
STORMWATER OPERATION & MAINTENANCE MANUAL

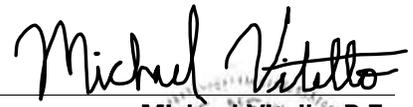
3501 STATE ROUTE 66 REDEVELOPMENT
3501 STATE ROUTE 66
BLOCK No. 3903, LOT No. 12 & 13
TOWNSHIP OF NEPTUNE, MONMOUTH COUNTY, NEW JERSEY

Prepared For:

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4488 W Boy Scout Boulevard, Suite 250
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Prepared By:

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NJ Certificate of Authorization No: 24GA27996400



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1.0 INTRODUCTION

The New Jersey Administrative Code NJAC 7:8-5.8 entitled "Maintenance Requirements" sets forth rules and refers to the New Jersey Stormwater Best Practices Manual (the BMP manual) by the New Jersey Department of Environmental Protection (NJDEP). Chapter 8 of the BMP manual entitled "Maintenance and Retrofit of Stormwater Management Measures" specifically addresses the requirements for maintenance of a major development. Major development is defined in the aforementioned administrative code as any development that provides for ultimately disturbing one or more acres of land or increasing the amount of impervious surface by one-quarter of an acre. This report is prepared to address the maintenance component of the herein described development to ensure the effective, efficient, and enduring service of a particular stormwater measure. This plan contains preventative and corrective maintenance tasks and procedures.

The party responsible for the preventative and corrective maintenance of the stormwater measures described herein is:

3501 RT 66 LLC
4488 W Boy Scout Boulevard, Suite 250
Tampa, Florida 33607
Contact: Gregory Williams
Phone: 813-676-9303
Email: gwilliams@crdpt.com

2.0 PROJECT DESCRIPTION

The project site is comprised of Block No. 3903, Lot No. 12 & 13 in the Township of Neptune, Monmouth County, New Jersey. The 47.38± acre tract consists of a vacant office complex, parking areas, and wetlands, and is bound by vacant land and industrial properties to the north, Green Grove Road to the east, State Route 66 to the south, and an office and industrial complex to the west. Jumping Brook traverses the western portion of the property, flowing from north to south toward State Route 66.

The proposed redevelopment includes the construction of:

- A 251,022± square foot warehouse with 32 loading docks and 25 trailer parking spaces;
- A 15,000 square foot retail building;
- An open space amenity area; and,
- Associated driveways, sidewalks, car parking areas, stormwater and utility infrastructure, and landscaping.

The proposed redevelopment increases regulated motor vehicle surfaces by more than one-quarter acre and disturbs more than one acre of land; therefore, this project is considered a "major development" from a stormwater management perspective, and the proposed design is required to address stormwater quantity, quality, and groundwater recharge requirements. The proposed stormwater management system consists of the following:

- A subsurface conveyance system consisting of inlets, manholes, and pipes to convey stormwater runoff from the 25-year design storm event;
- 4 small-scale bioretention basins;
- 2 small-scale infiltration basins;
- 1 large-scale infiltration basin; and,
- 1 porous asphalt pavement system.

3.0 STORMWATER MAINTENANCE OBJECTIVE

The stormwater management system for the proposed development is intended to collect and convey the stormwater runoff. Regular maintenance procedures are required to ensure the consistent operation and safe conditions of the stormwater management facilities and prevent the occurrence of problems and malfunctions. The maintenance program provides the stormwater maintenance procedures for the site. The maintenance plan shall be evaluated and adjusted as needed.

Funding shall be allocated to cover costs of preventive and corrective maintenance. Such funding must cover the costs of staffing, equipment, materials, maintenance, emergency repairs, replacement of equipment, training of employees, administrative costs, disposal costs and permit fees.

Regularly scheduled inspection and maintenance is necessary to ensure long-term operation and safety of stormwater management facilities. Inspection and maintenance procedure shall be recorded through detailed logs. Copies of maintenance related work orders shall be retained. Logs, work orders, the maintenance plan, and documentation of its evaluation shall be made available, upon request by any public entity with administrative, health, environmental or safety authority of the site.

Maintenance personnel shall be trained about the purpose and operation of the stormwater management facilities. They must understand the importance of the maintenance of such facilities and the consequences of neglect. The training shall include maintenance and inspection techniques, proper record keeping, and emergency procedures. Sample maintenance work order and inspection checklist and logs have been provided in Appendix A

and B of this manual. Actual maintenance work order and inspection checklists and logs shall be developed as part of the site stormwater facilities maintenance program.

4.0 CONSTRUCTED STORMWATER MANAGEMENT SYSTEM ELEMENTS

The on-site stormwater management system includes best management practices (BMPs) designed to meet the stormwater quantity, quality, and groundwater recharge requirements for the project site, as well as series of subsurface conveyance systems comprised of precast inlets, manhole structures, drainage pipes, and riprap aprons, which convey stormwater runoff to and from the stormwater management BMPs and ultimately to the proposed off-site discharge points.

4.1 Stormwater Management BMPs

The proposed redevelopment incorporates the following BMPs into the stormwater management design: 2 small-scale infiltration basins, 4 small-scale bioretention basins, and one large-scale infiltration basin. Refer to Drawings CG103, CG104, and CG105 for the location of each proposed BMP; the table below lists each BMP proposed on the property that is subject to the requirements set forth in this maintenance plan:

Table 1 – Summary of Proposed BMPs		
BMP Designation	Type of BMP	Location on Project Site
SSIB-1A	Small-scale infiltration basin	North of warehouse employee parking area
SSBB-1B	Small-scale bioretention basin	North of warehouse employee parking area
SSIB-1D	Small-scale infiltration basin	East of warehouse building
SSBB-1E	Small-scale bioretention basin	East of warehouse building
SSBB-1F	Small-scale bioretention basin	Southeast of warehouse building
SSBB-1G	Small-scale bioretention basin	Southwest of warehouse truck loading area
LSIB-1H	Large-scale infiltration basin	West of warehouse truck loading area
Porous Asphalt Pavement System 1	Porous Pavement	South of retail building

4.1.1 Small-Scale Bioretention Basins

There are 4 small-scale bioretention basins proposed on the project site. Small-scale bioretention basins are comprised of a 24-inch thick soil media layer, underlain by a 6" thick sand layer and an underdrain collection system comprised of perforated 4" or 6" diameter HDPE pipes encased by a minimum of 3 inches of AASHTO #57 stone aggregate both above and below the collection system piping. A variety of ornamental grasses, plants, and shrubs are planted within the basin to promote uptake of pollutants and evapotranspiration. An outlet control structure maintains specific water levels within the basin for each design storm event. The bioretention basins will be under-drained due to native soils that are mostly unsuitable for infiltration due to poor field-tested percolation test results of less than 1 inch per hour in various areas across the site.

The small-scale bioretention basins are designed to store and percolate the volume of stormwater generated by the water quality design storm event, which is defined as 1.25 inches of rainfall over a period of 2 hours. The first outlet opening within the outlet control is set a maximum 12" above the bottom of the storage area of the basin in order to promote infiltration through the soil media layer and achieve 80% TSS removal.

4.1.2 Small-Scale Infiltration Basins

There are 2 small-scale infiltration basins proposed on the project site. Small-scale infiltration basins are comprised of a 6" thick sand layer bottom, with vegetated side slopes. The small-scale infiltration basins are designed to store and percolate the volume of stormwater generated by the water quality design storm event, which is defined as 1.25 inches of rainfall over a period of 2 hours. The first outlet opening within the outlet control is set a maximum 12" above the bottom of the storage area of the basin in order to promote infiltration through the sand layer and achieve 80% TSS removal.

4.1.3 Large-Scale Infiltration Basins

There is one large-scale infiltration basin proposed on the project site. Large-scale infiltration basins are comprised of a 6" thick sand layer bottom, with vegetated side slopes. The large-scale infiltration basins are designed to store and percolate the volume of stormwater generated by the water quality design storm event, which is defined as 1.25 inches of rainfall over a period of 2 hours. The first outlet opening within the outlet control is set a maximum 12" above the bottom of the storage area of the basin in order to promote infiltration through the sand layer and achieve 80% TSS removal.

4.1.4 Porous Pavement Systems

There is one porous pavement system proposed on the project site. Porous pavement systems consist of a porous asphalt surface layer, a choker course that filters pollutants, subbase aggregate that acts as the stormwater runoff storage component of the BMP, and an underdrain collection system comprised of perforated 4" diameter HDPE pipes encased by stone aggregate both above and below the collection system piping. The depth of the subbase aggregate has been designed to store the volume of stormwater generated by the water quality design storm event in order to achieve 80% TSS removal credit. The underdrain collection system prevents runoff from infiltrating into the native subsoils; instead, the runoff is captured and discharged into the proposed subsurface conveyance network.

4.2 Stormwater Conveyance Network

The proposed project utilizes various series of subsurface conveyance networks to facilitate the collection and conveyance of stormwater runoff for the 25-year design storm event. The conveyance networks consist of precast concrete inlet structures, precast concrete manhole structures, drainage piping, roof lateral connections, and riprap aprons. Refer to Drawings CG104 and CG105 – Partial Drainage Plans for an overview of the conveyance network and location of various pipes and structures.

4.2.1 Storm Sewer Conveyance Piping

High Density Polyethylene (HDPE) Pipe is proposed for the conveyance of stormwater where the proposed cover over the top of the pipe is a minimum 2 feet. Where the cover over the top of the pipe is less than 2 feet, Class V reinforced concrete pipe (RCP) is proposed. Perforated HDPE pipe is proposed to be utilized as the underdrain collection system piping for the BMPs specified to utilize an underdrain collection system as part of their design. HDPE flared-end sections are proposed at outfall locations within stormwater management basins where retentive grading measures are not required.

4.2.2 Precast Concrete Structures

Precast concrete inlets utilized throughout the site generally consist of NJDOT Type A, Type B, and Type E inlets. Type B curb inlets will be fitted with Type N Eco curb pieces to prevent trash and floatables from entering the conveyance network. All inlet grates shall be bicycle-safe, and rated to meet heavy-duty H-20 traffic loading requirements. Precast storm manhole structures and inlet box sizes are to be sized to accommodate the largest proposed pipe connections, and polypropylene steps shall be provided for maintenance access. Precast concrete headwalls are proposed where outfall pipes enter stormwater management basins and the grade change necessitates a retaining wall along the basin embankment.

5.0 INSPECTION AND MAINTENANCE PROCEDURES

The owner is responsible for maintenance identified in the maintenance manual and shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater system measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders. The owner is to evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan as needed.

Maintenance and inspection access to all proposed stormwater BMPs shall be maintained at all times. All components of the stormwater management measures must be readily accessible; trees, shrubs, and ornamental grasses must be pruned or trimmed as necessary to maintain access, and areas adjacent to these BMPs shall be made clear during scheduled maintenance activities to allow for ease of access for maintenance vehicles.

5.1 Preventative Maintenance Measures

The frequency and type of preventative maintenance prescribed is adopted from the New Jersey Best Management Practices Manual.

5.1.1 Conveyance Networks

The conveyance systems, including inlets, manholes, and pipes are expected to receive and/or accumulate debris and sediment. These systems shall be inspected for clogging and sediment accumulation at least bi-annually, and shall be inspected for trash and debris removal at least quarterly, and may require cleaning to prevent the loss of discharge capacity storage volume. Sediment removal should take place when all runoff has drained from the pipe networks and the systems are reasonably dry. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

All structural components must be inspected for cracking, subsidence, breaching, wearing and deterioration at least annually. The conditions of surrounding and above lying materials shall be inspected for evidence of potential failures or deterioration.

Two people may be needed to perform routine maintenance of the conveyance systems. The routine equipment expected to be utilized for the maintenance tasks may include a jet vacuum vehicle, shovels, lighting equipment and a wheelbarrow or truck for the hauling off of debris.

All inspections and maintenance operations shall be documented and logged. All

documentations and logs shall be retained for future review.

5.1.2 Bioretention and Infiltration Basins

The basins shall be inspected for sediment accumulation at least quarterly, and shall be inspected for trash and debris removal at least quarterly. The bottom elevation and design storage volume of each basin must be maintained in order to maintain adequate capacity; sediment and debris build-up shall be removed upon inspection. The basins and associated riprap aprons should be inspected for signs of erosion at least quarterly, and after each major rainfall event in excess of 2 inches. Structural components associated with the outlet control structure, including any trash racks, should be inspected at least annually.

Meadow mix seeding is utilized along the bottom and embankment sides of the proposed bioretention basins. After the first growing season, and if the meadow mix seeding is well established, the meadow mix native vegetation shall be mowed only once annually in order to promote sustained growth. If the meadow mix is not fully established, the meadow mix areas shall be supplemented with additional seeding to ensure re-establishing all meadow mix areas. The annual maintenance mowing shall be done in late winter during the month of March.

Sand is utilized along the bottom of the proposed infiltration basins. Sand shall be replaced as necessary upon quarterly inspections in order to prevent excessive build-up of silt and sediment. The sand layer shall maintain a minimum infiltration rate of 20 inches per hour.

5.1.3 Porous Pavement Systems

All components of the porous asphalt pavement systems should be inspected at least twice annually unless otherwise noted. The perforated HDPE underdrain system should be inspected for clogging and jet-cleaned as necessary to remove sediment. The porous asphalt layer should be inspected for clogging at least quarterly, and after each major rain event, for signs of clogging, sediment build-up, and weed growth. Sediment be removed and jet-cleaned as necessary, in order to maintain adequate permeability for runoff to percolate into the storage bed below.

5.2 Corrective Maintenance Measures

Depending on many factors, such as the performance of preventative maintenance actions, weather, or unexpected incidents, corrective maintenance requirements may not be precisely anticipated. Corrective maintenance is required on an emergency or non-routine basis to

correct problems or malfunctions and to restore the components of the stormwater management system to its intended operations and safe conditions.

Standing water within the proposed basins more than 72 hours after a storm event has ended is a sign that there is inadequate infiltration and/or discharge through the outlet control structure is occurring. The outlet control structure orifice openings, soil media layer, and underdrain collection piping within bioretention basins shall be inspected for sediment build-up, clogging, or debris and corrected immediately. The outlet control structure and sand layer within infiltration basins shall be inspected sediment build-up, clogging, or debris and corrected immediately.

Sediment, debris, and trash which threaten the discharge capacity and storage volume of a stormwater facility should be removed immediately and properly disposed of in a timely manner, Equipment and personnel must be available to perform the removal work on short notice. Disposal of debris, trash, sediments and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. The lack of an available disposal site should not delay the removal of trash, debris, and sediment. Temporary storage shall be utilized until an approved disposal site is available.

Structural damage to precast structures, treatment devices, pipes, and trash racks must be repaired promptly. Equipment, materials and personnel must be available to perform these repairs on short notice. The immediacy of the repairs will depend upon the nature of the damage and its effects on the safety and operations of the facility. The analysis of structural damage and the design and performance of structural repairs should only be undertaken by qualified personnel.

All corrective maintenance operation shall be documented and logged. All documentation and logs shall be retained for future review.

6.0 ESTIMATED COST FOR MAINTENANCE PROCEDURES

Storm Sewer Conveyance Systems sediment removal by jet vacuum truck (2-man crew) performed annually:

\$5,000 per session X 1 = \$5,000.00 annual cost (if required)

Bioretention/Infiltration basins and preventative maintenance performed annually:

\$5,000 per session X 1 = \$5,000.00 annual cost (if required)

Porous Asphalt Pavement System sediment removal by jet vacuum truck (2-man crew) performed annually:

\$5,000 per session X 1 = \$5,000.00 annual cost (if required)

Trash and Debris removal by manual labor (2-man crew) performed Bi-annually

\$2,000.00 per session X 2 = \$4,000.00 annual cost

Total = \$19,000.00 annual cost (if required)

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DRAWINGS



- GRADING AND DRAINAGE PLAN NOTES:**
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND / OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES, WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
 - CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ACTUAL LOCATIONS OF ALL UTILITY ENTRANCES TO INCLUDE SANITARY SEWER LATERALS, DOMESTIC WATER SERVICE, ELECTRICAL TELEPHONE AND GAS SERVICE. CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND TO ENSURE PROPER DEPTHS ARE ACHIEVED AS WELL AS COORDINATING WITH THE UTILITY COMPANIES AS TO LOCATION AND SCHEDULING OF CONNECTIONS TO THEIR FACILITIES.
 - PVC = POLYVINYL CHLORIDE PIPE
HDPE = HIGH DENSITY POLYETHYLENE PIPE
RCP = REINFORCED CONCRETE PIPE
 - STORM DRAINAGE PIPING TO UTILIZE WATER TIGHT JOINTS.
 - COMPACTION CRITERIA FOR FILL PLACEMENT IN THE FOLLOWING AREAS SHALL MEET OR EXCEED THE FOLLOWING MINIMUM PERCENTAGE OF MAXIMUM MODIFIED PROCTOR DRY DENSITY AS DETERMINED BY ASTM D-1557 USED ON REPRESENTATIVE SOIL SAMPLES, UNLESS MORE STRINGENT CRITERIA GIVEN ELSEWHERE:

FILL AREA	PERCENT OF MAXIMUM MODIFIED PROCTOR DRY DENSITY
BUILDING FOOTPRINT	95%
PAVEMENT AND ROADWAYS	98%
SIDEWALKS	95%
LANDSCAPE AREAS	90%
TRENCH BACKFILL	95%
 - PROTECT SUBGRADE FROM EXCESSIVE WHEEL LOADING DURING CONSTRUCTION, INCLUDING CONCRETE TRUCKS AND DUMP TRUCKS.
 - REMOVE AREAS OF FINISHED SUBGRADE FOUND TO HAVE INSUFFICIENT COMPACTION DENSITY TO DEPTH NECESSARY AND REPLACE IN A MANNER THAT WILL COMPLY WITH COMPACTION REQUIREMENTS BY USE OF MATERIAL EQUAL TO OR BETTER THAN BEST SUBGRADE MATERIAL ON-SITE. SURFACE OF SUBGRADE AFTER COMPACTION SHALL BE HARD, UNIFORM, SMOOTH, STABLE, AND TRUE TO GRADE AND CROSS SECTION.
 - ALL CONCRETE, UNLESS OTHERWISE NOTED OR SPECIFIED BY REGULATORY AUTHORITIES, SHALL BE A MINIMUM OF 4,000 PSI.

- THE CONTRACTOR SHALL REVIEW THE STORM DRAINAGE CONNECTIONS TO THE INLETS, MANHOLES, ETC. AND PROVIDE THE APPROPRIATE BOX SIZE, MANHOLES SIZE, TOP PIECES, ETC. AS NECESSARY TO ACCOMMODATE THE PROPOSED INLET AND OUTLET PIPES.
- CONTRACTOR TO PROVIDE A SHOP DRAWING FOR REVIEW AND APPROVAL BY THE OWNER'S ENGINEER FOR EACH CATCH BASIN, MANHOLE, AND OTHER PRECAST STORM STRUCTURES DETAILING STRUCTURE DIMENSIONS, LOCATION OF STEPS, PIPE CONNECTIONS AND OPENINGS, AND RIM/GRATE/INVERT ELEVATIONS. A SHOP DRAWING, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY, SHALL BE PROVIDED FOR EACH TYPE OF PRECAST CONCRETE STRUCTURE THAT DETAILS THE STRUCTURAL DESIGN. ALL PRECAST STRUCTURES AND FRAMES/GRATES SHALL MEET H-20 TRAFFIC LOADING REQUIREMENTS. CATCH BASINS, MANHOLES, AND DETENTION SYSTEM PIPING SHALL BE CONSTRUCTED IN A MANNER THAT WILL PREVENT FLOATION DUE TO GROUNDWATER. CONTRACTOR SHALL SUBMIT METHODOLOGY AND SUPPORTING BUOYANCY CALCULATIONS PREPARED BY AND SIGNED/SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY FOR ANTI-FLOATION OF THE STORM STRUCTURES IF THEY ARE TO BE LOCATED WITHIN THE GROUNDWATER TABLE.
- THE CONTRACTOR SHALL PROVIDE A RETAINING WALL DESIGN FOR EACH PROPOSED WALL PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY FOR REVIEW BY THE OWNER'S ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR AND THE RETAINING WALL DESIGNER SHALL SPECIFICALLY NOTE ANY EXISTING OR PROPOSED STRUCTURES THAT ARE LOCATED IN OR NEAR THE WALL (INLETS, LIGHT POLES, FENCES, STORM PIPES, UTILITIES, GUIDE RAILS, AND OTHER FEATURES) AND SHALL COORDINATE DESIGN AND INSTALLATION OF RETAINING WALL SUCH THAT THE FEATURES ARE ACCOMMODATED IN THE DESIGN AS APPROPRIATE.
- PIPE LENGTHS PROVIDED ARE MEASURED FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
- CONTRACTOR SHALL CLEAR EXISTING STORM PIPES OF ANY DEBRIS OR SEDIMENT.
- TRENCH DEPTH REQUIREMENTS MEASURED FROM FINISHED GRADE OR PAVED SURFACE SHALL MEET THE FOLLOWING REQUIREMENTS OR APPLICABLE CODES AND ORDINANCES:
 - SANITARY SEWER: DEPTHS, ELEVATIONS AND GRADES AS INDICATED ON DRAWINGS.
 - STORM SEWER: DEPTHS, ELEVATIONS, AND GRADES AS SHOWN ON DRAWINGS.
 - ELECTRICAL CONDUITS: 24 INCHES MINIMUM TO TOP OF CONDUIT OR AS REQUIRED BY NEC 300-5, NEC 710-36 CODES, OR THE LOCAL UTILITY COMPANY REQUIREMENTS, WHICHEVER IS DEEPER.
 - TELEPHONE CONDUITS: 18 INCHES MINIMUM TO TOP OF CONDUIT OR AS REQUIRED BY THE LOCAL UTILITY COMPANY, WHICHEVER IS DEEPER.

- GENERAL NOTES:**
- BACKGROUND BOUNDARY AND TOPOGRAPHIC SURVEY INFORMATION REFERENCED FROM PLAN TITLED "BOUNDARY AND TOPOGRAPHIC SURVEY," PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, LLC, DATED OCTOBER 27, 2020, AND LAST REVISED AUGUST 4, 2021.
 - HORIZONTAL DATUM REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 83).
 - ELEVATIONS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
 - THE FRESHWATER WETLANDS/WATERS BOUNDARY LINE DEPICTED ON THE PLANS HAVE BEEN VERIFIED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION PER THE LETTER OF INTERPRETATION DATED MAY 24, 2021, FILE NO. 1334-09-0002. THE DEPARTMENT HAS DETERMINED THAT ALL FRESHWATER WETLANDS ON-SITE ARE OF INTERMEDIATE RESOURCE VALUE AND HAVE A 50-FOOT FRESHWATER WETLAND TRANSITION AREA BUFFER.
 - THE STATE OF NEW JERSEY HAS DETERMINED THAT ALL OR A PORTION OF THIS LOT LIES IN A FLOOD HAZARD AREA AND/OR RIPARIAN ZONE. CERTAIN ACTIVITIES IN FLOOD HAZARD AREAS AND RIPARIAN ZONES ARE REGULATED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SOME ACTIVITIES MAY BE PROHIBITED ON THIS SITE OR MAY FIRST REQUIRE A FLOOD HAZARD AREA PERMIT. CONTACT THE WATERSHED AND LAND MANAGEMENT PROGRAM AT (609) 777-0454 FOR MORE INFORMATION PRIOR TO ANY CONSTRUCTION ON-SITE.
 - THE FLOOD HAZARD ELEVATION FOR THE PROJECT SITE WAS DETERMINED USING METHOD 3, THE FEMA FLUVIAL METHOD, AS SET FORTH IN N.J.A.C. 7:13 FLOOD HAZARD AREA CONTROL ACT RULES. THE NEW JERSEY FLOOD HAZARD AREA DESIGN FLOOD (NFADFD) FOR THE PROJECT SITE HAS BEEN DETERMINED TO BE ELEVATION 72.4 NAVD 88.
- DRAINAGE PIPE INSTALLATION WITHIN WETLAND TRANSITION AREA NOTES:**
- THE PROPOSED 36" DIA. HDPE DRAINAGE PIPE FROM PROPOSED DRAINAGE MANHOLE MH1-0 TO THE EXISTING DRAINAGE MANHOLE LOCATED WITHIN THE WETLAND TRANSITION AREA SHALL BE INSTALLED USING HORIZONTAL DIRECTIONAL DRILLING (HDD) FOR THE LENGTH OF PROPOSED PIPE LOCATED WITHIN THE WETLAND TRANSITION AREA, IN ORDER TO AVOID SOIL DISTURBANCE AND IMPACTS TO THE WETLAND TRANSITION AREA.

- GAS MAINS AND SERVICE: 30 INCHES MINIMUM TO TOP OF PIPE, OR AS REQUIRED BY THE LOCAL UTILITY COMPANY, WHICHEVER IS DEEPER.
- SITE GRADING SHALL NOT PROCEED UNTIL ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
- CONTRACTOR SHALL PROVIDE WRITTEN REQUESTS FOR INFORMATION TO THE OWNER AND OWNER'S ENGINEER PRIOR TO THE CONSTRUCTION OF ANY SPECIFIC SITEWORK ITEM IF ANY SPECIFIC SITEWORK ITEM DEPICTED ON THE PLANS WARRANTS ADDITIONAL INFORMATION REQUIRED FOR CONSTRUCTION AND IS NOT RELATED TO MEANS AND METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SPECIFIC SITE WORK ITEMS INSTALLED DIFFERENTLY THAN INTENDED AS DEPICTED ON THE PLANS IN THE ABSENCE OF SUBMITTING AND ADDRESSING WRITTEN REQUESTS FOR INFORMATION.
- PROPOSED SIDEWALKS SHALL BE CONSTRUCTED WITH CROSS-SLOPES THAT DO NOT EXCEED 1.5%.
- PROPOSED RCP PIPE IS TO BE CLASS V PIPE.



LEGEND		
	EXISTING	PROPOSED
PROPERTY LINE/ROW	---	---
CONTOUR	90	95
SPOT ELEVATION	92.53	92.08
STORM MANHOLE	○	●
SANITARY MANHOLE	○	●
CATCH BASIN	□	■
STORM SEWER	—	—
SANITARY SEWER	—	—
RETAINING WALL	—	—

Date	Description	No.
5/3/24	REVISED FOR SUBMISSION TO NEPTUNE	4
8/30/23	REVISED PER NJDEP COMMENTS	3
7/28/23	REVISED PER NJDEP, NJDEP & FIRST ENERGY COMMENTS	2
5/10/23	REVISED RETAIL LAYOUT & PER NJDEP COMMENTS	1

REVISIONS

SIGNATURE: *John Cote* DATE SIGNED: 5/3/2024
 PROFESSIONAL ENGINEER NJ Lic. No. 246E03705800

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Project: 3501 STATE ROUTE 66 REDEVELOPMENT
 BLOCK No. 3903, LOT No. 12 & 13
 NEPTUNE TOWNSHIP
 MONMOUTH COUNTY NEW JERSEY

Drawing Title: **OVERALL GRADING PLAN**

Project No. 100775002	Drawing No. CG100
Date: AUGUST 26, 2022	Drawn By: TEG
Checked By: MVJ	Sheet 19 of 48

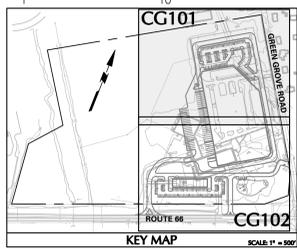
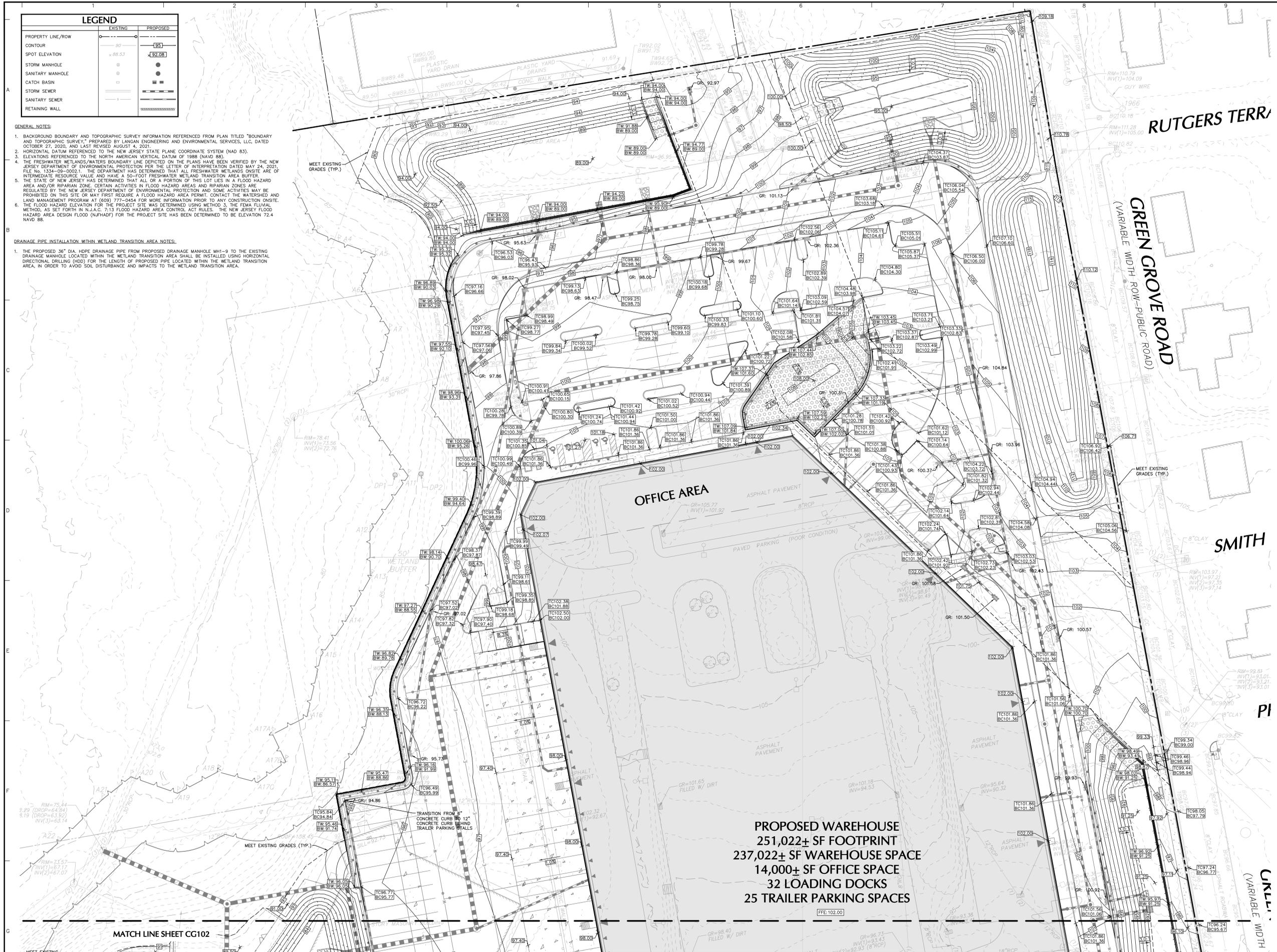
LEGEND	
EXISTING	PROPOSED
PROPERTY LINE/ROW	---
CONTOUR	---
SPOT ELEVATION	---
STORM MANHOLE	---
SANITARY MANHOLE	---
CATCH BASIN	---
STORM SEWER	---
SANITARY SEWER	---
RETAINING WALL	---

GENERAL NOTES:

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OFFICE AREA

PROPOSED WAREHOUSE
 251,022± SF FOOTPRINT
 237,022± SF WAREHOUSE SPACE
 14,000± SF OFFICE SPACE
 32 LOADING DOCKS
 25 TRAILER PARKING SPACES

Date	Description	No.
5/3/24	REVISED FOR SUBMISSION TO NEPTUNE	4
8/30/23	REVISED PER NJDEP COMMENTS	3
7/28/23	REVISED PER NJDOT, NJDEP, & FIRST ENERGY COMMENTS	2
5/10/23	REVISED RETAIL LAYOUT & PER NJDOT COMMENTS	1

REVISIONS

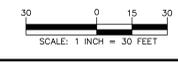
5/3/2024
 SIGNATURE: *John Cote* DATE SIGNED: 5/3/2024
 PROFESSIONAL ENGINEER NJ Lic. No. 246E03705800

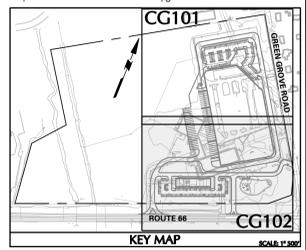
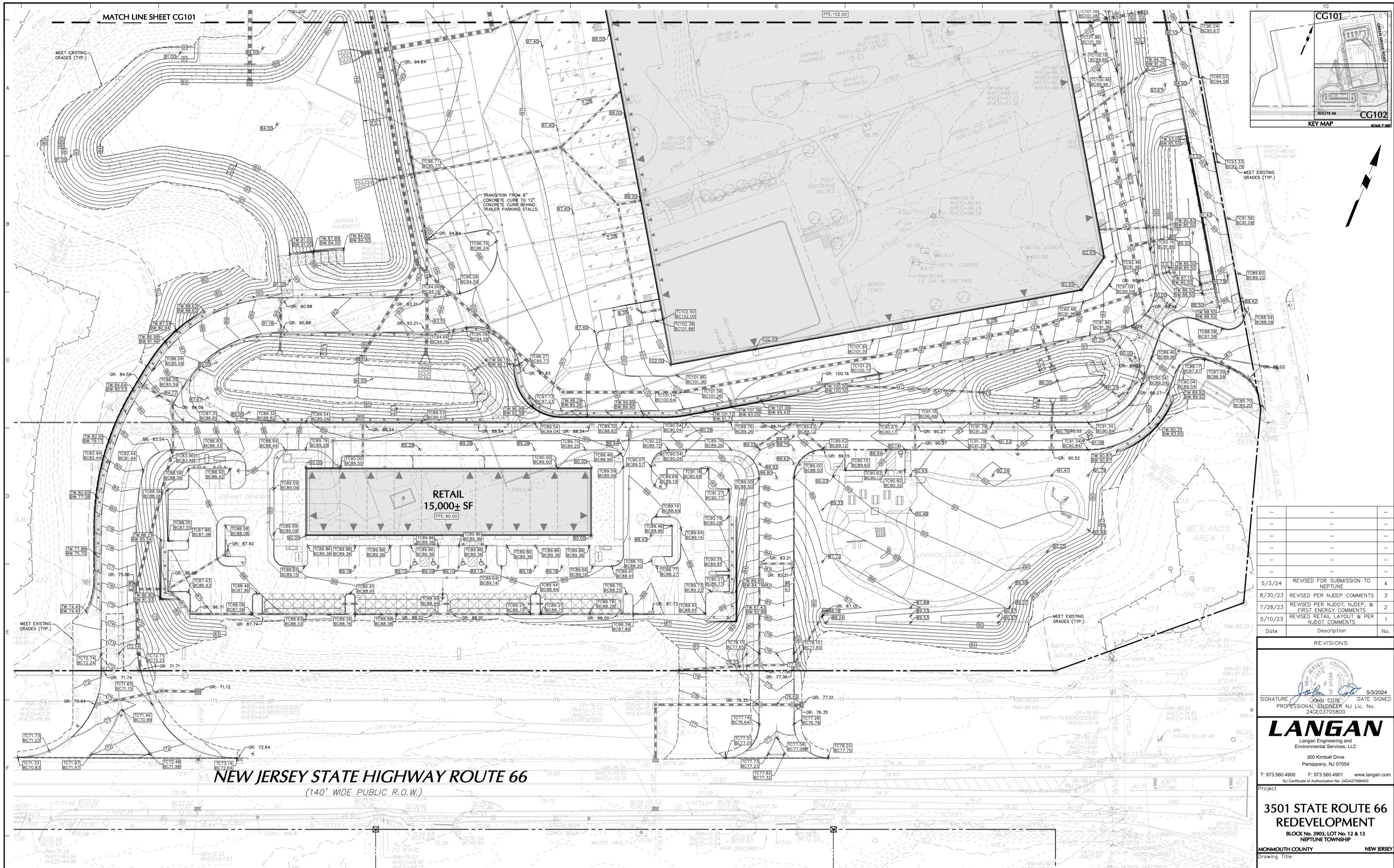
LANGAN
 Langan Engineering and Environmental Services, LLC
 300 Kimball Drive
 Parsippany, NJ 07054
 T: 973.560.4900 F: 973.560.4901 www.langan.com
 NJ Certificate of Authorization No. 246A27866400

3501 STATE ROUTE 66 REDEVELOPMENT
 BLOCK No. 3903, LOT No. 12 & 13
 NEPTUNE TOWNSHIP
 MONMOUTH COUNTY NEW JERSEY

PARTIAL GRADING PLAN

Project No.	100775002	Drawing No.	CG101
Date	AUGUST 26, 2022	Drawn By	TEG
Checked By	MJV	Sheet	20 of 48





Date	Description	No.
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REVISIONS

SIGNATURE: *John Cote* 5/3/2024
 JOHN COTE DATE SIGNED
 PROFESSIONAL ENGINEER NJ Lic. No. 24603705800



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3501 STATE ROUTE 66 REDEVELOPMENT
 BLOCK No. 3903, LOT No. 12 & 13
 NEPTUNE TOWNSHIP
 MONMOUTH COUNTY NEW JERSEY

Drawing Title

PARTIAL GRADING PLAN

Project No.	100775002	Drawing No.	CG102
Date	AUGUST 26, 2022	Drawn By	TEG
Checked By	MV	Sheet	21 of 48

LEGEND

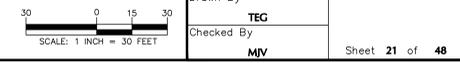
PROPERTY	EXISTING	PROPOSED
PROPERTY LINE/ROW	—	—
CONTOUR	90	95
SPOT ELEVATION	88.53	92.08
STORM MANHOLE	○	●
CATCH BASIN	○	■
STORM SEWER	—	—
SANITARY SEWER	—	—
RETAINING WALL	—	—

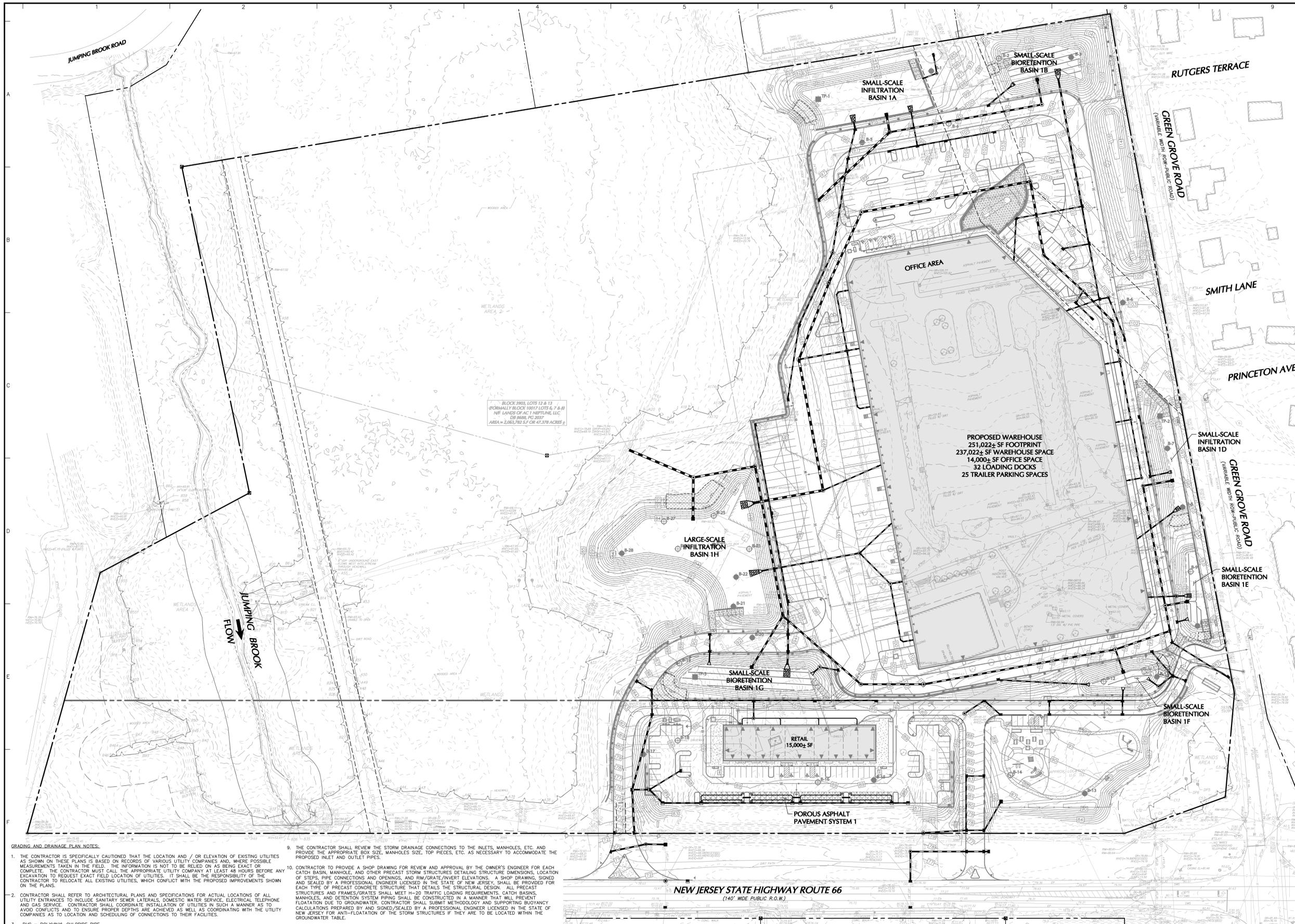
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	LEGEND	
	EXISTING	PROPOSED
PROPERTY LINE/ROW	---	---
CONTOUR	---	---
SPOT ELEVATION	• 99.53	• 99.53
STORM MANHOLE	○	●
SANITARY MANHOLE	○	●
CATCH BASIN	□	■
STORM SEWER	---	---
SANITARY SEWER	---	---
RETAINING WALL	---	---



BLOCK 3903, LOTS 12 & 13
FORMERLY BLOCK 10017 LOTS 6, 7 & 8
NEE LANDS OF ACT 1 NEPTUNE, LLC
D.R. 8668, PG. 2017
AREA = 2,265,792.57 SQ. FT. OR 41.376 ACRES

PROPOSED WAREHOUSE
251,022± SF FOOTPRINT
237,022± SF WAREHOUSE SPACE
14,000± SF OFFICE SPACE
32 LOADING DOCKS
25 TRAILER PARKING SPACES

LARGE-SCALE INFILTRATION BASIN 1H

SMALL-SCALE BIORETENTION BASIN 1G

RETAIL 15,000± SF

POROUS ASPHALT PAVEMENT SYSTEM 1

NEW JERSEY STATE HIGHWAY ROUTE 66
(140' WIDE PUBLIC R.O.W.)

- GRADING AND DRAINAGE PLAN NOTES:**
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND / OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES, WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
 - CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ACTUAL LOCATIONS OF ALL UTILITY ENTRANCES TO INCLUDE SANITARY SEWER LATERALS, DOMESTIC WATER SERVICE, ELECTRICAL TELEPHONE AND GAS SERVICE. CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND TO ENSURE PROPER DEPTHS ARE ACHIEVED AS WELL AS COORDINATING WITH THE UTILITY COMPANIES AS TO LOCATION AND SCHEDULING OF CONNECTIONS TO THEIR FACILITIES.
 - PVC = POLYVINYL CHLORIDE PIPE
HDPE = HIGH DENSITY POLYETHYLENE PIPE
RCP = REINFORCED CONCRETE PIPE
 - STORM DRAINAGE PIPING TO UTILIZE WATER TIGHT JOINTS.
 - COMPACTION CRITERIA FOR FILL PLACEMENT IN THE FOLLOWING AREAS SHALL MEET OR EXCEED THE FOLLOWING MINIMUM PERCENTAGE OF MAXIMUM MODIFIED PROCTOR DRY DENSITY AS DETERMINED BY ASTM D-1557 USED ON REPRESENTATIVE SOIL SAMPLES, UNLESS MORE STRINGENT CRITERIA GIVEN ELSEWHERE:

FILL AREA	PERCENT OF MAXIMUM MODIFIED PROCTOR DRY DENSITY
BUILDING FOOTPRINT	95%
PAVEMENT AND ROADWAYS	98%
SIDEWALKS	95%
LANDSCAPE AREAS	90%
TRENCH BACKFILL	95%
 - PROTECT SUBGRADE FROM EXCESSIVE WHEEL LOADING DURING CONSTRUCTION, INCLUDING CONCRETE TRUCKS AND DUMP TRUCKS.
 - REMOVE AREAS OF FINISHED SUBGRADE FOUND TO HAVE INSUFFICIENT COMPACTION DENSITY TO DEPTH NECESSARY AND REPLACE IN A MANNER THAT WILL COMPLY WITH COMPACTION REQUIREMENTS BY USE OF MATERIAL EQUAL TO OR BETTER THAN BEST SUBGRADE MATERIAL ON-SITE. SURFACE OF SUBGRADE AFTER COMPACTION SHALL BE HARD, UNIFORM, SMOOTH, STABLE, AND TRUE TO GRADE AND CROSS SECTION.
 - ALL CONCRETE, UNLESS OTHERWISE NOTED OR SPECIFIED BY REGULATORY AUTHORITIES, SHALL BE A MINIMUM OF 4,000 PSI.
 - CONTRACTOR SHALL REVIEW THE STORM DRAINAGE CONNECTIONS TO THE INLETS, MANHOLES, ETC. AND PROVIDE THE APPROPRIATE BOX SIZE, MANHOLES SIZE, TOP PIECES, ETC. AS NECESSARY TO ACCOMMODATE THE PROPOSED INLET AND OUTLET PIPES.
 - CONTRACTOR TO PROVIDE A SHOP DRAWING FOR REVIEW AND APPROVAL BY THE OWNER'S ENGINEER FOR EACH CATCH BASIN, MANHOLE, AND OTHER PRECAST STORM STRUCTURES DETAILING STRUCTURE DIMENSIONS, LOCATION OF STEPS, PIPE CONNECTIONS AND OPENINGS, AND RIM/GRADE/INVERT ELEVATIONS. A SHOP DRAWING, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY, SHALL BE PROVIDED FOR EACH TYPE OF PRECAST CONCRETE STRUCTURE THAT DETAILS THE STRUCTURAL DESIGN. CALL PRECAST STRUCTURES AND FRAMES/GRATES SHALL MEET H-20 TRAFFIC LOADING REQUIREMENTS. CATCH BASINS, MANHOLES, AND DETENTION SYSTEM PIPING SHALL BE CONSTRUCTED IN A MANNER THAT WILL PREVENT FLOATION DUE TO GROUNDWATER. CONTRACTOR SHALL SUBMIT METHODOLOGY AND SUPPORTING BUOYANCY CALCULATIONS PREPARED BY AND SIGNED/SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY FOR ANTI-FLOATION OF THE STORM STRUCTURES IF THEY ARE TO BE LOCATED WITHIN THE GROUNDWATER TABLE.
 - CONTRACTOR SHALL PROVIDE A RETAINING WALL DESIGN FOR EACH PROPOSED WALL PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY FOR REVIEW BY THE OWNER'S ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR AND THE RETAINING WALL DESIGNER SHALL SPECIFICALLY NOTE ANY EXISTING OR PROPOSED STRUCTURES THAT ARE LOCATED IN OR NEAR THE WALL (INLETS, LIGHT POLES, FENCES, STORM PIPES, UTILITIES, GUIDE RAILS, AND OTHER FEATURES) AND SHALL COORDINATE DESIGN AND INSTALLATION OF RETAINING WALL SUCH THAT THE FEATURES ARE ACCOMMODATED IN THE DESIGN AS APPROPRIATE.
 - PIPE LENGTHS PROVIDED ARE MEASURED FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
 - CONTRACTOR SHALL CLEAR EXISTING STORM PIPES OF ANY DEBRIS OR SEDIMENT.
 - TRENCH DEPTH REQUIREMENTS MEASURED FROM FINISHED GRADE OR PAVED SURFACE SHALL MEET THE FOLLOWING REQUIREMENTS OR APPLICABLE CODES AND ORDINANCES:
 - SANITARY SEWER: DEPTHS, ELEVATIONS AND GRADES AS INDICATED ON DRAWINGS.
 - STORM SEWER: DEPTHS, ELEVATIONS, AND GRADES AS SHOWN ON DRAWINGS.
 - ELECTRICAL CONDUITS: 24 INCHES MINIMUM TO TOP OF CONDUIT OR AS REQUIRED BY NEC 300-5, NEC 710-36 CODES, OR THE LOCAL UTILITY COMPANY REQUIREMENTS, WHICHEVER IS DEEPER.
 - TV CONDUITS: 18 INCHES MINIMUM TO TOP OF CONDUIT OR AS REQUIRED BY THE LOCAL UTILITY COMPANY, WHICHEVER IS DEEPER.
 - TELEPHONE CONDUITS: 18 INCHES MINIMUM TO TOP OF CONDUIT OR AS REQUIRED BY THE LOCAL UTILITY COMPANY, WHICHEVER IS DEEPER.

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- f. GAS MAINS AND SERVICE:** 30 INCHES MINIMUM TO TOP OF PIPE, OR AS REQUIRED BY THE LOCAL UTILITY COMPANY, WHICHEVER IS DEEPER.
- SITE GRADING SHALL NOT PROCEED UNTIL ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
 - CONTRACTOR SHALL PROVIDE WRITTEN REQUESTS FOR INFORMATION TO THE OWNER AND OWNER'S ENGINEER PRIOR TO THE CONSTRUCTION OF ANY SPECIFIC SITEWORK ITEM IF ANY SPECIFIC SITEWORK ITEM DEPICTED ON THE PLANS WARRANTS ADDITIONAL INFORMATION REQUIRED FOR CONSTRUCTION AND IS NOT RELATED TO MEANS AND METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SPECIFIC SITE WORK ITEMS INSTALLED DIFFERENTLY THAN INTENDED AS DEPICTED ON THE PLANS IN THE ABSENCE OF SUBMITTING AND ADDRESSING WRITTEN REQUESTS FOR INFORMATION.
 - PROPOSED SIDEWALKS SHALL BE CONSTRUCTED WITH CROSS-SLOPES THAT DO NOT EXCEED 1.5%.
 - PROPOSED RCP PIPE IS TO BE CLASS V PIPE.

Date	Description	No.
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REVISIONS

SIGNATURE: *John Cote* DATE SIGNED: 5/3/2024
PROFESSIONAL ENGINEER NJ Lic. No. 246E03705800

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NJ Certificate of Authorization No. 246A27896403

Project: **3501 STATE ROUTE 66 REDEVELOPMENT**
BLOCK No. 3903, LOT No. 12 & 13
NEPTUNE TOWNSHIP
MONMOUTH COUNTY NEW JERSEY

Drawing Title: **OVERALL DRAINAGE PLAN**

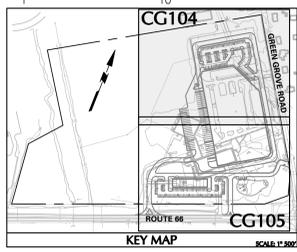
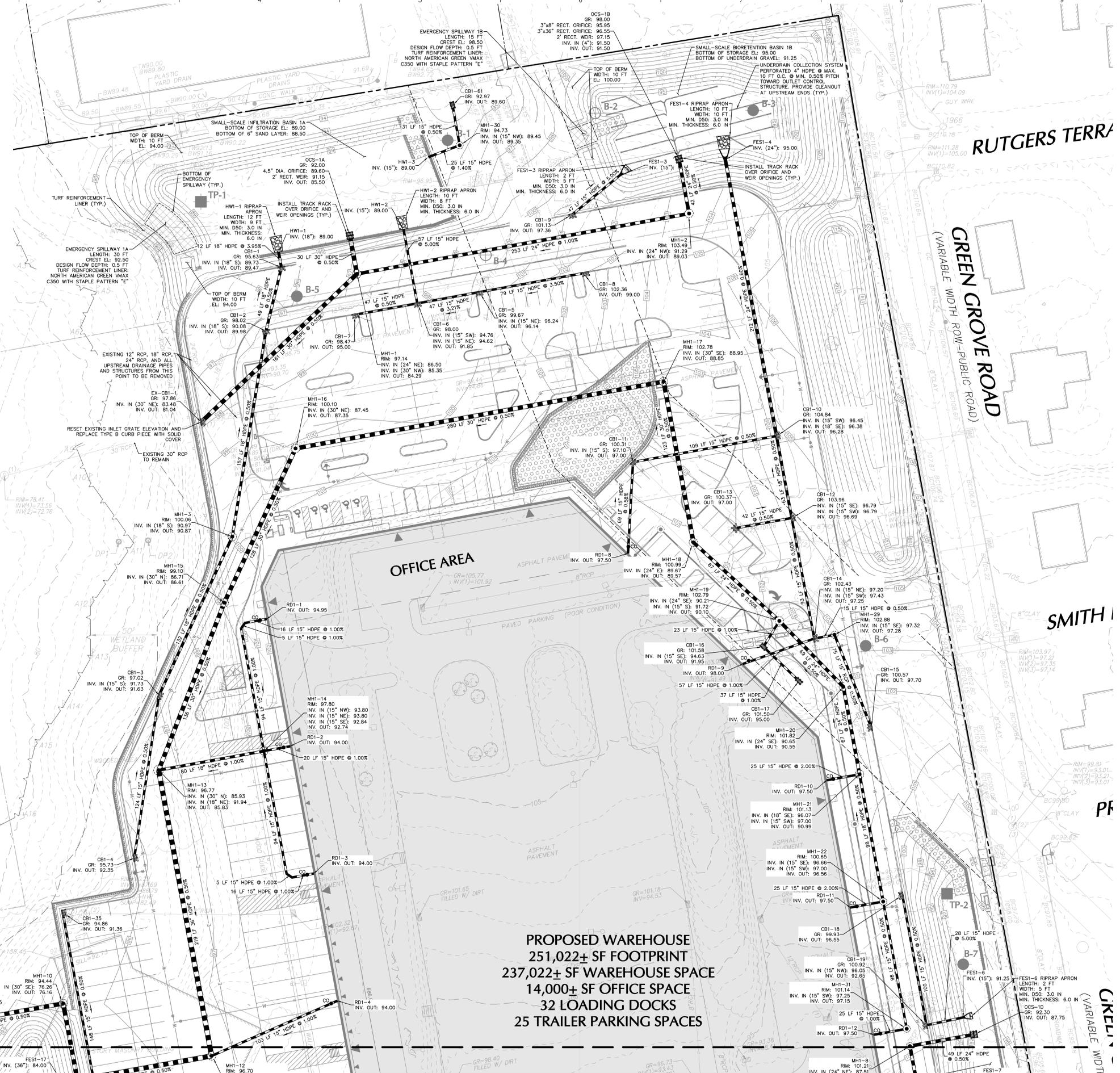
Project No.	Drawing No.
100775002	CG103
Date	August 26, 2022
Drawn By	TEG
Checked By	MJV

Sheet 22 of 48

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PROPERTY LINE/ROW	LEGEND	
	EXISTING	PROPOSED
CONTOUR	90	95
SPOT ELEVATION	x 88.53	x 92.08
STORM MANHOLE	⊙	⊙
SANITARY MANHOLE	⊙	⊙
CATCH BASIN	⊙	⊙
STORM SEWER	---	---
SANITARY SEWER	---	---
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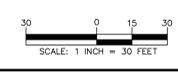
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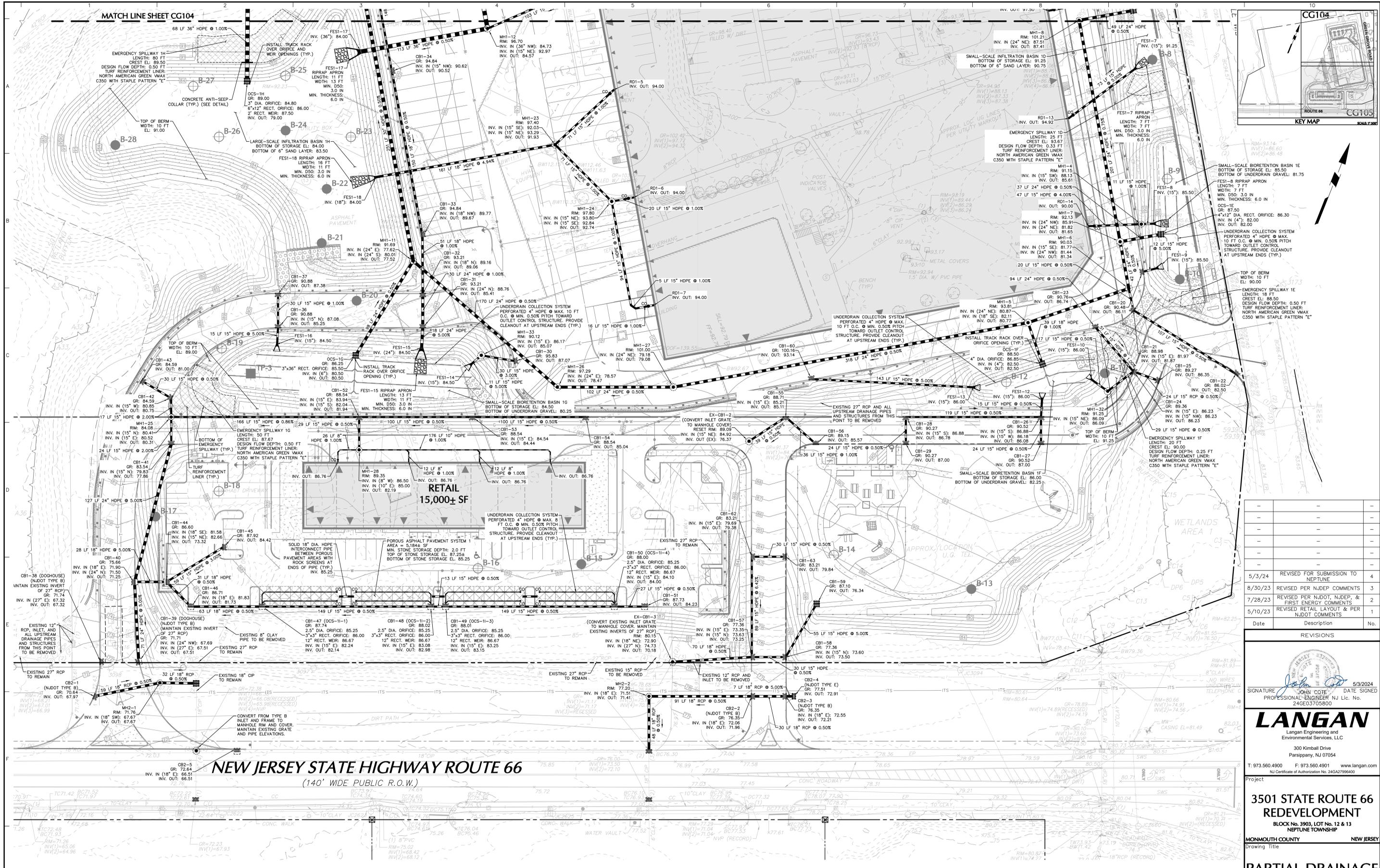
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3501 STATE ROUTE 66 REDEVELOPMENT
 BLOCK No. 3903, LOT No. 12 & 13
 NEPTUNE TOWNSHIP
 MONMOUTH COUNTY NEW JERSEY

PARTIAL DRAINAGE PLAN

Project No.	100775002	Drawing No.	CG104
Date	AUGUST 26, 2022	Drawn By	TEG
Checked By	MJV	Sheet	23 of 48





NEW JERSEY STATE HIGHWAY ROUTE 66
(140' WIDE PUBLIC R.O.W.)

LEGEND	
EXISTING	PROPOSED
PROPERTY LINE/ROW	PROPERTY LINE/ROW
CONTOUR	CONTOUR
SPOT ELEVATION	SPOT ELEVATION
STORM MANHOLE	STORM MANHOLE
SANITARY MANHOLE	SANITARY MANHOLE
CATCH BASIN	CATCH BASIN
STORM SEWER	STORM SEWER
SANITARY SEWER	SANITARY SEWER
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 - HORIZONTAL DATUM REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 83).
 - ELEVATIONS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
 - THE FRESHWATER WETLANDS/WATERS BOUNDARY LINE DEPICTED ON THE PLANS HAVE BEEN VERIFIED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION PER THE LETTER OF INTERPRETATION DATED MAY 24, 2021, FILE NO. 1334-09-0021. THE AGENCY HAS DETERMINED THAT ALL FRESHWATER WETLANDS ON-SITE ARE OF INTERMEDIATE RESOURCE VALUE AND HAVE A 50-FOOT FRESHWATER WETLAND TRANSITION AREA BUFFER.
 - THE STATE OF NEW JERSEY HAS DETERMINED THAT ALL OR A PORTION OF THIS LOT LIES IN A FLOOD HAZARD AREA AND/OR RIPARIAN ZONE. CERTAIN ACTIVITIES IN FLOOD HAZARD AREAS AND RIPARIAN ZONES ARE REGULATED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUCH ACTIVITIES MAY BE PROHIBITED ON THIS SITE OR MAY FIRST REQUIRE A FLOOD HAZARD AREA PERMIT. CONTACT THE WATERSHED AND LAND MANAGEMENT PROGRAM AT (609) 777-0454 FOR MORE INFORMATION PRIOR TO ANY CONSTRUCTION ON-SITE.
 - THE FLOOD HAZARD ELEVATION FOR THE PROJECT SITE WAS DETERMINED USING METHOD 1, THE FEMA FLUVIAL METHOD, AS SET FORTH IN N.J.A.C. 7:13 FLOOD HAZARD AREA CONTROL ACT RULES. THE NEW JERSEY FLOOD HAZARD AREA DESIGN FLOW (NFJHDF) FOR THE PROJECT SITE HAS BEEN DETERMINED TO BE ELEVATION 72.4 NAVD 88.

- DRAINAGE PIPE INSTALLATION WITHIN WETLAND TRANSITION AREA NOTES:**
- THE PROPOSED 36" DIA. HDPE DRAINAGE PIPE FROM PROPOSED DRAINAGE MANHOLE MH-9 TO THE EXISTING DRAINAGE MANHOLE LOCATED WITHIN THE WETLAND TRANSITION AREA SHALL BE INSTALLED USING HORIZONTAL DIRECTIONAL DRILLING (HDD) FOR THE LENGTH OF PROPOSED PIPE LOCATED WITHIN THE WETLAND TRANSITION AREA, IN ORDER TO AVOID SOIL DISTURBANCE AND IMPACTS TO THE WETLAND TRANSITION AREA.

Date	Description	No.
5/3/24	REVISED FOR SUBMISSION TO NEPTUNE	4
8/30/23	REVISED PER NJDEP COMMENTS	3
7/28/23	REVISED PER NJDEP, NJDEP & FIRST ENERGY COMMENTS	2
5/10/23	REVISED RETAIL LAYOUT & PER NJDOT COMMENTS	1

REVISIONS

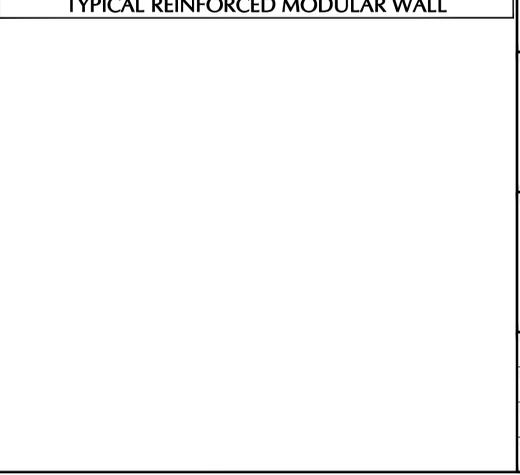
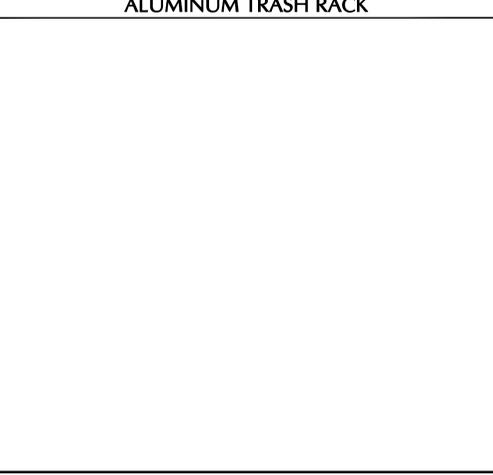
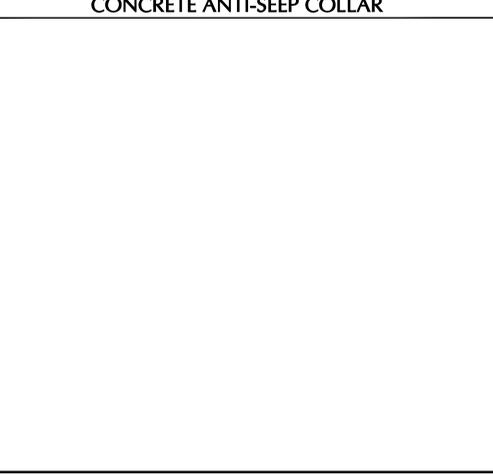
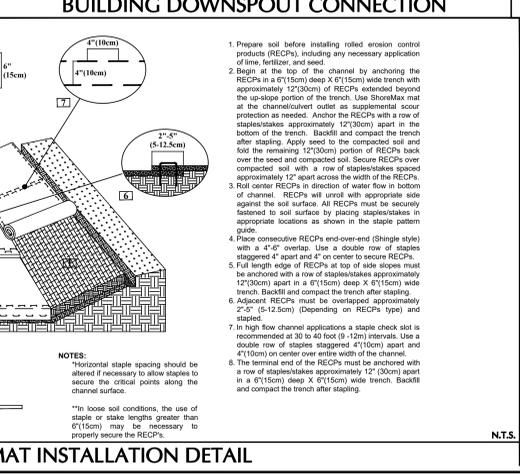
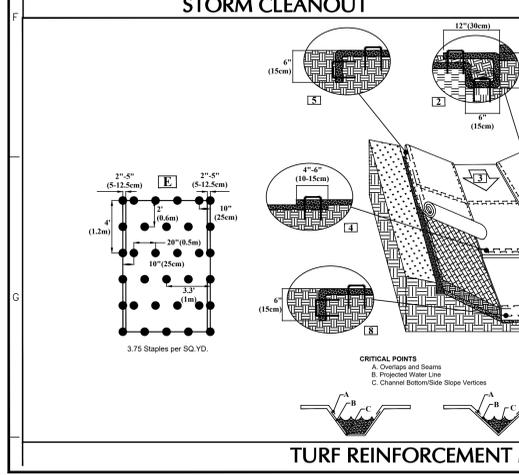
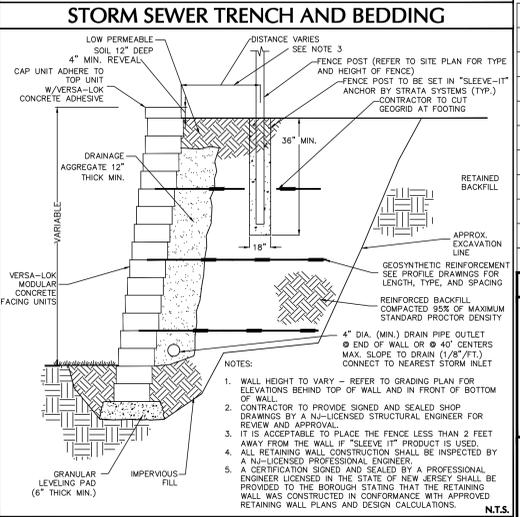
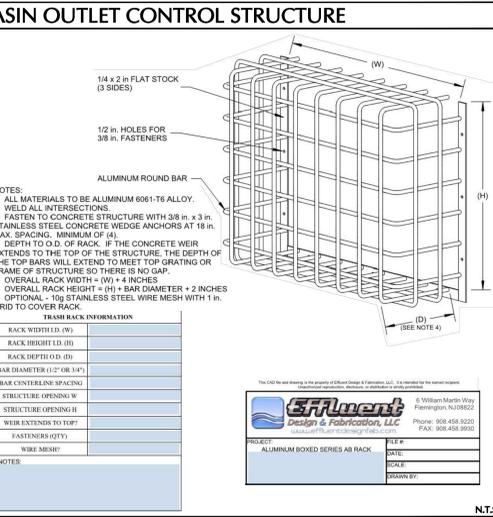
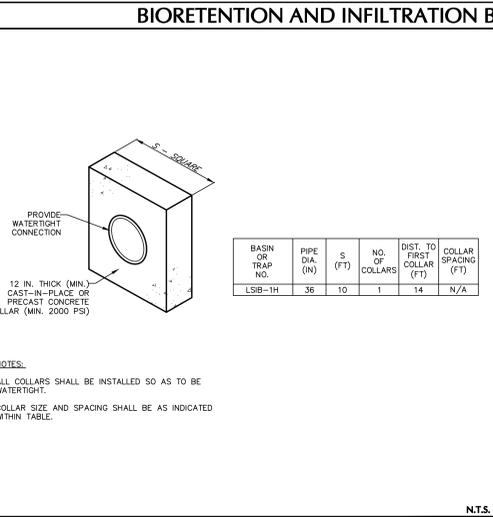
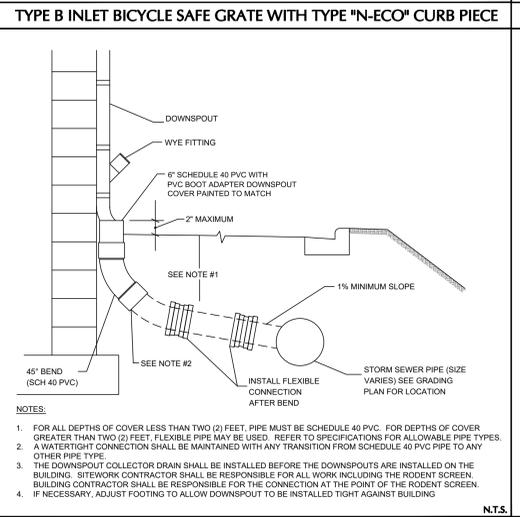
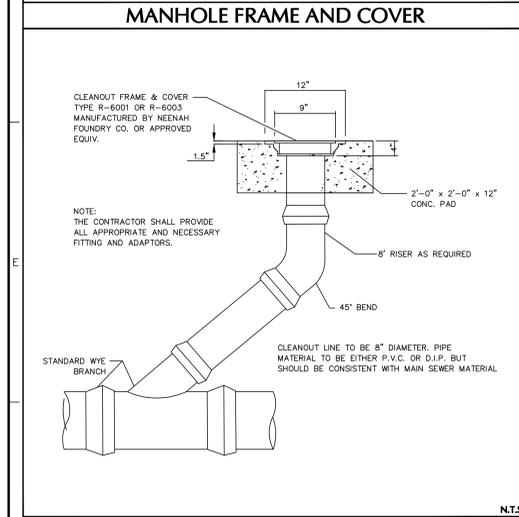
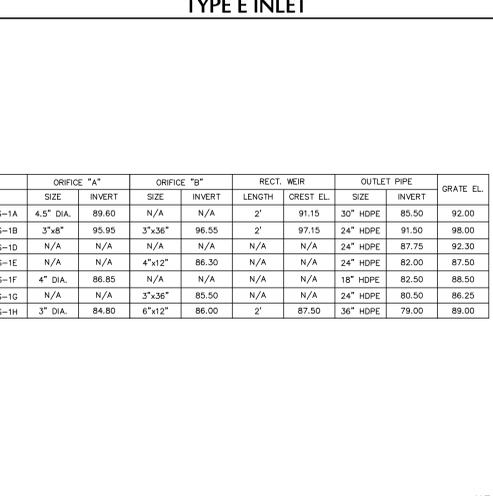
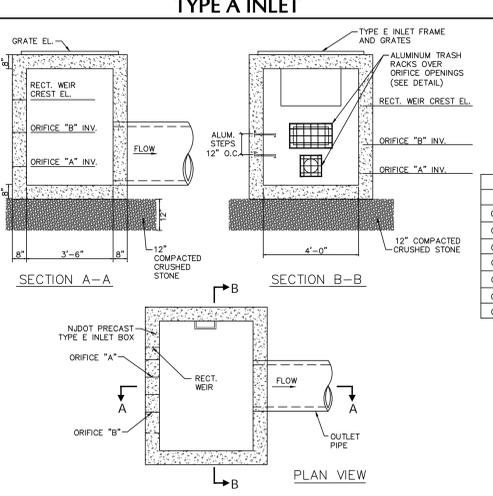
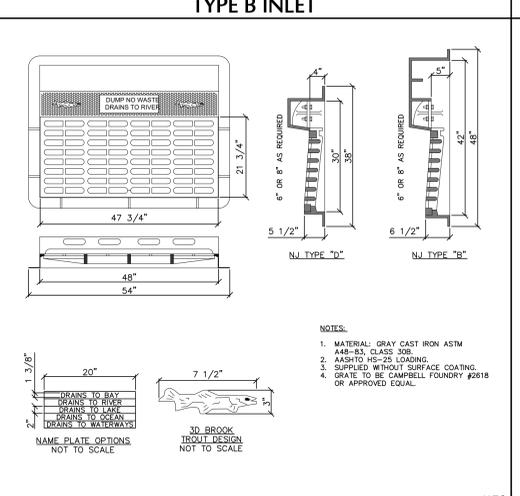
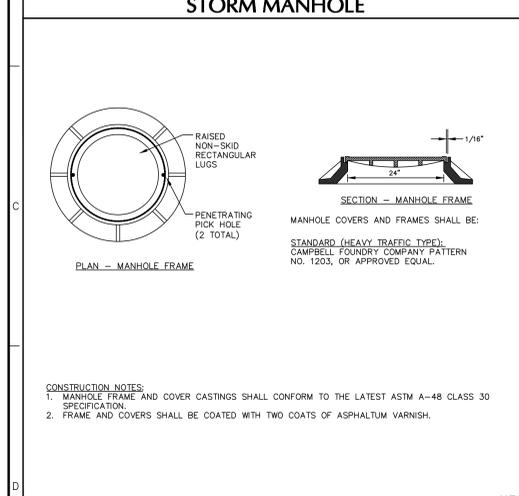
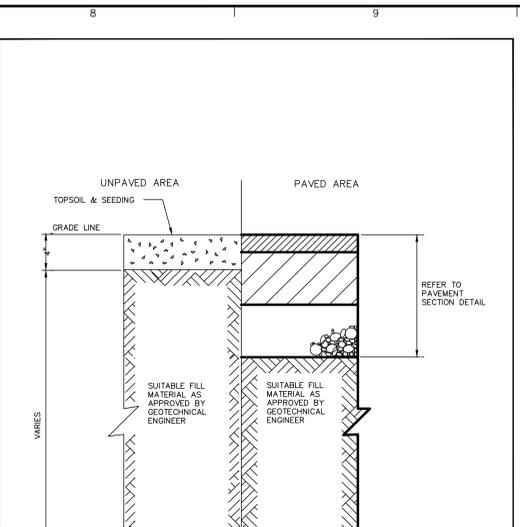
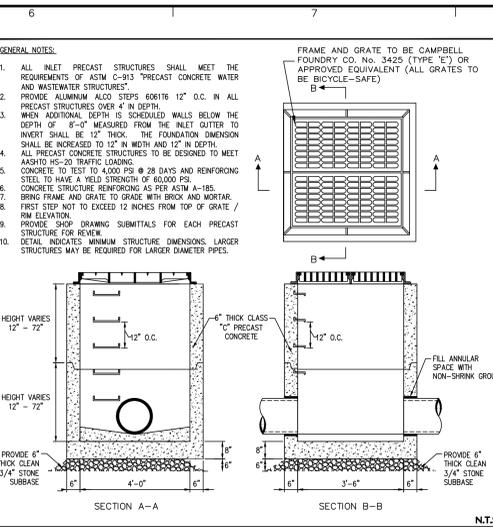
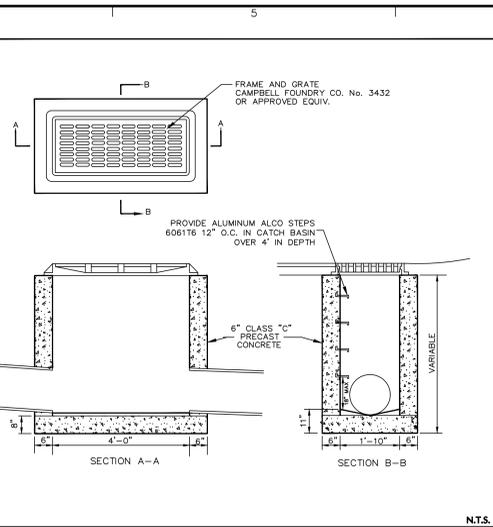
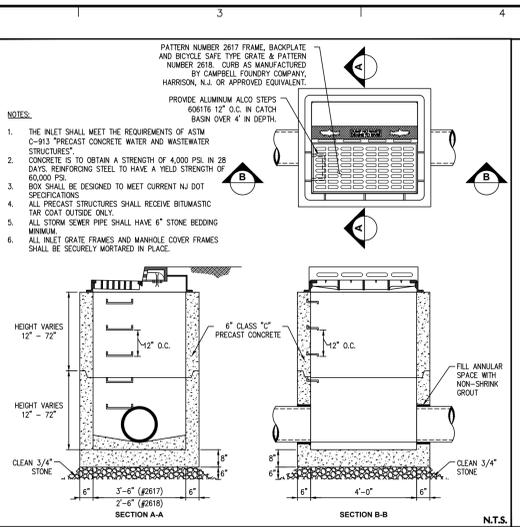
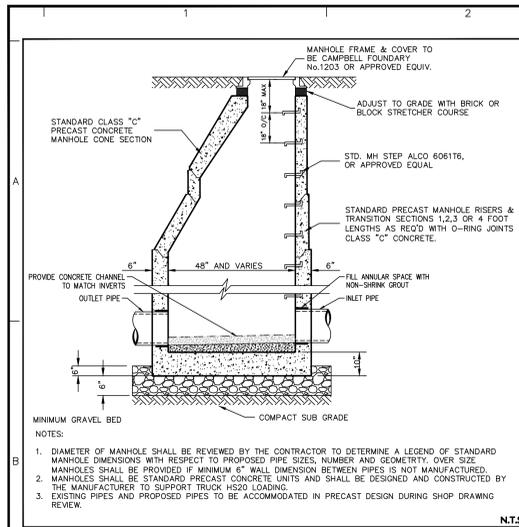
DATE SIGNED: 5/3/2024
 SIGNATURE: JOHN COTE
 PROFESSIONAL ENGINEER NJ Lic. No. 24603705800

LANGAN
 Langan Engineering and Environmental Services, LLC
 300 Kimball Drive
 Parsippany, NJ 07054
 T: 973.560.4900 F: 973.560.4901 www.langan.com
 NJ Certificate of Authorization No. 24624796640

3501 STATE ROUTE 66 REDEVELOPMENT
 BLOCK No. 3903, LOT No. 12 & 13
 NEPTUNE TOWNSHIP
 MONMOUTH COUNTY NEW JERSEY

PARTIAL DRAINAGE PLAN

Project No.	10075002	Drawing No.	CG105
Date	AUGUST 26, 2022	Checked By	TEG
Drawn By	TEG	Sheet	24 of 48



LANGAN

Project No. 100775002

Date	Description	No.
5/3/24	REVISED FOR SUBMISSION TO NEPTUNE	3
7/28/23	REVISED PER NJDOT, NJDEP, & FIRST ENERGY COMMENTS	2
5/10/23	REVISED RETAIL LAYOUT & PER NJDOT COMMENTS	1

REVISIONS

5/3/2024

JOHN COTE DATE SIGNED

PROFESSIONAL ENGINEER NJ Lic. No. 24GE03705800

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Project

3501 STATE ROUTE 66 REDEVELOPMENT

BLOCK No. 3903, LOT No. 12 & 13 NEPTUNE TOWNSHIP

MONMOUTH COUNTY NEW JERSEY

Drawing Title

DRAINAGE DETAILS

Project No. 100775002 Drawing No. CG501

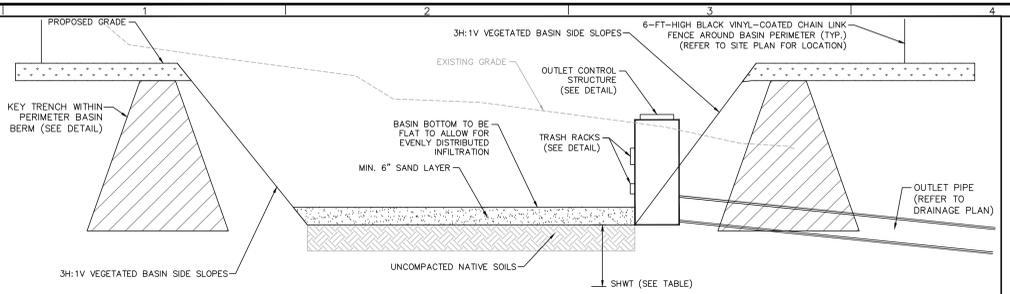
Date AUGUST 26, 2022

Drawn By TEG

Checked By MV

Sheet 30 of 48

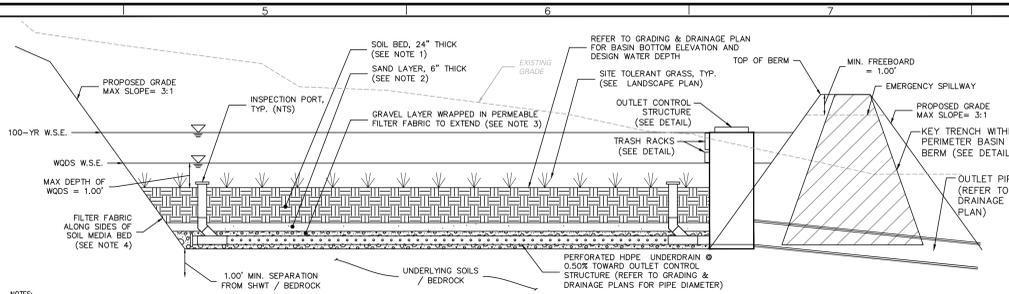
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INFILTRATION BASIN	MAX. BEDROCK / GROUNDWATER EL.	GROUNDWATER MOUNDING HEIGHT AT CENTER (FT)	MAX. GROUNDWATER MOUNDING EL.	BOTTOM OF SAND LAYER EL.
SSIB-1A	76.0	3.42	79.42	88.50
SSIB-1D	88.0	2.62	90.62	90.75
LSIB-1H	78.0	5.32	83.32	83.50

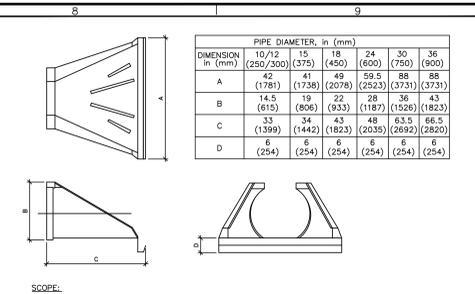
Notes:
1. Groundwater was not encountered within test pits and borings performed in Large Scale Infiltration Basin 1H. Evidence of mottling was found in Boring B-22 at EL. 78.0, making this the seasonal high groundwater elevation.

INFILTRATION BASIN TYPICAL CROSS SECTION



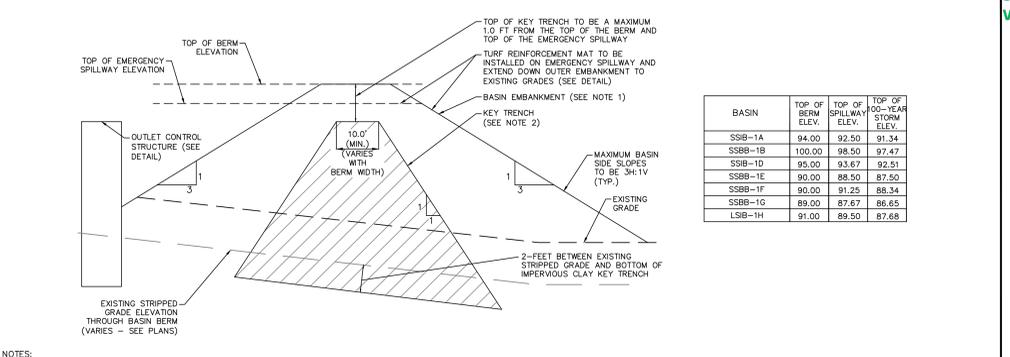
NOTES:
1. SOIL BED SPECIFICATIONS
1.1. THE SOIL BED MATERIAL MUST CONSIST OF THE FOLLOWING MIX, BY WEIGHT: 85 TO 95% SAND, WITH NO MORE THAN 25% OF THE SAND AS FINE OR VERY FINE SANDS; NO MORE THAN 15% SILT AND CLAY WITH 2% TO 5% CLAY CONTENT. THE ENTIRE MIX MUST THEN BE AMENDED WITH 3 TO 7% ORGANIC, BY WEIGHT.
1.2. PRE-WED SOIL MUST BE CERTIFIED TO BE CONSISTENT WITH THE REQUIREMENT ABOVE BY EITHER THE VENDOR OR BY A PROFESSIONAL ENGINEER LICENSED BY THE STATE OF NEW JERSEY. THE CONTENT OF ANY SOIL MIXED ON-SITE MUST BE CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED BY THE STATE OF NEW JERSEY. IN ADDITION, THE ENGINEER MUST BE PRESENT WHILE THE SOIL IS MIXED.
1.3. THE PH OF THE SOIL BED MATERIAL MUST RANGE FROM 5.5 TO 6.5.
1.4. THE SOIL BED MATERIAL MUST BE PLACED IN LIFTS NOT TO EXCEED 8 INCHES. ADDITIONAL MATERIALS MAY BE NECESSARY TO ACCOUNT FOR SETTLING OVER TIME.
2. SAND LAYER SPECIFICATIONS
2.1. THE SAND LAYER MUST BE AT LEAST 6 INCHES IN DEPTH AND MUST CONSIST OF CLEAN, MEDIUM-AGGREGATE CONCRETE SAND (AASHTO M-6/ASTM C-33).
3. GRAVEL LAYER SPECIFICATIONS
3.1. THE GRAVEL LAYER MUST BE AASHTO #57 AND HAVE SUFFICIENT DEPTH TO PROVIDE AT LEAST 3 INCHES OF GRAVEL ABOVE AND BELOW THE PERFORATED UNDERDRAIN AND MUST CONSIST OF 0.5 TO 1.5 INCH CLEAN, BROKEN STONE OR PEA GRAVEL (AASHTO M-43).
4. GEOTEXTILE FILTER FABRIC SHALL BE INSTALLED ALONG THE SIDES AND THE BOTTOM OF THE BASIN AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
5. FLEXIBLE CORRUGATED PERFORATED PLASTIC DRAIN PIPE SHOULD NOT BE USED AS UNDERDRAIN PIPE.
6. REFER TO THE GRADING & DRAINAGE PLANS FOR BASIN ELEVATIONS, PIPE INVERTS, AND GRADE ELEVATIONS.
7. REFER TO THE OUTLET CONTROL STRUCTURE DETAIL FOR SPECIFICATIONS.
8. REFER TO LANDSCAPING PLANS AND DETAILS FOR PROPOSED PLANTINGS WITHIN BIORETENTION BASINS AND FOR PLANTING SITE DETAILS AND SPECIFICATIONS.

UNDERDRAINED BIORETENTION BASIN TYPICAL CROSS SECTION



THIS SPECIFICATION DESCRIBES 10"-THROUGH 36"-INCH (250 TO 900 mm) HI-Q FLARED END SECTIONS FOR USE IN CULVERT AND DRAINAGE OUTLET APPLICATIONS.
REQUIREMENTS:
THE INVERT OF THE PIPE AND THE END SECTION SHALL BE AT THE SAME ELEVATION. HI-Q FLARED END SECTION SHALL BE HIGH DENSITY POLYETHYLENE MEETING ASTM D3350 MINIMUM CELL CLASSIFICATION 213320. EACH END SECTION SHALL HAVE A CARBON BLACK ADDITIVE FOR UV PROTECTION. THE METAL THROUGHT FASTENER SHALL BE STAINLESS STEEL.
INSTALLATION:
INSTALLATION SHALL BE IN ACCORDANCE WITH HANCOCK INSTALLATION INSTRUCTIONS AND WITH THOSE ISSUED BY STATE OR LOCAL AUTHORITIES.

HDPE FLARED END SECTION



BASIN	TOP OF BERM ELEV.	TOP OF SPILLWAY ELEV.	TOP OF 100-YEAR STORM ELEV.
SSIB-1A	94.00	92.50	91.34
SSIB-1B	100.00	98.50	97.47
SSIB-1D	95.00	93.67	92.51
SSIB-1E	90.00	88.50	87.50
SSIB-1F	90.00	91.25	88.34
SSIB-1G	89.00	87.67	86.85
LSIB-1H	91.00	89.50	87.68

NOTES:
1. ALL BASIN EMBANKMENTS SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO A DEPTH OF TWO FEET PRIOR TO ANY PLACEMENT AND COMPACTION OF EARTHEN FILL. FILL MATERIAL FOR THE EMBANKMENTS SHALL BE FREE OF ROOTS, OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIALS. THE EMBANKMENT SHALL BE COMPACTED IN LAYERED LIFTS CONSISTING OF MAXIMUM 8-INCH LIFTS. THE MAXIMUM ROCK SIZE SHALL BE NO GREATER THAN 2/3 THE LIFT THICKNESS. EMBANKMENTS SHALL BE COMPACTED TO A MINIMUM OF 95% DRY DENSITY. COMPACTION TESTS SHALL BE PERFORMED USING THE MODIFIED PROCTOR METHOD IN ACCORDANCE WITH ASTM-D-1557.
2. KEY TRENCH SHALL HAVE A MINIMUM DEPTH OF FILL MATERIAL THAT IS 2' BELOW THE STRIPPED GRADE (OR SHALLOWER IF BEDROCK IS ENCOUNTERED), MINIMUM WIDTH=4', MAXIMUM SIDE SLOPE STEEPNESS IS 1H:1V AND FILLED WITH HIGHLY IMPERVIOUS AND WELL COMPACTED CLAY MATERIAL. THE TRENCH MUST BE INSTALLED IN ALL AREAS OF FILL AND EXTEND UP BOTH ABUTMENTS TO 1' BELOW THE TOP OF BERM ELEVATION AND TO 1' BELOW THE TOP OF THE EMERGENCY SPILLWAY ELEVATION, AND EXCAVATED UNDER THE ENTIRE LENGTH OF THE BERM AND LOCATED AT OR UPSTREAM OF THE CENTERLINE OF THE BERM. COMPACTION REQUIREMENTS SHOULD BE THE SAME AS THOSE FOR THE EMBANKMENT. THE TRENCH SHOULD BE DEMARDED DURING BACKFILLING AND COMPACTION OPERATIONS IF NECESSARY.

BASIN EMBANKMENT & KEY TRENCH DETAIL

Specification Sheet
VMax® C350® Turf Reinforcement Mat

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 100% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings, an ultra heavy duty UV-stabilized, dramatically corrugated (corrugated) intermediate netting with 0.5 x 0.5 in. (1.27 x 1.27 cm) openings, and covered by a super heavy duty UV-stabilized netting with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 in. (3.81 cm) centers with UV-stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The C350 shall meet Type 5A, B and C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FHWA 010 Section 703.16

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.79 in. (20.1 mm)
Resiliency	ASTM D6524	90%
Density	ASTM D792	0.97 g/cm ³
Max/Unit Area	ASTM D6556	18.36 oz./sq. yd.
UV Stability	ASTM D4855/1000 H6	80%
Porosity	ECTC Guidelines	99%
Stiffness	ASTM D3888	0.34 in.-lb. (20990 mg-cm)
Light Penetration	ASTM D6567	7.2%
Tensile Strength - MD	ASTM D6818	585.8 lbs/ft (8.70 kN/m)
Elongation - MD	ASTM D6818	45.3%
Tensile Strength - TD	ASTM D6818	687.6 lbs/ft (10.10 kN/m)
Elongation - TD	ASTM D6818	19.5%
Biomass Improvement	ASTM D7322	380%

Design Permissible Shear Stress

Phase	Unvegetated	Short Duration	Long Duration
Phase 1 Partially Veg.	3.2 psf (153 Pa)	3.0 psf (144 Pa)	10.0 psf (480 Pa)
Phase 2 Fully Veg.	12.0 psf (576 Pa)	12.0 psf (576 Pa)	10.0 psf (480 Pa)
Unvegetated Velocity	10.5 fps (3.2 m/s)		
Vegetated Velocity	20 fps (6.0 m/s)		

Material Content

Matrix	100% Coconut Fiber	0.5 lb/lyd (0.27 kg/m ³)
Top and Bottom, UV-Stabilized Polypropylene	8 lb/1000 sq ft (0.81 kg/100 m ²)	
Middle Corrugated UV-Stabilized Polypropylene	24 lb/1000 sq ft (2.17 kg/100 m ²)	

Standard Roll Sizes

Width	Length	Weight
5.5 ft (16.8 m)	8 ft (2.44 m)	40 lbs (18.1 kg)
10 ft (3.05 m)	30 ft (9.14 m)	160 lbs (72.6 kg)

Thread Polypropylene, UV Stable 80 sp (66.8 sm)

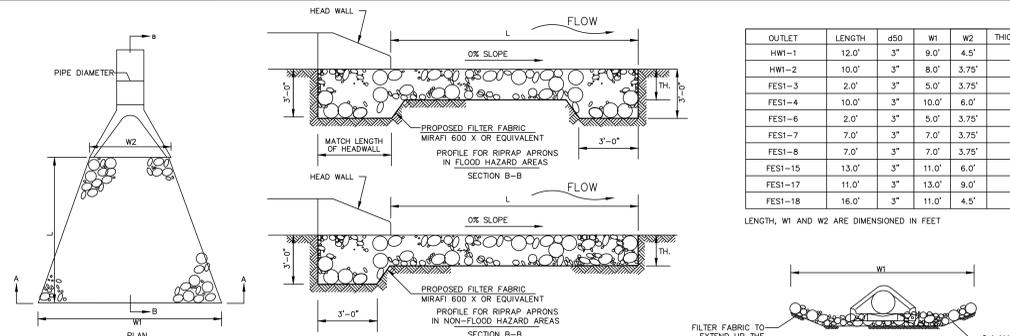
ROLLMAX™
ROLLED EROSION CONTROL

TRASH RACK INFORMATION

Parameter	Value
RACK WIDTH (D)	8 ft (2.44 m)
RACK HEIGHT (H)	10.0 ft (3.05 m)
RACK DEPTH (D)	10.0 ft (3.05 m)
RACK SPACING (S)	12" (305 mm)
RACK CENTERLINE SPACING (C)	12" (305 mm)
STRUCTURE OPENING (W)	12" (305 mm)
STRUCTURE OPENING (H)	12" (305 mm)
WEIR EXTENDS TO TOP	NO
FASTENERS (QTY)	12
WIRE MESH	NO

NOTES:
1. ALL MATERIALS TO BE ALUMINUM 6061-T6 ALLOY.
2. WELLS ALL INTERSECTIONS.
3. FASTEN TO CONCRETE STRUCTURE WITH 3/8" x 3" STAINLESS STEEL CONCRETE WEDGE ANCHORS AT 18" MAX. SPACING. MINIMUM OF 4.
4. DEPTH O.D. OF RACK: IF THE CONCRETE WEIR EXTENDS TO THE TOP OF THE STRUCTURE, THE DEPTH OF THE TOP BARS WILL EXTEND TO MEET TOP GRATING OR FRAME OF STRUCTURE SO THERE IS NO GAP.
5. OVERALL RACK WIDTH = (W) + 4 INCHES
6. OVERALL RACK HEIGHT = (H) + BAR DIAMETER + 2 INCHES
7. OPTIONAL: +10g STAINLESS STEEL WIRE MESH WITH 1 in. GRID TO COVER RACK.

POROUS PAVEMENT OUTLET CONTROL STRUCTURE ALUMINUM ROCK SCREEN

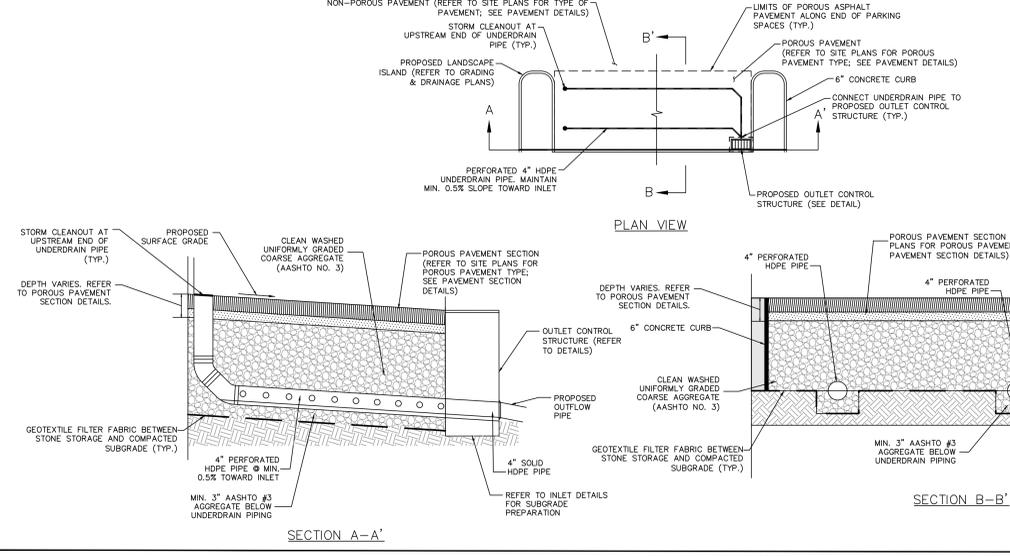


OUTLET	LENGTH	d50	W1	W2	THICKNESS
HWT-1	12.0'	3"	9.0'	4.5'	6"
HWT-2	10.0'	3"	8.0'	3.75'	6"
FESI-3	2.0'	3"	5.0'	3.75'	6"
FESI-4	10.0'	3"	10.0'	6.0'	6"
FESI-6	2.0'	3"	5.0'	3.75'	6"
FESI-7	7.0'	3"	7.0'	3.75'	6"
FESI-8	7.0'	3"	7.0'	3.75'	6"
FESI-15	13.0'	3"	11.0'	6.0'	6"
FESI-17	11.0'	3"	13.0'	9.0'	6"
FESI-18	16.0'	3"	11.0'	4.5'	6"

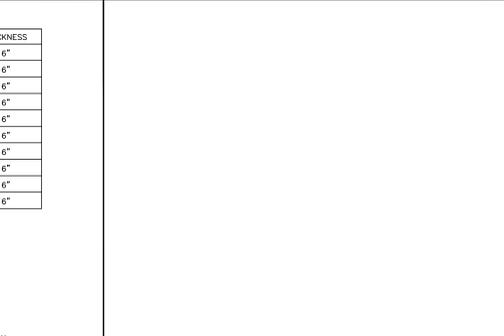
LENGTH, W1 AND W2 ARE DIMENSIONED IN FEET

GENERAL NOTES:
1. THE INDICATED d50, APRON LENGTH AND WIDTH HAS BEEN DESIGNED IN ACCORDANCE WITH "STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY"
2. FOR ALL PIPE SIZES, SLOPES, AND INVERTS SEE GRADING PLAN.
3. RIPRAP APRON LOCATED ALONG THE EMBANKMENT EDGE CAN BE FLARED UP TO ALIGN WITH GRADES OF THE DRAINAGE DITCH, REFER TO SECTION A-A.

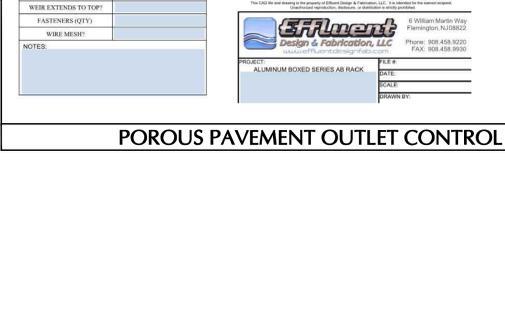
RIPRAP APRON



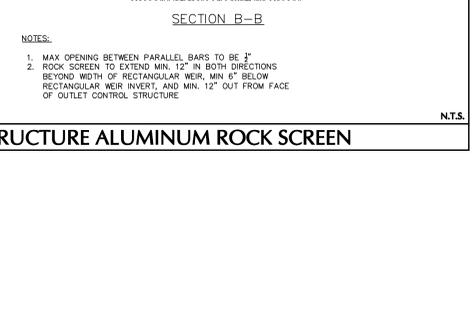
TYPICAL POROUS PAVEMENT CROSS SECTION DETAIL



EMERGENCY SPILLWAY TURF REINFORCEMENT MAT



POROUS PAVEMENT SYSTEM OUTLET CONTROL STRUCTURE



POROUS PAVEMENT SYSTEM OUTLET CONTROL STRUCTURE

Date	Description	No.
5/3/24	REVISED FOR SUBMISSION TO NEPTUNE	3
7/28/23	REVISED PER NJDOT, NJDEP, & FIRST ENERGY COMMENTS	2
5/10/23	REVISED RETAIL LAYOUT & PER NJDOT COMMENTS	1

REVISIONS

SIGNATURE: *John Cote* DATE SIGNED: 5/3/2024
PROFESSIONAL ENGINEER NJ Lic. No. 246E03705800

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NJ Certificate of Authorization No. 246E03705800

Project: **3501 STATE ROUTE 66 REDEVELOPMENT**
BLOCK No. 3903, LOT No. 12 & 13
NEPTUNE TOWNSHIP
MONMOUTH COUNTY NEW JERSEY

Drawing Title: **DRAINAGE DETAILS**

Project No. 100775002
Date: AUGUST 26, 2022
Drawn By: TEG
Checked By: MV
Sheet 31 of 48

APPENDIX A

Stormwater Management Facilities – Inspection Checklist

Inspection Checklist for Stormwater Management Facilities

Name of Facility: _____

Location: _____

	O.K	Routine	Urgent	Comments
1. Bioretention / Infiltration Basins				
A. Standing Water				
B. Trash & Debris				
C. Sediment				
D. Other				

	O.K	Routine	Urgent	Comments
2. Outlet Control Structures				
A. Condition of Structure				
B. Trash & Debris				
C. Sediment				
D. Condition of Trash Racks				
E. Other				

	O.K	Routine	Urgent	Comments
3. Inlet Structures				
A. Condition of Structure				
B. Trash & Debris				
C. Sediment				
D. Other				

	O.K	Routine	Urgent	Comments
4. Manhole Structures				
A. Condition of Structure				
B. Trash & Debris				
C. Sediment				
D. Other				

	O.K	Routine	Urgent	Comments
5. Drainage Swales / Riprap Aprons				
A. Signs of Erosion				
B. Trash & Debris / Sediment				
C. Vegetative Cover				
D. Other				

	O.K	Routine	Urgent	Comments
6. Porous Pavement				
A. Condition of Outlet Structures				
B. Trash & Debris				
C. Sediment within Porous Asphalt				
D. Condition of Trash Racks on Outlets				
E. Condition of Underdrain Piping				

	O.K	Routine	Urgent	Comments
7. Miscellaneous				
A. Effectiveness of Exist. Maint. Program				
B. Potential Mosquito Habitats				
C. Potential Rodent Habitats				

APPENDIX B

Stormwater Management Facilities – Maintenance Log

Maintenance Log for Stormwater Facilities

Name of Facility: _____

Location: _____

Preventative Maintenance:

Date:

Work Item:

--	--	--	--

(X) - Completed

1	Trash and Debris Removal				
	A. Bioretention / Infiltration Basins				
	B. Outlet Control Structures				
	C. Inlets/Manholes				
	D. Conveyance Pipes				
	E. Drainage Swales				
	F. Riprap aprons				
	G. Porous Pavement				

2	Sediment				
	A. Bioretention / Infiltration Basins				
	B. Outlet Control Structures				
	C. Inlets/Manholes				
	D. Conveyance Pipes				
	E. Drainage Swales				
	F. Riprap aprons				
	G. Porous Pavement				

3	Elimination of Potential Insect and Rodent Habitats				
	A. Potential Mosquito Habitats - Eliminate Standing Water				
	B. Potential Rodent Habitats - Fill Burrows and Remove Debris				

4	Other Preventative Maintenance				
	A.				

Corrective Maintenance:

Date:

Work Item:

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(X) - Completed

1	Removal of Debris and Sediment				
2	Structural Repairs				
3	Dewatering				
4	Erosion Repair				
5	Elimination of Trees, Brush, Roots & Animal Burrows				
6	Snow & Ice Removal				
7	Other				