UPPER RAINGARDENWQV

Peak Elev=78.00' Storage=0 cf Inflow=0.00 cfs 0.000 af

Outflow=0.00 cfs 0.000 af

Total Runoff Area = 18.221 ac Runoff Volume = 1.824 af Average Runoff Depth = 1.20"
 83.55% Pervious = 15.224 ac 16.45% Impervious = 2.997 ac

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 6
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment201S: SUB 201S	Runoff Area=310,035 sf 7.38% Impervious Runoff Depth>2.51" Flow Length=1,439' Tc=25.6 min CN=70 Runoff=12.63 cfs 1.487 af
Subcatchment202S: SUB 202S	Runoff Area=21,489 sf 25.96% Impervious Runoff Depth>2.52" Tc=6.0 min CN=70 Runoff=1.45 cfs 0.104 af
Subcatchment203S: SUB 203S	Runoff Area=19,745 sf 7.18% Impervious Runoff Depth>2.01" Tc=6.0 min CN=64 Runoff=1.03 cfs 0.076 af
Subcatchment204S: SUB 204S	Runoff Area=3,958 sf 52.75% Impervious Runoff Depth>3.55" Tc=6.0 min CN=81 Runoff=0.38 cfs 0.027 af
Subcatchment205S: SUB 205S	Runoff Area=23,121 sf 93.64% Impervious Runoff Depth>5.16" Tc=6.0 min CN=96 Runoff=2.89 cfs 0.228 af
Subcatchment206S: SUB 206S	Runoff Area=10,544 sf 74.54% Impervious Runoff Depth>4.38" Tc=6.0 min CN=89 Runoff=1.20 cfs 0.088 af
Subcatchment207S: SUB 207S	Runoff Area=50,863 sf 13.35% Impervious Runoff Depth>3.07" Flow Length=235' Tc=8.8 min CN=76 Runoff=3.82 cfs 0.298 af
Subcatchment208S: SUB 208S	Runoff Area=40,889 sf 17.38% Impervious Runoff Depth>2.09" Flow Length=405' Tc=9.8 min CN=65 Runoff=1.96 cfs 0.163 af
Subcatchment209S: SUB 209S	Runoff Area=71,289 sf 8.01% Impervious Runoff Depth>1.76" Flow Length=275' Tc=9.0 min CN=61 Runoff=2.87 cfs 0.241 af
Subcatchment210S: SUB 210S	Runoff Area=83,762 sf 10.67% Impervious Runoff Depth>2.16" Flow Length=613' Tc=22.6 min CN=66 Runoff=3.06 cfs 0.347 af
Subcatchment212S: SUB 212S	Runoff Area=15,649 sf 14.04% Impervious Runoff Depth>2.09" Tc=6.0 min CN=65 Runoff=0.86 cfs 0.063 af
Subcatchment213S: SUB 213S	Runoff Area=46,843 sf 20.11% Impervious Runoff Depth>2.97" Tc=6.0 min CN=75 Runoff=3.76 cfs 0.267 af
Subcatchment215S: SUB 215S	Runoff Area=31,297 sf 47.10% Impervious Runoff Depth>3.86" Tc=6.0 min CN=84 Runoff=3.21 cfs 0.231 af
Subcatchment218S: SUB 218S	Runoff Area=37,553 sf 0.00% Impervious Runoff Depth>1.68" Flow Length=284' Tc=11.4 min CN=60 Runoff=1.32 cfs 0.121 af
Subcatchment219S: SUB 219S	Runoff Area=26,673 sf 53.18% Impervious Runoff Depth>3.55" Tc=6.0 min CN=81 Runoff=2.54 cfs 0.181 af
Reach 2R: CULVERT 2R	Avg. Flow Depth=0.38' Max Vel=4.76 fps Inflow=1.32 cfs 0.121 af 12.0" Round Pipe n=0.013 L=106.0' S=0.0142 '/ Capacity=4.24 cfs Outflow=1.32 cfs 0.121 af

Reach AP1: AP1

Inflow=15.01 cfs 1.662 af

Outflow=15.01 cfs 1.662 af

Pond 1P: EX CB 1

Peak Elev=91.54' Inflow=1.45 cfs 0.104 af

12.0" Round Culvert n=0.013 L=75.0' S=0.0773 '/' Outflow=1.45 cfs 0.104 af

Pond 2P: PR CB 2

Peak Elev=84.59' Inflow=3.88 cfs 0.281 af

18.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=3.88 cfs 0.281 af

Pond 3P: PR CB 3

Peak Elev=80.73' Inflow=4.91 cfs 0.357 af

18.0" Round Culvert n=0.013 L=50.0' S=0.0614 '/' Outflow=4.91 cfs 0.357 af

Pond 4P: PR CB 4

Peak Elev=84.83' Inflow=1.20 cfs 0.088 af

15.0" Round Culvert n=0.013 L=82.0' S=0.0050 '/' Outflow=1.20 cfs 0.088 af

Pond 5P: PR CB 5

Peak Elev=84.09' Inflow=4.94 cfs 0.394 af

18.0" Round Culvert n=0.013 L=20.0' S=0.0650 '/' Outflow=4.94 cfs 0.394 af

Pond 6P: PR CB 6

Peak Elev=84.79' Inflow=1.96 cfs 0.163 af

15.0" Round Culvert n=0.013 L=56.0' S=0.0196 '/' Outflow=1.96 cfs 0.163 af

Pond 7P: PR CB 7

Peak Elev=87.54' Inflow=0.86 cfs 0.063 af

12.0" Round Culvert n=0.013 L=113.0' S=0.0177 '/' Outflow=0.86 cfs 0.063 af

Pond 8P: PR CB 8

Peak Elev=81.56' Inflow=4.91 cfs 0.588 af

24.0" Round Culvert n=0.013 L=315.0' S=0.0142 '/' Outflow=4.91 cfs 0.588 af

Pond 9P: PR CB 9

Peak Elev=84.01' Inflow=2.87 cfs 0.241 af

15.0" Round Culvert n=0.013 L=243.0' S=0.0100 '/' Outflow=2.87 cfs 0.241 af

Pond 10P: PR CB 10

Peak Elev=76.26' Inflow=10.34 cfs 0.767 af

30.0" Round Culvert n=0.013 L=63.0' S=0.0090 '/' Outflow=10.34 cfs 0.767 af

Pond 12P: UPPER RAINGARDEN

Peak Elev=78.42' Storage=7,203 cf Inflow=8.67 cfs 0.661 af

Outflow=3.23 cfs 0.651 af

Pond 13P: PR CB 13

Peak Elev=76.87' Inflow=7.45 cfs 0.539 af

30.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=7.45 cfs 0.539 af

Pond 14P: LOWER RAINGARDEN

Peak Elev=72.20' Storage=9,645 cf Inflow=21.09 cfs 2.304 af

Discarded=14.74 cfs 2.250 af Primary=1.84 cfs 0.054 af Outflow=16.58 cfs 2.304 af

Pond 15P: PR DMH 1

Peak Elev=75.50' Inflow=10.34 cfs 0.767 af

30.0" Round Culvert n=0.013 L=57.0' S=0.0084 '/' Outflow=10.34 cfs 0.767 af

Pond 17P: LOWER RAINGARDENWQV

Peak Elev=0.00' Storage=0 cf

Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Pond 22P: UPPER RAINGARDENWQV

Peak Elev=78.00' Storage=0 cf Inflow=0.00 cfs 0.000 af

Outflow=0.00 cfs 0.000 af

Total Runoff Area = 18.221 ac Runoff Volume = 3.922 af Average Runoff Depth = 2.58"
83.55% Pervious = 15.224 ac 16.45% Impervious = 2.997 ac

Summary for Subcatchment 201S: SUB 201S

Runoff = 12.63 cfs @ 12.37 hrs, Volume= 1.487 af, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
11,748	98	Paved parking, HSG B
3,216	98	Roofs, HSG B
90,395	61	>75% Grass cover, Good, HSG B
1,735	55	Woods, Good, HSG B
6,874	98	Paved parking, HSG C
1,043	98	Roofs, HSG C
87,715	74	>75% Grass cover, Good, HSG C
107,309	70	Woods, Good, HSG C
310,035	70	Weighted Average
287,154		92.62% Pervious Area
22,881		7.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
3.0	390	0.0930	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	35	0.0260	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	42	0.0250	3.21		Shallow Concentrated Flow, Paved Kv= 20.3 fps
4.3	312	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.6	410	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,439	Total			

Summary for Subcatchment 202S: SUB 202S

Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

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Type III 24-hr 10YR Rainfall=5.64"

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Area (sf)	CN	Description
14,206	61	>75% Grass cover, Good, HSG B
1,704	55	Woods, Good, HSG B
5,579	98	Paved parking, HSG B
21,489	70	Weighted Average
15,910		74.04% Pervious Area
5,579		25.96% Impervious Area

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

Summary for Subcatchment 203S: SUB 203S

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.076 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
18,327	61	>75% Grass cover, Good, HSG B
1,418	98	Paved parking, HSG B
19,745	64	Weighted Average
18,327		92.82% Pervious Area
1,418		7.18% Impervious Area

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

Summary for Subcatchment 204S: SUB 204S

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
1,870	61	>75% Grass cover, Good, HSG B
2,088	98	Paved parking, HSG B
3,958	81	Weighted Average
1,870		47.25% Pervious Area
2,088		52.75% Impervious Area

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

Summary for Subcatchment 205S: SUB 205S

Runoff = 2.89 cfs @ 12.08 hrs, Volume= 0.228 af, Depth> 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
1,471	61	>75% Grass cover, Good, HSG B
15,041	98	Paved parking, HSG B
6,609	98	Roofs, HSG B
23,121	96	Weighted Average
1,471		6.36% Pervious Area
21,650		93.64% Impervious Area

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

Summary for Subcatchment 206S: SUB 206S

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.088 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
2,685	61	>75% Grass cover, Good, HSG B
1,766	98	Paved parking, HSG B
6,093	98	Roofs, HSG B
10,544	89	Weighted Average
2,685		25.46% Pervious Area
7,859		74.54% Impervious Area

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

Summary for Subcatchment 207S: SUB 207S

Runoff = 3.82 cfs @ 12.13 hrs, Volume= 0.298 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

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Type III 24-hr 10YR Rainfall=5.64"

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Area (sf)	CN	Description
1,090	98	Paved parking, HSG B
4,753	98	Roofs, HSG B
4,694	61	>75% Grass cover, Good, HSG B
945	98	Paved parking, HSG C
39,381	74	>75% Grass cover, Good, HSG C
50,863	76	Weighted Average
44,075		86.65% Pervious Area
6,788		13.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.1040	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.22"
1.4	76	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	109	0.0710	1.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.8	235	Total			

Summary for Subcatchment 208S: SUB 208S

Runoff = 1.96 cfs @ 12.14 hrs, Volume= 0.163 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
1,680	98	Roofs, HSG B
15,339	61	>75% Grass cover, Good, HSG B
16,960	55	Woods, Good, HSG B
3,418	98	Paved parking, HSG B
1,483	74	>75% Grass cover, Good, HSG C
2,009	98	Paved parking, HSG C
40,889	65	Weighted Average
33,782		82.62% Pervious Area
7,107		17.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
1.8	173	0.1040	1.61		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.8	132	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
9.8	405	Total			

Summary for Subcatchment 209S: SUB 209S

Runoff = 2.87 cfs @ 12.14 hrs, Volume= 0.241 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
27,823	61	>75% Grass cover, Good, HSG B
400	98	Paved parking, HSG B
3,361	98	Roofs, HSG B
2,467	74	>75% Grass cover, Good, HSG C
1,949	98	Paved parking, HSG C
35,289	55	Woods, Good, HSG B
71,289	61	Weighted Average
65,579		91.99% Pervious Area
5,710		8.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1100	0.23		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
1.8	175	0.1040	1.61		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.0	275	Total			

Summary for Subcatchment 210S: SUB 210S

Runoff = 3.06 cfs @ 12.33 hrs, Volume= 0.347 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
56,093	61	>75% Grass cover, Good, HSG B
10,224	55	Woods, Good, HSG B
8,510	74	>75% Grass cover, Good, HSG C
4,076	98	Paved parking, HSG C
4,859	98	Roofs, HSG C
83,762	66	Weighted Average
74,827		89.33% Pervious Area
8,935		10.67% Impervious Area

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Type III 24-hr 10YR Rainfall=5.64"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0200	0.12		Sheet Flow, Grass: Dense n= 0.240 P2= 3.22"
2.3	245	0.1270	1.78		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.1	268	0.0110	0.73		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.6	613	Total			

Summary for Subcatchment 212S: SUB 212S

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.063 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
10,953	61	>75% Grass cover, Good, HSG B
2,499	55	Woods, Good, HSG B
2,197	98	Paved parking, HSG B
15,649	65	Weighted Average
13,452		85.96% Pervious Area
2,197		14.04% Impervious Area

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

Summary for Subcatchment 213S: SUB 213S

Runoff = 3.76 cfs @ 12.09 hrs, Volume= 0.267 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
1,653	98	Paved parking, HSG B
1,519	98	Roofs, HSG B
8,157	61	>75% Grass cover, Good, HSG B
2,416	98	Paved parking, HSG C
3,832	98	Roofs, HSG C
16,744	74	>75% Grass cover, Good, HSG C
12,522	70	Woods, Good, HSG C
46,843	75	Weighted Average
37,423		79.89% Pervious Area
9,420		20.11% Impervious Area

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Type III 24-hr 10YR Rainfall=5.64"

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

Summary for Subcatchment 215S: SUB 215S

Runoff = 3.21 cfs @ 12.09 hrs, Volume= 0.231 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
491	61	>75% Grass cover, Good, HSG B
2,310	55	Woods, Good, HSG B
12,209	98	Paved parking, HSG C
2,532	98	Roofs, HSG C
13,755	74	>75% Grass cover, Good, HSG C
31,297	84	Weighted Average
16,556		52.90% Pervious Area
14,741		47.10% Impervious Area

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

Summary for Subcatchment 218S: SUB 218S

Runoff = 1.32 cfs @ 12.17 hrs, Volume= 0.121 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
33,445	61	>75% Grass cover, Good, HSG B
4,108	55	Woods, Good, HSG B
37,553	60	Weighted Average
37,553		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.1400	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.22"
1.6	184	0.0760	1.93		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
11.4	284	Total			

Summary for Subcatchment 219S: SUB 219S

Runoff = 2.54 cfs @ 12.09 hrs, Volume= 0.181 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=5.64"

Area (sf)	CN	Description
14,186	98	Paved parking, HSG B
12,487	61	>75% Grass cover, Good, HSG B
26,673	81	Weighted Average
12,487		46.82% Pervious Area
14,186		53.18% Impervious Area

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

Summary for Reach 2R: CULVERT 2R

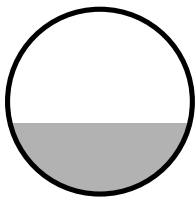
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.862 ac, 0.00% Impervious, Inflow Depth > 1.68" for 10YR event
Inflow = 1.32 cfs @ 12.17 hrs, Volume= 0.121 af
Outflow = 1.32 cfs @ 12.18 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Max. Velocity= 4.76 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.04 fps, Avg. Travel Time= 0.9 min

Peak Storage= 29 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.24 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 106.0' Slope= 0.0142 '/'
Inlet Invert= 79.00', Outlet Invert= 77.50'



Summary for Reach AP1: AP1

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

Inflow Area = 18.221 ac, 16.45% Impervious, Inflow Depth > 1.09" for 10YR event
 Inflow = 15.01 cfs @ 12.34 hrs, Volume= 1.662 af
 Outflow = 15.01 cfs @ 12.34 hrs, Volume= 1.662 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Summary for Pond 1P: EX CB 1

Inflow Area = 0.493 ac, 25.96% Impervious, Inflow Depth > 2.52" for 10YR event
 Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af
 Outflow = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Peak Elev= 91.54' @ 12.09 hrs

Flood Elev= 92.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	90.80'	12.0" Round Culvert L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 90.80' / 85.00' S= 0.0773 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.45 cfs @ 12.09 hrs HW=91.54' TW=84.59' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.45 cfs @ 2.31 fps)**Summary for Pond 2P: PR CB 2**

Inflow Area = 1.185 ac, 34.32% Impervious, Inflow Depth > 2.85" for 10YR event
 Inflow = 3.88 cfs @ 12.09 hrs, Volume= 0.281 af
 Outflow = 3.88 cfs @ 12.09 hrs, Volume= 0.281 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.88 cfs @ 12.09 hrs, Volume= 0.281 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Peak Elev= 84.59' @ 12.09 hrs

Flood Elev= 89.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	83.50'	18.0" Round Culvert L= 170.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 83.50' / 79.55' S= 0.0232 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.88 cfs @ 12.09 hrs HW=84.59' TW=80.73' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 3.88 cfs @ 2.81 fps)

Summary for Pond 3P: PR CB 3

Inflow Area = 1.639 ac, 26.81% Impervious, Inflow Depth > 2.62" for 10YR event
 Inflow = 4.91 cfs @ 12.09 hrs, Volume= 0.357 af
 Outflow = 4.91 cfs @ 12.09 hrs, Volume= 0.357 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.91 cfs @ 12.09 hrs, Volume= 0.357 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 80.73' @ 12.09 hrs
 Flood Elev= 84.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	79.45'	18.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 79.45' / 76.38' S= 0.0614 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.90 cfs @ 12.09 hrs HW=80.73' TW=76.87' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 4.90 cfs @ 3.05 fps)

Summary for Pond 4P: PR CB 4

Inflow Area = 0.242 ac, 74.54% Impervious, Inflow Depth > 4.38" for 10YR event
 Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.088 af
 Outflow = 1.20 cfs @ 12.09 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.20 cfs @ 12.09 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 84.83' @ 12.09 hrs
 Flood Elev= 87.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	84.00'	15.0" Round Culvert L= 82.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 84.00' / 83.59' S= 0.0050 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.20 cfs @ 12.09 hrs HW=84.82' TW=84.59' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 1.20 cfs @ 1.98 fps)

Summary for Pond 5P: PR CB 5

Inflow Area = 1.657 ac, 30.27% Impervious, Inflow Depth > 2.85" for 10YR event
 Inflow = 4.94 cfs @ 12.10 hrs, Volume= 0.394 af
 Outflow = 4.94 cfs @ 12.10 hrs, Volume= 0.394 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.94 cfs @ 12.10 hrs, Volume= 0.394 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 84.09' @ 12.10 hrs
 Flood Elev= 86.00'

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Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	18.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 82.80' / 81.50' S= 0.0650 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.93 cfs @ 12.10 hrs HW=84.09' TW=78.07' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 4.93 cfs @ 3.05 fps)**Summary for Pond 6P: PR CB 6**

Inflow Area = 0.939 ac, 17.38% Impervious, Inflow Depth > 2.09" for 10YR event
Inflow = 1.96 cfs @ 12.14 hrs, Volume= 0.163 af
Outflow = 1.96 cfs @ 12.14 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.0 min
Primary = 1.96 cfs @ 12.14 hrs, Volume= 0.163 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Peak Elev= 84.79' @ 12.14 hrs

Flood Elev= 87.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	84.00'	15.0" Round Culvert L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 84.00' / 82.90' S= 0.0196 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.96 cfs @ 12.14 hrs HW=84.79' TW=84.02' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.96 cfs @ 2.39 fps)**Summary for Pond 7P: PR CB 7**

Inflow Area = 0.359 ac, 14.04% Impervious, Inflow Depth > 2.09" for 10YR event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.063 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Peak Elev= 87.54' @ 12.09 hrs

Flood Elev= 90.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	87.00'	12.0" Round Culvert L= 113.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.00' / 85.00' S= 0.0177 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 12.09 hrs HW=87.54' TW=84.59' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.85 cfs @ 1.97 fps)

Summary for Pond 8P: PR CB 8

Inflow Area = 3.559 ac, 9.45% Impervious, Inflow Depth > 1.98" for 10YR event
 Inflow = 4.91 cfs @ 12.23 hrs, Volume= 0.588 af
 Outflow = 4.91 cfs @ 12.23 hrs, Volume= 0.588 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.91 cfs @ 12.23 hrs, Volume= 0.588 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 81.56' @ 12.23 hrs
 Flood Elev= 86.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	80.47'	24.0" Round Culvert L= 315.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 80.47' / 76.00' S= 0.0142 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.90 cfs @ 12.23 hrs HW=81.56' TW=72.20' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 4.90 cfs @ 2.81 fps)

Summary for Pond 9P: PR CB 9

Inflow Area = 1.637 ac, 8.01% Impervious, Inflow Depth > 1.76" for 10YR event
 Inflow = 2.87 cfs @ 12.14 hrs, Volume= 0.241 af
 Outflow = 2.87 cfs @ 12.14 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.87 cfs @ 12.14 hrs, Volume= 0.241 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 84.01' @ 12.14 hrs
 Flood Elev= 87.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	83.00'	15.0" Round Culvert L= 243.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 83.00' / 80.57' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.86 cfs @ 12.14 hrs HW=84.01' TW=81.53' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 2.86 cfs @ 2.70 fps)

Summary for Pond 10P: PR CB 10

Inflow Area = 2.782 ac, 45.37% Impervious, Inflow Depth > 3.31" for 10YR event
 Inflow = 10.34 cfs @ 12.09 hrs, Volume= 0.767 af
 Outflow = 10.34 cfs @ 12.09 hrs, Volume= 0.767 af, Atten= 0%, Lag= 0.0 min
 Primary = 10.34 cfs @ 12.09 hrs, Volume= 0.767 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 76.26' @ 12.09 hrs
 Flood Elev= 80.50'

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Device	Routing	Invert	Outlet Devices
#1	Primary	74.65'	30.0" Round Culvert L= 63.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.65' / 74.08' S= 0.0090 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=10.32 cfs @ 12.09 hrs HW=76.26' TW=75.50' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 10.32 cfs @ 4.41 fps)

Summary for Pond 12P: UPPER RAINGARDEN

Inflow Area = 2.733 ac, 26.27% Impervious, Inflow Depth > 2.90" for 10YR event
 Inflow = 8.67 cfs @ 12.10 hrs, Volume= 0.661 af
 Outflow = 3.23 cfs @ 12.41 hrs, Volume= 0.651 af, Atten= 63%, Lag= 18.7 min
 Primary = 3.23 cfs @ 12.41 hrs, Volume= 0.651 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Starting Elev= 75.25' Surf.Area= 6,252 sf Storage= 650 cf

Peak Elev= 78.42' @ 12.41 hrs Surf.Area= 6,885 sf Storage= 7,203 cf (6,553 cf above start)

Plug-Flow detention time= 49.1 min calculated for 0.636 af (96% of inflow)

Center-of-Mass det. time= 22.6 min (849.7 - 827.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	74.99'	11,862 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)
74.99	6,252	488.4	0.0	0	0	6,252
75.00	6,252	488.4	40.0	25	25	6,257
75.99	6,252	488.4	40.0	2,476	2,501	6,740
76.00	6,252	488.4	15.0	9	2,510	6,745
77.99	6,252	488.4	15.0	1,866	4,376	7,717
78.00	6,252	488.4	100.0	63	4,439	7,722
78.49	6,992	497.8	100.0	3,243	7,682	8,498
78.50	7,835	501.1	100.0	74	7,756	8,761
79.00	8,593	510.5	100.0	4,106	11,862	9,559

Device	Routing	Invert	Outlet Devices
#1	Primary	75.25'	18.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 75.25' / 74.50' S= 0.0187 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	75.25'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Device 1	78.55'	48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.23 cfs @ 12.41 hrs HW=78.42' TW=71.72' (Dynamic Tailwater)

↑**1=Culvert** (Passes 3.23 cfs of 10.45 cfs potential flow)

↑**2=Orifice/Grate** (Orifice Controls 3.23 cfs @ 8.23 fps)

↑**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 13P: PR CB 13

Inflow Area = 2.251 ac, 33.99% Impervious, Inflow Depth > 2.87" for 10YR event
 Inflow = 7.45 cfs @ 12.09 hrs, Volume= 0.539 af
 Outflow = 7.45 cfs @ 12.09 hrs, Volume= 0.539 af, Atten= 0%, Lag= 0.0 min
 Primary = 7.45 cfs @ 12.09 hrs, Volume= 0.539 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 76.87' @ 12.09 hrs
 Flood Elev= 81.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	75.38'	30.0" Round Culvert L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 75.38' / 74.75' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=7.45 cfs @ 12.09 hrs HW=76.87' TW=76.26' (Dynamic Tailwater)
 ↑ **1=Culvert** (Outlet Controls 7.45 cfs @ 3.51 fps)

Summary for Pond 14P: LOWER RAINGARDEN

Inflow Area = 10.242 ac, 24.14% Impervious, Inflow Depth > 2.70" for 10YR event
 Inflow = 21.09 cfs @ 12.11 hrs, Volume= 2.304 af
 Outflow = 16.58 cfs @ 12.22 hrs, Volume= 2.304 af, Atten= 21%, Lag= 6.6 min
 Discarded = 14.74 cfs @ 12.22 hrs, Volume= 2.250 af
 Primary = 1.84 cfs @ 12.22 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 72.20' @ 12.22 hrs Surf.Area= 9,580 sf Storage= 9,645 cf

Plug-Flow detention time= 8.6 min calculated for 2.303 af (100% of inflow)
 Center-of-Mass det. time= 8.5 min (844.4 - 835.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	69.24'	22,739 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)
69.24	9,580	526.2	0.0	0	0	9,580
69.25	9,580	526.2	40.0	38	38	9,585
69.50	9,580	526.2	40.0	958	996	9,717
71.49	9,580	526.2	40.0	7,626	8,622	10,764
71.50	9,580	526.2	15.0	14	8,636	10,769
73.49	9,580	526.2	15.0	2,860	11,496	11,816
73.50	9,580	526.2	100.0	96	11,592	11,822
73.99	10,377	536.5	100.0	4,888	16,480	12,731
74.00	11,841	605.1	100.0	111	16,591	18,963
74.50	12,756	614.6	100.0	6,148	22,739	19,934

Device	Routing	Invert	Outlet Devices
#1	Primary	71.00'	24.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.00' / 65.00' S= 0.1000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	71.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Device 1	74.20'	48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Discarded	69.24'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 69.10' Phase-In= 0.01'

Discarded OutFlow Max=14.74 cfs @ 12.22 hrs HW=72.20' (Free Discharge)

↑ **4=Exfiltration** (Controls 14.74 cfs)

Primary OutFlow Max=1.84 cfs @ 12.22 hrs HW=72.20' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 1.84 cfs of 5.80 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 1.84 cfs @ 4.70 fps)

↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 15P: PR DMH 1

Inflow Area = 2.782 ac, 45.37% Impervious, Inflow Depth > 3.31" for 10YR event
 Inflow = 10.34 cfs @ 12.09 hrs, Volume= 0.767 af
 Outflow = 10.34 cfs @ 12.09 hrs, Volume= 0.767 af, Atten= 0%, Lag= 0.0 min
 Primary = 10.34 cfs @ 12.09 hrs, Volume= 0.767 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Peak Elev= 75.50' @ 12.09 hrs

Flood Elev= 83.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.98'	30.0" Round Culvert L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.98' / 73.50' S= 0.0084 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=10.32 cfs @ 12.09 hrs HW=75.50' TW=71.12' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 10.32 cfs @ 4.73 fps)

Summary for Pond 17P: LOWER RAINGARDEN WQV

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	73.50'	11,147 cf	Custom Stage Data (Irregular) Listed below (Recalc)

17088 - PROPOSED_03-30-2020

Type III 24-hr 10YR Rainfall=5.64"

Prepared by Microsoft

Printed 4/1/2020

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.50	9,580	526.2	0	0	9,580
73.99	10,377	536.5	4,888	4,888	10,489
74.00	11,841	605.1	111	4,999	16,721
74.50	12,756	614.6	6,148	11,147	17,692

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	24.0" Round Culvert L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.50' / 66.00' S= 0.0714 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	70.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	72.90'	48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	73.00'	30.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#5	Discarded	73.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 68.20' Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)↑ **5=Exfiltration** (Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)↑ **1=Culvert** (Controls 0.00 cfs)↑ **2=Orifice/Grate** (Controls 0.00 cfs)↑ **3=Orifice/Grate** (Controls 0.00 cfs)↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 22P: UPPER RAINGARDEN WQV**

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6

Starting Elev= 75.25' Surf.Area= 0 sf Storage= 0 cf

Peak Elev= 78.00' @ 0.00 hrs Surf.Area= 6,252 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	7,423 cf	Custom Stage Data (Irregular) Listed below (Recalc)

17088 - PROPOSED_03-30-2020

Type III 24-hr 10YR Rainfall=5.64"

Prepared by Microsoft

Printed 4/1/2020

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	6,252	465.9	0	0	6,252
78.49	6,992	465.9	3,243	3,243	6,480
78.50	7,835	465.9	74	3,317	6,485
79.00	8,593	484.8	4,106	7,423	7,934

Device	Routing	Invert	Outlet Devices
#1	Primary	75.25'	18.0" Round Culvert L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 75.25' / 73.00' S= 0.0300 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	75.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	78.50'	48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=78.00' (Free Discharge)

- 1=Culvert (Passes 0.00 cfs of 9.50 cfs potential flow)
- 2=Orifice/Grate (Passes 0.00 cfs of 1.49 cfs potential flow)
- 3=Orifice/Grate (Controls 0.00 cfs)

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 6
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment201S: SUB 201S	Runoff Area=310,035 sf 7.38% Impervious Runoff Depth>3.73" Flow Length=1,439' Tc=25.6 min CN=70 Runoff=18.97 cfs 2.213 af
Subcatchment202S: SUB 202S	Runoff Area=21,489 sf 25.96% Impervious Runoff Depth>3.75" Tc=6.0 min CN=70 Runoff=2.17 cfs 0.154 af
Subcatchment203S: SUB 203S	Runoff Area=19,745 sf 7.18% Impervious Runoff Depth>3.12" Tc=6.0 min CN=64 Runoff=1.64 cfs 0.118 af
Subcatchment204S: SUB 204S	Runoff Area=3,958 sf 52.75% Impervious Runoff Depth>4.95" Tc=6.0 min CN=81 Runoff=0.52 cfs 0.037 af
Subcatchment205S: SUB 205S	Runoff Area=23,121 sf 93.64% Impervious Runoff Depth>6.68" Tc=6.0 min CN=96 Runoff=3.70 cfs 0.295 af
Subcatchment206S: SUB 206S	Runoff Area=10,544 sf 74.54% Impervious Runoff Depth>5.86" Tc=6.0 min CN=89 Runoff=1.58 cfs 0.118 af
Subcatchment207S: SUB 207S	Runoff Area=50,863 sf 13.35% Impervious Runoff Depth>4.39" Flow Length=235' Tc=8.8 min CN=76 Runoff=5.46 cfs 0.427 af
Subcatchment208S: SUB 208S	Runoff Area=40,889 sf 17.38% Impervious Runoff Depth>3.22" Flow Length=405' Tc=9.8 min CN=65 Runoff=3.09 cfs 0.252 af
Subcatchment209S: SUB 209S	Runoff Area=71,289 sf 8.01% Impervious Runoff Depth>2.81" Flow Length=275' Tc=9.0 min CN=61 Runoff=4.76 cfs 0.383 af
Subcatchment210S: SUB 210S	Runoff Area=83,762 sf 10.67% Impervious Runoff Depth>3.31" Flow Length=613' Tc=22.6 min CN=66 Runoff=4.77 cfs 0.531 af
Subcatchment212S: SUB 212S	Runoff Area=15,649 sf 14.04% Impervious Runoff Depth>3.22" Tc=6.0 min CN=65 Runoff=1.35 cfs 0.096 af
Subcatchment213S: SUB 213S	Runoff Area=46,843 sf 20.11% Impervious Runoff Depth>4.29" Tc=6.0 min CN=75 Runoff=5.40 cfs 0.384 af
Subcatchment215S: SUB 215S	Runoff Area=31,297 sf 47.10% Impervious Runoff Depth>5.29" Tc=6.0 min CN=84 Runoff=4.35 cfs 0.317 af
Subcatchment218S: SUB 218S	Runoff Area=37,553 sf 0.00% Impervious Runoff Depth>2.71" Flow Length=284' Tc=11.4 min CN=60 Runoff=2.23 cfs 0.195 af
Subcatchment219S: SUB 219S	Runoff Area=26,673 sf 53.18% Impervious Runoff Depth>4.95" Tc=6.0 min CN=81 Runoff=3.51 cfs 0.253 af
Reach 2R: CULVERT 2R	Avg. Flow Depth=0.51' Max Vel=5.46 fps Inflow=2.23 cfs 0.195 af 12.0" Round Pipe n=0.013 L=106.0' S=0.0142 '/ Capacity=4.24 cfs Outflow=2.22 cfs 0.195 af

Reach AP1: AP1

Inflow=23.25 cfs 2.535 af

Outflow=23.25 cfs 2.535 af

Pond 1P: EX CB 1

Peak Elev=91.83' Inflow=2.17 cfs 0.154 af

12.0" Round Culvert n=0.013 L=75.0' S=0.0773 '/' Outflow=2.17 cfs 0.154 af

Pond 2P: PR CB 2

Peak Elev=84.94' Inflow=5.62 cfs 0.406 af

18.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=5.62 cfs 0.406 af

Pond 3P: PR CB 3

Peak Elev=81.37' Inflow=7.26 cfs 0.524 af

18.0" Round Culvert n=0.013 L=50.0' S=0.0614 '/' Outflow=7.26 cfs 0.524 af

Pond 4P: PR CB 4

Peak Elev=85.11' Inflow=1.58 cfs 0.118 af

15.0" Round Culvert n=0.013 L=82.0' S=0.0050 '/' Outflow=1.58 cfs 0.118 af

Pond 5P: PR CB 5

Peak Elev=84.67' Inflow=7.12 cfs 0.568 af

18.0" Round Culvert n=0.013 L=20.0' S=0.0650 '/' Outflow=7.12 cfs 0.568 af

Pond 6P: PR CB 6

Peak Elev=85.15' Inflow=3.09 cfs 0.252 af

15.0" Round Culvert n=0.013 L=56.0' S=0.0196 '/' Outflow=3.09 cfs 0.252 af

Pond 7P: PR CB 7

Peak Elev=87.71' Inflow=1.35 cfs 0.096 af

12.0" Round Culvert n=0.013 L=113.0' S=0.0177 '/' Outflow=1.35 cfs 0.096 af

Pond 8P: PR CB 8

Peak Elev=81.93' Inflow=7.95 cfs 0.914 af

24.0" Round Culvert n=0.013 L=315.0' S=0.0142 '/' Outflow=7.95 cfs 0.914 af

Pond 9P: PR CB 9

Peak Elev=84.67' Inflow=4.76 cfs 0.383 af

15.0" Round Culvert n=0.013 L=243.0' S=0.0100 '/' Outflow=4.76 cfs 0.383 af

Pond 10P: PR CB 10

Peak Elev=76.67' Inflow=14.46 cfs 1.072 af

30.0" Round Culvert n=0.013 L=63.0' S=0.0090 '/' Outflow=14.46 cfs 1.072 af

Pond 12P: UPPER RAINGARDEN

Peak Elev=78.73' Storage=9,603 cf Inflow=12.48 cfs 0.952 af

Outflow=6.55 cfs 0.941 af

Pond 13P: PR CB 13

Peak Elev=77.29' Inflow=10.76 cfs 0.777 af

30.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=10.76 cfs 0.777 af

Pond 14P: LOWER RAINGARDEN

Peak Elev=73.61' Storage=12,674 cf Inflow=29.76 cfs 3.355 af

Discarded=21.45 cfs 3.228 af Primary=2.91 cfs 0.127 af Outflow=24.36 cfs 3.355 af

Pond 15P: PR DMH 1

Peak Elev=75.86' Inflow=14.46 cfs 1.072 af

30.0" Round Culvert n=0.013 L=57.0' S=0.0084 '/' Outflow=14.46 cfs 1.072 af

Pond 17P: LOWER RAINGARDENWQV

Peak Elev=0.00' Storage=0 cf

Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Pond 22P: UPPER RAINGARDENWQV

Peak Elev=78.00' Storage=0 cf Inflow=0.00 cfs 0.000 af

Outflow=0.00 cfs 0.000 af

Total Runoff Area = 18.221 ac Runoff Volume = 5.774 af Average Runoff Depth = 3.80"
 83.55% Pervious = 15.224 ac 16.45% Impervious = 2.997 ac

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 6
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment201S: SUB 201S	Runoff Area=310,035 sf 7.38% Impervious Runoff Depth>4.95" Flow Length=1,439' Tc=25.6 min CN=70 Runoff=25.17 cfs 2.936 af
Subcatchment202S: SUB 202S	Runoff Area=21,489 sf 25.96% Impervious Runoff Depth>4.97" Tc=6.0 min CN=70 Runoff=2.88 cfs 0.204 af
Subcatchment203S: SUB 203S	Runoff Area=19,745 sf 7.18% Impervious Runoff Depth>4.25" Tc=6.0 min CN=64 Runoff=2.26 cfs 0.161 af
Subcatchment204S: SUB 204S	Runoff Area=3,958 sf 52.75% Impervious Runoff Depth>6.29" Tc=6.0 min CN=81 Runoff=0.66 cfs 0.048 af
Subcatchment205S: SUB 205S	Runoff Area=23,121 sf 93.64% Impervious Runoff Depth>8.10" Tc=6.0 min CN=96 Runoff=4.45 cfs 0.358 af
Subcatchment206S: SUB 206S	Runoff Area=10,544 sf 74.54% Impervious Runoff Depth>7.26" Tc=6.0 min CN=89 Runoff=1.93 cfs 0.146 af
Subcatchment207S: SUB 207S	Runoff Area=50,863 sf 13.35% Impervious Runoff Depth>5.69" Flow Length=235' Tc=8.8 min CN=76 Runoff=7.03 cfs 0.554 af
Subcatchment208S: SUB 208S	Runoff Area=40,889 sf 17.38% Impervious Runoff Depth>4.37" Flow Length=405' Tc=9.8 min CN=65 Runoff=4.23 cfs 0.342 af
Subcatchment209S: SUB 209S	Runoff Area=71,289 sf 8.01% Impervious Runoff Depth>3.89" Flow Length=275' Tc=9.0 min CN=61 Runoff=6.70 cfs 0.531 af
Subcatchment210S: SUB 210S	Runoff Area=83,762 sf 10.67% Impervious Runoff Depth>4.47" Flow Length=613' Tc=22.6 min CN=66 Runoff=6.48 cfs 0.717 af
Subcatchment212S: SUB 212S	Runoff Area=15,649 sf 14.04% Impervious Runoff Depth>4.37" Tc=6.0 min CN=65 Runoff=1.84 cfs 0.131 af
Subcatchment213S: SUB 213S	Runoff Area=46,843 sf 20.11% Impervious Runoff Depth>5.57" Tc=6.0 min CN=75 Runoff=6.99 cfs 0.499 af
Subcatchment215S: SUB 215S	Runoff Area=31,297 sf 47.10% Impervious Runoff Depth>6.66" Tc=6.0 min CN=84 Runoff=5.41 cfs 0.399 af
Subcatchment218S: SUB 218S	Runoff Area=37,553 sf 0.00% Impervious Runoff Depth>3.77" Flow Length=284' Tc=11.4 min CN=60 Runoff=3.16 cfs 0.271 af
Subcatchment219S: SUB 219S	Runoff Area=26,673 sf 53.18% Impervious Runoff Depth>6.29" Tc=6.0 min CN=81 Runoff=4.42 cfs 0.321 af
Reach 2R: CULVERT 2R	Avg. Flow Depth=0.64' Max Vel=5.91 fps Inflow=3.16 cfs 0.271 af 12.0" Round Pipe n=0.013 L=106.0' S=0.0142 '/ Capacity=4.24 cfs Outflow=3.15 cfs 0.271 af

Reach AP1: AP1

Inflow=32.32 cfs 3.429 af

Outflow=32.32 cfs 3.429 af

Pond 1P: EX CB 1

Peak Elev=92.23' Inflow=2.88 cfs 0.204 af

12.0" Round Culvert n=0.013 L=75.0' S=0.0773 '/' Outflow=2.88 cfs 0.204 af

Pond 2P: PR CB 2

Peak Elev=85.43' Inflow=7.31 cfs 0.529 af

18.0" Round Culvert n=0.013 L=170.0' S=0.0232 '/' Outflow=7.31 cfs 0.529 af

Pond 3P: PR CB 3

Peak Elev=82.23' Inflow=9.56 cfs 0.690 af

18.0" Round Culvert n=0.013 L=50.0' S=0.0614 '/' Outflow=9.56 cfs 0.690 af

Pond 4P: PR CB 4

Peak Elev=85.60' Inflow=1.93 cfs 0.146 af

15.0" Round Culvert n=0.013 L=82.0' S=0.0050 '/' Outflow=1.93 cfs 0.146 af

Pond 5P: PR CB 5

Peak Elev=85.44' Inflow=9.24 cfs 0.740 af

18.0" Round Culvert n=0.013 L=20.0' S=0.0650 '/' Outflow=9.24 cfs 0.740 af

Pond 6P: PR CB 6

Peak Elev=86.19' Inflow=4.23 cfs 0.342 af

15.0" Round Culvert n=0.013 L=56.0' S=0.0196 '/' Outflow=4.23 cfs 0.342 af

Pond 7P: PR CB 7

Peak Elev=87.88' Inflow=1.84 cfs 0.131 af

12.0" Round Culvert n=0.013 L=113.0' S=0.0177 '/' Outflow=1.84 cfs 0.131 af

Pond 8P: PR CB 8

Peak Elev=82.32' Inflow=11.06 cfs 1.248 af

24.0" Round Culvert n=0.013 L=315.0' S=0.0142 '/' Outflow=11.06 cfs 1.248 af

Pond 9P: PR CB 9

Peak Elev=85.77' Inflow=6.70 cfs 0.531 af

15.0" Round Culvert n=0.013 L=243.0' S=0.0100 '/' Outflow=6.70 cfs 0.531 af

Pond 10P: PR CB 10

Peak Elev=77.17' Inflow=18.43 cfs 1.370 af

30.0" Round Culvert n=0.013 L=63.0' S=0.0090 '/' Outflow=18.43 cfs 1.370 af

Pond 12P: UPPER RAINGARDEN

Peak Elev=78.88' Storage=10,809 cf Inflow=16.15 cfs 1.239 af

Outflow=11.13 cfs 1.227 af

Pond 13P: PR CB 13

Peak Elev=77.77' Inflow=13.98 cfs 1.011 af

30.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=13.98 cfs 1.011 af

Pond 14P: LOWER RAINGARDEN

Peak Elev=74.33' Storage=20,583 cf Inflow=42.54 cfs 4.398 af

Discarded=25.06 cfs 4.175 af Primary=5.22 cfs 0.222 af Outflow=30.28 cfs 4.397 af

Pond 15P: PR DMH 1

Peak Elev=76.20' Inflow=18.43 cfs 1.370 af

30.0" Round Culvert n=0.013 L=57.0' S=0.0084 '/' Outflow=18.43 cfs 1.370 af

Pond 17P: LOWER RAINGARDENWQV

Peak Elev=0.00' Storage=0 cf

Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

Pond 22P: UPPER RAINGARDENWQV

Peak Elev=78.00' Storage=0 cf Inflow=0.00 cfs 0.000 af

Outflow=0.00 cfs 0.000 af

Total Runoff Area = 18.221 ac Runoff Volume = 7.617 af Average Runoff Depth = 5.02"
83.55% Pervious = 15.224 ac 16.45% Impervious = 2.997 ac

About this Project

Data & Products

Daily Monitoring

Documentation


Select Product ?
[Extreme Precipitation Tables - HTML ?](#)
[Extreme Precipitation Tables - Text/CSV ?](#)
[Partial Duration Series - by Point ?](#)
[Partial Duration Series - by Station ?](#)
[Distribution Curves - Graphical ?](#)
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Select Location ? Double-click the map to place a marker, or enter address or latitude/longitude.

Locate by Address ?
→

Locate by Lat/Lon ?
°N °W →

Locate by State/County ?



Map data ©2019 Imagery ©2019, MassGIS, Commonwealth of Massachusetts EOE, Maxar Technologies, USDA F. Report a map error

Select Options ?

Smoothing ?
Yes

Delivery ?
Popup

Submit ?

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This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC)



Natural Resources Conservation Service (NRCS)

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.915 degrees West
Latitude	43.017 degrees North
Elevation	0 feet
Date/Time	Tue, 13 Aug 2019 09:28:36 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day		+1570
1yr	0.26	0.40	0.50	0.66	0.82	1.04	1yr	0.71	0.99	1.22	1.57	2.04	2.68	2.91	1yr	2.37	2.80	3.21	3.93	4.55	1yr	3.70
2yr	0.32	0.50	0.62	0.81	1.02	1.30	2yr	0.88	1.18	1.52	1.94	2.49	3.22	3.57	2yr	2.85	3.43	3.94	4.68	5.33	2yr	5.64
5yr	0.37	0.58	0.73	0.97	1.25	1.61	5yr	1.08	1.46	1.89	2.44	3.15	4.09	4.59	5yr	3.62	4.41	5.04	5.96	6.73	5yr	7.16
10yr	0.41	0.65	0.82	1.11	1.45	1.89	10yr	1.25	1.72	2.23	2.90	3.77	4.90	5.55	10yr	4.34	5.33	6.08	7.16	8.04	10yr	8.51
25yr	0.48	0.76	0.97	1.34	1.77	2.34	25yr	1.53	2.14	2.78	3.64	4.77	6.23	7.14	25yr	5.51	6.86	7.80	9.12	10.17	25yr	
50yr	0.54	0.86	1.10	1.54	2.07	2.76	50yr	1.79	2.52	3.30	4.34	5.70	7.47	8.64	50yr	6.61	8.31	9.41	10.97	12.15	50yr	
100yr	0.60	0.97	1.25	1.77	2.42	3.26	100yr	2.09	2.97	3.92	5.18	6.83	8.96	10.46	100yr	7.93	10.06	11.37	13.19	14.53	100yr	
200yr	0.68	1.10	1.43	2.05	2.83	3.85	200yr	2.44	3.51	4.64	6.17	8.16	10.76	12.67	200yr	9.52	12.18	13.73	15.88	17.39	200yr	
500yr	0.80	1.32	1.72	2.49	3.48	4.78	500yr	3.01	4.38	5.79	7.77	10.34	13.70	16.33	500yr	12.12	15.70	17.62	20.29	22.05	500yr	

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.89	1yr	0.64	0.87	0.93	1.28	1.58	2.22	2.56	1yr	1.97	2.46	2.88	3.30	3.94	1yr
2yr	0.32	0.49	0.60	0.81	1.00	1.19	2yr	0.87	1.16	1.37	1.82	2.34	3.08	3.50	2yr	2.73	3.36	3.85	4.58	5.09	2yr
5yr	0.35	0.55	0.68	0.93	1.18	1.41	5yr	1.02	1.38	1.62	2.13	2.74	3.83	4.28	5yr	3.39	4.12	4.74	5.61	6.34	5yr
10yr	0.39	0.60	0.74	1.04	1.34	1.62	10yr	1.16	1.58	1.82	2.41	3.08	4.43	5.00	10yr	3.92	4.80	5.53	6.51	7.32	10yr
25yr	0.45	0.68	0.85	1.21	1.60	1.93	25yr	1.38	1.89	2.11	2.79	3.59	4.78	6.11	25yr	4.23	5.87	6.78	7.92	8.86	25yr
50yr	0.50	0.76	0.94	1.35	1.82	2.21	50yr	1.57	2.17	2.36	3.12	4.01	5.40	7.10	50yr	4.78	6.83	7.91	9.20	10.23	50yr
100yr	0.56	0.84	1.06	1.52	2.09	2.54	100yr	1.80	2.48	2.64	3.49	4.47	6.07	8.25	100yr	5.37	7.93	9.23	10.65	11.78	100yr
200yr	0.62	0.94	1.19	1.72	2.39	2.91	200yr	2.07	2.84	2.95	3.88	4.98	6.79	9.59	200yr	6.01	9.22	10.77	12.34	13.59	200yr
500yr	0.73	1.09	1.40	2.03	2.88	3.50	500yr	2.49	3.42	3.42	4.47	5.77	7.88	11.68	500yr	6.98	11.23	13.21	14.95	16.39	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	0.76	1.06	1.26	1.73	2.19	2.99	3.09	1yr	2.65	2.97	3.60	4.33	5.05	1yr
2yr	0.33	0.51	0.63	0.86	1.05	1.26	2yr	0.91	1.23	1.48	1.95	2.49	3.43	3.66	2yr	3.03	3.52	4.04	4.82	5.65	2yr
5yr	0.40	0.62	0.76	1.05	1.33	1.61	5yr	1.15	1.57	1.87	2.50	3.19	4.35	4.89	5yr	3.85	4.70	5.37	6.33	7.12	5yr
								1.39	1.92	2.26	3.04	3.84	5.39	6.10	10yr	4.77	5.87	6.69	7.83	8.73	10yr
								1.77	2.49	2.92	3.96	4.94	7.75	8.19	25yr	6.86	7.88	8.93	10.40	11.45	25yr
								2.13	3.02	3.55	4.84	6.01	9.71	10.25	50yr	8.59	9.86	11.13	12.89	14.05	50yr
								2.55	3.67	4.31	5.93	7.30	12.16	12.83	100yr	10.77	12.34	13.86	16.03	17.26	100yr
								3.07	4.47	5.25	7.26	8.87	15.28	16.09	200yr	13.53	15.47	17.29	19.91	21.23	200yr
								3.89	5.78	6.81	9.52	11.50	20.68	21.68	500yr	18.30	20.85	23.13	26.56	27.95	500yr



GOVE ENVIRONMENTAL SERVICES, INC.

HIGH INTENSITY SOIL SURVEY REPORT
NH SPCA Expansion
102, 104, & 108 Portsmouth Avenue
Stratham, NH
[GES PROJECT NO. 2018099]
May 22, 2019

1. MAPPING STANDARDS

High Intensity Soil Maps for New Hampshire Standards, SSSNNE Publication No.1, December 2017.

2. DATE SOIL MAP PRODUCED

05/07/2019

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

Tax Map 13, Lots 83, 84 & 85, Stratham, New Hampshire. Approximately 14 acres.

4. PURPOSE OF THE SOIL MAP

The preparation of this map was requested by Jones & Beach Engineers, Inc. The purpose was to meet the requirements of the Town of Stratham.

There is a conversion in the soil identification legend to the nearest NRCS Soil Series and the Hydrologic Soil Group (HSG).

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / Fax (603) 778 0654
info@gesinc.biz
www.gesinc.biz

5. SOIL IDENTIFICATION LEGEND

SYMBOL	NEAREST SOIL SERIES HAVING SIMILAR PROPERTIES	HSG
221(s)H	Canton fine sandy loam – well drained	B
321(s)H	Newfields fine sandy loam – moderately well drained	B
343(s)H	Eldridge fine sandy loam – moderately well drained	C
543 (s)H	Squamscott fine sandy loam – poorly drained	C
261(s)H	Similar to Canton fine sandy loam – well drained	B

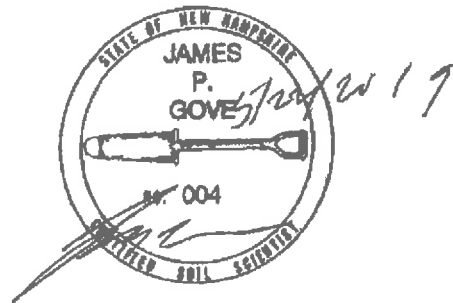
(s) = slope phase

B = 0 to 8%

C = 8 to 15%

D = 15 to 25%

E = 25% +



6. RESPONSIBLE SOIL SCIENTIST

James P. Gove, C.S.S. #004

7. OTHER DISTINGUISHING FEATURES OF SITE

The main buildings and parking areas were identified as impervious.





EXISTING CONDITIONS NOTES:

CERTIFICATION:

[illegible]

DAVID M. COLLIER, LL.S. 882 DATE:

THE UNIVERSITY OF CHICAGO PRESS

PROJECT PARCEL
TOWN OF STRATTON
MAP 13, LOT 80, 84 & 86

APPLICANT
NH EPCA
64 PORTSMOUTH AVE.
STRATFORD, NH 03336

TOTAL LOT AREA
628,300 SQ. FT.
14.30 ACRES

Continued No.

NH SPCA EXPANSION, STRATHAM, NH
102, 104, & 108 PORTSMOUTH AVENUE

NH SPCA, LISA DENNISON, DIRECTOR
104 PORTSMOUTH AVENUE, STRATHAM, NH 03806

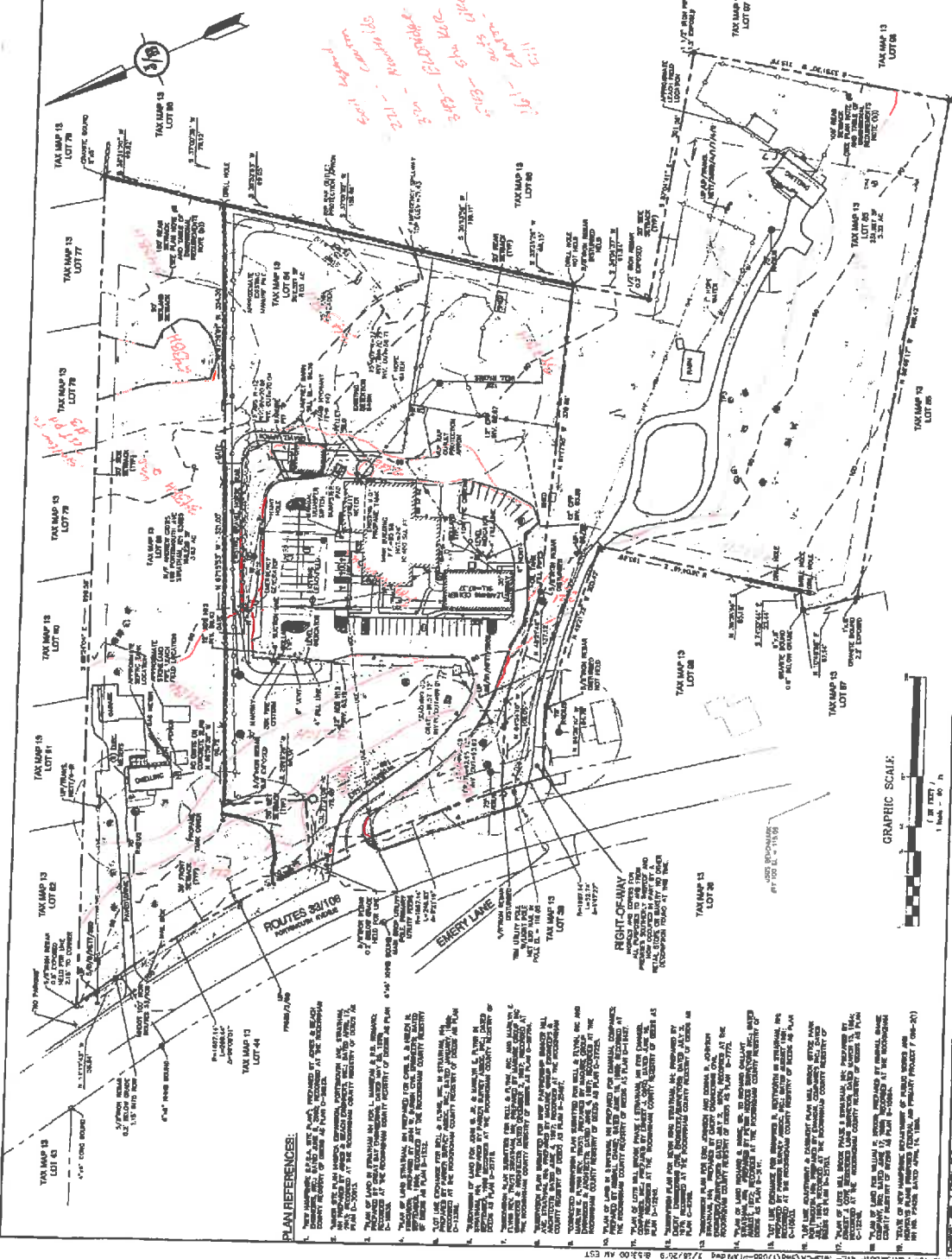
1

J/R Jones & Beach Engineers, Inc.
Designed and Fabricated in NY
 26 Paramount Ave.
 P.O. Box 117
 Brooklyn, NY 11208
 Civil Engineering Services
 Tel: 718-778-1234
 Fax: 718-778-1237
 E-Mail: jbeach@jonesbeach.com

NO.	DATE	DESCRIPTION	P.L.B.	BY
4	4/28/19	RECEIPT FROM ACHS	P.L.B.	
5	5/25/19	RECEIPT FROM ACHS	P.L.B.	
6	7/17/19	UNPAID PORT DUES COLLECTION	P.L.B.	
7	11/25/18	UNPAID PORT DUES COLLECTION	P.L.B.	
8	11/25/18	UNPAID PORT DUES COLLECTION	P.L.B.	
9	11/25/18	UNPAID PORT DUES COLLECTION	P.L.B.	
10		RECEIPT FROM ACHS	P.L.B.	

DATE: JUL 8	DATE: 1981
ORIGIN: JRM	ORIGIN: JRM
TO: JRM	TO: JRM
FROM: JRM	FROM: JRM
SUBJECT: JRM	SUBJECT: JRM
PROJECT: JRM	PROJECT: JRM

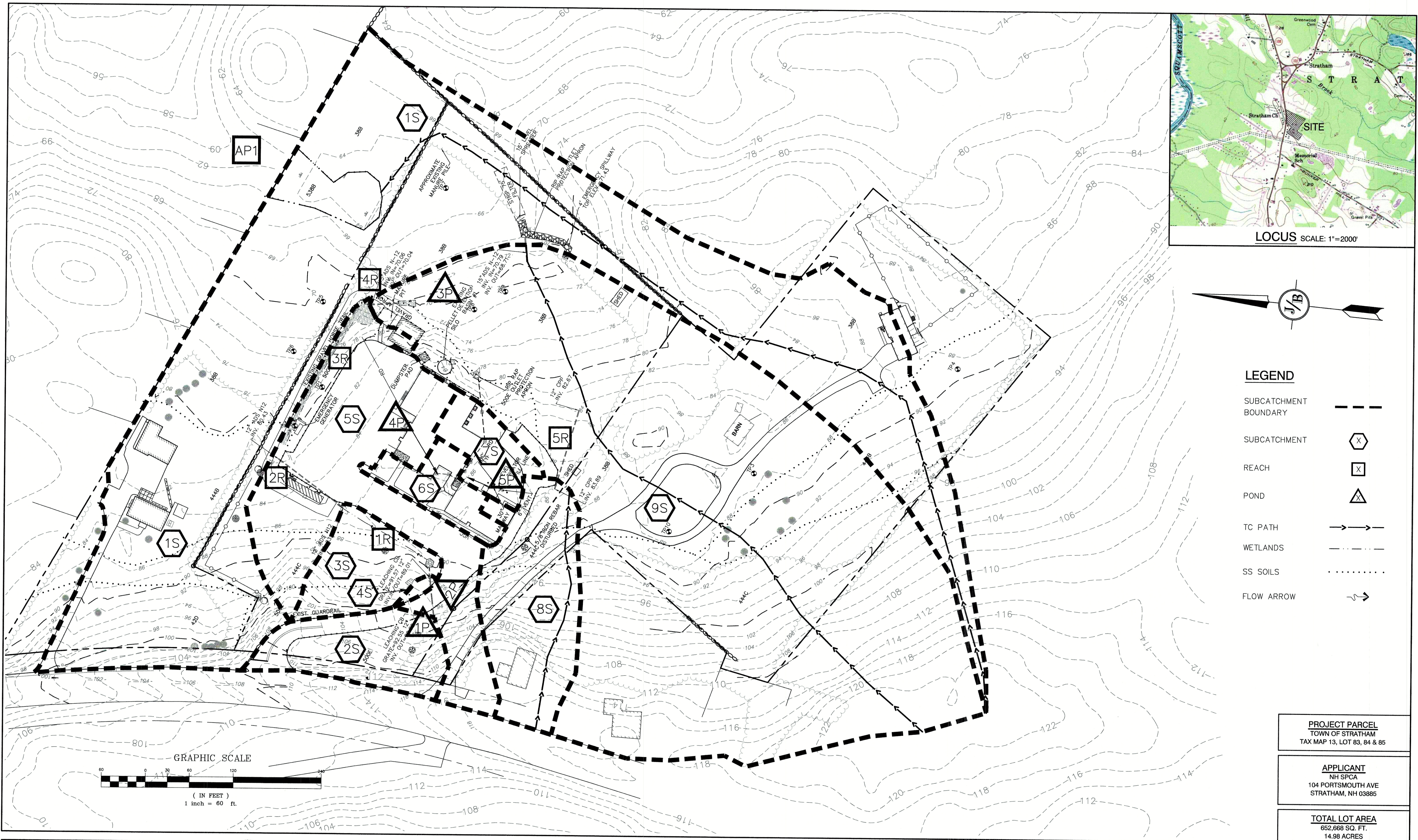
THIS PLAN SHALL NOT BE ACCOUPED WITHOUT WRITING
 PERMISSION FROM JAMES R. MCHENRY, INC. (JRM)
 ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE
 AT THE USER'S RISK AND WITHOUT LIABILITY TO JRM.



GRAPHIC SCALE:

PLAN REFERENCES:

[illegible]



LEGEND

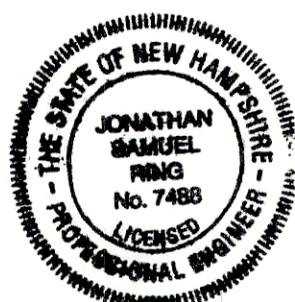
- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- SS SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF STRATHAM
TAX MAP 13, LOT 83, 84 & 85

APPLICANT
NH SPCA
104 PORTSMOUTH AVE
STRATHAM, NH 03885

TOTAL LOT AREA
652,668 SQ. FT.
14.98 ACRES

Design: PLB Draft: PLB Date: 5/8/19
Checked: JSR Scale: AS SHOWN Project No.: 17088
Drawing Name: 17088-WATERSHED.dwg
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.



REV.	DATE	REVISION	BY
2	3/3/20	REVISED PER OWNER; SUBMIT TO PLANNING BOARD AND NHDES	MJK
1	8/1/19	ISSUED FOR NHDES REVIEW	PLB
0	5/15/19	ISSUED FOR REVIEW	PLB

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

Plan Name: **EXISTING WATERSHED PLAN**
Project: **NH SPCA EXPANSION, STRATHAM, NH
102, 104, & 108 PORTSMOUTH AVENUE**
Owner of Record: **NH SPCA, LISA DENNISON, DIRECTOR
104 PORTSMOUTH AVENUE, STRATHAM, NH 03885**

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 17088



Design: PLB	Draft: PLB	Date: 5/8/19
Checked: JSR	Scale: AS SHOWN	Project No.: 17088
Drawing Name: 17088-WATERSHED.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		



2	3/3/20	REVISED PER OWNER; SUBMIT TO PLANNING BOARD AND NHDES	MJK
1	8/1/19	ISSUED FOR NHDES REVIEW	PLB
0	5/15/19	ISSUED FOR REVIEW	PLB
REV.	DATE	REVISION	BY

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

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

Plan Name:	PROPOSED WATERSHED PLAN
Project:	NH SPCA EXPANSION, STRATHAM, NH 102, 104, & 108 PORTSMOUTH AVENUE
Owner of Record:	NH SPCA, LISA DENNISON, DIRECTOR 104 PORTSMOUTH AVENUE, STRATHAM, NH 03885

DRAWING No.

W2

SHEET 2 OF 2

IRE PROJECT NO. 17088

JONES & BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

March 31, 2020

Town of Stratham Planning Board
Attn: Tavis Austin, Town Planner
10 Bunker Hill Avenue
Stratham, NH 03885

**RE: Response Letter 3 – Horsley Witten Group
Third Party Peer Review – NH SPCA Site Plan
102, 104 & 108 Portsmouth Avenue, Stratham, NH
Tax Map 13, Lots 83, 84 & 85
JBE Project No. 17088**

Dear Mr. Austin,

The SPCA Site Plan has been revised as shown on the attached plans. Jones & Beach Engineers, Inc. has received Review Letter 3 with comments from Horsley Witten Group, dated March 16, 2020. Review comments that remain outstanding are listed below with our responses in bold.

Site Plan Regulations:

- 1. The Applicant has not provided a Landscaping Plan to demonstrate proposed landscaping and to demonstrate if the buffers adjacent to residential properties are being maintained or proposed. The Applicant states in the Drainage Analysis that a raingarden is proposed (Pond 18P); however, the location is not marked on the drawings and details and a landscaping plan is not provided for this feature. HW recommends that the Applicant provide a leader on the site plans for the raingarden. Further, HW recommends that the Applicant provide a Landscaping Plan to meet the requirements stated above.*

The Applicant states that all proposed raingarden are included on the Grading and Drainage Plan (Sheet C3) and that the Landscaping Plan has been provided. The Landscaping Plan provided only includes planting details for proposed raingarden 14P and does not include details for raingardens 18P, 12P, and 13P. HW recommends that the Applicant provide landscaping details for the additional rain gardens, as the details show on sheet D2, refer to the landscaping plan for plantings.

New Comment – The Applicant has removed raingardens 13P and 18P from the Site Plans and has increased the footprint of raingarden 14P. A detail has been provided for pond 12P, although the Landscape Plan will be delivered as soon as possible. HW

recommends that the Applicant provide the revised Landscape Plan for review. The Planning Board may choose to include the submission of a Landscape Plan as a Special Condition, however HW recommends that the plan be reviewed prior to land disturbance at the site.

NEW RESPONSE: The updated Landscape Plan Sheet L101 is delivered herewith.

Addendum C – Town of Stratham Stormwater Regulations:

2. *The Applicant has not provided calculations to demonstrate that the groundwater recharge volume (GR_v) has been infiltrated to meet the requirements under Section C.ix. HW recommends that the Applicant revisit the design and provide calculations to demonstrate that the proposed design meets the GR_v requirements in the current Alteration of Terrain (AoT) guidelines.*

The Applicant provided calculations for the groundwater recharge volume and indicates that groundwater recharge volume will be managed by infiltration in raingardens 13P and 14P. Based on review of the calculations it should be noted that for raingarden 13P that Applicant assumes that infiltration will occur below an invert elevation of 72.5 feet; however, the invert of the 6" underdrain is 71.5 feet. Using the correct elevation of 71.5 feet, the storage under the underdrain is sufficient to meet the groundwater recharge volume. HW recommends that the Applicant revise the calculations to represent the correct elevation.

New Comment: The Applicant has removed raingarden 13P, and the storage volume of raingarden 14P has been accurately noted in the recharge calculations. It appears that the Applicant's revised design will provide sufficient storage.

Further, it appears that raingarden 14P will be able to drain completely within 72 hours; HW recommends that the Applicant provide a calculation to verify that drainage will occur within this timeframe.

NEW RESPONSE: See attached BMP worksheet for raingarden 14P showing a drain time of 5.9 hours. This sheet is included in the bound Drainage Analysis.

3. *Based on review of the proposed HydroCAD model, it appears that Ponds 12P, 13P, and 14P are designed to exfiltrate. The detail provided for the pond section isn't consistent with the modeled designs. If the Applicant intends for these to be infiltration basins, the Applicant should provide at least one test pit data to a depth of at least 5 feet below the proposed system (in accordance with the NH Stormwater Manual) at each proposed infiltration basin location. The Applicant should also provide information on how the design infiltration rate was selected, how the basins were designed and typical construction details.*

The Applicant has provided an Infiltration Feasibility Report for the proposed raingardens that have been designed to infiltrate (see comment #3 and 4 above). The Report indicates that the underlying soils have an approximately design infiltration rate of 3 inches per hour; however, test pits in the proposed location of these BMPs has not been provided. HW recommends that prior to construction of the infiltrating rain

gardens, the Applicant conduct test pits and infiltration testing and provide it to the Planning Board for approval.

New Comment: The Applicant has indicated that the design infiltration rate of 3 inches per hour was chosen based on the Society of Soil Scientists of Northern New England (SSSNNE) Special Publication No. 5. In accordance with the Site Specific Soil Survey classification, the soil underlying raingarden 14P is classified as Eldridge, fine sandy loam (Hydrologic Soil Group type C). HW recommends that the Applicant revise the drainage analysis to use a design infiltration rate of 0.6 inches per hour corresponding to the SSSNNE value for the HSG type C Eldridge soil.

NEW RESPONSE: The infiltration for raingarden 14P will occur within the top 3' +/- of the soil, so the value of the 6.0 to 20.0 in/hr was used, as it will occur on the "B" soil horizon.

4. *July 15, 2019: According to the NH Stormwater Manual, the minimum setbacks from a water supply well to a stormwater discharge is 75 feet. If Pond 14P is designed to infiltrate, it would be in violation of this condition. HW recommends that the Applicant review the well setbacks and design of Pond 14P.*

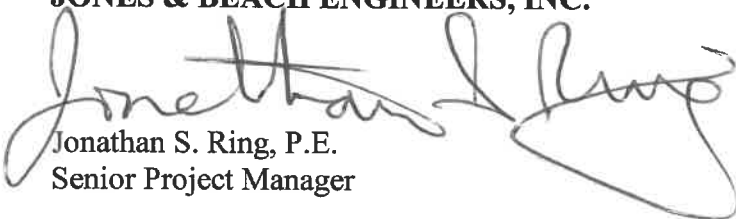
August 28, 2019: The Applicant has changed to design such that raingarden 14P is outside of the 75 foot well setback. The Applicant has addressed this comment.

New Comment: It appears that the Applicant has revised the footprint of Pond 14P to extend into the 75 foot well setback again. HW recommends that the Applicant revise the footprint to avoid the setback zone.

NEW RESPONSE: The footprint has been moved out of the 75 foot well setback.

Thank you very much for your time. If you have any questions, or need further assistance, please contact our office.

Very truly yours,
JONES & BEACH ENGINEERS, INC.



Jonathan S. Ring, P.E.
 Senior Project Manager

cc: Janet Carter Bernardo, P.E., Horsley Witten Group (letter, plans and calculations via email)
 Lisa Dennison, NH SPCA (letter and plans via email)
 Lucy Schlaffer, AIA, ARQ Architects (letter and plans via email)