

722-2018 ADDENDUM 2

NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING

URGENT

**PLEASE FORWARD THIS DOCUMENT TO
WHOEVER IS IN POSSESSION OF THE BID
OPPORTUNITY**

ISSUED: January 8, 2019
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**THIS ADDENDUM SHALL BE INCORPORATED
INTO THE BID OPPORTUNITY AND SHALL
FORM A PART OF THE CONTRACT
DOCUMENTS**

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Please note the following and attached changes, corrections, additions, deletions, information and/or instructions in connection with the Bid Opportunity, and be governed accordingly. Failure to acknowledge receipt of this Addendum in Paragraph 10 of Form A: Bid may render your Bid non-responsive.

PART D – SUPPLEMENTAL CONDITIONS

- Revise: D17.1(c) to read: Successful Air Tightness Testing achieved within **eighty-five (85)** consecutive Working Days of the commencement of the Work as specified in D16;
- Revise: D18.1 to read: The Contractor shall achieve Substantial Performance within **ninety (90)** consecutive Working Days of the commencement of the Work as specified in D16.
- Revise: D19.1 to read: The Contractor shall achieve Total Performance within **one hundred and five (105)** consecutive Working Days of the commencement of the Work as specified in D16.

PART E – SPECIFICATIONS

Revise: E17.4 to read:

E17.4 Air Tightness Test Protocol

(a) General

- (i) Performance of the new gas proofing system for Digester 11 will be confirmed using a combined hydro pneumatic leak test. This test will be performed with the digester filled with potable water to the minimum operating level and an initial test pressure of 4.5 kPaG (18 inches water column (WC)). The Contractor will determine the minimum operating test during preparation of the test protocol submittal.
- (ii) The test pressure is approximately 1.5 times the pressure relief valve (PRV) setting, less a 0.5 kPaG (2 inches WC) allowance for a drop in atmospheric pressure during the test.
- (iii) The existing PRVs have a pressure setting of 3.36 kPa (13.5 inches WC) and a vacuum setting of 0.25 kPa (1 inch WC).
- (iv) The self-weight of the existing digester roof (425 mm concrete) is equivalent to an internal pressure of 9.57 kPaG (38.5 inches WC), which is significantly greater than the test pressure.
- (v) The pressure rating of the existing 2.745 m square central cover has not been evaluated for structural capacity. As a precaution during testing, place sandbags equivalent to 1.75 kPa pressure (7 inches WC) on the existing central cover when the pressure in the digester increases to 3 kPaG (12 inches WC).

- (vi) Provide details for the proposed method of sandbag placement in the procedure submittal for review by the Contract Administrator. The Contractor must obtain confirmation in writing from the Contract Administrator that the proposed placement of sandbags is acceptable before any sandbags are placed on the digester roof or central cover. Remove sandbags on successful test completion.
 - (vii) Remove the enclosure on top of the existing central cover prior to testing and replace on successful test completion.
 - (viii) The results of this test will be used to verify that the relining of the digesters satisfies the requirements of ANSI/CSA B149.6-15 Code for digester gas, landfill gas, and biogas generation and utilization, as required by the Authority Having Jurisdiction (AHJ).
 - (ix) The allowable loss in headspace pressure loss will be 2% over a 24 hour period.
 - (x) The test is to be completed once the interior coating work has been completed.
- (b) Digester Configuration
- (i) The existing digester has an inside diameter of 33.530 m with interior columns, a flat floor and a sloped roof approximately 1.3% (9 inches over 57 feet). The digester headspace is the area above the liquid in the digester with the digester filled to the minimum operating level.
 - (ii) The initial and final volume in the digester headspace will be calculated based on a nominal inside diameter of 33.530 m, the distance between the minimum operating level and the underside of the digester roof at the wall, and a nominal roof slope. Confirm dimensions before filling the digester with potable water. Note the following:
 - a. It is estimated that the minimum operating level in the digester is approximately 400 mm below the top of digester wall (8.2 m above the digester floor).
 - b. Confirm the top of pipe elevation of the 250 mm of emergency overflow level connection inside the digester before filling the digester.
 - c. The minimum operating level for testing will be adjusted to the field measurement plus 760 mm.
 - (iii) The Contract Administrator may elect to perform the test at a liquid level lower than that determined based on the Contractor's field measurements.
- (c) Digester Filling and Emptying
- (i) In preparation for the test the Contractor will fill the digester with potable water to the minimum operating level in the digester. The minimum operating level is defined as the level in the digester which is 750 mm above the top of pipe for the existing 250 mm emergency overflow pipe for Digester 11.
 - (ii) The Contractor will be required to supply potable water for filling of the digester, and to dispose of the water after testing.
 - (iii) Fill the digester to the minimum operating level a minimum of five days prior to the combined hydro-pneumatic test. Correct any leakage through process or mechanical connections and maintain at the minimum operating level.
 - (iv) Confirm that the liquid level in the digester is at the minimum operating level before sealing the last of the four 150 mm sampling connections (Repeat this measurement from this location at the end of the test).
- (d) Preparation for Testing
- (i) The contractor is to provide all test instrumentation, test water, the compressor, and all needed temporary works required to insert probes and piping into the digester and complete the test.
 - (ii) All existing process and mechanical connections to the digester will be soap tested during the pressure test, or isolated from the digester prior to the test. Connections to the digester with the potential for leakage during the test must be removed and/or isolated from the digester prior to the test.
 - (iii) The existing exterior roofing system and precast concrete pavers will not be soap tested (only the piping and structural steel covers require soap testing).

- (iv) Connections which are to be isolated include the following:
 - a. One (1) 1,200 mm roof manhole
 - b. Four (4) 600 mm emergency relief manholes
 - c. Four (4) 150 mm flanged sampling hatches
 - d. One (1) 600 mm observation window
 - e. The three-way valve, two flame arrestor/PRV assemblies mounted on the roof of the digester.
 - (v) When a PRV assembly is not in service, the internal digester pressure must be maintained above 0.25 kPa vacuum (1 inch WC) and below 5.0 kPa pressure (20 inches WC) to avoid structural damage to the digester roof.
 - (vi) During testing this will be achieved using a temporary 150 mm connection to one of the flanged sampling connections of the roof of the digester. The end of the connection will be submerged in a 300 mm pipe filled with water to allow the 150 mm pipe to be submerged in 500 mm of water. Pressure in excess of 500 mm WC (5.0 kPaG) will be relieved through the submerged pipe.
 - (vii) Pressures will be monitored continuously during the test, and the liquid used to submerge the temporary connection will be manually drained (relieving the pressure) before the digester pressure drops to 100 mm WC (1 kPaG). At all other times at least one digester opening must remain open.
- (e) Test Instrumentation
- (i) Testing will be performed by measuring the barometric pressure (local atmospheric pressure), internal digester pressure (gauge pressure), digester headspace temperature, and liquid level over an 8 hour interval. These measurements will be used to calculate any change in the mass of air in the digester headspace observed during the test. This change in mass will be expressed as a % loss over a 24 hour period. Instruments required to perform this testing includes:
 - a. A data logger to continuously record local atmospheric pressure, digester test pressure and three temperature transmitters,
 - b. One pressure transmitter (absolute pressure) capable of measuring local atmospheric pressure with a minimum accuracy of 0.075% of span
 - c. One pressure transmitter (gauge pressure) capable of measuring digester pressure with a minimum accuracy of 0.075% of span
 - d. Three temperature transmitters, two to measure temperature in the digester headspace, and one to measure temperature 0.6m below the liquid surface
 - e. One liquid manometer to manually indicate pressure in the digester headspace
 - f. One water tape to measure changes in liquid level at the start and end of the test.
- (f) Test Procedure
- (i) With the digester filled to the minimum operating level with potable water, and the temporary pressure relief assembly connected to one of the four 150 mm diameter sampling connections, and submerged in 500 mm of water, the digester headspace will be pressurized using a portable compressor. Fill the digester using a positive displacement compressor with a maximum capacity of 185 CFM, and monitor pressure to prevent digester over pressuring.
 - a. Add air to the digester using a 25 mm hard piped connection submerged 3 m to 4 m below the liquid surface (to normalize air temperature downstream of the compressor). This will require temporary piping installed on one of the four 150 mm sampling connections.
 - b. Adjust air flow to the digester to limit the digester pressure increase to 0.25 kPaG per minute or less.
 - (ii) Remove or isolate one of the PRV assemblies. Install a blind flange. This would be the inactive PRV. The other PRV assembly would remain in operation if the three way valve is open to that PRV.

- (iii) Stop the compressor when the digester pressure reaches 3.0 kPaG (12 inches WC). If there is no change in the digester pressure for 15 minutes, place sand ballast on 2.745 m square center cover. The method with which to distribute the ballast to be confirmed on site by the Contractor and reviewed by the Contract Administrator. With the ballast in place, re-position the three-way valve to the inactive PRV assembly and continue to pressurize the digester until achieving the 4.5 kPaG (18 inches WC) test pressure. Once the digester is at the test pressure, begin logging pressure and temperature, and manually record instrument readings every 15 minutes.
 - a. Disconnect and isolate connection to compressor at start of test.
 - b. Two people will be required to monitor the digester for the duration of the test (8-hours), and will be required to drain the 300 mm diameter pipe if the digester pressure drops to 1 kPaG (4 inches WC)
 - (iv) Visually inspect all piping, and bolted covers or manways connected to the digester headspace for leakage (soap test) including temporary piping connected to the digester headspace for testing. Correct any leakage and restart the test, adding additional air to return to the test pressure. Depending on the time required to correct leakage, this may require a restart of the test on the next day.
 - a. Remove the protective screen on the inactive PRV assembly and perform a visual leak test on the pressure and vacuum sides of the pressure relieve valve.
 - b. If leakage is observed, remove PRV and isolate piping at the connection to the PRV.
 - c. Recertify both PRV assemblies after completion of the testing.
 - (v) On completion of test, vent pressure through the temporary test assembly, remove sandbags and temporary pipe connections.
 - (vi) Identify any concerns noted in planning and completing the test that would affect either personal safety or the condition of the digester.
- (g) Miscellaneous
- (i) Prepare a test plan for review by the Contract Administrator, detailing locations of temporary piping, the temporary pressure relief assembly and details for mounting instruments. Include a communication plan, showing how the Contractor plans to monitor and control pressure for the duration of the test, and provide copies of the forms to be used to record test information.
 - a. Provide a heated shelter on the digester roof for the temporary pressure relief assembly, liquid manometer and pressure transmitters.
 - b. Span pressure transmitters to suit the range of pressures expected during the test to reduce instrument error.
 - c. Provide calibration sheets for the two pressure transmitters and the three temperature transmitters.
 - (ii) The Contract Administrator will review the test results prepared by the Contractor and will prepare a test report for submission to the AHJ.