GE-Pittsfield/Housatonic River
Silver Lake Area
2025 Cap System Maintenance

July 22, 2025

SEMS Doc ID 693662

Agenda

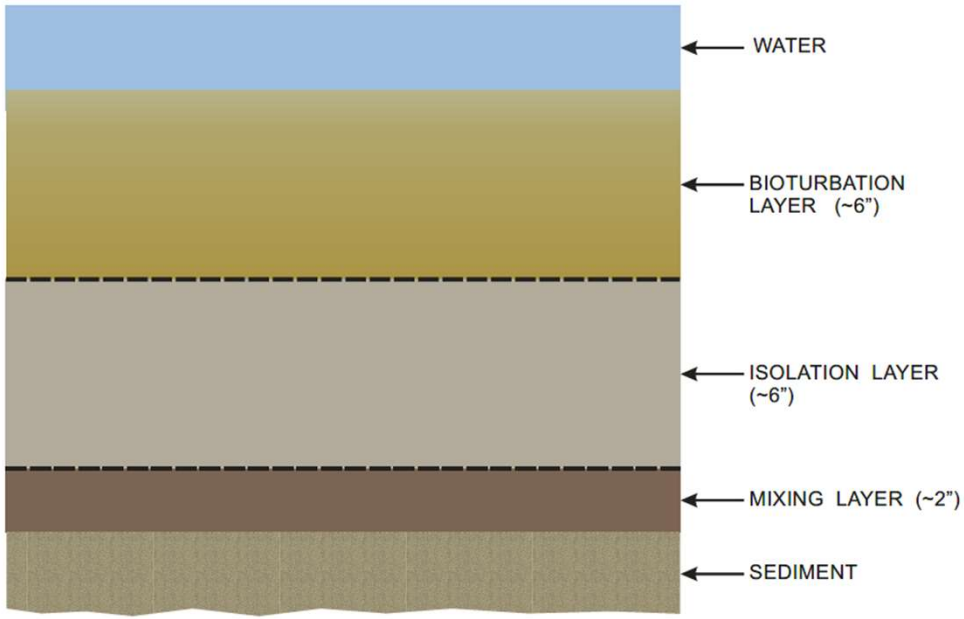
- Silver Lake Remediation
- Cap Design and Construction
- Post-Construction Cap Monitoring Activities and Results
- Upcoming Cap Maintenance

Silver Lake Remediation

- The remediation of Silver Lake required by the 2000 Consent Decree and conducted by GE in 2012-2013 included:
  - Removal of bank soils and non-bank soils at non-residential and residential properties abutting the Lake to achieve specified cleanup standards
  - Removal and replacement of 400 cubic yards of highly contaminated sediments near the northeast corner outfall from the GE facility.
  - Installation of a 14-inch capping system across the entire 26-acre Lake bottom and armoring the entire perimeter of the Lake with stone rip rap to prevent bank erosion
  - Construction of a shallow-water shelf along the shoreline to provide improved habitat for aquatic species
  - Various natural resource enhancement and restoration activities

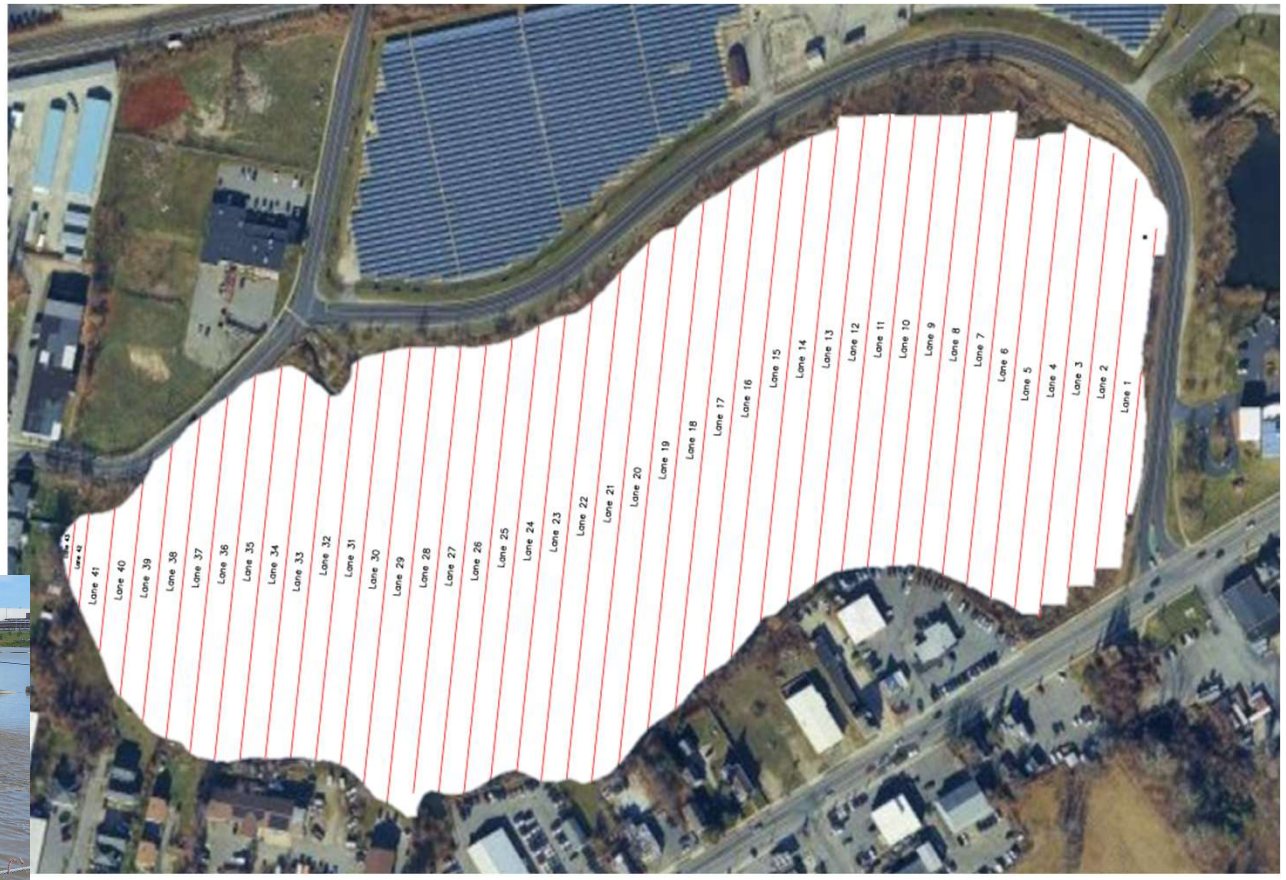
Cap Design

- The cap in open-water areas of Silver Lake was designed based on a thickness of **14 inches of clean material**, including:
  - **6-inch bioturbation layer** – a layer to accommodate the benthic community and vegetation after restoration
  - **6-inch isolation layer** – a layer designed to provide isolation between the native sediment and the overlying water
  - **2-inch mixing layer** – a sacrificial base layer designed to potentially mix with the underlying native sediment



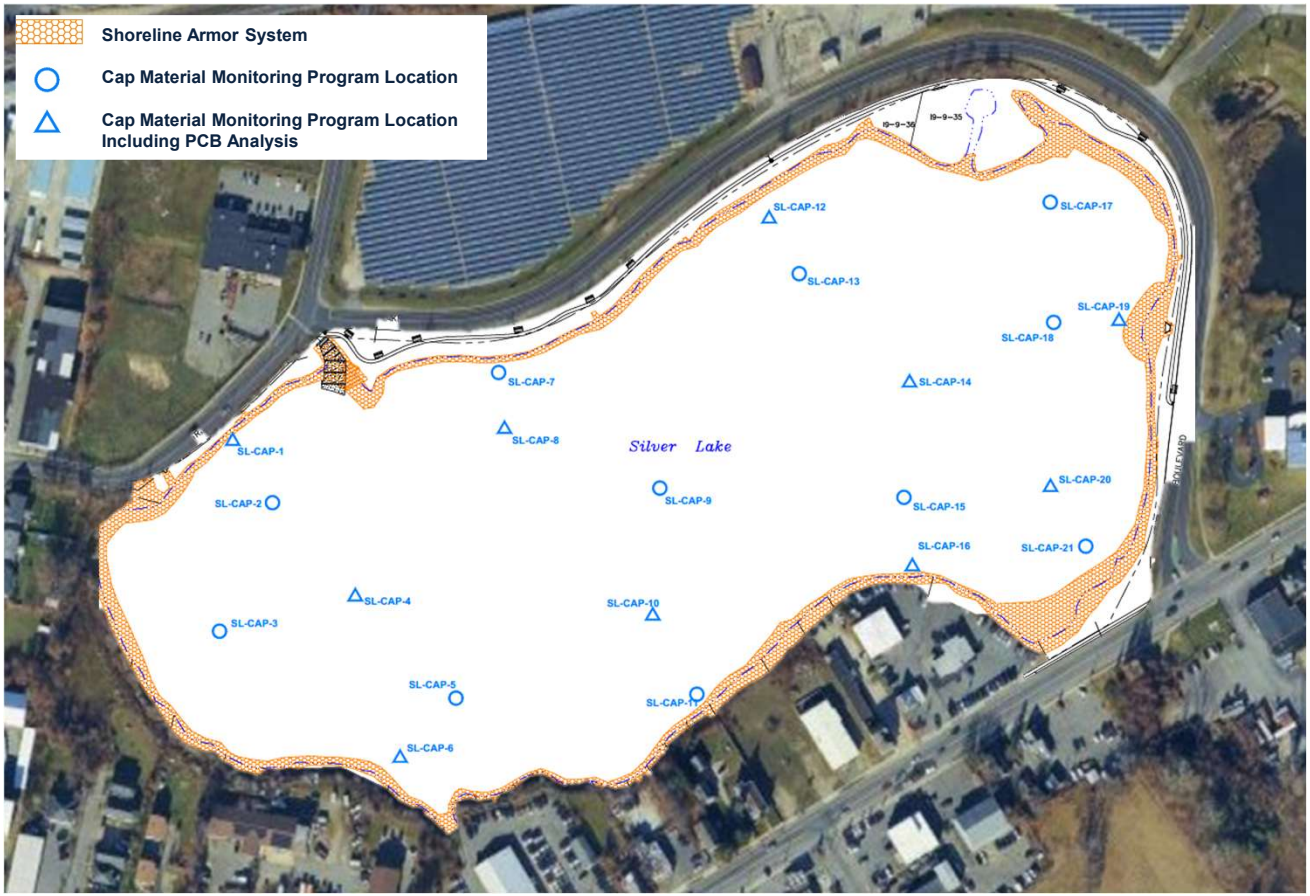
2013 Cap Construction

- Sandy cap materials were placed in thin lifts of ~1 to 2 inches, using a spreader barge pulled along cables and traveling in lanes.
- Each lift was placed across the entire lake before the next lift was started.



2013 Cap Construction (continued)

- During construction, monitoring of accurate placement was performed using collection pans (one per lane) and cores evenly spaced around Silver Lake.
- Cap construction was completed in 2013. All 26 acres of Silver Lake were capped.



Post-Construction Cap Monitoring Activities

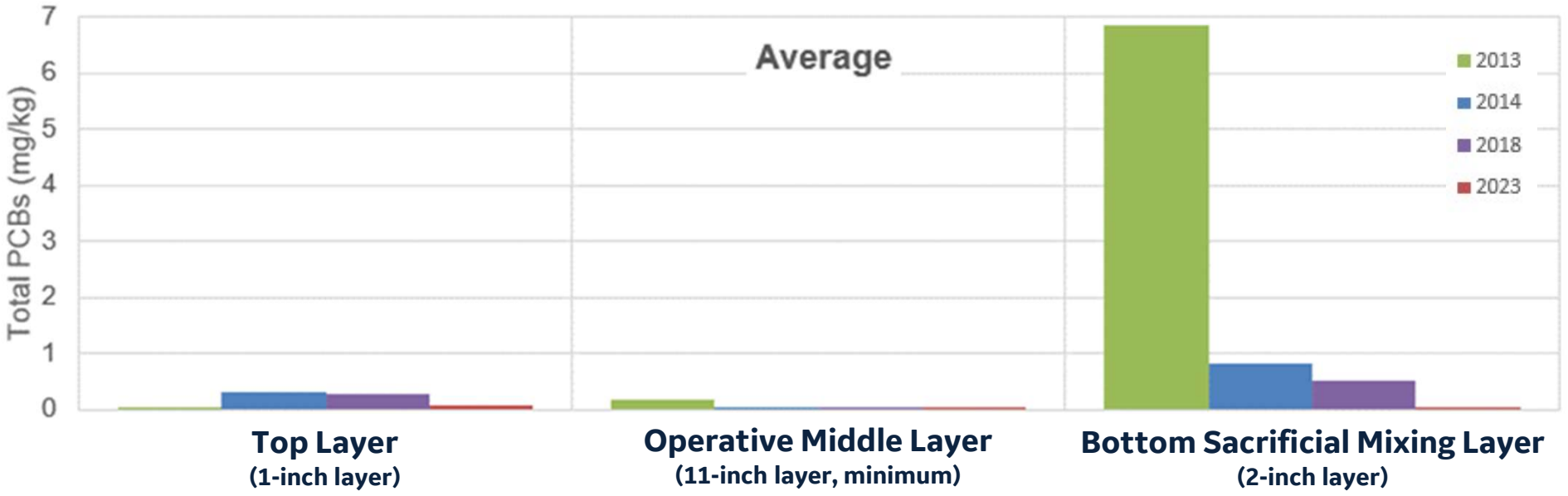
- GE has performed periodic post-construction inspections and monitoring to assess the effectiveness of the cap in meeting the specific design standards, including the following:
  - Sampling of the cap material to assess PCB migration through the cap and evaluate PCB deposition on the cap surface
  - Monitoring of the design cap thickness
  - Sampling of surface water to assess PCB concentrations
  - Sampling of fish to assess PCB concentrations

Post-Construction Cap Monitoring for PCB Concentrations

- Sampling of the cap material to assess PCB migration through the cap and evaluate PCB deposition on the cap surface included analysis of material from a subset of cores collected immediately after construction (2013) and 1 year (2014), 5 years (2018), and 10 yeas (2023) after construction.
- Evaluation included PCB analysis of the following layers:
  - **Top Layer** – The top one-inch layer of the material collected in the core, which may include material deposited naturally over time on top of the installed cap
  - **Operative Middle Layer** – The portion of the material collected in the core between the top and bottom layers
  - **Bottom Sacrificial Mixing Layer** – The bottom two-inch layer of the material collected in the core, which represents the sacrificial mixing layer

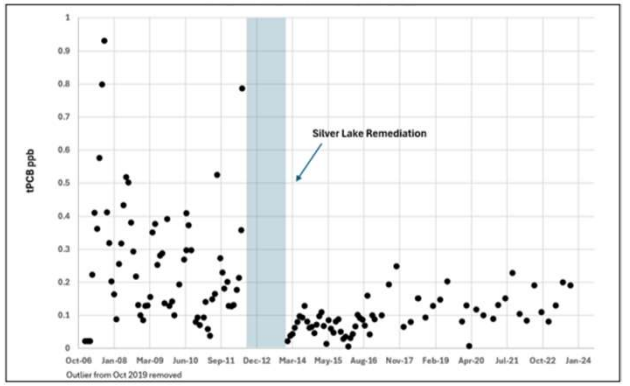
Post-Construction Cap Monitoring Results for PCB Concentrations (cont'd)

- PCB concentrations are observed to decrease, on average, since construction was completed and are generally not detected in the operative middle layer.
- The isolation layer is performing as designed and expected, effectively limiting migration of PCBs from the underlying sediments through the cap and into the surface water of the lake.

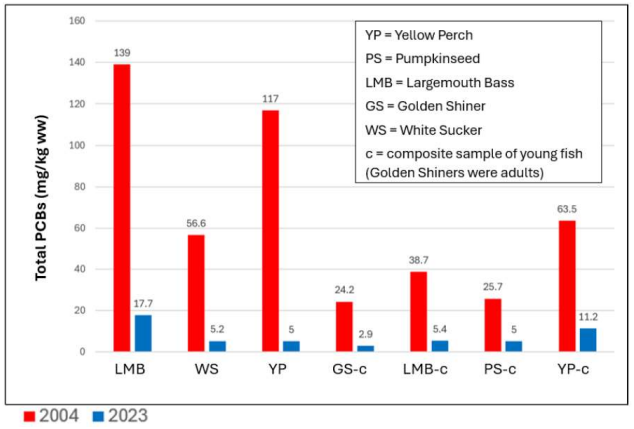


Post-Construction Monitoring for Surface Water and Fish

- Post-construction PCB sampling of the surface water and fish in Silver Lake shows substantial reductions in PCB concentrations.
  - Surface water monitoring before and after construction show that PCB concentrations in surface water have been **reduced by approximately 63%** from pre-remediation concentrations (from average of 0.25 ppb to 0.09 ppb).
  - Fish sampling conducted by GE as part of the 10-year post-construction monitoring event show that fish tissue PCB concentrations have been reduced from pre-cleanup levels in edible size largemouth bass by 87% and in yellow perch by 96% -- with **overall reduction of nearly 90%**.



Surface Water PCB Concentrations

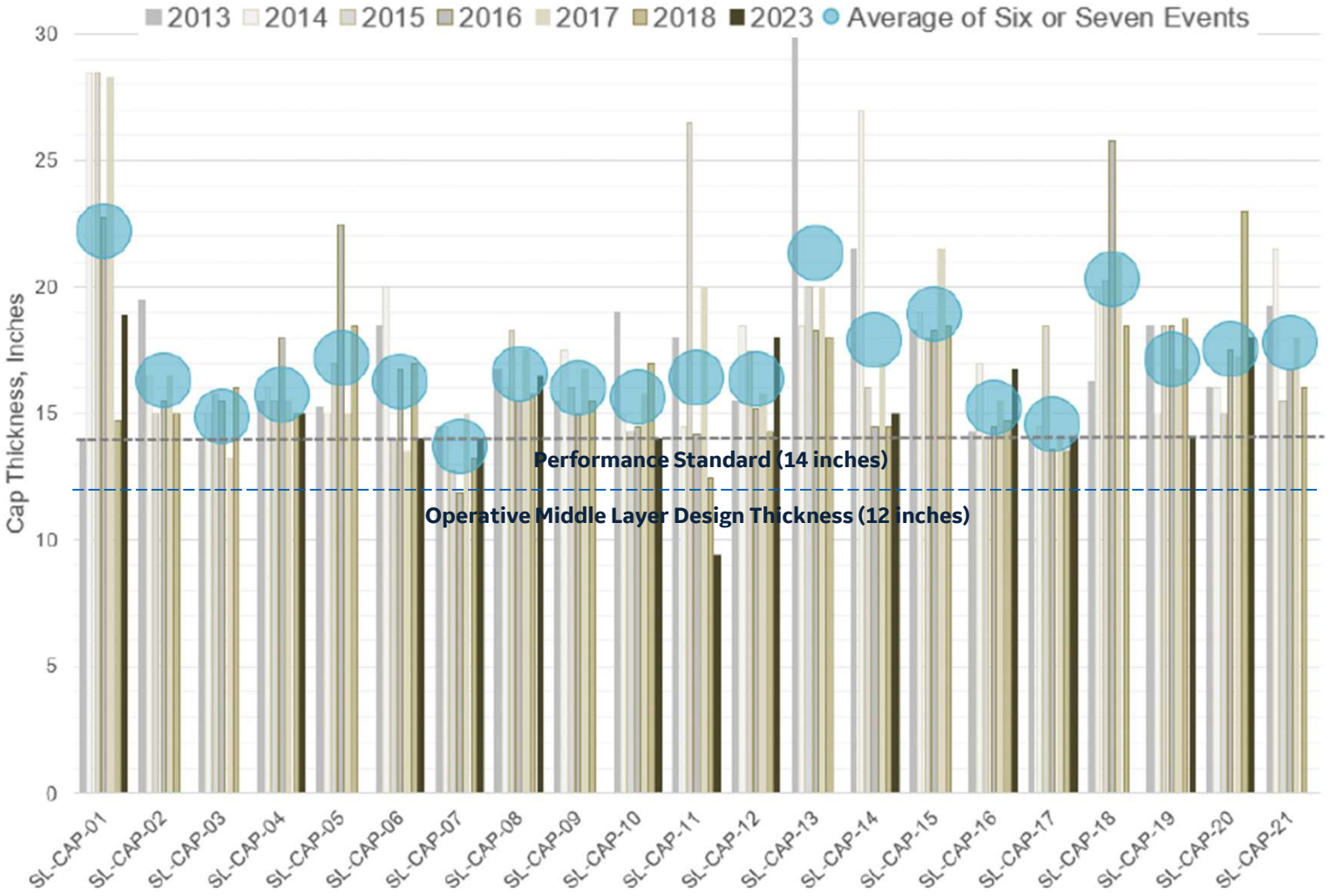


Whole Body Fish PCB Concentrations

Post-Construction Cap Monitoring for Cap Thickness

- Monitoring of the design cap thickness has included collection of cores immediately after construction (2013), annually for 5 years (2014 through 2018), and 10 years after construction (2023) and measurement of the total cap thickness in each core-collection tube.

Post-Construction Monitoring Results for Cap Thickness



- Design standards for the cap thickness have generally been maintained, with the average thickness at each location exceeding/meeting the 14-inch Performance Standard.
- Averages at all locations exceed the 12-inch design thickness for the operative middle layer of the cap, which includes the 6-inch bioturbation layer and 6-inch isolation layer.

Post-Construction Cap Monitoring in 2023-2024

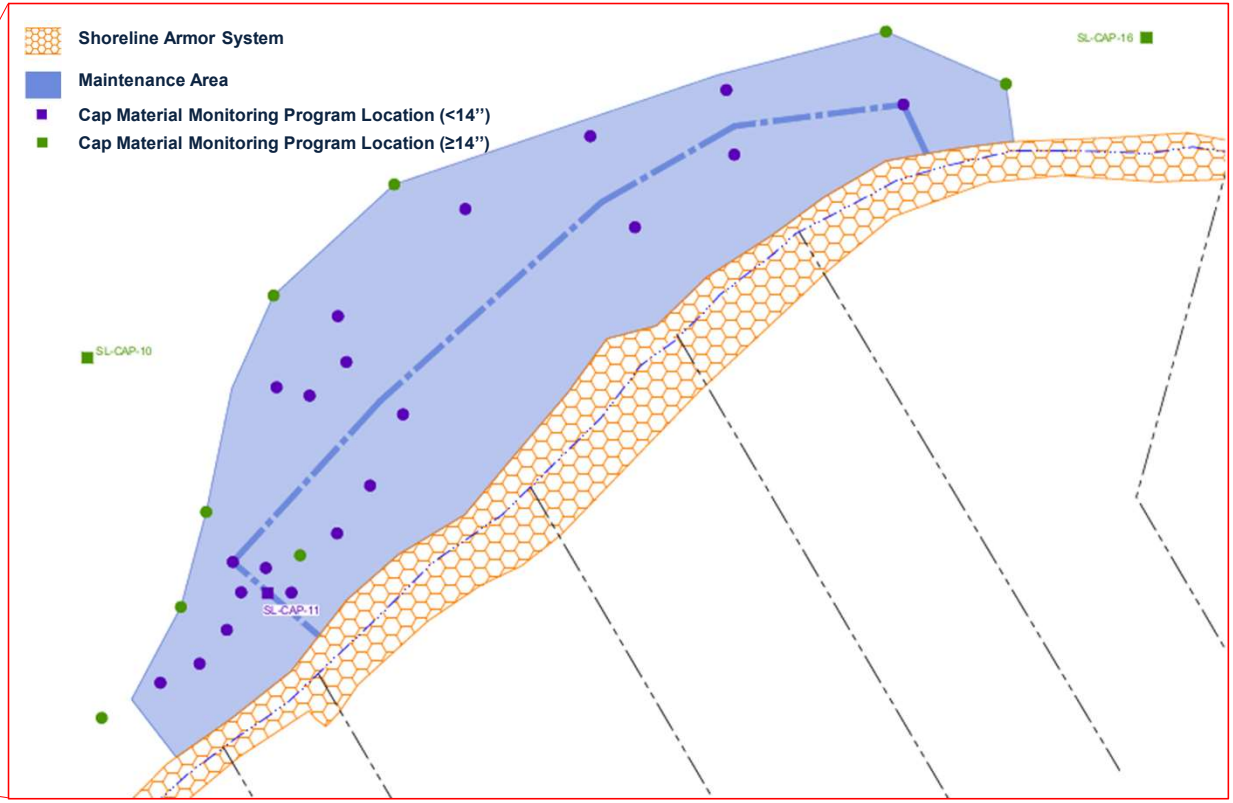
- The cap monitoring program demonstrated that the cap has remained stable over the 10 years since remediation.
- Cap monitoring in 2023 was performed at 13 locations. The results showed:
  - At 12 locations, the cap met the required thickness, with additional sediment deposition observed at many locations on top of the cap.
  - At one location in the southern area of the Lake along East Street (SL-CAP-11), it appeared that the cap thickness was less than the required 14 inches.
- Based on the thickness results observed at SL-CAP-11, additional cores were collected around that location in 2024 to delineate the area in which the cap thickness was observed to be less than 14 inches.

Post-Construction Cap Monitoring in 2023-2024 (cont'd)

- Measured cap thicknesses can vary over time due to several factors, including:
  - Consolidation of cap materials
  - Sediment deposition
  - Ecological activity
  - Disturbances from debris or human activity
  - Variability in the lake-bed topography
  - Differential settling patterns during cap construction

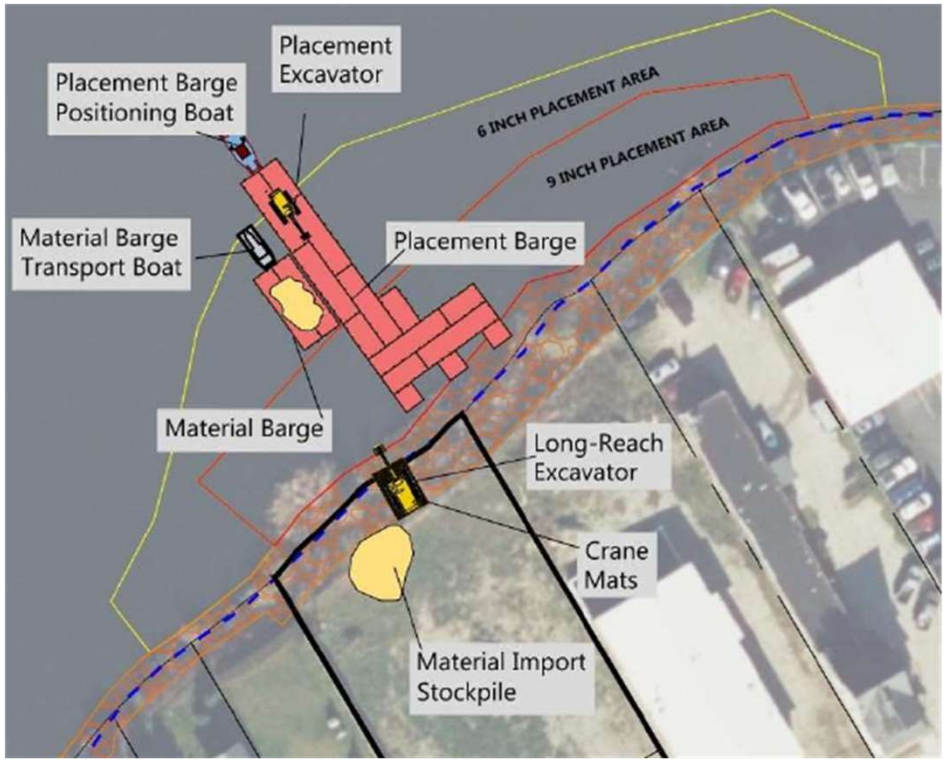
Upcoming Post-Construction Cap Maintenance Activities

- Based on the 2023-2024 monitoring results, GE has identified an area of approximately 0.76 acres (2.9% of original placement area) over which it plans to add an additional 6 to 9 inches of cap material to re-establish the design cap thickness



Upcoming Post-Construction Cap Maintenance Activities

- Contractor mobilization is anticipated in mid-August 2025, and construction is anticipated to be completed within 3 weeks.
  - Additional cap material will be placed in thin lifts along a portion of the south shore (as delineated around SL-CAP-11) to fortify the cap thickness in this area.
  - Work will be performed from floating barges.
  - Turbidity monitoring will be performed throughout construction.
  - Work is not anticipated to disturb the shoreline armoring.
  - Any cleared vegetation will be replanted.



Future Cap Monitoring Activities

- GE will monitor the maintenance area one year and five years after the completion of the maintenance activities (i.e., in 2026 and 2030) to assess cap thickness.
- An additional monitoring event of the entire lake is scheduled for 2033 (20 years post-construction) to assess cap thickness and to conduct sampling of the isolation layer to assess migration of PCBs. An additional fish sampling event will also be performed in 2033.

Silver Lake Project Summary

- **Protection of Human Health and the Environment** - The Silver Lake cleanup resulted in significant reductions in PCB concentrations in surface water, sediment, and fish tissue.
- **Restoration** - During the cleanup, GE removed a large quantity of debris from around the Lake. The restoration following the cleanup provided increased recreational opportunities such as fishing and use of the public walking trail and improved wildlife habitat.
- **Achieving Performance Standards** - GE has conducted inspection, monitoring, and maintenance of the Silver Lake cleanup under EPA oversight. GE has achieved the cleanup performance standards for Silver Lake, except for the thickness issue around the southern area of the Lake along East Street, which will be corrected by GE's upcoming maintenance.