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Technical Memo

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Subject: BB2 Second Site Visit

Date: September 9, 2022

The group visited the site again on September 8, 2022. From the County, Berenice, Hamid, Farhad and Maria attended. Greg from Ghilotti Construction was there. From SLMO, Sean, Scott and Erica attended. Eric from MPEG, and Wes and I from MGE were there.

2002 Repair Design Plans Observations

- The reason for the repairs is stated on the plans as loss of soil at the toe of the Pier 2 footing and subsequent loss of resistance to sliding resulting from soil pressure behind the pier wall. In simpler terms, this means the soil pressure was kicking the bottom of the pier wall out, making the wall crack because of the outward swinging of its base.
- Seven 12”x18”± (not 12x12, as shown on the plans) tie-beams run between the base of Abut 3 and the near mid-height of Pier 2’s back along the east half of the structure. They connect to a continuous 18”X18” grade beam poured against the lower part of Pier 2.
- They used helical anchors, presumably at the abutment ends of the tie-beams, to neutralize the soil pressure behind the abutment.
- A pile is presumed to be under each Pier 2 end of the tie-beam, as shown on the repair plans. Some of its rebar meshes with tie-beam rebars, which in turn mesh with grade beam rebars, all in close proximity. The grade beam/tie-beam/piles junction is dowel-connected to the back of Pier 2.
- The purpose of using the 18”-diameter piles near the pier end of each tie-beam was probably to create a drag through the soil for the pier wall that’s connected to them so the wall does not kick out from its base. The piles may also support the pier vertically.

Important Field Observations

- We verified seven tie-beams had been placed per the 2002 repair plans. The underside of two tie-beams (first and 6th from the east edge) were excavated slightly to verify the existence of a pile at the expected spot, but no pile was seen. Overall, seven piles are supposed to exist.
- Existence of helical anchor could not be verified. Seven are supposed to be there.
- We observed another generation of repairs at the site, clearly from a time other than 2002, having added seven other tie-beams from the bottom of Abut 3 to Pier 2 in the west half of the structure. No plans are

available for these repairs. Some of these tie-beams are above the soil grade and no pile was seen under them and there is no grade beam to spread their force to the pier.

- In the above half of the structure, a one-foot-wide concrete strip has been added to the toe of the Pier 2 footing under the main span. It's not obvious how deep the footing toe augmentation is dug into the soil.
- The horizontal crack in the back of the wall is nearly continuous to the west edge of the structure. In general, the crack is wide in the discrete 18"x18" pier wall "pilasters" that are connected together with 12"-wide web walls. The cracks run continuously along the web walls as well and are relatively wide.

MGE's Conclusions

The presence of the two sheets of plans and discovery of the second set of repairs in the field have added to our better understanding of the history of the structure and the modifications made to it. These modifications may have been effective arresting the distress. Over the past year, when the wall has been closely monitored by the Town, it has been observed that the cracks have not increased in width, and, subsequently, the wall has not experienced additional lateral displacement. We do not have the history of the above two indicators of structural distress from the time before the repairs were done to last year, when the monitoring began.

Based on our observations and the configuration of the structure, as well as the two sets of repairs implemented, we do not believe that this structure would fail abruptly and catastrophically due to additional movement of the Pier 2 footing. Given this, it may not be necessary to pursue partial or full removal of the structure. However, review of repair plans and structure condition inspection are not sufficient to conclude whether the structure is safe for public use. Additional analysis and non-destructive investigations would need to be performed to assess the safety and load capacity of the structure.

Based on the above conclusions, we recommend the following additional measures be implemented to ensure the safety of the public using this facility:

1. Continue the monitoring of the crack at Pier 2. Measure and record the crack size at specific locations every 2-4 weeks and immediately after rain events. If evidence of increased cracking is observed, public use of the structure should be prohibited until the conditions can be investigated and evaluated.
2. Limit the public use of the structure. Large public events or gatherings on the deck should not be allowed.