

St. Clair River Shoreline Restoration Assessment and Design of Restorative Works

Report to Great Lakes Sustainability Fund and Project Partners



St. Clair Region Conservation Authority
April 2006

The Great Lakes Sustainability Fund is a component of the Government of Canada's Great Lakes Program. The Sustainability Fund provides resources to demonstrate and implement technologies and techniques to assist in the remediation of Areas of Concern and other priority areas in the Great Lakes. The report that follows was sponsored by the Great Lakes Sustainability Fund and addresses habitat issues in the St. Clair River Area of Concern between Sarnia and Mitchell's Bay, Ontario. Although the report was subject to technical review, it does not necessarily reflect the views of the Sustainability Fund or the Government of Canada.

St. Clair River Shoreline Restoration Assessment and Design of Restorative Works

In December 2005, St. Clair Region Conservation Authority as part of its commitment to the St. Clair River Area of Concern (AOC) and the Remedial Action Plan for the AOC, submitted an application to undertake the above noted project. Great Lakes Sustainability Fund approved the project in late December.

The project was to result in the following deliverables:

- Identify the location of all publicly owned shoreline properties in the St. Clair River AOC and map the properties, labeling each with a unique site identifier
- Briefly describe the location of the property, the type and condition of the existing shoreline protection structures and identify the potential for habitat activities at these locations
- Create 6 general cross-sectional designs showing “habitat friendly” shoreline protection options and a cost comparison between these options and more traditional shoreline protection measures
- At 2 locations in need of shore protection redevelopment, undertake a detailed review of the existing conditions and produce specific designs that incorporate shore protection and habitat enhancement and cost estimates for implementation

This document is divided into 3 sections.

Section 1 outlines the publicly owned properties, with a map identifying locations and property descriptions of each site.

Section 2 provides cross-sectional designs and cost comparisons.

Section 3 provides designs for protection and habitat improvements for a portion of the CN Lands property in the City of Sarnia and Guthrie Park just north of the community of Corunna in St. Clair Township.

Design works and cost estimates were undertaken by Shoreplan Engineering of Toronto, Ontario.

If you have any questions or require further information on any item within this document please contact Brian McDougall (bmcdougall@scrca.on.ca) at the St. Clair Region Conservation Authority, 205 Mill Pond Crescent, Strathroy, Ontario, N7G 3P9 or by phone at (519) 245 – 3710.

Section 1

Section 1 maps out each of the properties reviewed under this project. For the mapping, the AOC has been divided into 4 reaches using current and former municipal boundaries (A full map identifying all sites in the AOC is available but was not appropriate in this format). Each of the maps foreshadow a portion of Section 1 and the properties identified on the map for that area are described on the subsequent pages.

For each site mapped there is a brief description of the property location, the shore protection that exists and its condition as well as a suggestion as to whether habitat enhancements could potentially be undertaken at the site and what those enhancements might be.

Property 1

- Canatara Park

Property Description:

- Canatara Park is located in the City of Sarnia and is owned by the City
- The Park is located on the south shore of Lake Huron adjacent the mouth of the Lake
- This is a passive recreation park with extensive use of the beach
- Part Lots 16 – 25, Front Concession, City of Sarnia



Shore Protection:

- Little protection exists at the site
- Steel sheet pile groynes assist in maintaining a significant beach

Shore Protection Status:

- Existing protection (groynes) are in fair to poor condition

Potential Enhancement Activities:

- Due to the active recreation on the site there is little opportunity for enhancement at this location



Property 2

- Lambton Area Water Supply System Water Treatment Plant

Property Description:

- Wrapping around the peak of the St. Clair River and opening into Lake Huron this property is effected by both the riverine and lake conditions
- The water treatment plant is owned by the Lambton Area Water Supply System which is owned and operated by the municipalities to which the plant supplies water
- Part of previous military reserve
- The property is located in the City of Sarnia



Shore Protection:

- Three types / styles of protection safeguard the property
- The northern portion, along the south shore of Lake Huron, is protected by stepped concrete blocks
- The central portion, at the mouth of the Lake, is protected by a steel sheet pile wall which encases and protects the outfall for the plant
- The southern portion, along the shore of the St. Clair River, is protected by a combination stepped and sloped armourstone revetment
- Protection ranges from 2.5 to 4 metres in height
- Both the stepped concrete block revetment and the stepped and sloped armourstone protection are fronted by rip rap providing additional protection and habitat opportunities



Shore Protection Status:

- Southern portion of the protection was constructed in 2003, the northern protection was constructed in the mid 1990's, while the steel sheet pile wall in the central section predates its flanks
- The protection of each portion is in good condition and should not require repair or replacement over the next 20 years
- The protection wraps from the foot of the Lake around and down the St. Clair River shoreline providing a variety of near shore conditions

Potential Enhancement Activities:

- The greatest portion of the protection is habitat friendly
- The existing steel sheet pile wall is required for the use of the immediate site and therefore there is no potential for change in the type of protection



Property 3

- Point Edward Waterfront Park

Property Description:

- St. Clair River shoreline between the Bluewater Bridge and the Lambton Area Water Supply System Water Treatment Plant
- This is a passive recreation park
- Part of previous military reserve
- The park is owned by the Village of Point Edward

Shore Protection:

- A stepped armourstone revetment constructed in 1995 protects the property
- The revetment is approximately 3 metres in height and is fronted by rip rap and cobble at the toe providing habitat opportunities

Shore Protection Status:

- The protection is in good condition, several fractured stones are scheduled for replacement in 2006 which will further improve the quality of the protection

Potential Enhancement Activities:

- The protection contours to match the existing protection to the north and south and as a result it provides a diversity of near shore depth



Property 4

- Sarnia Federal Harbour

Property Description:

- Located on land between Seaway Road and Exmouth Street, the Harbour also extends a significant distance into and north on the St. Clair River to near the Bluewater Bridge
- The Harbour is owned by the Government of Canada (Transport Canada)
- The Harbour is used as a mooring location for large vessels including for use as a maintenance facility in the winter

Shore Protection:

- Steel Sheet Pile Wall with a cap of concrete and steel at various locations

Shore Protection Status:

- Generally in good condition
- The wall appears to be erect and is protected from damage from ship hulls by timbers along its face

Potential Enhancement Activities:

- Due to the purpose it fulfils, it would be very difficult to change the type of protection, however, it does provide a deep water area off the main channel and out of the normal flow pattern



Property 5

- Sydney Smith / Point Lands

Property Description:

- Immediately south of the Sarnia Federal Harbour, the Sydney Smith is the hull of a sunken ship, that has been capped with concrete and is used as a maintenance dock for Lake vessels
- Continuing south, the Point Lands (passive recreation area) are protected by concrete rubble
- Both properties are owned by the City of Sarnia

Shore Protection:

- The Sydney Smith protection is the steel hull of the sunken ship approximately 140 metres in length
- A small section of the shore connecting the two halves of the hull was repaired in 1998
- The Point Lands are protected by concrete rubble
- The backshore is lower than the top elevation of the concrete rubble

Shore Protection Status:

- The structures appear to be in good condition
- There appears to be no significant erosion behind the concrete rubble

Potential Enhancement Activities:

- The steel wall serves a purpose in allowing large vessel dockage for maintenance
- The concrete rubble, although not natural does provide some habitat
- It is proposed that the concrete rubble shoreline be cleaned up and covered with a rip rap revetment
- Any exposed debris such as reinforcing bar would be removed and the large pieces of concrete would be broken up into smaller pieces to create a smoother slope
- Any voids would be filled with rip rap and a layer of rip rap would be placed over the concrete
- This approach is suggested as it is more economical than removing existing concrete rubble
- The rubble appears to have formed a suitable filter layer and there is no visible loss
- This should provide an improvement to the quality of the habitat as well as the structural integrity, however it is not expected to increase the quantity of habitat



Property 6

- Sarnia Bay Marina

Property Description:

- Continuing south on the waterfront, the Sarnia Bay Marina
- The Marina is owned by the City of Sarnia and operated by a company under a management agreement
- The Marina is a transient and seasonal small vessel harbour
- There is an existing steel sheet pile boat haul out slip situated along the shoreline
- Along the shoreline is a walkway that extends to the east side of the marina



Shore Protection:

- Shore protection for the marina is a combination of an small armourstone revetment, steel sheet pile retaining walls and a rip rap revetment
- The Marina is protected from the St. Clair River by an armour stone revetment that is approximately 240 metres long
- The crest of the revetment extends approximately 1 metre above the backshore grade to an elevation of approximately 178.0 metres
- The west shoreline inside the marina is protected by rip rap which extends up to the tableland of the park
- The estimated elevation of the tableland is approximately 178.5 m to 179.0 m.
- Extending 150 m along the inside of Sarnia Bay Marina is a steel sheet pile dock to the breakwater
- Along the north shore of the marina, approximately 400 m in length, is a shoreline protected by rip rap revetment



Shore Protection Status:

- The armour stone revetment and breakwater both appear to be in good condition
- The steel sheet pile wall and the rip rap revetment also appear to be in good condition
- There are some maintenance issues with the boat ramp, specifically bolts and anchors that are loose
- As a result the boat ramp is in fair to good condition



Potential Enhancement Activities:

- There are few opportunities to increase the quantity or quality of habitat due to the recreational activities occurring at this site



Property 7

- Centennial Park / Bayshore Park

Property Description:

- Located at the peak of Sarnia Bay is Centennial Park with Bayshore Park immediately to the south
- Both are owned by the City of Sarnia and are principally used for passive recreation
- Tour vessel dock is included in Bayshore Park

Shore Protection:

- This reach is continuously protected by steel sheet pile walls with a concrete cap
- The protection was constructed in the 1980's with some parts of older structures incorporated into the present structures
- A walkway runs along the entire 695 metres of protection

Shore Protection Status:

- The steel sheet pile walls and concrete cap along this reach appear to be in good condition
- The railings and lamp standards are vertical
- This is a good indicator of stability of the seawalls

Potential Enhancement Activities:

- Due to the status of the existing protection, potential enhancement will not be practical in the near future
- Opportunities may exist over the longer term but will have to be coordinated with significant changes in uses



Property 8

- MacKenzie Park

Property Description:

- Located south of Bayshore Park and north of George Street
- Owned by the City of Sarnia and used for passive recreation

Shore Protection:

- Protected by steel sheet pile wall with a concrete cap
- Constructed in 1992
- A walkway runs along the top of these walls over the entire length of 190 m

Shore Protection Status:

- The steel sheet pile walls and concrete cap along this reach appear to be in good condition
- The railings and lamp standards are vertical
- This is a good indicator of stability of the seawalls



Potential Enhancement Activities:

- Due to the status of the existing protection, potential enhancement will not be practical in the near future
- Opportunities may exist over the longer term but will have to be coordinated with significant changes in uses

Property 9

- Seaway Park

Property Description:

- Continuing south from MacKenzie Park is Seaway Park
- Seaway Park extends from George Street to the foot of Ferry Dock Hill
- The protection was constructed in two phases in 1978 and 1980
- Again owned by the City of Sarnia, the park is used for passive recreation

Shore Protection:

- Seaway Park is protected by steel sheet pile walls with a concrete cap
- The protection was constructed in the late 1970's and early 1980's
- A walkway runs along the top of these walls
- This reach is approximately 265 m in length



Shore Protection Status:

- The steel sheet pile walls and concrete cap along this reach appear to be in good condition
- The railings and lamp standards are vertical
- This is a good indicator of stability of the seawalls

Potential Enhancement Activities:

- Due to the status of the existing protection, potential enhancement will not be practical in the near future
- Opportunities may exist over the longer term but will have to be coordinated with significant changes in uses



Property 10

- Ferry Dock Hill / Former CN Lands

Property Description:

- Following the shoreline south from Seaway Park are the foot of Ferry Dock Hill and the property known as the CN Lands
- These properties have been acquired by the City of Sarnia over the last 10 years
- A commercial building is located on the waterfront at the foot of Ferry Dock Hill



Shore Protection:

- There are various structures along this 720 metres of shoreline
- At the north end is short reach of steel sheet pile wall which is in very poor condition
- Approximately 25 m south of the SSP wall, the City owned commercial building is built on concrete caissons over the water
- The concrete caissons support steel beams which carry the office building
- South of the building the shoreline is protected by concrete rubble topped with poured asphalt in some areas and another concrete wall
- Along the shoreline of this reach, there are numerous wooden piles reaching above the surface of the water
- At the north end of the reach near the end of Davis Street, there is a steel sheet pile structure that is approximately 10 m long and extends approximately 5 m from the shoreline
- Continuing south the reach contains several structures that were constructed for very specific functions and accommodated past uses of the site
- These include a train unloading ramp and ice flow deflector structures
- A pier which extends from the shoreline approximately 35 m into the water is a part of ice deflecting structure put in place to protect the train loading dock to the south and is protected with concrete blocks
- Offshore of the pier are two caissons which anchor an ice boom
- The first caisson has as a steel sheet pile base with concrete cap



- The second caisson farther offshore appears to have a stepped concrete face at the waterline with no steel sheet pile protection visible
- The shoreline is protected with long pieces of concrete rubble
- Timber piles front the north part of the reach and then become buried in the approach ramp of the train loading ramp before continuing to the south
- South of the ramp, the shoreline is protected by concrete rubble and in some locations concrete has been poured over the embankment
- Approximately 155 m south of the pier is a ramp, once used to load and unload trains. The ramp consists of adjustable platform supported by piles and protective timber dolphins and guide piles on the south side
- The north end of the platform is hinged on a concrete foundation
- The foundation is protected with a Gobimat which is in poor condition
- South of the ramp, five additional docking dolphins are located along the west side of the approach
- Three of these are timber pile dolphins with steel bollards
- Two are steel pile bollards with a concrete block
- No obvious damage was observed when viewed from the shore



Shore Protection Status:

- The steel sheet pile wall at the north end is in poor condition
- The steel sheet pile wall at the end of Davis Street is in good condition
- The concrete blocks of the pier have shifted and there has been erosion of the fill material from behind the blocks
- Rip rap in most areas is oversized and is having a negative impact on the structure
- The slope is too steep in several areas

Potential Enhancement Activities:

- Opportunities exist to remove the current protection and replace it with softer protection with variations in slope and depth and in the contouring of the shore
- The new protection will set a new baseline for the development of the remainder of the property
- Where possible the concrete rubble could be broken up into rip rap size material and reused to fill voids and modify the underwater slope, rip rap would be placed on top of the remaining concrete rubble
- Any debris would be removed or unacceptable material (rebar, etc.) would be removed from the site
- As a result it has been reviewed and draft designs for new protection undertaken as a part of this study

Property 11

- CN Lands / Concrete Plant

Property Description:

- The southern end of the CN Lands is leased to a commercial operator of the concrete plant on site
- These properties have been acquired by the City of Sarnia over the last 10 years

Shore Protection:

- This reach consists of approximately 245 m of shoreline
- The shoreline is protected with concrete rubble and portions of the shoreline have been used for the disposal of unused concrete mix
- The toe of the concrete rubble slope is retained by timber piles
- Based on site review and limited site survey, it is estimated that the grade of the bank varies between 2:1 to 6:1 (h:v)

Shore Protection Status:

- The protection is in fair to poor condition
- The grade of the bank in several areas is very steep
- Existing rubble on site is oversized and has been hardened by being overtopped with poured concrete in some areas

Potential Enhancement Activities:

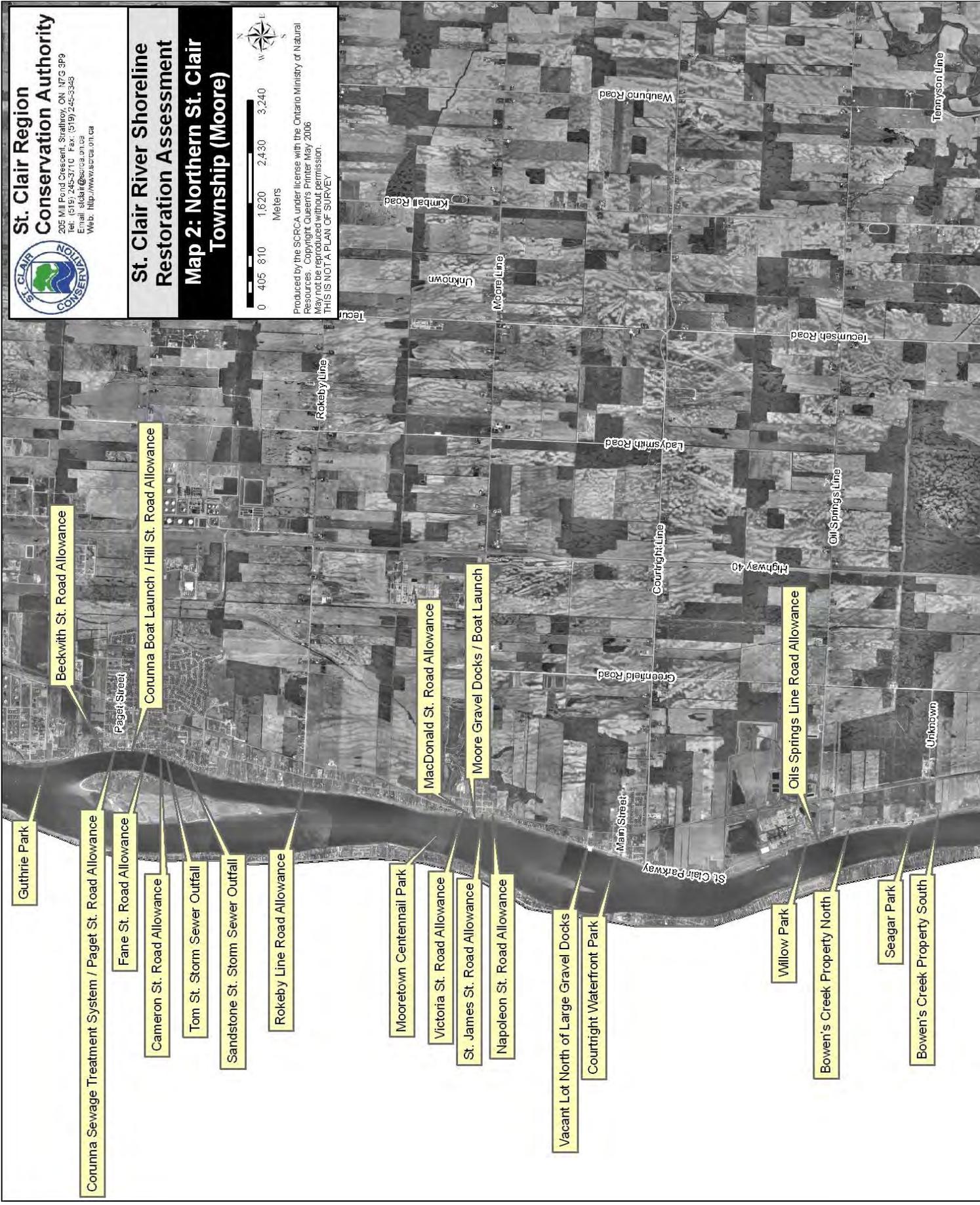
- Opportunities exist to remove the existing protection and replace it with softer protection with variations in slope and depth and in the contouring of the shore
- The new protection will set a new baseline for the development of the remainder of the property



**St. Clair River Shoreline
Restoration Assessment**
**Map 2: Northern St. Clair
Township (Moore)**



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Property 12

- Guthrie Park

Property Description:

- Located just north of the community of Corunna
- Lot 64 - 68, Front Concession, Township of St. Clair (former Moore)
- Guthrie Park is owned by the Township of St. Clair

Shore Protection:

- The property is protected by steel sheet piles walls of varying ages
- The 15 metres of wall at the north end of the property is constructed of heavy gauge steel with remaining wall to the south 685 metres is constructed of significantly lighter gauge steel

Shore Protection Status:

- The steel sheet pile wall is showing signs of extreme stress and failure
- Repairs have been undertaken at several locations with very limited success
- The top of the wall is marginally low and the light gauge wall rusted through at several locations
- Anchor rods are poorly attached and anchors appear to be too close to the wall to be effective



Potential Enhancement Activities:

- Due to its poor condition and the resulting necessity for repairs, there are significant opportunities for improving habitat at this site
- As a result it has been reviewed and draft designs for new protection undertaken as a part of this study

Property 13

- Road allowance for Beckwith Street

Property Description:

- This site is located in the community of Corunna at the end of Beckwith Street
- Lot 62 - 63, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- The erosion protection at this location is a steel sheet pile wall with a steel cap
- As it is the road allowance it is just over 20 metres in length

Shore Protection Status:

- The surface of the wall is in fairly good condition
- The wall is vertical in all locations and there does not appear to be any movement of the wall
- There is an outfall in this wall and it appears to be in good condition, however, there are two twelve inch depressions in the ground surface, two to three metres behind the wall at the outfall and may be an indication of a fault in the drain



Potential Enhancement Activities:

- The existing protection is in good condition and is not expected to be replaced in the short term
- Further investigation is required to determine if an opportunity exists to place rip rap at the toe of the steel sheet pile wall to improve habitat opportunities

Property 14

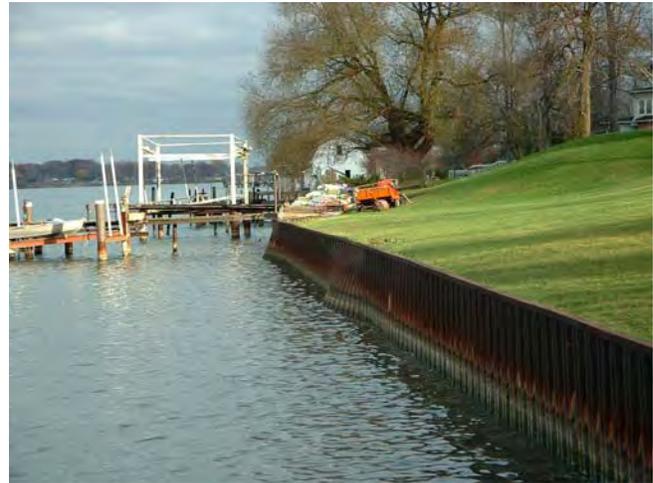
- Corunna Sewage Treatment System / End of Paget Street

Property Description:

- Located at 362 Beresford Street in the community of Corunna and the end of Paget Street immediately to the south
- Lot 61 - 62, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- The shoreline protection at this location is a capped, driven sheet pile wall
- This site is currently included in an ongoing St. Clair Township slope stability study. (Beresford St.)



Shore Protection Status:

- The retaining wall and cap surfaces are in fair condition, exhibiting signs of structural instability at certain locations
- Depressions are noted in the soil behind the retaining wall at every tie rod
- There are two spots where the surface material behind the wall has slumped
- These depressions may be indicative of water moving along the tie rod lines or of drainage issues behind the wall itself
- The depressions are occurring directly above the nuts and washers used to secure the tie rods into the wall and it is for this reason that is felt that the problem can be attributed to the potential failure of the tie backs
- Also, the locations of the tie rods are areas where the retaining wall is experiencing bowing and again can be related to the failure of the tie rods
- At the west end of the wall there is an exposed outfall
- The soil surrounding the outfall has been lost as the outfall has corroded through



Potential Enhancement Activities:

- Due to the use of the upland area and the outfalls built into the existing protection it may not be possible to enhance the protection significantly
- If a sheet pile wall is reconstructed at this site, at minimum we may inquire as to whether a rip rap toe may be included to provide some habitat

Property 15

- Corunna Boat Launch / Hill Street Road Allowance

Property Description:

- The property is located at the foot of Hill Street in the community of Corunna
- The address is 172 Hill Street
- A boat launch is located on the south side of the property

Shore Protection:

- The shore protection is a capped, steel driven sheet pile wall
- Boat ties and ladders are present on the wall
- There is a parking area behind the wall and to the south of the wall is a concrete boat launch

Shore Protection Status:

- The boat launch wall is in good condition and has undergone relatively recent repairs that appear to be sufficient
- There are slight depressions in the asphalt behind the wall
- The concrete floor of the boat launch appears to be in good condition as well
- There does not appear to be any erosion at this location
- The wooden spiles that are protecting the wall from impact damage are functioning and in good condition



Potential Enhancement Activities:

- The existing protection is in good condition and is not expected to be replaced in the short term
- The active recreation occurring at this location may not permit enhancement opportunities without impact



Property 16

- Fane Street Road Allowance

Property Description:

- The property is the shoreline end of the road allowance of Fane Street in the community of Corunna
- Lot 59 - 60, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- The shore protection at this site is a steel sheet pile wall with a steel cap

Shore Protection Status:

- The wall is vertical and appears to be in good condition
- There appears to be no loss of material behind the wall
- One outfall is present in the wall and it appears to be in good condition

Potential Enhancement Activities:

- The existing protection is in good condition and is not expected to be replaced in the short term
- Further investigation is required to determine if an opportunity exists to place rip rap at the toe of the steel sheet pile wall to improve habitat opportunities



Property 17

- Cameron Street Road Allowance

Property Description:

- This property is the road allowance of Cameron Street in the community of Corunna
- Lot 58 - 59, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair and is just over 20 metres in length

Shore Protection:

- Little protection exists at this location
- The protection that does exist is broken sidewalk and railroad ties and is covered with brush and clippings
- A boat launch has been constructed which is approximately 4 metres by 6 metres

Shore Protection Status:

- The lack of designed protection is leaving this site subject to erosion

Potential Enhancement Activities:

- Two issues will limit the opportunities for enhancement at this location
- The active use and desired continued use of the existing boat launch and the size of the property



Property 18

- Tom Street Storm Sewer Outfall

Property Description:

- The property is located between 481 and 483 Tom Street in the community of Corunna
- Lot 58, Front Concession, Township of St. Clair (former Moore)
- The property which is just under 5 metres wide is owned by the Township of St. Clair

Shore Protection:

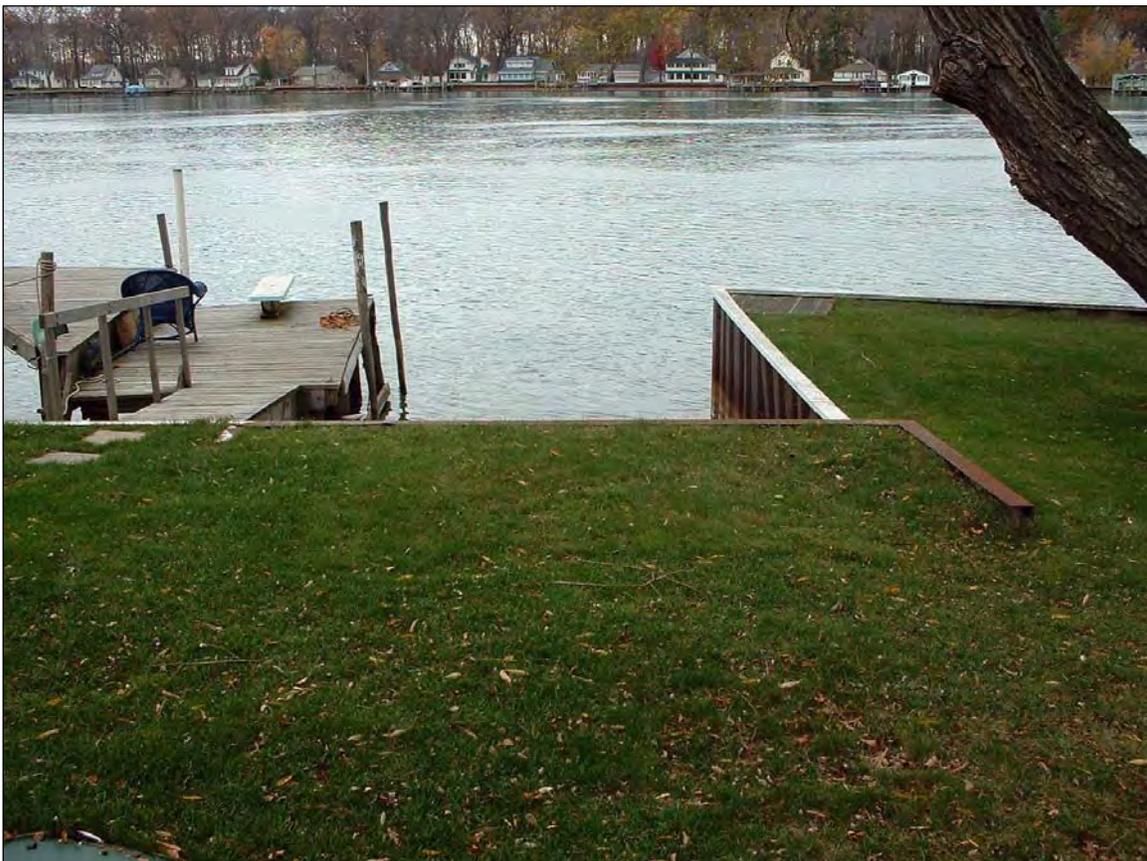
- A steel sheet pile wall with two storm sewer outfalls protects this property

Shore Protection Status:

- The steel sheet pile wall and cap are in good condition but does bow slightly near the centre
- There is no observable loss of material behind the wall or erosion in front of the wall

Potential Enhancement Activities:

- Due to the short length of protection and the requirement to maintain the 2 outfalls it will be difficult to enhance the habitat on this site



Property 19

- Sandstone Street Sewer Outfall

Property Description:

- The property is located at the south end of Sandstone Street in the community of Corunna
- Lot 57, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair



Shore Protection:

- The property is protected by a steel sheet pile wall with a steel cap
- The property is just over 3 metres in length and there is one outfall

Shore Protection Status:

- The wall and the outfall are in good condition
- The wall is vertical but does show a small loss of material behind it

Potential Enhancement Activities:

- Due to the short length of protection and the requirement to maintain the 2 outfalls it will be difficult to enhance the habitat on this site



Property 20

- Rokeby Line Road Allowance

Property Description:

- This property is the road allowance for Rokeby Line and is the property of the Township of St. Clair
- The property is located just south of the community of Corunna

Shore Protection:

- No shore protection exists at this time
- The road allowance is just over 20 metres in length
- Within the road allowance there is a large outfall that is in a large concrete casing.

Shore Protection Status:

- Despite the lack of protection, erosion does not appear to be an issue at this location
- The slope of the shoreline appears to be very stable and there is no indication of previous erosion
- Beyond the large concrete outfall, the remainder of the shoreline is overgrown with large woody vegetation coupled with ground cover

Potential Enhancement Activities:

- The large woody vegetation is beginning to have an impact on the site
- As this impact increases, some action will be required to prevent erosion
- There will be an opportunity to enhance habitat during the construction of any protection
- The velocity of the discharge output from such a large outfall must be considered due to its erosive capability



Property 21

- Mooretown Centennial Park

Property Description:

- Mooretown Centennial Park is located in the community of Mooretown and is owned by the Township of St. Clair
- Lot 38, Front Concession, Township of St. Clair (former Moore)
- The property is used for passive recreation

Shore Protection:

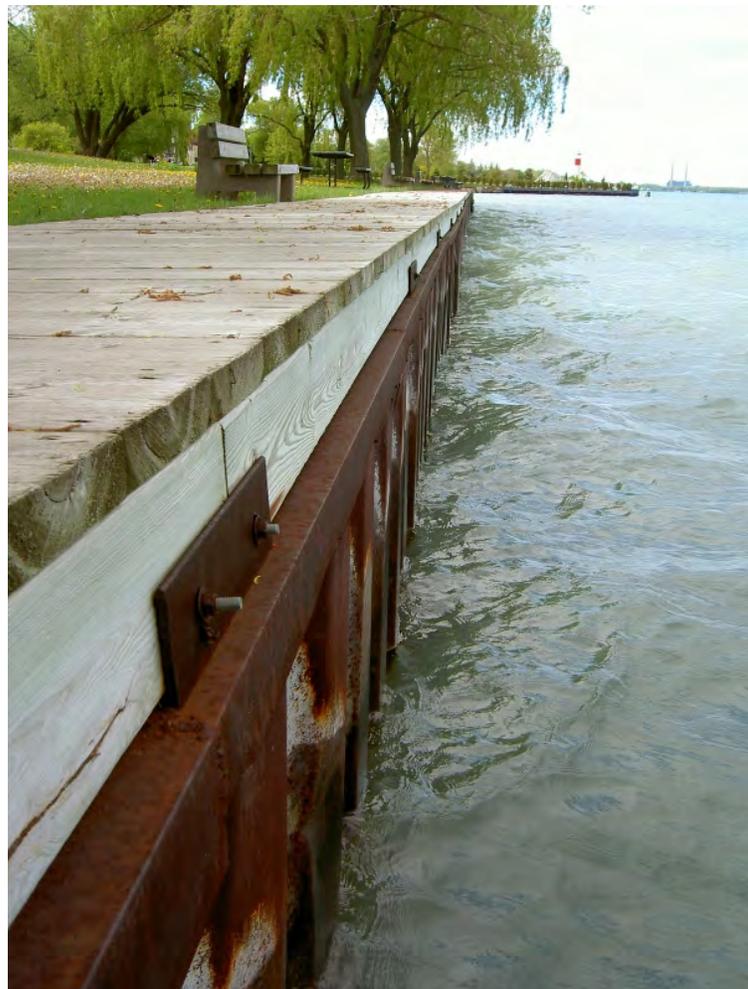
- The property extends between 12 and 15 metres into the St. Clair River
- Protection for the property is in the form of a steel sheet pile wall
- The wall is capped by angle iron which is in turn capped by a timber boardwalk
- The shoreline is approximately 80 metres in length

Shore Protection Status:

- There are no visible problems with vertical or horizontal alignment of the wall
- Due to the lighter gauge of the wall minor dents are noticeable which are assumed to have been caused by ice
- There is a minor loss of material behind the boardwalk
- The boardwalk masks any issues occurring immediately behind the steel sheet pile wall

Potential Enhancement Activities:

- The existing protection is estimated to have a 10 to 20 years lifespan
- Enhancement opportunities will be limited by this lifespan and by the desired use of the site



Property 22

- Victoria Street Road Allowance

Property Description:

- The property is identified as the road allowance of Victoria Street in the community of Mooretown
- Lot 37, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- The shore protection in place of site is a steel sheet pile wall with a steel cap
- One outfall is visible through the structure

Shore Protection Status:

- The wall is vertical and in good condition
- There appears to be some slight loss of surface material from behind the wall

Potential Enhancement Activities:

- The existing protection is in good condition and is not expected to be replaced in the short term
- The shallow nature of the nearshore with its rocky substrate may also limit opportunities



Property 23

- MacDonald Street Road Allowance

Property Description:

- The property is the end of the road allowance of MacDonald Street in the community of Mooretown
- Lot 37, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- There is no designed shore protection in place
- One large outfall exits the bank at the toe of the slope
- Some portions of the bank are protected by large slabs of concrete
- Other areas have large woody vegetation
- A shallow nearshore and a beach at lower water levels provide a front line of protection for the site

Shore Protection Status:

- Low water levels have assisted in permitting the bank to survive without protection
- The outfall is in good condition

Potential Enhancement Activities:

- The shallow near shore and the small outfall should provide opportunities for enhancement
- The large concrete slabs could be used in any new protection



Property 24

- Moore Gravel Dock / Boat Slip

Property Description:

- The gravel docks and boat ramp are located in the community of Mooretown
- Lot 36 – 37, Front Concession, Township of St. Clair (former Moore)
- The properties are owned by St. Clair Township
- The boat ramp has been acquired since 2000

Shore Protection:

- The boat slip is constructed of steel sheet pile wall with a steel cap
- The north boundary of the property is half steel sheet wall and half discarded concrete rip rap along a very steep bank
- Moving south from the boat slip and just north of the gravel dock is an area of discarded concrete rip rap, asphalt and broken concrete with a large amount of exposed rebar
- The erosion control structure around the gravel dock is a steel sheet pile wall with a steel cap

Shore Protection Status:

- The northern portion of the property has very steep slopes and at one location there is evidence of bank failure
- At the toe of the slope, in a five foot section, there is the debris from the failure
- The boat slip is in good condition
- The steel wall and cap are in also in very good condition
- However, due to a flaw in the design of the sheet pile wall, massive soil loss has occurred
- The wall does not reach the river bed and consequently the entire bank is being undercut behind the wall
- Minor surface loss has occurred behind wall for its entire length
- At the corners of each wall section, major failure has occurred behind the walls
- Depressions greater than a metre cubed have occurred at each corner
- Some of the corners have been filled with poured concrete
- Moving south, there are large voids between the broken concrete and sections of the bank are experiencing loss of material
- There are some safety concerns with regard to the large voids and exposed rebar



- Around the gravel dock, the retaining wall does not appear to be vertically straight at all locations thus indicating areas of slippage behind wall
- The top of the wall appears to be leaning toward the water
- A possible explanation for this slippage may be attributed to the significant amount of weight that is being placed on the underlying substrate from the gravel storage
- The cap of this wall is cracked
- This is further evidence of stress on the wall and of movement



Potential Enhancement Activities:

- At the north end of the site it is recommended that the existing wall be replaced with a wall that is anchored into the bed of the river so that no undercutting behind the wall is possible
- An armourstone wall / revetment would provide the necessary support as well as provide a significantly more friendly environment
- The option does exist to contour the wall to provide further opportunities
- The discarded concrete rip rap should be replaced with suitable erosion control in the form of rock rip rap or armourstone
- In the longer term, the wall around the gravel docks could be replaced with a armourstone wall



Property 25

- St. James Street Road Allowance

Property Description:

- The end of the road allowance for St. James Street in the community of Mooretown
- Lot 36, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- There are gabion baskets 10 metres inland from the shoreline
- There is an outfall on this property
- The bank is overgrown with large vegetation including the gabion baskets

Shore Protection Status:

- Due to very low water levels, there appears to be no erosion at the present time
- The site is inundated with the growth of phragmites so currently erosive processes would be very minimal
- There are also two large evergreen trees present on the bank and at this time appear to be having no effect on the stability of the bank
- The steel corrugated outfall present within the slope is half filled with sediment due to low flows this year.

Potential Enhancement Activities:

- Existing vegetation is providing some habitat and providing some near shore shading
- Due to the lack of erosion it is not anticipated that shore protection will be required at this site in the near future



Property 26

- Napoleon Street Road Allowance

Property Description:

- The end of the road allowance of Napoleon Street in the community of Mooretown
- Lot 35, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- There is no designed erosion protection currently at this location
- Some dumped concrete exists on site
- The greatest erosion protection currently on site is the thick vegetation on site

Shore Protection Status:

- The thickness of the vegetation makes it very difficult to determine the amount of ongoing erosion but also indicates that erosion is limited at this location

Potential Enhancement Activities:

- Existing vegetation is providing some habitat and providing some near shore shading
- Due to the lack of erosion it is not anticipated that shore protection will be required at this site in the near future



Property 27

- Vacant Lot North of Large Gravel Docks

Property Description:

- The property is located directly north of the LaFarge Gravel Docks in the community of Courtright
- Lot 29, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- The shoreline of the property is approximately 6 metres in length extending north from the seawall which protects the gravel docks
- Protection on site is discarded concrete and broken sidewalk

Shore Protection Status:

- Due to the lack of design and sporadic placement there are several large voids in the protection
- The large voids indicate existing erosion and foreshadow major failures in addition to being a safety concern

Potential Enhancement Activities:

- Due to the current status of the site and the resulting short lifespan of the existing protection this site is a candidate for habitat enhancement activities
- However, the site is quite short in length and is bounded to the north and south by areas of greater activity (gravel docks to the south requiring deeper water access and a recreational dock to the north) which will have to be taken into consideration



Property 28

- Courtright Waterfront Park

Property Description:

- The property extends from just north of Thompson Street to just north of Centre Street in the community of Courtright
- Lot 26 - 27, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- This reach is approximately 210 metres in length
- The northern third of the property is protected with concrete rubble
- The central third of the site has rip rap and armourstone providing some protection to the shoreline
- The southern third has small rip rap and cobble as protection
- The park has been filled out into the channel by approximately 12 metres relative to the adjacent shoreline
- A large dock supported on piles extends out from and north along the shoreline in the near the centre of the site



Shore Protection Status:

- The rubble in the north end although providing some protection also contains a sizeable amount of rebar and other steel and has several voids
- Other protection is quite marginal, especially at higher water levels

Potential Enhancement Activities:

- Increased water levels will increased the issues present at this site
- Safety concerns are quite serious at the northern end
- This is a sizeable site and would provide significant opportunities for enhancement however, without higher water levels the incentive will not be there in the short term



Property 29

- Willow Park

Property Description:

- The park is located immediately south of the Lambton Generating Station
- Lot 13 - 14, Front Concession, Township of St. Clair (former Moore)
- The property is owned by the Township of St. Clair

Shore Protection:

- A small area at the north end of the property has a sand beach
- Immediately to the south is a boat launch constructed from steel sheet pile wall and a concrete block floor (approximately 50 metres in length)
- The remainder of the site to the south is protected by a rip rap / cobble revetment at a very gentle slope
- In the middle of the property a fishing pier constructed of timber and piles
- The total reach of the property is just over 370 metres



Shore Protection Status:

- The boat launch is in poor condition
- The steel sheet pile walls are rusted through and the floor of the launch is rutted
- The timbers of the fishing platform are also a concern as they are undersized for the span
- The beach and the rip rap / cobble revetment of are in fair to good condition and will only be of concern in the short term at higher lake levels

Potential Enhancement Activities:

- Limited enhancement opportunities at this location with the immediate requirements at this site being driven by human activities



Property 30

- Oil Springs Line Road Allowance

Property Description:

- The shoreline end of the road allowance for Oil Springs Line
- The property is owned by the Township of St. Clair

Shore Protection:

- The bank is quite significant at this location in excess of 5 metres in height
- No designed protection is in place at this location
- Large slabs of concrete have been deposited at this location and although they have added a significant amount of weight to the slope it does not appear to be having a significant impact
- Some erosion on the upper portion of the slope is evident, possibly as a result of overland flow
- Woody vegetation is also prevalent on the slope



Shore Protection Status:

- Despite the lack of protection, erosion appears to be in check

Potential Enhancement Activities:

- Again although this is a potential site for enhancement without the need for protection it will certainly be a lower priority
- The steep bank at this location will also limit the options available



Property 31

- Bowen's Creek Property North

Property Description:

- The property is part of a habitat improvement project
- Part Lots 10 & 11 (former Moore), Front Concession, Township of St. Clair
- The property includes a walkway at the upper portion of the slope
- The property is owned by Lambton County



Shore Protection:

- Shore protection varies greatly along this reach
- The northern portion of the site is protected with a row of gabion baskets
- A cobble beach fronts the gabions at current water levels
- Proceeding south on the site, the gabions end and no protection replaces it
- A very narrow sand beach with sporadic rip rap and wood debris provide the remainder of the site with protection
- Several outfalls are present throughout the site some of which have erosion protection measures



Shore Protection Status:

- The gabion baskets at the north end of the site are breaking down and are rolling toward the river
- Cobble beach is providing some added protection at lower water levels
- Further south erosion is more obvious as a narrow sand beach fronts the toe of an eroding slope
- The degree of toe erosion varies from section to section
- In addition some erosion has been caused by overland drainage and still further erosion is evident at some of the multiple outlets within the reach



Potential Enhancement Activities:

- The site is a good candidate for habitat enhancement works
- Alternatives that permit the existing uses (footpath) and provide protection to the road at the top of the slope could be proposed but will have to be supported by the landowner



Property 32

- Seagar Park

Property Description:

- The property is located between Oil Springs Line and Bickford Line
- Part Lot 6 (former Moore), Front Concession, St. Clair Township
- The property is owned by the Township of St. Clair

Shore Protection:

- The property is protected by a steel sheet pile wall with two pocket beach cells
- The wall has a steel cap and in some areas has a boardwalk on the inland side
- At the south end, cobble has been placed in front of the steel sheet pile wall for additional protection



Shore Protection Status:

- In the beach cell areas there are signs of minor misalignment, however on the whole the wall is in good condition
- Minor backfill losses behind the wall and boardwalk in some locations
- Some of the boardwalk timbers are broken



Potential Enhancement Activities:

- In the short term the opportunities at this site are limited as the existing wall should provide adequate protection for 10 – 20 years
- Two issues limit habitat enhancement opportunities at this site – the property is narrow and this is one of a limited number of beach sites on the St. Clair River

Property 33

- Bowen's Creek Property South

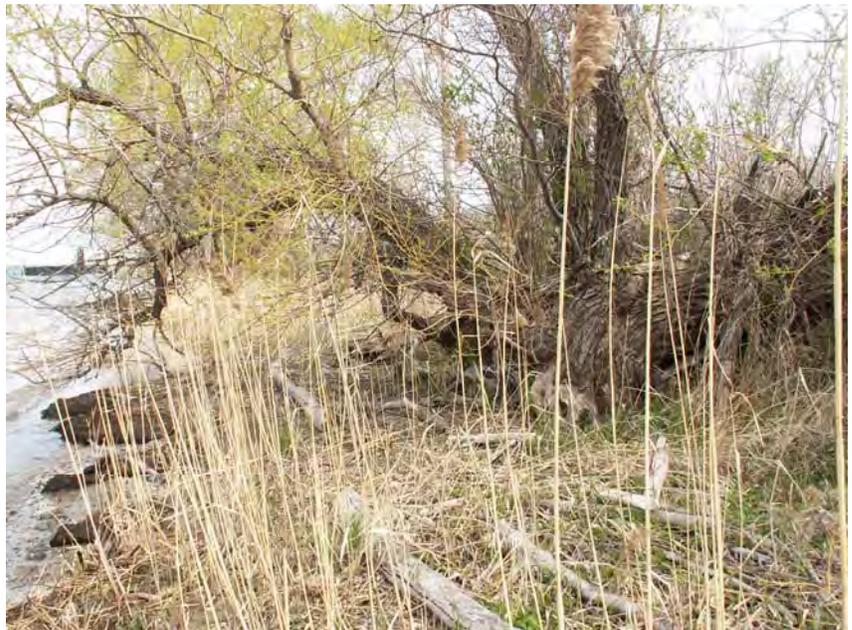
Property Description:

- This property is part of a habitat improvement project
- Part Lots 4, 5 & 6 (former Moore), Front Concession, Township of St. Clair
- This property includes a walkway in the mid and upper portions of the slope
- The property is owned by Lambton County



Shore Protection:

- Two types of shore protection are present at this site
- The area around the outlet of Bowen's Creek is protected by large concrete blocks which are also incorporated into the construction of a bridge over the creek for the walkway
- A very narrow sand beach with sporadic rip rap and wood debris provide the remainder of the site with protection
- The bank is heavily vegetated but does show some signs of previous slumps
- Several outfalls are present throughout the site some of which have erosion protection measures



Shore Protection Status:

- The concrete blocks are in good condition and are supporting the bank, walkway and bridge
- In other areas north and south of the outlet, erosion is more obvious as a narrow sand beach fronts the toe of an eroding slope
- Other areas are protected to some degree by dense wetland vegetation
- The degree of toe erosion varies from section to section
- In addition some erosion has been caused by overland drainage and still further erosion is evident at some of the multiple outlets within the reach



Potential Enhancement Activities:

- The site is a good candidate for habitat enhancement works
- Alternatives that permit the existing uses (footpath) and provide protection to the road at the top of the slope could be proposed but will have to be supported by the landowner



St. Clair River Shoreline Restoration Assessment
Map 3: Southern St. Clair Township (Sombra)



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Property 34

- Stanley Line Road Allowance

Property Description:

- The shoreline end of the road allowance of Stanley Line
- Lot 1, Concession 14 - 15, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- There is no designed erosion protection at this site
- The banks are heavily vegetated with grass and woody vegetation
- There is a large concrete outfall which is the outlet of a drainage ditch

Shore Protection Status:

- The banks appear to be in stable condition
- Based on the angle of growth of some of the larger woody vegetation it appears that there has been some form of slippage in previous years
- The outfall is functional and in good condition

Potential Enhancement Activities:

- No anticipated improvement is protection at this time
- Some of the large vegetation should be removed to reduce weight on the bank
- There may be an opportunity to improve the channel from the St. Clair River up to the concrete culvert which should be investigated further



Property 35

- Cathcart Park

Property Description:

- Cathcart Park is located on the south shore of the outlet of Clay Creek
- It is an active recreation park providing seasonal and transient camping opportunities and a boat launch
- Part Lots A & B, Concession 14, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair



Shore Protection:

- Steel sheet pile wall line all but 75 metres of the over 1300 metres of shore protection on site
- Along Clay Creek moving toward the mouth from the St. Clair Parkway, a rip rap revetment protects the banks
- Continuing out to the mouth of Clay Creek along the St. Clair River and along both sides of the internal channel (around an island) are steel sheet pile walls which extend 1 – 2 metres above water level
- The boat launch walls are constructed of



steel sheet pile wall with a floor of concrete

Shore Protection Status:

- The rip rap in the revetment is undersized but no significant erosion is apparent
- Repairs to the walls of the internal channel have occurred recently
- Walls along the St. Clair River are misaligned both vertically and horizontally
- Some denting of the wall is evident, likely from ice
- Use of launch ramp hampered by reflecting waves from surrounding steel sheet pile walls
- Walls also reflect waves notably into internal channel docking area
- Walls along the creek and on the internal channel appear to be in satisfactory condition

Potential Enhancement Activities:

- The exposed steel sheet pile wall have a very limited lifespan (under 5 years) and may afford an opportunity to change the type of protection
- An armourstone revetment with rip rap ramp at the toe would provide improved significantly improved
- Limited opportunities will exist to vary direction of the shore protection but these opportunities should be researched
- A reduction in the amount of steel sheet pile walls will improve boat launch and dock safety as well



Property 36

- Brandon Cundick Park

Property Description:

- Brandon Cundick Park is located at the end of West Wilkesport Line
- It is an passive recreation park with a boat launch
- Part Lots B, Concession 12 and 13, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair



Shore Protection:

- Light gauge steel sheet pile walls protected most of the shoreline
- 3 pocketed beaches are incorporated into the structures
- The north end of the site is partially protected with rubble and partially unprotected
- The boat launch wall are constructed on steel sheet pile with a concrete floor

Shore Protection Status:

- Steel sheet pile walls in the north end of the site and south of the ramp exhibit signs of moderate instability (horizontal and vertical misalignment)
- North wall of boat launch appears stable
- Unprotected extreme north end of the site is experiencing erosion
- A minor indent from ice observed at several locations



Potential Enhancement Activities:

- Extreme north end of site is a candidate for enhancement works however, it quite short in length
- Walls in north end and south of ramp have a 5 – 10 year lifespan and would be an option in that time frame

Property 37

- A portion of the road shoulder between West Wilkesport Line and Bentpath Line

Property Description:

- The property is the road shoulder which extends to the water's edge in this narrowed area
- It begins just north of the Bentpath Line and extends north for almost a kilometer
- Lot B, Concession 12, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Protection varies greatly along the length of this site from discarded concrete, broken sidewalk, cinder blocks, crushed quarry stone and no protection in several areas
- None of the existing appears to have been designed
- Some areas have a fifteen foot buffer of green space between the top of bank and the road while others have no green space and just a guard rail
- Therefore it is imperative that erosion protection is in place to prevent any loss of roadway or road bed
- Along this section of riverfront there are several private docks



Shore Protection Status:

- Erosion is evident in several areas ranging from minor toe erosion to significant voids around large blocks of misplaced concrete

Potential Enhancement Activities:

- Good candidate for enhancement
- Two issues will have to be taken into consideration
- Protection of the road and road bed will be a priority for any improvement works
- With little land available in some areas the project will have few contours and will likely require some infilling



Property 38

- Sombra Park

Property Description:

- Sombra Park is a passive recreation area in the north end of the community of Sombra in the Township of St. Clair
- Lot B, Concession 11, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- The property is protected by a steel sheet pile wall with a steel cap
- The wall is approximately 1.2 metres in height above water levels
- There is one outlet through the wall

Shore Protection Status:

- The wall is in good condition
- The wall is vertical and shows few signs of pitting
- Outlet is in fair condition with some deterioration

Potential Enhancement Activities:

- Due to the estimated lifespan of the existing protection of 15 to 20 years, this is not seen as a good candidate site
- However, there may be an opportunity to research this site further to determine if there is an opportunity to place rip rap at the toe of the wall to provide some additional habitat



Property 39

- George Street and Smith Street Road Allowances

Property Description:

- The end of the road allowances for both George Street and Smith Street in the community of Sombra in the Township of St. Clair
- Lot B, Concession 11, Township of St. Clair (former Sombra)
- The properties are owned by the Township of St. Clair

Shore Protection:

- The property is protected by a steel sheet pile wall with a steel cap
- Several outfalls are located at these properties

Shore Protection Status:

- The retaining wall is experiencing some movement
- This is evident in the vertical variability in the wall
- At several locations the wall is bowed and at these locations there is a significant loss of material from behind the wall
- The loss of material has exposed tie-backs at some locations
- Another concern at this location is a break in the weld along the steel cap
- The outfalls are in good condition

Potential Enhancement Activities:

- The anticipated lifespan of these walls, 10 years, and the size of each site makes these properties lesser candidates



Property 40

- Reagan Park

Property Description:

- The property is a passive recreation park and is located just north of the W. Darcy McKeough Floodway
- Part Lot C, Concession 10, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Scattered concrete rubble and rock line the upper bank in most area
- Very gentle slope and low backshore
- The property is approximately 225 metres in length

Shore Protection Status:

- Minor erosion is occurring at this site
- Existing rubble performing no function
- Site is likely subject to wave topping

Potential Enhancement Activities:

- This is an excellent candidate site
- A rip rap revetment would provide the necessary protection and any woody vegetation that can be maintained will provide shade
- The only issue is that with the shallow slope there may be little reason for the Township to support the installation of shore protection



Property 41

- McKeough Floodway

Property Description:

- This property is a passive recreation area incorporated into a flood control project
- Part Lot C, Concession 10, Township of St. Clair (former Sombra)
- The property is owned by the St. Clair Region Conservation Authority

Shore Protection:

- The shoreline protected by a large rip rap / small armourstone revetment along both the river shoreline and the floodway outlet shoreline
- The total shoreline length of the property is almost 300 metres



Shore Protection

Status:

- Existing shore protection is in good conditions
- Protection appears to be over designed for the site which may be the result of the capping of core material under the park

Potential Enhancement Activities:

- The condition of the existing protection and the requirement to maintain the existing cap on the site will not permit any significant changes to the protection

Property 42

- Gravel Docks and Fawn Island Parking

Property Description:

- Immediately south of the McKeough Floodway is a parking lot for residents of Fawn Island and further south is a rented gravel dock
- Lot C - D, Concession 10, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair



Shore Protection:

- The northern portion of this location there is erosion control in the form of discarded concrete slab and broken cinder block rubble
- Running south, the erosion control makes a transition into a steel sheet pile wall with a steel cap, within this section there is a boat launch
- Further south the structure makes the transition back into dumped concrete

Shore Protection Status:

- In the areas of discarded concrete and blocks erosion is ongoing and several large voids have developed
- There is some large stock woody vegetation which may pose a threat to the erosion control protection and the stability of the bank
- The area of the steel sheet pile wall appears to be in good condition having only warped slightly and with minimal erosion present



Potential Enhancement Activities:

- Due to the ongoing erosion issues this site is a good candidate for erosion protection works
- A rip rap revetment would provide adequate protection to this location
- Few opportunities for variation of the shoreline due to existing uses

Property 43

- Holt Line Road Allowance

Property Description:

- The property is the end of the road allowance of Holt Line
- Lot D, Concession 10 - 11, Township of St. Clair (former Sombra)
- This property is owned by the Township of St. Clair
- There is a pump house for Chinook Chemicals located on this site

Shore Protection:

- Erosion control at this site is discarded concrete slab and gravel
- There is a sizeable outlet at this location and the erosion protection proceeds upstream on the north and south bank

Shore Protection Status:

- The erosion protection appears to be in good condition with no evidence of ongoing erosion being visible
- There is some large woody vegetation which is adding weight to the bank at several locations

Potential Enhancement Activities:

- Large woody vegetation although providing some shade is of concern due to the potential for significant failure
- Although not created of preferred material, the existing material is performing its required duty and therefore this site is not seen as a lesser candidate



Property 44

- Marshy Creek Park

Property Description:

- This is a passive recreation park located just north of the outlet of Marshy Creek
- Lot D, Concession 9, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Shore protection at this location is steel sheet pile wall in three headlands enclosing 2 small silty sand beaches
- The walls extend 1.2 metres above water level

Shore Protection Status:

- The walls are leaning out in several locations showing moderate misalignment
- The beaches have a very high silt content and are covered in vegetation and debris making them unusable but stable

Potential Enhancement Activities:

- The protection has been estimated to have a lifespan of 5 to 10 years
- The unusable beaches may be a good candidate for enhancement works as their desired use does not appear to be a feasible
- Unfortunately these are small areas and may not survive a cost benefit analysis



Property 45

- Seaway Road Road Allowance

Property Description:

- The property is the north end of the road allowance for Seaway Road in the Leeland Gardens subdivision just north of the community of Port Lambton
- Lot D, Concession 9, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Shore protection in place is a steel sheet pile wall with a steel cap
- Rip rap has been place in front of the wall

Shore Protection Status:

- The wall is in very good condition with minimal rusting and only the slightest misalignment

Potential Enhancement Activities:

- Due to the size and condition of the site, enhancement activities are not expected to be supported



Property 46

- French Line Road Allowance

Property Description:

- The property is the end of the road allowance for the French Line
- Lot D - E, Concession 8 - 9, Township of St. Clair (former Sombra)
- This property is owned by the Township of St. Clair

Shore Protection:

- A large drain outlets to the St. Clair River at the road allowance
- North of a drain outlet a small section by steel sheet pile wall
- The remainder of the bank is being protected by broken concrete
- Refuse is also present at the site in the form of discarded tires
- The bank is virtually covered by woody vegetation

Shore Protection Status:

- The extent of the erosion, if any, is difficult to quantify due to the large amount of vegetation present on the bank
- Overall, the site appears to be in good condition with minimal erosion taking place

Potential Enhancement Activities:

- Although a portion of the protection is an unnatural product (broken concrete) this site has naturalized itself and therefore this is not seen as a candidate site
- However, the refuse being removed from the site would be a significant improvement



Property 47

- Ward Line Road Allowance

Property Description:

- The shoreline end of the road allowance of Ward Line
- Lot E, Concession 7 - 8, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Concrete rubble, asphalt, rock rip rap and cinder blocks have been dumped as placed on the site to control erosion
- A corrugated steel culverts outlets through this protection

Shore Protection Status:

- Although some of the cinder blocks have been placed, the greatest portion of the rubble protection was not
- As a result there are quite a few large voids within the existing erosion control structure
- These large voids not only increase the threat of erosion and decrease the marginal effectiveness of the existing protection it also can pose safety issues due to the instability
- The outfall is in good condition

Potential Enhancement Activities:

- With very little value in the existing protection, this site is a good candidate for enhancement especially with an opportunity to remove the unwanted materials from the shore and near shore
- However, as a road allowance the reach is only approximately 20 metres in length



Property 48

- Gibson Lane Road Allowance

Property Description:

- The shoreline end of the road allowance for Gibson Lane in the community of Port Lambton
- Lot F, Concession 7, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Virtually no protection exists at this site, some broken concrete and blocks are present
- As a residential road allowance this reach is short
- The bank at this location is approximately 1.5 metres in height

Shore Protection Status:

- Erosion is occurring along the bank
- Grass clippings and discarded brush litter the slope and make it difficult to determine the extent of the erosion
- In addition some erosion occurring at the top of the bank, apparently due to run off from the road surface

Potential Enhancement Activities:

- Although protection improvements and habitat enhancement at this site would be significant improvements, due to its size this site would not rank well in comparison to other
- Education to the local residents with regards to disposal of clippings and brush would provide an immediate improvement



Property 49

- Gallerno Lane Road Allowance

Property Description:

- The shore end of the road allowance of Gallerno Lane in Port Lambton
- Lot F, Concession 7, Township of St. Clair (former Sombra)
- The site is the property of the Township of St. Clair

Shore Protection:

- There is large rip rap / small armourstone placed along the toe of the slope
- There is also some dumped fill and broken concrete blocks placed along the length of the slope
- Similar to the previous site, this site has a fairly short bank, approximately 1.5 metres in height
- Most of the bank is grassed
- There is one outfall within the erosion control structure

Shore Protection Status:

- There does not appear to be any significant erosion taking place with the exception of a few areas where fill has been placed
- There is some minimal surface erosion occurring due to overland flow
- The outfall is corroded and completely blocked with sediment which may indicate that it no longer support its intended function

Potential Enhancement Activities:

- Due to the stability of this site, this does not appear to be a good candidate site
- Improved protection will provide little habitat enhancement



Property 50

- Sewer Outfall north of Second Street

Property Description:

- The property is the outfall for storm sewers just north of Second Street in the community of Port Lambton
- Lot F, Concession 7, Township of St. Clair (former Sombra)
- This site is the property of the Township of St. Clair

Shore Protection:

- Placed and dumped broken concrete and rip rap line the lower portions of the bank and extend to top of bank in some areas
- The bank is approximately 1.25 metres in height
- Two outfalls are present within this reach

Shore Protection Status:

- The existing erosion protection appears to be slipping as a result of toe erosion
- This is evident by the large crescent shaped depression that appears to be forming just above the erosion protection
- The two outfalls are in good condition

Potential Enhancement Activities:

- Once again, due to the length of the site this is not a strong candidate for habitat enhancement



Property 51

- First Street Road Allowance

Property Description:

- The end of the road allowance of First Street in the community of Port Lambton
- Lot F, Concession 7, Township of St. Clair
- This site is the property of the Township of St. Clair

Shore Protection:

- The bank at this location is very shallow, approximately 2' in height
- The current erosion protection on site is composed of large field stone, crushed concrete sidewalk, dumped concrete and cinder blocks
- There is an outlet at the far south end of this site location

Shore Protection Status:

- There are some large voids within the structure but based on the height and gentle gradient of the slope, bank erosion is not of concern
- There is no surface loss observable at the top of the erosion protection and the outfall is in good condition

Potential Enhancement Activities:

- A sizeable beach fronts the protection, as a results habitat enhancements opportunities at this location are limited



Property 52

- Port Lambton Park

Property Description:

- This property is a passive recreation park in the community of Port Lambton
- The property is actual in three separate parcels with private or other public lands interspersed
- Lot F, Concession 6 - 7, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- Waterfront protection in the two northern portions of the property takes the form of a steel sheet pile wall with a steel cap
- At the southern end of this area a steel railing has been attached to the steel cap and a boardwalk placed adjacent
- Continuing south as you approach a Public Works Canada / Transport Canada Rescue Station the protection breaks down to roughly placed concrete rubble and rock
- South of the Public Works Canada / Transport Canada Rescue Station is a partially protected water lot where concrete rubble and discarded sidewalks have been placed / dumped to provide shore protection
- Total length of this site is approximately 275 metres



Shore Protection Status:

- The light steel sheet pile wall in the northern area shows slight misalignment and minor losses of material
- The rubble protection immediately north and to the south of the Public Works Canada / Transport Canada Rescue Station is providing some protection however, each area is experiencing some erosion and these losses become exaggerated at higher water levels

Potential Enhancement Activities:

- This site and the adjacent Public Works Canada / Transport Canada Rescue Station site provide opportunities for significant improvements in the quality of protection and could provide significant habitat improvement opportunities
- The area south of the Rescue station is also adjacent the end of a road allowance providing an additional reach for an enhancement project



Property 53

- Public Works Canada / Transport Canada Rescue Station

Property Description:

- The property is used as a marine rescue station by Transport Canada
- Lot F, Concession 7, Township of St. Clair (former Sombra)
- The property is owned by Public Works Canada

Shore Protection:

- Protection along the south and west sides of the property is a steel sheet pile wall
- The east shore of the interior basin is protected with concrete rubble, discarded sidewalk and rip rap

Shore Protection Status:

- The steel sheet pile wall is in fair condition with some misalignment but no apparent loss material
- The interior basin protection is in fair condition with what appears to be minor erosion occurring along at least the northern portion of the protection

Potential Enhancement Activities:

- This site and the adjacent Port Lambton Park site provide opportunities for significant improvements in the quality of protection and could provide significant habitat improvement opportunities
- The area south of the Rescue station is also adjacent the end of a road allowance providing an additional reach for an enhancement project



Property 54

- Moore Street Road Allowance and North

Property Description:

- The end of the road allowance for Moore Street in the community of Port Lambton
- This parcel also extends north to the south limit of the Port Lambton Park property
- Lot F, Concession 7, Township of St. Clair (former Sombra)
- This property is owned by the Township of St. Clair

Shore Protection:

- The end of the road allowance of Moore Street is protected by a steel sheet pile wall
- The area extending north is protected by dumped and placed concrete rubble and sidewalk slabs
- In some areas, an old wooden seawall fronts the broken concrete protection
- There are two drain outlet in the rubble protected area



Shore Protection Status:

- The steel sheet pile wall is in fair condition
- There is both vertical and horizontal misalignment as well as a minor loss of material
- There are numerous large voids in the rubble protection where material continues to be lost due to overland flow
- Due to the proximity to the road these pose a safety hazard
- The outfalls are corroded

Potential Enhancement Activities:

- The misaligned wall, ongoing erosion and corroded outfall make this site a reasonable candidate on its own
- However, when combined with the adjacent areas to the north, opportunities for significant improvements in the quality of protection and could provide significant habitat improvement opportunities

Property 55

- Brander Park

Property Description:

- This property is a passive recreation park just south of the community of Port Lambton
- Lot E, Concession 6, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair



Shore Protection:

- A light gauge steel sheet pile wall with steel cap protects the shoreline and extends to 1.2 metres above the water level
- Water is 0.5 metres deep at the steel sheet pile wall
- Several mature trees are located near the waterline
- Three beach cells are enclosed with steel sheet pile walls

Shore Protection Status:

- Minor to moderate vertical and horizontal misalignment is noted along the protection
- The steel cap has been damaged at several locations
- The sand beaches appear to be stable



Potential Enhancement Activities:

- Although the estimated lifespan of the structure is 5 – 10 years, this site may not be a strong candidate due to its other functions

Property 56

- River Road Road Allowance

Property Description:

- This property is immediate south of Brander Park and is the shoreline end of River Road just south of Port Lambton
- Lot E, Concession 6, Township of St. Clair (former Sombra)
- The property is owned by the Township of St. Clair

Shore Protection:

- The gentle sloping bank , 1 metre in height, is protected by dumped concrete and rubble along with poured cement and bricks
- One outfall is present within this reach

Shore Protection Status:

- The only erosion that is observable is on the perimeter of the poured cement
- The distance from the toe of the slope to the waters edge is approximately 10 metres, therefore concerns for erosion at this point are minimal
- There is also a heavy growth of vegetation amongst the protection indicating stability

Potential Enhancement Activities:

- Although the lifespan of the protection is very short with any increase in water level, this is not a strong candidate site for enhancement works as it is a narrow site and stable at this point in time



Property 57

- Riverside Drive Road Allowance and Bridge Abutment

Property Description:

- This property is the road allowance at the Riverside Drive bridge
- Lot E, Concession 5, Township of St. Clair (former Sombra)
- This property is owned by the Township of St. Clair

Shore Protection:

- This short reach is protected by a steel sheet pile wall with a steel cap
- Several outfalls outlet through the wall



Shore Protection Status:

- The wall and outfalls appear to be in good condition
- The only area of concern is the northeast corner of the bridge abutment
- At this location there is significant loss of material behind the wall
- The loss of material is occurring where the tie backs are located

Potential Enhancement Activities:

- Despite a concern at one specific point, as the remainder of the protection remains in very good condition, this is not a good candidate site for habitat enhancement works



Property 58

- Old River Road Road Allowance / Channel Cut 1

Property Description:

- This property is the road allowance of Old River Road at a channel cut in from the Chenal Ecarte
- Lot D, Concession 5, Township of St. Clair (former Sombra)
- The western portion of the property is owned by the Township of St. Clair
- The eastern portion of the property is owned by the Management Board Secretariat

Shore Protection:

- Along this span, erosion control in the form of a rip rap revetment
- This bank has an outlet structure

Shore Protection Status:

- Erosion does not appear to be occurring at this site
- The rip rap erosion control structure is in good condition as are the flanking steel sheet pile walls
- The outlet is also in good condition

Potential Enhancement Activities:

- The existing protection is in good condition and afford reasonable habitat
- Therefore this is not considered to be a good candidate site



Property 59

- Old River Road Road Allowance / Channel Cut 2

Property Description:

- This property is the road allowance of Old River Road at a channel cut in from the Chenal Ecarte
- Lot D, Concession 5, Township of St. Clair (former Sombra)
- This property is owned by the Management Board Secretariat

Shore Protection:

- Along this span, erosion control in the form of a rip rap revetment
- This bank has an outlet structure

Shore Protection Status:

- Erosion is not evident at this site
- The rip rap erosion control structure is in good condition as are the flanking steel sheet pile walls
- The outlet is also in good condition

Potential Enhancement Activities:

- The existing protection is in good condition and afford reasonable habitat
Therefore this is not considered to be a good candidate site



Property 60

- McDonald Park

Property Description:

- This property is a passive recreation park located on the east bank of the Chenal Ecarte
- Lot B, Concession III, Municipality of Chatham-Kent (former Chatham Gore)
- This property is owned by the Municipality of Chatham-Kent

Shore Protection:

- The remnants of a wooden pile wall in the central portion of the park
- Areas to the north and south have very limited protection in the form of broken rubble and rip rap
- The bank is relatively low, peaking approximately a metre above current water level



Shore Protection Status:

- The wooden pile wall is severely deteriorated
- The rubble is providing little support to the shoreline

Potential Enhancement Activities:

- With virtually no protection in place, this site is an excellent candidate for enhancement activities



Property 61

- Environment Canada Bear Creek Unit

Property Description:

- This site is a habitat preservation site
- Lot 19, Concession 16, Municipality of Chatham-Kent (former Dover)
- The property is owned by Environment Canada

Shore Protection:

- Protection is in the form of a rip rap revetment

Shore Protection Status:

- The shore protection is in good to fair condition
- Minor erosion is evident is having limited impact at this point

Potential Enhancement Activities:

- Based on the current status of the protection and the requirement to not impact other habitat improvement project we would have to carefully review this site for opportunities to determine the viability of an enhancement project on this site

Property 62

- Mitchell's Bay Marina

Property Description:

- This property is an active recreation area with interior areas housing both a marina and a campground
- Lot 11, Concession 13, Municipality of Chatham-Kent (former Dover)
- This property is owned by the Municipality of Chatham-Kent and is leased to a private operator



Shore Protection:

- The protection along the marina perimeter varies significantly
- Protection on the north as you exit the marina is in the form of a rip rap revetment
- At the farthest extension of land the protection changes to a sheet steel wall with a steel cap
- The sheet steel wall wraps around and extends back to the shore
- A lighter gauge steel sheet pile wall with a steel cap and rip rap toe extends along the shoreline



Shore Protection Status:

- The rip rap revetment was constructed from significantly undersized material
- In some areas the rip rap has been removed completely leaving the install filter cloth exposed
- The sheet steel wall is properly aligned and in good condition
- However voids are obvious at most of the support piles
- It appears that the soil loss may be attributed to the type of wall constructed and the quality of the assembly
- The lighter gauge wall is misaligned vertically at several locations and the steel cap welds have been broken and the cap displaced



Potential Enhancement Activities:

- This is would be an excellent candidate for enhancement improvements
- The light gauge wall, despite its rip rap toe, is providing little habitat and has a lifespan of possibly 5 years
- Replacement of the existing protection would provide a virtually blank slate, however, current and forecasted water levels must be taken into account



Property 63

- Dover Beach Park

Property Description:

- This is an active recreation park which includes 2 boat launches
- Lot 10, Concession 13, Municipality of Chatham-Kent (former Dover)
- The property is owned by the Municipality of Chatham-Kent



Shore Protection:

- Protection varies across the shoreline of the property
- Adjacent to Mitchell's Bay Wharf, the protection is large rip rap
- As you proceed north, the rip rap protection is broken up by steel sheet pile walls and concrete floors of 2 boat launches
- Continuing north to the point of the property, armourstone provides protection to the shore
- As the shoreline bends back around to the interior, the protection converts to a steel sheet pile wall



Shore Protection Status:

- The near shore is very shallow in front of the rip rap and the bank being protected by the rip rap is just over a half metre in height
- The rip rap is quite large but placement is very rough
- The boat launches are in good condition, however low water levels find them use little in spring
- The armourstone protection on the point of the property is fair protection for the site
- The steel sheet pile wall is in good condition with rip rap fronting the greatest portion of the protection

Potential Enhancement Activities:

- This would have to be considered a fair to poor site for enhancement opportunities
- An obviously well used municipal park, any major changes may not be taken well
- The existing protection is maintaining the site, mostly because of low water levels but meeting needs



Property 64

- Mitchell's Bay Wharf

Property Description:

- This wharf provides docking for larger vessels to part at Mitchell's Bay
- Lot 10, Concession 13, Municipality of Chatham-Kent (former Dover)
- The property is owned by the Municipality of Chatham-Kent



Shore Protection:

- Steel sheet pile wall surrounds the wharf

Shore Protection Status:

- The wall is in good condition

Potential Enhancement Activities:

- Due to the use of the site, there are few habitat enhancement that would be permitted at this site



Section 2

Within this section, 6 general cross-sectional designs for habitat friendly shore protection are provided.

The intention of creating these designs is to have a variety of designs to review with landowners who may be interested in replacing existing protection or installing new shore protection on their properties.

The designs may not be specifically applicable to a given property but instead would provide a template for the design of works for an individual site.

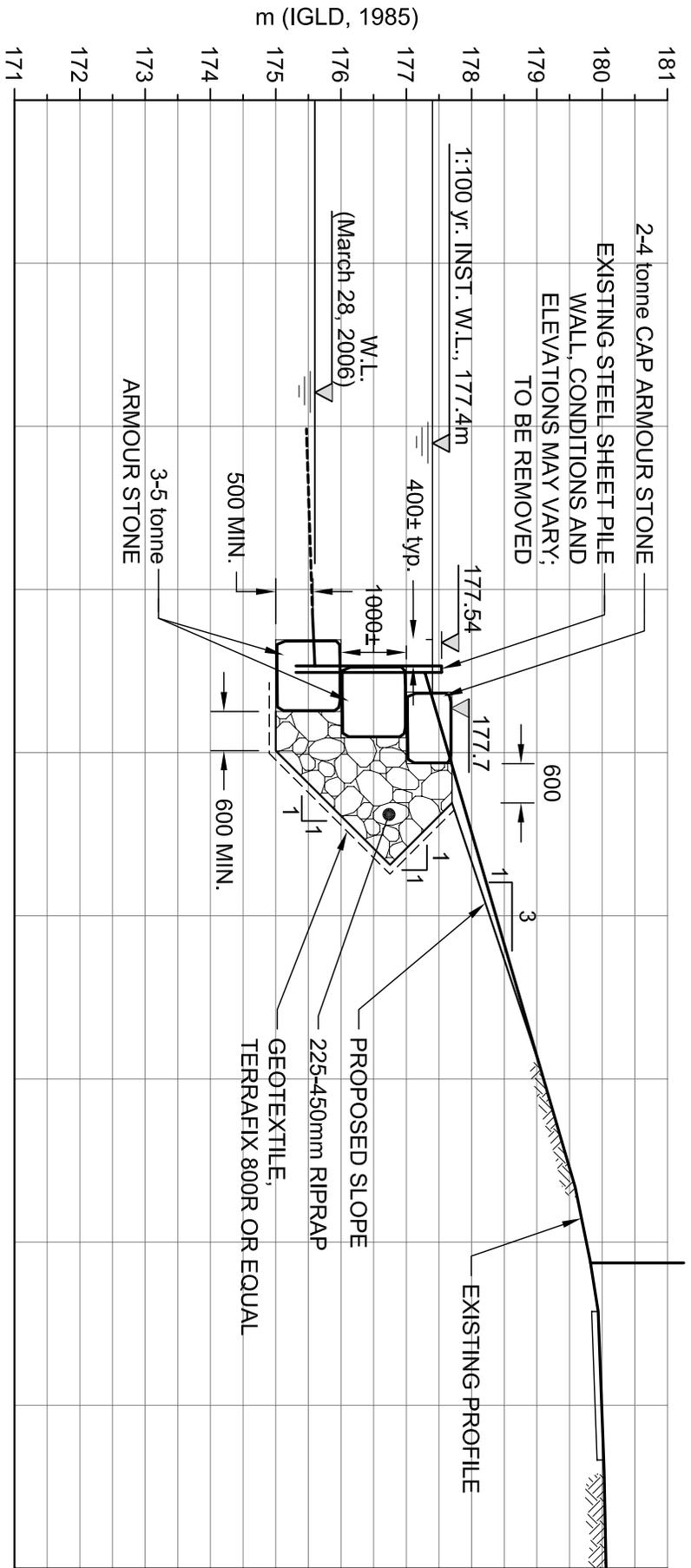
In addition, in order to educate landowners and property managers about the potential options for shore protection, a review of cost estimates must be included as this will directly impact decision making.

The following cost estimates are very general in nature as to provide a true cost estimate you must have a specific site to review. However, it will act as an educational tool for landowners and property managers.

Shore Protection Cost Comparison

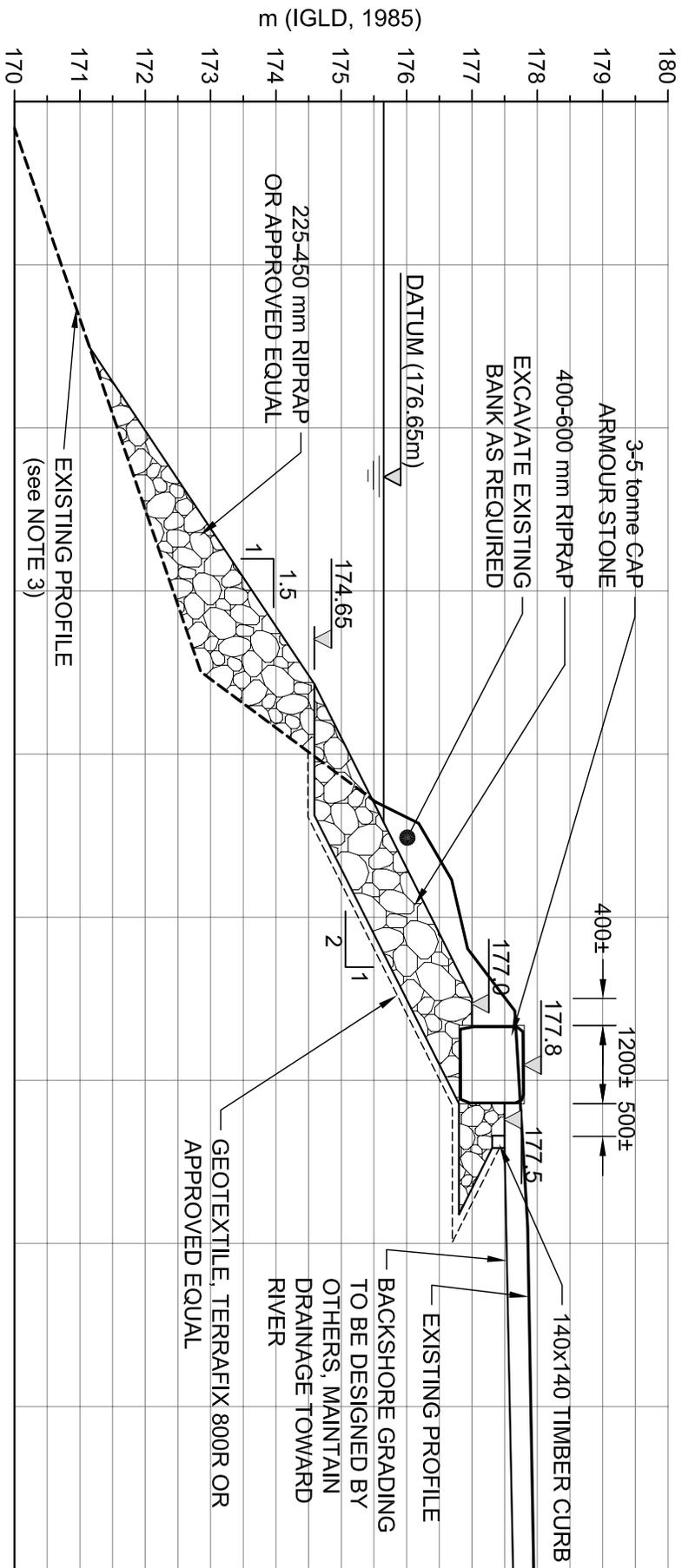
Type of Protection Cost Estimate Per Metre Updated Cost Per Metre

		2006 Cost Estimate	2012 Cost Estimate
Current Standard Steel Sheet Pile Wall		\$4,500	\$4,700
Alternate 1	Armourstone Wall	\$1,900	\$2,000
Alternate 2	Typical Rip Rap Revetment with Armourstone Cap	\$1,400	\$1,700
Alternate 3	Typical Rip Rap Revetment with Armourstone Cap for deep water	\$2,000	\$2,500
Alternate 4	Stepped Armourstone Wall with Habitat or Planting Pod	\$2,400	\$2,900
Alternate 5	Typical Stepped Armourstone Revetment	\$3,100	\$3,500
Alternate 6	Typical Armourstone Revetment	\$3,100	\$3,400

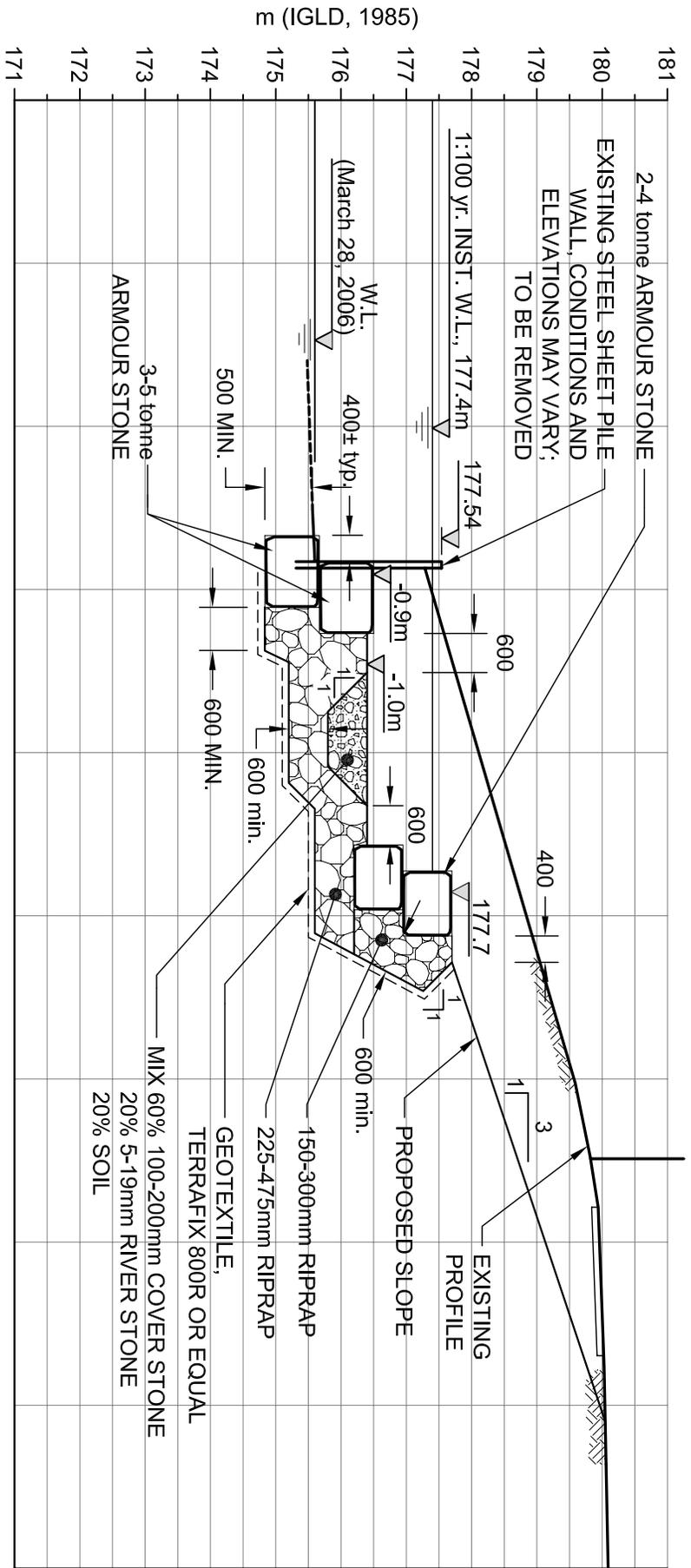


**St. Clair River Restoration
Design of Restorative Works**

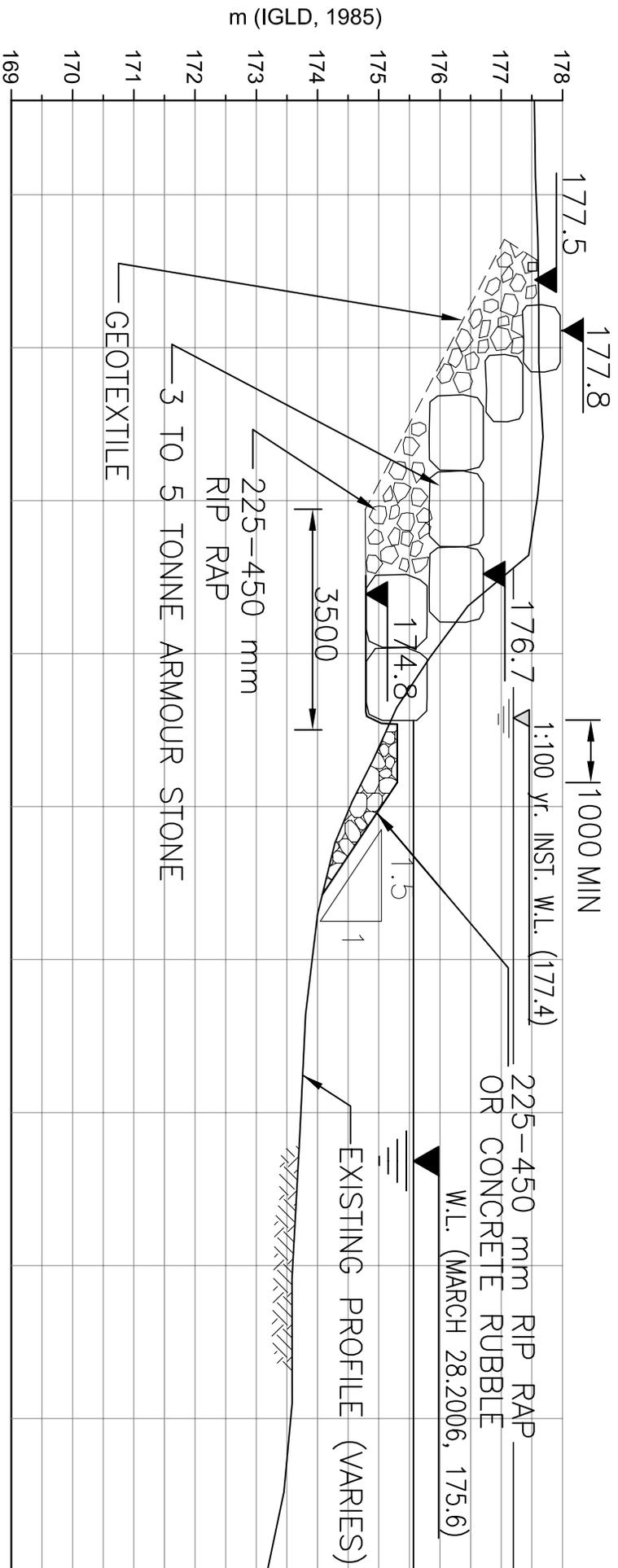
**ALTERNATE 1
ARMOUR STONE WALL**
Scale 1:100



ALTERNATE 3
TYPICAL RIPRAP REVETMENT
WITH ARMOUR STONE CAP FOR DEEP WATER
St. Clair River Restoration
Design of Restorative Works
 Scale 1:100



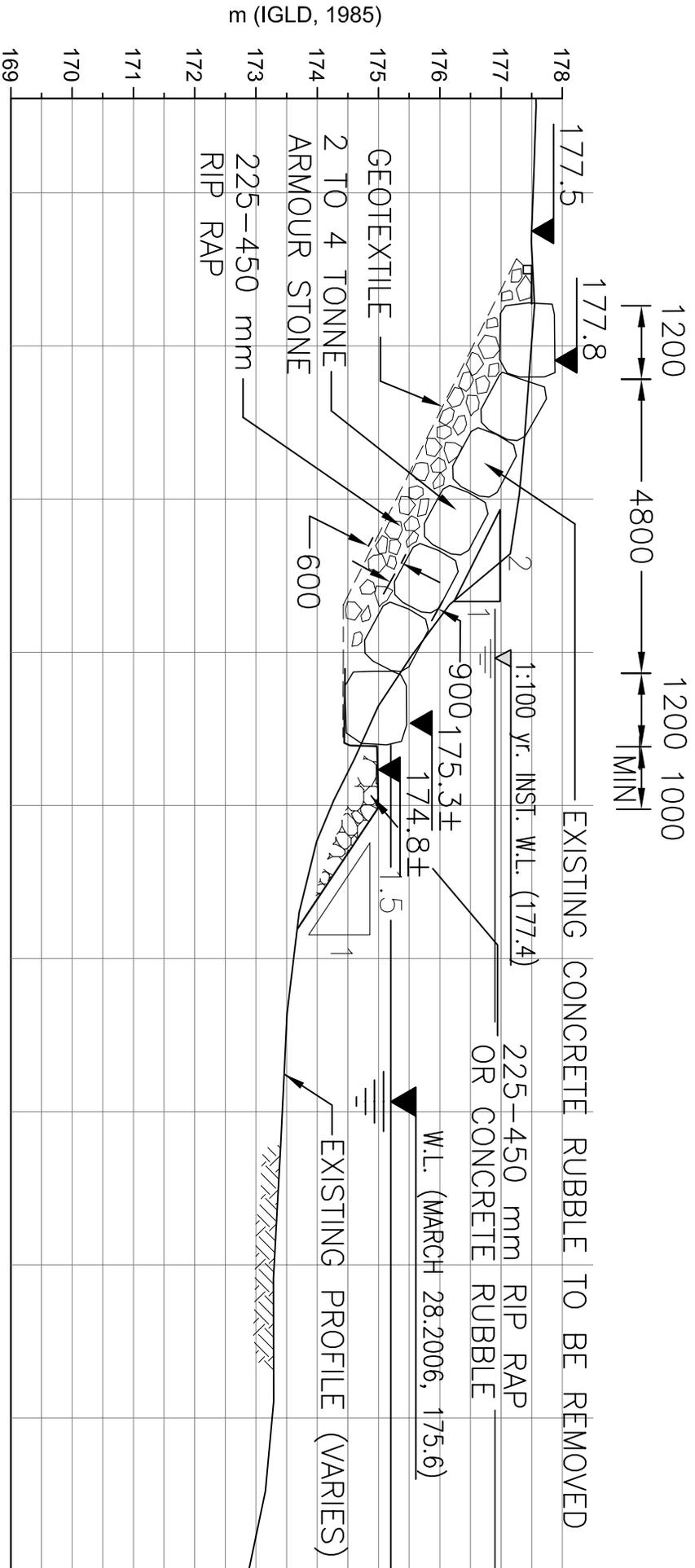
ALTERNATE 4
STEPPED ARMOUR STONE WALL
WITH PLANTING POD
St. Clair River Restoration
Design of Restorative Works
 Scale 1:100



**St. Clair River Restoration
Design of Restorative Works**

**ALTERNATE 5
TYPICAL STEPPED
ARMOUR STONE REVETMENT
Scale 1:100**

St. Clair River Restoration
Design of Restorative Works



ALTERNATE 6
TYPICAL ARMOUR STONE REVETMENT

Scale 1:100

Section 3

The following drawings provide plan form and cross sectional views of 2 of the 64 publicly owned sites within the St. Clair River AOC.

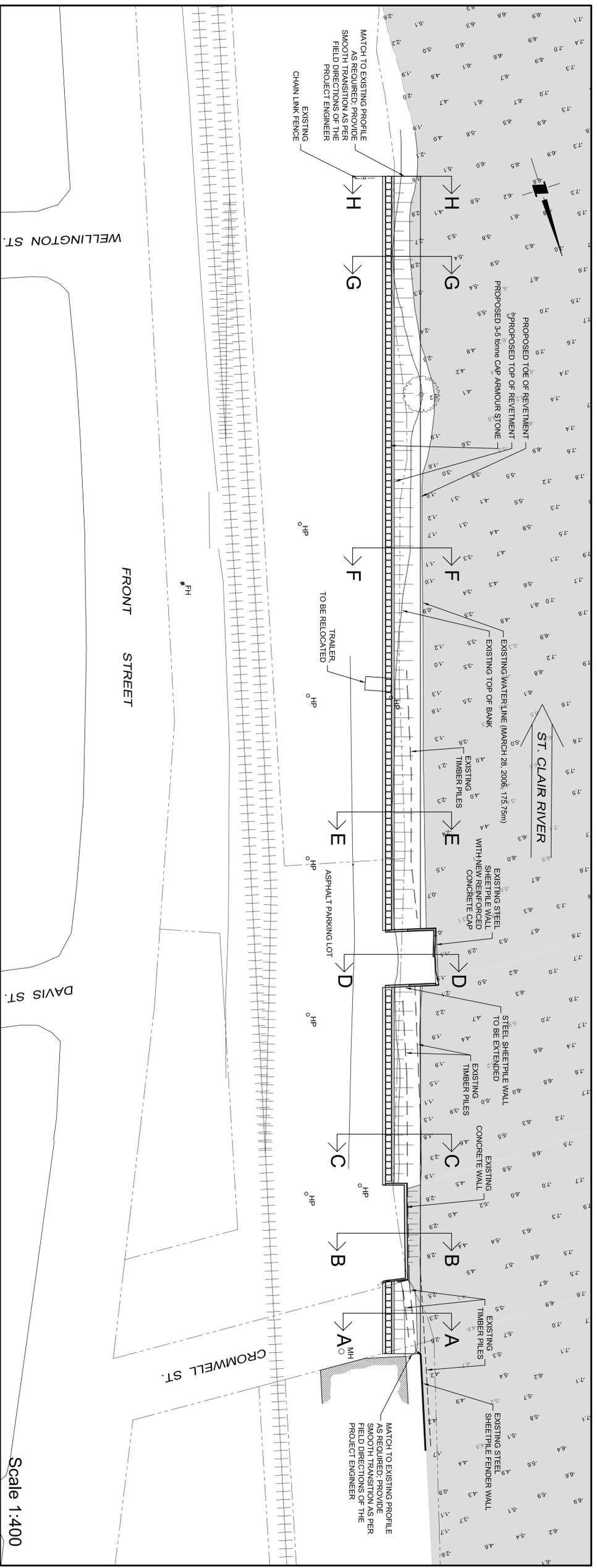
These sites were chosen for several reasons. Failure of the existing protection, interest in and support for replacement of existing protection, and a sizeable site which could provide significant opportunities for habitat enhancement or creation were all considered.

The designs provided here are merely one option and are subject to review and revision in concert with the landowner. The base data that has been obtained will be made available to the landowner at their request.

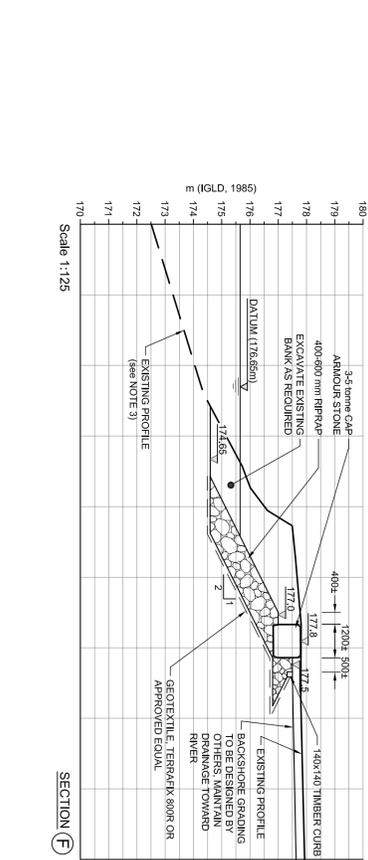
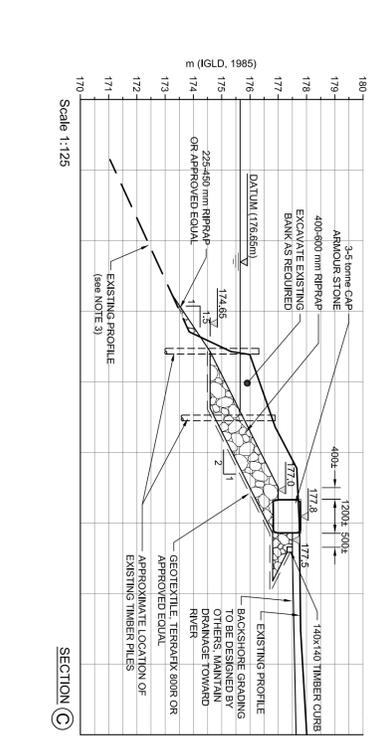
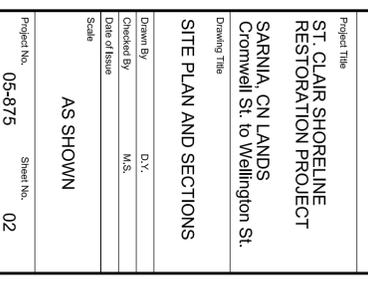
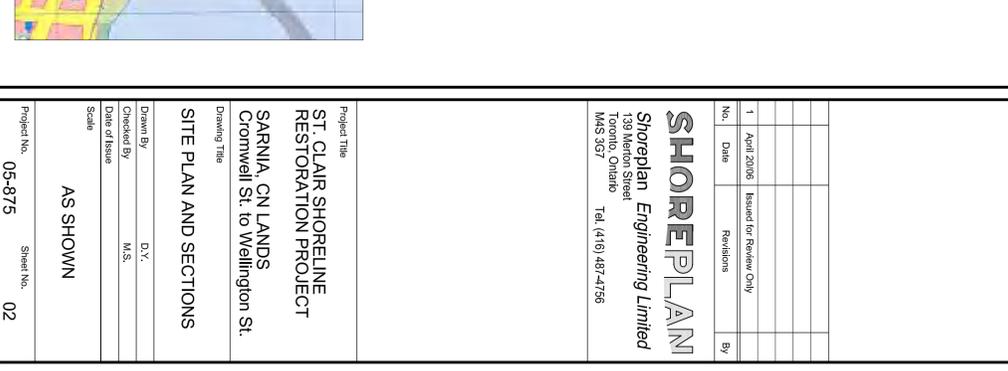
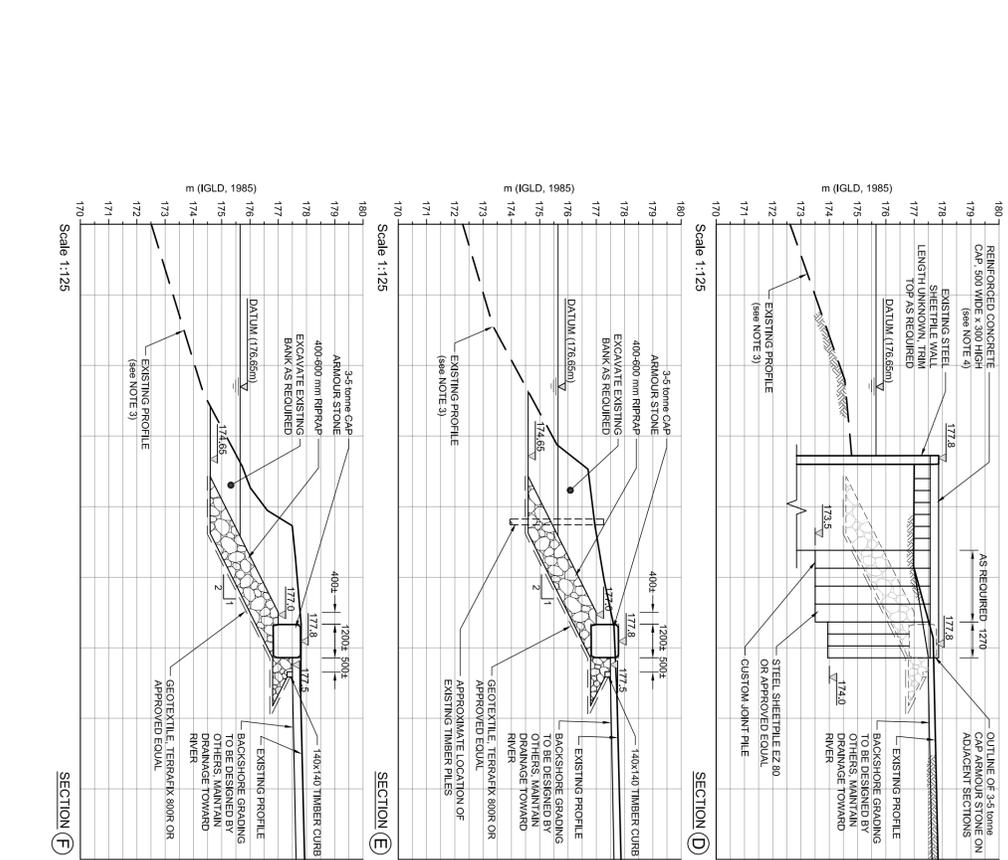
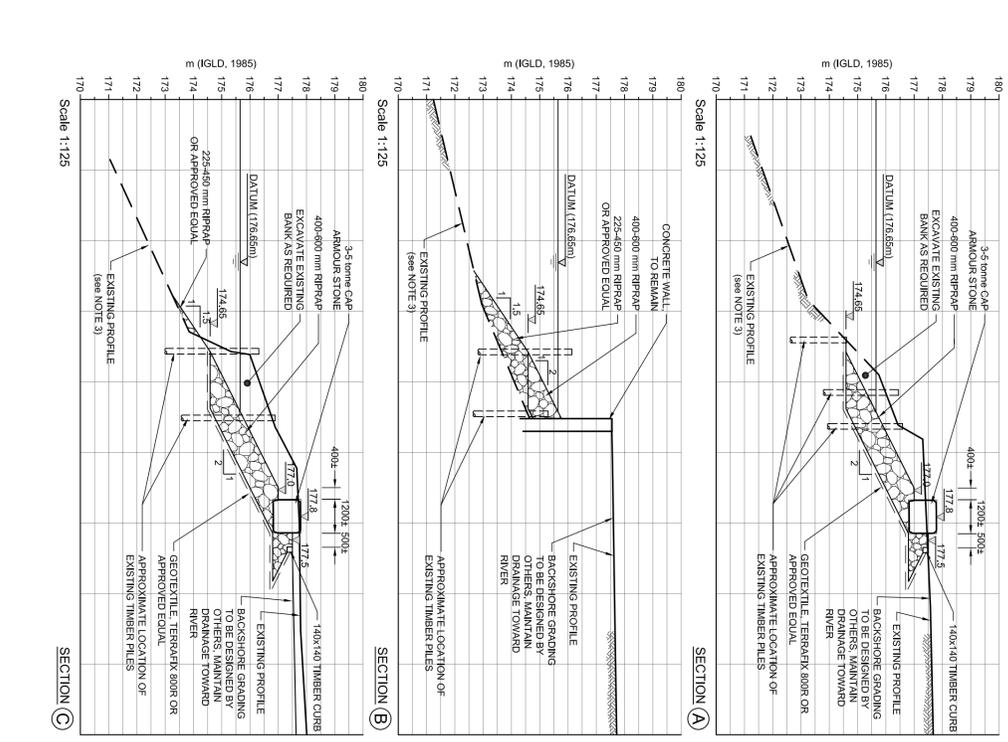
Cost estimates for each of the projects have been undertaken.

Property 12 - Guthrie Park (700 metre reach of shoreline)	
Rip rap revetment with an armourstone cap (700 m @ \$1,450/m)	\$1,015,000
Construction Contingency	\$125,000
Contract Administration/Review	\$125,000
Estimated Total	\$1,265,000

Property 10 - Ferry Dock Hill / Former CN Lands (217 metre reach of shoreline at the north end of the CN Lands)	
Rip rap revetment with an armourstone cap for deep water (217 m @ \$2,000/m)	\$434,000
Construction Contingency	\$50,000
Contract Administration/Review	\$56,000
Estimated Total	\$540,000



- GENERAL NOTES**
- All existing elevations in metres, G.S.C., established from water level and are approximate only.
 - All dimensions in millimeters unless indicated otherwise.
 - All profiles are based on linear interpolations of available nearshore soundings. Actual profiles will vary. Nearshore may contain additional piles or other structures not shown on drawing.
 - Contractor to provide details of reinforcement and cap attachment for approval by the project engineer.



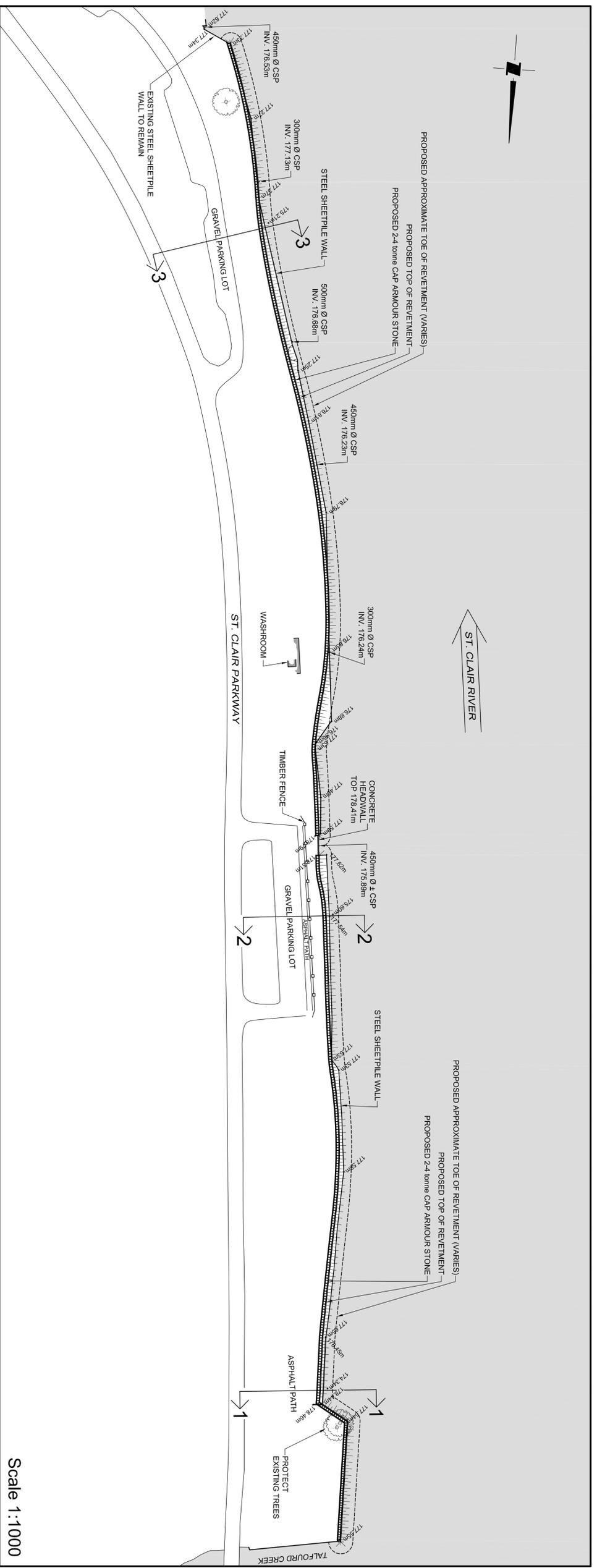
SHOREPLAN
Shoreplan Engineering Limited
138 Meriton Street
Toronto, Ontario
M4S 5V7 Tel: (416) 493-4756

No.	Date	Revisions	By
1	April 2016	Issued for Review Only	

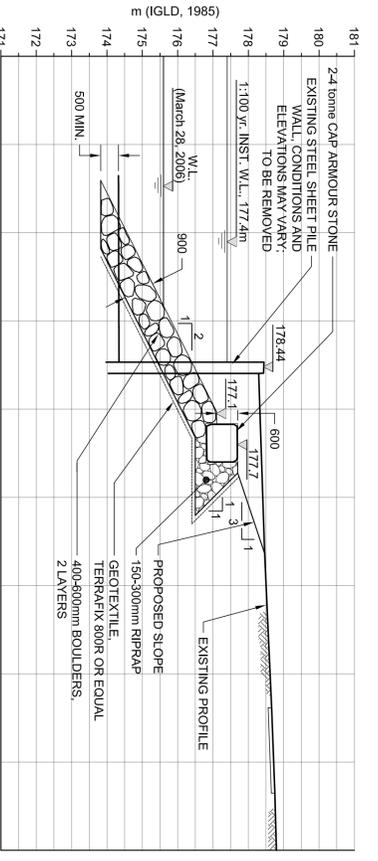
Project Title: ST. CLAIR SHORELINE RESTORATION PROJECT
SARINIA CN LANDS
Cornwall St. to Wellington St.
Drawing Title: SITE PLAN AND SECTIONS
Drawn By: D.V.
Checked By: M.S.
Date of Issue: AS SHOWN
Scale: AS SHOWN
Project No.: 05-875
Sheet No.: 02

GENERAL NOTES

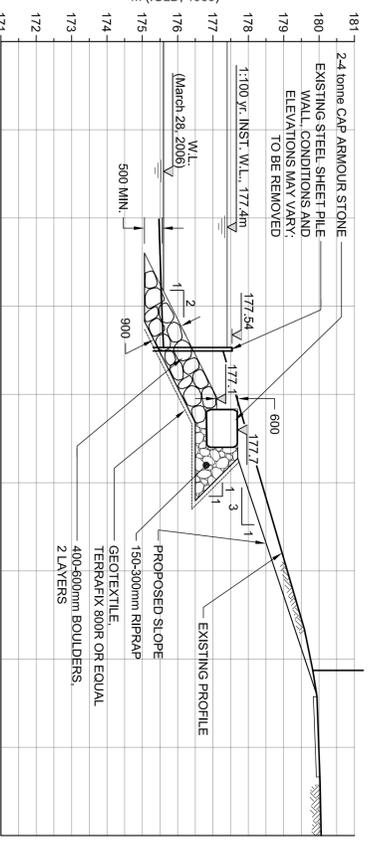
1. All elevations in meters, G.S.C., estimated from water level on the day of survey.
2. All dimensions in millimeters unless indicated otherwise.



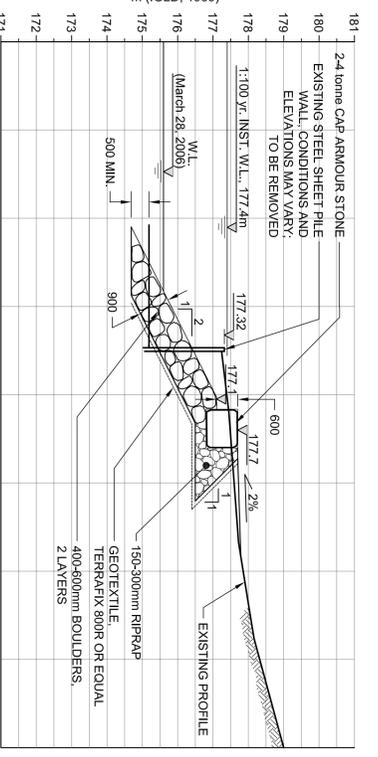
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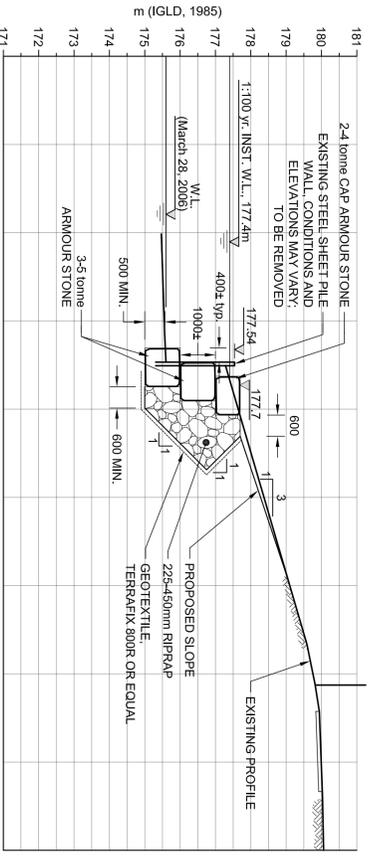
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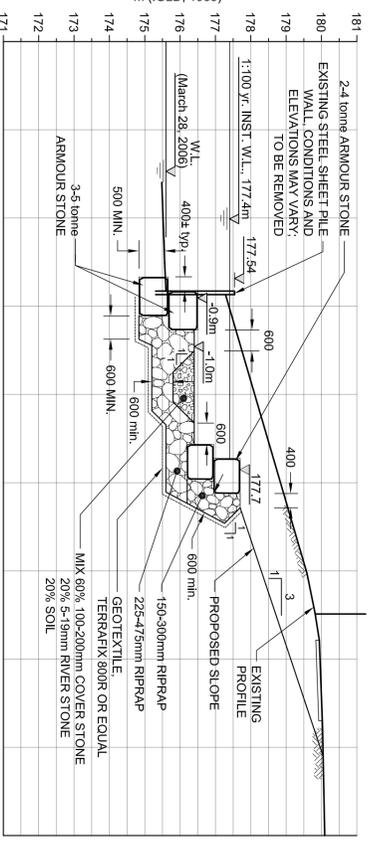
SECTION 2



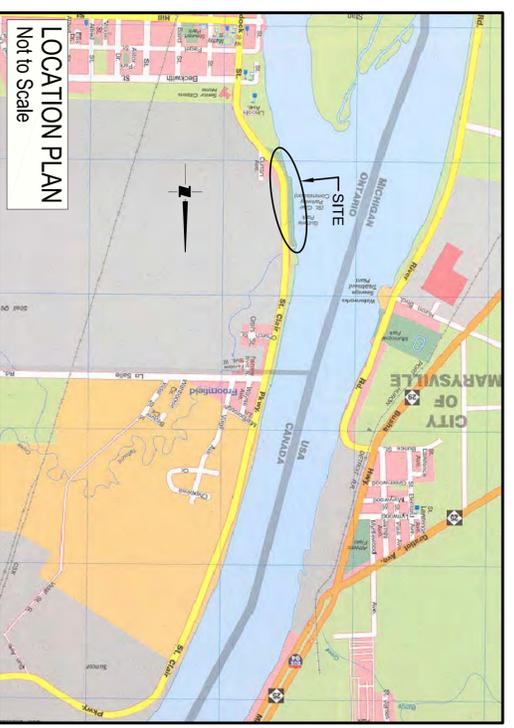
SECTION 3



SECTION 2



SECTION 2



LOCATION PLAN
Not to Scale

No.	Date	Revisions	By
1	April 2005	Issued for Review Only	

SHOREPLAN
Shoreplan Engineering Limited
139 Merion Street
Toronto, Ontario
M5S 3G7 Tel: (416) 483-4756

Project Title
ST. CLAIR SHORELINE RESTORATION PROJECT

GUTHRIE PARK

Drawing Title
SITE PLAN AND SECTIONS

Drawn By
D.V.

Checked By
M.S.

Date of Issue

Scale
AS SHOWN

Project No. 05-875
Sheet No. 01