

**DATE** December 1, 2015

**PROJECT No.** 10-1121-0197

**TO** Jeff Hayward, C.E.T.  
McIntosh Perry Consulting Engineers Ltd., Contract Administrator

**CC** MTO Contract Control Officer / MTO Foundations Engineer

**FROM** Erin O'Neill, P. Eng.  
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**GEOTECHNICAL PROGRESS REPORT  
INSTRUMENTATION READINGS “3 YEARS AFTER PAVING”  
TDA EMBANKMENT, MTO CONTRACT 2010-4003, CORNWALL**

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This geotechnical progress report covers the period of September 25, 2014 to October 7, 2015 and constitutes the 3 years “after paving” (2015 annual) report. During this time, Golder made a visit to the site on October 28, 2015 to observe the constructed embankment and download data from the temperature sensors. Golder was previously on site on August 27, 2015 to carry out groundwater and surface water sampling. The previous set of instrumentation readings (settlement and temperature) were taken in October 2014.

### **Summary of Monitoring and Contractor’s Operations**

During the period from October 2014 to October 2015, no changes were made to the TDA embankments since the previous year; however, the adjacent overpass was removed.

Surveying of the rod elevations for the bottom and top settlement plates on the north and south embankments was carried out by McIntosh Perry Consulting Engineers (MPCE) on October 7, 2015. The “height of fill” measurements at the SPs (which are located within the gravel shoulder) were taken at the nearby top of the asphalt surface course.

Surveys of the surface settlement monitors (SSMs) were also taken by MPCE on October 7, 2015.

Golder downloaded the temperature data from all monitors at the time of our site visit on October 28, 2015. At the time of our site visit, no signs of slumping or instability were observed along the embankment side slopes. There were also no new signs of cracking of the pavement surface.

Based on discussions between MPCE and MTO, we understand that this set of readings represents the final set of instrumentation survey data to be collected for this project.

### **Settlement Monitor Readings**

MPCE acquired readings of the top and bottom settlement plates in the north embankment (SP1 to SP4) and in the south embankment (SP5 to SP8) and heights of fill on October 7, 2015. Elevations of the surface settlement monitors on the final pavement surface (SSM1 to SSM8 L/C/R installed in September, 2014) were also taken by MPCE at this time. Plots of settlement versus time recorded at the SPs and SSMs, together with an updated processed copy of the monitoring data are attached in tables and figures appended to the text.



The recorded heights of fill for the north and south approach embankment reflect the “average” height of fill at each set of settlement plate locations at the top of the adjacent asphalt surface (e.g., SP5/SP6 and SP7/SP8).

The following table provides a summary of the settlement monitoring results for the settlement plates, including the current total recorded settlement at each SP, and the net increase in settlement between September 25, 2014 and October 7, 2015 readings.

**Table 1: Summary of Settlement Monitoring Results**

Instrument ID and Location <sup>1</sup>	Settlement Response Levels (Review/Alert)	As of October 7, 2015 (AFTER PAVING)				Net Settlement <sup>3</sup> (mm) between October 7, 2015 and September 25, 2014
		Total Height of Fill above Settlement Plate (m) <sup>2</sup>	Thickness of TDA Fill above SPs (m)	Thickness of Earth Borrow and Granulars above SPs (m)	Current Recorded Total Settlement (mm)	
SP1 BN	65 / 90	4.9	1.9	3.0	70 (REVIEW)	-3
SP2 TN	350 / 450	3.0	-	3.0	487 (ALERT)	-1
SP3 BN	75 / 90	5.9	2.6	3.3	137 (ALERT)	+1
SP4 TN	470 / 500	3.3	-	3.3	681 (ALERT)	-2
SP5 BS	80 / 100	4.7	2.4	2.3	79 (REVIEW)	-1
SP6 TS	450 / 500	2.3	-	2.3	622 (ALERT)	-4
SP7 BS	80 / 100	4.1	1.8	2.2	148 (ALERT)	-1
SP8 TS	300 / 350	2.4	0.2	2.2	421 (ALERT)	+3

**Notes:** <sup>1</sup> Instrument Location: B/T = bottom/top of TDA, N/S = north/south embankment.

<sup>2</sup> Height of Fill taken at pavement surface adjacent to SP location (SPs located on gravel shoulder).

<sup>3</sup> A positive number (+#) indicates rebound, or net decrease in the settlement, between September 25, 2014 and October 7, 2015.

While total settlements recorded to date on the north and south embankments all exceed review or alert levels, minimal net settlement has been recorded over the past year, and no consistent trends in movements. It is considered that these readings are generally within the level of accuracy of the survey.

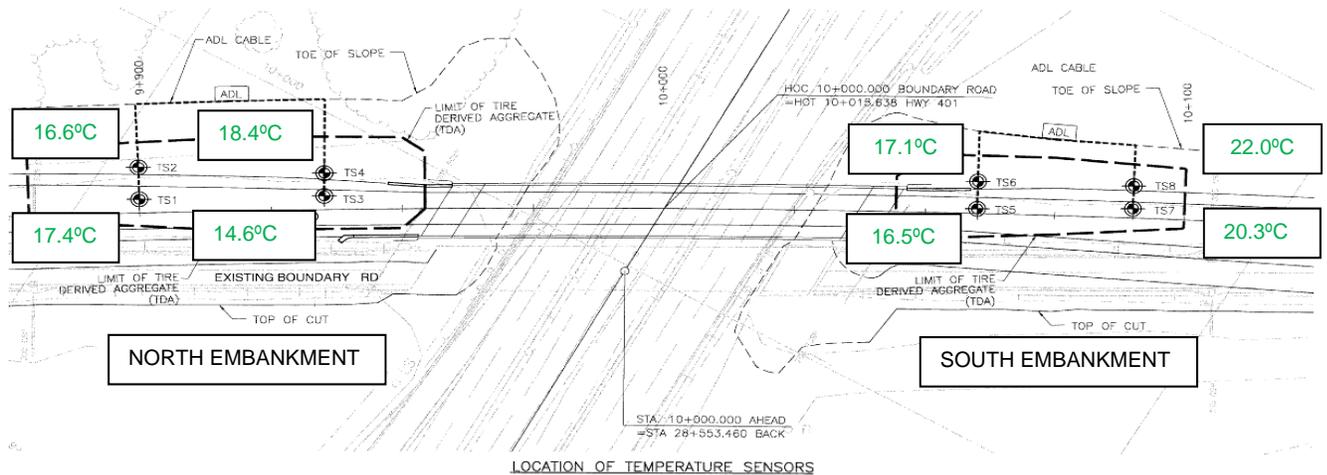
The recorded settlement of the north embankment SSMs from September 25, 2014 to October 7, 2015 indicate plus or minus 1 to 3 millimetres of movement from the previous readings on September 25, 2015. The recorded settlement of the south embankment SSMs from September 25, 2014 to October 7, 2015 indicate plus or minus 1 to 4 millimetres of movement from the previous readings on September 25, 2015. These movements are also considered to be in the range of survey tolerance.

## Temperature Sensor Installation and Readings

The temperature sensors on the north embankment (TS1 to TS4) and south embankment (TS3 and TS4) were downloaded from the dataloggers at the time of our site visit on October 28, 2015. Previous readings were downloaded on October 8, 2014. Temperature data has now been collected since May 2012, so over three full years of data are now available and trends in seasonal changes in temperature are now more obvious. Ignoring the early spikes in TDA temperature during construction (which are largely attributed to exposure of the tires to the sun), the temperatures recorded in the TDA generally follow the trend in change in air temperature, with a lag of about 12 to 16 weeks between peak high or low air temperatures and maximum or minimum temperatures recorded in the TDA.

The peak temperature recorded during the monitoring period of October 8, 2014 and October 28, 2015 at monitors installed within the TDA on the north embankment was 18.4°C at TS4. In the previous year, the peak temperature was 16.6°C at TS1. At temperature sensors installed within the TDA on the south embankment, the peak temperature recorded between October 8, 2014 and October 28, 2015 was 22.0°C at TS8. In the previous year, the peak temperature was 21.4°C at TS8. Peak temperatures at the sensors within the north and south embankments continue to be below the 52°C review and 65°C alert levels.

A summary of the peak temperatures between October 8, 2014 and October 28, 2015 are shown graphically below and plots of temperature versus time for the north and south embankments are attached.



### Groundwater Monitoring Wells, Surface Water Monitors and Pan Lysimeter Sampling

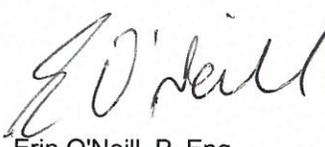
Golder personnel obtained the final set of quarterly samples of surface water, groundwater, and leachate from the pan lysimeters in August, 2015. Results of the most recent sampling event were provided in a separate report (Progress Report #49). The results of the Post-Construction Monitoring Annual Report will be provided in a separate report (Progress Report #51).

## Closure

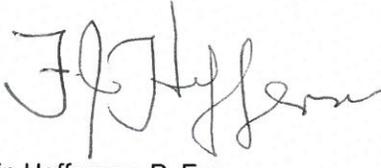
We trust the information included meets your current needs. Should you require clarification, please do not hesitate to contact us.

Yours truly,

**GOLDER ASSOCIATES LTD.**

  
Erin O'Neill, P. Eng.  
Associate, Geotechnical Engineer



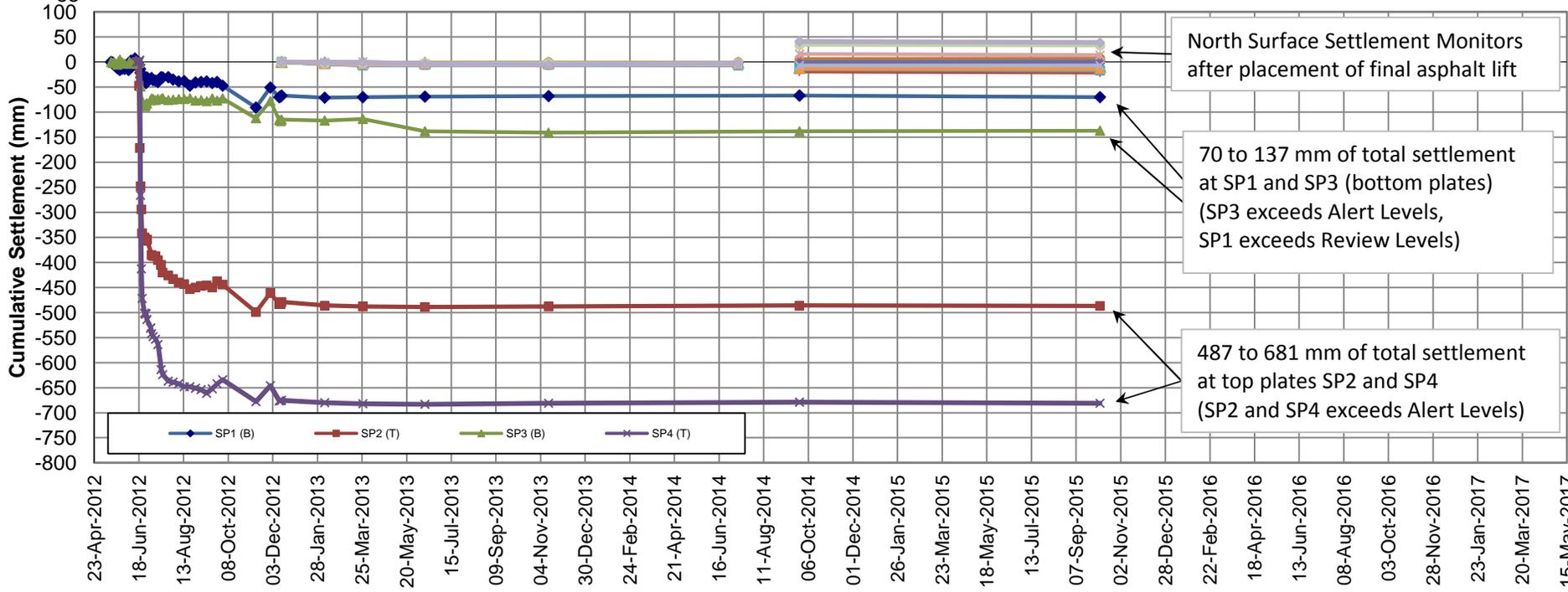
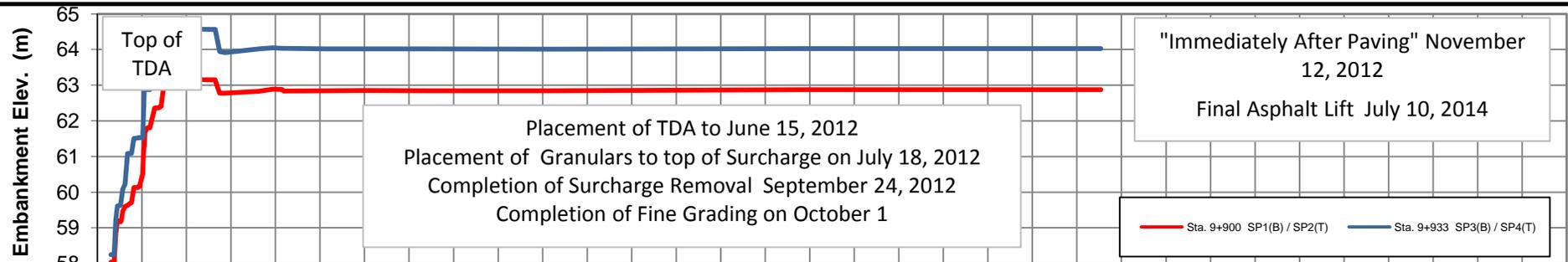
  
Fin Heffernan, P. Eng.  
Designated MTO Contact



ESO/FJH/ob

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Attachments: Figure 1: North Embankment Cumulative Settlement and Embankment Elevation  
Figure 2: North Embankment Cumulative Settlement Summary  
Figure 3: South Embankment Cumulative Settlement and Embankment Elevation  
Figure 4: South Embankment Cumulative Settlement Summary  
Figure 5: North Embankment Temperature Sensor Summary  
Figure 6: South Embankment Temperature Sensor Summary  
Instrumentation Data – Plate Elevations – North and South Embankments  
Instrumentation Data – Height of Fill – North and South Embankments  
Instrument Data – Surface Settlement Monitor Elevations – North and South Embankments



Settlement Plate ID / Location in TDA	Station / Offset (m)	Settlement Response Levels (mm)					
		Review			Alert		
		A	B	C	A	B	C
SP1 BOTTOM	9+898.5/10LT	-60	-65	-65	-75	-90	-90
SP2 TOP	9+901.5/10LT	-300	-350	-350	-400	-450	-450
SP3 BOTTOM	9+933.5/8LT	-65	-75	-75	-75	-90	-90
SP4 TOP	9+936.5/8LT	-375	-470	-470	-425	-500	-500

\* SPs surveyed to an accuracy of +/- 2 mm and reported to the nearest millimetre  
 \* Surveying conducted by a registered surveyor retained by McIntosh Perry

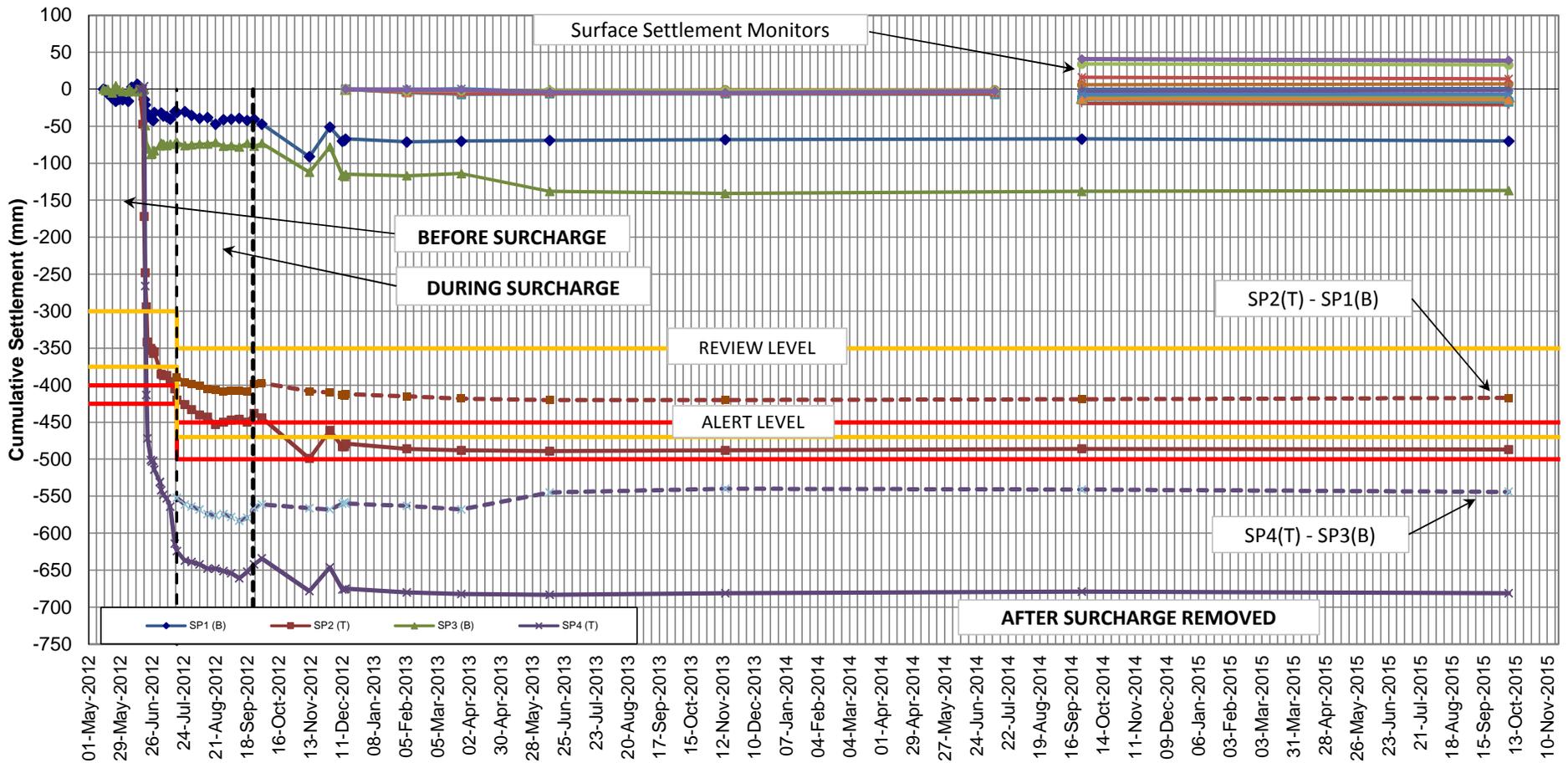
A before surcharge  
 B during surcharge  
 C after surcharge removed

**MTO  
 TIRE DERIVED AGGREGATE EMBANKMENT  
 CORNWALL, ONTARIO**

**NORTH EMBANKMENT  
 CUMULATIVE SETTLEMENT AND  
 EMBANKMENT ELEVATION**

PROJECT No. 10-1121-0197		PHASE No. 1000	
DESIGN	ESO	10/25/2010	SCALE NTS
CADD		10/25/2010	REV. 0
CHECK	ESO	11/23/2015	<b>FIGURE 1</b>
REVIEW	FJH	11/23/2015	

**Golder Associates**



Settlement Plate ID / Location in TDA	Station / Offset (m)	Settlement Response Levels (mm)					
		Review			Alert		
		A	B	C	A	B	C
SP1 BOTTOM	9+898.5/10LT	-60	-65	-65	-75	-90	-90
SP2 TOP	9+901.5/10LT	-300	-350	-350	-400	-450	-450
SP3 BOTTOM	9+933.5/8LT	-65	-75	-75	-75	-90	-90
SP4 TOP	9+936.5/8LT	-375	-470	-470	-425	-500	-500

\* SPs surveyed to an accuracy of +/- 2 mm and reported to the nearest millimetre  
 \* Surveying conducted by a registered surveyor retained by McIntosh Perry

A before surcharge  
 B during surcharge  
 C after surcharge removed

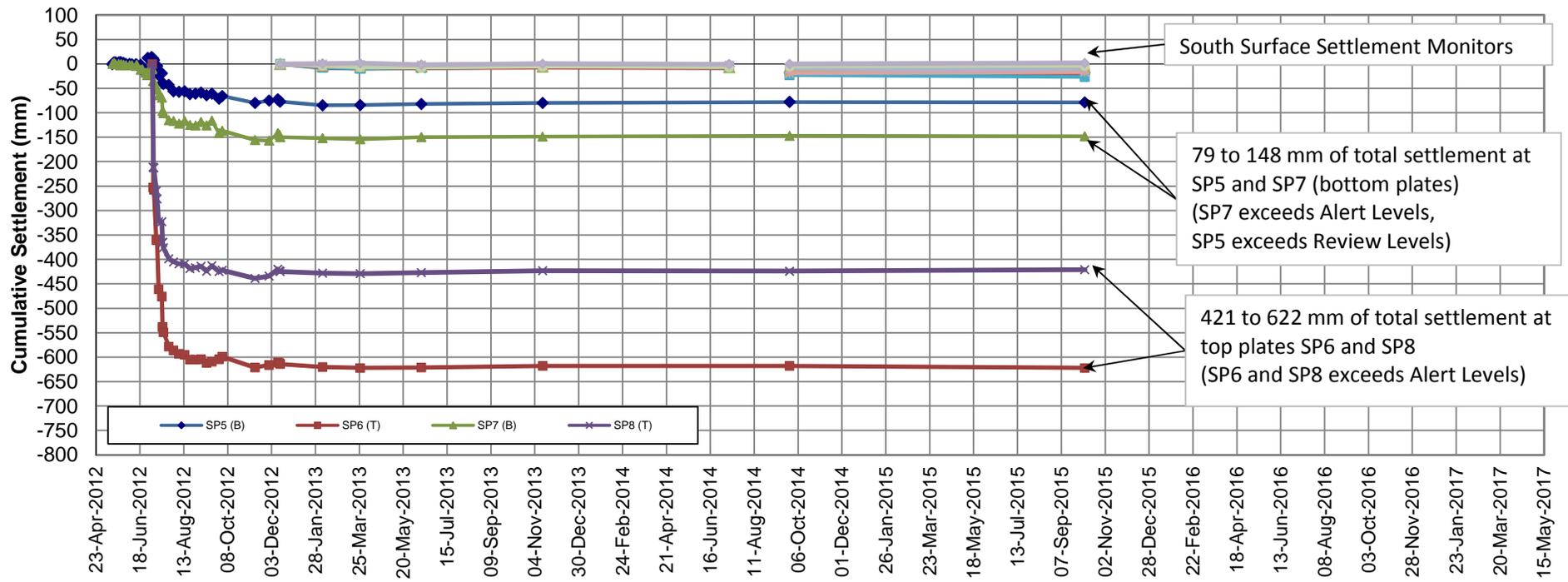
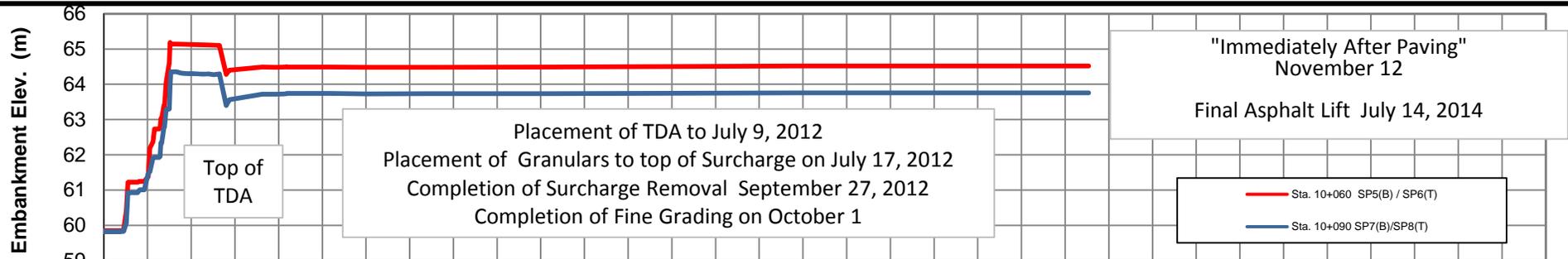
**MTO**  
**TIRE DERIVED AGGREGATE EMBANKMENT**  
**CORNWALL, ONTARIO**

**NORTH EMBANKMENT**  
**CUMULATIVE SETTLEMENT SUMMARY**

PROJECT No. 10-1121-0197		PHASE No. 1000	
DESIGN	ESO	10/25/2010	SCALE NTS REV. 0
CADD		10/25/2010	
CHECK	ESO	11/23/2015	
REVIEW	FJH	11/23/2015	

**FIGURE 2**





Settlement Plate ID / Location in TDA	Station / Offset (m)	Settlement Response Levels (mm)					
		Review			Alert		
		A	B	C	A	B	C
SP5 BOTTOM	10+058.5/6LT	-70	-80	-80	-80	-100	-100
SP6 TOP	10+061.5/6LT	-330	-450	-450	-350	-500	-500
SP7 BOTTOM	10+088.5/7LT	-70	-80	-80	-80	-100	-100
SP8 TOP	10+091.5/7LT	-260	-300	-300	-300	-350	-350

\* SPs surveyed to an accuracy of +/- 2 mm and reported to the nearest millimetre  
 \* Surveying conducted by a registered surveyor retained by McIntosh Perry

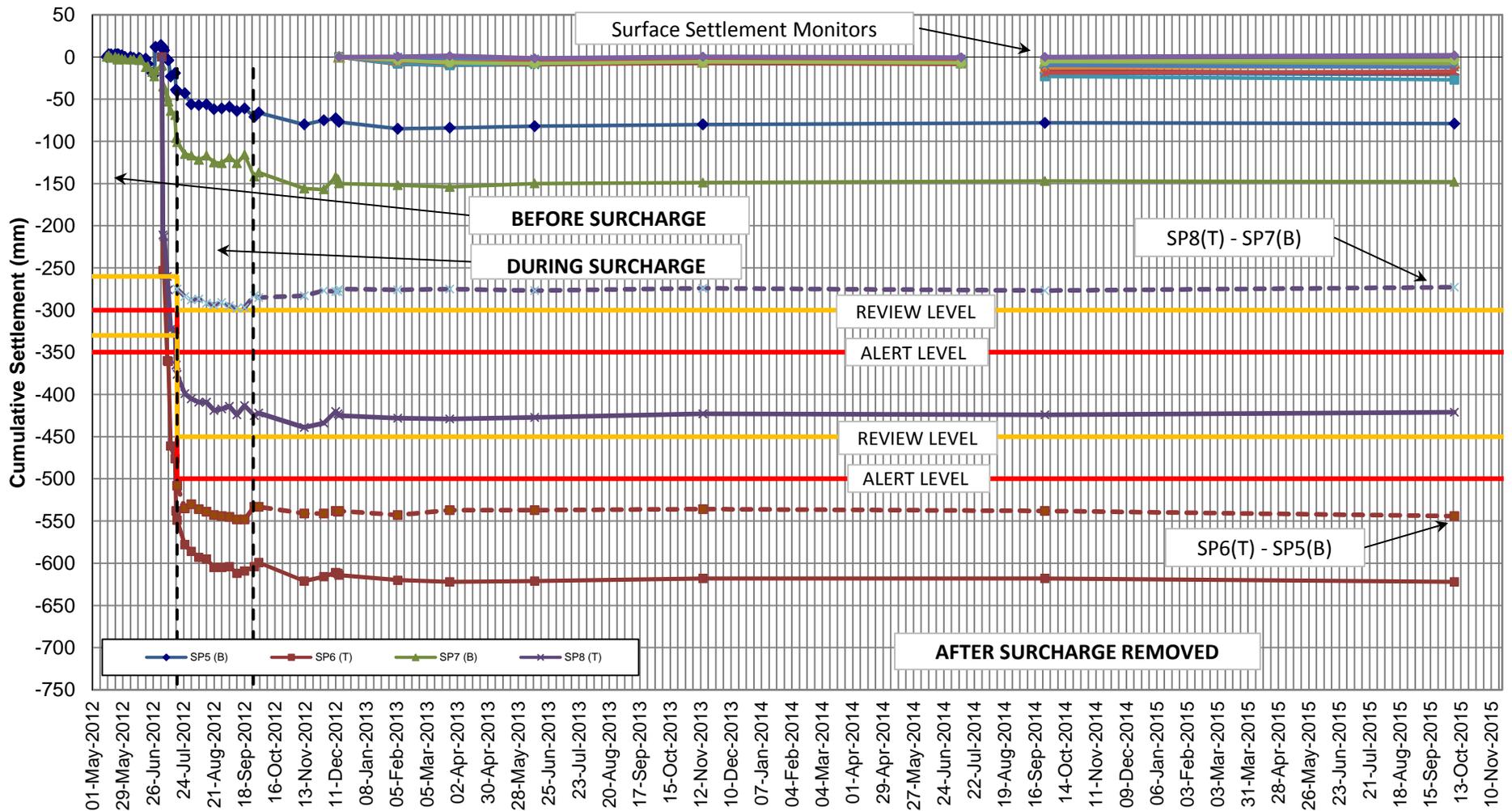
A before surcharge  
 B during surcharge  
 C after surcharge removed

**MTO**  
**TIRE DERIVED AGGREGATE EMBANKMENT**  
**CORNWALL, ONTARIO**

**SOUTH EMBANKMENT**  
**CUMULATIVE SETTLEMENT AND**  
**EMBANKMENT ELEVATION**

PROJECT No. 10-1121-0197		PHASE No. 1000	
DESIGN	ESO	10/25/2010	SCALE NTS
CADD		10/25/2010	REV. 0
CHECK	ESO	11/23/2015	<b>FIGURE 3</b>
REVIEW	FJH	11/23/2015	

**Golder Associates**



Settlement Plate ID / Location in TDA	Station / Offset (m)	Settlement Response Levels (mm)					
		Review			Alert		
		A	B	C	A	B	C
SP5 BOTTOM	10+058.5/6LT	-70	-80	-80	-80	-100	-100
SP6 TOP	10+061.5/6LT	-330	-450	-450	-350	-500	-500
SP7 BOTTOM	10+088.5/7LT	-70	-80	-80	-80	-100	-100
SP8 TOP	10+091.5/7LT	-260	-300	-300	-300	-350	-350

\* SPs surveyed to an accuracy of +/- 2 mm and reported to the nearest millimetre  
 \* Surveying conducted by a registered surveyor retained by McIntosh Perry

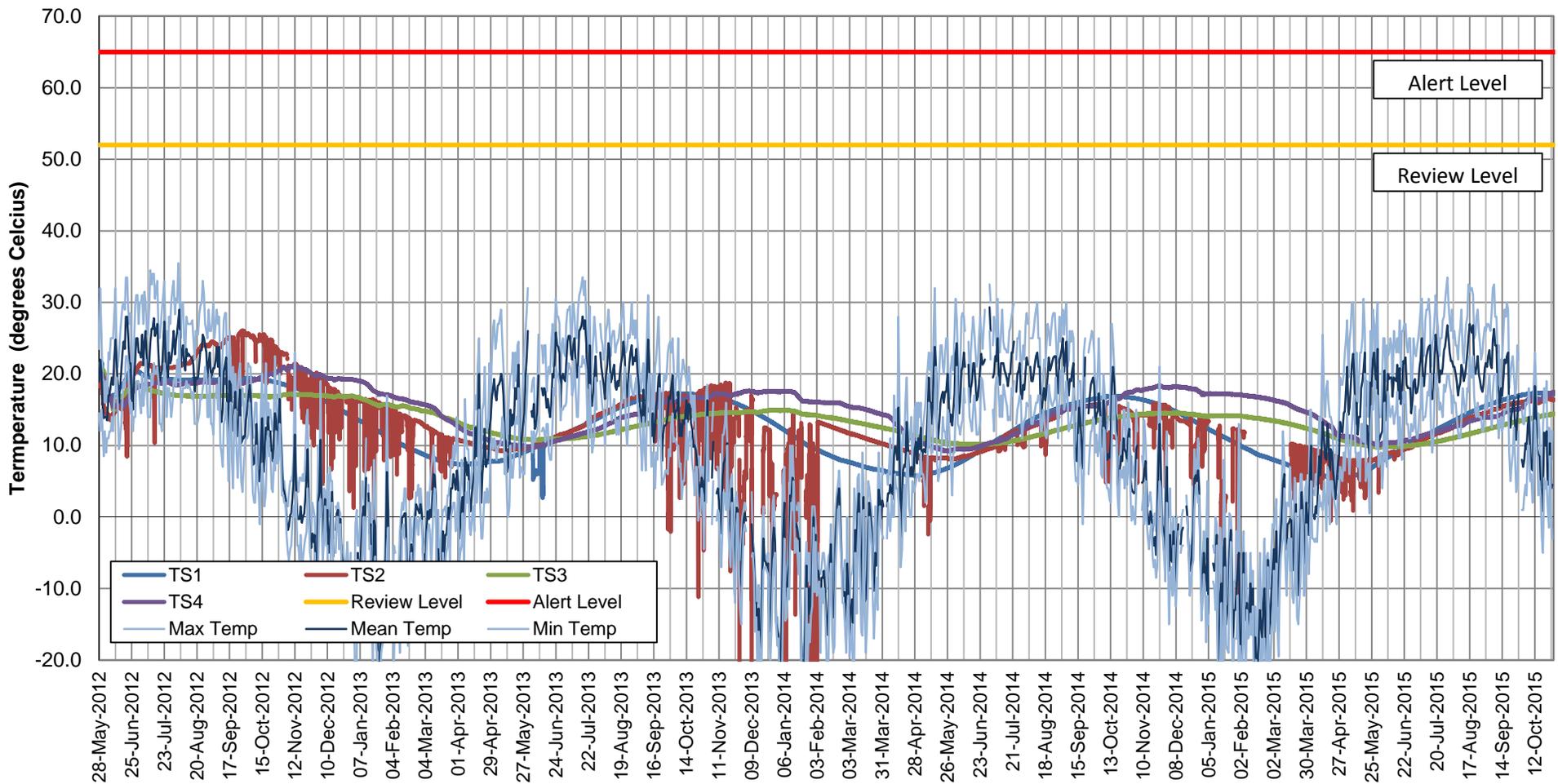
A before surcharge  
 B during surcharge  
 C after surcharge removed

**MTO**  
**TIRE DERIVED AGGREGATE EMBANKMENT**  
**CORNWALL, ONTARIO**

**SOUTH EMBANKMENT**  
**CUMULATIVE SETTLEMENT SUMMARY**

PROJECT No. 10-1121-0197		PHASE No. 1000	
DESIGN	ESO	10/25/2010	SCALE NTS
CADD		10/25/2010	REV. 0
CHECK	ESO	11/23/2015	<b>FIGURE 4</b>
REVIEW	FJH	11/23/2015	

**Golder Associates**



Temperature Sensor ID	Station / Elevation in TDA	Station / Offset (m)	Temperature Sensor Response Levels (degrees Celcius)	
			Review	Alert
TS1	59.3	9+900/3LT	52	65
TS2	59.3	9+900/10LT	52	65
TS3	59.8	9+935/3LT	52	65
TS4	59.8	9+935/8LT	52	65

Source: Weather data recorded at St. Anicet near Cornwall, Ontario, downloaded from <http://www.timeanddate.com/weather/canada/cornwall/historic>

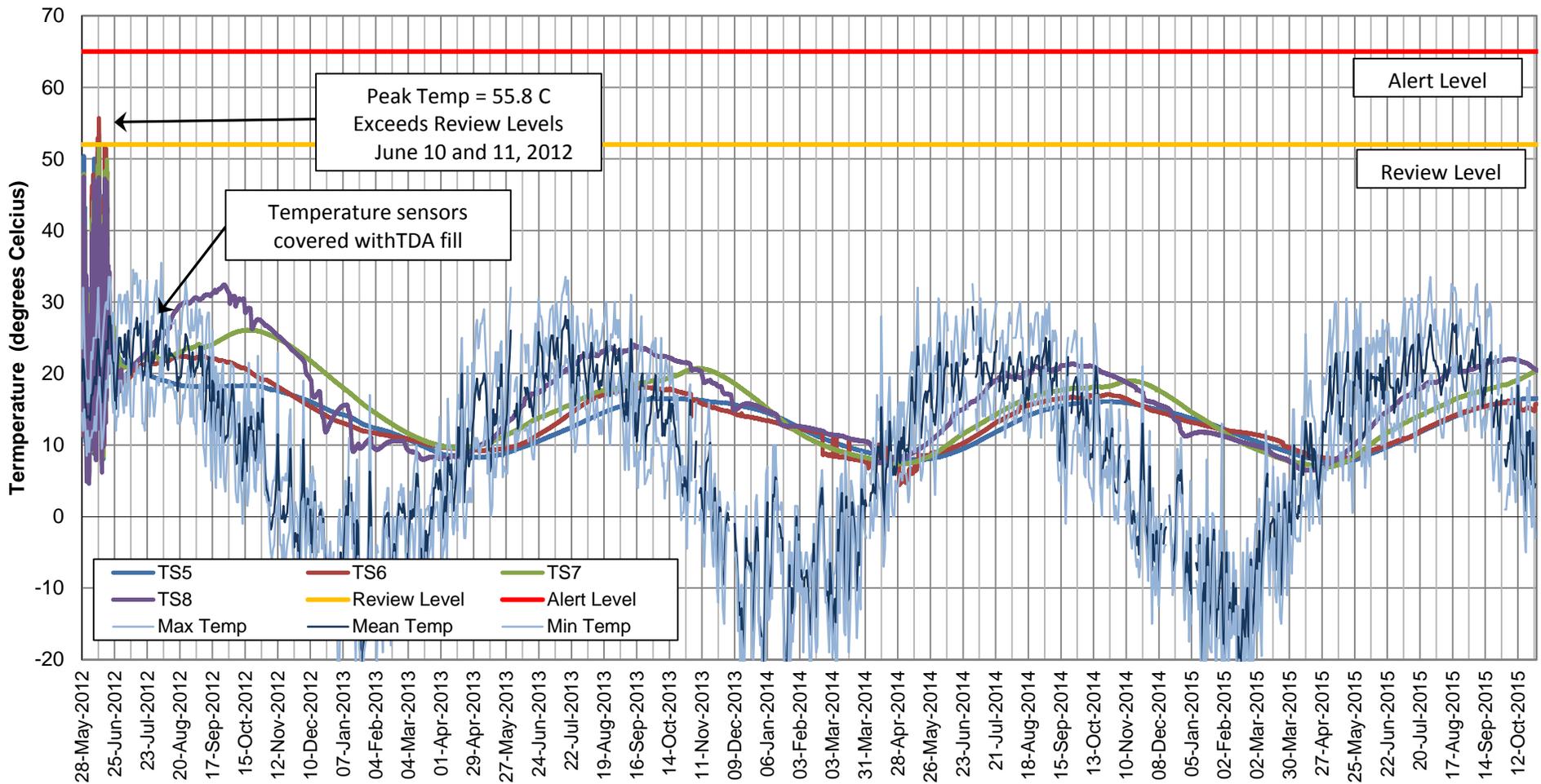
**MTO  
TIRE DERIVED AGGREGATE EMBANKMENT  
CORNWALL, ONTARIO**

**NORTH EMBANKMENT  
TEMPERATURE SENSOR SUMMARY**



PROJECT No.	10-1121-0197	PHASE No.	1000
DESIGN	ESO	10/25/2010	SCALE NTS
CADD		10/25/2010	REV. 0
CHECK	ESO	11/23/2015	
REVIEW	FJH	11/23/2015	

**FIGURE 5**



Temperature Sensor ID	Station / Elevation in TDA	Station / Offset (m)	Temperature Sensor Response Levels (degrees Celcius)	
			Review	Alert
TS5	61.2	10+060/LT	52	65
TS6	61.2	10+060/7LT	52	65
TS7	60.8	10+090/2LT	52	65
TS8	60.8	10+090/7LT	52	65

Source: Weather data recorded at St. Anicet near Cornwall, Ontario, downloaded from <http://www.timeanddate.com/weather/canada/cornwall/historic>

**MTO**  
**TIRE DERIVED AGGREGATE EMBANKMENT**  
**CORNWALL, ONTARIO**

**SOUTH EMBANKMENT**  
**TEMPERATURE SENSOR SUMMARY**

PROJECT No. 10-1121-0197		PHASE No. 1000	
DESIGN	ESO	10/25/2010	SCALE NTS
CADD		10/25/2010	REV. 0
CHECK	ESO	11/23/2015	
REVIEW	FJH	11/23/2015	

**FIGURE 6**

<b>Instrumentation Data - Plate Elevations - North Embankment</b>												
<b>SP1 (B)</b>			<b>SP2 (T)</b>			<b>SP3 (B)</b>			<b>SP4 (T)</b>			
<i>Date</i>	<i>Baseline Readings Reading</i>	<i>Elevation</i>	<i>Date</i>	<i>Baseline Readings Reading</i>	<i>Elevation</i>	<i>Date</i>	<i>Baseline Readings Reading</i>	<i>Elevation</i>	<i>Date</i>	<i>Baseline Readings Reading</i>	<i>Elevation</i>	
10-May-12	1	58.041	13-Jun-12	1	60.371	10-May-12	1	58.247	13-Jun-12	1	61.428	
11-May-12	2	58.040	14-Jun-12	2	60.371	11-May-12	2	58.248	14-Jun-12	2	61.427	
14-May-12	3	58.038	15-Jun-12	3	60.367	14-May-12	3	58.244	15-Jun-12	3	61.426	
<b>Initial Top of Plate Elev.</b>		<b>58.040</b>	<b>Initial Top of Plate Elev.</b>		<b>60.370</b>	<b>Initial Top of Plate Elev.</b>		<b>58.246</b>	<b>Initial Top of Plate Elev.</b>			<b>61.427</b>
<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	
14-May-12	58.040	0	15-Jun-12	60.370	0	14-May-12	58.246	0	15-Jun-12	61.427	0	
16-May-12	58.039	-1	18-Jun-12	60.323	-47	16-May-12	58.244	-2	18-Jun-12	61.427	0	
18-May-12	58.034	-6	19-Jun-12	60.198	-172	18-May-12	58.246	0	19-Jun-12	61.431	4	
22-May-12	58.028	-12	20-Jun-12	60.122	-248	22-May-12	58.241	-5	20-Jun-12	61.161	-266	
23-May-12	58.034	-6	21-Jun-12	60.076	-294	23-May-12	58.246	0	21-Jun-12	61.014	-413	
23-May-12	58.034	-6	22-Jun-12	60.028	-342	23-May-12	58.246	0	22-Jun-12	60.955	-472	
25-May-12	58.024	-16	22-Jun-12	60.028	-342	25-May-12	58.251	5	25-Jun-12	60.926	-501	
28-May-12	58.027	-13	25-Jun-12	60.020	-350	28-May-12	58.245	-1	26-Jun-12	60.924	-503	
31-May-12	58.026	-14	26-Jun-12	60.017	-353	31-May-12	58.243	-3	27-Jun-12	60.925	-502	
5-Jun-12	58.024	-16	27-Jun-12	60.013	-357	5-Jun-12	58.243	-3	28-Jun-12	60.913	-514	
8-Jun-12	58.043	3	28-Jun-12	60.015	-355	6-Jun-12	58.246	0	3-Jul-12	60.896	-531	
13-Jun-12	58.047	7	4-Jul-12	59.985	-385	6-Jun-12	58.246	0	3-Jul-12	60.896	-531	
14-Jun-12	58.042	2	6-Jul-12	59.983	-387	8-Jun-12	58.243	-3	4-Jul-12	60.885	-542	
15-Jun-12	58.042	2	9-Jul-12	59.983	-387	13-Jun-12	58.246	0	6-Jul-12	60.879	-548	
18-Jun-12	58.035	-5	12-Jul-12	59.975	-395	14-Jun-12	58.243	-3	9-Jul-12	60.874	-553	
19-Jun-12	58.026	-14	16-Jul-12	59.965	-405	15-Jun-12	58.243	-3	12-Jul-12	60.863	-564	
19-Jun-12	58.026	-14	18-Jul-12	59.950	-420	18-Jun-12	58.244	-2	16-Jul-12	60.813	-614	
20-Jun-12	58.019	-21	25-Jul-12	59.944	-426	19-Jun-12	58.246	0	18-Jul-12	60.803	-624	
21-Jun-12	58.009	-31	31-Jul-12	59.937	-433	20-Jun-12	58.197	-49	25-Jul-12	60.790	-637	
22-Jun-12	58.003	-37	7-Aug-12	59.930	-440	21-Jun-12	58.171	-75	31-Jul-12	60.788	-639	
25-Jun-12	58.003	-37	14-Aug-12	59.927	-443	22-Jun-12	58.165	-81	7-Aug-12	60.785	-642	
26-Jun-12	57.999	-41	21-Aug-12	59.917	-453	25-Jun-12	58.158	-88	14-Aug-12	60.779	-648	
27-Jun-12	57.998	-42	28-Aug-12	59.920	-450	26-Jun-12	58.159	-87	21-Aug-12	60.779	-648	
28-Jun-12	58.009	-31	4-Sep-12	59.923	-447	27-Jun-12	58.163	-83	28-Aug-12	60.776	-651	
4-Jul-12	58.008	-32	11-Sep-12	59.924	-446	28-Jun-12	58.163	-83	4-Sep-12	60.773	-654	
6-Jul-12	58.004	-36	18-Sep-12	59.920	-450	3-Jul-12	58.170	-76	11-Sep-12	60.766	-661	
9-Jul-12	58.003	-37	24-Sep-12	59.932	-438	3-Jul-12	58.170	-76	18-Sep-12	60.775	-652	
12-Jul-12	58.000	-40	1-Oct-12	59.926	-444	4-Jul-12	58.173	-73	24-Sep-12	60.785	-642	
16-Jul-12	58.010	-30	12-Nov-12	59.871	-499	6-Jul-12	58.172	-74	1-Oct-12	60.793	-634	
18-Jul-12	58.009	-31	30-Nov-12	59.909	-461	9-Jul-12	58.170	-76	12-Nov-12	60.749	-678	
25-Jul-12	58.010	-30	11-Dec-12	59.887	-483	12-Jul-12	58.172	-74	30-Nov-12	60.781	-646	
31-Jul-12	58.005	-35	13-Dec-12	59.887	-483	16-Jul-12	58.172	-74	11-Dec-12	60.751	-676	
7-Aug-12	58.001	-39	14-Dec-12	59.891	-479	18-Jul-12	58.174	-72	13-Dec-12	60.751	-676	
14-Aug-12	58.002	-38	6-Feb-13	59.884	-486	25-Jul-12	58.170	-76	14-Dec-12	60.752	-675	
21-Aug-12	57.993	-47	26-Mar-13	59.882	-488	31-Jul-12	58.171	-75	6-Feb-13	60.747	-680	
28-Aug-12	57.999	-41	12-Jun-13	59.881	-489	7-Aug-12	58.172	-74	26-Mar-13	60.745	-682	
4-Sep-12	58.000	-40	14-Nov-13	59.882	-488	14-Aug-12	58.172	-74	12-Jun-13	60.744	-683	
11-Sep-12	58.001	-39	25-Sep-14	59.884	-486	21-Aug-12	58.174	-72	14-Nov-13	60.746	-681	
18-Sep-12	57.998	-42	7-Oct-15	59.883	-487	28-Aug-12	58.169	-77	25-Sep-14	60.748	-679	
24-Sep-12	58.000	-40				4-Sep-12	58.170	-76	7-Oct-15	60.746	-681	
1-Oct-12	57.993	-47				11-Sep-12	58.168	-78				
12-Nov-12	57.949	-91				18-Sep-12	58.173	-73				
30-Nov-12	57.989	-51				24-Sep-12	58.169	-77				
11-Dec-12	57.970	-70				1-Oct-12	58.173	-73				
13-Dec-12	57.971	-69				12-Nov-12	58.134	-112				
14-Dec-12	57.973	-67				30-Nov-12	58.168	-78				
6-Feb-13	57.969	-71				11-Dec-12	58.130	-116				
26-Mar-13	57.970	-70				13-Dec-12	58.128	-118				
12-Jun-13	57.971	-69				14-Dec-12	58.131	-115				
14-Nov-13	57.972	-68				6-Feb-13	58.129	-117				
25-Sep-14	57.973	-67				26-Mar-13	58.132	-114				
7-Oct-15	57.970	-70				12-Jun-13	58.108	-138				
						14-Nov-13	58.105	-141				
						25-Sep-14	58.108	-138				

<b>Instrumentation Data - Plate Elevations - South Embankment</b>												
<b>SP5 (B)</b>			<b>SP6 (T)</b>			<b>SP7 (B)</b>			<b>SP8 (T)</b>			
<b>Date</b>	<b>Baseline Readings Reading</b>	<b>Elevation</b>	<b>Date</b>	<b>Baseline Readings Reading</b>	<b>Elevation</b>	<b>Date</b>	<b>Baseline Readings Reading</b>	<b>Elevation</b>	<b>Date</b>	<b>Baseline Readings Reading</b>	<b>Elevation</b>	
10-May-12	1	59.843	29-Jun-12	1	62.773	10-May-12	1	59.827	29-Jun-12	1	61.718	
11-May-12	2	59.842	3-Jul-12	2	62.768	11-May-12	2	59.823	3-Jul-12	2	61.717	
14-May-12	3	59.846	4-Jul-12	3	62.763	14-May-12	3	59.826	4-Jul-12	3	61.713	
<b>Initial Top of Plate Elev.</b>		<b>59.844</b>	<b>Initial Top of Plate Elev.</b>		<b>62.768</b>	<b>Initial Top of Plate Elev.</b>		<b>59.825</b>	<b>Initial Top of Plate Elev.</b>			<b>61.716</b>
<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	<b>Reading Date</b>	<b>Top of Plate Elevation (m)</b>	<b>Settlement (mm)</b>	
14-May-12	59.844	0	4-Jul-12	62.768	0	14-May-12	59.825	0	4-Jul-12	61.716	0	
16-May-12	59.847	3	5-Jul-12	62.515	-253	16-May-12	59.827	2	5-Jul-12	61.505	-211	
18-May-12	59.847	3	6-Jul-12	62.510	-258	18-May-12	59.824	-1	6-Jul-12	61.503	-213	
22-May-12	59.847	3	9-Jul-12	62.408	-360	22-May-12	59.825	0	9-Jul-12	61.456	-260	
24-May-12	59.847	3	10-Jul-12	62.407	-361	24-May-12	59.822	-3	10-Jul-12	61.440	-276	
24-May-12	59.847	3	12-Jul-12	62.307	-461	24-May-12	59.822	-3	12-Jul-12	61.393	-323	
25-May-12	59.847	3	16-Jul-12	62.292	-476	25-May-12	59.824	-1	16-Jul-12	61.393	-323	
28-May-12	59.846	2	17-Jul-12	62.230	-538	28-May-12	59.823	-2	17-Jul-12	61.351	-365	
31-May-12	59.844	0	17-Jul-12	62.230	-538	31-May-12	59.822	-3	17-Jul-12	61.351	-365	
5-Jun-12	59.844	0	18-Jul-12	62.219	-549	5-Jun-12	59.822	-3	18-Jul-12	61.340	-376	
8-Jun-12	59.843	-1	25-Jul-12	62.190	-578	8-Jun-12	59.822	-3	25-Jul-12	61.317	-399	
13-Jun-12	59.843	-1	31-Jul-12	62.182	-586	13-Jun-12	59.821	-4	31-Jul-12	61.311	-405	
14-Jun-12	59.842	-2	7-Aug-12	62.175	-593	14-Jun-12	59.823	-2	7-Aug-12	61.307	-409	
19-Jun-12	59.842	-2	14-Aug-12	62.173	-595	19-Jun-12	59.813	-12	14-Aug-12	61.307	-409	
21-Jun-12	59.836	-8	21-Aug-12	62.163	-605	21-Jun-12	59.814	-11	21-Aug-12	61.297	-419	
25-Jun-12	59.825	-19	28-Aug-12	62.163	-605	25-Jun-12	59.807	-18	28-Aug-12	61.299	-417	
27-Jun-12	59.823	-21	4-Sep-12	62.164	-604	27-Jun-12	59.802	-23	4-Sep-12	61.302	-414	
28-Jun-12	59.856	12	11-Sep-12	62.156	-612	28-Jun-12	59.809	-16	11-Sep-12	61.292	-424	
3-Jul-12	59.858	14	18-Sep-12	62.159	-609	3-Jul-12	59.814	-11	18-Sep-12	61.303	-413	
4-Jul-12	59.856	12	27-Sep-12	62.164	-604	4-Jul-12	59.815	-10	27-Sep-12	61.291	-425	
4-Jul-12	59.856	12	1-Oct-12	62.169	-599	5-Jul-12	59.790	-35	1-Oct-12	61.294	-422	
5-Jul-12	59.855	11	12-Nov-12	62.147	-621	6-Jul-12	59.789	-36	12-Nov-12	61.277	-439	
6-Jul-12	59.852	8	30-Nov-12	62.152	-616	9-Jul-12	59.777	-48	30-Nov-12	61.282	-434	
9-Jul-12	59.841	-3	11-Dec-12	62.157	-611	10-Jul-12	59.772	-53	11-Dec-12	61.296	-420	
10-Jul-12	59.840	-4	13-Dec-12	62.156	-612	12-Jul-12	59.761	-64	13-Dec-12	61.293	-423	
12-Jul-12	59.821	-23	14-Dec-12	62.154	-614	16-Jul-12	59.756	-69	14-Dec-12	61.291	-425	
16-Jul-12	59.825	-19	6-Feb-13	62.148	-620	17-Jul-12	59.729	-96	6-Feb-13	61.288	-428	
17-Jul-12	59.805	-39	26-Mar-13	62.146	-622	17-Jul-12	59.729	-96	26-Mar-13	61.287	-429	
17-Jul-12	59.805	-39	12-Jun-13	62.147	-621	18-Jul-12	59.724	-101	12-Jun-13	61.289	-427	
18-Jul-12	59.803	-41	14-Nov-13	62.150	-618	25-Jul-12	59.710	-115	14-Nov-13	61.293	-423	
25-Jul-12	59.801	-43	25-Sep-14	62.150	-618	31-Jul-12	59.708	-117	25-Sep-14	61.292	-424	
31-Jul-12	59.788	-56	7-Oct-15	62.146	-622	7-Aug-12	59.703	-122	7-Oct-15	61.295	-421	
7-Aug-12	59.787	-57				14-Aug-12	59.708	-117				
14-Aug-12	59.788	-56				21-Aug-12	59.700	-125				
21-Aug-12	59.782	-62				28-Aug-12	59.699	-126				
28-Aug-12	59.783	-61				4-Sep-12	59.706	-119				
4-Sep-12	59.785	-59				11-Sep-12	59.699	-126				
11-Sep-12	59.780	-64				18-Sep-12	59.709	-116				
18-Sep-12	59.783	-61				27-Sep-12	59.683	-142				
27-Sep-12	59.773	-71				1-Oct-12	59.688	-137				
1-Oct-12	59.778	-66				12-Nov-12	59.669	-156				
12-Nov-12	59.764	-80				30-Nov-12	59.668	-157				
30-Nov-12	59.769	-75				11-Dec-12	59.683	-142				
11-Dec-12	59.771	-73				13-Dec-12	59.680	-145				
11-Dec-12	59.771	-73				14-Dec-12	59.675	-150				
13-Dec-12	59.768	-76				6-Feb-13	59.673	-152				
14-Dec-12	59.767	-77				26-Mar-13	59.671	-154				
6-Feb-13	59.759	-85				12-Jun-13	59.675	-150				
26-Mar-13	59.760	-84				14-Nov-13	59.676	-149				
12-Jun-13	59.762	-82				25-Sep-14	59.678	-147				
14-Nov-13	59.764	-80				7-Oct-15	59.677	-148				
25-Sep-14	59.766	-78										
7-Oct-15	59.765	-79										

**Instrumentation Data - Height of Fill**

READING DATE	NORTH EMBANKMENT			READING DATE	SOUTH EMBANKMENT		
	Sta. 9+900 SP1(B) / SP2(T)	Sta. 9+933 SP3(B) / SP4(T)	Notes		Sta. 10+060 SP5(B) / SP6(T)	Sta. 10+090 SP7(B)/SP8(T)	Notes
	Elev	Elev			Elev	Elev	
10-May-12	58.041	58.247	TDA Base - Top of Plate = Fill Height	10-May-12	59.843	59.827	TDA Base - Top of Plate = Fill Height
11-May-12	58.040	58.248	TDA Base - Top of Plate = Fill Height	11-May-12	59.842	59.823	TDA Base - Top of Plate = Fill Height
14-May-12	58.038	58.244	TDA Base - Top of Plate = Fill Height	14-May-12	59.844	59.825	TDA Base - Top of Plate = Fill Height
16-May-12	58.835	59.225	Top of TDA	16-May-10	59.847	59.827	TDA Base - Top of Plate = Fill Height
18-May-12	59.207	59.612	Top of TDA	18-May-12	59.847	59.824	TDA Base - Top of Plate = Fill Height
22-May-12	59.168	59.638	Top of TDA	22-May-12	60.409	60.069	Top of TDA
23-May-12	59.211	59.800	Top of TDA	24-May-12	61.213	60.923	Top of TDA
25-May-12	59.463	60.082	Top of TDA	25-May-12	61.226	60.926	Top of TDA
28-May-12	59.600	60.230	Top of TDA	28-May-12	61.226	60.926	Top of TDA
31-May-12	59.633	61.083	Top of TDA	31-May-12	61.226	60.926	Top of TDA
5-Jun-12	59.707	61.087	Top of TDA	5-Jun-12	61.226	60.926	Top of TDA
8-Jun-12	60.135	61.505	Top of TDA	8-Jun-12	61.243	61.003	Top of TDA
13-Jun-12	60.135	61.520	Top of TDA	13-Jun-12	61.243	61.003	Top of TDA
14-Jun-12	60.157	61.532	Top of TDA	14-Jun-12	61.243	61.003	Top of TDA
15-Jun-12	60.157	61.532	Top of TDA	19-Jun-12	61.378	61.473	Top of TDA
19-Jun-12	60.511	61.532	Top of Clay Seal	21-Jun-12	62.187	61.517	Top of TDA
20-Jun-12	61.114	62.164	Top of Clay Seal	25-Jun-12	62.363	61.913	Top of TDA
21-Jun-12	61.308	62.838	Top Earth Embankment	27-Jun-12	62.729	61.926	Top of TDA
22-Jun-12	61.702	62.917	Top Earth Embankment	28-Jun-12	62.729	61.926	Top of TDA
25-Jun-12	61.805	62.875	Top Earth Embankment	3-Jul-12	62.729	61.926	Top of TDA
26-Jun-12	61.805	62.875	Top Earth Embankment	4-Jul-12	62.745	61.949	Top of TDA
27-Jun-12	61.805	62.875	Top Earth Embankment	5-Jul-12	63.023	62.333	Top of Clay Seal
28-Jun-12	61.805	62.875	Top Earth Embankment	6-Jul-12	63.030	62.330	Top of Clay Seal
4-Jul-12	62.360	63.585	Top of Granular "B" Type II	9-Jul-12	63.400	62.792	Top of Clay Seal
6-Jul-12	62.366	63.581	Top of Granular "B" Type II	10-Jul-12	63.394	62.800	Top Earth Embankment
9-Jul-12	62.366	63.581	Top of Granular "B" Type II	12-Jul-12	64.056	63.281	Top of Granular "B" Type II
12-Jul-12	62.407	63.762	Top of Granular "B" Type II	16-Jul-12	64.611	63.301	Start of Surcharge
16-Jul-12	63.080	64.717	Top of Surcharge	17-Jul-12	65.182	63.952	Top of Surcharge
18-Jul-12	63.280	64.630	Top of Surcharge	18-Jul-12	65.141	64.351	Top of Surcharge
25-Jul-12	63.280	64.630	Top of Surcharge	25-Jul-12	65.141	64.351	Top of Surcharge
31-Jul-12	63.201	64.596	Top of Surcharge	31-Jul-12	65.140	64.315	Top of Surcharge
7-Aug-12	63.178	64.588	Top of Surcharge	7-Aug-12	65.128	64.298	Top of Surcharge
14-Aug-12	63.162	64.577	Top of Surcharge	14-Aug-12	65.131	64.301	Top of Surcharge
21-Aug-12	63.155	64.575	Top of Surcharge	21-Aug-12	65.119	64.294	Top of Surcharge
28-Aug-12	63.155	64.570	Top of Surcharge	28-Aug-12	65.114	64.289	Top of Surcharge
4-Sep-12	63.154	64.565	Top of Surcharge	4-Sep-12	65.115	64.293	Top of Surcharge
11-Sep-12	63.150	64.563	Top of Surcharge	11-Sep-12	65.109	64.271	Top of Surcharge
18-Sep-12	63.151	64.562	Top of Surcharge	18-Sep-12	65.104	64.293	Top of Surcharge
24-Sep-12	62.775	63.945	Top of Granular "A"	27-Sep-12	64.282	63.396	Top of Granular "A"
1-Oct-12	62.775	63.910	Top of Granular "A"	1-Oct-12	64.401	63.561	Top of Granular "A"
12-Nov-12	62.833	64.017	Top of Asphalt	12-Nov-12	64.490	63.720	Top of Asphalt
30-Nov-12	62.886	64.046	Top of Asphalt	30-Nov-12	64.482	63.720	Top of Asphalt
11-Dec-12	62.885	64.035	Top of Asphalt	11-Dec-12	64.490	63.730	Top of Asphalt
13-Dec-12	62.845	64.030	Top of Asphalt	13-Dec-12	64.494	63.732	Top of Asphalt
14-Dec-12	62.838	64.030	Top of Asphalt	14-Dec-12	64.489	63.738	Top of Asphalt
6-Feb-13	62.846	64.020	Top of Asphalt	6-Feb-13	64.486	63.738	Top of Asphalt
26-Mar-13	62.850	64.018	Top of Asphalt	26-Mar-13	64.479	63.728	Top of Asphalt
12-Jun-13	62.845	64.014	Top of Asphalt	12-Jun-13	64.483	63.735	Top of Asphalt
14-Nov-13	62.847	64.009	Top of Asphalt	14-Nov-13	64.488	63.733	Top of Asphalt
25-Sep-14	62.873	64.028	Top of Surface Course Asphalt	25-Sep-14	64.522	63.758	Top of Surface Course Asphalt
7-Oct-15	62.874	64.027	Top of Surface Course Asphalt	7-Oct-15	64.519	63.758	Top of Surface Course Asphalt



