HARMONY PARK

GREEN INFRASTRUCTURE IMPLEMENTATION PROJECT
280 WEST HARMONY ROAD, WEST GROVE BOROUGH
CHESTER COUNTY, PENNSYLVANIA
PA UPI: 5-3-8-E

PROJECT DESCRIPTION:

A RAIN GARDEN (845 S.F.) IS TO BE IMPLEMENTED ALONG THE SOUTHWEST CORNER OF THE PARKING LOT AND WILL CAPTURE, TREAT, AND INFILTRATE STORMWATER RUNOFF FROM THE WEST SIDE OF THE PARKING LOT (3,120 S.F.).

LOCATION MAP:

LEGEND:

- EXISTING DRAINAGE AREA
- EDGE OF PAVEMENT
- EXISTING CENTERLINE
- EXISTING FENCE
- EXISTING TREELINE
- EXISTING TREE/SHRUB
- EXISTING BUILDING
- EXISTING UTILITY POLE
- EXISTING CATCH BASIN
- EXISTING CONTOURS
- LIMIT OF WORK
- PROPOSED TOP OF BERM

LIST OF DRAWINGS:

SHEET NAME	TITLE
COVER	COVER SHEET
P-1	EXISTING CONDITIONS PLAN
P-2	PROPOSED SITE PLAN
P-3	PLANTING PLAN
DT-1	RAIN GARDEN DETAILS
DT-2	RENDERING

GENERAL NOTES:

1. ELEVATION DATA OBTAINED FROM NOAA DIGITAL COASTAL LIDAR. (ELEVATION ARE HEIGHT ABOVE MEAN SEA LEVEL SET BY NAVD 1988).
2. EXISTING SOILS ARE SILT LOAM WHICH ARE CLASSIFIED AS HYDROLOGIC SOIL GROUP B WHICH HAVE MODERATE INFILTRATION RATES BASED ON THE NRCS WEB SOIL SURVEY (websoilsurvey.sc.egov.usda.gov).
3. 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. NJ ONE CALL: 811 OR 800-272-1000

DRAFT

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
PROFESSIONAL ENGINEER - NJ LICENSE # 37532
DATE 03/03/20

DRAWN RPK | CHECKED MAL | APPROVED CCO | DATE 03/03/20

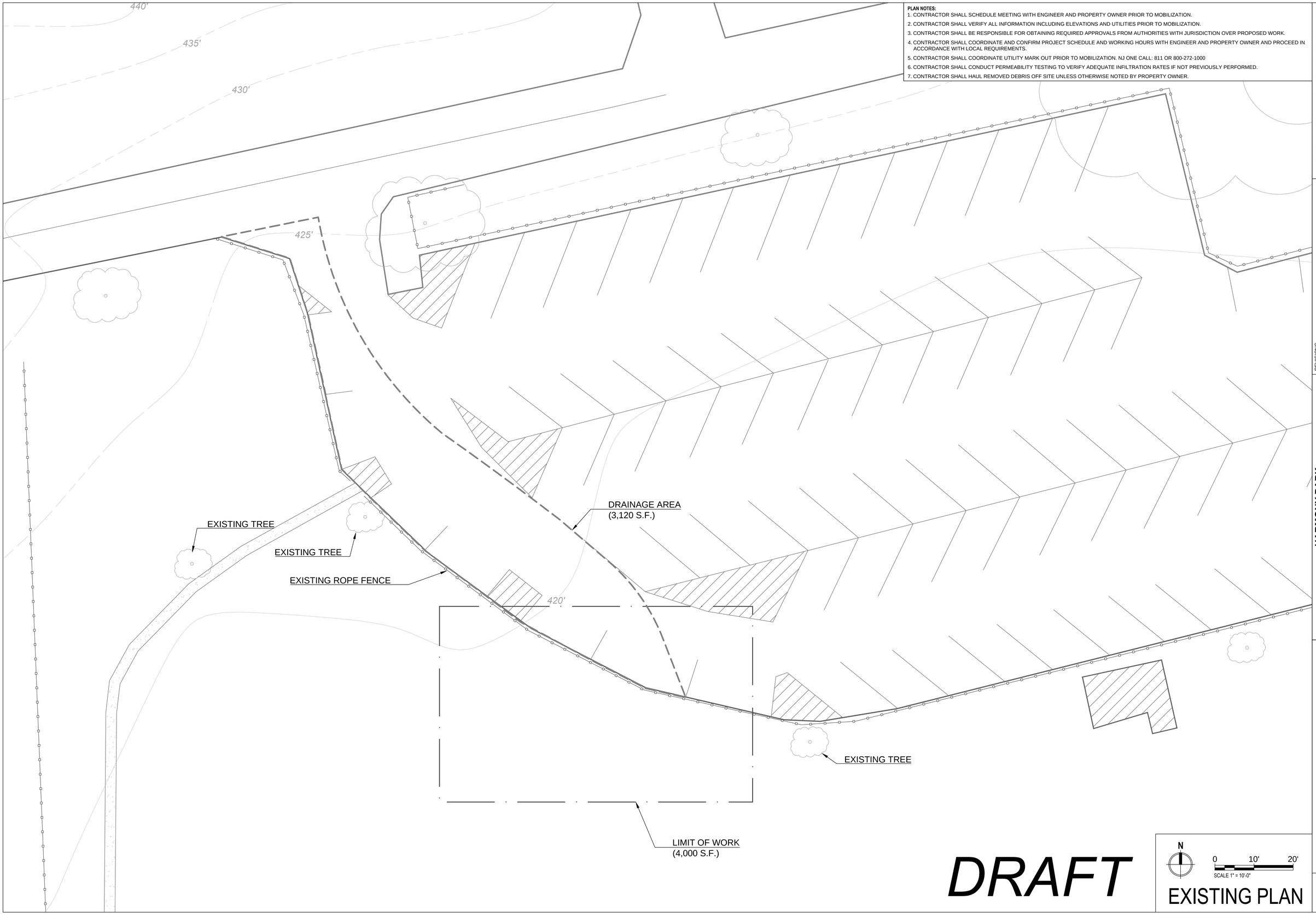
REVISIONS

No.	DATE	DESCRIPTION

HARMONY PARK
GREEN INFRASTRUCTURE IMPLEMENTATION PROJECT
280 HARMONY ROAD, WEST GROVE BOROUGH
CHESTER COUNTY, PA
COVER SHEET

RUTGERS New Jersey Agricultural Experiment Station

SHEET NAME
COVER



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 CONDUCT PERMEABILITY TESTING TO VERIFY ADEQUATE INFILTRATION RATES IF NOT PREVIOUSLY PERFORMED.
7. CONTRACTOR SHALL HAUL REMOVED DEBRIS OFF SITE UNLESS OTHERWISE NOTED BY PROPERTY OWNER.

DRAFT

N

0 10' 20'

SCALE 1" = 10'-0"

EXISTING PLAN

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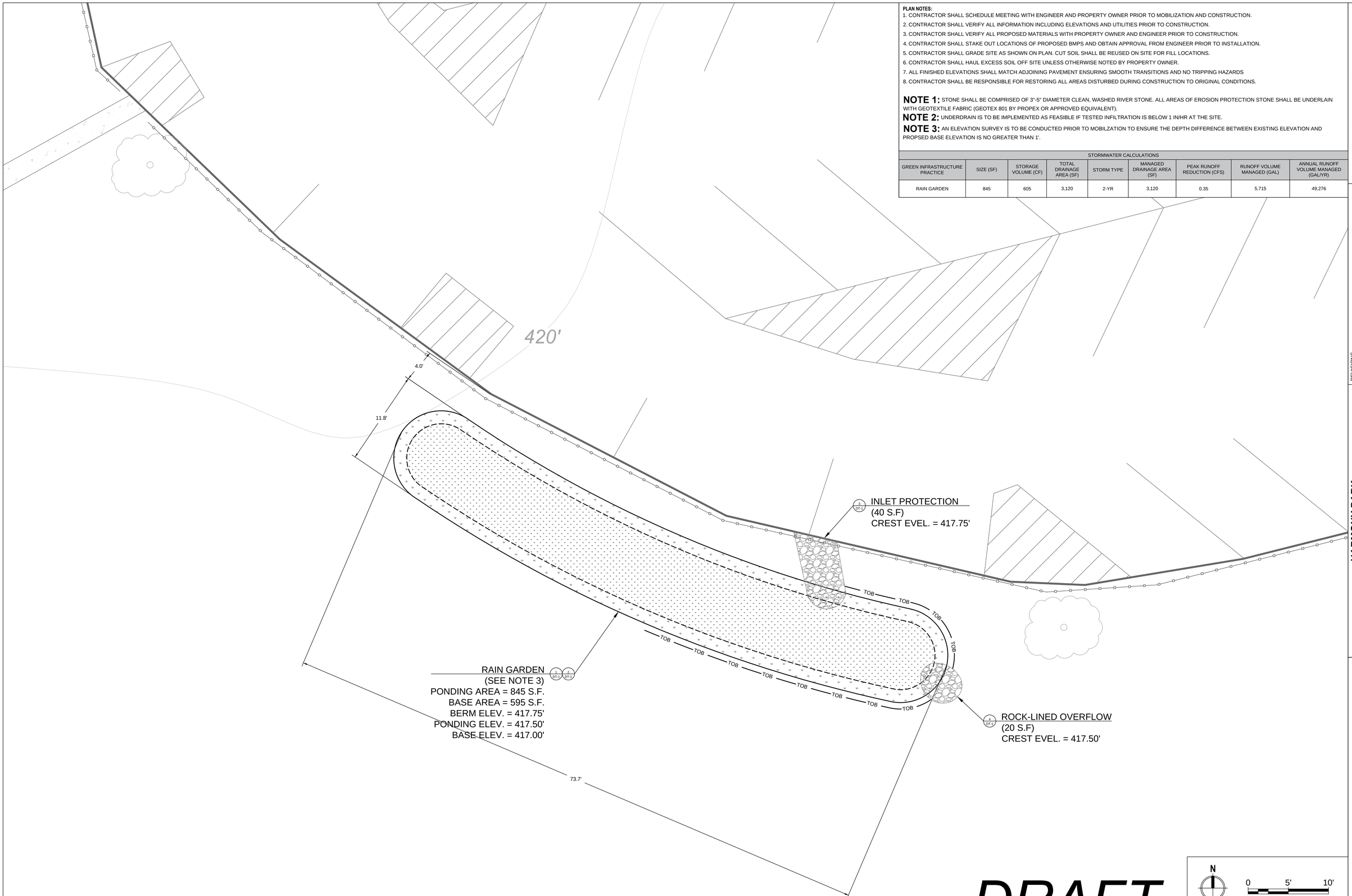
280 HARMONY ROAD, WEST GROVE BOROUGH
CHESTER COUNTY, PA

EXISTING CONDITIONS AND DEMOLITION PLAN

RUTGERS New Jersey Agricultural Experiment Station

SHEET NAME
P-1



PLAN NOTES:

1. CONTRACTOR SHALL SCHEDULE MEETING WITH ENGINEER AND PROPERTY OWNER PRIOR TO MOBILIZATION AND CONSTRUCTION.
2. CONTRACTOR SHALL VERIFY ALL INFORMATION INCLUDING ELEVATIONS AND UTILITIES PRIOR TO CONSTRUCTION.
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.

NOTE 3: AN ELEVATION SURVEY IS TO BE CONDUCTED PRIOR TO MOBILZATION TO ENSURE THE DEPTH DIFFERENCE BETWEEN EXISTING ELEVATION AND PROPSED BASE ELEVATION IS NO GREATER THAN 1'.

STORMWATER CALCULATIONS

GREEN INFRASTRUCTURE PRACTICE	SIZE (SF)	STORAGE VOLUME (CF)	TOTAL DRAINAGE AREA (SF)	STORM TYPE	MANAGED DRAINAGE AREA (SF)	PEAK RUNOFF REDUCTION (CFS)	RUNOFF VOLUME MANAGED (GAL)	ANNUAL RUNOFF VOLUME MANAGED (GAL/YR)
RAIN GARDEN	845	605	3,120	2-YR	3,120	0.35	5,715	49,276

DRAFT

N

0 5' 10'

SCALE 1" = 5'-0"

SITE PLAN

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
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CHESTER COUNTY, PA

PROPOSED SITE PLAN

RUTGERS New Jersey Agricultural Experiment Station

SHEET NAME
P-2

PLANTING SCHEDULE

PLANT SPECIES				QUANTITY	SIZE
TYPE	KEY	BOTANICAL NAME	COMMON NAME		
RAIN GARDEN					
PERRINALS	**CP**	*Calthus palustris*	MARSH MARIGOLD	80	1 QUART
	HM	*Hibiscus moscheutos*	ROSE-MALLOW	60	1 QUART
	IV	*Iris versicolor*	BLUE FLAG IRIS	55	1 QUART
	LC	*Lobelia cardinalis*	CARDINAL FLOWER	40	1 QUART
	SS	*Schizachyrium scoparium*	LITTLE BLUESTEM	30	1 QUART
SHRUBS	**MP**	*Myrica pensylvanica*	BAYBERRY	6	#2 CONT.
	VT	*Viburnum trilobum*	CRANBERRYBUSH	6	#2 CONT.

MP
VT
SS
CP
HM
VT
MP
VT
IV
MP
LC
MP
TOB
RAIN GARDEN
5 DT-1
6 DT-1

DRAFT

N
0 2' 4'
SCALE 1" = 2'-0"

PLANTING PLAN

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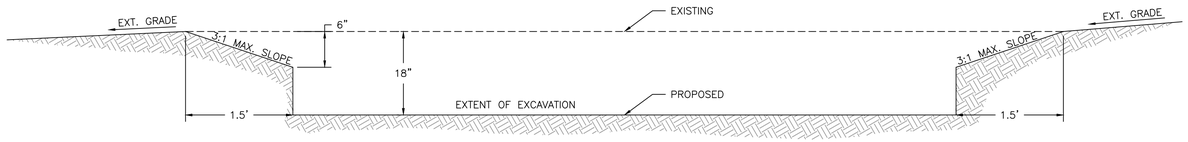
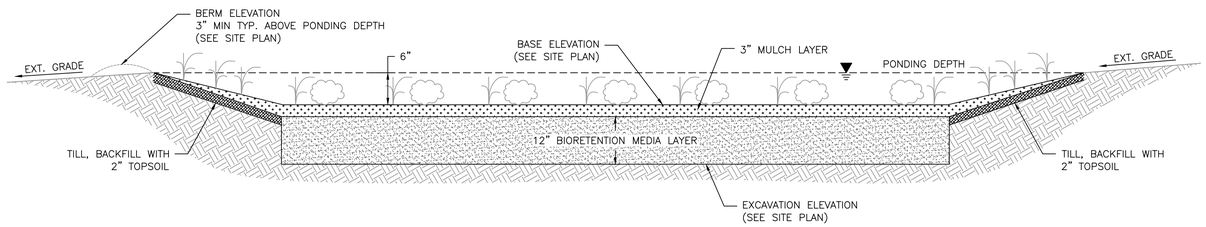
PLANTING PLAN

RUTGERS New Jersey Agricultural Experiment Station

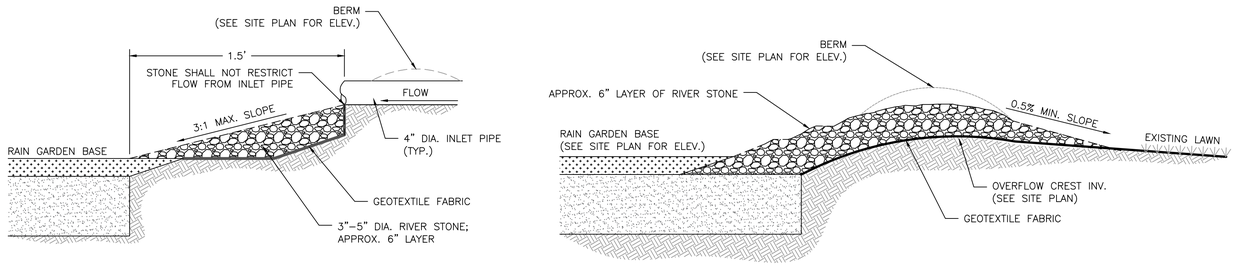
SHEET NAME
P-3



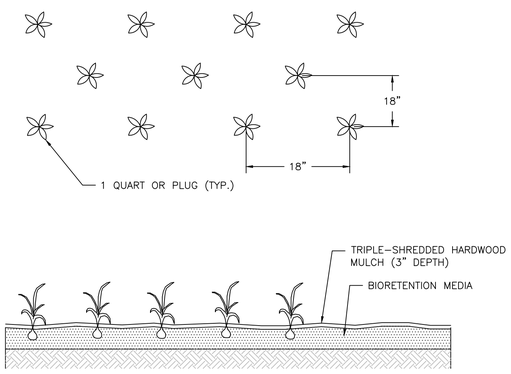
1 DT-1 RAIN GARDEN EXCAVATION SECTION
N.T.S.



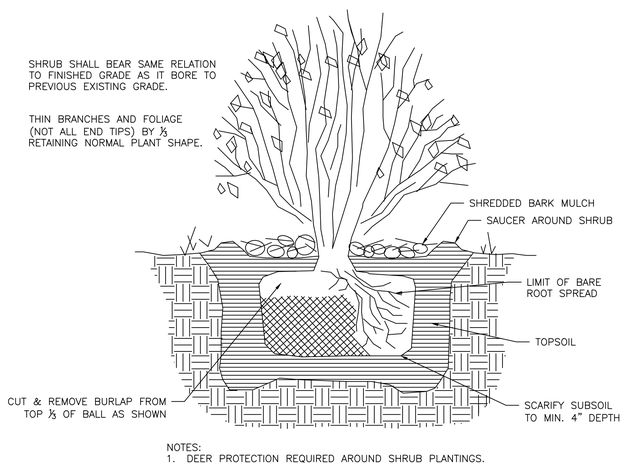
2 DT-1 RAIN GARDEN CROSS-SECTION
N.T.S.



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



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



NOTES:
1. DEER PROTECTION REQUIRED AROUND SHRUB PLANTINGS.

5 DT-1 HERBACEOUS PLUG PLANTING DETAIL
N.T.S.

6 DT-1 SHRUB PLANTING DETAIL
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. BIORETENTION MEDIA SHALL CONSIST OF 70% SAND AND 30% COMPOST MIXTURE.
3. 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.
4. UNDERLYING SOILS SHALL BE TILLED/SCARIFIED PRIOR TO SPREADING/MIXING OF BIORETENTION MEDIA.
5. 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.
6. RAIN GARDEN SHALL BE CONSTRUCTED TO DIMENSIONS INDICATED ON THE SITE PLAN.
7. 3-5 INCH DELAWARE RIVER STONE SHALL BE USED FOR STONE CHANNEL AND INLET/OUTLET PROTECTION.
8. NON-DYED, TRIPLE-SHREDDED HARDWOOD MULCH SHALL BE USED.
9. PLANTING OF RAIN GARDEN AND SLOPED BERM SHALL BE COMPLETED AS INDICATED ON THE SITE PLAN.
10. THE CONTRACTOR SHALL PERFORM ALL WORK IN CONFORMANCE WITH THE NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2007 OR LATEST VERSION.

PLANTING AND LANDSCAPING:

OPEN LAWN AND TURF AREAS

1. SEED ALL REMAINING PARK AREAS WITH TURF TYPE FALL FESCUE AND PERENNIAL RYEGRASS BLEND (LOFTS – SUMMER STRESS MIX II OR APPROVED EQUIVALENT). INSTALL AT A RATE OF 350 LBS. PER ACRE PER MANUFACTURERS SPECIFICATIONS.

TOPSOILING, SEEDING AND MULCHING NOTES

1. ANY UNDISTURBED AREA ON WHICH ACTIVITY HAS CEASED AND WHICH WILL REMAIN EXPOSED FOR MORE THAN 10 DAYS MUST BE SEEDED AND MULCHED IMMEDIATELY. DURING NON-GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE REQUIRED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN 1 YEAR SHALL BE SEEDED AND MULCHED WITH A QUICK GROWING TEMPORARY SEEDING MIXTURE AND MULCH. DISTURBED AREAS WHICH ARE EITHER AT FINISHED GRADE OR WILL NOT BE REDISTURBED WITHIN 1 YEAR MUST BE SEEDED AND MULCHED WITH A PERMANENT SEED MIXTURE AND MULCH.
2. DIVERSIONS, CHANNELS, SEDIMENTATION BASINS, SEDIMENT TRAPS, AND STOCKPILES MUST BE SEEDED AND MULCHED IMMEDIATELY.
3. GRADED AREAS SHALL BE TEMPORARILY SEEDED AND MULCHED IMMEDIATELY FOLLOWING EARTH MOVING PROCEDURES. TEMPORARY SEED SHALL BE ANNUAL RYE GRASS APPLIED AT A RATE OF 3 LBS. PER 1000 SQ. FT.
4. AFTER SEEDING, HAY OR STRAW MULCH MUST BE APPLIED AT A RATE OF AT LEAST 3.0 TONS PER ACRE. MULCH SHALL BE ANCHORED BY EITHER CRIMPING WITH A COULTER IMPLEMENT, OR BY STAPLING BIODEGRADABLE NETTING TO THE SURFACE.
5. SITE PREPARATION TO UPLAND AREAS: APPLY 1 TON OF AGRICULTURAL-GRADE LIMESTONE PER ACRE PLUS 10-20-10 FERTILIZER AT THE RATE OF 500 LB. PER ACRE. WORK IN WHERE POSSIBLE. SEEDING OF DISTURBED UPLAND AREAS (BEYOND LIMITS OF RIPARIAN ENHANCEMENT AREA) TO BE DONE USING MIX OF FINE FESCUE AT 35 LBS/ACRE (PURE LIVE SEED) PLUS PERENNIAL RYEGRASS AT 15 LBS/ACRE (PURE LIVE SEED).
6. TOPSOIL SHALL BE A CLEAN FRIABLE LOAM WITH SUFFICIENT ORGANIC CONTENT (2.75%) TO PROMOTE PLANT VIGOR. AMENDMENTS SHALL BE ADDED AS NEEDED TO IMPROVE DEFICIENT SOILS. TOPSOIL SHALL BE RETURNED AT A LOOSE DEPTH OF FIVE INCHES TO ALLOW FOR SETTLEMENT.
7. ESTABLISH PERMANENT SEEDING AS SOON AS POSSIBLE AFTER FINAL GRADING IS COMPLETE. UNLESS OTHERWISE INDICATED, PERMANENT SEEDING SHALL BE SEED MIXTURE SPECIFIED IN TABLE.
8. SEE TABLES FOR SEED SPECIES MIXTURE AND APPLICATION RATES
9. SEED MIXES ARE AVAILABLE AT ERNST CONSERVATION SEEDS IN MEADVILLE, PA. WEBSITE: WWW.ERNSTSEED.COM OR PHONE: 1-800-873-3321.
10. NATIVE SHRUBS AND HERBACEOUS PLUGS ARE AVAILABLE AT PINELANDS NURSERY AND SUPPLY, COLUMBUS NJ.
    WEBSITE: WWW.PINELANDSNURSERY.COM OR
    PHONE 1-800-667-2729

GENERAL LANDSCAPING NOTES

1. ALL PLANT MATERIALS SHALL CONFIRM TO THE AMERICAN ASSOCIATION OF NURSERYMEN'S AMERICAN STANDARD FOR NURSERY STOCK (LATEST EDITION)
2. INSPECTION OF PLANTING BEDS – THE LANDSCAPE ARCHITECT SHALL INSPECT ALL PLANTING AREAS BEFORE ANY TOPSOILING OR PLANTING IS BEGUN TO INSURE THAT ADEQUATE DRAINAGE EXISTS. IF ANY AREAS TO BE LANDSCAPED SHOW EVIDENCE OF POOR DRAINAGE, THE LANDSCAPE ARCHITECT SHALL NOTIFY THE OWNER IMMEDIATELY FOR CORRECTIVE ACTION
3. THE LANDSCAPE ARCHITECT SHALL APPROVE ALL PLANT MATERIAL AND STAKED PLANT LOCATIONS PRIOR TO INSTALLATION. ALL HERBACEOUS PLUG PLANTINGS SHALL BE A MINIMUM 3 INCH DEPTH. PLUGS SHALL BE PLANTED 1 FOOT O.C. AS INDICATED ON PLAN.
4. ALL TREES, SHRUBS, AND GROUNDCOVER SHALL BE PLACED IN CONTINUOUS MULCHED BEDS 4" IN DEPTH. MUCH SHALL BE TRIPLE SHREDDED HARDWOOD.
5. ALL TREES, SHRUBS, AND GROUNDCOVER SHALL BE AS SPECIFIED AND SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS AND COMMENTS NOTED ON THE DRAWINGS.
6. TOPSOIL SHALL BE PROVIDED BY THE LANDSCAPE CONTRACTOR FOR PLANTING ACCORDING TO THE PLANS AND DETAILS
7. PREPARED TOPSOIL FOR BACKFILLING AROUND TREE BALLS SHALL BE A MIXTURE OF VOLUME OF THE FOLLOWING MATERIALS IN QUANTITIES SPECIFIED: ⅓ COMPOST, ⅔ TOPSOIL
8. ALL HERBACEOUS PLUG PLANTINGS SHALL BE MINIMUM 3 INCH DEPTH. PLUGS SHALL BE PLANTED 1 FOOT O.C. AS INDICATED ON PLAN.

QUANTITY/COST ESTIMATES

Rain Garden		Quantity	Cost
Excavation *(CY)*		31	$ 1,240.00
Bioretention Soil	Concrete Sand *(CY)*	14	$ 700.00
	Compost (CY)	6	$ 180.00
Mulch *(CY)*		7	$ 210.00
3-5" River Stone *(Tons)*		1.5	$ 75.00
Landscape Fabric *(SF)*		60	$ 15.00
Plants	Perennials	240	$ 720.00
	Shrubs	12	$ 168.00
Total Cost			$ 3,308.00

PLANTING SCHEDULE

PLANT SPECIES TYPE	KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE
RAIN GARDEN					
PERRINALS	**CP**	*Calthus palustris*	MARSH MARIGOLD	75	1 QUART
	HM	*Hibiscus moscheutos*	ROSE-MALLOW	55	1 QUART
	IV	*Iris versicolor*	BLUE FLAG IRIS	25	1 QUART
	LC	*Lobelia cardinalis*	CARDINAL FLOWER	35	1 QUART
	SS	*Schizachyrium scoparium*	LITTLE BLUESTEM	50	1 QUART
SHRUBS	**MP**	*Myrica pensylvanica*	BAYBERRY	6	#2 CONT.
	VT	*Viburnum trilobum*	CRANBERRYBUSH	6	#2 CONT.

STORMWATER CALCULATIONS

GREEN INFRASTRUCTURE PRACTICE	SIZE (SF)	STORAGE VOLUME (CF)	TOTAL DRAINAGE AREA (SF)	STORM TYPE	MANAGED DRAINAGE AREA (SF)	PEAK RUNOFF REDUCTION (CFS)	RUNOFF VOLUME MANAGED (GAL)	ANNUAL RUNOFF VOLUME MANAGED (GAL/YR)
RAIN GARDEN	845	605	3,120	2-YR	3,120	0.35	5,715	49,276

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CHESTER COUNTY, PA

RAIN GARDEN DETAILS

RUTGERS New Jersey Agricultural Experiment Station

SHEET NAME
DT-1

1
DT-2
RENDERING
N.T.S.

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DT-2