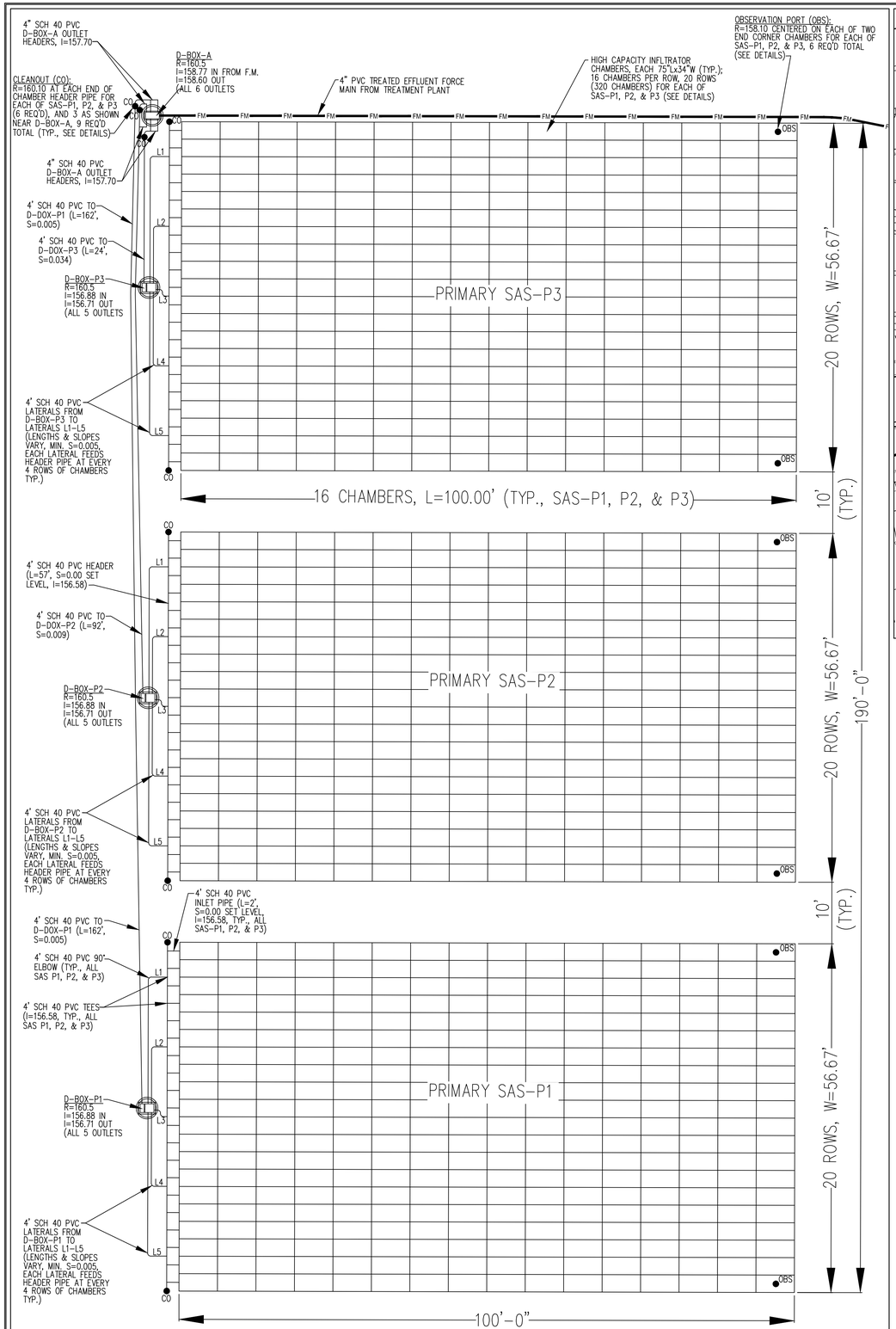
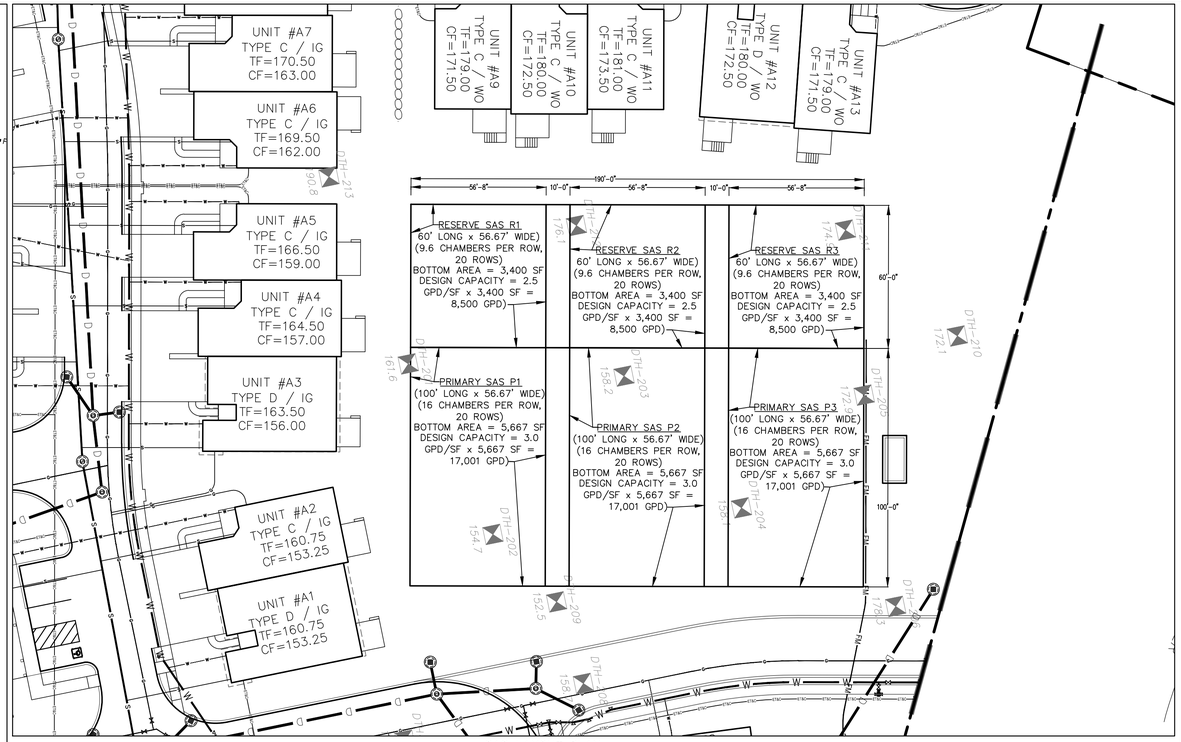
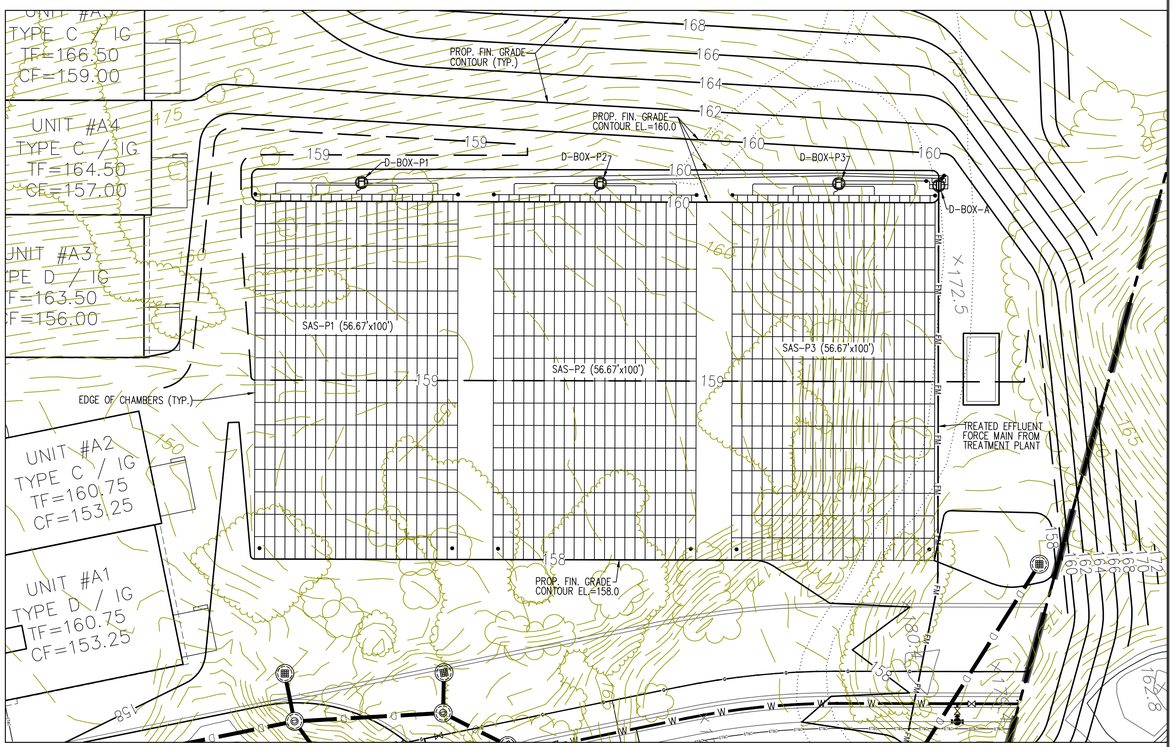


SAS CHAMBERS LAYOUT AND PIPING DETAIL
1" = 10'



SAS LAYOUT PLAN
1" = 30'



SAS CHAMBERS, PIPING, & GRADING PLAN
1" = 20'

NOTES:
1. REFER TO ENGINEERS REPORT & PROJECT SPECIFICATIONS BY ON-SITE ENGINEERING, INC., DATED MARCH 11, 2020 FOR ADDITIONAL INFORMATION ON SEWER SYSTEM.
2. EXISTING CONDITIONS INFORMATION AND PROPOSED SITE DESIGN PROVIDED BY CIVIL DESIGN GROUP, LLC.
3. REFER TO "HYDROGELOGIC REPORT" BY GEOHYDROCYCLE, INC., DATED AUGUST 7, 2019 FOR SOIL EVALUATION LOGS AND OTHER HYDROGEOLOGIC INFORMATION.

PREPARED FOR:

QUARRY NORTH ROAD, LLC

2134 SEVILLA WAY
NAPLES, FL 34109

PROJECT SITE INFORMATION:

COLD BROOK CROSSING

NORTH ROAD
SUDBURY, MASSACHUSETTS

DEP TRANSMITTAL # X285761
DEP PERMIT APP. BRPWP79

PREPARED BY:

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REVISION BLOCK:

COMMONWEALTH OF MASSACHUSETTS
DONALD A. PROVENCHER
CIVIL
No. 38272
REGISTERED PROFESSIONAL ENGINEER

MARCH 11, 2020

NO.	REVISION DATE	REVISION DESCRIPTION
7		
6		
5		
4		
3		
2		
1		
0	3/11/2020	INDIV. SEWAGE TREATMENT BRPWP79

PROJECT:

GROUNDWATER DISCHARGE PERMIT

COLD BROOK CROSSING
SUDBURY, MASSACHUSETTS

INITIAL ISSUE DATE: MARCH 11, 2020

PLAN SCALE: NOT TO SCALE

PLAN TITLE:

SAS LAYOUT, PIPING, AND GRADING PLAN

PROJECT NO. PE344.01	SAS 1
CAD FILE NO. PE344003.dwg	
DRAWING NO. PE344001	
SHEET NO: 1 of 2	

GENERAL CONSTRUCTION AND MATERIAL REQUIREMENTS

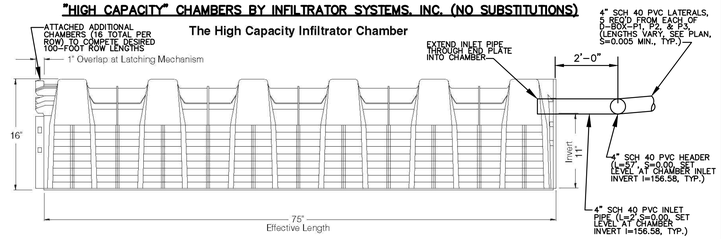
1. ALL SYSTEM COMPONENTS SHALL BE CONSTRUCTED OF CORROSION RESISTANT MATERIAL.
2. ALL TOPSOIL, SUBSOIL, AND UNSUITABLE OR IMPERMEABLE SOILS SHALL BE EXCAVATED AND REMOVED WITHIN 5 FEET LATERALLY FROM THE EDGES AND ENDS AND BENEATH THE BOTTOM OF THE SOIL ABSORPTION SYSTEMS, AND REPLACE WITH TITLE 5 FILL.
3. THE BOTTOM OF EACH LEACHING FIELD SHALL BE FILLED WITH TITLE 5 FILL TO A LEVEL GRADE. IF THE REMOVAL OF STONES OR BOULDERS IS REQUIRED, CREATING LOCALIZED DEPRESSIONS, RE FILLING WITH THE EXCAVATED SUITABLE SOIL IS ACCEPTABLE.
4. PRIOR TO PLACEMENT OF THE TITLE 5 FILL, WHICH SHALL BE STOCKPILED AT THE EDGE OF THE EXCAVATION AND FILLED IN GRADUALLY, THE BOTTOM SURFACE OF THE EXCAVATION SHALL BE SCARIFIED AND RELATIVELY DRY. TITLE 5 FILL SHALL NOT BE PLACED DURING RAIN OR SNOW STORMS. IF PONDED STANDING WATER IS ABOVE THE ELEVATION OF THE BOTTOM OF THE EXCAVATION, THE EXCAVATION SHALL BE DEWATERED AS NECESSARY.
5. FILL MATERIAL MEETING THE SPECIFICATIONS OF TITLE 5 FILL SHALL BE PLACED BENEATH, BETWEEN, AND WITHIN FIVE FEET LATERALLY OF ALL CHAMBERS, UP TO TOP OF CHAMBER ELEVATION, AND SHALL BE FREE OF ORGANIC MATTER AND DELETERIOUS SUBSTANCES.
6. THE SOIL PLACED AS BACKFILL OVER THE SYSTEM SHALL BE A MINIMUM OF 12 INCHES, INCLUDING TOPSOIL, PLACED IN LIFTS AND SUFFICIENTLY COMPACTED WITH A WALK BEHIND VIBRATORY COMPACTOR TO PREVENT DEPRESSIONS DUE TO SETTLING WHICH MAY INTERCEPT OR COLLECT SURFACE WATER RUNOFF ABOVE THE SYSTEM. BACKFILL MUST BE CLEAN AND FREE OF STONES AND BOULDERS GREATER THAN THREE INCHES IN SIZE. TAILINGS, CLAY OR SIMILAR MATERIALS ARE PROHIBITED.
7. FINAL TOPSOIL COVER ABOVE THE SYSTEM SHALL BE GRADED TO REDUCE INFILTRATION OF SURFACE WATER AND MINIMIZE EROSION. FINISH GRADE SHALL HAVE A MINIMUM SLOPE OF 0.02 FEET PER FOOT AND RUNOFF SHALL BE DIRECTED AWAY FROM THE SAS.
8. INFILTRATOR UNITS SHALL NOT BE REQUIRED TO BE CUT TO ACCOMPLISH THE REQUIRED TOTAL ROW LENGTH OF THE PRIMARY SAS.
9. TITLE 5 FILL SHALL NOT BE MECHANICALLY COMPACTED BETWEEN CHAMBERS. INSTEAD, THIS MATERIAL SHALL BE "WALKED IN" BY HUMAN LABORERS IN TWO SIX-INCH LIFTS UP TO TOP OF CHAMBER ELEVATION. ONCE ALL CHAMBERS ARE COVERED, ORDINARY COVER FILL MATERIAL CAN BE PLACED AS INDICATED IN NOTES #6 AND #7 ABOVE.
10. EXCAVATION BENEATH THE BOTTOM OF CHAMBER ELEVATION FOR EACH SOIL ABSORPTION SYSTEM P1-P3 SHALL BE BY MECHANICAL MEANS, PROVIDED CARE IS TAKEN TO ASSURE THAT THE SOIL AT THE BOTTOM OF THE EXCAVATION IS NOT COMPACTED OR SMEARED. THE BOTTOM OF THE EXCAVATION SHALL BE LEVEL AND SCARIFIED. VEHICULAR TRAFFIC AND PARKING OF VEHICLES OR EQUIPMENT IN OR ON THE AREA OF THE SOIL ABSORPTION SYSTEM IS STRICTLY PROHIBITED DURING CONSTRUCTION.
11. FROM THE DATE OF THE INSTALLATION OF THE SOIL ABSORPTION SYSTEM UNTIL COMPLETION OF CONSTRUCTION, THE PERIMETER OF THE SOIL ABSORPTION SYSTEM SHALL BE STAKED AND FLAGGED TO PREVENT THE USE OF SUCH AREA FOR ALL ACTIVITIES WHICH MIGHT DAMAGE THE SOIL ABSORPTION SYSTEM. SUCH FLAGGING IS NOT INTENDED TO PRECLUDE THE FINAL GRADING AND LANDSCAPING OF THE AREA OF THE SOIL ABSORPTION SYSTEM. STOCKPILING OF MATERIALS OR EQUIPMENT WITHIN THE AREA IS PROHIBITED.
12. CONSTRUCTION OF THE SOIL ABSORPTION SYSTEM SHALL CONFORM TO THE GUIDELINES FOR THE DESIGN, CONSTRUCTION, OPERATION AND MAINTENENCE OF SMALL WASTEWATER TREATMENT FACILITIES WITH LAND DISPOSAL, DATED JUNE 2018, BY THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION.
13. NO STONE AGGREGATE IS REQUIRED FOR THIS SOIL ABSORPTION SYSTEM.
14. ALL COMPONENTS SHALL BE INSTALLED AT THE ELEVATIONS AND LOCATIONS INDICATED ON THE PLANS. ANY CHANGES MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE.
15. ALL HEADER PIPES AND INLET PIPES TO ALL CHAMBERS SHALL BE INSTALLED ON A SUITABLY COMPACTED COMPLETELY LEVEL SELECT SOIL BASE AND SHALL BE BACKFILLED AND COMPACTED WITH A WALK-BEHIND VIBRATORY COMPACTOR ONLY.

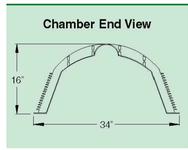
GENERAL CONSTRUCTION NOTES

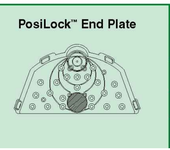
1. THE CONTRACTOR SHALL REPORT TO THE OWNER AND ENGINEER ANY SIGNIFICANT VARIATIONS IN EXISTING SITE CONDITIONS FROM THOSE SHOWN ON THESE PLANS. ANY PROPOSED REVISIONS TO THE WORK, IF REQUIRED BY THESE SITE CONDITIONS, SHALL NOT BE UNDERTAKEN UNTIL REVIEWED BY THE OWNER AND THE ENGINEER.
2. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 48 HOURS IN ADVANCE OF ANY REQUIRED INSPECTIONS.
3. IN ORDER TO PROTECT THE PUBLIC SAFETY DURING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING AT ALL TIMES NECESSARY SAFETY DEVICES AND PERSONNEL, WARNING LIGHTS, BARRICADES, AND POLICE DETAILS AS NECESSARY.
4. THE CONTRACTOR SHALL REGULARLY INSPECT THE PERIMETER OF THE PROPERTY TO CLEAN UP AND REMOVE LOOSE CONSTRUCTION DEBRIS.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTITUTE EROSION CONTROL MEASURES ON AN AS NECESSARY BASIS, SUCH THAT EXCESSIVE SOIL EROSION DOES NOT OCCUR. MEASURES SHALL INCLUDE HAY BALE DIKES ALONG THE PERIMETER OF CUTS AND FILLS, MULCHING, AND PLANTING OF DISTURBED AREAS AS SOON AS PRACTICABLE.
6. AT THE END OF CONSTRUCTION THE CONTRACTOR SHALL REMOVE ALL CONSTRUCTION DEBRIS AND SURPLUS MATERIALS FROM THE SITE. A THOROUGH INSPECTION OF THE WORK PERIMETER IS TO BE MADE AND ALL DISCARDED MATERIALS, BLOWN OR WATER CARRIED DEBRIS, SHALL BE COLLECTED AND REMOVED.
7. AT THE END OF CONSTRUCTION, AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE CONTRACTOR SHALL CLEAN THE SUMPS OF ALL CATCH BASINS AND THE INVERTS OF ALL DRAIN CONDUITS.
8. THE LOCATION OF UNDERGROUND UTILITIES AS REPRESENTED ON THESE PLANS IS BASED UPON PLANS AND INFORMATION PROVIDED BY THE RESPECTIVE UTILITY COMPANIES OR MUNICIPAL DEPARTMENTS SUPPLEMENTED BY FIELD IDENTIFICATION WHEREVER POSSIBLE. NO WARRANTY IS MADE AS TO THE ACCURACY OF THESE LOCATIONS OR THAT ALL UNDERGROUND UTILITIES ARE SHOWN. THE CONTRACTOR IS TO CONTACT DIG SAFE AT LEAST 72 HOURS PRIOR TO THE START OF CONSTRUCTION. DIG SAFE TELEPHONE NUMBER IS 811.
9. THE CONTRACTOR IS TO VERIFY THE LOCATION, SIZE, AND DEPTH OF EXISTING UTILITIES PRIOR TO TAPPING INTO, CROSSING OR EXTENDING THEM. IF THE PROPOSED WORK POSES A CONFLICT WITH THE EXISTING UTILITIES, THE ENGINEER IS TO BE NOTIFIED PRIOR TO THE CONTRACTOR CONTINUING.

NOTES:
1. REFER TO ENGINEERS REPORT & PROJECT SPECIFICATIONS BY ON-SITE ENGINEERING, INC., DATED MARCH 11, 2020 FOR ADDITIONAL INFORMATION ON SEWER SYSTEM.
2. EXISTING CONDITIONS INFORMATION AND PROPOSED SITE DESIGN PROVIDED BY CIVIL DESIGN GROUP, LLC.
3. REFER TO "HYDROGELOGIC REPORT" BY GEOHYDROCYCLE, INC., DATED AUGUST 7, 2019 FOR SOIL EVALUATION LOGS AND OTHER HYDROGEOLOGIC INFORMATION.

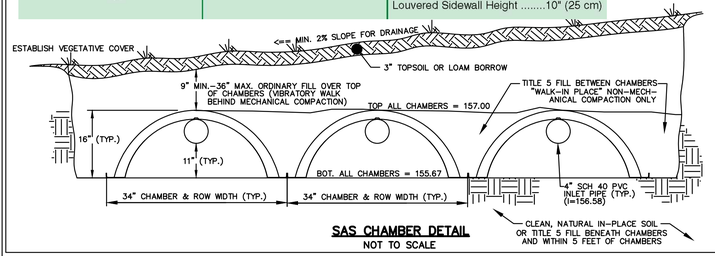
"HIGH CAPACITY" CHAMBERS BY INFILTRATOR SYSTEMS, INC. (NO SUBSTITUTIONS)







Specifications
Size (W x L x H).....34" x 75" x 16" (85 cm x 191 cm x 41 cm)
Storage Capacity .....114.4 gal (433 L)
Weight.....38 lbs (17.2 kg)
Louvered Sidewall Height .....10" (25 cm)



SAS CHAMBER DETAIL
NOT TO SCALE

Schedule of Primary Soil Absorption System Inverts and Elevations:

Design Mounded GW Elev	Bot Chbr Elev	Top Chbr Breakout Elev	Invert in Chbr Elev	Min Fin Grade Elev	Max Fin Grade Elev
126.6	155.67	157.00	156.59	158.0	160.0

NOTE: ALL FUTURE RESERVE AREAS ARE PROPOSED TO BE CONSTRUCTED AT AN ELEVATION OF 5 FEET HIGHER THAN THE ABOVE PRIMARY ELEVATIONS. THE RESERVE AREAS WOULD REQUIRE ADDITIONAL EARTHWORK AND RETAINING WALLS.

SCHEDULE OF D-BOX RIMS & INVERTS:

D-BOX-A: R=160.50, INV IN=158.77, INVS OUT=158.60
D-BOX-P1: R=160.50, INV IN=156.88, INVS OUT=156.71
D-BOX-P2: R=160.50, INV IN=156.88, INVS OUT=156.71
D-BOX-P3: R=160.50, INV IN=156.88, INVS OUT=156.71

NOTES:
1. THE INITIAL UP TO TWO FEET OF ALL OUTLET PIPES FROM DISTRIBUTION BOX D-BOX-A TO BE SET LEVEL.
2. PROVIDE 2" MIN. DROP BETWEEN D-BOX INLET AND OUTLET PIPE INVERTS.
3. BOTTOM OF D-BOXES SET ON LEVEL STABLE BASE (6" COMPACTED CRUSHED STONE OR PROCESSED GRAVEL).
4. 4" SCH40 PVC INLET TEES NOT REQ'D FOR D-BOXES P1-P3.
5. DO NOT USE SPEED LEVELERS IN D-BOX-A.
6. SPEED LEVELERS MUST BE USED IN D-BOXES P1-P3.

PART NO. 300 (4" 90° ELBOWS)

1/4 Bend (Sanitary 90° Ell) ALL HUB

SIZE	A
1¼ (PVC)	1⁹/₁₆
1½	1¾
2 (PVC)	2⁵/₁₆
2 (ABS)	2¼
3	3¼
4	3⅝

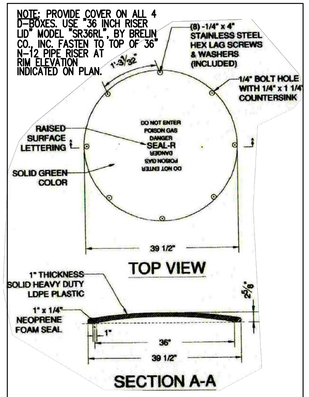
PART NO. 441 (4" TEES)

Vent Tee ALL HUB

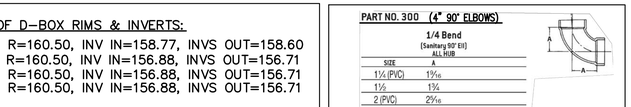
SIZE	A	B
1½ (PVC)	1⁹/₁₆	2⅛
1½ (ABS)	1⅝	2¹⁵/₁₆
2	1½	3
3 (PVC)	1⅞	3¼
3 (ABS)	1¹³/₁₆	3¼
4 (PVC)	2½	3

4" PVC FITTINGS (CHARLOTTE PIPE)

NOTE: PROVIDE COVER ON ALL 4 D-BOXES. USE "36 INCH RISER LID" MODEL "SR36RL", BY BRELIN CO., INC. FASTEN TO TOP OF 36" N-12 PIPE RISER AT RIM ELEVATION INDICATED ON PLAN.

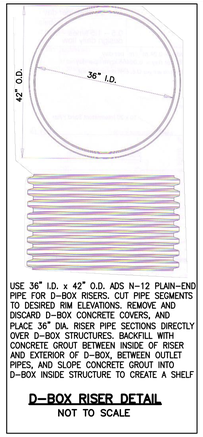


D-BOX COVER DETAIL
(NOT TO SCALE)



SECTION VIEW (NOT TO SCALE)

CLEANOUTS & OBS. PORTS DETAIL
NOT TO SCALE



USE 36" I.D. x 42" O.D. ADS N-12 PLAIN-END PIPE FOR D-BOX RISERS. CUT PIPE SEGMENTS TO DESIRED RIM ELEVATIONS. REMOVE AND DISCARD D-BOX CONCRETE COVERS, AND PLACE 36" DIA. RISER PIPE SECTIONS DIRECTLY OVER D-BOX STRUCTURES. BACKFILL WITH CONCRETE GROUT BETWEEN INSIDE OF RISER AND EXTERIOR OF D-BOX, BETWEEN OUTLET PIPES, AND SLOPE CONCRETE GROUT INTO D-BOX INSIDE STRUCTURE TO CREATE A SHELF

D-BOX RISER DETAIL
NOT TO SCALE

SAS Sizing Calculations – Leaching Chambers in Bed (Field) Configuration

Application Rates:
Observed Perc Rates: Primary Area: <2–4 min/inch (PT–203, 205, & 207) Reserve Area: 6 min/inch (PT–211)
Design Perc Rate: Primary Area: 2–5 min/in; Reserve Area: 5–10 min/in*
Application Rate: Primary Area: 3.0 gpd/SF; Reserve Area: 2.50 gpd/SF*

* Guidelines for the Design, Construction, Operation and Maintenance of Small Wastewater Treatment Facilities with Land Disposal, DEP July 2018, Table 3, page 47, with use of "Leaching Chambers" using percolation testing.

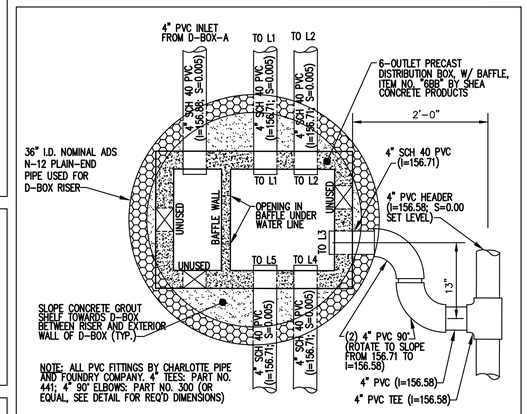
High Capacity "Infiltrator" Chamber Leaching Fields in Bed (Field) Configuration

SAS	# Chambers/row	Row & SAS[1] Length (LF)	No. Rows	Width[2] SAS (Ft)	Bot. Area[3] all Chambers (LF)	Application Rate (GPD/SF)	Design[4] Capacity (GPD)
P1–P3	16	100.00	20	56.67	5,667	3.0	17,001
R1–R3	9.6	60.00	20	56.67	3,400	2.5	8,500

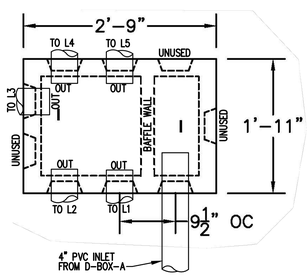
Primary Leaching Capacity = 3 beds x 17,001 GPD = 51,003 GPD > 49,755 GPD[5]
Reserve Leaching Capacity = 3 beds x 8,500 GPD = 25,500 GPD > 24,888 GPD[6]

Primary SAS Long-term app. rate = 49,755 GPD / (100' x 190') = 2.62 GPD/SF[7]

Footnotes:
1. Row & SAS Length = No. of Chambers per row x 6.25 Ft per chamber
2. Width SAS = Number of Rows x 34 inch High Capacity chamber width / 12 inches per foot
3. Bot. Area all Chambers = SAS Length x SAS Width
4. Design Capacity (GPD) = Bot. Area all Chambers (SF) x App Rate (GPD/SF)
5. Primary Leaching Capacity Exceeds Site Design Flow of 49,755 GPD
6. Reserve Leaching Capacity Exceeds 50% of Site Design Flow of 24,888 GPD
7. Max LTAR of 2.59 GPD/SF in BRPWS79 App'l is incorrect, based on app'd 49,755 GPD design flow over 19,000 SF app'd Primary Area noted in permit.

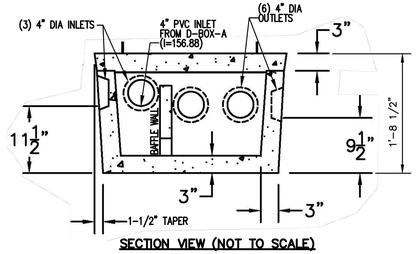


"D-BOX-P1, P2, & P3" PIPING PLAN VIEW (1" = 1')



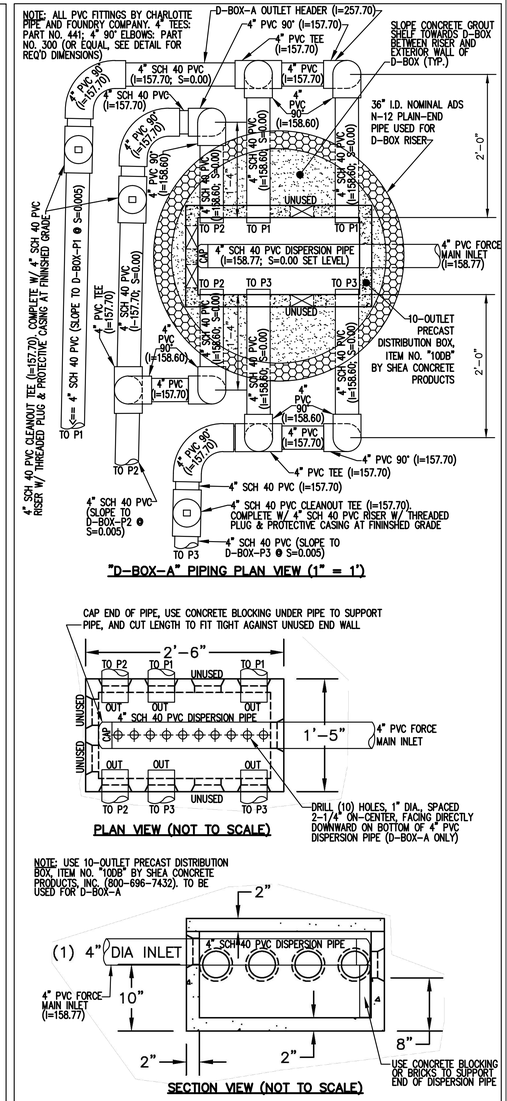
PLAN VIEW (NOT TO SCALE)

NOTE: USE 6-OUTLET PRECAST DISTRIBUTION BOX, W/ BAFFLE, ITEM NO. "6BB" BY SHEA CONCRETE PRODUCTS, INC. (800-696-7432). TO BE USED FOR D-BOX-P1, P2, & P3



SECTION VIEW (NOT TO SCALE)

"D-BOX-P1, P2, & P3" DETAILS
(SCALE AS NOTED)



"D-BOX-A" PIPING PLAN VIEW (1" = 1')

PLAN VIEW (NOT TO SCALE)

NOTE: USE 10-OUTLET PRECAST DISTRIBUTION BOX, ITEM NO. "10DB" BY SHEA CONCRETE PRODUCTS, INC. (800-696-7432). TO BE USED FOR D-BOX-A

SECTION VIEW (NOT TO SCALE)

"D-BOX-A" DETAILS
(SCALE AS NOTED)

PREPARED FOR:

QUARRY NORTH ROAD, LLC

2134 SEVILLA WAY
NAPLES, FL 34109

PROJECT SITE INFORMATION:

COLD BROOK CROSSING

NORTH ROAD
SUDBURY, MASSACHUSETTS

DEP TRANSMITTAL # X285761
DEP PERMIT APP. BRPWP79

PREPARED BY:

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REVISION BLOCK:

COMMONWEALTH OF MASSACHUSETTS
DONALD A. PROVENCHER
CIVIL
No. 38272
REGISTERED PROFESSIONAL ENGINEER
MARCH 11, 2020

NO.	REVISION DATE	REVISION DESCRIPTION
7		
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1		
0	3/11/2020	INDIV. SEWAGE TREATMENT BRPWP79

PROJECT:

GROUNDWATER DISCHARGE PERMIT

COLD BROOK CROSSING
SUDBURY, MASSACHUSETTS

INITIAL ISSUE DATE: MARCH 11, 2020

PLAN SCALE: NOT TO SCALE

PLAN TITLE:

SAS DETAILS

PROJECT NO. PE344.01	SAS 2
CAD FILE NO. PE344003.dwg	
DRAWING NO. PE344002	
SHEET NO: 2 of 2	