GOLDER
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REPORT

Safety Factor Assessment 5-Year Update

Martin Lake Steam Electric Station
Ash Pond Area and Permanent Disposal Pond 5
Rusk County, Texas

Submitted to:

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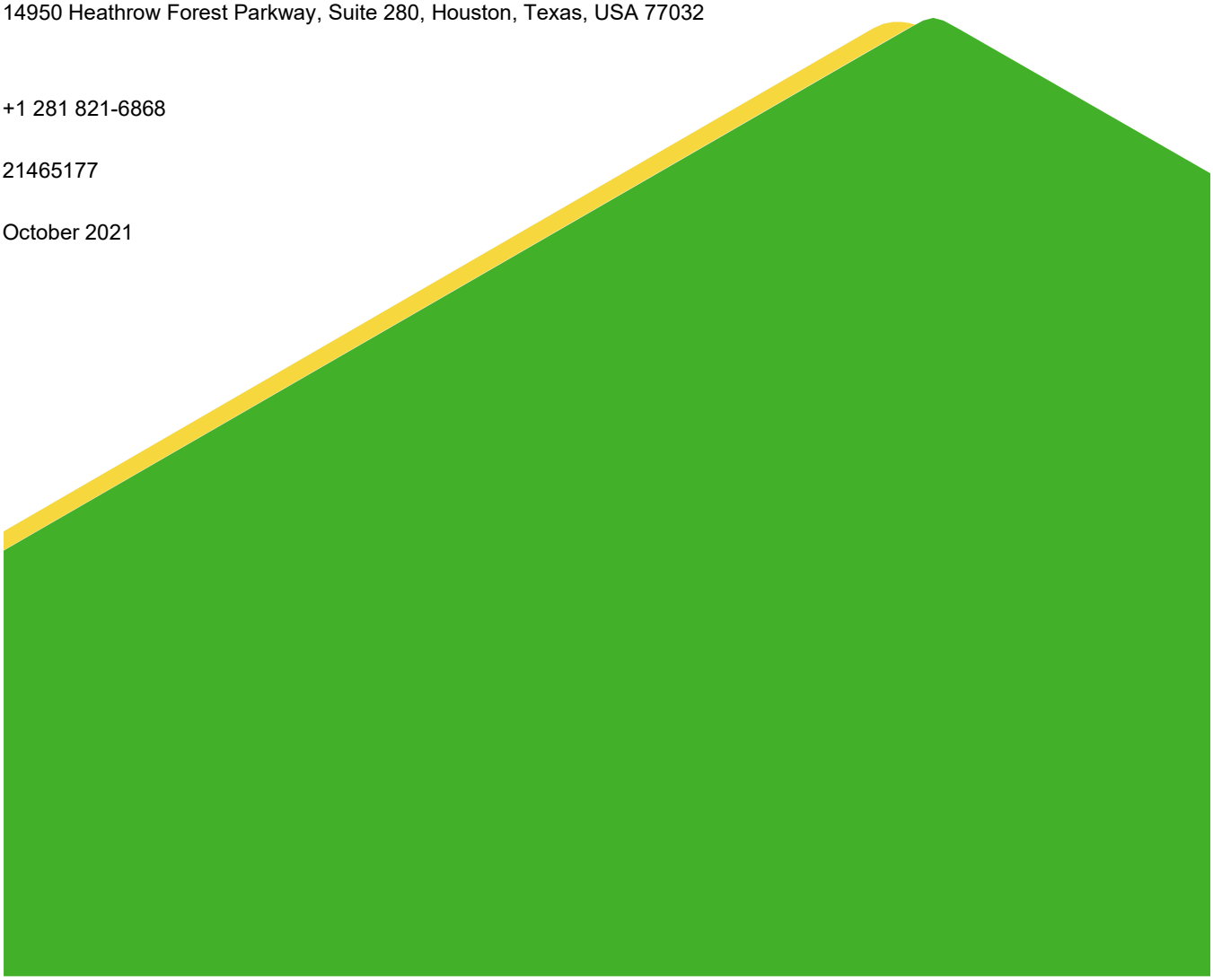
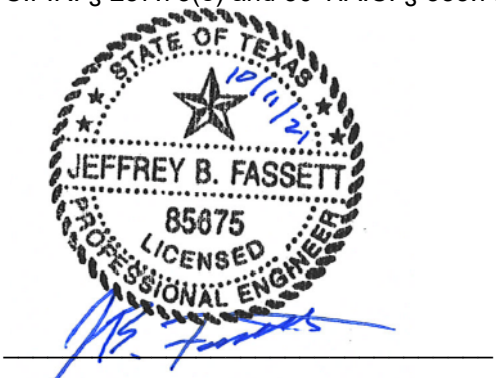


PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates Inc. under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the Factor of Safety Assessment Update has been prepared in accordance with the requirements of 40 C.F.R. § 257.73(e) and 30 T.A.C. § 353.731.



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1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) owns and operates the Martin Lake Steam Electric Station (MLSES) located approximately five miles southwest of Tatum in Rusk County, Texas. The power plant and related support areas occupy approximately 700 acres on a peninsula on the southwest side of Martin Lake (Figure 1). The MLSES consists of three coal/lignite-fired units with a combined operating capacity of approximately 2,250 megawatts. Coal Combustion Residuals (CCR) including fly ash, bottom ash, and gypsum are generated as part of MLSES unit operation and managed in the Bottom Ash Ponds and New Scrubber Pond (referred to collectively as the Ash Pond Area) and in Permanent Disposal Pond No. 5.

The U.S. Environmental Protection Agency promulgated 40 C.F.R. Part 257, Subpart D (the CCR Rule) and the Texas Commission on Environmental Quality (TCEQ) promulgated 30 T.A.C. Chapter 352 (which largely adopts the federal CCR Rule by reference) to establish technical requirements for new and existing CCR landfills and surface impoundments. On June 28, 2021, USEPA approved the majority of TCEQ's CCR program, which will now operate in lieu of the federal regulations. The Bottom Ash Ponds (BAPs), New Scrubber Pond (NSP) and Permanent Disposal Pond No. 5 (PDP-5) have been identified as Existing CCR Surface Impoundments regulated under the CCR Rule. It should be noted that the New Scrubber Pond has been referred to in past CCR reports as both the SP and the NSP. This pond will be referred to as the NSP in this report and all subsequent reports.

Section 257.73(e) specifies that periodic safety factor assessments must be conducted for each CCR surface impoundment and 30 T.A.C. 352.731 adopts this requirement by reference. In accordance with § 257.73(g), the initial Safety Factor Assessments for the BAPs, NSP, and PDP-5 was completed and placed in the facility operating record in November 2016 (Golder, 2016a). As specified in § 257.73(f)(3), the Safety Factor Assessment must be updated every five years from the completion date of the initial plan. Golder Associates Inc., member of WSP (Golder), was retained by Luminant to prepare this updated Safety Factor Assessment for the BAPs, NSP, and PDP-5.

1.1 Description of Bottom Ash Ponds

The MLSES generates bottom ash, fly ash, and flue gas desulfurization (FGD) material during electricity generation. The following surface impoundments, shown on Figure 1, are in operation at the MLSES and subject to the CCR rule.

The WAP and EAP (collectively "Bottom Ash Ponds" or "BAPs") are located approximately 2,000 feet east of the MLSES power plant (Figure 2). The WAP and EAP receive recovered sluice water from bottom ash dewatering bins and other MLSES process wastewater sources that typically include bottom ash fines. The ponds also act as surge basins for various water streams in the ash-water system. Process wastewater can be transferred from the MLSES impoundments to the NSP and PDP-5 or used as makeup water to the bottom ash system. When sufficient ash has accumulated in either the WAP or EAP, the recovered sluice water is diverted to the other pond. Ash in the inactive pond is then removed and transported via rail car to the A1 Area Landfill. The BAPs were originally constructed in the 1977 and upgraded in 1988 (WAP) and 2010 (EAP).

The WAP and EAP are constructed partially above and partially below grade and are surrounded by engineered earthen embankments that extend above grade. The WAP and EAP share an interior embankment and cover areas of approximately 14.6 acres and 9.6 acres, respectively. The crest elevation of the BAP embankments is 330 feet above mean sea level (MSL) and the EAP borders Martin Lake (normal pool elevation 306 feet MSL).

The BAPs were originally constructed in the 1977 with an in-situ compacted clay liner. The WAP was removed from service in March 1988 and re-lined with a double 60-mil high density polyethylene (HDPE) liner system overlain with a concrete revetment mat. The EAP was dredged and removed from service in 1989, and a new south embankment was constructed to allow for an increase in the size of the NSP. The EAP remained inactive until the installation of a new double 60-mil HDPE liner system with concrete revetment mat was completed in February 2010.

In 2020, the EAP was retrofitted with a new composite liner system meeting the requirements of § 257.70(b). The retrofitted liner system was installed on top of the existing liner system and consisted of the following (from bottom to top):

- A polymer-enhanced geosynthetic clay liner (GCL) and
- A 60-mil HDPE liner

The liner system in the WAP will be similarly retrofitted in 2021.

Based on available construction data, the BAPs were constructed to provide the following estimated storage capacities:

- WAP: 232.6 acre-feet; and
- EAP: 125.8 acre-feet.

1.2 Description of New Scrubber Pond

The New Scrubber Pond (NSP) is located immediately south of the EAP and east of the WAP (Figure 2). The NSP is an approximately 12.5-acre surface impoundment that is used to manage FGD wastes as well as discharge from the sludge thickener sumps, the plant yard sumps, and storm water management areas. Solids are managed similar to the ash solids from the WAP and EAP. Process wastewater can be transferred from the NSP to the BAPs and PDP-5 or used as makeup water to the scrubber systems. The NSP was originally constructed in 1977 and was expanded to its current size in 1989.

The NSP is constructed partially above and partially below grade and is surrounded by engineered earthen embankments that extend above grade. The west embankment of the NSP is an internal/shared embankment with the WAP and a portion of the northern embankment is an internal/shared embankment with the EAP. The crest elevation of the NSP embankments is 330 feet MSL. Martin Lake (normal pool elevation 306 feet MSL) adjoins portions of the north and south embankments of the NSP.

The NSP was originally constructed in 1977 with an in-situ compacted clay liner and was expanded to its current size in 1989. The NSP was relined in 1989 with a double 60-mil HDPE liner system, overlain with a concrete revetment mat.

In 2022, Luminant anticipates retrofitting the NSP with a new composite liner system meeting the requirements of § 257.70(b). The retrofitted liner system will be installed on top of the existing liner system and will consist of the following (from bottom to top):

- A polymer-enhanced geosynthetic clay liner (GCL) and
- A 60-mil HDPE liner

Based on available construction data, the NSP was constructed to provide an estimated storage capacity of 198.9 acre-feet.

1.3 Description of PDP-5

Permanent Disposal Pond No. 5 (PDP-5) is located approximately 3,000 feet west-northwest of the MLSES power plant (Figure 3). PDP-5 is an approximately 40-acre surface impoundment that was constructed in 2010 over three closed PDPs (PDPs 1-3). PDP-5 is primarily used to manage excess liquids, including storm water from large precipitation events and excess process wastewater from both the FGD and bottom ash loops. Recovered CCR wastewaters are received in PDP-5 during cleaning cycles for the BAPs and NSP. Process wastewater can be transferred between the BAPs, NSP, or used as makeup water for specific CCR related systems. Process wastewater can be transferred from PDP-5 to the BAPs and the NSP.

PDP-5 is constructed above grade and is surrounded by engineered earthen embankments. The crest elevation of the PDP-5 embankments is 405.5 feet MSL, and the embankments are approximately 10 to 15 feet above surrounding grade. The liner system for the PDP-5 consists of a 6-inch thick soil layer over a 2-foot thick compacted clay layer on the base and a 3-foot thick compacted clay liner on the upstream slope and beneath the new PDP-5 embankment. A 3-foot thick compacted clay layer overlain with 18 inches of topsoil was placed over the portions of PDP-1, PDP-2, and PDP-3 beyond the PDP-5 embankment. The compacted clay layers have an in-place permeability less than $1x10^{-7}$ cm/sec).

Based on available construction data, PDP-5 was constructed to provide an estimated storage capacity of 190.3 acre-feet.

1.4 Previous Stability Evaluations

As required under Section 257.73(e), the Initial Factor of Safety Assessment for the BAPs, the NSP, and PDP-5 was completed and placed in the MLSES operating record in October 2016 (Golder, 2016a). The calculated factors of safety met the minimum criteria presented in § 257.73(e)(i) through (iv).

In addition, Golder and ETTL Engineers and Consultants (ETTL) have previously performed evaluations on the BAPs, the NSP and PDP-5 as part of the following reports submitted to Luminant:

- Ash and Scrubber Ponds and Permanent Disposal Pond #4, Stability Investigation Report, Luminant Martin Lake SES, Rusk County, Texas, Golder, dated December 2012.
- Geotechnical Investigation, Luminant Martin Lake SES, Reline East Ash Disposal Pond, Tatum, Texas, ETTL, dated December 2008.

The studies found the BAPs and NSP slopes to be adequately stable.

ETTL also performed stability evaluations on PDP-5 in 2009, as presented in the following report:

- Geotechnical Investigation, Luminant Martin Lake SES, Vertical Expansion of Permanent Disposal Ponds 1, 2, and 3, Tatum, Texas. ETTL Engineers and Consultants Inc. Tyler, Texas, dated July 2008.
- Geotechnical Investigation, Luminant Martin Lake SES, Vertical Expansion of Permanent Disposal Ponds 1, 2, and 3, Tatum, Texas – Supplemental Seepage and Slope Stability. ETTL Engineers and Consultants Inc., dated October 2009.

The above reports found the design slopes of PDP-5 to be stable as long as drainage is functional, preventing the embankments from saturating.

2.0 SUBSURFACE CONDITIONS

The MLSES site is located in the Martin Creek area which is situated in the Sabine River Valley and lies on the west flank of the Sabine Uplift. The formations in the region comprise sedimentary deposits of continental and marine origin, mainly the lower Wilcox Group flanked by younger beds like the Carrizo Sand. In the Martin Creek area, the Wilcox formation is estimated to be about 650- to 700-feet thick and consists of sandy clays, silty sands, clays, and lignite in varying amounts. The Rockdale formation is the major component in the area among the sediments of the Wilcox group occupying approximately the middle four-fifths of the Wilcox Section. The Wilcox Group is underlain by the Paleocene Midway Group (containing Upper Willis and Lower Kincaid), which is estimated to be 900-feet thick around the site and is composed mainly of silty clay and clay. The Midway Group overlies a section of Cretaceous Rocks that are approximately 7000-feet thick (Rone Engineers, 1984).

2.1 Site Geology

2.1.1 Bottom Ash Ponds and New Scrubber Pond

2.1.1.1 Subsurface Investigations and Laboratory Testing

Information from previous subsurface investigations was used to characterize the subsurface site conditions. In 2008, ETTL conducted a subsurface investigation for the EAP as part of an effort to reline the pond. ETTL drilled twelve borings along the crest of the EAP embankment at approximate elevation 330 feet – mean sea level (ft-msl). All borings were 40-feet deep except one which was 100-feet deep. The boring map and boring logs are presented in Appendix A of the initial Factor of Safety Assessment (Golder2016a). Geotechnical laboratory testing – moisture contents, Atterberg limits, grain size distribution, and consolidated-undrained (CU) triaxial compression tests - was conducted on selected samples. The soil index testing results presented as part of the boring logs, while the CU test results from ETTL are summarized in Appendix B of the initial Factor of Safety Assessment (Golder2016a).

Golder conducted a subsurface investigation for the WAP and NSP in December 2012. Golder completed eight, 50- to 60-foot deep borings along the crest of the pond embankments at approximate elevation 330 ft-msl. The boring map and boring logs are presented in Appendix A of the initial Factor of Safety Assessment (Golder2016a). As part of the investigation, laboratory testing was performed on selected samples in accordance with commonly accepted methods and practices. Undisturbed and disturbed soil samples were tested to determine water content, Atterberg limits, grain size distribution, and shear strength. Water content determination was performed in accordance with ASTM D2216; Atterberg limits were determined in accordance with ASTM D4318; and grain size distribution was performed in accordance with ASTM D422. Shear strength testing consisted of unconsolidated-undrained (UU) triaxial compression in general accordance with ASTM D2850. Laboratory test results are presented in Appendix B of the initial Factor of Safety Assessment (Golder2016a).

The findings from the above subsurface investigations were reviewed for their applicability to this study and are summarized in the following sections.

2.1.1.2 Subsurface Site Conditions

The above borings consisted of fill and native soils. The soils encountered in the borings generally consisted of stiff to hard sandy clays and firm to very dense sands. The subsurface stratigraphy generally consisted of interchanging layers of clays, sandy clays, clayey sands and non-plastic sands. The clayey sand layers ranged in thickness from 2 to 16 feet where encountered. The sandy clay and clay layers are described as firm to hard, low to high plasticity clays and vary in thickness from 2 to 38 feet. Loose to very dense, silty or poorly graded sand

was typically encountered beneath or interlayered with the sandy clay/clayey sand strata. The 100-foot boring by ETTL showed deeper layers of very dense silty sand with intermittent layers of hard low plasticity clay.

Water was encountered in each of the eight borings performed by Golder, ranging between El. 296.1 to 303.3 ft-msl. The average water elevation measured in the Golder boreholes, during drilling, was at El. 300.3 ft-msl. The ETTL borings measured the water level to range between El. 304 to 309 ft-msl, with an average water level of El. 306 ft-msl.

Groundwater levels measured in 2015, from wells surrounding the BAPs vary from approximately El. 304 ft-msl in the southeast corner to El. 307 ft-msl in the northwest corner. Measurements taken in 2020 indicate that the groundwater levels vary from approximately 304 ft-msl in the southeast corner to 308 ft-msl near the western edge of the WAP.

2.1.2 PDP - 5

2.1.2.1 Subsurface Investigations and Laboratory Testing

In 2008, ETTL performed a pre-construction subsurface investigation for PDP-5 that included a total of eleven borings within the PDP-5 footprint. In addition, three cone penetrometer tests (CPTs) were performed. As part of a supplemental investigation in 2009, ETTL drilled four additional borings within the pond footprint. A map of borings, and boring and CPT logs are presented in Appendix A of the initial Factor of Safety Assessment (Golder2016a).

ETTL performed laboratory tests including natural moisture contents (ASTM D2216), Atterberg limits (ASTM D4318), particle size distributions (ASTM D 1140 and ASTM D422). Unconsolidated-undrained (UU) triaxial compression tests (ASTM D2850) were performed to determine the strength characteristics of cohesive substrata. Direct shear tests (ASTM D3080) were performed on coarser materials including remolded bulk ash samples. Consolidation tests (ASTM D2435) and permeability tests (ASTM D5084) were also performed but are not relevant to the current study. The results of the laboratory tests performed by ETTL are presented in Appendix B of the initial Factor of Safety Assessment (Golder2016a).

2.1.2.2 Subsurface Site Conditions

Most of the above borings were drilled through the bottom ash within closed PDP-1, 2, and 3. Based on particle size, the ash classifies as very loose to medium dense poorly graded sands in some locations, to silts in other locations and depths. The borings passing through existing embankments of PDP-1, 2, and 3 contained medium stiff to very stiff clay of low plasticity and/or high plasticity clay with clayey sand. Native soils were identified in deeper borings as very dense silt with hard low plasticity clay seams.

Since the subsurface investigations for the PDP-5 area were performed prior to construction of the PDP-5 embankment, there are no borings that pass through the embankment. However, ETTL (ETTL 2009) identified a site borrow source (characterized as sandy materials), soils from which were to be used in the construction of the embankment. Triaxial strength testing (CU tests) were also performed on these site soils, and hence, the embankment strength has been estimated.

Two borings located outside of the ash encountered water approximately between El. 355 to 368 ft-msl. Groundwater levels measured in 2015, from wells surrounding PDP-5, indicate that the groundwater level varies from approximately El. 355 ft-msl in the north to El. 375 ft-msl in the south. Measurements taken in 2019 indicate that the groundwater levels vary from 360 ft-msl in the north, to approximately 380 ft-msl to the east. The groundwater along the southern portion of PDP-5 is at approximately 365 ft-msl.

3.0 STABILITY ANALYSIS - §257.73(E)

3.1 Safety Factor Assessment

According to the CCR rules, structural stability factors of safety need to be evaluated for the critical cross- section of each CCR facility under static and seismic loading for “Maximum Storage Pool” (2 feet of freeboard for this facility) and “Maximum Surcharge Pool” (no freeboard) conditions. Liquefaction potential analysis is only necessary when soil sampling, construction documentation or anecdotal evidence from personnel with knowledge about the facility, indicates that soils of the embankment are susceptible to liquefaction. Since ash classifying as sandy soil is present below portions of the PDP-5 embankment, liquefaction potential is considered for PDP-5 foundation soils.

The safety factor assessment [§ 257.73(e)] does not require evaluation of rapid-drawdown loading conditions; however, if the CCR unit has downstream slopes that can be inundated by an adjacent water body, the structural stability assessment requirements [§ 257.73(d)(1)(viii)] state that these slopes must be assessed. Since one of the cross-sections analyzed in this Safety Factor Assessment may be subjected to rapid draw-drawdown conditions, this condition was evaluated and presented herein. The results of the analysis are also reported in the Structural Stability Assessment Report (Golder, 2016b).

Slope stability analyses were performed using a limit-equilibrium-based commercial computer program, Slide v7.0 by Rocscience. The analyses used a searching routine to identify the potential failure surface with minimum factor of safety for a given set of geometry, ground and groundwater conditions. The Spencer method of analysis was used in the analyses, while the Morgenstern Price method was used for verification. The factors of safety of numerous potential failure surfaces were computed to establish minimum factors of safety. Circular failure surfaces were considered for all cases. Stability analyses were performed for “Maximum Storage Pool” (freeboard of 2 feet) and “Maximum Surcharge Pool” (no freeboard) conditions for both the interior and exterior slopes of the ponds. In addition, the interior slopes were analyzed while the pond is empty. For each case, respective slopes were analyzed for both static and seismic loading conditions. The interior berms separating individual ponds were not analyzed since the failure of the interior berms will not result in any release of CCR materials beyond the embankment surrounding the BAPs and NSP.

3.2 Cross-Sections Analyzed

3.2.1 Bottom Ash Ponds and New Scrubber Pond

The BAPs and NSP are contiguous ponds surrounded by a continuous embankment that was built using the same site soils. Hence, the embankment is considered as one structure and a critical cross-section was identified after considering multiple cross-sections across the entire embankment. The geometry of the slopes, soil profile, loading conditions, and phreatic surface of each segment of the embankment were evaluated in identifying the critical cross-section. Cross-section (A-A’), located on the eastern slope of the EAP as shown on Figure 2, was identified as the critical cross-section for the BAPs and NSP and was selected for evaluation of factors of safety under the loading conditions identified in § 257.74(e)(1)(i) - (iv).

3.2.2 PDP-5

The geometry of the slopes, soil profile, loading conditions and phreatic surface of each segment of the embankment surrounding the PDP-5 was evaluated. Cross-Section B-B’, located on the south side of PDP- 5 as shown on Figure 3, was identified as the critical cross-section and was selected for evaluation of factors of safety under the loading conditions identified in § 257.74(e)(1)(i) - (iv).

3.3 Material Properties

3.3.1 Bottom Ash Ponds and New Scrubber Pond – Cross Section A-A'

Based on the previous subsurface investigations, appropriate material properties were selected for use in the stability analysis. CU triaxial testing was performed on three samples on the BAP embankments, by ETTL (2008). The effective stress parameters from these three tests are averaged and used in the analysis. For the subsequent foundation soil layers, values of shear strength are chosen either based on testing of deeper samples by ETTL or by assuming typical, conservative values for sandy soils. Table 1 summarizes the material properties used in the stability analysis of Section A-A'.

Table 1: Soil Properties for Section A-A'

Soil Material	Description	Moist Unit Weigh (lb./ft3)	Saturated Unit Weigh (lb./ft3)	Drained Soil Properties	
				Cohesion, c' (lb./ft2)	Friction Angle, ϕ' (°)
I	Fat Clay	120	125	542	23
II	Silty Sand	127	132	0	30
III	Clayey Sand	127	132	0	32
IV	Sand/Silty Sand	127	132	0	34

3.3.2 PDP-5 – Cross Section B-B'

Based on the borings and CU tests performed as part of the 2009 investigation by ETTL, shear strength parameters were chosen for the soil layers for cross-section B-B'. For the deep sand layer, a conservative friction angle of 34° and zero cohesion was assumed. Table 2 summarizes the material properties used in the stability analysis of cross-section B-B'.

Table 2: Soil Properties for Section B-B'

Soil Material	Description	Moist Unit Weigh (lb./ft3)	Saturated Unit Weigh (lb./ft3)	Drained Soil Properties	
				Cohesion, c' (lb./ft2)	Friction Angle, ϕ' (°)
I	New embankment	125	130	0	34.7
II	Clay liner	127	132	650	31.4
III	Old ash	90	95	0	34.6
IV	Native clay	127	132	175	31.9
V	Sandy Clay/Clayey Sand	127	132	650	31.4
VI	Deep sand	127	132	0	34

3.4 Phreatic Surface

3.4.1 Bottom Ash Ponds and New Scrubber Pond

For the purpose of this report, the phreatic surface is defined as the potential saturated zone within the embankment that could exist due to infiltration of water from the ponded CCR. As discussed earlier, measurements within the monitoring wells indicate groundwater levels across the BAPs and NSP vary between El. 304 to 308 ft-msl. At cross-section A-A', the groundwater level is assumed to be El. 306 ft-msl. The interior slopes of the ponds have a clay liner, a double HDPE geomembrane layer, overlain by a concrete revetment. Hence, it is unlikely that the phreatic surface will extend into the embankment, or into the ground below on the floor of the ponds.

Drawdown of the water level in Martin Lake can potentially affect the stability of Section A-A'. Based on the historic water level data available from the Texas Water Development Board (TWDB 2016), the maximum drawdown was observed to be about 10 feet. This drawdown, however, was not instant but spread across a period of approximately one year. Hence, effective stress-transient drawdown analyses were conducted for the exterior slope at Section A-A', for a 10-foot drawdown in water level at a uniform rate, over one year.

3.4.2 PDP-5

As mentioned previously, groundwater levels measured in 2020, from wells surrounding PDP-5, indicate that the groundwater level around the pond varies from approximately El. 355 ft-msl in the north to El. 380 ft-msl in the west and 365 ft-msl in the south. Underlying PDP-5, the ash in PDP-1, 2 and 3 is at least partially saturated. A toe drain system keeps the water level within the ash below El. 380 feet. Therefore, the saturated zone within the ash is assumed to be at El. 380 ft-msl for cross-section B-B' on the upstream side.

For the stability analysis of the exterior embankment slope, the location of the phreatic surface was estimated by allowing steady state seepage conditions to develop based on the water level within PDP-5 and the elevation of the saturated ash in PDP-1, 2 and 3.

Note that the resulting phreatic surface elevations were conservatively assumed for stability analysis purposes and are significantly higher than measured in the monitoring wells -- they do not represent the elevation of the uppermost aquifer.

3.5 Seismic Loading

Based on the "US Seismic Hazard 2014 Map" prepared by the United States Geologic Survey (USGS) and the "2008 Interactive Deaggregations" (USGS), the peak ground acceleration (PGA) for a 2% probability of exceedance in 50 years (return period of 2,475 years) is 0.09g for the site location (including amplification factors for site soil conditions). A horizontal seismic load coefficient equal to the PGA was conservatively used in the pseudostatic analysis.

3.6 Liquefaction Potential

Soil liquefaction describes a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid. The phenomenon is most often observed in saturated, loose (low density or uncompacted), sandy soils.

3.6.1 Bottom Ash Ponds and New Scrubber Pond

The embankment soils of the BAPs and NSP are composed of clayey materials with significant fines content. The immediate foundation materials are composed of sandy clay and compact to dense sand. The subsurface investigations do not indicate the presence of any soils in the embankment or its foundation that are susceptible to liquefaction. Hence, failure of the pond slopes due to liquefaction is considered unlikely for the BAPs and NSP.

3.6.2 Permanent Disposal Pond - 5

Based on particle size, the bottom ash within PDP-1, 2, and 3 classifies as very loose to medium dense, poorly graded sand at some locations and silts at other locations and depths. Therefore, portions of the foundation soils for PDP-5 embankments are founded above potentially liquefiable material. Based on the above mentioned ETTL reports and the preparation of foundation materials during construction, the foundations and abutments are generally considered to be stable. Nevertheless, due to the classification of the some of the underlying ash as poorly graded sand, the potential for cyclic liquefaction of the ash was evaluated.

As part of the 2008 investigation by ETTL, CPTs were conducted within the ash underlying PDP-5. Golder conducted a liquefaction analysis based on this CPT data using the commercially available program, CLiq v.2.0.6.85 released by GeoLogismiki. The method prescribed by Robertson (2009) was adopted in the cyclic liquefaction analysis. The site earthquake information (magnitude and PGA) was estimated using the seismic hazard tool developed by USGS (USGS 2008).

The analysis showed that all three CPT locations showed a low likelihood for cyclic liquefaction with a factor of safety greater than the minimum factor of safety of 1.20 specified in § 257.73(e)(iv). The results from the cyclic liquefaction analysis are presented in Appendix A.

3.7 Stability Analysis Results

Slope stability analyses were performed for long-term conditions for each of the critical cross-sections considered under static and seismic loading conditions. Both interior and exterior slopes were analyzed for “Maximum Storage Pool” (2 feet of freeboard) and “Maximum Surcharge Pool” (no freeboard) conditions. The interior slopes were analyzed for the condition where the pond is empty.

The results of the slope stability analysis cases are presented in Table 3 and Appendix B. The results indicate that the BAP, NSP, and PDP-5 pond slopes are sufficiently stable under all considered loading scenarios.

Table 3: Slope Stability Analysis Results

Ponds	Cross-Section	Case #	Slope Location	Pond Pool Level	Loading Condition	Required Safety Factor (1)	Calculated Safety Factor
BAP and NSP	A-A'	1a	Exterior	Storage	Static	1.50	1.94
		1b			Pseudostatic	1.00	1.45
		1c			Rapid Drawdown	1.30 (2)	1.61
		2a		Surcharge	Static	1.40	1.94
		2b			Pseudostatic	1.00	1.45
		3a	Interior	Storage	Static	1.50	6.43
		3b			Pseudostatic	1.00	4.22
		4a		Surcharge	Static	1.40	7.21
		4b			Pseudostatic	1.00	4.60
		5a		Empty	Static	1.50	2.54
		5b			Pseudostatic	1.00	1.91
PDP-5	B-B'	1a	Exterior	Storage	Static	1.50	1.67
		1b			Pseudostatic	1.00	1.13
		2a		Surcharge	Static	1.40	1.67
		2b			Pseudostatic	1.00	1.13
		3a	Interior	Storage	Static	1.50	2.05
		3b			Pseudostatic	1.00	1.31
		4a		Surcharge	Static	1.40	2.43
		4b			Pseudostatic	1.00	1.45
		5a		Empty	Static	1.50	2.31
		5b			Pseudostatic	1.00	1.73

Note: (1) Required safety factors per §257.73(e)(i)-(iii)
(2) Required factor safety per EM 1110–2–1902 (USACE 2003)

4.0 CONCLUSIONS

Based on our review of the information provided by Luminant, on information prepared by Golder, and on our analyses, the calculated factors of safety through the critical cross sections in the surface impoundments exceed the values listed in § 257.73(e)(1)(i)-(iv).

5.0 REFERENCES

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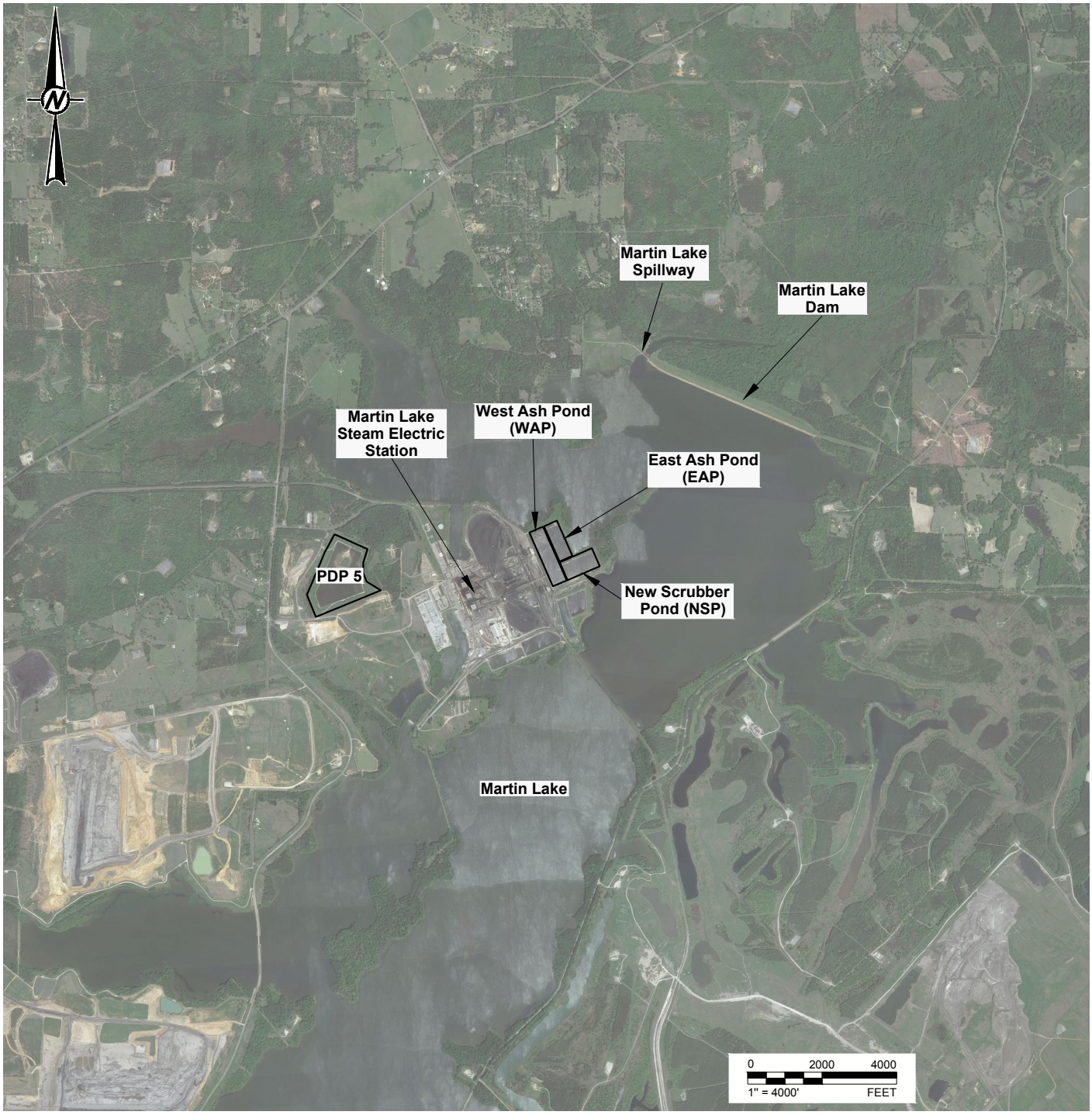
Figures



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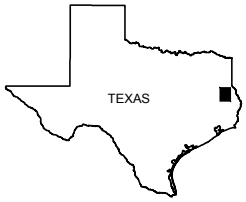
BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 4/9/19.



PHOTOGRAPH LOCATION

CLIENT

LUMINANT GENERATION COMPANY

PROJECT

MARTIN LAKE STEAM ELECTRIC STATION
ASH POND AREA AND PDP-5
SAFETY FACTOR ASSESSMENT UPDATE

TITLE

SITE PLAN

CONSULTANT

GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-10-01
DESIGNED	AJD
PREPARED	AJD
REVIEWED	PJB
APPROVED	PJB

PROJECT NO.	CONTROL	REV.	FIGURE
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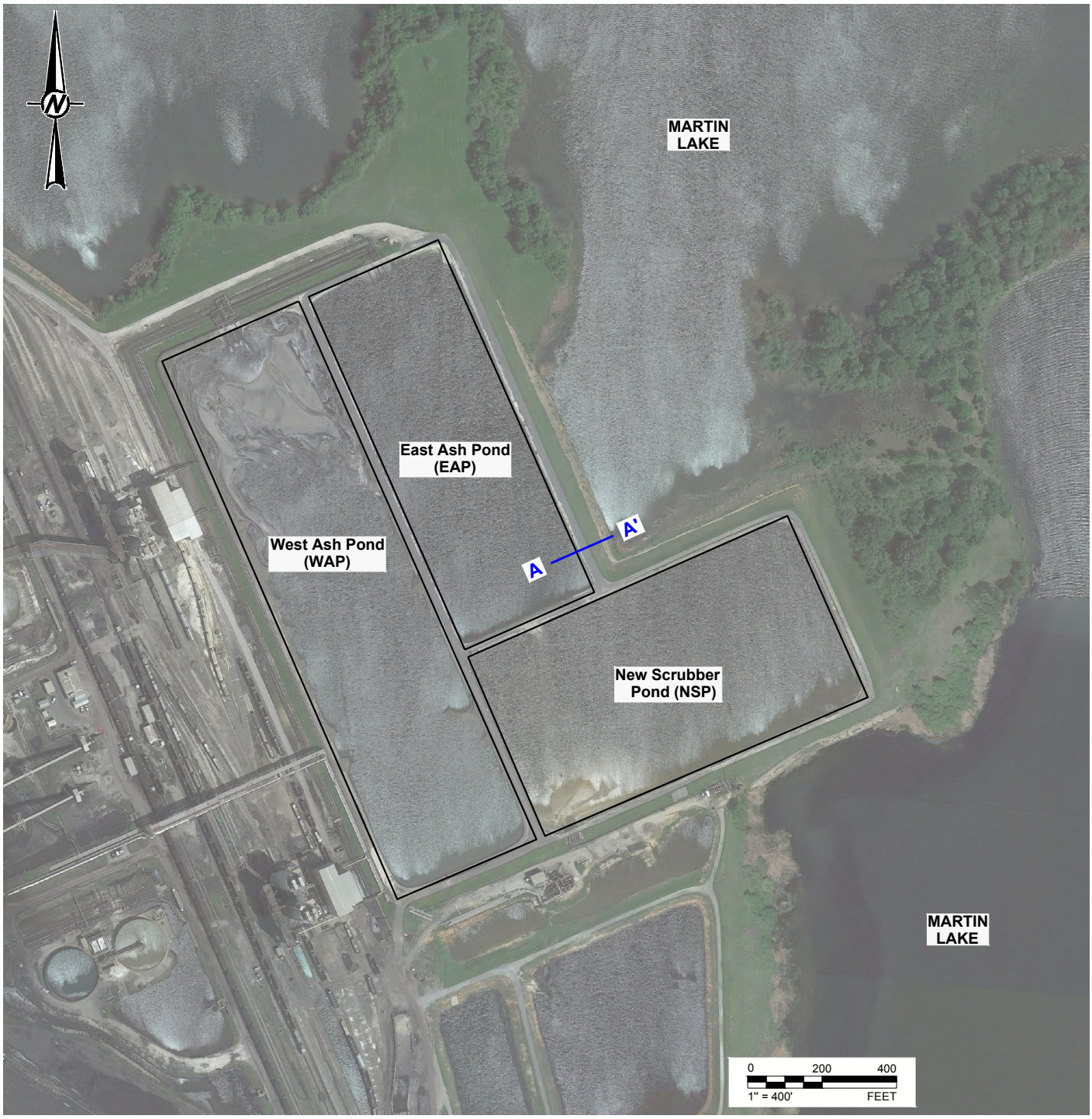

LEGEND

A ——— A' CRITICAL CROSS-SECTION

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 4/9/19.

CLIENT

LUMINANT GENERATION COMPANY

PROJECT

MARTIN LAKE STEAM ELECTRIC STATION
ASH POND AREA AND PDP-5
SAFETY FACTOR ASSESSMENT UPDATE

TITLE

ASH POND AREA MAP

CONSULTANT

GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-10-01
DESIGNED	AJD
PREPARED	AJD
REVIEWED	PJB
APPROVED	PJB

PROJECT NO.	CONTROL	REV.	FIGURE
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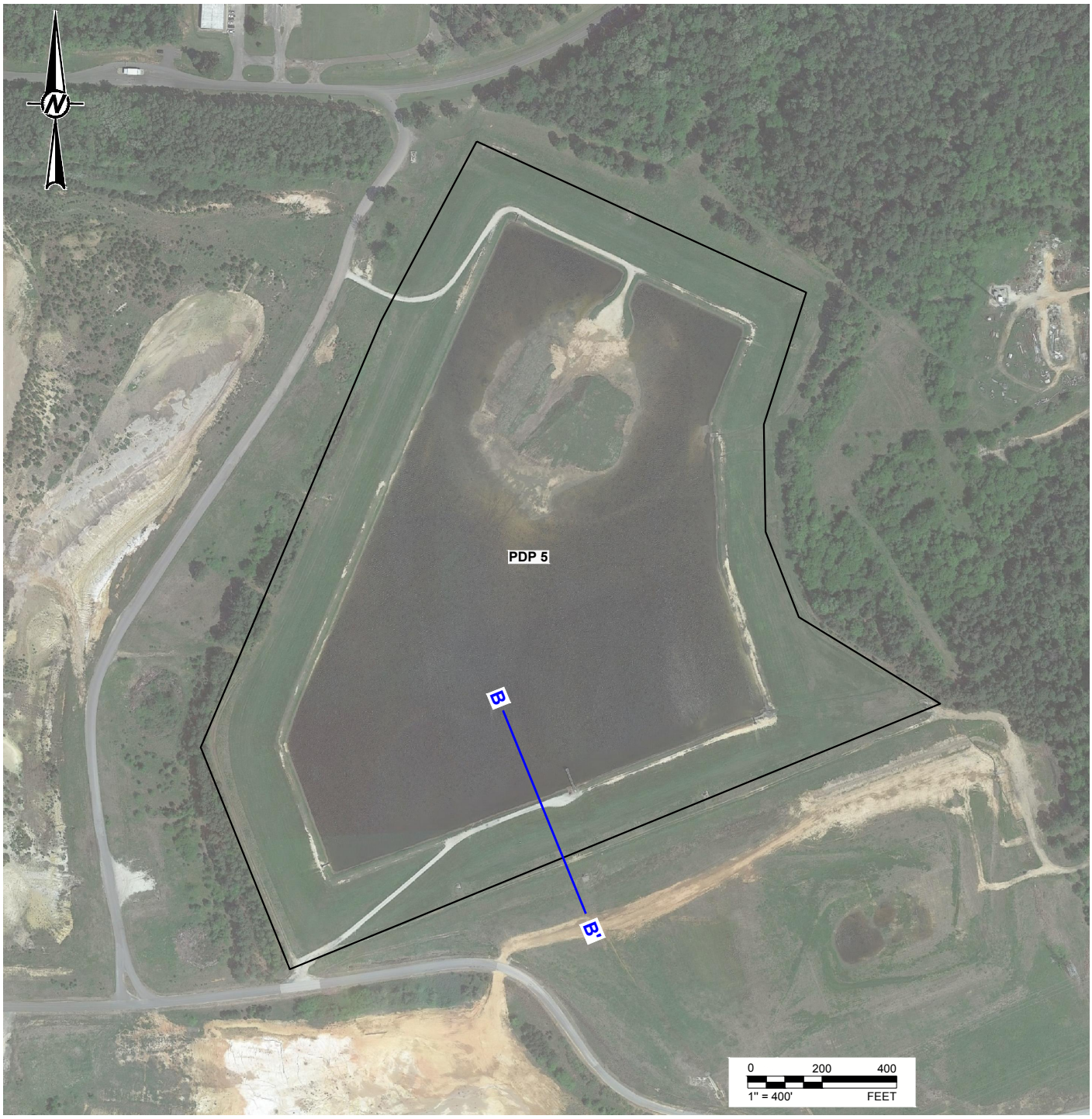

LEGEND

B —— B' CRITICAL CROSS-SECTION

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 4/9/19.

CLIENT
LUMINANT GENERATION COMPANY

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
ASH POND AREA AND PDP-5
SAFETY FACTOR ASSESSMENT UPDATE

TITLE
PDP-5 AREA MAP

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-10-01
DESIGNED	AJD
PREPARED	AJD
REVIEWED	PJB
APPROVED	PJB

PROJECT NO.	CONTROL	REV.	FIGURE
21465177		0	3

APPENDIX A

CPT-Based Liquefaction Potential Analysis

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Liquefaction potential index data 2

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Summary data report 15
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GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

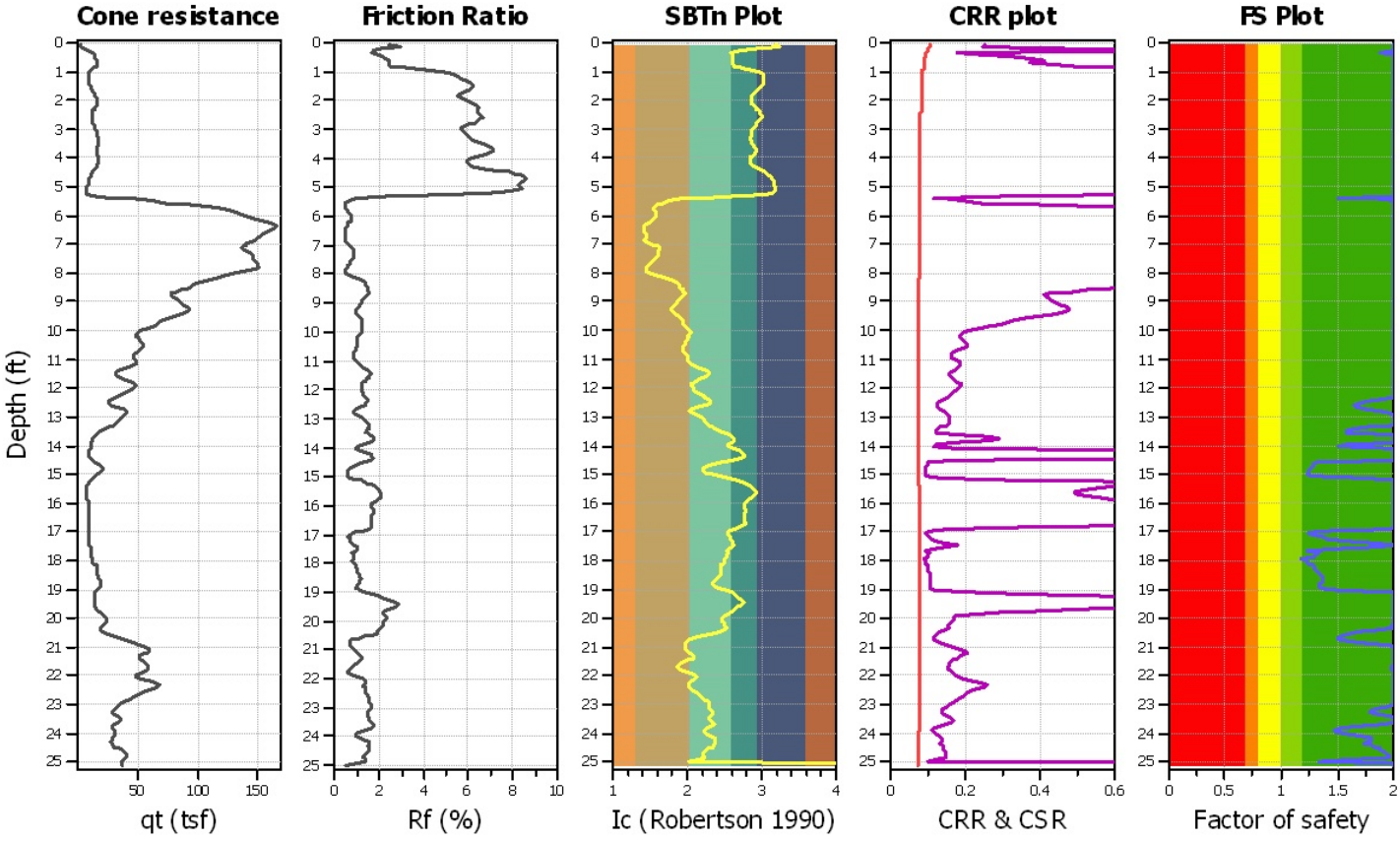
LIQUEFACTION ANALYSIS REPORT

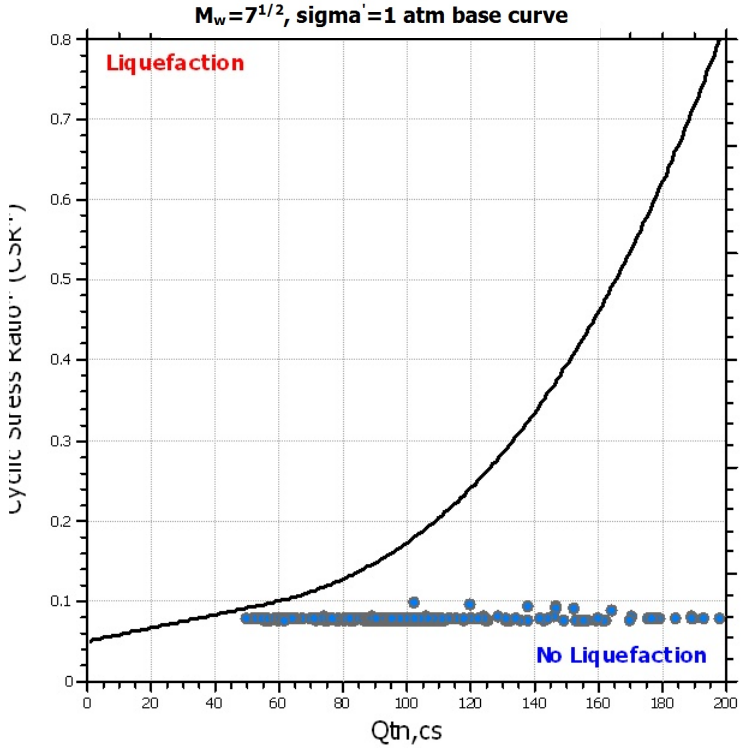
Project title : Martin Lake **Location : PDP-5**

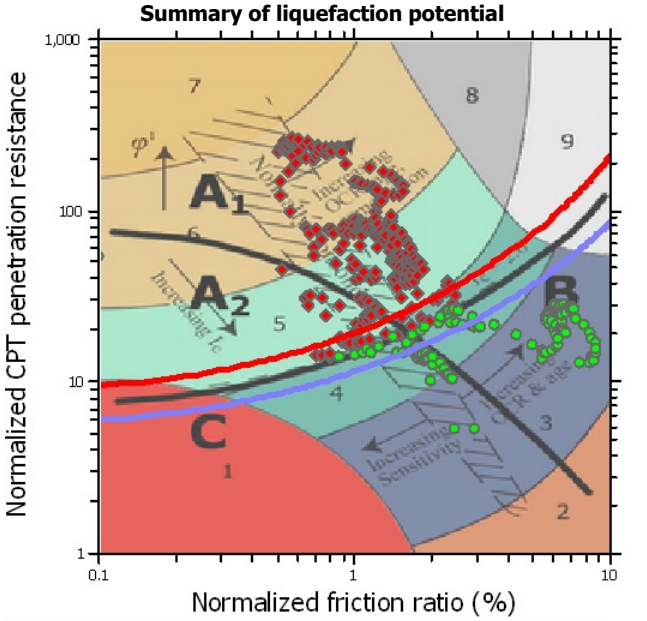
CPT file : B-02

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	0.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.20	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.09	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

:: Liquefaction Potential Index calculation data ::

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
0.07	2.00	0.00	9.99	0.06	0.00	0.13	2.00	0.00	9.98	0.06	0.00
0.20	2.00	0.00	9.97	0.07	0.00	0.26	2.00	0.00	9.96	0.06	0.00
0.33	1.88	0.00	9.95	0.07	0.00	0.39	2.00	0.00	9.94	0.06	0.00
0.46	2.00	0.00	9.93	0.07	0.00	0.52	2.00	0.00	9.92	0.06	0.00
0.59	2.00	0.00	9.91	0.07	0.00	0.66	2.00	0.00	9.90	0.07	0.00
0.72	2.00	0.00	9.89	0.06	0.00	0.79	2.00	0.00	9.88	0.07	0.00
0.85	2.00	0.00	9.87	0.06	0.00	0.92	2.00	0.00	9.86	0.07	0.00
0.98	2.00	0.00	9.85	0.06	0.00	1.05	2.00	0.00	9.84	0.07	0.00
1.12	2.00	0.00	9.83	0.07	0.00	1.18	2.00	0.00	9.82	0.06	0.00
1.25	2.00	0.00	9.81	0.07	0.00	1.31	2.00	0.00	9.80	0.06	0.00
1.38	2.00	0.00	9.79	0.07	0.00	1.44	2.00	0.00	9.78	0.06	0.00
1.51	2.00	0.00	9.77	0.07	0.00	1.57	2.00	0.00	9.76	0.06	0.00
1.64	2.00	0.00	9.75	0.07	0.00	1.71	2.00	0.00	9.74	0.07	0.00
1.77	2.00	0.00	9.73	0.06	0.00	1.84	2.00	0.00	9.72	0.07	0.00
1.90	2.00	0.00	9.71	0.06	0.00	1.97	2.00	0.00	9.70	0.07	0.00
2.03	2.00	0.00	9.69	0.06	0.00	2.10	2.00	0.00	9.68	0.07	0.00
2.16	2.00	0.00	9.67	0.06	0.00	2.23	2.00	0.00	9.66	0.07	0.00
2.30	2.00	0.00	9.65	0.07	0.00	2.36	2.00	0.00	9.64	0.06	0.00
2.43	2.00	0.00	9.63	0.07	0.00	2.49	2.00	0.00	9.62	0.06	0.00
2.56	2.00	0.00	9.61	0.07	0.00	2.62	2.00	0.00	9.60	0.06	0.00
2.69	2.00	0.00	9.59	0.07	0.00	2.76	2.00	0.00	9.58	0.07	0.00
2.82	2.00	0.00	9.57	0.06	0.00	2.89	2.00	0.00	9.56	0.07	0.00
2.95	2.00	0.00	9.55	0.06	0.00	3.02	2.00	0.00	9.54	0.07	0.00
3.08	2.00	0.00	9.53	0.06	0.00	3.15	2.00	0.00	9.52	0.07	0.00
3.21	2.00	0.00	9.51	0.06	0.00	3.28	2.00	0.00	9.50	0.07	0.00
3.35	2.00	0.00	9.49	0.07	0.00	3.41	2.00	0.00	9.48	0.06	0.00
3.48	2.00	0.00	9.47	0.07	0.00	3.54	2.00	0.00	9.46	0.06	0.00
3.61	2.00	0.00	9.45	0.07	0.00	3.67	2.00	0.00	9.44	0.06	0.00
3.74	2.00	0.00	9.43	0.07	0.00	3.80	2.00	0.00	9.42	0.06	0.00
3.87	2.00	0.00	9.41	0.07	0.00	3.94	2.00	0.00	9.40	0.07	0.00
4.00	2.00	0.00	9.39	0.06	0.00	4.07	2.00	0.00	9.38	0.07	0.00
4.13	2.00	0.00	9.37	0.06	0.00	4.20	2.00	0.00	9.36	0.07	0.00
4.26	2.00	0.00	9.35	0.06	0.00	4.33	2.00	0.00	9.34	0.07	0.00
4.40	2.00	0.00	9.33	0.07	0.00	4.46	2.00	0.00	9.32	0.06	0.00
4.53	2.00	0.00	9.31	0.07	0.00	4.59	2.00	0.00	9.30	0.06	0.00
4.66	2.00	0.00	9.29	0.07	0.00	4.72	2.00	0.00	9.28	0.06	0.00
4.79	2.00	0.00	9.27	0.07	0.00	4.85	2.00	0.00	9.26	0.06	0.00
4.92	2.00	0.00	9.25	0.07	0.00	4.99	2.00	0.00	9.24	0.07	0.00
5.05	2.00	0.00	9.23	0.06	0.00	5.12	2.00	0.00	9.22	0.07	0.00
5.18	2.00	0.00	9.21	0.06	0.00	5.25	2.00	0.00	9.20	0.07	0.00
5.31	2.00	0.00	9.19	0.06	0.00	5.38	1.50	0.00	9.18	0.07	0.00
5.44	1.85	0.00	9.17	0.06	0.00	5.51	2.00	0.00	9.16	0.07	0.00
5.58	2.00	0.00	9.15	0.07	0.00	5.64	2.00	0.00	9.14	0.06	0.00
5.71	2.00	0.00	9.13	0.07	0.00	5.77	2.00	0.00	9.12	0.06	0.00
5.84	2.00	0.00	9.11	0.07	0.00	5.90	2.00	0.00	9.10	0.06	0.00
5.97	2.00	0.00	9.09	0.07	0.00	6.04	2.00	0.00	9.08	0.07	0.00
6.10	2.00	0.00	9.07	0.06	0.00	6.17	2.00	0.00	9.06	0.07	0.00
6.23	2.00	0.00	9.05	0.06	0.00	6.30	2.00	0.00	9.04	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
6.36	2.00	0.00	9.03	0.06	0.00	6.43	2.00	0.00	9.02	0.07	0.00
6.49	2.00	0.00	9.01	0.06	0.00	6.56	2.00	0.00	9.00	0.07	0.00
6.63	2.00	0.00	8.99	0.07	0.00	6.69	2.00	0.00	8.98	0.06	0.00
6.76	2.00	0.00	8.97	0.07	0.00	6.82	2.00	0.00	8.96	0.06	0.00
6.89	2.00	0.00	8.95	0.07	0.00	6.95	2.00	0.00	8.94	0.06	0.00
7.02	2.00	0.00	8.93	0.07	0.00	7.08	2.00	0.00	8.92	0.06	0.00
7.15	2.00	0.00	8.91	0.07	0.00	7.22	2.00	0.00	8.90	0.07	0.00
7.28	2.00	0.00	8.89	0.06	0.00	7.35	2.00	0.00	8.88	0.07	0.00
7.41	2.00	0.00	8.87	0.06	0.00	7.48	2.00	0.00	8.86	0.07	0.00
7.54	2.00	0.00	8.85	0.06	0.00	7.61	2.00	0.00	8.84	0.07	0.00
7.68	2.00	0.00	8.83	0.07	0.00	7.74	2.00	0.00	8.82	0.06	0.00
7.81	2.00	0.00	8.81	0.07	0.00	7.87	2.00	0.00	8.80	0.06	0.00
7.94	2.00	0.00	8.79	0.07	0.00	8.00	2.00	0.00	8.78	0.06	0.00
8.07	2.00	0.00	8.77	0.07	0.00	8.13	2.00	0.00	8.76	0.06	0.00
8.20	2.00	0.00	8.75	0.07	0.00	8.27	2.00	0.00	8.74	0.07	0.00
8.33	2.00	0.00	8.73	0.06	0.00	8.40	2.00	0.00	8.72	0.07	0.00
8.46	2.00	0.00	8.71	0.06	0.00	8.53	2.00	0.00	8.70	0.07	0.00
8.59	2.00	0.00	8.69	0.06	0.00	8.66	2.00	0.00	8.68	0.07	0.00
8.72	2.00	0.00	8.67	0.06	0.00	8.79	2.00	0.00	8.66	0.07	0.00
8.86	2.00	0.00	8.65	0.07	0.00	8.92	2.00	0.00	8.64	0.06	0.00
8.99	2.00	0.00	8.63	0.07	0.00	9.05	2.00	0.00	8.62	0.06	0.00
9.12	2.00	0.00	8.61	0.07	0.00	9.18	2.00	0.00	8.60	0.06	0.00
9.25	2.00	0.00	8.59	0.07	0.00	9.32	2.00	0.00	8.58	0.07	0.00
9.38	2.00	0.00	8.57	0.06	0.00	9.45	2.00	0.00	8.56	0.07	0.00
9.51	2.00	0.00	8.55	0.06	0.00	9.58	2.00	0.00	8.54	0.07	0.00
9.64	2.00	0.00	8.53	0.06	0.00	9.71	2.00	0.00	8.52	0.07	0.00
9.77	2.00	0.00	8.51	0.06	0.00	9.84	2.00	0.00	8.50	0.07	0.00
9.91	2.00	0.00	8.49	0.07	0.00	9.97	2.00	0.00	8.48	0.06	0.00
10.04	2.00	0.00	8.47	0.07	0.00	10.10	2.00	0.00	8.46	0.06	0.00
10.17	2.00	0.00	8.45	0.07	0.00	10.23	2.00	0.00	8.44	0.06	0.00
10.30	2.00	0.00	8.43	0.07	0.00	10.36	2.00	0.00	8.42	0.06	0.00
10.43	2.00	0.00	8.41	0.07	0.00	10.50	2.00	0.00	8.40	0.07	0.00
10.56	2.00	0.00	8.39	0.06	0.00	10.63	2.00	0.00	8.38	0.07	0.00
10.69	2.00	0.00	8.37	0.06	0.00	10.76	2.00	0.00	8.36	0.07	0.00
10.82	2.00	0.00	8.35	0.06	0.00	10.89	2.00	0.00	8.34	0.07	0.00
10.96	2.00	0.00	8.33	0.07	0.00	11.02	2.00	0.00	8.32	0.06	0.00
11.09	2.00	0.00	8.31	0.07	0.00	11.15	2.00	0.00	8.30	0.06	0.00
11.22	2.00	0.00	8.29	0.07	0.00	11.28	2.00	0.00	8.28	0.06	0.00
11.35	2.00	0.00	8.27	0.07	0.00	11.41	2.00	0.00	8.26	0.06	0.00
11.48	2.00	0.00	8.25	0.07	0.00	11.55	2.00	0.00	8.24	0.07	0.00
11.61	2.00	0.00	8.23	0.06	0.00	11.68	2.00	0.00	8.22	0.07	0.00
11.74	2.00	0.00	8.21	0.06	0.00	11.81	2.00	0.00	8.20	0.07	0.00
11.87	2.00	0.00	8.19	0.06	0.00	11.94	2.00	0.00	8.18	0.07	0.00
12.00	2.00	0.00	8.17	0.06	0.00	12.07	2.00	0.00	8.16	0.07	0.00
12.14	2.00	0.00	8.15	0.07	0.00	12.20	2.00	0.00	8.14	0.06	0.00
12.27	2.00	0.00	8.13	0.07	0.00	12.33	2.00	0.00	8.12	0.06	0.00
12.40	1.89	0.00	8.11	0.07	0.00	12.46	1.78	0.00	8.10	0.06	0.00
12.53	1.71	0.00	8.09	0.07	0.00	12.60	1.65	0.00	8.08	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
12.66	1.66	0.00	8.07	0.06	0.00	12.73	1.76	0.00	8.06	0.07	0.00
12.79	1.87	0.00	8.05	0.06	0.00	12.86	1.97	0.00	8.04	0.07	0.00
12.92	2.00	0.00	8.03	0.06	0.00	12.99	2.00	0.00	8.02	0.07	0.00
13.05	2.00	0.00	8.01	0.06	0.00	13.12	2.00	0.00	8.00	0.07	0.00
13.19	2.00	0.00	7.99	0.07	0.00	13.25	2.00	0.00	7.98	0.06	0.00
13.32	1.93	0.00	7.97	0.07	0.00	13.38	1.78	0.00	7.96	0.06	0.00
13.45	1.65	0.00	7.95	0.07	0.00	13.51	1.59	0.00	7.94	0.06	0.00
13.58	1.57	0.00	7.93	0.07	0.00	13.64	2.00	0.00	7.92	0.06	0.00
13.71	2.00	0.00	7.91	0.07	0.00	13.78	2.00	0.00	7.90	0.07	0.00
13.84	2.00	0.00	7.89	0.06	0.00	13.91	2.00	0.00	7.88	0.07	0.00
13.97	1.58	0.00	7.87	0.06	0.00	14.04	1.52	0.00	7.86	0.07	0.00
14.10	2.00	0.00	7.85	0.06	0.00	14.17	2.00	0.00	7.84	0.07	0.00
14.24	2.00	0.00	7.83	0.07	0.00	14.30	2.00	0.00	7.82	0.06	0.00
14.37	2.00	0.00	7.81	0.07	0.00	14.43	2.00	0.00	7.80	0.06	0.00
14.50	2.00	0.00	7.79	0.07	0.00	14.56	1.31	0.00	7.78	0.06	0.00
14.63	1.29	0.00	7.77	0.07	0.00	14.69	1.27	0.00	7.76	0.06	0.00
14.76	1.26	0.00	7.75	0.07	0.00	14.83	1.25	0.00	7.74	0.07	0.00
14.89	1.24	0.00	7.73	0.06	0.00	14.96	1.22	0.00	7.72	0.07	0.00
15.02	1.23	0.00	7.71	0.06	0.00	15.09	1.26	0.00	7.70	0.07	0.00
15.15	1.73	0.00	7.69	0.06	0.00	15.22	2.00	0.00	7.68	0.07	0.00
15.28	2.00	0.00	7.67	0.06	0.00	15.35	2.00	0.00	7.66	0.07	0.00
15.42	2.00	0.00	7.65	0.07	0.00	15.48	2.00	0.00	7.64	0.06	0.00
15.55	2.00	0.00	7.63	0.07	0.00	15.61	2.00	0.00	7.62	0.06	0.00
15.68	2.00	0.00	7.61	0.07	0.00	15.74	2.00	0.00	7.60	0.06	0.00
15.81	2.00	0.00	7.59	0.07	0.00	15.88	2.00	0.00	7.58	0.07	0.00
15.94	2.00	0.00	7.57	0.06	0.00	16.01	2.00	0.00	7.56	0.07	0.00
16.07	2.00	0.00	7.55	0.06	0.00	16.14	2.00	0.00	7.54	0.07	0.00
16.20	2.00	0.00	7.53	0.06	0.00	16.27	2.00	0.00	7.52	0.07	0.00
16.33	2.00	0.00	7.51	0.06	0.00	16.40	2.00	0.00	7.50	0.07	0.00
16.47	2.00	0.00	7.49	0.07	0.00	16.53	2.00	0.00	7.48	0.06	0.00
16.60	2.00	0.00	7.47	0.07	0.00	16.66	2.00	0.00	7.46	0.06	0.00
16.73	2.00	0.00	7.45	0.07	0.00	16.79	2.00	0.00	7.44	0.06	0.00
16.86	2.00	0.00	7.43	0.07	0.00	16.92	1.96	0.00	7.42	0.06	0.00
16.99	1.33	0.00	7.41	0.07	0.00	17.06	1.24	0.00	7.40	0.07	0.00
17.12	1.29	0.00	7.39	0.06	0.00	17.19	1.38	0.00	7.38	0.07	0.00
17.25	1.40	0.00	7.37	0.06	0.00	17.32	1.56	0.00	7.36	0.07	0.00
17.38	1.82	0.00	7.35	0.06	0.00	17.45	2.00	0.00	7.34	0.07	0.00
17.52	1.88	0.00	7.33	0.07	0.00	17.58	1.48	0.00	7.32	0.06	0.00
17.65	1.23	0.00	7.31	0.07	0.00	17.71	1.33	0.00	7.30	0.06	0.00
17.78	1.29	0.00	7.29	0.07	0.00	17.84	1.29	0.00	7.28	0.06	0.00
17.91	1.18	0.00	7.27	0.07	0.00	17.97	1.23	0.00	7.26	0.06	0.00
18.04	1.23	0.00	7.25	0.07	0.00	18.11	1.25	0.00	7.24	0.07	0.00
18.17	1.27	0.00	7.23	0.06	0.00	18.24	1.29	0.00	7.22	0.07	0.00
18.30	1.30	0.00	7.21	0.06	0.00	18.37	1.31	0.00	7.20	0.07	0.00
18.43	1.34	0.00	7.19	0.06	0.00	18.50	1.36	0.00	7.18	0.07	0.00
18.56	1.36	0.00	7.17	0.06	0.00	18.63	1.36	0.00	7.16	0.07	0.00
18.70	1.37	0.00	7.15	0.07	0.00	18.76	1.36	0.00	7.14	0.06	0.00
18.83	1.34	0.00	7.13	0.07	0.00	18.89	1.34	0.00	7.12	0.06	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
18.96	1.35	0.00	7.11	0.07	0.00	19.02	1.52	0.00	7.10	0.06	0.00
19.09	2.00	0.00	7.09	0.07	0.00	19.16	2.00	0.00	7.08	0.07	0.00
19.22	2.00	0.00	7.07	0.06	0.00	19.29	2.00	0.00	7.06	0.07	0.00
19.35	2.00	0.00	7.05	0.06	0.00	19.42	2.00	0.00	7.04	0.07	0.00
19.48	2.00	0.00	7.03	0.06	0.00	19.55	2.00	0.00	7.02	0.07	0.00
19.61	2.00	0.00	7.01	0.06	0.00	19.68	2.00	0.00	7.00	0.07	0.00
19.75	2.00	0.00	6.99	0.07	0.00	19.81	2.00	0.00	6.98	0.06	0.00
19.88	2.00	0.00	6.97	0.07	0.00	19.94	2.00	0.00	6.96	0.06	0.00
20.01	2.00	0.00	6.95	0.07	0.00	20.07	2.00	0.00	6.94	0.06	0.00
20.14	2.00	0.00	6.93	0.07	0.00	20.20	2.00	0.00	6.92	0.06	0.00
20.27	1.99	0.00	6.91	0.07	0.00	20.34	2.00	0.00	6.90	0.07	0.00
20.40	1.90	0.00	6.89	0.06	0.00	20.47	1.69	0.00	6.88	0.07	0.00
20.53	1.62	0.00	6.87	0.06	0.00	20.60	1.54	0.00	6.86	0.07	0.00
20.66	1.50	0.00	6.85	0.06	0.00	20.73	1.52	0.00	6.84	0.07	0.00
20.80	1.62	0.00	6.83	0.07	0.00	20.86	1.77	0.00	6.82	0.06	0.00
20.93	1.97	0.00	6.81	0.07	0.00	20.99	2.00	0.00	6.80	0.06	0.00
21.06	2.00	0.00	6.79	0.07	0.00	21.12	2.00	0.00	6.78	0.06	0.00
21.19	2.00	0.00	6.77	0.07	0.00	21.25	2.00	0.00	6.76	0.06	0.00
21.32	2.00	0.00	6.75	0.07	0.00	21.39	2.00	0.00	6.74	0.07	0.00
21.45	2.00	0.00	6.73	0.06	0.00	21.52	2.00	0.00	6.72	0.07	0.00
21.58	2.00	0.00	6.71	0.06	0.00	21.65	2.00	0.00	6.70	0.07	0.00
21.71	1.99	0.00	6.69	0.06	0.00	21.78	1.99	0.00	6.68	0.07	0.00
21.84	2.00	0.00	6.67	0.06	0.00	21.91	2.00	0.00	6.66	0.07	0.00
21.98	2.00	0.00	6.65	0.07	0.00	22.04	2.00	0.00	6.64	0.06	0.00
22.11	2.00	0.00	6.63	0.07	0.00	22.17	2.00	0.00	6.62	0.06	0.00
22.24	2.00	0.00	6.61	0.07	0.00	22.30	2.00	0.00	6.60	0.06	0.00
22.37	2.00	0.00	6.59	0.07	0.00	22.44	2.00	0.00	6.58	0.07	0.00
22.50	2.00	0.00	6.57	0.06	0.00	22.57	2.00	0.00	6.56	0.07	0.00
22.63	2.00	0.00	6.55	0.06	0.00	22.70	2.00	0.00	6.54	0.07	0.00
22.76	2.00	0.00	6.53	0.06	0.00	22.83	2.00	0.00	6.52	0.07	0.00
22.89	2.00	0.00	6.51	0.06	0.00	22.96	2.00	0.00	6.50	0.07	0.00
23.03	2.00	0.00	6.49	0.07	0.00	23.09	1.96	0.00	6.48	0.06	0.00
23.16	1.86	0.00	6.47	0.07	0.00	23.22	1.81	0.00	6.46	0.06	0.00
23.29	1.78	0.00	6.45	0.07	0.00	23.35	1.86	0.00	6.44	0.06	0.00
23.42	1.98	0.00	6.43	0.07	0.00	23.48	2.00	0.00	6.42	0.06	0.00
23.55	2.00	0.00	6.41	0.07	0.00	23.62	2.00	0.00	6.40	0.07	0.00
23.68	1.93	0.00	6.39	0.06	0.00	23.75	1.69	0.00	6.38	0.07	0.00
23.81	1.53	0.00	6.37	0.06	0.00	23.88	1.47	0.00	6.36	0.07	0.00
23.94	1.49	0.00	6.35	0.06	0.00	24.01	1.58	0.00	6.34	0.07	0.00
24.08	1.70	0.00	6.33	0.07	0.00	24.14	1.81	0.00	6.32	0.06	0.00
24.21	1.80	0.00	6.31	0.07	0.00	24.27	1.77	0.00	6.30	0.06	0.00
24.34	1.73	0.00	6.29	0.07	0.00	24.40	1.80	0.00	6.28	0.06	0.00
24.47	1.84	0.00	6.27	0.07	0.00	24.53	1.87	0.00	6.26	0.06	0.00
24.60	1.89	0.00	6.25	0.07	0.00	24.67	1.90	0.00	6.24	0.07	0.00
24.73	1.93	0.00	6.23	0.06	0.00	24.80	1.96	0.00	6.22	0.07	0.00
24.86	1.96	0.00	6.21	0.06	0.00	24.93	1.61	0.00	6.20	0.07	0.00
24.99	1.34	0.00	6.19	0.06	0.00	25.06	2.00	0.00	6.18	0.07	0.00
25.12	2.00	0.00	6.17	0.06	0.00						

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI

Overall liquefaction potential: 0.00

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (ft)
LPI: Liquefaction potential index value for test point

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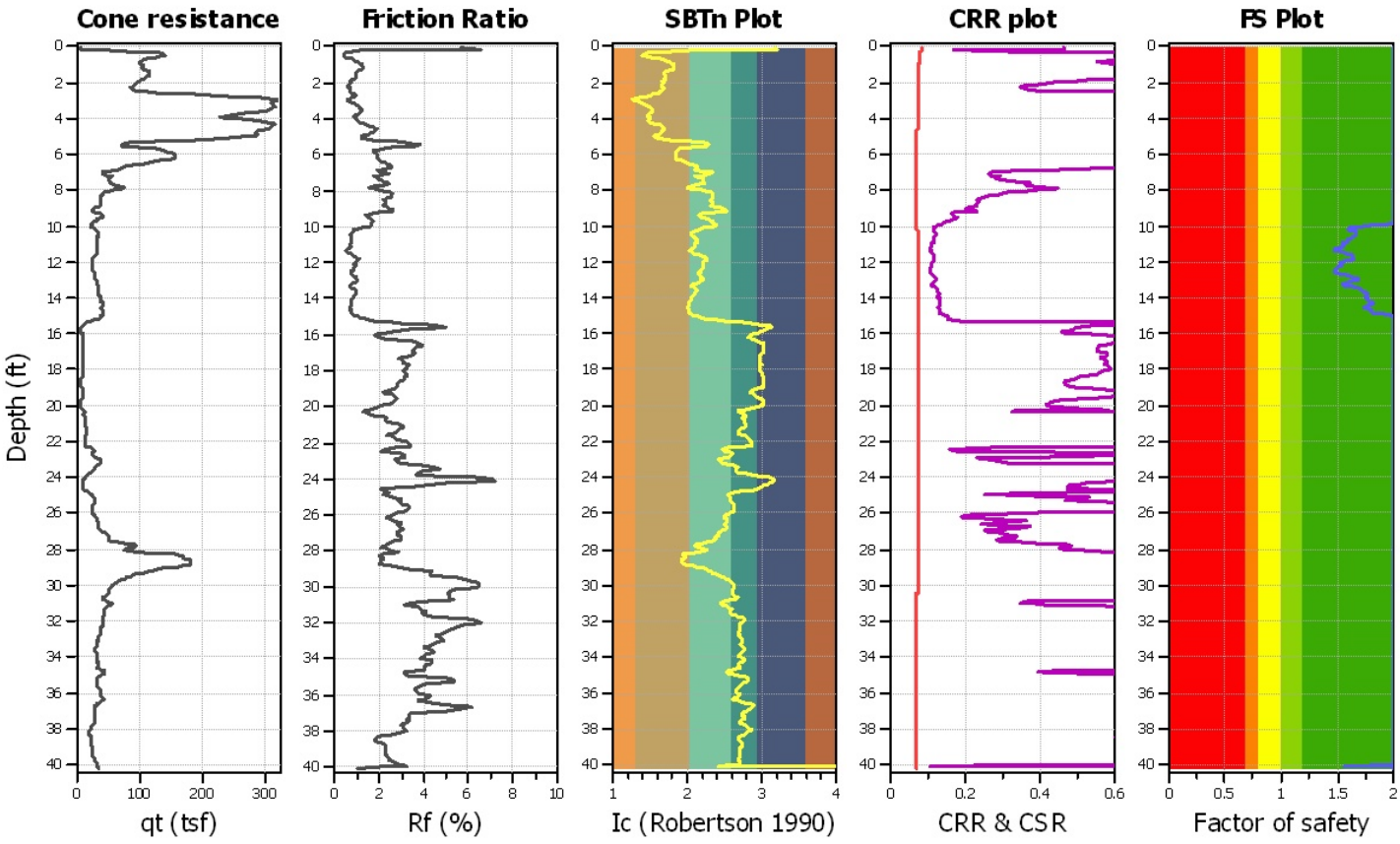
LIQUEFACTION ANALYSIS REPORT

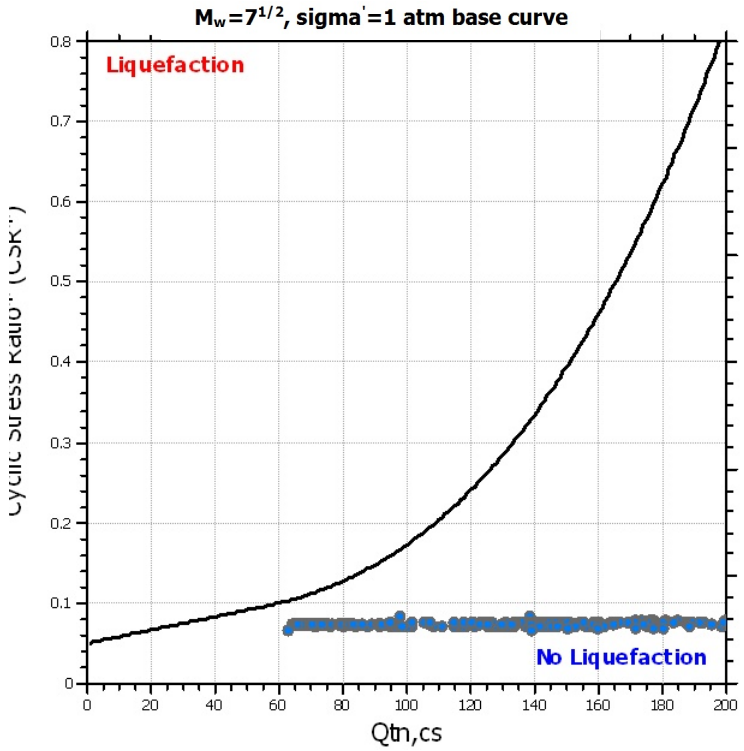
Project title : Martin Lake **Location : PDP-5**

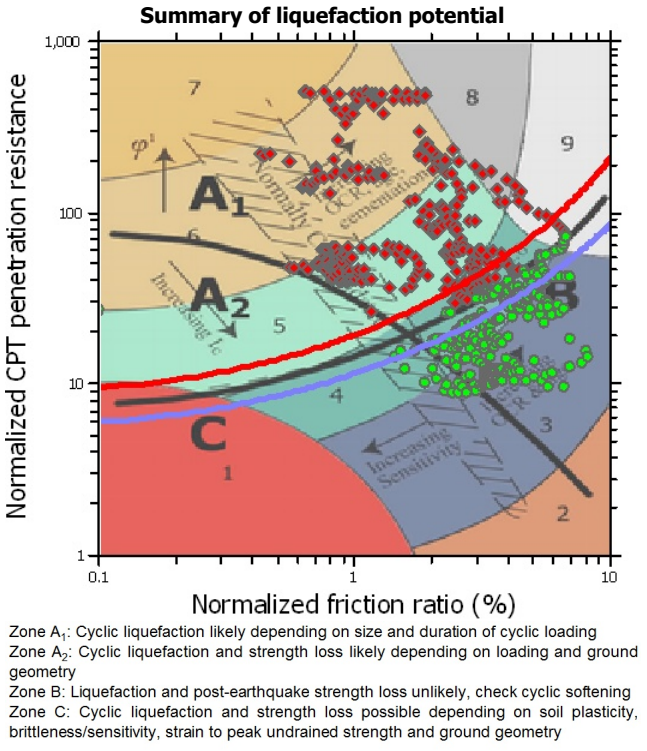
CPT file : B-07

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	0.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.20	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.09	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

:: Liquefaction Potential Index calculation data ::

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
0.07	2.00	0.00	9.99	0.06	0.00	0.13	2.00	0.00	9.98	0.06	0.00
0.20	2.00	0.00	9.97	0.07	0.00	0.26	2.00	0.00	9.96	0.06	0.00
0.33	2.00	0.00	9.95	0.07	0.00	0.39	2.00	0.00	9.94	0.06	0.00
0.46	2.00	0.00	9.93	0.07	0.00	0.52	2.00	0.00	9.92	0.06	0.00
0.59	2.00	0.00	9.91	0.07	0.00	0.66	2.00	0.00	9.90	0.07	0.00
0.72	2.00	0.00	9.89	0.06	0.00	0.79	2.00	0.00	9.88	0.07	0.00
0.85	2.00	0.00	9.87	0.06	0.00	0.92	2.00	0.00	9.86	0.07	0.00
0.98	2.00	0.00	9.85	0.06	0.00	1.05	2.00	0.00	9.84	0.07	0.00
1.12	2.00	0.00	9.83	0.07	0.00	1.18	2.00	0.00	9.82	0.06	0.00
1.25	2.00	0.00	9.81	0.07	0.00	1.31	2.00	0.00	9.80	0.06	0.00
1.38	2.00	0.00	9.79	0.07	0.00	1.44	2.00	0.00	9.78	0.06	0.00
1.51	2.00	0.00	9.77	0.07	0.00	1.57	2.00	0.00	9.76	0.06	0.00
1.64	2.00	0.00	9.75	0.07	0.00	1.71	2.00	0.00	9.74	0.07	0.00
1.77	2.00	0.00	9.73	0.06	0.00	1.84	2.00	0.00	9.72	0.07	0.00
1.90	2.00	0.00	9.71	0.06	0.00	1.97	2.00	0.00	9.70	0.07	0.00
2.03	2.00	0.00	9.69	0.06	0.00	2.10	2.00	0.00	9.68	0.07	0.00
2.16	2.00	0.00	9.67	0.06	0.00	2.23	2.00	0.00	9.66	0.07	0.00
2.30	2.00	0.00	9.65	0.07	0.00	2.36	2.00	0.00	9.64	0.06	0.00
2.43	2.00	0.00	9.63	0.07	0.00	2.49	2.00	0.00	9.62	0.06	0.00
2.56	2.00	0.00	9.61	0.07	0.00	2.62	2.00	0.00	9.60	0.06	0.00
2.69	2.00	0.00	9.59	0.07	0.00	2.76	2.00	0.00	9.58	0.07	0.00
2.82	2.00	0.00	9.57	0.06	0.00	2.89	2.00	0.00	9.56	0.07	0.00
2.95	2.00	0.00	9.55	0.06	0.00	3.02	2.00	0.00	9.54	0.07	0.00
3.08	2.00	0.00	9.53	0.06	0.00	3.15	2.00	0.00	9.52	0.07	0.00
3.21	2.00	0.00	9.51	0.06	0.00	3.28	2.00	0.00	9.50	0.07	0.00
3.35	2.00	0.00	9.49	0.07	0.00	3.41	2.00	0.00	9.48	0.06	0.00
3.48	2.00	0.00	9.47	0.07	0.00	3.54	2.00	0.00	9.46	0.06	0.00
3.61	2.00	0.00	9.45	0.07	0.00	3.67	2.00	0.00	9.44	0.06	0.00
3.74	2.00	0.00	9.43	0.07	0.00	3.80	2.00	0.00	9.42	0.06	0.00
3.87	2.00	0.00	9.41	0.07	0.00	3.94	2.00	0.00	9.40	0.07	0.00
4.00	2.00	0.00	9.39	0.06	0.00	4.07	2.00	0.00	9.38	0.07	0.00
4.13	2.00	0.00	9.37	0.06	0.00	4.20	2.00	0.00	9.36	0.07	0.00
4.26	2.00	0.00	9.35	0.06	0.00	4.33	2.00	0.00	9.34	0.07	0.00
4.40	2.00	0.00	9.33	0.07	0.00	4.46	2.00	0.00	9.32	0.06	0.00
4.53	2.00	0.00	9.31	0.07	0.00	4.59	2.00	0.00	9.30	0.06	0.00
4.66	2.00	0.00	9.29	0.07	0.00	4.72	2.00	0.00	9.28	0.06	0.00
4.79	2.00	0.00	9.27	0.07	0.00	4.85	2.00	0.00	9.26	0.06	0.00
4.92	2.00	0.00	9.25	0.07	0.00	4.99	2.00	0.00	9.24	0.07	0.00
5.05	2.00	0.00	9.23	0.06	0.00	5.12	2.00	0.00	9.22	0.07	0.00
5.18	2.00	0.00	9.21	0.06	0.00	5.25	2.00	0.00	9.20	0.07	0.00
5.31	2.00	0.00	9.19	0.06	0.00	5.38	2.00	0.00	9.18	0.07	0.00
5.44	2.00	0.00	9.17	0.06	0.00	5.51	2.00	0.00	9.16	0.07	0.00
5.58	2.00	0.00	9.15	0.07	0.00	5.64	2.00	0.00	9.14	0.06	0.00
5.71	2.00	0.00	9.13	0.07	0.00	5.77	2.00	0.00	9.12	0.06	0.00
5.84	2.00	0.00	9.11	0.07	0.00	5.90	2.00	0.00	9.10	0.06	0.00
5.97	2.00	0.00	9.09	0.07	0.00	6.04	2.00	0.00	9.08	0.07	0.00
6.10	2.00	0.00	9.07	0.06	0.00	6.17	2.00	0.00	9.06	0.07	0.00
6.23	2.00	0.00	9.05	0.06	0.00	6.30	2.00	0.00	9.04	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
6.36	2.00	0.00	9.03	0.06	0.00	6.43	2.00	0.00	9.02	0.07	0.00
6.49	2.00	0.00	9.01	0.06	0.00	6.56	2.00	0.00	9.00	0.07	0.00
6.63	2.00	0.00	8.99	0.07	0.00	6.69	2.00	0.00	8.98	0.06	0.00
6.76	2.00	0.00	8.97	0.07	0.00	6.82	2.00	0.00	8.96	0.06	0.00
6.89	2.00	0.00	8.95	0.07	0.00	6.95	2.00	0.00	8.94	0.06	0.00
7.02	2.00	0.00	8.93	0.07	0.00	7.08	2.00	0.00	8.92	0.06	0.00
7.15	2.00	0.00	8.91	0.07	0.00	7.22	2.00	0.00	8.90	0.07	0.00
7.28	2.00	0.00	8.89	0.06	0.00	7.35	2.00	0.00	8.88	0.07	0.00
7.41	2.00	0.00	8.87	0.06	0.00	7.48	2.00	0.00	8.86	0.07	0.00
7.54	2.00	0.00	8.85	0.06	0.00	7.61	2.00	0.00	8.84	0.07	0.00
7.68	2.00	0.00	8.83	0.07	0.00	7.74	2.00	0.00	8.82	0.06	0.00
7.81	2.00	0.00	8.81	0.07	0.00	7.87	2.00	0.00	8.80	0.06	0.00
7.94	2.00	0.00	8.79	0.07	0.00	8.00	2.00	0.00	8.78	0.06	0.00
8.07	2.00	0.00	8.77	0.07	0.00	8.13	2.00	0.00	8.76	0.06	0.00
8.20	2.00	0.00	8.75	0.07	0.00	8.27	2.00	0.00	8.74	0.07	0.00
8.33	2.00	0.00	8.73	0.06	0.00	8.40	2.00	0.00	8.72	0.07	0.00
8.46	2.00	0.00	8.71	0.06	0.00	8.53	2.00	0.00	8.70	0.07	0.00
8.59	2.00	0.00	8.69	0.06	0.00	8.66	2.00	0.00	8.68	0.07	0.00
8.72	2.00	0.00	8.67	0.06	0.00	8.79	2.00	0.00	8.66	0.07	0.00
8.86	2.00	0.00	8.65	0.07	0.00	8.92	2.00	0.00	8.64	0.06	0.00
8.99	2.00	0.00	8.63	0.07	0.00	9.05	2.00	0.00	8.62	0.06	0.00
9.12	2.00	0.00	8.61	0.07	0.00	9.18	2.00	0.00	8.60	0.06	0.00
9.25	2.00	0.00	8.59	0.07	0.00	9.32	2.00	0.00	8.58	0.07	0.00
9.38	2.00	0.00	8.57	0.06	0.00	9.45	2.00	0.00	8.56	0.07	0.00
9.51	2.00	0.00	8.55	0.06	0.00	9.58	2.00	0.00	8.54	0.07	0.00
9.64	2.00	0.00	8.53	0.06	0.00	9.71	2.00	0.00	8.52	0.07	0.00
9.77	2.00	0.00	8.51	0.06	0.00	9.84	2.00	0.00	8.50	0.07	0.00
9.91	1.91	0.00	8.49	0.07	0.00	9.97	1.81	0.00	8.48	0.06	0.00
10.04	1.70	0.00	8.47	0.07	0.00	10.10	1.61	0.00	8.46	0.06	0.00
10.17	1.60	0.00	8.45	0.07	0.00	10.23	1.61	0.00	8.44	0.06	0.00
10.30	1.66	0.00	8.43	0.07	0.00	10.36	1.67	0.00	8.42	0.06	0.00
10.43	1.67	0.00	8.41	0.07	0.00	10.50	1.67	0.00	8.40	0.07	0.00
10.56	1.65	0.00	8.39	0.06	0.00	10.63	1.63	0.00	8.38	0.07	0.00
10.69	1.62	0.00	8.37	0.06	0.00	10.76	1.60	0.00	8.36	0.07	0.00
10.82	1.60	0.00	8.35	0.06	0.00	10.89	1.59	0.00	8.34	0.07	0.00
10.96	1.55	0.00	8.33	0.07	0.00	11.02	1.54	0.00	8.32	0.06	0.00
11.09	1.55	0.00	8.31	0.07	0.00	11.15	1.55	0.00	8.30	0.06	0.00
11.22	1.50	0.00	8.29	0.07	0.00	11.28	1.46	0.00	8.28	0.06	0.00
11.35	1.47	0.00	8.27	0.07	0.00	11.41	1.51	0.00	8.26	0.06	0.00
11.48	1.57	0.00	8.25	0.07	0.00	11.55	1.60	0.00	8.24	0.07	0.00
11.61	1.63	0.00	8.23	0.06	0.00	11.68	1.62	0.00	8.22	0.07	0.00
11.74	1.64	0.00	8.21	0.06	0.00	11.81	1.64	0.00	8.20	0.07	0.00
11.87	1.62	0.00	8.19	0.06	0.00	11.94	1.57	0.00	8.18	0.07	0.00
12.00	1.55	0.00	8.17	0.06	0.00	12.07	1.53	0.00	8.16	0.07	0.00
12.14	1.54	0.00	8.15	0.07	0.00	12.20	1.53	0.00	8.14	0.06	0.00
12.27	1.51	0.00	8.13	0.07	0.00	12.33	1.49	0.00	8.12	0.06	0.00
12.40	1.48	0.00	8.11	0.07	0.00	12.46	1.47	0.00	8.10	0.06	0.00
12.53	1.48	0.00	8.09	0.07	0.00	12.60	1.48	0.00	8.08	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
12.66	1.52	0.00	8.07	0.06	0.00	12.73	1.55	0.00	8.06	0.07	0.00
12.79	1.61	0.00	8.05	0.06	0.00	12.86	1.65	0.00	8.04	0.07	0.00
12.92	1.68	0.00	8.03	0.06	0.00	12.99	1.69	0.00	8.02	0.07	0.00
13.05	1.65	0.00	8.01	0.06	0.00	13.12	1.60	0.00	8.00	0.07	0.00
13.19	1.55	0.00	7.99	0.07	0.00	13.25	1.54	0.00	7.98	0.06	0.00
13.32	1.55	0.00	7.97	0.07	0.00	13.38	1.61	0.00	7.96	0.06	0.00
13.45	1.68	0.00	7.95	0.07	0.00	13.51	1.72	0.00	7.94	0.06	0.00
13.58	1.73	0.00	7.93	0.07	0.00	13.64	1.74	0.00	7.92	0.06	0.00
13.71	1.75	0.00	7.91	0.07	0.00	13.78	1.78	0.00	7.90	0.07	0.00
13.84	1.76	0.00	7.89	0.06	0.00	13.91	1.76	0.00	7.88	0.07	0.00
13.97	1.76	0.00	7.87	0.06	0.00	14.04	1.77	0.00	7.86	0.07	0.00
14.10	1.78	0.00	7.85	0.06	0.00	14.17	1.78	0.00	7.84	0.07	0.00
14.24	1.81	0.00	7.83	0.07	0.00	14.30	1.83	0.00	7.82	0.06	0.00
14.37	1.82	0.00	7.81	0.07	0.00	14.43	1.77	0.00	7.80	0.06	0.00
14.50	1.74	0.00	7.79	0.07	0.00	14.56	1.75	0.00	7.78	0.06	0.00
14.63	1.78	0.00	7.77	0.07	0.00	14.69	1.81	0.00	7.76	0.06	0.00
14.76	1.81	0.00	7.75	0.07	0.00	14.83	1.83	0.00	7.74	0.07	0.00
14.89	1.90	0.00	7.73	0.06	0.00	14.96	2.00	0.00	7.72	0.07	0.00
15.02	2.00	0.00	7.71	0.06	0.00	15.09	2.00	0.00	7.70	0.07	0.00
15.15	2.00	0.00	7.69	0.06	0.00	15.22	2.00	0.00	7.68	0.07	0.00
15.28	2.00	0.00	7.67	0.06	0.00	15.35	2.00	0.00	7.66	0.07	0.00
15.42	2.00	0.00	7.65	0.07	0.00	15.48	2.00	0.00	7.64	0.06	0.00
15.55	2.00	0.00	7.63	0.07	0.00	15.61	2.00	0.00	7.62	0.06	0.00
15.68	2.00	0.00	7.61	0.07	0.00	15.74	2.00	0.00	7.60	0.06	0.00
15.81	2.00	0.00	7.59	0.07	0.00	15.88	2.00	0.00	7.58	0.07	0.00
15.94	2.00	0.00	7.57	0.06	0.00	16.01	2.00	0.00	7.56	0.07	0.00
16.07	2.00	0.00	7.55	0.06	0.00	16.14	2.00	0.00	7.54	0.07	0.00
16.20	2.00	0.00	7.53	0.06	0.00	16.27	2.00	0.00	7.52	0.07	0.00
16.33	2.00	0.00	7.51	0.06	0.00	16.40	2.00	0.00	7.50	0.07	0.00
16.47	2.00	0.00	7.49	0.07	0.00	16.53	2.00	0.00	7.48	0.06	0.00
16.60	2.00	0.00	7.47	0.07	0.00	16.66	2.00	0.00	7.46	0.06	0.00
16.73	2.00	0.00	7.45	0.07	0.00	16.79	2.00	0.00	7.44	0.06	0.00
16.86	2.00	0.00	7.43	0.07	0.00	16.92	2.00	0.00	7.42	0.06	0.00
16.99	2.00	0.00	7.41	0.07	0.00	17.06	2.00	0.00	7.40	0.07	0.00
17.12	2.00	0.00	7.39	0.06	0.00	17.19	2.00	0.00	7.38	0.07	0.00
17.25	2.00	0.00	7.37	0.06	0.00	17.32	2.00	0.00	7.36	0.07	0.00
17.38	2.00	0.00	7.35	0.06	0.00	17.45	2.00	0.00	7.34	0.07	0.00
17.52	2.00	0.00	7.33	0.07	0.00	17.58	2.00	0.00	7.32	0.06	0.00
17.65	2.00	0.00	7.31	0.07	0.00	17.71	2.00	0.00	7.30	0.06	0.00
17.78	2.00	0.00	7.29	0.07	0.00	17.84	2.00	0.00	7.28	0.06	0.00
17.91	2.00	0.00	7.27	0.07	0.00	17.97	2.00	0.00	7.26	0.06	0.00
18.04	2.00	0.00	7.25	0.07	0.00	18.11	2.00	0.00	7.24	0.07	0.00
18.17	2.00	0.00	7.23	0.06	0.00	18.24	2.00	0.00	7.22	0.07	0.00
18.30	2.00	0.00	7.21	0.06	0.00	18.37	2.00	0.00	7.20	0.07	0.00
18.43	2.00	0.00	7.19	0.06	0.00	18.50	2.00	0.00	7.18	0.07	0.00
18.56	2.00	0.00	7.17	0.06	0.00	18.63	2.00	0.00	7.16	0.07	0.00
18.70	2.00	0.00	7.15	0.07	0.00	18.76	2.00	0.00	7.14	0.06	0.00
18.83	2.00	0.00	7.13	0.07	0.00	18.89	2.00	0.00	7.12	0.06	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
18.96	2.00	0.00	7.11	0.07	0.00	19.02	2.00	0.00	7.10	0.06	0.00
19.09	2.00	0.00	7.09	0.07	0.00	19.16	2.00	0.00	7.08	0.07	0.00
19.22	2.00	0.00	7.07	0.06	0.00	19.29	2.00	0.00	7.06	0.07	0.00
19.35	2.00	0.00	7.05	0.06	0.00	19.42	2.00	0.00	7.04	0.07	0.00
19.48	2.00	0.00	7.03	0.06	0.00	19.55	2.00	0.00	7.02	0.07	0.00
19.61	2.00	0.00	7.01	0.06	0.00	19.68	2.00	0.00	7.00	0.07	0.00
19.75	2.00	0.00	6.99	0.07	0.00	19.81	2.00	0.00	6.98	0.06	0.00
19.88	2.00	0.00	6.97	0.07	0.00	19.94	2.00	0.00	6.96	0.06	0.00
20.01	2.00	0.00	6.95	0.07	0.00	20.07	2.00	0.00	6.94	0.06	0.00
20.14	2.00	0.00	6.93	0.07	0.00	20.20	2.00	0.00	6.92	0.06	0.00
20.27	2.00	0.00	6.91	0.07	0.00	20.34	2.00	0.00	6.90	0.07	0.00
20.40	2.00	0.00	6.89	0.06	0.00	20.47	2.00	0.00	6.88	0.07	0.00
20.53	2.00	0.00	6.87	0.06	0.00	20.60	2.00	0.00	6.86	0.07	0.00
20.66	2.00	0.00	6.85	0.06	0.00	20.73	2.00	0.00	6.84	0.07	0.00
20.80	2.00	0.00	6.83	0.07	0.00	20.86	2.00	0.00	6.82	0.06	0.00
20.93	2.00	0.00	6.81	0.07	0.00	20.99	2.00	0.00	6.80	0.06	0.00
21.06	2.00	0.00	6.79	0.07	0.00	21.12	2.00	0.00	6.78	0.06	0.00
21.19	2.00	0.00	6.77	0.07	0.00	21.25	2.00	0.00	6.76	0.06	0.00
21.32	2.00	0.00	6.75	0.07	0.00	21.39	2.00	0.00	6.74	0.07	0.00
21.45	2.00	0.00	6.73	0.06	0.00	21.52	2.00	0.00	6.72	0.07	0.00
21.58	2.00	0.00	6.71	0.06	0.00	21.65	2.00	0.00	6.70	0.07	0.00
21.71	2.00	0.00	6.69	0.06	0.00	21.78	2.00	0.00	6.68	0.07	0.00
21.84	2.00	0.00	6.67	0.06	0.00	21.91	2.00	0.00	6.66	0.07	0.00
21.98	2.00	0.00	6.65	0.07	0.00	22.04	2.00	0.00	6.64	0.06	0.00
22.11	2.00	0.00	6.63	0.07	0.00	22.17	2.00	0.00	6.62	0.06	0.00
22.24	2.00	0.00	6.61	0.07	0.00	22.30	2.00	0.00	6.60	0.06	0.00
22.37	2.00	0.00	6.59	0.07	0.00	22.44	2.00	0.00	6.58	0.07	0.00
22.50	2.00	0.00	6.57	0.06	0.00	22.57	2.00	0.00	6.56	0.07	0.00
22.63	2.00	0.00	6.55	0.06	0.00	22.70	2.00	0.00	6.54	0.07	0.00
22.76	2.00	0.00	6.53	0.06	0.00	22.83	2.00	0.00	6.52	0.07	0.00
22.89	2.00	0.00	6.51	0.06	0.00	22.96	2.00	0.00	6.50	0.07	0.00
23.03	2.00	0.00	6.49	0.07	0.00	23.09	2.00	0.00	6.48	0.06	0.00
23.16	2.00	0.00	6.47	0.07	0.00	23.22	2.00	0.00	6.46	0.06	0.00
23.29	2.00	0.00	6.45	0.07	0.00	23.35	2.00	0.00	6.44	0.06	0.00
23.42	2.00	0.00	6.43	0.07	0.00	23.48	2.00	0.00	6.42	0.06	0.00
23.55	2.00	0.00	6.41	0.07	0.00	23.62	2.00	0.00	6.40	0.07	0.00
23.68	2.00	0.00	6.39	0.06	0.00	23.75	2.00	0.00	6.38	0.07	0.00
23.81	2.00	0.00	6.37	0.06	0.00	23.88	2.00	0.00	6.36	0.07	0.00
23.94	2.00	0.00	6.35	0.06	0.00	24.01	2.00	0.00	6.34	0.07	0.00
24.08	2.00	0.00	6.33	0.07	0.00	24.14	2.00	0.00	6.32	0.06	0.00
24.21	2.00	0.00	6.31	0.07	0.00	24.27	2.00	0.00	6.30	0.06	0.00
24.34	2.00	0.00	6.29	0.07	0.00	24.40	2.00	0.00	6.28	0.06	0.00
24.47	2.00	0.00	6.27	0.07	0.00	24.53	2.00	0.00	6.26	0.06	0.00
24.60	2.00	0.00	6.25	0.07	0.00	24.67	2.00	0.00	6.24	0.07	0.00
24.73	2.00	0.00	6.23	0.06	0.00	24.80	2.00	0.00	6.22	0.07	0.00
24.86	2.00	0.00	6.21	0.06	0.00	24.93	2.00	0.00	6.20	0.07	0.00
24.99	2.00	0.00	6.19	0.06	0.00	25.06	2.00	0.00	6.18	0.07	0.00
25.12	2.00	0.00	6.17	0.06	0.00	25.19	2.00	0.00	6.16	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
25.26	2.00	0.00	6.15	0.07	0.00	25.32	2.00	0.00	6.14	0.06	0.00
25.39	2.00	0.00	6.13	0.07	0.00	25.45	2.00	0.00	6.12	0.06	0.00
25.52	2.00	0.00	6.11	0.07	0.00	25.58	2.00	0.00	6.10	0.06	0.00
25.65	2.00	0.00	6.09	0.07	0.00	25.72	2.00	0.00	6.08	0.07	0.00
25.78	2.00	0.00	6.07	0.06	0.00	25.85	2.00	0.00	6.06	0.07	0.00
25.91	2.00	0.00	6.05	0.06	0.00	25.98	2.00	0.00	6.04	0.07	0.00
26.04	2.00	0.00	6.03	0.06	0.00	26.11	2.00	0.00	6.02	0.07	0.00
26.17	2.00	0.00	6.01	0.06	0.00	26.24	2.00	0.00	6.00	0.07	0.00
26.31	2.00	0.00	5.99	0.07	0.00	26.37	2.00	0.00	5.98	0.06	0.00
26.44	2.00	0.00	5.97	0.07	0.00	26.50	2.00	0.00	5.96	0.06	0.00
26.57	2.00	0.00	5.95	0.07	0.00	26.63	2.00	0.00	5.94	0.06	0.00
26.70	2.00	0.00	5.93	0.07	0.00	26.76	2.00	0.00	5.92	0.06	0.00
26.83	2.00	0.00	5.91	0.07	0.00	26.90	2.00	0.00	5.90	0.07	0.00
26.96	2.00	0.00	5.89	0.06	0.00	27.03	2.00	0.00	5.88	0.07	0.00
27.09	2.00	0.00	5.87	0.06	0.00	27.16	2.00	0.00	5.86	0.07	0.00
27.22	2.00	0.00	5.85	0.06	0.00	27.29	2.00	0.00	5.84	0.07	0.00
27.36	2.00	0.00	5.83	0.07	0.00	27.42	2.00	0.00	5.82	0.06	0.00
27.49	2.00	0.00	5.81	0.07	0.00	27.55	2.00	0.00	5.80	0.06	0.00
27.62	2.00	0.00	5.79	0.07	0.00	27.68	2.00	0.00	5.78	0.06	0.00
27.75	2.00	0.00	5.77	0.07	0.00	27.81	2.00	0.00	5.76	0.06	0.00
27.88	2.00	0.00	5.75	0.07	0.00	27.95	2.00	0.00	5.74	0.07	0.00
28.01	2.00	0.00	5.73	0.06	0.00	28.08	2.00	0.00	5.72	0.07	0.00
28.14	2.00	0.00	5.71	0.06	0.00	28.21	2.00	0.00	5.70	0.07	0.00
28.27	2.00	0.00	5.69	0.06	0.00	28.34	2.00	0.00	5.68	0.07	0.00
28.40	2.00	0.00	5.67	0.06	0.00	28.47	2.00	0.00	5.66	0.07	0.00
28.54	2.00	0.00	5.65	0.07	0.00	28.60	2.00	0.00	5.64	0.06	0.00
28.67	2.00	0.00	5.63	0.07	0.00	28.73	2.00	0.00	5.62	0.06	0.00
28.80	2.00	0.00	5.61	0.07	0.00	28.86	2.00	0.00	5.60	0.06	0.00
28.93	2.00	0.00	5.59	0.07	0.00	29.00	2.00	0.00	5.58	0.07	0.00
29.06	2.00	0.00	5.57	0.06	0.00	29.13	2.00	0.00	5.56	0.07	0.00
29.19	2.00	0.00	5.55	0.06	0.00	29.26	2.00	0.00	5.54	0.07	0.00
29.32	2.00	0.00	5.53	0.06	0.00	29.39	2.00	0.00	5.52	0.07	0.00
29.45	2.00	0.00	5.51	0.06	0.00	29.52	2.00	0.00	5.50	0.07	0.00
29.59	2.00	0.00	5.49	0.07	0.00	29.65	2.00	0.00	5.48	0.06	0.00
29.72	2.00	0.00	5.47	0.07	0.00	29.78	2.00	0.00	5.46	0.06	0.00
29.85	2.00	0.00	5.45	0.07	0.00	29.91	2.00	0.00	5.44	0.06	0.00
29.98	2.00	0.00	5.43	0.07	0.00	30.04	2.00	0.00	5.42	0.06	0.00
30.11	2.00	0.00	5.41	0.07	0.00	30.18	2.00	0.00	5.40	0.07	0.00
30.24	2.00	0.00	5.39	0.06	0.00	30.31	2.00	0.00	5.38	0.07	0.00
30.37	2.00	0.00	5.37	0.06	0.00	30.44	2.00	0.00	5.36	0.07	0.00
30.50	2.00	0.00	5.35	0.06	0.00	30.57	2.00	0.00	5.34	0.07	0.00
30.64	2.00	0.00	5.33	0.07	0.00	30.70	2.00	0.00	5.32	0.06	0.00
30.77	2.00	0.00	5.31	0.07	0.00	30.83	2.00	0.00	5.30	0.06	0.00
30.90	2.00	0.00	5.29	0.07	0.00	30.96	2.00	0.00	5.28	0.06	0.00
31.03	2.00	0.00	5.27	0.07	0.00	31.09	2.00	0.00	5.26	0.06	0.00
31.16	2.00	0.00	5.25	0.07	0.00	31.23	2.00	0.00	5.24	0.07	0.00
31.29	2.00	0.00	5.23	0.06	0.00	31.36	2.00	0.00	5.22	0.07	0.00
31.42	2.00	0.00	5.21	0.06	0.00	31.49	2.00	0.00	5.20	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
31.55	2.00	0.00	5.19	0.06	0.00	31.62	2.00	0.00	5.18	0.07	0.00
31.68	2.00	0.00	5.17	0.06	0.00	31.75	2.00	0.00	5.16	0.07	0.00
31.82	2.00	0.00	5.15	0.07	0.00	31.88	2.00	0.00	5.14	0.06	0.00
31.95	2.00	0.00	5.13	0.07	0.00	32.01	2.00	0.00	5.12	0.06	0.00
32.08	2.00	0.00	5.11	0.07	0.00	32.14	2.00	0.00	5.10	0.06	0.00
32.21	2.00	0.00	5.09	0.07	0.00	32.28	2.00	0.00	5.08	0.07	0.00
32.34	2.00	0.00	5.07	0.06	0.00	32.41	2.00	0.00	5.06	0.07	0.00
32.47	2.00	0.00	5.05	0.06	0.00	32.54	2.00	0.00	5.04	0.07	0.00
32.60	2.00	0.00	5.03	0.06	0.00	32.67	2.00	0.00	5.02	0.07	0.00
32.73	2.00	0.00	5.01	0.06	0.00	32.80	2.00	0.00	5.00	0.07	0.00
32.87	2.00	0.00	4.99	0.07	0.00	32.93	2.00	0.00	4.98	0.06	0.00
33.00	2.00	0.00	4.97	0.07	0.00	33.06	2.00	0.00	4.96	0.06	0.00
33.13	2.00	0.00	4.95	0.07	0.00	33.19	2.00	0.00	4.94	0.06	0.00
33.26	2.00	0.00	4.93	0.07	0.00	33.32	2.00	0.00	4.92	0.06	0.00
33.39	2.00	0.00	4.91	0.07	0.00	33.46	2.00	0.00	4.90	0.07	0.00
33.52	2.00	0.00	4.89	0.06	0.00	33.59	2.00	0.00	4.88	0.07	0.00
33.65	2.00	0.00	4.87	0.06	0.00	33.72	2.00	0.00	4.86	0.07	0.00
33.78	2.00	0.00	4.85	0.06	0.00	33.85	2.00	0.00	4.84	0.07	0.00
33.92	2.00	0.00	4.83	0.07	0.00	33.98	2.00	0.00	4.82	0.06	0.00
34.05	2.00	0.00	4.81	0.07	0.00	34.11	2.00	0.00	4.80	0.06	0.00
34.18	2.00	0.00	4.79	0.07	0.00	34.24	2.00	0.00	4.78	0.06	0.00
34.31	2.00	0.00	4.77	0.07	0.00	34.37	2.00	0.00	4.76	0.06	0.00
34.44	2.00	0.00	4.75	0.07	0.00	34.51	2.00	0.00	4.74	0.07	0.00
34.57	2.00	0.00	4.73	0.06	0.00	34.64	2.00	0.00	4.72	0.07	0.00
34.70	2.00	0.00	4.71	0.06	0.00	34.77	2.00	0.00	4.70	0.07	0.00
34.83	2.00	0.00	4.69	0.06	0.00	34.90	2.00	0.00	4.68	0.07	0.00
34.96	2.00	0.00	4.67	0.06	0.00	35.03	2.00	0.00	4.66	0.07	0.00
35.10	2.00	0.00	4.65	0.07	0.00	35.16	2.00	0.00	4.64	0.06	0.00
35.23	2.00	0.00	4.63	0.07	0.00	35.29	2.00	0.00	4.62	0.06	0.00
35.36	2.00	0.00	4.61	0.07	0.00	35.42	2.00	0.00	4.60	0.06	0.00
35.49	2.00	0.00	4.59	0.07	0.00	35.56	2.00	0.00	4.58	0.07	0.00
35.62	2.00	0.00	4.57	0.06	0.00	35.69	2.00	0.00	4.56	0.07	0.00
35.75	2.00	0.00	4.55	0.06	0.00	35.82	2.00	0.00	4.54	0.07	0.00
35.88	2.00	0.00	4.53	0.06	0.00	35.95	2.00	0.00	4.52	0.07	0.00
36.01	2.00	0.00	4.51	0.06	0.00	36.08	2.00	0.00	4.50	0.07	0.00
36.15	2.00	0.00	4.49	0.07	0.00	36.21	2.00	0.00	4.48	0.06	0.00
36.28	2.00	0.00	4.47	0.07	0.00	36.34	2.00	0.00	4.46	0.06	0.00
36.41	2.00	0.00	4.45	0.07	0.00	36.47	2.00	0.00	4.44	0.06	0.00
36.54	2.00	0.00	4.43	0.07	0.00	36.60	2.00	0.00	4.42	0.06	0.00
36.67	2.00	0.00	4.41	0.07	0.00	36.74	2.00	0.00	4.40	0.07	0.00
36.80	2.00	0.00	4.39	0.06	0.00	36.87	2.00	0.00	4.38	0.07	0.00
36.93	2.00	0.00	4.37	0.06	0.00	37.00	2.00	0.00	4.36	0.07	0.00
37.06	2.00	0.00	4.35	0.06	0.00	37.13	2.00	0.00	4.34	0.07	0.00
37.20	2.00	0.00	4.33	0.07	0.00	37.26	2.00	0.00	4.32	0.06	0.00
37.33	2.00	0.00	4.31	0.07	0.00	37.39	2.00	0.00	4.30	0.06	0.00
37.46	2.00	0.00	4.29	0.07	0.00	37.52	2.00	0.00	4.28	0.06	0.00
37.59	2.00	0.00	4.27	0.07	0.00	37.65	2.00	0.00	4.26	0.06	0.00
37.72	2.00	0.00	4.25	0.07	0.00	37.79	2.00	0.00	4.24	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
37.85	2.00	0.00	4.23	0.06	0.00	37.92	2.00	0.00	4.22	0.07	0.00
37.98	2.00	0.00	4.21	0.06	0.00	38.05	2.00	0.00	4.20	0.07	0.00
38.11	2.00	0.00	4.19	0.06	0.00	38.18	2.00	0.00	4.18	0.07	0.00
38.24	2.00	0.00	4.17	0.06	0.00	38.31	2.00	0.00	4.16	0.07	0.00
38.38	2.00	0.00	4.15	0.07	0.00	38.44	2.00	0.00	4.14	0.06	0.00
38.51	2.00	0.00	4.13	0.07	0.00	38.57	2.00	0.00	4.12	0.06	0.00
38.64	2.00	0.00	4.11	0.07	0.00	38.70	2.00	0.00	4.10	0.06	0.00
38.77	2.00	0.00	4.09	0.07	0.00	38.84	2.00	0.00	4.08	0.07	0.00
38.90	2.00	0.00	4.07	0.06	0.00	38.97	2.00	0.00	4.06	0.07	0.00
39.03	2.00	0.00	4.05	0.06	0.00	39.10	2.00	0.00	4.04	0.07	0.00
39.16	2.00	0.00	4.03	0.06	0.00	39.23	2.00	0.00	4.02	0.07	0.00
39.29	2.00	0.00	4.01	0.06	0.00	39.36	2.00	0.00	4.00	0.07	0.00
39.43	2.00	0.00	3.99	0.07	0.00	39.49	2.00	0.00	3.98	0.06	0.00
39.56	2.00	0.00	3.97	0.07	0.00	39.62	2.00	0.00	3.96	0.06	0.00
39.69	2.00	0.00	3.95	0.07	0.00	39.75	2.00	0.00	3.94	0.06	0.00
39.82	2.00	0.00	3.93	0.07	0.00	39.88	2.00	0.00	3.92	0.06	0.00
39.95	2.00	0.00	3.91	0.07	0.00	40.02	2.00	0.00	3.90	0.07	0.00
40.08	1.57	0.00	3.89	0.06	0.00	40.15	2.00	0.00	3.88	0.07	0.00
40.21	2.00	0.00	3.87	0.06	0.00						

Overall liquefaction potential: 0.00

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (ft)
LPI: Liquefaction potential index value for test point

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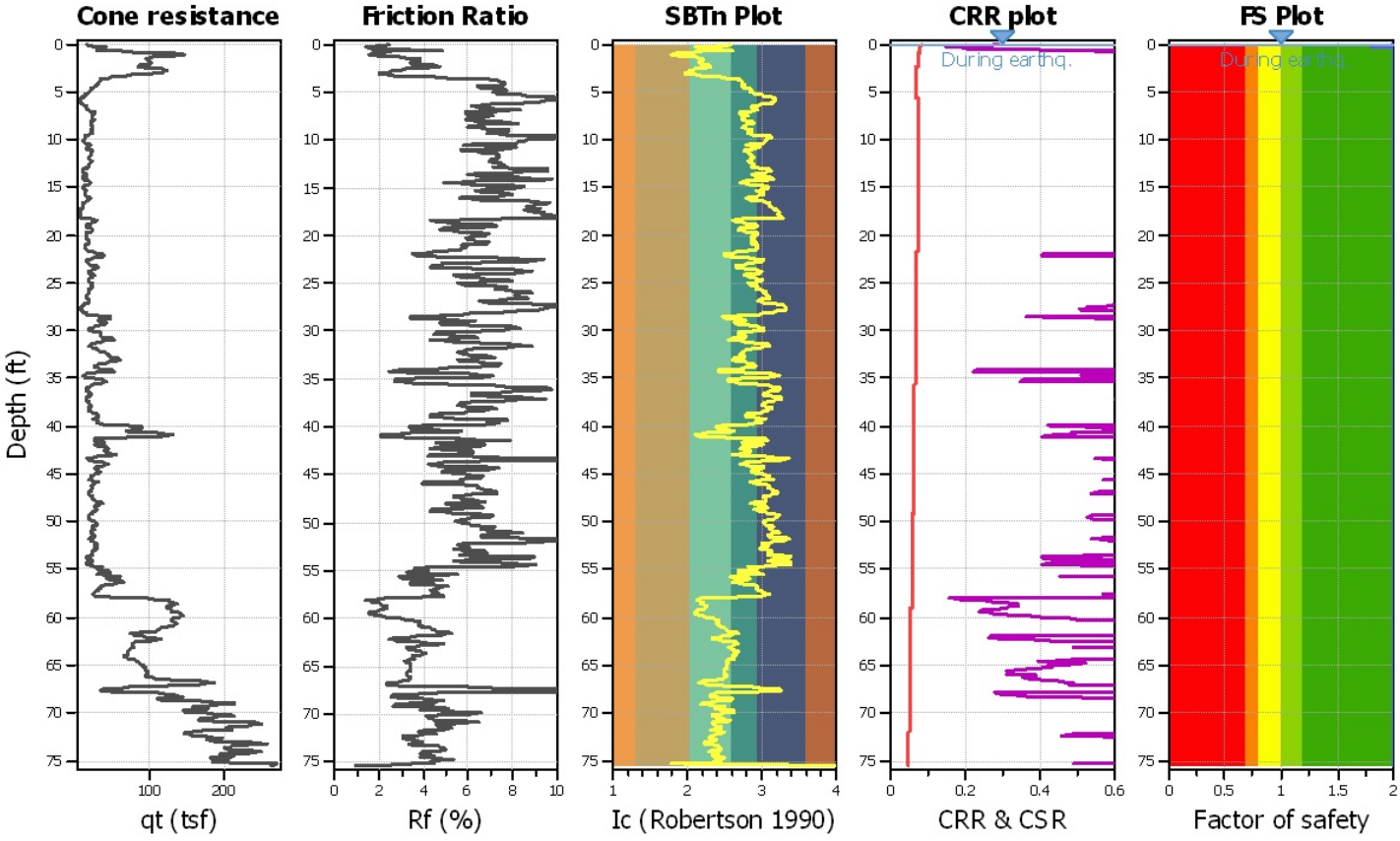
LIQUEFACTION ANALYSIS REPORT

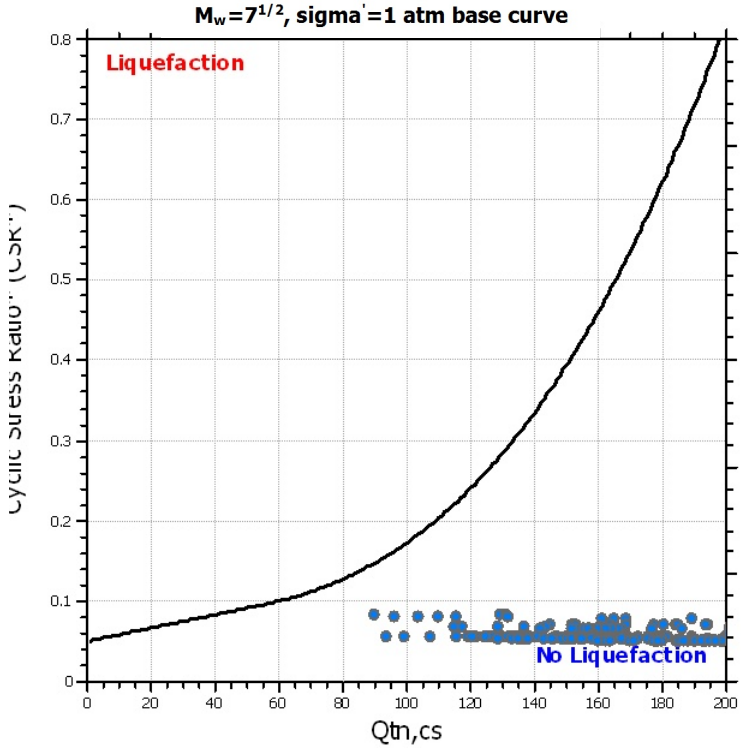
Project title : Martin Lake **Location : PDP-5**

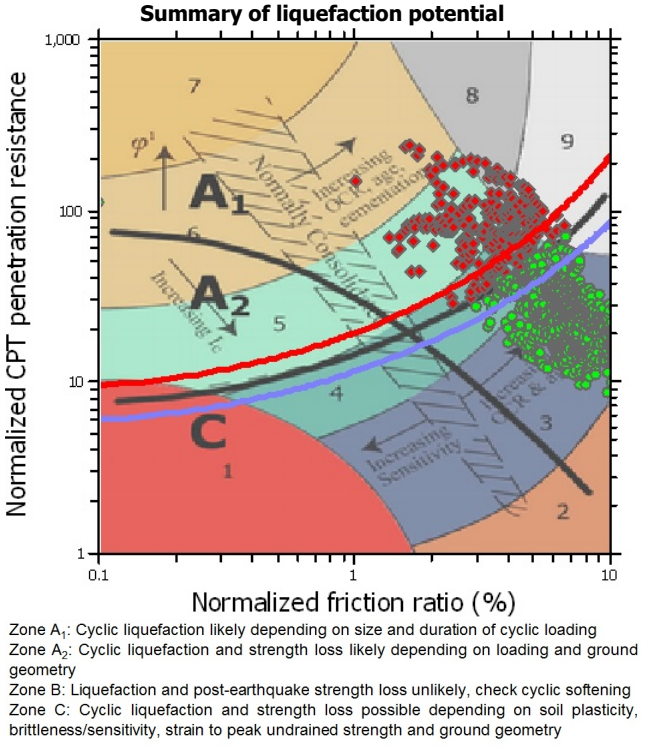
CPT file : B-12

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	0.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.20	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.09	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

:: Liquefaction Potential Index calculation data ::

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
0.07	2.00	0.00	9.99	0.06	0.00	0.13	2.00	0.00	9.98	0.06	0.00
0.20	1.80	0.00	9.97	0.07	0.00	0.26	2.00	0.00	9.96	0.06	0.00
0.33	2.00	0.00	9.95	0.07	0.00	0.39	2.00	0.00	9.94	0.06	0.00
0.46	2.00	0.00	9.93	0.07	0.00	0.52	2.00	0.00	9.92	0.06	0.00
0.59	2.00	0.00	9.91	0.07	0.00	0.66	2.00	0.00	9.90	0.07	0.00
0.72	2.00	0.00	9.89	0.06	0.00	0.79	2.00	0.00	9.88	0.07	0.00
0.85	2.00	0.00	9.87	0.06	0.00	0.92	2.00	0.00	9.86	0.07	0.00
0.98	2.00	0.00	9.85	0.06	0.00	1.05	2.00	0.00	9.84	0.07	0.00
1.12	2.00	0.00	9.83	0.07	0.00	1.18	2.00	0.00	9.82	0.06	0.00
1.25	2.00	0.00	9.81	0.07	0.00	1.31	2.00	0.00	9.80	0.06	0.00
1.38	2.00	0.00	9.79	0.07	0.00	1.44	2.00	0.00	9.78	0.06	0.00
1.51	2.00	0.00	9.77	0.07	0.00	1.57	2.00	0.00	9.76	0.06	0.00
1.64	2.00	0.00	9.75	0.07	0.00	1.71	2.00	0.00	9.74	0.07	0.00
1.77	2.00	0.00	9.73	0.06	0.00	1.84	2.00	0.00	9.72	0.07	0.00
1.90	2.00	0.00	9.71	0.06	0.00	1.97	2.00	0.00	9.70	0.07	0.00
2.03	2.00	0.00	9.69	0.06	0.00	2.10	2.00	0.00	9.68	0.07	0.00
2.16	2.00	0.00	9.67	0.06	0.00	2.23	2.00	0.00	9.66	0.07	0.00
2.30	2.00	0.00	9.65	0.07	0.00	2.36	2.00	0.00	9.64	0.06	0.00
2.43	2.00	0.00	9.63	0.07	0.00	2.49	2.00	0.00	9.62	0.06	0.00
2.56	2.00	0.00	9.61	0.07	0.00	2.62	2.00	0.00	9.60	0.06	0.00
2.69	2.00	0.00	9.59	0.07	0.00	2.76	2.00	0.00	9.58	0.07	0.00
2.82	2.00	0.00	9.57	0.06	0.00	2.89	2.00	0.00	9.56	0.07	0.00
2.95	2.00	0.00	9.55	0.06	0.00	3.02	2.00	0.00	9.54	0.07	0.00
3.08	2.00	0.00	9.53	0.06	0.00	3.15	2.00	0.00	9.52	0.07	0.00
3.21	2.00	0.00	9.51	0.06	0.00	3.28	2.00	0.00	9.50	0.07	0.00
3.35	2.00	0.00	9.49	0.07	0.00	3.41	2.00	0.00	9.48	0.06	0.00
3.48	2.00	0.00	9.47	0.07	0.00	3.54	2.00	0.00	9.46	0.06	0.00
3.61	2.00	0.00	9.45	0.07	0.00	3.67	2.00	0.00	9.44	0.06	0.00
3.74	2.00	0.00	9.43	0.07	0.00	3.80	2.00	0.00	9.42	0.06	0.00
3.87	2.00	0.00	9.41	0.07	0.00	3.94	2.00	0.00	9.40	0.07	0.00
4.00	2.00	0.00	9.39	0.06	0.00	4.07	2.00	0.00	9.38	0.07	0.00
4.13	2.00	0.00	9.37	0.06	0.00	4.20	2.00	0.00	9.36	0.07	0.00
4.26	2.00	0.00	9.35	0.06	0.00	4.33	2.00	0.00	9.34	0.07	0.00
4.40	2.00	0.00	9.33	0.07	0.00	4.46	2.00	0.00	9.32	0.06	0.00
4.53	2.00	0.00	9.31	0.07	0.00	4.59	2.00	0.00	9.30	0.06	0.00
4.66	2.00	0.00	9.29	0.07	0.00	4.72	2.00	0.00	9.28	0.06	0.00
4.79	2.00	0.00	9.27	0.07	0.00	4.85	2.00	0.00	9.26	0.06	0.00
4.92	2.00	0.00	9.25	0.07	0.00	4.99	2.00	0.00	9.24	0.07	0.00
5.05	2.00	0.00	9.23	0.06	0.00	5.12	2.00	0.00	9.22	0.07	0.00
5.18	2.00	0.00	9.21	0.06	0.00	5.25	2.00	0.00	9.20	0.07	0.00
5.31	2.00	0.00	9.19	0.06	0.00	5.38	2.00	0.00	9.18	0.07	0.00
5.44	2.00	0.00	9.17	0.06	0.00	5.51	2.00	0.00	9.16	0.07	0.00
5.58	2.00	0.00	9.15	0.07	0.00	5.64	2.00	0.00	9.14	0.06	0.00
5.71	2.00	0.00	9.13	0.07	0.00	5.77	2.00	0.00	9.12	0.06	0.00
5.84	2.00	0.00	9.11	0.07	0.00	5.90	2.00	0.00	9.10	0.06	0.00
5.97	2.00	0.00	9.09	0.07	0.00	6.04	2.00	0.00	9.08	0.07	0.00
6.10	2.00	0.00	9.07	0.06	0.00	6.17	2.00	0.00	9.06	0.07	0.00
6.23	2.00	0.00	9.05	0.06	0.00	6.30	2.00	0.00	9.04	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
6.36	2.00	0.00	9.03	0.06	0.00	6.43	2.00	0.00	9.02	0.07	0.00
6.49	2.00	0.00	9.01	0.06	0.00	6.56	2.00	0.00	9.00	0.07	0.00
6.63	2.00	0.00	8.99	0.07	0.00	6.69	2.00	0.00	8.98	0.06	0.00
6.76	2.00	0.00	8.97	0.07	0.00	6.82	2.00	0.00	8.96	0.06	0.00
6.89	2.00	0.00	8.95	0.07	0.00	6.95	2.00	0.00	8.94	0.06	0.00
7.02	2.00	0.00	8.93	0.07	0.00	7.08	2.00	0.00	8.92	0.06	0.00
7.15	2.00	0.00	8.91	0.07	0.00	7.22	2.00	0.00	8.90	0.07	0.00
7.28	2.00	0.00	8.89	0.06	0.00	7.35	2.00	0.00	8.88	0.07	0.00
7.41	2.00	0.00	8.87	0.06	0.00	7.48	2.00	0.00	8.86	0.07	0.00
7.54	2.00	0.00	8.85	0.06	0.00	7.61	2.00	0.00	8.84	0.07	0.00
7.68	2.00	0.00	8.83	0.07	0.00	7.74	2.00	0.00	8.82	0.06	0.00
7.81	2.00	0.00	8.81	0.07	0.00	7.87	2.00	0.00	8.80	0.06	0.00
7.94	2.00	0.00	8.79	0.07	0.00	8.00	2.00	0.00	8.78	0.06	0.00
8.07	2.00	0.00	8.77	0.07	0.00	8.13	2.00	0.00	8.76	0.06	0.00
8.20	2.00	0.00	8.75	0.07	0.00	8.27	2.00	0.00	8.74	0.07	0.00
8.33	2.00	0.00	8.73	0.06	0.00	8.40	2.00	0.00	8.72	0.07	0.00
8.46	2.00	0.00	8.71	0.06	0.00	8.53	2.00	0.00	8.70	0.07	0.00
8.59	2.00	0.00	8.69	0.06	0.00	8.66	2.00	0.00	8.68	0.07	0.00
8.72	2.00	0.00	8.67	0.06	0.00	8.79	2.00	0.00	8.66	0.07	0.00
8.86	2.00	0.00	8.65	0.07	0.00	8.92	2.00	0.00	8.64	0.06	0.00
8.99	2.00	0.00	8.63	0.07	0.00	9.05	2.00	0.00	8.62	0.06	0.00
9.12	2.00	0.00	8.61	0.07	0.00	9.18	2.00	0.00	8.60	0.06	0.00
9.25	2.00	0.00	8.59	0.07	0.00	9.32	2.00	0.00	8.58	0.07	0.00
9.38	2.00	0.00	8.57	0.06	0.00	9.45	2.00	0.00	8.56	0.07	0.00
9.51	2.00	0.00	8.55	0.06	0.00	9.58	2.00	0.00	8.54	0.07	0.00
9.64	2.00	0.00	8.53	0.06	0.00	9.71	2.00	0.00	8.52	0.07	0.00
9.77	2.00	0.00	8.51	0.06	0.00	9.84	2.00	0.00	8.50	0.07	0.00
9.91	2.00	0.00	8.49	0.07	0.00	9.97	2.00	0.00	8.48	0.06	0.00
10.04	2.00	0.00	8.47	0.07	0.00	10.10	2.00	0.00	8.46	0.06	0.00
10.17	2.00	0.00	8.45	0.07	0.00	10.23	2.00	0.00	8.44	0.06	0.00
10.30	2.00	0.00	8.43	0.07	0.00	10.36	2.00	0.00	8.42	0.06	0.00
10.43	2.00	0.00	8.41	0.07	0.00	10.50	2.00	0.00	8.40	0.07	0.00
10.56	2.00	0.00	8.39	0.06	0.00	10.63	2.00	0.00	8.38	0.07	0.00
10.69	2.00	0.00	8.37	0.06	0.00	10.76	2.00	0.00	8.36	0.07	0.00
10.82	2.00	0.00	8.35	0.06	0.00	10.89	2.00	0.00	8.34	0.07	0.00
10.96	2.00	0.00	8.33	0.07	0.00	11.02	2.00	0.00	8.32	0.06	0.00
11.09	2.00	0.00	8.31	0.07	0.00	11.15	2.00	0.00	8.30	0.06	0.00
11.22	2.00	0.00	8.29	0.07	0.00	11.28	2.00	0.00	8.28	0.06	0.00
11.35	2.00	0.00	8.27	0.07	0.00	11.41	2.00	0.00	8.26	0.06	0.00
11.48	2.00	0.00	8.25	0.07	0.00	11.55	2.00	0.00	8.24	0.07	0.00
11.61	2.00	0.00	8.23	0.06	0.00	11.68	2.00	0.00	8.22	0.07	0.00
11.74	2.00	0.00	8.21	0.06	0.00	11.81	2.00	0.00	8.20	0.07	0.00
11.87	2.00	0.00	8.19	0.06	0.00	11.94	2.00	0.00	8.18	0.07	0.00
12.00	2.00	0.00	8.17	0.06	0.00	12.07	2.00	0.00	8.16	0.07	0.00
12.14	2.00	0.00	8.15	0.07	0.00	12.20	2.00	0.00	8.14	0.06	0.00
12.27	2.00	0.00	8.13	0.07	0.00	12.33	2.00	0.00	8.12	0.06	0.00
12.40	2.00	0.00	8.11	0.07	0.00	12.46	2.00	0.00	8.10	0.06	0.00
12.53	2.00	0.00	8.09	0.07	0.00	12.60	2.00	0.00	8.08	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
12.66	2.00	0.00	8.07	0.06	0.00	12.73	2.00	0.00	8.06	0.07	0.00
12.79	2.00	0.00	8.05	0.06	0.00	12.86	2.00	0.00	8.04	0.07	0.00
12.92	2.00	0.00	8.03	0.06	0.00	12.99	2.00	0.00	8.02	0.07	0.00
13.05	2.00	0.00	8.01	0.06	0.00	13.12	2.00	0.00	8.00	0.07	0.00
13.19	2.00	0.00	7.99	0.07	0.00	13.25	2.00	0.00	7.98	0.06	0.00
13.32	2.00	0.00	7.97	0.07	0.00	13.38	2.00	0.00	7.96	0.06	0.00
13.45	2.00	0.00	7.95	0.07	0.00	13.51	2.00	0.00	7.94	0.06	0.00
13.58	2.00	0.00	7.93	0.07	0.00	13.64	2.00	0.00	7.92	0.06	0.00
13.71	2.00	0.00	7.91	0.07	0.00	13.78	2.00	0.00	7.90	0.07	0.00
13.84	2.00	0.00	7.89	0.06	0.00	13.91	2.00	0.00	7.88	0.07	0.00
13.97	2.00	0.00	7.87	0.06	0.00	14.04	2.00	0.00	7.86	0.07	0.00
14.10	2.00	0.00	7.85	0.06	0.00	14.17	2.00	0.00	7.84	0.07	0.00
14.24	2.00	0.00	7.83	0.07	0.00	14.30	2.00	0.00	7.82	0.06	0.00
14.37	2.00	0.00	7.81	0.07	0.00	14.43	2.00	0.00	7.80	0.06	0.00
14.50	2.00	0.00	7.79	0.07	0.00	14.56	2.00	0.00	7.78	0.06	0.00
14.63	2.00	0.00	7.77	0.07	0.00	14.69	2.00	0.00	7.76	0.06	0.00
14.76	2.00	0.00	7.75	0.07	0.00	14.83	2.00	0.00	7.74	0.07	0.00
14.89	2.00	0.00	7.73	0.06	0.00	14.96	2.00	0.00	7.72	0.07	0.00
15.02	2.00	0.00	7.71	0.06	0.00	15.09	2.00	0.00	7.70	0.07	0.00
15.15	2.00	0.00	7.69	0.06	0.00	15.22	2.00	0.00	7.68	0.07	0.00
15.28	2.00	0.00	7.67	0.06	0.00	15.35	2.00	0.00	7.66	0.07	0.00
15.42	2.00	0.00	7.65	0.07	0.00	15.48	2.00	0.00	7.64	0.06	0.00
15.55	2.00	0.00	7.63	0.07	0.00	15.61	2.00	0.00	7.62	0.06	0.00
15.68	2.00	0.00	7.61	0.07	0.00	15.74	2.00	0.00	7.60	0.06	0.00
15.81	2.00	0.00	7.59	0.07	0.00	15.88	2.00	0.00	7.58	0.07	0.00
15.94	2.00	0.00	7.57	0.06	0.00	16.01	2.00	0.00	7.56	0.07	0.00
16.07	2.00	0.00	7.55	0.06	0.00	16.14	2.00	0.00	7.54	0.07	0.00
16.20	2.00	0.00	7.53	0.06	0.00	16.27	2.00	0.00	7.52	0.07	0.00
16.33	2.00	0.00	7.51	0.06	0.00	16.40	2.00	0.00	7.50	0.07	0.00
16.47	2.00	0.00	7.49	0.07	0.00	16.53	2.00	0.00	7.48	0.06	0.00
16.60	2.00	0.00	7.47	0.07	0.00	16.66	2.00	0.00	7.46	0.06	0.00
16.73	2.00	0.00	7.45	0.07	0.00	16.79	2.00	0.00	7.44	0.06	0.00
16.86	2.00	0.00	7.43	0.07	0.00	16.92	2.00	0.00	7.42	0.06	0.00
16.99	2.00	0.00	7.41	0.07	0.00	17.06	2.00	0.00	7.40	0.07	0.00
17.12	2.00	0.00	7.39	0.06	0.00	17.19	2.00	0.00	7.38	0.07	0.00
17.25	2.00	0.00	7.37	0.06	0.00	17.32	2.00	0.00	7.36	0.07	0.00
17.38	2.00	0.00	7.35	0.06	0.00	17.45	2.00	0.00	7.34	0.07	0.00
17.52	2.00	0.00	7.33	0.07	0.00	17.58	2.00	0.00	7.32	0.06	0.00
17.65	2.00	0.00	7.31	0.07	0.00	17.71	2.00	0.00	7.30	0.06	0.00
17.78	2.00	0.00	7.29	0.07	0.00	17.84	2.00	0.00	7.28	0.06	0.00
17.91	2.00	0.00	7.27	0.07	0.00	17.97	2.00	0.00	7.26	0.06	0.00
18.04	2.00	0.00	7.25	0.07	0.00	18.11	2.00	0.00	7.24	0.07	0.00
18.17	2.00	0.00	7.23	0.06	0.00	18.24	2.00	0.00	7.22	0.07	0.00
18.30	2.00	0.00	7.21	0.06	0.00	18.37	2.00	0.00	7.20	0.07	0.00
18.43	2.00	0.00	7.19	0.06	0.00	18.50	2.00	0.00	7.18	0.07	0.00
18.56	2.00	0.00	7.17	0.06	0.00	18.63	2.00	0.00	7.16	0.07	0.00
18.70	2.00	0.00	7.15	0.07	0.00	18.76	2.00	0.00	7.14	0.06	0.00
18.83	2.00	0.00	7.13	0.07	0.00	18.89	2.00	0.00	7.12	0.06	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
18.96	2.00	0.00	7.11	0.07	0.00	19.02	2.00	0.00	7.10	0.06	0.00
19.09	2.00	0.00	7.09	0.07	0.00	19.16	2.00	0.00	7.08	0.07	0.00
19.22	2.00	0.00	7.07	0.06	0.00	19.29	2.00	0.00	7.06	0.07	0.00
19.35	2.00	0.00	7.05	0.06	0.00	19.42	2.00	0.00	7.04	0.07	0.00
19.48	2.00	0.00	7.03	0.06	0.00	19.55	2.00	0.00	7.02	0.07	0.00
19.61	2.00	0.00	7.01	0.06	0.00	19.68	2.00	0.00	7.00	0.07	0.00
19.75	2.00	0.00	6.99	0.07	0.00	19.81	2.00	0.00	6.98	0.06	0.00
19.88	2.00	0.00	6.97	0.07	0.00	19.94	2.00	0.00	6.96	0.06	0.00
20.01	2.00	0.00	6.95	0.07	0.00	20.07	2.00	0.00	6.94	0.06	0.00
20.14	2.00	0.00	6.93	0.07	0.00	20.20	2.00	0.00	6.92	0.06	0.00
20.27	2.00	0.00	6.91	0.07	0.00	20.34	2.00	0.00	6.90	0.07	0.00
20.40	2.00	0.00	6.89	0.06	0.00	20.47	2.00	0.00	6.88	0.07	0.00
20.53	2.00	0.00	6.87	0.06	0.00	20.60	2.00	0.00	6.86	0.07	0.00
20.66	2.00	0.00	6.85	0.06	0.00	20.73	2.00	0.00	6.84	0.07	0.00
20.80	2.00	0.00	6.83	0.07	0.00	20.86	2.00	0.00	6.82	0.06	0.00
20.93	2.00	0.00	6.81	0.07	0.00	20.99	2.00	0.00	6.80	0.06	0.00
21.06	2.00	0.00	6.79	0.07	0.00	21.12	2.00	0.00	6.78	0.06	0.00
21.19	2.00	0.00	6.77	0.07	0.00	21.25	2.00	0.00	6.76	0.06	0.00
21.32	2.00	0.00	6.75	0.07	0.00	21.39	2.00	0.00	6.74	0.07	0.00
21.45	2.00	0.00	6.73	0.06	0.00	21.52	2.00	0.00	6.72	0.07	0.00
21.58	2.00	0.00	6.71	0.06	0.00	21.65	2.00	0.00	6.70	0.07	0.00
21.71	2.00	0.00	6.69	0.06	0.00	21.78	2.00	0.00	6.68	0.07	0.00
21.84	2.00	0.00	6.67	0.06	0.00	21.91	2.00	0.00	6.66	0.07	0.00
21.98	2.00	0.00	6.65	0.07	0.00	22.04	2.00	0.00	6.64	0.06	0.00
22.11	2.00	0.00	6.63	0.07	0.00	22.17	2.00	0.00	6.62	0.06	0.00
22.24	2.00	0.00	6.61	0.07	0.00	22.30	2.00	0.00	6.60	0.06	0.00
22.37	2.00	0.00	6.59	0.07	0.00	22.44	2.00	0.00	6.58	0.07	0.00
22.50	2.00	0.00	6.57	0.06	0.00	22.57	2.00	0.00	6.56	0.07	0.00
22.63	2.00	0.00	6.55	0.06	0.00	22.70	2.00	0.00	6.54	0.07	0.00
22.76	2.00	0.00	6.53	0.06	0.00	22.83	2.00	0.00	6.52	0.07	0.00
22.89	2.00	0.00	6.51	0.06	0.00	22.96	2.00	0.00	6.50	0.07	0.00
23.03	2.00	0.00	6.49	0.07	0.00	23.09	2.00	0.00	6.48	0.06	0.00
23.16	2.00	0.00	6.47	0.07	0.00	23.22	2.00	0.00	6.46	0.06	0.00
23.29	2.00	0.00	6.45	0.07	0.00	23.35	2.00	0.00	6.44	0.06	0.00
23.42	2.00	0.00	6.43	0.07	0.00	23.48	2.00	0.00	6.42	0.06	0.00
23.55	2.00	0.00	6.41	0.07	0.00	23.62	2.00	0.00	6.40	0.07	0.00
23.68	2.00	0.00	6.39	0.06	0.00	23.75	2.00	0.00	6.38	0.07	0.00
23.81	2.00	0.00	6.37	0.06	0.00	23.88	2.00	0.00	6.36	0.07	0.00
23.94	2.00	0.00	6.35	0.06	0.00	24.01	2.00	0.00	6.34	0.07	0.00
24.08	2.00	0.00	6.33	0.07	0.00	24.14	2.00	0.00	6.32	0.06	0.00
24.21	2.00	0.00	6.31	0.07	0.00	24.27	2.00	0.00	6.30	0.06	0.00
24.34	2.00	0.00	6.29	0.07	0.00	24.40	2.00	0.00	6.28	0.06	0.00
24.47	2.00	0.00	6.27	0.07	0.00	24.53	2.00	0.00	6.26	0.06	0.00
24.60	2.00	0.00	6.25	0.07	0.00	24.67	2.00	0.00	6.24	0.07	0.00
24.73	2.00	0.00	6.23	0.06	0.00	24.80	2.00	0.00	6.22	0.07	0.00
24.86	2.00	0.00	6.21	0.06	0.00	24.93	2.00	0.00	6.20	0.07	0.00
24.99	2.00	0.00	6.19	0.06	0.00	25.06	2.00	0.00	6.18	0.07	0.00
25.12	2.00	0.00	6.17	0.06	0.00	25.19	2.00	0.00	6.16	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
25.26	2.00	0.00	6.15	0.07	0.00	25.32	2.00	0.00	6.14	0.06	0.00
25.39	2.00	0.00	6.13	0.07	0.00	25.45	2.00	0.00	6.12	0.06	0.00
25.52	2.00	0.00	6.11	0.07	0.00	25.58	2.00	0.00	6.10	0.06	0.00
25.65	2.00	0.00	6.09	0.07	0.00	25.72	2.00	0.00	6.08	0.07	0.00
25.78	2.00	0.00	6.07	0.06	0.00	25.85	2.00	0.00	6.06	0.07	0.00
25.91	2.00	0.00	6.05	0.06	0.00	25.98	2.00	0.00	6.04	0.07	0.00
26.04	2.00	0.00	6.03	0.06	0.00	26.11	2.00	0.00	6.02	0.07	0.00
26.17	2.00	0.00	6.01	0.06	0.00	26.24	2.00	0.00	6.00	0.07	0.00
26.31	2.00	0.00	5.99	0.07	0.00	26.37	2.00	0.00	5.98	0.06	0.00
26.44	2.00	0.00	5.97	0.07	0.00	26.50	2.00	0.00	5.96	0.06	0.00
26.57	2.00	0.00	5.95	0.07	0.00	26.63	2.00	0.00	5.94	0.06	0.00
26.70	2.00	0.00	5.93	0.07	0.00	26.76	2.00	0.00	5.92	0.06	0.00
26.83	2.00	0.00	5.91	0.07	0.00	26.90	2.00	0.00	5.90	0.07	0.00
26.96	2.00	0.00	5.89	0.06	0.00	27.03	2.00	0.00	5.88	0.07	0.00
27.09	2.00	0.00	5.87	0.06	0.00	27.16	2.00	0.00	5.86	0.07	0.00
27.22	2.00	0.00	5.85	0.06	0.00	27.29	2.00	0.00	5.84	0.07	0.00
27.36	2.00	0.00	5.83	0.07	0.00	27.42	2.00	0.00	5.82	0.06	0.00
27.49	2.00	0.00	5.81	0.07	0.00	27.55	2.00	0.00	5.80	0.06	0.00
27.62	2.00	0.00	5.79	0.07	0.00	27.68	2.00	0.00	5.78	0.06	0.00
27.75	2.00	0.00	5.77	0.07	0.00	27.81	2.00	0.00	5.76	0.06	0.00
27.88	2.00	0.00	5.75	0.07	0.00	27.95	2.00	0.00	5.74	0.07	0.00
28.01	2.00	0.00	5.73	0.06	0.00	28.08	2.00	0.00	5.72	0.07	0.00
28.14	2.00	0.00	5.71	0.06	0.00	28.21	2.00	0.00	5.70	0.07	0.00
28.27	2.00	0.00	5.69	0.06	0.00	28.34	2.00	0.00	5.68	0.07	0.00
28.40	2.00	0.00	5.67	0.06	0.00	28.47	2.00	0.00	5.66	0.07	0.00
28.54	2.00	0.00	5.65	0.07	0.00	28.60	2.00	0.00	5.64	0.06	0.00
28.67	2.00	0.00	5.63	0.07	0.00	28.73	2.00	0.00	5.62	0.06	0.00
28.80	2.00	0.00	5.61	0.07	0.00	28.86	2.00	0.00	5.60	0.06	0.00
28.93	2.00	0.00	5.59	0.07	0.00	29.00	2.00	0.00	5.58	0.07	0.00
29.06	2.00	0.00	5.57	0.06	0.00	29.13	2.00	0.00	5.56	0.07	0.00
29.19	2.00	0.00	5.55	0.06	0.00	29.26	2.00	0.00	5.54	0.07	0.00
29.32	2.00	0.00	5.53	0.06	0.00	29.39	2.00	0.00	5.52	0.07	0.00
29.45	2.00	0.00	5.51	0.06	0.00	29.52	2.00	0.00	5.50	0.07	0.00
29.59	2.00	0.00	5.49	0.07	0.00	29.65	2.00	0.00	5.48	0.06	0.00
29.72	2.00	0.00	5.47	0.07	0.00	29.78	2.00	0.00	5.46	0.06	0.00
29.85	2.00	0.00	5.45	0.07	0.00	29.91	2.00	0.00	5.44	0.06	0.00
29.98	2.00	0.00	5.43	0.07	0.00	30.04	2.00	0.00	5.42	0.06	0.00
30.11	2.00	0.00	5.41	0.07	0.00	30.18	2.00	0.00	5.40	0.07	0.00
30.24	2.00	0.00	5.39	0.06	0.00	30.31	2.00	0.00	5.38	0.07	0.00
30.37	2.00	0.00	5.37	0.06	0.00	30.44	2.00	0.00	5.36	0.07	0.00
30.50	2.00	0.00	5.35	0.06	0.00	30.57	2.00	0.00	5.34	0.07	0.00
30.64	2.00	0.00	5.33	0.07	0.00	30.70	2.00	0.00	5.32	0.06	0.00
30.77	2.00	0.00	5.31	0.07	0.00	30.83	2.00	0.00	5.30	0.06	0.00
30.90	2.00	0.00	5.29	0.07	0.00	30.96	2.00	0.00	5.28	0.06	0.00
31.03	2.00	0.00	5.27	0.07	0.00	31.09	2.00	0.00	5.26	0.06	0.00
31.16	2.00	0.00	5.25	0.07	0.00	31.23	2.00	0.00	5.24	0.07	0.00
31.29	2.00	0.00	5.23	0.06	0.00	31.36	2.00	0.00	5.22	0.07	0.00
31.42	2.00	0.00	5.21	0.06	0.00	31.49	2.00	0.00	5.20	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
31.55	2.00	0.00	5.19	0.06	0.00	31.62	2.00	0.00	5.18	0.07	0.00
31.68	2.00	0.00	5.17	0.06	0.00	31.75	2.00	0.00	5.16	0.07	0.00
31.82	2.00	0.00	5.15	0.07	0.00	31.88	2.00	0.00	5.14	0.06	0.00
31.95	2.00	0.00	5.13	0.07	0.00	32.01	2.00	0.00	5.12	0.06	0.00
32.08	2.00	0.00	5.11	0.07	0.00	32.14	2.00	0.00	5.10	0.06	0.00
32.21	2.00	0.00	5.09	0.07	0.00	32.28	2.00	0.00	5.08	0.07	0.00
32.34	2.00	0.00	5.07	0.06	0.00	32.41	2.00	0.00	5.06	0.07	0.00
32.47	2.00	0.00	5.05	0.06	0.00	32.54	2.00	0.00	5.04	0.07	0.00
32.60	2.00	0.00	5.03	0.06	0.00	32.67	2.00	0.00	5.02	0.07	0.00
32.73	2.00	0.00	5.01	0.06	0.00	32.80	2.00	0.00	5.00	0.07	0.00
32.87	2.00	0.00	4.99	0.07	0.00	32.93	2.00	0.00	4.98	0.06	0.00
33.00	2.00	0.00	4.97	0.07	0.00	33.06	2.00	0.00	4.96	0.06	0.00
33.13	2.00	0.00	4.95	0.07	0.00	33.19	2.00	0.00	4.94	0.06	0.00
33.26	2.00	0.00	4.93	0.07	0.00	33.32	2.00	0.00	4.92	0.06	0.00
33.39	2.00	0.00	4.91	0.07	0.00	33.46	2.00	0.00	4.90	0.07	0.00
33.52	2.00	0.00	4.89	0.06	0.00	33.59	2.00	0.00	4.88	0.07	0.00
33.65	2.00	0.00	4.87	0.06	0.00	33.72	2.00	0.00	4.86	0.07	0.00
33.78	2.00	0.00	4.85	0.06	0.00	33.85	2.00	0.00	4.84	0.07	0.00
33.92	2.00	0.00	4.83	0.07	0.00	33.98	2.00	0.00	4.82	0.06	0.00
34.05	2.00	0.00	4.81	0.07	0.00	34.11	2.00	0.00	4.80	0.06	0.00
34.18	2.00	0.00	4.79	0.07	0.00	34.24	2.00	0.00	4.78	0.06	0.00
34.31	2.00	0.00	4.77	0.07	0.00	34.37	2.00	0.00	4.76	0.06	0.00
34.44	2.00	0.00	4.75	0.07	0.00	34.51	2.00	0.00	4.74	0.07	0.00
34.57	2.00	0.00	4.73	0.06	0.00	34.64	2.00	0.00	4.72	0.07	0.00
34.70	2.00	0.00	4.71	0.06	0.00	34.77	2.00	0.00	4.70	0.07	0.00
34.83	2.00	0.00	4.69	0.06	0.00	34.90	2.00	0.00	4.68	0.07	0.00
34.96	2.00	0.00	4.67	0.06	0.00	35.03	2.00	0.00	4.66	0.07	0.00
35.10	2.00	0.00	4.65	0.07	0.00	35.16	2.00	0.00	4.64	0.06	0.00
35.23	2.00	0.00	4.63	0.07	0.00	35.29	2.00	0.00	4.62	0.06	0.00
35.36	2.00	0.00	4.61	0.07	0.00	35.42	2.00	0.00	4.60	0.06	0.00
35.49	2.00	0.00	4.59	0.07	0.00	35.56	2.00	0.00	4.58	0.07	0.00
35.62	2.00	0.00	4.57	0.06	0.00	35.69	2.00	0.00	4.56	0.07	0.00
35.75	2.00	0.00	4.55	0.06	0.00	35.82	2.00	0.00	4.54	0.07	0.00
35.88	2.00	0.00	4.53	0.06	0.00	35.95	2.00	0.00	4.52	0.07	0.00
36.01	2.00	0.00	4.51	0.06	0.00	36.08	2.00	0.00	4.50	0.07	0.00
36.15	2.00	0.00	4.49	0.07	0.00	36.21	2.00	0.00	4.48	0.06	0.00
36.28	2.00	0.00	4.47	0.07	0.00	36.34	2.00	0.00	4.46	0.06	0.00
36.41	2.00	0.00	4.45	0.07	0.00	36.47	2.00	0.00	4.44	0.06	0.00
36.54	2.00	0.00	4.43	0.07	0.00	36.60	2.00	0.00	4.42	0.06	0.00
36.67	2.00	0.00	4.41	0.07	0.00	36.74	2.00	0.00	4.40	0.07	0.00
36.80	2.00	0.00	4.39	0.06	0.00	36.87	2.00	0.00	4.38	0.07	0.00
36.93	2.00	0.00	4.37	0.06	0.00	37.00	2.00	0.00	4.36	0.07	0.00
37.06	2.00	0.00	4.35	0.06	0.00	37.13	2.00	0.00	4.34	0.07	0.00
37.20	2.00	0.00	4.33	0.07	0.00	37.26	2.00	0.00	4.32	0.06	0.00
37.33	2.00	0.00	4.31	0.07	0.00	37.39	2.00	0.00	4.30	0.06	0.00
37.46	2.00	0.00	4.29	0.07	0.00	37.52	2.00	0.00	4.28	0.06	0.00
37.59	2.00	0.00	4.27	0.07	0.00	37.65	2.00	0.00	4.26	0.06	0.00
37.72	2.00	0.00	4.25	0.07	0.00	37.79	2.00	0.00	4.24	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
37.85	2.00	0.00	4.23	0.06	0.00	37.92	2.00	0.00	4.22	0.07	0.00
37.98	2.00	0.00	4.21	0.06	0.00	38.05	2.00	0.00	4.20	0.07	0.00
38.11	2.00	0.00	4.19	0.06	0.00	38.18	2.00	0.00	4.18	0.07	0.00
38.24	2.00	0.00	4.17	0.06	0.00	38.31	2.00	0.00	4.16	0.07	0.00
38.38	2.00	0.00	4.15	0.07	0.00	38.44	2.00	0.00	4.14	0.06	0.00
38.51	2.00	0.00	4.13	0.07	0.00	38.57	2.00	0.00	4.12	0.06	0.00
38.64	2.00	0.00	4.11	0.07	0.00	38.70	2.00	0.00	4.10	0.06	0.00
38.77	2.00	0.00	4.09	0.07	0.00	38.84	2.00	0.00	4.08	0.07	0.00
38.90	2.00	0.00	4.07	0.06	0.00	38.97	2.00	0.00	4.06	0.07	0.00
39.03	2.00	0.00	4.05	0.06	0.00	39.10	2.00	0.00	4.04	0.07	0.00
39.16	2.00	0.00	4.03	0.06	0.00	39.23	2.00	0.00	4.02	0.07	0.00
39.29	2.00	0.00	4.01	0.06	0.00	39.36	2.00	0.00	4.00	0.07	0.00
39.43	2.00	0.00	3.99	0.07	0.00	39.49	2.00	0.00	3.98	0.06	0.00
39.56	2.00	0.00	3.97	0.07	0.00	39.62	2.00	0.00	3.96	0.06	0.00
39.69	2.00	0.00	3.95	0.07	0.00	39.75	2.00	0.00	3.94	0.06	0.00
39.82	2.00	0.00	3.93	0.07	0.00	39.88	2.00	0.00	3.92	0.06	0.00
39.95	2.00	0.00	3.91	0.07	0.00	40.02	2.00	0.00	3.90	0.07	0.00
40.08	2.00	0.00	3.89	0.06	0.00	40.15	2.00	0.00	3.88	0.07	0.00
40.21	2.00	0.00	3.87	0.06	0.00	40.28	2.00	0.00	3.86	0.07	0.00
40.34	2.00	0.00	3.85	0.06	0.00	40.41	2.00	0.00	3.84	0.07	0.00
40.48	2.00	0.00	3.83	0.07	0.00	40.54	2.00	0.00	3.82	0.06	0.00
40.61	2.00	0.00	3.81	0.07	0.00	40.67	2.00	0.00	3.80	0.06	0.00
40.74	2.00	0.00	3.79	0.07	0.00	40.80	2.00	0.00	3.78	0.06	0.00
40.87	2.00	0.00	3.77	0.07	0.00	40.93	2.00	0.00	3.76	0.06	0.00
41.00	2.00	0.00	3.75	0.07	0.00	41.07	2.00	0.00	3.74	0.07	0.00
41.13	2.00	0.00	3.73	0.06	0.00	41.20	2.00	0.00	3.72	0.07	0.00
41.26	2.00	0.00	3.71	0.06	0.00	41.33	2.00	0.00	3.70	0.07	0.00
41.39	2.00	0.00	3.69	0.06	0.00	41.46	2.00	0.00	3.68	0.07	0.00
41.52	2.00	0.00	3.67	0.06	0.00	41.59	2.00	0.00	3.66	0.07	0.00
41.66	2.00	0.00	3.65	0.07	0.00	41.72	2.00	0.00	3.64	0.06	0.00
41.79	2.00	0.00	3.63	0.07	0.00	41.85	2.00	0.00	3.62	0.06	0.00
41.92	2.00	0.00	3.61	0.07	0.00	41.98	2.00	0.00	3.60	0.06	0.00
42.05	2.00	0.00	3.59	0.07	0.00	42.12	2.00	0.00	3.58	0.07	0.00
42.18	2.00	0.00	3.57	0.06	0.00	42.25	2.00	0.00	3.56	0.07	0.00
42.31	2.00	0.00	3.55	0.06	0.00	42.38	2.00	0.00	3.54	0.07	0.00
42.44	2.00	0.00	3.53	0.06	0.00	42.51	2.00	0.00	3.52	0.07	0.00
42.57	2.00	0.00	3.51	0.06	0.00	42.64	2.00	0.00	3.50	0.07	0.00
42.71	2.00	0.00	3.49	0.07	0.00	42.77	2.00	0.00	3.48	0.06	0.00
42.84	2.00	0.00	3.47	0.07	0.00	42.90	2.00	0.00	3.46	0.06	0.00
42.97	2.00	0.00	3.45	0.07	0.00	43.03	2.00	0.00	3.44	0.06	0.00
43.10	2.00	0.00	3.43	0.07	0.00	43.16	2.00	0.00	3.42	0.06	0.00
43.23	2.00	0.00	3.41	0.07	0.00	43.30	2.00	0.00	3.40	0.07	0.00
43.36	2.00	0.00	3.39	0.06	0.00	43.43	2.00	0.00	3.38	0.07	0.00
43.49	2.00	0.00	3.37	0.06	0.00	43.56	2.00	0.00	3.36	0.07	0.00
43.62	2.00	0.00	3.35	0.06	0.00	43.69	2.00	0.00	3.34	0.07	0.00
43.76	2.00	0.00	3.33	0.07	0.00	43.82	2.00	0.00	3.32	0.06	0.00
43.89	2.00	0.00	3.31	0.07	0.00	43.95	2.00	0.00	3.30	0.06	0.00
44.02	2.00	0.00	3.29	0.07	0.00	44.08	2.00	0.00	3.28	0.06	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
44.15	2.00	0.00	3.27	0.07	0.00	44.21	2.00	0.00	3.26	0.06	0.00
44.28	2.00	0.00	3.25	0.07	0.00	44.35	2.00	0.00	3.24	0.07	0.00
44.41	2.00	0.00	3.23	0.06	0.00	44.48	2.00	0.00	3.22	0.07	0.00
44.54	2.00	0.00	3.21	0.06	0.00	44.61	2.00	0.00	3.20	0.07	0.00
44.67	2.00	0.00	3.19	0.06	0.00	44.74	2.00	0.00	3.18	0.07	0.00
44.80	2.00	0.00	3.17	0.06	0.00	44.87	2.00	0.00	3.16	0.07	0.00
44.94	2.00	0.00	3.15	0.07	0.00	45.00	2.00	0.00	3.14	0.06	0.00
45.07	2.00	0.00	3.13	0.07	0.00	45.13	2.00	0.00	3.12	0.06	0.00
45.20	2.00	0.00	3.11	0.07	0.00	45.26	2.00	0.00	3.10	0.06	0.00
45.33	2.00	0.00	3.09	0.07	0.00	45.40	2.00	0.00	3.08	0.07	0.00
45.46	2.00	0.00	3.07	0.06	0.00	45.53	2.00	0.00	3.06	0.07	0.00
45.59	2.00	0.00	3.05	0.06	0.00	45.66	2.00	0.00	3.04	0.07	0.00
45.72	2.00	0.00	3.03	0.06	0.00	45.79	2.00	0.00	3.02	0.07	0.00
45.85	2.00	0.00	3.01	0.06	0.00	45.92	2.00	0.00	3.00	0.07	0.00
45.99	2.00	0.00	2.99	0.07	0.00	46.05	2.00	0.00	2.98	0.06	0.00
46.12	2.00	0.00	2.97	0.07	0.00	46.18	2.00	0.00	2.96	0.06	0.00
46.25	2.00	0.00	2.95	0.07	0.00	46.31	2.00	0.00	2.94	0.06	0.00
46.38	2.00	0.00	2.93	0.07	0.00	46.45	2.00	0.00	2.92	0.07	0.00
46.51	2.00	0.00	2.91	0.06	0.00	46.58	2.00	0.00	2.90	0.07	0.00
46.64	2.00	0.00	2.89	0.06	0.00	46.71	2.00	0.00	2.88	0.07	0.00
46.77	2.00	0.00	2.87	0.06	0.00	46.84	2.00	0.00	2.86	0.07	0.00
46.90	2.00	0.00	2.85	0.06	0.00	46.97	2.00	0.00	2.84	0.07	0.00
47.04	2.00	0.00	2.83	0.07	0.00	47.10	2.00	0.00	2.82	0.06	0.00
47.17	2.00	0.00	2.81	0.07	0.00	47.23	2.00	0.00	2.80	0.06	0.00
47.30	2.00	0.00	2.79	0.07	0.00	47.36	2.00	0.00	2.78	0.06	0.00
47.43	2.00	0.00	2.77	0.07	0.00	47.49	2.00	0.00	2.76	0.06	0.00
47.56	2.00	0.00	2.75	0.07	0.00	47.63	2.00	0.00	2.74	0.07	0.00
47.69	2.00	0.00	2.73	0.06	0.00	47.76	2.00	0.00	2.72	0.07	0.00
47.82	2.00	0.00	2.71	0.06	0.00	47.89	2.00	0.00	2.70	0.07	0.00
47.95	2.00	0.00	2.69	0.06	0.00	48.02	2.00	0.00	2.68	0.07	0.00
48.09	2.00	0.00	2.67	0.07	0.00	48.15	2.00	0.00	2.66	0.06	0.00
48.22	2.00	0.00	2.65	0.07	0.00	48.28	2.00	0.00	2.64	0.06	0.00
48.35	2.00	0.00	2.63	0.07	0.00	48.41	2.00	0.00	2.62	0.06	0.00
48.48	2.00	0.00	2.61	0.07	0.00	48.54	2.00	0.00	2.60	0.06	0.00
48.61	2.00	0.00	2.59	0.07	0.00	48.68	2.00	0.00	2.58	0.07	0.00
48.74	2.00	0.00	2.57	0.06	0.00	48.81	2.00	0.00	2.56	0.07	0.00
48.87	2.00	0.00	2.55	0.06	0.00	48.94	2.00	0.00	2.54	0.07	0.00
49.00	2.00	0.00	2.53	0.06	0.00	49.07	2.00	0.00	2.52	0.07	0.00
49.13	2.00	0.00	2.51	0.06	0.00	49.20	2.00	0.00	2.50	0.07	0.00
49.27	2.00	0.00	2.49	0.07	0.00	49.33	2.00	0.00	2.48	0.06	0.00
49.40	2.00	0.00	2.47	0.07	0.00	49.46	2.00	0.00	2.46	0.06	0.00
49.53	2.00	0.00	2.45	0.07	0.00	49.59	2.00	0.00	2.44	0.06	0.00
49.66	2.00	0.00	2.43	0.07	0.00	49.73	2.00	0.00	2.42	0.07	0.00
49.79	2.00	0.00	2.41	0.06	0.00	49.86	2.00	0.00	2.40	0.07	0.00
49.92	2.00	0.00	2.39	0.06	0.00	49.99	2.00	0.00	2.38	0.07	0.00
50.05	2.00	0.00	2.37	0.06	0.00	50.12	2.00	0.00	2.36	0.07	0.00
50.18	2.00	0.00	2.35	0.06	0.00	50.25	2.00	0.00	2.34	0.07	0.00
50.32	2.00	0.00	2.33	0.07	0.00	50.38	2.00	0.00	2.32	0.06	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
50.45	2.00	0.00	2.31	0.07	0.00	50.51	2.00	0.00	2.30	0.06	0.00
50.58	2.00	0.00	2.29	0.07	0.00	50.64	2.00	0.00	2.28	0.06	0.00
50.71	2.00	0.00	2.27	0.07	0.00	50.77	2.00	0.00	2.26	0.06	0.00
50.84	2.00	0.00	2.25	0.07	0.00	50.91	2.00	0.00	2.24	0.07	0.00
50.97	2.00	0.00	2.23	0.06	0.00	51.04	2.00	0.00	2.22	0.07	0.00
51.10	2.00	0.00	2.21	0.06	0.00	51.17	2.00	0.00	2.20	0.07	0.00
51.23	2.00	0.00	2.19	0.06	0.00	51.30	2.00	0.00	2.18	0.07	0.00
51.37	2.00	0.00	2.17	0.07	0.00	51.43	2.00	0.00	2.16	0.06	0.00
51.50	2.00	0.00	2.15	0.07	0.00	51.56	2.00	0.00	2.14	0.06	0.00
51.63	2.00	0.00	2.13	0.07	0.00	51.69	2.00	0.00	2.12	0.06	0.00
51.76	2.00	0.00	2.11	0.07	0.00	51.82	2.00	0.00	2.10	0.06	0.00
51.89	2.00	0.00	2.09	0.07	0.00	51.96	2.00	0.00	2.08	0.07	0.00
52.02	2.00	0.00	2.07	0.06	0.00	52.09	2.00	0.00	2.06	0.07	0.00
52.15	2.00	0.00	2.05	0.06	0.00	52.22	2.00	0.00	2.04	0.07	0.00
52.28	2.00	0.00	2.03	0.06	0.00	52.35	2.00	0.00	2.02	0.07	0.00
52.41	2.00	0.00	2.01	0.06	0.00	52.48	2.00	0.00	2.00	0.07	0.00
52.55	2.00	0.00	1.99	0.07	0.00	52.61	2.00	0.00	1.98	0.06	0.00
52.68	2.00	0.00	1.97	0.07	0.00	52.74	2.00	0.00	1.96	0.06	0.00
52.81	2.00	0.00	1.95	0.07	0.00	52.87	2.00	0.00	1.94	0.06	0.00
52.94	2.00	0.00	1.93	0.07	0.00	53.01	2.00	0.00	1.92	0.07	0.00
53.07	2.00	0.00	1.91	0.06	0.00	53.14	2.00	0.00	1.90	0.07	0.00
53.20	2.00	0.00	1.89	0.06	0.00	53.27	2.00	0.00	1.88	0.07	0.00
53.33	2.00	0.00	1.87	0.06	0.00	53.40	2.00	0.00	1.86	0.07	0.00
53.46	2.00	0.00	1.85	0.06	0.00	53.53	2.00	0.00	1.84	0.07	0.00
53.60	2.00	0.00	1.83	0.07	0.00	53.66	2.00	0.00	1.82	0.06	0.00
53.73	2.00	0.00	1.81	0.07	0.00	53.79	2.00	0.00	1.80	0.06	0.00
53.86	2.00	0.00	1.79	0.07	0.00	53.92	2.00	0.00	1.78	0.06	0.00
53.99	2.00	0.00	1.77	0.07	0.00	54.05	2.00	0.00	1.76	0.06	0.00
54.12	2.00	0.00	1.75	0.07	0.00	54.19	2.00	0.00	1.74	0.07	0.00
54.25	2.00	0.00	1.73	0.06	0.00	54.32	2.00	0.00	1.72	0.07	0.00
54.38	2.00	0.00	1.71	0.06	0.00	54.45	2.00	0.00	1.70	0.07	0.00
54.51	2.00	0.00	1.69	0.06	0.00	54.58	2.00	0.00	1.68	0.07	0.00
54.65	2.00	0.00	1.67	0.07	0.00	54.71	2.00	0.00	1.66	0.06	0.00
54.78	2.00	0.00	1.65	0.07	0.00	54.84	2.00	0.00	1.64	0.06	0.00
54.91	2.00	0.00	1.63	0.07	0.00	54.97	2.00	0.00	1.62	0.06	0.00
55.04	2.00	0.00	1.61	0.07	0.00	55.10	2.00	0.00	1.60	0.06	0.00
55.17	2.00	0.00	1.59	0.07	0.00	55.24	2.00	0.00	1.58	0.07	0.00
55.30	2.00	0.00	1.57	0.06	0.00	55.37	2.00	0.00	1.56	0.07	0.00
55.43	2.00	0.00	1.55	0.06	0.00	55.50	2.00	0.00	1.54	0.07	0.00
55.56	2.00	0.00	1.53	0.06	0.00	55.63	2.00	0.00	1.52	0.07	0.00
55.69	2.00	0.00	1.51	0.06	0.00	55.76	2.00	0.00	1.50	0.07	0.00
55.83	2.00	0.00	1.49	0.07	0.00	55.89	2.00	0.00	1.48	0.06	0.00
55.96	2.00	0.00	1.47	0.07	0.00	56.02	2.00	0.00	1.46	0.06	0.00
56.09	2.00	0.00	1.45	0.07	0.00	56.15	2.00	0.00	1.44	0.06	0.00
56.22	2.00	0.00	1.43	0.07	0.00	56.29	2.00	0.00	1.42	0.07	0.00
56.35	2.00	0.00	1.41	0.06	0.00	56.42	2.00	0.00	1.40	0.07	0.00
56.48	2.00	0.00	1.39	0.06	0.00	56.55	2.00	0.00	1.38	0.07	0.00
56.61	2.00	0.00	1.37	0.06	0.00	56.68	2.00	0.00	1.36	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
56.74	2.00	0.00	1.35	0.06	0.00	56.81	2.00	0.00	1.34	0.07	0.00
56.88	2.00	0.00	1.33	0.07	0.00	56.94	2.00	0.00	1.32	0.06	0.00
57.01	2.00	0.00	1.31	0.07	0.00	57.07	2.00	0.00	1.30	0.06	0.00
57.14	2.00	0.00	1.29	0.07	0.00	57.20	2.00	0.00	1.28	0.06	0.00
57.27	2.00	0.00	1.27	0.07	0.00	57.33	2.00	0.00	1.26	0.06	0.00
57.40	2.00	0.00	1.25	0.07	0.00	57.47	2.00	0.00	1.24	0.07	0.00
57.53	2.00	0.00	1.23	0.06	0.00	57.60	2.00	0.00	1.22	0.07	0.00
57.66	2.00	0.00	1.21	0.06	0.00	57.73	2.00	0.00	1.20	0.07	0.00
57.79	2.00	0.00	1.19	0.06	0.00	57.86	2.00	0.00	1.18	0.07	0.00
57.93	2.00	0.00	1.17	0.07	0.00	57.99	2.00	0.00	1.16	0.06	0.00
58.06	2.00	0.00	1.15	0.07	0.00	58.12	2.00	0.00	1.14	0.06	0.00
58.19	2.00	0.00	1.13	0.07	0.00	58.25	2.00	0.00	1.12	0.06	0.00
58.32	2.00	0.00	1.11	0.07	0.00	58.38	2.00	0.00	1.10	0.06	0.00
58.45	2.00	0.00	1.09	0.07	0.00	58.52	2.00	0.00	1.08	0.07	0.00
58.58	2.00	0.00	1.07	0.06	0.00	58.65	2.00	0.00	1.06	0.07	0.00
58.71	2.00	0.00	1.05	0.06	0.00	58.78	2.00	0.00	1.04	0.07	0.00
58.84	2.00	0.00	1.03	0.06	0.00	58.91	2.00	0.00	1.02	0.07	0.00
58.97	2.00	0.00	1.01	0.06	0.00	59.04	2.00	0.00	1.00	0.07	0.00
59.11	2.00	0.00	0.99	0.07	0.00	59.17	2.00	0.00	0.98	0.06	0.00
59.24	2.00	0.00	0.97	0.07	0.00	59.30	2.00	0.00	0.96	0.06	0.00
59.37	2.00	0.00	0.95	0.07	0.00	59.43	2.00	0.00	0.94	0.06	0.00
59.50	2.00	0.00	0.93	0.07	0.00	59.57	2.00	0.00	0.92	0.07	0.00
59.63	2.00	0.00	0.91	0.06	0.00	59.70	2.00	0.00	0.90	0.07	0.00
59.76	2.00	0.00	0.89	0.06	0.00	59.83	2.00	0.00	0.88	0.07	0.00
59.89	2.00	0.00	0.87	0.06	0.00	59.96	2.00	0.00	0.86	0.07	0.00
60.02	2.00	0.00	0.85	0.06	0.00	60.09	2.00	0.00	0.84	0.07	0.00
60.16	2.00	0.00	0.83	0.07	0.00	60.22	2.00	0.00	0.82	0.06	0.00
60.29	2.00	0.00	0.81	0.07	0.00	60.35	2.00	0.00	0.80	0.06	0.00
60.42	2.00	0.00	0.79	0.07	0.00	60.48	2.00	0.00	0.78	0.06	0.00
60.55	2.00	0.00	0.77	0.07	0.00	60.61	2.00	0.00	0.76	0.06	0.00
60.68	2.00	0.00	0.75	0.07	0.00	60.75	2.00	0.00	0.74	0.07	0.00
60.81	2.00	0.00	0.73	0.06	0.00	60.88	2.00	0.00	0.72	0.07	0.00
60.94	2.00	0.00	0.71	0.06	0.00	61.01	2.00	0.00	0.70	0.07	0.00
61.07	2.00	0.00	0.69	0.06	0.00	61.14	2.00	0.00	0.68	0.07	0.00
61.21	2.00	0.00	0.67	0.07	0.00	61.27	2.00	0.00	0.66	0.06	0.00
61.34	2.00	0.00	0.65	0.07	0.00	61.40	2.00	0.00	0.64	0.06	0.00
61.47	2.00	0.00	0.63	0.07	0.00	61.53	2.00	0.00	0.62	0.06	0.00
61.60	2.00	0.00	0.61	0.07	0.00	61.66	2.00	0.00	0.60	0.06	0.00
61.73	2.00	0.00	0.59	0.07	0.00	61.80	2.00	0.00	0.58	0.07	0.00
61.86	2.00	0.00	0.57	0.06	0.00	61.93	2.00	0.00	0.56	0.07	0.00
61.99	2.00	0.00	0.55	0.06	0.00	62.06	2.00	0.00	0.54	0.07	0.00
62.12	2.00	0.00	0.53	0.06	0.00	62.19	2.00	0.00	0.52	0.07	0.00
62.25	2.00	0.00	0.51	0.06	0.00	62.32	2.00	0.00	0.50	0.07	0.00
62.39	2.00	0.00	0.49	0.07	0.00	62.45	2.00	0.00	0.48	0.06	0.00
62.52	2.00	0.00	0.47	0.07	0.00	62.58	2.00	0.00	0.46	0.06	0.00
62.65	2.00	0.00	0.45	0.07	0.00	62.71	2.00	0.00	0.44	0.06	0.00
62.78	2.00	0.00	0.43	0.07	0.00	62.85	2.00	0.00	0.42	0.07	0.00
62.91	2.00	0.00	0.41	0.06	0.00	62.98	2.00	0.00	0.40	0.07	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
63.04	2.00	0.00	0.39	0.06	0.00	63.11	2.00	0.00	0.38	0.07	0.00
63.17	2.00	0.00	0.37	0.06	0.00	63.24	2.00	0.00	0.36	0.07	0.00
63.30	2.00	0.00	0.35	0.06	0.00	63.37	2.00	0.00	0.34	0.07	0.00
63.44	2.00	0.00	0.33	0.07	0.00	63.50	2.00	0.00	0.32	0.06	0.00
63.57	2.00	0.00	0.31	0.07	0.00	63.63	2.00	0.00	0.30	0.06	0.00
63.70	2.00	0.00	0.29	0.07	0.00	63.76	2.00	0.00	0.28	0.06	0.00
63.83	2.00	0.00	0.27	0.07	0.00	63.89	2.00	0.00	0.26	0.06	0.00
63.96	2.00	0.00	0.25	0.07	0.00	64.03	2.00	0.00	0.24	0.07	0.00
64.09	2.00	0.00	0.23	0.06	0.00	64.16	2.00	0.00	0.22	0.07	0.00
64.22	2.00	0.00	0.21	0.06	0.00	64.29	2.00	0.00	0.20	0.07	0.00
64.35	2.00	0.00	0.19	0.06	0.00	64.42	2.00	0.00	0.18	0.07	0.00
64.49	2.00	0.00	0.17	0.07	0.00	64.55	2.00	0.00	0.16	0.06	0.00
64.62	2.00	0.00	0.15	0.07	0.00	64.68	2.00	0.00	0.14	0.06	0.00
64.75	2.00	0.00	0.13	0.07	0.00	64.81	2.00	0.00	0.12	0.06	0.00
64.88	2.00	0.00	0.11	0.07	0.00	64.94	2.00	0.00	0.10	0.06	0.00
65.01	2.00	0.00	0.09	0.07	0.00	65.08	2.00	0.00	0.08	0.07	0.00
65.14	2.00	0.00	0.07	0.06	0.00	65.21	2.00	0.00	0.06	0.07	0.00
65.27	2.00	0.00	0.05	0.06	0.00	65.34	2.00	0.00	0.04	0.07	0.00
65.40	2.00	0.00	0.03	0.06	0.00	65.47	2.00	0.00	0.02	0.07	0.00
65.53	2.00	0.00	0.01	0.06	0.00	65.60	2.00	0.00	0.00	0.07	0.00
65.67	2.00	0.00	0.00	0.00	0.00	65.73	2.00	0.00	0.00	0.00	0.00
65.80	2.00	0.00	0.00	0.00	0.00	65.86	2.00	0.00	0.00	0.00	0.00
65.93	2.00	0.00	0.00	0.00	0.00	65.99	2.00	0.00	0.00	0.00	0.00
66.06	2.00	0.00	0.00	0.00	0.00	66.13	2.00	0.00	0.00	0.00	0.00
66.19	2.00	0.00	0.00	0.00	0.00	66.26	2.00	0.00	0.00	0.00	0.00
66.32	2.00	0.00	0.00	0.00	0.00	66.39	2.00	0.00	0.00	0.00	0.00
66.45	2.00	0.00	0.00	0.00	0.00	66.52	2.00	0.00	0.00	0.00	0.00
66.58	2.00	0.00	0.00	0.00	0.00	66.65	2.00	0.00	0.00	0.00	0.00
66.72	2.00	0.00	0.00	0.00	0.00	66.78	2.00	0.00	0.00	0.00	0.00
66.85	2.00	0.00	0.00	0.00	0.00	66.91	2.00	0.00	0.00	0.00	0.00
66.98	2.00	0.00	0.00	0.00	0.00	67.04	2.00	0.00	0.00	0.00	0.00
67.11	2.00	0.00	0.00	0.00	0.00	67.17	2.00	0.00	0.00	0.00	0.00
67.24	2.00	0.00	0.00	0.00	0.00	67.31	2.00	0.00	0.00	0.00	0.00
67.37	2.00	0.00	0.00	0.00	0.00	67.44	2.00	0.00	0.00	0.00	0.00
67.50	2.00	0.00	0.00	0.00	0.00	67.57	2.00	0.00	0.00	0.00	0.00
67.63	2.00	0.00	0.00	0.00	0.00	67.70	2.00	0.00	0.00	0.00	0.00
67.77	2.00	0.00	0.00	0.00	0.00	67.83	2.00	0.00	0.00	0.00	0.00
67.90	2.00	0.00	0.00	0.00	0.00	67.96	2.00	0.00	0.00	0.00	0.00
68.03	2.00	0.00	0.00	0.00	0.00	68.09	2.00	0.00	0.00	0.00	0.00
68.16	2.00	0.00	0.00	0.00	0.00	68.22	2.00	0.00	0.00	0.00	0.00
68.29	2.00	0.00	0.00	0.00	0.00	68.36	2.00	0.00	0.00	0.00	0.00
68.42	2.00	0.00	0.00	0.00	0.00	68.49	2.00	0.00	0.00	0.00	0.00
68.55	2.00	0.00	0.00	0.00	0.00	68.62	2.00	0.00	0.00	0.00	0.00
68.68	2.00	0.00	0.00	0.00	0.00	68.75	2.00	0.00	0.00	0.00	0.00
68.81	2.00	0.00	0.00	0.00	0.00	68.88	2.00	0.00	0.00	0.00	0.00
68.95	2.00	0.00	0.00	0.00	0.00	69.01	2.00	0.00	0.00	0.00	0.00
69.08	2.00	0.00	0.00	0.00	0.00	69.14	2.00	0.00	0.00	0.00	0.00
69.21	2.00	0.00	0.00	0.00	0.00	69.27	2.00	0.00	0.00	0.00	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI
69.34	2.00	0.00	0.00	0.00	0.00	69.41	2.00	0.00	0.00	0.00	0.00
69.47	2.00	0.00	0.00	0.00	0.00	69.54	2.00	0.00	0.00	0.00	0.00
69.60	2.00	0.00	0.00	0.00	0.00	69.67	2.00	0.00	0.00	0.00	0.00
69.73	2.00	0.00	0.00	0.00	0.00	69.80	2.00	0.00	0.00	0.00	0.00
69.86	2.00	0.00	0.00	0.00	0.00	69.93	2.00	0.00	0.00	0.00	0.00
70.00	2.00	0.00	0.00	0.00	0.00	70.06	2.00	0.00	0.00	0.00	0.00
70.13	2.00	0.00	0.00	0.00	0.00	70.19	2.00	0.00	0.00	0.00	0.00
70.26	2.00	0.00	0.00	0.00	0.00	70.32	2.00	0.00	0.00	0.00	0.00
70.39	2.00	0.00	0.00	0.00	0.00	70.45	2.00	0.00	0.00	0.00	0.00
70.52	2.00	0.00	0.00	0.00	0.00	70.59	2.00	0.00	0.00	0.00	0.00
70.65	2.00	0.00	0.00	0.00	0.00	70.72	2.00	0.00	0.00	0.00	0.00
70.78	2.00	0.00	0.00	0.00	0.00	70.85	2.00	0.00	0.00	0.00	0.00
70.91	2.00	0.00	0.00	0.00	0.00	70.98	2.00	0.00	0.00	0.00	0.00
71.05	2.00	0.00	0.00	0.00	0.00	71.11	2.00	0.00	0.00	0.00	0.00
71.18	2.00	0.00	0.00	0.00	0.00	71.24	2.00	0.00	0.00	0.00	0.00
71.31	2.00	0.00	0.00	0.00	0.00	71.37	2.00	0.00	0.00	0.00	0.00
71.44	2.00	0.00	0.00	0.00	0.00	71.50	2.00	0.00	0.00	0.00	0.00
71.57	2.00	0.00	0.00	0.00	0.00	71.64	2.00	0.00	0.00	0.00	0.00
71.70	2.00	0.00	0.00	0.00	0.00	71.77	2.00	0.00	0.00	0.00	0.00
71.83	2.00	0.00	0.00	0.00	0.00	71.90	2.00	0.00	0.00	0.00	0.00
71.96	2.00	0.00	0.00	0.00	0.00	72.03	2.00	0.00	0.00	0.00	0.00
72.09	2.00	0.00	0.00	0.00	0.00	72.16	2.00	0.00	0.00	0.00	0.00
72.23	2.00	0.00	0.00	0.00	0.00	72.29	2.00	0.00	0.00	0.00	0.00
72.36	2.00	0.00	0.00	0.00	0.00	72.42	2.00	0.00	0.00	0.00	0.00
72.49	2.00	0.00	0.00	0.00	0.00	72.55	2.00	0.00	0.00	0.00	0.00
72.62	2.00	0.00	0.00	0.00	0.00	72.69	2.00	0.00	0.00	0.00	0.00
72.75	2.00	0.00	0.00	0.00	0.00	72.82	2.00	0.00	0.00	0.00	0.00
72.88	2.00	0.00	0.00	0.00	0.00	72.95	2.00	0.00	0.00	0.00	0.00
73.01	2.00	0.00	0.00	0.00	0.00	73.08	2.00	0.00	0.00	0.00	0.00
73.14	2.00	0.00	0.00	0.00	0.00	73.21	2.00	0.00	0.00	0.00	0.00
73.28	2.00	0.00	0.00	0.00	0.00	73.34	2.00	0.00	0.00	0.00	0.00
73.41	2.00	0.00	0.00	0.00	0.00	73.47	2.00	0.00	0.00	0.00	0.00
73.54	2.00	0.00	0.00	0.00	0.00	73.60	2.00	0.00	0.00	0.00	0.00
73.67	2.00	0.00	0.00	0.00	0.00	73.73	2.00	0.00	0.00	0.00	0.00
73.80	2.00	0.00	0.00	0.00	0.00	73.87	2.00	0.00	0.00	0.00	0.00
73.93	2.00	0.00	0.00	0.00	0.00	74.00	2.00	0.00	0.00	0.00	0.00
74.06	2.00	0.00	0.00	0.00	0.00	74.13	2.00	0.00	0.00	0.00	0.00
74.19	2.00	0.00	0.00	0.00	0.00	74.26	2.00	0.00	0.00	0.00	0.00
74.32	2.00	0.00	0.00	0.00	0.00	74.39	2.00	0.00	0.00	0.00	0.00
74.46	2.00	0.00	0.00	0.00	0.00	74.52	2.00	0.00	0.00	0.00	0.00
74.59	2.00	0.00	0.00	0.00	0.00	74.65	2.00	0.00	0.00	0.00	0.00
74.72	2.00	0.00	0.00	0.00	0.00	74.78	2.00	0.00	0.00	0.00	0.00
74.85	2.00	0.00	0.00	0.00	0.00	74.92	2.00	0.00	0.00	0.00	0.00
74.98	2.00	0.00	0.00	0.00	0.00	75.05	2.00	0.00	0.00	0.00	0.00
75.11	2.00	0.00	0.00	0.00	0.00	75.18	2.00	0.00	0.00	0.00	0.00
75.24	2.00	0.00	0.00	0.00	0.00	75.31	2.00	0.00	0.00	0.00	0.00
75.37	2.00	0.00	0.00	0.00	0.00	75.44	2.00	0.00	0.00	0.00	0.00
75.51	2.00	0.00	0.00	0.00	0.00						

:: Liquefaction Potential Index calculation data :: (continued)

Depth (ft)	FS	F_L	w_z	d_z	LPI	Depth (ft)	FS	F_L	w_z	d_z	LPI

Overall liquefaction potential: 0.00

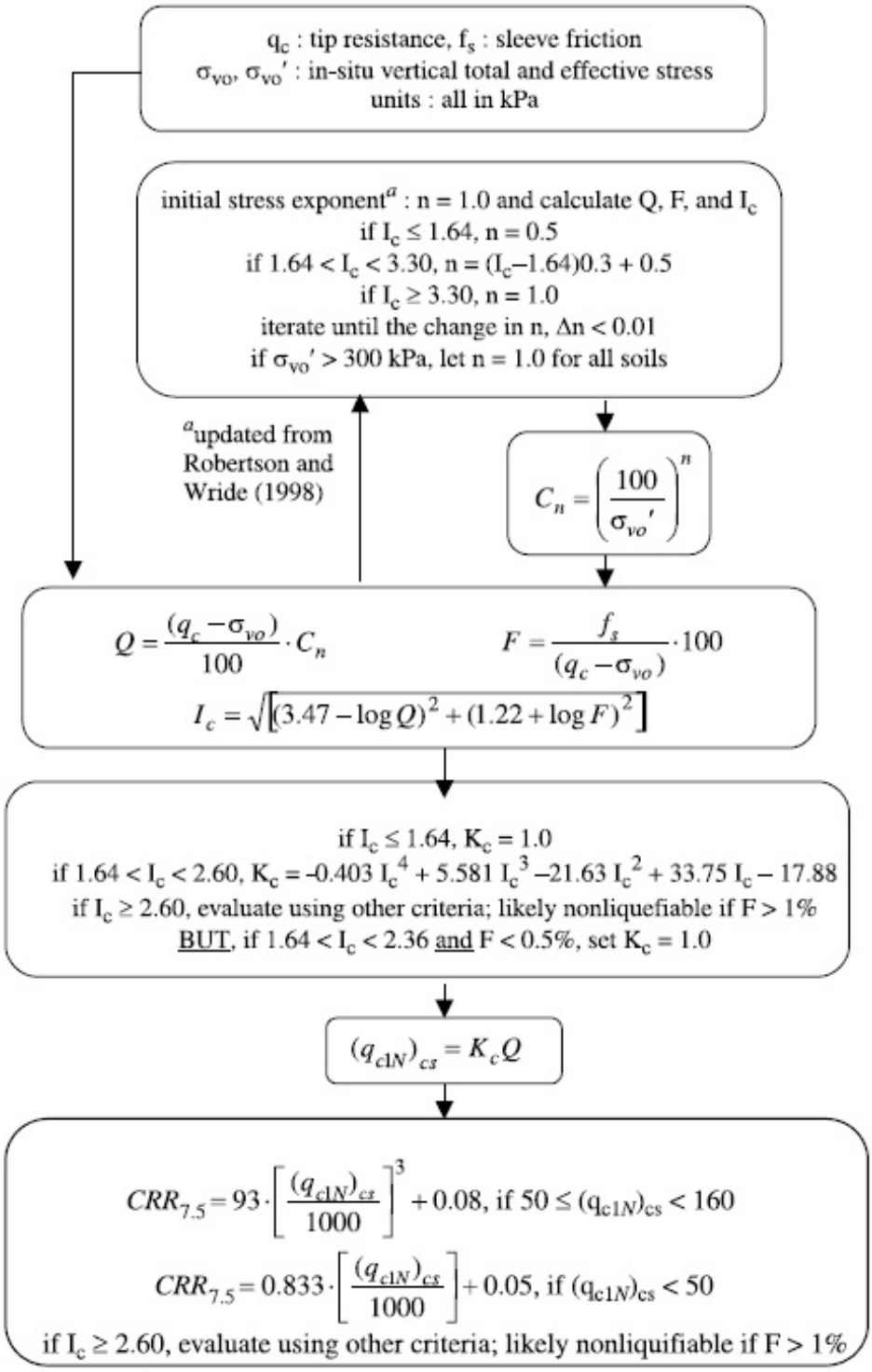
LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (ft)
LPI: Liquefaction potential index value for test point

Procedure for the evaluation of soil liquefaction resistance, NCEER (1998)

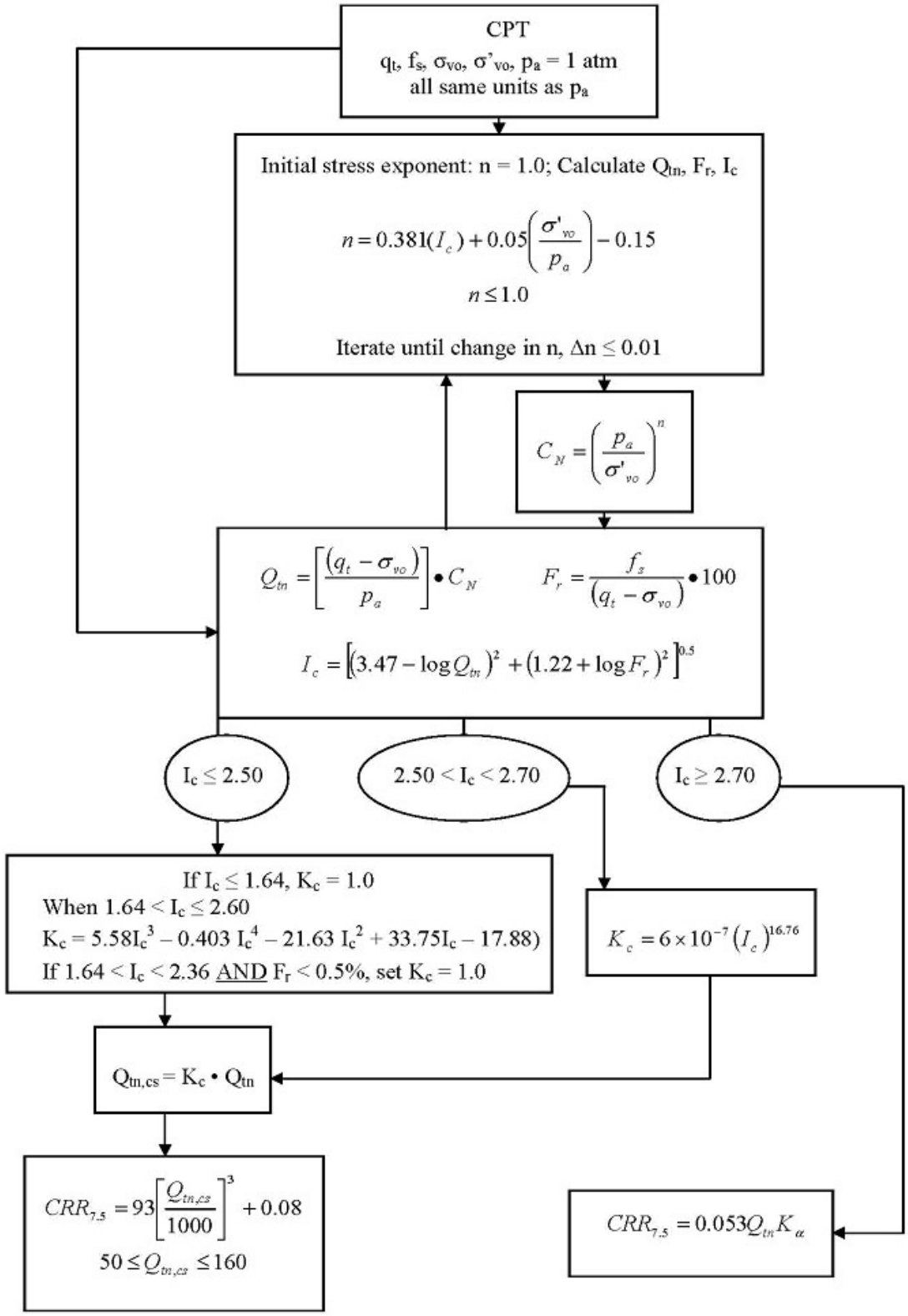
Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. The procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart[1]:



[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

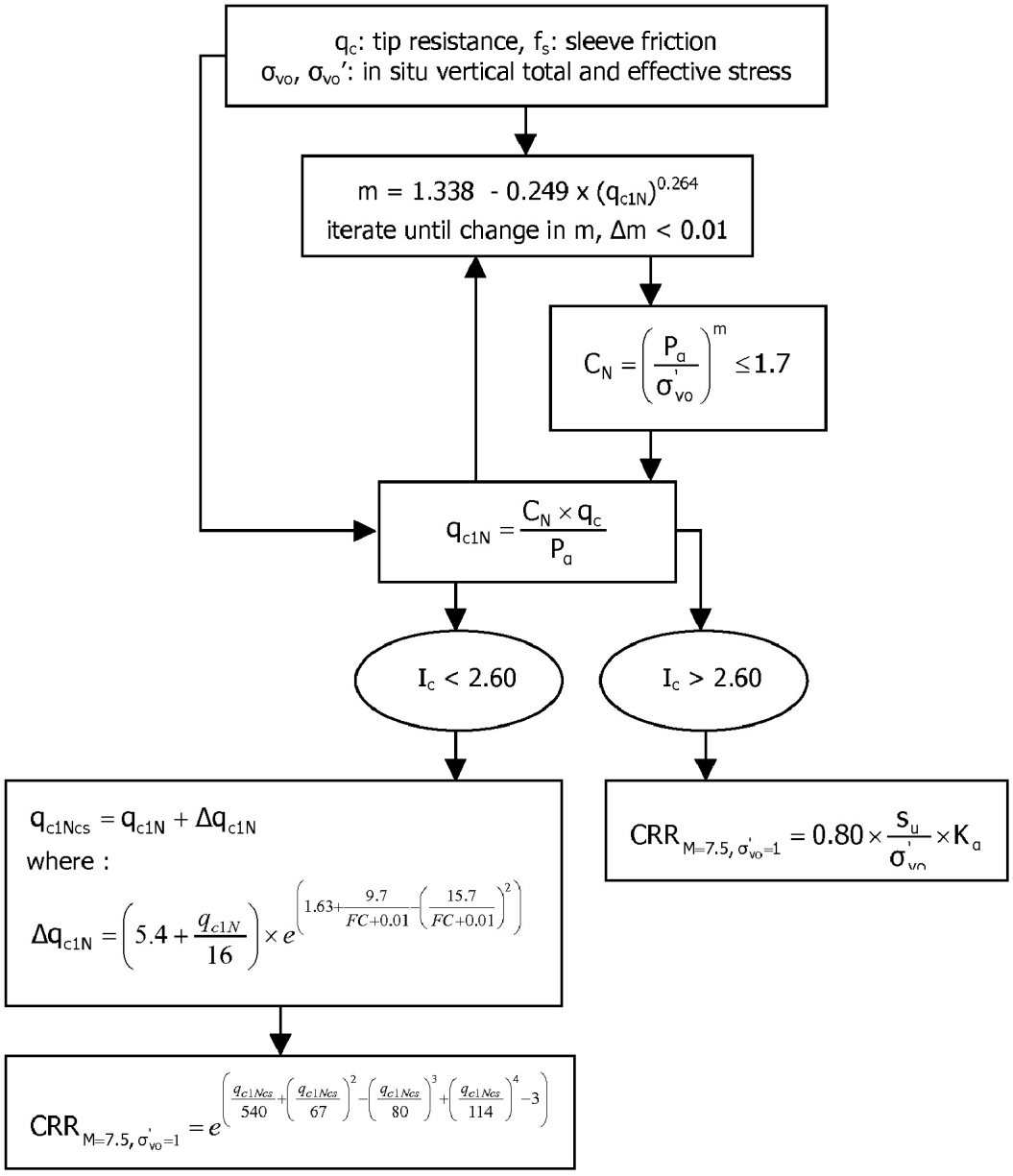
Procedure for the evaluation of soil liquefaction resistance (all soils), Robertson (2010)

Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. This procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart[1]:

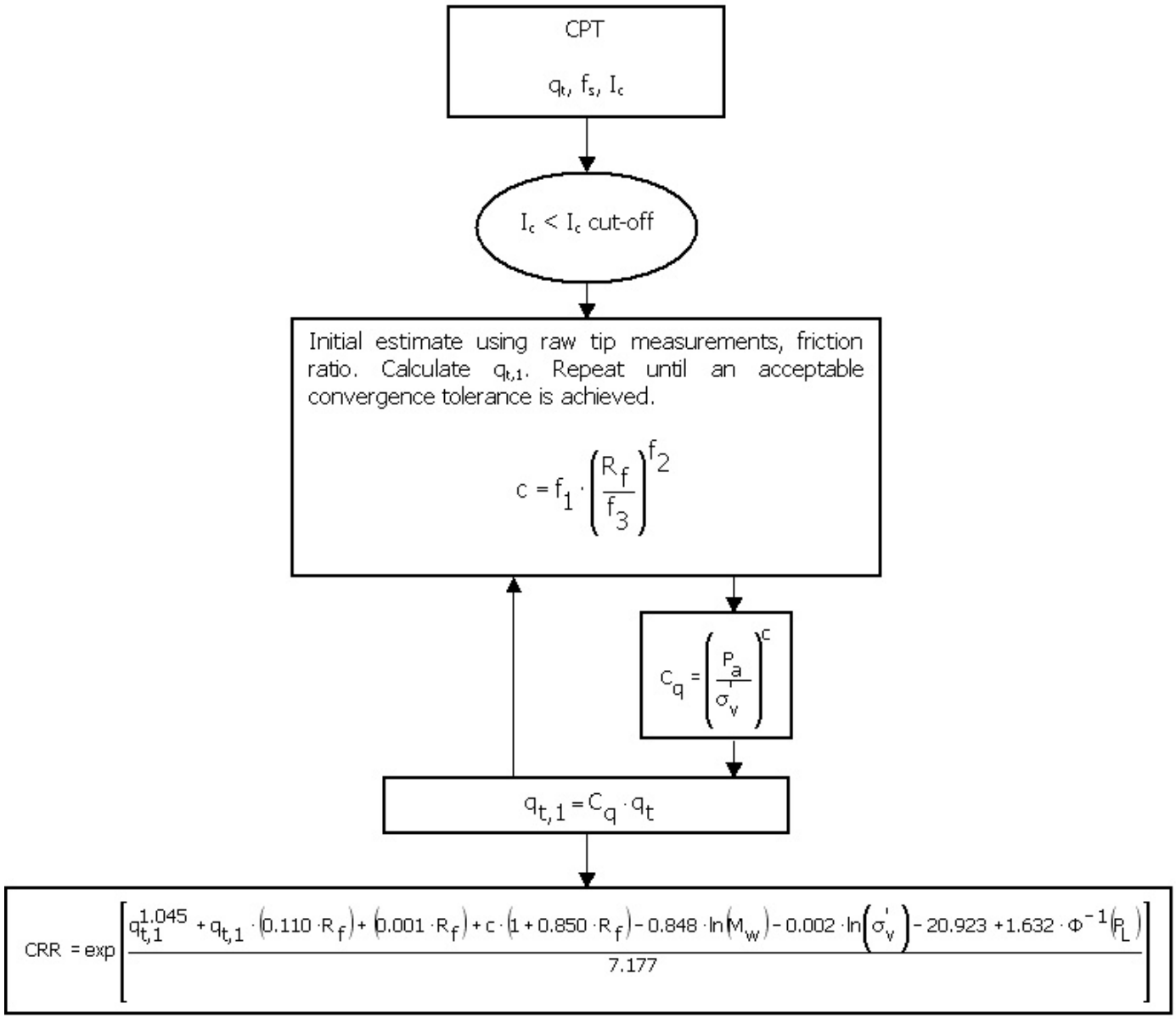


[1] P.K. Robertson, 2009. "Performance based earthquake design using the CPT", Keynote Lecture, International Conference on Performance-based Design in Earthquake Geotechnical Engineering – from case history to practice, IS-Tokyo, June 2009

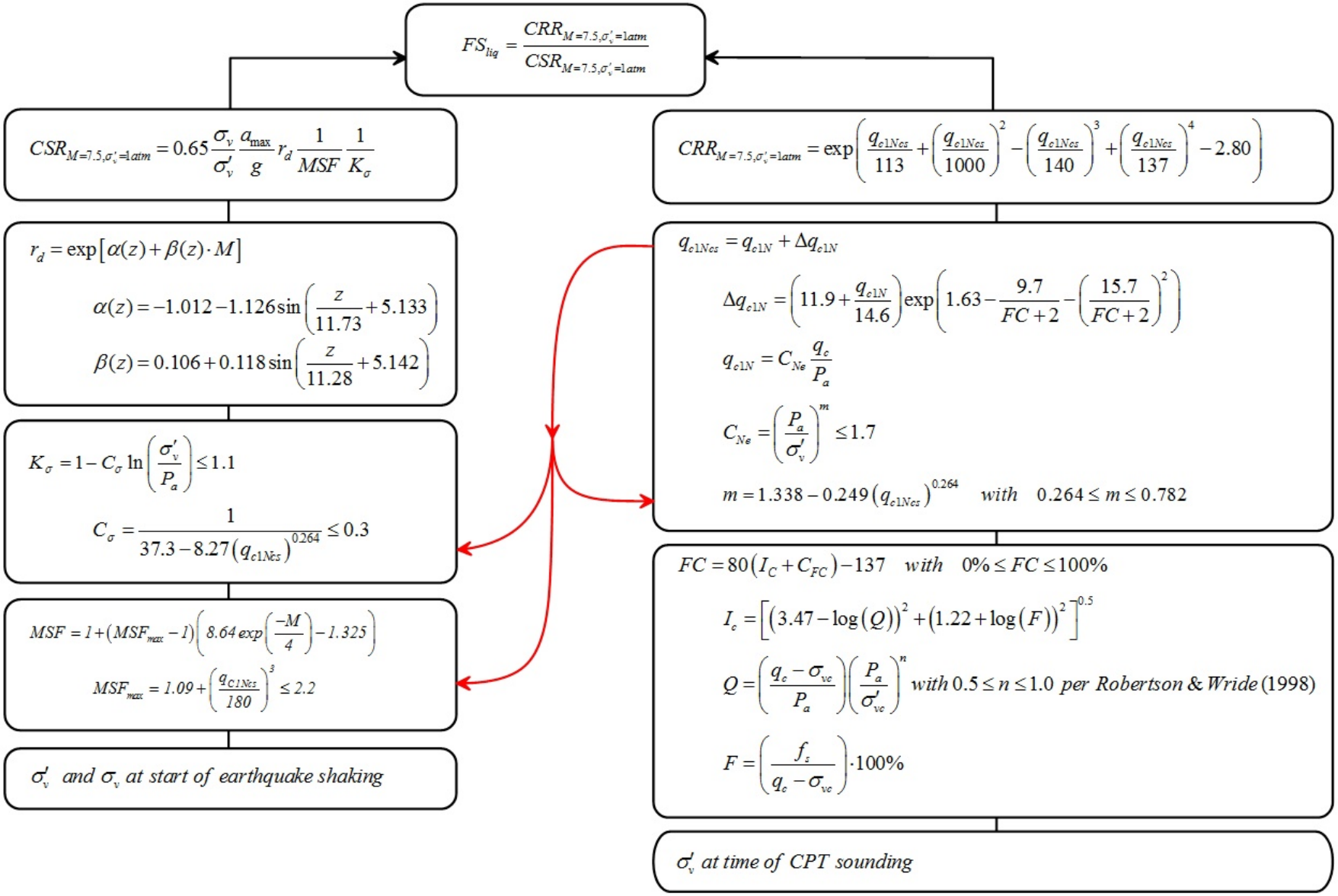
Procedure for the evaluation of soil liquefaction resistance, Idriss & Boulanger (2008)



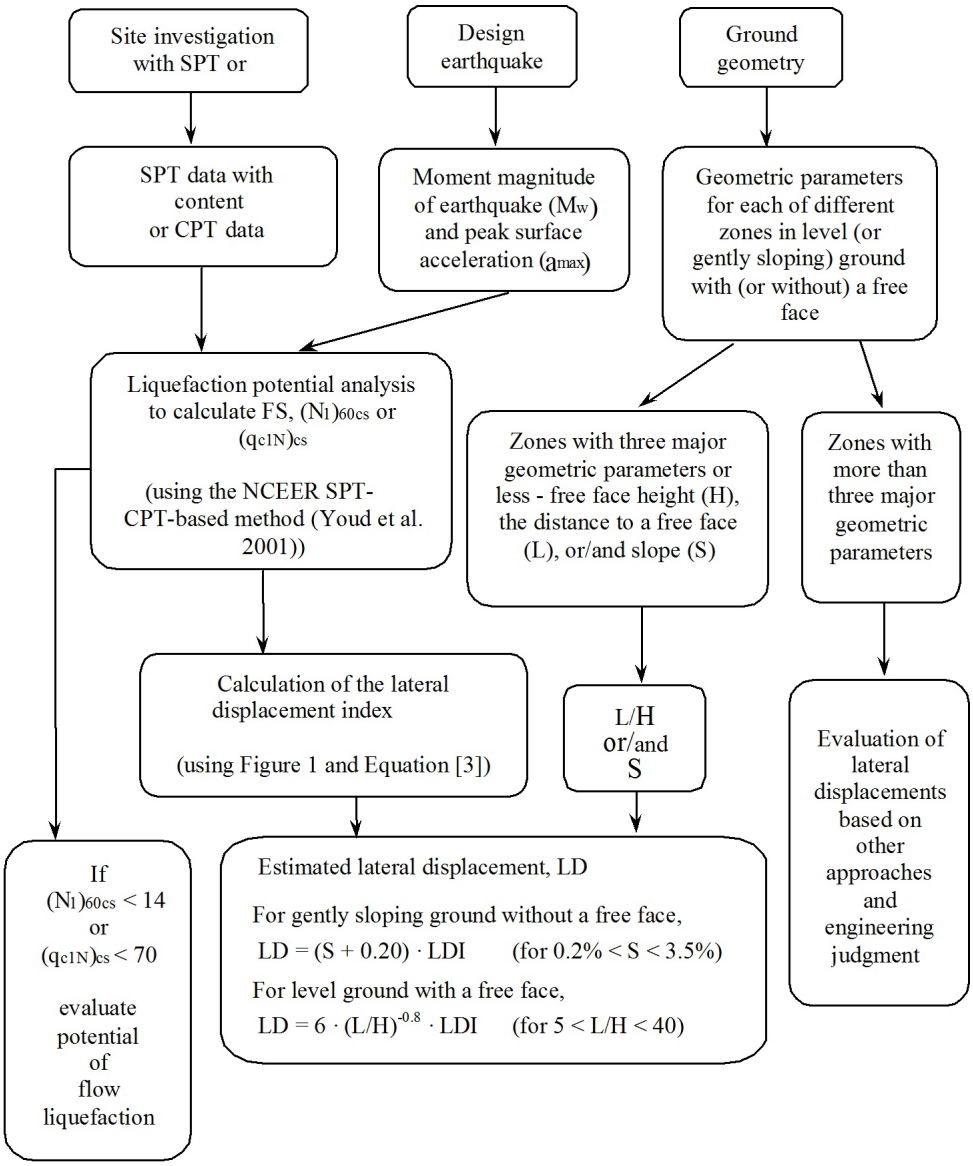
Procedure for the evaluation of soil liquefaction resistance (sandy soils), Moss et al. (2006)



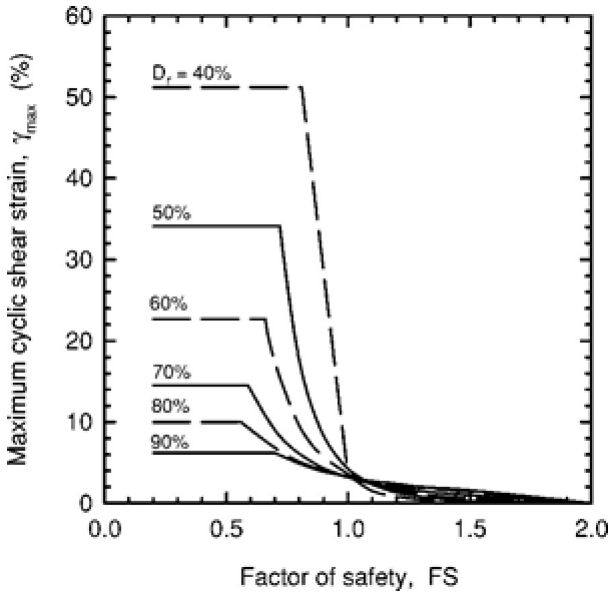
Procedure for the evaluation of soil liquefaction resistance, Boulanger & Idriss(2014)



Procedure for the evaluation of liquefaction-induced lateral spreading displacements



[1] Flow chart illustrating major steps in estimating liquefaction-induced lateral spreading displacements using the proposed approach



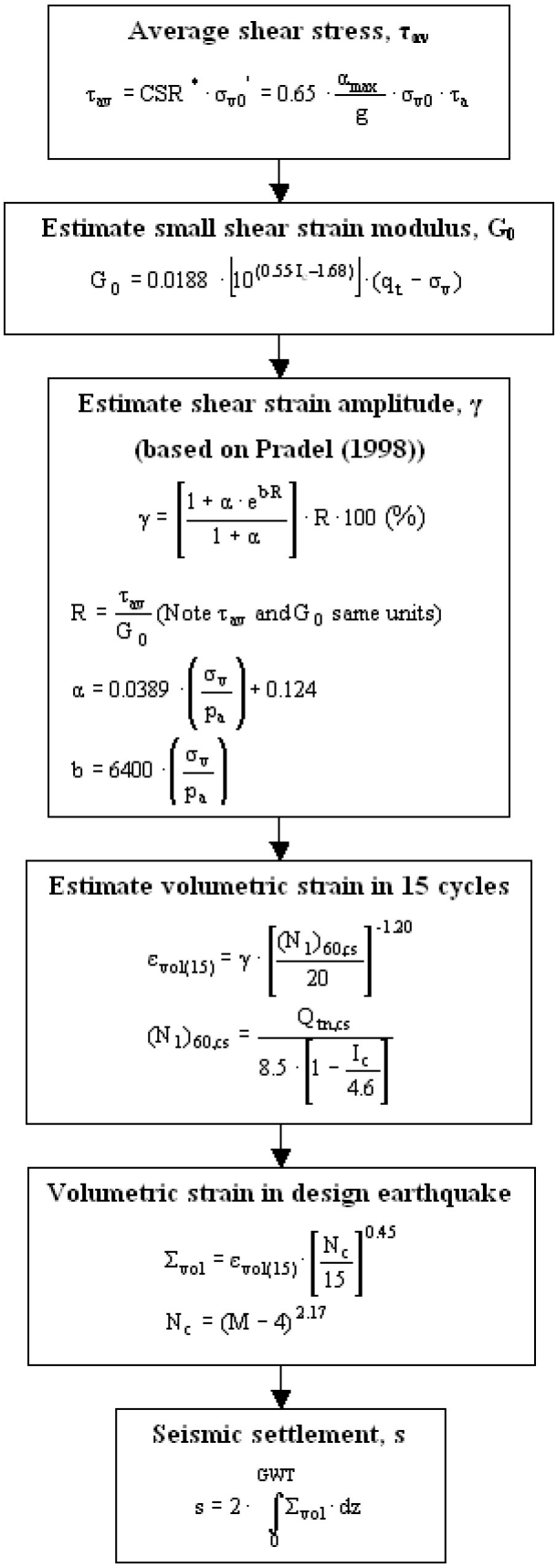
[1] **Figure 1**

$$LDI = \int_0^{z_{max}} \gamma_{max} dz$$

[1] **Equation [3]**

[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Procedure for the estimation of seismic induced settlements in dry sands



Robertson, P.K. and Lisheng, S., 2010, "Estimation of seismic compression in dry soils using the CPT" FIFTH INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN GEOTECHNICAL EARTHQUAKE ENGINEERING AND SOIL DYNAMICS, Symposium in honor of professor I. M. Idriss, San Diego, CA

Liquefaction Potential Index (LPI) calculation procedure

Calculation of the Liquefaction Potential Index (LPI) is used to interpret the liquefaction assessment calculations in terms of severity over depth. The calculation procedure is based on the methology developed by Iwasaki (1982) and is adopted by AFPS.

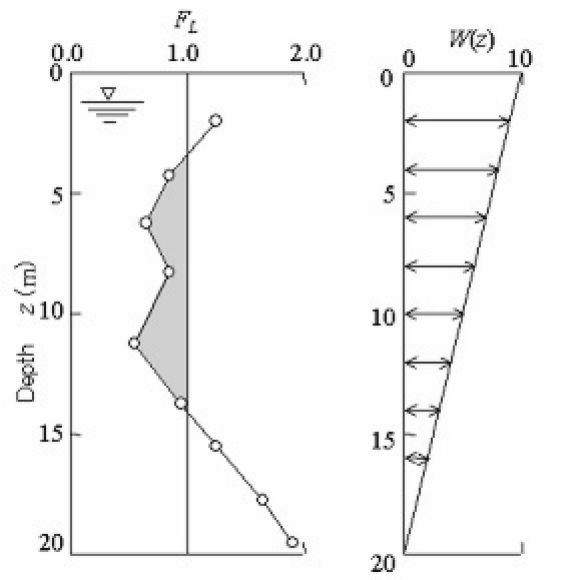
To estimate the severity of liquefaction extent at a given site, LPI is calculated based on the following equation:

$$\mathbf{LPI} = \int_0^{20} (10 - 0{,}5z) \times F_L \times dz$$

where:
F_L = 1 - F.S. when F.S. less than 1
F_L = 0 when F.S. greater than 1
z depth of measurment in meters

Values of LPI range between zero (0) when no test point is characterized as liquefiable and 100 when all points are characterized as susceptible to liquefaction. Iwasaki proposed four (4) discrete categories based on the numeric value of LPI:

- LPI = 0 : Liquefaction risk is very low
- 0 < LPI <= 5 : Liquefaction risk is low
- 5 < LPI <= 15 : Liquefaction risk is high
- LPI > 15 : Liquefaction risk is very high



Graphical presentation of the LPI calculation procedure

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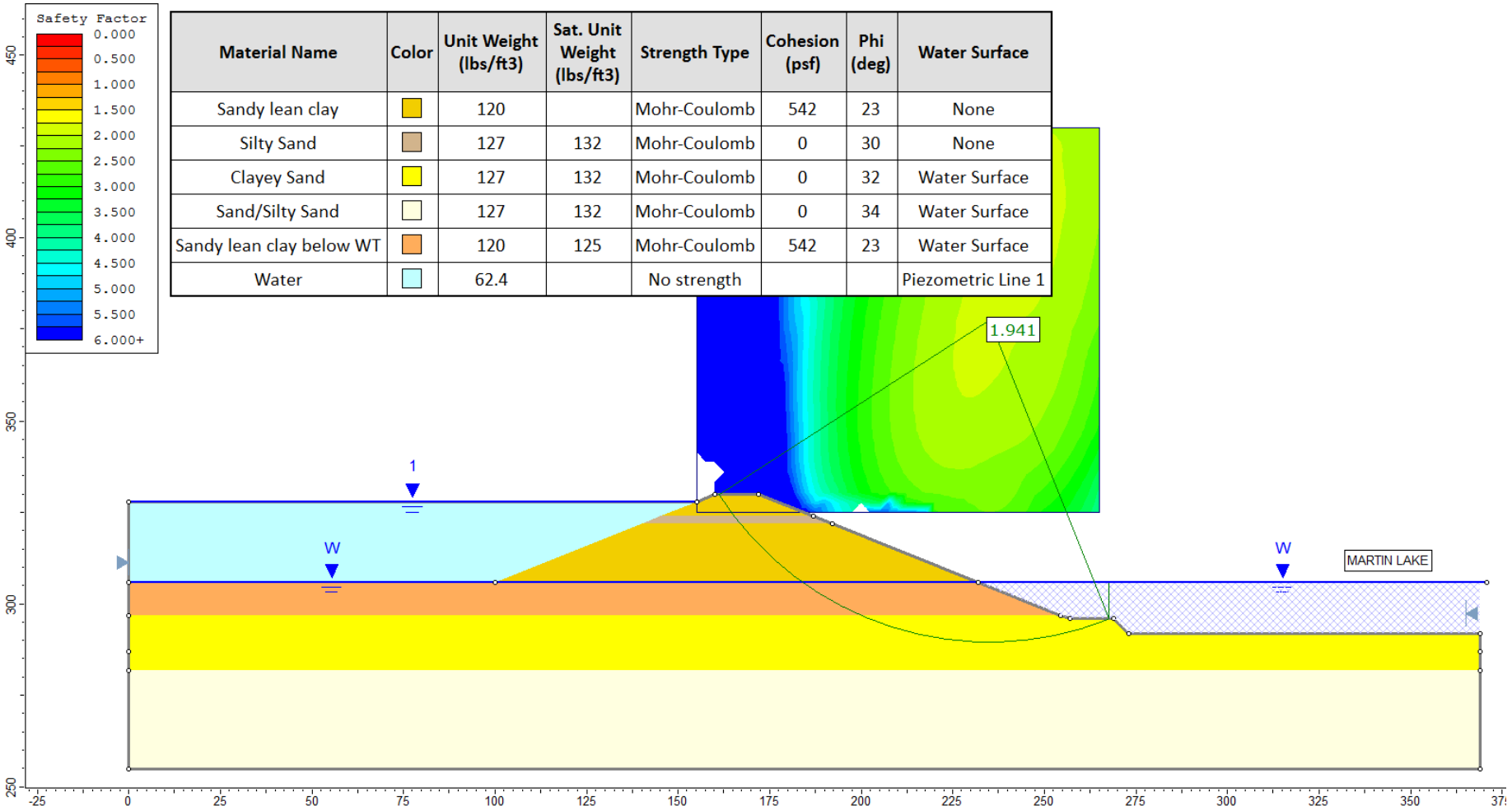
APPENDIX B

Slope Stability Analysis Results

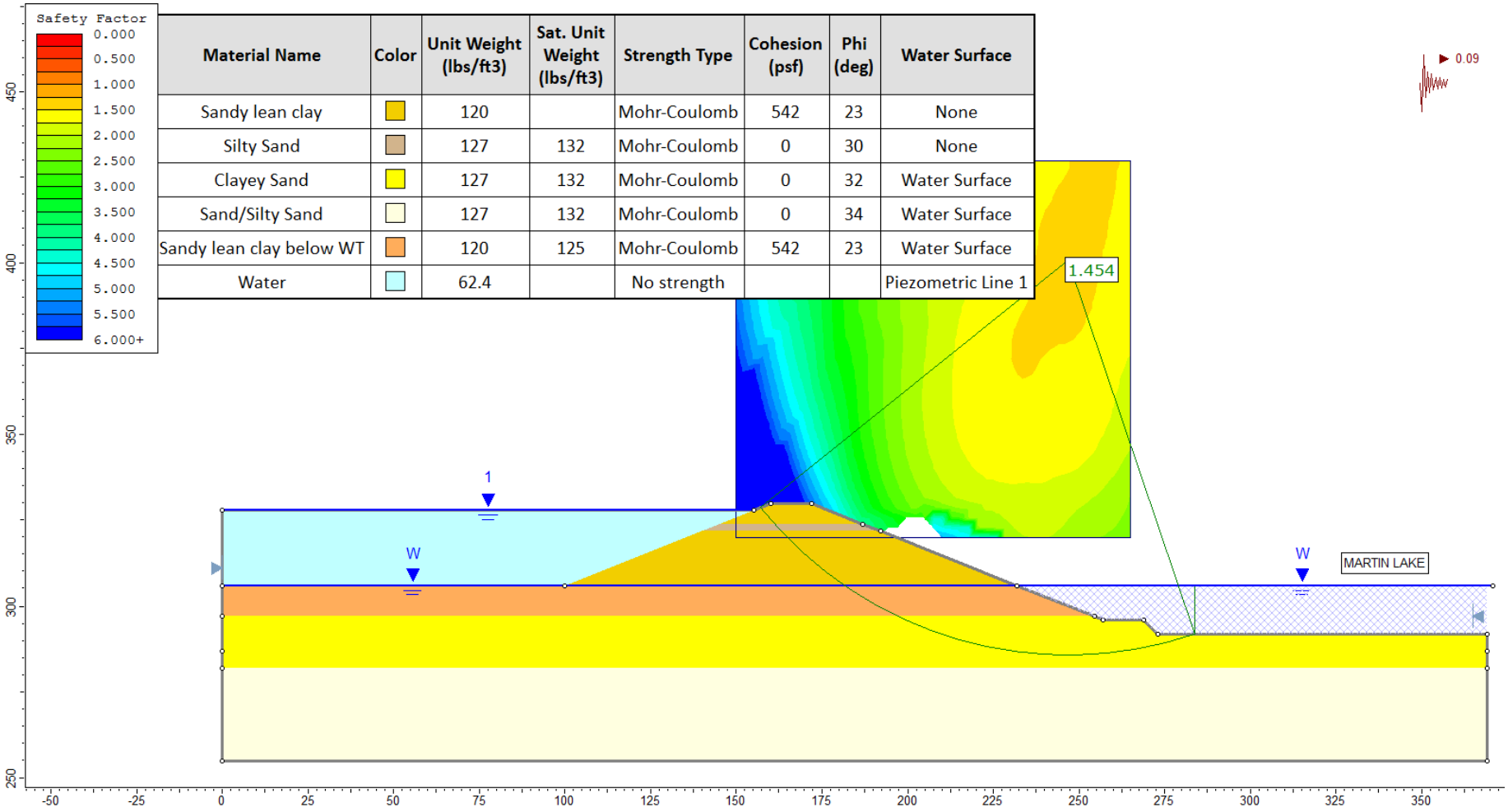


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.1**

Results of Stability Analysis − BAP−SP: A−A' − Case 1a

Stability and Safety Factor Assessment, Martin Lake SES

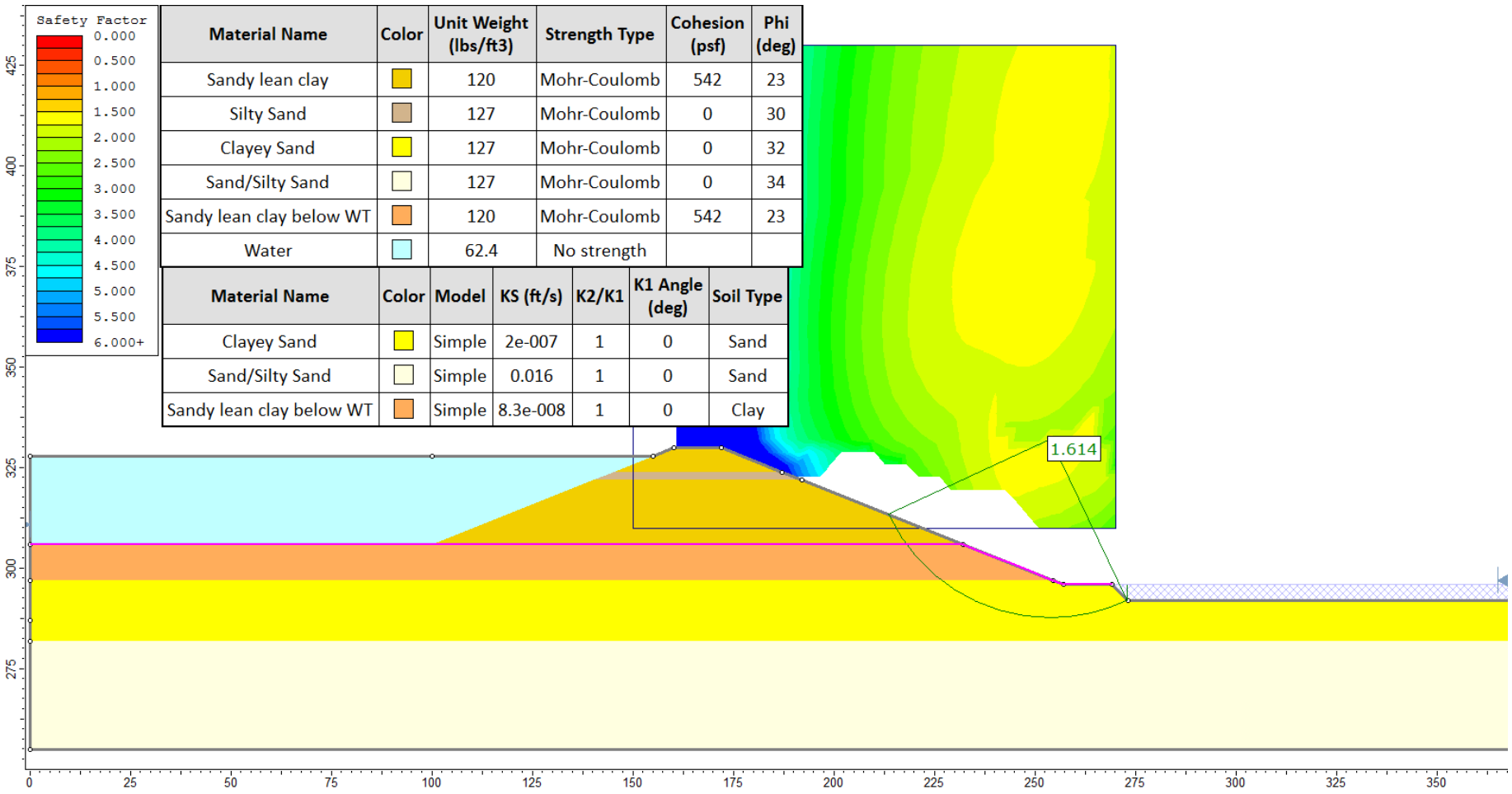


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.2**

Results of Stability Analysis − BAP−SP: A−A' − Case 1b

Stability and Safety Factor Assessment, Martin Lake SES



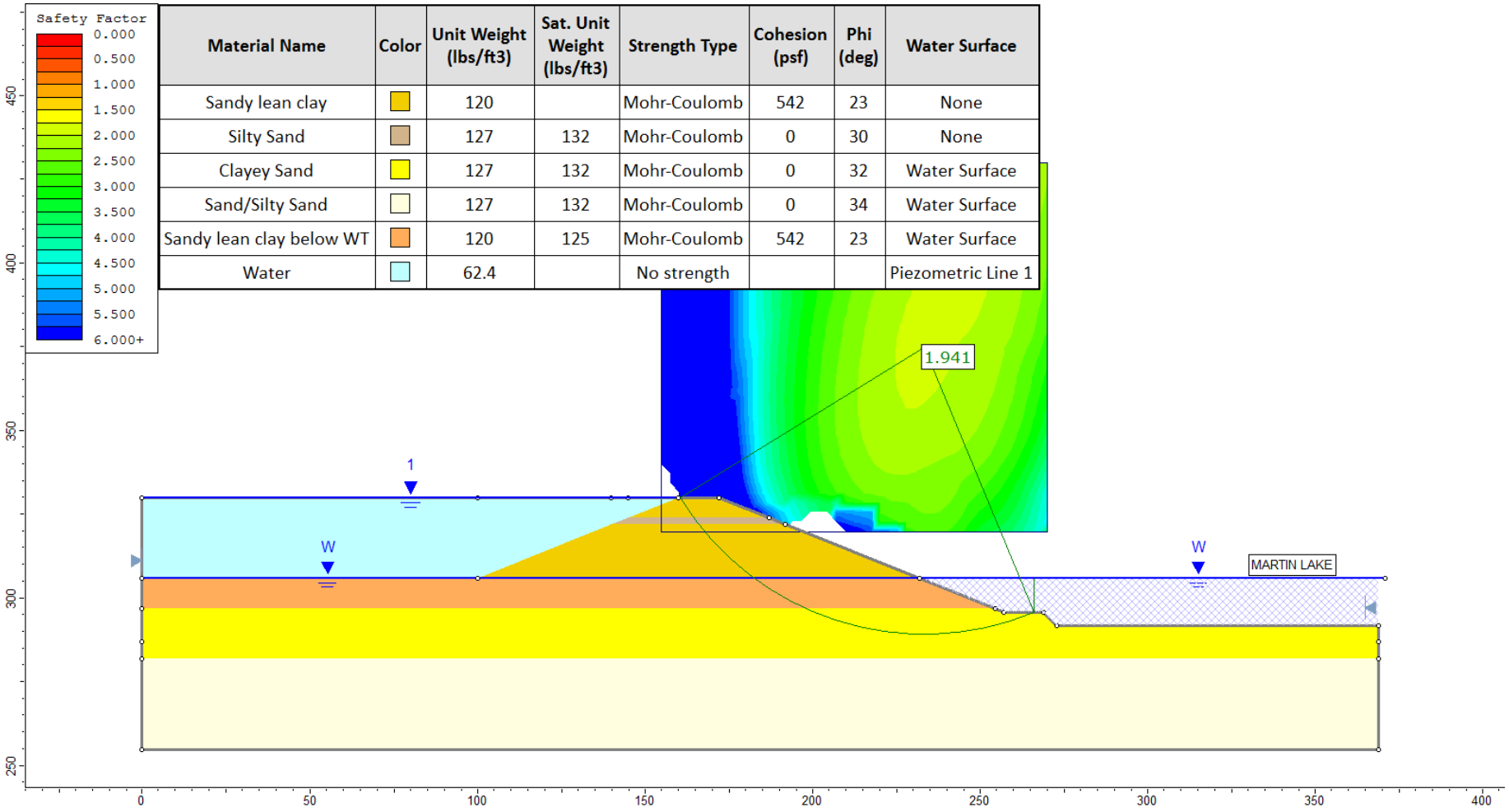
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Sandy lean clay		120	Mohr-Coulomb	542	23
Silty Sand		127	Mohr-Coulomb	0	30
Clayey Sand		127	Mohr-Coulomb	0	32
Sand/Silty Sand		127	Mohr-Coulomb	0	34
Sandy lean clay below WT		120	Mohr-Coulomb	542	23
Water		62.4	No strength		

Material Name	Color	Model	KS (ft/s)	K2/K1	K1 Angle (deg)	Soil Type
Clayey Sand		Simple	2e-007	1	0	Sand
Sand/Silty Sand		Simple	0.016	1	0	Sand
Sandy lean clay below WT		Simple	8.3e-008	1	0	Clay

FIGURE **C.3**

Results of Stability Analysis − BAP−SP: A−A' − Case 1c

Stability and Safety Factor Assessment, Martin Lake SES

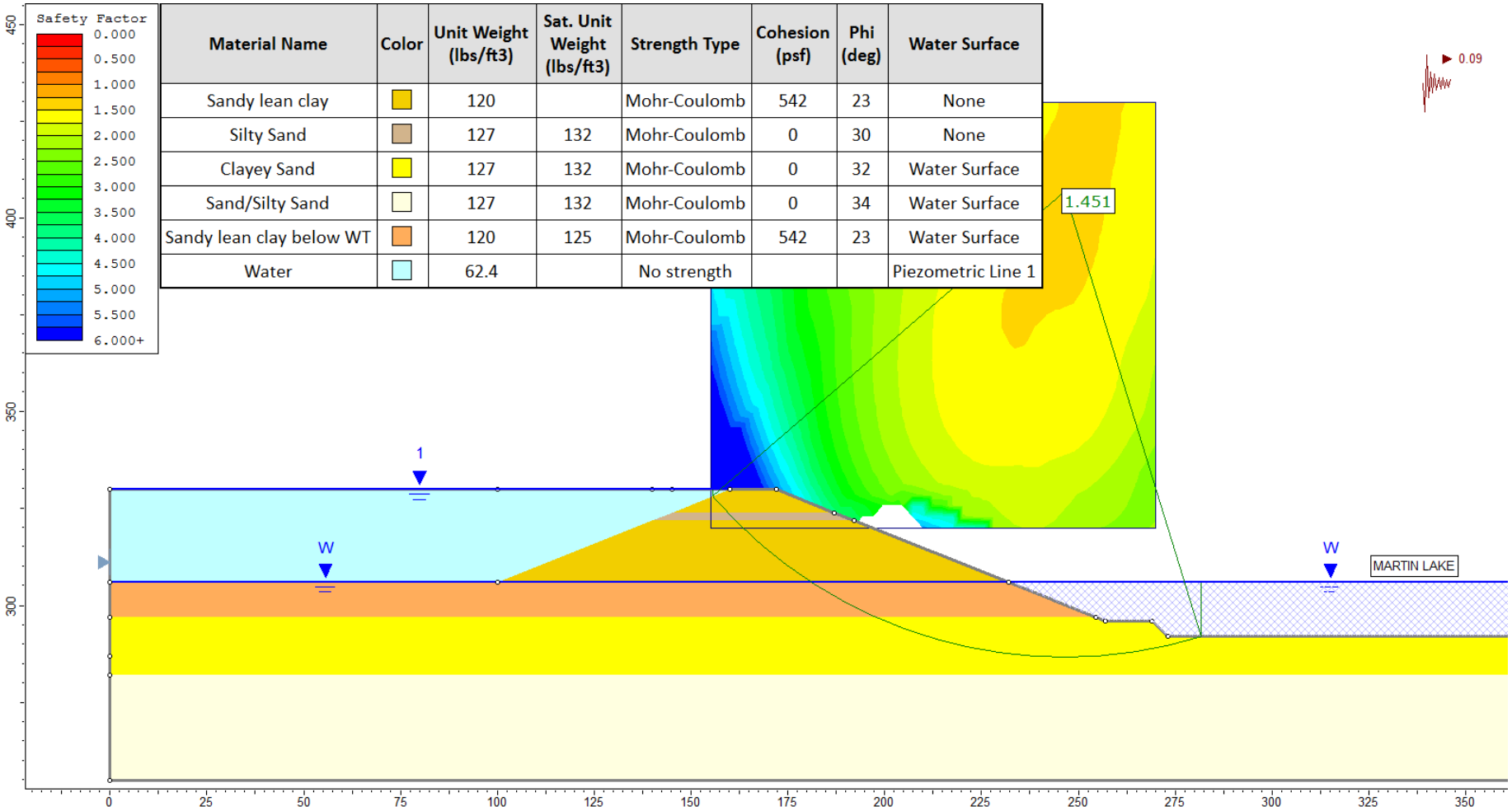


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.4**

Results of Stability Analysis − BAP−SP: A−A' − Case 2a

Stability and Safety Factor Assessment, Martin Lake SES

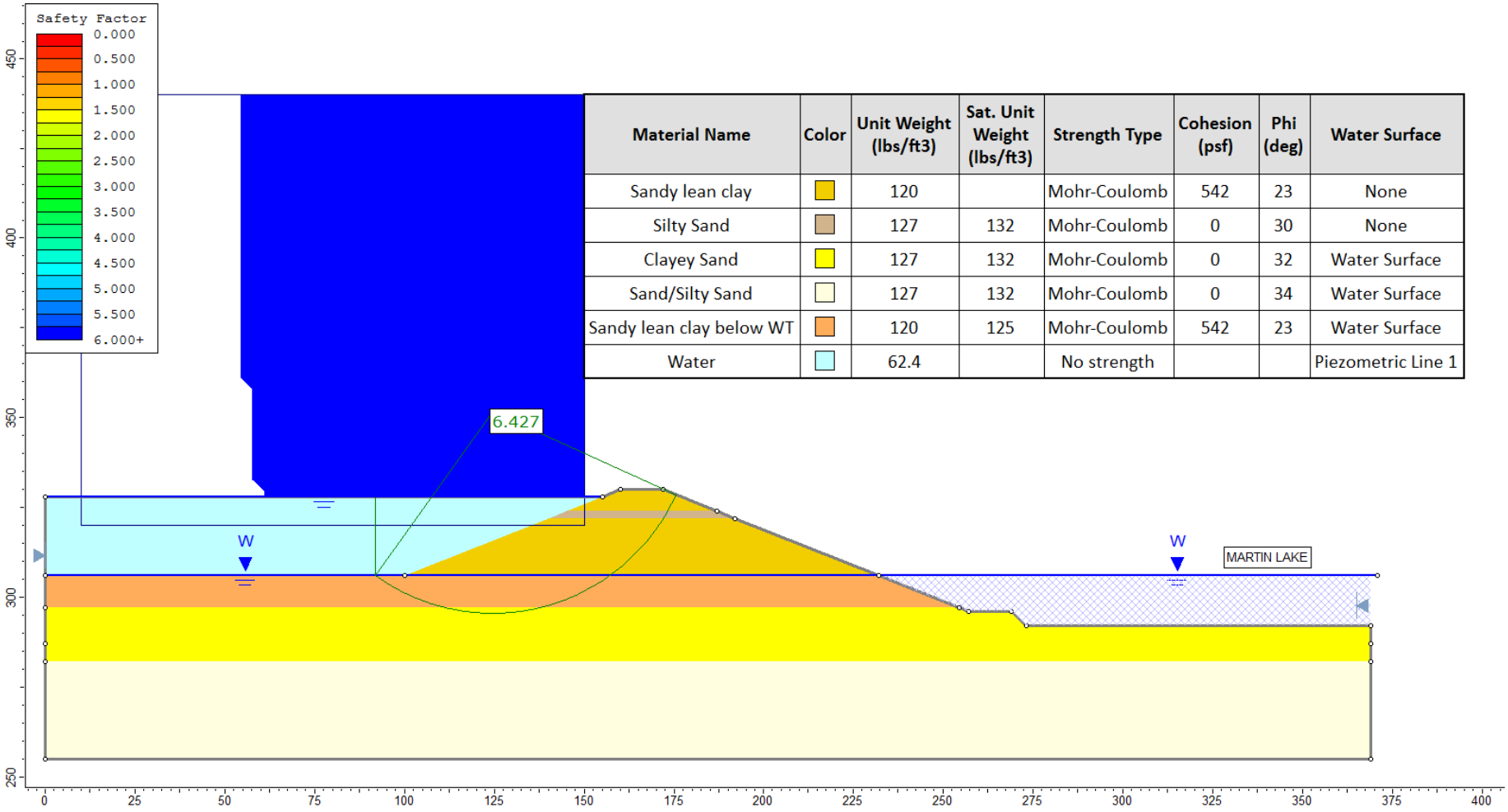


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.5**

Results of Stability Analysis − BAP−SP: A−A' − Case 2b

Stability and Safety Factor Assessment, Martin Lake SES

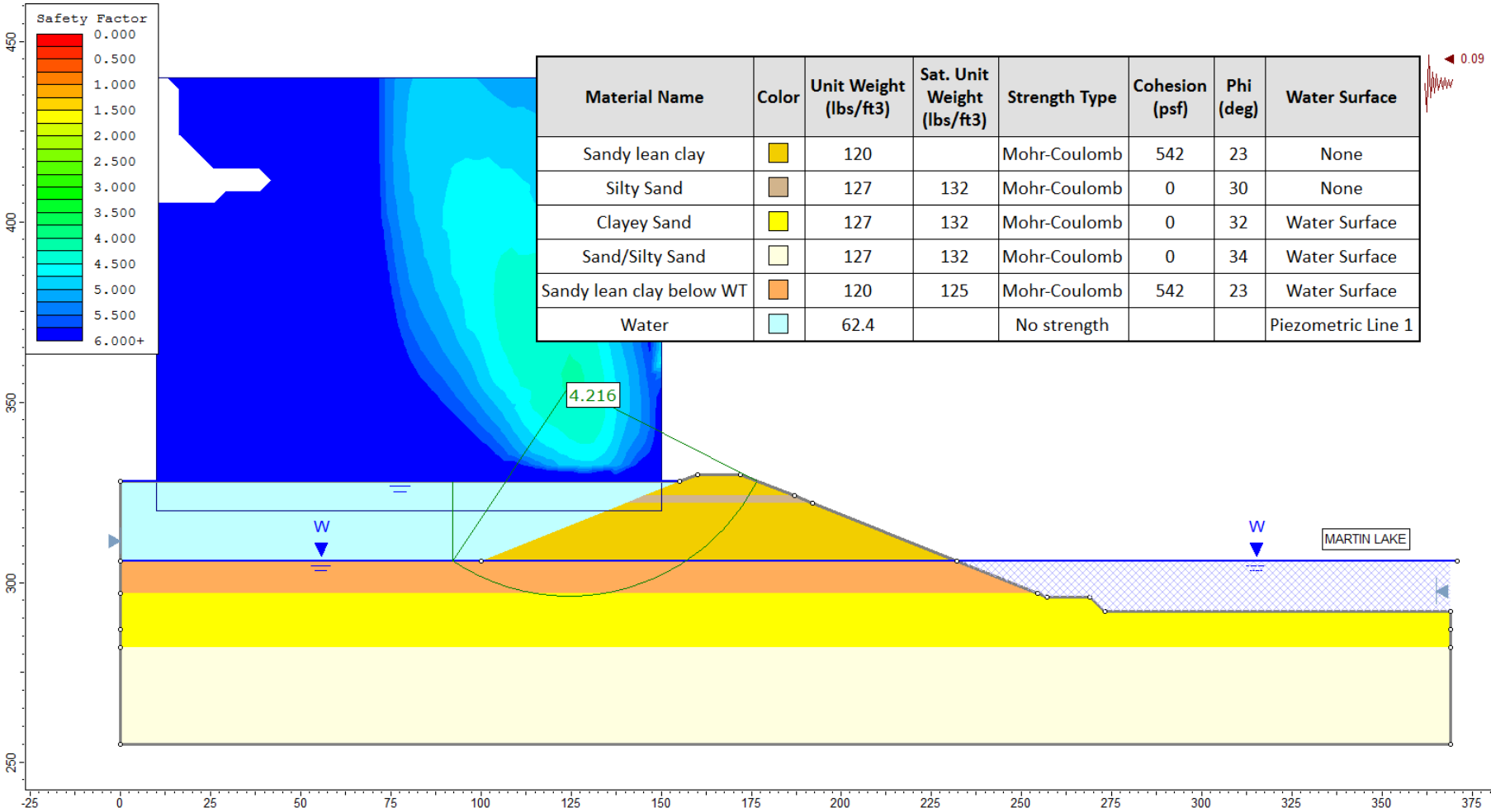


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.6**

Results of Stability Analysis − BAP−SP: A−A' − Case 3a

Stability and Safety Factor Assessment, Martin Lake SES

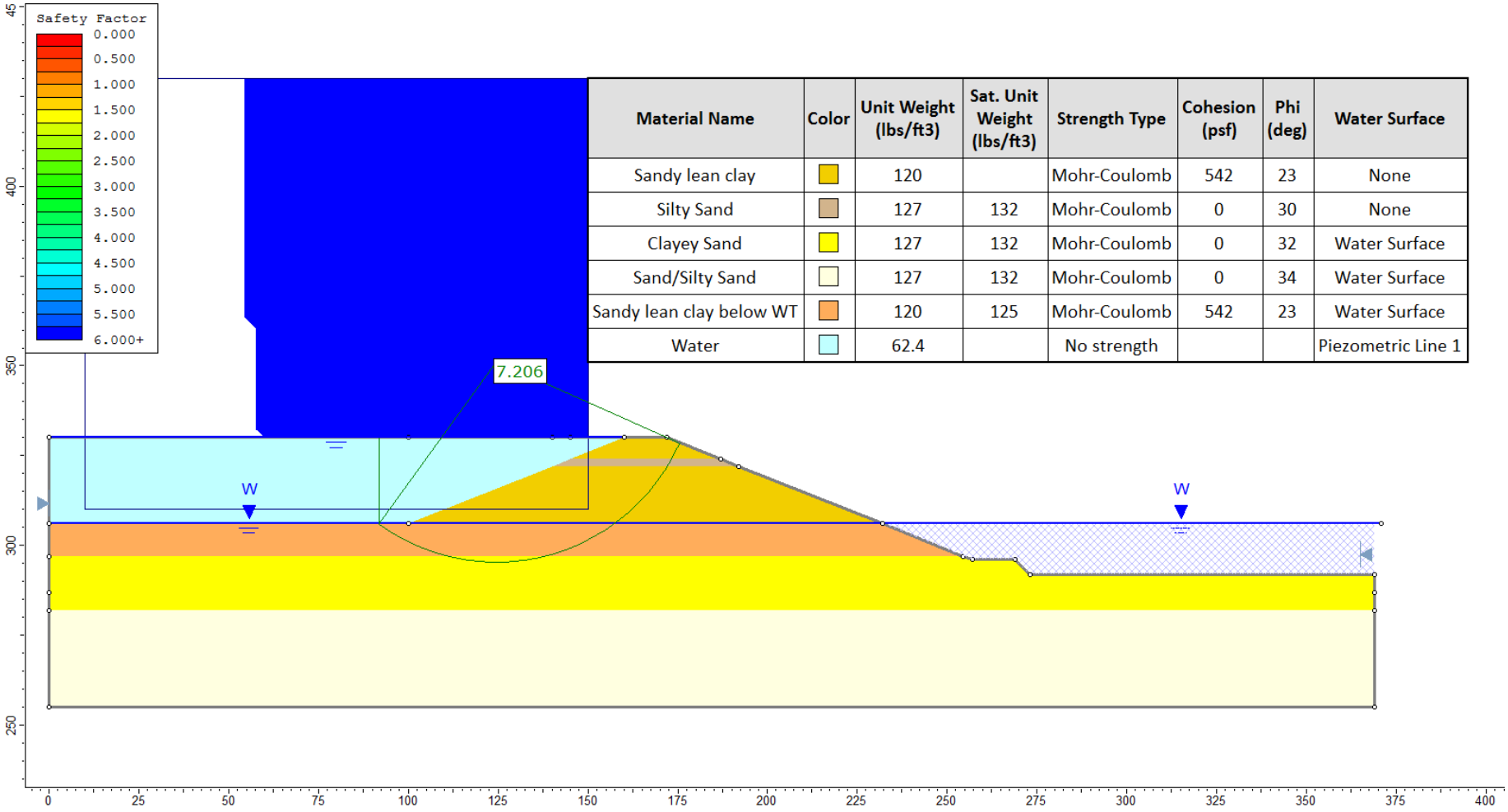


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.7**

Results of Stability Analysis − BAP−SP: A−A' − Case 3b

Stability and Safety Factor Assessment, Martin Lake SES

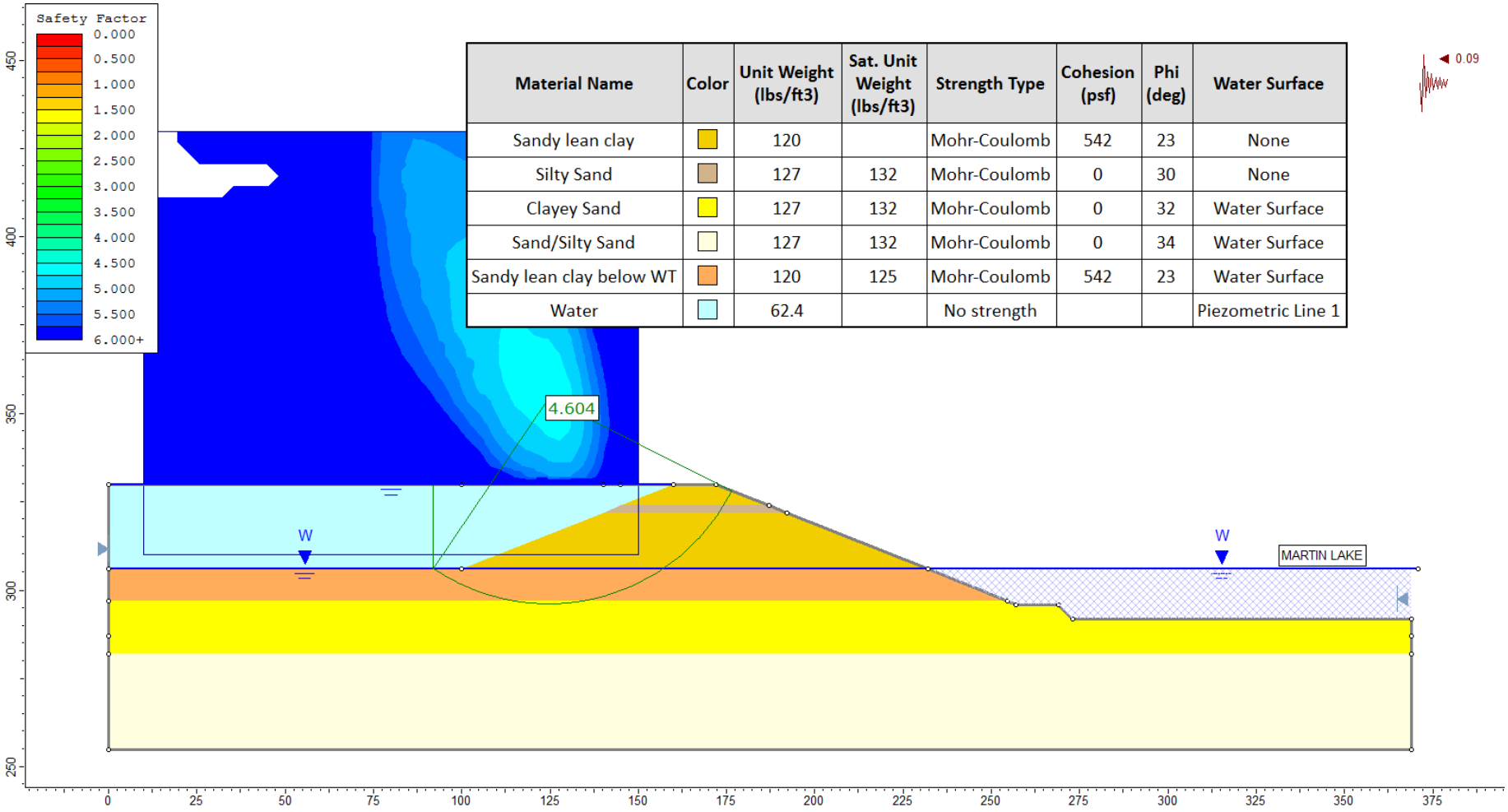


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.8**

Results of Stability Analysis − BAP−SP: A−A' − Case 4a

Stability and Safety Factor Assessment, Martin Lake SES

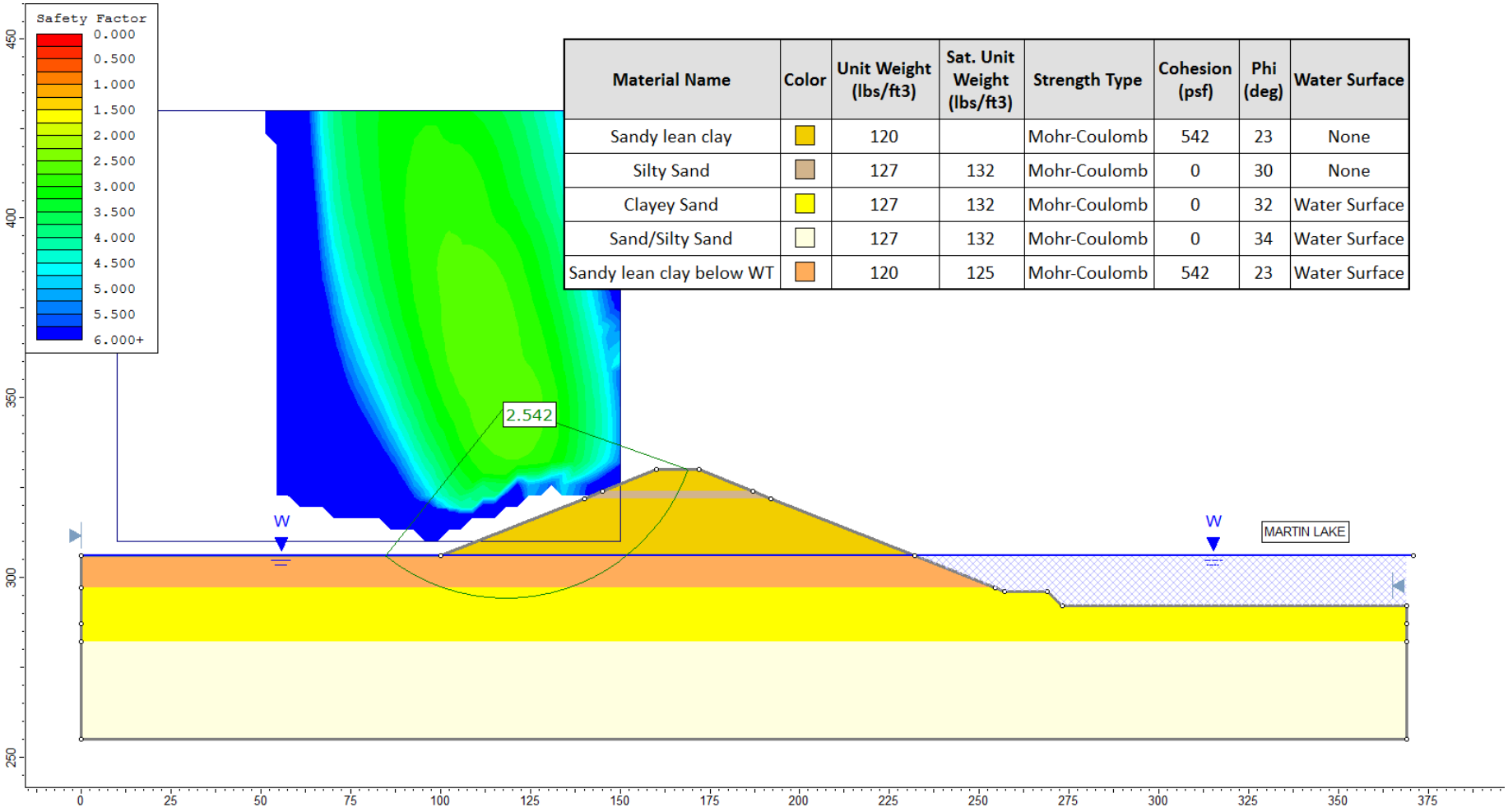


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface
Water		62.4		No strength			Piezometric Line 1

FIGURE **C.9**

Results of Stability Analysis − BAP−SP: A−A' − Case 4b

Stability and Safety Factor Assessment, Martin Lake SES

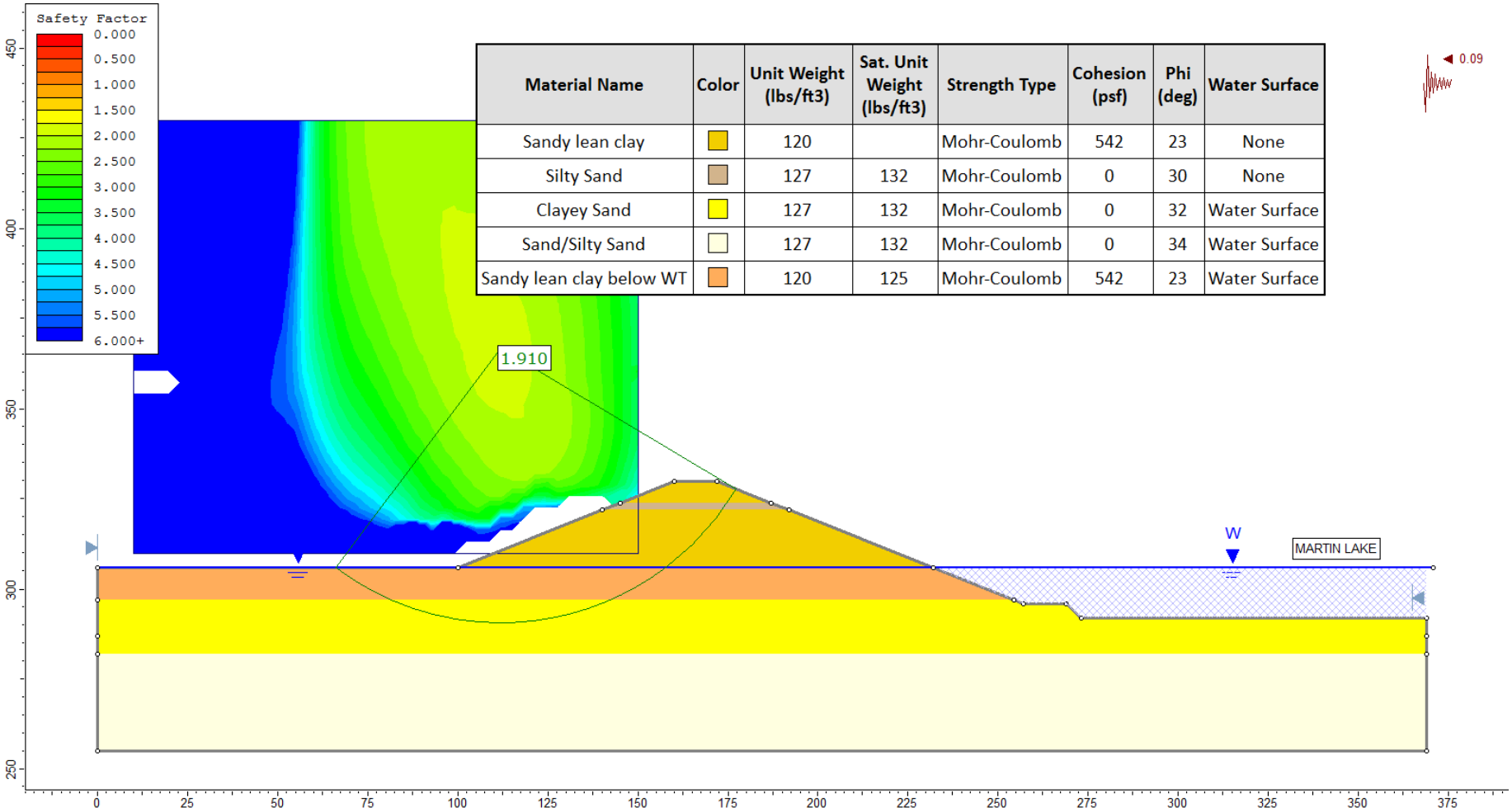


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface

FIGURE **C.10**

Results of Stability Analysis − BAP−SP: A−A' − Case 5a

Stability and Safety Factor Assessment, Martin Lake SES

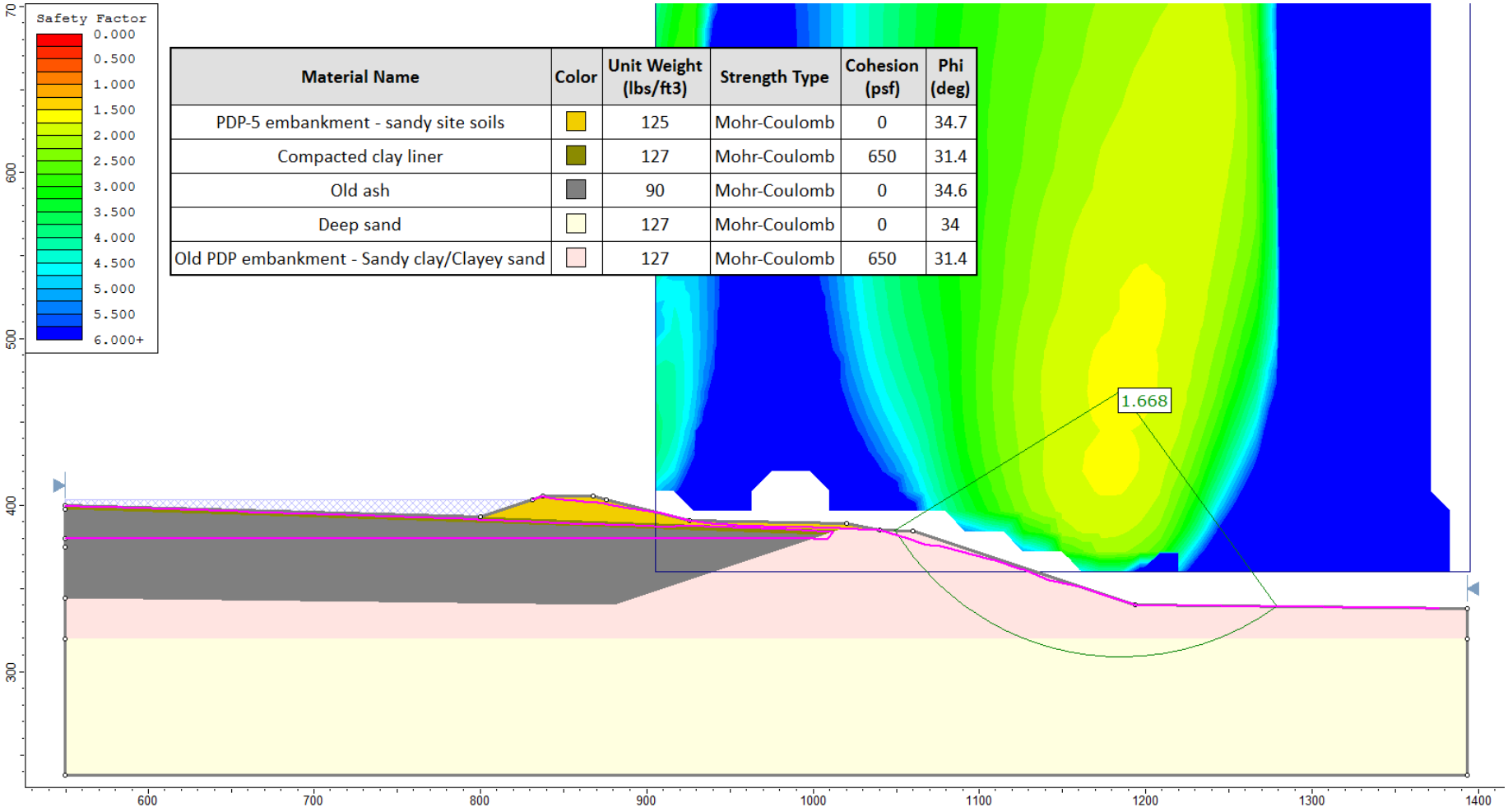


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sandy lean clay		120		Mohr-Coulomb	542	23	None
Silty Sand		127	132	Mohr-Coulomb	0	30	None
Clayey Sand		127	132	Mohr-Coulomb	0	32	Water Surface
Sand/Silty Sand		127	132	Mohr-Coulomb	0	34	Water Surface
Sandy lean clay below WT		120	125	Mohr-Coulomb	542	23	Water Surface

FIGURE **C.11**

Results of Stability Analysis − BAP−SP: A−A' − Case 5b

Stability and Safety Factor Assessment, Martin Lake SES

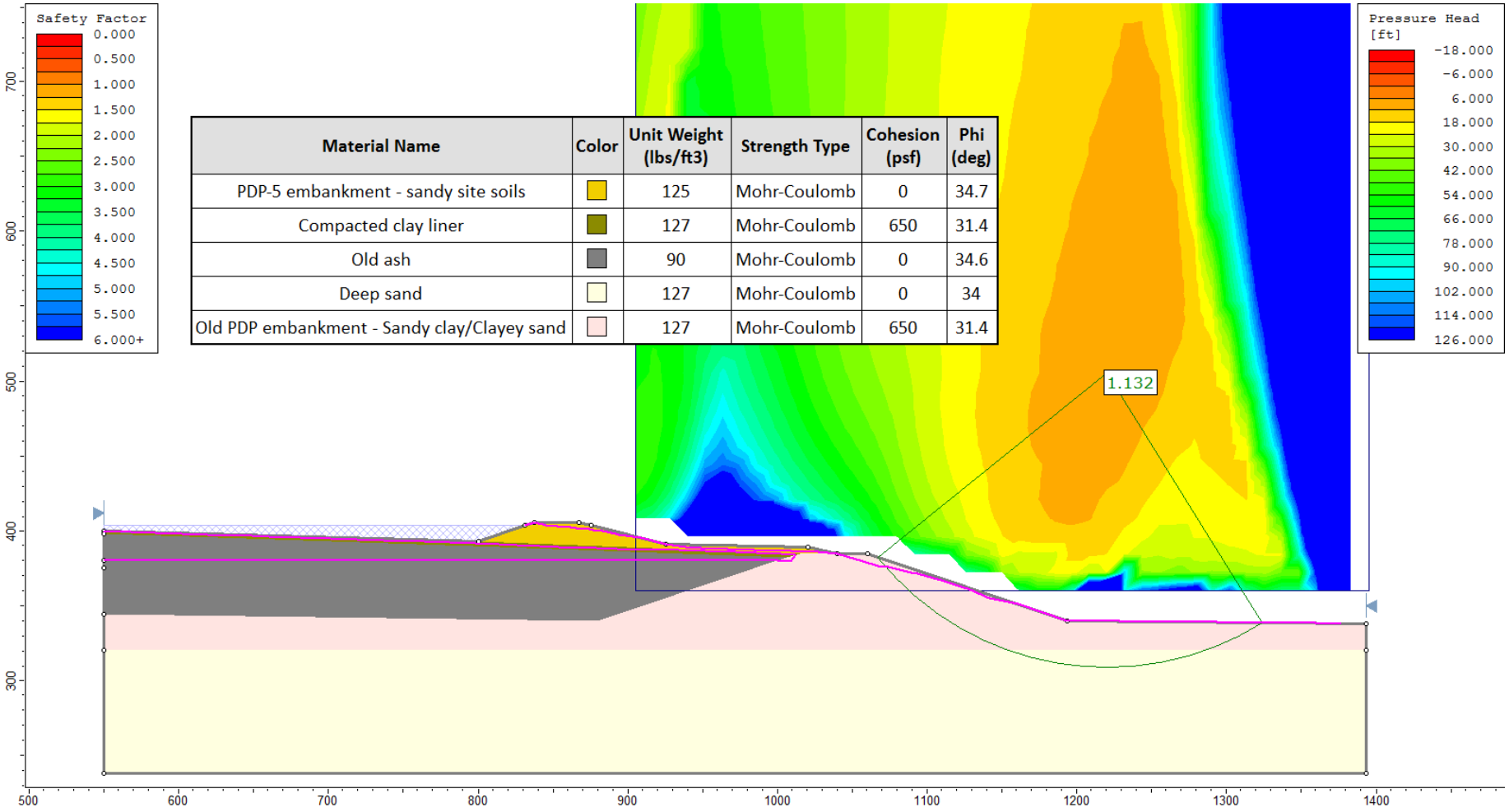


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.12**

Results of Stability Analysis − PDP5: B−B' − Case 1a

Stability and Safety Factor Assessment, Martin Lake SES

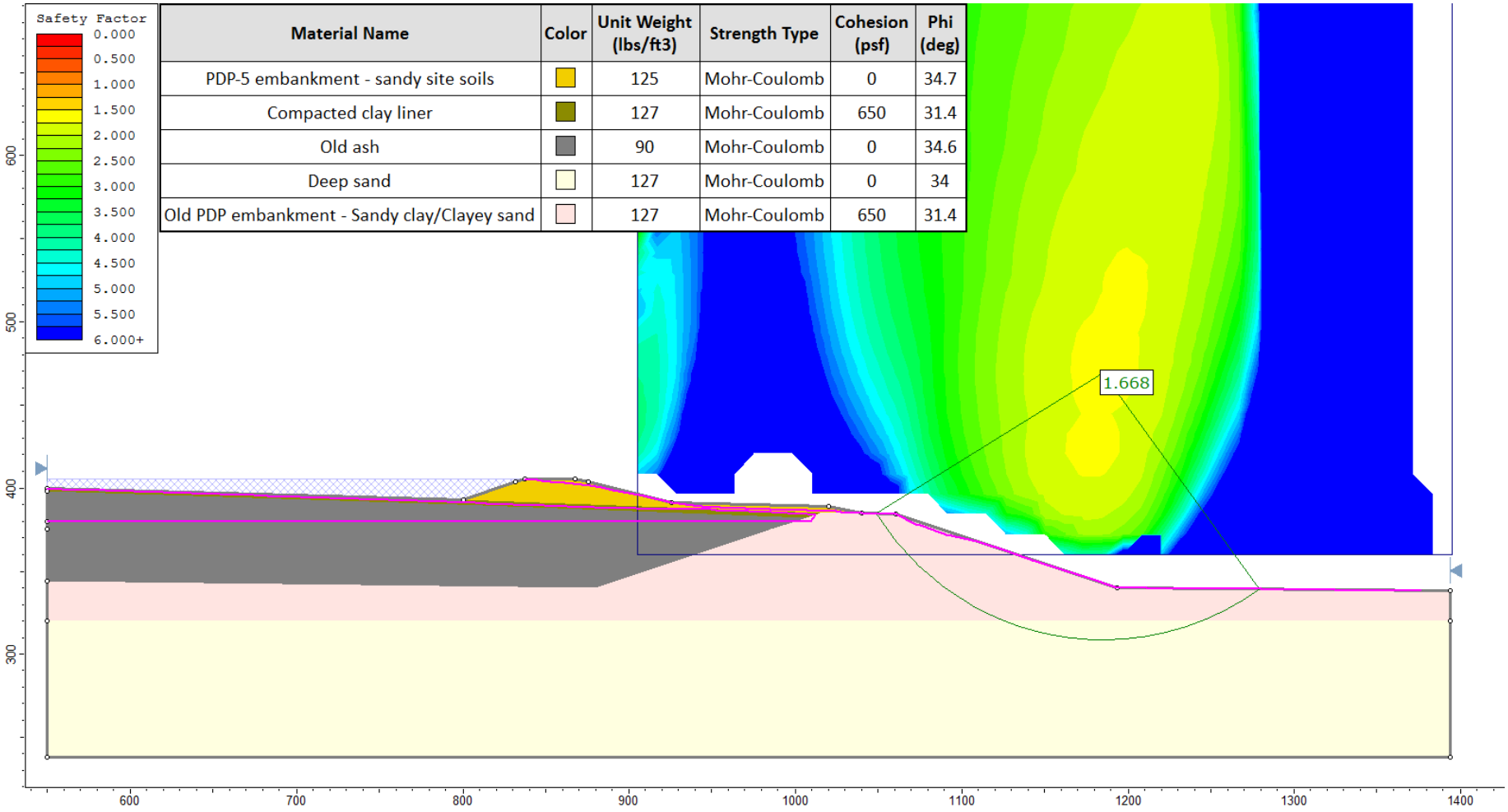


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.13**

Results of Stability Analysis − PDP5: B−B' − Case 1b

Stability and Safety Factor Assessment, Martin Lake SES

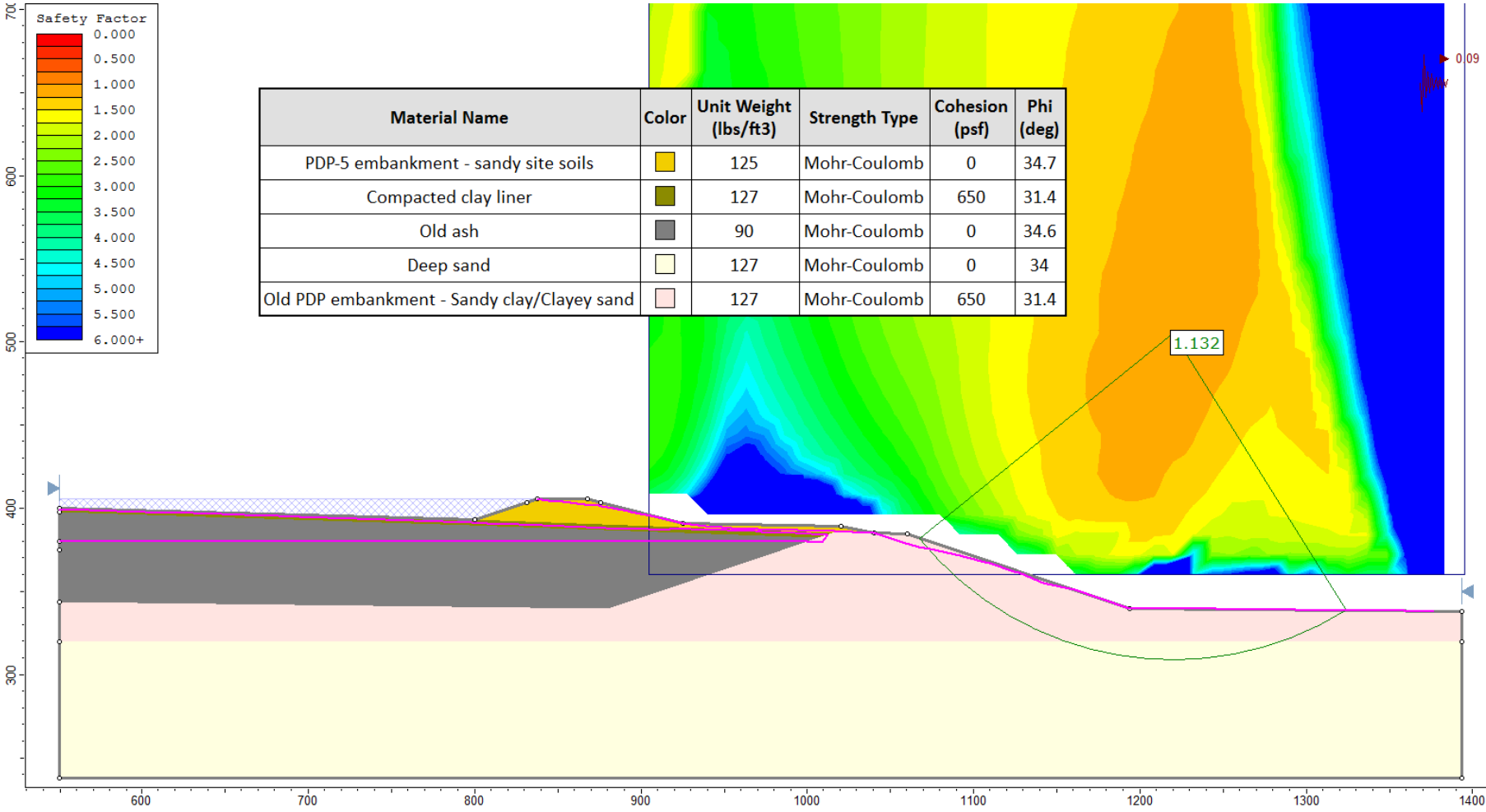


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.14**

Results of Stability Analysis − PDP5: B−B' − Case 2a

Stability and Safety Factor Assessment, Martin Lake SES

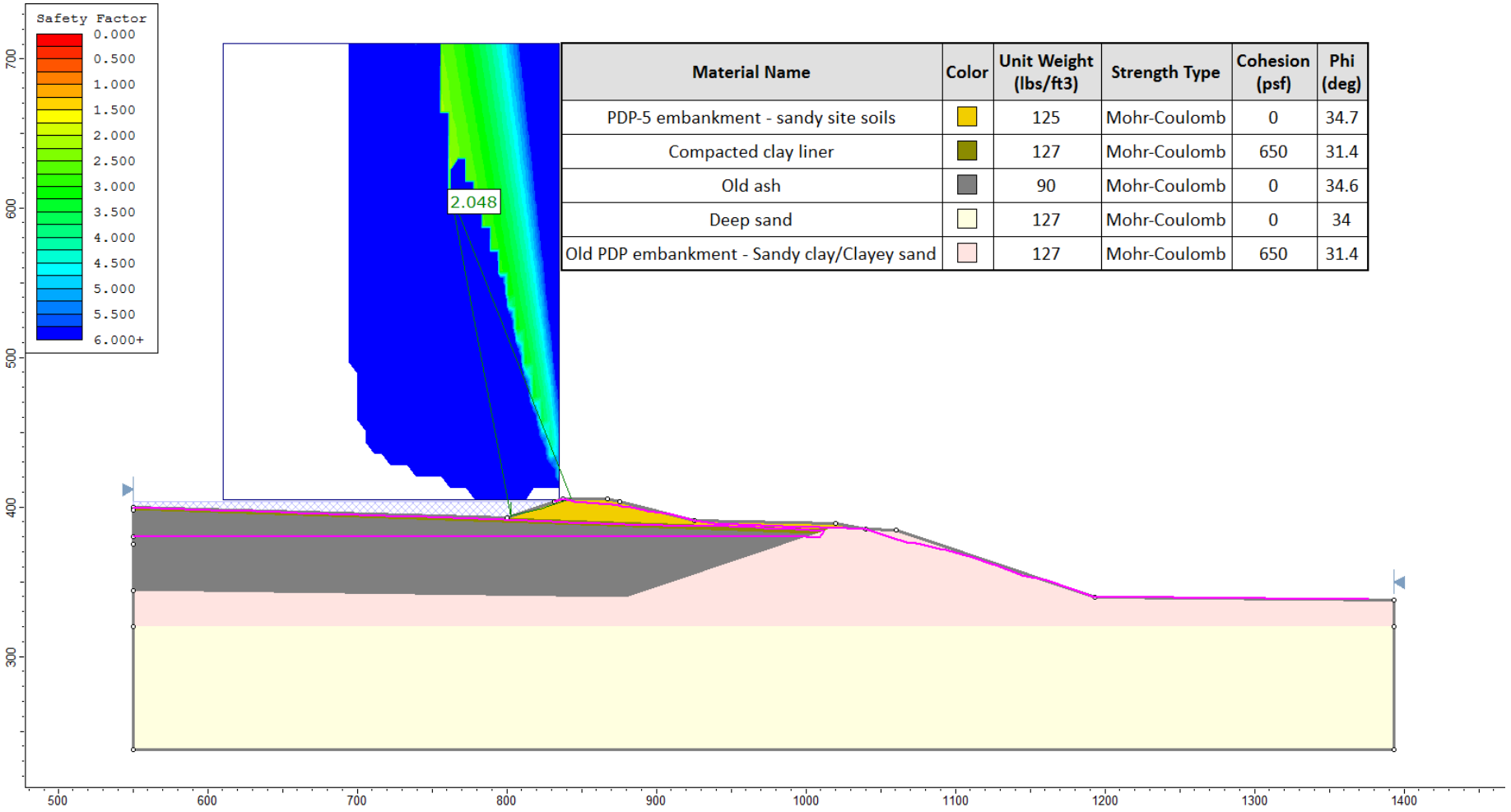


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.15**

Results of Stability Analysis − PDP5: B−B' − Case 2b

Stability and Safety Factor Assessment, Martin Lake SES

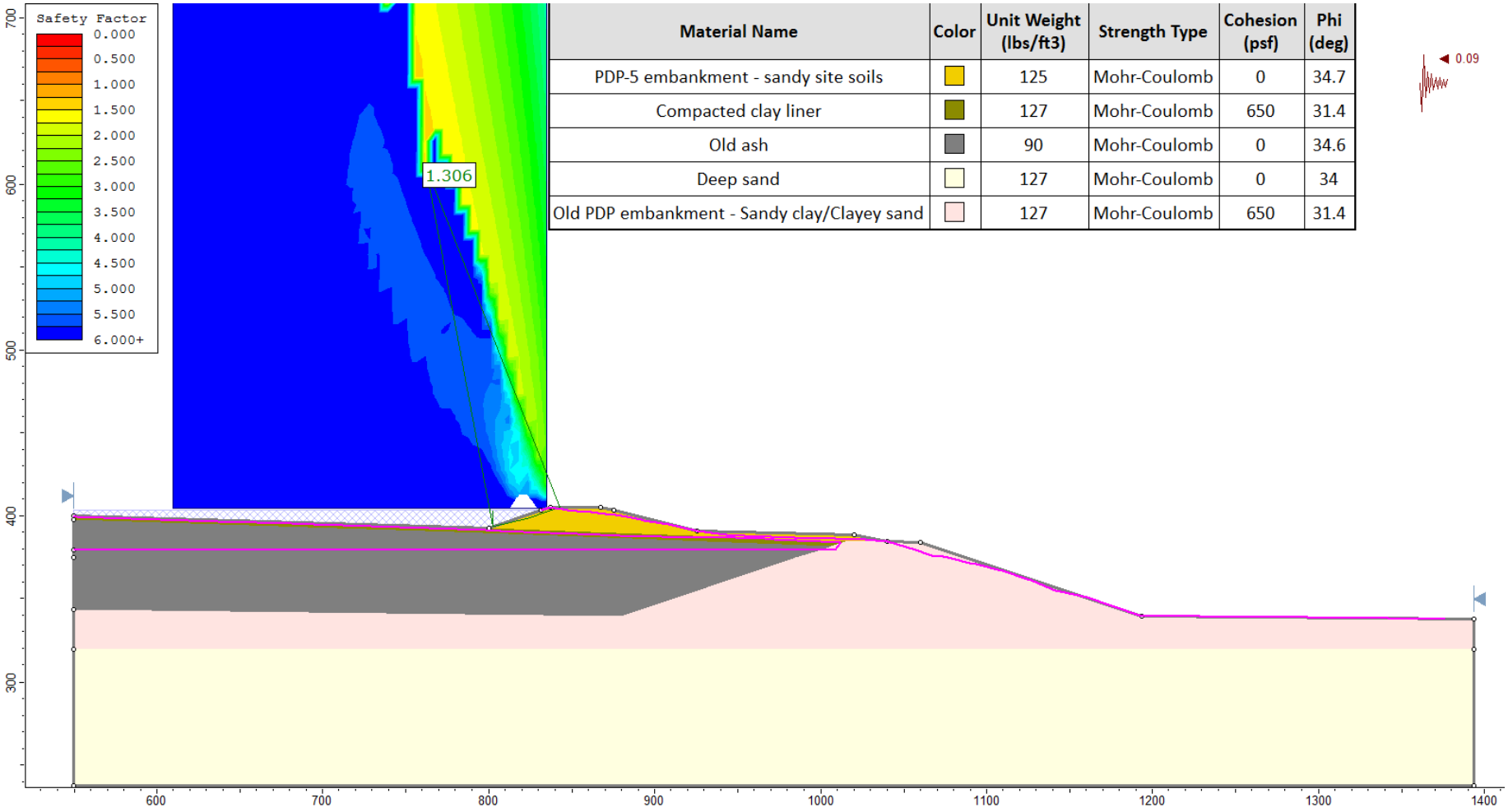


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.16**

Results of Stability Analysis − PDP5: B−B' − Case 3a

Stability and Safety Factor Assessment, Martin Lake SES

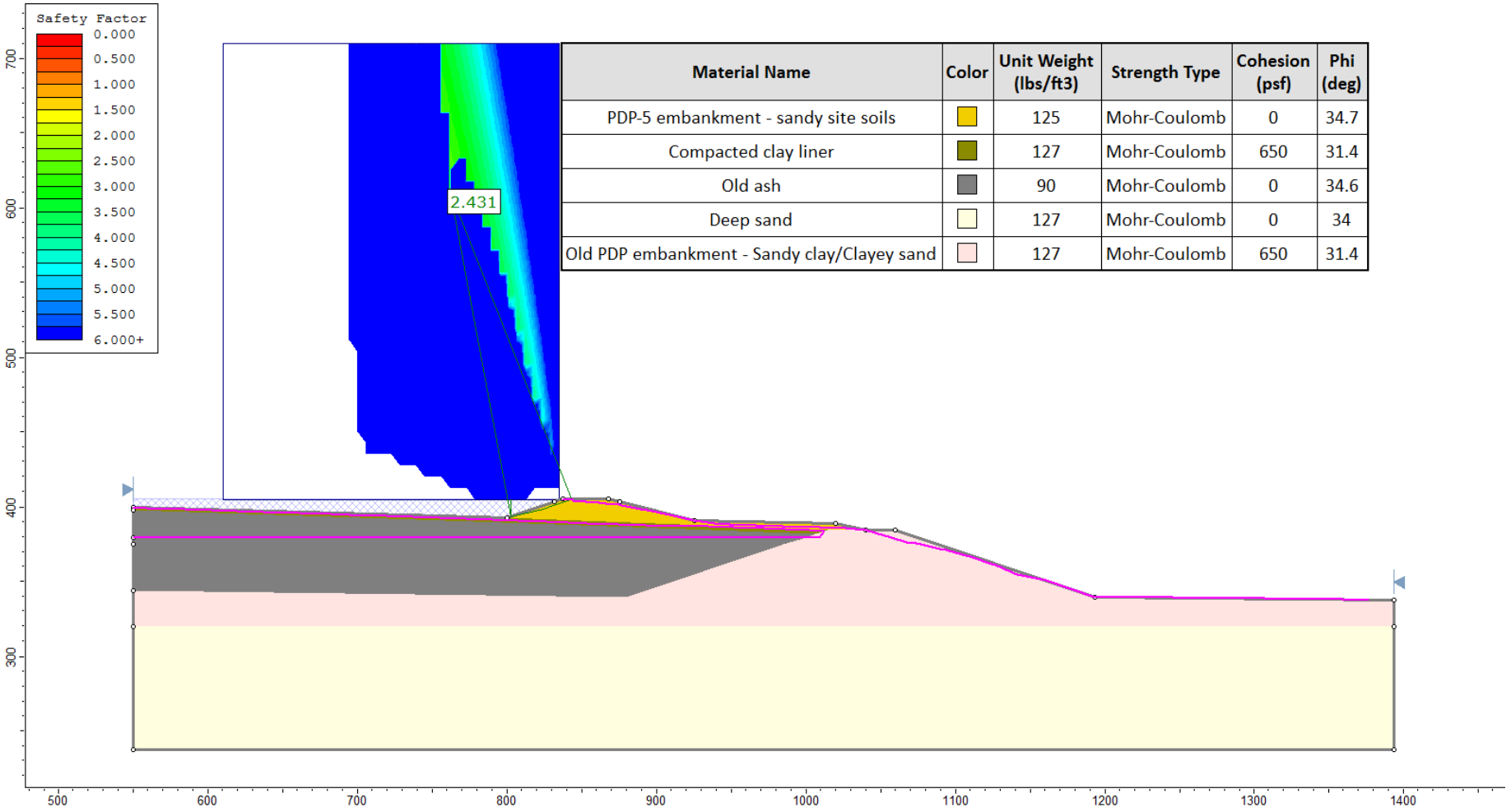


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.17**

Results of Stability Analysis − PDP5: B−B' − Case 3b

Stability and Safety Factor Assessment, Martin Lake SES

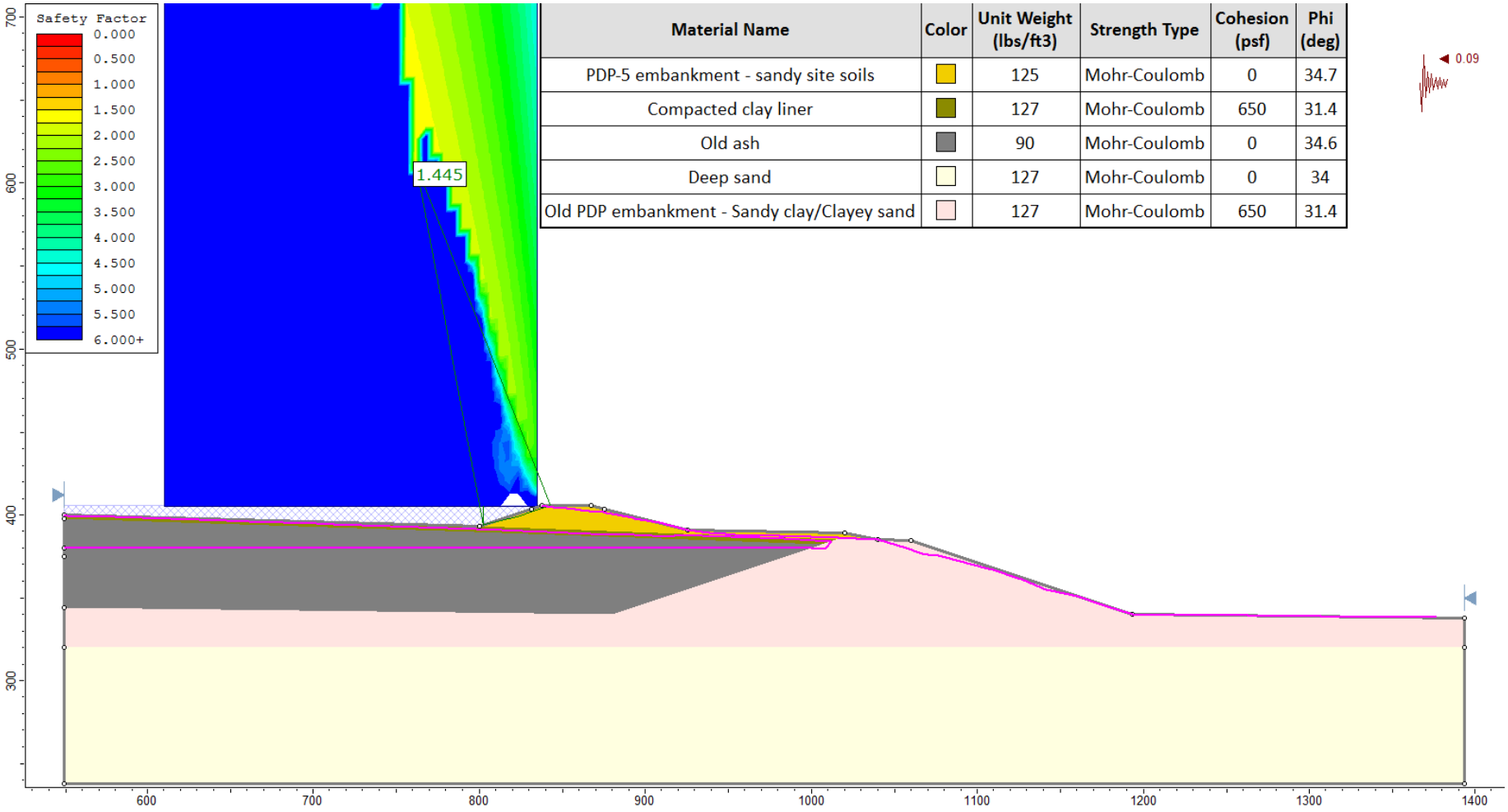


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.18**

Results of Stability Analysis – PDP5: B–B' – Case 4a

Stability and Safety Factor Assessment, Martin Lake SES

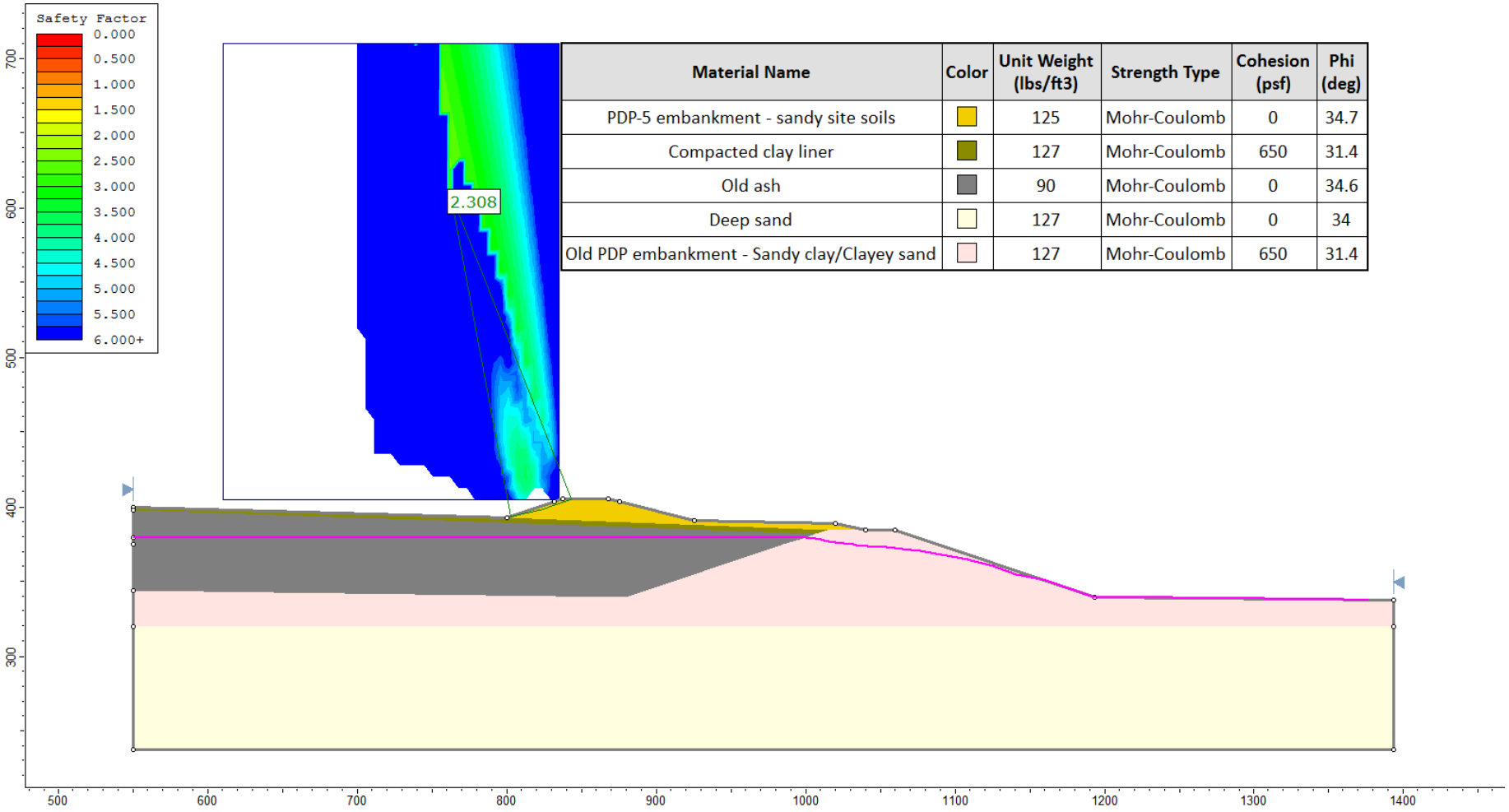


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.19**

Results of Stability Analysis − PDP5: B−B' − Case 4b

Stability and Safety Factor Assessment, Martin Lake SES

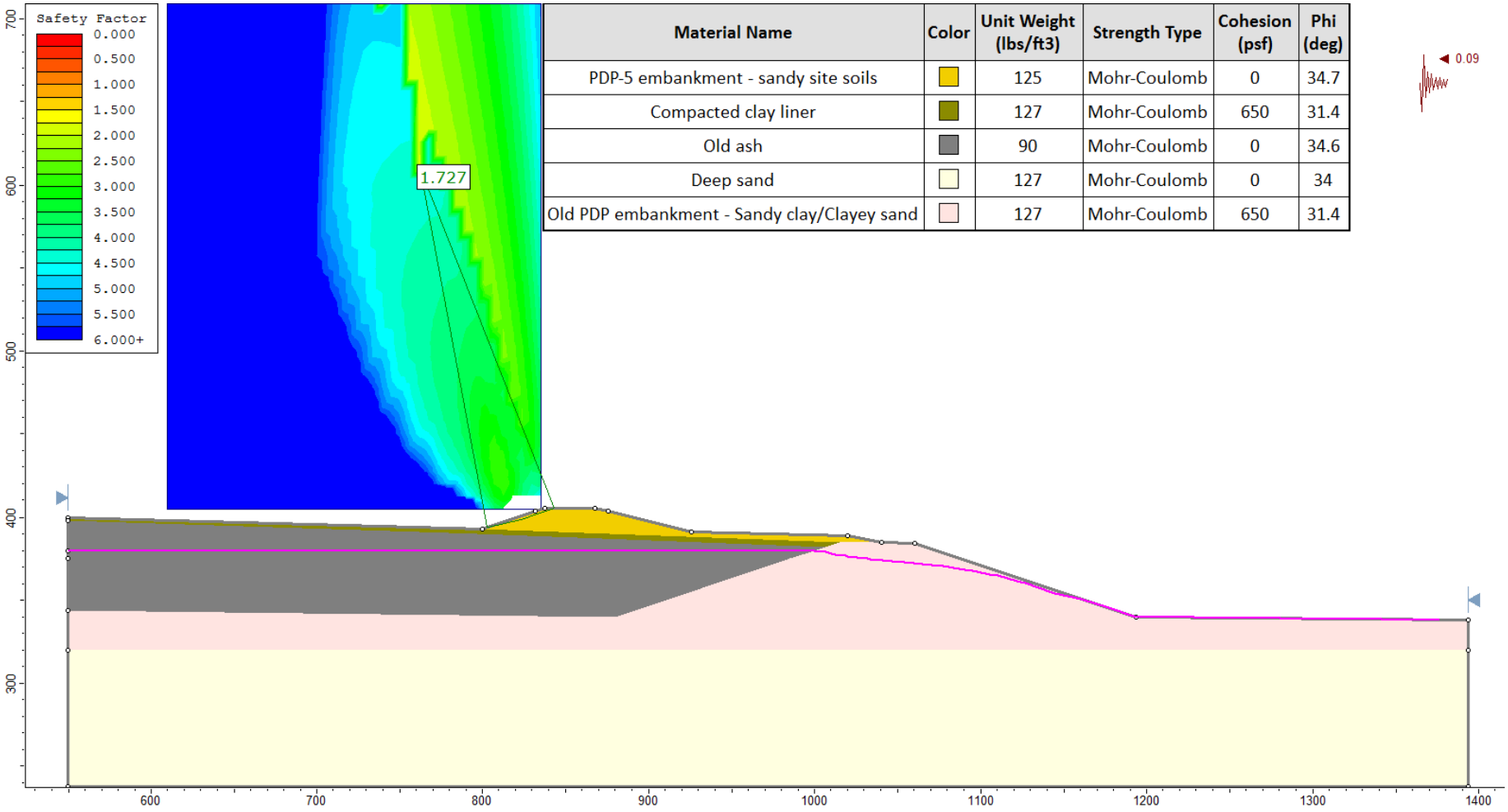


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.20**

Results of Stability Analysis − PDP5: B−B' − Case 5a

Stability and Safety Factor Assessment, Martin Lake SES



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PDP-5 embankment - sandy site soils		125	Mohr-Coulomb	0	34.7
Compacted clay liner		127	Mohr-Coulomb	650	31.4
Old ash		90	Mohr-Coulomb	0	34.6
Deep sand		127	Mohr-Coulomb	0	34
Old PDP embankment - Sandy clay/Clayey sand		127	Mohr-Coulomb	650	31.4

FIGURE **C.21**

Results of Stability Analysis − PDP5: B−B' − Case 5b

Stability and Safety Factor Assessment, Martin Lake SES

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