

Wetland Shelf, Stone Toe, and Sill: Lake Huron, MI

Region: Great Lakes

Coastal Risks Addressed: Erosion, waves

Figure 5-29 shows yet another nature-based solution with a transportation application, but this time in the Great Lakes. This project was implemented along the St. Clair River in Marysville, MI, a tributary to Lake Huron, and replaced 1,900 feet of failing steel seawall, which is visible in Figure 5-29b taken prior to implementation. The roadway visible at the top left of that figure is Interstate 94. This shoreline is a major feature of the City of Marysville and it is used for both passive and active recreation. A heavily used walking path along the shoreline was relocated as part of this project.

This nature-based design, used to stabilize the roadway embankment and reduce erosion from wave action, includes a large stone toe, emergent wetland shelf/bench with more than 10,000 native plants, embankment revetment with toe protection, and vegetation near the edge of pavement. This site is subject to large fluctuations in lake level, with low and high water conditions visible in Figure 5-29c and Figure 5-29d, respectively. The large water level fluctuations necessitated a substantial toe channelward of the wetland shelf.

This nature-based solution provides multiple benefits. Removal of the seawall allows connectivity between the upland and the waterway. As lake levels rise, the land-water interface extends over the wetland bench and stone toe, which provide wave attenuation. The presence of the wetland plants also improves water quality associated with stormwater runoff from the roadway. The improved land-water connectivity also provides enhanced recreational opportunities along the riverfront.

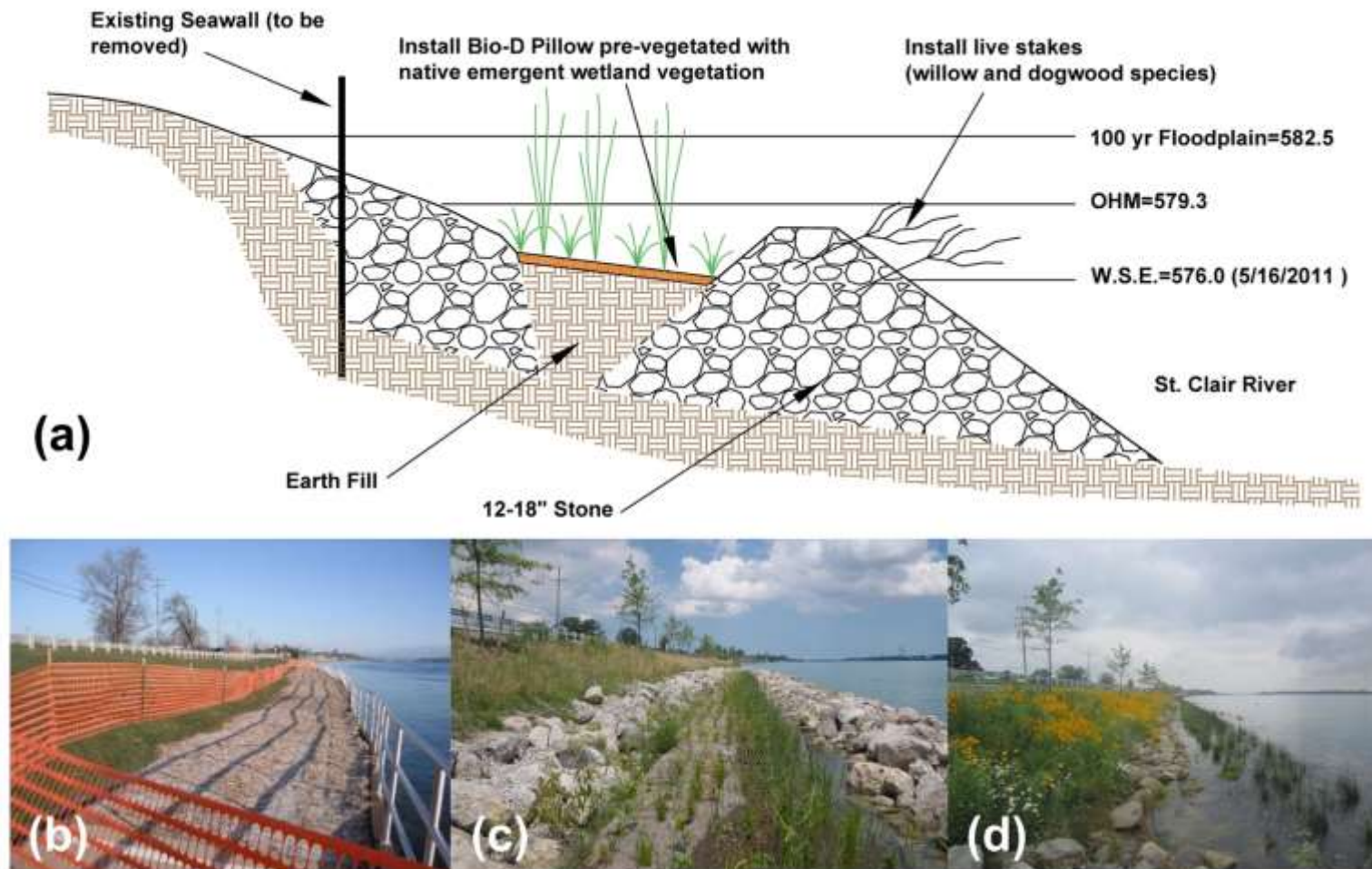


Figure 5-29. Sample cross-section of an emergent wetland shelf with stone toe protection and sill (diagram and photos courtesy of Brian Majka and Scott Dierks).