

Bulkheads

Bulkheads are vertical structures built to stop the land from sliding into the lake and to provide deep water access to adjacent shores. Commonly found at marinas or mooring facilities, they may also be found in urban areas and may be the base of a promenade along the lake.



Bulkhead at a ferry terminal

Bulkheads commonly consist of a vertical steel sheet pile face and may have a horizontal area landward of the sheet-pile crest that is capped with concrete or vegetated. The sheet-piling is typically driven into the lakebed to a depth required to prevent the weight of the landward soils from pushing the wall over. Additional support is provided by installing tie rods between the sheet-piling and anchors buried in the upland. Drainage is typically designed as part of the bulkhead to allow water in the soils landward of the wall to be released, reducing the pressure on the wall.

Bulkheads typically have a smooth, vertical surface which can reflect waves leading to erosion of the shore area, scouring at the toe of the structure, erosion of the area directly lakeward of the structure, and/or erosion of unprotected areas adjacent to the structure. Erosion of the lakebed in front of the bulkhead creates a deeper nearshore which can lead to larger, more powerful waves reaching the shore. These larger waves have a greater potential for increasing erosion at the toe which reduces the amount of the sheet pile that is embedded in the lake bottom. If the scour becomes too great, the structure will not be able to resist the pressure of the soils it is holding back and may begin to tilt lakeward. Additionally, overtopping by waves can lead to erosion of the area landward of the bulkhead.

To maintain a bulkhead it is critical to monitor the structure for erosion at the toe and drainage issues. Both of these items could lead to failure of the structure through overturning. Maintenance includes installing or repairing a drainage system, and potentially reinforcing the bulkhead if signs of overturning are present.

Since bulkheads are most commonly found around marinas and urban areas and require specialized skills and machinery, a contractor is typically hired to construct these structures. The design of a bulkhead requires the services of a professional engineer.

Bulkheads and seawalls are similar structures, with the main difference between the two exhibited in how each is intended to function. A seawall is intended to reduce wave-based erosion and landward flooding, whereas a bulkhead is used to hold the land from the water. The design of these structures often reflects their differences.



Bulkhead Construction



Bulkhead Post-construction



Bulkhead Construction



Bulkhead Post-construction