



Environmental Impact Study Addendum

Riverfront Residential
Niagara Falls, Ontario

JUNE 2021



Environmental Impact Study Addendum

Riverfront Residential
Niagara Falls, Ontario

REPORT PREPARED FOR

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1.0 INTRODUCTION AND PURPOSE OF ADDENDUM

This Environmental Impact Study (EIS) Addendum has been prepared to address the Conditions for Draft Plan (DP) Approval (dated October 6, 2020) for the proposed Riverfront Residential development in Niagara Falls, Ontario (**Figure 1, Appendix A**). Specifically, this 2021 EIS Addendum provides an ecological impact assessment for the following June 2021 site plan details, with reference to the relevant Condition of Draft Plan Approval:

- Feature-based water balance (FBWB; DP Condition No.'s 40 & 76a);
- Low Impact Development (LID) mitigation measures (DP Condition No.'s 41 & 76a);
- Provincially Significant Wetland (PSW) buffer widths (DP Condition No.'s 38 & 76);
- Recommendations to reduce the use of road salt (DP Condition No. 76b); and
- Detailed Trail Design (DP Condition No.'s 44 & 74).

This 2021 EIS Addendum should be reviewed in conjunction with the preceding documents including:

- Environmental Impact Study Addendum, Riverfront Residential (December 2019 EIS; Savanta 2019a);
- Environmental Impact Study, Riverfront Residential (January 2019 EIS; Savanta 2019b);
- Environmental Impact Study Addendum, Riverfront Community OPA (Savanta 2018);
- Environmental Impact Study, Riverfront Community OPA (September 2017 EIS; Savanta 2017); and
- Characterization and Environmental Impact Study, Thundering Waters Secondary Plan (2016 EIS; Dougan & Associates 2016).

Certain figures from the December 2019 EIS have been updated to illustrate the results of this Addendum. Revised and/or new figures are provided in **Appendix A**.

1.1 Study Location

In October 2020 GR (CAN) Investment Co. Ltd received Draft Plan approval, subject to meeting Draft Plan Conditions to develop a 49-ha block (herein referred to as the Subject Lands) within a larger 195 ha (484 acre) area of lands they own in Niagara Falls. The portion of these lands south of the rail line is the subject of this report and is herein referred to as the Study Area. As mentioned in the previous EIS Addendums, the Study Area and Subject Lands are located within the limits of Niagara Falls (City) and are situated north of the Welland River/Chippawa Parkway, east of the Ontario Power Generation Inc. (OPG)/Chippawa Power Canal, south of Oldfield Road, and west of Stanley Avenue. The limits of the GR (CAN) Riverfront Residential lands are depicted on **Figure 1 (Appendix A)**.

2.0 FEATURE-BASED WATER BALANCE

Ten wetland catchments (FBWB Report; Wood 2021) are present within the Subject Lands that contain one or more of the five wetland vegetation types: Oak Mineral Deciduous Treed Swamp (SWD1), Green Ash Mineral Deciduous Treed Swamp (SWD2-2), Willow Mineral Deciduous Treed Swamp (SWD41-1), Willow Mineral Thicket Swamp (SWT2) and Open Aquatic (OAO). The dominant species within each of these wetland types differ in their seasonal tolerance to flooding (frequency, duration, depth). In 2019 Wood completed an annual feature-based water balance (FBWB) for the wetland catchments. In 2021 Wood completed a monthly FBWB for the wetland catchments.

This June 2021 EIS Addendum summarizes the 2021 FBWB results, evaluates the ecological impacts of the FBWB results, determined which 2019 mitigative measures still apply to maintain hydrological conditions for retained wetlands, and advises on whether the wetland buffers are of sufficient width to maintain the FBWB post-development based on mitigative measures required to maintain the retained wetlands.

2.1 December 2019 EIS Recommendations

In 2019, Wood completed an annual feature-based water balance. Based on the results of this study the December 2019 EIS Addendum (December 2019 EIS Addendum; Table 11 (Appendix C)) identified potential mitigation measures to maintain suitable hydrological conditions to the retained wetlands, summarized below.

- Conveyance LIDs to direct additional surface water to the two open aquatic features (W1A and W4) to increase opportunities to support turtle overwintering habitat, since these features have been observed to dry up under existing conditions;
- Infiltration LIDs to reduce the surface water runoff volume to Oak Mineral Deciduous Swamps (SWD1), Green Ash Mineral Deciduous Swamps (SWD2-2) and Mineral Thicket Swamp (SWT2), during the summer months; and
- A combination of conveyance and infiltration LIDs have been recommended to support more frequent inundation with a relatively shorter dry season within the Willow Mineral Deciduous Swamp (SWD4-1).

2.2 2021 Monthly Feature-based Water Balance Methodology

Wood's 2021 FBWB evaluated the runoff volume and depth of runoff for average (i.e., mean, and median) "precipitation event" volumes for the respective months for each wetland catchment. Daily data from a 32-year period of record from a local weather station was used to determine the mean and median event volumes for each month, and the Thornthwaite method

applied to determine the corresponding runoff volume. The change (i.e., difference) in average event runoff volume between proposed and existing conditions was also calculated.

Savanta then reviewed the difference in mean event volumes post-development in comparison to existing conditions and with respect to the dominant vegetation species (**Table 1, Appendix B**) tolerance for flooding (frequency, duration, depth). This monthly FBWB allowed for an evaluation of any seasonal changes to water volumes to the wetlands; whereas past FBWB have been annually based.

As documented in Wood's FBWB Report (2021), post-development the retained wetlands will receive treated surface water from a combination of pervious (i.e., rear yard) and impervious (i.e., road) sources. Surface water will be treated through an oil-grit separator and then discharged to a pocket wetland for polishing prior to discharging to a level spreader for distribution across the length of the wetland. The pocket wetland and level spreader are planned within the retained wetland buffer.

The following features were excluded from the 2021 FBWB report (Wood 2021) and are to be addressed at (condominium) detailed design:

- Increased surface water volumes to retained open aquatic features and hydrologic conditions for the two created open aquatic features to support turtle foraging and overwinter habitat; and
- Impacts of buried pipe removal associated with Watercourse 1 (WC1) (December 2019 EIS; Figure 15) on upstream wetlands.

2.3 2021 FBWB Results and Recommendations

Post-development, there are no changes to monthly average event potential surface runoff volumes (m^3) for wetland catchment W1_A. For all other wetland catchments, under post development conditions pre-development summer dry periods (June through October) are maintained while winter average event potential surface runoff volumes decreased anywhere from 1% to 26% for a given month (to maintain summer dry period). Changes in spring average event potential surface runoff volumes under post-development conditions varied from an 11% decrease to 33% increase depending on the catchment.

Pre-development, post-development, and percent change in average event potential surface runoff volumes (m^3) is summarized by catchment in **Table 2, Appendix B**. Surface water contributions to all wetland catchment post-development is expected to support the dominant vegetation species present; see **Table 1, Appendix B** for a detailed summary of post-development inundation conditions for each wetland catchment by vegetation type.

2.4 LID Measures

As detailed in Wood's FBWB Report (2021) LID measures are planned to provide water quality treatment and to distribute this treated surface water to retained wetlands, to maintain hydrological monthly inputs post-development. The June 2021 Site Plan includes easements where the collected surface water will discharge to a pocket wetland just inside the wetland buffer. The pocket wetlands will discharge to a level spreader which will discharge surface water across the entire length of the wetland. The FBWB Report (Wood 2021) determined that LID measures will take up no more than 2% of the PSW buffer (20 m buffer for SWD1; 15 m for other wetlands) and no additional buffer area is required.

Detailed LID plans will be prepared for future condominium site plan submissions (FBWB Report, Wood 2021). The following sections provide ecological considerations for the LID siting, design details and phasing for the future condominium LID Detailed Design Submission.

2.4.1 LID Siting

The pocket wetland and level spreader are planned within the wetland buffer. LID measures should be located as close as possible to the outside edge of buffers to minimize construction disturbance in proximity to the natural feature, maximum long-term vegetation between the LID measure and the feature edge and minimize potential encroachment into the buffer associated with any potential future maintenance of LID measures.

Within the 20 m SWD1 buffer targeted (individual stems) invasive species removal is planned, as individual native woody stems identified for retention (Tree Saving Plan; Colville 2021), with native-- in-plantings occurring where invasive species removal was completed. Where LIDs are planned within the SWD1 buffer, a tree assessment and preservation plan are required to compensate for removed trees previously identified under the 2021 Tree Saving Plan for retention.

2.4.2 LID Design

The size of the LIDs should be minimized to maximize the amount of vegetated area within buffers while providing the post-development surface water volumes to the wetlands. Where feasible the LIDs should encompass no more than the first 5 m of wetland buffer. The remaining area of the buffer (15 m for the SWD1 and 10 m for the other wetlands) will be restored as detailed in the Ecological Restoration Plan (Savanta 2021).

The LIDs should be vegetated, with native species, to the extent possible to maximum buffer function and incorporating specific vegetation forms/species into LID measure design to enhance buffer function (e.g., discouraging public access/use of buffers and access into adjacent natural

features). For example, stone size within the level spreader should support growth of native species.

The LIDs are to be vegetated as per the restoration treatment identified for this buffer (Restoration Plan 2021; Figure 3). Woodland restoration, woodland/open shrub land restoration, or woodland/native meadow restoration is planned within the wetland buffers. The LIDs Landscape Plans are to follow the committed restoration treatment planting details as provided in the Ecological Restoration Plan (Savanta 2021).

2.4.3 LID Maintenance

See Wood's FBWB report (2021) for LID maintenance requirements.

2.4.4 LID Impact Summary

For all wetland catchments the 2021 monthly FBWB post-development average event volumes are suitable to maintain the dominant species present within the retained wetlands (SWD1, SWD2-2, SWD4-1 and SWT2). Additional surface runoff volumes, to be provided by the future condominium blocks via a roof drain collector system are required for the two retained OAO's and the two created OAO's to provide suitable water depths to support turtle basking and overwintering.

As part of the future condominium application, an environmental impact assessment is required to assess the LID detailed design with respect to maintaining/protecting the wetland buffer restoration treatments and the retained wetlands as detailed in this 2021 subdivision submission (EIS Addendum, Ecological Restoration Plan and Ecological Monitoring Plan).

3.0 PSW BUFFER WIDTHS

Both 15 m and 20 m buffers are proposed for natural heritage features on the Subject Lands. Specifically, the June 2021 site plan provides 20 m buffers for the large Oak Mineral Deciduous Swamp Community (SWD1) on the Subject Lands and a 15 m buffer for all other protected natural heritage features (**Figure 2, Appendix A**).

The prescribed buffer widths and restoration treatments (Restoration Plan; Savanta 2021) will ensure that the functions of the existing natural heritage features are protected from the effects of the proposed development. To preserve the identified functions, the buffers serve to:

- Screen the features from human disturbance through native habitat restoration plans;
 - Most of the retained feature buffers have a 15 m (SWD2-2, SWD4-1, SWT2) or 20 m woodland restoration area. The SWD2-2 communities on either side of the Open Shrub Restoration Area (OS1) will have Common Buckthorn removed and in-plantings

of woodland species within removal within a 7.5 m area, followed by the open shrub restoration area. The southernmost SWD4-1 communities will have Common Buckthorn removed and in-plantings of woodland species within removal within a 7.5 m area, followed by a native meadow restoration (Figure 3, Appendix A).

- Restore woodland communities where exotic/invasive species (i.e., buckthorn) currently predominate on the landscape;
- Protect the features from exotic/invasive species establishment;
- Limit anthropogenic encroachment (residents, domestic animals, etc.) into the natural heritage features. All rear facing lots adjacent to natural feature buffers to have fences with no gates extending into the natural feature;
- Filter surficial runoff into vegetation communities to improve water quality and reduce contamination; and
- Provide location (first 5 m of buffer) for the establishment of Low Impact Development measures that will provide required hydrologic inputs to maintain wetland communities.

For residential developments trails and LIDs are often placed in buffers and depending on their siting and design they could impact the buffer functions. For the Subject Lands, as discussed in Section 5 below, two short west-east trails are planned within the site plan, and they are located outside of the 20 m SWD1 woodland restoration area buffer and at least 7.5 m away from SWD2-2 woodland restoration area (**Figure 4, Appendix A**). The function of the buffers, bulleted above, will not be negatively impacted by the trail design. LIDs are recommended to be located within the first 5 m of the feature buffer and the same restoration treatment (i.e., woodland, open shrub land or meadow restoration) applied within the LID post-construction. With the absence of trails in the buffers, LIDs sited and designed as discussed in Section 2 above, and the buffer restorative treatments implemented as per the Restoration Plan (Savanta 2021) the 15 m and 20 m PSW buffers are suitable to protect the retained features post-development

4.0 RECOMMENDATIONS TO REDUCE THE USE OF ROAD SALT

A salt management plan is recommended to be prepared and implemented through the subdivision agreement and subsequent condominium agreement to prevent use of chloride-based ice/snow controls (roads and sidewalks) within the site plan. This will minimize the potential for discharge of chloride-laden water to the natural heritage features (including wetlands) and their buffers. Further details on salt management are provided in the stormwater management plan (Wood 2021).

4.1 Impact Summary

Provided that the salt management plan is effective in preventing or minimizing the use of chloride-based ice/snow controls within the site plan, no negative impacts on adjacent wetlands and associated ecological functions are expected.

5.0 DETAILED TRAIL DESIGN

5.1 Trail Siting Considerations

The detailed trail design (**Figure 4, Appendix A**) was developed in consultation with Savanta to avoid/minimize impacts to significant natural heritage features and functions while providing educational and recreational benefits to the public. This section discusses the environmental considerations related to the proposed trail locations.

There are two trails proposed within the NHS, as shown on **Figure 4 (Appendix A)**. During the trail siting exercise, priority was given to locating trails within portions of the NHS that were 1) previously disturbed (e.g., historical roads or existing informal trails), 2) comprised of less sensitive, culturally influenced vegetation communities and 3) within areas proposed for restoration, such that trails can be fully integrated with the area design.

The first proposed trail section (~195 m) will extend through the NHS to connect residential neighbourhoods in Blocks 2 and 12. The proposed trail is located within a portion of cultural woodland and cultural thicket (comprised of dense Common Buckthorn) within a proposed native meadow restoration area (Native Meadow Treatment 1). The Tree Saving Plan (Colville 2021) identifies trees to be retained, with the remaining area to be cut/mowed for Buckthorn Treatment (Buckthorn Treatment 2; **Figure 3, Appendix A**). The trail is sited outside of the woodland restoration area and outside of SWD1 (20 m) and SWD4-1 (15 m) buffer. Given that this entire area will be undergoing significant disturbance during the restoration process, it offers the opportunity to construct the trail at the same time to prevent incremental disturbance to the area. Further, this allows the opportunity to site the proposed trail to avoid sensitive features in the restoration design, while locating it next to features that would still be of interest to the public most appropriately with respect to the proposed trails. For instance, interpretive signage could be placed near the created turtle overwintering pond and/or turtle nesting beach in Native Meadow Treatment 1 to highlight these features to the public, while transplanted rare species could be placed well away from the trails to avoid negative impacts.

The second proposed trail (~50 m) will extend through the NHS to connect residential neighbourhoods in Blocks 4 and 12. The trail will cross the narrowest portion of the NHS and will be located outside of the 15 m PSW buffer. The proposed trail is located within a portion of cultural woodland (comprised of dense Common Buckthorn) within a proposed Open Shrub land restoration area (Native Meadow Treatment 1). The Tree Saving Plan (Colville 2021) identifies trees to be retained, with the remaining area to be cut/mowed for Buckthorn Treatment (Buckthorn Treatment 2; **Figure 3, Appendix A**). The trail is sited outside of the 7.5 m woodland restoration area adjacent to the retained features. Siting the trail in this location will minimize disruption to the NHS, given that this is the shortest direct route possible. The trail will be field fit to avoid the depressional feature as referred to in Section 8.3.2 of the December 2019 EIS).

No other trails through the NHS, including through any of the identified NHS buffers, are proposed. The proposed trail locations are expected to minimize disruption to the NHS while still providing recreational, educational and connectivity opportunities for the public.

5.2 Trail Design Elements

Each of the two trails through the NHS is proposed to consist of a 2-m wide, gravel surfaced path.

The proposed trail design will incorporate the following mitigative design elements to minimize impacts to natural heritage features and prevent impacts on wildlife movement within the corridor:

Trail Siting

- Trail to be sited away from retained trees as identified in the Tree Saving Plan (Colville 2021);
- The exact trail location to be determined on site with City Arborist, NPCA Ecologist and proponent's Arborist and Ecologist;
- Woodland restoration is planned adjacent to retained features. All trails are to be located outside of the woodland restoration area;
- Exact trail pathways will be located to minimize impacts on surface water drainage (e.g., by avoiding depressions in the ground that may be important for water storage);
- Appropriately sized and spaced culverts under the trail will be installed, where required to maintain existing hydrological connectivity between features north and south of the trail;
- The proposed trail within the Native Meadow Restoration Area has been situated to avoid ecological restoration areas associated with Great Plains Ladies'-tresses relocation site and the proposed turtle nesting beach (see Figure 4, Appendix A); and
- The proposed trail within the Open Shrub Land Restoration Area to be field fit to avoid the depressional feature that may be associated with a buried pipe upstream from watercourse WC-1.

Trail Design

- The width of the trail and associated vegetation removal will be minimized to the extent possible;
- A maximum width of 2 m will be required for the trail surface (Wavefront Planning and Design 2019);
- Wherever possible, the trail will be surfaced with gravel and/or limestone screening base and will be at grade to permit wildlife to cross the trail and prevent impacts on surface water drainage;
- Where appropriate, suitable thorny native species will be planted along trails to prevent disturbance to the NHS from trail users; and

- Lighting within the native meadow and open shrub restoration areas to be directed downward, to minimize light pollution.

Trail Construction

- Trails within the NHS will be constructed outside the bird breeding season (April 1 to August 30) to avoid impacts on nesting birds;
- The trails through the CUW1 communities, should it be constructed prior to Common Buckthorn Treatment (woody cover removal) will also be constructed outside the bat roosting period (April 1 to September 30) to avoid impacts on roosting bats within the woodland;
- The trails should be constructed outside the amphibian breeding and movement period (e.g., early March to end of June), and along the amphibian movement corridor to avoid impacts on amphibian breeding and movements. Should construction need to occur within the amphibian breeding and movement period the site can be screened for amphibians;
- Based on these identified timing restrictions, trail construction should occur between October 1 and February 30 to prevent impacts on sensitive wildlife;
- An erosion and sedimentation control plan should be prepared to ensure that trail construction does not cause erosion and sedimentation within adjacent wetlands;
- Spill prevention and response measures should be in place during installation of the trails as it is expected that equipment will be required for construction. This should include, but not be limited to ensuring the equipment is well maintained and free of fluid leaks, that no refueling, or equipment maintenance takes place within the NHS, that a spill kit is available in the event of an accidental spill and that response measures are in place; and
- To minimize the potential for transfer of invasive vegetation species, all construction must adhere to the Clean Equipment Protocol for Industry (Halloran et al. 2013).

Trail Use

- In sensitive areas, cyclists will be prevented from using the trail via signs and trail design to minimize potential impacts on wildlife (e.g., mortality of small wildlife such as snakes and amphibians due to collisions with cyclists who may not be able to observe and/or avoid wildlife like pedestrians would be due to the higher rate of travel);
- Interpretative signage will be installed at trail entrances explaining the sensitivity of the habitats and the role of trail users to be stewards (e.g., signs will inform trail users to stay on the trail, refrain from littering, and keep dogs leashed). Signage will also be placed along the trail to remind users that they are in sensitive habitat and to stay on the trail; and
- Garbage and recycling receptacles will be placed at trail head(s) to minimize littering.

5.3 Impact Summary

The following sections summarize the predicted negative effects and mitigative measures for the two proposed trails.

5.3.1 *Trail Through Native Meadow Restoration Area 1*

The proposed trail in this location will cut through an existing cultural thicket community that is being restored to a native meadow. The trail will be approximately 10 m from the adjacent PSW to avoid impacts on the wetland. Given that the area is being restored to native meadow, the proposed trail will not have any incremental impacts on mature trees.

The only significant natural feature that the trail will run through will be the Amphibian Movement Corridor Significant Wildlife Habitat that extends approximately north-south through the NHS to link the northern woodland/wetland (SWD1) to the Welland River. While the proposed trail will result in a narrow break in the vegetated corridor, the feature will only be 2-m wide and will be constructed at grade with surfacing of gravel and/or limestone screening. Therefore, the trail is not expected to provide a barrier to amphibian movement. Other mitigation (including signage along the trail and prevention of cyclists) will also assist in preventing impacts on amphibian movement through the corridor. Overall, the trail is not expected to have any negative impact on the function of the amphibian movement corridor SWH.

As noted previously, the trail will be strategically located outside of the PSW buffers and the created open wetland pond and turtle nesting beach, with mitigation (e.g., signage and strategic plantings along the trail) to minimize the potential for ad hoc trail creation that could result in impacts on adjacent features.

Trail construction will result in disruption to local wildlife due to noise and vibration from equipment use and human presence, although adherence to the identified timing restrictions will prevent disturbance during sensitive time periods (e.g., critical reproductive and movement periods).

Long-term trail use will result in increased human presence in this area relative to current conditions. This location has not been identified as Significant Wildlife Habitat for any sensitive wildlife species (e.g., area sensitive species). While the trail is located within a larger amphibian movement corridor, impacts to amphibians are expected to be minimal as these movements occur between dusk and dawn on rainy evenings when pedestrian use is lowest. Trail use by pedestrians will result in increased noise and human presence, which may result in periodic disruption to wildlife in the area. The proposed mitigation (e.g., strategic plantings along the trail) will minimize the potential that trail users leave the trail and disturb adjacent habitats. Further, the signage that will be installed will inform trail users that wildlife is present and that their actions could result in disturbance. Although this mitigation is not expected to alter the behaviour of all trail users, it is expected to be effective in decreasing noise and disturbance levels to some

degree. Overall, periodic trail use by pedestrians will disturb local wildlife species, but this is not expected to have any negative impacts on overall wildlife populations (e.g., viability of existing populations, diversity, and completion of critical life cycle functions).

Overall, given the proposed siting and identified construction, design and operational mitigation measures, this proposed trail segment is not expected to have any significant long-term negative impacts on the ecological functions of the NHS.

5.3.2 Trail Through Open Shrub Land Restoration Area

The proposed trail in this location will cut through an existing cultural woodland community that is being restored to an open shrub land. This cultural woodland is currently dominated by invasive Common Buckthorn. The trail will be approximately 10 m from the adjacent PSW to avoid impacts on the wetland. Given that the area is being restored to open shrub land, the proposed trail will not have any incremental impacts on mature trees.

The only significant natural feature that the trail will run through will be the Amphibian Movement Corridor Significant Wildlife Habitat that extends approximately north-south through the NHS to the link the northern woodland/wetland (SWD1) to the Welland River. While the proposed trail will result in a narrow break in the vegetated corridor, the feature will only be 2-m wide and will be constructed at grade with surfacing of gravel and/or limestone screening. Therefore, the trail is not expected to provide a barrier to amphibian movement. Other mitigation (including signage along the trail and prevention of cyclists) will also assist in preventing impacts on amphibian movement through the corridor). Overall, the trail is not expected to have any negative impact on the function of the amphibian movement corridor SWH.

As noted previously in Section 5.1, this trail will be sited in the field to avoid the depressional feature associated with buried watercourse WC1 in this area. The proposed trail location will be assessed by a geotechnical engineer to confirm that any ongoing erosion associated with the depressional feature will not have any long-term impact on the trail and pedestrian safety. Savanta recommends that signage be installed on the trail where it runs past the depressional feature to warn trail users of the presence and associated danger of the depressional area. Given that the trail will be constructed at grade using granular material, no impacts on overland surface water flow towards the depressional feature are expected to occur.

With respect to the trail going through the Amphibian Movement Corridor, in similarity to the other trail discussed above, the trail is not expected to provide a barrier to amphibian movement given that it will be at grade, not paved and narrow. Other mitigation (including signage along the trail and prevention of cyclists) will also assist in preventing impacts on amphibian movement through the corridor). Overall, the trail is not expected to have any negative impact on the function of the amphibian movement corridor SWH.

Also, in similarity to the discussion above regarding the trail through the Native Meadow Restoration Area, construction, and long-term use of this trail through the cultural woodland is also expected to result in some disruption to local wildlife populations. However, overall, while periodic trail use by pedestrians will disturb local wildlife to some degree, given the proposed mitigation, this is not expected to have any negative impacts on overall wildlife populations (e.g., viability of existing populations, diversity, and completion of critical life cycle functions) that use this area or adjacent areas of the NHS.

Overall, given the proposed siting and identified construction, design and operational mitigation measures, this proposed trail segment is not expected to have any significant long-term negative impacts on the ecological functions of the NHS.

5.3.3 Trail Impact Summary

Trails have been proposed at two locations in the NHS to provide connectivity between adjacent residential areas as well as recreational and nature appreciation opportunities for residents of the Riverfront Community. While it is recognized that any trails through the NHS will necessarily result in some disruption to vegetation communities, temporary construction impacts and long-term increases in noise and disturbance due to human presence, the proposed trails have been sited and mitigation has been identified to minimize potential impacts on the ecological form and function of the NHS. The proposed trail locations have been selected to prevent intrusion into more sensitive areas and use either areas that are being disturbed for restoration or the narrowest portion of the NHS to minimize disturbance. Design mitigation has been proposed to minimize the footprint to the extent possible and minimize the potential for ad hoc trails to be created off these main trails.

Construction of the trails will result in short-term disruption to wildlife due to noise, vibration, and human presence. Appropriate construction timing windows have been identified to ensure that wildlife is not disturbed during the most sensitive life cycle periods (e.g., reproduction). Other mitigation will be implemented during construction (e.g., sediment and erosion control, spill prevention and response measures) to minimize the potential for negative impacts on adjacent features during trail installation.

Long-term trail use has the potential to impact surrounding ecosystems via litter, going off trail, noise, unleashed pets, and potential introduction of invasive species (among other impacts). However, by applying the mitigation measures discussed in the previous sections, including strategically placing trails, using signs and thorny flora to prevent trail user impacts, impacts to the Riverfront Natural Heritage System can be minimized. Moreover, including trails within the Riverfront Natural Heritage System provides opportunities to educate the public on the natural features present on the Subject Lands, while simultaneously encouraging physical activity and outdoor recreation.

6.0 CONCLUDING REMARKS

This EIS Addendum has been prepared as a supplement to the December 2019 EIS Addendum to address Draft Plan Conditions comments provided by the Region and NPCA. Additional responses to comments from each agency are provided in the comment-response matrices that will be included with the resubmission package to the City of Niagara Falls. This EIS Addendum also addresses changes that have been made to the proposed Draft Plan for the Riverfront Residential Community.

The December 2019 EIS concluded that development on the Subject Lands could be completed without negative effects on the natural heritage features and associated functions. The results of analysis conducted for this 2021 EIS Addendum demonstrate that this previous conclusion remains accurate and valid.

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Wood 2021. Stormwater Management Plan. Prepared for GR (CAN) Investment Co. Ltd. XX pp. + Appendices

APPENDICES

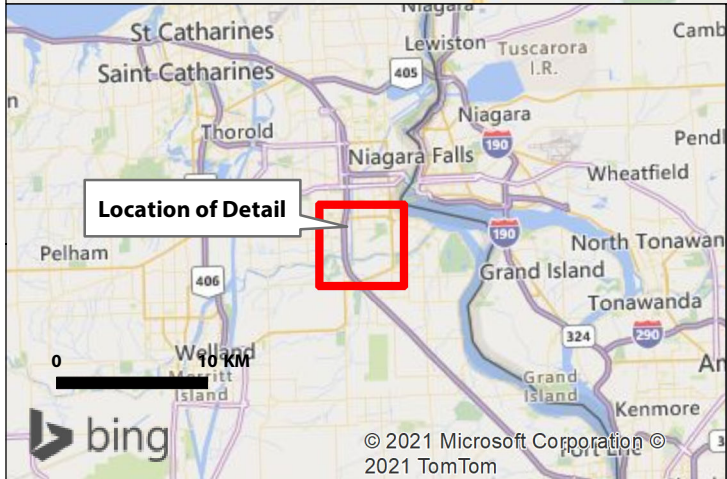
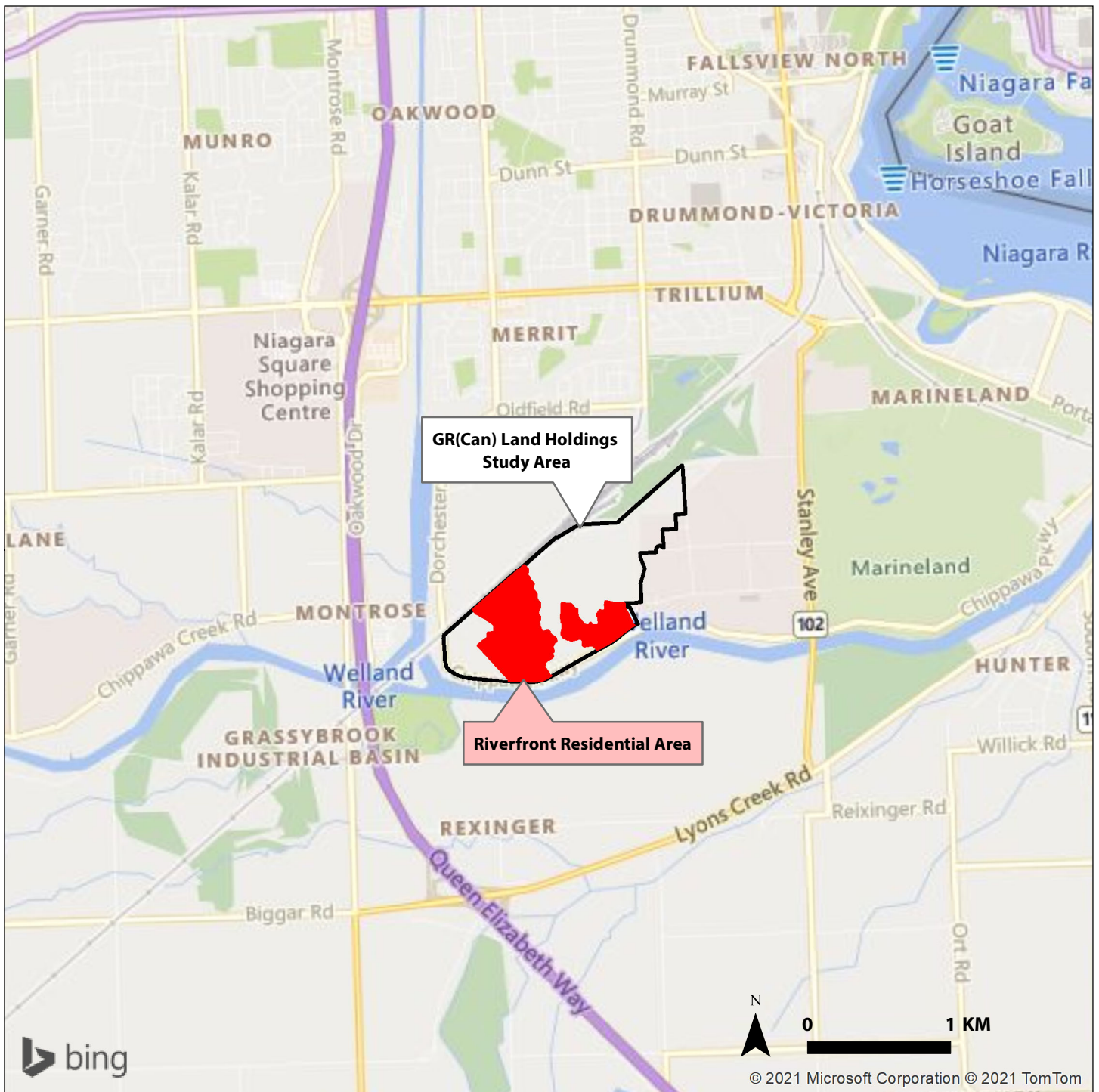
Appendix A – Figures (Revised and New)

- Figure 1: Location of Subject Lands
- Figure 2: National Heritage System & Buffers
- Figure 3: Ecological Restoration Treatment Types
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Appendix B – Tables (Revised and New)

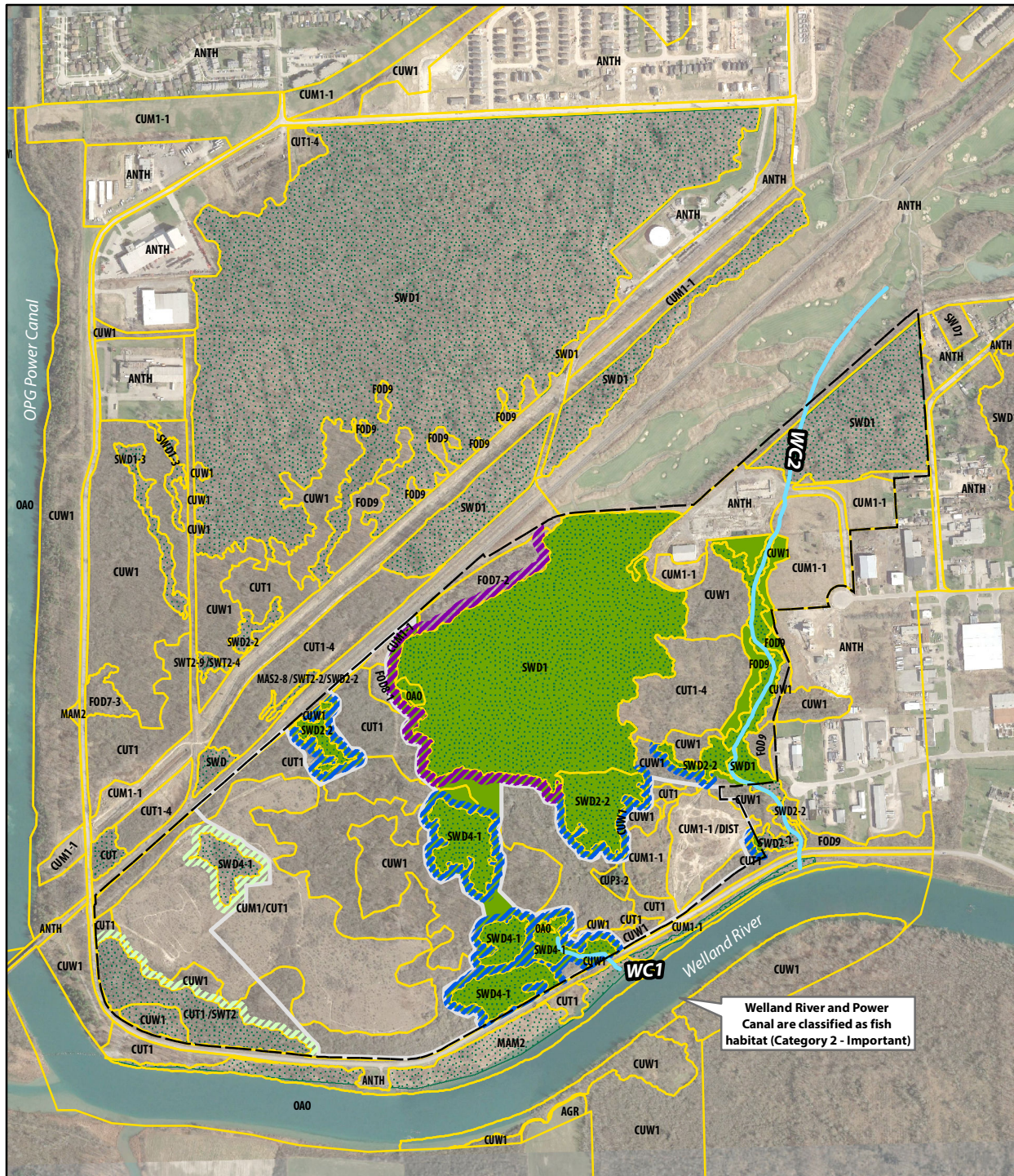
- Table 1: Water Budget Recommendations by Wetland Vegetation Community
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Appendix A – Figures



Riverfront Residential
June 2021 Environmental Impact Study Addendum

Figure 1
Location of Subject Lands



- Study Area
- Riverfront Residential
- Ecological Land Classification (updated area within/ adjacent to Riverfront Residential, Savanta 2018)
- Provincially Significant Wetland (MNR)
- Fish Habitat (Category 2 - Important)
- Riverfront Residential Natural Heritage System
- 15 m Buffer
- 20 m Buffer
- Other Lands Owned by Applicant - Outside OPA 128
- 15 m Buffer

Vegetation Community (ELC Code)

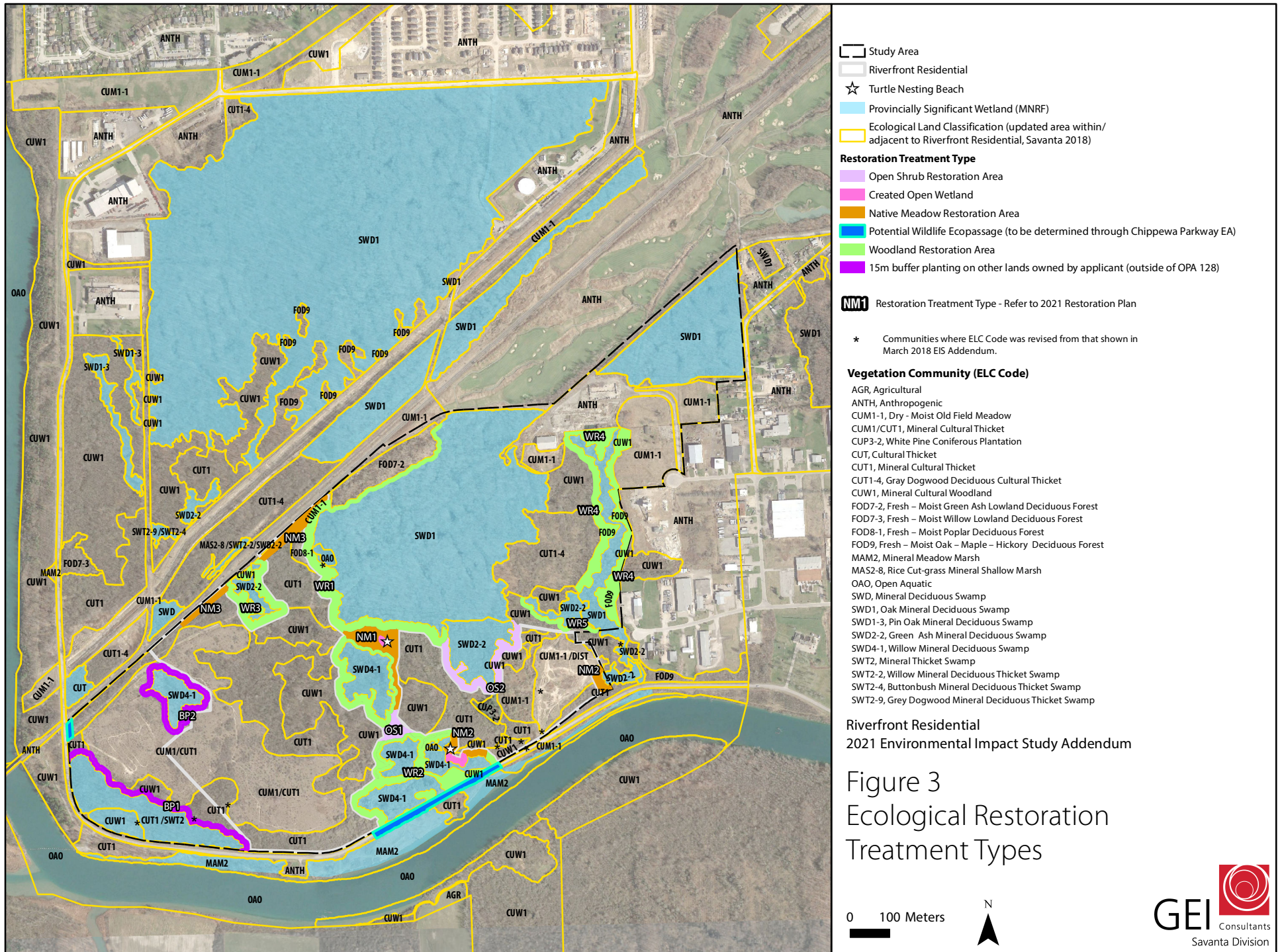
- AGR, Agricultural
- ANTH, Anthropogenic
- CUM1-1, Dry - Moist Old Field Meadow
- CUM1/CUT1, Mineral Cultural Thicket
- CUP3-2, White Pine Coniferous Plantation
- CUT, Cultural Thicket
- CUT1, Mineral Cultural Thicket
- CUT1-4, Gray Dogwood Deciduous Cultural Thicket
- CUW1, Mineral Cultural Woodland
- FOD7-2, Fresh - Moist Green Ash Lowland Deciduous Forest
- FOD7-3, Fresh - Moist Willow Lowland Deciduous Forest
- FOD8-1, Fresh - Moist Poplar Deciduous Forest
- FOD9, Fresh - Moist Oak - Maple - Hickory Deciduous Forest
- MAM2, Mineral Meadow Marsh
- MAS2-8, Rice Cut-grass Mineral Shallow Marsh
- OAO, Open Aquatic
- SWD, Mineral Deciduous Swamp
- SWD1, Oak Mineral Deciduous Swamp
- SWD1-3, Pin Oak Mineral Deciduous Swamp
- SWD2-2, Green Ash Mineral Deciduous Swamp
- SWD4-1, Willow Mineral Deciduous Swamp
- SWT2, Mineral Thicket Swamp
- SWT2-2, Willow Mineral Deciduous Thicket Swamp
- SWT2-4, Buttonbush Mineral Deciduous Thicket Swamp
- SWT2-9, Grey Dogwood Mineral Deciduous Thicket Swamp

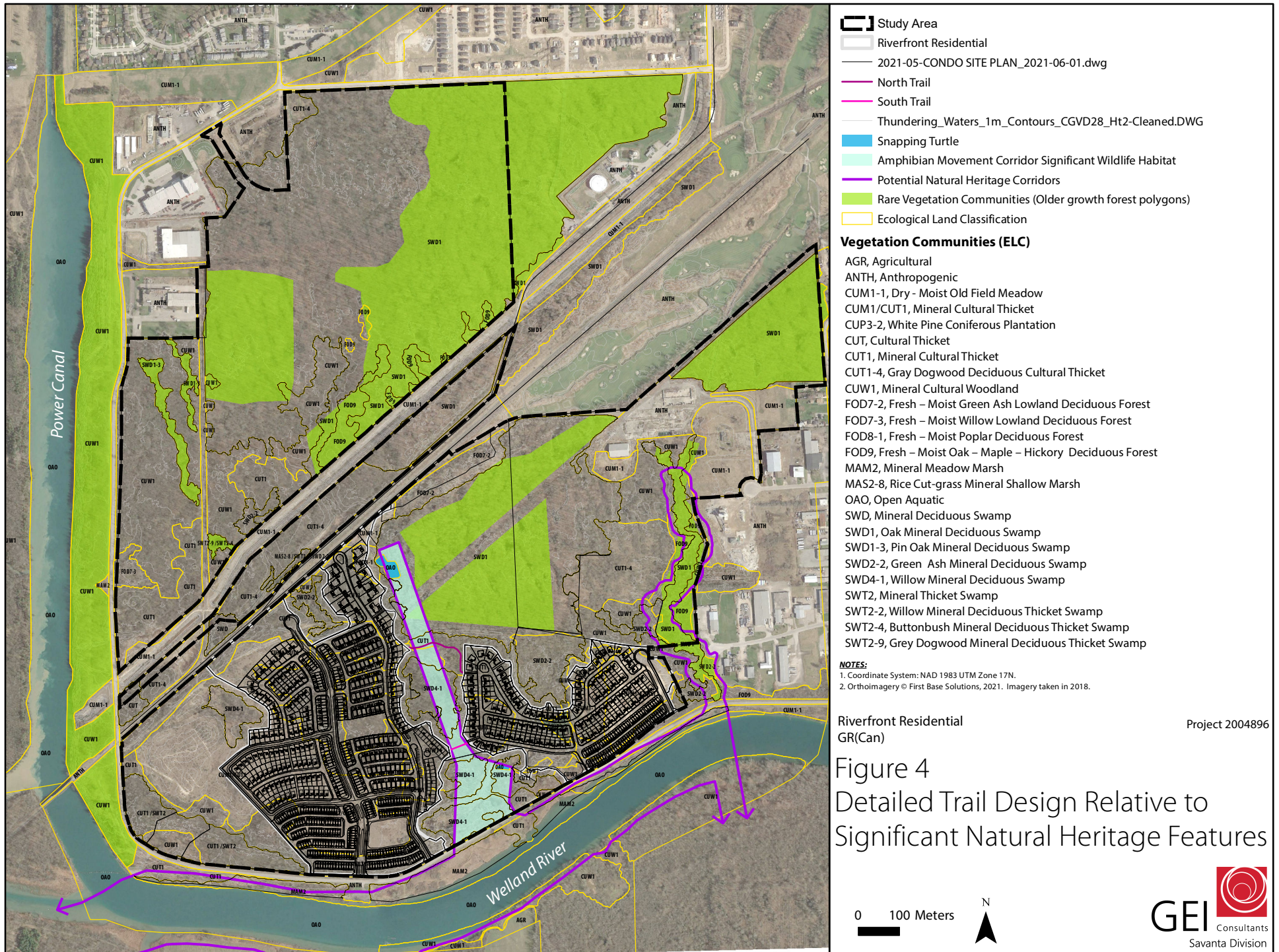
Riverfront Residential
June 2021 Environmental Impact Study Addendum

Figure 2
Natural Heritage System and Buffers

0 100 Meters







Appendix B – Tables

Table 1: Water Budget Recommendations by Wetland Vegetation Community

ELC code	Significant wildlife habitat identified for breeding amphibians?	Dominant canopy layer vegetation species	Water inundation requirements for dominant vegetation species	Water inundation requirements for dominant vegetation species	Water Budget Assessment Recommendations (Wood 2021)
OA0 Open Aquatic	W1A & W4 – Confirmed SWH for amphibian breeding habitat (woodland) See Figure 4a (Appendix A) W1A & W4 - Wetland Amphibian Breeding SWH and Turtle Overwintering SWH See Figure 4e (Appendix A)	NA (primarily open water)	Permanent standing water	W1A - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 3%-6% decrease in mean event volumes (average event) volumes between November and April. In May there is an 8% increase in mean event volumes (average event). Post-development, seasonal mean event volumes present under pre-development conditions for dominant species maintained. W4 – No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. To provide summer dry periods there is a 14%-25% decrease in mean event volumes (average event) volumes between November and March. In April there is an 8% decrease, while May has a 33% increase in mean event volumes. Post-development, seasonal mean event volumes present under pre-development conditions for dominant species maintained.	At condominium detailed design identify opportunities, through LIDs (e.g., roof drain collector system), for providing additional surface water inputs to support turtle overwintering. In 2017 and 2018 it was observed that OA0's in both W1A and W4 catchment went dry.
SWD1 Oak Mineral Deciduous Swamp	W1A, W1B, W3, EWC1, EWC2, EWC3, EWC4, EWC5, EWCLF – Confirmed SWH for amphibian breeding habitat (woodland) See Figure 4a	Bur Oak, Pin Oak	Bur Oak are relatively intolerant of flooding >2 weeks long during the growing season; Pin Oak requires intermittent flooding during the dormant season but is relatively intolerant of flooding during the growing season similar to Bur Oak	W1A - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 3%-6% decrease in mean event volumes (average event) volumes between November and April. In May there is an 8% increase in mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained. W1B- No change (0%) in seasonal (January thru December) mean event volumes (average event) post-development with mitigation. Seasonal mean event volumes for dominant species maintained. W3 – No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 13%-23% decrease in mean event volumes (average event) volumes between November and March. In April there is an 8% decrease in mean event volumes (average event). In May there is an 27% increase in mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained. EWC1 – No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. A 1% decrease in mean event volumes (average event) volumes between November and May. Post-development, seasonal mean event volumes for dominant species maintained. EWC-LF – No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 12%-23% decrease in mean event volumes (average event) volumes between November and March. In April there is an 7% decrease in mean event volumes (average event). In May there is an 29% increase in mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained.	Post-development pervious and impervious surface water will be treated through an oil-grit separator and pocket wetland. Pocket wetland that discharges to a level spreader is planned within buffer to distribute surface water volumes across length of wetland.

ELC code	Significant wildlife habitat identified for breeding amphibians?	Dominant canopy layer vegetation species	Water inundation requirements for dominant vegetation species	Water inundation requirements for dominant vegetation species	Water Budget Assessment Recommendations (Wood 2021)
SWD2-2 Green Ash Mineral Deciduous Swamp	W1C, W2, EWC1, EWC2 and EWCLF - Confirmed SWH for amphibian breeding habitat (woodland) See Figure 4a	Green Ash	Green Ash is common on land subject to flooding and can remain healthy when flooded for as much as 40% of the growing season	W1A - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 3%-6% decrease in mean event volumes (average event) volumes between November and April. In May there is an 8% increase in mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained. W1C - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Post-development there is a 2% increase in mean event volumes (average event) volumes between November and May. Post-development, seasonal mean event volumes for dominant species maintained. W2 - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 2%-13% decrease in mean event volumes (average event) volumes between November and March. In April there is a 1% increase with a 33% increase occurring in May mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained. C1 - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. A 1% decrease in mean event volumes (average event) volumes between November and May. Post-development, seasonal mean event volumes for dominant species maintained. EWC-LF - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 12%-23% decrease in mean event volumes (average event) volumes between November and March. In April there is a 7% decrease in mean event volumes (average event). In May there is a 29% increase in mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained.	Post-development pervious and impervious surface water will be treated through an oil-grit separator and pocket wetland. Pocket wetland that discharges to a level spreader is planned within buffer to distribute surface water volumes across length of wetland. Further assessment at detailed design is needed to determine if the Green Ash swamp within EWC-LF catchment is a tableland wetland (surface water fed) or a riparian wetland.
SWD4-1 WillowMineral Deciduous Swamp	W4 - Confirmed SWH for amphibian breeding habitat (woodland) See Figure 4a W3 & W6 - Candidate SWH for amphibian breeding habitat (woodland) See Figure 4a	Hybrid Crack Willow	This hybrid species is common on land subject to flooding (i.e. riversides, stream banks, pond sides); tolerant to inundation and can have a short dry season (~ 2 months)	W1B contributes surface water flow to W3. W1B- no change (0%) in seasonal mean event volumes (average event) post-development with mitigation. Short dry season expected to be maintained. Seasonal mean event volumes for dominant species maintained W3 - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. Summer dry periods are maintained post-development. To provide summer dry periods there is a 13%-23% decrease in mean event volumes (average event) volumes between November and March. In April there is an 8% decrease in mean event volumes (average event). In May there is an 27% increase in mean event volumes (average event). Post-development, seasonal mean event volumes for dominant species maintained. W4 - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. To provide summer dry periods there is a 14%-25% decrease in mean event volumes (average event) volumes between November and March. In April there is an 8% decrease, while May has a 33% increase in mean event volumes. Post-development, seasonal mean event volumes for dominant species maintained. W6 - no change (0%) in seasonal mean event volumes (average event) post-development with mitigation. Short dry season expected to be maintained. Seasonal mean event volumes for dominant Willow species maintained	Post-development pervious and impervious surface water will be treated through an oil-grit separator and pocket wetland. Pocket wetland that discharges to a level spreader is planned within buffer to distribute surface water volumes across length of wetland.
SWT2 Mineral Thicket Swamp	No (Figure 4a, Appendix A)	Common Buckthorn, Grey Dogwood, Nannyberry	Shallow inundation up to 5cm or water at surface level early April - late May, drawdown in summer, and moist (no inundation) September-November	W4 - No change (0%) in mean event volumes (average event) post-development with mitigation between June and October. To provide summer dry periods there is a 14%-25% decrease in mean event volumes (average event) volumes between November and March. In April there is an 8% decrease, while May has a 33% increase in mean event volumes. Post-development, seasonal mean event volumes for dominant species maintained. W5 - no change (0%) in seasonal mean event volumes (average event) post-development with mitigation. Seasonal inundation requirements for dominant species maintained.	Post-development pervious and impervious surface water will be treated through an oil-grit separator and pocket wetland. Pocket wetland that discharges to a level spreader is planned within buffer to distribute surface water volumes across length of wetland.

Table 2: Pre-development, Post-development and Percent Change in Average Event Potential Surface Runoff Volumes (m3)

Average Event Potential Surface Runoff Volume (m3)																
	Wetland Catchments	Primary ELC Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	
Pre. Dev.	W1_A	SWD1 + OAO	102	107	102	64	36	0	0	0	0	0	93	118	52	
Post-Dev.			95	100	96	63	39	8	8	8	10	7	90	110	53	
% Change			-6.07%	-6.07%	-5.71%	-1.68%	8.52%	0.00%	0.00%	0.00%	0.00%	0.00%	-3.02%	-6.07%	2.50%	
Pre. Dev.	W1_B	SWD1	221	232	221	139	78	0	0	0	0	0	202	256	112	
Post-Dev.			221	232	221	139	78	0	0	0	0	0	202	256	112	
% Change			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Pre. Dev.	W1_C	SWD2-2	88	92	88	55	31	0	0	0	0	0	80	102	45	
Post-Dev.			90	94	90	56	32	0	0	0	0	0	82	104	46	
% Change			2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	2%	2%	2%	
Pre. Dev.	W2	SWD2-2	231	243	231	145	81	0	0	0	0	0	211	267	118	
Post-Dev.			202	212	204	147	108	57	59	60	71	52	206	233	134	
% Change			-13%	-13%	-12%	1%	33%	0%	0%	0%	0%	0%	-2%	-13%	14%	
Pre. Dev.	W3	SWD4-1	637	670	638	401	224	0	0	0	0	0	582	738	324	
Post-Dev.			488	513	497	368	285	174	179	181	216	155	507	565	344	
% Change			-23%	-23%	-22%	-8%	27%	0%	0%	0%	0%	0%	-13%	-23%	6%	
Pre. Dev.	W4	SWD4-1 + OAO	1052	1105	1053	661	370	0	0	0	0	0	960	1218	535	
Post-Dev.			776	816	793	606	492	338	346	351	419	301	828	899	581	
% Change			-26%	-26%	-25%	-8%	33%	0%	0%	0%	0%	0%	-14%	-26%	9%	
Pre. Dev.	W5	CUT1/SWT2	329	346	329	207	116	0	0	0	0	0	300	381	167	
Post-Dev.			286	300	288	198	135	52	54	55	65	47	278	331	174	
% Change			-13%	-13%	-12%	-4%	16%	0%	0%	0%	0%	0%	-7%	-13%	4%	
Pre. Dev.	W6	SWD4-1	169	178	170	106	60	0	0	0	0	0	155	196	86	
Post-Dev.			148	155	148	94	54	4	4	4	4	4	140	171	78	
% Change			-13%	-13%	-13%	-11%	-9%	0%	0%	0%	0%	0%	-9%	-13%	-10%	
Pre. Dev.	EW1	SWD1 + SWD2-2	2972	3124	2977	1869	1047	0	0	0	0	0	2714	3442	1512	
Post-Dev.			2949	3100	2954	1855	1039	0	0	0	0	0	2693	3415	1500	
% Change			-1%	-1%	-1%	-1%	-1%	0%	0%	0%	0%	0%	-1%	-1%	-1%	
Pre. Dev.	EW1 LF	SWD2-2	42	44	42	26	15	0	0	0	0	0	38	49	21	
Post-Dev.			32	34	33	24	19	12	12	12	15	11	34	37	23	
% Change			-23%	-23%	-22%	-7%	29%	0%	0%	0%	0%	0%	-12%	-23%	8%	