APPENDIX M

Engineering Reports

M.1 | SIGNATURE EAST – ENGINEER'S REPORT

M.2 | SIGNATURE EAST – SITE DRAWINGS

M.3 | SIGNATURE SOUTH – ENGINEER'S REPORT

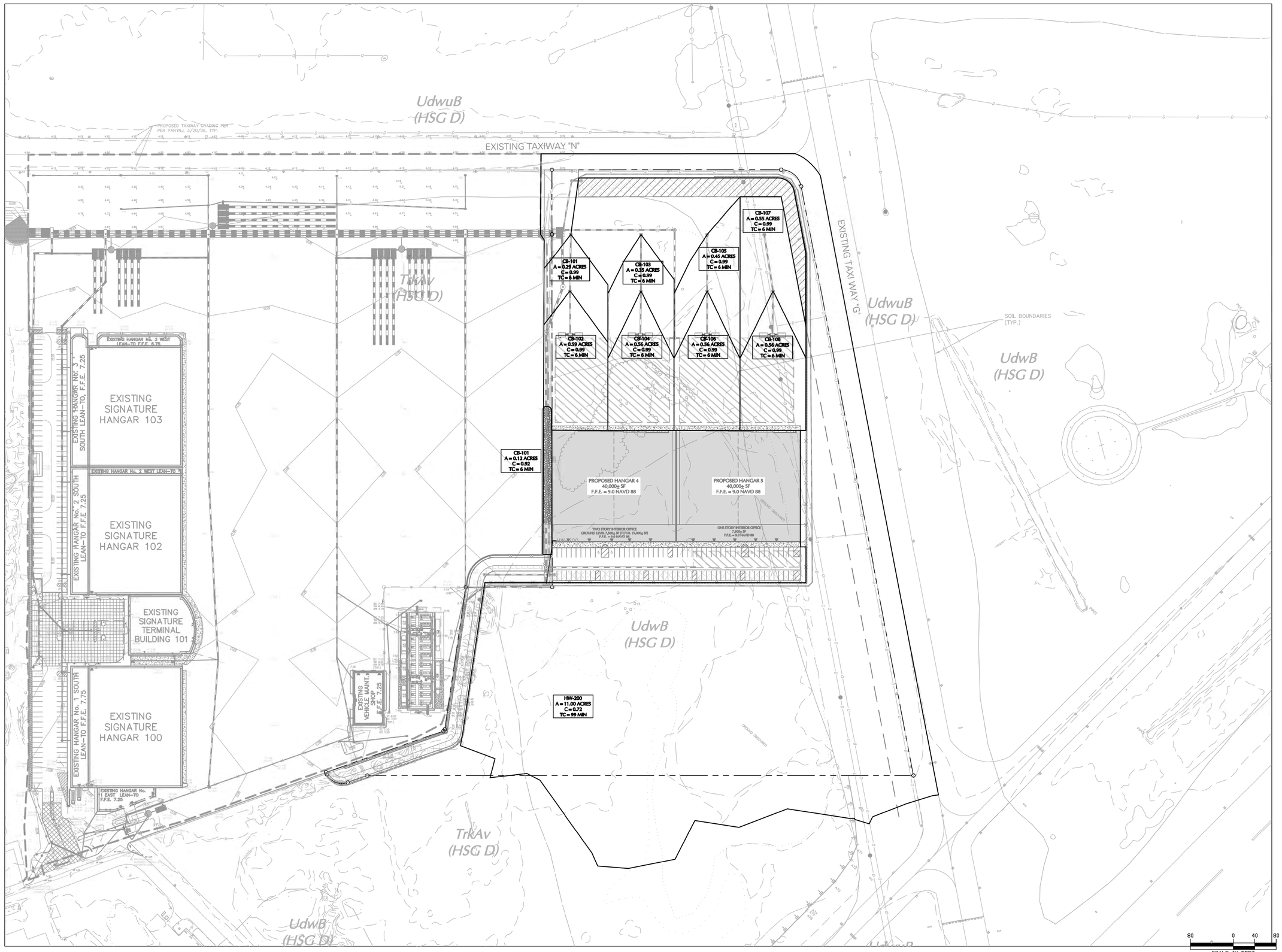
M.4 | SIGNATURE SOUTH – SITE DRAWINGS

APPENDIX M.3

Signature South – Engineer's Report

APPENDIX I
Groundwater Recharge

DRAWINGS



NJ STATE PLANE NAD83

NOTES:
1. BOUNDARY, TOPOGRAPHY AND EXISTING FEATURES SHOWN HEREIN ARE BASED ON PLANS ENTITLED "SITE DEVELOPMENT LINE, 20+59 + ACRES" DATED 3/22/2002 PREPARED BY THE PORT AUTHORITY OF NY & NJ, NUMBER TEB-6009 AND SURVEY PERFORMED BY LANGAN ENGINEERING, DATED 1/20/2004. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO THE EXECUTION OF CONTRACTS OR COMMENCING WORK. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER OF RECORD.
2. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. WETLANDS WERE DELINEATED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, LLC. WETLAND SCIENTISTS IN APRIL 2014. WETLAND FLAG LOCATIONS SHOWN HEREON HAVE BEEN OBTAINED USING FIELD PROCEDURES THAT INCLUDE CODE-ONLY GPS/GNSS COMPATIBLE UNITS WITH EXTERNAL ANTENNAS AND OFFICE PROCEDURES THAT INCLUDE POST-PROCESSING OF THE COLLECTED FIELD DATA. THE WETLAND BOUNDARY WAS CONFIRMED BY THE USACE THROUGH THE ISSUANCES OF A JURISDICTIONAL DETERMINATION ON JUNE 11, 2024 (USACE FILE NO. NAN-2024-00049-EMI).

Date	Description	No.
REVISIONS		

SIGNATURE DANIEL MIOLA DATE SIGNED
PROFESSIONAL ENGINEER NJ Lic. No. 24GE04676300

LANGAN
Langan Engineering and Environmental Services, LLC.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
TN CERTIFICATE OF AUTHORIZATION NO. 6907

Project
SIGNATURE SOUTH EXPANSION
TETERBORO AIRPORT
BOROUGH OF MOONACHIE BLOCK 76, LOT 1.02
BOROUGH OF TETERBORO BLOCK 203, LOT 1
BERGEN COUNTY NEW JERSEY

Drawing Title
PROPOSED CATCHMENT AREA PLAN

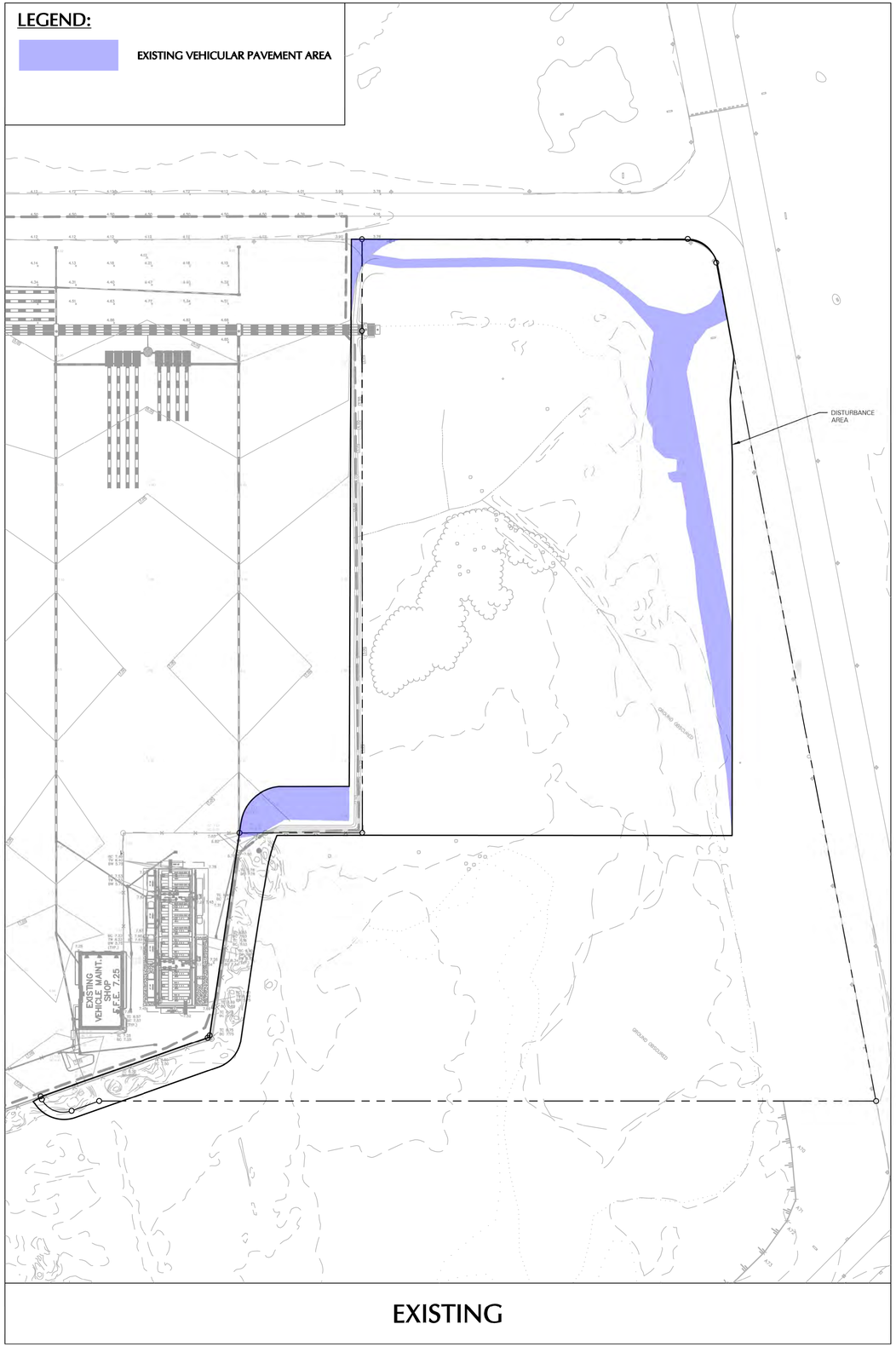
Project No.	001642424
Date	7/30/2025
Drawn By	CS
Checked By	KMR/LM

DA300
Sheet ### of ##

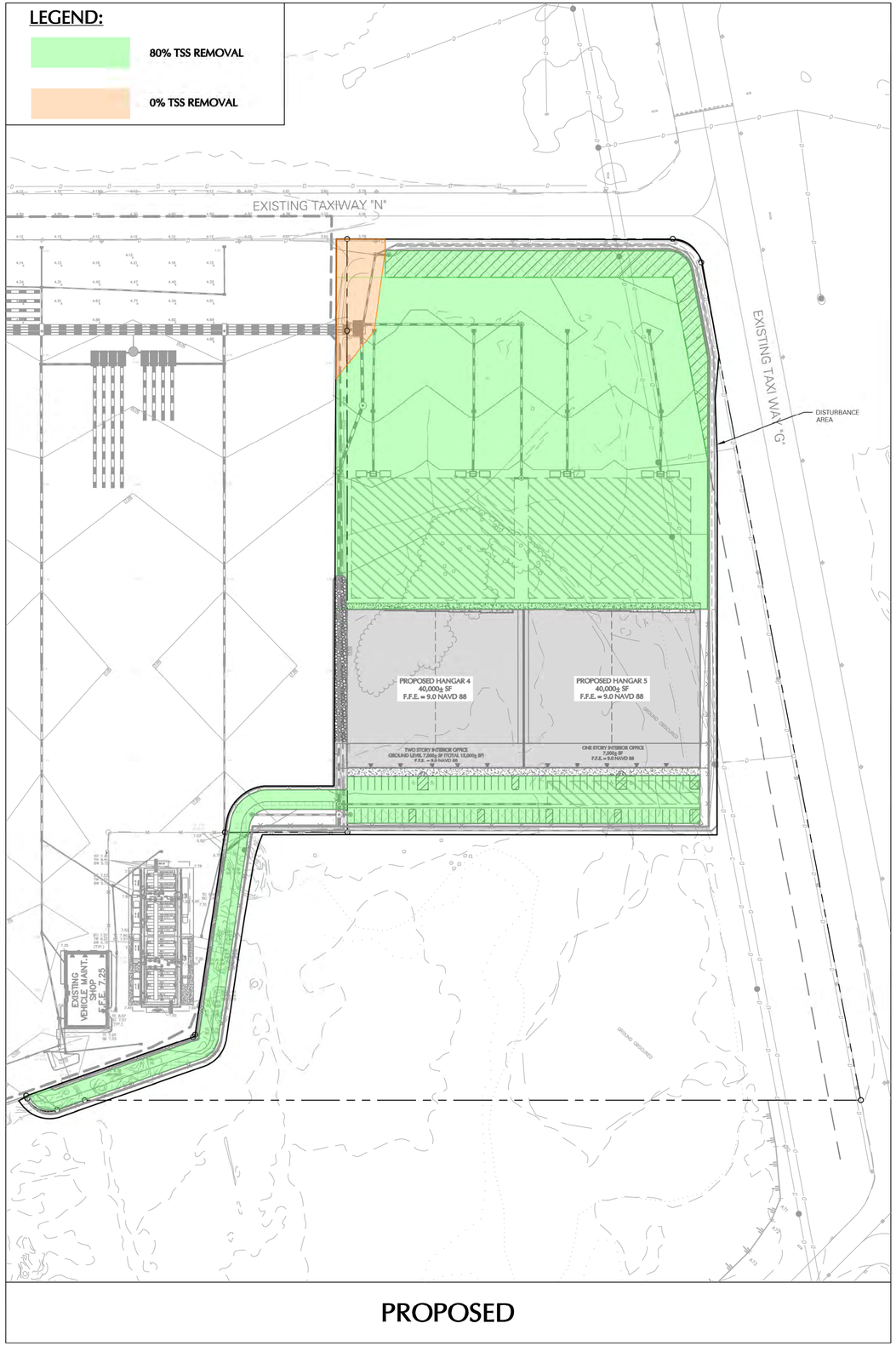
LANGAN Project No. 001642424

©2025 Langan

Filename: \\langan.com\data\NYC\data4\001642424\Cadd Data - 001642424\2D-DesignFiles\Civil\2025 Finalized Stormwater Design\DA300 - PROPOSED CATCHMENT AREA PLAN.dwg Date: 8/22/2025 Time: 14:23 User: cschum Style Table: Langan.stb Layout: DA300



EXISTING



PROPOSED

NJSPCS, NAD83

NOTES:
1. BOUNDARY, TOPOGRAPHY AND EXISTING FEATURES SHOWN HEREIN ARE BASED ON PLANS ENTITLED "SITE DEVELOPMENT LINE, 20+59 + ACRES" DATED 3/22/2002 PREPARED BY THE PORT AUTHORITY OF NY & NJ, NUMBER TEB-6009 AND SURVEY PERFORMED BY LANGAN ENGINEERING, DATED 1/20/2004. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO THE EXECUTION OF CONTRACTS OR COMMENCING WORK. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER OF RECORD.
2. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

80 0 40 80
SCALE IN FEET

Date	Description	No.
REVISIONS		

SIGNATURE DANIEL MIOLA DATE SIGNED
PROFESSIONAL ENGINEER NJ Lic. No. 24GE04676300

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Project
SIGNATURE SOUTH EXPANSION
TETERBORO AIRPORT
BOROUGH OF MOONACHIE BLOCK 76, LOT 1.02
BOROUGH OF TETERBORO BLOCK 203, LOT 1
BERGEN COUNTY NEW JERSEY

Drawing Title
WATER QUALTY TSS REMOVAL PLAN

Project No. 001642424	DA400
Date 7/30/2025	
Drawn By CS	
Checked By KMR/ LM	

LANGAN
Project No. 001642424

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1 STORMTRAP DETENTION SYSTEM (UNDER AIRCRAFT APRON)

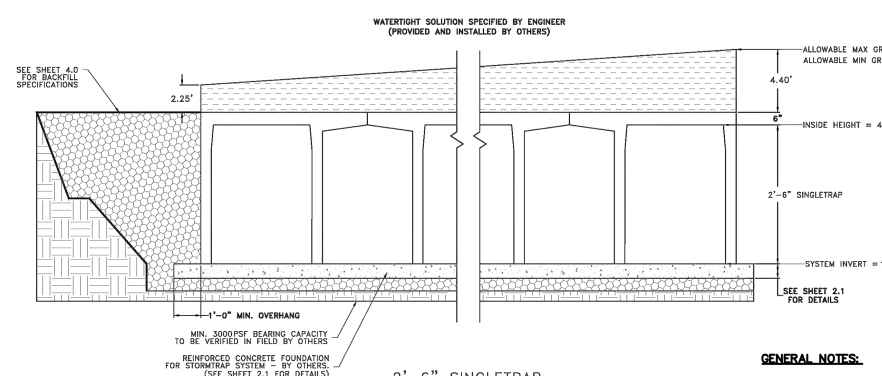
SINGLETRAP PROFILE VIEW

STRUCTURAL DESIGN LOADING CRITERIA	
LIVE LOADING:	FIRE TRUCK OUTRIGGER LOADING 75 PSI ON A 2'x2' PAD
GROUND WATER TABLE:	ABOVE INVERT OF SYSTEM
SOIL BEARING PRESSURE:	3000PSF
SOIL DENSITY:	120 PCF
EQUIVALENT UNSATURATED LATERAL ACTIVE EARTH PRESSURE:	35 PSF / FT.
EQUIVALENT SATURATED LATERAL ACTIVE EARTH PRESSURE:	80 PSF/FT. (IF WATER TABLE PRESENT)
APPLICABLE CODES:	ASTM C857, ACI-318
BACKFILL TYPE:	SEE SHEET 4.0 FOR BACKFILL OPTIONS

STORMTRAP SYSTEM INFORMATION	
UNIT HEADROOM:	2'-6" SINGLETRAP
TOTAL STORAGE PROV:	74188.19 CUBIC FEET

SITE SPECIFIC DESIGN CRITERIA

1. STORMTRAP UNITS SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/ OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.
2. COVER RANGE: MIN. 2.25' MAX. 4.40' CONSULT STORMTRAP FOR ADDITIONAL COVER OPTIONS.
3. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.
4. FOR STRUCTURAL CALCULATIONS THE GROUND WATER TABLE IS ASSUMED TO BE ABOVE INVERT OF SYSTEM IF WATER TABLE IS DIFFERENT THAN ASSUMED, CONTACT STORMTRAP.
5. SYSTEM DESIGN INTENT IS TO CONTAIN WATER AND / OR PREVENT GROUNDWATER MIGRATION INTO THE SYSTEM AND WILL NOT BE SUBJECT TO LEAKAGE TESTING. A THIRD PARTY WATER PROOFING SOLUTION IS REQUIRED FOR SEALING OF SYSTEM / MODULE JOINTS AND SEAMS. SOLUTION TO BE PROVIDED AND INSTALLED BY CONTRACTOR IN ACCORDANCE WITH THIRD PARTY WATER-PROOFING SUPPLIER'S PRODUCT SPECIFICATIONS.



2'-6" SINGLETRAP

GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.
3. STORMTRAP TO BE DESIGNED FOR AIRCRAFT LOADING.

BACKFILL SPECIFICATIONS

ZONE CHART		
ZONES	ZONE DESCRIPTIONS	REMARKS
ZONE 1	FOUNDATION AGGREGATE	#5 (3/4") STONE ANGULAR AGGREGATE (SEE NOTE 4)
ZONE 2	BACKFILL	UNIFIED SOILS CLASSIFICATION (GW, GP, SW, SP) OR SEE BELOW FOR APPROVED BACKFILL OPTIONS
ZONE 3	FINAL COVER OVERTOP	MATERIALS NOT TO EXCEED 120 PCF

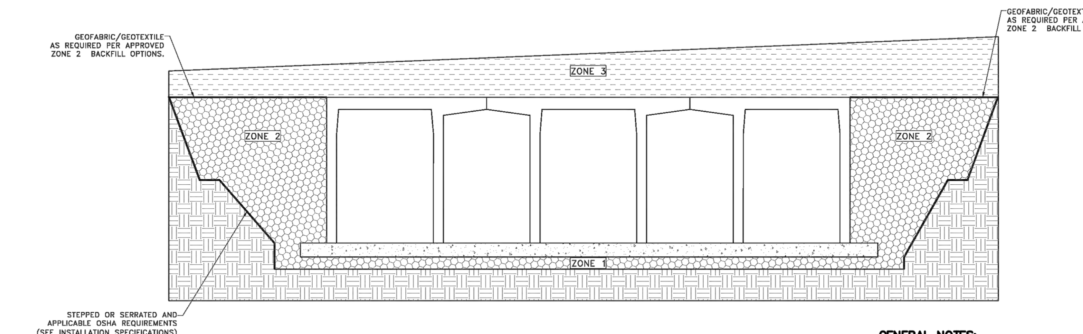
FILL DEPTH	TRACK WIDTH	MAX VEHICLE WEIGHT (KIPS)	MAX GROUND PRESSURE
12"	12"	51.8	1690 psf
	18"	56.1	1219 psf
	24"	68.1	1111 psf
	30"	76.7	1000 psf
	36"	85.0	924 psf

NOTE:
TRACK LENGTH NOT TO EXCEED 15'-4".
ONLY TWO TRACKS PER VEHICLE.

APPROVED ZONE 2 BACKFILL OPTIONS	
OPTION	REMARKS
3/4" STONE AGGREGATE	THE STONE AGGREGATE SHALL CONSIST OF CLEAN AND FREE DRAINING ANGULAR MATERIAL. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL (ASTM SIZE #57) AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
SAND	IMPORTED PURE SAND IS PERMITTED TO BE USED AS BACKFILL IF IT IS CLEAN AND FREE DRAINING. THE SAND USED FOR BACKFILLING SHALL HAVE LESS THAN 40% PASSING #40 SIEVE AND LESS THAN 5% PASSING #200 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE SAND BACKFILL.
CRUSHED CONCRETE AGGREGATE	CLEAN, FREE DRAINING CRUSHED CONCRETE AGGREGATE MATERIAL CAN BE USED AS BACKFILL FOR STORMTRAP'S MODULES. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL.
ROAD PACK	STONE AGGREGATE 100% PASSING THE 1-1/2" SIEVE WITH LESS THAN 12% PASSING THE #200 SIEVE (ASTM SIZE #467). GEOFABRIC AS PER GEOTECHNICAL ENGINEER RECOMMENDATION.

STORMTRAP ZONE INSTALLATION SPECIFICATION/PROCEDURE

1. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST BE DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTER LOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MUST BE FREE-DRAINING MATERIAL. SEE ZONE 2 BACKFILL CHART ON THIS PAGE FOR APPROVED BACKFILL OPTIONS. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED (PROVIDED BY OTHERS). ALL MODULES MUST BE SET AND ALL SIDES MUST BE FULLY BACKFILLED BEFORE TRAVEL OVERTOP THE SYSTEM IS PERMITTED. SEE NOTE 2 FOR EXCEPTIONS AND LIMITATIONS.
2. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED IN MINIMUM 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN LIVE LOAD LISTED ON SHEET 1.1 TRAVEL OVERTOP THE SYSTEM. IF TRAVEL OVER THE SYSTEM OCCURS BEFORE THE MINIMUM DESIGN COVER IS ACHIEVED, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. VEHICLES AND MACHINERY USED TO PLACE FILL MATERIAL ON TOP OF THE SYSTEM SHALL TRAVEL PARALLEL TO THE LONGITUDINAL AXIS OF THE STORMTRAP MODULES WHENEVER POSSIBLE.
3. THE VIBRATORY FUNCTION OF ANY ROLLER, COMPACTOR, VEHICLE, ETC. SHALL NOT BE USED OVERTOP THE SYSTEM WITHOUT PRIOR APPROVAL FROM STORMTRAP. IN SOME CASES, HAND COMPACTION MAY BE NECESSARY TO ENSURE THAT THE ALLOWABLE DESIGN LOADING IS NOT EXCEEDED.
4. STONE AGGREGATE FOUNDATION IN ZONE 1 IS FOR LEVELING PURPOSES.



BACKFILL DETAIL

GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.
3. STORMTRAP TO BE DESIGNED FOR AIRCRAFT LOADING.

SINGLETRAP PLAN LAYOUT

BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	2'-6" SINGLETRAP	0
221	II	2'-6" SINGLETRAP	14606
0	III	2'-6" SINGLETRAP	0
44	IV	2'-6" SINGLETRAP	12569
0	VII	2'-6" SINGLETRAP	0
0	VII-1	2'-6" SINGLETRAP	0
0	VII-2	2'-6" SINGLETRAP	0
0	VII-3	2'-6" SINGLETRAP	0
0	VII-4	2'-6" SINGLETRAP	0
0	SPIII	2'-6" SINGLETRAP	VARIES
4	SPIV	2'-6" SINGLETRAP	VARIES
0	T2 PANEL	6" THICK PANEL	0
4	T4 PANEL	6" THICK PANEL	1491
0	T7 PANEL	6" THICK PANEL	0
48	JOINTWRAP	150' PER ROLL	
56	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 269			
TOTAL PANELS = 4			
HEAVIEST PICK WEIGHT = 14606			

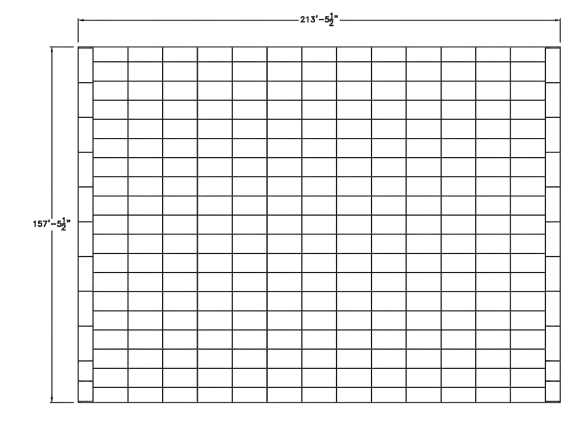
BMP	System Inv	Orifice Size (in)	Orifice Elevation	Weir Length (ft)	Weir Elevation	Outlet Size (in)
Stormtrap - A3	1.6	2.5	1.6	2	3.75	18
Stormtrap - A4	1.6	2.5	1.6	2	3.75	18

NOTE: OUTLET CONTROL DESIGN ELEMENTS TO BE INCLUDED WITHIN STORMTRAP SYSTEM

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 9.00'
ALLOWABLE MIN GRADE = 6.85'
INSIDE HEIGHT ELEVATION = 4.10'
SYSTEM INVERT = 1.60'

NOTES:

1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP - INDICATES A MODULE WITH MODIFICATIONS.
5. P - INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.
3. STORMTRAP TO BE DESIGNED FOR AIRCRAFT LOADING.

PIPE CONNECTION DETAILS

ACCESS OPENING SPECIFICATION

1. A TYPICAL ACCESS OPENING FOR THE STORMTRAP SYSTEM ARE 2'-0" IN DIAMETER. ACCESS OPENINGS LARGER THAN 4'-0" IN DIAMETER NEED TO BE APPROVED BY STORMTRAP. ALL OPENINGS MUST RETAIN AT LEAST 2'-0" OF CLEARANCE FROM THE END OF THE STORMTRAP MODULE UNLESS NOTED OTHERWISE. ALL ACCESS OPENINGS TO BE LOCATED ON INSIDE LEG UNLESS OTHERWISE SPECIFIED. SEE SHEET 2.0 FOR SIZES AND LOCATIONS.
2. UNLESS OTHERWISE SPECIFIED, PLASTIC COATED STEPS ARE PROVIDED INSIDE ANY MODULE WHERE DEEMED NECESSARY. THE HIGHEST STEP IN THE MODULE IS TO BE PLACED A DISTANCE OF 1'-0" FROM THE INSIDE EDGE OF THE STORMTRAP MODULES. ALL ENSUING STEPS SHALL BE PLACED AT A DISTANCE BETWEEN 10" MIN AND 14" MAX BETWEEN THEM. STEPS MAY BE MOVED OR ALTERED TO AVOID OPENINGS OR OTHER IRREGULARITIES IN THE MODULE.
3. STORMTRAP LIFTING INSERTS MAY BE RELOCATED TO AVOID INTERFERENCE WITH ACCESS OPENINGS OR THE CENTER OF GRAVITY OF THE MODULE AS NEEDED.
4. STORMTRAP ACCESS OPENINGS MAY BE RELOCATED TO AVOID INTERFERENCE WITH INLET AND/OR OUTLET PIPE OPENINGS SO PLACEMENT OF STEPS IS ATTAINABLE.
5. ACCESS OPENINGS SHOULD BE LOCATED IN ORDER TO MEET THE APPROPRIATE MUNICIPAL REQUIREMENTS. STORMTRAP RECOMMENDS AT LEAST TWO ACCESS OPENINGS PER SYSTEM FOR ACCESS AND INSPECTION.
6. USE PRECAST ADJUSTING RINGS AS NEEDED TO MEET GRADE. STORMTRAP RECOMMENDS FOR COVER OVER 2' TO USE PRECAST BARREL OR CONE SECTIONS. (PROVIDED BY OTHERS)

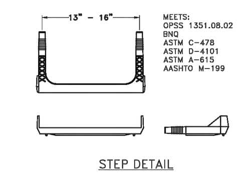
PIPE OPENING SPECIFICATION

1. MINIMUM EDGE DISTANCE FOR AN OPENING ON THE OUTSIDE WALL SHALL BE NO LESS THAN 1'-0".
2. CONNECTING PIPES MAY BE INSTALLED WITH A 1'-0" CONCRETE COLLAR AND AN AGGREGATE CRADLE (AS REQUIRED) FOR AT LEAST ONE PIPE LENGTH (SEE PIPE CONNECTION DETAIL). A STRUCTURAL GRADE CONCRETE OR HIGH STRENGTH, NON-SHRINK GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI MAY BE USED.
3. THE ANNULAR SPACE BETWEEN THE PIPE AND THE HOLE SHALL BE FILLED WITH HIGH STRENGTH NON-SHRINK GROUT.

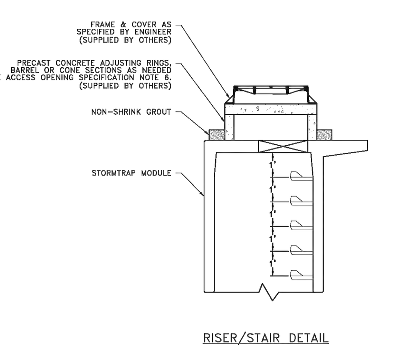
PIPE INSTALLATION INSTRUCTIONS

1. CLEAN AND LIGHTLY LUBRICATE ALL OF THE PIPE TO BE INSERTED INTO STORMTRAP.
2. IF PIPE IS CUT, CARE SHOULD BE TAKEN TO ALLOW NO SHARP EDGES. BEVEL AND LUBRICATE LEAD END OF PIPE.
3. ALIGN CENTER OF PIPE TO CORRECT ELEVATION AND INSERT INTO OPENING.

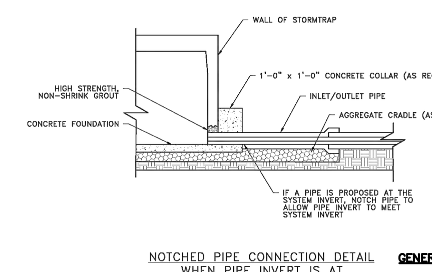
NOTE: ALL ANCILLARY PRODUCTS/SPECIFICATIONS RECOMMENDED AND SHOWN ON THIS SHEET INCLUDING BUT NOT LIMITED TO CONCRETE COLLARS, AGGREGATE CRADLES, GRADE RINGS, RISER SECTIONS, ETC., ARE RECOMMENDATIONS ONLY AND SUBJECT TO CHANGE PER THE INSTALLING CONTRACTOR AND/OR PER LOCAL MUNICIPAL CODE/REQUIREMENTS.



STEP DETAIL



RISER/STAIR DETAIL



NOTCHED PIPE CONNECTION DETAIL WHEN PIPE INVERT IS AT INVERT OF STORMTRAP SYSTEM

GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.
3. STORMTRAP TO BE DESIGNED FOR AIRCRAFT LOADING.

2 STORMTRAP DETENTION SYSTEM (UNDER CAR PARKING)

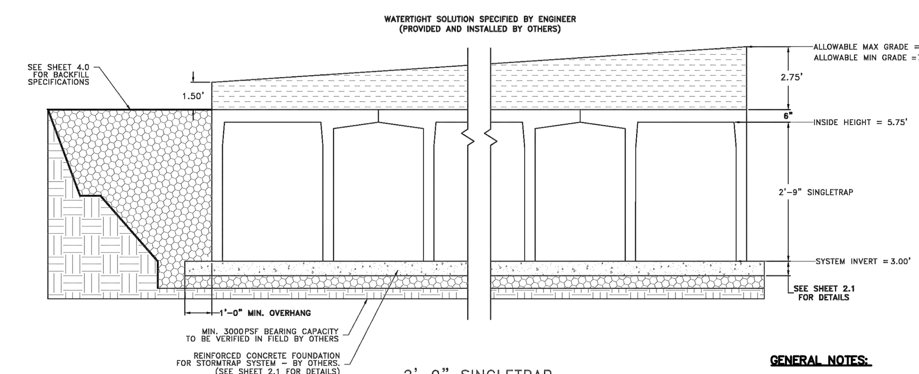
SINGLETRAP PROFILE VIEW

STRUCTURAL DESIGN LOADING CRITERIA	
LIVE LOADING:	AASHTO HS-20 HIGHWAY LOADING
GROUND WATER TABLE:	BELOW INVERT OF SYSTEM
SOIL BEARING PRESSURE:	3000PSF
SOIL DENSITY:	120 PCF
EQUIVALENT UNSATURATED LATERAL ACTIVE EARTH PRESSURE:	35 PSF / FT.
EQUIVALENT SATURATED LATERAL ACTIVE EARTH PRESSURE:	80 PSF/FT. (IF WATER TABLE PRESENT)
APPLICABLE CODES:	ASTM C857, ACI-318
BACKFILL TYPE:	SEE SHEET 4.0 FOR BACKFILL OPTIONS

STORMTRAP SYSTEM INFORMATION	
UNIT HEADROOM:	2'-9" SINGLETRAP
TOTAL STORAGE PROV:	14410.25 CUBIC FEET

SITE SPECIFIC DESIGN CRITERIA

1. STORMTRAP UNITS SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/ OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.
2. COVER RANGE: MIN. 1.50' MAX. 2.75' CONSULT STORMTRAP FOR ADDITIONAL COVER OPTIONS.
3. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.
4. FOR STRUCTURAL CALCULATIONS THE GROUND WATER TABLE IS ASSUMED TO BE BELOW INVERT OF SYSTEM IF WATER TABLE IS DIFFERENT THAN ASSUMED, CONTACT STORMTRAP.
5. SYSTEM DESIGN INTENT IS TO CONTAIN WATER AND / OR PREVENT GROUNDWATER MIGRATION INTO THE SYSTEM AND WILL NOT BE SUBJECT TO LEAKAGE TESTING. A THIRD PARTY WATER PROOFING SOLUTION IS REQUIRED FOR SEALING OF SYSTEM / MODULE JOINTS AND SEAMS. SOLUTION TO BE PROVIDED AND INSTALLED BY CONTRACTOR IN ACCORDANCE WITH THIRD PARTY WATER-PROOFING SUPPLIER'S PRODUCT SPECIFICATIONS.



2'-9" SINGLETRAP

GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.

BACKFILL SPECIFICATIONS

ZONE CHART		
ZONES	ZONE DESCRIPTIONS	REMARKS
ZONE 1	FOUNDATION AGGREGATE	#5 (3/4") STONE ANGULAR AGGREGATE (SEE NOTE 4)
ZONE 2	BACKFILL	UNIFIED SOILS CLASSIFICATION (GW, GP, SW, SP) OR SEE BELOW FOR APPROVED BACKFILL OPTIONS
ZONE 3	FINAL COVER OVERTOP	MATERIALS NOT TO EXCEED 120 PCF

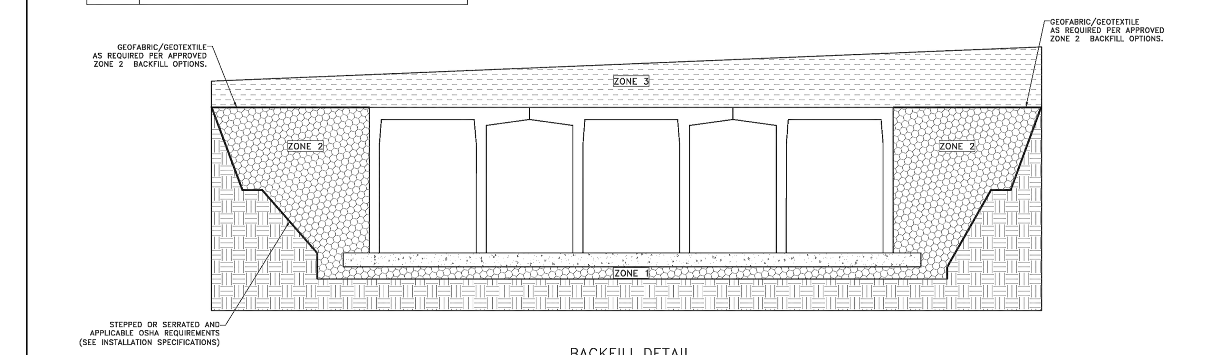
FILL DEPTH	TRACK WIDTH	MAX VEHICLE WEIGHT (KIPS)	MAX GROUND PRESSURE
12"	12"	51.8	1690 psf
	18"	56.1	1219 psf
	24"	68.1	1111 psf
	30"	76.7	1000 psf
	36"	85.0	924 psf

NOTE:
TRACK LENGTH NOT TO EXCEED 15'-4".
ONLY TWO TRACKS PER VEHICLE.

APPROVED ZONE 2 BACKFILL OPTIONS	
OPTION	REMARKS
3/4" STONE AGGREGATE	THE STONE AGGREGATE SHALL CONSIST OF CLEAN AND FREE DRAINING ANGULAR MATERIAL. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL (ASTM SIZE #57) AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
SAND	IMPORTED PURE SAND IS PERMITTED TO BE USED AS BACKFILL IF IT IS CLEAN AND FREE DRAINING. THE SAND USED FOR BACKFILLING SHALL HAVE LESS THAN 40% PASSING #40 SIEVE AND LESS THAN 5% PASSING #200 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE SAND BACKFILL.
CRUSHED CONCRETE AGGREGATE	CLEAN, FREE DRAINING CRUSHED CONCRETE AGGREGATE MATERIAL CAN BE USED AS BACKFILL FOR STORMTRAP'S MODULES. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL.
ROAD PACK	STONE AGGREGATE 100% PASSING THE 1-1/2" SIEVE WITH LESS THAN 12% PASSING THE #200 SIEVE (ASTM SIZE #467). GEOFABRIC AS PER GEOTECHNICAL ENGINEER RECOMMENDATION.

STORMTRAP ZONE INSTALLATION SPECIFICATION/PROCEDURE

1. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST BE DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTER LOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MUST BE FREE-DRAINING MATERIAL. SEE ZONE 2 BACKFILL CHART ON THIS PAGE FOR APPROVED BACKFILL OPTIONS. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED (PROVIDED BY OTHERS). ALL MODULES MUST BE SET AND ALL SIDES MUST BE FULLY BACKFILLED BEFORE TRAVEL OVERTOP THE SYSTEM IS PERMITTED. SEE NOTE 2 FOR EXCEPTIONS AND LIMITATIONS.
2. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED IN MINIMUM 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN LIVE LOAD LISTED ON SHEET 1.1 TRAVEL OVERTOP THE SYSTEM. IF TRAVEL OVER THE SYSTEM OCCURS BEFORE THE MINIMUM DESIGN COVER IS ACHIEVED, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. VEHICLES AND MACHINERY USED TO PLACE FILL MATERIAL ON TOP OF THE SYSTEM SHALL TRAVEL PARALLEL TO THE LONGITUDINAL AXIS OF THE STORMTRAP MODULES WHENEVER POSSIBLE.
3. THE VIBRATORY FUNCTION OF ANY ROLLER, COMPACTOR, VEHICLE, ETC. SHALL NOT BE USED OVERTOP THE SYSTEM WITHOUT PRIOR APPROVAL FROM STORMTRAP. IN SOME CASES, HAND COMPACTION MAY BE NECESSARY TO ENSURE THAT THE ALLOWABLE DESIGN LOADING IS NOT EXCEEDED.
4. STONE AGGREGATE FOUNDATION IN ZONE 1 IS FOR LEVELING PURPOSES.



BACKFILL DETAIL

GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.

SINGLETRAP PLAN LAYOUT

BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	2'-9" SINGLETRAP	0
24	II	2'-9" SINGLETRAP	15085
0	III	2'-9" SINGLETRAP	0
26	IV	2'-9" SINGLETRAP	13048
0	VII	2'-9" SINGLETRAP	0
0	VII-1	2'-9" SINGLETRAP	0
0	VII-2	2'-9" SINGLETRAP	0
0	VII-3	2'-9" SINGLETRAP	0
0	VII-4	2'-9" SINGLETRAP	0
0	SPIII	2'-9" SINGLETRAP	VARIES
2	SPIV	2'-9" SINGLETRAP	VARIES
0	T2 PANEL	6" THICK PANEL	0
4	T4 PANEL	6" THICK PANEL	1615
0	T7 PANEL	6" THICK PANEL	0
10	JOINTWRAP	150' PER ROLL	
40	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 52			
TOTAL PANELS = 4			
HEAVIEST PICK WEIGHT = 15085			

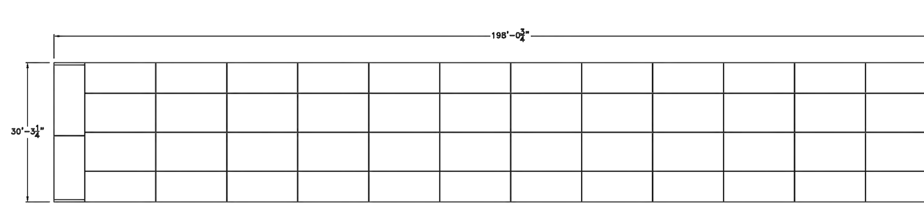
BMP	System Inv	Orifice Size (in)	Orifice Elevation	Weir Length (ft)	Weir Elevation	Outlet Size (in)
Stormtrap - A7	3.0	2.5	3.0	8	4.5	24

NOTE: OUTLET CONTROL DESIGN ELEMENTS TO BE INCLUDED WITHIN STORMTRAP SYSTEM

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 9.00'
ALLOWABLE MIN GRADE = 7.75'
INSIDE HEIGHT ELEVATION = 5.75'
SYSTEM INVERT = 3.00'

NOTES:

1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP - INDICATES A MODULE WITH MODIFICATIONS.
5. P - INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.

PIPE CONNECTION DETAILS

ACCESS OPENING SPECIFICATION

1. A TYPICAL ACCESS OPENING FOR THE STORMTRAP SYSTEM ARE 2'-0" IN DIAMETER. ACCESS OPENINGS LARGER THAN 4'-0" IN DIAMETER NEED TO BE APPROVED BY STORMTRAP. ALL OPENINGS MUST RETAIN AT LEAST 2'-0" OF CLEARANCE FROM THE END OF THE STORMTRAP MODULE UNLESS NOTED OTHERWISE. ALL ACCESS OPENINGS TO BE LOCATED ON INSIDE LEG UNLESS OTHERWISE SPECIFIED. SEE SHEET 2.0 FOR SIZES AND LOCATIONS.
2. UNLESS OTHERWISE SPECIFIED, PLASTIC COATED STEPS ARE PROVIDED INSIDE ANY MODULE WHERE DEEMED NECESSARY. THE HIGHEST STEP IN THE MODULE IS TO BE PLACED A DISTANCE OF 1'-0" FROM THE INSIDE EDGE OF THE STORMTRAP MODULES. ALL ENSUING STEPS SHALL BE PLACED AT A DISTANCE BETWEEN 10" MIN AND 14" MAX BETWEEN THEM. STEPS MAY BE MOVED OR ALTERED TO AVOID OPENINGS OR OTHER IRREGULARITIES IN THE MODULE.
3. STORMTRAP LIFTING INSERTS MAY BE RELOCATED TO AVOID INTERFERENCE WITH ACCESS OPENINGS OR THE CENTER OF GRAVITY OF THE MODULE AS NEEDED.
4. STORMTRAP ACCESS OPENINGS MAY BE RELOCATED TO AVOID INTERFERENCE WITH INLET AND/OR OUTLET PIPE OPENINGS SO PLACEMENT OF STEPS IS ATTAINABLE.
5. ACCESS OPENINGS SHOULD BE LOCATED IN ORDER TO MEET THE APPROPRIATE MUNICIPAL REQUIREMENTS. STORMTRAP RECOMMENDS AT LEAST TWO ACCESS OPENINGS PER SYSTEM FOR ACCESS AND INSPECTION.
6. USE PRECAST ADJUSTING RINGS AS NEEDED TO MEET GRADE. STORMTRAP RECOMMENDS FOR COVER OVER 2' TO USE PRECAST BARREL OR CONE SECTIONS. (PROVIDED BY OTHERS)

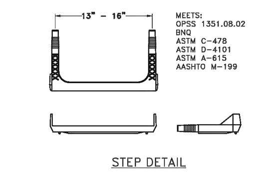
PIPE OPENING SPECIFICATION

1. MINIMUM EDGE DISTANCE FOR AN OPENING ON THE OUTSIDE WALL SHALL BE NO LESS THAN 1'-0".
2. CONNECTING PIPES MAY BE INSTALLED WITH A 1'-0" CONCRETE COLLAR AND AN AGGREGATE CRADLE (AS REQUIRED) FOR AT LEAST ONE PIPE LENGTH (SEE PIPE CONNECTION DETAIL). A STRUCTURAL GRADE CONCRETE OR HIGH STRENGTH, NON-SHRINK GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI MAY BE USED.
3. THE ANNULAR SPACE BETWEEN THE PIPE AND THE HOLE SHALL BE FILLED WITH HIGH STRENGTH NON-SHRINK GROUT.

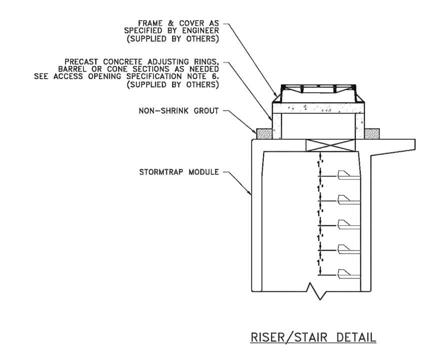
PIPE INSTALLATION INSTRUCTIONS

1. CLEAN AND LIGHTLY LUBRICATE ALL OF THE PIPE TO BE INSERTED INTO STORMTRAP.
2. IF PIPE IS CUT, CARE SHOULD BE TAKEN TO ALLOW NO SHARP EDGES. BEVEL AND LUBRICATE LEAD END OF PIPE.
3. ALIGN CENTER OF PIPE TO CORRECT ELEVATION AND INSERT INTO OPENING.

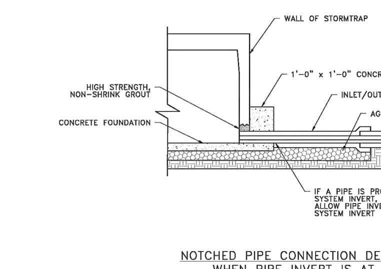
NOTE: ALL ANCILLARY PRODUCTS/SPECIFICATIONS RECOMMENDED AND SHOWN ON THIS SHEET INCLUDING BUT NOT LIMITED TO CONCRETE COLLARS, AGGREGATE CRADLES, GRADE RINGS, RISER SECTIONS, ETC., ARE RECOMMENDATIONS ONLY AND SUBJECT TO CHANGE PER THE INSTALLING CONTRACTOR AND/OR PER LOCAL MUNICIPAL CODE/REQUIREMENTS.



STEP DETAIL



RISER/STAIR DETAIL



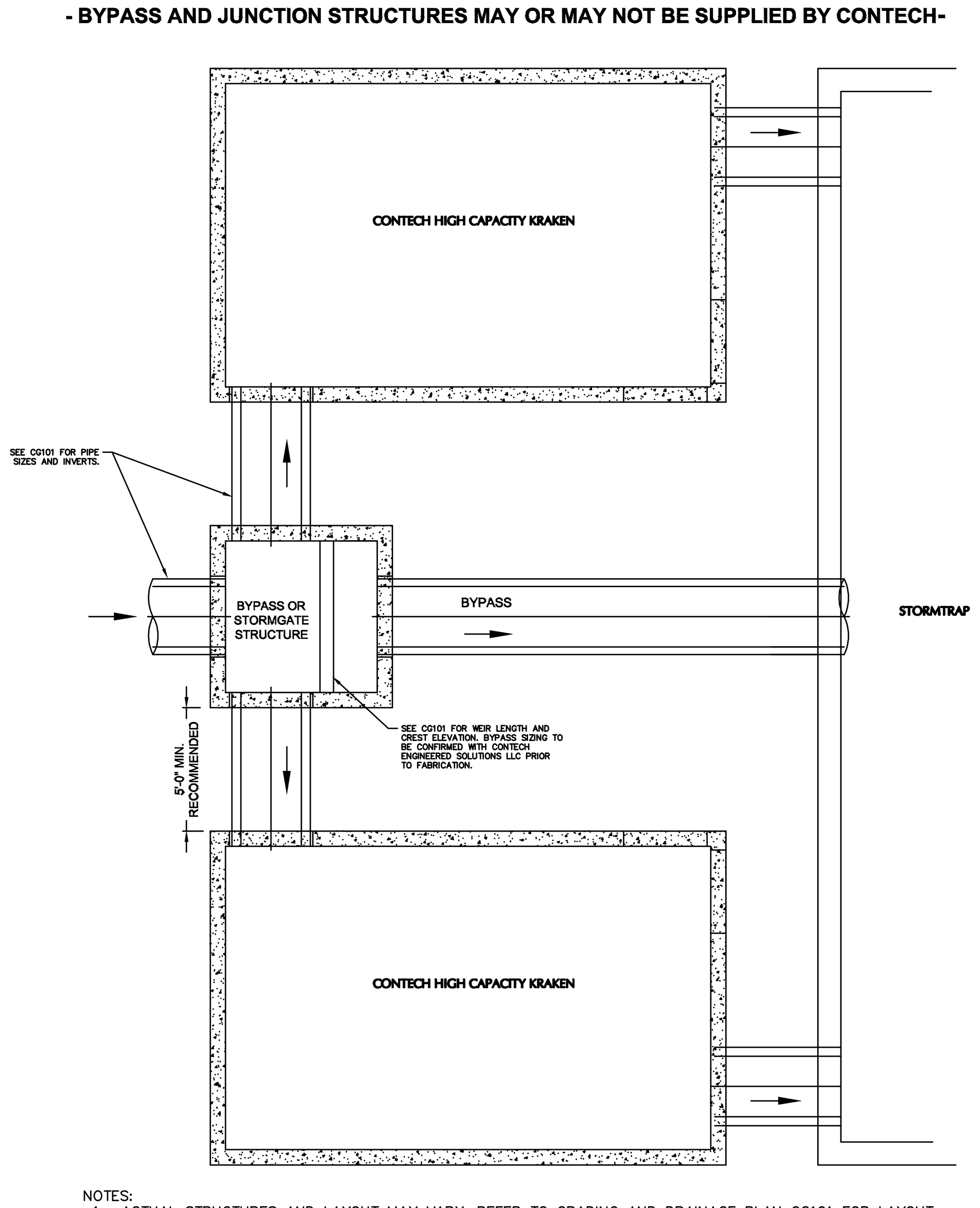
NOTCHED PIPE CONNECTION DETAIL WHEN PIPE INVERT IS AT INVERT OF STORMTRAP SYSTEM

GENERAL NOTES:

1. GENERIC DETAILS PROVIDED BY STORMTRAP.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.

3 DIVERSION STRUCTURE

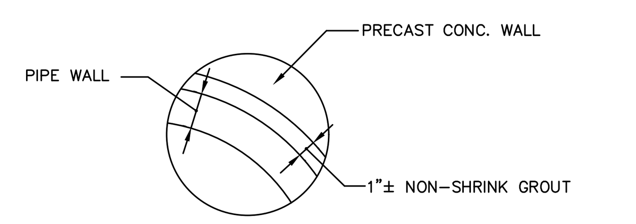
FOR INFORMATIONAL PURPOSES ONLY
NOT INTENDED AS A CONSTRUCTION DOCUMENT
- BYPASS AND JUNCTION STRUCTURES MAY OR MAY NOT BE SUPPLIED BY CONTECH-



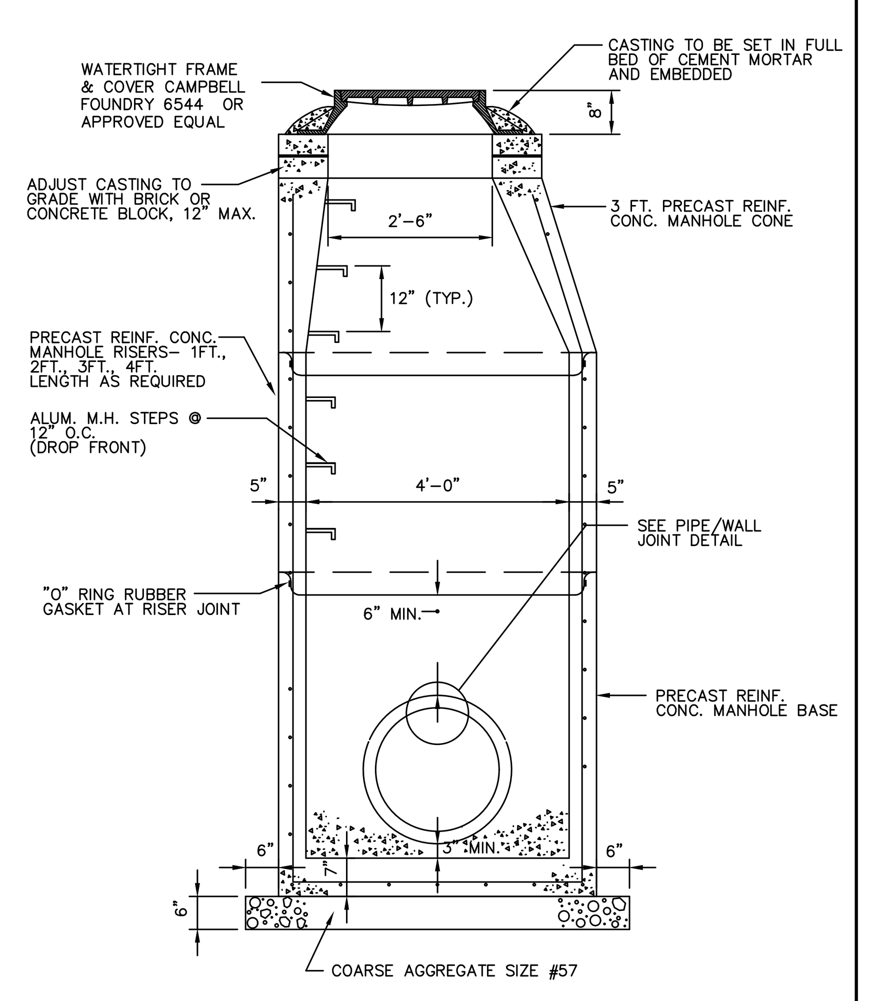
NOTES:

1. ACTUAL STRUCTURES AND LAYOUT MAY VARY. REFER TO GRADING AND DRAINAGE PLAN CG101 FOR LAYOUT, PIPE SIZES, INVERT ELEVATIONS, ETC.
2. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.

4 PRECAST STORM MANHOLE

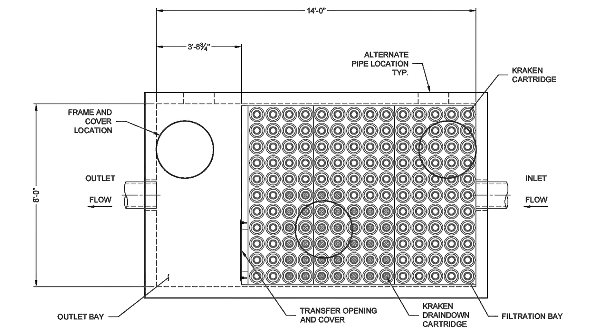


PIPE/WALL JOINT DETAIL
NTS

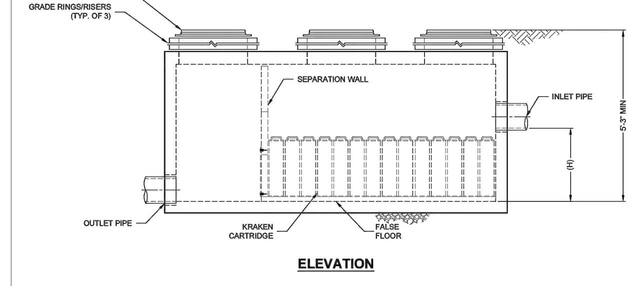


NOTE:
STRUCTURAL DESIGN BY PRECASTER AND SHALL MEET PANYNJ STANDARDS.

5 CONTECH KRAKEN FILTER VAULT (8' x 14')



PLAN



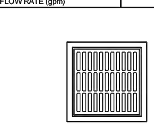
ELEVATION

THE KRAKEN

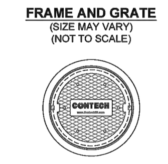
KRAKEN FILTER DESIGN NOTES

- KRAKEN FILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD
- A 8' x 14' OFFLINE STYLE KRAKEN FILTER (KFOV0814) IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (154)
- ALL PARTS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS NOTED OTHERWISE

CARTRIDGE HEIGHT	30"	20"	10"
RECOMMENDED HYDRAULIC DROP (H)	38.5"	28.5"	18.5"
SPECIFIC FLOW RATE (gpm/sf)	0.10	0.10	0.10
CARTRIDGE FLOW RATE (gpm)	17 (0.038 cfs)	10.6 (0.024 cfs)	4.9 (0.011 cfs)



FRAME AND GRATE
(SIZE MAY VARY)
(NOT TO SCALE)



FRAME AND COVER
(DIAMETER MAY VARY)
(NOT TO SCALE)

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			*
WATER QUALITY FLOW RATE (cfs)			*
PEAK FLOW RATE (cfs)			*
RETURN PERIOD OF PEAK FLOW (yrs)			*
CARTRIDGE HEIGHT (SEE TABLE ABOVE)			*
# OF CARTRIDGES REQUIRED			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	*	*	*
OUTLET PIPE	*	*	*
UPSTREAM RIM ELEVATION			*
DOWNSTREAM RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS: *			
* PER ENGINEER OF RECORD *			

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. ALTERNATE DIMENSIONS ARE IN MILLIMETERS [mm] UNLESS NOTED OTHERWISE.
4. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
5. KRAKEN FILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
6. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 8.75' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE KRAKEN FILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

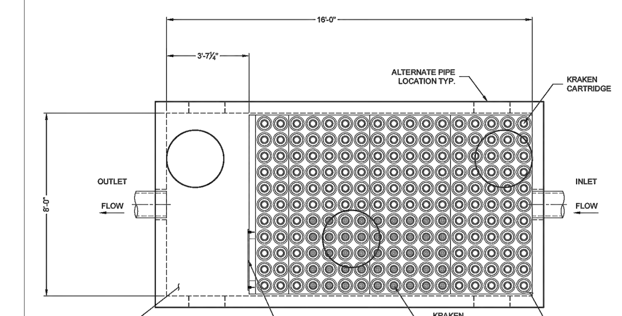
CONTECH ENGINEERED SOLUTIONS LLC
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

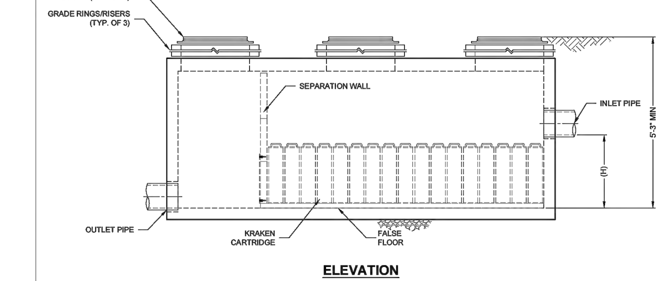
HIGH CAPACITY (HC) KRAKEN FILTER
8' x 14' OFFLINE KRAKEN FILTER
STANDARD DETAIL

GENERAL NOTES

1. GENERIC WATER QUALITY UNIT DETAILS PROVIDED BY CONTECH. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.
2. REFER TO STORMWATER REPORT FOR CARTRIDGE CALCULATIONS

6 CONTECH KRAKEN FILTER VAULT (8' x 16')





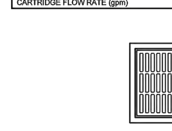
ELEVATION

THE KRAKEN

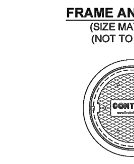
KRAKEN FILTER DESIGN NOTES

- KRAKEN FILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD
- A 8' x 16' OFFLINE STYLE KRAKEN FILTER (KFOV0816) IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (187)
- ALL PARTS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS NOTED OTHERWISE

CARTRIDGE HEIGHT	30"	20"	10"
RECOMMENDED HYDRAULIC DROP (H)	38.5"	28.5"	18.5"
SPECIFIC FLOW RATE (gpm/sf)	0.10	0.10	0.10
CARTRIDGE FLOW RATE (gpm)	17 (0.038 cfs)	10.6 (0.024 cfs)	4.9 (0.011 cfs)



FRAME AND GRATE
(SIZE MAY VARY)
(NOT TO SCALE)



FRAME AND COVER
(DIAMETER MAY VARY)
(NOT TO SCALE)

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			*
WATER QUALITY FLOW RATE (cfs)			*
PEAK FLOW RATE (cfs)			*
RETURN PERIOD OF PEAK FLOW (yrs)			*
CARTRIDGE HEIGHT (SEE TABLE ABOVE)			*
# OF CARTRIDGES REQUIRED			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	*	*	*
OUTLET PIPE	*	*	*
UPSTREAM RIM ELEVATION			*
DOWNSTREAM RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS: *			
* PER ENGINEER OF RECORD *			

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. ALTERNATE DIMENSIONS ARE IN MILLIMETERS [mm] UNLESS NOTED OTHERWISE.
4. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
5. KRAKEN FILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
6. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 10' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE KRAKEN FILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH ENGINEERED SOLUTIONS LLC
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

HIGH CAPACITY (HC) KRAKEN FILTER
8' x 16' OFFLINE KRAKEN FILTER
STANDARD DETAIL

GENERAL NOTES

1. GENERIC WATER QUALITY UNIT DETAILS PROVIDED BY CONTECH. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS FOR REVIEW.
2. REFER TO STORMWATER REPORT FOR CARTRIDGE CALCULATIONS

Date	Description	No.
REVISIONS		

SIGNATURE — DATE SIGNED
DANIEL MIOLA
PROFESSIONAL ENGINEER NJ Lic. No. 24GE04676300

LANGAN
Langan Engineering and Environmental Services, LLC.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
TN CERTIFICATE OF AUTHORIZATION NO. 6907

Project
SIGNATURE SOUTH EXPANSION
TETERBORO AIRPORT
BOROUGH OF MOONACHIE BLOCK 76, LOT 1.02
BOROUGH OF TETERBORO BLOCK 203, LOT 1
BERGEN COUNTY **NEW JERSEY**

Drawing Title
DETAILS II

Project No. 001642424
Date 01/12/2026
Drawn By CS
Checked By KMR/ LM

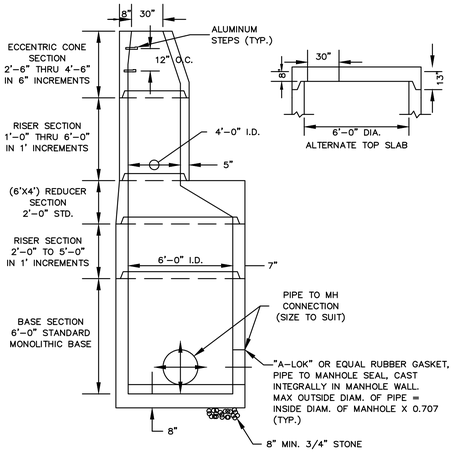
CS-502

LANGAN Project No. 001642424

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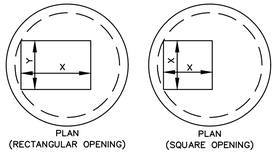
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NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400

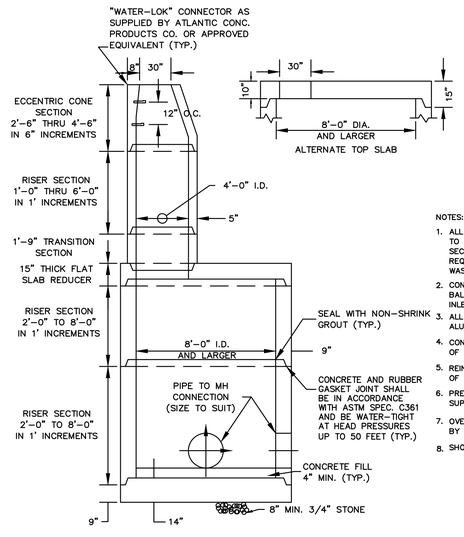


MANHOLE FRAME & COVER TO BE CAMPBELL FOUNDARY No. 6544 OR APPROVED EQUIVALENT., UNLESS OTHERWISE INDICATED ON THE PLANS

CATCH BASIN CASTINGS SHALL BE AS SPECIFIED FOR THE INLET TYPE REQUIRED (SEE DETAILS FOR SPECIFIC INLET TYPE).

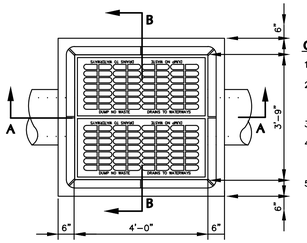


1 OVERSIZE STORM MANHOLE



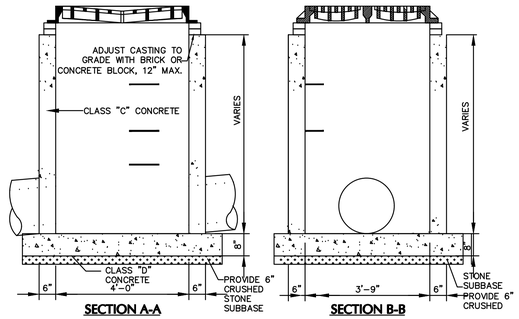
NOTES:

1. ALL PRECAST CONCRETE MANHOLES SHALL, AS A MINIMUM, CONFORM TO ASTM C478 (PRECAST REINFORCED CONCRETE MANHOLE SECTIONS). ALL INLETS SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF ASTM C913 (PRECAST CONCRETE WATER AND WASTEWATER STRUCTURES).
2. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING ADEQUATE BALLAST TO OFFSET FLOTATION FORCES ACTING ON MANHOLES OR INLETS INSTALLED IN WET AREAS.
3. ALL MANHOLE OR INLET STEPS SHALL BE FABRICATED OF NON-SLIP ALUMINUM.
4. CONCRETE FOR INLETS SHALL BE DESIGNED TO OBTAIN A STRENGTH OF 4000 PSI AFTER 28 DAYS.
5. REINFORCING STEEL FOR INLETS SHALL HAVE A YIELD STRENGTH OF 60,000 PSI.
6. PRECAST INLETS SHALL BE DESIGNED BY THE MANUFACTURER TO SUPPORT THE AIRCRAFT LOADING.
7. OVERSIZE STRUCTURES MAY BE A SQUARE SHAPE IF DESIGNED BY PRECAST MANUFACTURER.
8. SHOP DRAWING TO BE SUBMITTED TO ENGINEER FOR REVIEW.

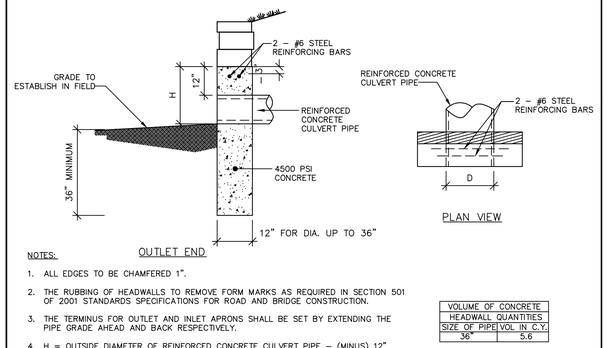


GENERAL NOTES

1. FOOTER AND INVERT TO BE NJDOT CLASS "C" CONCRETE.
2. IF WALL CONSTRUCTION OTHER THAN CONCRETE THE WALLS SHALL BE PLASTERED BOTH INSIDE AND OUTSIDE WITH 1/2" THICK CEMENT PLASTER.
3. CASTING TO BE CAMPBELL FOUNDRY NO. 8301 OR EQUIVALENT
4. PROVIDE ALUMINUM ALCO STEPS 6061T6 18" O.C. IN CATCH BASIN OVER 4' IN DEPTH. MAX. DIST. BETWEEN BOTTOM STEP AND BOTTOM OF INLET SHALL BE 18".
5. WHEN ADDITIONAL DEPTH IS SCHEDULED WALLS BELOW THE DEPTH OF 8'-0" MEASURED FROM THE INLET GUTTER TO INVERT, SHALL BE 12" THICK IF CONCRETE OR DOUBLE BLOCK IF BLOCK. THE FOUNDATION DIMENSION SHALL BE INCREASED 12" IN WIDTH AND TO 12" IN DEPTH.
6. SHALL MEET PANNYNJ STANDARDS



2 TYPE 'E' INLET

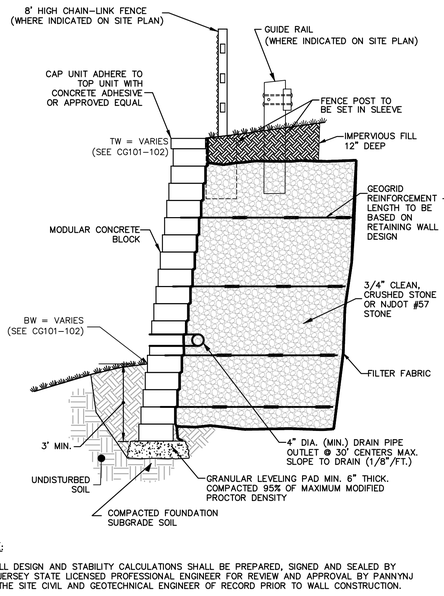


NOTES:

1. ALL EDGES TO BE CHAMFERED 1".
2. THE RUBBING OF HEADWALLS TO REMOVE FORM MARKS AS REQUIRED IN SECTION 501 OF 2001 STANDARDS SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
3. THE TERMINUS FOR OUTLET AND INLET APRONS SHALL BE SET BY EXTENDING THE PIPE GRADE AHEAD AND BACK RESPECTIVELY.
4. H = OUTSIDE DIAMETER OF REINFORCED CONCRETE CULVERT PIPE – (MINUS) 12".
5. D = DIAMETER OF THE PIPE. SEE CG101&102 FOR DETAILS.

VOLUME OF CONCRETE HEADWALL QUANTITIES	
SIZE OF PIPE	VOL. IN C.Y.
36"	5.6

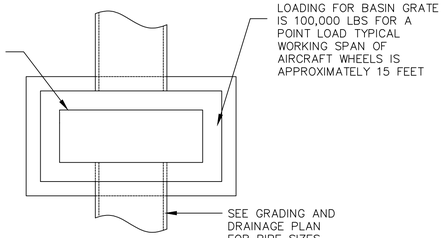
4 HEADWALL DETAIL



NOTE:

1. WALL DESIGN AND STABILITY CALCULATIONS SHALL BE PREPARED, SIGNED AND SEALED BY NEW JERSEY STATE LICENSED PROFESSIONAL ENGINEER FOR REVIEW AND APPROVAL BY PANNYNJ AND THE SITE CIVIL AND GEOTECHNICAL ENGINEER OF RECORD PRIOR TO WALL CONSTRUCTION.

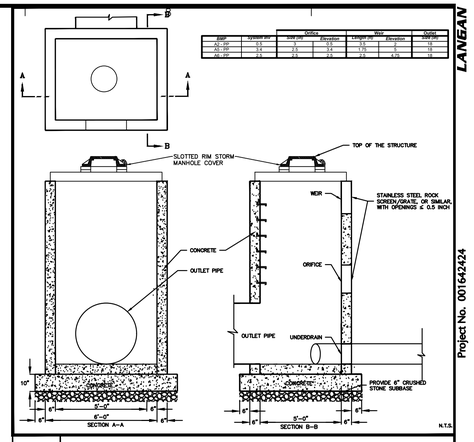
3 RETAINING WALL



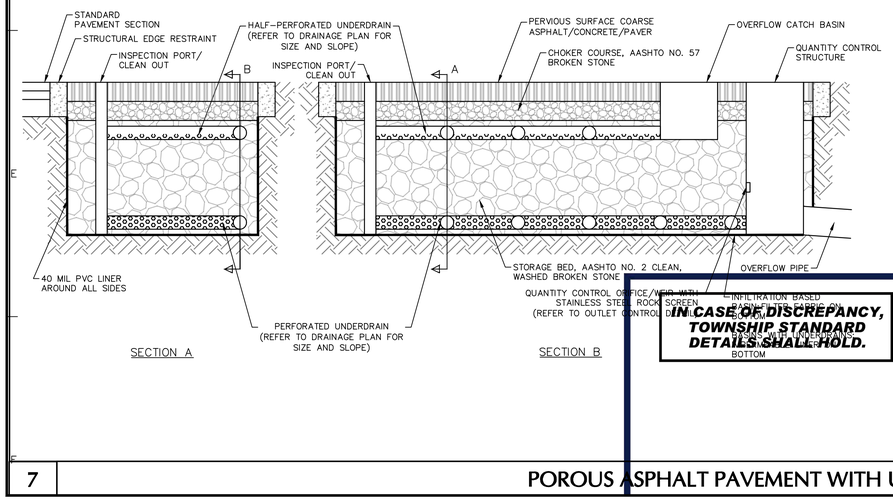
NOTE:

1. FOR CATCH BASINS LAYOUT SEE GRADING AND DRAINAGE PLAN FOR LOCATIONS
2. CATCH BASIN TO BE DESIGNED BY OTHERS
3. DESIGNER OF CATCH BASIN SHALL TAKE INTO ACCOUNT THAT THE 100 YEAR FLOOD ELEVATIONS AROUND THE SITE IS AT ELEVATION 8.0 NAVD88.
4. LOADING FOR BASIN GRATE IS 100,000 LBS FOR A POINT LOAD TYPICAL WORKING SPAN OF AIRCRAFT WHEELS IS APPROXIMATELY 15 FEET

5 CATCH BASIN



6 POROUS PAVEMENT OCS

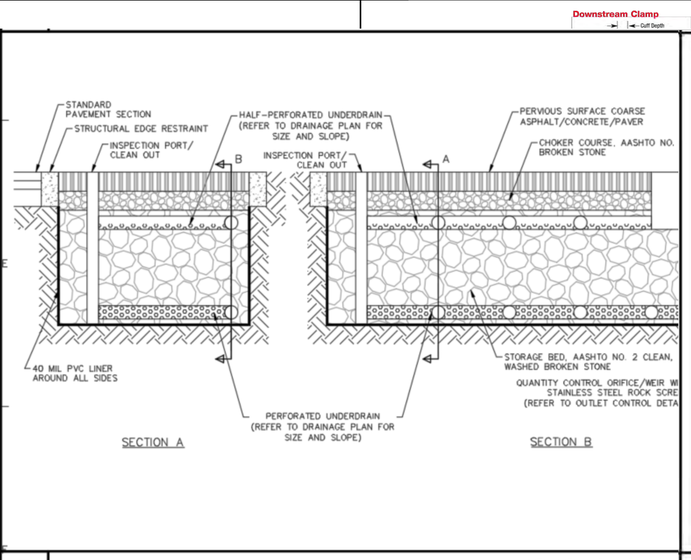


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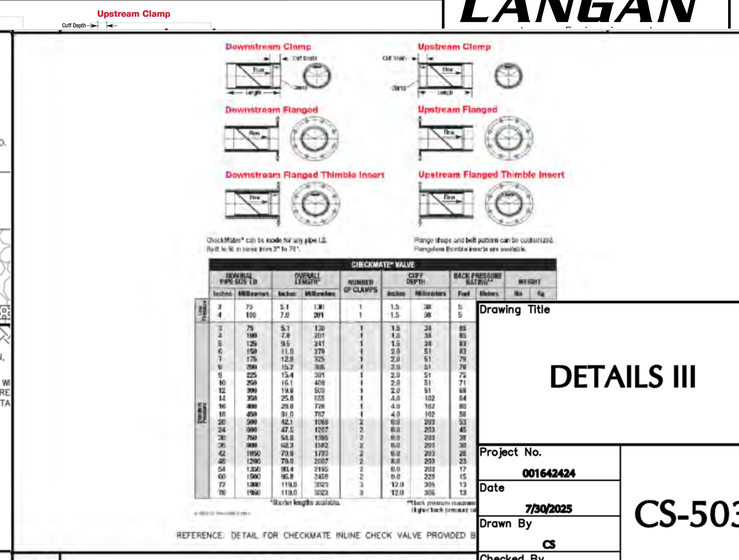
1. PERVIOUS PAVEMENT SYSTEMS STORMWATER BEST MANAGEMEN GETOTECHNICAL REPORT FOR TH
2. UNDERDRAINS:
   - SHALL BE PVC SDR35 (OR A LOADS. ALL JOINTS MUST BE
   - PROVIDE AT LEAST 3 INCHE STONE ABOVE AND BELOW.
   - PROVIDE POSITIVE DRAINAGE
   - UPPER UNDERDRAINS SHALL FACING DOWN TO DISTRIBUTE STORAGE BAD. LOWER UNDER ARE NOT INFILTRATION BAS UNDERDRAIN SHALL NOT BE
2. INSPECTION PORTS:
   - LARGE ENOUGH TO ALLOW FO
   - FLUSH WITH THE SURFACE CO
   - PLACED AT LEAST 3 FEET FR
3. ALL AGGREGATE MATERIAL SHA AND OTHER FINE PARTICLES.
4. SURFACE COURSE:
   - 15-25% POROSITY
   - MINIMUM INFILTRATION RATE
5. CHOKER COURSE:
   - CLEAN, WASHED AASHTO NO
6. STORAGE BED:
   - AASHTO NO 2 OPEN-GRADE
   - PLACED IN LIFTS AND COMP
   - LIFT THICKNESS
7. POST CONSTRUCTION TESTING C1781: STANDARD TEST METHO PAVEMENT SYSTEMS.
8. IMPERMEABLE LINER IS REQUIRE BASED PERVIOUS PAVEMENT SY REQUIRED ALONG THE BOTTOM UNDERDRAINS, IMPERMEABLE LIN
9. OUTLET CONTROL STRUCTURE C APPROVED EQUAL) GRATE OR F INCH IN SIZE.
10. PERVIOUS PAVEMENT SYSTEMS EXCAVATION TO FINAL DESIGN B AREAS ARE COMPLETED AND ST

APPLICA
IN CASE OF DISCREPANCY, TOWNSHIP STANDARD DETAILS SHALL HOLD.
NORMA

7 POROUS ASPHALT PAVEMENT WITH UNDERDRAINS



7 POROUS ASPHA



8 CHECKMATE INLINE CH

Date	Description	No.
REVISIONS		

SIGNATURE DANIEL MIOLA DATE SIGNED
PROFESSIONAL ENGINEER NJ Lic. No. 24GE04676300

LANGAN

Drawing Title: **DETAILS III**

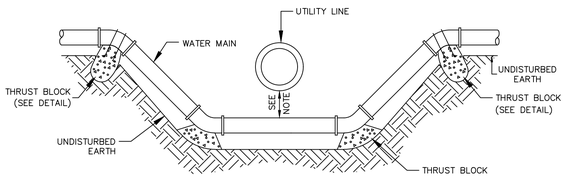
Project No. 001642424
Date 7/30/2025
Drawn By CS
Checked By

CS-503

NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400

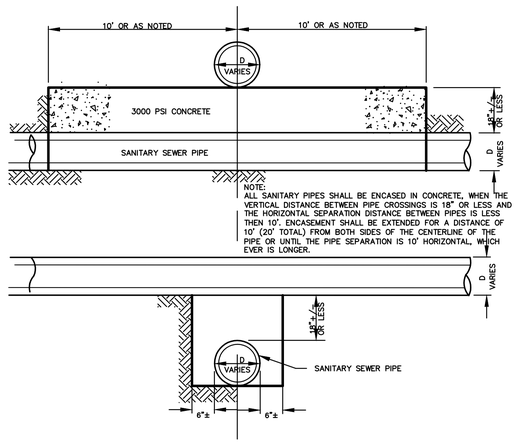
LANGAN

Project No. 001642424

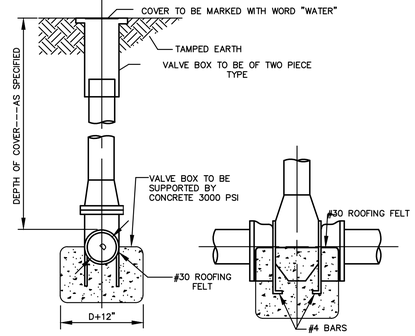


NOTE:
IF LESS THAN 12" TO STORM OR 18" TO SANITARY, USE CONC. ENCASEMENT OR AS DIRECTED BY UTILITY CO.

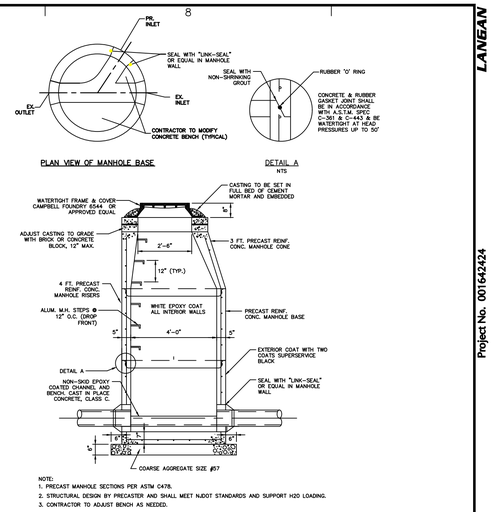
1 DEPRESSED WATERLINE



2 PIPE ENCASEMENT

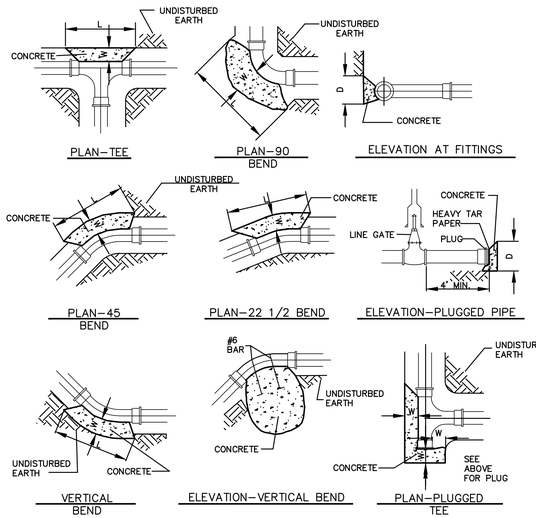


3 GATE VALVE



NOTE:
1. PRECAST MANHOLE SECTIONS PER ASTM C478.
2. STRUCTURAL DESIGN BY PRECASTER AND SHALL MEET NJDOT STANDARDS AND SUPPORT H20 LOADING.
3. CONTRACTOR TO ADJUST BENCH AS NEEDED.

4 SANITARY MANHOLE

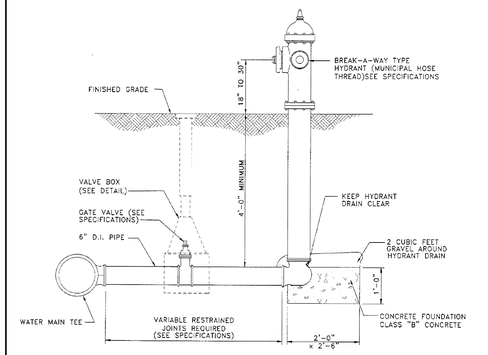


THRUST BLOCK SCHEDULE									
PIPE SIZE	TEE		22 1/2		45		90		W
	L	D	L	D	L	D	L	D	
6"	18"	15"	15"	12"	15"	12"	15"	15"	21"
8"	2'	18"	18"	12"	18"	12"	2'	18"	2'
12"	3'	2'	2'	12"	2'	12"	3'	2'	28"
16"	4'	2.5'	2'	12"	2.33'	15"	4'	2.5'	31"
20"	5.25'	3'	2'	18"	3'	2'	5.25'	3'	33"
24"	7.5'	3'	3'	18"	4'	2.5'	7.5'	3'	3'

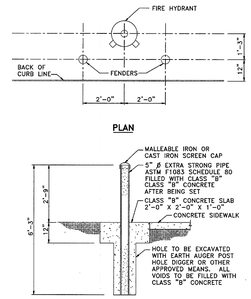
BASIS:
2,000 LB/SQ.FT. SOIL RESISTANCE 250 PSI WATER PRESSURE CORRECTION
FACTORS FOR OTHER SOILS:
SOFT CLAY 4
SAND 2
SAND & GRAVEL 1.33
SHALE 0.4

NOTE:
1. IF SOFT MATERIALS ARE ENCOUNTERED, THE THRUST BLOCKS SIZES SHALL BE ADJUSTED ACCORDINGLY.
2. CONCRETE TO BE 3000 PSI.

5 THRUST BLOCK

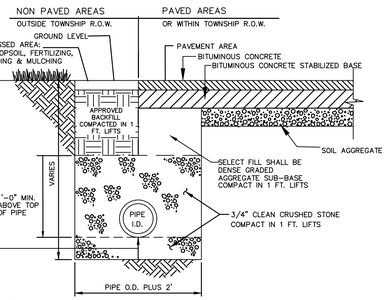


6 PANYNJ HYDRANT DETAIL



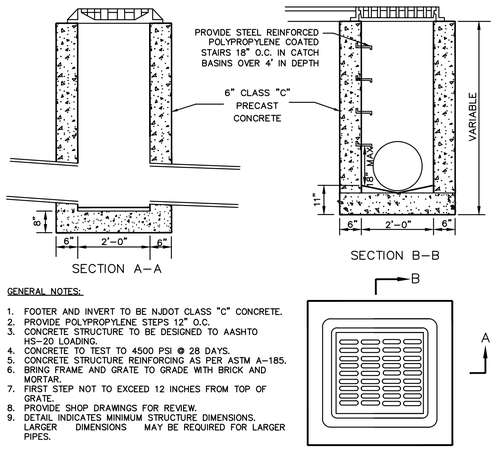
NOTE:
ALL PARTS OF HYDRANT FENDER SHALL BE CLEANED IN ACCORDANCE WITH THE PAINT MANUFACTURERS PRINTED INSTRUCTIONS AND COATED ON THE OUTSIDE WITH ONE COAT OF ZINC RICH EPOXY POLYAMIDE PRIMER AND ONE COAT OF ALUMINUM COLORED LOW GLOSS EPOXY ENAMEL ABOVE THE GROUND.

7 PANYNJ STEEL HYDRANT FENDER DETAIL



NOTES:
1. COMPACTED BACKFILL TO BE FREE OF EXCESSIVE CLAY. ORGANIC MATERIAL AND BOULDERS.
2. RECYCLED CONCRETE IS NOT TO BE USED AS BACKFILL.

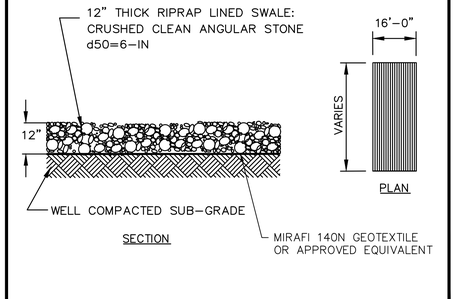
8 TYPICAL TRENCH DETAIL



GENERAL NOTES:

1. FOOTER AND INVERT TO BE NJDOT CLASS "C" CONCRETE.
2. PROVIDE POLYPROPYLENE STEPS 12" O.C.
3. CONCRETE STRUCTURE TO BE DESIGNED TO AASHTO HS-20 LOADING.
4. CONCRETE TO TEST TO 4500 PSI @ 28 DAYS.
5. CONCRETE STRUCTURE REINFORCING AS PER ASTM A-185.
6. BRING FRAME AND GRATE TO GRADE WITH BRICK AND MORTAR.
7. FIRST STEP NOT TO EXCEED 12 INCHES FROM TOP OF GRATE.
8. PROVIDE SHOP DRAWINGS FOR REVIEW.
9. DETAIL INDICATES MINIMUM STRUCTURE DIMENSIONS. LARGER DIMENSIONS MAY BE REQUIRED FOR LARGER PIPES.

9 2' X 2' YARD DRAIN



10 GRAVEL LINED SWALE

Date	Description	No.
REVISIONS		

SIGNATURE DANIEL MIOLA DATE SIGNED
PROFESSIONAL ENGINEER NJ Lic. No. 24GE04676300

LANGAN
Langan Engineering and Environmental Services, LLC.
300 Kimball Drive
Parsippany, NJ 07054
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TN CERTIFICATE OF AUTHORIZATION NO. 6907

Project
SIGNATURE SOUTH EXPANSION
TETERBORO AIRPORT
BOROUGH OF MOONACHIE BLOCK 76, LOT 1.02
BOROUGH OF TETERBORO BLOCK 203, LOT 1
BERGEN COUNTY NEW JERSEY

Drawing Title
DETAILS IV

Project No.	001642424
Date	01/12/2026
Drawn By	CS
Checked By	KMR/ LM

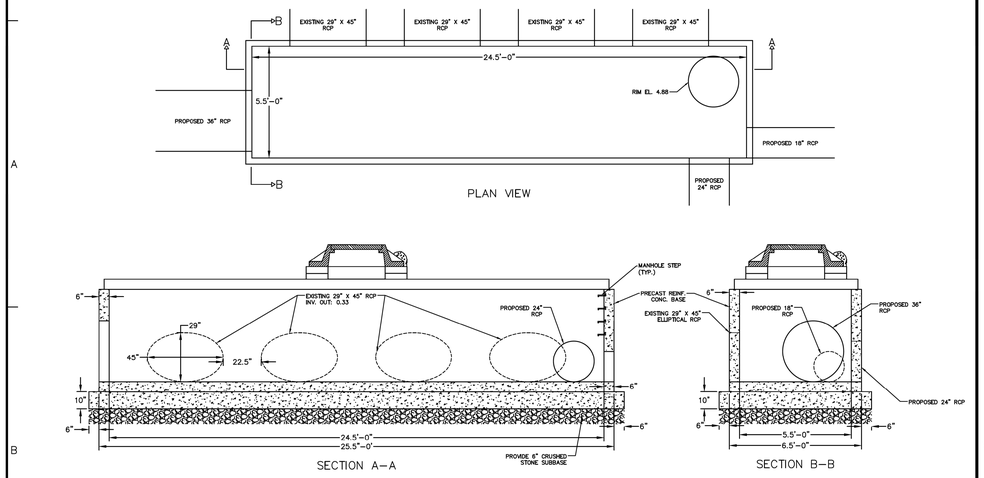
CS-504

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Project No. 001642424

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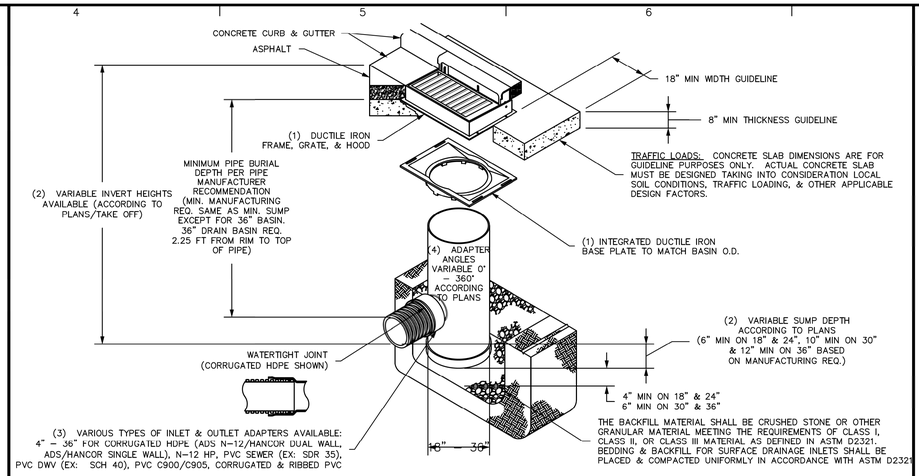
NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400



NOTES:

1. FOOTER AND INVERT TO BE NJDOT CLASS "C" CONCRETE.
2. IF WALL CONSTRUCTION OTHER THAN CONCRETE THE WALLS SHALL BE PLASTERED BOTH INSIDE AND OUTSIDE WITH 1/2" THICK CEMENT PLASTER.
3. PROVIDE ALUMINUM ALCO STEPS 6061T6 18" O.C. IN CATCH BASIN OVER 4' IN DEPTH. MAX. DIST. BETWEEN BOTTOM STEP AND BOTTOM OF INLET SHALL BE 18".
4. STRUCTURAL DESIGN SHALL BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD AND DESIGNED IN ACCORDANCE WITH PANYNJ STANDARDS.
5. CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS PRIOR TO CONSTRUCTION.

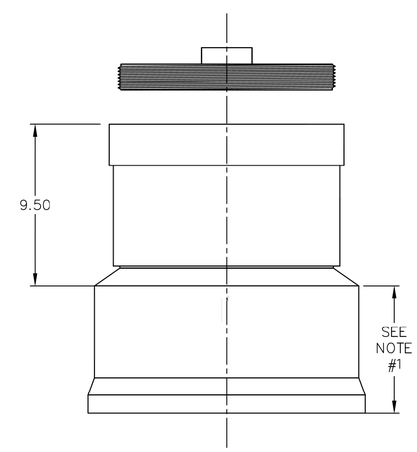
1 STORMWATER JUNCTION BOX



NOTES:

1. 18" – 30" FRAMES, GRATES, HOODS, & BASE PLATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
3. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (4" – 36").
4. ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
5. ALL CURB INLET GRATE OPTIONS (DIAGONAL & HIGH FLOW) SHALL MEET H-20 LOAD RATING

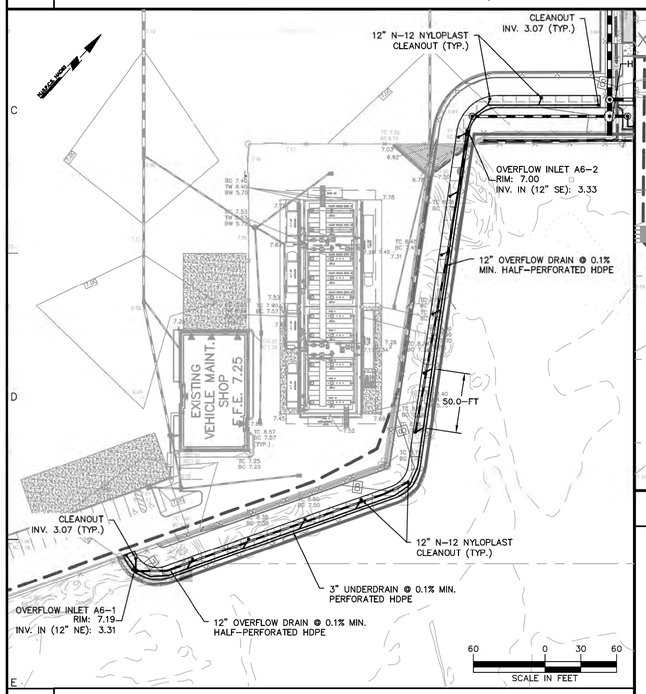
2 NYLOPLAST OVERFLOW CATCH BASIN



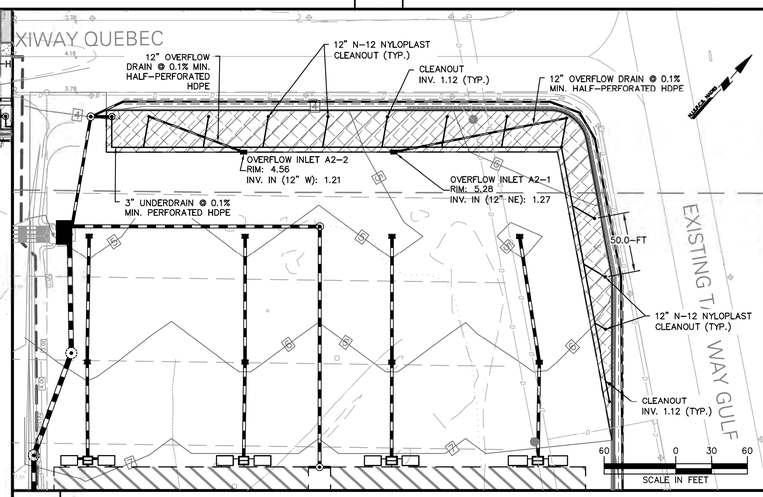
NOTES:

1. SEE DRAWING NO. 7001-110-275 FOR ADS N-12 & HANCOR DUAL WALL BELL INFORMATION.
2. DIMENSIONS ARE FOR REFERENCE ONLY. ACTUAL DIMENSIONS MAY VARY.
3. DIMENSIONS ARE IN INCHES.
4. DETAIL OBTAINED FROM ADS DETAIL LIBRARY.

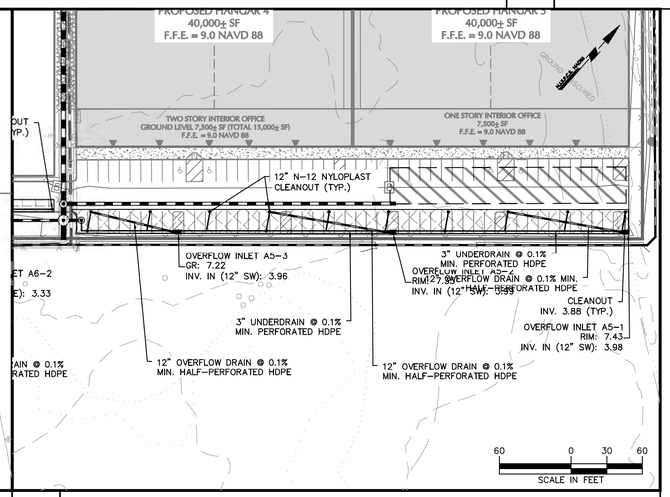
3 12" N12 NYLOPLAST CLEANOUT



4 PERVIOUS PAVEMENT SYSTEM A-6



5 PERVIOUS PAVEMENT SYSTEM A-2



6 PERVIOUS PAVEMENT SYSTEM A-5

Date	Description	No.
REVISIONS		

SIGNATURE DANIEL MIOLA DATE SIGNED
PROFESSIONAL ENGINEER NJ Lic. No. 24GE04676300

LANGAN
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TN CERTIFICATE OF AUTHORIZATION NO. 6907

Project
SIGNATURE SOUTH EXPANSION
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BERGEN COUNTY NEW JERSEY

Drawing Title
DETAILS V

Project No.	Date	Drawn By	Checked By
001642424	01/12/2026	CS	KMR/ LM

CS-505

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Filename: \\langan.com\data\NYC\data4\001642424\Cadd Data - 001642424\2D-DesignFiles\Civil\2025 Finalized Stormwater Design\CS501 - DETAILS.dwg Date: 1/13/2026 Time: 20:25 User: cschum Style Table: Langan.stb Layout: CS505

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Project No. 001642424