

6. One River Strategy

The Thames River has played a vital role in the City of London's history and is recognized as an important heritage river in southwestern Ontario. Not only does the Thames River serve as a key recreational resource, it also represents a significant natural resource that can be part of a strong and healthy social, economic, and natural environment within the City. The One River Master Plan Environmental Assessment provides an opportunity to recognize and integrate the various goals and objectives for the river and to map out a strategy that matches the community vision. The One River Strategy incorporates each of the selected preferred alternatives for the Springbank Dam, the Forks of the Thames, and the River Management Plan into an integral part of the City's current and future vision of the Thames River as an important cultural heritage resource.

6.1 One River Strategy Components

The One River Strategy is illustrated in Figure 6-1 and includes the following components:

- **Springbank Dam Partial Removal:** This component was completed as a Schedule B EA. Figure 6-2 illustrates the elements for the partial removal of the Springbank Dam, including the following design elements:
 - Water retaining equipment will be removed or salvaged including hydraulics, gates, and control room electronics and equipment.
 - The existing dam structure will be stabilized.
 - The southern shoreline will be restored.
 - A preventative rehabilitation and safety inspection program will be implemented.
- **Forks of the Thames Suspended Walkway and Softscaped Terraces:** This was completed as a Schedule B EA. Figures 6-3, 6-4 and 6-5 illustrate the preferred alternative for the Forks of the Thames, including the following design elements:
 - Terraces will provide spaces for events, social gathering, and select access to the shoreline. They will be softscaped to provide pockets of more natural areas that represent opportunities for enhanced habitat and biodiversity.
 - The Viewing Overlook will be suspended over the Thames River without supports in the Thames River. The overlook will connect with the Thames Valley Parkway (TVP) and will meet City standards for pathway design requirements.
 - Design of the Viewing Overlook and Terraces will protect the existing sewer outfalls in-place and will allow for access to linear infrastructure (such as the Labatt Siphon) at the Forks.
 - The Viewing Overlook and Terraces will be designed to provide pedestrian integration with the TVP and Ivey Park.
 - Terracing will provide space for First Nations at the Forks of the Thames to incorporate and celebrate their cultural heritage. The location and design of this space will be defined through engagement with First Nations communities.
- **River Management Plan Strategic River Corridor Active Use and Strategic Access to the Thames River:** This component of the One River Master Plan was completed as a Master Plan EA. Figures 6-6 illustrates the preferred River Management Plan (Strategic River Corridor Active Use and Strategic Access) and includes the following design elements:
 - Maintain and improve the quality and safety of existing access locations including formalized pathways, fishing and boating access points, and lookouts.

Maintained/improved access locations include:

- Boating access at the Springbank Dam, Wonderland Road and Riverside Drive, in proximity to Harris Park, and at Charles Hunt Weir Park.
- Fishing access at Greenway Park and Ivey Park at the Forks of the Thames.
- Lookouts at Greenway Park and at Ivey Park at the Forks of the Thames.

Existing access locations that will be maintained in their current form include:

- Lookouts located at Springbank Park and on the Maurice Chapman Walkway Bridge.
- Construct new strategic access points selected to protect against sensitive habitat infringement.
 - Trails accessing the shoreline from Hyde Park Road and along the north shore of the Thames River from McKillop Park to Mackellar Ave connecting to the Maurice Chapman Walkway Bridge.
 - Boating access near Springbank Gardens.
 - Fishing access at the Springbank Dam, West of the Thames Valley Golf Club (access from new trail from Hyde Park Drive), and East of the Thames Valley Golf club (access from trail from Mackellar Ave before the Maurice Chapman Walkway Bridge).
 - Lookouts located at Springbank Dam, West of the Thames Valley Golf Club, in Springbank Park just off the Maurice Chapman Walkway near the Civic Gardens, and along Cavendish Park pathway in Cavendish Park.
- Protect and improve natural heritage features in the study area through removal of non-native vegetation species.
- Repair areas of bank erosion and instability.

As the Thames River is still evolving as a free-flowing system through the study area, additional strategic river corridor active use and strategic access may be considered in future planning exercises.

6.2 One River Strategy Design Considerations and Constraints

6.2.1 Springbank Dam Partial Removal

All recommendations must follow and support any regulated safety inspection and maintenance program elements for the remaining dam structure components.

6.2.1.1 Equipment Removal

The preferred alternative (partial dam removal) includes the removal of mechanical, electrical, and hydraulic components. This involves gate panels, hydraulic actuator arms, gate hydraulic system, and control building.

There are four gates constructed of an upper and lower panel bolted together at the interface to make up one gate leaf. Each gate has an actuator cylinder on each side of the gate. Each gate leaf is approximately 44,000 kg. The gates have baffle assemblies for fish passage which are removable. Two of the gates have baffle assemblies on one side and two of the gates have baffle pairs of either side resulting in a total of six baffle pair assemblies. Each baffle pair assembly weighs approximately 644 kg.

6.2.1.2 Stabilize Structure

The study team conducted an assessment of the Springbank Dam in 2018 through a review of previous reports and a site visit. The report detailing this assessment can be found in Appendix A-6. Through the assessment, it was concluded that rain and snow will advance the deterioration of the concrete encasement around deck girders and concrete piers if no further maintenance and repair steps are taken.

Growth of trees and bushes on the north bank concrete crib wall may result in failures of the crib wall, and continued erosion on the south bank sheet pile embankment wall may compromise structural integrity.

The Springbank Dam assessment also found that, with the implementation of the recommended structural repairs, and with an ongoing maintenance program, the anticipated service life of the structure can be extended another 15 to 25 years before any more extensive work would be required to maintain the structure. Recommended long-term, short-term and on-going maintenance items are identified below.

Short-term preventive maintenance recommendations include:

- **Seal top deck with epoxy overlay:** This will seal cracks that allow water to soak through the deck or into interface steel deck girders and the encasement concrete. Preventing water travel through the deck surface will extend the life of the structure.
- **Replace expansion joints:** Replacing the two expansion joints will further minimize water travel through the concrete structure. Rehabilitation of the two expansion joints on either end of the two superstructure center spans is recommended. This includes sealant and backer rod to keep water from traveling down the joints.
- **Remove north bank crib wall face vegetation:** Remove the larger vegetation (trees and bushes) growing on the north bank crib wall. This could be an annual or biennial task to prevent vegetation from potentially prying the crib wall elements apart.

Ongoing maintenance items recommended as part of a preventive maintenance program include:

- **Visual inspections and repairs:** Inspections by City staff on 2-year intervals should include routine structure inspections for debris accumulation on the upstream nose of piers, public safety features like fences and rails, overhead concrete spalling, scour evidence, and erosion evidence.
- **Vegetation removal:** Remove vegetation on the north bank crib wall on an annual or biennial basis to prevent vegetation from potentially prying the crib wall elements apart.

Long-term maintenance recommendations include:

- **Cathodic protection:** The addition of cathodic protection on the south bank sheet pile wall would establish electrical connectivity between the existing sheet piles with a connecting weld and installation of a deep anode ground bed system to protect the structure against further corrosion.
- **Safety upgrades:** If the dam is repurposed to allow public access, upgrades to the superstructure railings are necessary.
- **Petrographic inspection:** Inspection of the concrete elements of the dam petrographically would assess the condition of the concrete structures.

6.2.1.3 Riverbank Restoration

Erosion controls and hardened bank treatments along the south shore near the dam structure will be removed and the bank will be replaced with a more naturalized shoreline. The bank and naturalized shoreline will provide stability to the bank and access to the river at safe and strategic locations. Typical restoration designs are illustrated in Figure 6-7.

Riverbank restoration will be designed for both stability and ecological enhancement. The removal of the existing hardened bank treatments will result in the removal of existing bank vegetation which contain many invasive and non-native species. The new plantings required to stabilize and naturalize the bank will include native vegetation species to establish a healthy riparian zone and provide wildlife habitat. The riparian area will require revegetation with native seedlings (such as grasses, herbs, and flowers), shrubs, and caliper trees. Riparian planting utilizing live stakes with fast-growing species, such as willows and dogwoods, is a highly efficient and economical method to provide relatively rapid and dense riparian cover. The bank restoration design should consider habitat features recommended for terrestrial and

aquatic species. The design will also include safe public access to the shoreline for the purposes of fishing and canoe/kayak launch.

6.2.1.4 Cultural Heritage

The study team conducted a Stage 2 archeological and cultural heritage assessment at the Springbank Dam study area in November 2018, the detailed findings of this effort can be found in Appendix A-3. This assessment found a pre-contact Indigenous site at the southern boundary of the eastern side of the study area, shown in Figure 3-11. It was determined that the site did not meet the provincial requirements for a Stage 3 assessment, however, it is recommended that the design of any bank restoration options consider avoidance of, or minimal disturbance at this site.

6.2.1.5 Construction

The river is approximately 70 to 80 meters wide at the dam. Access from the north bank is not possible due to slope constraints and property access. Therefore, it is anticipated that access during construction will occur from the south bank. In addition, it is anticipated that temporary access into the river will be required to remove the gates on the north end of the structure. Construction planning should consider the feasibility of both a cofferdam access road and a floating working barge and select the alternative that is most feasible and that meets both permitting, environmental impact and economic objectives.

6.2.2 The Forks of the Thames Suspended Walkway and Softscaped Terraces

The viewing overlook will be suspended over the Thames River, without supports in the Thames River. Terraces will be softscaped with a combination of hardened and landscaped surfaces.

6.2.2.1 Design Considerations

The alternative design elements will include the following considerations:

- **Destination:** Provide a celebrated public realm connecting people to the Thames River from downtown and surrounding neighborhoods across the river and establish a signature iconic element providing striking views of the Thames River and downtown.
- **Accessibility:** Make portions of the Thames shoreline accessible to everyone. This is accomplished, in part, through terraces with sloping sidewalks and providing accessible access from Ivey Park to the terraces along the shoreline.
- **Durability:** Construct terraces with durable materials that create a space that can be used for public events throughout any season and can withstand heavy pedestrian traffic.
- **Natural Environment:** Provide ecological enhancements to encourage biodiversity.
- **Existing Amenities:** Retain and protect the existing splash pad and historic One Dundas. This element will include connectivity to the TVP and protection of existing mature trees to the extent possible.
- **Flexibility:** Improvements should be designed with flexibility to accommodate a range of development and programming opportunities into the future.
- **First Nations:** This alternative will reserve a space for local First Nations to celebrate their cultural heritage at the Forks. This space will be selected and defined through engagement with First Nations.

6.2.2.2 Design Constraints

Figure 6-8 illustrates the underground utilities located at the Forks of the Thames. The design must maintain access to underground utilities and the subsurface design cannot conflict with these utilities. In addition, the design must limit its terrestrial and aquatic habitat impacts. Environmental constraints on the design were identified through the Forks area Environmental Impact Study (EIS) (Matrix, 2018x).

The design is to minimize and avoid impacts on the natural heritage features and functions identified in the Forks of the Thames area, therefore the following constraints are placed on the design:

- Design extent along the shoreline is limited to the existing riverbank
- Specimen trees are to be identified and protected as possible
- Design to limit in-water works during construction

6.2.2.3 Cultural Heritage

The study team conducted a Stage 2 archeological and cultural heritage assessment at the Forks study area in November 2018, the detailed findings of this effort can be found in Appendix A-3. Test pitting at the Forks area was completed on November 13th and did not find any new archaeological or cultural sites. The Forks Stage 2 study area does, however, have the potential to contain deeply buried deposits or cultural remains below the level of the test pits. Construction monitoring for Stage 2 considerations is recommended if the construction is anticipated to disturb soils below the level of the test pits.

6.2.2.4 Construction

The following activities are anticipated during the construction of the suspended walkway and softscape terraces:

- Construction access to be through the existing paved pathways as much as possible to reduce environmental impact.
- Vegetation and tree removal and earthworks will be required along the eastern shoreline in order to construct the suspended walkway.
- Gabion baskets will be removed and the bank will be stabilized along the toe of the Thames River. In-water work should be limited but may be necessary.
- Terracing and grading to create the terracing from Ivey park to the shoreline.
- Installation of hardscaping and softer landscaping features to construct the softscape terraces.
- Riverbank naturalization along the southeastern shoreline.
- Access to Ivey Park and the Forks of the Thames will be restricted during construction activities.

6.2.3 River Management Plan

The recommended River Management Plan includes improved and new boating and fishing access locations, new pathways, and new lookout locations. In addition, identified areas of bank instability and erosion will be repaired.

6.2.3.1 EA Requirements

The River Management Plan was developed at a Master Plan level and meets the MEA's Municipal Class EA requirements. Therefore, additional studies may be required prior to implementation of a number of the River Management Plan recommendations. Projects identified within this Master Plan that are identified as Schedule A projects may proceed to implementation (design and construction) without further study, projects identified as requiring a Schedule B or Schedule C EA will require additional studies. The items identified in the preferred River Management Plan alternative and their respective anticipated EA Schedules are in Table 6-1. These Schedules should be reviewed when additional design or maintenance details are available.

Table 6-1. River Management Plan Itemized EA Schedules

Description	Recommended Schedule
Improve Existing Access Locations	
Springbank Dam boat access	Included in Schedule B work completed in this EA
Wonderland Road / Riverside Drive boat access	Schedule A
Harris Park boat access	Schedule A
Charlie Hunt Weir boat access	Schedule A
Greenway Park fishing access and lookout	Schedule A
Ivey Park fishing access and lookout	Included in Schedule B work completed in this EA
New Access Points	
Pathway from Hyde Park Drive to northern shoreline including fishing access and a new lookout	Schedule A
Trail from Mackellar Ave before the Maurice Chapman Walkway Bridge including a Lookout	Schedule A
Boating access from Springbank Gardens	Schedule A
Fishing access at the Springbank Dam	Included in Schedule B work completed in this EA
Lookout on Cavendish Trail in Cavendish Park	Schedule A
Repair Areas of Bank Erosion and Instability ^a	Schedule B

^a A prioritized list of areas requiring repair is included in Section 7 and Appendix A-1.

6.2.3.2 Design Considerations

The alternative design elements will include the following considerations:

- Maintenance and improvement of existing fishing and boating locations to be done in a manner that protects natural heritage features of the river and public safety.
- The design of new pathways identified in the river management plan will be consistent with the City's design guidelines (London, 2017). The pathways identified in this EA are consistent with the pathways and connections identified in the City's Cycling Master Plan (MMM Group, 2016).
- The design of new fishing and boating access locations will vary and are to integrate with the natural setting of each location. Boating locations have been selected near parking amenities and should be designed in a manner that allows people to safely launch a canoe or kayak while protecting the natural heritage features of the riverbank and riverbed.
- Lookout locations are located considering existing infrastructure. A typical lookout may include a bench and appropriate signage to provide context for a significant vista or historic site. It is recommended that signage be designed to be resistant to vandalism and graffiti.

6.2.3.3 Cultural Heritage

The study team conducted a Stage 1 archeological and cultural heritage assessment for the River Management Plan study area in the fall of 2017. The detailed findings of this effort can be found in Appendix A-3. This cultural heritage overview determined that the study area contains a high number of cultural heritage constraints that may have to be addressed through further cultural heritage studies such as cultural heritage evaluation reports (CHERs) and heritage impact assessments (HIAs). These reports may recommend further conservation actions such as, but not limited to, retaining existing heritage structures or features, screening new construction from significant views or vistas, documentation and

recording of heritage structures or features prior to demolition or removal, or monitoring for direct impact from construction vibration.

6.2.3.4 Construction

The following activities are anticipated during the construction of the various elements recommended in the River Management Plan:

- **Pathways (designed to City standards):**
 - Removal of vegetation along the selected pathway, specifically removal of non-native species to the extent possible
 - Grading to maintain positive drainage across the pathway
 - Pathway paving
 - Revegetation in the areas disturbed during construction with diverse native species
- **Lookouts:**
 - Minimal removal of vegetation, specifically the removal of non-native species to the extent possible
 - Installation of base or foundation for a bench, platform or signage
 - Revegetation in the areas disturbed during construction with diverse native species
- **Fishing and Boat Access:**
 - Removal of vegetation, specifically removal of non-native species to the extent possible
 - Site grading
 - Construction of boat and fishing access structural elements
 - Revegetation in the areas disturbed during construction with diverse native species
- **Bank Erosion and Instability Repair:**
 - Vegetation will be removed, specifically non-native species
 - Repair of bank using appropriate engineering design elements including bioengineering methods where feasible
 - Revegetation of the bank with non-native, fast growing native species to establish a robust riparian zone

6.3 Environmental Management Plan

6.3.1 Springbank Dam

The study team completed an EIS for the Springbank Dam Schedule B study area. The full EIS report is included in Appendix A-5.

6.3.1.1 Existing Impacts

Dams have direct impacts on water elevation, streamflow, and sediment movement by modifying water flow, depth and velocity. Natural recovery of a river system following a major change, such as the removal of a dam, generally takes several years to decades.

In the case of the Springbank Dam, this recovery has been occurring over the last decade and is still ongoing. The non-operation of the dam over the last 10 years has resulted in a physical transformation of the river system upstream of the dam. The free-flowing river has allowed for more sediment movement and vegetation growth, altering existing, and creating new upstream aquatic and riparian environments.

6.3.1.2 Potential Impacts

Several activities are required to complete the work associated with the partial dam removal that could affect terrestrial and aquatic habitat. Activities for the partial dam removal are anticipated to include

- Accessing the dam along the south shoreline from River Edge Drive through Springbank Park.
- Creating staging and laydown areas within the parking lots and cleared pathways within the park.
- Removing vegetation along the south shoreline and potentially re-shaping the bank for more stability.
- Entering the river to remove the north side gates.
- Removing vegetation along the north bank crib wall face.

Potential impacts associated with these activities are provided in detail in Appendix A-5 but generally include:

- Habitat loss and/or alternation due to spills or changes to the composition of vegetation communities,
- disturbance and avoidance of habitat due to increase noise during construction and;
- injury or incidental take of species and/or habitats.

6.3.1.3 Mitigation

The London Plan (London, 2017) requires that impacts to natural heritage features due to construction of infrastructure projects be addressed through a mitigation and compensation plan. Impacts and mitigation measures were evaluated through the Springbank Dam EIS, located in Appendix A-5. Mitigation measures identified in the EIS include:

- **Timing of Work** is required to conform with timing constraints including tree removal outside of the breeding bird window (April 1 to August 25) or complete a detailed bird survey of the construction impacted areas, confining construction activities to the minimum area necessary, performing in-water work during the allowable fisheries windows, and completing in-channel work during “dry” conditions.
- **Best Construction Practices** can be implemented to prevent environmental harm and can include:
 - Control all maintenance and refueling to prevent the discharge of petroleum products by performing these activities at least 30 m from the watercourse and natural heritage features.
 - Implement surface protection measures to minimize soil compaction.
 - Store construction material, excess material, construction debris, and empty containers at least 30 m for the watercourse and natural heritage features. It is recommended that the parking lot on Riverside Drive be utilized to store construction materials.
 - Implement stormwater management plan to maintain pre-construction drainage patterns during all project phases.
 - Implement emergency and response management plan for potential spills.
 - Develop and implement a monitoring plan to see that mitigation and contingency measures are implemented and performance objectives are met.
 - Enlist an onsite environmental monitor to observe and advise to see that activities do not have negative environmental impacts.
- **Prevent wildlife mortality and disturbance** by demarcating wildlife habitat to avoid offsite disturbances, implement traffic controls onsite, install fencing to prevent wildlife from entering the site during construction, inspect the construction area for wildlife daily during construction activities, and educate workers to be aware of potential wildlife conflicts.
- **Prevent terrestrial disturbance** by identifying setback from natural heritage features, installing protection fencing along the identified disturbance limit, implement an invasive species management plan and a dust management plan, restore disturbed areas with native vegetation, and replace trees at a 3:1 ratio. During detailed design, an arborist should document trees and vegetation communities that could be impacted during construction.

- **Prevention of fish mortality** through the installation of intake screens at all pumps, net and release fish trapped during dewatering of work areas by a qualified person; and limit heavy equipment from entering wetted area at any time during or after construction.
- **Erosion and sedimentation control** can be achieved through careful planning and design, construction supervision, and maintenance of control works throughout the operation life. Control measures include:
 - Develop an Erosion and Sediment Control (ESC) to minimize the potential for erosion and construction-related sediment release into natural features/water bodies and prepare ESC Plan condition reports through a monitoring and maintenance plan.
 - ESC should be installed before groundbreaking and should be monitored during construction.
 - Delineate storage, stockpiling, and staging areas prior to construction. ESC should only be removed after constructed when disturbed areas have stabilized.
 - Install sediment control fence along the channel margins
 - Direct pumped discharge to sediment basin, sediment bag or similar during dewatering before releasing to the watercourse.
 - Avoid construction during high volume rain events and significant snow melt/thaw, resuming construction when soils are stabilized.
 - Implement construction monitoring to see that erosion and sediment control measures are in place and working effectively.
 - Implement post-construction monitoring to see that any constructed works continue to provide environmental benefit.

6.3.1.4 Residual Impacts

Construction impacts are anticipated to be isolated and temporary. The long-term impact associated with partial dam removal is anticipated to be a net positive benefit to the terrestrial and aquatic communities. The removal of the concrete apron and vegetation on the southern shoreline will result in a temporary loss of habitat. The recommended mitigation strategies and the restoration of the shoreline with diverse native vegetation are anticipated to improve natural heritage features in the long term. Vegetative riprap or other naturalized erosion control structure will provide increase refuge for terrestrial and aquatic species.

The removal of the Springbank Dam gates is expected to result in isolated and temporary loss of aquatic habitat. With the recommended mitigation strategies, the long-term impact is anticipated to be net positive. The removal of the gates is expected to improve fish passage for a variety of species and will improve connectivity, sediment mobility and diversity downstream and upstream of the dam.

6.3.2 The Forks of the Thames

The study team completed an EIS for the Forks of the Thames Schedule B study area. The full EIS report is included in Appendix A-4.

6.3.2.1 Existing Impacts

The existing public space and infrastructure at the Forks of the Thames was planned and constructed for the seasonally higher water levels due to the operation of the Springbank Dam. In the decade that the dam has been inoperable the lower water level has resulted in areas of bank instability. The existing dock is intended for higher water level and poses a risk to public safety. The dock is often accessed to fish, however, is too high for members of the public to safely launch a boat. The gabion basket retaining wall along the east side of the Forks is degrading and will eventually need to be replaced. The existing gabion baskets are also thought to limit the connected between the aquatic and terrestrial environments along the river corridor.

6.3.2.2 Potential Impacts

Several activities are required to implement the preferred Forks of the Thames alternative that could affect terrestrial and aquatic habitat. Activities for the construction and implementation of the suspended walkway and softscaped terracing are anticipated to include:

- Creating staging and laydown areas
- Removing vegetation and the gabion baskets along the eastern bank of the project site to implement the walkway, and terracing
- Completing earth-work and excavation to reshape the bank and develop the softscape terracing.
- Planting native trees and shrubs in the softscape terracing areas and banks to enhance shoreline habitat

Potential impacts associated with these activities are provided in detail in Appendix A-5 but generally include:

- habitat loss and/or alternation such as soil compaction or changes to the composition of vegetation communities,
- disturbance and avoidance of habitat due to increase noise during construction and human presence once the project has been completed, and;
- injury or incidental take of species and/or habitats.

6.3.2.3 Mitigation

Impacts associated with implementing the Forks of the Thames design can be partially mitigated with the following area and access restrictions.

- Access to the eastern bank will utilize paved trails
- Staging and laydown areas are to occur within the cleared pathway and open areas within the park
- Vegetation removal will be limited to the eastern bank of the project site, and will minimize impacts to trees that have natural heritage features
- No access or construction will be completed on the north or south banks of the project site
- Any required in-water works will be minimized and appropriate environmental controls put in place, particularly during the removal of gabion baskets and bank stabilization
- Implement post-construction monitoring to see that any constructed works continue to provide environmental benefit.

A detailed inventory of impacts and mitigation measures is included in the Forks of the Thames EIS, located in Appendix A-4.

6.3.3 River Management Plan

In support of the One River Master Plan the study team conducted a River Characterization Study and a Natural Heritage Study. These reports are included in Appendix A-1 and Appendix A-2 respectively. Additional detailed environmental impact studies will be conducted as required for the recommended Schedule B River Management Plan components in conjunction with the implementation of any next steps including design and construction.

6.3.3.1 Existing Impacts

The Thames River in the study area is impacted by a number of factors in both the upstream watershed and local study area context. The historic operations of Springbank Dam on the Thames River

backwatered a portion of Thames River, reducing velocities and increasing depth and wetted widths. Upstream flows are controlled through the Fanshaw, Pittock, and Wildwood reservoirs, which augment both the upper (high flow) and lower (low flow) portions of the hydrograph. The surrounding land use within the Study Area is completely urbanized, and local runoff is conveyed through stormwater infrastructure. The river is confined by the valley slopes as well as West London, Riverview-Evergreen, and Coves Dykes for flood protection. There are also a number of hardened treatments that have been used to stabilize the banks and protect the stormwater outfalls.

To compensate for these anthropogenic influences, the river has over-widened in many areas and attempted to regain sediment through bank and riverbed erosion. The free-flowing system over the past decade provides more natural river dynamics creating more diverse bedforms including lateral and mid-channel bars, vegetated islands, riffles, and alcoves. Changes to the river are still in flux, however environmental investigations in the study area have identified and prioritized several areas in need of bank stabilization. The erosion areas are defined further in Section 7 and Appendix A-1.

“User created” informal access points are a potential source of environmental impact. The goal of the River Management Plan is to direct members of the public accessing the river corridor to formal access locations through the improvement of existing access locations and the construction of new access locations in strategic locations that direct users away from sensitive habitats and wildlife populations.

6.3.3.2 Potential Impacts

The elements of the River Management Plan will be implemented gradually over time, as described in the implementation plan outlined in Section 7. Impacts due to construction of each component are anticipated to be temporary with an overall long-term net benefit created through the removal of non-native species, re-vegetation of native species and improvement to river bank stability. Temporary impacts are primarily due to construction activities including the removal of vegetation and habitat disturbance during construction activities.

6.3.3.3 Mitigation

Mitigation strategies will be identified in detail in the next steps of implementation of any recommended works. It is recommended that construction follows best management practices including sedimentation and erosion controls, materials staging and stock piling, and equipment fueling and maintenance practices. Some limited in-water works may be required for the construction of boat and fishing access locations. This work will occur during the allowed construction windows that consider protection of species and habitat areas.

6.4 River Management Strategy Cost Estimates

Table 6.2 provides a summary of the anticipated costs associated with each component of the River Management Strategy. More detailed cost estimates for each of the components are included in Appendix A-4. The estimated costs for the Schedule B Springbank Dam Partial Removal design and the Schedule B Forks of the Thames design are provided in more detail than those provided for the River Management Plan, to meet Schedule B requirements.

Table 6-2. Summary of Cost Estimates for River Management Strategy

River Management Strategy Component	Cost Estimate
Springbank Dam ^a	\$1,000,000 to \$4,000,000
The Forks of the Thames ^b	
Ribbon Overlook	\$8,270,000
Softscape Terraces (Site Development)	\$4,133,400
River Management Plan ^c	
New Access Point (Boat, Fishing, Lookout)	\$10,000 to \$80,000 per location
Pathway (Paved)	\$75 to \$250 per meter
Educational Signage	\$1,500 to \$6,000 per sign
Bank Restoration	\$1,000 to \$3,000 per meter

^a This is a Class 5 cost estimate and represents the +100% to -50% accuracy associated with a Class 5 cost estimate, see the Springbank Dam Inspection TM (CH2M, 2018) in Appendix A-6 for more details.

^b This is a Class D cost estimate and represents an accuracy range relevant to a concept level of design.

^c Cost estimates are based on unit costs for similar restoration and infrastructure projects in Southern Ontario.



SHORE ACCESS		CURRENT	LOOKOUT LOCATION		CURRENT		PARKING		THAMES RIVER FLOW		PUBLIC PARK / PUBLIC GOLF COURSE
		IMPROVED			IMPROVED		WASHROOMS		BRIDGE		ESA - ENVIRONMENTALLY SIGNIFICANT AREA
		PROPOSED			PROPOSED		ACCESSIBLE FACILITIES		ROADS		
FISHING ACCESS		CURRENT					PICNIC AREA		RAILWAY		
		IMPROVED					DAM / WEIR		TRAILS AND PATHWAYS		
		PROPOSED					CAUTION		BANK STABILIZATION AREA		
									PROPOSED PATHWAYS		

One River Master Plan Preferred Alternatives:

1. Partial Removal of the Springbank Dam
2. Suspended Walkway and Softscaped Terraces at the Forks of the Thames
3. Strategic River Corridor Active Use and Strategic Access to the Thames River



Notes:
 1. Source: Matrix Solutions Inc., 2018.
 2. Design and base data sourced from City of London Fish & Paddle Guide Map, November 2017.
 3. Accessed from the City of London's Open Data Catalogue in June 2018.
 *Access and lookout Locations are approximate.

Figure 6-1. One River River Management Strategy
 One River EA
 City of London
 London, Ontario

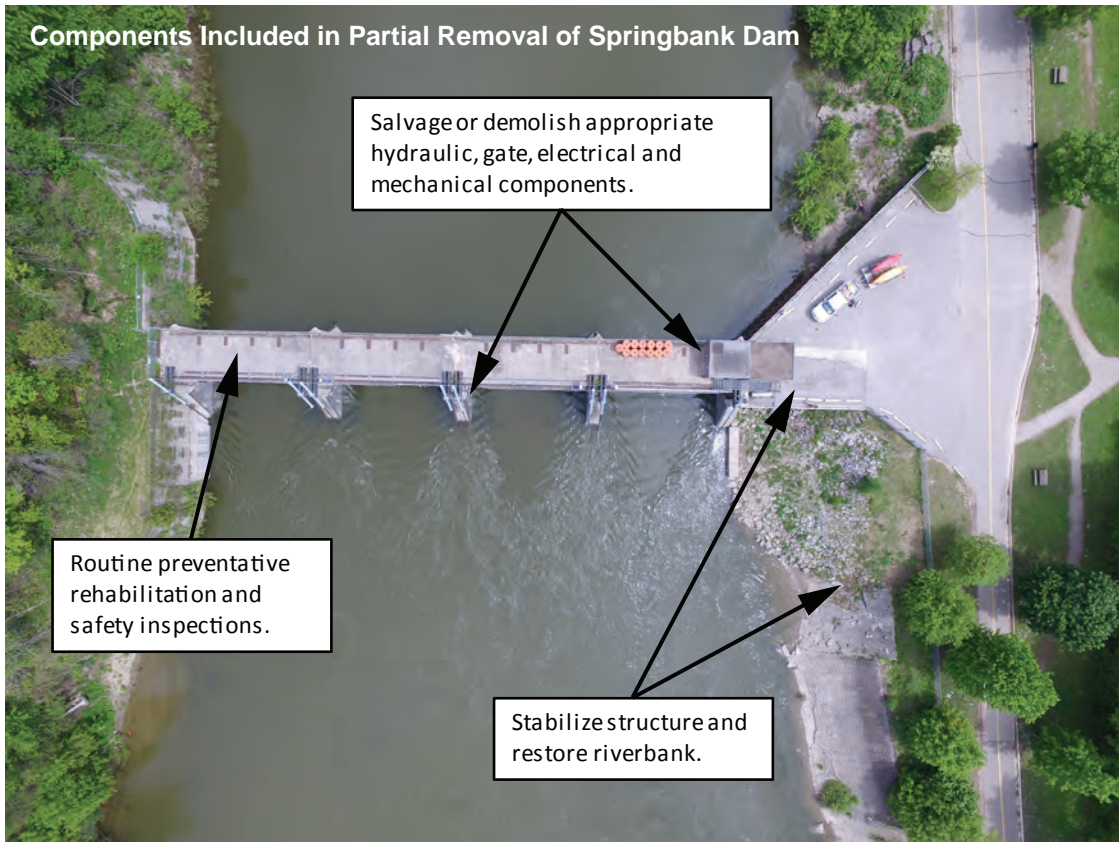


Figure 6-2. Springbank Dam Removal Elements
One River EA
City of London
London, Ontario



- (A) Ribbon Overlook, Wood Decking
- (B) Upper Plaza, Unit Pavers
- (C) Armourstone Amphitheater Seating
- (D) Performance Stage Area
- (E) Lawn Terraces
- (F) Sloping Lawn
- (G) Universal Access Walk
- (H) Bio-Engineered Vegetated Slope
- (I) monument
- (J) Gas Fire Pit
- (K) Expanded Play Area
- (L) Concrete Steps
- (M) Lower Level Plaza, Unit Pavers
- (N) Protect Existing Trees Where
- (O) Protect Existing Lawn and Trees
- (P) Armourstone Seatwalls
- (Q) Existing Dock Lowered
- (R) Protect Existing TVP
- (S) New TVP Alignment
- (T) Enhanced Native Shrub Area

Note:
1. Source: Civitas, 2018.

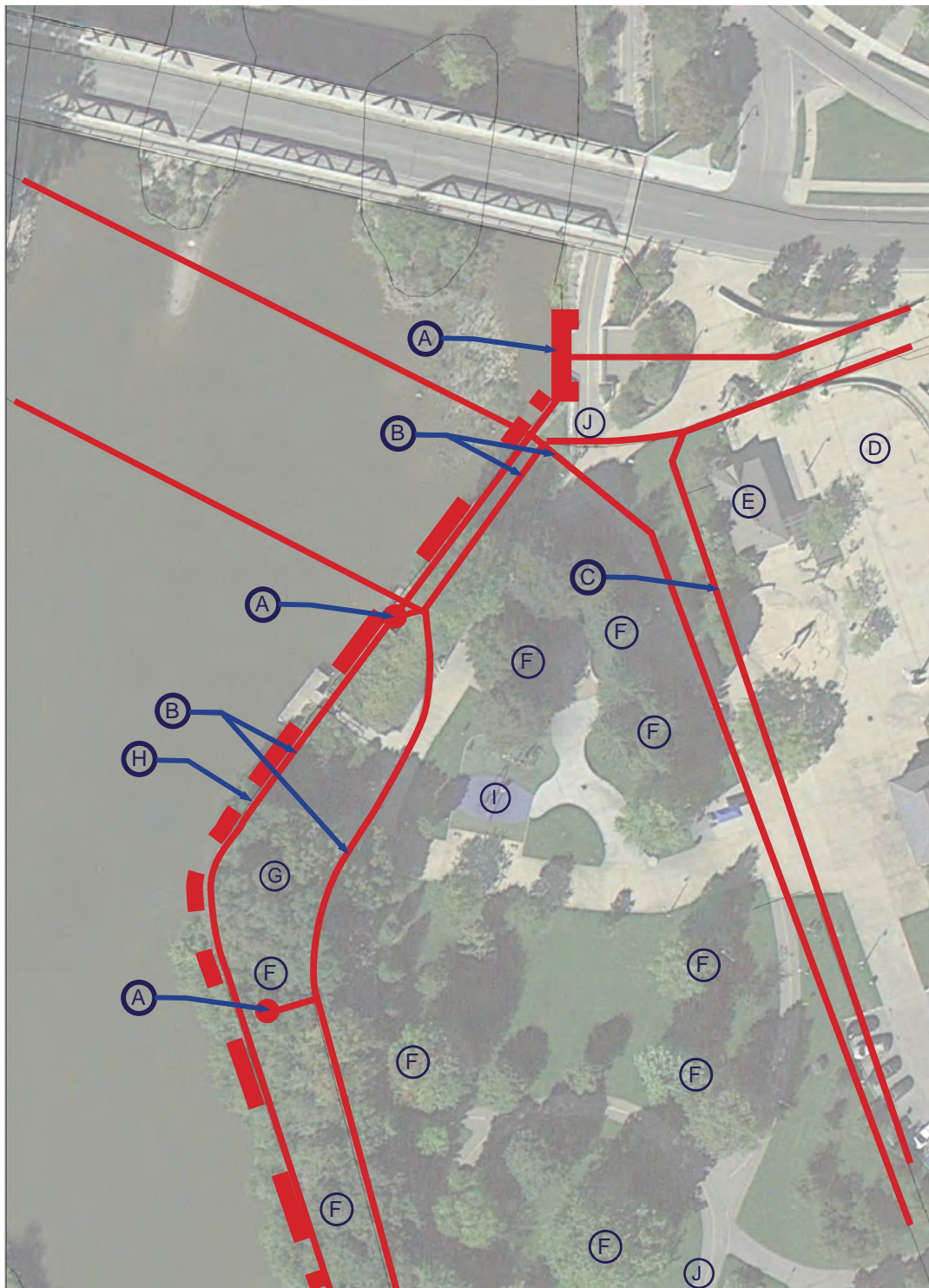
**Figure 6-3. Forks of the Thames
Preferred Alternative**
One River EA
City of London
London, Ontario

The Ribbon of the Thames



Note:
1. Source: Civitas, 2018.

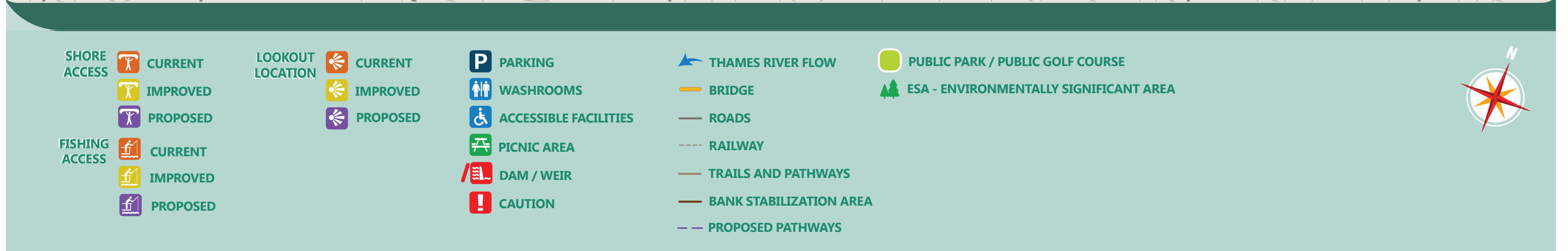
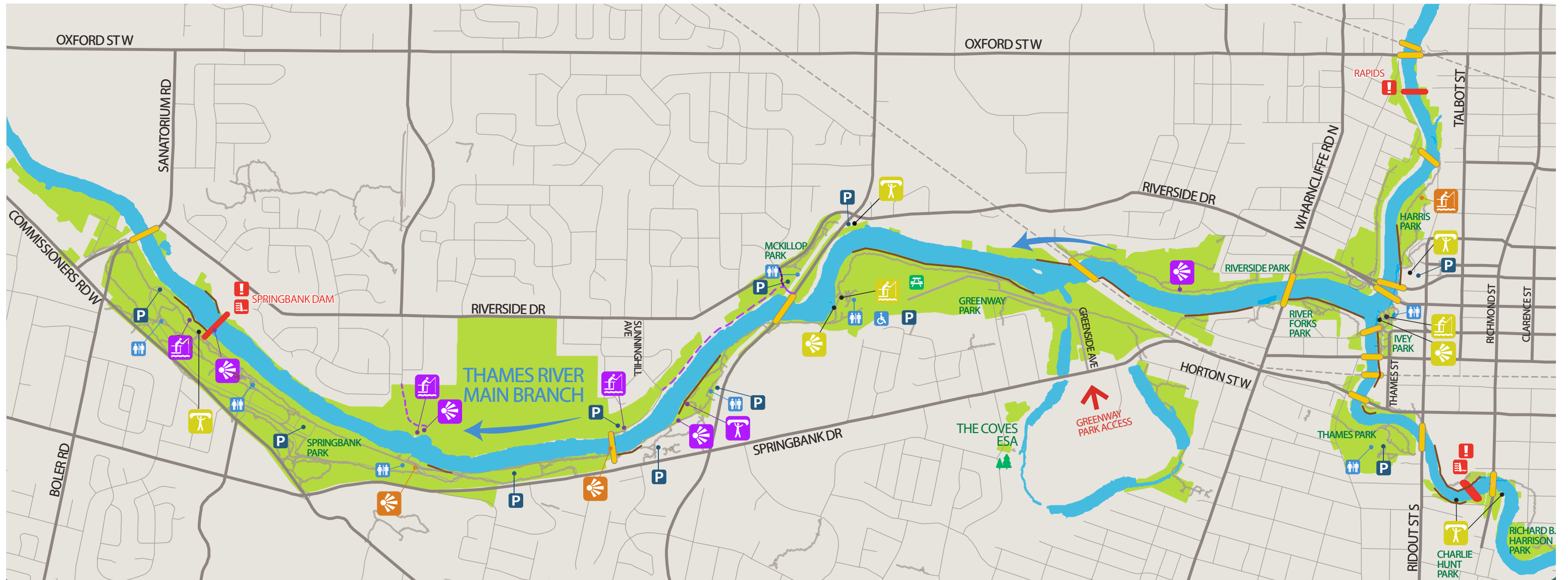
Figure 6-4. Forks of the Thames
Preferred Alternative Rendering
One River EA
City of London
London, Ontario



- (A) Protect existing sewer outfall
- (B) Protect existing sewer pipes
- (C) Protect existing water main
- (D) Protect existing splash pad
- (E) Protect existing One Dundas building
- (F) Identify specimen trees and protect when possible
- (G) Remove invasive vegetation and open up views
- (H) Limit area of improvements to bottom of existing riverbank
- (I) Relocate existing play equipment as needed
- (J) Connect TVP from Dundas St. to bottom and top of King St. bridge

Note:
1. Source: Civitas, 2018.

**Figure 6-5. Forks of the Thames
Parameters and Constraints**
One River EA
City of London
London, Ontario



Notes:

1. Source: Matrix Solutions Inc., 2018.
2. Design and base data sourced from City of London Fish & Paddle Guide Map, November 2017.
3. Accessed from the City of London's Open Data Catalogue in June 2018.

*Access and lookout Locations are approximate.

Figure 6-6. Preferred River Management Plan Alternative
One River EA
City of London
London, Ontario

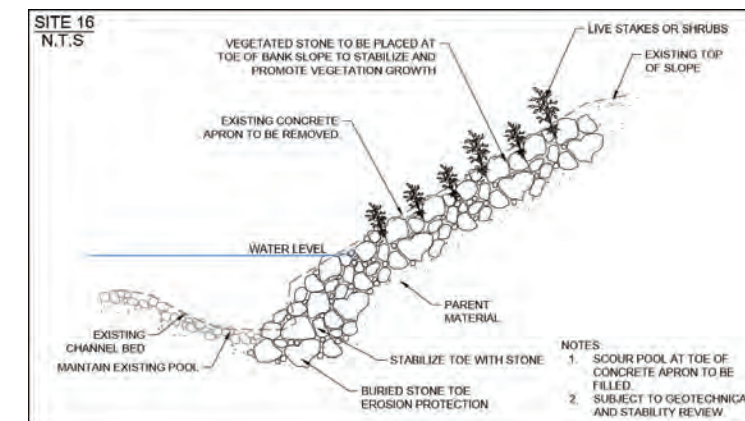
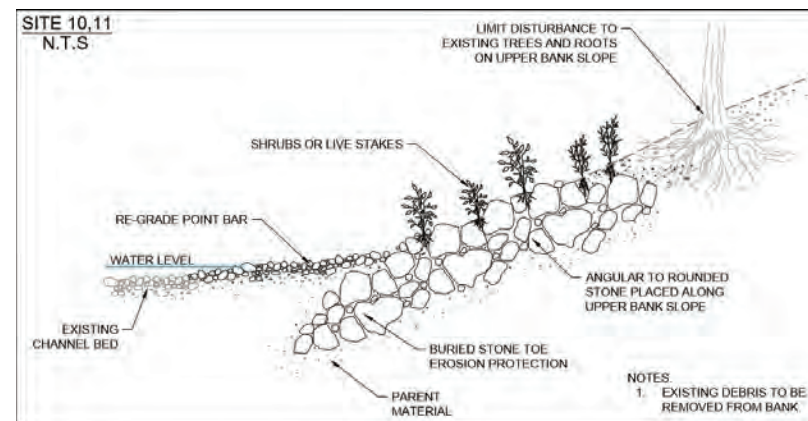
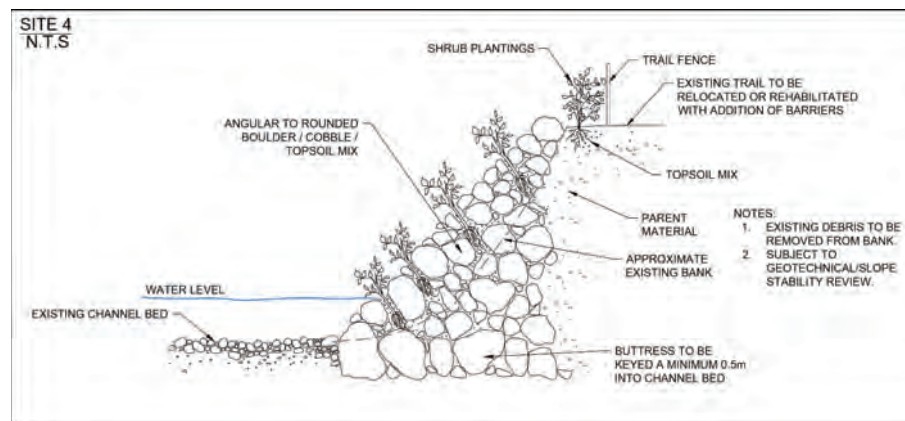
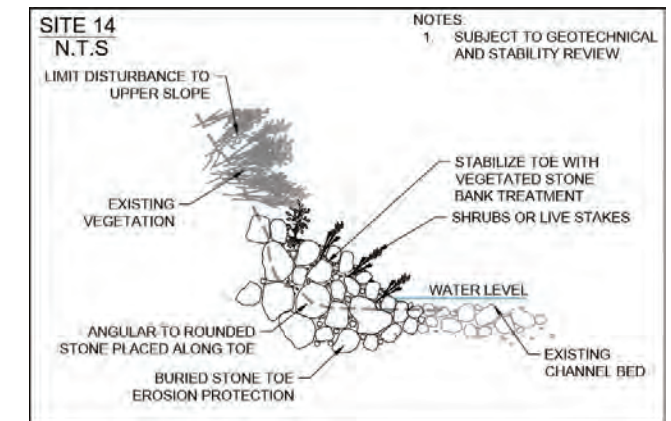
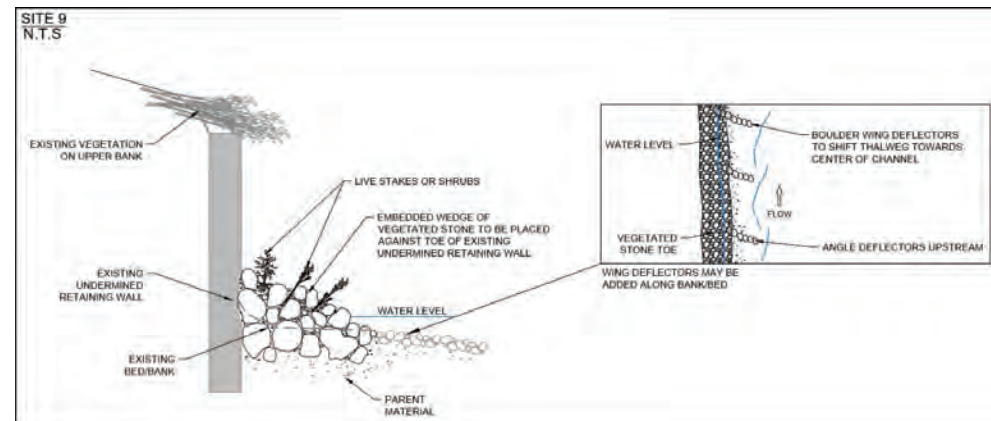
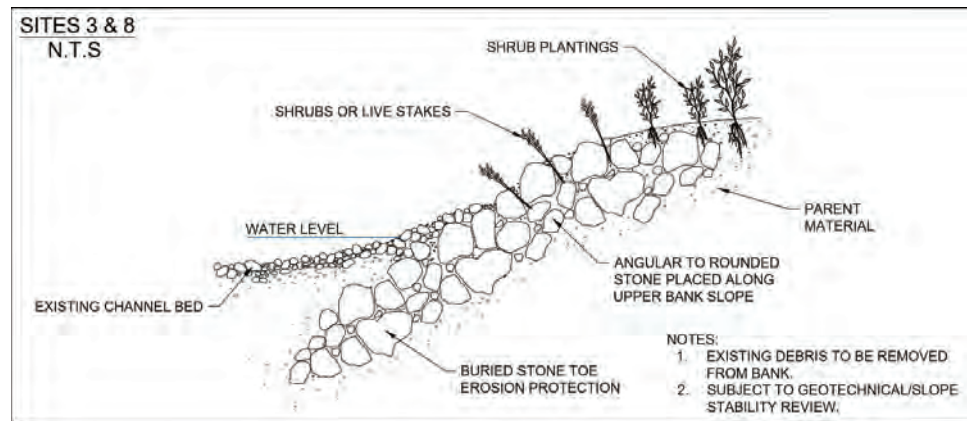
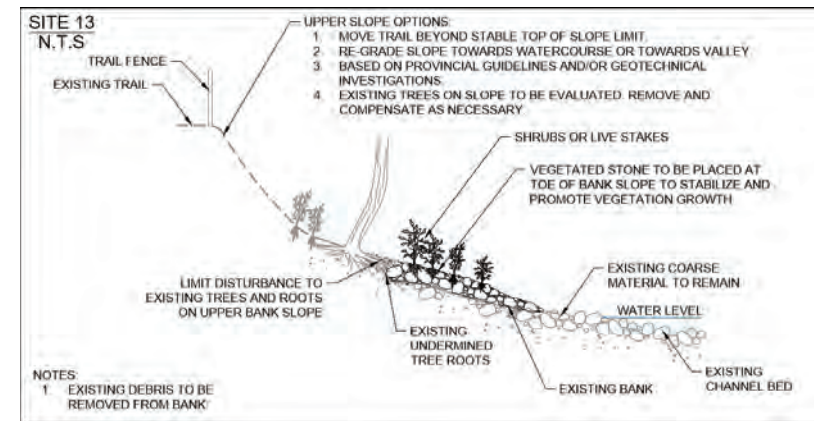
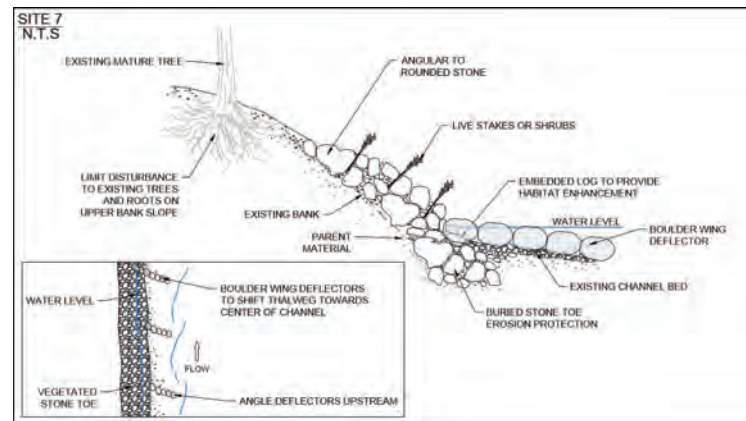
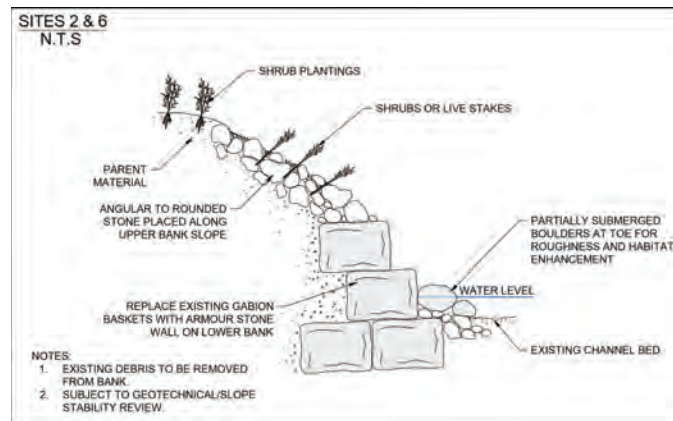
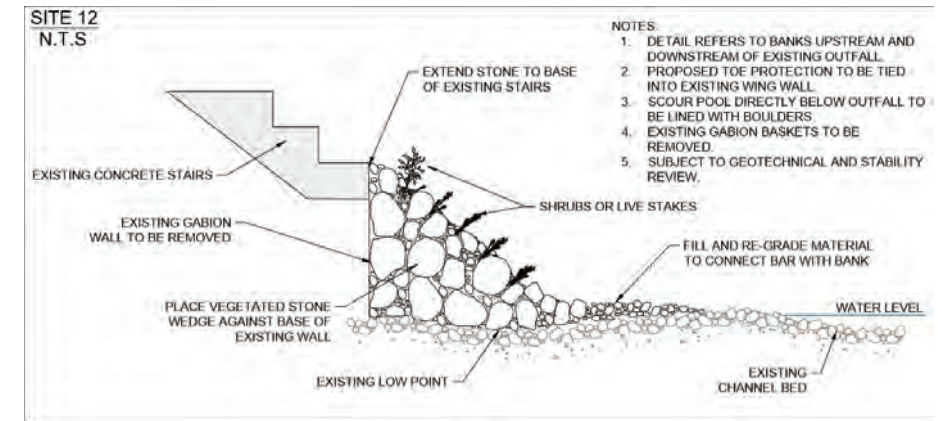
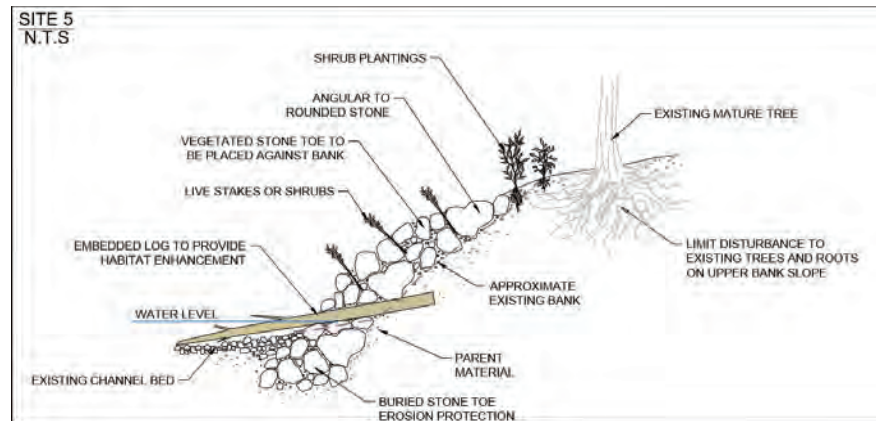
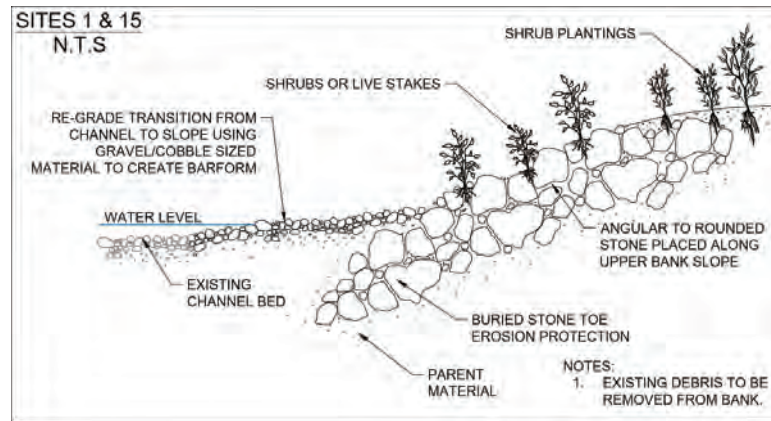
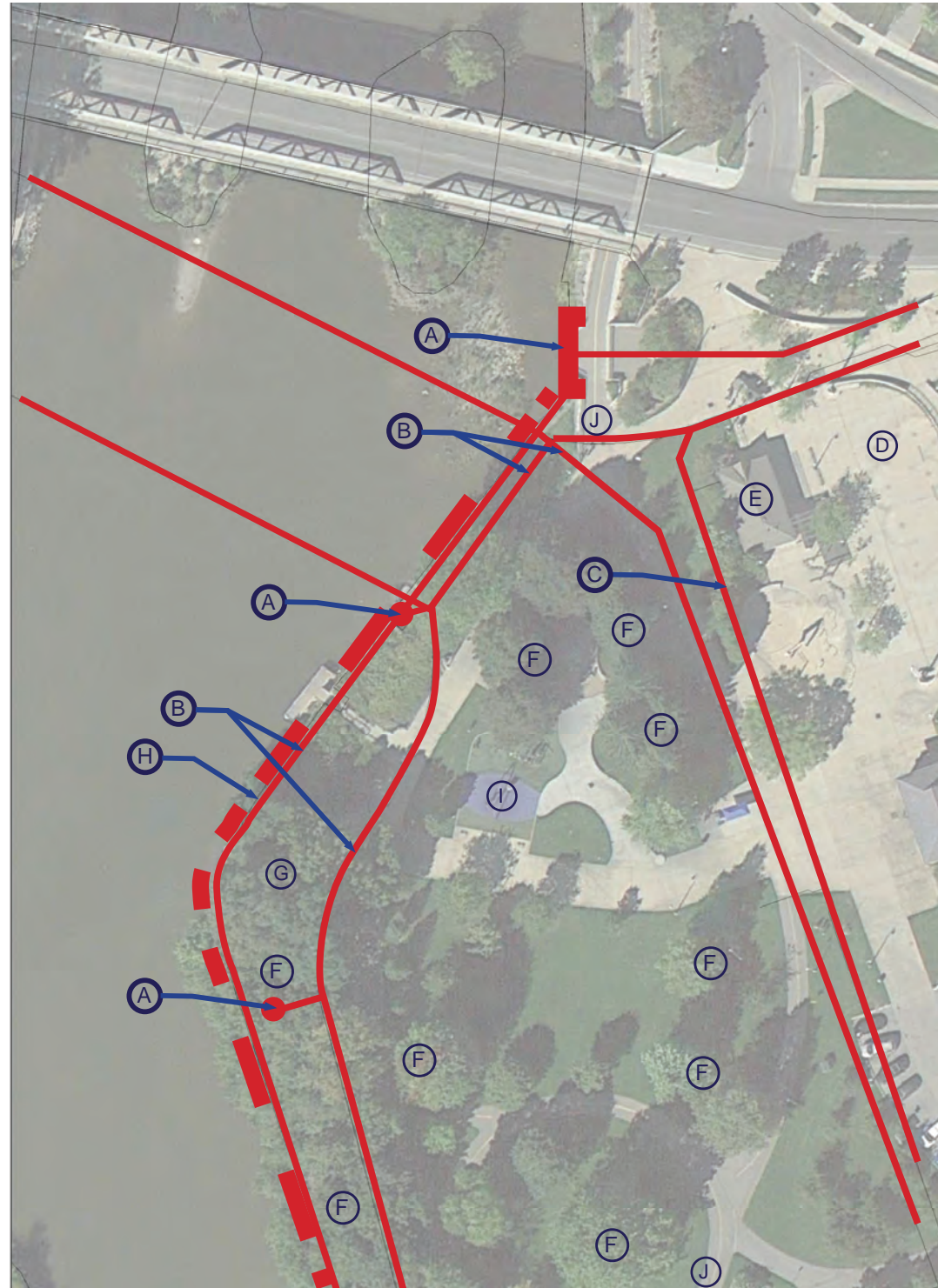


Figure 6-7. Concept Designs for Erosion Site Repair One River EA City of London London, Ontario

Parameters and Constraints



- (A) Protect existing sewer outfall
- (B) Protect existing sewer pipes
- (C) Protect existing water main
- (D) Protect existing splash pad
- (E) Protect existing One Dundas building
- (F) Identify specimen trees and protect when possible
- (G) Remove invasive vegetation and open up views
- (H) Limit area of improvements to bottom of existing riverbank
- (I) Relocate existing play equipment as needed
- (J) Connect TVP from Dundas St. to bottom and top of King St. bridge

Preferred Alternative



- (A) Ribbon Overlook, Wood Decking
- (B) Upper Plaza, Unit Pavers
- (C) Armourstone Amphitheater Seating
- (D) Performance Stage Area
- (E) Lawn Terraces
- (F) Sloping Lawn
- (G) Universal Access Walk
- (H) Bio-Engineered Vegetated Slope
- (I) First Nations Treaty-Signing Monument
- (J) Gas Fire Pit
- (K) Expanded Play Area
- (L) Concrete Steps
- (M) Lower Level Plaza, Unit Pavers
- (N) Protect Existing Trees Where Possible, Remove Invasive Vegetation As-Needed
- (O) Protect Existing Lawn and Trees
- (P) Armourstone Seatwalls
- (Q) Existing Dock Lowered
- (R) Protect Existing TVP
- (S) New TVP Alignment
- (T) Enhanced Native Shrub Area

Note:
1. Source: Civitas, 2018.

**Figure 6-8. Forks of the Thames
Preferred Alternative**
One River EA
City of London
London, Ontario