KOSCIUSZKO BRIDGE PROJECT
(BIN 1075699)
PIN X731.24, Contract D900011

DB CONTRACT DOCUMENTS
PART 6
RFP PLANS

Final August 27, 2013
DIRECTIVE PLANS
GENERAL NOTES

1. Base contract includes the design and construction of the new eastbound medians,
   Brooklyn Connector, Queens Connector, etc.
   Exhibit A, Example Bridge Approach,
   Eastbound Queens Approach and Eastbound
   Main Span. The base contract also includes
   Pedestrian Facilities and related elements.
   Exhibit B, Brooklyn Approach, Westbound
   Queens Approach, Westbound Main Span
   Approach and Westbound Main Span
   including all related facilities.

2. The bid ploy includes the final design
   and construction of the Westbound Main
   Span structure only.

3. The final design will be produced
   separately for the final design
   and construction of the remaining
   Westbound Portion of the structure as well as
   the expansion joints, barriers, railings, lights
   and striping for the Westbound Main Span.

4. The final design will be produced
   separately for the final design
   and construction of the remaining
   Westbound Portion of the structure as well as
   the expansion joints, barriers, railings, lights
   and striping for the Westbound Main Span.

5. For all environmental requirements, refer to
   the project documents.

6. The new structure shall be the same as
   the new bridge designed and
   constructed of the structure as well as
   the expansion joints, barriers, railings, lights
   and striping for the Westbound Main Span.

7. A 15'-0" minimum clear span shall be provided
   between the eastbound and westbound approach
   spans.

8. At the Brooklyn connection, the horizontal
   geometry for the eastbound/mainline/bridge
   to the eastbound collector/distributor road
   shall be designed as a major turn diversion.

9. The eastbound and westbound auxiliary lanes
   including the median barrier shall be continued
   at the length shown on the 400 civil plans.

10. The profile grades for the Brooklyn Approach,
    West Main Span Bridge Approach shall not exceed
    the profile grades shown in the 400 civil plans.

11. A minimum clearance of 14'-6" shall be provided
    above any existing road/way for
    the new structure.

12. A 15'-0" minimum clear zone shall be provided
    between the new bridge facades but within
    the permanent easements acquired by the department
    to facilitate future maintenance and inspection
    of the structure.

AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS

P/W: XX7577
DIRECTIVE PLANS

BRIDGES

OIL WEIRS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED

CERTIFICATE

CONTRACT NUMBER: D015624
DRAWING NO: CN-01
SHEET NO.

NEW YORK STATE DEPARTMENT OF TRANSPORTATION REGION 11

DOCUMENT NAME: a110711dr-01.001.dgn
TYPICAL APPROACH SECTION
LOOKING UPSTATION

NOTES:
1. THE RIDGWAY INCLUDES THE EXIT DESIGN CONSTRUCTION OF THE WESTBOUND MAIN SPAN STRUCTURE ONLY.
2. PROVIDE 12'-0" MINIMUM CLEARANCE FROM FASCIA FOR MAINTENANCE ACCESS.

AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

COUNTY:

NEW YORK STATE DEPARTMENT OF TRANSPORTATION REGION 11
DOCUMENT NAME: D015624 - DC.P04 - 02/27/08
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<th>PARCEL NO.</th>
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**ATTACHMENTS:**

- [Image 0x0 to 1224x792]

**ADDITIONAL INFORMATION:**

- **AS-BUILT REVISIONS:**
  - Description of Alterations:
  - [Image 0x0 to 1224x792]

**PINS:**

- **DIRECTIVE PLANS:**
  - Bridges: [Image 0x0 to 1224x792]
  - Cemeteries: [Image 0x0 to 1224x792]

**RIGHT-OF-WAY TABLES:**

- SHEET 1

- **ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED**

- **DRAWING NO:** DP-13

- **CONTRACT NUMBER:** D015624

New York State Department of Transportation Region 11

**DOCUMENT NAME:** 210129-21-00-P1-2020-2020
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Proposed Capping Plans, Specifications and Standard Drawings for Parcels OU1Aa, OU9A and OU2

CONTRACT NO.: D015624       PIN NO.: X729.77

REPLACEMENT OF THE KOSCIUSZKO BRIDGE OVER NEWTOWN CREEK

KINGS AND QUEENS, NEW YORK

August 2013
KOSCIUSZKO BRIDGE PROJECT
KINGS AND QUEENS COUNTIES

PROPOSED CAPPING PLANS
PARCELS OU1Aa, OU9A, OU2
**GENERAL NOTES**

1. **CULVERTS CHECK**
   - ALL DIMENSIONS IN ft UNLESS OTHERWISE NOTED

2. **DATE / TIME**
   - K. GRIESSING ON:
     - 8.4.3.1.

**DESIGN SPECIFICATIONS**

1. **RESTRICTIONS.**
   - ALL ELEVATIONS SHOWN ON PLANS REFER TO NAVD 88 WHICH IS PERMIT.

2. **CONSTRUCTION SEQUENCE FOR PARCELS OU1Aa & OU6A**
   - INSTALL TREATED CONSTRUCTION ENTRANCE IN THE LOCATION INDICATED ON PLAN GP-02 AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

3. **DRAINAGE NOTES**
   - STRUCTURALS AND SEPARATELY ARE TO BE DRAWN TO THE SCALE OF THE STRUCTURE.

4. **EXISTING CONDITION NOTES**
   - INSTALL AS SHOWN ON PLAN GP-02 AND Specifications.

**EROSION and SEDIMENT CONTROL NOTES**

1. **DESCRIPTION OF ALTERATIONS:**
   - INSTALL WHITE FENCING AS INDICATED ON PLAN GP-02 AND SPECIFICATIONS.

2. **PROJECT CONSTRUCTION INSTALLATION.**
   - REMOVE EROSION CONTROL MEASURES UPON COMPLETION OF BRIDGE INSTALLATION.

3. **GENERAL NOTES**
   - INSTALL STABILIZED CONSTRUCTION ENTRANCE IN THE LOCATION INDICATED ON PLAN GP-02 AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

4. **PROJECT CONSTRUCTION INSTALLATION.**
   - REMOVE EROSION CONTROL MEASURES UPON COMPLETION OF BRIDGE INSTALLATION.

5. **GENERAL NOTES**
   - INSTALL STABILIZED CONSTRUCTION ENTRANCE IN THE LOCATION INDICATED ON PLAN GP-02 AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
Temporary Barrier Detail

Square or Rectangular Drainage Structure

Curb Detail

Elevation

Catch Basin and Manholes

NOTES:
1. All new catch basin connections with 12" ductile iron pipe. Class A 600 lb. Plain End or S. A. E. Joint Pipe of 9" diameter size. The entire length of the backfilled void shall be covered with a minimum of 6" of backfill material. Crushed stone bedding for the entire travel on the pipe, upon the pipe line or both. All new catch basins shall be a minimum of 9" diameter size.
2. Base on the elevation shown as short, to prevent water flow through the structure. All other details for which a scale is shown are drawn proportionally and are fully dimensioned.

All details on the drawing are shown to scale. The drawings are not drawn proportionally for clarity.

DATE/TIME = 5/23/2013 5:30:25 PM

FILE NAME = p:\02461.00_finedesign_cadwcapecapdesign\x72977_GENERAL_dtl.dgn

USER = pmarzullo

DESIGN SUPERVISOR = D. WAN

JOB MANAGER = DESIGN CHECK

PROJECT MANAGER = K. Griswold

AFFIX SEAL:

PROPOSED FINAL CAP GRADE
EXISTING GRADE LINE
TO CAP

TEMPORARY BARRIER DETAIL
ASPHALT CURB, ITEM 609.22

CURB DETAIL
ON:
ALTERED BY:

SCALE 1"=5'

ASPHALT CURB DETAIL

SUBGRADE SURFACE

EXISTING MONITORING WELL

EXCAVATED AREA TO BE EXCAVATED

DRAINAGE PIPE ON BEDDING

SIDEWALK RESTORATION
PAVEMENT, GROUND, OR SUBGRADE SURFACE

NOTE 1

PAYMENT LINES FOR EXCAVATION, BACKFILL WITH SUITABLE EXCAVATED MATERIAL OR SELECT GRANULAR FILL

REPLACEMENT OF THE KOSCIUSZKO BRIDGE OVER NEWTOWN CREEK
KINGS AND QUEENS BRIDGES

COUNTY:

REMARKS:

It is a violation of law for any person unless they are acting under the direction of a licensed professional engineer, architect, landscape architect, or land surveyor to alter a drawing. If any person shall alter a drawing for the purpose of such alteration, a copy of the sketch alteration, and a specific description of the alteration, shall be kept and the copy shall be certified. All such drawings Shall be certified. All such drawings shall be certified. All such drawings shall be certified.

This form must be submitted to the department of transportation for review and approval before it is used for construction.
SILTSACK DETAIL INLET PROTECTION FOR INLETS IN PAVED AREAS

ITEM NO: 209.11——11 (PROPOSED) AND 209.12——11 (EXISTING)

SILTSACK SECTION

CATCH BASIN WITH SILTSACK INSTALLED

ABANDONMENT OF EXISTING DRAINAGE STRUCTURES

SILTSACK DETAIL INLET PROTECTION FOR INLETS IN PAVED AREAS
REPLACEMENT OF THE KOSCIUSZKO BRIDGE OVER NEWTOWN CREEK
PARCEL 2 STORMWATER SIZING CALCULATIONS

Site Parameters

\[ C = 0.65 \text{ pr. percent} \]
\[ f = 0.125 \text{ in.} \]
\[ A = 0.12 \text{ ft}^2 \text{ per ft} \]
\[ P = 0.20 \text{ ft} \]
\[ D = 0.20 \text{ ft} \]

Affordable Discharge Calculation

\[ Q_A = 0.55 + 0.40 \times 0.125 + 0.125 \times 0.20 + 0.125 \times 0.20 = 0.185 \text{ ft}^3 / \text{min} \]

Design Flow

\[ Q_D = 0.55 + 0.40 \times 0.125 + 0.125 \times 0.20 = 0.177 \text{ ft}^3 / \text{min} \]

Storage Volume Calculations

\[ V_S = 0.55 + 0.40 \times 0.125 + 0.125 \times 0.20 + 0.125 \times 0.20 = 0.181 \text{ ft}^3 \]

\[ V_K = \frac{0.55 \times 0.125 \times 0.125}{2} = 0.001 \text{ ft}^3 \]

\[ V_T = \frac{(0.55 + 0.40 \times 0.125 + 0.125 \times 0.20 + 0.125 \times 0.20) 
\times 0.125}{2} = 0.006 \text{ ft}^3 \]

\[ F = \sqrt{0.55 + 0.40 \times 0.125 + 0.125 \times 0.20 + 0.125 \times 0.20} = 0.187 \text{ ft} \]

\[ F = \sqrt{0.55 + 0.40 \times 0.125 + 0.125 \times 0.20 + 0.125 \times 0.20} = 0.187 \text{ ft} \]

\[ F = 0.187 + 0.125 \times 0.20 + 0.125 \times 0.20 = 0.233 \text{ ft} \]

\[ F = 0.187 + 0.125 \times 0.20 + 0.125 \times 0.20 = 0.233 \text{ ft} \]
THIS MAP IS IN DRAFT FORM, AND FOR DISCUSSION PURPOSES ONLY. IN FURTHERANCE (AND WITHOUT LIMITING THE GENERALITY) OF THE FOREGOING, THIS MAP IS INTENDED TO GRAPHICALLY DEPICT, BASE ON THE CURRENT INFORMATION AND BELIEF AS OF THE DATE HEREOF, THE GENERAL LOCATION OF (I) CERTAIN OF THE PARCELS OF LAND AFFECTED BY THE DOT TAKINGS, (II) CERTAIN ENVIRONMENTAL REMEDIATION INFRASTRUCTURE COMPONENTS (IN SOME CASES, SUBSURFACE) PRESENTLY LOCATED ON SAID PARCELS, (III) THE DOT TAKING AREAS, AND (IV) THE PROPOSED BRIDGE INFRASTRUCTURE TO BE CONSTRUCTED ON SAID PARCELS. THIS MAP DOES NOT PURPORT TO BE ACCURATE OR COMPLETE, AND SHOULD NOT BE RELIED UPON AS A PROPERTY SURVEY OR OTHER TECHNICALLY OR LEGALLY CORRECT DESCRIPTION OF THE MATTERS DEPICTED, OR OF ANY REAL ESTATE OWNERSHIP.
Armortec Product Details

- ArmorWedge®
- ArmorRoad®
- ArmorFlex® - Open Cell
- ArmorLoc®
- ArmorFlex® - Close Cell
- A-Jacks®
- ArmorStone®
- ArmorFlex® OS

MANUFACTURING SPECIFICATION
ASTM D6684-04
ArmorFlex® (not to scale)

Open Cell Block

Close Cell Block

Tapered Series

ArmorFlex® Unit Specification

<table>
<thead>
<tr>
<th>Concrete Block Class</th>
<th>Open/Closed</th>
<th>Nominal Dimensions (in.)</th>
<th>Gross Area/Unit (sq. ft.)</th>
<th>Block Weight (lbs)</th>
<th>Open Area %</th>
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<tr>
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<td>Open</td>
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<td>High Velocity Application Block Classes</td>
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<table>
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<tr>
<th>Concrete Block Class</th>
<th>Open/Closed</th>
<th>Nominal Dimensions (in.)</th>
<th>Gross Area/Unit (sq. ft.)</th>
<th>Block Weight (lbs)</th>
<th>Open Area %</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Open</td>
<td>L 17.4 W 15.5 H 4.75</td>
<td>1.77</td>
<td>62-71</td>
<td>20</td>
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<td>Open</td>
<td>L 17.4 W 15.5 H 6.00</td>
<td>1.77</td>
<td>81-94</td>
<td>20</td>
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<tr>
<td></td>
<td>Open</td>
<td>L 17.4 W 15.5 H 8.50</td>
<td>1.77</td>
<td>120-138</td>
<td>20</td>
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</tbody>
</table>
# ArmorFlex® cont.

![Typical Mat](image)

## A-Jacks® (not to scale)

### A-Jacks Placement Profile

![A-Jacks Unit](image)

## A-Jacks Unit Specification

<table>
<thead>
<tr>
<th>A-JACKS</th>
<th>L(IN)</th>
<th>T(IN)/H(IN)</th>
<th>C(IN)</th>
<th>VOL(FT³)</th>
<th>WT (LBS)</th>
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<tbody>
<tr>
<td>AJ-24</td>
<td>24</td>
<td>4</td>
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## ArmorWedge® (not to scale)

### Side View - Typical Block

![Side View](image)

## ArmorWedge Unit Specification

<table>
<thead>
<tr>
<th>UNIT DIMENSION</th>
<th>UNIT WEIGHT (LBS)</th>
<th>SYSTEM WEIGHT (LBS)</th>
<th>UNIT COVERAGE (SF)</th>
<th>COMpressive Strength (PSI)</th>
<th>MAXIMUM ABSORPTION (LBS/FT³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12x18</td>
<td>40-52</td>
<td>36-40</td>
<td>1.1875</td>
<td>4000</td>
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### ArmorLoc® Unit Specification

<table>
<thead>
<tr>
<th>BLOCK</th>
<th>TECHNICAL DATA</th>
<th>DIMENSIONS AND WEIGHTS</th>
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<tbody>
<tr>
<td></td>
<td>Specific Weight lbs/ft³</td>
<td>Compressive Strength psi</td>
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<tr>
<td>3510</td>
<td>130-150</td>
<td>4000 min</td>
</tr>
<tr>
<td>4511</td>
<td>130-150</td>
<td>4000 min</td>
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### ArmorStone® Unit Specification

<table>
<thead>
<tr>
<th>CONCRETE BLOCK CLASS</th>
<th>NOMINAL DIMENSIONS (IN.)</th>
<th>UNIT COVERAGE (SF)</th>
<th>BLOCK</th>
<th>OPEN AREA %</th>
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<tbody>
<tr>
<td></td>
<td>L</td>
<td>W</td>
<td>H</td>
<td></td>
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<tr>
<td>AS 40</td>
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<td>18.00</td>
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<td>AS 55</td>
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<td>10.00</td>
<td>4.50</td>
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</tbody>
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### ArmorRoad® Unit Specification

<table>
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<tr>
<th>BLOCK</th>
<th>TYPE</th>
<th>L</th>
<th>W</th>
<th>H</th>
<th>SF COVERAGE PER UNIT</th>
<th>WEIGHT LBS PER UNIT</th>
<th>SF PER TRUCK LOAD</th>
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<tr>
<td>Mat</td>
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<td>6.00</td>
<td>1.74</td>
<td>100-104</td>
<td>750</td>
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</tbody>
</table>

### Armortec Minimum Physical Requirements per ASTM 06684-04

<table>
<thead>
<tr>
<th>MIN. DENSITY (IN AIR) LBS/FT³</th>
<th>MIN. COMPRESSIVE STRENGTH PSI</th>
<th>MAX WATER ABSORPTION LBS/FT³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave. of 3 Units</td>
<td>Individual Unit</td>
<td>Ave. of 3 Units</td>
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<tr>
<td>130</td>
<td>125</td>
<td>4,000</td>
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<tr>
<td></td>
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<td>9.1</td>
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</table>
REPLACEMENT OF THE KOSCIUSZKO BRIDGE OVER NEWTOWN CREEK
ITEM 203.28020011 - HYDRAULIC FILL

DESCRIPTION

The work shall consist of placing fill by hydraulic methods in pipes and structures to be abandoned under this contract in accordance with the contract documents and as directed by the Engineer.

MATERIALS

Hydraulically place fill shall be composed of sand, free of any organic substances, suitable for placing by hydraulic methods.

CONSTRUCTION DETAILS

Fill shall be placed by a method approved by the Engineer in order to fill pipes or structures as required to within 3 inches of the inside top of pipes and to the required elevation within structures.

METHOD OF MEASUREMENT

The quantity to be paid for under this item shall be measured as cubic yards of pipe or structure actually filled.

BASIS OF PAYMENT

The unit price bid for this item shall include the cost of furnishing all materials, equipment, and labor necessary to satisfactorily complete the work, not to include bulkheading of pipes or removal of portions of structures to be paid for under their respective items where called for on the plans.
The purpose of drainage structure inlet protection is to prevent sediment from entering a drainage system or staging water near the weir segment to fall out of suspension.

The top of the weir protection shall be set at the weir or stage inlet elevation based on field location and conditions.

Application Notes:
1. Secure the ends of the fabric to prevent the uncontrolled drainage structure inlet protection with staples as detailed in the plan view or as recommended by the manufacturer's literature.
2. Staple shall be inspected every seven (7) days after each rainfall of 1/2 inch or more after a 24-hour period or during periods of heavy rainfall. All staples shall be cleaned and repaired as needed.
3. Sediment shall be removed when accumulation reduces the flow of the weir. Sediment shall be disposed of as suitable material.
4. Weep holes shall be protected by geosynthetic and stone.
5. For the stabilization of downstream area, weep holes shall be sealed and geosynthetic removed.
6. Maintenance shall include removal and reinstallation of inlet protection as needed to ensure that it functions as originally intended.

Inlet protection - excavated. For this project, shall be installed at grades or contours as shown on the plans and as designed by the engineer.
The purpose of a pipe slope drain is to prevent erosion of embankments or where slope of transmissive clean water through a pipe from a higher elevation to a lower elevation.

General Notes:
1. Approved Exit fence cover tiles are listed in the department's approved list.
2. Measures shall be inspected every 7 days after each rainfall of 1.0 in or more within a 24-hour period.
3. Pipe may be corrugated plastic pipe or corrugated metal pipe type or some material at the contractor's option. The pipe shall have watertight connections of pipe or other connections.
4. Crushed stone of stone filling for the pipe slope drain shall meet the requirements of stone filling as specified in chapter 8 of the specifications (COT-3, COT-4) and shall meet the requirements of COT-3, COT-4.

<table>
<thead>
<tr>
<th>Pipe Slope Drain</th>
<th>Max. Drainage Area Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-03</td>
<td>0.05</td>
</tr>
<tr>
<td>00-12</td>
<td>0.10</td>
</tr>
<tr>
<td>00-18</td>
<td>0.15</td>
</tr>
<tr>
<td>00-24</td>
<td>0.20</td>
</tr>
<tr>
<td>00-30</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Temporary Erosion may be prevented by additional entrance, or other approved material length of pipe is required to control surface flow into temporary erosion control and should be placed into embankment.
APPLICATION NOTES:
A. The purpose of a Turbidity Curtain is to separate work areas in or adjacent to streams, to prevent turbidity from entering the waterways.
B. Turbidity Curtain shall not be placed across a fishing barrier.
C. Concrete slurry will be disposed of at cement curbs, sewers, etc., shall not be located within Turbidity Curtain.

GENERAL NOTES:
3. The Turbidity Curtain shall be at a bridge location, but Turbidity Curtain may be applied at other locations.
4. Turbidity Curtains shall be a minimum of 500 ft. long across each section of stream. End sections shall terminate 10 ft. from the limit of construction.
5. The Turbidity Curtain shall be placed as close to the work as possible without interfering with construction operations.
6. The contractor shall monitor the installation, taking into account existing patterns and providing working directions that will affect water levels, velocity and movement of the Turbidity Curtain.
7. The Turbidity Curtain shall be designed by pulling towards the shore to promote stability of sediment into the waterways.
8. The proposed work system shall be a type of support that allows the curtain to conform to the contours of the bottom on the waterways.
9. For flows of 10,000 cfs, use a suspension barrier of steel that will not cause damage to the water. For flows greater than 10,000 cfs, use a suspension barrier that will not cause damage to the water. For flows greater than 10,000 cfs, use a suspension barrier that will not cause damage to the water.
10. The suspension barrier may consist of concrete barriers, floating or other materials. The design of this barrier shall be approved by the contractor.

TYPICAL TURBIDITY CURTAIN LAYOUTS

PLAN
Tidal Waters
AND/OR HEAVY WIND AND WAVE ACTION

SECTION A-B

WATER

E/B

FLOW

STREAMS, FLOW VELOCITY > 5 FT/S

PONDS, LAKE, AND STREAMS
FLOW VELOCITY ≤ 5 FT/S

TURBIDITY CURTAIN

SHORE ANCHOR PT.

SHORE ANCHOR PT, LOCATED 7 MIN ALLOWED DEPTH IS A NARROW WAVE (50 YD)

SHORE ANCHOR PT, LOCATED 7 MIN ALLOWED DEPTH IS A NARROW WAVE (50 YD)

SHORE ANCHOR PT.

E/B

FLOW

TURBIDITY CURTAIN

SECTION A-B

WATER

E/B

FLOW

PROPOSED WORK SITE

WATER

EXAMPLES

TURBIDITY CURTAIN FIXTURES

EXISTING GROUND / WATERランタン

WATER NUTS

E/B

FLOW

TO UNDERTAKEN BARRIER

SECTION A-B

WATER

E/B

FLOW

TURBIDITY CURTAIN FIXTURES

EXISTING GROUND / WATERランタン

WATER NUTS

E/B

FLOW

TO UNDERTAKEN BARRIER

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
U.S. CUSTOMARY STANDARD SHEET

TURBIDITY CURTAIN

APPROVED FEBRUARY 08, 2016
SIGNED BY THE DEPUTY CHIEF ENGINEER

ISSUED UNDER RF 200-20

EFFECTIVE DATE 09/02/2016

209-06
REPLACEMENT OF THE KOSCIUSZKO BRIDGE OVER NEWTOWN CREEK
TYPE I - SIDEWALK, OUTSIDE DRIVEWAY AND CORNER QUADRANTS
6" CONC. SIDEWALK
COMPACTED EARTH
6" GRAVEL, BROKEN STONE OR SAND AS PER STANDARD SPECIFICATION

TYPE II - SIDEWALK, IN DRIVEWAY AND IN CORNER QUADRANTS
7" CONC. SIDEWALK
COMPACTED EARTH
6" GRAVEL, BROKEN STONE OR SAND AS PER STANDARD SPECIFICATION

TYPE III - SIDEWALK WITH WELDED WIRE FABRIC
6" GRAVEL, BROKEN STONE OR SAND AS PER STANDARD SPECIFICATIONS
WELDED WIRE FABRIC 34.84 (# 6) 15" SPACING

NOTES:
1. ALL MATERIALS AND CONSTRUCTION METHODS USED ARE TO CONFORM TO SECTION A.13 OF THE NYC DEPARTMENT OF TRANSPORTATION (DOT) STANDARD HIGHWAY Specifications.
2. WELDED WIRE FABRIC, WHERE SPECIFIED, SHALL BE ASTM DESIGNATION A-193, GAUGE # 6, AT 6" ON - SPACING, AND CONFORM TO SECTION A. 2.25 OF THE NYC DOT STANDARD HIGHWAY Specifications.
REPLACEMENT OF THE KOSCIUSZKO BRIDGE OVER NEWTOWN CREEK
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 1 OF 3)

(LOOSE TOP SLAB AND MONOLITHIC BASE SECTION)

SECTION A-A

ASSESSANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

7/9/07

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/10/07
STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 3)
(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)

NOTE A:
9" MIN. TO 20" MAX.; 9" BRICK MIN. LAID RADially, USE 1 OR 2 PRECAST COLLARS OR BRICK AS REQUIRED. (4" BRICK MIN. ONLY FOR SHALLOW MANHOLE CONSTRUCTION)

NOTE B:
ALTERNATE LOOSE BOTTOM SLAB TO BE USED ONLY IN SHALLOW MANHOLE CONSTRUCTION. A SHALLOW MANHOLE IS A MANHOLE ON A SEWER WHICH HAS A COVER FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE OF LESS THAN 4'-0".

NOTE C:
PIPE OPENINGS WILL NOT BE PERMITTED THROUGH JOINTS. DISTANCE FROM TOP OR BOTTOM OF ANY SECTION SHALL BE A MINIMUM OF 3" PLUS THE JOINT DEPTH FOR CAST PIPE OPENINGS AND A MINIMUM OF 12" PLUS THE JOINT DEPTH FOR CORED OPENINGS FOR BASIN CONNECTIONS.

NOTE D:
THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

GENERAL NOTES:
(1) THIS 4'-0" DIA. PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1 AND B-2 ON SEWERS 24" IN DIAMETER AND LESS ONLY.

(2) MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C493. EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH (WMM) 3/4"-12 GRI. X 0.06 LONG. E-F. WITH 2-8 HOOPS AROUND ALL CAST PIPE OPENINGS (1-6" PIPES) THE 2-8 HOOPS WILL NOT BE REQUIRED AT CORE OPENINGS FOR BASIN CONNECTIONS. ALL VALUES OF AREA OF STEEL (AS) ARE IN SQUARE INCHES AND ARE A MINIMUM.

(3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 18" FOR THESE BASIN CONNECTIONS.

(4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PIPE CAP AND POUR IN PLACE ALTERNATE MONOLITHIC BASE SECTION SEE STANDARD FOR PRECAST MANHOLE DETAILS, STANDARD FOR MANHOLE STEPS AND STANDARD FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE).

(5) THE MAXIMUM DEPTH OF COVER OF THE 4'-0" DIA. PRECAST MANHOLE, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY FIVE (25) FEET.

(6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.

(7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURERS RECOMMENDATIONS AND GROOVED PRIOR TO BUCKLING.

(8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.

(9) CONCRETE DESIGN MIX = 5,000 PSI MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47; REBARS = FS = 60,000 PSI; WMM: FS = 60,000 PSI.

(10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.

(11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: # 8 TO 24" DIA. PIPES = O.D.".

(12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 4'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB. (A) THE MINIMUM SLAB THICKNESS SHALL BE X"+Y" (WHERE "X" IS JOINT DEPTH) AND (B) THE EMBEDMENT LENGTH SHALL BE T" (WHERE T IS THE THICKNESS OF RISER WALL). SEE DETAIL "A" ON DWG. 2 OF 3.

PLAN OF BASE SECTION

SCHEDULE

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>OPENING</th>
<th>S MAX</th>
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<tr>
<td>8&quot;</td>
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* SEE NOTE 11
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 27" DIAMETER CAST IRON MANHOLE FRAME AND COVER
(FOR ACCESS OR CLEANOUT)

NOTE:
1. FRAME MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 30B.
MINIMUM WEIGHT OF FRAME IS 345 LBS.
2. COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 30B.
MINIMUM WEIGHT OF COVER IS 199 LBS.
3. DESIGN LOADING: HS20-44 HIGHWAY LOADING.
4. ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

REvised NOVEMBER 2008 - L. JAGODA

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

9/15/08

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

9/15/08
NOTES:

(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF STEP IS 11 LBS.

(2) ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DSP SPECIFICATION.
NOTES:

1. LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
3. KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
4. THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
5. EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
6. CONCRETE IS TO BE CLASS 40, REBARS-Grade 60.

SE48

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

7/9/07

DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/10/07

DATE
NOTES:

(1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN. LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.

(2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTIONS.)

(3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBAR: GRADE 60. WWM-FD=65,000 PSI.

WILLIAM D. LAMON
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

7/19/07

P.E.

DANIEL F. FARREN
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/10/07

P.E.
STANDARD FOR PRECAST DOUBLE CATCH BASIN (DWG. 2 OF 2)
(REMOVABLE PRECAST DOUBLE CATCH BASIN SLAB)

NOTES:

(1) ALL STEEL REINFORCEMENT ARE #5 BARS.
(2) CONCRETE IS TO BE CLASS 40, REBARS-GRADE 60.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR CAST IRON FRAME FOR CATCH BASINS
(WITHOUT CURB PIECE)

NOTES:
(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 3SB. MINIMUM WEIGHT OF FRAME IS 275 LBS.
(2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
(3) ALL FRAMES SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DATE
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR CAST IRON GRATING, BACK PLATE, AND CURB PIECE FOR CATCH BASINS

PLAN OF GRATING

THE FOLLOWING INFORMATION SHALL BE INCLUDED ON THE BACK SIDE OF THE CURB PIECE:
* NAME OF PRODUCING FOUNDRY
* DATE OF MANUFACTURE
* PRODUCT NUMBER
* CAST IRON ASTM A-48

PLAN OF CURB PIECE

NOTES:
(1) GRATING MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 358. MINIMUM WEIGHT OF TYPE R GRATING IS 425 LBS.
(2) CURB PIECE MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 358. MINIMUM WEIGHT OF 8" IS 172 LBS. MINIMUM WEIGHT OF 6" IS 119 LBS.
(3) BACK PLATE MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 358. MINIMUM WEIGHT IS 176 LBS.
(4) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
(5) ALL MANHOLE FRAMES AND COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
(6) TWO (2) - 3/4" DIA. CARBON STEEL BOLTS ASTM 307 GRADE - 3 1/2" LONG WITH HEXAGONAL HEAD AND NUT WITH TWO (2) FLAT WASHERS PER BOLT TO BE FURNISHED WITH EACH FRAME TOGETHER WITH 8" CURB PIECE OR 8" CURB PIECE.

Assistant Commissioner, Design
Department of Design and Construction

Date

Director of Engineering
Department of Environmental Protection

Date
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR CAST IRON
HOOD AND HOOKS FOR CATCH BASINS

PLAN OF HOOD IN PLACE

SECTION OF HOOD IN PLACE

NOTES:
(1) MATERIAL FOR HOOD: GRAY CAST IRON ASTM A-48 CLASS 35B, MINIMUM WEIGHT OF HOOD IS 140 LBS.
(2) MATERIAL FOR HOOK: 18-8 STAINLESS STEEL 1/2" SQUARE BAR STOCK TYPE 303 ASTM A-582.
(3) ALL CATCH BASIN HOODS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALELY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

REAR ELEVATION OF HOOD IN PLACE

FRONT ELEVATION OF HOOD

HOOK DETAIL (2 REQUIRED)

1/30/09 P.E. DIRECTOR OF ENGINEERING
1/30/09 P.E. DEPARTMENT OF ENVIRONMENTAL PROTECTION

1/30/09 DATE

SE60

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR DUCTILE IRON PIPE ALTERNATE

PLAN
TYPICAL HOUSE CONNECTION (D.I.P.) OFF D.I.P. SEWER

FILTER FABRIC, MIRAFI 140 OR APPROVED EQUAL, TO BE PLACED ALL AROUND AT THE INTERFACE OF BASE AND SHEETING AND/OR SOIL.

MINIMUM 12" LAP

3/4" TO 1 1/4" CRUSHED STONE STONE BEDDING (ENCEASMEMENT WHERE REQUIRED)

TO BE SET LEVEL AND SQUARE

TYPICAL D.I.P. RISER FOR HOUSE CONNECTION OFF D.I.P. SEWER

NOTES:

1) THIS ALTERNATE WILL BE PERMITTED ONLY WHEN SO STATED IN THE SPECIFICATIONS.

2) MATERIAL: THE DUCTILE IRON PIPE SHALL BE 60-43-10 GRADE AND CLASS 58, UNLESS OTHERWISE SPECIFIED. THE DUCTILE IRON PIPE SHALL BE LINED WITH CERAMIC EPOXY.

3) JOINTS: ALL JOINTS FOR DUCTILE IRON PIPE SEWERS SHALL BE "FILLS-IN" JOINT TYPE, EXCEPT AS NOTED ABOVE FOR SPUR AND RISER PIPE WHICH SHALL BE MECHANICAL JOINT TYPE, MEETING THE REQUIREMENTS OF ANSI STANDARD A21.11, LATEST REVISION.

4) JOINTS SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR ASSEMBLING THE TYPE OF JOINT FURNISHED.

5) FITTINGS SHALL BE DUCTILE IRON OR GRAY IRON (250 PSI) MECHANICAL JOINTS IN ACCORDANCE WITH THE LATEST REVISIONS OF ANSI/WA C110/A21.10 AND ANSI/WA C111/A21.11.

6) LEVELING BLOCKS ARE NOT PERMITTED.

SUBSTITUTION CHART

PIPE DIA.

FOR USE

E.S.V.P. D.I.P.

15" 10"

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

7/9/07 8/10/07

DATE DATE
Introduction

This Scope of Work describes a monitoring program that can be used to detect any damage occurring to the barrier wall/groundwater collection system or the wooden bulkhead or detect any changes to the groundwater quality attributable to the NYSDOT bridge construction activities at the Laurel Hill Site (Site).

The Scope of Work includes installation of inclinometers and additional performance monitoring wells along the barrier wall in Area OU-1Aa, installation of a seismograph on the wooden bulkhead, and additional groundwater monitoring wells in OU-2. The proposed locations of the inclinometers and additional performance monitoring wells are shown on Figure 1. Installation details for the wells, inclinometers and seismographs, the rationale for their installation and details of the proposed monitoring program are discussed in the following sections.

The installation of all equipment called for in this monitoring program shall be performed by a qualified contractor engaged by NYSDOT and supervised by a licensed professional engineer. The inclinometers shall be installed and monitored in accordance with ASTM D6230-13\(^1\) and D7299-12\(^2\). Installation and monitoring of the seismographs shall comply with manufacturers specifications and the protocols described below. The groundwater monitoring wells shall comply with NYSDEC acceptable standards and the requirements described below.

This Scope of Work is intended to be incorporated as a permit condition to the wetlands permits granted by NYSDEC to NYSDOT and be binding on all contractors and subcontractors of NYSDOT for the Kosciuszko Bridge Construction Project.

Inclinometers

Seven inclinometers are proposed to be installed along the barrier wall as shown on Figure 1. The inclinometers will detect any lateral ground movement that might potentially compromise the barrier wall structure during construction activities. The inclinometers will be placed on the down-gradient side of the barrier wall, as close as possible to the barrier wall. The groundwater collection trench and piping are located on the up-gradient side of the barrier wall, and

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\(^2\) ASTM D7299-12 “Standard Practice for Verifying Performance of a Vertical Inclinometer Probe.”
therefore preclude installation of the inclinometers on the upgradient side of the wall. The bottom of the inclinometers will be set at depths below the bottom of the barrier wall, and where the ends of the inclinometers are not expected to move. Consequently, the inclinometers will be installed to a depth of approximately 70 feet below ground surface (bgs) in the silt and clay unit. The bottom of the barrier wall in this area is approximately 27 feet bgs.

The proposed inclinometers will comprise a 2.75-inch outer-diameter (OD) machine-grooved PVC casing, installed such that one set of inclinometer grooves are aligned perpendicular (direction of potential movement) to the barrier wall. The inclinometer and casing details are shown on Figure 2. The well casing will be supported in the borehole at least every 5 feet and under couplings. The supports will be tied to the casing so that it does not float upwards when the cement-bentonite grout is poured. The joints will be wrapped with tape to ensure that grout does not enter the casing. The annular space between the boreholes and the PVC casing will be sealed using a cement-bentonite grout placed using a tremie pipe. Grout will be placed to within 2 feet of the ground surface. The remainder of the borehole will be backfilled with concrete and a lockable protective casing will be placed over the riser stick-up. The grout will be allowed to set for 24 hours prior to using the inclinometer. Measures such as installation of a temporary steel casing shall be taken to seal off the shallow groundwater system to prevent cross contamination during installation of the inclinometers. NYSDOT's consultant should discuss the inclinometer installations with a reputable drilling firm to develop a methodology which accomplishes the installation objective and prevents the potential for cross contamination.

An inclinometer works on the principle that horizontal movement of the soil strata will cause a lateral tilt in the casing at the depth of movement. A wheeled inclinometer probe containing two force-balanced servo-accelerometers is lowered into the casing to measure the tilt of the casing at regular depth intervals (2-foot depth intervals in this case) starting from the bottom of the casing, with the wheels of the probe tracking the grooves in the PVC casing. One accelerometer measures tilt in the plane of the inclinometer wheels, and the other accelerometer measures tilt in the plane perpendicular to that of the wheels. The readings are taken with the probe traveling in the grooves perpendicular to the barrier wall. Two sets of readings are taken at each event with the probe rotated by 180° for the second reading, in order to eliminate instrument bias error, if any. The average of the two readings is then calculated to obtain the final set of readings at each depth interval for that event. The readings are recorded by a digital readout unit connected to the inclinometer probe through a control cable graduated at 2-foot intervals.

Once the inclinometer is installed and the grout is set, the inclinometer probe will be used to record the tilt at 2-foot intervals. These readings will represent baseline conditions. The tilt measurements of subsequent events will be compared to the baseline measurements to discern any lateral movements. The change in tilt, if any, at each depth interval is converted to a
horizontal displacement. A plot of displacement versus depth can then be plotted, and then used to assess if there is any structural impact on the barrier wall at the location of the inclinometer.

Tilt measurements will be collected from the inclinometers during the construction of the proposed platform in Newtown Creek, the bridge structure spanning from the platform to the haul road to be constructed on OU-1Aa and the haul road itself, as well as during the entire time that the haul road is being used for construction traffic through its demolition. Tilt measurements will be collected on a daily basis during construction of the proposed platform in Newtown Creek, construction of the temporary bridge and during construction of the haul road. During the first week of construction traffic, tilt measurements will be collected from all inclinometers on a daily basis; and thereafter, once a month. The measurement data will be compiled, plotted and evaluated by a professional engineer and submitted to NYSDEC and PDRC on a monthly basis.

**Additional Shallow Performance Monitoring Wells**

Four pairs of additional shallow performance monitoring wells will be installed along the barrier wall in Area OU-1Aa, as shown on Figure 1. One well of each pair will be installed on the up-gradient side of the barrier wall ("A" well), and the other well will be installed on the down-gradient side ("B" well). Each of the "A" wells will be located such that it is directly across from an inclinometer and the respective "B" well. This arrangement will allow correlation of any damaging impact on the barrier wall structure with any change in groundwater quality due to a breach in the wall.

Borehole and monitoring well details are illustrated in Figure 3. Boreholes for the monitoring wells will be advanced using air rotary drilling where necessary to drill through difficult fill material, and continue with 4¼-inch ID, 8-inch OD Hollow Stem Auger (HSA) techniques to the target depths. Continuous soil samples will be collected using split-spoons and be classified by the field representative. Boreholes for the "A" wells will be advanced to the depth of the granular material of the groundwater collection trench. Boreholes for the "B" wells will be advanced to approximately 14 feet bgs, in order to install wells with 10-foot screens that straddle the fluctuating water levels caused by tides in Newtown Creek.

Each well installation will be comprised of 2-inch diameter PVC (Schedule 40) riser pipe and a 2-inch diameter and 10-foot long PVC (Schedule 40) well screen. A sand pack will be placed around the well screen to approximately 2 feet above the top of the sand pack. A minimum 1-foot thick bentonite plug will be placed on top of the sand pack, followed by bentonite grout to within 2 feet of the ground surface. The remainder of the borehole will be backfilled with concrete and a lockable protective casing will be placed over the riser stick-up.

After waiting a minimum of 24 hours to allow the grout to set, each new well will be developed using pumping and surging methods to achieve a silt-free condition. Two complete rounds of
groundwater samples will then be collected from all new monitoring wells and analyzed for metals and general chemistry, which will represent baseline conditions.

Additional Deep Groundwater Monitoring Wells

Two additional deep groundwater monitoring wells will be installed along the western side on that site; one in the southwest corner of OU-2 and one in the northwest corner of OU-1A. These wells will be monitored along with existing deep wells OW26D-03 and OW11D-03 to detect any changes in the deep groundwater chemistry that may result from the NYSDOT bridge construction activities.

The objectives for the deep monitoring wells are: (1) to install monitoring wells capable of monitoring the water quality in the deep aquifer, and (2) prevent the potential for cross contamination between the shallow groundwater and the deep groundwater. Rotosonic or hollow stem augering drilling methods can be used for the deep monitoring well installations provided that the objectives defined above are met. General procedures for the deep well installations are described below.

A steel casing will be set into the confining layer separating the shallow groundwater flow zone from the deeper groundwater (estimated approximately 20 ft deep). The steel casing will be allowed to set for 24 hrs before advancing a minimum 4 inch diameter borehole through the steel casing to an estimated depth of 50 ft. A 2 inch diameter PVC riser attached to a 5 ft slotted well screen will then be installed. A sand pack will be placed around the well screen to approximately 2 feet above the top of the sand pack. A minimum 1-foot thick bentonite plug will be placed on top of the sand pack, followed by bentonite grout to within 2 feet of the ground surface. The remainder of the borehole will be backfilled with concrete and a lockable protective casing will be placed over the riser stick-up.

After waiting a minimum of 24 hours to allow the grout to set, each new well will be developed using pumping and surging methods to achieve a silt-free condition. Two complete rounds of groundwater samples will then be collected from all new monitoring wells and analyzed for metals and general chemistry, which will represent baseline conditions.

Groundwater Monitoring

Groundwater samples will be collected from the following wells on a quarterly basis:

- 8 new shallow performance monitoring wells
- PMW-1A
- PMW-1B
- 2 new deep monitoring wells
- OW26D-03
- OW11D-03
A minimum of 4 samples (5 to 8 would be preferable) will be collected from all wells prior to any construction work in order to establish baseline conditions. Groundwater monitoring will continue on a quarterly basis for at least 5 years after all construction and construction related dewatering activities are completed in the vicinity of the Site. Groundwater samples will be analyzed for TAL metals, chloride, sodium and conductivity. Monitoring wells should also be monitored for VOCs, SVOCs and TPH (these contaminants may be drawn to the Site by NYSDOT dewatering).

Sampling and analytical protocols will be in accordance with the Operation, Maintenance and Monitoring Plan, Barrier Wall and Collection Trench/ Treatment System, CRA, September 2007. The groundwater monitoring data will be compared to the baseline conditions using statistical (Shewhart-CUSUM) control charts, on a per-parameter per-well basis, to identify any changes in groundwater chemistry that may be attributable to the NYSDOT construction activities. Through the use of control charts, both sudden changes (significantly different individual observations) and gradual changes (less abrupt shifts over a longer period of time) in groundwater quality will be assessed. The use of statistical control charts in evaluating groundwater monitoring data is a recommended alternative under federal RCRA regulations (40 CFR 264.97-100) and USEPA guidance (“Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance,” Office of Resource Conservation and Recovery, Program Implementation and Information Division, United States Environmental Protection Agency, March 2009 (EPA 530-R-09-007)).

The groundwater monitoring results will be presented in quarterly reports submitted to NYSDEC and PDRC.

At the same time that samples are collected from the groundwater monitoring wells as described above, samples will be collected from wet wells WW-1, WW-2 and WW-3. These samples will also be analyzed for TAL metals, chloride, sodium and conductivity.

**Vibration Monitoring at the Bulkhead**

Vibrations generated by pile driving and other operations could result in damage to the wooded bulkhead. Vibrations will be recorded at the bulkhead using one (1) triaxial seismograph Instantel brand, model MiniMate Plus or BlastMate III to monitor and collect data during the construction period. The seismograph used to record the vibrations during construction operations will be installed on the wooden bulkhead (bridge) as close as possible to the work. The unit will be bolted to the existing structure with a sand bag installed on top to serve as a weight to anchor it to the structure and minimize any risk of accidental triggering of the equipment, not representative of the construction activities.

The trigger level of the seismograph will be adjusted on the first day on site, to ensure that the vibrations generated by the work are collected and ambient vibrations are filtered.
The instrument is triggered every time there is a higher vibration than the set trigger level. The information stored for each event consists of a PPV (Peak Particle Velocity) in the vertical, transverse and radial directions (in/s), displacement (in) and acceleration (g) as well as the associated frequencies (Hz).

Seismographs will be checked on a regular basis by the NYSDOT contractor. The bulkhead will be inspected at the same time for any evidence of shifting.

The purpose of this survey is to quantify the intensity of vibrations generated by the NYSDOT bridge work and to have statistical data should any shifting of the bulkhead occur. Quarterly reports will be prepared and submitted to NYSDEC and PDRC. NYSDOT has indicated that it may install deflection monitors on the bulkhead and settlement monitors along the barrier wall alignment in addition to that which is required herein. All monitoring results, including results for any additional monitors installed by NYSDOT, shall be included in the quarterly reports.

**Development of baseline data and performance standards**

Before NYSDOT bridge construction activities begin, NYSDOT and PDRC, in consultation with NYSDEC, shall evaluate the baseline data and develop performance standards to determine whether the construction activities have caused damage to the barrier wall or wooden bulkhead, or exacerbated contamination in groundwater, and for how long monitoring shall continue, which will be provided to NYSDEC for review and approval.

**Sharing of information and PDRC participation**

In the event this monitoring program is implemented by NYSDOT or its contractor, PDRC, as property owner or easement holder at the relevant portions of the Laurel Hill Site, shall have the following participation rights:

1. PDRC shall be provided specifications for all equipment related to this monitoring program to be installed, the specific locations where said equipment will be installed, and the identity of NYSDOT’s contractors prior to NYSDOT installation of equipment on the Site.

2. PDRC shall be provided advance notice of the installation of equipment and be permitted to observe the installation of all equipment related to this monitoring program.

3. PDRC shall be provided 7 days advance notice of sampling activities and be permitted to observe all such activities and, upon reasonable notice to NYSDOT, to take split samples.

4. PDRC shall be provided the results of all sampling and analysis and all inclinometer measurements within 30 days of the sampling or measurement.

5. PDRC shall be allowed to take its own samples or measurements from all equipment installed as part of this monitoring program upon reasonable advance notice to NYSDOT.
6. In the event PDRC objects to any aspect of NYSDOT's implementation of this monitoring program, NYSDOT agrees to confer with PDRC and NYSDEC regarding that objection, and NYSDEC's determination as to what is required under this program shall control.