

Section 3: Preferred Solution

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3.0 Preferred Solution and Cost Estimate

This section of the Project File provides discussion regarding the Preferred Solution that was developed, based on refinements made to the Recommended Solution. A budgetary level Cost Estimate is also presented herein.

3.1 Evaluation of Alternatives

As part of the EA process, four alternative shoreline solutions were identified: Do Nothing, Enhance Safety of the Existing Beach, Move the Beach Eastward or No Public Beach at Sandpoint Beach Park. An evaluation matrix, outlining the potential benefits and disadvantages of each option, presented at the PIC. A copy of the matrix is attached here for reference.

Based on our review of the decision matrix, it was confirmed that Option C: Move the Beach Eastward, is the alternative that best satisfies the criteria identified in the Problem/Opportunity statement for the project.

In order to protect the shoreline and move the beach eastward, three types of shoreline protection alternatives were considered. The impacts, opportunities and constraints associated with each alternative were presented at the PIC and are discussed below. A copy of the presentation board is attached in this section for reference purposes.

3.1.1 Steel Sheet Pile Shorewall

The area of the existing steel sheet pile walls along the east half of the site was identified as a more desirable area for swimming, being located farther away from the deep-water area at the west end of the site. Therefore, it was determined that the existing walls should be removed and other shoreline protection options used in lieu of using steel sheet piling throughout the site.

Another consideration was the fact that vertical walls reflect wave energy and do not provide any fish habitat benefits. For these reasons, no new steel sheet pile shorewalls have been proposed as part of the Preferred Solution.

3.1.2 Beach

The existing beaches within the study area appear to be generally stable and consist of naturally-deposited, well-graded sand. Due to the unsafe swimming area identified at the west end of the site, approximately half of the west beach is currently fenced off. The designated swimming areas are delineated with buoy lines during the swimming season.

Given the known dangers at the west limit of the beach, it was determined that moving the beach entirely to the east side of the existing building would provide opportunity to create a safer swimming area. The new beach location will provide the following safety opportunities:

- The main swimming beach will not be divided in half by the building;
- The new rock promontory will provide a visual barrier at the west end of the swimming area;
- Life Guards will have a single, continuous area to patrol; and,
- Life Guards will have more time to warn anyone who leaves the designated swimming area of the danger before they reach the deep-water area.

Although the beach shoreline provides minimal fish habitat, there is minimal lakebottom encroachment or reflection of wave energy associated with this type of improvement - which can be seen as a net environmental improvement over the existing steel sheet pile walls.

3.1.3 Rock Revetment

Rock revetments have been proposed along the west half of the site as a more natural shoreline alternative to steel sheet pile walls. The rock revetments have multiple benefits, including:

- Minimal lakebottom encroachment (depending on alignment);
- Provides erosion and flood protection;
- Discourages swimming;
- Dissipates wave action; and,
- Enhances fish habitat.

3.2 Flood and Erosion Protection

A combination of the shoreline protection alternatives has been used to develop a new shoreline improvement plan that will address erosion and flood protection for the site. In order to address flooding along Riverside Drive, it is intended that a continuous barrier landform be installed along the entire site with a minimum top elevation of 177.2 meters. This elevation is higher than that of the existing landform barrier located south of Riverside Drive (i.e. the Ganatchio Trail) that has a top elevation of 176.8 meters. The intention is to raise the existing grade along the site so that there is continuous protection to the 177.2m elevation at a minimum.

The Preferred Solution figures identify the 'high point' on the new barrier that should be achieved along the entire shoreline.

3.3 Surface Water

3.3.1 Quantity Control

The existing beach site is located immediately adjacent to Lake St. Clair, which serves as a sufficient outlet. As such, stormwater quantity control is not likely to be required.

3.3.2 Quality/Erosion Control

The proposed beach areas on the site are predominantly pervious in nature (i.e., grass and sand). As such, the pollutant loading for this particular site is expected to be quite low. Runoff from future paved trails identified in the Master Plan will be directed to the adjacent grass/beach areas. It is intended that the grass areas will be drained via trench drains and/or surface inlets with small drainage tiles outletting into the proposed rock revetment. The designs for any new surface inlets should consider using a pervious bottom to utilize the potentially high percolation rate available in the native sandy soils.

In summary, quality/erosion impacts associated with the preferred solution are expected to be negligible given the following:

- the relatively small size of the proposed impervious areas;
- the indirect discharge of runoff into the adjacent grass/beach areas prior to outletting to the receiver (i.e., Lake St. Clair);
- the relatively low pollutant loading anticipated from the site; and,
- maintenance of the existing stormwater strategy at the site (i.e., no need to add capacity to existing sewers).

To mitigate any potential negative impacts to Lake St. Clair during construction of the shoreline works, the following measures are recommended:

- all rock material should be clean and free of fines to reduce sedimentation;
- all work should be scheduled to avoid wet, windy, and rainy periods; and,
- all equipment on site should be in clean condition and maintained free of fluid leaks and invasive species.

3.4 Recommended Solution

The Recommended Solution for the site was based on the Concept plan that was developed as part of the Park Master Plan project. Through the EA process, the proposed shoreline improvement options were considered based on their ability to satisfy the project objectives identified in the Problem/Opportunity Statement. A copy of the Recommended Solution Plan has been attached here for reference purposes.

One of the improvements proposed along the shoreline is the addition of a new fishing pier. Although the fishing pier is not a shoreline improvement from an erosion protection perspective, the addition of the pier and its location provides benefits to the site for both functional and safety purposes. The existing deep-water area is a desirable fishing location that attracts fisherman regardless of the known safety issues. Providing a safe way to fish this area is one of the main considerations for adding the pier to the recommended solution.

The pier provides the following functions:

- More opportunity for warning signage as swimmers approach the deep-water area;

- The railings along the pier can be equipped with life preservers if swimmers do pass by the warning signs;
- Provides a safe location for those that want to fish in the deep-water area;
- Ladders can be installed along the pier for opportunity to get out of the water and aid in a rescue;
- Provides an efficient access to the deeper water area if a rescue is needed.

3.5 Preferred Solution

3.5.1 Planning Policies Review

Provincial Policy Statement (PPS)

Section 1.5 of the Provincial Policy Statement discusses the planning considerations for Public Spaces, Recreation, Parks, Trails and Open Spaces. The Preferred Solution supports the policy of creating a healthy and active community by providing public access to the shoreline on the park side and direct access to the water on the beach side. As part of the Preferred Solution, the natural corridor along the west side of the site will be maintained to minimize negative impacts to the existing habitat and maintain access to the water for the native wildlife.

The PPS is also discussed in the SAR Impact Assessment which is included in Section 7 of the project file.

City of Windsor Official Plan (CWOP)

The City of Windsor's Official Plan outlines how land should be used when considering future development. Similarly to the PPS, the CWOP includes consideration for a sustainable and healthy environment, including providing public access to the waters' edge (Section 3.2.3.2).

The CWOP identifies the project study area land use as 'Waterfront Recreation.' Based on this designation, the Preferred Solution has considered the following planning objectives:

- Protecting and enhancing the quality of the naturalized habitat;
- Mitigating potential impacts to the shoreline and flood-prone areas;
- Providing sufficient flooding and erosion protection;
- Providing the public with access to the shoreline; and,
- Providing the public with safer direct access to the water (swimming beach).

3.5.2 Shoreline Improvements

The Preferred Solution for the site is based largely on the Recommended Solution. After consideration of the feedback from the public, stakeholders and approval agencies as well (as a review of the environmental considerations and project objectives) the Recommended Solution was refined to create the Preferred Solution for this project.

The Preferred Solution includes the following improvements:

- Removal of the existing steel sheet pile walls east of the main facilities building;
- Relocation of the Beach to the east side of the existing building;
- New rock revetments along the west half of the site;
- A new rock promontory in front of the existing building;
- A new rock promontory to separate the new beach from the existing Stop 26 beach;
- Site grading to maintain a minimum flooding elevation along the entire site (shoreline elevation tied to berm elevation south of the beach);
- A pile supported fishing pier; and,
- An enhanced naturalized corridor with connection to the water west of the pier.

3.5.3 Safety Considerations

One of the primary considerations for the proposed shoreline improvements is site safety. The proposed shoreline improvements offer the opportunity to incorporate the following safety features:

- Lighting along the shoreline and fishing pier to improve visibility at night;
- New railing to deter the public from accessing the water along the west half of the site;
- Opportunities for life preservers to be installed on the railings along the west shoreline and the fishing pier, closer to the deep-water area where they are most likely to be needed;
- Providing a safe option for fishing in the deep-water area from the proposed pier;
- One continuous swimming area, located farther from the deep-water area provides better view for lifeguards with more time to warn swimmers before they venture too far west; and,
- The new fishing pier provides a visible barrier with signage to warn of the deep-water area and strong currents.

3.5.4 Blue Flag Status

Another consideration for the Preferred Solution is the City's desire to attain Blue Flag status for the beach. The proposed shoreline improvements will not limit the City's ability to apply for Blue Flag status, if desired. It is anticipated that moving the beach to the east will help in meeting the Safety and Services criteria for this designation.

We anticipate that water quality will be the most difficult condition to achieve for Blue Flag status. The proposed works are not likely to have any negative effect on the water quality within the proposed swimming area, but are also unlikely to improve the water quality.

3.5.5 Natural Habitat Improvements

As part of the Preferred Solution, the intention is to enhance the connection of the existing naturalized area along the west end of the site with the water. Currently, there is a fence that blocks access from the natural area to the water. This fence will be re-routed south around the naturalized area to prohibit public access to the water through the naturalized corridor. Removing this fence along the shoreline will permit wildlife passage to and from Peche Island, creating a wildlife corridor. The naturalized area will offer an

area of rest and refuge to wildlife. There is also an opportunity to enhance the naturalized area with native species planting and restoration.

For the in-water works, the Project Team has selected natural armour rock materials for the shoreline erosion protection rather than steel sheet pile walls. Removal of the existing sheet pile walls will create an ecological gain in terms of aquatic and riparian habitat that can be used by fish and wildlife. The addition of rock to the riparian shoreline and lakebed will also increase the complexity and value of the habitat. Layered rock of varying sizes can mimic a natural reef and provide species-specific habitats for a variety of fish. Interstitial spaces created between rocks will create refuge areas for smaller baitfish and other aquatic organisms, while the extension of rock vanes into deeper water will provide a break in the nearshore current and create the preferred foraging habitat for ambush fish species.

Maintaining the existing naturalized corridor along the west side of the property, adjacent to the shoreline, will provide several benefits to the newly created shoreline habitat. Adjacent trees and shrubs will provide the long-term benefits of shading, large wood recruitment, and organic litter deposition. Organic deposition is essential to feed plankton and benthic communities that in turn feed nearshore fish communities.

Removal of the steel pile walls and the installation of rock will create a more naturalized and accessible shoreline for both aquatic and terrestrial wildlife. This will increase both the value and usability of the movement corridor between Sandpoint Beach and Peche Island. Vulnerable species, such as turtles and snakes, will now be able to access the natural habitats found on Sandpoint Beach for rest, foraging or breeding purposes where they may have previously been excluded by a sheet pile wall. A softening of the shoreline protection will create an overall benefit to both terrestrial and aquatic wildlife by increasing the quality and quantity of habitat available and by enhancing the existing wildlife movement corridor.

3.6 Preliminary Budget Cost Estimate

A preliminary budget cost estimate has been prepared for the Preferred Solution and is presented below. The budget estimate includes all of the following proposed shoreline works and associated site improvements:

- Site Preparation (i.e., removals and excavation);
- Rock Promontory Infill;
- Rock Revetment;
- Rock Promontory at Stop 26;
- Sand Beach Construction;
- Curbs, Railings and Fence;
- Pile Supported Fishing Pier;
- Flood Protection Berms/Earthwork;
- Safety Features (i.e., lighting, life preservers, signage, etc.); and,
- Site Restoration.

The total preliminary budget estimate for the proposed shoreline works has been set at **\$2 million to \$2.25 million**. These costs have been prepared based on the following considerations:

- The estimate was prepared based on 2023 dollars;
- An allowance of 30% was included for approvals, engineering and contingencies; and,
- The estimate excludes HST.

3.7 Approvals and Next Steps

In order for the proposed shoreline improvements to be constructed as depicted in the Preferred Solution, approval to build on the riverbed/lakebed will be required. The ownership of the riverbed is understood to be controlled by the Port Authority of Windsor. The First Nations also have a claim to the ownership of the existing riverbed. Consultation with both parties is recommended.

The Department of Fisheries and Oceans Canada (DFO) controls this portion of the Lake St. Clair under an agreement in the *Fisheries Act*. Unfortunately, Federal agencies do not typically participate in Provincial EA's. Therefore, more meaningful input from DFO cannot be obtained until a final project design has been prepared, and an application is submitted.

An approval from Transport Canada will be required in order to construct the fishing pier. Although it is not within the main channel of the Lake, it does protrude into the potential navigable waters for smaller watercraft.

There remains potential for deeply buried archaeological sites in the study area. Per the recommendations of the Stage 1 marine (underwater) archaeological assessment, any work extending 1 m or greater below current grade in the study area should only be undertaken after a marine archaeological assessment of the study area has cleared the potential for deeply buried archaeological sites. In order to construct the fishing pier, a Stage 2 marine archaeological assessment will be required in order address archaeological potential in the area where piles will be driven to support the pier. The assessment must be carried out by a licensed archaeologist, as early as possible during detailed design, and prior to any ground disturbing activities.

It is also recommended that some preliminary soil sampling and characterization be undertaken for the site prior to construction in order to create a plan for on-site handling and re-use of soils during construction.

The following is a list of the agencies and authorities which approvals will be required before construction can be commenced:

- Essex Region Conservation Authority;
- Ministry of the Environment Conservation and Parks;
- Transport Canada, Navigable Waters Protection;
- Department of Fisheries and Oceans Canada;
- First Nations (Addressing claims to Lake St. Clair lakebed)

Evaluation of Alternatives

Shoreline Protection Alternatives

The Environmental Assessment for this site was commenced to evaluate the potential shoreline improvements that were identified in the site Concept Plan. This slide discusses the alternative shoreline solutions that were considered, and provides a general assessment of the degrees to which they satisfy (or fail to satisfy) the criteria that were established in the Problem/Opportunity statement at the onset of the project.

Generally positive assessments are depicted in **BLUE**; negative assessments are shown in **RED**.

	PROJECT OBJECTIVES AND CONSIDERATIONS				
	Limit public access to the neighbouring shoreline area where deep water and strong currents are known to exist	Maintain public access to Lake St. Clair while improving safety	Maintain/improve flood and erosion protection	Improve overall function of the park	Other Considerations
Option A: Do Nothing No changes to the existing shoreline	<ul style="list-style-type: none"> Does nothing to limit public access to deep water area beyond the existing fence. 	<ul style="list-style-type: none"> Maintains public access to the Lake. Does not improve safety. 	<ul style="list-style-type: none"> Does not address flood and erosion issues at the site. 	<ul style="list-style-type: none"> Most of the desired site improvements could still be implemented. Update required to the Park Master Plan Concept. 	<ul style="list-style-type: none"> Does not address the demand for a safe fishing area near the deep water area.
Option B: Enhance Safety of the Existing Beach Keep the existing beach and add additional safety measures	<ul style="list-style-type: none"> Potential to create a physical barrier (i.e., a rock promontory) east of the existing beach to further deter swimmers from accessing the deep water area Proximity of barrier to beach may facilitate it being bypassed by swimmers 	<ul style="list-style-type: none"> Maintains public access to the Lake. Swimming area remains in fairly close proximity to the deep water area. 	<ul style="list-style-type: none"> Limited opportunities to address flood and erosion issues at the site. 	<ul style="list-style-type: none"> Most of the desired site improvements could still be implemented. Update required to the Park Master Plan Concept. 	<ul style="list-style-type: none"> Does not address the demand for a safe fishing area near the deep water area.
Option C: Move the Beach Eastward Based on the Concept Plan – move the beach east of the Facilities Building	<ul style="list-style-type: none"> Limits access to the deep water and strong currents by moving the beach further east. Fence and railing along the shoreline to deter swimming at the west end of the site. 	<ul style="list-style-type: none"> Maintains public access to the Lake. Swimming area located substantially farther away from the deep water area. More time for lifeguards to react should people swim beyond the designated swimming area. 	<ul style="list-style-type: none"> Shoreline improvements along the shoreline will address flood and erosion issues. Proposed shoreline works will be installed to a higher elevation. Will address existing scour issues along the east side of the site. 	<ul style="list-style-type: none"> All desired functions identified in the Park Master Plan Concept could be implemented. 	<ul style="list-style-type: none"> Improved natural habitat connection to the water while keeping the site secure. Opportunity for more naturalized shoreline treatments to replace existing steel sheet piles. Highest initial cost option.
Option D: No Public Beach at Sandpoint Beach Park Remove the beach and close the shoreline to restrict all access to the water	<ul style="list-style-type: none"> Effectively eliminates access to the deep water and strong currents. 	<ul style="list-style-type: none"> Does not maintain public access to the Lake. Removes the only public sand beach where swimming is permitted within the City. 	<ul style="list-style-type: none"> Potential to improve the shoreline to address flood and erosion protection. 	<ul style="list-style-type: none"> Many of the desired park improvements could still be implemented. Cannot incorporate beach features or kayak launch if all water access is removed. 	<ul style="list-style-type: none"> Opportunity for more naturalized shoreline treatments to replace existing steel sheet piles. Elimination of Stop 26 Beach as a historic beach.

ALTERNATIVES

Evaluation of Alternatives

Shoreline Protection Alternatives

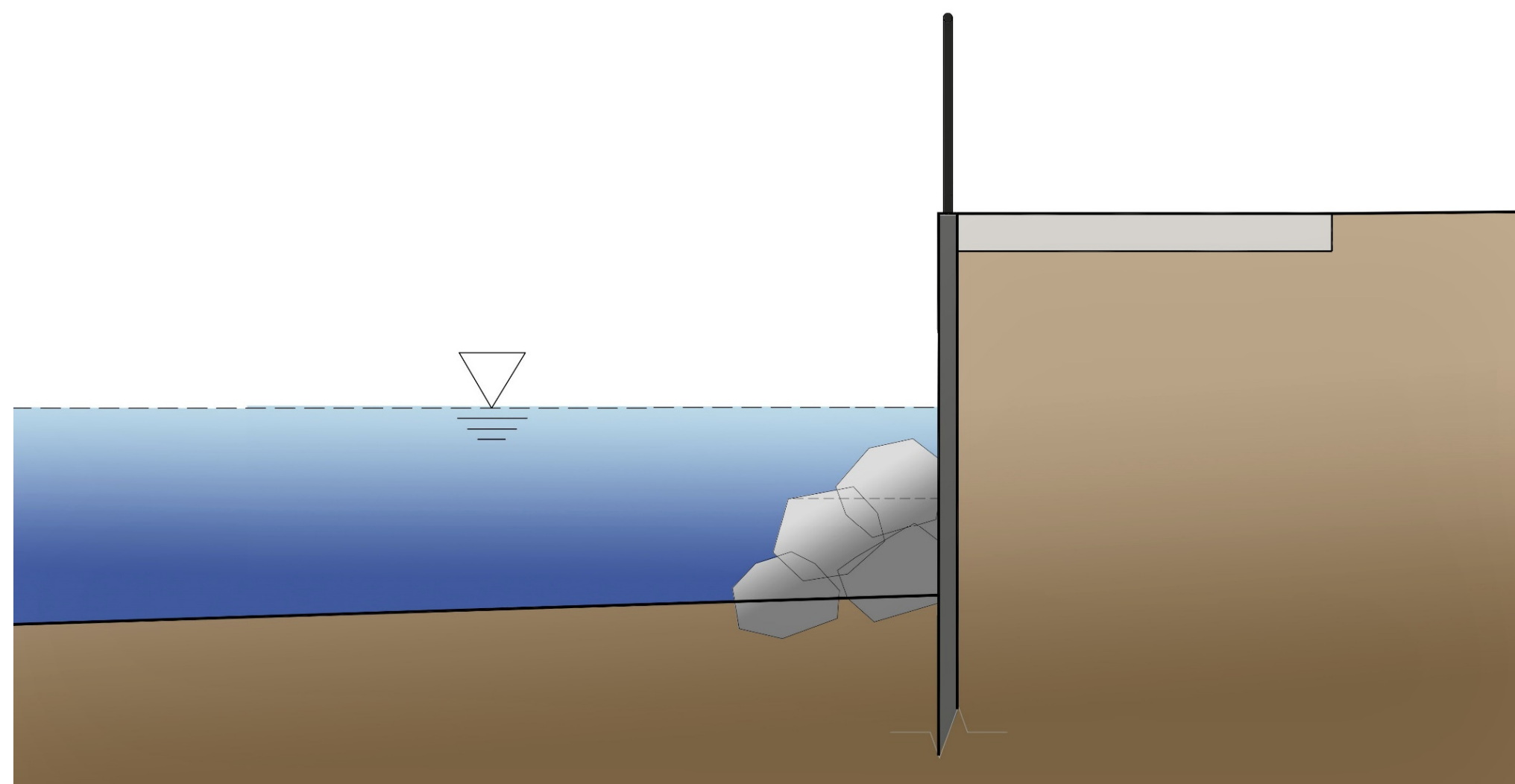
In order to protect the shoreline at Sandpoint Beach Park from erosion due to wave action, the following treatments have been considered:

Type 1: Shorewall

This treatment involves the installation of a vertical wall along the shoreline, typically consisting of steel sheet piles with a steel cap that can accommodate a safety railing attached to the top.

Impacts, Opportunities and Constraints:

- Does not provide access to the water for swimming.
- Desirable in areas with deeper water or where direct access to the water should be discouraged.
- Height of the wall will typically be set at an elevation to provide erosion and flooding protection.
- Railings are typically installed along the top of the wall for safety.
- Limited lakebottom encroachment (depending on alignment).
- Vertical walls reflect wave energy and do not provide fish habitat.
- Rock is typically placed in front of the wall to prevent scouring of the lake bed and enhance fish habitat.
- High initial capital cost.
- Little to no maintenance required.

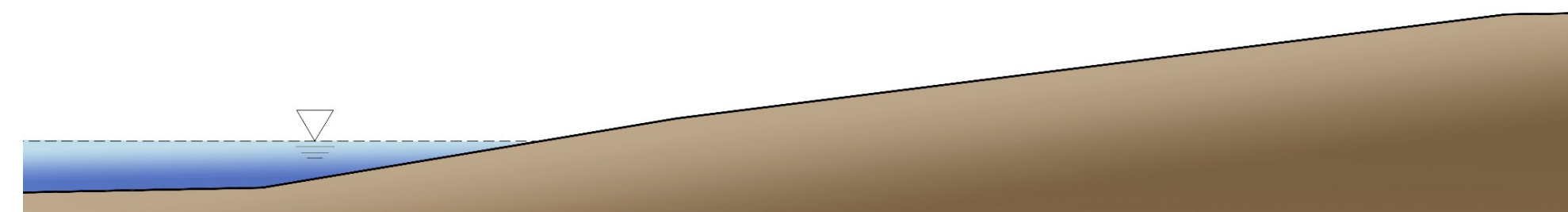


Type 2: Beach

This treatment consists of a groomed or natural sand (or cobble) slope that extends shoreward from the lake bottom at a shallow angle.

Impacts, Opportunities and Constraints:

- Allows for direct access to the water.
- Desirable in areas that are away from deep water and/or strong currents.
- No lakebottom encroachment (depending on alignment)
- Provides minimal fish habitat.
- Low initial capital cost.
- Continued maintenance required to groom the beach and remove water-bourne debris

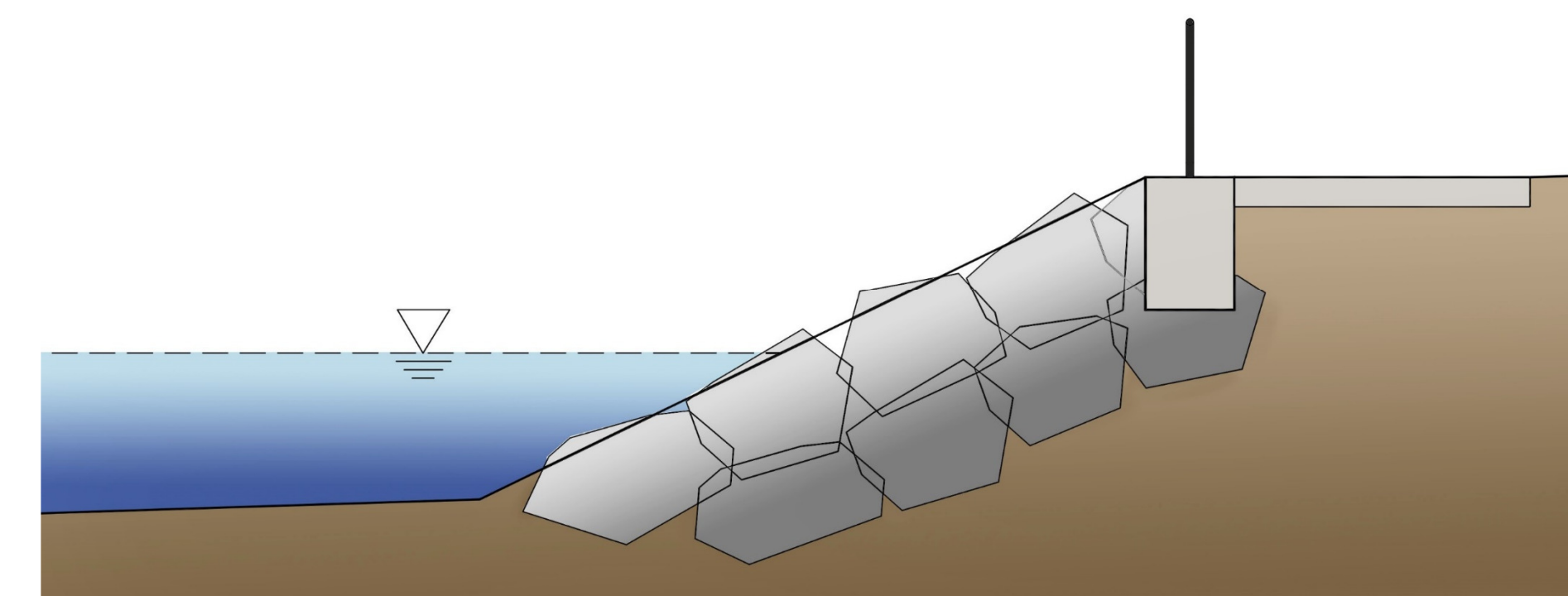


Type 3: Rock Revetment / Promontory

In this option, large armour rock is used along the shoreline to protect against erosion and dissipate wave energy.

Impacts, Opportunities and Constraints:

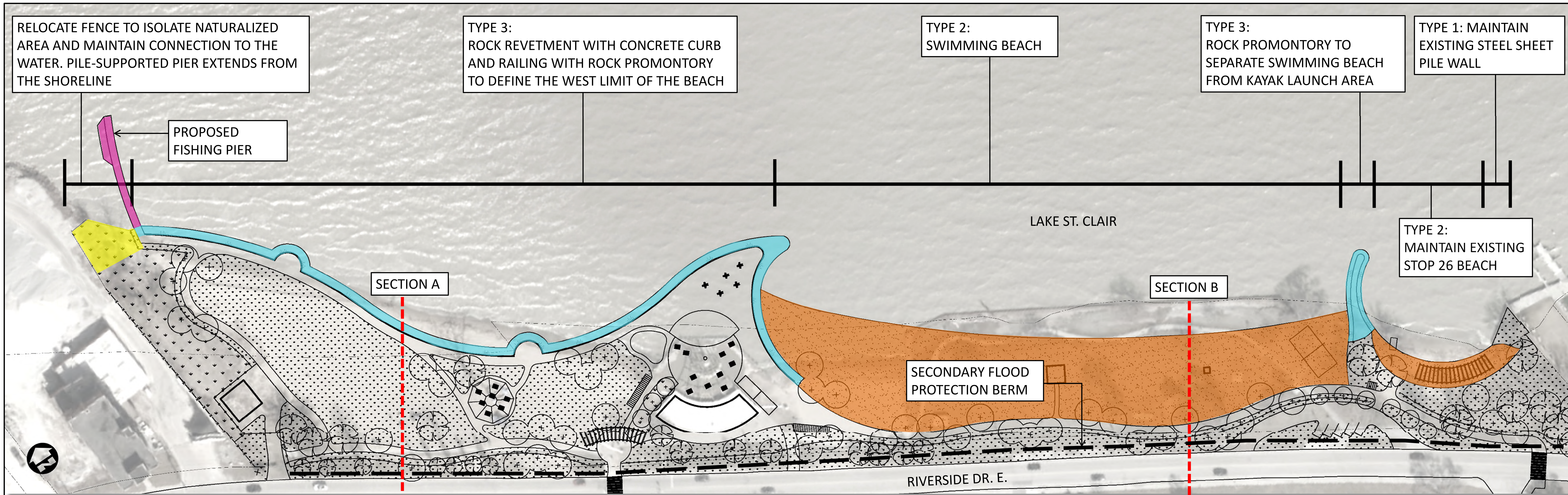
- Desirable in areas with a steeper lakebed slope or where direct access to the water should be discouraged.
- Railings can be installed behind the revetment along the top of a curb to further limit access to the water.
- Significant lakebottom encroachment (depending on alignment)
- Provides enhanced fish habitat.
- Rock promontories can be used to delineate/separate different functional areas along the shoreline.
- High initial capital cost.
- Little to no maintenance required.



Evaluation of Alternatives

Recommended Shoreline Improvements - Plan

In an effort to address the objectives outlined in the project's Problem/Opportunity Statement, the Project Team has developed a scope of shoreline improvements for Sandpoint Beach Park, as depicted below. The recommended plan incorporates all 3 shore protection alternatives that were under consideration, with each used in locations that maximize their individual advantages.



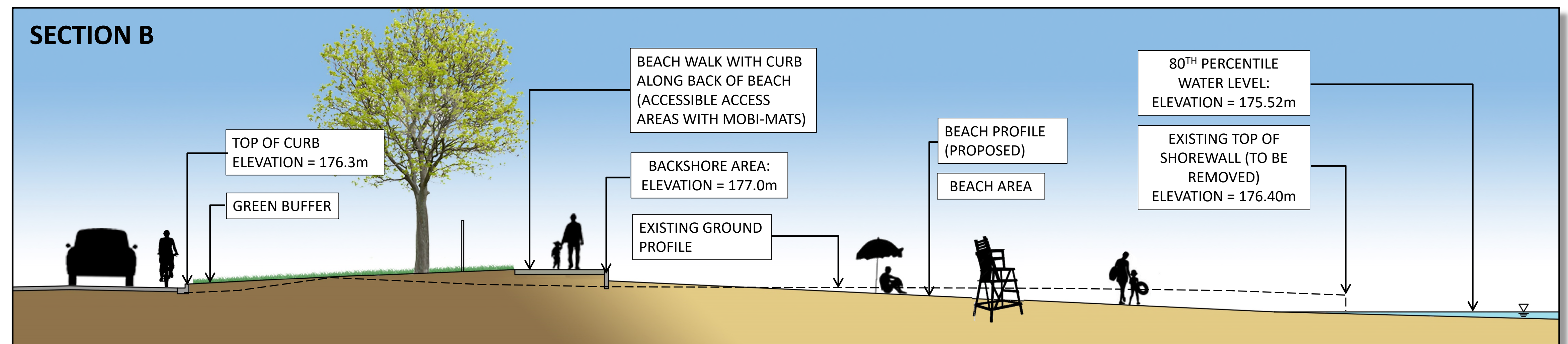
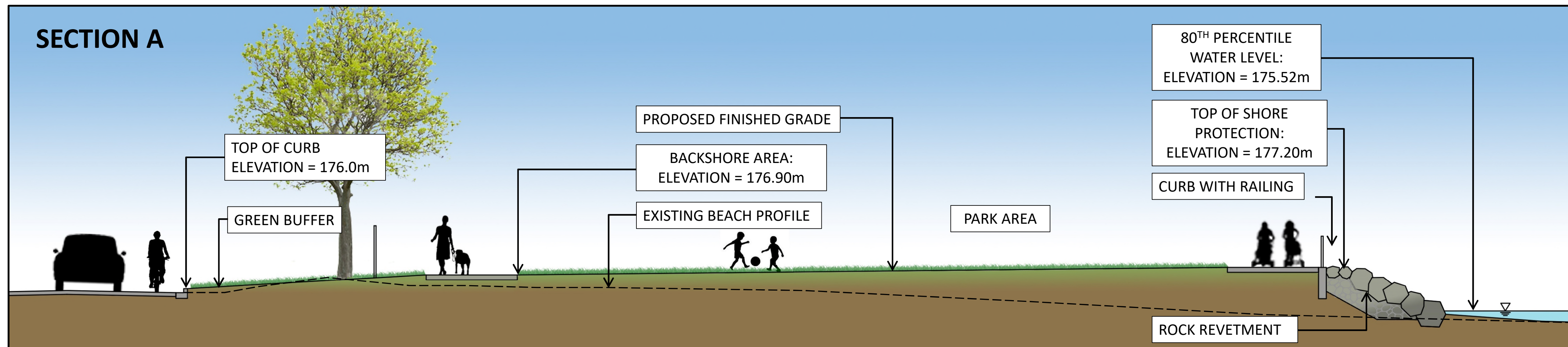
The primary considerations used in developing this plan included:

- Restricting direct access to the lake for the entire shoreline within 250 metres of the neighbouring deep-water area.
- Maintaining access to the neighbouring deep-water area for anglers via a pile-supported fishing pier.
- Establishing an accessible, undivided swimming beach with as much lake access as currently exists.
- Maintaining the historic Stop-26 Beach as a dedicated kayak launch area.
- Maintaining a fenced-off connection between the lake and the naturalized buffer area at the west limit of the site.

The cross-sections of the site depicted below are intended to illustrate the general configuration and function of the proposed shoreline works with respect to the upland areas of the park.

Flooding and Erosion Protection Considerations:

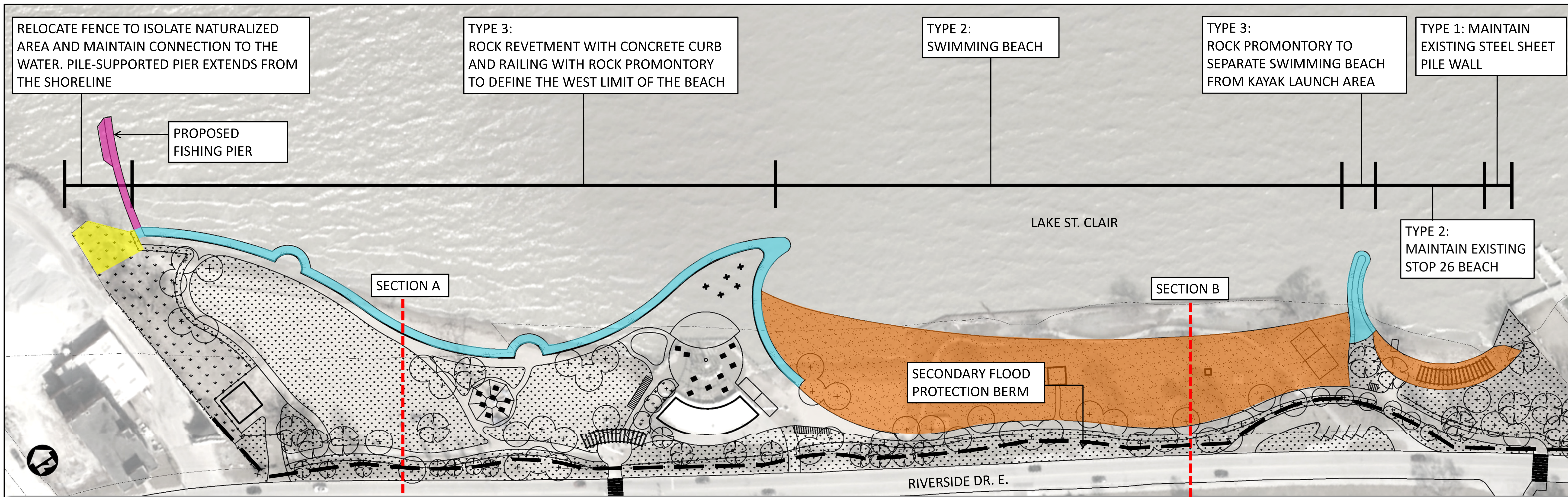
- The inland areas of East Riverside are currently protected from flooding via the barrier landform along the Ganatchio Trail (south of Riverside Drive, top elevation = 176.80m).
- A continuous barrier landform with a top elevation of 177.20m (minimum) will be established across the study area (along the shoreline and continuing along the back of the beach) to prevent flooding on Riverside Drive.
- It is anticipated that minimal stormwater management will be required on-site, with most wave splash and runoff outletting directly to the Lake.








Preferred Solution

Shoreline Improvements - Plan

In an effort to address the objectives outlined in the project's Problem/Opportunity Statement, the Project Team has developed a scope of shoreline improvements for Sandpoint Beach Park, as depicted below. The Preferred Solution incorporates all 3 shore protection alternatives that were considered, with each used in locations that maximize their individual advantages.



Legend

-  SECONDARY FLOOD PROTECTION BERM
-  BEACH AREA
-  ROCK REVETMENT
-  PROPOSED FISHING PIER
-  NATURAL AREA

The primary considerations used in developing this plan included:

- Restricting direct access to the lake for the entire shoreline within 250 metres of the neighbouring deep-water area.
- Maintaining access to the neighbouring deep-water area for anglers via a pile-supported fishing pier.
- Establishing an accessible, undivided swimming beach with as much lake access as currently exists.
- Maintaining the historic Stop-26 Beach as a dedicated kayak launch area.
- Maintaining a fenced-off connection between the lake and the naturalized buffer area at the west limit of the site.

Preferred Solution

Shoreline Improvements - Sections

The cross-sections of the site depicted below are intended to illustrate the general configuration and function of the proposed shoreline works with respect to the upland areas of the park.

Flooding and Erosion Protection Considerations:

- The inland areas of East Riverside are currently protected from flooding via the barrier landform along the Ganatchio Trail (south of Riverside Drive, top elevation = 176.80m).
- A continuous barrier landform with a top elevation of 177.20m (minimum) will be established across the study area (along the shoreline and continuing along the back of the beach) to prevent flooding on Riverside Drive.
- It is anticipated that minimal stormwater management will be required on-site, with most wave splash and runoff outletting directly to the Lake.

