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PORT IVORY INTERMODAL FACILITY
HOWLAND HOOK MARINE TERMINAL
Storm Water Pollution Prevention Plan

A Report to: Port Authority of New York & New Jersey

August 26, 2004

Prepared by:

MAGUIRE GROUP

Maguire Group Inc.
3131 Princeton Pike
Building 6, Suite 112
Lawrenceville, NJ 08648

Storm Water Pollution Prevention Plan
Port Ivory Intermodal Facility

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OBJECTIVES

This storm water pollution prevention plan (SWPPP) is prepared for the construction and post construction activities for the Port Ivory Intermodal Facility. It has been developed as required under New York State Department of Environmental Conservation general permit for storm water discharges and in accordance with good engineering practices. This SWPPP describes the intermodal facility and its operations, identifies potential sources of storm water pollution, recommends appropriate best management practices (BMPs) or pollution control measures to reduce the discharge of pollutants in storm water runoff, and provides for periodic review of the BMPs.

This SWPPP will:

- identify sources of storm water and non-storm water contamination to the storm water drainage system;
- identify and prescribe appropriate "source area control" type best management practices designed to prevent storm water contamination from occurring; identify and prescribe "storm water treatment" type best management practices to reduce pollutants in contaminated storm water prior to discharge; and
- prescribe an implementation schedule so as to ensure that the storm water management actions prescribed in the SWPPP are carried out and evaluated on a regular basis.

SITE DESCRIPTION

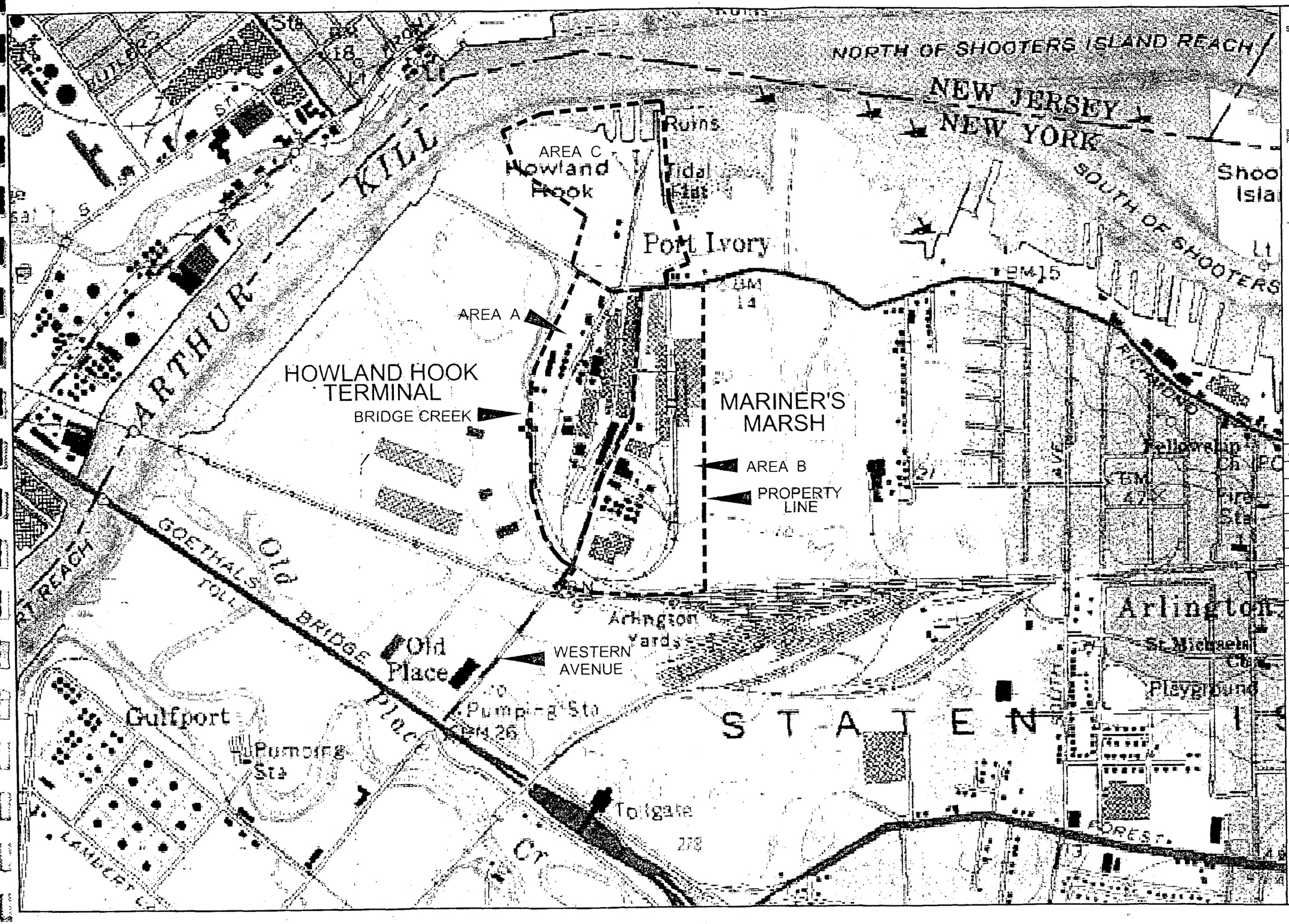
General Site Description

The project site is located in the northwest section of Richmond County on Staten Island. It is bordered by Richmond Terrace on the north, Western Avenue on the east, railroad tracks and the Howland Hook Marine Terminal on the south and Bridge Creek and the marine terminal on the west. Figure 1 shows the location of the intermodal facility (Area A) and its surrounding area.

The project site was the former location for Procter and Gamble's (P&G) manufacturing and distribution operations. The area is 47.3 acres in size and has been intensively developed with warehouses, open storage areas and railroad sidings. Demolition activities have removed most of the P&G structures as well as most of the built surface features including railroad tracks, paved storage and parking areas and storage tanks.

Construction Activity

The Port Authority of New York New Jersey (PANYNJ) is developing an intermodal facility to support the Howland Hook Marine Container Terminal. The intermodal facility is a transportation transfer facility where containers delivered to the Howland Hook Marine Terminal are loaded onto rail cars for inland distribution. The facility consists of a series of railroad tracks and paved working areas adjacent to the tracks. Construction



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Edward J. Spinard, Jr.
N.Y. Professional Engineer #080332

SWPPP
AUGUST 27, 2004

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No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HOWLAND HOOK MARINE TERMINAL

CIVIL

Title

PORT IVORY
INTERMODAL FACILITY
PHASE 1A

LOCATION OF INTERMODAL FACILITY AND SURROUNDING AREA

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Contract Number HH-234.927

Drawing Number **FIGURE 1**

PID# 00250005

activity includes the removal of existing railroad tracks, pavement and under ground utilities. The site will be graded and new railroad tracks, pavement and utilities will be installed to support the operations of the intermodal facility.

The intermodal facility will be constructed in three phases. Figure 2 shows the phased construction of the intermodal facility. Phase 1A involves the construction of the first five railroad sidings along with pavement areas adjacent to the tracks to support the operations of the container handling equipment. The Phase 1B and Phase 2 areas will be surcharged to stabilize the subsurface conditions for the future intermodal construction.

Demolition activities have occurred on the site, which have removed most of the major structures. Only two buildings will remain on the site. The first phase involves about 14 acres of the total site area of 47.3 acres.

Existing Site Conditions

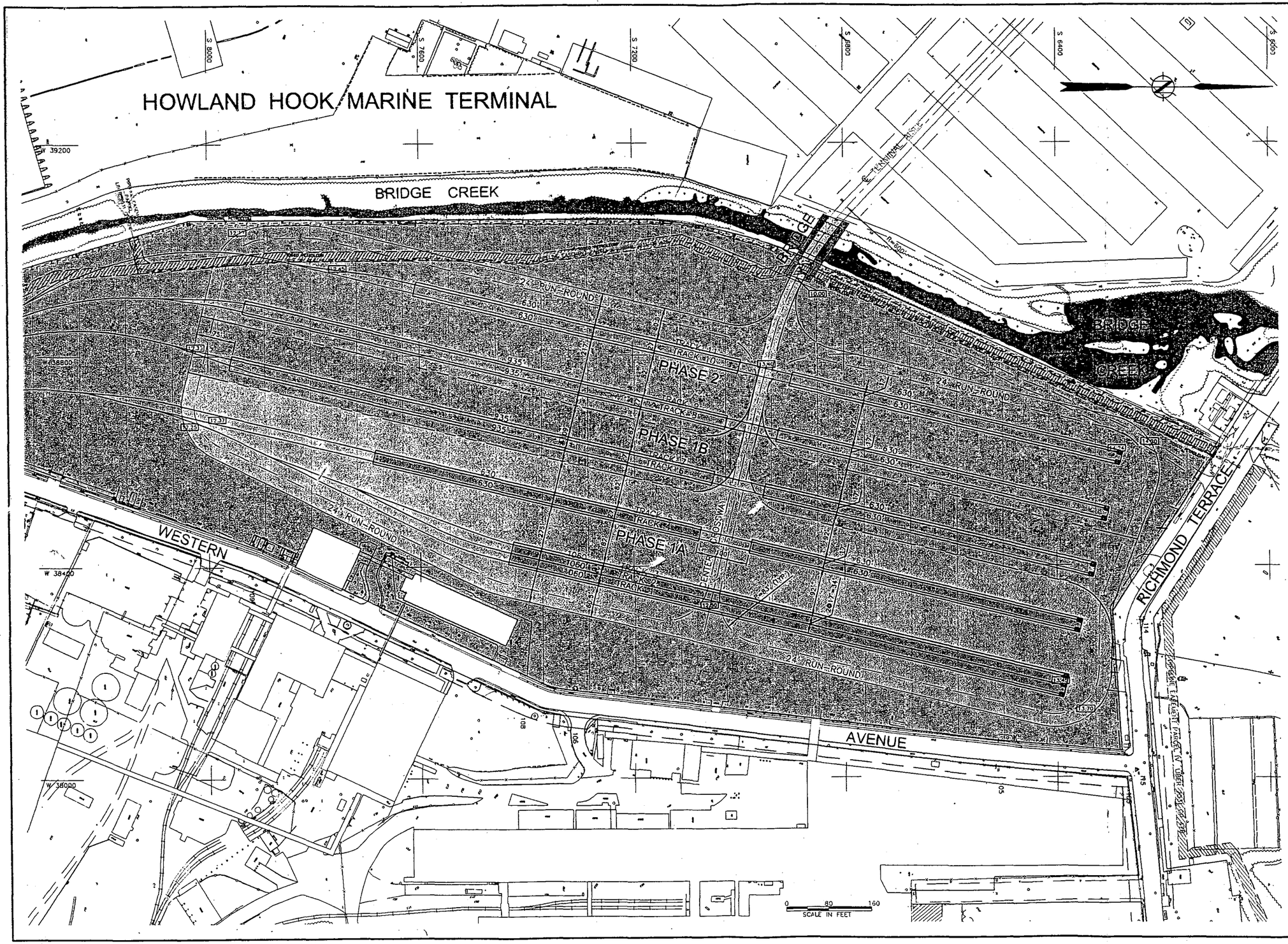
The existing site was an intensively developed industrial area. The soil classification is Urban Land reflecting the highly developed nature of the site. The existing topography consists of a relatively level parcel sloping towards Bridge Creek. The southern section of the site has the lowest elevation generally in the range of 5 to 10 feet above mean sea level (MSL) using National Geodetic Vertical Datum of 1929 (NGVD 29) as the base. The northern section of the site has a higher elevation generally in the range of 14 to 22 feet above MSL.

Existing Storm Water Drainage System

The majority of the intermodal facility (Area A) was serviced by a storm water collection system of catch basins, underground piping and surface drainage swales that collected runoff from the P&G facility. Storm water runoff from the site was collected by the drainage system and discharged off-site into a tidal creek called Bridge Creek. Bridge Creek is located between the Howland Hook Marine Terminal and the intermodal facility. Bridge Creek discharges into Arthur Kill.

There are eight existing storm water outfalls from Area A, seven outfalls discharge into Bridge Creek and one discharges into a channel connecting directly with Arthur Kill. Figure 3 shows the existing discharge locations. A large section of the area adjacent to Bridge Creek has surface flow that directly flows into Bridge Creek. There was no storm water quality treatment of the surface runoff into Bridge Creek

Table 1 provides information relating to the existing P&G outfalls. Each outfall is identified by a letter designation used by P&G as shown on Figure 3. The outfall information includes watershed size, intended use and discharge pipe size. This information was obtained from several different historical drawings from P&G including the sewer separation plans (1967) and the interference plans for the northern boundary fuel line.



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PORT IVORY
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PRELIMINARY SITE PLAN WITH PHASING

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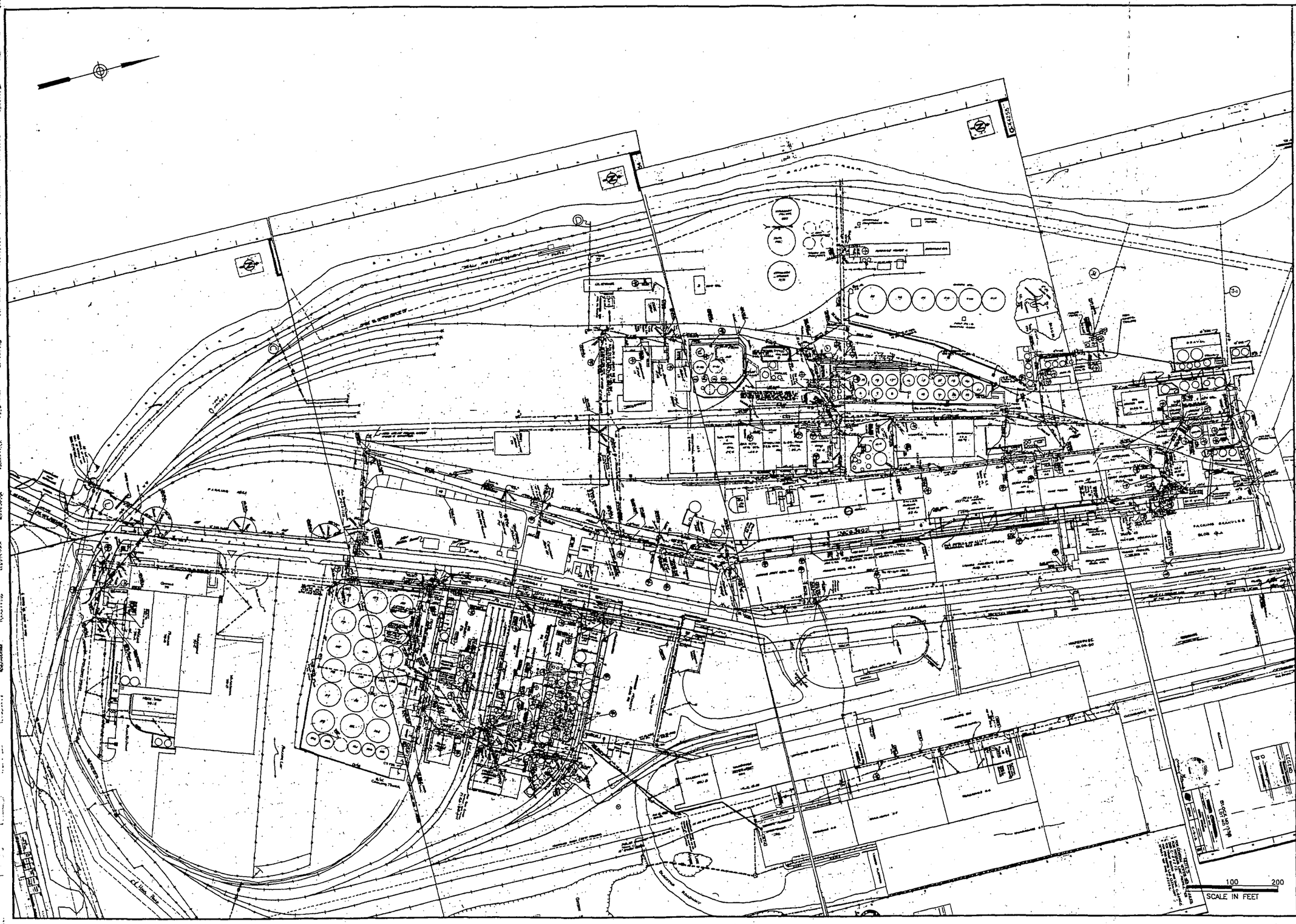
Drawing Number SK3



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PORT IVORY
INTERMODAL FACILITY
PHASE 1A

EXISTING OUTFALL LOCATION PLAN

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Drawing Number **FIGURE 3**

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Table 1. Description of Existing Outlets.

Outfall	Description			
	Use	P&G Surface Characteristics	Watershed Area (acres)	Pipe Size (inches)
J	Area drainage	Highly impervious, intensively developed with buildings	4.00	24
I-1	Area Drainage	Highly impervious, intensively developed with buildings	0.25	12
H	Process Water/Area Drainage	Highly impervious, with a building	0.10	20
G	Area Drainage	Primarily impervious with buildings, tanks, paved surface, surface area, some gravel.	6.58	30
F	Process Water/Area Drainage	Primarily impervious with buildings, tanks, paved surface area, some gravel.	0.10	12
D	Area Drainage	Primarily impervious with buildings, tanks, paved surface area, some gravel.	6.87	24
C	Area Drainage	Moderately impervious with railroad tracks mostly gravel.	1.37	12
L	Area Drainage	Primarily impervious with buildings, railroad tracks, paved surface area, some gravel.	6.15	20
W	Wood Pile Storage Area	Moderately impervious with wood storage piles	6.34 (into sanitary system)	NA
O	Overland Flow to Bridge Creek	Moderately impervious with railroad tracks and gravel.	15.54	

The J outfall discharges into a manhole on the southern side of Richmond Terrance. The pipeline from the manhole crosses under Richmond Terrace and travels through Area C discharging into Arthur Kill. The D and G outfalls discharge into weir structures. The weir structures act as drop structures with the downstream pipes from the structure at a lower elevation, allowing the storm water drainage pipe to be located below the existing fuel lines.

Proposed Storm water System

Generally, regulatory agencies desire the post rate of storm water discharge to equal the pre-development discharge rate to prevent downstream flooding. Since Bridge Creek is tidal, it is not necessary in this case to achieve the same discharge rate in the post condition. Hydrographs produced by the TR-55 method are not needed in the design of the storm water system for the intermodal facility since detention of storm water to mitigate any potential increase in storm discharge rate is not required.

The storm water conveyance system is designed to mirror as much as possible the existing drainage system with the major difference being that water quality treatment will

be provided. The full build (Phases 1A, 1B and 2) storm water system will use the existing locations of Outlets L, C, D, G, H-alt. and H to discharge storm water from the intermodal facility into Bridge Creek.

The storm water conveyance system is designed to be built in phases consistent with the construction of the intermodal facility. In Phase 1A the storm water system will utilize outfall L, C and H-alt. In Phase 1B outfalls D, G and H would be constructed. In Phase 2, additional storm water pipes would be connected to outfalls D, G, and H.

Figure 4 shows the watersheds and storm water conveyance system for Phase 1A. Surface water from the intermodal facility will continue to be conveyed to Bridge Creek in relatively the same manner as it does today.

POTENTIAL SOURCES OF STORM WATER POLLUTION

The purpose of this section is to identify potential sources of pollution from storm water runoff into Bridge Creek. Potential pollutants can result from construction activities and from the operation of the intermodal facility.

Construction Activities

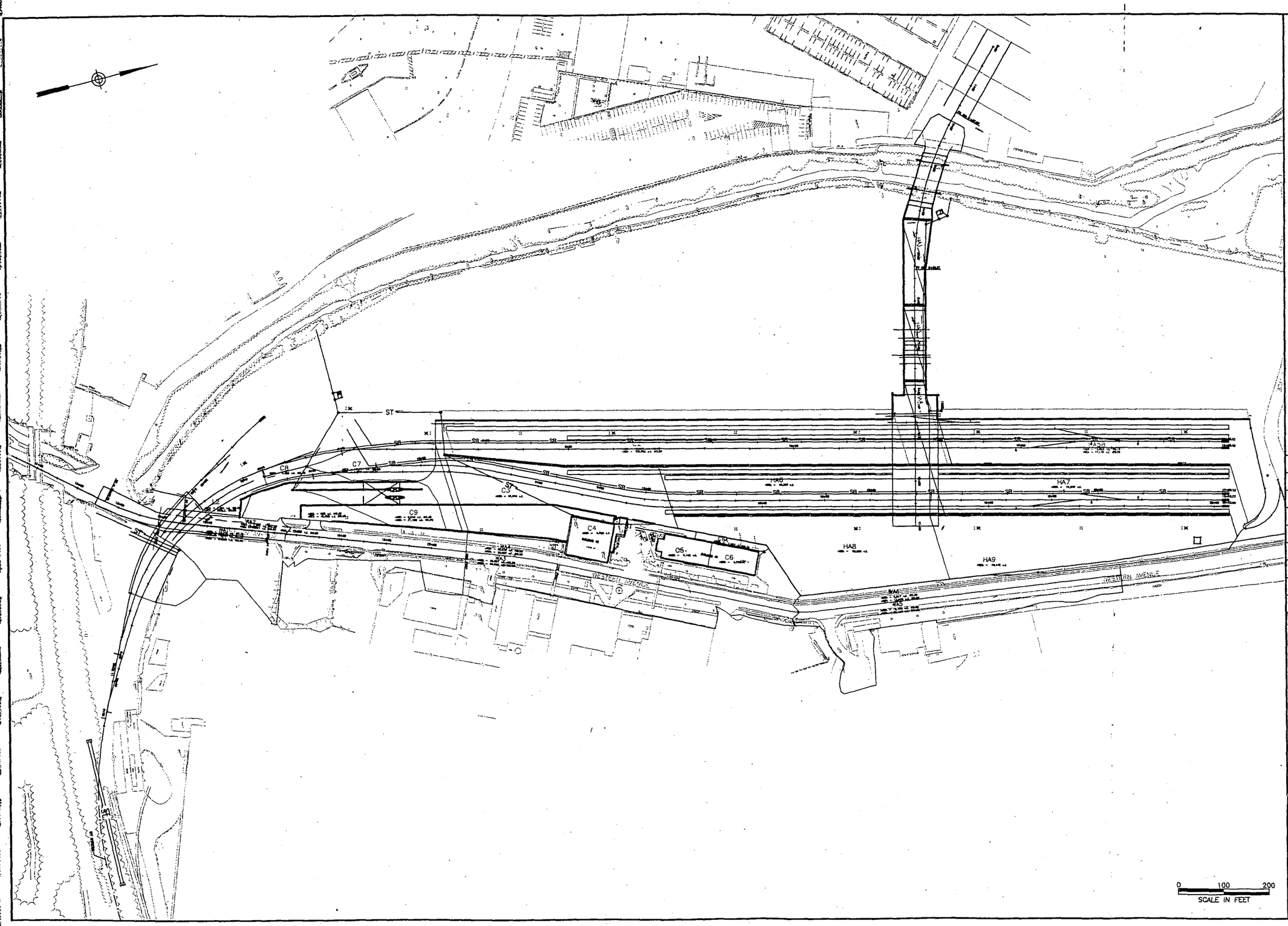
Construction activities such as grading can cause the soil to be exposed to the erosive forces of rain and wind. Because the soil is unprotected, soil and sand particles can be easily washed away by rain and eventually being deposited into Bridge Creek. Other potential sources from construction activities include vehicle tracking, debris and equipment and construction material storage.

Intermodal Operations

The operation of the intermodal facility has the potential to introduce pollutants into the storm water runoff from contaminated sediment and from vehicle and train movements. The storm water discharge from the intermodal also has the potential of causing accelerated channel erosion from the storm water discharge outlet velocity.

The US Environmental Protection Agency (EPA) and the Federal Highway Administration (FHWA) conducted in-depth studies of storm water runoff. EPA's study, known as the Nationwide Urban Runoff Program (NURP), documented concentrations of heavy metals in storm water runoff. The FHWA studies confirmed the NURP findings. These studies found that pollutant generation is primarily influenced by the amount of impervious surface in the drainage area. Pollutants produced by airborne deposition and deterioration of automobile parts build-up on impervious surfaces. These pollutants are then washed off by rainfall and are contained in the runoff. The studies found that the primary pollutants contained in the runoff from paved surfaces are heavy metals.

It should be noted that the intermodal facility would be almost entirely covered by an impervious surface. There will be no grassed areas except for the natural growth along the riverbank. Thus, phosphorus is not a potential source of pollutant which is generated by atmospheric deposition, pet waste and organic matter such as leaves. The primary



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AUGUST 27, 2004

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HOWLAND HOOK MARINE TERMINAL

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Title

PORT IVORY
INTERMODAL FACILITY
PHASE 1A

WATERSHEDS AND STORMWATER CONVEYANCE SYSTEM FOR PHASE 1A

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Drawing Number **FIGURE 4**

PID# 00250005

sources of phosphorus that can cause high concentrations in storm water runoff are lawn fertilizers and agricultural practices. Since there are no grass areas very little phosphorus will be generated.

STORM WATER MANAGEMENT CONTROL

The purpose of this section is to identify the types of temporary and permanent storm water management control measures that will mitigate water quality impacts to Bridge Creek. The controls will provide for soil stabilization and management of waste disposal, sanitary sewer, construction material and equipment during the construction process. This section will also address permanent storm water management control measures during the operation of the intermodal facility.

Best Management Practices – Construction

Best Management Practices (BMPs) will be implemented to protect Bridge Creek. BMPs that will be utilized for the construction of the intermodal facility fall into three general categories: construction schedule, structural measures for erosion and sedimentation control and other pollution prevention measures.

Construction Schedule

The intent of the construction schedule is to ensure that BMPs are an integral part of the construction process. The sequence of construction activities for this project is:

- install erosion and sediment control measures;
- removal of structures and utilities;
- site preparation loading pads and toppick foundation;
- site preparation and grading (site, internal road and railroad reconfiguration);
- drainage and utility construction;
- railroad track construction;
- paving; and
- site cleanup.

It should be noted the silt and hay bale barrier that separates the intermodal facility from Bridge Creek would not be removed at the completion of the intermodal facility. The construction activities identified in this SWPPP are for the first phase of the construction of the intermodal facility. Surcharging of the Phase 1B and Phase 2 areas will be undertaken at the completion of the first phase of the intermodal facility. Therefore, the silt and hay bale barrier will remain in place to protect Bridge Creek during the surcharging operation.

Erosion and Sedimentation Control

The erosion and sedimentation control measures that will be utilized for the construction of Phase 1A of the intermodal fall into three general categories: site stabilization, river segregation and sediment retention. The site stabilization measures are designed to stabilize the active areas of construction site. The river segregation measures provide a

barrier between the river and the construction activities to cut off sediment transport to the wetlands. The sediment retention measures are designed to remove sediment from runoff prior to its discharge to the river.

Details of the erosion and sediment control measures and the locations where they will be installed are shown on Figures N1 to N9 at the end of this document. The combination of these different measures will provide effective control of erosion and will prevent sediment transport off the site during construction. The intent has been to develop a series of control measures such as silt fences, straw bale barriers, diversions, a specified construction site entrances and construction road will act collectively to minimize the transport of sediment. The control measures include:

- Site Stabilization

Vegetative Cover - Temporary vegetative cover will not be needed on this project. The construction of Phase 1A is planned to begin immediately following the preparation of the site.

- River Segregation

Silt Fencing - To prevent sediment in runoff from entering Bridge Creek, a temporary physical barrier will be constructed between the river and the construction site. This barrier, consisting of silt fence, will reduce the transport of sediment by filtering runoff. Water will pass through the barrier, but sediment will be trapped and retained by the bales.

The silt fence will be placed in a single row parallel to the Bridge Creek at the top of the riverbank. Straw bale barriers will be placed around all catch basins to remain within the limits of disturbance.

When constructing the headwalls, a turbidity curtain will separate the work area from Bridge Creek, which will prevent sediment from entering the creek.

- Construction Entrance and Road

Crushed stone pads will be constructed at all points of egress from the site. These stabilized entrances will be used in combination with the construction road to remove soils from construction vehicles prior to leaving the site. The paved section of Western Avenue near the construction entrance will be regularly swept to remove excess mud, dirt or rock tracked from the site.

Other Measures

Erosion and sedimentation are not the only potential sources of pollution from construction activities; other pollutants may be present during construction. To prevent contamination of the project area, the contractors will be accountable for material management, waste disposal and spill prevention and response.

❖ Spill Prevention

Oil, gas, lubricants and other petroleum products will not be deposited on the ground. Typically, construction-related activities such as vehicle refueling and equipment maintenance (including the drainage and pumping of lubricants) are prohibited for over-the-road vehicles. When necessary for earth moving equipment, these activities will be conducted in designated areas to prevent runoff into the river and with adequate equipment (such as absorbent materials) to immediately clean up any accidental spills. All vehicles on site will be monitored for leaks and receive regular preventive maintenance to reduce chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Upon completion of all work, surplus materials and equipment will be removed from the site.

❖ Waster Disposal

Proper management and disposal procedures of building materials and other construction waste will be in place to prevent these materials from ending up in wetlands. All trash, litter and construction debris will be collected for disposal in accordance with state and local ordinances. It is expected that the contractor will provide an adequate number of containers with lids or covers that can be placed over containers prior to rainfall. The contractor will be required to ensure that the containers are taken off site before any possibility of the containers overflowing. All spills will be cleaned up immediately. Sanitary waste will be collected from portable units a minimum of two times a week to avoid overfilling. These measures will prevent the introduction of foreign materials or contaminants into surface or ground water.

❖ Good Housekeeping

The contractor will maintain a clean and orderly work environment. This will include maintenance of industrial machinery; material storage practices; material inventory controls; routine and regular clean-up; maintaining well organized work areas; and training programs for employees regarding these practices. Material storage piles, such as stockpiles of dry materials, spoils piles, gravel, sand, compost and building materials, will be covered.

Best Management Practices – Post Construction

Storm water runoff from the impervious surfaces during the operation of the intermodal facility will be treated prior to discharging into Bridge Creek. The type of BMP proposed for this project will be precast concrete structures specifically designed for the size of the drainage areas to capture and retain oils and grit found in storm water runoff. The proposed location of the storm water treatment structures is shown on Figures N3 and N4 at the end of this document. A Performance Specification has been prepared that requires storm water treatment structure to be capable of 80% total suspended solids (TSS) removal as well as oil. The Performance Specification is included in the Appendix A of this SWPPP.

MAINTENANCE PROCEDURES

The maintenance procedures for the control measures are included in the contract documents. The SWPPP drawings Figures N1 to N9 at the end of this document include notes that identify specific maintenance methods for each control measure. Section 02272 "Soil Erosion and Sediment Control" of the contract documents included in Appendix B also identify maintenance methods.

Responsible Person

Section 02272 "Soil Erosion and Sediment Control" requires the contractor to assign a supervisory level person to serve in the capacity of Soil Erosion and Sediment Control Manager. This person will be responsible for:

- implementation of the SWPPP plan,
- overseeing maintenance practices,
- conducting or providing for inspection and monitoring activities,
- identification any deficiencies in the SWPPP and make sure they are corrected, and

Outline of Maintenance Procedures

An outline of these procedures follows:

- General

All control measures will be inspected by the contractor at least once a week and following all storms that produce 0.5 inches or more of precipitation.

All control measures will be maintained in good working order and any necessary repairs will be completed within 24 hours.

- Silt Fencing/Straw Bales (Sediment Barriers)

Sediment barriers will be inspected for depth of sediment and tears in the fabric, ensuring that fabric is securely fastened to support posts, that the fence and posts remain erect and that posts are securely implanted in the ground. Bales will be checked to insure their integrity and anchoring.

Sediment build up behind the silt fence or straw bale barrier will be removed when the sediment reaches one-third the height of the barrier.

- Storm Water Treatment Structures

The maintenance procedures for the treatment structures will be per the manufacturer's recommendations, which includes inspections and clean-out when necessary.

❖Catch Basins

Catch basin sumps will also be inspected yearly and clean-out when necessary. PANYNJ personnel would be responsible for inspection and for arranging for the clean-out.

CERTIFICATIONS

Engineer's Certification

I hereby certified that, under my supervision, the Storm Water Pollution Prevention Plan has been prepared, and being familiar with *New York Guidelines for Urban Erosion and Sediment Control* and being knowledgeable of soil erosion and sediment control measures attest that the plan has been in accordance with good engineering principles and practice.

_____

Edward J. Spinard Jr.
New York Professional Engineer
License Number 080332

Owner's Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manages the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____

Name

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Title

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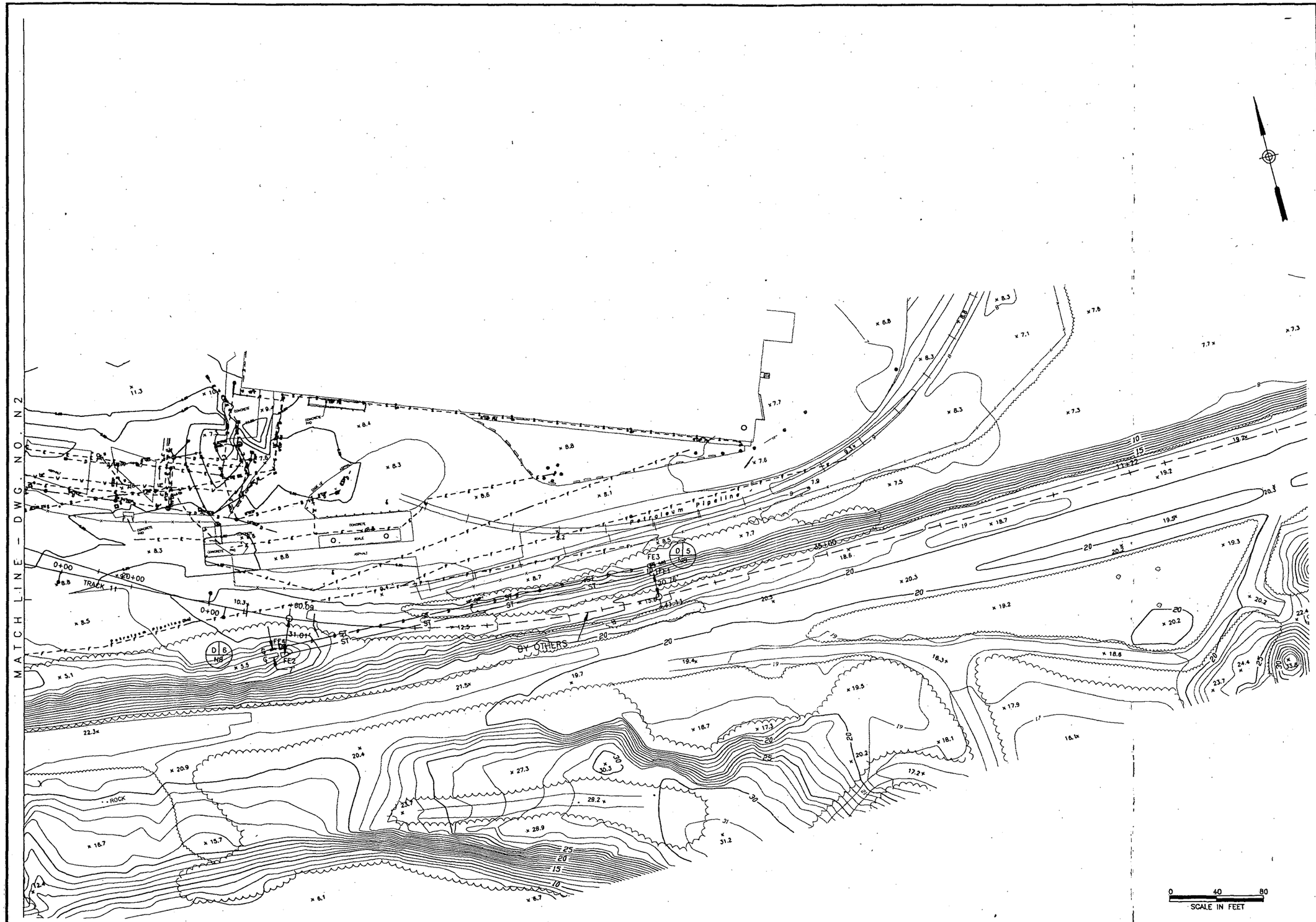
Date



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HOWLAND HOOK MARINE TERMINAL

ENVIRONMENTAL

Title

PORT IVORY INTERMODAL FACILITY PHASE 1A

STORMWATER POLLUTION PREVENTION PLAN 1 OF 6

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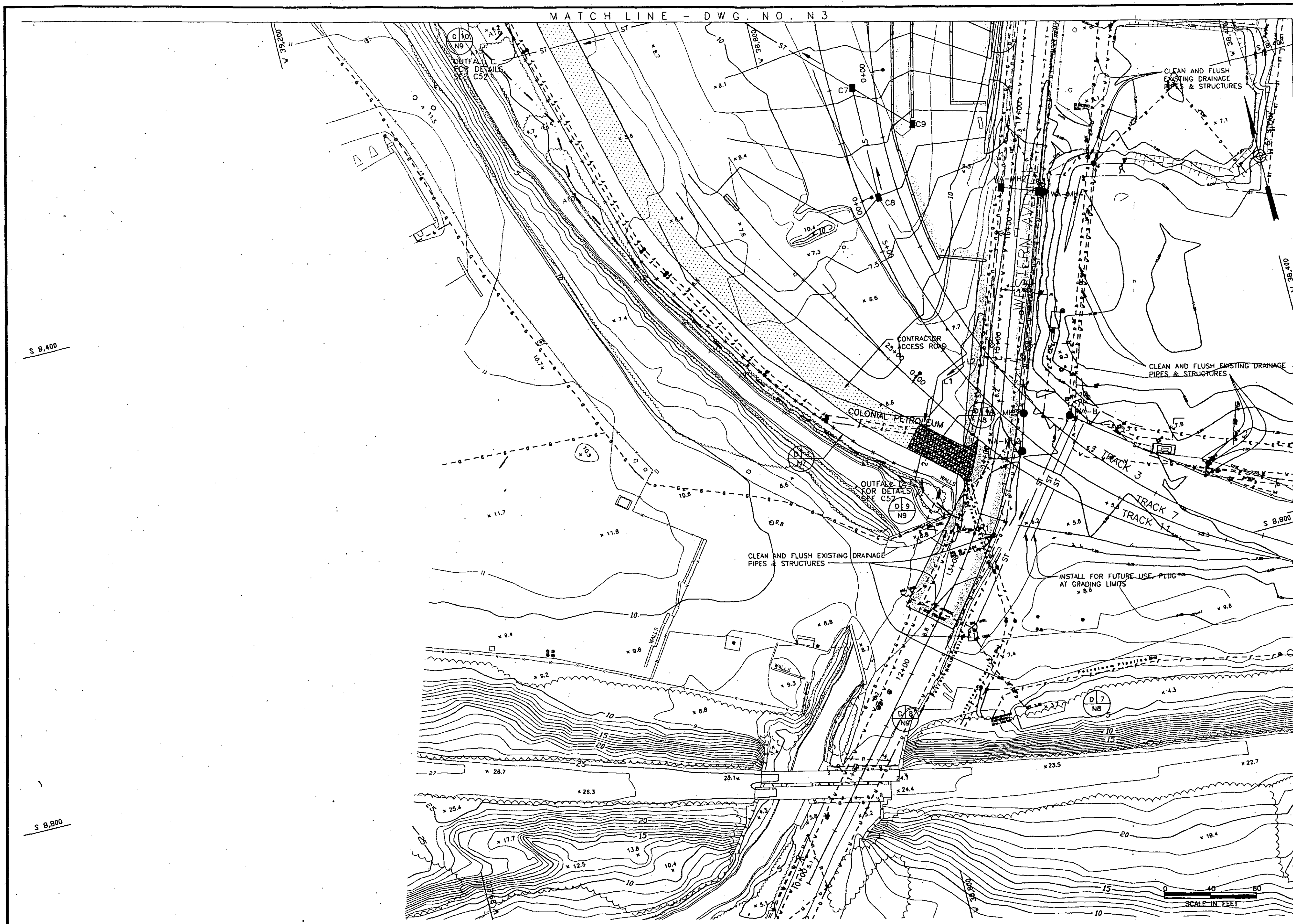
Contract Number HH-234.927

Drawing Number N1



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PORT IVORY
INTERMODAL FACILITY
PHASE 1A

STORMWATER POLUTION PREVENTION PLAN 2 OF 6

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TRACK 5
TRACK 4
TRACK 3
TRACK 2
TRACK 1

BUILDING 40

TOSCO PETROLEUM

AREA AVAILABLE FOR CONTRACTORS USE AND STOCKPILE AREA

CONTRACTOR ACCESS ROAD

CLEAN AND FLUSH EXISTING DRAINAGE PIPES & STRUCTURES

CLEAN AND FLUSH EXISTING DRAINAGE PIPES & STRUCTURES

CLEAN AND FLUSH EXISTING DRAINAGE PIPES & STRUCTURES

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PORT IVORY
INTERMODAL FACILITY
PHASE 1A

STORMWATER POLUTION PREVENTION PLAN
3 OF 6

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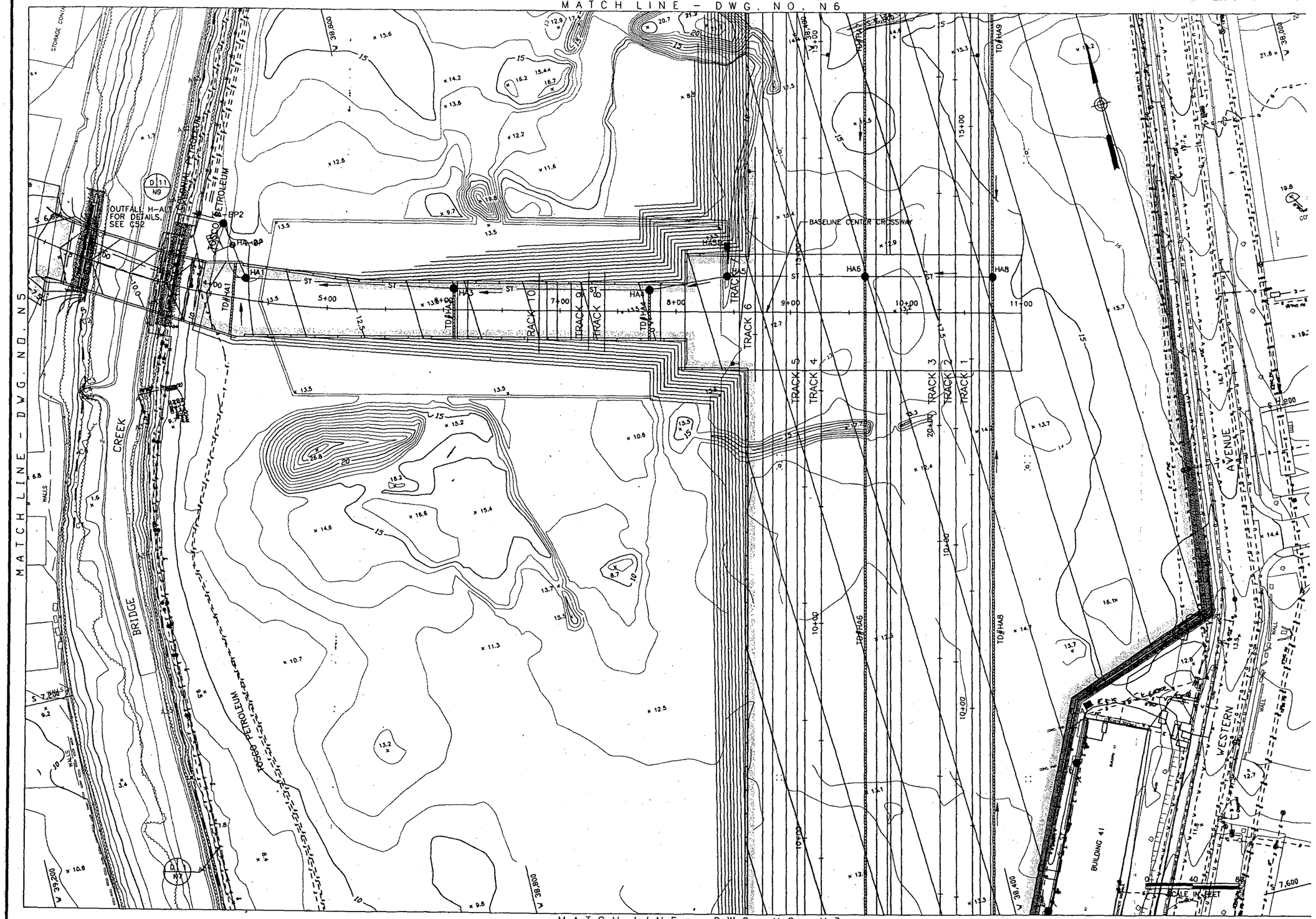

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PORT IVORY
INTERMODAL FACILITY
PHASE 1A

STORMWATER POLUTION PREVENTION PLAN
4 OF 6

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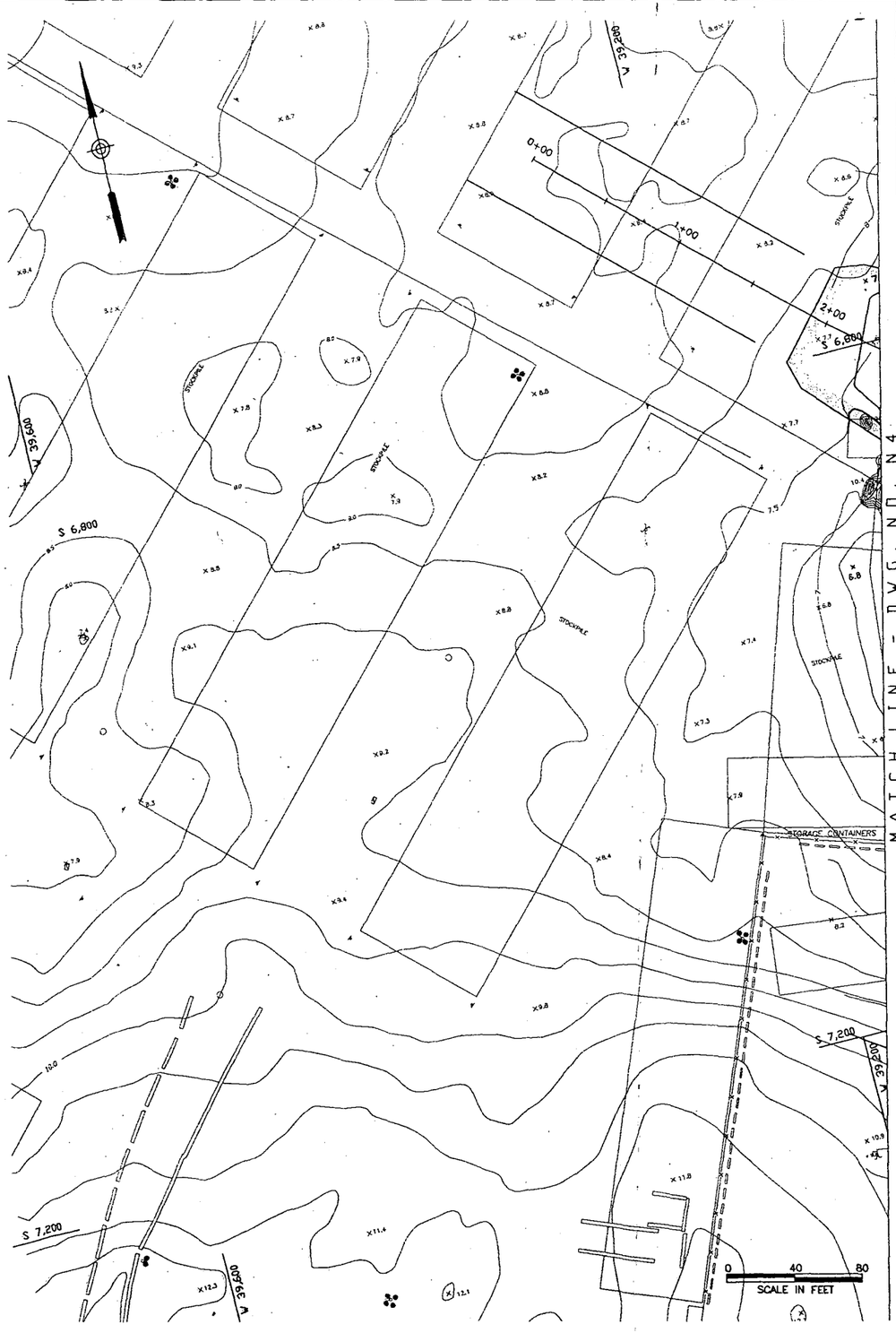

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ENVIRONMENTAL

Title

PORT IVORY INTERMODAL FACILITY PHASE 1A

STORMWATER POLUTION PREVENTION PLAN 5 OF 6

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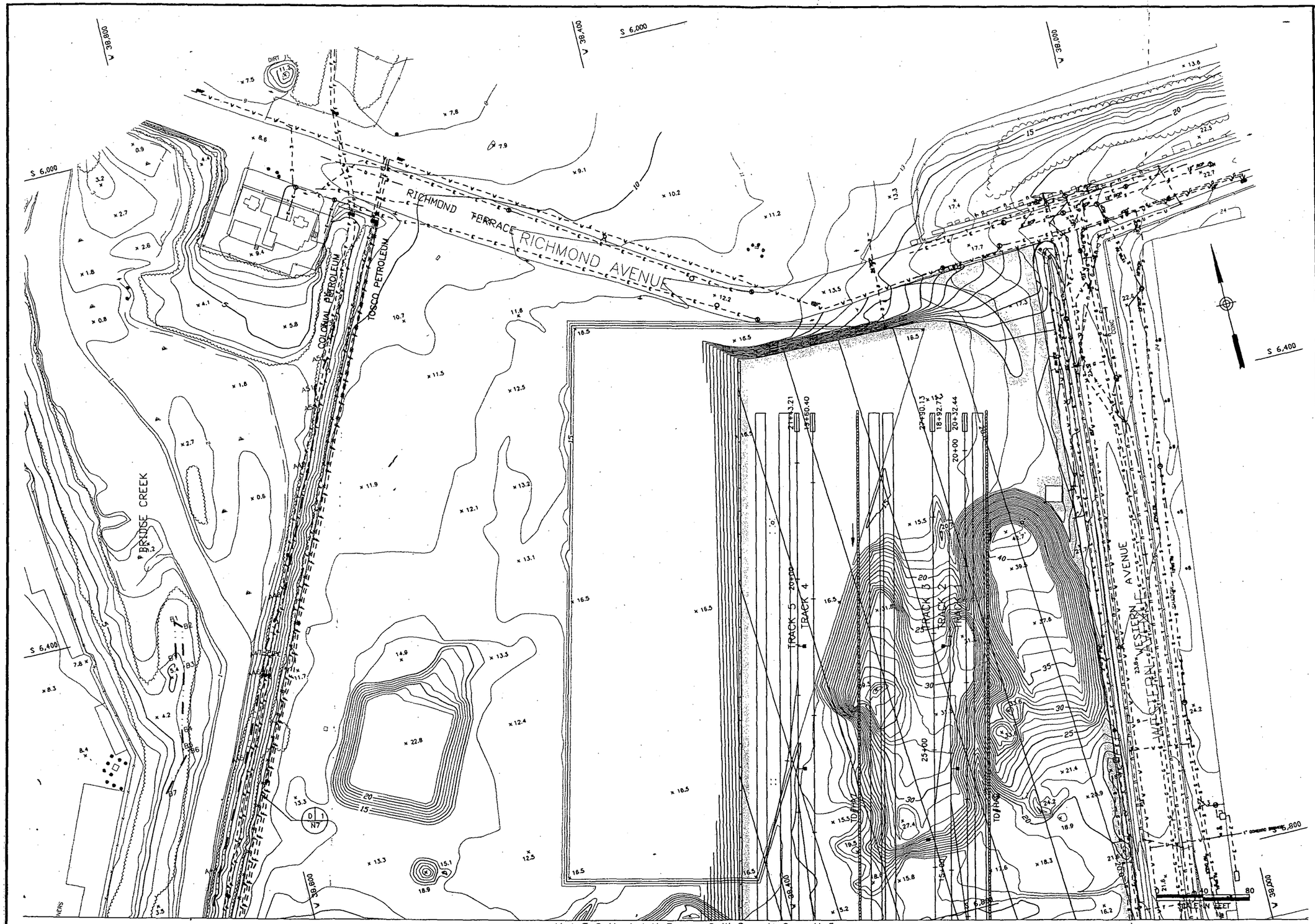

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PORT IVORY
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PHASE 1A

STORMWATER POLUTION PREVENTION PLAN
6 OF 6

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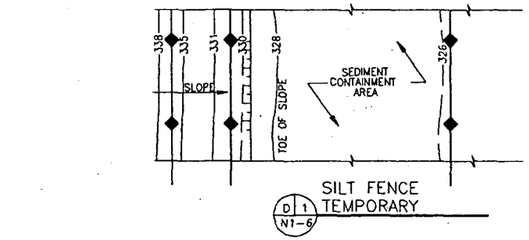
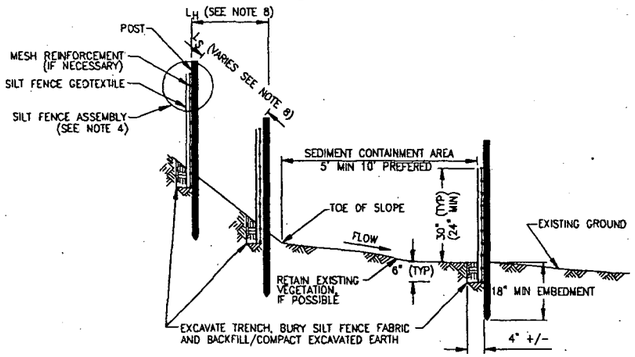
Contract Number HH-234.927

Drawing Number **N6**



D 1 N1-6

SILT FENCE TEMPORARY



S 1 N1-6

SILT FENCE TEMPORARY

APPLICATION NOTES:

A. THE PRIMARY PURPOSE OF A SILT FENCE IS TO REDUCE RUNOFF VELOCITY AND TRAP SEDIMENT. VELOCITY IS REDUCED, WATER IS IMPOUNDED BEHIND THE MEASURE, AND SEDIMENT FALLS OUT OF SUSPENSION.

B. SILT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION (CONTOUR). THEY MAY BE INSTALLED AT INTERMEDIATE POINTS UP SLOPES AS WELL AS AT THE BOTTOM AS SHOWN IN THE DETAIL.

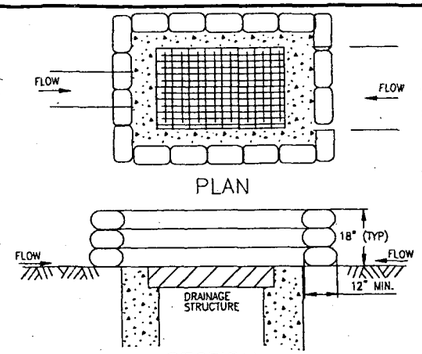
C. SILT FENCE SHALL NOT BE USED IN OR ACROSS A FLOWING NATURAL CHANNEL.

GENERAL NOTES:

1. SILT FENCE SHALL BE PLACED A MINIMUM OF 5'-0" FROM TOE OF SLOPE, 10'-0" PREFERRED, TO PROVIDE ADEQUATE AREA FOR SEDIMENT STORAGE AND FACILITATE MAINTENANCE OF SEDIMENT CONTAINMENT AREA.
2. POSTS MAY BE 1½"x1½"(MINIMUM) HARDWOOD, 1½"x1½"(MINIMUM) SOFTWOOD, OR 1.3 LB/FT (MIN.) STEEL. SPACING FOR THE PROVIDED SILT FENCE SHALL BE AS DESIGNATED ON THE DEPARTMENT APPROVED LIST FOR SILT FENCE.
3. APPROVED SILT FENCE ASSEMBLIES ARE LISTED ON THE DEPARTMENT APPROVED LIST. ASSEMBLIES MAY HAVE 4'-0" OR 6'-6" POST SPACING, AND MAY OR MAY NOT HAVE MESH REINFORCEMENT, AS PER APPROVED LIST.
4. THE BOTTOM EDGE OF SILT FENCE SHALL BE BURIED A MINIMUM OF 6" BELOW GROUND. THE FENCE SHALL BE INSTALLED WITH THE POSTS ON THE DOWNSTREAM SIDE OF THE FABRIC.
5. MEASURES SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS, AFTER EACH RAINFALL OF ½" OR MORE WITHIN A 12 HOUR PERIOD, OR DAILY DURING PROLONGED RAINFALL. MEASURES SHALL BE CLEANED AND REPAIRED AS REQUIRED.
6. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES ONE-HALF OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF AS UNSUITABLE MATERIAL.
7. DRAINAGE AREAS:
   MAXIMUM DRAINAGE AREA TRIBUTARY TO 100' OF SILT FENCE SHALL BE 0.5 acres.,
   MAXIMUM DRAINAGE AREA TRIBUTARY TO 100' OF HAYBALE DIKE SHALL BE 0.25 acres.
8. THE FOLLOWING ARE MAXIMUM SLOPE LENGTHS TO THESE MEASURES:

SILT FENCE SLOPE	SLOPE LENGTH L (ft)	HORIZ LENGTH L (ft)
2:1	49	43
3:1	82	75
4:1	131	128
5:1	192	192
>5:1	282	282

9. INSTALLATION, I.E. EXCAVATION, BACKFILL, COMPACTION, SILT FENCE SHALL BE INCLUDED IN UNIT PRICE BID FOR ITEM.



SECTION

DRAINAGE STRUCTURE INLET PROTECTION-TEMPORARY (GRAVEL BAG)

SYMBOL

GB

APPLICATION NOTES:

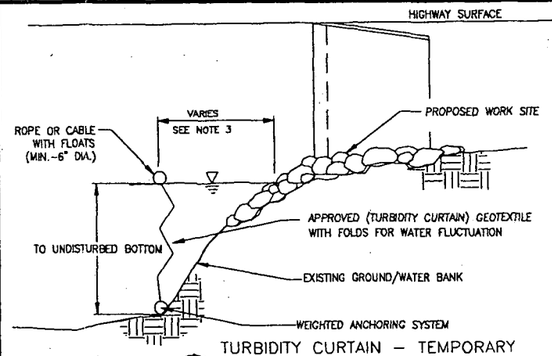
A. THE PRIMARY PURPOSE OF DRAINAGE STRUCTURE INLET PROTECTION IS TO PREVENT SEDIMENT FROM ENTERING A DRAINAGE SYSTEM BY PONDING WATER WHICH ALLOWS SEDIMENT TO FALL OUT OF SUSPENSION.

B. GRAVEL BAGS ARE FILLED WITH CLEAN STONE RATHER THAN SAND TO PREVENT SEDIMENT FROM ENTERING A DRAINAGE SYSTEM IF BAGS ARE DAMAGED DURING USE.

C. THE TOP OF THE INLET PROTECTION SHALL BE SET AT THE MAXIMUM DESIRED WATER LEVEL BASED ON FIELD LOCATION AND CONDITIONS.

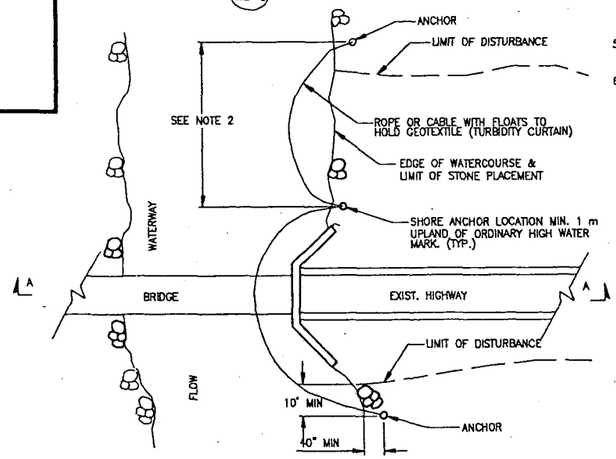
NOTES:

1. GRAVEL BAGS SHALL BE INDIVIDUALLY TIED, DOUBLE BAGGED AND INVERSELY INSERTED. GRAVEL BAGS SHALL LAP THE JOINTS BETWEEN THE BAGS IN THE LAYER BELOW. COST OF EXCAVATION FOR INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR ITEM.
2. MEASURES SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS, AFTER EACH RAINFALL OF ½" OR MORE WITHIN A 12 HOUR PERIOD, OR DAILY DURING PROLONGED RAINFALL. MEASURES SHALL BE CLEANED AND REPAIRED AS REQUIRED.
3. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES ONE-HALF OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF AS UNSUITABLE MATERIAL.



TURBIDITY CURTAIN - TEMPORARY SECTION A-A

S 3 N8-9



TURBIDITY CURTAIN - TEMPORARY DETAIL

D 3 N8-9

SYMBOL

T/C

APPLICATION NOTES:

A. THE PURPOSE OF A TURBIDITY CURTAIN IS TO SEPARATE WORK AREAS IN OR ADJACENT TO WATERWAYS, TO PREVENT TURBIDITY FROM ENTERING THE WATERWAY.

B. TURBIDITY CURTAIN SHALL NOT BE PLACED ACROSS A FLOWING WATERWAY, OR IN A WATERWAY WITH STREAM VELOCITIES GREATER THAN 1.6 ft/sec.

C. CONCENTRATED FLOW OUTLETS SUCH AS CULVERT OUTLETS, DITCHES, ETC SHALL NOT BE LOCATED BEHIND TURBIDITY CURTAIN.

NOTES:

1. THE DETAIL DEPICTS WORK AT A BRIDGE LOCATION, BUT TURBIDITY CURTAIN MAY BE APPLIED AT OTHER LOCATIONS.
2. TURBIDITY CURTAIN SHALL BE A MAXIMUM OF 100' LONG FOR EACH SECTION OF CURTAIN REQUIRED. LAST SECTION SHALL TERMINATE 10' BEYOND THE LIMIT OF DISTURBANCE.
3. THE TURBIDITY CURTAIN SHALL BE PLACED AS CLOSE TO THE WORK AS POSSIBLE WITHOUT INTERFERING WITH CONSTRUCTION OPERATIONS.
4. THE CONTRACTOR SHALL CONTINUALLY MONITOR THE INSTALLATION, TAKING INTO ACCOUNT WEATHER PATTERNS AND PREVAILING WIND DIRECTIONS THAT MAY AFFECT WATER LEVELS, VELOCITY AND MOVEMENT OF THE TURBIDITY CURTAIN.
5. THE TURBIDITY CURTAIN SHALL BE REMOVED BY PULLING TOWARD THE SHORE TO MINIMIZE ESCAPE OF SEDIMENTS INTO THE WATERWAY.
6. THE WEIGHTED ANCHOR SYSTEM SHALL BE A TYPE THAT ALLOWS THE CURTAIN TO CONFORM TO THE CONTOUR OF THE BOTTOM ON THE WATERWAY.

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ORIGINAL SEALED AND SIGNED BY

Edward J. Spinard, Jr.
N.Y. Professional Engineer #080332

100% SUBMISSION
AUGUST 20, 2004

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HOWLAND HOOK MARINE TERMINAL

ENVIRONMENTAL

Title

PORT IVORY
INTERMODAL FACILITY
PHASE 1A

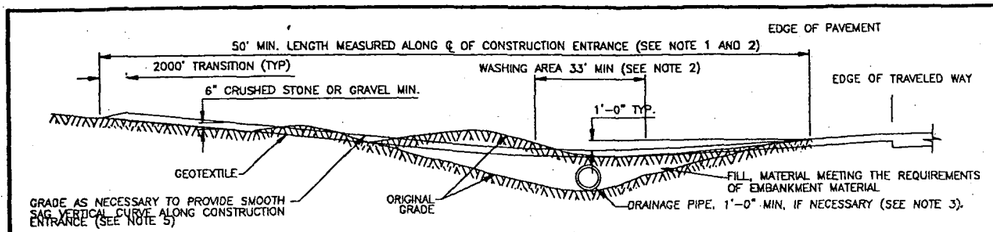
STORMWATER POLLUTION PREVENTION DETAILS 1 OF 3

MAD	MAD	
Designed by	Drawn by	Checked by

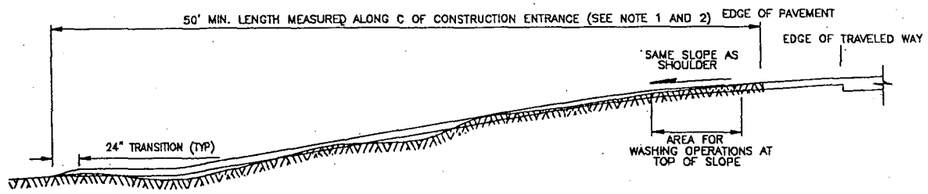
Date

Contract Number HH-234.927

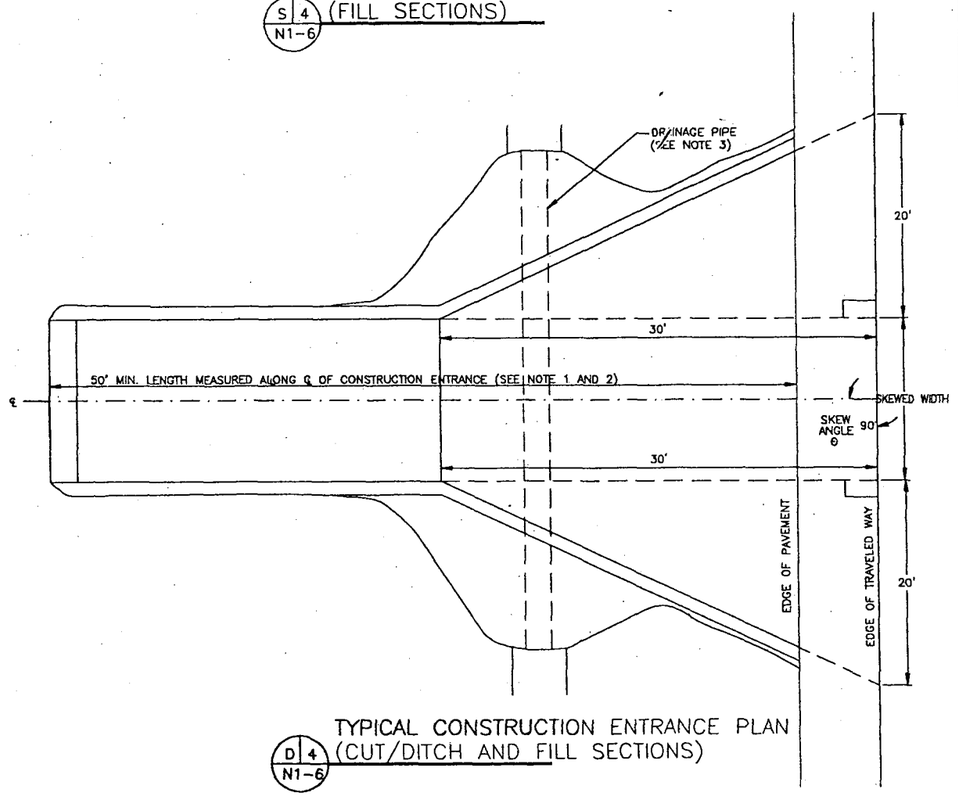
Drawing Number N7



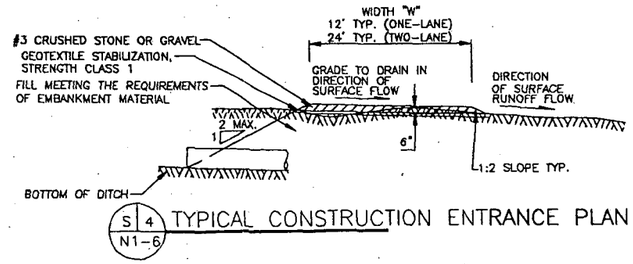
S 4 / N1-6 TYPICAL CONSTRUCTION ENTRANCE PLAN (CUT AND DITCH SECTIONS)



S 4 / N1-6 TYPICAL CONSTRUCTION ENTRANCE PLAN (FILL SECTIONS)



D 4 / N1-6 TYPICAL CONSTRUCTION ENTRANCE PLAN (CUT/DITCH AND FILL SECTIONS)



S 4 / N1-6 TYPICAL CONSTRUCTION ENTRANCE PLAN

SKEWED ENTRANCE LAYOUT WIDTHS

ENTRANCE TYPE	SKEW ANGLE (°)				
	60	75	90	105	120
ONE-WAY	4.2	3.8	3.6	3.8	4.2
TWO-WAY	8.4	7.6	7.2	7.6	8.4

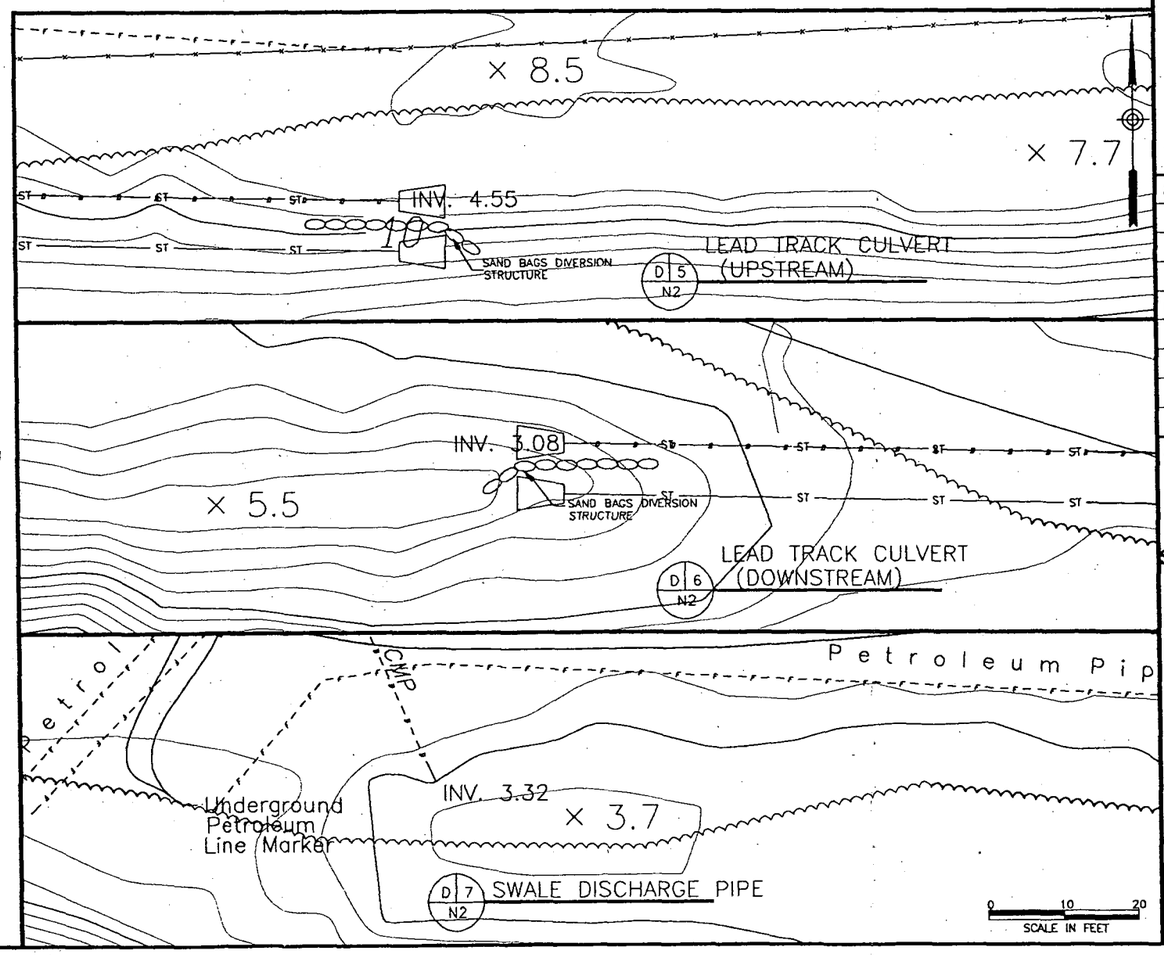
NOTE:
FOR CORNER ANGLES NOT SHOWN IN TABLE, SEE NYSDOT "POLICY AND STANDARDS FOR ENTRANCES TO STATE HIGHWAYS, FEBRUARY 1998", MINOR COMMERCIAL DRIVEWAYS.

APPLICATION NOTES:

A. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY OR STREETS.

NOTES:

1. MODIFICATIONS MAY BE REQUIRED TO MATCH FIELD CONDITIONS.
2. A 33' WASH AREA SHALL BE PROVIDED. ADDITIONAL GRADING MAY BE REQUIRED TO PROVIDE WASHING AREAS.
3. PROPOSED DRAINAGE PIPES SHALL BE SIZED WITH SUFFICIENT CAPACITY TO CARRY DITCH FLOWS. ALTERNATIVE WAYS OF TRANSPORTING DITCH DRAINAGE ACROSS CONSTRUCTION ENTRANCES MAY BE PROPOSED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER.
4. THE CONTRACTOR SHALL GRADE TO PREPARE AND SMOOTH ORIGINAL GROUND FOR PLACEMENT OF 6" OF #3 CRUSHED STONE OR GRAVEL ENTRANCE MATERIAL UP TO THE EDGE OF PAVEMENT.
5. ALL WORK TO CONSTRUCT THE STABILIZED ENTRANCE, INCLUDING GRADING, DRAINAGE PIPE, EXCAVATION, FILL, GEOTEXTILE AND CRUSHED STONE OR GRAVEL SHALL BE INCLUDED IN THE UNIT PRICE BID.



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AUGUST 20, 2004

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HOWLAND HOOK MARINE TERMINAL

ENVIRONMENTAL

Title

PORT IVORY
INTERMODAL FACILITY
PHASE 1A

STORMWATER POLLUTION PREVENTION DETAILS 2 OF 3

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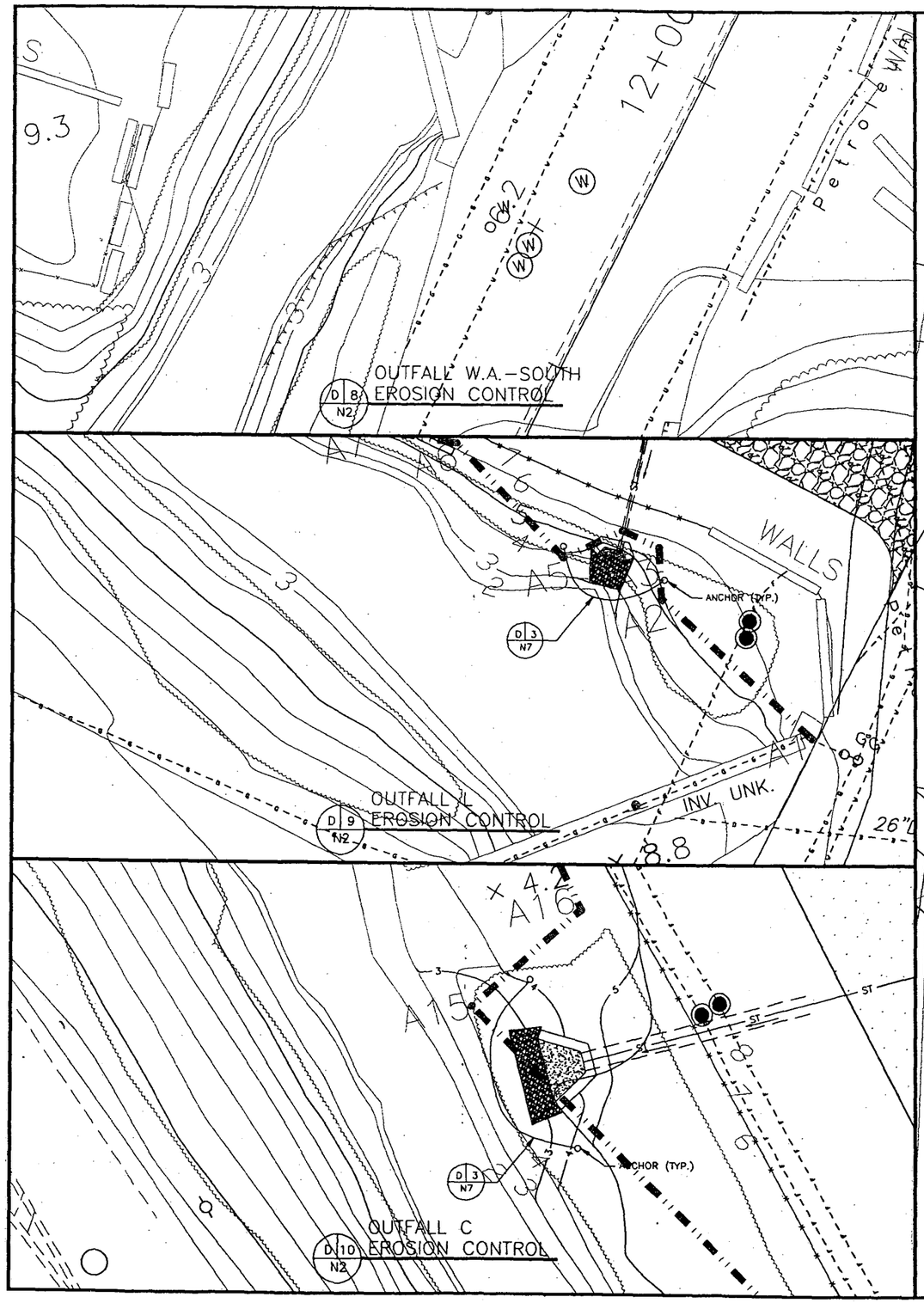
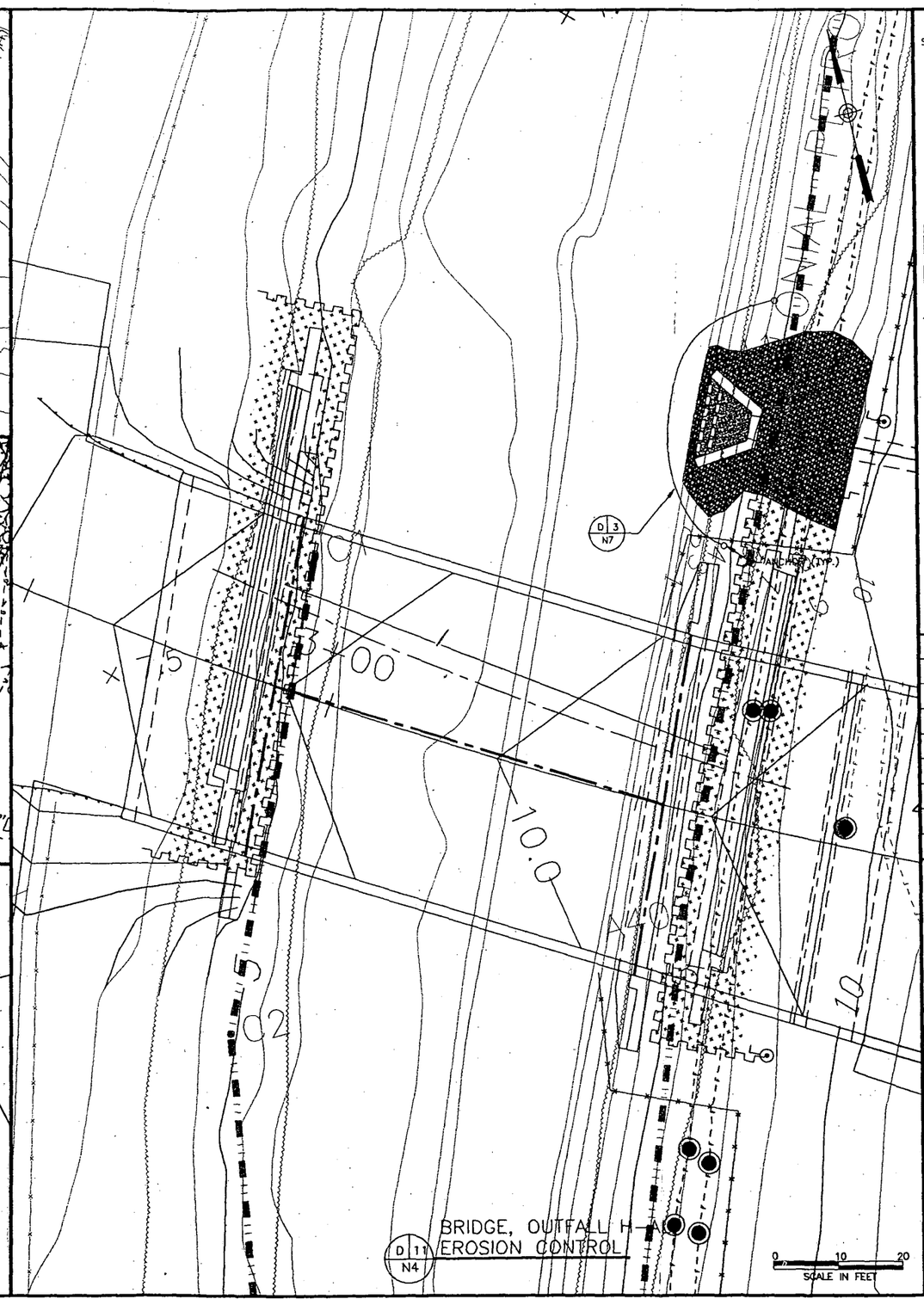
Contract Number HH-234.927

Drawing Number N8





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INTERMODAL FACILITY
PHASE 1A

STORMWATER POLLUTION PREVENTION DETAILS 3 OF 3

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Designed by	Drawn by	Checked by

Date

Contract Number HH-234.927

Drawing Number N9

Appendix A

DIVISION 2

SECTION (to be assigned by Contract)

STORMWATER TREATMENT SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. This Section specifies requirements for stormwater treatment system. The Contractor, and or a manufacturer selected by the Contractor and approved by the Engineer, shall furnish all labor, materials, tools, apparatus, and incidentals and equipment necessary to install, certify as meeting the performance and design requirements contained in this specification, and put in satisfactory operation stormwater treatment systems, as indicated on the contract documents and specified herein.

1.02 REFERENCES

A. Work of this Section shall conform to the provisions of the following references and regulations, except where otherwise noted herein or on the Contract Drawings. Where the requirements of this Section or the Contract Drawings and the following regulations differ, the stricter requirements shall control.

1. *Stormwater Management Design Manual*, New York State Department of Environmental Conservation, October 2001

Chapter 3 Stormwater Permit Requirements

Chapter 4 Unified Stormwater Sizing Criteria

Chapter 5 List of acceptable Stormwater Management Practices

1.03 JOB CONDITIONS

A. Take all steps necessary to become familiar with and obtain a thorough knowledge of the characteristics of the existing soils, groundwater and site conditions adjacent to and beneath the work area prior to designing and selecting stormwater treatment systems.

B. Shall be responsible for verification of location of existing fuel lines.

C. Stormwater treatment systems shall not interfere with utilities such as stormwater drainage, water, electrical, compressed air, or with their construction.

D. Stormwater treatment systems shall be located where shown on Contract Documents.

1.04 STORMWATER TREATMENT SYSTEM PERFORMANCE REQUIREMENTS

The following performance requirements shall be met:

A. Shall meet the following water quality criteria as specified in the *Stormwater Management Design Manual,* Chapter 5 Acceptable Stormwater Management Practices, Section 5.0 page 5-1.

"1. Can capture and treat the full water quality volume (as defined in Section 4.2 Water Quality Volume in the *Stormwater Management Design Manual.*)

2. Shall be capable of 80% Total Suspended Solids (TSS) removal

3. Shall have accepted longevity in the field."

B. Shall met the following monitoring criteria specified in the *Stormwater Management Design Manual,* Chapter 5 Acceptable Stormwater Management Practices, Section 5.3 Criteria for Practice Addition, page 5-4 and 5-5.

"1. Shall have been monitored in at least two locations

2. At least five storm events shall have been sampled at each site

3. Concentrations reported in studies shall have been flow-weighted.

4. The studies shall be independent (i.e. may not be conducted by vendor or designer).

5. The studies shall have been conducted in the field, as opposed to laboratory testing.

6. The practice must have been in the ground for at least one year at the time of monitoring.

7. At least one storm event in each study must be greater than the 90% storm event for the location."

1.05 SUBBMITTALS

See Appendix "A" for submittal requirements.

1.06 DESIGN REQUIREMENTS

A. Shall be capable of bypassing larger volume storms that are greater than the 90% Rainfall Event for the State of New York (as defined in Section 4.2 Water Quality Volume in the *Stormwater Management Design Manual* without loss of treatment capacity and without loss of previously captured oils and sediments. Bypass of treatment system shall be performed by isolating the treatment system from the main conveyance system using by-pass structures.

B. Each stormwater treatment system shall be of a hydraulic design that includes flow controls designed and certified by a Professional Engineer licensed in the State of New York using accepted principles of fluid mechanics that raise

the water surface inside the tank to a pre-determined level in order to prevent the re-entrainment of trapped floating contaminants.

C. Individual stormwater treatment systems shall have usable sediment storage capacity of not less than the volume recommended by the manufacturer. The systems shall be designed such that the pump-out volume is less than ½ of the total system volume and not allow surcharge of the upstream piping network during dry weather conditions.

D. A water-lock feature shall be incorporated into the design of the stormwater treatment system to prevent the introduction of trapped oil and floatable contaminants to the downstream piping during routine maintenance and to ensure that no oil escapes the system during an ensuing rain event. Direct access shall be provided for the removal of sediments and floatable contaminants. There shall be no obstructions that would preclude the required maintenance and cleaning.

E. Stormwater treatment systems shall be completely housed within one structure and be installed at elevations and approximate locations as shown on the Contract Documents.

1.06 STRUCTURAL REQUIREMENTS

A. Concrete for the precast stormwater systems shall conform to ASTM C 857 and C 858 and meet the following additional requirements:

1. The wall thickness shall be not less than 6 inches. In all cases the wall thickness shall be no less then the minimum thickness necessary to sustain HS20-44 loading requirements as determined by a New York Licensed Professional Engineer.
2. Cement shall be Type II conforming to ASTM C 150
3. All sections shall be cured by an approved ASTM method. Sections shall not be shipped nor subject to loading until the concrete attained a compressive strength of 5,000 psi or until 28 days after fabrication and/or repair, whichever is the longer.
4. Pipe openings shall be sized to accept pipes of the manufacturer's specified size(s) and material(s) to meet Section 1.04 Performance Requirements and shall be sealed by the Contractor with a hydraulic cement conforming to ASTM C 595M.

B. Construction joints shall be sealed with a butyl rubber-based sealant conforming to ASTM C 990.

C. Manhole riser sections, manhole steps, frames and covers shall be as specified by the manufacturer.

D. Design calculations shall be submitted to the Engineer to verify that the stormwater treatment systems have been designed to withstand the burial depth, submergence due to flooding if applicable, and the dead and live loads

anticipated for the structures. These calculations shall be in accordance with latest AASHTO Standard Specifications for Highway Bridges and AREMA *Manual for Railway Engineering* with all applicable safety factors included.

E. The stormwater treatment systems shall be designed with a "hold down" system to satisfactorily withstand uplift pressures exerted on the structure. The design for uplift forces shall reflect an assumed saturated ground and surface water condition to the height of the top of the access hatches. These calculations shall contain a minimum factor of safety of 1.20.

1.07 INSTALLATION

The stormwater system(s) shall be installed according to the manufacturer's specifications.

END OF SECTION

SECTION (to be assigned by Contract)

STORMWATER TREATMENT SYSTEM

SUBMITTALS

APPENDIX "A"

1. Prepare shop drawings showing details for construction, reinforcing, joints and any cast-in-place appurtenances. Indicate all materials to be used and all applicable standards for materials, required tests of materials and design assumptions for structural analysis. A Professional Engineer licensed in the State of New York shall prepare and certify design calculations and shop drawings. Shop drawings shall be prepared at a scale of not less than ¼" per foot.

END OF SECTION

Appendix B

SECTION 02272

SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SUMMARY

This Section specifies requirements for the construction and maintenance of various temporary soil erosion and sediment control measures, including relocation as required for staged construction.

1.02 REFERENCES

American Society for Testing and Materials (ASTM) ASTM C 33 Specification for Concrete Aggregates

1.03 REQUIREMENTS

A. Environmental Requirements

1. Apply dust retardants other than water only when wind velocity is less than 5 mph and drift hazard is negligible.

2. Conform to "Seeding Calendar Limitations" of the Section entitled "SEEDING".

3. Use Dust Retardant or other approved methods for temporary surface stabilization of short duration where establishing grass by seeding is not practical.

B. Construction Requirements

1. The Contractor shall employ soil erosion and sedimentation control measures during the duration of the contract to control erosion and minimize the sedimentation of water courses on the construction site.

2. The Contract Drawings do not include borrow pits or storage areas that the Contractor utilizes or establishes outside of the site in order to perform the Work. If the land disturbance for this Work is five thousand square feet (5,000 SF) or greater, the Contractor shall provide the Engineer with documentation that a soil erosion and sediment control plan has been approved for this Work by the appropriate Soil Conservation District of the New Jersey Department of Environmental Protection.

3. The Contractor shall incorporate all permanent pollution control features into the project at the earliest practicable time. Temporary soil erosion and sediment control measures shall be coordinated with the permanent pollution control features and with the construction of pavement, drainage facilities such as pipes, culverts, headwalls, channels, ditches, etc., to the maximum extent practical to assure economical, effective and continuous erosion control throughout the duration of the Contract, as outlined in the approved progress schedule.

4. Prior to all grubbing operations, soil erosion and sediment control measures shall be installed. When unstabilized areas caused by site development, grading, or other earth disturbing activities exist beyond 14 calendar days, the areas disturbed shall be seeded and mulched. These requirements pertain to perimeter controls, berms, dams, swales, ditches and slopes. Upon completion of the grading or construction, disturbed areas shall be permanently stabilized in accordance with the Contract Drawings within 7 calendar days.

5. When excavation or embankment construction reaches the finished subgrade, those areas on which paving is to be placed are exempt from the above stabilization requirements. Roadways and haul roads actively being used for daily conveyance of equipment as well as areas between temporary berms, except median areas, are also exempt unless otherwise shown on the Contract Drawings.

6. Streams shall be protected from soil erosion and sediment. Streams being diverted shall be protected through the use of silt fences. Temporary diversion channels shall be lined with geotextile and temporary riprap.

7. The turbid discharge from dewatering construction activities shall be contained in a dewatering basin in order to control sediment and provide filtration of water prior to it being released into adjacent streams or other watercourses.

8. Soil being stockpiled shall be placed in well-drained areas no closer than 50 feet from streams, wetlands, floodplains and other watercourses, unless otherwise directed by the Engineer. The stockpiles shall be seeded and mulched in accordance with the Contract Drawings. Temporary soil erosion and sediment controls shall be provided around the stockpiles until such time as vegetation is established on the piles.

9. Temporary soil erosion and sediment control measures shall be used to correct conditions that develop during construction.

10. In the event that temporary soil erosion and sediment control measures are required due to the Contractor's failure, for any reason, to install or maintain soil erosion and sediment controls, either as part of the work or as directed by the Engineer, such Work shall be performed by the Contractor at no additional cost to the Authority.

11. If the Contractor is not in compliance with soil erosion and sediment control provisions, corrective actions shall be taken immediately. The Engineer may suspend the Work, wholly or in part, until such time as the Contractor is fully in compliance. All corrective and remedial work required to bring the Contractor into compliance shall be performed at no additional cost to the Authority.

12. Temporary soil erosion and sediment control measures shall be removed when necessary to allow for the installation of permanent control features or as permanent controls become functional. Before issuance of a Certificate of Final Completion, all items used for temporary soil erosion and sediment control shall be removed unless otherwise shown on the Contract Drawings.

1.04 QUALITY ASSURANCE

A. Progress Schedule

1. The Contractor shall prepare a progress schedule for the Engineer's approval in accordance with Division 1 of the Specifications.

2. The progress schedule shall clearly outline the intended maintenance of traffic, the locations where temporary and permanent soil erosion and sediment control measures shall be installed, and such other information as required. The progress schedule shall give special consideration to sensitive areas such as wetlands, waterways, etc. Appropriate staging and seasonal constraints shall be used to maximize the effectiveness of the soil erosion and sediment controls. The progress schedule shall also indicate when Work is restricted in these sensitive areas as outlined in permits issued by regulatory agencies.

B. Soil Erosion and Sediment Control Manager

1. The Contractor shall assign to the project a supervisory-level employee to serve in the capacity of Soil Erosion and Sediment Control Manager. This employee shall be thoroughly experienced in all aspects of soil erosion and sediment control and construction. The Contractor shall submit the name and experience of this employee to the Engineer for approval at least 10 working days prior to commencing any Work on the project. Replacement of the Soil Erosion and Sediment Control Manager during the Contract shall be made only after approval of a written request for such replacement.

2. The Soil Erosion and Sediment Control Manager shall implement approved soil erosion and sediment control schedules and methods of operations. He shall coordinate his operations with the Engineer and shall oversee and supervise all aspects of soil erosion and sediment control work for the project.

   He will attend all soil erosion and sediment control meetings during the Contract.

1.05 SUBMITTALS

See Appendix "A" for submittals requirements.

1.06 DELIVERY, HANDLING AND STORAGE

Protect materials against damage prior to installation.

1.07 SPARE MATERIALS

During construction, the Contractor shall have on hand sufficient spare materials and appurtenances as are necessary to repair damage to permanent and temporary installations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Geotextiles shall conform to the Section entitled "Geotextiles". Unless otherwise shown on the Contract Drawings, geotextiles shall have a maximum Apparent Opening Size of 0.6 mm. and minimum permeability of 1 x 10^{-3} cm/sec.

1. Silt Fences and Inlet Filter Sediment Control shall be "Self Supported".

2. Geotextiles for other Soil Erosion and Sedimentation Control items shall be "Erosion Control - Class A".

B. Wood stakes, posts and boards shall be solid, reasonably knot-free lumber conforming to the nominal size specified on the Contract Drawings.

C. Hay bales shall consist of timothy , red top or native grasses securely bound with wire or baling twine. The twine shall be an ultra-violet light stabilized polypropylene which has a knot strength of 170 pounds and straight break strength of 300 pounds.

D. Rip rap shall be broken stone (argillite, calcite, dolomite, gneiss, granite, quartzite, traprock). Unless otherwise shown on the Contract Drawings, riprap shall have a designated median stone (D50) size in the range of 6 to 9 inches maximum dimension, weighing not more than 150 pounds, with at least 90% weighing more than 25 pounds but not more than 40% exceeding 100 pounds, having the following characteristics:

CHARACTERISTIC	MAX. %
Weathered decomposed stone	5
Other than that classification approved	5
Absorption in cold water	1.8
Sodium sulfate soundness, loss by weight	10

E. Coarse aggregate shall be broken stone or washed crushed gravel meeting the specification for rip rap except for size and weight requirements. Size and

gradation shall be as shown on the Contract Drawings.

F. Welded wire fabric shall conform to AASHTO M55 flat sheets or rolls.

G. Pipe for temporary slope drains shall be minimum 8-inch diameter of type shown on the Contract Drawings.

H. Seed and mulch shall be as specified in the Section entitled "SEEDING".

I. Topsoil Stabilization Matting.

Topsoil stabilization matting shall be one of the following:

1. Excelsior mat shall be wood excelsior, 48 $\pm$ 1 inch in width and weighing 0.8 pounds per square yard, $\pm$ 5 percent. The excelsior material shall be covered with a netting to facilitate handling and to increase strength and shall be biodegradable.

2. Jute mat shall be cloth of a uniform plain weave of undyed and unbleached single jute yarn, 48 $\pm$ 1 inch width and weighing an average of 1.2 pounds per linear yard of cloth with a tolerance of $\pm$ 5 percent, with approximately seventy-eight warp ends per width of cloth and forty-one weft ends per linear yard of cloth. The yarn shall be of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and shall not vary in thickness by more than one half its normal diameter.

J. Dust Retardant

1. "Coherex" as manufactured by Golden Bear Division of the Witco Corporation, Chandler, AZ 85244.

2. "Soil-Sement" as manufactured by Midwest Industrial Supply, Inc., Canton, OH 44711.

3. "Soil Seal Concentrate" as manufactured by Soil Seal Corporation, Los Angeles, CA 90017.

4. Or approved equal.

K. Calcium Chloride shall be Grade 2, in the form of loose dry granules or flakes, and shall be fine enough to feed through commonly used spreaders at the specified rates.

2.02 CONSTRUCTION FEATURES

A. Silt Fence

1. Silt fence shall consist of geotextile whose width shall be at least 3 feet to provide for a 2 foot high fence after 1 foot of fabric is buried in the existing soil. Heavy duty silt fence shall consist of geotextile whose width shall be at least 4 feet to provide for a 3 foot high fence after 1 foot of fabric is buried in the existing soil. Sections of fabric shall be joined in such a manner that, when in operation, the sections work effectively as a continuous fence. Fence posts shall be installed at a slight angle toward the anticipated runoff source.

2. Heavy duty silt fence shall include a welded wire mesh backing for the geotextile. This welded steel wire mesh shall be galvanized and contain 4 inch square openings. The geotextile shall be secured to the welded wire mesh.

B. Haybale Check Dams with Temporary Stone Outlets

1. Haybales shall be embedded 4 inches into the ground and anchored in place with 2 wood stakes per bale. The temporary stone outlets, consisting of riprap stones conforming to the requirements for temporary riprap, shall be placed in the center of each flow line. Coarse aggregate, conforming to ASTM C-33 size No. 2, shall be placed immediately upgrade of each stone outlet.

2. The riprap stones and coarse aggregate shall be placed on geotextile, and shall be embedded into the ground. When sections of geotextile need to be joined, the sections shall be overlapped a minimum of 18 inches in the direction of flow.

C. Temporary Stone Check Dams

1. Temporary stone check dams shall be constructed in ditches to reduce flow velocity.

2. The check dams shall consist of riprap stones conforming to the requirements for temporary riprap. Coarse aggregate, conforming to ASTM C-33 size No. 2, shall be placed immediately upgrade of each check dam.

3. The riprap stones and coarse aggregate shall be placed on geotextile and shall be embedded in the ground. When sections of geotextile need to be joined, the sections shall be overlapped a minimum of 18 inches in the direction of flow.

D. Temporary Slope Drains

1. Temporary slope drains shall be installed on embankment slopes to intercept surface runoff where concentrated runoff will cause excessive erosion of the slope.

2. The drain pipe shall be staked to the slope or secured with riprap stones to

prevent movement or displacement. A flared end section shall be attached at each end of the pipe and elbows shall be installed as required to conform with the existing changes in slopes.

3. A temporary earth berm and haybales shall be constructed at the top of slope in the vicinity of the slope drain to intercept runoff and channel the runoff to the slope drain. The haybales shall be embedded 4 inches into the ground and anchored in place with 2 wood stakes per bale.

4. Riprap stones, conforming to the requirements for temporary riprap, shall be placed loosely at both ends of the pipe to prevent scour. The riprap stones shall be placed on geotextile which, at the top of slope, shall be draped over the earth berm. When sections of geotextile fabric need to be joined, the sections shall be overlapped a minimum of 18 inches in the direction of flow.

E. Inlet Filters

1. For existing inlet structures, geotextile shall be placed under the grates, over the curb pieces and extend a minimum of 6 inches beyond. Coarse aggregate, size No. 8, shall be placed behind each curb piece and on the geotextile to secure the in place.

2. Openings required in new inlet walls to provide for temporary drainage shall be covered with welded wire mesh, geotextile and coarse aggregate, size No. 8.

3. Inlet filters, consisting of welded steel wire mesh and geotextile shall be installed to control sedimentation at new inlet drainage structures. Inlet filters of geotextile alone shall be installed to control sedimentation at existing inlet drainage structures.

4. For new inlet structures, welded steel wire mesh shall be molded around the inlet frames and grates, or inlet structures, and extend a minimum of 6 inches down each side of the new structures. Geotextile shall then be secured to the welded wire mesh. Coarse aggregate, size No. 8, shall be placed against the inlet structures to hold the inlet filter in place.

5. Inlet filters shall be removed before scheduled paving operations begin.

F. Inlet Protection (Haybale Barrier)

1. Inlet protection (haybale barrier) shall consist of haybales which completely encircle inlet drainage structures. The perimeter length of the haybale barrier shall be at least four times the perimeter length of the inlet structure. Haybales shall not encroach into the traveled way.

2. Haybales placed around inlet structures within earthen areas shall be embedded 4 inches into the ground and anchored in place with 2 wood stakes per bale. Haybales placed around inlet structures within pavement areas shall be placed on top of the pavement, tied together to prevent movement and shall not be anchored in place.

G. Inlet Sediment Traps

1. Inlet sediment traps, consisting of silt fence and temporary stone inlets, shall be constructed to control sedimentation at existing and proposed inlet drainage structures.

2. The silt fence shall consist of geotextile whose width shall be at least 3 feet to provide for a 2 foot high fence after 1 foot of geotextile is buried in the existing soil. Sections of geotextile shall be joined in such a manner that, when in operation, the sections work effectively as a continuous fence. The silt fence shall be installed around the drainage structure and into the stone inlets. Fence posts shall be installed at a slight angle toward the anticipated flow.

3. The temporary stone inlets, consisting of coarse aggregate, conforming to ASTM C-33 size No. 2, shall be placed in each flow line upgrade of the inlet structure. The coarse aggregate shall be placed on geotextile which shall be buried in the soil. When sections of geotextile need to be joined, the sections shall be overlapped a minimum of 18 inches in the direction of flow.

H. Floating Turbidity Barriers

1. Floating turbidity barriers, consisting of 10 mil. thick polyethylene plastic sheets suspended from floats, shall be installed in streams or other watercourses to intercept silt coming from drainage pipes or that caused by construction operations within waterways.

2. Barriers shall be located 50 feet from the point of discharge of drainage pipes or from the area of construction operations affecting waterways. The barriers shall extend across the entire waterway or radially from the shore line.

I. Temporary Stone Outlet Sediment Traps

1. Temporary stone outlet sediment traps, consisting of temporary basins and riprap spillways, shall be constructed within existing, proposed and temporary ditches.

2. The spillways shall consist of riprap stones conforming to the requirements for temporary riprap. Coarse aggregate, conforming to ASTM C-33 size No. 2, shall be placed immediately upgrade of the spillways.

3. The riprap stones and coarse aggregate shall be placed on geotextile which shall be buried in the soil. When sections of geotextile need to be joined, the sections shall be overlapped a minimum of 18 inches in the direction of flow.

J. Dewatering Basin

1. Dewatering basins shall be constructed within the Site and outside any undisturbed wetland area, and areas not affected by roadway construction, as a dewatering containment measure in order to control sediment and provide filtration of water.

2. The dewatering basins shall be sized by the Contractor to entirely contain the expected discharge of water and sediment based on the flow rate of the pump to be used and the volume of water present within the area to be dewatered. The material to be used to form the basin is at the discretion of the Contractor. The outfall of the basin shall be such that the water exiting the basin does not cause erosion to, or scouring of, the area onto which the water is being discharged.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clearing and grubbing operations shall be so scheduled and performed that grading, mulching, seeding and other permanent pollution control features can follow immediately thereafter according to the approved progress schedule. Should seasonal limitations make such coordination unattainable, additional temporary soil erosion and sediment control measures shall be performed between successive construction stages, as directed.

B. The amount of surface area of erodable earth material exposed at one time by clearing and grubbing, excavation, borrow or fill operations, without stabilization, shall not exceed 750,000 square feet for clearing and grubbing operations, or 750,000 square feet for grading operations without prior approval. The Engineer may increase or decrease these amounts commensurate with the Contractor's ability to keep the construction on the approved progress schedule.

C. Obtain the Engineer's approval before starting any operations which would require seeding for stabilization when seeding is restricted by the calendar limitations of the Section entitled "SEEDING". Approval will be based on the Contractor's alternate method for stabilizing disturbed areas when seeding is not reasonable due to seasonal constraints. The alternate method shall be approved by the Engineer before implementation and may include use of the Dust Retardant or other methods.

3.02 INSTALLATION

A. Embankment Areas

1. Side ditches shall be excavated and stabilized, and perimeter soil erosion and sediment controls installed, before beginning all earthwork. Stabilization for the ditches and swales shall consist of seed, mulch, topsoil stabilization matting or temporary riprap, as required to prevent erosion.

2. Embankment greater than 25 feet in height shall be stabilized in stages of

equal increments not to exceed 15 feet. Each stage shall be either temporarily seeded and mulched, or permanently stabilized, before proceeding with the next stage. At the completion of the final stage of embankment placement, the entire slope, if not previously done, shall be permanently stabilized.

3. At the end of each work day, temporary stabilized earth berms and slope drains shall be constructed along the top edges of the embankment to intercept surface runoff.

B. Excavation Areas

1. Ditches to be used in a cut section, and side and outlet ditches, shall be excavated and stabilized, and perimeter soil erosion and sediment controls installed, before beginning all earthwork. Stabilization for the ditches shall consist of seed, mulch, topsoil stabilization matting or temporary riprap, as required to prevent erosion.

2. Slopes greater than 25 feet in height shall be excavated and stabilized in stages of equal increments not to exceed 15 feet. Each stage shall be permanently stabilized before proceeding with the next stage, in accordance with the time limitations specified herein.

C. Dust Control

1. Employ construction methods and means that keep flying dust to a minimum. Provide for the laying of water or other dust control materials on the project and on roads, streets and other areas immediately adjacent to the project limits, and wherever traffic or buildings that are occupied or in use are affected by such dust caused by his hauling or other construction operations. The materials and methods used for dust control shall be as specified herein or as directed by the Engineer.

2. Apply Dust Retardant in accordance with the manufacturer's written instructions. Reapply as often as required. Calcium chloride shall not be used in any areas to be seeded or landscaped.

3. Calcium chloride may only be used on pavement subgrades subject to the approval of the Engineer. Care shall be exercised when using calcium chloride on steep slopes to prevent the calcium chloride from washing into streams or accumulating around plants or in landscape areas. Calcium chloride shall not be applied in solution. Apply calcium chloride at a rate of approximately 1.5 pounds per square yard.

D. Dirt Control

1. The Contractor shall provide for prompt removal from existing roadways of all dirt and other materials that have been spilled, washed, tracked or otherwise deposited thereon by his hauling and other operations, whenever the accumulation is sufficient to cause the formation of mud, interfere with drainage, damage pavements or create a traffic hazard.

2. In order to minimize tracking of dirt and other materials onto existing roadways, a stabilized construction driveway shall be constructed at locations where vehicles exit a work site. The construction driveway shall consist of a layer of broken stone, which shall be a minimum 4 inches thick and 100 feet long where practical, and of sufficient width to serve the intended purpose. The broken stone shall be 2 1/2 - inch nominal size conforming to ASTM C-33 size No. 2. The driveway shall be maintained by top dressing with additional stone, as directed, and shall be removed when no longer required.

E. Seeding

Temporary and permanent seeding shall be in accordance with the Section entitled "SEEDING".

3.03 SOIL EROSION AND SEDIMENT CONTROL MAINTENANCE

A. Soil erosion and sediment control measures shall be maintained during the Contract even when the Work is suspended. Controls shall be inspected immediately after each rain, and any required corrective work shall immediately be performed. Riprap stones, coarse aggregate, silt fence,or haybales damaged due to washouts or siltation shall be replaced.

B. Sediment traps and basins shall be cleaned out when they are 50 percent filled. Silt fences, stone outlet structures, dams, and haybales shall have sediment removed when the sediment reaches 50 percent of the height of the soil erosion and sediment control measure. Sediment removed shall be disposed of in accordance with the Contract Drawings.

END OF SECTION

SECTION 02272

SOIL EROSION AND SEDIMENT CONTROL

SUBMITTALS

APPENDIX "A"

A. Submit catalog cuts for the following:

   1. Geotextiles

   2. Pipe for Slope Drains

   3. Topsoil Stabilization Matting

   4. Dust Retartant

B. Submit certificate from geotextile manufacturers that geotextiles comply with the requirements specified in this Section.

C. Submit design computations for sizing of Dewatering Basins prepared by a Professional Engineer, licensed in the State in which the Work will be performed.

D. Submit to the Manager, Materials Engineering Division, Port Authority Technical Center, 241 Erie Street, Jersey City, New Jersey 07302-1397, certified test data the following:

   1. Riprap

   2. Coarse Aggregates

E. Submit a Progress Schedule reflecting the requirements of Section 1.04 A.

F. Submit name and applicable experience of Soil Erosion and Sediment Control Manager in accordance with Section 1.04B.

G. Submit alternate methods for stabilizing disturbed areas when seeding calendar limitations apply.

H. Submit documentation of approval of soil erosion and sediment control plan for offsite land disturbance greater than 5000 square feet.

END OF APPENDIX "A"

SECTION 02272

SOIL EROSION AND SEDIMENT CONTROL

INSTRUCTIONS TO SPECIFIERS

NOTE: This Specification is intended to conform to New Jersey Department of Transportation requirements and details as of June 13, 1994 (93027 ADU). Modification or revision may be required for use in other jurisdictions.

1. Contract Drawings

   Ensure that the Contract Drawings show the following items specified in the text:

   (2.01A) Geotextile AOS and permeability if any other than NJDOT Standard as specified.

   (2.01B) Size of wooden stakes, posts and boards.

   (2.01D) Size and gradation of riprap if other than NJDOT Standard as specified.

   (2.01E) Size and gradation of coarse aggregates wherever required.

   (2.01G) Type, size, diameter, and other details where temporary slope drains are anticipated. Flexible (plastic or corrugated metal) are typically used because their light weight does not require heavy equipment for installation, relocation and removal.

   (3.03B) Disposal of sediment removed during maintenance of soil erosion and sedimentation control measures.

2. OTHER

   A. Ensure that the specifications include the following Sections referenced in this Section:

   (2.01A) Section 02274 "GEOTEXTILES"

   (1.03B, 2.01M, 3.01C) At least one of the following:

   Section 02930 "SEEDING (HYDRO-MULCH & DUST RETARDANT)"

   Section 02931 "SEEDING (SALT HAY MULCH)"

   B. Coordinate with Landscape Architecture to ensure that appropriate seed mixes are included in Appendix "A" to Sections 02930 and/or 02931.

   C. Review Geotextile properties, AOS (0.6mm) and permeability (1×10^{-3} cm/sec) with Geotechnical Engineering to ensure that properties (NJDOT Standard) as specified are suitable.

END OF INSTRUCTIONS