

SHORELINE PROTECTION NEEDS, TECHNIQUES AND UPDATES

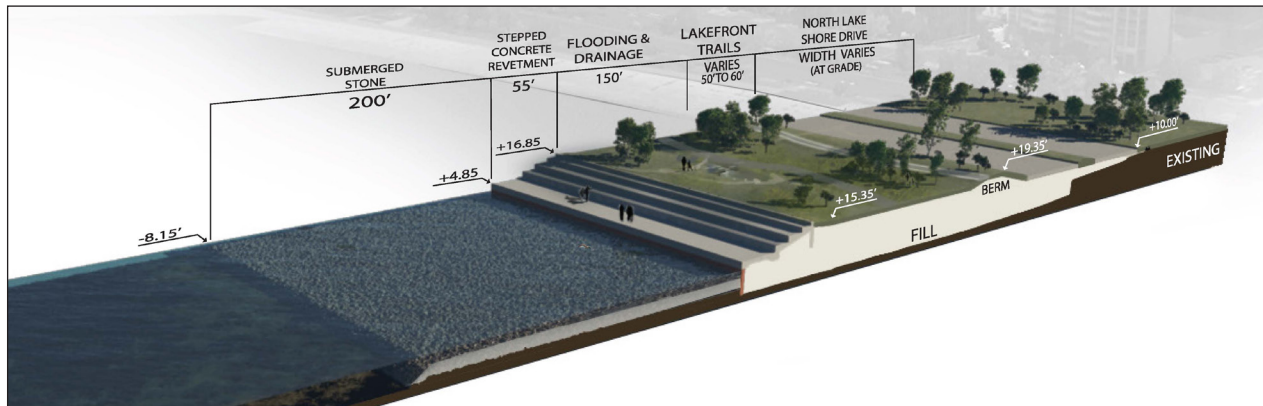
Need for Shoreline Protection

- Reduce potential for flooding of and damage to NLSD and the Lakefront Trail as a result of large storm events.
- Protect Lakefront Trail from wave action and ice build-up to keep facility open year-round.
- Prevent overtopping waves from entering proposed roadway and pedestrian underpasses that will be below the lake water level.



Shoreline Protection Techniques

- Submerged Stone Bench
 - Reduces near shore water depth to limit wave heights (minimum depth = 13 feet)
 - Creates habitat for marine life (Mitigation for lake fill)
- Stepped Concrete Revetment or Beach
 - Dissipates wave energy from smaller waves while preserving views
- Drainage Swale
 - Dissipates wave energy from large waves and returns flows to lake
- Backshore Berm
 - Prevents large waves from inundating Lake Shore Drive or proposed underpasses
 - Ranges in height from 6-9' above the roadway



Features of Updated Shoreline Protection

- No Submerged Stone Bench south of Federal Breakwater or in Oak Street Beach opening
- Lakefront Trail Bike Path atop 60-foot wide Backshore Berm (protected year round from wave overtopping and ice buildup)
- 150-foot wide Drainage Swale for overtopping waves
- Lakefront Trail Pedestrian/Jogging Path meanders within Drainage Swale