Luminant

Office Memorandum

Date: November 17, 2020

To: Cynthia Vodopivec

cc: Matt Ballance
Jason Campbell
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From: Vic Modeer

Subject: Ash Pond Structural Stability Assessment
Kincaid Generation, LLC
Kincaid Power Station

BACKGROUND

The October 2016 certified "CCR Rule Report: Initial Structural Stability Assessment for the Kincaid Ash Pond at the Kincaid Power Station" (CCR Certification Report) prepared by AECOM for Kincaid Generation, LLC (Kincaid Generation) describes the outlets for the Ash Pond. There are two hydraulic structures that pass through the dike of the Ash Pond, the 48-inch corrugated metal pipe (CMP) emergency outlet structure and a 60-inch reinforced concrete recycle intake pipe (RCP) that passes through the dike and travels back to the plant on the downstream side of the southern dike. The recycle pipe is 20-feet from the toe of the dike with 6 feet of soil cover. No other hydraulic structures pass through the dike of or underlie the base of the Kincaid Ash Pond. The AECOM report states that the Kincaid Ash Pond hydraulic structures cannot be structurally certified due to inability to complete a closed-circuit television (CCTV) inspection of the recycle intake structure pipe. However, the recycle pipes have been inspected numerous times thereafter and found to be structurally sufficient. Thus, both hydraulic structures are structurally sufficient.

Pipe Inspections and Structural Stability Statements. AECOM's 2016 report states that the CMP was able to be internally inspected via a CCTV inspection and found to be "free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris." In addition, the AECOM report states that "[e]valuation of design drawings and information about operations and maintenance for [the CMP] did not identify any issues." However, AECOM could not certify that all of the Kincaid Ash Pond hydraulic structures meet the requirements of § 257.73(d)(1)(vi) because it was not able to be internally inspect the RCP due to the

high flow volume. However, the intake structure that includes the section of the RCP through the embankment was observed in the field by AECOM and no structural defects were found as noted in AECOM's report.

The 60-inch RCP was constructed with a lean concrete bedding to prevent settlement during and after construction. The pipe is flowing freely as it is a key part of the plant operation water balance. Inspections of the ground surface above the pipe are performed weekly as part of the weekly inspections in compliance with § 257.83 and do not show any deformation or loss of ground surrounding the pipe.

EVALUATION

Analyses. The critical cross section for the 60-inch RCP is at Station 119+00, at the outlet. The remainder of the southern dike is flatter and does not have pooled water on the upstream face. The results of the 2016 AECOM report address conditions of steeper slope with saturated ash on the upstream face. In order to certify the complete 60-inch RCP is structurally sound in accordance with § 257.73(d)(1)(vi) the following analyses were performed at the critical outlet cross section at Station 119+00:

- § 257.73(e)(1)(i), Maximum storage pool safety factor must be at least 1.50. Figure 1 provides the graphic results of the analysis. The calculated safety factor is 2.86.

- § 257.73(e)(1)(ii), Maximum surcharge pool safety factor must be at least 1.40. Figure 2 provides the graphic results of the analysis. The calculated safety factor is 2.04.

- § 257.73(e)(1)(iii), Seismic safety factor must be at least 1.00, Figures 3 and 3A provide the graphic results of the analysis. The calculated safety factor is greater than 1.00 as shown in Figure 3 and the soils do not sustain perceptible movement according to the results shown in Figure 3A.

    - The analysis of the movement shown in Figure 3A is to determine the integrity of the pipe should earthquake movement occur at the outlet.

    - The design earthquake parameters were taken from the results of the Probabilistic Seismic Hazard Analysis (PSHA) from the 2016 AECOM report.

    - The analysis of Figure 3A is based on the state of the practice method by Jibson, et.al. (Jibson, R.W., Rathje, E.M., Jibson, M.W. and Lee, Y.W., 2013. *SLAMMER: Seismic landslide movement modeled using earthquake records* (No. 12-B1). US Geological Survey).

- § 257.73(e)(1)(iv) For dikes constructed of soils that have susceptibility to liquefaction safety factor must be at least 1.20. The soils are not susceptible to liquefaction, and the results of the analysis have a calculated safety factor of 2.83.

Evaluation. The above evaluation shows that the 60-inch RCP that runs from the pond outlet to the plant does not affect the stability of the impoundment that would cause a release of CCR material. Moreover, a failure within the 60-inch RCP would not cause the dike to become unstable and the dike instability to cause a release of CCR material. The evaluation also shows that the stability of the dike at the inlet structure meets the requirements of the CCR rule so any dike instability will not cause a pipe failure. The inlet structure does not have any structural defects.

Accordingly, based on the above analyses and evaluation of the 60-inch RCP and the information included in the 2016 AECOM report for the CMP, the hydraulic structures at the Ash Pond are structurally sufficient and meet the requirements of § 257.73(d)(1)(vi).

Please let me know if you have any questions.

Sincerely,

Vic Modeer, PE, D.GE
(IL, MO, IN, KY, OH, LA)
Consulting Engineer

FIGURE 1

§257.73(e)(1)(I) Maximum Storage Pool Safety Factor must be at least 1.5

- Square in embankment represents the 60-inch diameter pipe - in failure - no strength
- Drained shear strengths were used in this analysis

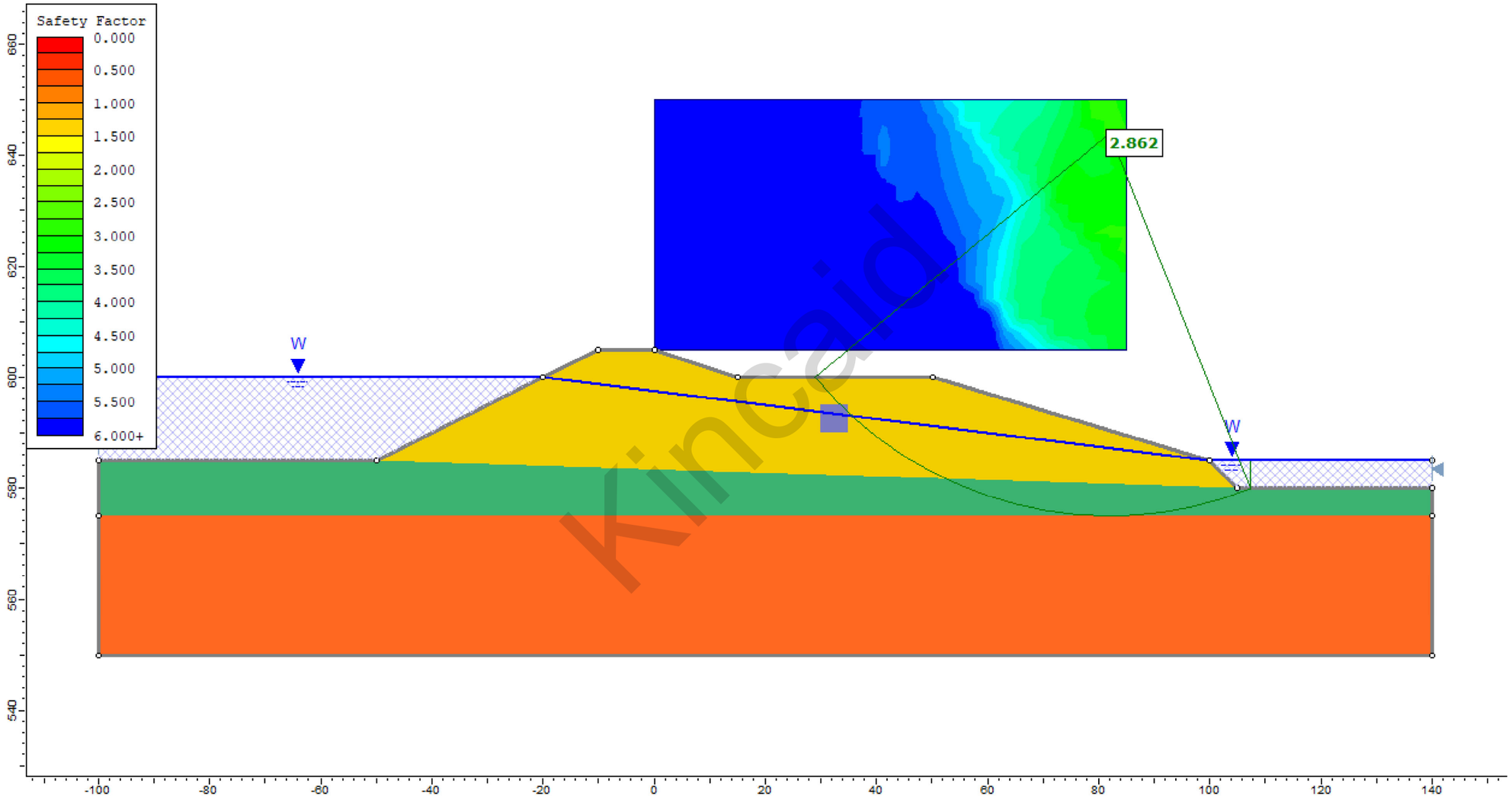

FIGURE 2

§257.73(e)(1)(II) Maximum Surcharge Pool Safety Factor must be at least 1.4

- Square in embankment represents the 60-inch diameter pipe - in failure - no strength
- Short term undrained strengths were used in this analysis

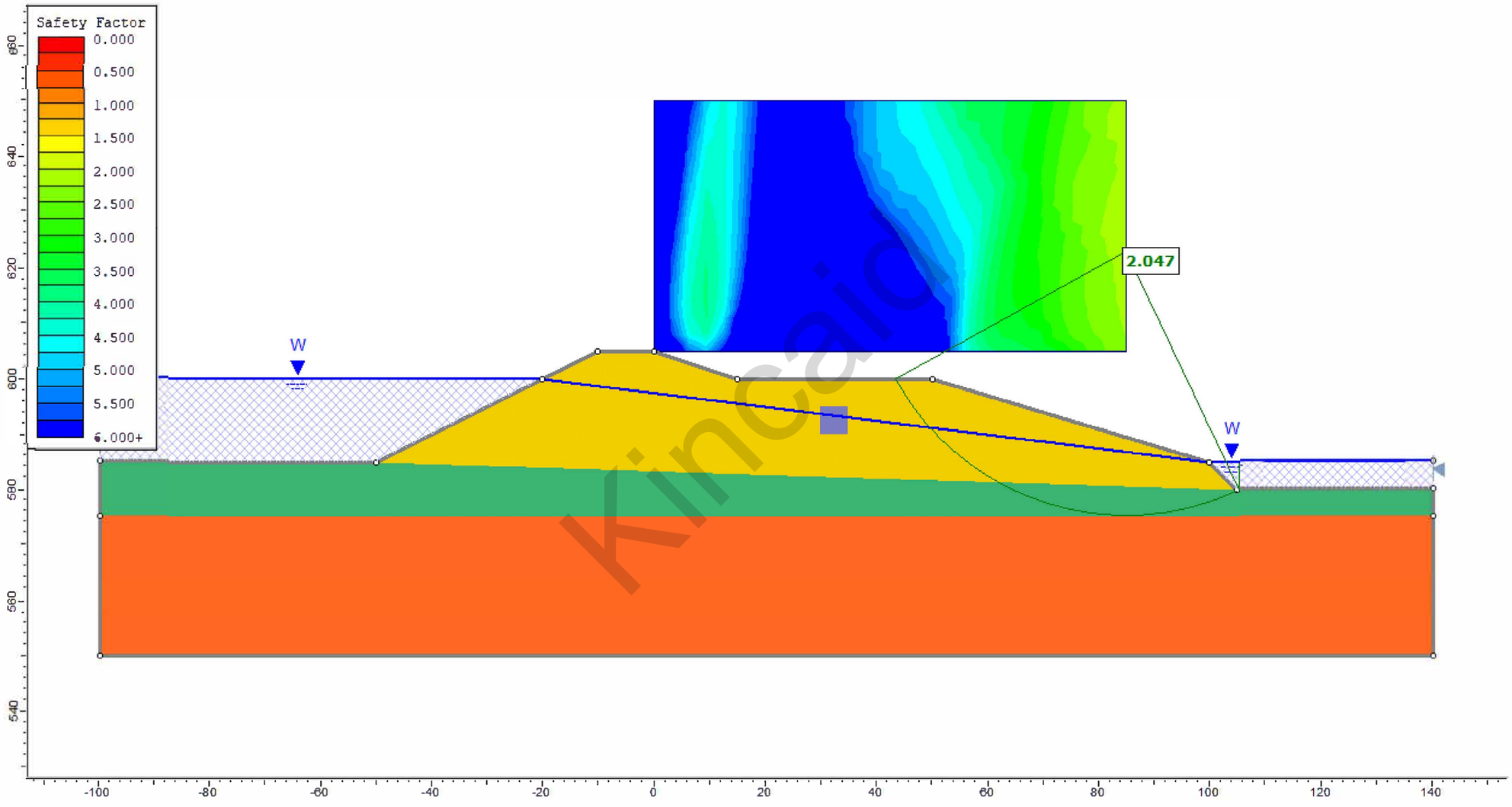

FIGURE 3

257.73(e)(1)(III) Seismic Safety Factor must be at least 1.0

- Square in embankment represents the 60-inch diameter pipe - in failure - no strength
- The horizontal acceleration from certification report is 0.07
- This analysis finds the lowest horizontal acceleration for a safety factor 1.0
- Lowest horizontal acceleration = 0.204 < 0.07, therefore embankment meets rule

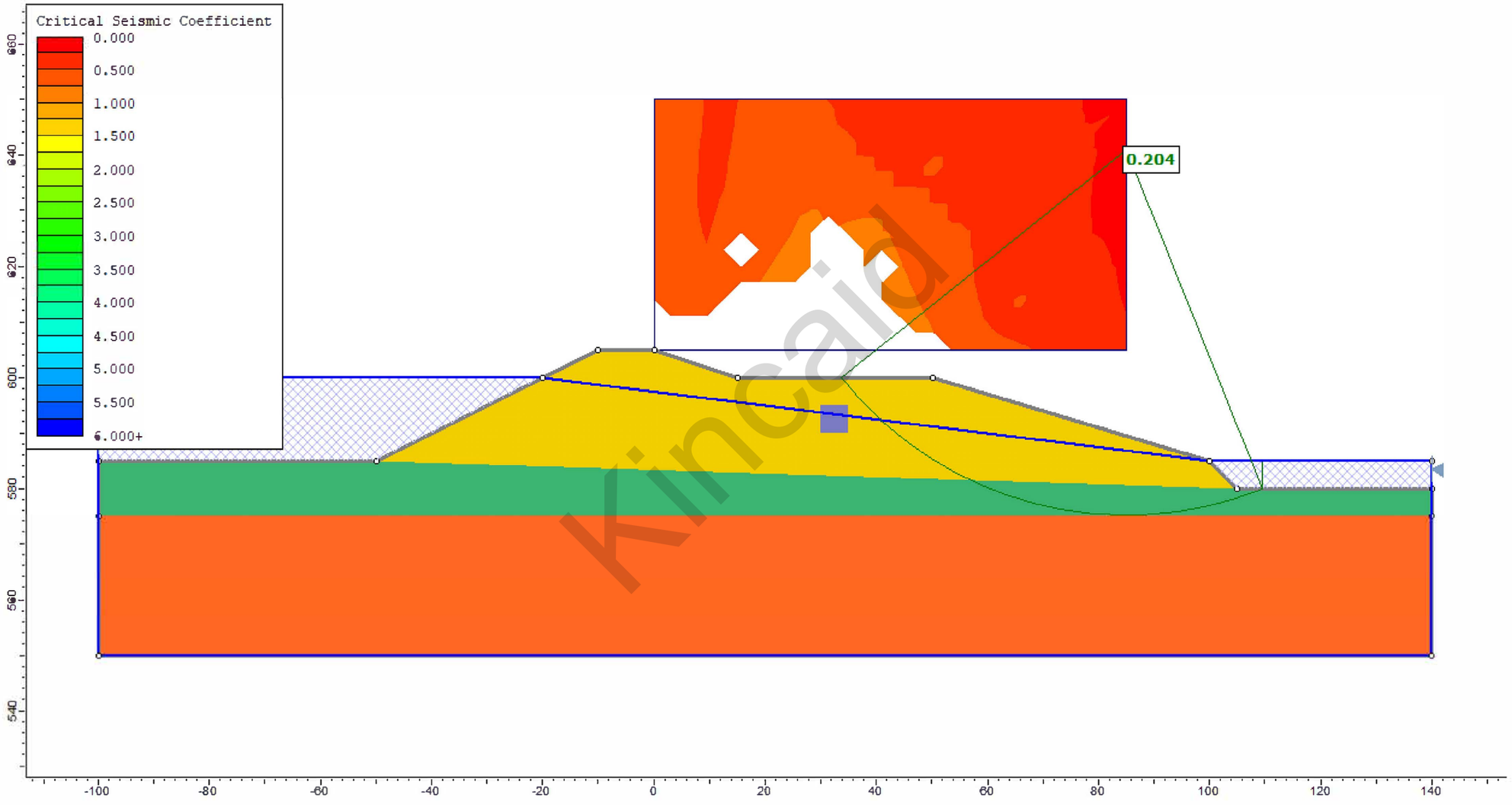

FIGURE 3A

§257.73(e)(1)(III) Seismic Safety Factor must be at least 1.0

- Square in embankment represents the 60-inch diameter pipe - in failure - no strength
- This analysis shows the displacement from the modeled earthquake in the PSHA from the certification report
- Referece: Jibson, R.W., Rathje, E.M., Jibson, M.W. and Lee, Y.W., 2013. SLAMMER: Seismic landslide movement modeled using earthquake records (No. 12-B1). US Geological Survey.

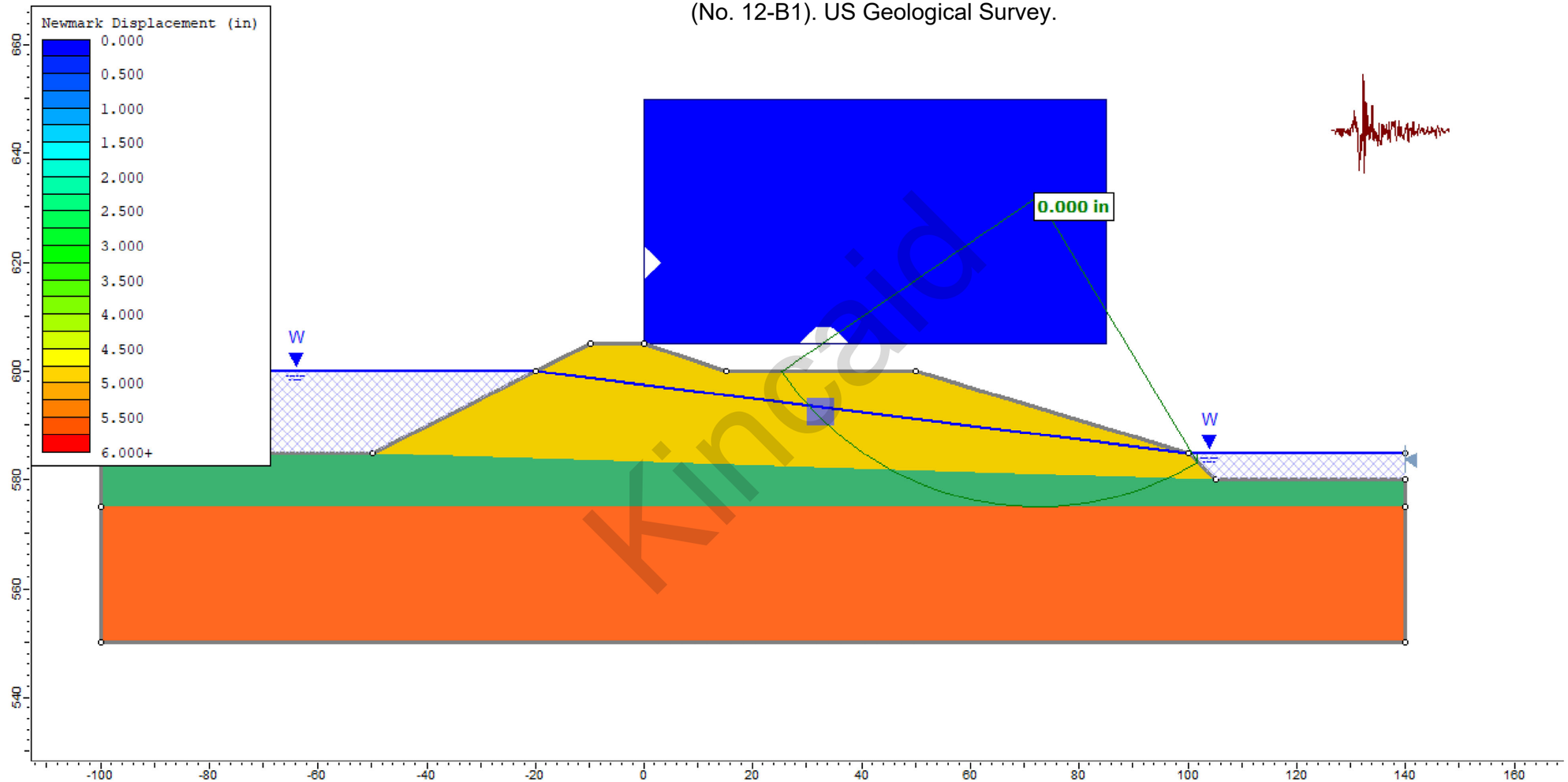

FIGURE 4

§257.73(e)(1)(IV) For dikes constructed of soils that have susceptibility to liquefaction safety factor must be at least 1.2

- Square in embankment represents the 60-inch diameter pipe - in failure - no strength
- The soils immediately below embankment were shown in certification report to be susceptible to earthquake or strain softening
- This analyses slope with strain softened strengths