Stantec

Perimeter Wall Stabilization (PWS) Segment 1 Test Parcel No. 10 (TP10)
Completion Concurrence and Acceptance
Kingston Perimeter Containment – Segment 1 (RDP-0113-E)

Stantec has reviewed the supporting QC documentation for the referenced Test Parcel with regards to the QC criteria of horizontal alignment, vertical alignment, rock embedment, uniformity to full depth, and unconfined compressive strength. The following table is a summary of the evaluation for each of these criteria and supporting documentation.

Test Parcel No. 10 (TP10)			
QC Criteria	**Referenced Specification**	**Documentation of Evaluation**	**Meets QC Criteria**
Horizontal Alignment	**Section 02650, Paragraph 4.4.2** "Maximum horizontal deviation of any Soil-Cement Panel shall not exceed 6 inches from the center location shown on the approved shop drawings."	**Approved Shop Drawings – Recommendation for Acceptance** **KRP Form 105 (latest revision)**	**Yes**
Vertical Alignment	**Section 02650, Paragraph 4.4.3** "Soil-Cement Panels shall be constructed to within +/- 1% of vertical (plumb)."	**KRP Form 105 (latest revision) – initial alignment** **Geo-Con Daily QC Report – maximum deviation**	**Yes**
Rock Embedment	**Section 02650, Paragraph 2.3.4** The Rock Embedment shall not be less than the minimum required depth of rock embedment along the full length of each Soil-Cement Panel. The minimum Rock Embedment is defined for each segment on the Profile Drawing. **Note**: For Segment 1, minimum rock embedment for a 3-foot wall is 2.7 feet, and for a 4-foot wall is 3.1 feet. **Note**: For Segment 1 between Baseline "A" Stations 175+00 and 179+50, minimum rock embedment for a 4-foot wall is 1.7-feet; based on field conditions, the QC Manager may require embedment of 3.1 feet when in a softer bedrock formation (FCN 37).	**KRP Form 105 (latest revision)**	**Yes**
Uniformity to Full Depth	**Section 02650, Paragraph 2.2.1** Absence of unmixed or unfixated ash, soil, and rock inclusions discovered by coring the completed wall. Any length of unrecovered core run shall be interpreted as indicating unmixed or unfixated inclusions. Walls shall have no continuous, unmixed or unfixated ash or soil fragments, or other discontinuity or deformity with any dimension exceeding half the effective thickness of the wall.	**S&ME Drafted Core Logs** **S&ME Core Photographs**	**Yes** ***(Required Mitigation – See Exhibit 10)***
Unconfined Compressive Strength (UCS) Results	**Section 02650, Paragraph 2.2.3** For acceptance based on wet-grab specimens, Soil Cement Strength shall be either of the following: **(1)** "the Adjusted Mean Strength shall be ≥ 280 psi, and the Adjusted Exceedence Fraction of tests above 185 psi shall be ≥ 90%," **OR** **(2)** "the Adjusted Mean Strength shall be ≥ 340 psi, and the Adjusted Exceedance Fraction of tests above 165 psi shall be ≥ 90%."	**S&ME Wet-Grab Test Results** **QC Manager Calculations – Adjusted Mean Strength**	**Yes**

Perimeter Wall Stabilization (PWS) Segment 1 Test Parcel No. 10 (TP10)
Completion Concurrence and Acceptance
Kingston Perimeter Containment – Segment 1 (RDP-0113-E)

Based on an assessment of the Quality Control documentation (previously defined), and field observations at the time of construction, Stantec recommends that TVA accept the above referenced Test Parcel.

Acceptance Concurrence:

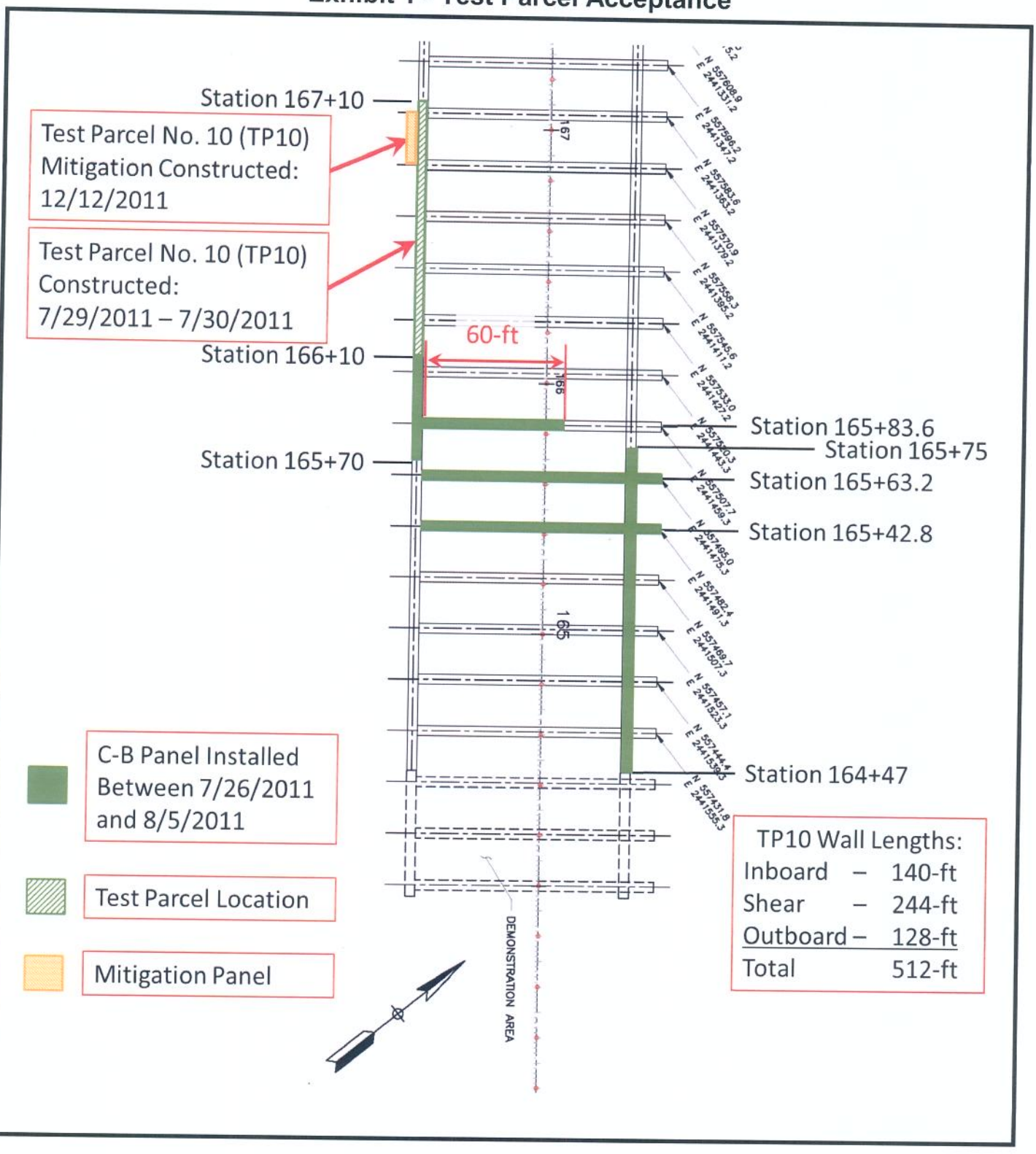
Quality Control – Stantec	
P. Brad Smiley, PE, CWI Stantec PWS QC Manager	03/07/2012 Date
Tennessee Valley Authority (or Representative)	
Diane F. Odom - Jacobs KRP Quality Officer, Operations, Engineering, & Construction	3-7-2012 Date
Jim Sells – Jacobs Geo-Con Technical Contract Manager	3-7-12 Date
Vernon J. Dotson, Jr. – TVA CCP Stantec Technical Contract Manager	3/8/12 Date
EPA Representative	
Craig Zeller US EPA Remedial Project Manager	3/08/12 Date

Enclosures:
Exhibit 1 - Test Parcel Acceptance
Exhibit 2 - Test Parcel Location
Exhibit 3 - Adjusted Strength Calculations
Exhibit 4 - Approved Shop Drawings – Recommendation for Acceptance
Exhibit 5 - KRP Form 105
Exhibit 6 - Geo-Con Daily QC Report
Exhibit 7 - S&ME Core Logs & Photographs
Exhibit 8 - Unconfined Compressive Strength Results
Exhibit 9 - 56-day Extension Justification (not required)
Exhibit 10 - QC Assessment and Mitigation Documentation

Stantec

Perimeter Wall Stabilization (PWS) Segment 1A Test Parcel No. 10 (TP10)
Completion Concurrence and Acceptance
Kingston Perimeter Containment – Segment 1 (RDP-0113-E)

Exhibit 1 - Test Parcel Acceptance



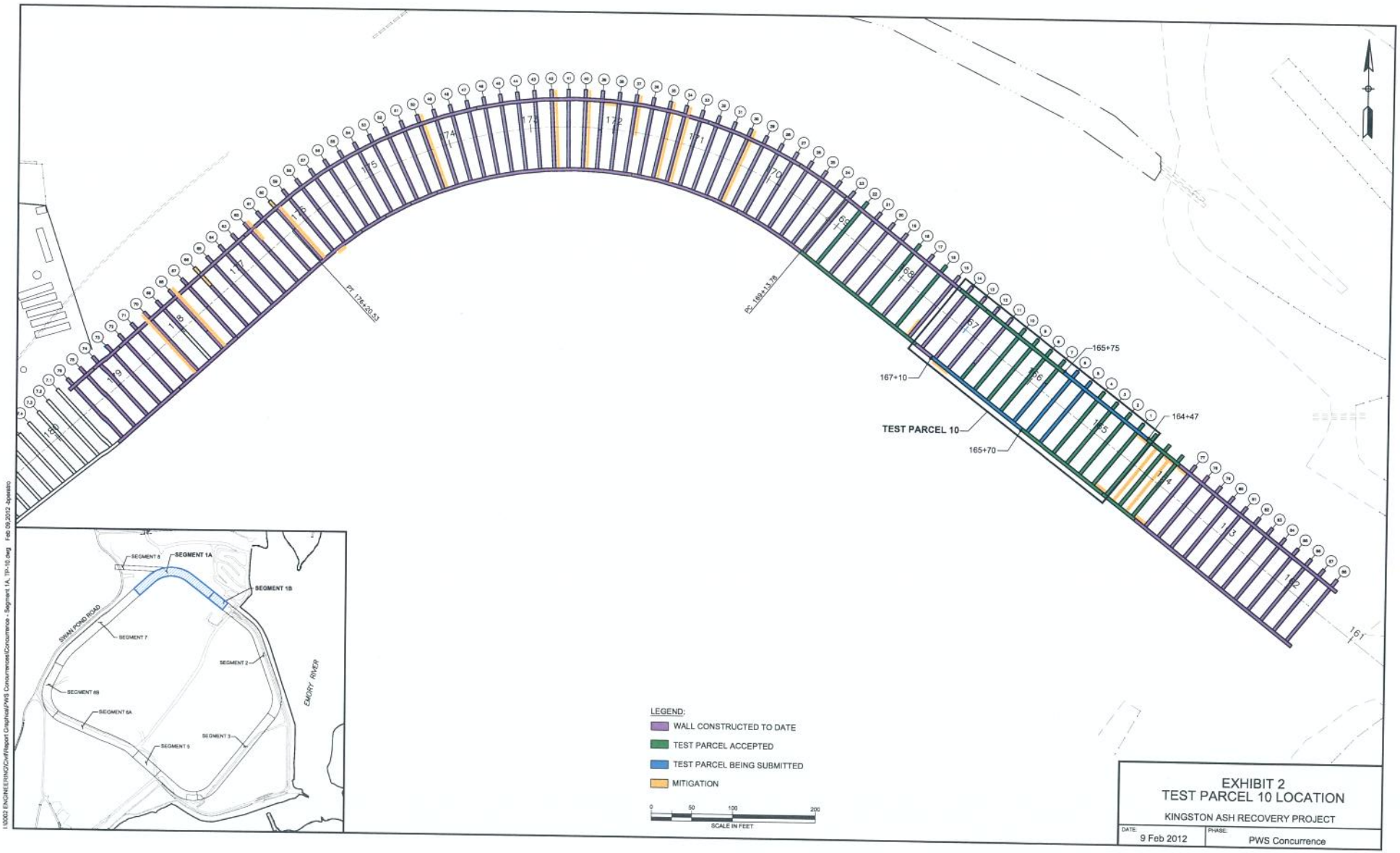


EXHIBIT 2
TEST PARCEL 10 LOCATION

KINGSTON ASH RECOVERY PROJECT

DATE:	PHASE:
9 Feb 2012	PWS Concurrence

I:\0002 ENGINEERING\Civil\Report Graphics\PWS Concurrence\Concurrence - Segment 1A_TP-10.dwg Feb 09,2012 dpieratto

Exhibit 3: Adjusted Strength Calculations

Test Parcel Adjusted Strength Calculations

Stantec

Test Parcel No. 10 (TP10)

1) The number of wet-grab cylinders which were tested for unconfined compressive strength, cured at an age of **56** days from Test Parcel **TP10.** — **25** samples

2) The mean UCS value of this data set was determined to be the following: — **311.9** psi

3) Fraction Exceeding **185** psi: **25** tests = — **100.0%**
Fraction Exceeding **165** psi: **25** tests = — **100.0%**

4) To compute the Inclusion Adjustment Fraction, the first 5-feet of the core hole and the penetration into rock are ignored, per Section 02650, Paragraph 1.4.39 of the Specifications.
Total Length of Core for Assessment = — **114.5** -ft

5) In **0** 5-foot core runs in the soil cement (each below a depth of 5-feet), the core recovery was less than 90% (core loss greater than 6-inches in each case). The total length of unrecovered core in these runs was computed to be: — **0.0** -ft

6) **0** unmixed or unfixated soil inclusions, each one being more than half of the diameter of the core and longer than 6-inches, were discovered in the recovered core. The total length of these inclusions was computed to be: — **0.0** -ft

7) The Inclusion Adjustment Fraction, as defined in the Section 02650, Paragraph 1.4.40 of the Specifications, is computed as follows:

Inclusion Adjustment Fraction = $\frac{\text{Total Core Loss (Step 5)} + \text{Total Length of Inclusions (Step 6)}}{\text{Total Length of Core (Step 4)}}$

Inclusion Adjustment Fraction = $\frac{0.0 + 0.0}{114.5}$ = **0.0000**

8) The Presumed Inclusion Strength is 10 psi, per Section 02650, Paragraph 1.4.41 of the Specifications.

9) The Adjusted Mean Strength, as defined in Section 02650, Paragraph 1.4.42, is computed as follows:

Adjusted Mean Strength = (10 psi) x **0.0000** + **311.9** x (1- **0.0000**) = — **311.9** psi

10) The Adjusted Exceedence Fraction as defined in Section 02650, Paragraph 1.4.43 of the Specifications is computed as follows:

Adjusted Exceedence Fraction (185psi)= **100.0%** x (1.0 - **0.0000**) = — **100.0%**
Adjusted Exceedence Fraction (165psi)= **100.0%** x (1.0 - **0.0000**) = — **100.0%**

11) Compare Results to Criteria in Section 02650, Paragraph 2.2.3 of the Specifications for Wet Grab samples.

			Achieved	Criteria Set 1		Criteria Set 2	
				Limit	Pass?	Limit	Pass?
Adjusted Mean Strength (psi):			**311.9**	**280**	TRUE	**340**	FALSE
Adjusted Exceedance Fraction for	**185**	psi:	**100.0%**	**90%**	TRUE		
Adjusted Exceedance Fraction for	**165**	psi:	**100.0%**			**90%**	TRUE
The Test Parcl passes this set of criteria:					TRUE		FALSE

Overall Criteria Pass: **TRUE**

12) From visual observations of retrieved core, are the requirements of Section 02650 Paragraph 2.2.1 of the Specifications met? — **FALSE**

Conclusion

The strength requirements are not relevant because of violation of Section 02650, Paragraph 2.2.1 of the specifications. The test parcel is NOT found to be in compliance in its current condition, and thus requires mitigation.

Mitigation

13) Based on the QC Assessment for this Test Parcel, this Test Parcel requires mitigation. — **TRUE**

14) The required mitigation has been implemented and meets the QC requirements outlined in the QC Assessment. (See Exhibit 10) — **TRUE**

The required mitigation has been implemented by the Contractor, and the Quality Control results and field observations indicate that this Test Parcel is now found to meet the specified requirements with regards to both uniformity (Section 02650, Paragraph 2.2.1) and strength (Section 02650, Paragraph 2.2.3).

Prepared By: P. Brad Smiley, PE - PWS QC Manager