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ADDENDUM 1

Settlement Analyses Reevaluation for SCA Final Cover Design

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CALCULATION PACKAGE COVER SHEET

Client:	Honeywell	Project: Onon	daga La	ake SCA Fit	nal Cover Desig	gnl	Project/Proposal #:	GD5497
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COMPU	TATIONS BY:	Si Printee au	ignature d Name nd Title	Ray Wu Senior Staff	Engineer			08/12/15 DATE
ASSUMI PROCEI	PTIONS AND DURES CHECKED B	Si Y: Printed au	ignature d Name nd Title	Ali Ebrahin Project Eng	Chrah ni, Ph.D., P.E. ineer	ini		08/12/15 DATE
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Client: Honeywell Project:	Onondaga Lake SCA Final Cover Design	Project/ Proposal No.: GD	05497 Task No.: 03			

SETTLEMENT ANALYSES REEVALUATION FOR SCA FINAL COVER DESIGN

PURPOSE

This package was prepared in support of the final cover design for the Sediment Consolidation Area (SCA) as part of the Onondaga Lake remediation project. The purpose of this package is to use the SCA survey performed 22 April 2015 to reevaluate the settlement analyses for the SCA final cover as presented in the NYSDEC approved calculation package titled "*Settlement Analyses for SCA Final Cover Design*" [Beech and Bonaparte, 2015], referred to herein as the Settlement Package.

METHODOLOGY

As discussed in the Settlement Package, the original settlement analyses for the SCA final cover used the SCA survey taken on 7 December 2014 as an initial surface to estimate the post-settlement grades of the top of clay liner and final cover. In this package, the SCA survey taken on 22 April 2015 is used to reevaluate the original settlement analyses.

The December 2014 and April 2015 SCA surveys are shown in Figures 1 and 2, respectively. The December 2014 survey was performed about a month after geotextile filling was completed at the SCA (i.e., beginning of SCA winter shutdown conditions) and the April 2015 survey was performed before the start of the 2015 construction season (i.e., end of SCA winter shutdown conditions). Therefore, the December 2014 and April 2015 SCA surveys bracket an approximately four to five month timeframe when no additional construction loading occurred in the SCA. As shown in Figure 3, an isopach between the two surveys indicates that approximately:

- 58% of the SCA area had a change in elevation between -0.5 and 0.5 ft;
- 25% of the SCA area had a change in elevation between -0.5 and -1 ft;
- 14% of the SCA area had a change in elevation between -1 and -2 ft;
- 2% of the SCA area had a change in elevation between 0.5 and 1 ft; and
- 1% of the SCA area had a change in elevation less than -2 or greater than 1 ft.

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The accuracy of the survey was reported to be ± 0.5 to 1 ft.¹ Therefore, approximately 85% of the areas showing a change in elevation are within the accuracy of the survey.

RESULTS

During the four to five months between the December 2014 and April 2015 SCA surveys, the settlement cells (SCs) installed underneath the compacted clay liner (Figure 4) measured minimal settlement in the underlying SOLW on the order of 0.5 to 1 ft, as shown in Figures 5A through 5D. It is noted that this range of settlement was also generally seen in previous winter shutdown condition periods. Since the settlement of the underlying SOLW measured by the SCs is within the elevation differences between the December 2014 and April 2015 SCA surveys, the following observations are made:

- The change in elevation between the two SCA surveys is likely due to the settlement of the underlying SOLW (i.e., settlement within the dredge material in the geotextile tubes is small compared to settlement in the underlying SOLW).
- Back calculated SOLW consolidation parameters obtained from using the measured settlements at the time of the April 2015 survey will be similar to the consolidation parameters back calculated from using the measured settlements at the time of the December 2014 survey. In turn, the estimated settlement of the underlying SOLW due to the final cover will not change significantly.

CONCLUSIONS

The change in elevations between the December 2014 and April 2015 SCA surveys were generally within the maximum survey tolerance of ± 1 ft and encompassed the settlements measured by the settlement cells over the same time period. Therefore, the assumptions made in the original settlement analyses remain valid and the estimated post-settlement final cover design grades presented in the Settlement Package are still expected to maintain proper drainage slopes on the top of the clay liner and final cover. The SCA final cover settlement analyses will be reevaluated again using a SCA survey to be performed prior to the start of construction in Spring 2016.

¹ Vertical accuracy of the survey is such that 90% of the elevations are reported within 0.5 ft of the true elevation, and the remaining 10% are within 1 ft of the true elevation.

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REFERENCES

Beech and Bonaparte. "Appendix A-1: *Settlement Analyses for SCA Final Cover*," Onondaga Lake SCA Final Cover Design, dated April 2015.

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Figures

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Figure 1. SCA survey performed 7 December 2014 (survey data provided by Parsons)

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150' SCALE IN FEET



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Figure 3. Isopach between SCA surveys performed 7 December 2014 and 22 April 2015 (survey data provided by Parsons) [Red and purple colors represent change in elevation between ±0.5 ft]

UM ELEVATION	COLOR	AREA (AC)
-3.500		0.01
-3.000		0.01
-2.500		0.06
-2.000		0.28
-1.500		2.49
-1.000		8.36
-0.500		18.64
0.000		25.66
0.500		17.46
1.000		1.38
1.500		0.44
2.000		0.17
2.500		0.05
3.000		0.01
3.500		0.01
4.000		0.00

150' 300'

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Figure 5B. Leg 2 Settlement Cell Data between January 31, 2012 and July 30, 2015 [Red arrows indicate approximate winter shutdown conditions]

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Leg 4 Affected Settlement Cells



Figure 5D. Leg 4 Settlement Cell Data between January 31, 2012 and July 30, 2015. [Red arrows indicate approximate winter shutdown conditions]