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Addendum to the Construction Quality Assurance Plan

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ADDENDUM TO THE CONSTRUCTION QUALITY ASSURANCE PLAN

ONONDAGA LAKE SEDIMENT CONSOLIDATION AREA (SCA) FINAL COVER DESIGN SUBMITTAL

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Project Number GD5497

May 2016

The purpose of this addendum is to update the NYSDEC approved Construction Quality Assurance Plan (CQAP) [Beech and Bonaparte, 2015]. This addendum presents the following updates:

(i) clarification of the components of the SCA final cover system originally presented in Section 1.5;

(ii) additional CQA testing and monitoring procedures for the drainage collection pipe and gas vent system of the SCA final cover (supplements Attachment A); and

(iii) clarifications to ASTM test methods in Tables A-3, A-4, and A-6.

This addendum clarifies that the geocomposite drainage layer will be installed over the entire SCA cover area (i.e., top deck, main deck, and side slopes of both decks). Additionally, a geotextile cushion layer will be installed over the entire leveling layer surface. The updated SCA final cover system consists of the following components from top to bottom:

- 6-inch thick vegetative soil layer;
- 18-inch thick protective soil layer;
- 8 oz/yd^2 single-sided (200-mil) or double-sided (250-mil) geocomposite drainage layer;
- 40-mil linear low-density polyethylene (LLDPE) geomembrane cover;
- 8 oz/yd^2 non-woven geotextile cushion layer; and
- leveling layer.

It is noted that in localized areas, drainage collection pipes will be installed above the geomembrane. The gas management system consists of the geotextile cushion layer (i.e., provides gas transmissivity), 4.5-ft wide geocomposite gas venting strips, and vent pipes. Procedures of CQA testing and monitoring for the drainage collection pipes and gas vent system are presented in Attachment A.

REFERENCES

Beech and Bonaparte. "Appendix D: *Construction Quality Assurance Plan (CQAP),*" Onondaga Lake SCA Final Cover Design, dated April 2015.

ATTACHMENT A

CQA TESTING AND MONITORING

DRAINAGE COLLECTION PIPES

1 Overview

CQA testing and monitoring will be performed during installation of the drainage collection pipes above the geomembrane cover. Criteria to be used for determination of acceptability of the drainage collection pipes are identified in the SCA Final Cover Contract Drawings and this CQAP. CQA activities will consist of pre-construction qualifying of material sources and field evaluation/monitoring of construction installation techniques.

2 Pre-Construction Qualifying of Material Sources

Prior to the shipment of the drainage collection pipe and fittings, the Contractor will be required to provide CQA personnel with the following information from the pipe Manufacturer:

- a list of properties for the pipes and fittings to be supplied which are guaranteed by the pipe Manufacturer to meet or exceed the values given for all properties specified in the Drawings;

- a written certification signed by a responsible party employed by the pipe Manufacturer that the pipe and fittings assigned and delivered to this project have properties which meet or exceed the guaranteed properties; and

- the pipe Manufacturer's recommended handling and installation procedures.

CQA personnel will verify that:

- the property values certified by the pipe Manufacturer meet the requirements of the Drawings; and

- pipe and fittings are made of the materials required in the Drawings.

The pipe Manufacturer will be required by the Contractor to continuously print on the pipe, at frequent intervals, the following:

- name and/or trademark of the pipe Manufacturer;

- nominal pipe size;

- manufacturing standard reference; and

- a production code from which the date and place of manufacture can be determined.

If, during Pre-Construction qualifying, the materials fail to meet the specified requirements, CQA personnel will notify the Contractor and the CQA Certifying Engineer. Use of the material will not be allowed until the material is prequalified by further tests or otherwise accepted by the CQA Certifying Engineer.

3 Construction Monitoring

3.1 Transportation, Handling, and Storage

During unloading and storage, the Contractor will be required to keep the pipes on clean level ground, free of conditions which could damage the pipe and in conformance with the pipe Manufacturer's recommendation.

The CQA personnel will observe drainage pipes upon delivery at the site and any deviation from the above requirements will be reported to the CM. Any significantly damaged pipes (e.g., maximum depth of any gouge shall be less than 10 percent of the thickness of the pipe's walls) will be rejected by the CQA Engineer and required to be repaired or replaced by the Contractor.

3.2 Field Placement

The Contractor will be required to handle all pipes in such a manner as to ensure the pipe is not damaged in any way. The CQA personnel will verify compliance with the following:

- ropes, fabric, or rubber-protected slings and straps are used when handling pipe;
- pipe or fittings are not dropped onto rocky or unprepared ground or into trenches or dragged over sharp objects;
- the subgrade surface is firm and free of debris;
- pipe segments are not brought into position until preceding lengths have been secured in its final position;
- pipe is properly joined using Manufacturer's recommendations for drainage applications;
- joints are stable and in secure condition prior to and after backfilling; and
- placement of geosynthetics and backfill over the pipe is conducted in lifts meeting the requirements of the Specifications, and in a manner that will prevent damage to the pipe and underlying geosynthetics.

3.3 Deficiencies, Problems, and Repairs

The CQA personnel will document any deficiencies or noncompliance with the specified requirements and report them to the CM. The extent of deficiencies will be evaluated by observations, a review of records, or other means deemed appropriate.

The Contractor will correct the deficiency to the satisfaction of CQA personnel and the CQA Certifying Engineer. If a project specification criterion cannot be met, or unusual weather conditions hinder work, then CQA personnel will develop and present to the CQA Certifying Engineer suggested alternative solutions for approval. All retests or subsequent re-evaluations recommended by CQA personnel must verify that the deficiency has been corrected before any additional work is performed by the Contractor in the area of the deficiency.

GAS VENT SYSTEM

1 Overview

CQA testing and monitoring will be performed during installation of the passive gas vent system. Criteria to be used for determination of acceptability of the gas vent pipes are identified in the SCA Final Cover Contract Drawings, SCA Final Cover Project Technical Specifications Section 02141, and this CQAP. CQA activities will consist of pre-construction qualifying of material sources and field evaluation/monitoring of construction techniques.

2 Pre-Construction Qualifying of Material Sources

Prior to gas vent installation, the CQA personnel and Contractor will verify that the materials needed to install the gas vents including, but not limited to, piping, perforations, joints and fittings, bottom caps, gravel, geotextile, and other components conform to the requirements shown on the Drawings. As required by the Specifications, the Contractor shall submit to the Engineer a list of equipment and materials; description of construction means, methods, and techniques; and other required information for installation of the various components of the gas management system.

If, during pre-construction qualifying, a sample, device, or component fails to meet the specified requirements, the CQA personnel and Contractor will notify the Contractor and the CQA Certifying Engineer. Use of the material will not be allowed until the material is prequalified by further tests or otherwise accepted by the CQA Certifying Engineer.

3 Construction Monitoring

3.1 Transportation, Handling, and Storage

The Contractor will be required to handle all materials for the gas vents in such a manner as to ensure the materials are not damaged in any way. Any damaged materials will be rejected by the CQA Engineer and required to be repaired or replaced by the Contractor.

3.2 Field Placement

The CQA personnel will verify compliance with the following:

- gas vents are advanced using the approved installation procedures;
- boreholes or excavations remain stable and boreholes are straight;
- perforated/slotted pipes are set the appropriate depth indicated in the Contract Documents;
- bottom caps are installed;
- joints are tight;
- backfill material is placed as specified;
- geotextiles are installed as indicated in the Contract Documents;
- solid riser pipes are installed vertically as specified;

- geomembrane boots are installed as specified; and
- vent pipes are terminated as specified.

The CQA personnel will document the installation and record the quantities and types of materials used.

3.3 Deficiencies, Problems, and Repairs

The CQA personnel will document any deficiencies or noncompliance with the specified requirements and report them to the CM. The extent of deficiencies will be evaluated by observations, a review of records, or other means deemed appropriate.

The Contractor will correct the deficiency to the satisfaction of CQA personnel and the CQA Certifying Engineer. If a project specification criterion cannot be met, or unusual weather conditions hinder work, then CQA personnel will develop and present to the CQA Certifying Engineer suggested alternative solutions for approval. All retests or subsequent re-evaluations recommended by CQA personnel must verify that the deficiency has been corrected before any additional work is performed by the Contractor in the area of the deficiency.

TABLE A-3

GEOCOMPOSITE

PROPERTIES	QUALIFIER	UNITS	SPECIFIED VALUES	TEST METHOD	FREQUENCY[1]
Geotextile Component					
Mass per unit area	minimum	oz/yd^2	per Section 02735	ASTM D 5261	1 per 250,000 ft^2
Tear strength	minimum	lb	per Section 02735	ASTM D 4533	1 per 250,000 ft^2
Apparent opening size	maximum	mm	per Section 02735	ASTM D 4751	1 per 250,000 ft^2
Geonet Components					
Polymer density	minimum	g/cm^3	per Section 02735	ASTM D 792 (Method B) or ASTM D 1505	1 per 250,000 ft^2
Nominal thickness	minimum	mils	per Section 02735	ASTM D 5199	1 per 250,000 ft^2
Geocomposite					
Transmissivity	minimum	m^2/s	per Section 02735	ASTM D 4716	1 per 250,000 ft^2

Notes:

1. The QA Engineer shall perform the tests per the frequency in the table or a minimum of 1 test per material, whichever is more frequent.
2. N/A = Not Applicable

Table A-4
MATERIAL CONFORMANCE TESTING REQUIREMENTS FOR 40-MIL LLDPE GEOMEMBRANE

TEST	METHOD	REQUIRED VALUE	FREQUENCY [1]
Thickness, mil (min.)	ASTM D 5199 or ASTM D 5994	per Section 02740	1 per 250,000 ft^2
Density, g/cm^3 (max.)	ASTM D 792 (Method B) or ASTM D 1505	per Section 02740	1 per 250,000 ft^2
Carbon Black Content (Allowable range in %)	ASTM D 1603 or ASTM D 4218	per Section 02740	1 per 250,000 ft^2
Carbon Black Dispersion	ASTM D 5596	per Section 02740	1 per 250,000 ft^2
Tensile Strength (force per unit width at Break and Yield (lb/in.)	ASTM D 6693	per Section 02740	1 per 250,000 ft^2
Elongation at Break and Yield (%)	ASTM D 6693	per Section 02740	1 per 250,000 ft^2
Tear Resistance, lbs (min.)	ASTM D 1004, Die C Puncture	per Section 02740	1 per 250,000 ft^2
Puncture Resistance, lbs (min.)	ASTM D 4833	per Section 02740	1 per 250,000 ft^2
Shear Strength	ASTM D 5321	per Section 02740	1 per 250,000 ft^2

Note

1. The QA Engineer shall perform the tests per the frequency in the table or a minimum of 1 test per material, whichever is more frequent.

Table A-6
MATERIAL CONFORMANCE TESTING REQUIREMENTS FOR GEOTEXTILE CUSHION

PROPERTIES	QUALIFIER	UNITS	SPECIFIED VALUES	TEST METHOD	FREQUENCY[1]
Type					
Nonwoven needlepunched	N/A	N/A	N/A	(-)	N/A
Polymer composition	minimum	%	per Section 02710	(-)	N/A
Mass per unit area	minimum	oz/yd^2	per Section 02710	ASTM D 5261	1 per 250,000 ft^2
Mechanical Requirements					
Grab strength	minimum	lb	per Section 02710	ASTM D 4632	1 per 250,000 ft^2
Tear strength	minimum	lb	per Section 02710	ASTM D 4533	1 per 250,000 ft^2
Puncture strength	minimum	lb	per Section 02710	ASTM D 6241	1 per 250,000 ft^2

Notes:

1. The QA Engineer shall perform the tests per the frequency in the table or a minimum of 1 test per material, whichever is more frequent.
2. N/A = Not Applicable