121 Continental Drive
Suite 207
Newark, DE 19713
T: 302-655-4451

www.pennoni.com

June 17, 2025 CLCAX19001

Prepared for:
Collings Lake Civic Association
P.O. Box 475
Williamstown, NJ 08094

RE: Cushman Lake Dam Modifications
Block 2609, Lot 1.01 & Block 2710, Lot 1,
Borough of Folsom, Atlantic County, NJ

Dear Steve Slimm, President:

Pennoni was recently on-site to inspect the upstream (lake) area of the existing dam structure, as part of the follow-up investigation into recent condition changes at the site since April 24, 2025. The Client expressed concern about numerous boils that had formed on the downstream side of the North Auxiliary Spillway, indicating potential water passing through the ground and around/under the dam structure. On Tuesday, June 10th, Pennoni's dive team, with Pennoni's Project Manager Beth-Ann Grasso, visited the Cushman Lake Dam site to inspect and probe in front of the dam to detect any openings or avenues of water infiltration passing through the ground and around/under the dam structure. Additionally, the Pennoni dive team inspected the condition of the rehabilitated concrete of the culvert walls.

Prior to performing the in-water work, the Pennoni dive team and the Client's on-site representatives discussed the inspection plan and safety concerns. Staff had lowered the lake levels in advance of the inspection to decrease potential pressure head differential (dive safety concerns) and the sluice gate was closed prior to divers entering the water. The dive team was prepared with a full surface supplied air dive station, should it be determined necessary to use while on-site. Given the lowered water level and sluice gate closure, the divers were able to successfully complete the necessary investigation with wading and probing techniques. As per staff requested, the divers also manually removed a buildup of debris from in front of the sluice gate trash rack (timber, vegetation and a large snapping turtle carcass) that was impacting operations.

The purpose of the inspection was to determine if there was an upstream source of water infiltration/undermining, or if it was more likely that the boils were coming from groundwater sources. For the purposes of this memo, upstream is considered west and downstream as east and the three culvert cells are numbered south to north. Inspection activities and results were as noted below. Photos of the inspection can be found in ***Appendix A***.

- Prior to divers entering the water and after the sluice gate was closed, the team observed several small boils and light sand/silt buildup at the downstream end, just east of the North Auxiliary Spillway and primarily through the riprap adjacent to the northeast wingwall.
- Divers waded and probed along the west (lakeside) face of the structure, as well as along the corners of the concrete wingwalls/sheet pile retaining walls, in order to determine if there was any apron/footing exposure or obvious undermining. The top of footing was found via probing through several inches of channel bottom material. There was no vertical exposure or undermining observed. There were no significant defects on the upstream face.
- Soon after probing along the west face and northwest corner (approximately 15 min.), visible plumes of fine silt were observed emanating from the downstream boils at the northeast wingwall.
- Divers continued to probe along the west face and at the northeast corner. Additional smaller

boils and silt plumes were observed at the downstream end of the wall between Cells 1/2. This location was not previously observed, as it was likely obscured by the concentrated flow through Cell 2.

- Additionally, the divers placed concentrated dye and dye tablets along the upstream face and at the corners of the wingwall interfaces. No dye was observed downstream at the boil locations.
- The divers also "sounded" the concrete culvert walls for hollow areas with a hammer. The repairs are generally intact (no spalling/cracking) but exhibit numerous hollow areas on all cell walls, up to nearly full length x 18" to 30" high at/above the waterline.

Although the dye was not successfully observed downstream, based on the large plumes of silt repeatedly observed after upstream wading and probing activities, it appears that the boils are likely caused by an upstream infiltration source (as opposed to goundwater).

If you have questions regarding the inspection and the conditions observed, you can contact me at (914) 261-0912, or kakelly@pennoni.com.

Sincerely,
PENNONI ASSOCIATES INC.

Katherine A. Kelly, PE, ADCI
Underwater Inspection Practice Lead

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Appendix A: Photographs

Photo 1: *General view, lake side dam structure, northwest (upstream) face.*

Photo 2: *General view, lake side dam structure, east (downstream) face, prior to closing the sluice gate. Area of boils shown by arrows. Note, left location not observed until after wading and probing.*

Photo 3: *Close-up of boils at downstream end of Northern Auxiliary Spillway before closing the sluice gate.*

Photo 4: *General view of downstream end prior to inspection activities. Note the water clarity.*

Photo 5: *Initial view of silt plumes forming at the downstream end, emanating from near the boils in Photo 3.*

Photo 6: *Boils with silt infiltration at downstream end of Northern Auxiliary Spillway and south interior wall after wading and probing.*

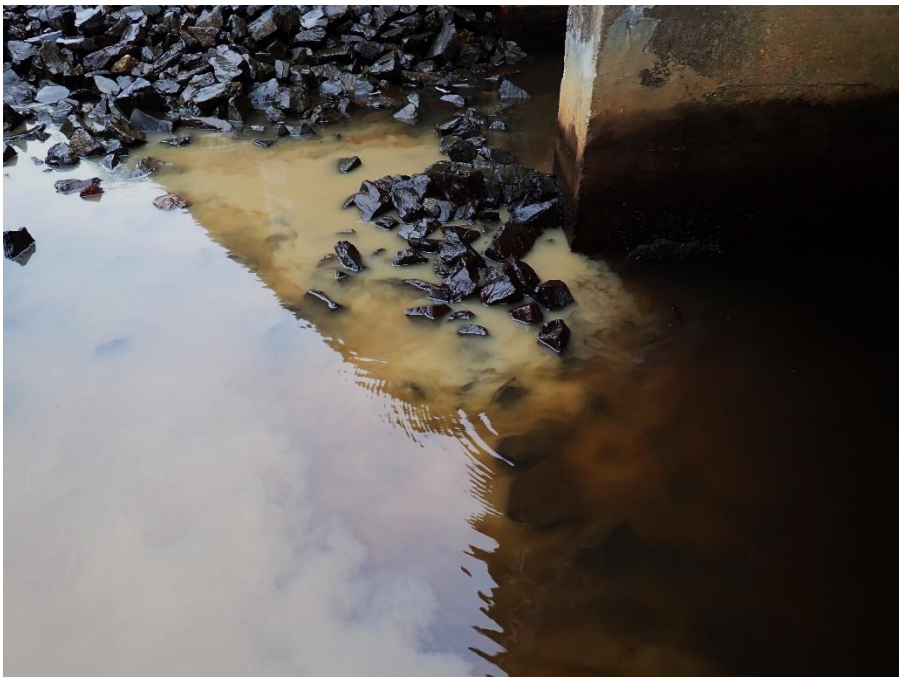

Photo 7: *Detail view of the boil and silt plume at the south wall of Cell 2.*

Photo 8: *General view of downstream end after inspection activities. Note the widespread silt.*

Photo 9: *Divers wading and pouring concentrated dye at upstream end of lake side dam structure, end of northwest retaining wall. Multiple dye locations tested.*

Photo 10: *Cell 2, north face of south wall. Typical hollow soundings of rehabilitated concrete.*