

HILLSBOROUGH MUNICIPAL COMPLEX

GREEN INFRASTRUCTURE IMPLEMENTATION PROJECT 379 SOUTH BRANCH ROAD, HILLSBOROUGH TOWNSHIP SOMERSET COUNTY, NEW JERSEY BLOCK: 149.01 LOT: 1.02

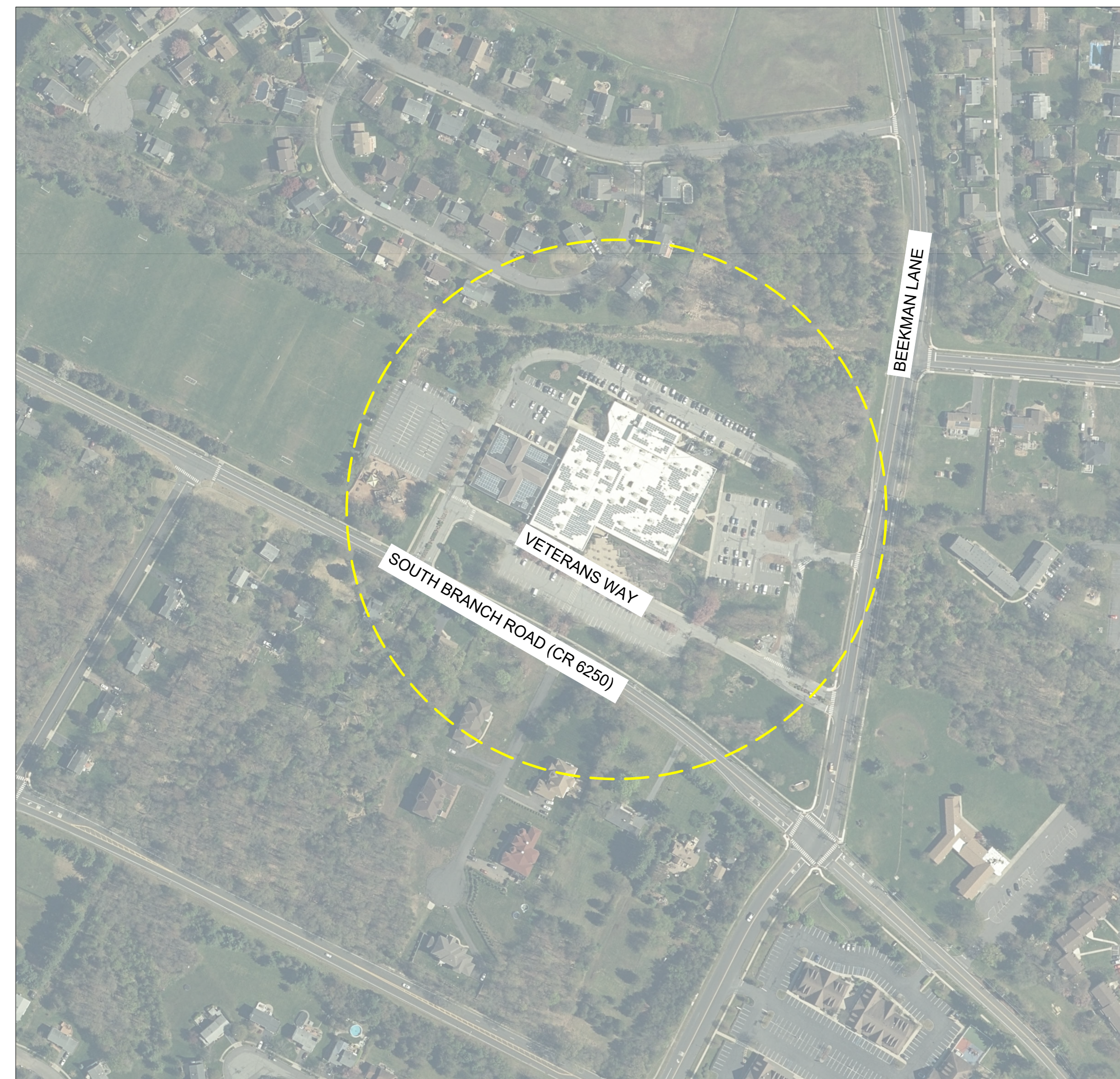
PROJECT DESCRIPTION:

STORM WATER RUNOFF WILL BE CAPTURED AND TREATED BY VARIOUS GREEN INFRASTRUCTURE SYSTEMS THROUGHOUT THE DEVELOPMENT. RUNOFF FROM THE BUILDING'S ROOFS AND ROADS (79,315 S.F.) WILL BE DIRECTED INTO RAIN GARDENS (13,695 S.F.) WHERE IT WILL BE CAPTURED, FILTERED AND INFILTRATED. PARKING SPACES AND ROADS WILL BE CONVERTED INTO PERVIOUS PAVEMENT (59,878 S.F.) AND UNDERGROUND STORAGE (84,754 S.F.) TO CAPTURE AND INFILTRATE ADDITIONAL RUNOFF FROM THE ROAD AND ROOFS (263,034 S.F.).

LIST OF DRAWINGS:

SHEET NAME	TITLE
COVER	COVER SHEET
P-1	EXISTING CONDITIONS AND DEMOLITION PLAN
P-2	PROPOSED CONCEPTUAL SITE PLAN OVERVIEW
P-4	PROPOSED CONCEPTUAL SITE PLAN DA 1 & 2
P-5	PROPOSED CONCEPTUAL SITE PLAN DA 3
P-6	PROPOSED CONCEPTUAL SITE PLAN DA 4 & 5
P-7	PROPOSED CONCEPTUAL SITE PLAN DA 6
DT-1	RAIN GARDEN DETAILS
DT-2	UNDERGROUND STORAGE DETAILS
DT-3	POROUS PAVEMENT DETAILS

LOCATION MAP (N.T.S.):



LEGEND:

	EXISTING DRAINAGE AREA
	EDGE OF PAVEMENT
	EXISTING CENTERLINE
	EXISTING FENCE
	EXISTING TREELINE
	EXISTING TREE/SHRUB
	EXISTING BUILDING
	EXISTING UTILITY POLE
	EXISTING LIGHT POLE
	EXISTING CATCH BASIN
	EXISTING CONTOURS
	EXISTING SPOT ELEVATIONS
<small>SPOT ELEVATION CODES: BL - BUILDING LINE GS - GROUND SHOT CB - CATCH BASIN MH - MANHOLE EP - EDGE OF PAVEMENT SW - SIDEWALK F - FENCE UP - UTILITY POLE</small>	
	LIMIT OF WORK
	LIMIT OF DISTURBANCE
	PROPERTY LINES
	PROPOSED GREEN INFRASTRUCTURE
	PROPOSED POROUS ASPHALT
	PROPOSED TREE
	PROPOSED TOP OF BERM
	PROPOSED CONTOURS
	PROPOSED SPOT ELEVATIONS
<small>SPOT ELEVATION CODES: G - GROUND SHOT CH - SWALE CHANNEL TOB - TOP OF BERM TC - TOP OF CURB</small>	

GENERAL NOTES:

- ELEVATION DATA OBTAINED FROM NOAA DIGITAL COASTAL LIDAR. ELEVATION ARE HEIGHT ABOVE MEAN SEA LEVEL SET BY NAVD 1988.
- EXISTING SOILS ARE PENN SILT LOAM AND LANSDOWNE SILT LOAM WHICH ARE CLASSIFIED AS HYDROLOGIC SOIL GROUP C WHICH HAVE POOR INFILTRATION RATES BASED ON THE NRCS WEB SOIL SURVEY (websoilsurvey.sc.egov.usda.gov). INFILTRATION TEST NEEDS TO BE CONDUCTED TO CONFIRM ADEQUATE INFILTRATION.
- ANY OVERHEAD AND UNDERGROUND UTILITIES SHOWN ARE FROM FIELD OBSERVATIONS AND ARE NOT A COMPLETE REPRESENTATION. A UTILITY MARKOUT NEEDS TO BE CONDUCTED PRIOR TO MOBILIZATION BY THOSE RESPONSIBLE FOR EXCAVATION. NJ ONE CALL: 811 OR 800-272-1000

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
PROFESSIONAL ENGINEER - NJ LICENSE # 37532

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PLAN REVISIONS

No.	DATE	DESCRIPTION
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HILLSBOROUGH MUNICIPAL COMPLEX
GREEN INFRASTRUCTURE IMPLEMENTATION PROJECT
379 SOUTH BRANCH ROAD, HILLSBOROUGH TOWNSHIP
SOMERSET COUNTY, NJ

COVER SHEET

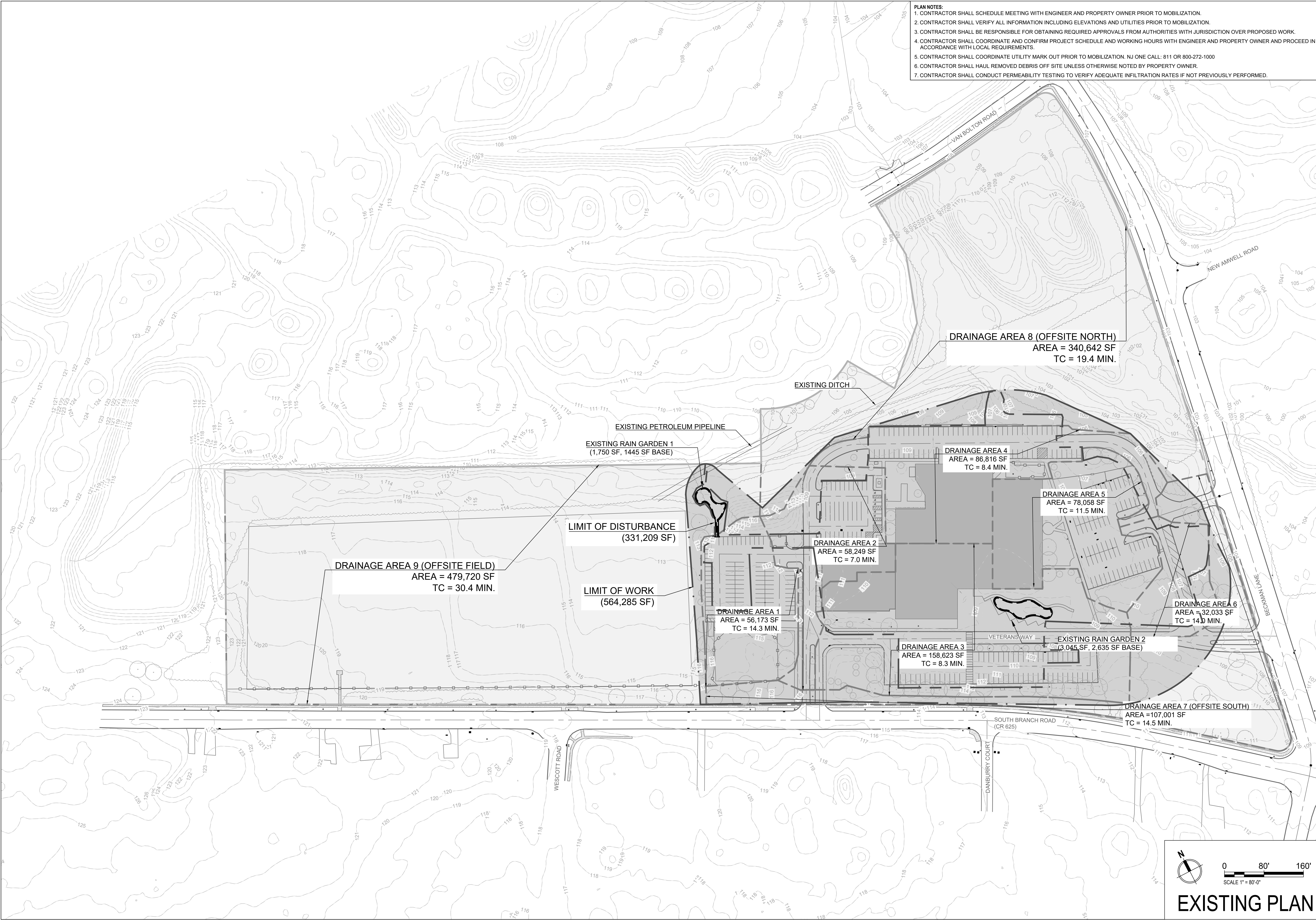
RUTGERS
New Jersey Agricultural
Experiment Station

14 COLLEGE FARM ROAD, NEW BRUNSWICK, NJ

SHEET NAME
COVER

PLAN REVISIONS		
REV. DATE	REV. SUMMARY	REV. SHEETS

- PLAN NOTES:**
1. CONTRACTOR SHALL SCHEDULE MEETING WITH ENGINEER AND PROPERTY OWNER PRIOR TO MOBILIZATION.
 2. CONTRACTOR SHALL VERIFY ALL INFORMATION INCLUDING ELEVATIONS AND UTILITIES PRIOR TO MOBILIZATION.
 3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING REQUIRED APPROVALS FROM AUTHORITIES WITH JURISDICTION OVER PROPOSED WORK.
 4. CONTRACTOR SHALL COORDINATE AND CONFIRM PROJECT SCHEDULE AND WORKING HOURS WITH ENGINEER AND PROPERTY OWNER AND PROCEED IN ACCORDANCE WITH LOCAL REQUIREMENTS.
 5. CONTRACTOR SHALL COORDINATE UTILITY MARK OUT PRIOR TO MOBILIZATION. NJ ONE CALL: 811 OR 800-272-1000
 6. CONTRACTOR SHALL HAUL REMOVED DEBRIS OFF SITE UNLESS OTHERWISE NOTED BY PROPERTY OWNER.
 7. CONTRACTOR SHALL CONDUCT PERMEABILITY TESTING TO VERIFY ADEQUATE INFILTRATION RATES IF NOT PREVIOUSLY PERFORMED.



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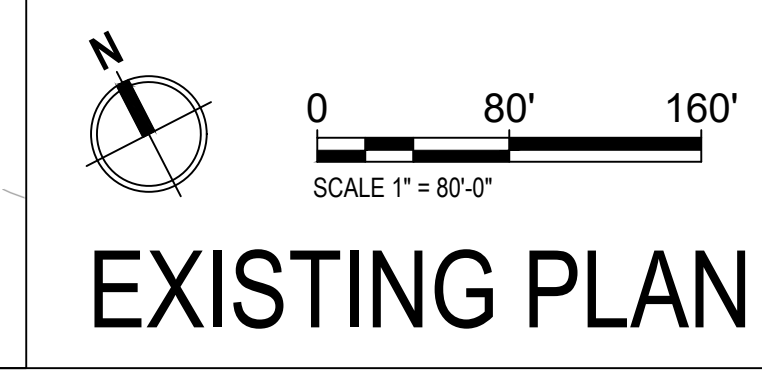
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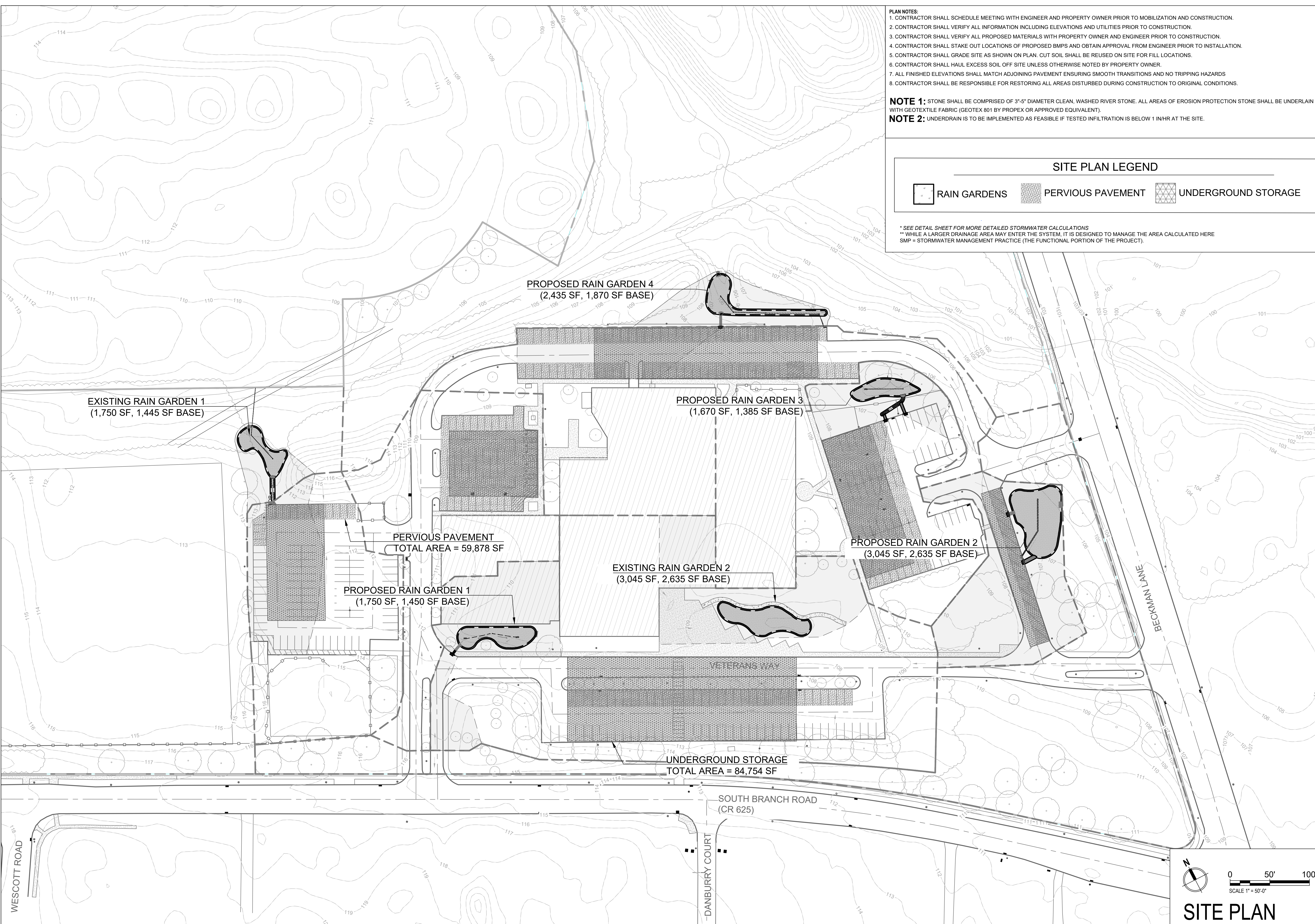
SHEET NAME
 P-1



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06/20/24	06/20/24	06/20/24

PLAN REVISIONS	DESCRIPTION
No.	DATE

EXISTING CONDITIONS AND DEMOLITION PLAN



- PLAN NOTES:**
1. CONTRACTOR SHALL SCHEDULE MEETING WITH ENGINEER AND PROPERTY OWNER PRIOR TO MOBILIZATION AND CONSTRUCTION.
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 3. CONTRACTOR SHALL VERIFY ALL PROPOSED MATERIALS WITH PROPERTY OWNER AND ENGINEER PRIOR TO CONSTRUCTION.
 4. CONTRACTOR SHALL STAKE OUT LOCATIONS OF PROPOSED BMPs AND OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLATION.
 5. CONTRACTOR SHALL GRADE SITE AS SHOWN ON PLAN. CUT SOIL SHALL BE REUSED ON SITE FOR FILL LOCATIONS.
 6. CONTRACTOR SHALL HAUL EXCESS SOIL OFF SITE UNLESS OTHERWISE NOTED BY PROPERTY OWNER.
 7. ALL FINISHED ELEVATIONS SHALL MATCH ADJOINING PAVEMENT ENSURING SMOOTH TRANSITIONS AND NO TRIPPING HAZARDS
 8. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL AREAS DISTURBED DURING CONSTRUCTION TO ORIGINAL CONDITIONS.

NOTE 1: STONE SHALL BE COMPRISED OF 3"-5" DIAMETER CLEAN, WASHED RIVER STONE. ALL AREAS OF EROSION PROTECTION STONE SHALL BE UNDERLAIN WITH GEOTEXTILE FABRIC (GEOTEX 801 BY PROPEX OR APPROVED EQUIVALENT).

NOTE 2: UNDERDRAIN IS TO BE IMPLEMENTED AS FEASIBLE IF TESTED INFILTRATION IS BELOW 1 IN/HR AT THE SITE.

SITE PLAN LEGEND

RAIN GARDENS
 PERVIOUS PAVEMENT
 UNDERGROUND STORAGE

* SEE DETAIL SHEET FOR MORE DETAILED STORMWATER CALCULATIONS
 ** WHILE A LARGER DRAINAGE AREA MAY ENTER THE SYSTEM, IT IS DESIGNED TO MANAGE THE AREA CALCULATED HERE
 SMP = STORMWATER MANAGEMENT PRACTICE (THE FUNCTIONAL PORTION OF THE PROJECT).

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PLAN REVISIONS

No.	DATE	DESCRIPTION

DRAFT

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 379 SOUTH BRANCH ROAD, HILLSBOROUGH TOWNSHIP
 SOMERSET COUNTY, NJ

PROPOSED CONCEPTUAL SITE PLAN OVERVIEW

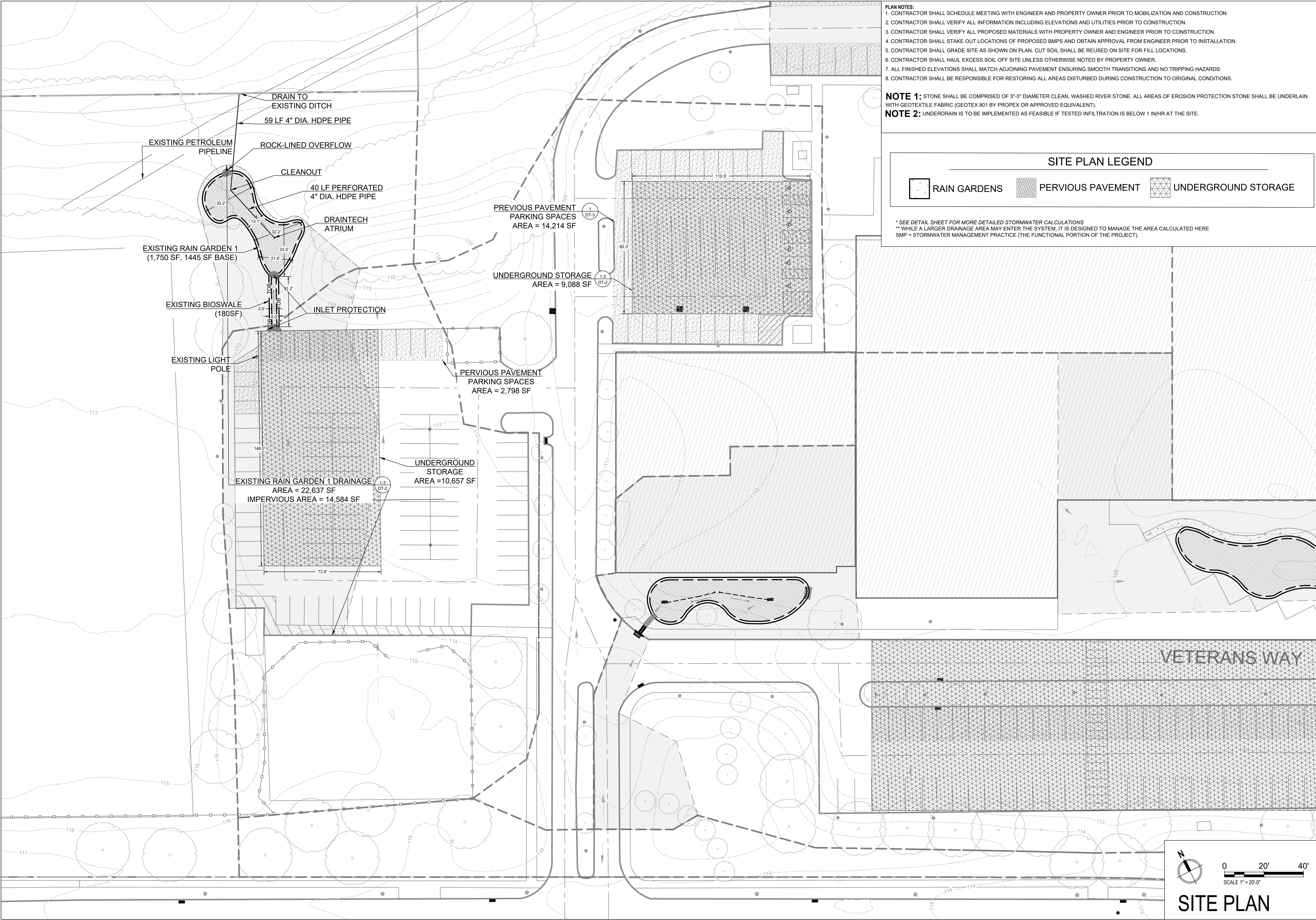
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14 COLLEGE FARM ROAD, NEW BRUNSWICK, NJ

SHEET NAME
 P-2

0 50' 100'
 SCALE 1" = 50'-0"

SITE PLAN



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SITE PLAN LEGEND

- RAIN GARDENS
- PERVIOUS PAVEMENT
- UNDERGROUND STORAGE

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PLAN REVISIONS

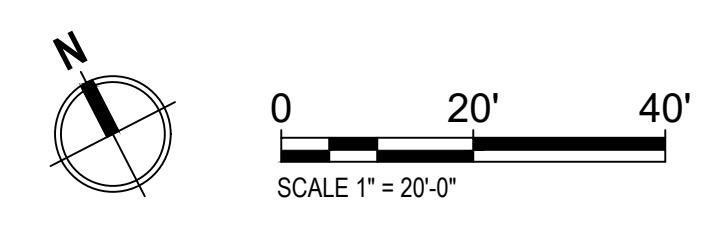
No.	DATE	DESCRIPTION

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 SOMERSET COUNTY, NJ

PROPOSED CONCEPTUAL SITE PLAN DA 1 & 2

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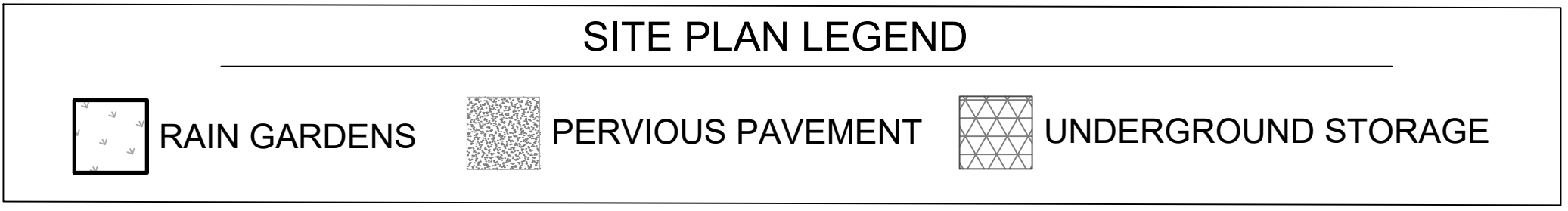
SITE PLAN

SHEET NAME
 P-3

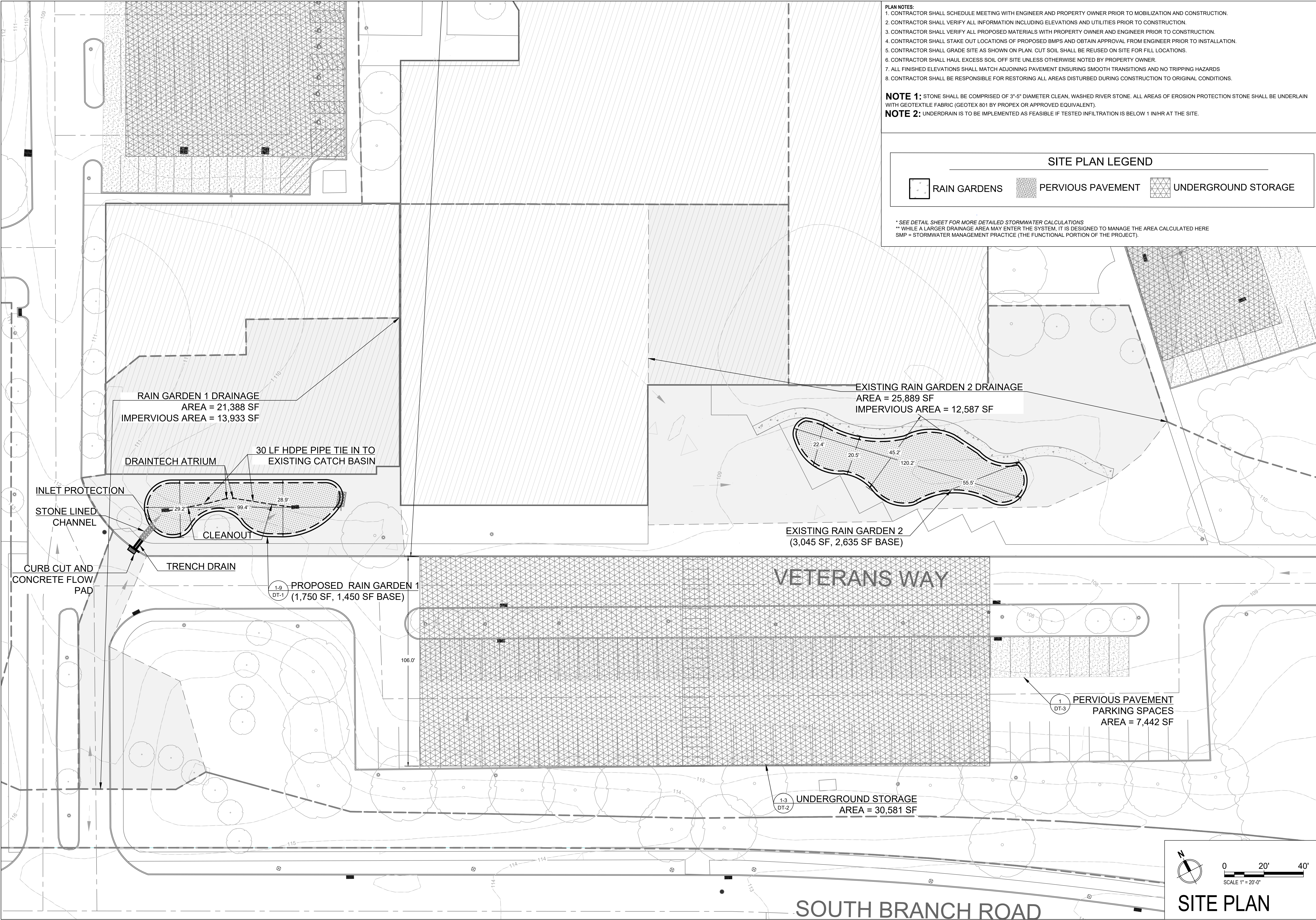
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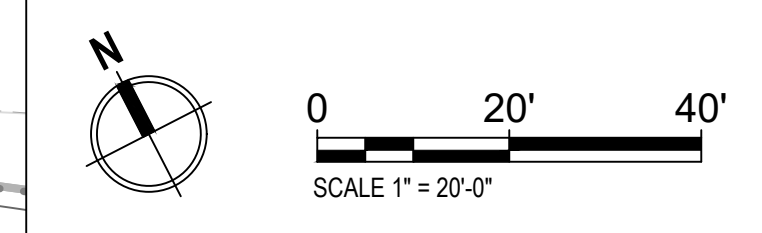
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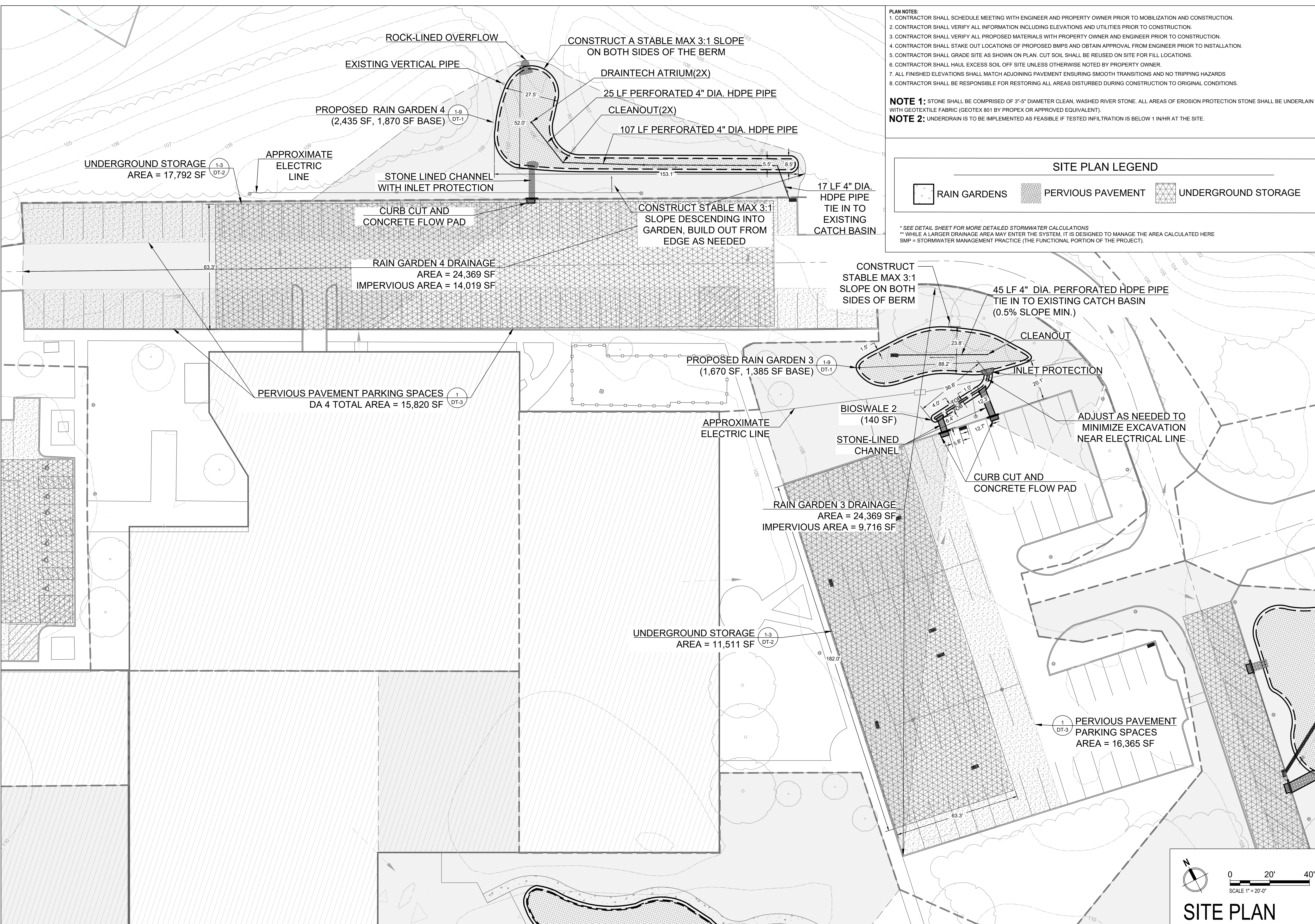
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SHEET NAME
 P-4



SITE PLAN

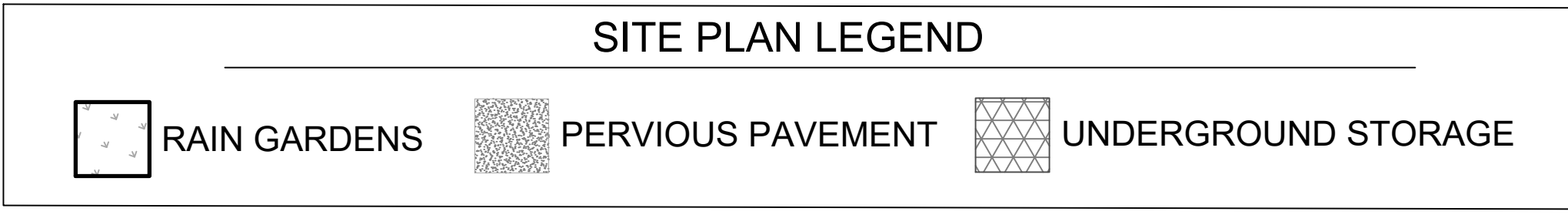


PLAN NOTES:

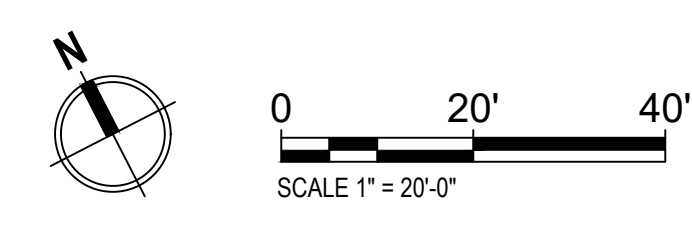
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SITE PLAN

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
 PROFESSIONAL ENGINEER - NJ LICENSE # 37532

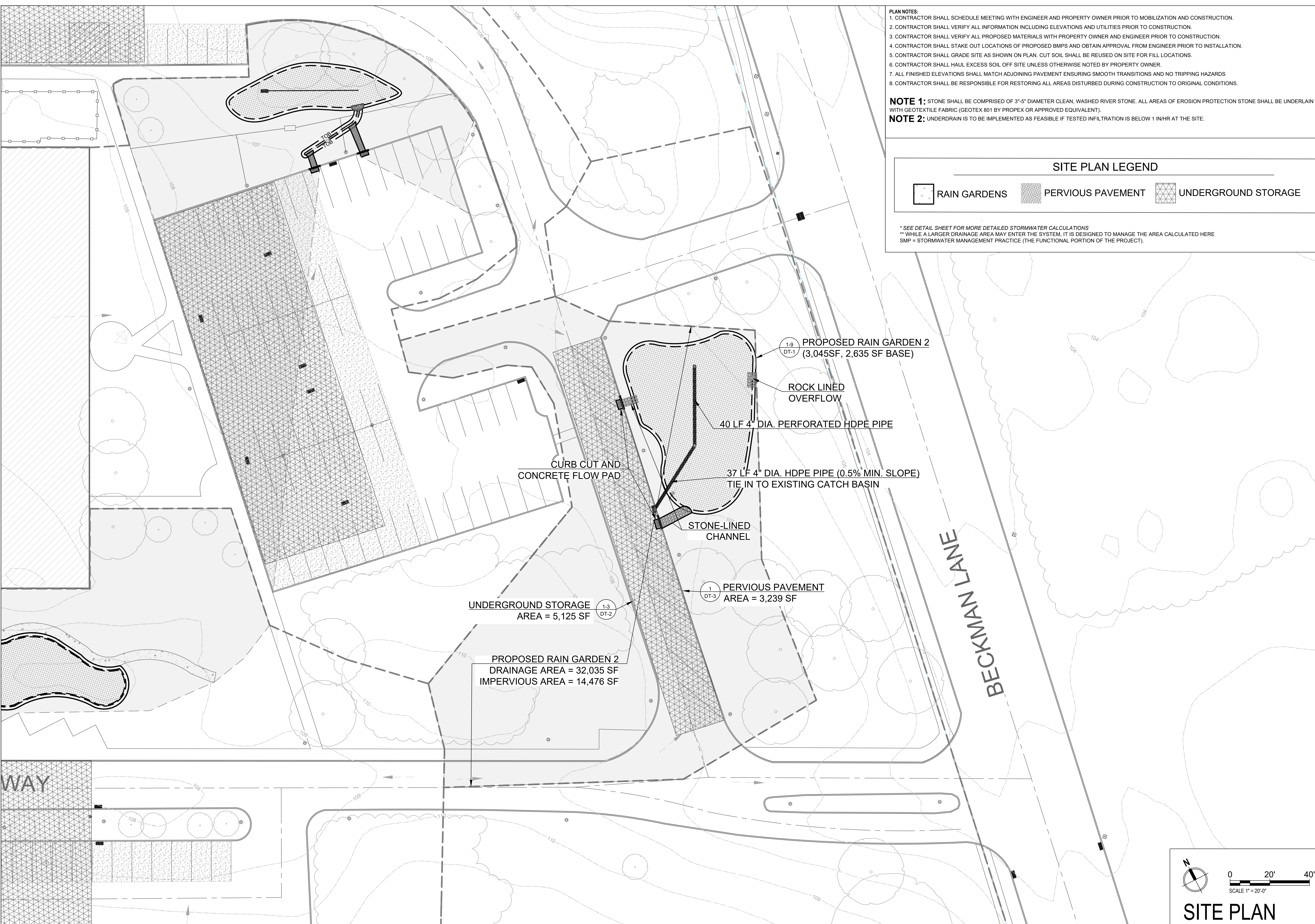
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HILLSBOROUGH MUNICIPAL COMPLEX
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 SOMERSET COUNTY, NJ

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14 COLLEGE FARM ROAD, NEW BRUNSWICK, NJ
 SHEET NAME
 P-5

DATE	XX/XX/XX
APPROVED	CCO
CHECKED	WAL
DRAWN	WAW
DATE	06/20/24



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SITE PLAN LEGEND

RAIN GARDENS	PERVIOUS PAVEMENT	UNDERGROUND STORAGE
--------------	-------------------	---------------------

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PROPOSED RAIN GARDEN 2
 (3,045SF, 2,635 SF BASE)

ROCK LINED OVERFLOW

40 LF 4" DIA. PERFORATED HDPE PIPE

37 LF 4" DIA. HDPE PIPE (0.5% MIN. SLOPE)
 TIE IN TO EXISTING CATCH BASIN

STONE-LINED CHANNEL

PERVIOUS PAVEMENT AREA = 3,239 SF

UNDERGROUND STORAGE AREA = 5,125 SF

PROPOSED RAIN GARDEN 2
 DRAINAGE AREA = 32,035 SF
 IMPERVIOUS AREA = 14,476 SF

CURB CUT AND CONCRETE FLOW PAD

SITE PLAN

SCALE 1" = 20'-0"

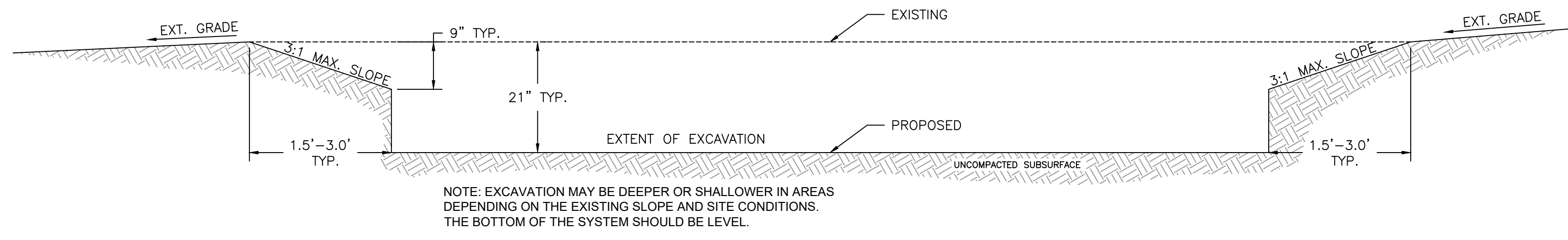
0 20' 40'

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
 PROFESSIONAL ENGINEER - NJ LICENSE # 37532
 DATE: 08/20/24
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 CHECKED: JAL
 DRAWN: JAV
 DATE: XXXXXX
 08/20/24

PLAN REVISIONS
 No. DATE DESCRIPTION
DRAFT

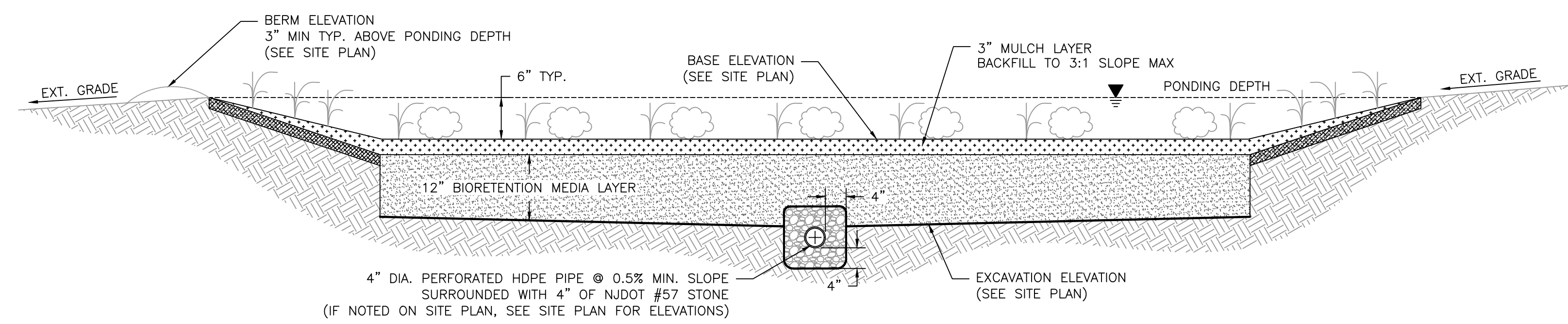
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 PROPOSED CONCEPTUAL SITE PLAN DA 6

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 P-6

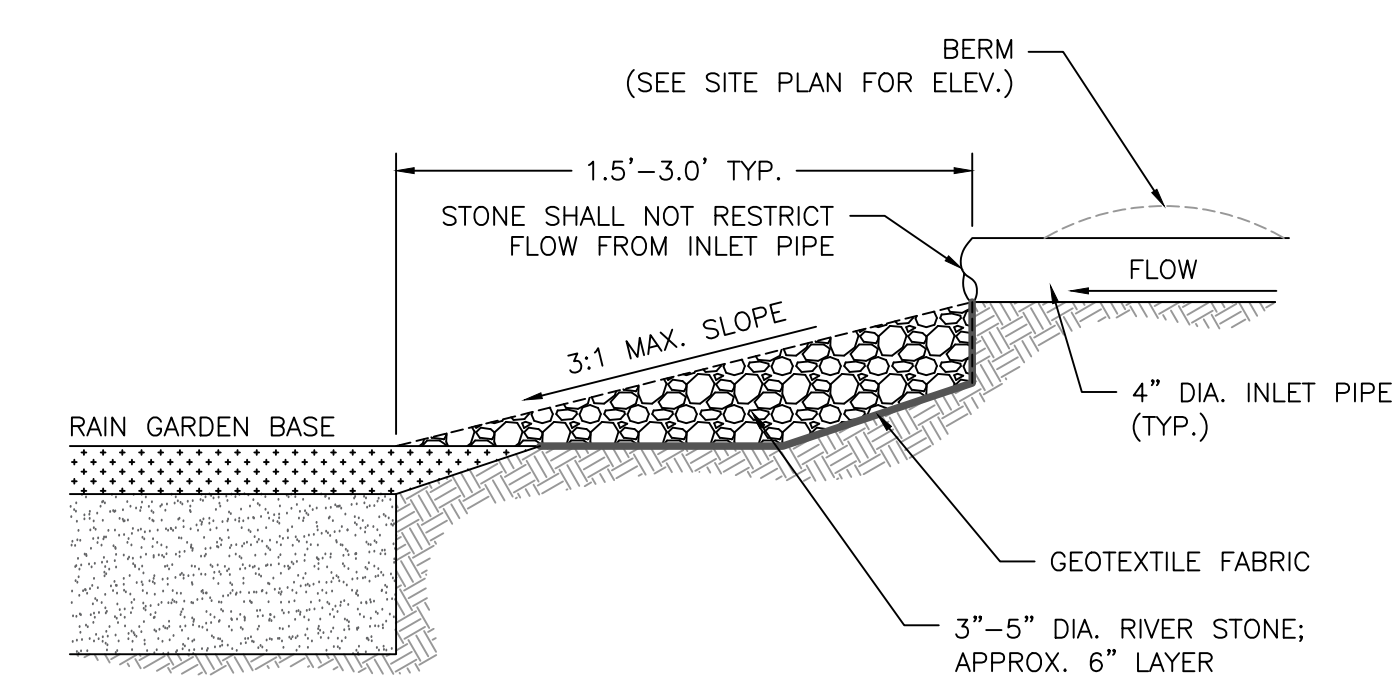


NOTE: EXCAVATION MAY BE DEEPER OR SHALLOWER IN AREAS DEPENDING ON THE EXISTING SLOPE AND SITE CONDITIONS. THE BOTTOM OF THE SYSTEM SHOULD BE LEVEL.

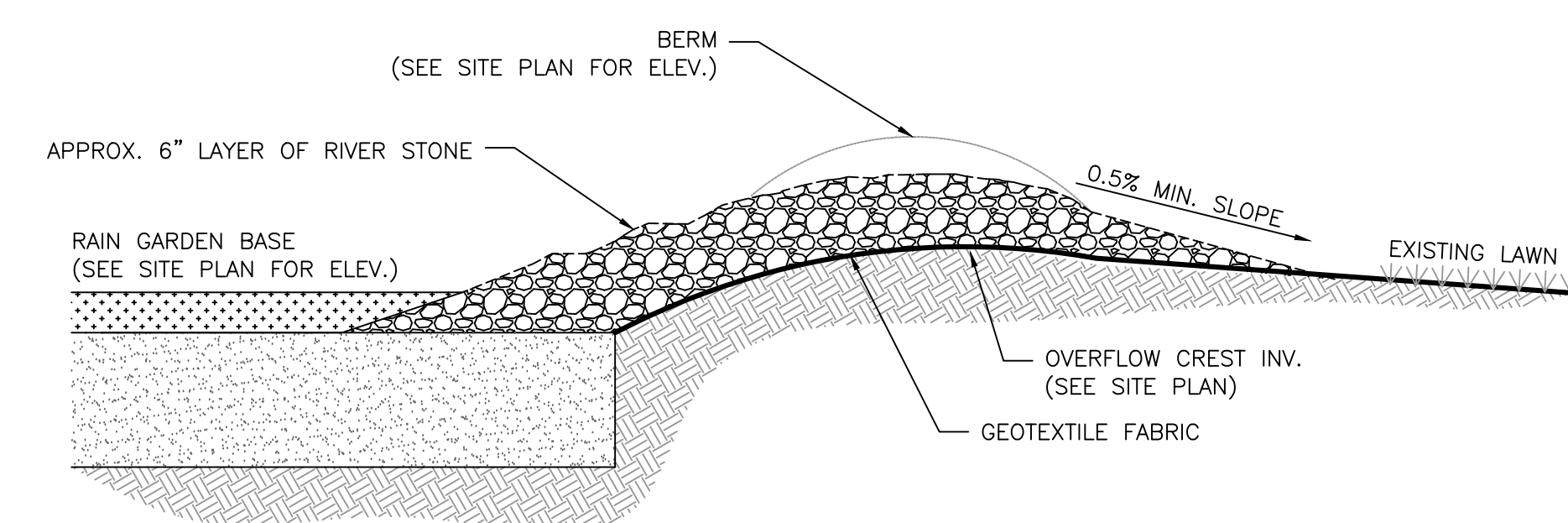
1 RAIN GARDEN EXCAVATION SECTION
DT-1 N.T.S.



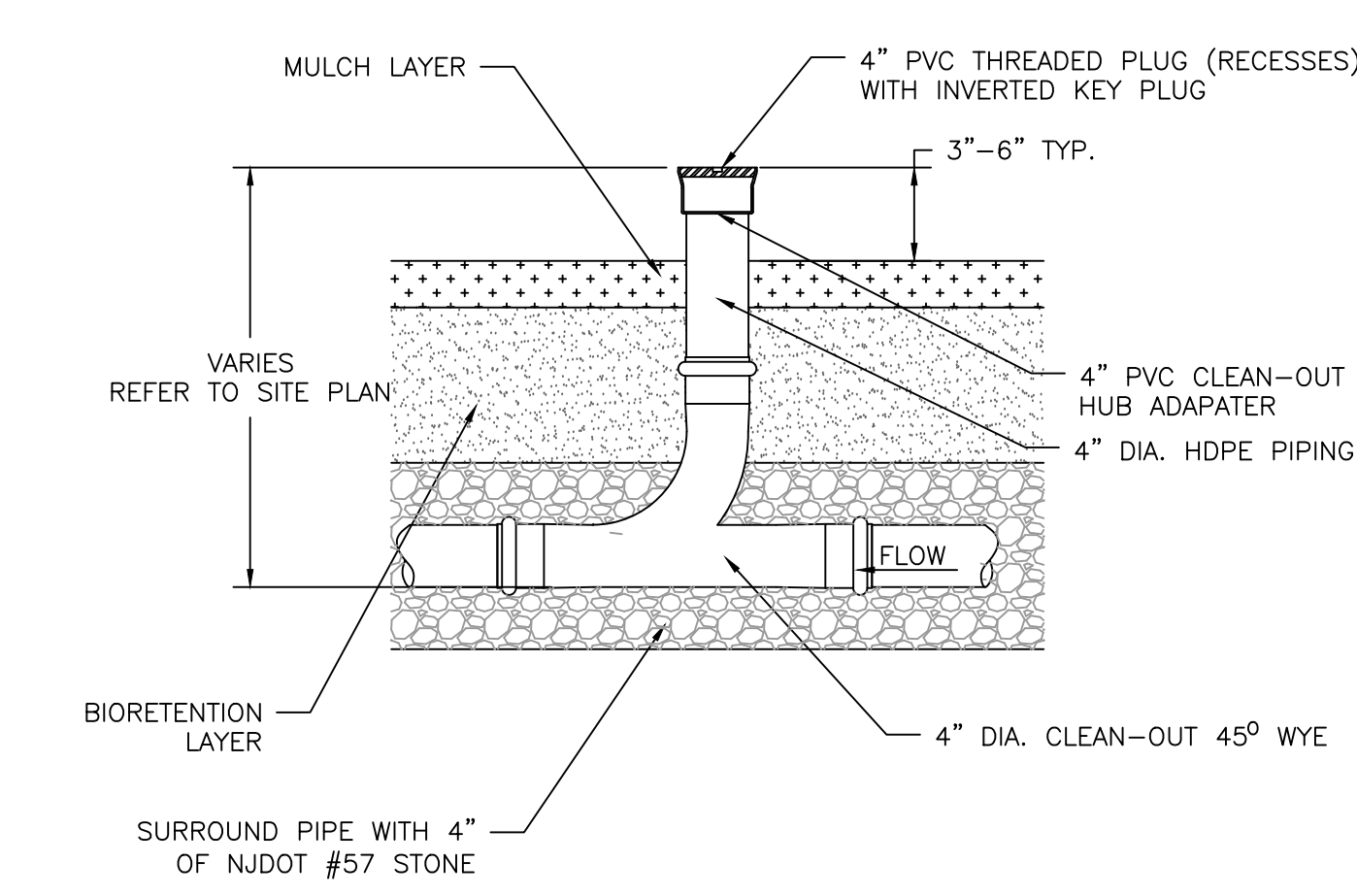
2 RAIN GARDEN CROSS-SECTION
DT-1 N.T.S.



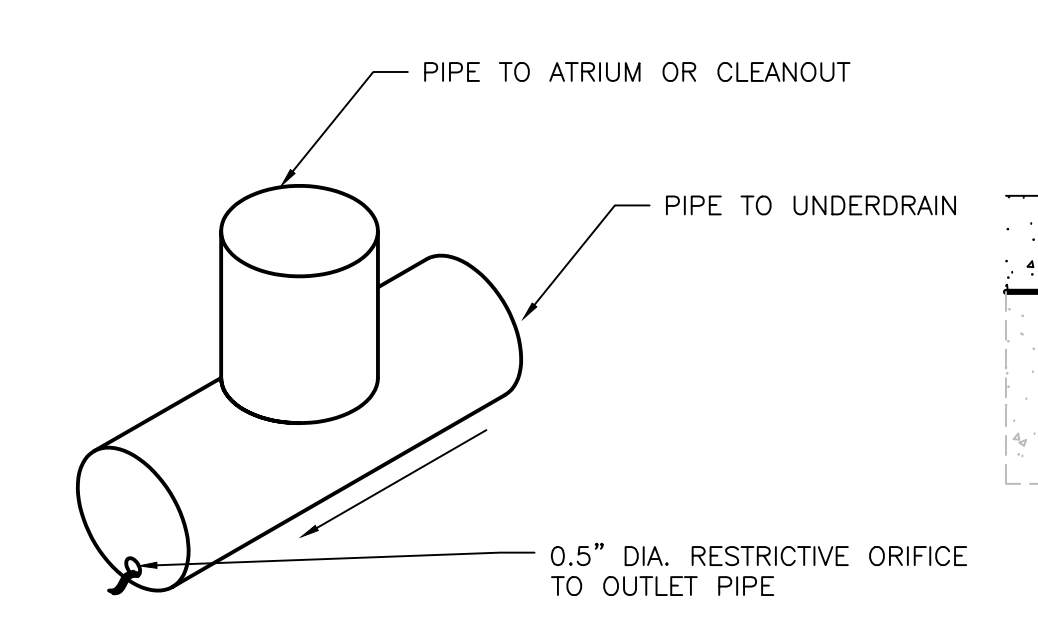
3 INLET PROTECTION CROSS-SECTION
DT-1 N.T.S.



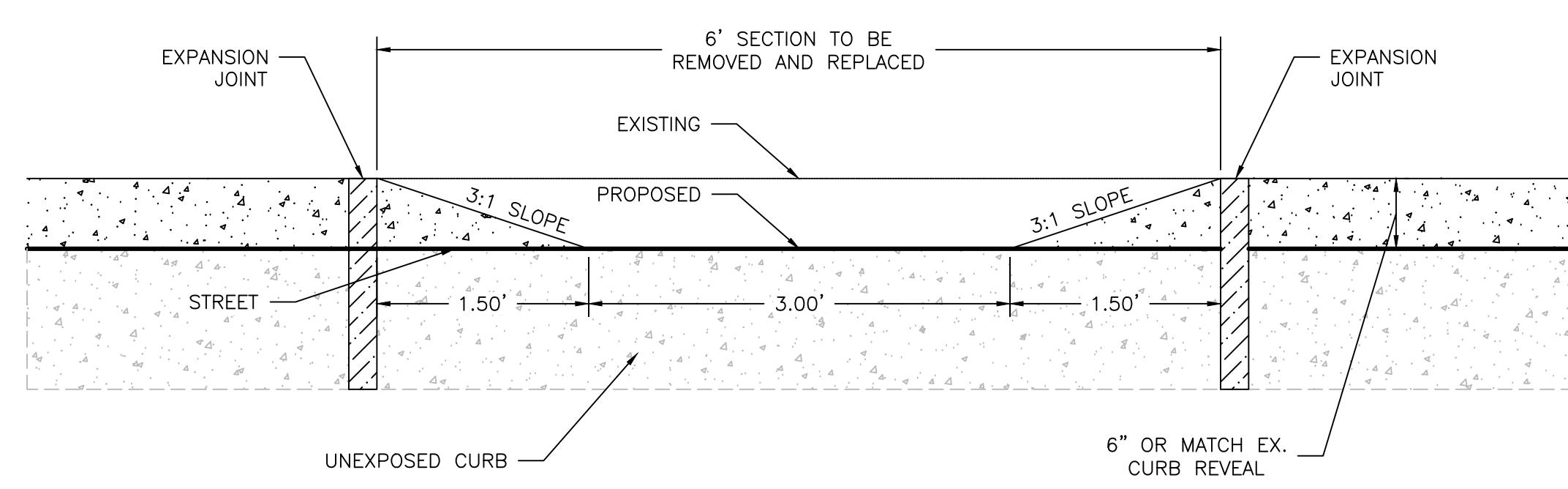
4 ROCK-LINED OVERFLOW DETAIL
DT-1 N.T.S.



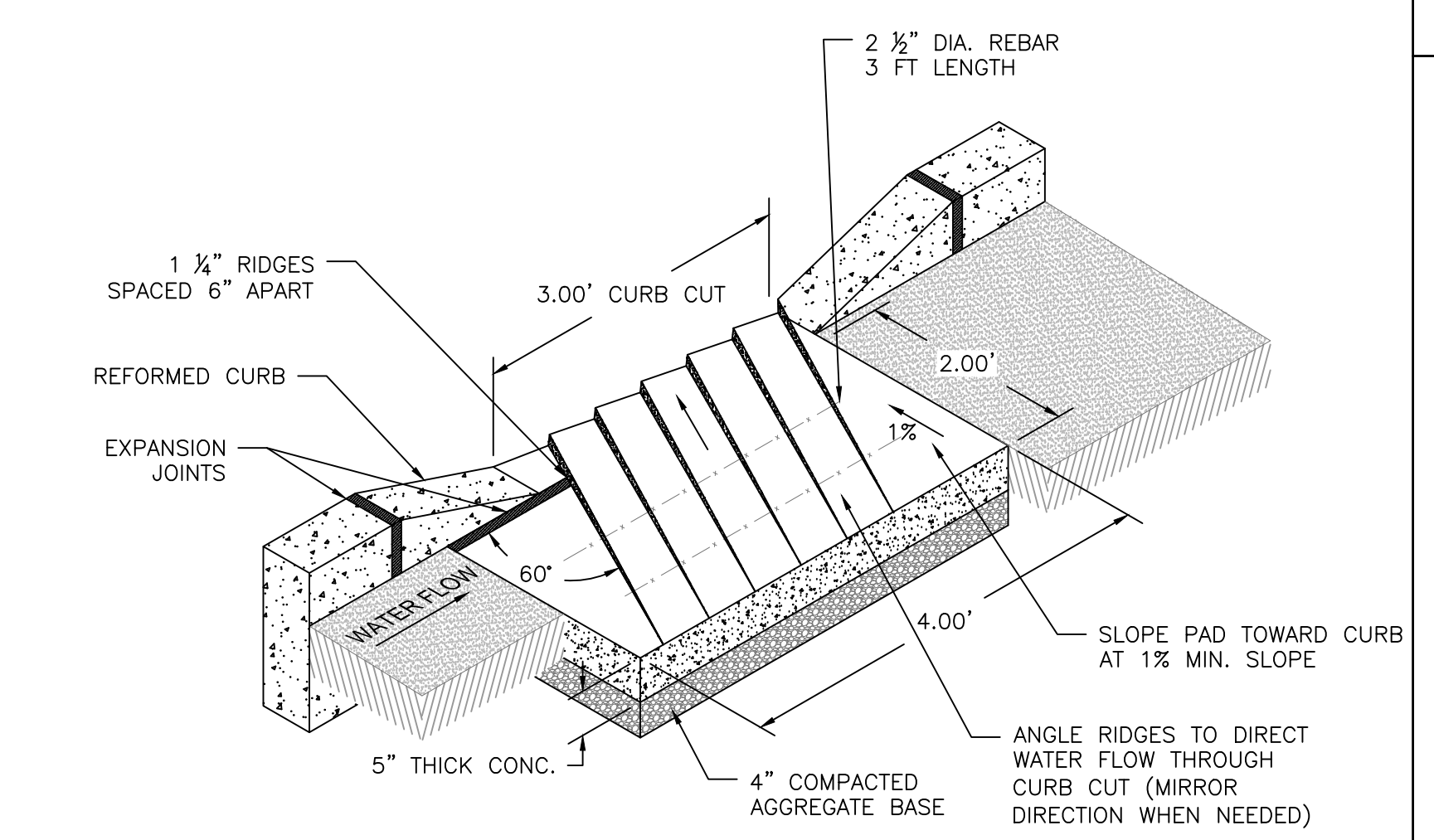
6 CLEAN OUT DETAIL
DT-1 N.T.S.



7 RESTRICTIVE ORIFICE DETAIL
DT-1 N.T.S.



8 CURB CUT CROSS-SECTION
DT-1 N.T.S.



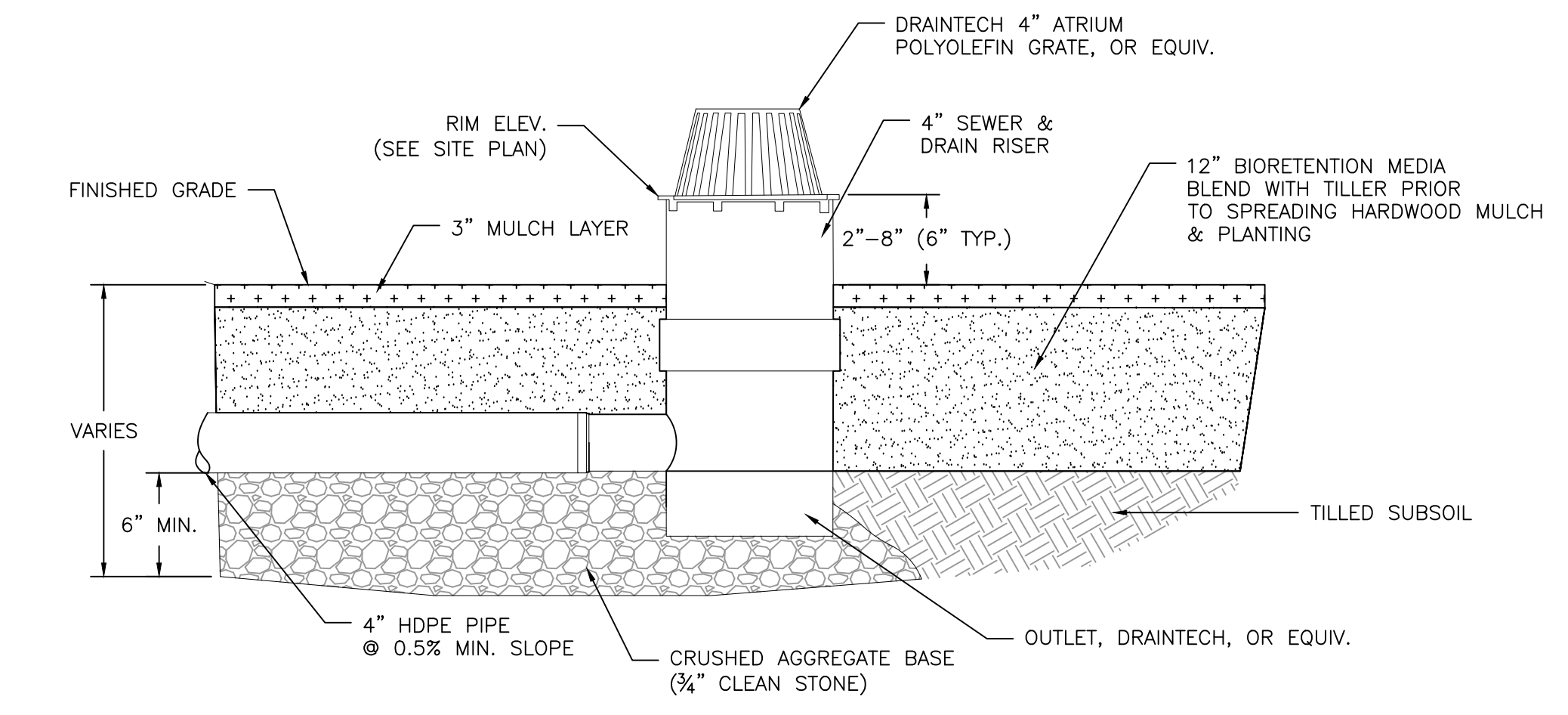
9 CONCRETE FLOW PAD DETAIL
DT-1 N.T.S.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL INFORMATION PRIOR TO EXCAVATION INCLUDING ELEVATIONS AND LOCATIONS OF EXISTING UTILITIES.
2. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF ANY FIELD CONDITIONS DIFFER MATERIALLY FROM THOSE REPRESENTED ON THESE DRAWINGS AND THE SPECIFICATIONS OR IF, IN THE CONTRACTOR'S OPINION, SAID CONDITIONS CONFLICT WITH THE DESIGNS SHOWN HEREON.
3. THE ENGINEER SHALL INSPECT ALL PLANTING BED AREAS BEFORE MULCHING TO ENSURE THAT ADEQUATE DRAINAGE EXISTS. IF ANY AREAS TO BE MULCHED SHOW EVIDENCE OF POOR DRAINAGE, THE CONTRACTOR SHALL TAKE CORRECTIVE ACTION.
4. THE CONTRACTOR SHALL AVOID DISTURBING ALL EXISTING TREES. ANY DISTURBANCE TO TREES OR TREE ROOTS MUST BE COORDINATED WITH THE PROPERTY OWNER.
5. DIMENSIONS AND SHAPE WILL VARY, REFER TO SITE PLAN.
6. RIVER STONE PROTECTION DIMENSIONS ARE TYPICAL AND MAY VARY PER SITE. CONSULT THE ENGINEER AND SITE PLAN FOR DIMENSIONS ON A PER SITE BASIS.
7. RIVER STONE PROTECTION SHALL SLOPE TO RAIN GARDEN BASE.
8. REFER TO SITE PLAN TO DETERMINE OUTLET TYPE (ROCK-LINED OVERFLOW OR DRAINTech RISER).
9. REFER TO SITE PLAN FOR ALL ELEVATIONS AND INVERTS.
10. THE CONTRACTOR SHALL EXCAVATE 15" LOWER THAN THE BASE ELEVATION SHOWN ON THE SITE PLANS. THE SLOPES OF THE RAIN GARDEN SHALL BE AT A 3:1 MAXIMUM.
11. THE SUBGRADE OF THE RAIN GARDEN SHALL BE LEVEL TO ENSURE PROPER DRAINAGE. CONTRACTOR SHALL OBTAIN ENGINEER APPROVAL PRIOR TO BACKFILLING WITH 12" OF BIORETENTION MEDIA.
12. THE CONTRACTOR SHALL INSTALL OVERFLOW IF SPECIFIED IN SITE PLANS PRIOR TO BACKFILLING WITH BIORETENTION MEDIA.
13. THE BIORETENTION LAYER SHALL BE LEVEL TO ENSURE PROPER DRAINAGE. CONTRACTOR SHALL OBTAIN ENGINEER APPROVAL PRIOR TO SPREADING MULCH AND PLANTING.
14. INLET AND OUTLET PROTECTION SHALL BE UNDERLAIN WITH GEOTEXTILE FABRIC.
15. INLETS AND OUTLETS SHALL NOT INHIBIT THE FLOW OF WATER FROM THE STREET. THE RIVER STONE SHALL BE PLACED BELOW THE BOTTOM OF THE PIPE.
16. THE CONTRACTOR SHALL TILL THE BERM SECTION AND BACKFILL WITH TOPSOIL.
17. ALL DISTURBED AREAS EXCLUSIVE OF RAIN GARDEN AND SLOPED BERM SHALL BE RESTORED TO ORIGINAL CONDITIONS BY CONTRACTOR.
18. THE CONTRACTOR SHALL HAVE A PRE-CONSTRUCTION MEETING WITH THE PROJECT ENGINEER PRIOR TO ANY WORK ON SITE.
19. CONTRACTOR SHALL PERFORM REQUIRED TESTING TO DETERMINE SOIL PERMEABILITY AND SEASONAL HIGH WATER TABLE ELEVATION AT THE SITE TO VERIFY INFILTRATION CAPABILITIES. TESTING SHALL BE DONE PRIOR TO EXCAVATION AND INSTALLATION OF THE PROPOSED PROJECTS. PROJECT ENGINEER SHALL BE PRESENT DURING TESTING AND SHALL BE INFORMED OF THE RESULTS.

SPECIFICATIONS:

1. MAX COVER OVER TOP OF PIPES IS 4 FT. CONTACT ADS IF OTHERWISE GREATER.
2. THE APPROVAL OF MATERIALS AND MIXING OF SAND, COMPOST, AND SOIL SHALL BE DONE UNDER THE SUPERVISION OF THE PROJECT ENGINEER/LANDSCAPE ARCHITECT.
3. THE SOIL BED MATERIAL MUST CONSIST OF THE FOLLOWING MIX, BY WEIGHT: 85 TO 95% SAND, WITH NO MORE THAN 25% OF THE SAND AS FINE OR VERY FINE SANDS; NO MORE THAN 15% SILT AND CLAY WITH 2% TO 5% CLAY CONTENT. THE ENTIRE MIX MUST THEN BE AMENDED WITH 3 TO 7% ORGANICS, BY WEIGHT.
4. BIORETENTION MEDIA MAY BE CREATED WITH A 70% SAND AND 30% COMPOST MIXTURE IF IT CONFORMS TO THE ABOVE. SAND SHALL AT THE MINIMUM CONFORM TO THE SIEVE ANALYSIS FOR CONCRETE AGGREGATE SAND (ASTM C-33). USGA TEE/GREEN SIEVE GRADATION MIX IS PREFERABLE WHERE AVAILABLE.
5. UNDERLYING SOILS SHALL BE TILLED/SCARIFIED PRIOR TO SPREADING/MIXING OF BIORETENTION MEDIA.
6. ALL BIORETENTION MEDIA SHALL BE PLACED FROM THE SIDES OF THE FACILITIES, AND IN NO EVENT SHALL ANY TRACKED OR WHEELED EQUIPMENT BE PERMITTED TO CROSS THE RAIN GARDEN.
7. RAIN GARDEN SHALL BE CONSTRUCTED TO DIMENSIONS INDICATED ON THE SITE PLAN.
8. 3-5 INCH DELAWARE RIVER STONE SHALL BE USED FOR STONE CHANNEL AND INLET/OUTLET PROTECTION.
9. NON-DYED, TRIPLE-SHREDDED HARDWOOD MULCH SHALL BE USED.
10. PLANTING OF RAIN GARDEN AND SLOPED BERM SHALL BE COMPLETED AS INDICATED ON THE SITE PLAN.
11. THE CONTRACTOR SHALL PERFORM ALL WORK IN CONFORMANCE WITH THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2007 OR LATEST VERSION.



5 DRAINTech OUTLET DETAIL
DT-1 N.T.S.

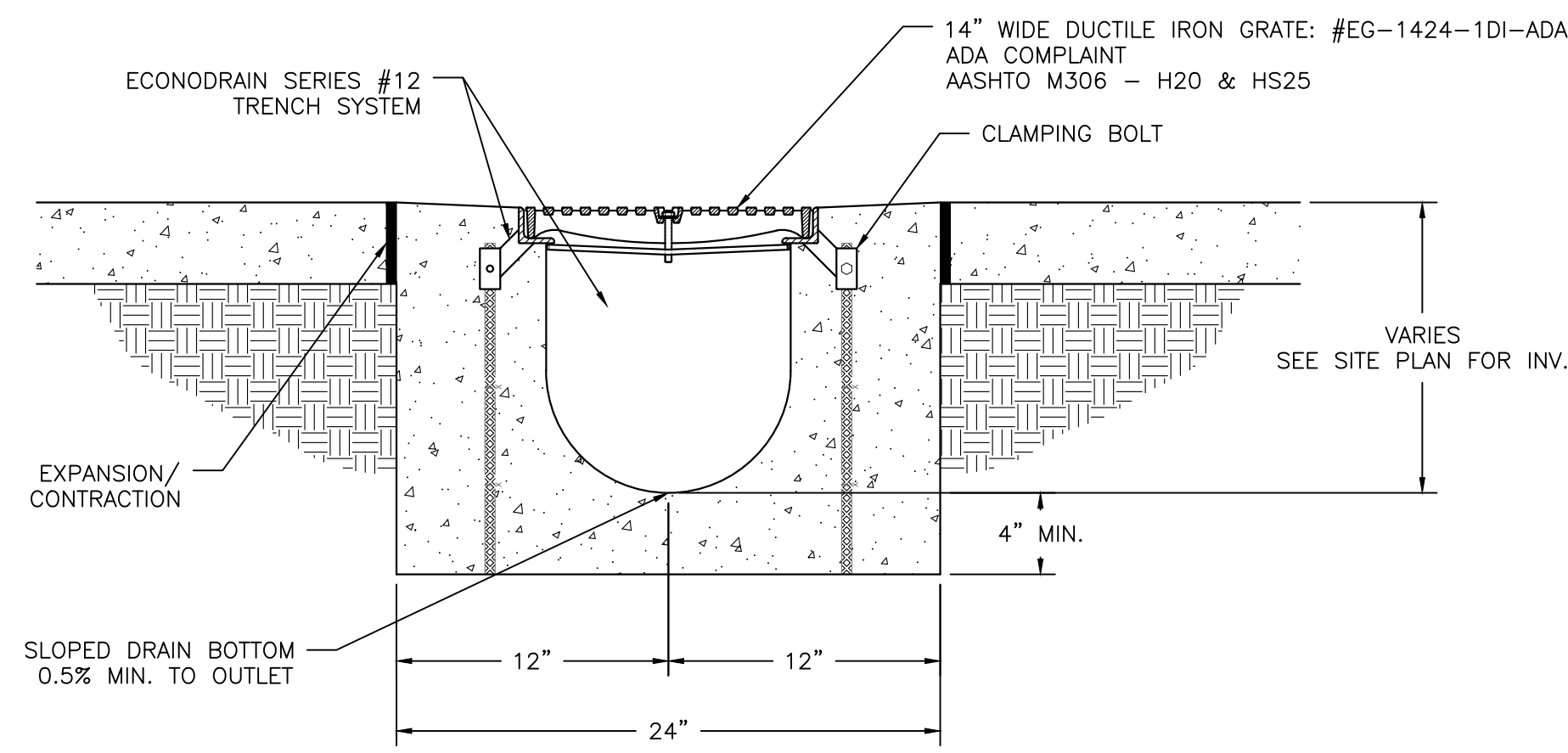
CHRISTOPHER C. OBROPTA, Ph.D., P.E.
PROFESSIONAL ENGINEER - NJ LICENSE # 97532

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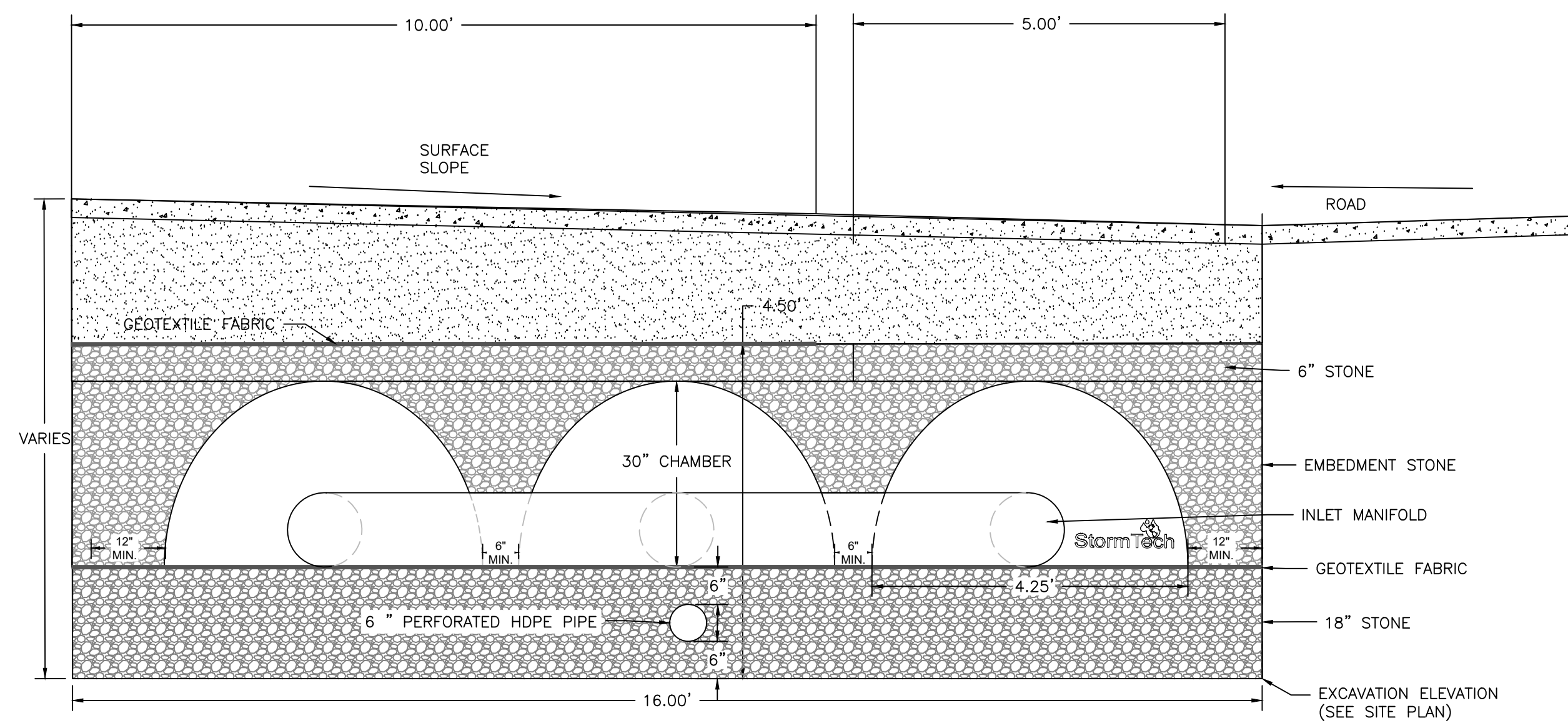
HILLSBOROUGH MUNICIPAL COMPLEX
GREEN INFRASTRUCTURE IMPLEMENTATION PROJECT
379 SOUTH BRANCH ROAD, HILLSBOROUGH TOWNSHIP
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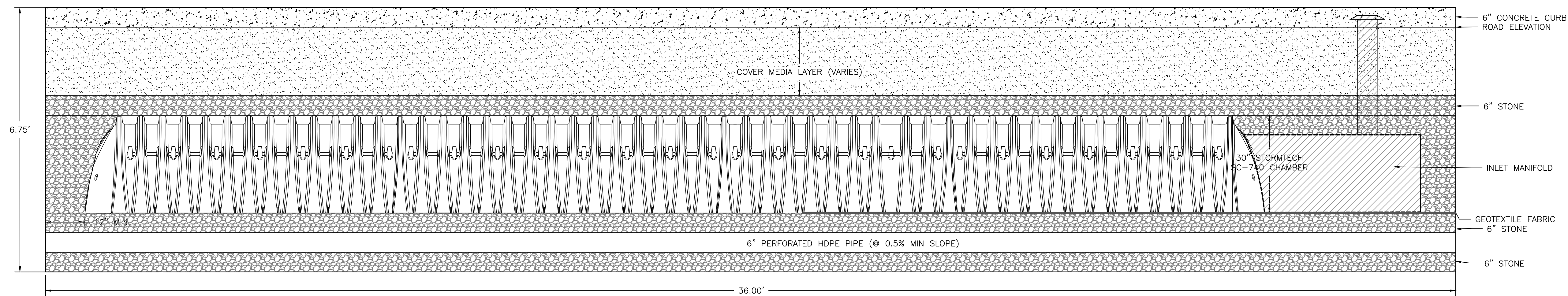
14 COLLEGE FARM ROAD, NEW BRUNSWICK, NJ
SHEET NAME
DT-1



1 TRENCH DRAIN DETAIL
DT-4 N.T.S.



2 STORMWATER PLANTER WITH STORMTECH STORAGE [A-A]
DT-4 N.T.S.



3 STORMWATER PLANTER CROSS SECTION (LONGITUDINAL) [B-B]
DT-4 N.T.S.

GENERAL CONSTRUCTION NOTES:

- REFER TO SITE PLAN FOR ALL ELEVATIONS, INVERTS, DIMENSIONS, AND SHAPE OF THE PROJECT.
- ALL WORK MUST MEET THE STANDARDS OF THE ENGINEER BEFORE PAYMENT. ADDITIONAL WORK AND TESTING WILL BE NECESSARY IF STANDARDS ARE NOT SUFFICED.
- THE APPROVAL OF MATERIALS SHALL BE DONE BY THE PROJECT ENGINEER/LANDSCAPE ARCHITECT.
- THE CONTRACTOR SHALL HAVE A PRE-CONSTRUCTION MEETING WITH THE PROJECT ENGINEER PRIOR TO ANY WORK ON SITE.
- THE CONTRACTOR SHALL VERIFY ALL INFORMATION PRIOR TO MOBILIZATION INCLUDING ELEVATIONS AND LOCATIONS OF EXISTING UTILITIES.
- THE CONTRACTOR SHALL PERFORM REQUIRED TESTING TO DETERMINE SOIL PERMEABILITY AND SEASONAL HIGH WATER TABLE ELEVATION AT THE SITE TO VERIFY INFILTRATION CAPABILITIES FOR SYSTEMS DESIGNED TO INFILTRATE. TESTING SHALL BE DONE PRIOR TO EXCAVATION AND INSTALLATION OF THE PROPOSED PROJECTS. PROJECT ENGINEER SHALL BE PRESENT DURING TESTING AND SHALL BE INFORMED OF THE RESULTS. THE TESTED INFILTRATION RATE SHALL BE AT LEAST 0.5 IN/HR OR 50 % OF THE HYDRAULIC CONDUCTIVITY (D3385).
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF ANY FIELD CONDITIONS DIFFER MATERIALLY FROM THOSE REPRESENTED ON THESE DRAWINGS AND THE SPECIFICATIONS OR IF, IN THE CONTRACTOR'S OPINION, SAID CONDITIONS CONFLICT WITH THE DESIGNS SHOWN HEREON.
- THE CONTRACTOR SHALL PERFORM ALL WORK IN CONFORMANCE WITH THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2019 OR LATEST VERSION.
- THE CONTRACTOR SHALL AVOID DISTURBING EXISTING AREAS OUTSIDE SPECIFIED LIMIT OF WORK. ANY DISTURBANCE TO SIDEWALKS, LANDSCAPED VEGETATION, AND TREES MUST BE COORDINATED WITH THE PROPERTY OWNER.
- THE CONTRACTOR IS TO RESTORE ALL DISTURBED AREAS OUTSIDE PROPOSED CHANGES TO ORIGINAL CONDITIONS AFTER INSTALLATION.
- THE CONTRACTOR SHALL HAVE ALL UTILITIES MARKED BEFORE ANY EXCAVATION. IF ANY UTILITIES INTERFERE WITH THE PROJECT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
- THE CONTRACTOR SHALL ESTABLISH ALL ELEVATIONS AND LINES AS SHOWN IN THE SITE PLAN FOR REVIEW BY THE ENGINEER BEFORE ANY CONSTRUCTION BEGINS.
- THE CONTRACTOR SHALL AVOID OVER COMPACTING THE EXISTING MATERIALS IN ORDER TO AVOID POOR INFILTRATION OR SHORT LIFETIME OF THE SYSTEM.
- THE CONTRACTOR SHALL VERIFY THAT THE SUBGRADE IS CONSISTENT WITH LINE, GRADE, AND ELEVATIONS AS INDICATED IN THE SITE PLAN. ANY AREAS SHOWING EROSION OR POTENTIAL PONDING SHALL BE REGRADED BEFORE SUBBASE INSTALLATION.
- THE CONTRACTOR SHALL DISCUSS ANY MODIFICATIONS TO THE PROJECT WITH THE ENGINEER AND PROPERTY OWNER BEFORE ACTION IS TAKEN.
- THE CONTRACTOR SHALL EXCAVATE TO THE ELEVATIONS ON THE SITE PLAN AND DISPOSE OF ANY EXCESS MATERIALS.

STORMWATER PLANTER CONSTRUCTION NOTES:

- THE STRUCTURAL WALL SHALL BE 6" ABOVE SIDEWALK AS A SAFETY PRECAUTION. FOR A CURB-SIDE PLANTER, THE STRUCTURAL WALL ADJACENT TO THE ROADWAY SHALL BE LEVEL WITH THE EXISTING CURB. THE RISE OF THE STRUCTURAL WALL SHALL HAVE A 3:1 SLOPE TO ADJACENT CURB LINES. AS AN ALTERNATIVE, A FENCE (MIN 18" HIGH) MAY BE INSTALLED AROUND THE PLANTER.
- STORMWATER PLANTER SHALL BE STAKED OUT AND APPROVED BY ENGINEER PRIOR TO CONCRETE POURING.
- SEPARATION FABRIC SHALL BE LAID PRIOR TO BACKFILLING STORMWATER PLANTER.
- STORAGE LAYER AND COMPACTED AGGREGATE LAYER SHALL BE COMPRISED OF NO. 57 CLEAN, WASHED STONE.
- CHOKER COURSE SHALL BE COMPRISED OF 3/8" PEA GRAVEL.
- STRUCTURAL WALL SHALL BE A DEEP CONCRETE CURB IN CONFORMANCE WITH THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2019 OR LATEST VERSION.
- THE CONTRACTOR SHALL ONLY USE CONCRETE WITH 4,500 PSI STRENGTH.
- STONE PROTECTION DIMENSIONS ARE TYPICAL AND MAY VARY PER SITE. CONSULT THE ENGINEER AND SITE PLAN FOR DIMENSIONS ON A PER SITE BASIS.
- STONE PROTECTION SHALL SLOPE TO PLANTER BASE.
- INLET AND OUTLET PROTECTION SHALL BE UNDERLAIN WITH GEOTEXTILE FABRIC.
- INLETS AND OUTLETS SHALL NOT INHIBIT THE FLOW OF WATER.
- PLANTER SHALL BE CONSTRUCTED TO DIMENSIONS INDICATED ON THE SITE PLAN.
- MAX COVER OVER TOP OF PIPES IF PRESENT IS 4 FT. UNLESS APPROVED BY ENGINEER.
- NON-DYED, TRIPLE-SHREDDED HARDWOOD MULCH OR APPROVED ALTERNATIVE SHALL BE USED.
- THE CONTRACTOR SHALL EXCAVATE TO THE EXCAVATION DEPTH SHOWN ON THE SITE PLANS.
- CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ANY EVIDENCE OF HIGH WATER TABLE, CLAY SOILS, OR POOR DRAINAGE IS OBSERVED.
- THE SOIL BED MATERIAL MUST CONSIST OF THE FOLLOWING MIX, BY WEIGHT: 85 TO 95% SAND, WITH NO MORE THAN 25% OF THE SAND AS FINE OR VERY FINE SANDS; NO MORE THAN 15% SILT AND CLAY WITH 2% TO 5% CLAY CONTENT. THE ENTIRE MIX MUST THEN BE AMENDED WITH 3 TO 7% ORGANICS, BY WEIGHT.
- BIORETENTION MEDIA MAY BE CREATED WITH A 70% SAND AND 30% COMPOST MIXTURE IF IT CONFORMS TO THE ABOVE. SAND SHALL AT THE MINIMUM CONFORM TO THE SIEVE ANALYSIS FOR CONCRETE AGGREGATE SAND (ASTM C-33). USGA TEE/GREEN SIEVE GRADATION MIX IS PREFERABLE WHERE AVAILABLE.
- PRIOR TO BACKFILLING, THE CONTRACTOR SHALL SCARIFY NATIVE SOIL TO PROMOTE INFILTRATION INTO UNDERLYING SUBGRADE.
- CONTRACTOR SHALL OBTAIN ENGINEER APPROVAL PRIOR TO BACKFILLING WITH BIORETENTION MEDIA.
- ALL BIORETENTION MEDIA SHALL BE PLACED FROM THE SIDES OF THE FACILITIES, AND IN NO EVENT SHALL ANY TRACKED OR WHEELED EQUIPMENT BE PERMITTED TO CROSS EXCAVATED SECTIONS.
- THE CONTRACTOR SHALL INSTALL THE OVERFLOW PIPE IF SPECIFIED IN SITE PLANS PRIOR TO BACKFILLING.

STORMTECH CHAMBER CONSTRUCTION NOTES:

- STORMTECH SC-740 CHAMBER OR APPROVED EQUIVALENT.
- FOLLOW ALL INSTALLATION GUIDANCE PROVIDED BY STORMTECH OR APPROVED EQUIVALENT VENDOR.

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
PROFESSIONAL ENGINEER - NJ LICENSE # 97532

PLAN REVISIONS
No. DATE DESCRIPTION

HILLSBOROUGH MUNICIPAL COMPLEX
GREEN INFRASTRUCTURE IMPLEMENTATION PROJECT
379 SOUTH BRANCH ROAD, HILLSBOROUGH TOWNSHIP
SOMERSET COUNTY, NJ

RUTGERS
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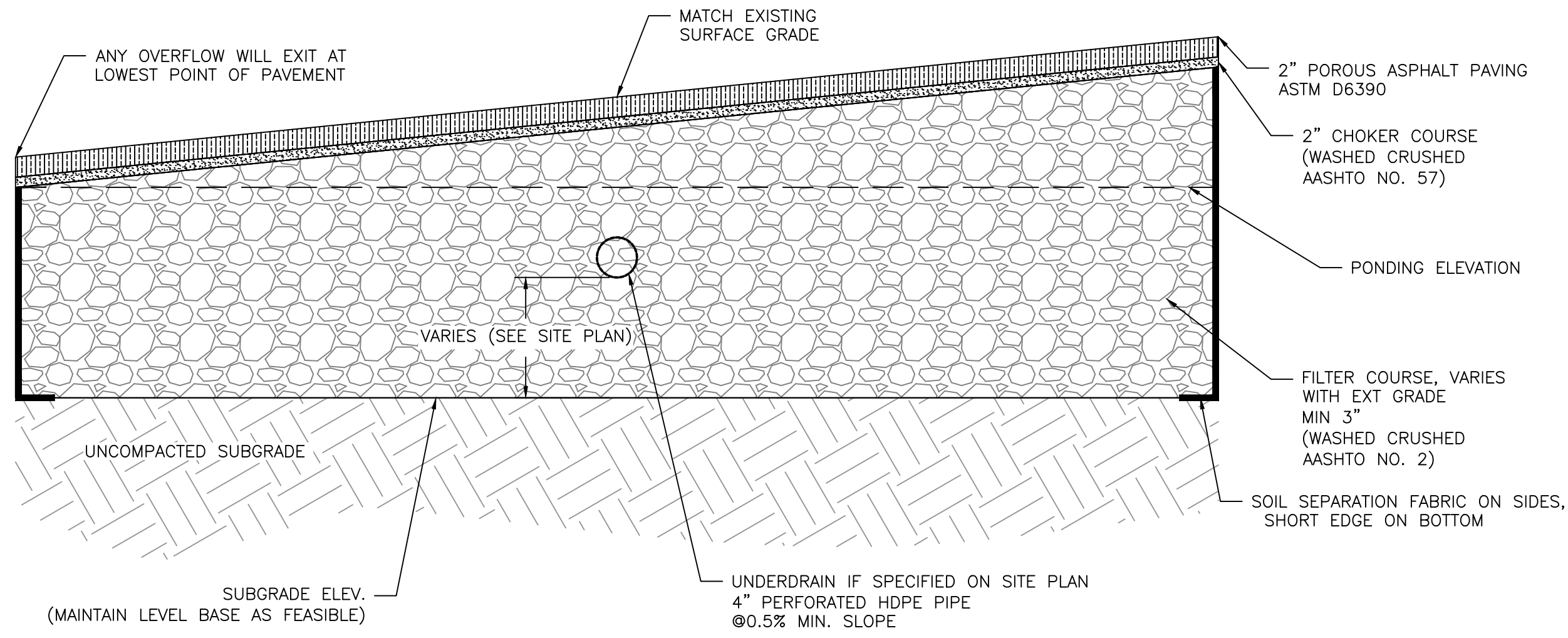
SHEET NAME
DT-2

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UNDERGROUND STORAGE DETAILS

14 COLLEGE FARM ROAD, NEW BRUNSWICK, NJ

DATE: 06/26/24
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1 POROUS ASPHALT CROSS-SECTION
DT-5 N.T.S.

TABLE 901.03-1 STANDARD SIZES OF COARSE AGGREGATE

No.	NOMINAL SIZE	AMOUNTS FINER THAN EACH LABORATORY SIEVE, % BY WEIGHT														
		4"	3 1/2"	3"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 50	No. 100
1	3 1/2" - 1 1/2"	100	90-100		25-60		0-15		0-5							
2	2 1/2" - 1 1/2"			100	90-100	35-70	0-15		0-5							
3	2" - 1"				100	90-100	35-70	0-15		0-5						
4	1 1/2" - 3/4"					100	90-100	20-55	0-15		0-5					
5	1" - 1/2"						100	90-100	20-55	0-10	0-5					
57	1"-No. 4							100	95-100		25-60		0-10	0-5		
67	3/4" - No. 4								100	90-100		20-55	0-10	0-5		
7	1/2" - No. 4									100	90-100	40-70	0-15	0-5		
8	3/8" - No. 8										100	85-100	10-30	0-10	0-5	
9	No. 4 - No. 16											100	85-100	10-40	0-10	0-5
10	No. 4 - No. 200												100	85-100		10-30

2 NJDOT STANDARD SPECIFICATIONS FOR AGGREGATE
DT-5

GENERAL CONSTRUCTION NOTES:

- REFER TO SITE PLAN FOR ALL ELEVATIONS, INVERTS, DIMENSIONS, AND SHAPE OF THE PROJECT.
- ALL WORK MUST MEET THE STANDARDS OF THE ENGINEER BEFORE PAYMENT. ADDITIONAL WORK AND TESTING WILL BE NECESSARY IF STANDARDS ARE NOT SUFFICED.
- THE APPROVAL OF MATERIALS SHALL BE DONE BY THE PROJECT ENGINEER/LANDSCAPE ARCHITECT.
- THE CONTRACTOR SHALL HAVE A PRE-CONSTRUCTION MEETING WITH THE PROJECT ENGINEER PRIOR TO ANY WORK ON SITE.
- THE CONTRACTOR SHALL VERIFY ALL INFORMATION PRIOR TO MOBILIZATION INCLUDING ELEVATIONS AND LOCATIONS OF EXISTING UTILITIES.
- THE CONTRACTOR SHALL PERFORM REQUIRED TESTING TO DETERMINE SOIL PERMEABILITY AND SEASONAL HIGH WATER TABLE ELEVATION AT THE SITE TO VERIFY INFILTRATION CAPABILITIES FOR SYSTEMS DESIGNED TO INFILTRATE. TESTING SHALL BE DONE PRIOR TO EXCAVATION AND INSTALLATION OF THE PROPOSED PROJECTS. PROJECT ENGINEER SHALL BE PRESENT DURING TESTING AND SHALL BE INFORMED OF THE RESULTS. THE TESTED INFILTRATION RATE SHALL BE AT LEAST 0.5 IN/HR OR 50 % OF THE HYDRAULIC CONDUCTIVITY (D3385).
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF ANY FIELD CONDITIONS DIFFER MATERIALLY FROM THOSE REPRESENTED ON THESE DRAWINGS AND THE SPECIFICATIONS OR IF, IN THE CONTRACTOR'S OPINION, SAID CONDITIONS CONFLICT WITH THE DESIGNS SHOWN HEREON.
- THE CONTRACTOR SHALL PERFORM ALL WORK IN CONFORMANCE WITH THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2019 OR LATEST VERSION.
- THE CONTRACTOR SHALL AVOID DISTURBING EXISTING AREAS OUTSIDE SPECIFIED LIMIT OF WORK. ANY DISTURBANCE TO SIDEWALKS, LANDSCAPED VEGETATION, AND TREES MUST BE COORDINATED WITH THE PROPERTY OWNER.
- THE CONTRACTOR IS TO RESTORE ALL DISTURBED AREAS OUTSIDE PROPOSED CHANGES TO ORIGINAL CONDITIONS AFTER INSTALLATION.
- THE CONTRACTOR SHALL HAVE ALL UTILITIES MARKED BEFORE ANY EXCAVATION. IF ANY UTILITIES INTERFERE WITH THE PROJECT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
- THE CONTRACTOR SHALL ESTABLISH ALL ELEVATIONS AND LINES AS SHOWN IN THE SITE PLAN FOR REVIEW BY THE ENGINEER BEFORE ANY CONSTRUCTION BEGINS.
- THE CONTRACTOR SHALL AVOID OVER COMPACTING THE EXISTING MATERIALS IN ORDER TO AVOID POOR INFILTRATION OR SHORT LIFETIME OF THE SYSTEM.
- THE CONTRACTOR SHALL VERIFY THAT THE SUBGRADE IS CONSISTENT WITH LINE, GRADE, AND ELEVATIONS AS INDICATED IN THE SITE PLAN. ANY AREAS SHOWING EROSION OR POTENTIAL PONDING SHALL BE REGRADED BEFORE SUBBASE INSTALLATION.
- THE CONTRACTOR SHALL DISCUSS ANY MODIFICATIONS TO THE PROJECT WITH THE ENGINEER AND PROPERTY OWNER BEFORE ACTION IS TAKEN.
- THE CONTRACTOR SHALL EXCAVATE TO THE ELEVATIONS ON THE SITE PLAN AND DISPOSE OF ANY EXCESS MATERIALS.

PERMEABLE PAVEMENT CONSTRUCTION NOTES:

- THE CONTRACTOR SHALL PLACE GEOTEXTILE FABRIC IN CONFORMANCE WITH MANUFACTURER'S STANDARDS. ALL ADJACENT FABRIC SHALL BE OVERLAPPED BY AT LEAST 16 INCHES. THE FABRIC SHALL BE SECURED AT LEAST FOUR FEET OUTSIDE OF THE EXCAVATED BASE. FABRIC SHALL NOT BE PLACED ON THE EXCAVATED BASE EXCEPT ON EDGES UNLESS AN UNDERDRAIN IS PRESENT.
- THE FILTER COURSE AGGREGATE SHALL BE INSTALLED IN 8 INCH MAXIMUM LIFTS TO A MAXIMUM OF 95% STANDARD PROCTOR COMPACTION (ASTM D698/AASHTO T99).
- CHOKER SHALL BE INSTALLED EVENLY OVER FILTER COURSE. THE CONTRACTOR SHALL NOTIFY THE ENGINEER FOR APPROVAL. CHOKER BASE SHALL BE AT LEAST TWO INCHES THICK. CHOKER, GRAVEL, AND STONE BASE AGGREGATE SHALL BE INSTALLED TO A MAXIMUM OF 95% STANDARD PROCTOR COMPACTION.
- SUBBASE COURSE DENSITIES SHALL BE APPROVED BY THE ENGINEER. ROLLING AND SHAPING SHALL RESUME UNTIL DENSITIES ARE ACCEPTABLE. WATER SHALL BE Poured OVER SUBBASE COURSE MATERIALS DURING COMPACTION.
- THE CONTRACTOR SHALL PERFORM ALL ROLLING AND SHAPING FROM THE LOW SIDE TO THE HIGH SIDE UNTIL EACH LAYER CONFORMS TO GRADES AS INDICATED AND LAYERS ARE SMOOTH.
- AFTER SUBBASE AGGREGATE INSTALLATION THE GEOTEXTILE FABRIC SHALL BE FOLDED BACK ALONG ALL BED EDGES. THE FABRIC SHALL REMAIN SECURE UNTIL ADJACENT SOILS ESTABLISH VEGETATION. ANY NECESSARY MEASURES SHALL BE TAKEN TO PREVENT SEDIMENT FROM WASHING INTO BEDS.
- THE ASPHALT AND CONCRETE MIXING PLANT, HAULING AND PLACING EQUIPMENT, AND INSTALLATION SHALL BE IN CONFORMANCE WITH NAPA IS 131 AND THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2019 OR LATEST VERSION.
- THE CONSTRUCTION SHALL BE PERFORMED IN CONFORMANCE WITH THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2019 OR LATEST VERSION.
- FINISHED PAVEMENTS SHALL SHOW NO MARKS FROM ROLLERS AND BE FREE FROM LOW LYING SPOTS SUBJECT TO PUDDLE FORMATION. ENTIRE SURFACE SHALL DRAIN PROPERLY. ALL ELEVATIONS MUST BE WITHIN 0.1 FT.

POROUS ASPHALT MIX DESIGN CRITERIA:

SIEVE SIZE (INCH/MM)	PERCENT PASSING (%)
0.75/19	100
0.50/12.5	85-100
0.375/9.5	55-75
No.4/4.75	10-25
No.8/2.36	5-10
No.200/0.075 (#200)	2-4
BINDER CONTENT (AASHTO T164)	6-6.5%
BINDER PERFORMANCE GRADE	64-22
FIBER CONTENT BY TOTAL MIXTURE MASS	0.3% CELLULOSE OR 0.4% MINERAL RUBBER SOLIDS (SBR) CONTENT BY WEIGHT OF THE BITUMEN 1.5-3% or TBD
AIR VOID CONTENT (ASTM D6752/AASHTO T275)	16.0-22.0%
DRAINDOWN (ASTM D6390)*	< 0.%
RETAINED TENSILE STRENGTH (AASHTO 283)**	> 80%
CANTABRO ABRASION TEST ENGAED SAMPLES (ASTM D7064-04)	< 20%
CANTABRO ABRASION TEST ON 7 DAY AGED SAMPLES	< 30%

*CELLULOSE OR MINERAL FIBERS MAY BE USED TO REDUCE DRAINDOWN.

**IF THE TSR (RETAINED TENSILE STRENGTH) VALUES FALL BELOW 80% WHEN TESTED PER NAPA IS 131 (WITH A SINGLE FREEZE THAW CYCLE RATHER THAN 5), THEN IN STEP 4, THE CONTRACTOR SHALL EMPLOY AN ANTISTRIP ADDITIVE, SUCH AS HYDRATED LIME (ASTM C977) OR A FATTY AMINE, TO RAISE THE TSR VALUE ABOVE 80%.

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
PROFESSIONAL ENGINEER - NJ LICENSE # 37632

DATE: XX/XX/XX
APPROVED: GCS
CHECKED: JAL
DRAWN: JAV

DRAFT

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PERMEABLE PAVEMENT DETAILS

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SHEET NAME

DT-3